

Lichens from Saqqaq and Qeqertaq, Central West Greenland

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Abstract: A total of 189 taxa of lichens are reported from two localities situated at the south coast of Nuussuaq Peninsula in Central West Greenland. The new combination *Arctocetraria simmonsii* (Krog) E. S. Hansen is proposed. Northern extensions of 15 species in West Greenland are presented. Geology, climate and vegetation of the localities are briefly treated.

Kokkuvõte: Saqqaq'i ja Qeqertag'i samblikud (Gröönimaa kesk-lääs).

Esitatakse Kesk-lääne Gröönimaa Saqqaq'i ja Qeqertaq'i piirkondade 189 samblikutaksoni andmed. Pakutakse välja uus kombinatsioon *Arctocetraria simmonsii* (Krog) E. S. Hansen. Esitatakse 15 liigi Lääne-Gröönimaa levila põhjasuunalise laienemise andmed. Lühidalt peatatakse piirkonna geoloogial, kliimal ja taimkattel.

INTRODUCTION

Saqqaq and Qeqertaq are situated at the south coast of Nuussuaq Peninsula in Central West Greenland (Fig. 1). The settlement, Saqqaq (= "sunny side", with c. 160 inhabitants) is located in a hilly lowland exposed to a big fjord, Vaigat, which separates Nuussuaq from Disko. The lichenological investigations took place in this lowland within a radius of about 5 km from Saqqaq (Fig. 2). Qeqertaq is a settlement with c. 75 inhabitants and is situated at the southernmost point of Qeqertaq Ø, which covers an area of c. 10 square kilometres. The island has a somewhat sheltered position in a bay, Tasiussaq, at the southernmost part of Nuussuaq (Fig. 3). A 211 m high rocky ridge occupies the central part of Qeqertaq Ø. The distance between Saqqaq and Qeqertaq is about 25 km.

The most important collections of lichens from the south coast of Nuussuaq were made by Th. M. Fries (Lynge, 1937). He visited the area in 1871 and collected numerous interesting species at two localities, viz. Saqqaq and Atanikerdluk. Lynge also reports on about 20 lichen species collected by J. Grøntved in 1932 at three localities situated somewhat north of those of Fries. P. Gelting collected many lichens in the area, in particular around Saqqaq and Atanikerdluk, in 1949 and 1950, but comparatively few of these collections have been published so far, most of them by the present author. Additional lichen species of particular interest are mentioned in the chapter, "Results and discussion", together with similar interesting lichens collected by

Th. M. Fries and J. Grøntved. Further informations about lichen collections from the south coast of Nuussuaq are available in the following publications: Breuss & Hansen, 1988; Hansen, 1984, 1986, 2003, 2004a & b, 2005a; Hansen et al., 1987a & b; Leuckert et al., 1987; Moberg & Hansen, 1986 and Thomson, 1984, 1997. A paper dealing with lichens collected at three localities located at the north coast of Nuussuaq, viz. Uummannaq, Qilakitsoq and Qaarsut, has recently been published (Hansen, 2005b).

Localities and geology

The following two localities were investigated:

1. Saqqaq. 70°01'N, 51°57'W. Alt. 0–100 m (Fig. 2). 13–22 August 2002. Archaean gneiss intersected by dykes composed of dolerite (Escher & Stuart Watt, 1976).
2. Qeqertaq. 70°00'N, 51°19'W. Alt. 0–211 m (Fig. 3). 30 July–6 August 2003. Archaean gneiss with extensive occurrences of amphibolite.

Climate

Scanty meteorological information is available from Saqqaq and Qeqertaq, which are both located in the continental, low arctic vegetational zone. Their climate presumably is comparable to that of Ilulissat, situated c. 90 km south of the two settlements. Measurements made by ASIAQ/Grønlands Forundersøgelse show that the mean temperature of the warmest month,

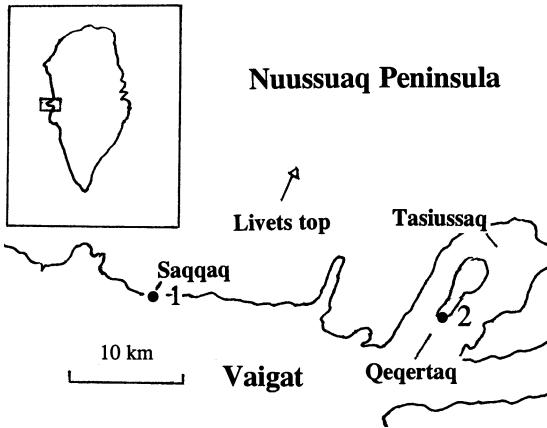


Fig. 1. Location of investigation area in Central West Greenland. 1 – Saqqaq. 2 – Qeqertaq. The small Greenland map shows the situation of the investigation area.

July, is 8°C at Ilulissat, while the mean temperature of the coldest month, February, is -15°C. The annual precipitation is about 250 mm (2000).

MATERIAL AND METHODS

Investigations of the lichen flora of the surroundings of Saqqaq and Qeqertaq were carried out by the author in August 2002 and from late July to early in August 2003, respectively. Lichens were collected at numerous sample plots around Saqqaq and all parts of the island Qeqertaq Ø were also studied. The collected material, a total of 440 lichen specimens, was studied with Zeiss light microscopes. Selected specimens of *Bryoria*, *Cladonia* and *Stereocaulon* were identified by means of HPTLC. The material is deposited at the Botanical Museum, University of Copenhagen (C).



Fig. 2. Gneissic rocks and fell-field patches just north of Saqqaq. The rocks hold a dense vegetation of epilithic lichens dominated by different species of *Umbilicaria* and microlichens with black thallus, for example, *Orphniospora moriopsis*. "Livets top" and other mountains are seen in the background.



Fig. 3. A mosaic of dwarf shrub heaths with *Cetrariella delisei* and *Cladonia trassii* and low gneissic rocks covered with black lichens characterize the landscape north of Qeqertaq.

RESULTS AND DISCUSSION

About 100 lichens have previously been reported from the south coast of Nuussuaq, most of them by Th. M. Fries, fewer by Hansen and other authors (see Introduction). The geological conditions prevailing in the areas visited by the author in 2002 and 2003 are comparatively uniform with dominance of different types of siliceous rocks, primarily gneiss. The lichen flora of Saqqaq and Qeqertaq distinctly reflects these conditions, as it contains rather few calciphilous lichens. The northern half of the Nuussuaq Peninsula, which is separated from the southern half along a line from western Sarqaq to Uummannaq Ø north of Nuussuaq, is both climatically and geologically different from the present investigation area, as it is situated in the middle arctic and oceanic zone and is dominated by Tertiary volcanic rocks and Cretaceous sediments (Escher & Stuart Watt, 1976). The rocks near Atanikerdluk are composed of such, more or less calcareous sediments together with

more resistant dolerite. Lyngé (1937) mentions a number of more or less calciphilous lichens from this locality, for example, *Catillaria groenlandica* Lyngé, *Eiglera flavida* (Hepp) Hafellner, *Stauriothele arctica* Lyngé, *Thelidium papulare* (Fr.) Arnold and *T. pyrenophorum* (Ach.) Mudd. In his diary from 1950 P. Gelting notes some lichens from different basaltic rocks occurring at Atanikerdluk, for example, *Dimelaena oreina* (Ach.) Norman, *Hypogymnia austerodes* (Nyl.) Räsänen, *H. subobscura* (Vain.) Poelt, *Pannaria hookeri* (Borrer ex Sm.) Nyl. and *Usnea sphacelata* R. Br. These species are not included in the present list of Saqqaq and Qeqertaq. The last mentioned lichen is very common on basaltic rocks at Qeqertarsuaq on Disko and on the basaltic top of the mountain Aucellabjerg in the Zackenberg area in East Greenland (Hansen, 1996, 1999a). Apart from a few localities on the north and south coast of Nuussuaq, for example, Qeqertaq, Saqqaq and Qaarsut, the whole pe-

ninsula is in need of lichenological exploration. The region is presumably just as rich in lichens as Disko, which also is composed by both basaltic, siliceous and more or less calcareous sediments. The following additional, mostly rare species of particular interest reported from the south coast of Nuussuaq were not found here in 2002 and 2003:

- Acarospora pyrenopsoides* H. Magn. (Lynge, 1937; Thomson, 1997)
Aspicilia pergibbosa (H. Magn.) Räsänen (Thomson, 1997; Hansen, 2004b)
Caloplaca decipiens (Arnold) Blomb. & Forssell (Hansen et al., 1987a)
Caloplaca epiphyta Lynge (Hansen et al., 1987a)
Caloplaca lactea (A. Massal.) Zahlbr. (Hansen et al., 1987a)
Caloplaca tominii L. I. Savicz (Hansen et al., 1987a)
Carbonea vorticosa (Flörke) Hertel (Syn. *Lecidea vorticosa* (Flörke) Körb.) (Lynge, 1937)
Endocarpon pusillum Hedw. (Hansen, 1984)
Dimelaena oreina (Ach.) Norman chemotype II (usnic acid, gyrophoric acid, lecanoric acid) (Leuckert et al., 1987)
Hypocenomyce leucococca R. Sant. (Hansen, 1984).
Lecania flavescens Lynge (Lynge, 1937; Thomson, 1997)
Lecanora groenlandica Lynge (Lynge, 1937; Thomson, 1997)
Lecanora molariformis Lynge (Lynge, 1937)
Lecidea brachyspora (Th. Fr.) Nyl. (Hansen, 2004a)
Lecidea fuscocapitata Lynge (Lynge, 1937)
Lecidea leucothallina Arnold (Thomson, 1997; Hansen, 2004b)
Lecidea theodori Lynge (Lynge, 1937; Thomson, 1997)
Pyrenopsis grumulifera Nyl. (Hansen, 2004b)

General remarks on the lichen vegetation

Different heath complexes more or less rich in terricolous lichens are of great importance at both Saqqaq and Qeqertaq. Macrolichens such as *Alectoria nigricans*, *A. ochroleuca*, *Bryoria nitidula*, *Cetraria islandica*, *Cladonia mitis*, *Flavocetraria cucullata* and *F. nivalis* cover large patches in some dwarf shrub heaths dominated by *Vaccinium uliginosum* just east of Saqqaq. *Dryas integrifolia* and *Carex rupestris* are faith-

ful components of this fairly dry and moderately wind exposed heath type. The extensive *Betula nana* inland heaths north of Saqqaq are comparatively poor in lichens, but some mixed *B. nana*-*Ledum palustre*-*Vaccinium* heaths at Qeqertaq contain many lichen species, for example, *Cladonia mitis*, *Flavocetraria cucullata*, *F. nivalis* and *Stereocaulon paschale*. *Empetrum hermaphroditum*-*Salix glauca*-*Vaccinium* heath patches occur frequently near the two settlements. They differ from the above-mentioned dry heath types by their abundant contents of lichen species preferring moist habitats, for example, *Arctocetraria andrejevii*, *A. simmonsii*, *Cetrariella delisei*, *Cladonia phyllophora* and *C. trassii*. A few populations of *Arctocetraria nigricascens* occurring in this community at Saqqaq are of particular interest, as this species presumably is very rare in this region. *Cladonia macrophyllodes* and *Peltigera didactyla* and the microlichens, *Buellia papillata*, *Caloplaca jungermanniae*, *Ochrolechia upsaliensis* and *Psoroma tenue*, occur commonly along paths, where they can avoid competition from dwarf shrubs and more quick-growing lichens in the heaths. Some pioneer lichens such as, for example, *Acarospora rhizobola*, *Baeomyces carneus*, *Candelariella placodizans*, *Protomicarea limosa* and *Psora rubiformis*, have a distinct preference for mineral soil, while others, for example, *Trapeliopsis granulosa*, prefer soil rich in humus. Numerous crustose lichens are usually found growing on plant remains and mosses in the heaths. This applies to the following species: *Bryonora pruinoso*, *Buellia papillata*, *Caloplaca cerina*, *C. tetraspora*, *C. tirolensis*, *Fuscopannaria praetermissa*, *Lecanora epibryon*, *Lecidella wulfenii*, *Ochrolechia frigida*, *O. lapuënensis*, *Pertusaria dactylina*, *P. geminipara* and *Rinodina turfacea*. Species such as *Lichenomphalia hudsoniana* and *Peltigera leucophlebia* grows abundantly on thick moss cushions among rocks. *Cassiope tetragona* heath patches with *Cetrariella delisei*, *Cladonia bellidiflora*, *C. borealis*, *C. mitis*, *C. stygia*, *C. sulphurina*, *Pertusaria oculata* and *Stereocaulon alpinum* occur at some small, north-facing terraces at Saqqaq just north of Saqqaq. Some terraces are covered with *Salix herbacea* snow-patches containing lichens such as *Arthrurhaphis alpina*, *Cladonia sulphurina* and *Cetrariella delisei*. The latter species also occurs on frost boils together with *Pertusaria oculata* at Saqqaq. The *Salix herbacea* snow-patches at Qeqertaq differ from those at

Saqqaq by a richer occurrence of lichens such as *Cladonia ecmocyna*, *Pertusaria oculata* and *Solorina crocea*. A mixed *Cassiope-Empetrum-Salix herbacea* heath at the middle of Qeqertaq Ø contains well-developed populations of *Cladonia stellaris* (Fig. 4) and *Nephroma arcticum* (Fig. 5), which are both extremely rare so far north in Greenland. *Peltigera aphthosa* also occurs abundantly in this heath type. The corticolous lichens are represented by one species, only, viz. *Lecanora fuscescens*. This agrees well with the situation at the north coast of Nuussuaq, where *L. fuscescens* is the only recorded epiphytic lichen (Hansen, 2005b).

Some conspicuous E-facing, vertical rocks composed of amphibolite and gneiss just north of Qeqertaq hold a characteristic lichen vegetation consisting of some more or less nitrophilous species such as *Phaeophyscia sciastra*, *Physcia caesia*, *Rhizocarpon geminatum*, *Rhizoplaca melanophthalma* (infested by *Caloplaca epithallina*), *Umbilicaria decussata* and dominant *Xanthoria elegans*. *Lecanora swartzii* grows on overhanging parts of these rocks, which in some moist places hold a particular association with *Collema glebulentum*, *Lecanora argopholis*, *Placynthium asperellum*, *Rhizocarpon badioatrum*, *Umbilicaria deusta* and *U. vellea* (dominant). Similar associations dominated by *Umbilicaria arctica* and *Xanthoria elegans* occur on E-facing, vertical gneissic rocks just north of Saqqaq and on dykes composed of dolerite just northwest of the settlement. *Bryoria lanestrus* also grows abundantly on the rock faces, while *Physconia detersa* occurs sparsely on mosses on these rocks. Wind-exposed parts of the rocks are covered by *Calvitimela armeniaca*, *Ophiparma ventosum* and *Sporastatia testudinea*. *Xanthoria soreliata* is restricted to the basal rock faces, which provide a rich supply of nutrition via guano from, for example, ravens together with optimum moisture conditions. Gneissic seashore rocks at Saqqaq and Qeqertaq hold a characteristic association consisting of lichens such as *Acarospora molybdina*, *Caloplaca alcarum*, *Lecanora contractula*, *L. straminea*, *Melanelia infumata*, *Physcia caesia*, *P. dubia*, *Umbilicaria arctica* (dominant) and *Xanthoria candelaria*. *Verrucaria ceuthocarpa* occurs on the partly submerged coastal rocks. A particular zonation pattern with algae, *Tremolecia atrata*, *Ephebe hispidula*, *Rhizocarpon bolanderi*, *Umbilicaria virginis* and at the uppermost rock faces,

a black community dominated by *Orphniospora moriosis*, was recorded around some rock pools at Saqqaq. The last mentioned community is widely distributed on gneissic rocks at both settlements and contains species such as *Alantoparmelia alpicola*, *Arctoparmelia incurva*, *Brodoa oroarctica*, *Cetraria nigricans*, *Parmelia saxatilis*, *Pseudephebe minuscula*, *Rhizocarpon inarense*, *Sphaerophorus fragilis*, *Umbilicaria hyperborea*, *U. lyngei* and *U. torrefacta*. Rocks composed of amphibolite and other gneissic rocks more or less rich in iron support a vegetation of ferruginous lichens, for example, *Miriquidica atrofulva*, *Porpidia flavocaerulescens* and *Tremolecia atrata*. *Leprocaulon subalbicans* and *Massalongia carnosa* were both found growing on mosses on moist, sloping rock faces at Qeqertaq. *Placidium lachneum* occurs at similar habitats.

Annotated list of lichens

The following list of lichens is based on the author's collections. It is very important to document the present contents of different Greenland floras to be able to state the vegetation changes caused by, for example, climatical changes. Even very common lichens can possibly be rare or absent in the future. A number of sterile and lecideoid microlichens have been neglected during the present investigation. Nomenclature follows Santesson et al. (2004) with some exceptions. Numbers 1 and 2 indicate the two localities listed above. Annotations are given as regards the substrate of the lichens, associate lichen species and presence of apothecia (ap.) or perithecia (pe.); "st." means that the specimen is sterile. The asterisk * in front of the name indicates that the collection represents a northern range extension of the taxon in West Greenland. The frequency of selected lichens is shortly stated. Collections, which have been distributed previously from herbarium C as part of "Lichenes Groenlandici Exsiccati" (LGE) are mentioned by their numbers. Selected references are cited.

- ACAROSPORA MOLYBDINA (Wahlenb.) A. Massal. – 1, 2. On gneissic seashore rocks manured by sea birds; ap.
- A. RHIZOBOLA (Nyl.) Alstrup – 1. On clay soil, together with *Arthrorhaphis alpina* and *Baeomyces carneus*; ap.; rare.

- A. SMARAGDULA (Wahlenb.) A. Massal. – 2. On gravel; ap.
- ALECTORIA NIGRICANS (Ach.) Nyl. – 1, 2. On soil in dwarf shrub heaths; st.; common. LGE 881.
- A. OCHROLEUCA (Hoffm.) A. Massal. – 1, 2. On soil in dwarf shrub heaths; st.; common. LGE 878, 918.
- ALLANTOPARMELIA ALPICOLA (Th. Fr.) Essl. – 1, 2. On gneissic rocks, together with, for example, *Orphniospora moriopsis*; ap.; common.
- AMANDINEA PUNCTATA (Hoffm.) Coppins & Scheid. – 1. On dead twig of *Salix glauca*, together with *Caloplaca tirolensis* and *Lecanora hagenii* var. *fallax*; ap.; rare.
- * AMYGDALARIA PANAEOLA (Ach.) Hertel & Brodo – 2. On siliceous rock with traces of limonite; st.; rare.
- ARCTOCETRARIA ANDREJEVII (Oxner) Kärnefelt & A. Thell – 1, 2. On moist soil in depressions in dwarf shrub heaths, together with *Cetrariella delisei*; ap.; common. LGE 886, 932.
- A. NIGRICASCENS (Nyl.) Kärnefelt & A. Thell – 1. On moist soil in dwarf shrub heath, together with *Cetrariella delisei*; st.; rare. LGE 893. *Arctocetraria nigricascens* is an Amphi-Beringian taxa with a northern distribution in Greenland (Kärnefelt, 1979; Hansen, 1995).
- * A. SIMMONSII (Krog) E. S. Hansen nov. comb. (Basionym: *Cetraria simmonsii* Krog, Norsk Polarinstittut Skrifter nr. 144: 124, 1968) – 1. On moist soil in dwarf shrub heath, together with *Cetrariella delisei*; st.; locally abundant. LGE 891. The material agrees with that previously described by Krog (1968). Kärnefelt (1979) considers *A. simmonsii* to be a broad-lobed form of *A. andrejevii* and states that he usually finds a continuous series from very broad-lobed to normal individuals within one stand. However, the two species always appear to be well-separated in different stands in Greenland, although they have the same habitat preferences, moist depressions in dwarf shrub heaths. Here *A. simmonsii* is morphologically well distinguished from *A. andrejevii*, in particular by its very broad lobes with chestnut-brown upper parts. The basal parts of *A. simmonsii* are yellowish brown, never greyish white such as those of *A. andrejevii*. In addition, they are persistent and anastomosing contrary to those of *A. andrejevii*, which has easily separated lobes as pointed out by Krog (1968). The underside of the lobes is always strongly wrinkled by *A. simmonsii*, while it is almost smooth or pitted by *A. andrejevii*. Like Kärnefelt, the present author considers characters such as marginal lobules and projections to be of no taxonomical importance.
- ARCTOPARMELIA CENTRIFUGA (L.) Hale – 1, 2. On gneissic boulders, together with *Pseudephebe minuscula*; ap.
- A. INCURVA (Pers.) Hale – 1, 2. On gneissic boulders, together with, for example, *Calvitimela armeniaca*, *Orphniospora moriopsis*, *Rhizocarpon inarense* and *Rhizoplaca melanophthalma*; st.
- ARTHRORHAPHIS ALPINA (Schaer.) R. Sant. – 1, 2. On mineral soil, together with *Baeomyces carneus* and *Candelariella placodizans*; st. *Arthrorhaphis citrinella* has previously been reported from Disko, but has so far not been reported from Nuussuaq (Hansen & Obermayer, 1999).
- ASPICILIA MASTOIDEA (Lynge) Thomson – 2. On gneissic rocks; ap.
- A. MASTRUCATA (Wahlenb.) Th. Fr. – 1, 2. On gneissic rocks, together with *Umbilicaria arctica*; ap.
- BAEOMYCES CARNEUS Flörke – 1, 2. On clay soil, together with, for example, *Acarospora rhizobola* and *Arthrorhaphis alpina*; st.
- BELLEMERIA ALPINA (Sommerf.) Clauzade & Cl. Roux – 2. On siliceous rock, together with *Rhizocarpon geminatum* and *Umbilicaria hyperborea*; ap.
- BRODOA OROARCTICA (Krog) Goward – 1, 2. On horizontal face of gneissic rocks; st.
- BRYONORA PRUINOSA (Th. Fr.) Holt.-Hartw. – 1, 2. On mosses, together with *Cladonia borealis*; ap.
- BRYORIA CHALYBEIFORMIS (L.) Brodo & D. Hawksw. – 1. On soil; st. Cortex and medulla react Pd–; soralia present.
- B. LANESTRIS (Ach.) Brodo & D. Hawksw. – 1. On vertical face of gneissic rock, together with *Parmelia saxatilis*, *Umbilicaria arctica* and *H. decussata*; st. Thallus contains fumarprotocetraric acid (HPTLC). LGE 890.
- B. NITIDULA (Th. Fr.) Brodo & D. Hawksw. – 1, 2. On soil in *Vaccinium uliginosum* heaths, together with *Alectoria nigricans*, *A. ochroleuca*, *Flavocetraria cucullata* and *F. nivalis*; st.; common. LGE 880, 919.

- * *BUSELLIA DISCIFORMIS* (Fr.) Mudd – 1. On dead twigs of *Betula nana*, together with *Xanthoria candelaria*; ap.
- B. *PAPILLATA* (Sommerf.) Tuck. – 1. On mosses and soil rich in humus, together with, for example, *Physconia muscigena*; ap.
- CALOPLACA ALCARUM* Poelt – 1. On gneissic rocks, together with *Acarospora molybdina*, *Lecanora contractula* and *Xanthoria candelaria*; ap.
- C. *AMMIOSPILA* (Wahlenb.) H. Olivier – 1. On mineral soil and dead mosses, together with, for example, *Caloplaca tiroliensis*, *Candelariella placodizans* and *Megaspora verrucosa*; ap.
- C. *CERINA* (Ehrh. ex Hedw.) Th. Fr. – 1, 2. On dead mosses and dead *Silene acaulis*, together with, for example, *Caloplaca tiroliensis*, *Lecanora epibryon* and *Physcia muscigena*; ap.
- C. *EPITHALLINA* Lynge – 2. On *Rhizoplaca melanophthalma* on gneissic rock; ap.; rare.
- C. *JUNGERMANNIAE* (Vahl) Th. Fr. – 1, 2. On soil rich in humus and on dead mosses and other plant remains, together with, for example, *Bryonora pruinosa*, *Caloplaca tetraspera*, *C. tiroliensis* and *Rinodina turfacea*; ap. LGE 901.
- C. *NIVALIS* (Körb.) Th. Fr. – 2. On *Andreaea* on rock; ap.; rare.
- C. *TETRASPORA* (Nyl.) H. Olivier – 1. On plant remains; ap.
- C. *TIROLIENSIS* Zahlbr. – 1. On plant remains, mosses and bones; ap.; common.
- CALVITIMELA AGLAEA* (Sommerf.) Hafellner – 1. On gneissic rocks; ap.; rare.
- C. *ARMENIACA* (DC.) Hafellner – 1, 2. On wind-exposed gneissic rocks, together with, for example, *Orphniospora moriopsis*, *Rhizocarpon inarense*, *R. jemtlandicum* and *Sporastatia testudinea*; st.
- * *CANDELARIELLA ARCTICA* (Körb.) R. Sant. – 1. On gneissic seashore rock, together with *Rhizocarpon geminatum*; ap.
- C. *AURELLA* (Hoffm.) Zahlbr. – 1. On old bone, together with *Caloplaca tiroliensis*, *Lecanora hagenii* var. *fallax* and *Lecidella euphorea*; ap.
- C. *DISPERSA* (Räsänen) Hakul. – 2. On *Placynthium asperellum* on gneissic rock; st.
- C. *PLACODIZANS* (Nyl.) H. Magn. – 1, 2. On soil and mosses in heaths; ap.; locally abundant. LGE 896.
- C. *TERRIGENA* Räsänen – 2. On mosses and soil; st.
- C. *VITELLINA* (Hoffm.) Müll. Arg. – 1. On gneissic and basaltic rocks, together with, for example, *Lecanora polytropa*, *Melanelia hepatizon* and *Pseudophebe minuscula*; ap.
- C. *XANTHOSTIGMA* (Ach.) Lettau – 1. On dead twigs; st.; rare.
- CESTRARIA ERICETORUM* Opiz. ssp. *ERICETORUM* – 2. On soil in heath; st.; rare.
- C. *ISLANDICA* (L.) Ach. – 1, 2. On soil in dwarf shrub heaths; st.; common. LGE 883, 914.
- C. *MURICATA* (Ach.) Eckfeldt – 1, 2. On soil in dwarf shrub heaths and fell-fields, together with, for example, *Alectoria nigricans*, *Cladonia amaurocraea*, *C. mitis* and *Thamnotia vermicularis* var. *subuliformis*; st.; common.
- C. *NIGRICANS* Nyl. – 1, 2. On gneissic rocks and on soil, together with, for example, *Sphaerophorus fragilis*; ap.; locally abundant. LGE 885, 940.
- CESTRARIELLA DELISEI* (Bory ex Schaer.) Kärnefelt & A. Thell – 1, 2. On moist soil in depressions in heaths, together with, for example, *Cladonia trassii*; ap.; common. LGE 882, 915.
- CLADONIA AMAUROCRAEA* (Flörke) Schaer. – 1, 2. On soil in heaths and fell-fields, together with, for example, *Cladonia mitis*, *Flavocetraria nivalis* and *Sphaerophorus globosus*; st.; common.
- C. *BELLIDIFLORA* (Ach.) Schaer. – 1, 2. On soil rich in humus, together with, for example, *Cladonia crispata* and *C. macrophyllodes*; ap.; common. LGE 917.
- C. *BOREALIS* S. Stenroos – 1, 2. On soil and plant remains, together with, for example, *Cladonia phyllophora*, *C. pyxidata* and *Ochrolechia frigida*; ap.; common.
- C. *CENOTEA* (Ach.) Schaer. – 2. On soil rich in humus, together with *Cladonia borealis* and *C. sulphurina*; st.; rare.
- C. *CHLOROPHAEA* (Flörke ex Sommerf.) Spreng. – 1, 2. On mosses, plant remains and soil rich in humus; st.; common. Thallus contains fumarprotocetraric acid (HPTLC).
- C. *CORNUTA* (L.) Hoffm. – 2. On soil; st.; rare.
- C. *CYANIPES* (Sommerf.) Nyl. – 2. On dead mosses; st.; rare.
- C. *ECMOCYNA* Leight – 2. On moist soil in *Salix herbacea* snow-patch; ap.; locally abundant. LGE 945.
- C. *FIMBRIATA* (L.) Fr. – 1. On dead mosses; st.; rare.
- C. *GRACILIS* (L.) Willd. – 1, 2. On mosses, plant remains and soil in heaths, together with,

- for example, *Cetraria islandica* and *Flavocetraria cucullata*; ap.; common.
- C. LUTEOALBA Wheldon & A. Wilson – 1. On mosses and plant remains, together with *Cladonia borealis*; st.; rare.
- C. MACROPHYLLA (Schaer.) Stenh. – 1, 2. On soil rich in humus, together with *Cladonia bellidiflora*; ap.
- C. MACROPHYLLODES Nyl. – 1, 2. On soil rich in humus, together with *Cladonia pyxidata*; ap.
- C. MITIS Sandst. – 1, 2. On soil in dwarf shrub heaths, together with, for example, *Cetraria islandica*, *Cladonia gracilis* and *Stereocaulon alpinum*; st.; common. LGE 887, 913.
- C. PHYLLOPHORA Hoffm. – 1, 2. On soil rich in humus and on mosses, together with, for example, *Cladonia stygia*; ap.
- C. PLEUROTA (Flörke) Schaer. – 1, 2. On plant remains and mosses; ap.; common.
- C. POCILLUM (Ach.) Grognot – 1, 2. On soil and mosses; st.
- C. PYXIDATA (L.) Hoffm. – 1, 2. On soil rich in humus, together with *Cladonia borealis* and *C. chlorophaea*; st. LGE 941.
- C. SQUAMOSA Hoffm. – 1. Among mosses on soil; st.; rare.
- * C. STELLARIS (Opiz) Pouzar & Vázda – 2. In dwarf shrub heath, together with *Nephroma arcticum*; st.; locally abundant. LGE 921.
- C. STYGIA (Fr.) Ruoss – 1, 2. On soil in dwarf shrub heaths, together with, for example, *Cladonia gracilis*; st.
- C. SULPHURINA (Michx.) Fr. – 1, 2. On soil rich in humus and on mosses in dwarf shrub heaths, together with, for example, *Cladonia borealis* and *C. cenotea*; st. LGE 933.
- C. TRASSII Ahti – 1, 2. On soil near snow-patches and in depressions in dwarf shrub heaths, together with, for example, *Cetrariella delisei* and *Cladonia phyllophora*; st.; locally abundant. LGE 944.
- COLLEMA GLEBULENTUM (Nyl. ex Cromb.) Degel – 2. On mosses on siliceous rock; st.; rare.
- * EPHEBE HISPIDULA (Ach.) Horw. – 1, 2. On mosses on moist gneissic rocks; st.
- * EPILICHEN GLAUCONIGELLUS (Nyl.) Hafellner – 1. On *Baeomyces carneus* on clay soil; ap.; rare.
- E. SCABROSUS (Ach.) Clem. – 1, 2. On *Baeomyces carneus*; ap.; rare.
- EUOPSIS PULVINATA (Schaer.) Vain. – 1. On siliceous rock; ap.
- FLAVOCETRARIA CUCULLATA (Bellardi) Kärnefelt & A. Thell – 1, 2. On soil in dwarf shrub heaths, together with, for example, *Alectoria nigricans*, *Bryoria nitidula* and *Flavocetraria nivalis*; ap.; common. LGE 877.
- F. NIVALIS (L.) Kärnefelt & A. Thell – 1, 2. On soil in dwarf shrub heaths; st.; common. LGE 879, 920.
- FUSCOPANNARIA PRAETERMISSA (Nyl.) P. M. Jørg. – 1. On plant remains; st.
- IONASPIS LACUSTRIS (With.) Lutzoni – 2. On temporarily moistened gneissic stones; ap.
- I. ODORA (Ach.) Stein. – 2. On temporarily moistened gneissic stones coated with limonite; ap.
- LECANORA ARGOPHOLIS (Ach.) Ach. – 2. On siliceous rocks; ap.
- L. CHLOROLEPROSA (Vain.) H. Magn. – 1, 2. On gneissic rocks; st.
- L. CONTRACTULA Nyl. – 1, 2. On gneissic seashore rocks, together with, for example, *Caloplaca alcarum*; ap.; locally abundant.
- L. EPIBRYON (Ach.) Ach. – 1. On dead mosses, together with *Caloplaca cerina* and *C. tirolensis*; ap.
- L. FUSCESCENS (Sommerf.) Nyl. – 2. On twigs of *Salix glauca*, together with, for example, *Ochrolechia frigida*; ap.; rare.
- L. HAGENII (Ach.) Ach. var. FALLAX Hepp – 1, 2. On old bone, dead twig of *Salix glauca* and dead *Silene acaulis*; ap.
- L. INTRICATA (Ach.) Ach. – 1. On basaltic rock, together with *Xanthoria elegans*; ap.
- L. POLYTROPA (Ehrh. ex Hoffm.) Rabenh. – 1, 2. On gneissic and basaltic rocks, together with both ferruginous and nitrophilous lichens, for example, *Miriquidica atrofulva* and *Rhizocarpon geminatum*; ap.; common.
- L. STRAMINEA Ach. – 1, 2. On gneissic seashore rocks manured by sea birds; st.
- * L. SWARTZII (Ach.) Ach. ssp. SWARTZII – 1, 2. On overhanging gneissic rocks, together with, for example, *Rhizocarpon copelandii*; ap.
- LECIDEA ATROBRUNNEA (Ramond ex Lam. & DC.) Schaer. – 1, 2. On gneissic rocks, together with, for example, *Rhizoplaca melanophthalma*; ap.
- L. AURICULATA Th. Fr. – 1. On gneissic rock; ap.
- L. LAPICIDA (Ach.) Ach. var. LAPICIDA – 1. On gneissic rock, together with *Miriquidica nigroleprosa*; ap.
- L. LAPICIDA (Ach.) Ach. var. PANTHERINA Ach. – 1, 2. On gneissic rocks; ap.
- L. TESSELLATA Flörke – 1, 2. On gneissic and basaltic rocks, together with, for example,

- Rhizocarpon bolanderi*, *Tremolechia atrata* and *Xanthoria elegans*; ap.
- LECIDELLA EUPHOREA (Flörke) Hertel – 1. On old bone, together with, for example, *Candelariella aurella*; ap.
- L. WULFENII (Hepp) Körb. – 1, 2. On dead mosses, together with, for example, *Rinodina mniaranea*; ap.
- LEPRARIA NEGLECTA (Nyl.) Lettau – 1. On soil and mosses.
- * L. VOUAUXII (Hue) R. C. Harris – 2. On mosses.
- LEPROCAULON SUBALBICANS (I. M. Lamb) I. M. Lamb & A.M. Ward – 2. On mosses on rocks. LGE 938.
- LICHENOMPHALIA ALPINA (Britzelm.) Redhead et al. – 1. On soil rich in humus.
- L. HUDSONIANA (H. S. Jenn.) Redhead et al. – 1. On mosses.
- MASSALONGIA CARNOSA (Dicks.) Körb. – 2. On mosses on moist rocks; ap.; locally abundant.
- MEGASPORA VERRUCOSA (Ach.) Hafellner & V. Wirth – 1. On mineral soil; ap.
- MELANELIA DISJUNCTA (Erichsen) Essl. – 1, 2. On gneissic rocks, together with, for example, *Rhizoplaca melanophthalma*, *Umbilicaria virginis* and *Physconia muscigena*; st.
- M. HEPATIZON (Ach.) A. Thell – 1, 2. On gneissic rocks, together with, for example, *Placopsis gelida*, *Rhizocarpon geminatum* and *R. inarense*; ap.; common.
- M. INFUMATA (Nyl.) Essl. – 1, 2. On siliceous and basaltic rocks manured by birds, together with, for example, *Parmelia saxatilis*, *Physcia dubia* and *Xanthoria elegans*; st.
- MIRIQUIDICA ATROFULVA (Sommerf.) A. J. Schwab & Rambold – 2. On gneissic rocks, together with *Lecanora polytropa* and *Rhizocarpon geographicum*; st.; rare. *Miriquidica atrofulva* is restricted to iron-containing rocks in Greenland (Hansen, 1995, 1999b).
- M. GAROVAGLII (Schaer.) Hertel & Rambold – 1. On gneissic rocks, together with, for example, *Rhizocarpon geographicum* and *Umbilicaria torrefacta*; ap.
- M. NIGROLEPROSA (Vain.) Hertel & Rambold var. NIGROLEPROSA – 1, 2. On siliceous rocks, together with, for example, *Lecidea lapicida* var. *lapicida*, *Melanelia hepatizon* and *Orphniospora moriopsis*; ap.
- * NEPHROMA ARCTICUM (L.) Torss. – 2. On soil in dwarf shrub heath, together with *Cladonia stellaris*; st.; rare, but abundant at its single habitat. LGE 922.
- OCHROLECHIA FRIGIDA (Sw.) Lyngé – 1, 2. On soil, mosses and plant remains, together with, for example, *Flavocetraria nivalis* and *Pertusaria dactylina*; ap.; common. LGE 900.
- O. GRIMMIAE Lyngé – 1. On *Racomitrium lanuginosum*; ap.; rare.
- O. LAPUËNSIS (Räsänen) Räsänen – 1, 2. On mosses and plant remains; ap.
- O. UPSALIENSIS (L.) A. Massal. – 1. On dead mosses, together with *Caloplaca jungermanniae* and *Rinodina turfacea*; ap.; rare.
- OPHIOPARMA VENTOSA (L.) Norman – 1, 2. On gneissic rocks; ap.
- ORPHNIOSPORA MORIOPSIS (A. Massal.) D. Hawksw. – 1, 2. On gneissic rocks and stones, together with, for example, *Pseudephebe minuscula*, *Rhizocarpon geographicum* and *Umbilicaria hyperborea*; ap.; locally abundant. LGE 889.
- PARMELIA OMPHALODES (L.) Ach. – 1, 2. On gneissic rocks, together with, for example, *Sphaerophorus fragilis*; st.
- P. SAXATILIS (L.) Ach. – 1, 2. On gneissic rocks, together with, for example, *Parmelia sulcata*; st.
- P. SULCATA Taylor – 1, 2. On gneissic rocks manured by birds, together with *Melanelia infumata*; st.
- PELTIGERA APHTHOSA (L.) Willd. – 1, 2. On and among mosses in scrubs and marshes; st. LGE 937.
- * P. CANINA (L.) Willd. – 1. On mosses in dwarf shrub heath; st.
- P. DIDACTYLA (With.) J. R. Laundon – 1, 2. On soil and mosses in dwarf shrub heaths and open scrubs; st. LGE 892.
- P. LEUCOPHLEBIA (Nyl.) Gyeln. – 1, 2. On soil and among mosses in scrubs and dwarf shrub heaths; st; locally abundant. LGE 936.
- P. MALACEA (Ach.) Funck – 1, 2. On soil and mosses in moist dwarf shrub heaths; st.
- P. RUFESCENS (Weiss) Humb. – 1, 2. On soil and among mosses in dwarf shrub heaths; st.
- P. SCABROSA Th. Fr. – 1, 2. On mosses in dwarf shrub heaths; ap.
- PERTUSARIA DACTYLINA (Ach.) Nyl. – 1, 2. On mosses and plant remains in dwarf shrub heaths; st.
- P. GEMINIPARA (Th. Fr.) C. Knight ex Brodo – 1, 2. On mosses; st.
- P. OCULATA (Dicks.) Th. Fr. – 1, 2. On soil in *Salix herbacea* snow-patches; st.; rare.

- PHAEOPHYSICIA SCIASTRA (Ach.) Moberg – 1, 2. On gneissic rocks, together with *Rhizocarpon geminatum*; rarely on mosses; st.
- PHYSICIA CAESIA (Hoffm.) Fűrnr – 1, 2. On gneissic and basaltic rocks and over mosses, together with *Xanthoria elegans*; st.
- P. DUBIA (Hoffm.) Lettau – 1, 2. On gneissic and basaltic rocks manured by birds, together with, for example, *Melanelia infumata*, *Umbilicaria arctica*, *Xanthoria candelaria* and *X. elegans*; rarely on plant remains; st.
- PHYSCONIA DETERSA (Nyl.) Poelt – 1, 2. On mosses on vertical rocks manured by birds, together with, for example, *Xanthoria soredata*; sparse at its habitats; st.
- P. MUSCIGENA (Ach.) Poelt – 1, 2. On manured gneissic rocks and over mosses, together with, for example, *Melanelia disjuncta* and *Xanthoria elegans*; st.
- PLACIDIUM LACHNEUM (Ach.) de Lesd. – 1, 2. On mosses and soil; pe. LGE 897.
- PLACOPSIS GELIDA (L.) Linds. – 1. On siliceous rock; st.; rare.
- PLACYNTHIUM ASPERELLUM (Ach.) Trevis – 1, 2. On gneissic rocks, together with *Rhizocarpon geminatum* and *Xanthoria elegans*; ap. LGE 899.
- * P. PANNARIELLUM (Nyl.) H. Magn. – 1. On gneissic stones in moist depression; ap.; rare.
- POLYCHIDIUM MUSCICOLA (Sw.) Gray – 2. On mosses; st.
- * PORPIDIA CINEREOATRA (Ach.) Hertel & Knoph – 1. On gneissic rock; ap.; rare.
- P. FLAVOCAERULESCENS (Hornem.) Hertel & A. J. Schwab – 1, 2. On gneissic rocks with traces of limonite, together with *Rhizocarpon badioatrum* and *Tremolecia atrata*; ap.
- PROTOMICARIA LIMOSA Ach. – 1. On clay soil; ap.
- PROTOPARMELIA BADIA (Hoffm.) Hafelner – 2. On gneissic rock manured by birds; ap.
- PSEUDEPHEBE MINUSCULA (Nyl. ex Arnold) Brodo & D. Hawksw. – 1, 2. On gneissic rocks, together with, for example, *Melanelia hepatizon*, *Orphniospora moriopsis* and *Rhizocarpon inarense*; ap.; common. LGE 912.
- P. PUBESCENS (L.) M. Choisy – 1. On gneissic rock, together with *Parmelia omphalodes* and *Sphaerophorus fragilis*; ap.
- PSORA RUBIFORMIS (Ach.) Hook. – 2. On mineral soil; ap.
- PSOROMA TENUE Henssen var. BOREALE Henssen – 1, 2. On plant remains and mosses, together with, for example, *Physconia muscigena*; ap.
- RHIZOCARPON BADIOATRUM (Flörke ex Spreng.) Th. Fr. – 2. On moist gneissic rock, together with *Rhizocarpon bolanderi*, *R. jemtlandicum* and *Umbilicaria deusta*; ap.
- R. BOLANDERI (Tuck.) Herre – 1, 2. On gneissic rocks, together with *Rhizocarpon geminatum* and *R. inarense*; ap.
- R. COPELANDII (Körb.) Th. Fr. – 1. On gneissic rock, together with *Lecanora swartzii*, *Rhizocarpon grande* and *Stereocaulon botryosum*; ap.
- R. EUPETRAEOIDES (Nyl.) Blomb. & Forssell – 1. On gneissic rocks; ap.
- R. GEMINATUM Körb. – 1, 2. On manured gneissic and basaltic rocks, together with, for example, *Candelariella vitellina* and *Lecanora polytropia*; ap.
- R. GEOGRAPHICUM (L.) DC. – 1, 2. On gneissic rocks, together with, for example, *Orphniospora moriopsis*, *Rhizocarpon jemtlandicum* and *Umbilicaria hyperborea*; ap.; common.
- R. GRANDE (Flörke) Arnold – 1. On gneissic rocks, together with, for example, *Melanelia hepatizon* and *Rhizocarpon inarense*; ap.
- R. INARENSE (Vain.) Vain. – 1, 2. On gneissic rocks, together with, for example, *Allantoparmelia alpicola*, *Melanelia hepatizon* and *Pseudephebe minuscula*; ap.; common.
- R. JEMTLANDICUM (Malme) Malme – 1, 2. On gneissic rocks, together with *Orphniospora moriopsis* and *Rhizocarpon inarense*; ap.
- * R. LAVATUM (Fr.) Hazsl. – 2. On gneissic rock; ap.; rare.
- R. SUPERFICIALE (Schaer.) Vain. – 1, 2. On gneissic rocks, together with *Orphniospora moriopsis*; ap.
- RHIZOPLACA MELANOPHTHALMA (DC.) Leuckert & Poelt – 1, 2. On gneissic and basaltic rocks manured by birds, together with *Lecidea atrobrunnea*, *Physcia dubia* and *Rhizocarpon geminatum*; ap.
- RINODINA ARCHAEA (Ach.) Arnold – 1, 2. On primary squamules of *Cladonia* and dead *Silene acaulis* tussock, together with, for example, *Caloplaca jungermanniae*; ap.
- R. MNIARAEA (Ach.) Körb. – 2. On mosses, together with *Lecidella wulfenii* and *Peltigera didactyla*; ap.; rare.
- R. TURFACEA (Wahlenb.) Körb. – 1. On dead mosses; ap.

- SOLORINA CROCEA (L.) Ach. – 1, 2. On clay soil in snow patches; rarely on mosses on the ground; ap.
- SPHAEROPHORUS FRAGILIS (L.) Pers. – 1, 2. On gneissic rocks and soil; ap. LGE 898.
- S. GLOBOSUS (Huds.) Vain. – 1, 2. On soil rich in humus and among mosses in dwarf shrub heaths, together with, for example, *Cladonia mitis*, *Flavocetraria nivalis* and *Ochrolechia frigida*; st.; locally abundant.
- SPORASTATIA TESTUDINEA (Ach.) A. Massal. – 2. On gneissic rocks, together with, for example, *Calvitimela armeniaca*; ap.; rare.
- STEREOCAULON ALPINUM Laurer – 1, 2. On soil in dwarf shrub heaths and snow patches; st.; locally abundant. LGE 888, 916.
- S. BOTRYOSUM Ach. – 1, 2. On gneissic rocks, together with *Rhizocarpon copelandii* and *R. grande*; st.
- S. GLAREOSUM (L. I. Savicz) H. Magn. – 1. On frost boils; st.
- * S. PASCHALE (L.) Hoffm. – 1, 2. On soil and among mosses in dwarf shrub heaths, together with, for example, *Cladonia mitis*; st.; locally abundant. LGE 935.
- S. VESUVIANUM Pers. – 1, 2. On siliceous rocks and gravel; st. Thallus contains atranorin and stictic acid (HPTLC).
- THAMNOLIA VERMICULARIS (Sw.) Schaer. var. SUBULIFORMIS (Ehrh.) Schaer. – 1, 2. On soil and mosses in dwarf shrub heaths and fell-fields, together with, for example, *Alectoria nigricans*, *Cetraria muricata* and *Cladonia amaurocraea*; st.
- TRAPELIOPSIS GRANULOSA (Hoffm.) Lumbsch – 1, 2. On soil rich in humus and on dead mosses, together with *Cladonia bellidiflora* and *C. borealis*; ap.
- TREMOLECIA ATRATA (Ach.) Hertel – 1, 2. On gneissic rocks, together with *Lecidea tessellata* and *Rhizocarpon bolanderi*; ap.
- UMBILICARIA ARCTICA (Ach.) Nyl. – 1, 2. On gneissic and basaltic rocks manured by birds, together with, for example, *Melanelia infumata*, *Physcia dubia* and *Xanthoria candelaria*; ap.; locally abundant. LGE 894, 943.
- U. DECUSSATA (Vill.) Zahlbr. – 1, 2. On manured gneissic and basaltic rocks; st.
- U. DEUSTA (L.) Baumg. – 2. On moist gneissic rock; st.
- U. HYPERBOREA (Ach.) Hoffm. – 1, 2. On gneissic and basaltic rocks, together with, for example, *Aspicilia mastrucata*, *Pseudephebe minuscula* and *Umbilicaria torrefacta*; ap.; common.
- U. LYNGEI Schol. – 1, 2. On gneissic rocks; ap.; common. LGE 884.
- U. PROBOSCIDEA (L.) Schrad. – 1, 2. On gneissic rocks, together with, for example, *Miriquidica nigroleprosa* and *Orphniospora moriopsis*; ap.; common.
- U. TORREFACTA (Lightf.) Schrad. – 1, 2. On siliceous rocks, together with, for example, *Pseudephebe minuscula*, *Rhizocarpon geographicum* and *Umbilicaria hyperborea*; ap.
- U. VELLEA (L.) Hoffm. – 1, 2. On moist vertical rocks; st.; locally abundant. LGE 939.
- U. VIRGINIS Schaer. – 1, 2. On gneissic rocks; ap.; locally abundant. LGE 895, 992.
- VERRUCARIA CEUTHOCARPA Wahlenb. – 1. On gneissic seashore rocks; pe.
- XANTHORIA CANDELARIA (L.) Th. Fr. – 1, 2. On gneissic and basaltic rocks manured by birds, together with, for example, *Physcia caesia*; ap.; rarely on bark.
- X. ELEGANS (Link) Th. Fr. – 1, 2. On gneissic and basaltic rocks manured by birds, together with, for example, *Melanelia infumata*, *Physcia caesia* and *Rhizocarpon geminatum*; ap.; common.
- X. SOREDIATA (Vain.) Poelt – 1, 2. On vertical gneissic rocks; st.

ACKNOWLEDGEMENTS

I wish to thank Palle Petersen for allowing me to rent his house in Saqqaq and Lasse Østergaard and Kristen Grønvold for given me permission to stay on the school in Qeqertaq. Thanks are also due to Peer Corfixen for technical help with the manuscript and to Steen Christensen for assistance with HPTLC. The investigation was financially supported by the Botanical Museum, University of Copenhagen.

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