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A contribution to the lichen flora of Johannes V. Jensen Land, northern Peary Land, North Greenland

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Abstract – This paper lists 41 species of lichens from the Frigg Fjord area in Johannes V. Jensen Land, northern Peary Land, North Greenland. All 41species are new to Johannes V. Jensen Land. 11 entries represent the first report from Peary Land. Notes on the distribution of the collected species are given.

Résumé – Cet article liste 41 espèces de lichens du Frigg Fjord (Johannes V. Jensen Land, northern Peary Land, North Greenland). Pour ces 41 espèces sont nouvelles pour le Johannes V. Jensen Land, et pour 11 d'entre-elles, il s'agit du premier relevé pour le Peary Land. Des informations complémentaires sont apportées en ce qui concerne la distribution des espèces récoltées.

Lichens / Frigg Fjord / Johannes V. Jensen Land / Peary Land / Greenland

INTRODUCTION

The lichen flora of the northernmost land area in the world, Johannes V. Jensen Land in North Greenland, has been almost totally unknown until recently. A few lichen collections from the region have been mapped by Thomson (1984, 1997), but no attempt at establishing a more complete survey of the lichen flora of Johannes V. Jensen Land has been made. Although a few Twin Otter strips have been established in the area, it still is considered difficult of access just as most parts of Peary Land south of Frederick E. Hyde Fjord and the region west of Johannes V. Jensen Land. Thorild Wulff collected 64 lichen taxa in this region (c. 83° N) in June 1917 during the 2nd Thule Expedition. He died from exhaustion during the sledge-journey, but his collections were saved and afterwards published by Lynge (1923). The British physician, Roderich Corner, visited the Frigg Fjord area in southern Johannes V. Jensen Land in June and July 1995 and collected a very valuable material of lichens, which was handed over to the author for determination. Two specimens were collected by Jean Balfóur and Hugh Lang, respectively. 41 species of lichens collected during this expedition have been identified and form the basis of the present paper. In June and July 1988 the author collected and published about 90 taxa of lichens in the Jørgen Brønlund

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area just north of Independence Fjord in southern Peary Land (Hansen, 1995a). He also outlined the previous lichenological collection work in Peary Land. Holmen (1957), who made very extensive plant collections in Peary Land, also provided a detailed survey of the general botanical work in this area. The author visited the northernmost part of Johannes V. Jensen Land in July and August 2007 and collected numerous lichens, which hopefully will be determined in the near future.

MATERIAL AND METHODS

Study area

Frigg Fjord is located at c. 83°10´N in the southern part of Johannes V. Jensen Land. It flows into Frederick E. Hyde Fjord. From the head of Frigg Fjord two valleys, viz. Drivhuset and Grønnemark, extend westwards and northwards, respectively. The surrounding mountains rise to altitudes of about 1000 m a. s. l. Lower Cambrian mudstones, siltstones and sandstones belonging to the Polkorridoren Group dominate around the fjord (Peel & Sønderholm, 1991), and erratic boulders occur commonly in the lowland area. The soil is neutral to slightly alkaline in most places. Dwarf shrub heaths, fell-fields, marshes, snow patches and epilithic plant communities are the most important vegetation types. The climate of the Frigg Fjord area is high arctic with low temperatures, low precipitation and maximum 2 months with mean temperatures above 0°C (Bay, 1992). Most of the precipitation falls as snow.

Collection and Identification

Lichens were collected at many sample plots in the Frigg Fjord area situated within the floristic province N (Böcher *et al.*, 1978; Fig. 1). The collected material, a total of 50 lichen specimens, was studied with Zeiss light microscopes and checked by the author. Lichens, which are new to Peary Land, are marked by an asterisk (*) in front of the name in the following list of lichens. The specimens are deposited at the Botanical museum, University of Copenhagen (C). The nomenclature in the following list of lichens mainly follows Santesson *et al.* (2004).

LIST OF LICHENS

Alectoria ochroleuca (Hoffm.) Massal. – West side of Grønnemark, 83°13´N, 34°20´W, alt. c. 800 m, on soil on sheltered scree, R. Corner 11 July 1995.

A. ochroleuca has a circumpolar, arctic-alpine distribution (Thomson, 1984).

Brodoa oroarctica (Krog) Goward – East side of Grønnemark, 83°12´N, 34°07´W, on boulder below small cliff near lake, R. Corner 30 June 1995; head of Grønnemark, 83°14´N, 34°10´W, alt. 180 m, on boulder below cliff, R. Corner 5 July 1995.

B. oroarctica has a circumpolar, arctic and northern boreal distribution (Thomson, 1984).

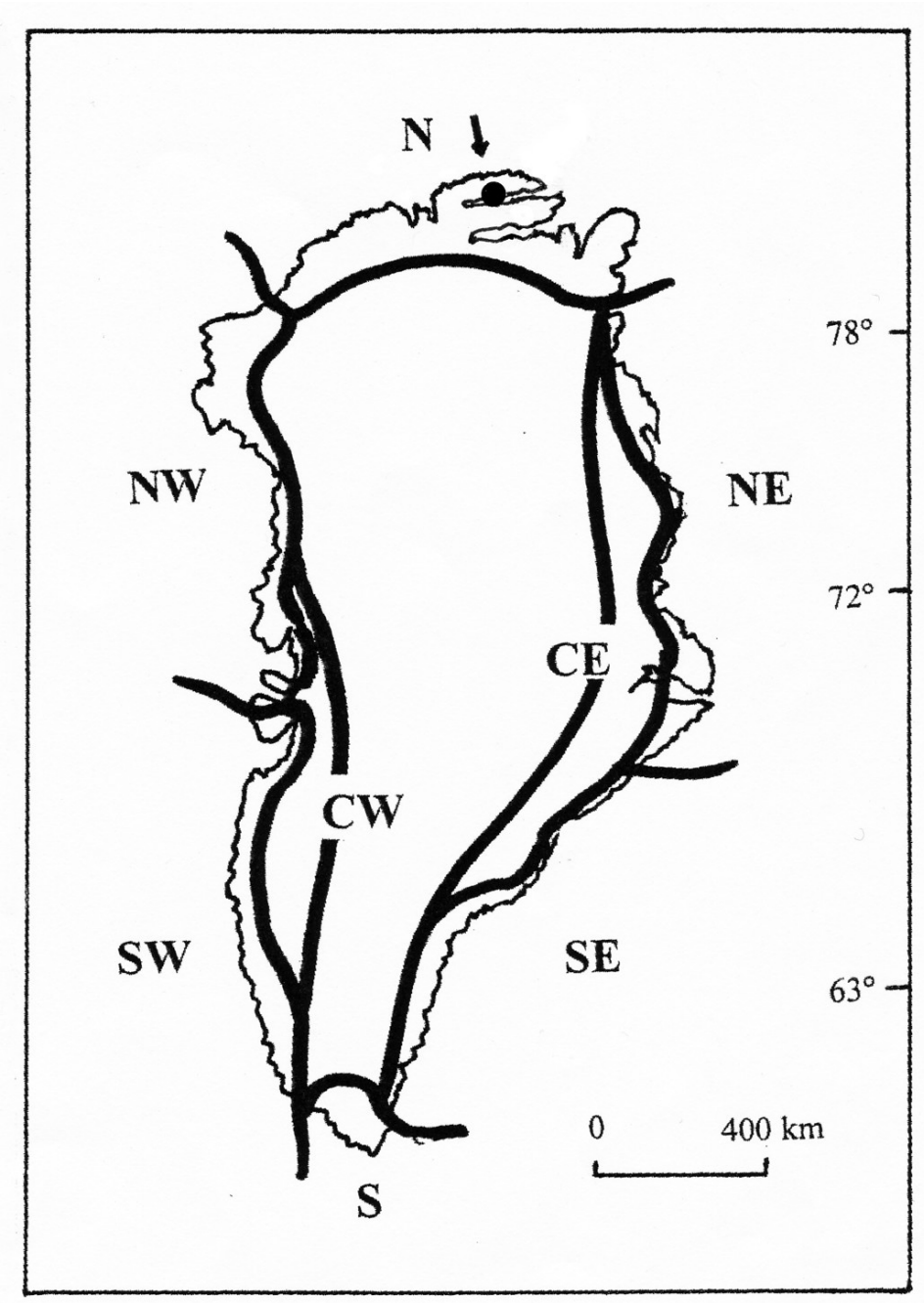

Fig. 1. The floristic provinces of Greenland according to Böcher *et al.* 1978 (N = North Greenland, NE = North East Greenland, CE = Central East Greenland, SE = South East Greenland, S = South Greenland, SW = South West Greenland, CW = Central West Greenland, NW = North West Greenland). The present investigation area is marked with a dot in North Greenland.

Bryoria chalybeiformis (L.) Brodo & D. Hawksw. – East side of Grønnemark, 83°12´N, 34°07´W, alt. 290 m, on soil among boulders below small cliff near lake, R. Corner 30 June 1995; west side of Grønnemark, 83°13´N, 34°20´W, alt. c. 800 m, on soil on sheltered scree, R. Corner 11 July 1995.

B. chalybeiformis has a circumpolar and bipolar, arctic-alpine distribution (Thomson, 1984).

Caloplaca tiroliensis Zahlbr. – Site west of the head of Frigg Fjord, 83°11´N, 34°35´W, alt. 100 m, on mosses together with *Psoroma tenue* and *Rinodina turfacea*, R. Corner 29 June 1995; site west of Grønnemark, 83°12´N, 34°20´W, alt. 400 m, on thallus of *Peltigera leucophlebia* on dry rocky slope, R. Corner 12 July 1995.

C. tiroliensis has a circumpolar and bipolar, arctic-alpine distribution (Hansen, 1995b; Thomson, 1997). In Greenland the species grows on many substrate types, for example, soil, mosses, plant remains, bark, old excrements of mountain hare and musk ox, old bones and reindeer antlers (Hansen, 1982; Hansen *et al.*, 1987).

* ***Candelariella terrigena*** Räsänen – Southern end of Grønnemark, 83°12´N, 34°07´W, alt c. 200 m, on plant remains together with *Flavocetraria nivalis*, *Lecanora hagenii* v. *fallax* and *Physconia muscigena* at base of cliff, R. Corner 30 June 1995.

C. terrigena has a circumpolar, arctic-alpine distribution (Andreev *et al.*, 1996; Thomson, 1997; Hansen, 2002).

* ***Cetraria muricata*** (Ach.) Eckfeldt – East side of Grønnemark, 83°12´N, 34°07´W, alt. 200 m, on soil among boulders below small cliff near lake together with *Physconia muscigena* and different mosses, R. Corner 30 June 1995.

C. muricata has a circumpolar, arctic-alpine, boreal and temperate distribution (Hansen, 1995b).

Cetrariella delisei (Bory ex Schaer.) Kärnefelt & Thell – Site west of Grønnemark, 83°13´N, 34°20´W, alt. 800 m, on soil on scree, H. Lang 11 July 1995.

C. delisei has a circumpolar, arctic-alpine distribution (Thomson, 1997).

Cladonia pocillum (Ach.) Grognot – Drivhuset, at the head of Frigg Fjord, 83°12´N, 34°15´W, alt. c. 50 m, on soil, R. Corner 27 June 1995.

C. pocillum has a circumpolar, arctic, boreal and temperate distribution (Hansen, 1995b).

Collema substellatum H. Magn. – Northern end of Grønnemark, 83°14´N, 34°15´W, alt. c. 180m, on soil in rocky area, R. Corner 1 July 1995.

C. substellatum has a disjunct distribution and is so far known from Greenland, Spain and Mongolia (Hansen, 1993, 1995a).

Collema undulatum Laurer ex Flot. – Site west of Drivhuset, 83°11´N, 34°35´W, alt. 100 m, on silty soil, R. Corner 29 June 1995; northern end of Grønnemark, 83°14´N, 34°15´W, alt. 180 m, on silty soil in rocky area, R. Corner 4 July 1995.

The collected specimens can be referred to v. *granulosum* Degel., which has a circumpolar, arctic-alpine distribution (Andreev *et al.*, 1996; Thomson, 1997; Hansen, 2005).

* ***Cystocoleus ebeneus*** (Dillwyn) Thwaites – West side of Grønnemark, 83°13´N, 34°20´W, alt. c. 700 m, on stones and soil below snow patch on scree together with *Lepraria* sp., R. Corner 11 July 1995.

C. ebeneus is known from Europe, North and South America, Greenland, New Zealand and Antarctica (Purvis *et al.* 1992; Esslinger & Egan, 1995; Hansen, 1997).

Dermatocarpon miniatum (L.) W. Mann – Northern end of Grønnemark, 83°14´N, 34°15´W, on rock at the base of S.-exposed cliff, R. Corner 4 July 1995.

D. miniatum has a circumpolar, arctic to temperate distribution (Hansen, 1995b).

Flavocetraria nivalis (L.) Kärnefelt & Thell – Southern end of Grønnemark, 83°12´N, 34°07´W, alt. c. 200 m, on mosses at the base of cliff, R. Corner 30 June 1995.

F. nivalis has a circumpolar, arctic and boreal distribution (Hansen, 1995b).

* ***Hypogymnia subobscura*** (Vain.) Poelt – East side of Grønnemark, 83°12´N, 34°07´W, alt. 290 m, on soil among boulders below small cliff near lake together with *Bryoria chalybeiformis* and *Melanelia infumata*, R. Corner 30 June 1995 (two specimens).

H. subobscura has a circumpolar, arctic-alpine distribution (Hansen, 1995b).

Lecanora hagenii (Ach.) Ach. – Southern end of Grønnemark, 83°12´N. 34°07´W, alt. c. 200 m, on mosses under boulder, R. Corner 30 June 1995. The specimen can be referred to v. *fallax* Hepp (Syn. *L. behringii* Nyl.) growing on mosses and plant remains.

L. hagenii v. *fallax* has a circumpolar, arctic-alpine distribution (Thomson, 1997; Hafellner & Türk, 2001).

* ***Lecidea tesselata*** Flörke – Drivhuset, 83°12´N, 35°55´W, alt. 280 m, on soil and stones over rock, R. Corner 8 July 1995.

L. tesselata has a circumpolar and bipolar, arctic to temperate distribution (Thomson, 1997).

* ***Leptogium lichenoides*** (L.) Zahlbr. – Drivhuset, at the head of Frigg Fjord, 83°12´N, 34°15´W, alt. 100 m, on mosses in *Cassiope tetragona* heath, R. Corner 27 June 1995; Grønnemark, 83°13´N, 34°12´W, c. 100 m, on mosses, R. Corner 1 July 1995.

L. lichenoides has a circumpolar, arctic-alpine to temperate distribution (Hansen, 1995b; Hafellner & Türk, 2001).

Melanelia commixta (Nyl.) Thell – West side of Grønnemark, 83°13´N, 34°20´W, alt. 900 m, on boulder on scree together with *Pseudephebe minuscula*, R. Corner 11 July 1995.

M. commixta has a circumpolar, arctic-alpine and boreal distribution (Hansen, 1995b).

Melanelia infumata (Nyl.) Essl. – East side of Grønnemark, 83°12´N, 34°17´W, on manured boulder below cliff near lake, R. Corner 30 June 1995

(three specimens); head of Grønnemark 83°14´N, 34°10´W, alt. 180 m, on manured boulder below cliff together with *Physcia caesia*, R. Corner 5 July 1995 (two specimens).

M. infumata has a circumpolar, arctic-alpine and boreal distribution (Hansen, 1995b).

* ***Peltigera leucophlebia*** (Nyl.) Gyeln. – West side of river draining Grønnemark, 83°12´N, 34°12´W, alt. 100 m, on mosses in *Cassiope tetragona* heath, R. Corner 27 June 1995; site west of Grønnemark, 83°12´N, 34°02´W, alt. 400 m, on dry rocky slope, R. Corner 12 July 1991.

P. leucophlebia has a circumpolar, arctic-alpine, boreal and temperate distribution (Hansen, 1995b).

Peltigera rufescens (Weiss) Humb. – West side of river draining Grønnemark, 83°12´N, 34°12´W, alt c. 50 m, on plant remains, R. Corner 27 June 1995; valley in the northern part of Grønnemark, 83°16´N, 34°25´W, on mosses on S.- exposed slope, R. Corner 5 July 1995.

P. rufescens has a circumpolar, arctic-alpine, boreal and temperate distribution (Hansen, 1995b).

Phaeophyscia sciastra (Ach.) Moberg – East side of Grønnemark, 83°12´N, 34°07´W, alt. 200 m, on manured boulder below cliff near lake together with *Umbilicaria virginis*, R. Corner 30 July 1995.

P. sciastra has a circumpolar, arctic-alpine, boreal and temperate distribution (Hansen, 1995b; Hafellner & Türk, 2001).

Physcia caesia (Hoffm.) Fürnr. – Head of Grønnemark, 83°14´N, 34°10´W, alt. 180 m, on manured boulder, R. Corner 5 July 1995.

P. caesia has a circumpolar, arctic-alpine, boreal and temperate distribution (Hansen, 1995b).

Physconia muscigena (Ach.) Poelt – East side of Grønnemark, 83°12´N, 34°07´W, on mosses below cliff, R. Corner 30 June 1995 (two specimens).

P. muscigena has a circumpolar, arctic-alpine and boreal distribution (Hansen, 1995b).

* ***Pleopsidium chlorophanum*** (Wahlenb.) Zopf – West side of Grønnemark, 83°13´N, 34°20´W, alt. c. 900 m, on siliceous rock, J. Balfóur 9 July 1995.

P. chlorophanum has a circumpolar, arctic-alpine distribution (Hansen, 1995b).

Pseudephebe minuscula (Nyl. Ex Arnold) Brodo & D. Hawksw. – West side of Grønnemark, 83°13´N, 34°20´W, alt. 900 m, on boulder on scree, R. Corner 11 July 1995.

P. minuscula has a circumpolar and bipolar, arctic-alpine distribution (Hansen, 1995b).

Psoroma tenue Henssen – Site west of the head of Frigg Fjord, 83°11´N, 34°35´W, alt. 100 m, on mosses, R. Corner 29 June 1995; Grønnemark, 83°14´N, 34°10´W, alt. c. 180 m, on mosses, R. Corner 5 July 1995.

P. tenue has a circumpolar, arctic-alpine and boreal distribution (Jørgensen, 2004). The specimen can be referred to v. *boreale* Henssen.

Rhizocarpon jemtlandicum (Malme) Malme – West side of Grønnemark, 83°13´N, 34°20´W, alt. c. 1000 m, on siliceous stone, R. Corner 11 July 1995.

R. jemtlandicum has a circumpolar, arctic and boreal distribution (Hansen, 1995b).

Rhizoplaca melanophthalma (DC.) Leuckert & Poelt – Site west of Drivhuset, 83°11´N, 34°35´W, alt. c. 100 m, on manured boulder, R. Corner 29 June 1995.

R. melanophthalma has a circumpolar, arctic-alpine and boreal distribution (Hansen, 1995b).

Rinodina turfacea (Wahlenb.) Körb. – Site west of the head of Frigg Fjord, 83°11´N, 34°35´W, alt. 100 m, on mosses, R. Corner 29 June 1995.

R. turfacea has a circumpolar, arctic-alpine distribution (Hansen, 1995b).

* ***Sarcogyne regularis*** Körb. – Drivhuset, 83°11´N, 34°10´W, alt. c. 100 m, on clayey soil, R. Corner 27 June 1995.

S. regularis has a very wide distribution on the northern hemisphere and is also known from New Zealand (Purvis *et al.*, 1992). The species has previously been reported from Central West and North East Greenland (Lynge, 1937, 1940).

Solorina bispora Nyl. – Head of Grønnemark, 83°16´N, 34°20'W, alt. 200 m, on bare soil near glacier, R. Corner 5 July 1995.

S. bispora has a circumpolar, arctic-alpine and boreal distribution (Hansen, 1995b).

Solorina saccata (L.) Ach. – Drivhuset, 83°12´N, 34°15´W, c. 50 m, on moist, bare soil, R. Corner 27 June 1995; slope west of "540-glacier", 83°17'N, 34°20´W, alt. 400 m, on soil and plant remains, R. Corner 3 July 1995.

S. saccata has a circumpolar, arctic-alpine, boreal and temperate distribution (Hansen, 1995b; Hafellner & Türk, 2001).

* ***Solorina spongiosa*** (Ach.) Anzi – Grønnemark, 83°15´N, 34°15´W, alt. c. 200 m, on soil, R. Corner 4 July 1995.

S. spongiosa has a circumpolar, arctic-alpine, boreal and temperate distribution (Hansen, 1995b).

Stereocaulon alpinum Laurer – Site west of Drivhuset, 83°12´N, 34°25´W, alt. c. 100 m, on soil in *Cassiope tetragona* heath at the edge of *Carex stans* mire, R. Corner 10 July 1995.

S. alpinum is a common arctic-alpine species with a very wide, circumpolar and bipolar distribution (Purvis *et al.*, 1992; Hansen, 1995b).

Thamnolia vermicularis (Sw.) Schaer. – Northern end of Grønnemark, 83°14´N, 34°10´W, on mosses among boulders, R. Corner 4 July 1995. The specimen can be referred to v. *subuliformis* (Ehrh.) Schaer., which reacts UV + yellow.

T. vermicularis has a wide circumpolar and bipolar distribution and is common in arctic-alpine areas (Purvis *et al.*, 1992; Hansen, 1995b).

Umbilicaria decussata (Vill.) Zahlbr. – West side of Syd Gletscher, Grønnemark, 83°16´N, 34°25´W, alt. 400 m, on rock, R. Corner 3 July 1995.

U. decussata has a circumpolar, arctic-alpine and boreal distribution (Hansen. 1995b).

Umbilicaria krascheninnikovii (Savicz) Zahlbr. – Site west of Drivhuset, 83°11´N, 34°35´W, alt. 100 m, on manured boulder, R. Corner 29 June 1995; east side of Grønnedal, 83°12´N, 34°07´W, on boulder below cliff, R. Corner 30 June 1995.

U. krascheninnikovii has a circumpolar, arctic-alpine distribution (Hansen, 1995b).

Umbilicaria lyngei Schol. – West side of Grønnedal, 83°13´N, 34°20´W, alt. c. 800 m, on boulder, R. Corner 11 July 1995.

U. lyngei has a circumpolar, arctic-alpine distribution (Hansen, 1995b).

Umbilicaria virginis Schaer. – East side of Grønnemark, 83°12´N, 34°07´W, alt. 200 m, on manured boulder, R. Corner 30 June 1995; northern end of Grønnemark, 83°14´N, 34°10´W, alt. 200 m, on boulder, R. Corner 4 July 1995.

U. virginis has a circumpolar, arctic-alpine and boreal distribution (Hansen, 1995b).

* ***Usnea sphacelata*** R. Br. – West side of Grønnemark, 83°13´N, 34°20´W, alt. 1000 m, on boulder on scree, R. Corner 11 July 1995.

U. sphacelata has a circumpolar and bipolar, arctic-alpine distribution (Hansen, 1995b; Andreev *et al.*, 1996).

CONCLUSION

Although rather small as regards the number of specimens, R. Corner´s lichen collections from Johannes V. Jensen Land are of great importance, because this land area, the northernmost of the world, is almost completely unknown lichenologically. As expected lichens growing on boulders manured by birds (e.g., *Melanelia infumata*, *Phaeophyscia sciastra* and *Rhizoplaca melanophthalma*) and lichens occurring on slightly alkaline soil (e.g., *Cladonia pocillum*, *Solorina bispora* and *S. saccata*) are fairly well represented in the material. This also applies to lichen species preferably growing in *Cassiope* heath patches (e.g., *Cetrariella delisei*, *Peltigera leucophlebia* and *Stereocaulon alpinum*). It is of great interest that the rare disjunct lichen, *Collema substellatum*, appeared to be included in the material, which generally is rich in species known from more southern parts of Peary Land.

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