Caloplaca tornoënsis new to Finland

INKA KUUSISTO and SAANA MATTANEN

Kuusisto, I. & Mattanen, S. 2022. *Caloplaca tornoënsis* new to Finland. *Graphis Scripta* **34** (6): 54–58. Oslo. ISSN 2002-4495.

Caloplaca tornoënsis is reported from Finland for the first time. Specimens were collected from five locations of NW Finland and from one location of NE Finland. Collections were made from snowbeds on bryophytes using transect plot-based sampling method. *C. tornoënsis* has a circumpolar distribution and it is probably overlooked, although a rare species in Finland. The species should be looked for in late melting areas of mountains of northernmost Finland.

Inka Kuusisto, Herbarium (TUR) and Kevo Subarctic Research Station, Biodiversity Unit, University of Turku, Finland. E-mail: ihmkuu@utu.fi (corresponding author).
Saana Mattanen, Department of Biology, University of Oulu, Finland. E-mail: Saana.Mattanen@student.oulu.fi

Introduction

Caloplaca tornoënsis (recently suggested to be reallocated to *Lendemeriella* by Kondratyuk et al. 2020) was described from Sweden growing on dying mosses (Magnusson 1944). *C. tornoënsis* has a circumpolar distribution, and it is found across arctic areas i.e. in Russia, Norway, Sweden, Greenland, Iceland, Svalbard, Canada and Alaska (Kristinsson et al. 2006, Søchting 1992, Søchting & Olech 1995, Spribille et al. 2020, Westberg et al. 2021). It is also known from Austria and in the southern hemisphere from New Zealand and Chile (Etayo et al. 2021, GBIF 2022). Typically, it grows on saxicolous mosses (*Andreaea* and *Grimmia* spp.) in snowbeds, brook sides or boulders on mountains (Hansen et al. 1987, GBIF 2022, Søchting 1992, Søchting et al. 2008, Søchting & Zhurbenko 1993, Westberg et al. 2021). From Greenland the species has been reported from dead plants (especially from twigs) and litter but also once from driftwood and old bone, and from Chile species has been reported from bryophytes on soil (Daniëls et al. 1985, Etayo et al. 2021, Hansen 2014, Hansen 2015). We report the species from five locations of NW Finland and from one location of NE Finland (Fig. 1). All collections were made from snowbeds on ground dwelling bryophytes.

Material and Methods

Field work was conducted in the summer 2021 as a part of the project "National monitoring of snowbed species and habitats for their improved red list assessment" funded by Finnish Ministry of the Environment within a PUTTE 2 research program. Vegetation of sixty snowbeds were studied using 15−50 m long transect with eight 0.8 × 0.8 m plots per transect (480 studied plots). Transects were placed from snowbed to tundra heath. Ground dwelling and bryophilous vascular plants, bryophytes and lichens were listed with coverage values from each plot and specimens of bryophytes and lichens were collected for identification. Specimens were studied in the laboratory using a dissecting microscope and an Olympus BX53 microscope. The studied snowbeds were located in

Published 2022-10-25 by The Nordic Lichen Society, http://nhm2.uio.no/lichens/NLS.

Figure 1. Localities of *Caloplaca tornoënsis* in Finland.

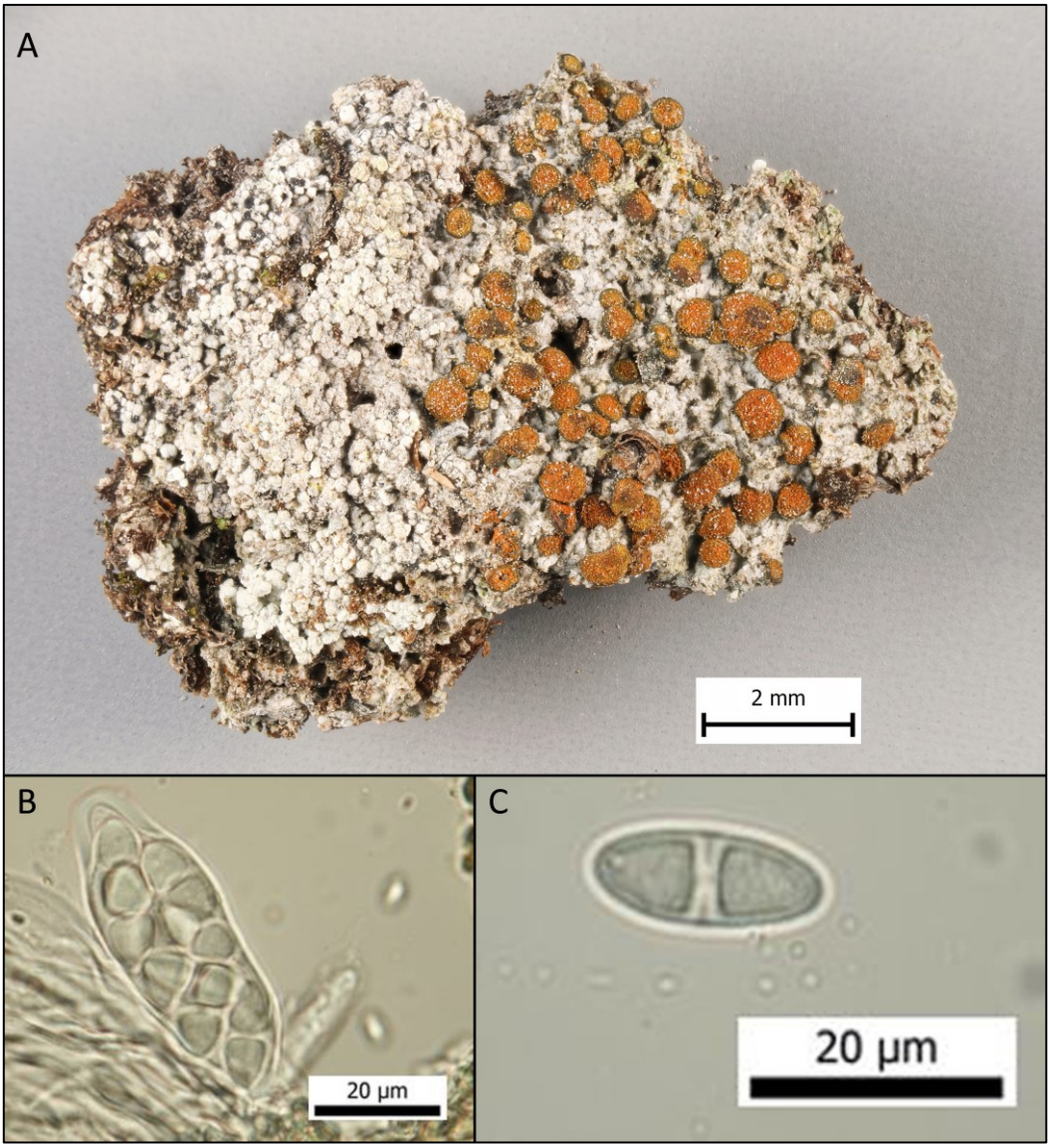
Enontekiö, Utsjoki and Pallas-Ounastunturi area, in northernmost Finland. *Caloplaca tornoënsis* specimens are deposited in the Turku University Herbarium (TUR).

The Species

Caloplaca tornoënsis H. Magn.

Description of the Finnish specimens: Thallus thin, whitish. Apothecia 0.2–0.6 mm diameter, biatorine with algal layer at the base of excipulum. Disk brownish orange to pure orange, K+ purplish, margin dark grey. Hymenium hyaline, *c.* 80 µm high. Hypothecium *c*. 90 µm high, hyaline. Asci 40–50 × 20 µm. Ascospores 8 per ascus, hyaline, ellipsoid, 15–20 × 6–8 µm with distinct, 1−2 µm thick septum (Fig. 2A, B & C).

Ecology and distribution in Finland: The species was growing on bryophytes in late melting bryophyte-dominated snowbeds (Fig. 3).The occurrence of the species was restricted to snowbeds along snowbed−heath transects. Mostly the species was growing on liverworts (i.e. on *Fuscocephaloziopsis albescens*, *Gymnomitrion brevissimum*, *G. concinnatum*, *Lophozia* sp., *Marsupella apiculata* and *M. condensata*) on mineral soil, but in one case it grew on the moss *Andreaea blyttii*, in which case both the moss and *C. tornoënsis* on it were growing both on rock and on the ground.



Figur 2. *Caloplaca tornoënsis*. **A**. On snowbed bryophytes. **B**. Ascus. **C.** Ascospore.

Caloplaca tornoënsis was found on five locations in NW Finland and on one location in NE Finland. On two sites it occurred in two plots, on four sites in one plot. Hence the species occurred totally on six sites, on eight plots. Specimens were collected from altitudes ranging from 380 to 960 m but the species occurrence was concentrated to high altitudes (700−960 m). The lowest occurrence was in Utsjoki, NE Finland, where mountains are typically low. The species was not found from the Pallas-Ounastunturi area which is the southernmost area of the studied areas.

Figur 3. Late melting bryophyte-dominated snowbed in Enontekiö, NW Finland.

Specimens examined: **Finland.** *Inari Lapland*: Utsjoki, Nuvvus, Áilegas, on *Andreaea blyttii* in bryophyte-dominated snowbed, 69.8129°N, 26.3079°E, alt. 380 m, 22 July 2021, coll. Kuusisto & Mattanen, det. Kuusisto, Mattanen & Pykälä (TUR 76553); *Enontekiö Lapland*: Käsivarsi wilderness area, Bihčosnjunni, on *Gymnomitrion concinnatum* and *Marsupella apiculata* in bryophyte-dominated snowbed, 69.2168°N, 21.2448°E, alt. 960 m, 12 August 2021, coll. Johanson & Mattanen, det. Kuusisto, Mattanen & Pykälä (TUR 76687); Malla strict nature reserve, Iso-Malla, on *Fuscocephaloziopsis albescens* in bryophyte-dominated snowbed, 69.0749°N, 20.6939°E, alt 710 m, 4 August 2021, coll. Huttunen et al., det. Kuusisto & Mattanen (TUR 76688); Malla strict nature reserve, Iso-Malla, on *Gymnomitrion brevissimum* in bryophyte-dominated snowbed, 69.0734°N, 20.6626°E, alt. 840 m, 29 July 2021, coll. Huttunen et al., det. Kuusisto & Mattanen (TUR 76689); Kilpisjärvi, Iso-Jehkas, on *Lophozia* sp. in bryophyte-dominated snowbed, 69.0595°N, 20.9152°E, alt. 840 m, 4 August 2021, coll. Kuusisto, Leskinen & Mattanen, det. Kuusisto, Mattanen & Pykälä (TUR 76690); Käsivarsi wilderness area, Guonjarvárri, on *Marsupella condensata* and *Lophozia* sp. in bryophyte-dominated snowbed, 69.0938°N, 21.1214°E, alt. 900 m, 24 August 2021, coll. Kuusisto, det Kuusisto, Mattanen & Pykälä (TUR 76691), duplicate in OULU.

Discussion

In the field *Caloplaca tornoënsis* can be misidentified as *C. nivalis* (Körb.) Th. Fr. with which it shares ecology. However, *C. nivalis* has larger, one-celled spores without septum and thus these two species are easily distinguished under microscope. *C. tornoënsis* occurs typically on saxicolous

mosses, but it is also found on other substrates (Etayo et al. 2021, GBIF 2022, Hansen et al. 1987, Søchting et al. 2008, Søchting & Zhurbenko 1993, Westberg et al. 2021). We did not examine saxicolous species and thus *C. tornoënsis* can have a wider distribution also among the studied snowbeds. In addition, *C. tornoënsis* grows typically in small patches, which increases the likelihood of it occurring exclusively outside the studied plots and hence to be missed in our sampling method. *C. tornoënsis* is probably overlooked, although rare in Finland; it should be looked for in late melting areas of mountains of northernmost Finland, both on saxicolous and ground dwelling bryophytes.

Acknowledgements: We warmly thank Juha Pykälä from Finnish Environment Institute for checking the specimens and for reviewing and commenting the manuscript. Kari Kaunisto from University of Turku is thanked for the dissection microscope photo (Fig. 2A). We also wish to thank Sanna Huttunen (Univ. Turku), Nicolina Johansson (Univ .Oulu), Antti Kotilainen, Sanna Laaka-Lindberg (Luomus), Suvi Leskinen (Univ. Helsinki), and Kati Pihlaja (Univ. Turku) for participating in field works and Risto Virtanen (Univ. Oulu) for help with planning the field works. Saku Anttila and Sari Metsämäki from Finnish Environment Institute produced the snow melt maps which we used as guides for selecting the study sites. The study was funded by Finnish Ministry of the Environment as a part of PUTTE 2 research program.

References

Daniëls, F.J.A., Hansen, E.S. & Sipman, H.J.M. 1985. New records of terricolous microlichens from Southeast Greenland. *Acta Botanica Neerlandica* **34**: 49–57.

Etayo, J., Sancho, L.G., Gómez-Bolea, A., Søchting, U., Aguirre, F., & Rozzi, R. 2021. Catalogue of lichens (and some related fungi) of Navarino Island, Cape Horn Biosphere Reserve, Chile. *Anales del Instituto de la Patagonia* **49**: 1–110.

GBIF 2022. Global Biodiversity Information Facility. *Caloplaca tornoënsis* H. Magn. https://www.gbif.org/species/4281404. Accessed 2022-05-11.

Hansen, E.S. 2014. Contribution to the lichen flora of South East Greenland. I. the Kangerlussuaq Area. *Botanica Lithuanica* **20**: 153–158.

Hansen, E.S. 2015. Contribution to the lichen flora of South East Greenland. III. The coastal area between 63° and 65° N. *Botanica Lithuanica* **21**: 119–124.

Hansen, E.S., Poelt, J., Søchting, U. 1987. Die Flechtengattung *Caloplaca* in Grönland. *Meddelelser om Grønland, Bioscience* **25**: 1–53.

Kondratyuk, S.Y., Lökös, L., Farkas, E., Kärnefelt, I., Thell, A., Yamamoto, Y., & Hur, J.S. 2020. Three new genera of the Teloschistaceae proved by three gene phylogeny. *Acta Botanica Hungarica* **62***:* 109–136.

Kristinsson, H., Hansen, E.S., & Zhurbenko, M. 2006. Panarctic lichen checklist. CAFF -Flora Group.

Magnusson, A.H. 1944. Studies in the ferruginea-group of the genus *Caloplaca*. *Kungliga Vetenskaps- och Vitterhets-Samhälles Handlingar* **3**: 1–69.

Søchting, U. 1992. On the identity and distribution of some Nordic *Caloplaca* species. *Graphis Scripta* **4**: 91–92.

Søchting, U. & Olech, M. 1995. The lichen genus *Caloplaca* in polar regions. *The Lichenologist* **27**: 463–471.

Søchting, U., Lorentsen, L.B. & Arup, U. 2008. The lichen genus *Caloplaca* (Ascomycota, Lecanoromycetes) on Svalbard. Notes and additions. *Nova Hedwigia* **87**: 69–96.

Søchting, U. & Zhurbenko, M. 1993. *Caloplaca tornoënsis* and *Caloplaca spitsbergensis* (Lichenes), the two lichen species from the Taimyr Peninsula new to Russia. *Botanicheskii Zhurnal* **78**: 118–120.

Spribille, T., Fryday, A.M., Pérez-Ortega, S., Svensson, M., Tønsberg, T., Ekman, S., Holien, H., Resl, P., Schneider, K., Stabentheiner, E., Thüs, H., Vondrák, J. & Sharman, L. 2020. Lichens and associated fungi from Glacier Bay National Park, Alaska. *The Lichenologist* **52**: 61–181.

Westberg, M., Moberg, R., Myrdal, M., Nordin, A. & Ekman, S. 2021. *Santesson's Checklist of Fennoscandian Lichen-Forming and Lichenicolous Fungi*. Museum of Evolution, Uppsala University, 938 pp.