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The lichen flora of the Jørgen Brønlund fjord area, northern Greenland

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Abstract: Based on extensive lichen collecting in the Jørgen Brønlund fjord area in Peary Land, 82°N, 86 species and 2 varieties are reported. Range extensions are given for 45 taxa. An account of the epigeic and epilithic lichen vegetation and of the lichens growing on particular substrates is provided. Information is also given about climate, topography and geology of the investigation area.

Introduction

Although a number of botanists have visited northern Greenland, published studies of the lichen flora of this remote area are very few. During the first (1912) and the second (1916-18) Thule expeditions P. FREUCHEN and T. WULFF, respectively, collected lichens in Greenland north of 82°N. The collections of WULFF, comprising 64 lichen taxa, were determined and published by LYNGE (1923).

K. HOLMEN collected c. 300 lichen specimens in the period 1947-50 during the first Peary Land expedition. In his material about 60 species are represented. They were determined by the present author and listed together with 60 additional species so far known from northern Greenland (ANDERSEN & DIETZ 1984). The list includes a few additional collections made by B. FRISTRUP, P. JOHNSEN, E. KNUTH, J. TROELSEN and a few others. Included are also 18 lichen taxa collected during the Joint Services Expedition to northern Peary Land in 1969 and identified by P. W. JAMES (GRIFFIN 1972).

Since then, G. MOGENSEN, C. BAY, B. FREDSKILD, P. MØLGAARD and the present author have brought home smaller and larger collections of lichens from northern Greenland. MØLGAARD, *e. g.* collected 45 species in Kronprins Christian Land. The author spent two months, June and July 1988, around Jørgen Brønlund fjord in southern Peary Land, with the two stations, Kap Moltke (82°09'N, 29°53'W) and Brønlundhus (82°10'N, 30°29'W) as the main locali-

ties. He collected 840 specimens belonging to about 90 species. The collected material is deposited at the Botanical Museum, University of Copenhagen.

Topography, geology, soil and climate

Jørgen Brønlund fjord is located in the southern part of Peary Land, which again is part of the Greenland National Park, the world's largest!, in northern and eastern Greenland (Fig. 1). The fjord is ice-free from late July to September. It debouches into the always ice-covered Independence fjord. The bedrock in the Jørgen Brønlund fjord area is composed of Proterozoic to Ordovician sediments, mainly carbonates (dolomite) and sandstones (JEPSEN 1971). The most conspicuous feature of the landscape are two mountain plateaus, Buen and Pyramideplateau, which rise to an altitude of about 700 m a. s. l. Two valleys dissect the plateaus, viz. the east-west Wandel dal at the head of Jørgen Brønlund fjord and the north-south Børglum elv valley. The terrain rises gently on the south side of Jørgen Brønlund fjord, and very steeply on the north side. In the area between Pyramideplateau and the fjord there are a number of marine terraces and hills and a low lying plain rich in mussel shells. The top of the terraces and hills is usually covered by stones of different geological origin.

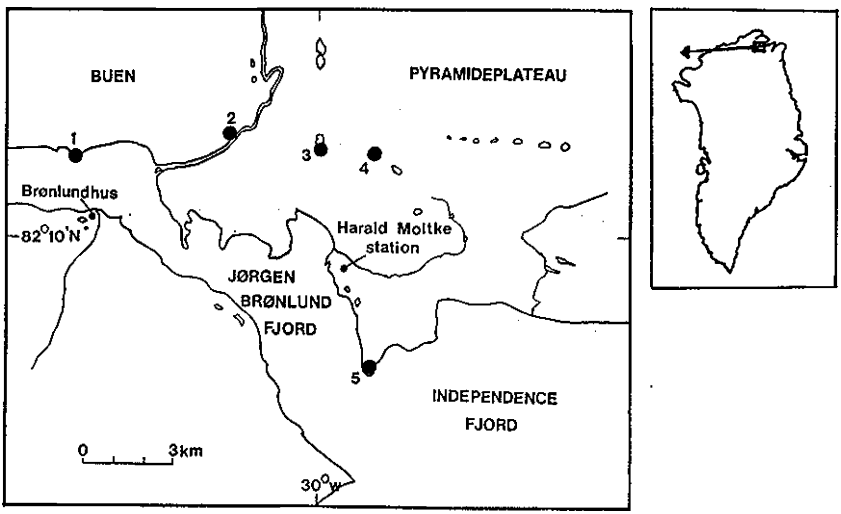

Fig. 1. The Jørgen Brønlund fjord area showing five important collection sites. 1. Pileodde; 2. Børglum elv near Buen; 3. & 4. sites just south and southwest of Pyramideplateau; 5. Kap Harald Moltke, the southernmost point of Trehøje Halvø (= peninsula). Okseslette is situated just south of Brønlundhus. The small map to the right shows the location of the Jørgen Brønlund fjord area in Greenland.

Tundra-like polygon-soil with a rich lichen vegetation occurs commonly in protected places around the fjord. The low lying plain is extremely wind-exposed, and in this true polar desert the clayey soil has distinct desiccation cracks and salt precipitates. Sandy soil is found in several places near Børglum elv. Lichens generally avoid the two last-mentioned types of soil. In all parts of the area the soil is calcareous with pH-values between 6 and 8 (HOLMEN 1957).

The Jørgen Brønlund fjord area has a high arctic, continental climate according to data available from the Meteorological Station of Denmark and data from local weather stations. The average temperature is above 0°C in June, July and August only. 40-60 days are without frost. The mean temperature of July is about 5°C, while the mean temperature of the coldest months often reaches below -30°C. The lowest temperature measured in the area is -45.5°C. The annual number of hours with sunshine is about 2000. The annual precipitation is extremely low, 20-80 mm only (HANSEN 1993a). Most of it falls as snow, which accumulates on the leeward east-facing slopes of hills. A continuous layer of permafrost is present. The area experiences comparatively warm and strong (10-40 m/s) west winds and somewhat colder and weaker (1-5 m/s) east winds. Snow and sand drifting occurs occasionally.

List of lichens

The following list of lichens is based on the author's collections. The lichens are arranged alphabetically. Nomenclature follows SANTESSON (1993). An asterisk in front of the name indicates that the taxon is an addition to the known lichen flora of northern Greenland north of 80°N. Numbers of selected representative specimens are quoted.

**Acarospora molybdina* (Wahlenb.) A.Massal. - 88343; 88496.
**Arthonia molendoi* (Heufl. ex Frauenf.) R.Sant. - 88623.
Arthrorhaphis citrinella (Ach.) Poelt - 88112; 88541.
Aspicilia contorta (Hoffm.) Kremp. - 88758.
**Bryonora pruinosa* (Th.Fr.) Holt.-Hartw. - 88325.
**Buellia epipolia* (Ach.) Mong. coll. - 88623.
**Caloplaca alcarum* Poelt - 88013; 88066.
**C. castellana* (Räsänen) Poelt - 88067; 88694.
**C. celata* Th.Fr. - 88326a.
C. cerina (Ehrh. ex Hedw.) Th.Fr. - 88885.
**C. holocarpa* (Hoffm. ex Ach.) A.E.Wade - 88459; 88651.
**C. saxicola* (Hoffm.) Nordin - 88070; 88341.
**C. saxifragarum* Poelt - 88123.
C. tiroliensis Zahlbr. - 88326.
**C. tominii* Savicz - Lich. Groenl. Exs. 338; 88638.
Candelariella aurella (Hoffm.) Zahlbr. - 88748.
C. vitellina (Hoffm.) Müll.Arg. - 88049.
**Catapyrenium daedaleum* (Kremp.) Stein - 88108.

C. squamulosum (Ach.) Breuss - 88107; 88820.
Cladonia pocillum (Ach.) Grognot - 88717.
Collema substellatum H.Magn. - 88147; 88831.
C. undulatum Laurer ex Flot. var. *granulosum* Degel. - 88407.
Dacampia hookeri (Borrer) A.Massal. - 88742.
Dermatocarpon miniatum (L.) W.Mann - 88225; 88550.
Dimelaena oreina (Ach.) Norman - 88752; 88783.
Diploschistes muscorum (Scop.) R.Sant. - 88516; 88827.
Endocarpon pusillum Hedw. coll. - 88515; 88598.
Fulgensia bracteata (Hoffm.) Räsänen - Lich. Groenl. Exs. 336; 88100.
F. desertorum (Tomin) Poelt - 88149; 88581.
Glypholecia scabra (Pers.) Müll.Arg. - 88244; 88789.
Gypsoplaca macrophylla (Zahlbr.) Timdal - 88461.
Ionaspis odora (Ach.) Stein - 88208; 88766.
Lecanora contractula Nyl. - 88029; 88066.
L. epibryon (Ach.) Ach. - Lich. Groenl. Exs. 332; 88390.
L. hagenii (Ach.) Ach. var. *saxifragae* Anzi - 88203; 88210.
L. marginata (Schaer.) Hertel & Rambold - Lich. Groenl. Exs. 339; 88038.
L. polytropa (Ehrh. ex Hoffm.) Rabenh. - 88806.
Lecidea atrobrunnea (Ramond ex Lam. & DC.) Schaer. - 88818.
L. auriculata Th.Fr. - 88380.
Lecidella euphorea (Flörke) Hertel - 88754.
L. stigmatea (Ach.) Hertel & Leuckert - 88768.
Leproloma vouauxii (Hue) J.R.Laundon - 88469; 88563.
Leptogium gelatinosum (With.) J.R.Laundon - 88684.
Melanelia infumata (Nyl.) Essl. - 88366.
Ochrolechia frigida (Sw.) Lynge - 88497.
Pannaria praetermissa Nyl. - 88318.
Peltigera rufescens (Weiss) Humb. - Lich. Groenl. Exs. 335; 88830.
Phaeophyscia kairamoi (Vain.) Moberg - 88600.
P. sciastra (Ach.) Moberg - 88315; 88365.
Phaeorrhiza nimbosa (Fr.) H.Mayrhofer & Poelt - 88105; 88238.
Phylliscum demangeonii (Moug. & Mont.) Nyl. - 88546; 88591.
Physcia caesia (Hoffm.) Fürnr. - 88422.
P. dubia (Hoffm.) Lettau - 88663.
Physconia muscigena (Ach.) Poelt - Lich. Groenl. Exc. 331; 88302.
Placynthium asperellum (Ach.) Trevis. - 88092; 88311.
Polyblastia bryophila Lönnr. - 88237; 88724.
P. sendtneri Kremp. - 88294; 88332.
Polysporina lapponica (Ach. ex Schaer.) Degel. - 88042.
P. simplex (Davies) Vězda - 88186; 88568.
Porpidia melinodes (Koerb.) Gowan & Ahti - 88668.
Protoblastenia terricola (Anzi) Lynge - 88864
Psora decipiens (Hedw.) Hoffm. - 88321; 88572.
P. vallesiaca (Schaer.) Timdal - Lich. Groenl. Exs. 337; 88322.

**Rhizocarpon atroflavescens* Lynge - Lich. Groenl. Exs. 334; 88380.
**R. disporum* (Nägeli ex Hepp) Müll.Arg. - 88087; 88133.
R. geminatum Koerb. - 88072; 88666.
**R. norvegicum* Räsänen - 88753.
R. pusillum Runemark - 88069; 88130.
R. superficiale (Schaer.) Vain. - 88093.
Rhizoplaca melanophthalma (DC.) Leuckert & Poelt - 88500; 88805.
**Rinodina calcigena* (Th.Fr.) Lynge - 88017; 88510.
**R. endophragmia* I.M.Lamb - 88054; 88637.
R. mniaraea (Ach.) Koerb. - 88480; 88574.
R. turfacea (Wahlenb.) Koerb. - 88680.
Solorina bispora Nyl. - 88287.
**S. saccata* (L.) Ach. - 88771.
Sporastatia testudinea (Ach.) A.Massal. - Lich. Groenl. Exs. 333; 88075.
**Teloschistes contortuplicatus* (Ach.) Clauzade & Rondon - 88034; 88730.
Toninia arctica Timdal - 88104; 88773.
T. sedifolia (Scop.) Timdal - Lich. Groenl. Exs. 329; 88829.
Tremolecia atrata (Ach.) Hertel - 88807.
Umbilicaria decussata (Vill.) Zahlbr. - 88787; 88810.
**U. krascheninnikovii* (Savicz) Zahlbr. - 88678; 88786.
U. lyngei Schol. - 88679.
U. virginis Schaer. - 88285; 88788.
**Xanthoria borealis* R.Sant. & Poelt - 88340; 88440.
X. elegans (Link) Th.Fr. - Lich. Groenl. Exs. 330; 88841.
**X. sorediata* (Vain.) Poelt - 88266; 88549.

It was not possible to include a number of undetermined specimens of *Aspicilia* with unknown affinity in the above list. The number of lichen species occurring in the Jørgen Brønlund fjord area is still comparatively low, and many of these lichens have a very scattered occurrence in this area. Some, for example, *Collema substellatum*, *Gypsoplaca macrophylla* and *Teloschistes contortuplicatus*, are very rare in the whole arctic region. There is, however, a concentration of sites with microhabitats suitable for lichens in some places around the fjord. The most important vegetation types for lichens are described in detail below.

Vegetation types

A. Epigeic vegetation

1. Polar desert and steppe

Extensive areas around Jørgen Brønlund fjord can best be characterized as polar desert. In extreme cases no plants are found except small thalli of *Candelariella* and a few additional microlichens occurring on a thin layer of soil in cracks on scattered wind-eroded stones.

A rather well-developed steppe vegetation occurs in more protected, south-exposed places just south of Pyramideplateau and Buen and at Okseslette. This vegetation colonizes sandy and silty soil with low contents of organic material and with a neutral to slightly basic reaction. Musk oxen manure the vegetation moderately. *Carex nardina*, *Melandrium triflorum* and *Papaver radicatum* are the most important phanerogams. *Caloplaca tominii*, *Catapyrenium squamulosum*, *Diploschistes muscorum*, *Endocarpon pusillum*, *Fulgensia desertorum*, *F. bracteata*, *Gypsoplaca macrophylla*, *Phaeorrhiza nimbosa*, *Psora vallesiaca*, *Toninia arctica*, *T. sedifolia*, *Collema substellatum*, *C. undulatum* var. *granulosum* and *Teloschistes contortuplicatus* are the most typical lichens in this steppe community (TIMDAL 1990, 1991; HANSEN 1993a). Most of these lichens are to some extent able to bind and stabilize the sandy substrate.

The floristic constitution shows some similarity to the community previously described from south-exposed loess slopes near the airport at Kangerlussuaq (Søndre Strømfjord, 67°01'N, 50°42'W) in West Greenland (HANSEN 1986), but the high arctic steppe is much poorer in phanerogams than the more southern one (BÖCHER 1954). The genus *Catapyrenium* is represented by at least three species, viz. *C. lachneum*, *C. michelii* and *C. squamulosum*, at Kangerlussuaq, while two species, viz. *C. daedaleum* and *C. squamulosum*, were found in Peary Land. *Catapyrenium lachneum* is previously known from northernmost Greenland (BREUSS & HANSEN 1988). *Acarospora schleicheri*, which is common at Kangerlussuaq, has so far not been reported from Peary Land.

With the exception of a few taxa, for example the two above-mentioned taxa of *Collema*, macrolichens are very rare in the polar desert and steppe. This is a distinct difference with more southern steppe and steppe-like areas in western and eastern Greenland, where macrolichens such as *Cetraria muricata*, *C. nivalis* and *Thamnolia vermicularis* are of great importance (BÖCHER 1954; HANSEN 1978). Near Qasigiannguit (68°49'N, 51°12'W) the present author recently studied some south-exposed steppe-like slopes with mineral soil derived from alkaline rocks. *Carex rupestris* and *Kobresia myosuroides* are the most important phanerogams on these slopes, which have species such as *Caloplaca tominii*, *Catapyrenium lachneum*, *Diploschistes muscorum* and *Collema undulatum* var. *granulosum* in common with the high arctic steppe. In addition they hold species such as *Acarospora rhizobola*, *Caloplaca jungermanniae*, *Ochrolechia upsaliensis*, *Peltigera lepidophora* and *Phaeophyscia constipata*.

2. Dwarf shrub heath and snowbed

Dwarf shrub heaths rich in lichens are a prominent feature of the vegetation occurring on sloping ground in the Jørgen Brønlund fjord area. This type of vegetation is best developed on east and southeast-exposed slopes with snow drift in the hilly areas south of Pyramideplateau and Brønlundhus, respectively. These heath patches have a distinct polygonal structure. The polygons measure 30-40 cm in diameter. The height of the tussocks varies from 5 to 15 cm. The humus and water contents of the polygon soil are generally higher than those of

the steppe soil, but the top of the tussocks is dryer than their lower part. Musk oxen feed on the vegetation, especially *Salix arctica*, and manure it to some extent. The vegetation shows a distinct zonation pattern, which in the following is illustrated by examples from the above-mentioned slopes and hills:

South of Pyramideplateau the top of the tussocks support a community composed predominantly of *Dryas octopetala, Saxifraga oppositifolia, Salix arctica, Lesquerella arctica, Carex nardina* and *C. misandra*. In some places these plants grow so densely upon the top surface of the tussocks that no lichens (apart from those growing on dead plant fragments) are able to colonize it. A number of lichens, for example, *Peltigera rufescens, Physconia muscigena, Solorina bispora, S. saccata, Lecanora epibryon* and *Toninia sedifolia*, occupy, however, the open areas between the phanerogams in places with more unfavourable growth conditions for higher plants.

Fulgensia bracteata and *F. desertorum* occur occasionally, only, on the top surface, but these two species appear to be very common on the sides of the polygons. The thalli of the species of *Fulgensia* often grow upon a layer of *Nostoc*-algae, which either continues into the cracks separating the polygons or is gradually replaced by different species of mosses. The edges of the more dry and flat polygons are sometimes colonized by *Psora decipiens*.

Semi-moist to moist polygon-soil is found near snowbeds and in depressions in the heath patches. The moist polygon tussocks are characterized by a more abundant occurrence of the two *Fulgensia* species, *Nostoc*-algae and mosses, and *Leproloma vouauxii* is of great importance, too. Near Pyramideplateau this community continues into a wetland vegetation including *Carex stans, Eriophorum scheuchzeri, Ranunculus sulphureus* and *Melandrium apetalum*. At Kap Harald Moltke *Caloplaca tominii, Lecanora epibryon, Psora vallesiaca* (dominant!) and *Solorina bispora* occur along the border of a snowbed situated on an east exposed slope, indicating that there is no sharp limit between the above-mentioned plant communities.

B. Lichens growing on dead plant fragments, old bones, animal droppings and pellets

Many arctic lichens have a relatively low substrate specificity (BRODO 1973). Thus species such as *Lecanora epibryon, Phaeorrhiza nimbosa* and *Physconia muscigena*, are able to grow both on mosses and soil. A few species belonging to the genera *Caloplaca, Candelariella, Lecanora* and *Rinodina* occur rather frequently on dead tufts of *Saxifraga oppositifolia* and *Dryas octopetala* in the Jørgen Brønlund fjord area (Tab. 1). *Physconia muscigena* is more rarely found growing upon these substrates. Dead branches of *Salix arctica* are also colonized by these lichens. An unidentified species of *Lecanora* grows on fragments of driftwood originating from Siberian pine. Such fragments occur scattered in the area, for example, on Trehøje Halvø.

Tab. 1. Particular substrates with lichens growing upon them

Substrate	Lichen species
Dead tufts of *Saxifraga oppositifolia* and *Dryas octopetala* and decaying branches of *Salix arctica*	*Caloplaca celata, C. cerina, C. saxifragarum, C. tiroliensis, C. tominii, Candelariella vitellina, Lecanora epibryon, Physconia muscigena, Rinodina turfacea*
Driftwood	*Lecanora* spec. (unknown affinity)
Old bones of musk ox	*Caloplaca alcarum, C. cerina, C. holocarpa, C. tiroliensis, Candelariella aurella, Lecanora contractula, L.* spec., (close to *L. dispersa*?), *Physcia dubia, Xanthoria elegans*
Old droppings of musk ox and mountain hare	*Caloplaca cerina, C. tiroliensis, C. tominii, Candelariella vitellina, Physconia muscigena, Rinodina turfacea*
Pellet impregnated by clayey dust	*Candelariella vitellina, Lecanora epibryon*

Different animal remains such as old bones and droppings also represent suitable substrates for more or less eutrophic lichen species belonging to, *e. g.*, *Caloplaca* and *Candelariella*. Some of these species grow on dead plant fragments, too. Two species found growing on bones at Jørgen Brønlund fjord, viz. *Caloplaca alcarum* and *Lecanora contractula*, occur usually in Greenland on seashore rocks manured by birds (HANSEN *et al.* 1987).

C. Epilithic vegetation

1. Calciphilous flora

Exposures of dolomite and limestone with colours varying from pale brown and grey to almost black occur in many places close to Pyramideplateau, Buen and Okseslette. The rocks are rich in Ca and Mg, but they are relatively hard and weather more slowly than soft limestone. They possess a weakly to distinct calcareous flora as illustrated by the following examples:

Sporastatia testudinea is dominant on the horizontal surfaces of some carbonates situated immediately to the south of Pyramideplateau, while *Xanthoria elegans*, *Aspicilia contorta* and some undetermined species of *Aspicilia* are scarce. Three vegetation zones are found on the sides of the rocks: The upper part is colonized by *Aspicilia* spec. (dominant), *Lecanora marginata*, *Lecidella stigmatea*, *Placynthium asperellum*, *Dermatocarpon miniatum* and *Xanthoria elegans*. The middle zone is slightly damper and consists of *Caloplaca castellana* (growing parasitically on *Rhizocarpon geminatum*), *Lecanora marginata*, *Dermatocarpon miniatum*, *Placynthium asperellum* and species of *Aspicilia* and *Rhizocarpon*. The lower zone, which is relatively moist, is often poor in lichens (*Caloplaca* spec., *Rhizocarpon geminatum*). *Xanthoria sorediata* is restricted to this zone (HANSEN 1991). *Candelariella vitellina*, *Lecanora marginata*, *Physcia dubia* and *Xanthoria elegans* grow in fissures in the horizontal surfaces of these rocks. *Xanthoria elegans* and *Lecanora marginata* are the most common lichens found on small stones covering the terraces and hills. Their thalli are, however, very weakly developed in windswept, exposed places, while they have a thicker and more continuous thallus on the leesides of the slopes. In particular on the hills near Jørgen Brønlund fjord *Xanthoria elegans* has a distinct preference for the lowest parts of the stones, and it grows most abundantly on the east sides of the hills, where the species is best protected against the direct and indirect influence of strong winds.

A very characteristic, calciphilous flora is found on some dark grey to almost black and very hard dolomitic blocks occurring in the hilly area north of the great plain at Kap Moltke. *Glypholecia scabra* grows in cracks and dents in these stones, although in small quantity only. The comparative high heat absorption of the dark coloured, calcareous blocks and the long period with solar radiation probably explain this exceptional high arctic occurrence of *Glypholecia scabra*. The species, which recently has been reported as an addition to the known lichen flora of Greenland (HANSEN & POELT 1987), grows in association with *Xanthoria elegans*, *Lecanora marginata* and species of *Aspicilia* and *Candelariella*. In the Maarmorilik area in central western Greenland *Glypholecia scabra* occurs on a siliceous rock with some calcium content.

The calciphilous flora is replaced by a nitrophilous type on calcareous rocks influenced by musk ox droppings and guano from various birds, for example, snowy owls and gulls. Lichens such as *Xanthoria elegans* (dominant), *X. borealis*, *Physcia caesia*, *P. dubia*, *Physconia muscigena* and *Candelariella vitellina* are of great importance on these rocks.

2. Nitrophilous flora

Caloplaca alcarum is widely distributed on bird rocks along the coasts of Greenland (HANSEN *et al.* 1987). The northernmost known occurrences of the species in Greenland are found on a few boulders composed of dolomite and sandstone situated on the coastal slope between Kap Moltke Station and Kap Harald Moltke. It grows together with *Lecanora contractula* and *Xanthoria*

elegans on east exposed sides of the boulders, near the ground. These blocks are influenced by guano of eiders, gulls and other sea birds.

Bird rock assemblages more rich in species occur on some up to 2 m high, dolomitic blocks and sandstone boulders influenced by guano of snow buntings and snowy owls just south of Pyramideplateau. *Xanthoria elegans* covers up to 90% of the top surfaces of these boulders in a glaring contrast to its generally poorly developed populations on the scattered stones on the terraces and hills. *Physcia caesia* is fairly abundant, too, covering up to 20% of the upper part of the boulders.

The enrichment also favours species such as *Melanelia infumata*, *Phaeophyscia sciastra*, *Physcia dubia*, *Physconia muscigena* (this species occurs mainly on soil in cracks and over mosses growing on the boulders), *Xanthoria borealis* and the following crustose lichens: *Candelariella vitellina*, *Rhizocarpon geminatum* and species of *Aspicilia* and *Caloplaca*. This ornithocoprophilous lichen community was also recorded - although in a somewhat impoverished form - at an altitude of c. 530 m a. s. l. on Pyramideplateau. The top of some sandstone blocks rich in iron-containing minerals and used as resting places by snow buntings on Okseslette are covered with *Xanthoria elegans* (cover %: 80), *Physcia caesia* (cover %: 5) and *Melanelia infumata* (cover %: 2). *Lecidea atrobrunnea* and *Rhizoplaca melanophthalma* are only just present. *Xanthoria sorediata* occurs on the lowest part of the vertical and overhanging surfaces of some blocks situated near the border of Kedelkrogelv.

Herds of musk oxen are often observed in the hilly area below Pyramideplateau, on the talus slopes of Pyramideplateau and Buen, in Børglum elv valley and on Okseslette. These animals affect the vegetation partly by feeding on, for example, *Salix arctica*, partly by manuring the plants. This can be illustrated by the following example from a small valley with abundant dung of musk oxen (and hare droppings) below Pyramideplateau: The top of an exposure of hard, quartzitic rock is covered with *Xanthoria elegans* and *Melanelia infumata*, while the sides are dominated by two species of *Rhizocarpon*, viz. *R. atroflavescens* and *R. geminatum*. Also present are *Physcia dubia*, *Placynthium asperellum*, *Xanthoria elegans*, *Aspicilia* spec., *Caloplaca* spec., and more scarcely, *Sporastatia testudinea* (infested by *Rhizocarpon pusillum*) and *Tremolecia atrata*, indicating the siliceous rock type.

The genus *Umbilicaria* - and here particularly the two species *U. arctica* and *U. decussata* - is usually well represented on bird-perch rocks in more southern parts of Greenland (HANSEN 1978, 1993b). *Umbilicaria* species are, however, comparatively rare in the Jørgen Brønlund fjord area. The three observed species, *Umbilicaria decussata*, *U. krascheninnikovii* and *U. virginis*, all show a distinct preference for the lower and more sheltered part of some of the bird stones in the area.

3. Lichens growing on sandstone rocks coated with Fe-containing minerals

Many sandstone boulders in the Jørgen Brønlund fjord area have a conspicuous, dark brown weathering crust. They hold a characteristic lichen flora consisting of species such as *Sporastatia testudinea* (dominant and often infested with *Rhizocarpon pusillum*), *Lecanora marginata*, *Rhizocarpon geminatum*, a yellow species of *Rhizocarpon* growing upon an *Acarospora* species with dark brown to almost black thallus, *Aspicilia* spec. and *Xanthoria elegans*. *Umbilicaria virginis* and *U. lyngei* occur on the basal part of the boulders. *Dimelaena oreina* replaces *Sporastatia testudinea* as the dominant species on some sandstone blocks on Okseslette.

Lecanora polytropa, which can be defined as an ubiquitous epilithic lichen in other parts of Greenland (HANSEN 1978) is extremely rare in the Jørgen Brønlund area. It was found growing on a ferrugineous sandstone rock at Pileodde, only. *Tremolecia atrata* occurs at the same place, but in a temporarily moistened fissure in the rock. Another lichen species with partly rust-coloured thallus, viz. *Porpidia melinodes*, was found in a similar habitat: on a stone near a small stream on Pyramideplateau together with *Placynthium asperellum* and *Xanthoria sorediata*.

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