ADDITIONAL NOTES ON LICHENS OF THE PRINCE OLAV COAST, ANTARCTICA

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Abstract: Four species of lichens are reported as new to the Prince Olav Coast, Antarctica. They are *Biatorella cerebriformis* (DODGE) FILS., *Caloplaca athallina* DARB., *Caloplaca citrina* (HOFFM.) TH. FR., and *Xanthoria parietina* (L.) BELTR. Of these, *X. parietina* is new to the antarctic flora. An unknown chemical substance is found in *Acarospora gwynii* DODGE & RUD., an endemic species in Antarctica.

In 1970, KASHIWADANI reported sixteen species and two varieties of lichens in the Prince Olav Coast. Recently NAKANISHI and KASHIWADANI (1976) reported, with some taxonomic notes, the occurrence of two species of *Physcia* from this area. Consequently, at present, eighteen species and two varieties of lichens are known to occur in the present area.

The results of recent collection and more critical examination of herbarium specimens, however, show that four species (*Biatorella cerebriformis, Caloplaca athallina, C. citrina,* and *Xanthoria parietina*) occur in the Prince Olav Coast. These four species are new to the Prince Olav Coast. Of them, *Xanthoria parietina* has never been reported before from Antarctica.

In studying lichens it is very important to examine the chemistry, but there are only a few recent data on the chemistry of antarctic lichens, especially on the crustose lichens, for example a paper by M. LAMB (1968). In the present paper, therefore, chemical data for five antarctic lichens will be reported.

I wish to express my sincere thanks to Dr. S. NAKANISHI, Kobe University, who offered me the opportunity to examine his collection.

1. ***Acarospora gwynii*** DODGE & RUD., Ann. Mo. Bot. Gard., **42**, 144, 1955.

In the previous paper, KASHIWADANI (1970) reported the common occurrence of this species in the Prince Olav Coast. *Acarospora gwynii* belongs to Subgenus *Xanthothallina* MAGN. (MAGNUSSON, 1956) and can be characterized by the yellowish thallus with cerebriform squamules, the immersed apothecia with brown discs, the asci with numerous spores, and the spores of 3–4 μ in length.

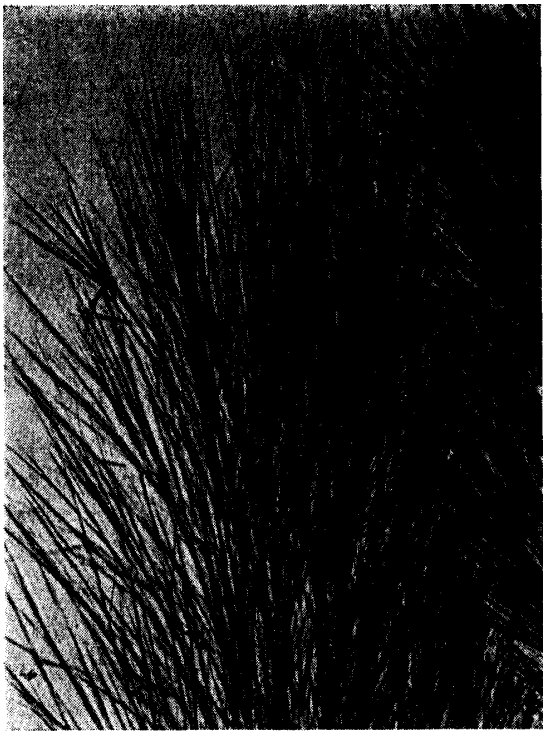

Fig. 1. Crystals of unknown substance of A. gwynii *recrystalized in GE, ×240.*

Although the thallus and the medulla of the present species do not show distinct color reaction with ordinary reagents, an unknown substance was detected by the microchemical and the thin layer chromatographic tests. By gentle heating of the acetone extract of thalli in GE, clusters of yellowish long needles were produced fairly rapidly (Fig. 1). This substance is demonstrated as a yellow spot at Rf 0.40 on chromatograms (developed with a mixture of hexane, ethyl ether, and formic acid=5: 4: 0.5), even without heating. Judging from the shape of crystals and the color of spots on chromatograms, this substance seems to belong to the pulvinic acid derivatives. It is noteworthy that *A. gwynii* produces this unknown substance and lacks rhizocarpic acid, which seems to be a constant component in species of the genus *Acarospora*, Subgenus *Xanthothallina* (FOLLMAN and HUNECK, 1971).

Specimens examined. Prince Olav Coast: Langhovde, H. KASHIWADANI 3930, 3931, 4034, 4035, 4037, 4044, 4045 (TNS), T. TATSUMI (Herb. Y. ASAHINA 36-a) (TNS), M. NAKANO s.n. (TNS).

Exsiccata examined. R. FILSON: Lich. Antarct. Exs. No. 1 (TNS).

2. ***Biatorella cerebriformis*** (DODGE) FILS., Muelleria, **3**, 149, 1975.

Biatorella cerebriformis is based on *Candellariella cerebriformis*, which was described from the Cape Denison, King George V Land by DODGE (1948). In 1975,

FILSON transferred the present species to the genus *Biatorella* because of the anatomical features of thalli and apothecia.

Although specimens from the present area are unfortunately sterile, they have sulphure-yellow thalli with cerebriform squamules, lacking asexual propagules, and they have white medulla (P−, K−, C−). The thalli are 1–4 mm thick and the medullary hyphae penetrate downwards into the substratum. The cortex and the upper part of medulla are paraplectenchymatous composed of hyphae having more or less inflated cell lumina, 4–6 μ in diameter. In addition, rhizocarpic acid was detected in this species by the microchemical and the thin layer chromatographic tests. These morphological and chemical features are also observed in a specimen determined by FILSON (Lich. Antarct. Exs. No. 4 in TNS).

Rhizocarpic acid has been reported in five species of *Acarospora*, Subgenus *Xanthothallina* (FOLLMAN and HUNECK, 1971), but never been reported in the genus *Biatorella*. The occurrence of rhizocarpic acid in this species indicates the close affinity of *B. cerebriformis* to certain species of *Acarospora*.

In external appearance, especially in the sterile specimens, this species resembles very much *Acarospora gwynii*, because they both have yellowish squamulous thallus and grow on rocks or on mosses located near the rookeries of birds. However, it can be clearly distinguished from the latter species by the presence of rhizocarpic acid and the lack of an unknown substance mentioned above.

Specimens examined. Prince Olav Coast: Yotuike Valley, Langhovde, S. NAKANISHI A-80 (TNS); Yatude Valley, Langhovde, S. NAKANISHI 45 (TNS); Langhovde, T. TATSUMI (Herb. Y. ASAHINA 36-b) (TNS); Cape Hinode, H. KASHIWADANI 4333, 4335, 4344 (TNS).

3. ***Caloplaca athallina*** DARB., Wiss. Ergeb. Schwed. Südpolar-Exped. 1901–1903, **4**, 9, 1912.

This species was collected from various localities in this area by Dr. S. NAKANISHI. According to him (in litt.) it usually grows on moss tufts near rookeries of birds. Specimens from the present area have dark brown thin thalli with clustered small apothecia of 0.2–0.3 mm in diameter. The discs of apothecia are pruinose with orange yellow pruina which show K+ purple reaction. Although the type specimen and original description have not been available for this study, our specimens agree well with a specimen of *C. athallina* determined by FILSON (R. FILSON, Lich. Antarct. Exs. No. 8 in TNS).

Specimens examined. Prince Olav Coast: Yatude Valley, Langhovde, S. NAKANISHI 86 (TNS); Yotuike Valley, Langhovde, S. NAKANISHI A-90 (TNS); Akarui Point, S. NAKANISHI E-69 (TNS).

4. ***Caloplaca citrina*** (HOFFM.) TH. FR., Nova Acta Regiae Soc. Sci. Ups., Ser. 3, **3**, 218, 1861.

This species was collected only at one locality of Cape Hinode in the present

area, where it grows on moss tufts. The thalli are up to 4 cm in diameter and are tightly attached to the substratum. The squamules are sorediate with marginal soralia and are various in shape, 0.5–1 mm in size. The thalli are distinctly orange yellow (K+ purple), containing parietin.

This species may be confused with *Caloplaca elegans*, a common lichen in this area, because these two species have similar thalli and habit. However, it can be clearly distinguished from the latter species by the presence of soralia and by the absence of lower cortex.

Specimen examined. Prince Olav Coast: Cape Hinode, H. KASHIWADANI 4319 (TNS).

5. ***Xanthoria parietina*** (L.) BELTR., Lich. Bassan., 102. 1858.

Even though *Xanthoria parietina* is one of the well known species of *Xanthoria*, being widely distributed in the world, it has never been reported from the Antarctic Continent. Among the large lichen collection of the late Dr. Y. ASAHINA, however, the author recently found two specimens of the present species collected in the Antarctic. The specimens were collected at the Ongul Islands by Dr. T. TATSUMI, a member of the 1st Japanese Antarctic Research Expedition.

In the specimens, the thalli form yellowish orange rosettes about 1.5–2 cm in diameter and have many apothecia (Fig. 2); the lobes are more or less imbricate and are 1–2 mm wide; the lower surface is pale yellow and is sparsely short-rhizinate. The thalli are 150–200 μ thick; the upper and lower cortices are paraplectenchymatous; the medulla are composed of loosely interwoven hyphae, which often forms thick strands. The apothecia are rather small, up to 0.5 mm in diameter; spores

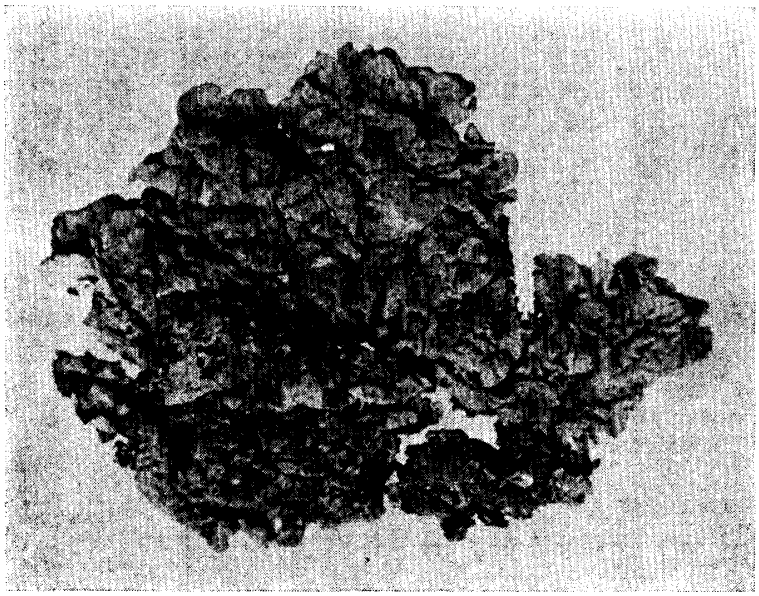

Fig. 2. Xanthoria parietina *with small apothecia* (*Y. ASAHINA 30*), ×*4.8*.

are 6–7.5×10–13 μ in size. As the chemical substance parietin was detected in the present specimens. These features agree very well with those of *X. parietina* collected in Japan and Europe.

Specimens examined. Prince Olav Coast: West Ongul Island, T. TATSUMI s.n. (Herb. Y. ASAHINA 30) (TNS); East Ongul Island, T. TATSUMI s.n. (Herb. Y. ASAHINA 30-b) (TNS).

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