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A phytogeographical study of South Greenland. Vascular plants

Jon Feilberg

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South Greenland, extending from 59° 45′ to 62° 20′ N., is considered a botanical province ranking with those of West, North and East Greenland. The province is divided into six vegetational zones, based on the distribution of selected taxa.

A phytogeographical analysis grouped the 346 taxa into eleven distribution types, each with two to seven subtypes. Each taxon is characterized further by a map of its distribution in South Greenland, by its holarctic distribution type (HDT) and climatic distribution type (CDT), and by a chorological index value (CI).

The flora of South Greenland is compared with that of adjacent areas in Greenland, and its affinities to the floras of Europe and North America shows a slight predominance of the American elements.

The following new combinations are proposed: *Elymus violaceus* (Hornem.) J. Feilberg, *Lychnis alpina* L. ssp. *americana* (Fern.) J. Feilberg and *Vaccinium oxycoccos* L. ssp. *microphyllum* (Lange) J. Feilberg.

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Introduction

The phytogeographical problems of the North Atlantic area have attracted growing attention since "The Amphi-Atlantic plants" (Hultén 1958) was published. His succeeding books (Hultén 1962 and 1971) together with others (e.g. Löve & Löve 1963) have furthered the discussion. Detailed studies of minor areas may contribute to the solution of various geobotanical problems. The flora of the Faroes and Jan Mayen has previously been mapped (Hansen 1966, Lid 1964) and the flora of Iceland has partly been mapped (Grøntved 1942).

South Greenland has a particular phytogeographical position, since it shows representatives of four great flora elements: arctic, boreal, American and Eurasian. In addition, the province is the floristically best known in Greenland, partly due to the activities of the Greenland Botanical Survey. On account of this, it seemed but natural to make a detailed study of the phytogeography of South Greenland, in as much as a floristic survey of the province has never been published. The northern limit of South Greenland is here placed at 62° 20′ N (Fig. 1), and compared with previous delimitations (e.g. Böcher *et al.* 1978) this is a great extension northwards, which is justified by the close relationship between the floras of the Ivigtût and Narssarssuaq areas. In the following the name South Greenland refers to this area of 73000 km^2, 26000 of which are free of permanent ice.

Climate

The great amount of precipitation on the east coast (Fig. 2) is caused by cyclons frequently passing south of Kap Farvel. The rather high precipitation in Ivigtût area of the west coast (Station 2 and 3, Table 1) is caused by cyclons following another route going northwards. The stations 4 to 12 show moderate precipitation which is principally brought in by southwestern winds as revealed from NOAA satellite pictures.

Mean summer temperatures of June, July and August show marked differences between the outer coast and the inland; only minor differences exist among coastal stations, where low temperatures occur partly because of the proximity of the Polar Ice drift. This ice causes foggy conditions all along the outer coast of South Greenland. The annual mean temperature ranges between 2.2°C at Igaliko (Station 5) and –0.6°C at Kap Cort Adelaer (Station 15), apart from which Pâmiut/Frederikshåb (Station 1) is the only station with an annual mean temperature below freezing point.

The wind condition changes from one station to another, depending on the local topography. Ivigtût and Kangilínguit/Grønnedal (Stations 2 and 3) have the largest number of calm days. Foehns may occur all through the year causing the greatest damage to vegetation during winter.

The continentality, as expressed by Conrad's index

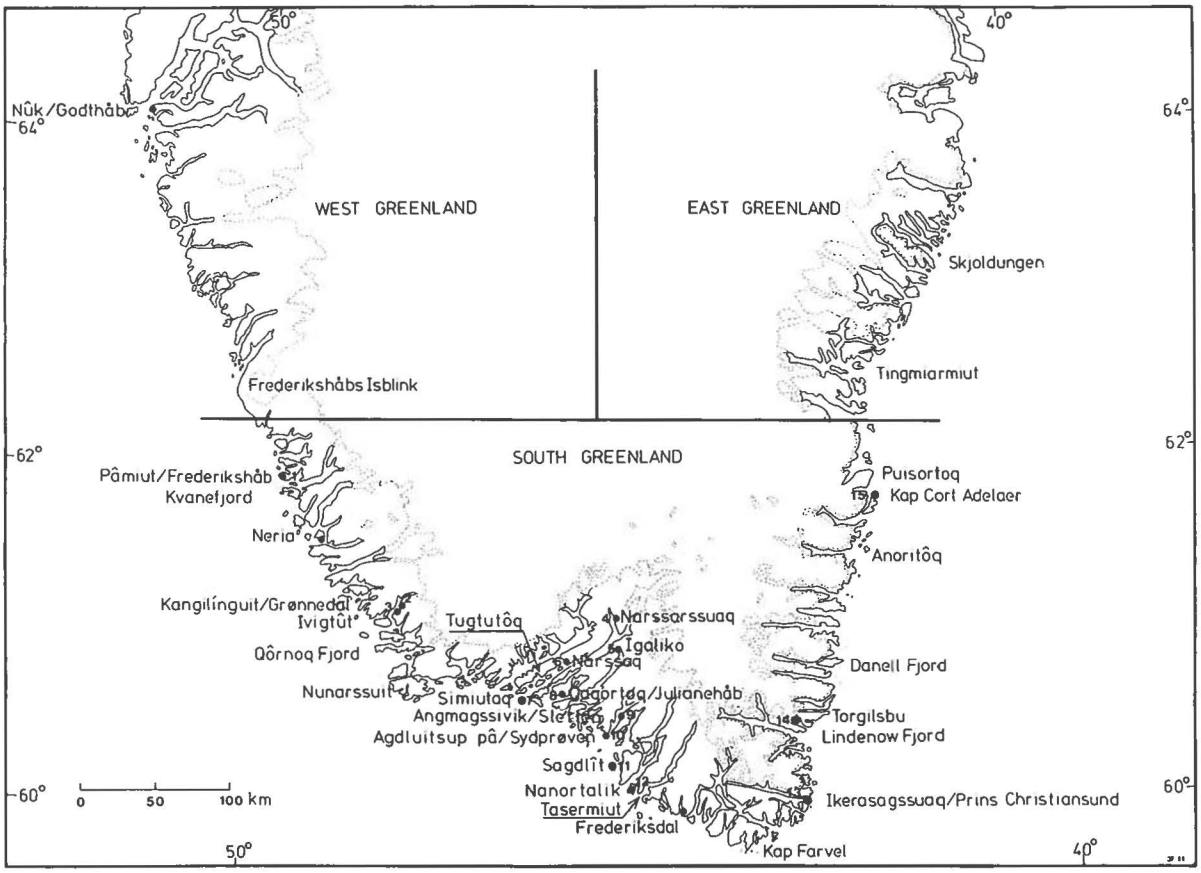

Fig. 1. Southern Greenland. Weather stations are numbered from one to fifteen.

(p. 11), is low, $3 \leq C \leq 16$, and the humidity, expressed by de Martonne's index (p. 11), is high $59 \leq H \leq 213$ (Table 1). For comparison, Bergen, Norway, has C = 13 and H = 113 and Søndre Strømfjord, West Greenland has C = 36 and H= 25.

Geology

Two major complexes dominate South Greenland, i.e. the Archaean gneiss complex in the northwestern part and the Ketilidian mobile belt in the rest of South Greenland (Fig. 3). Bridgwater *et al.* (1976: 20) summarized the former as follows: "Between 80 and 90% of the Archaean complex consists of granitoid quartzofeldspathic gneisses, of which major parts appear to have been derived from acid or intermediate igneous rocks. They are intercalated with units of amphibolite, which appear to be mainly derived from metavolcanics, a minor amount of metasedimentary gneisses, and concordant units of metaanorthosite and associated metabasic igneous rocks characterised by very calcic plagioclase. These units range from a few centimetres to a few kilometres in thickness".

Allaart (1976: 121) summarized as follows: "The Ketilidian mobile belt comprises gneisses, granites and metamorphosed supracrustal rocks and is characterised by the occurrence of numerous late, intrusive granite plutons covering large areas··· The mobile belt can be subdivided into several zones from the northern margin towards the south: (1) The northern border zone in the northern part of which Ketilidian sediments and volcanic rocks overlie Archaean gneisses and supracrustal rocks uncorformably. Towards the south these are progressively involved in Ketilidian metamorphism and deformation. (2) A complex body of granites, diorites and gneissose granites (Julianehåb granite) in which a central zone of late intrusive granites can be distinguished. (3) An intricately folded zone of granites, gneisses and migmatised Proterozoic or earlier sediments and volcanic rocks with amphibolite facies mineralogy. (4) A flat-laying, slightly domed, migmatic complex of high-grade . . . metasediments and metavolcanic rocks, early Ketilidian granite sheets and numerous late Ketilidian granite intrusions".

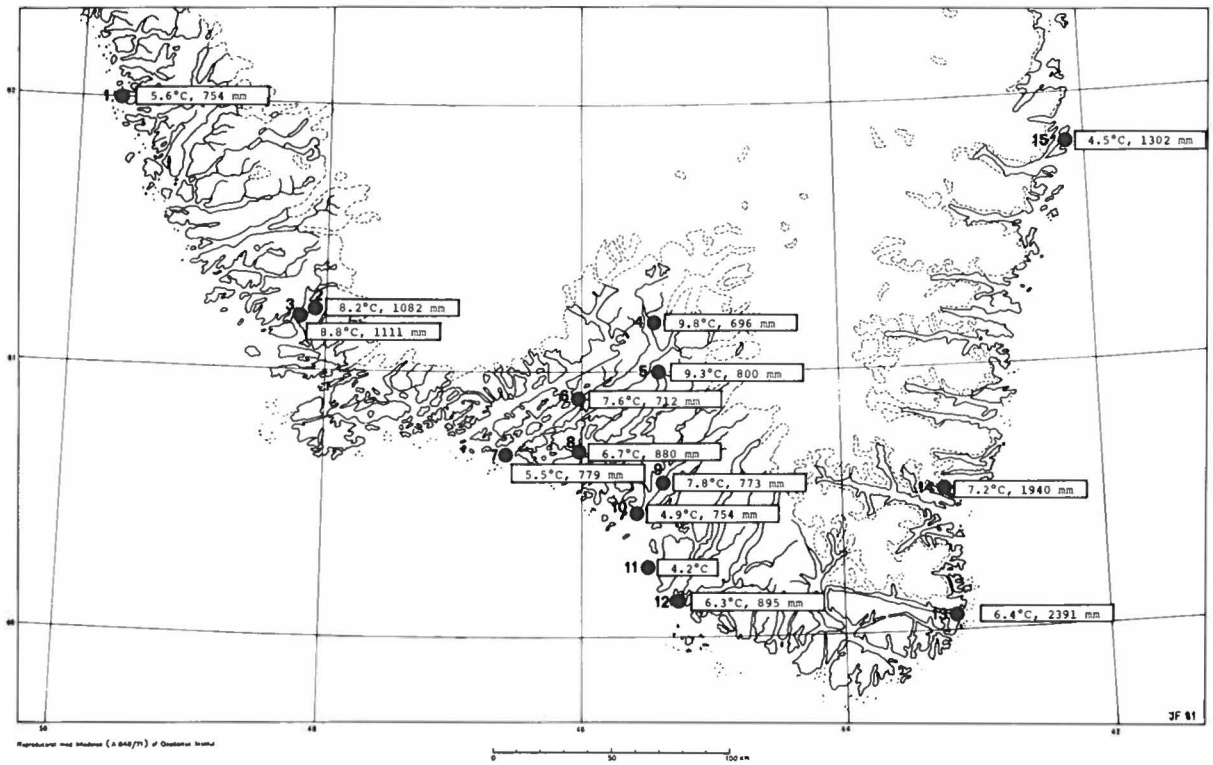

Fig. 2. Mean summer temperatures (June, July, August) and annual precipitation at the weather stations (Table 1).

In several areas the Ketilidian mobile belt is intruded by alkaline plugs and dykes from the Gardar period. The common rocks are syenites, granites, dolerites, gabbros and sandstones. The Ilímaussaq intrusion (Fig. 3) is remarkable by its low contents of Ca and high contents of Na, K and many exotic elements.

During the Quaternary, South Greenland was heavily glaciated, even though restricted areas may have remained unglaciated (Weidick 1976: 437). The ice-cover ceased ca 9500 ^{14}C years ago (Fredskild 1973: 232). The upper marine limit ranges from 25 to 60 m above sea level (Weidick 1976: 450, Fredskild 1973: 39).

Table 1. Weather stations and their indices.

No.	Station	Yrs of observation	Source	C	H
1	Pâmiut/Frederikshåb	1951–1960	MI	10	75
2	Kangilínguit/Grønnedal	1951–1960	MI	12	98
3	Ivigtût	1951–1960	MI	13	94
4	Narssarssuaq	1941–1948	Bl	16	59
5	Igaliko	1933–1946	MI	14	66
6	Narssaq	1944–1948	Bl	8	65
7	Simiutaq	1942–1948	Bl	7	76
8	Qaqortoq/Julianehåb	1916–1925	MI	12	81
9	Angmagssivik/Sletten	1934–1942	MI	10	68
10	Agdluitsup pâ/Sydprøven	1939–1946	MI	4	70
11	Sagdlît	1907–1914	MI	3	–
12	Nanortalik	1931–1946	MI	5	76
13	Ikerasagsssuaq/Pr. Christianssund	1951–1960	MI	6	213
14	Torgilsbu	1933–1940	MI	7	163
15	Kap Cort Adelaer	1943–1948	Bl	5	139

Sources: Bl = Blinkenberg (1952).
MI = Unpublished material from the Meteorological Institute, Copenhagen.
C: Conrad's index of continentality (p. 11).
H: de Martonne's index of humidity (p. 11).

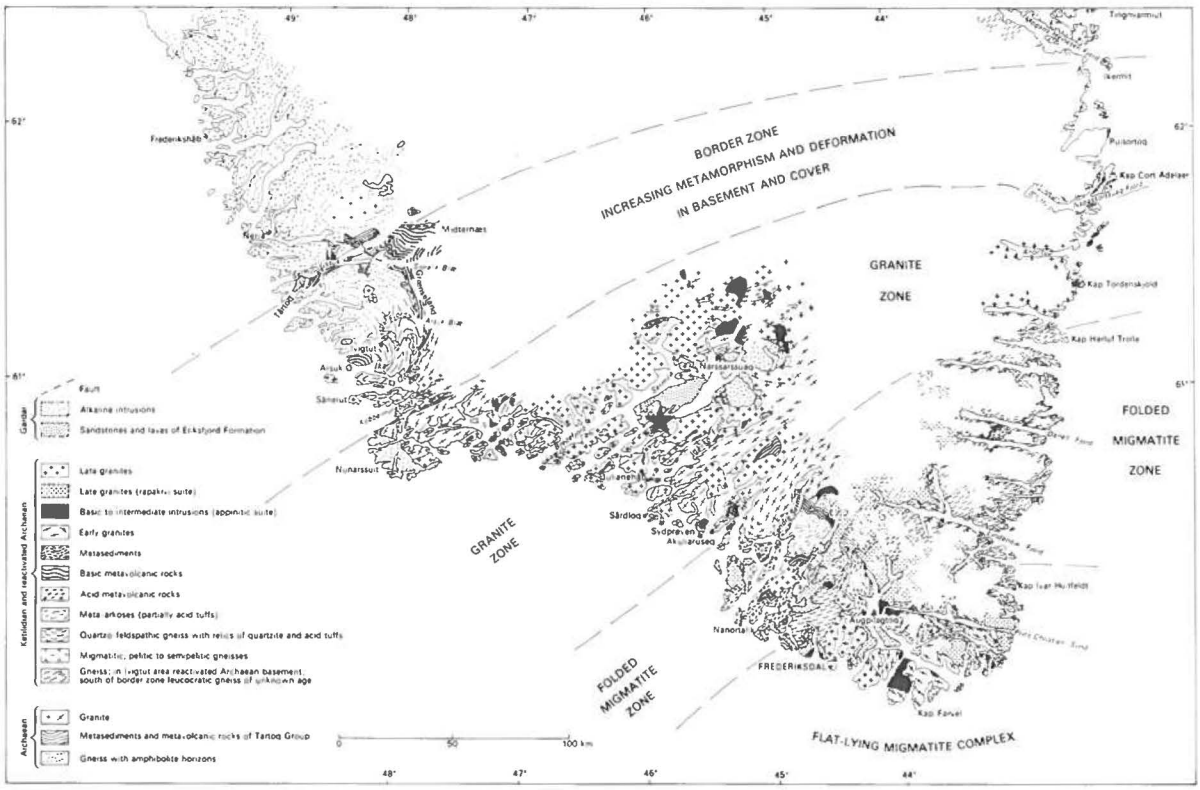

Fig. 3. Geological map of South Greenland (From Allaart 1976). The Ilímaussaq intrusion is marked by an asterix: further explanation in the text.

Topography

Alpine topography (Fig. 4) (Krüger 1974) dominates the eastern, southern, and southwestern parts and two small areas near Nunarssuit and Ivigtût (Fig. 1). Rounded mountain topography characterizes vast areas of the rest of South Greenland, with the broadest valleys around Narssarssuaq, but in the coastal areas hilly topography is commonly found as well.

Soil

The South Greenland soils range from Syrosem through Ranker and Brown soils to Podsols (Larsen 1977). Brown soils are most widespread and occur in rather densely vegetated areas. Syrosem soils are widespread too, but developed in areas with open and scattered vegetation. Ranker soils are found where the vegetation constitutes just a continuous cover, while Podsols are developed under dense vegetation, particularly in areas with high precipitation (Hansen 1969). Topsoils have pH 4–7 (Hansen 1969, Larsen 1977), the highest values from the inland.

Vegetation and flora

Previous investigations

Jens Vahl was the first naturalist to collect plants in South Greenland on a large scale. In the years 1828 and 1829 he travelled along the South Greenland coast, collecting about two thousand specimens, most of which are deposited in C. He never published these, but they are mentioned by Lange (1880b).

The first ecological study on the Greenland flora was presented by Warming (1888). The first chapter deals with South Greenland, but as Warming never visited this area, his description is general. The most comprehensive work intended as a supplement to Warming (1888), is that of Rosenvinge (1896). In this Rosenvinge discussed the "Norse-plants", subsequently dealt with by Ostenfeld (1926), Porsild (1932), Pedersen (1972), and Fredskild (1973, 1978). The flora of Southeast Greenland is described separately in Devold & Scholander (1933), Seidenfaden (1933), and Böcher (1938). Eight expeditions to South Greenland resulted in the following floristic papers: Berlin (1884), Holm (1887), Eberlin (1887), Porsild (1930), Polunin (1943), Lagerkranz (1950), Ødum (1958), and Young (1980).

The adventitious flora is dealt with by Porsild (1932)

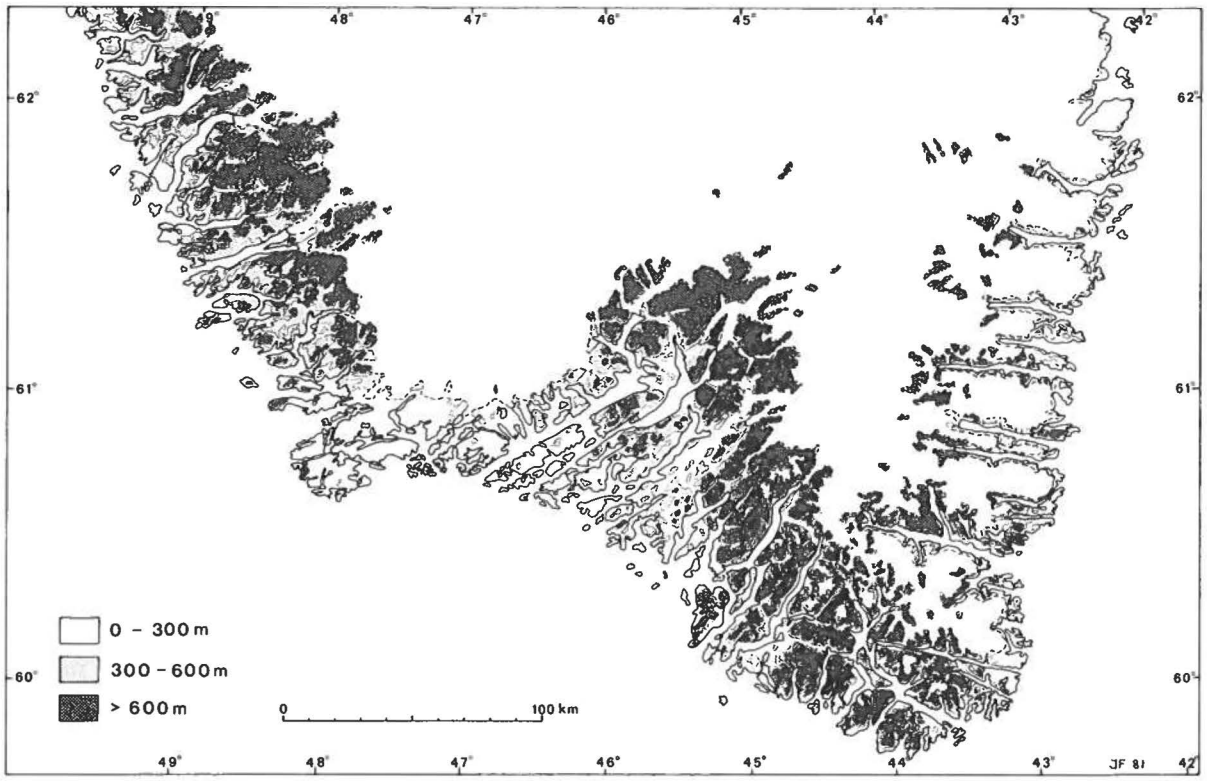

Fig. 4. Topographical map of South Greenland.

and Pedersen (1972). Jørgensen *et al.* (1957) give a taxonomical and cytological survey on the Greenland flora, and Böcher *et al.* (1959) presented a synoptical study. Phytogeographic papers touching South Greenland are Lange (1880a), Simmons (1913), Böcher (1938, 1963). Böcher *et al.* (1968, 1978) give an up-to-date flora. In his book on the Greenland botany, Böcher (1975) includes most botanical subjects.

Since 1962 the Greenland Botanical Survey (G.B.S.) has arranged yearly expeditions, ten of which heading for South Greenland. Only a minor part of this extensive material has been published (Fredskild 1964, Hansen & Lægaard 1966, Kliim-Nielsen 1971, Øllgaard 1971, Pedersen 1972, Hansen 1973, Frederiksen 1974, 1977, 1983, Feilberg 1975, Løjtnant & Jacobsen 1977).

History

The age of the Greenland flora and the possible immigration routes are still not fully known. Some authors have argued that Greenland was almost free of vegetation during the maximum glaciation (the theory of "tabula rasa") (Nathorst 1890, Simmons 1913, and Porsild 1922), while others have argued that almost all present species thrived in the country during the Quaternary on different kinds of "nunataks" (the theory of "refugium") (Eberlin 1887, Warming 1888, Gelting 1934, and Böcher 1938, 1956, and 1975). However, Ostenfeld (1926), Iversen (1952–53), Fredskild (1973), and Funder (1979) argue that only a small number of mainly ubiquitous species with arctic-alpine distributions survived the glaciations in Greenland in various refugia, the remainder of the present species thus being postglacial immigrants.

According to various authors, the number of European species introduced by the Norse settlers during five centuries of colonization range from a few to about 80 (Ostenfeld 1926, Pedersen 1972). Iversen (1938) and Polunin (1943) mention the possibility of American plants being introduced to southwestern Greenland by Norse settlers, particularly stressing *Sisyrinchium montanum* and *Danthonia spicata.* I consider the following taxa being Norse plants: *Achillea millefolium* s.l., *Leontodon autumnalis, Rumex longifolius, Vicia cracca* ssp. *cracca,* some strains of *Rumex acetosa, Rumex acetosella,* and several weeds e.g. *Capsella bursa-pastoris* and *Gnaphalium uliginosum.*

General description

Dwarf-shrub heath is the most widespread plant community, dominated by one or more of the following: *Betula glandulosa, Vaccinium uliginosum, Empetrum*

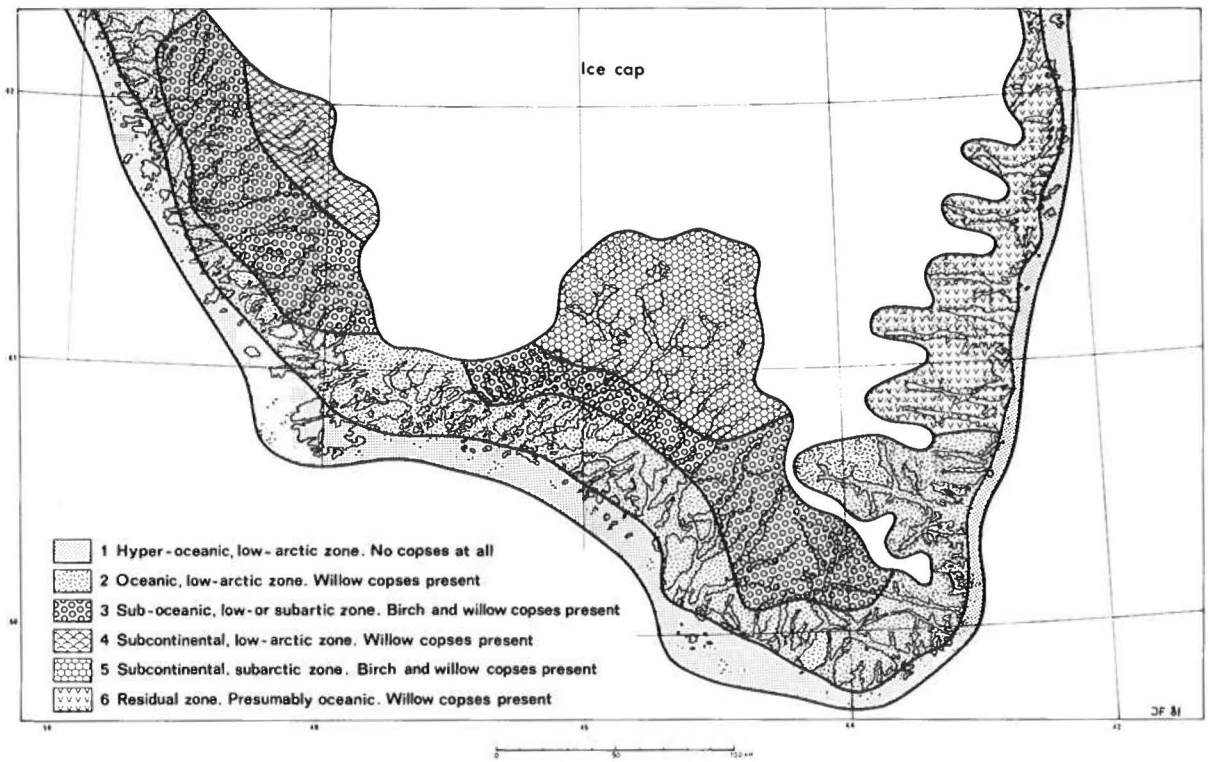

Fig. 5. Vegetational zones: further explanation in the text.

nigrum and *Salix glauca*. *Empetrum nigrum* prevails in coastal heaths, while the inland heaths are dominated by the other taxa.

Willow copses cover fairly large areas in the lowlands, particularly slopes with abundant snow-cover during winter. The ground vegetation may be dominated by ferns, grasses, or forbs like *Ranunculus acer* and *Lathyrus japonicus*. In the inner parts of the fiords the highest copses reach about 2 metres. *Sorbus groenlandica* is rather frequent, either isolated or scattered in the copses, and *Alnus crispa* is found in the western part of the province. *Betula pubescens* constitutes open woodlands or thickets on the most favored places. The highest birch stems reach 10 metres (Poul Bjerge, personal communication), but generally the height ranges between 2 and 5 metres. The stems are polycormic and tortuous.

Herb-slopes are most luxuriant in the inner parts of the coastal areas, below high rock walls. Typical herb-slope plants are *Angelica archangelica, Chamerion angustifolium, Alchemilla glomerulans,* and *Platanthera hyperborea*.

In the coastal parts of South Greenland, heaths are commonly dominated by mosses (especially *Racomitrium lanuginosum*), lichens (especially *Cladonia* sp.), or *Juncus trifidus*.

Near Kap Farvel, *Nardus stricta* may dominate heaths on the well-drained areas, while *Juncus squarrosus* dominates heaths in more damp areas.

Grassland-slopes are frequent in the inner parts of fiords. *Anthoxanthum odoratum* and *Deschampsia flexuosa* are dominating, often with *Alchemilla alpina* as subdominant.

Heaths with *Kobresia myosuroides* are found on horizontal or slightly sloping, well-drained soil in more continental areas, e.g. near Narssarssuaq.

In the alpine areas, here defined as areas above the altitudinal limit of willow copse, fell-fields are widespread, variable, and forming transitions to most other vegetational types. Common taxa are *Luzula confusa* and *Silene acaulis*. In gravelly and rocky areas, along rivers and brooks, *Chamerion latifolium* and *Saxifraga aizoides* are frequent.

Snow-patches are widespread, particularly in the alpine areas. Dominants are *Salix herbacea, Harrimanella hypnoides, Carex bigelowii,* or mosses.

Fens are frequent, but cover limited areas due to the topography. *Carex rariflora* and species of *Sphagnum* are the most frequent dominants followed by *Eriophorum angustifolium* and *E. scheuchzeri*. Raised bogs do not occur, as the peat layer is generally negligible. However, Hartz (1894) mentions a bog at Avigait, 62°12′ N.,

Fig. 6. *Empetrum* heath at a coastal station 20 km north of Nanortalik (Fig. 1). *Betula glandulosa* and *Salix glauca* grow scattered among the *Empetrum*. Copses are missing.

Fig. 7. Open *Salix glauca* scrub south of Narssaq (Fig. 1). *Deschampsia flexuosa* dominates the openings.

which was supposed to yield the best peat in South Greenland, this bog had a peat layer of two feet or more.

Seashore vegetation is generally poor, due to the prevalence of rocky coasts. Salt marshes and sandy beaches are confined to the heads of inlets and fiords. *Plantago maritima* and *Carex glareosa,* however, are found almost everywhere along the coast.

Freshwater vegetation is most vigorous in shallow ponds and brooklets, as great lakes and rivers in general are almost free of vascular plants. *Sparganium hyperboreum* and *Hippuris vulgaris* are among the most common hydrophytes.

Zones

Löve (1970:69) proposed the subarctic zone defined as the region between the economic tree limit and the polar tree limit, the latter being almost coincident with the 10°C mean isotherm for the warmest month of the year. Following this definition, Ivigtût (station no. 3; Fig. 1), Narssarssuaq (no. 4), and Igaliko (no. 5) are situated in the subarctic zone, whereas the rest of the stations are in that part of the Arctic which I consider low-arctic. The presence of big birch copses and open woodlands supports this concept.

By application of further vegetational characteristics, all South Greenland is here divided into a series of zones (Fig. 5). The criterions are:

a. Absence or presence of willow copses (Figs 6 & 7). The map of *Salix glauca* (Appendix II, No. 25) gives no indication of the outer limit of the *Salix* copses, as this species also enters the dwarf-shrub heaths. *Luzula parviflora ssp. parviflora* (Appendix II, No. 148) is then selected as additional guide taxon for willow copses. The outer limit of *Salix* copses is also indicated in Rosenvinge (1896:111) and Ødum (1958:388), supported by observations by Finn Nyhuus Kristoffersen (personal communication) near Nunarssuit, and by me near Narssaq and Nanortalik.
b. Absence or presence of "birch copses" (Fig. 8). The distribution of *Betula pubescense ssp. tortuosa* (Appendix II, No. 202) gives no indication of the range of birch copses, as this taxon also enters other communities. The criterion of "birch copses" is then selected as the coincident occurrence of *Betula pubescens* and *Sorbus groenlandica* (Appendix II, No. 184). Information about the distribution of "birch copses" is found in Rosenvinge (1896), Hartz (1894), Böcher (1979:220), and supported by my observations near Narssaq.
c. The subcontinental zones.
The coincident occurrence of two taxa with continental distribution, *Carex supina* (Appendix II, No. 263) and *Kobresia myosuroides* (Appendix II, No. 250) is used as a criterion.
d. The subarctic zone.
The coincident occurrence of two taxa with boreal distribution, *Elocharis quinqueflora* (Appendix II, No. 248) and *Sagina nodosa* (Appendix II, No. 292), is used as a criterion.

There is no great difference between the divisions proposed by Böcher (1938), Knapp (1964), and my concept.

Mammals and birds

Sheep is the only animal to influence the vegetation in South Greenland on a large scale. Most sheep are kept in Narssarssuaq and Tugtutôq districts (Fig. 9), but also

Fig. 8. *Betula pubescens* woodland in Tasermiut (Fig. 1), *Salix glauca* grows luxuriant too. (Jens H. Petersen photo).

Tasermiut district has got sheep-farming. The total number of sheep is ranging from 20 000 to 50 000 (Salomonsen 1979:15). Supposedly this farming has caused the disappearance of willow copses and the emergence of heaths with *Kobresia myosuroides* in the most grazed areas. Also the grassland slopes are influenced by sheep-grazing. Some horses are kept within the sheep-area, but they are of minor importance to the vegetation.

All indigenous mammals and birds affect the vegetation to a minor degree only playing a role, however, as agents in the dispersal of seeds, and, regarding colonial birds, as suppliers of guano. Sea-bird colonies are rare in South Greenland, and confined to the area north of Nunarssuit (Fig. 1) (Salomonsen 1979).

The terrestrial mammals and some of the more common birds are: Arctic Fox (*Alopex lagopus*), Arctic Hare (*Lepus arcticus*), Ptarmigan (*Lagopus mutus*), White-tailed Eagle (*Haliëtus albicilla*), Wheatear (*Oenanthe oenanthe*), Redpoll (*Carduelis flammea*), Lapland Bunting (*Calcarius lapponicus*), Snow Bunting (*Plectrophenax nivalis*), and Raven (*Corvus corax*).

Human society

About 11 000 people are living in South Greenland, mainly concentrated around the towns Pâmiut/Frederikshåb, Qaqortoq/Julianehåb, Narssaq and Nanortalik (Fig. 1). However, the fiords between Narssarssuaq and Kap Farvel are rather densely populated, whereas the east coast is unpopulated. The major industries are fishery and sheep-farming.

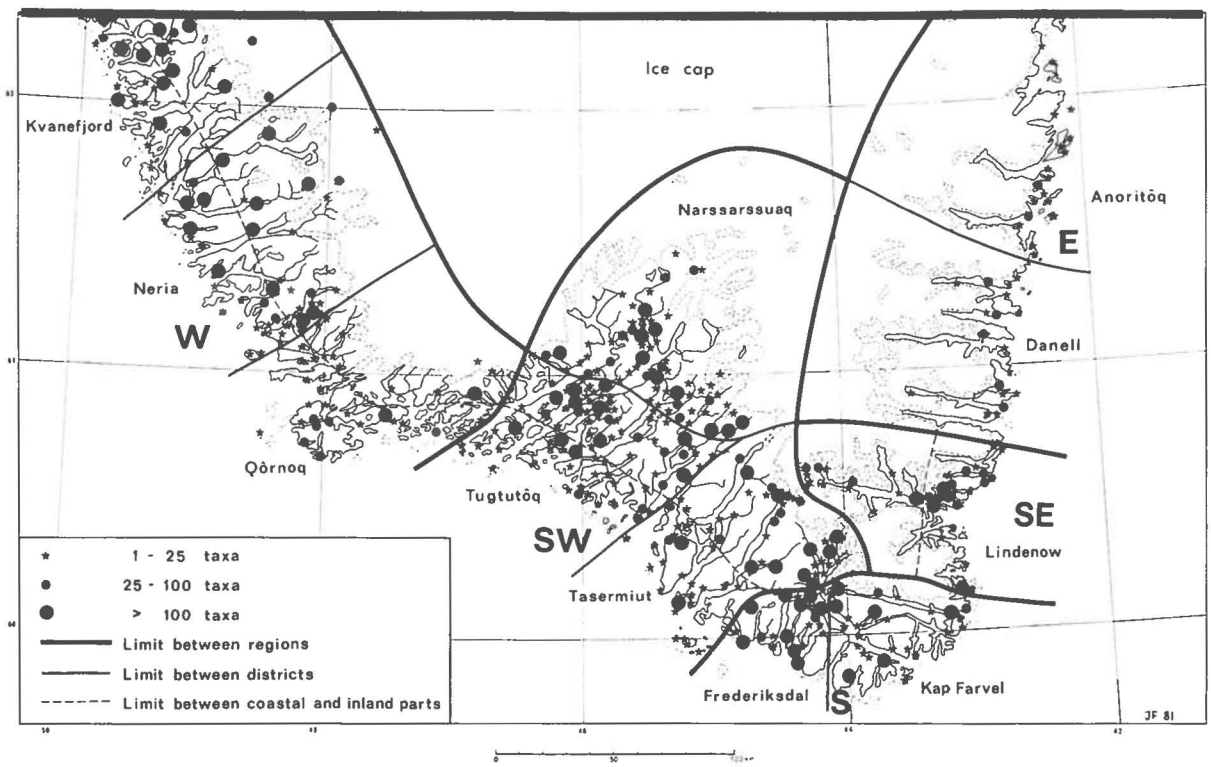

Fig. 9. The province of South Greenland subdivided into regions, districts and parts. Sampled localities are shown.

Materials

Field studies

During the seasons of 1974, 1975, and 1976 I participated in the Narssaq-project, working with ecological tasks in particular (Feilberg 1977, 1984).

Herbarium studies

More than 30 000 South Greenland specimens, kept in C, O, S, BM, CAN, NY and U (see the Code), were re-identified. Each specimen was listed, plotted on map, and marked on the sheet. For each specimen, I recorded its collector, collection number, coordinates, and altitude of the collecting site. From these data, distribution maps of each taxon were generated (Appendix II). Collections originated from 465 localities, but due to incomplete information 36 of these are omitted in the map (Fig. 9). Lists of specimens seen and of localities in South Greenland are deposited in the Botanical Museum, Copenhagen.

Table 2. Numbers of taxa (n) in the regions, districts and parts of the South Greenland province.

Region	n	District	n	Part	n
W	291	Kvanefjord	244	coastal	224
				inland	209
		Neria	272	coastal	218
				inland	256
		Qôrnoq	206	coastal	159
				inland	177
SW	326	Tugtutôq	279	coastal	237
				inland	269
		Narsarssuaq	309		–
		Tasermiut	265	coastal	191
				inland	249
S	237	Frederiksdal	222		–
		Kap Farvel	209		–
SE	158	Lindenow	158	coastal	149
				inland	134
E	127	Danell	112		–
		Anoritôq	100		–
South Greenland					346

Methods

Distribution patterns

To compare different distribution patterns within the province, South Greenland was divided into five regions, eleven districts, and twelve parts (Fig. 9). I have drawn the border-lines tentatively where most taxa have their distribution limits, rather than followed the divisions by Böcher *et al.* (1978). The number of taxa known from the regions, districts and parts varies substantially (Table 2). To show my estimate of numbers of taxa collected at each locality, three different signatures were applied on the map (Fig. 9).

Chorological index (CI)

Fitted for South Greenland only, a chorological index was made as a tool in the examination of the distributions. In comparing the number of occurrences of a considered taxon in coastal and inland areas, respectively, a measure of preference of the individual taxon was obtained. Narssarssuaq district was obvious as the inland reference area, and the coastal parts of region W and SW were taken as representative of the coastal reference area. The CI of a taxon was then defined:

$$CI = i/c,$$

where i = No. of localities in Narssarssuaq district, and c = No. of localities in the coastal parts of region W and SW.

CI could be calculated for 250 taxa; the remaining 96 taxa fall into two groups: fifteen got no localities in the coastal area (marked as ∞ on the maps), and 81 had less than five localities in the reference areas, and consequently no CI values were calculated (however, see South Greenland distribution type 9, p. 19).

Climatic indices

Conrad's index of continentality (Tuhkanen 1980) is applied to the climatic stations (Table 1):

$$C = 1.7\ A/\sin(\varnothing + 10°) - 14,$$

where A = annual temperature range in C°, and ∅ = latitude.

The index is designed to give C = 0 at Thorshavn, the Faroes, and C = 100 at Verkhoyansk, Siberia.

De Martonne's index of humidity is applied to the climatic stations (Table 1):

$$H = P/T + 10,$$

where P = annual precipitation in mm, and T = annual mean temperature in C°.

Results and discussion

Nomenclatural changes

In order to treat the South Greenland taxa, the following new combinations had to be published:

Elymus violaceus (Hornem.) Böcher, Fredskild, Holmen, et Jakobsen, Grønl. Fl.: 311 (1978), *comb. non val.*, basion. *non cit. ex* J. Feilberg, *comb. nov.* Basionym: *Triticum violaceum* Hornem., Fl. Dan. t. 2044 (1832).

Lychnis alpina L., ssp. *americana* (Fern.) J. Feilberg, *comb. nov.*

Basionym: *Viscaria alpina* (L.) Don, Gen. Syst. 1: 415 (1831) var. *americana* Fern., Rhodora 42: 259 (1940).

Vaccinium oxycoccos L., ssp. *microphyllum* (Lange) J. Feilberg, *comb. nov.*

Basionym: *Oxycoccus palustris* Pers., forma *microphylla* Lange, Meddr Grønland 3,2: 267 (1887).

Taxa of the South Greenland province

Indigenous taxa, and some of those which I consider introduced, add to a total of 346 present in South Greenland (Table 3). Of the numerous introduced taxa, I have selected only such that are naturalized (Pedersen 1972), and either collected repeatedly during 150 years (Nos 89, 137, 161, 186, 235, 238, 261, 264, 292), or occur in natural habitats (Nos 220, 253, 321).

Two species mentioned in Böcher *et al.* (1978) are omitted in the presented paper, viz. *Alopecurus alpinus Smith* and *Circium helenioides (L.) Hill.* The former due to lack of voucher specimen and the latter due to extinction (Pedersen 1972).

Table 3. List of taxa present in South Greenland. SDT: South Greenland distribution type; the figure refers to the specific distribution type (Fig. 10), and the letter refers to the subtype. CDT: Climatic distribution type. HDT: Holarctic distribution type. The symbols are explained in Appendix I, p. 25.

Map no.	Taxon (see Appendix II)	SDT	CDT	HDT
161	*Achillea millefolium* L. ssp. *borealis* (Bong.)Breitung	4b	B'	We
	Agrostis borealis Hartman (see *A. mertensii*)			
220	*Agrostis capillaris* L.	6c	B'	Ea
255	*Agrostis gigantea* Roth ssp. *gigantea*	8c	B'	Ci
	Agrostis hyperborea Laest. (see *A. vinealis* ssp. *vinealis*)			
36	*Agrostis mertensii* Trin.	1c	LO	Ci
279	*Agrostis scabra* Willd. var. *septentrionalis* Fern.	10g	B	We
246	*Agrostis stolonifera* L.	7c	B'	Ci
	Agrostis tenuis Sibth. (see *A. capillaris*)			
149	*Agrostis vinealis* Schreber ssp. *vinealis*	4e	B	Ea
26	*Alchemilla alpina* L.	1c	LO	Ea
146	*Alchemilla filicaulis* Buser ssp. *filicaulis* s.l.	4e	BO	Ea
163	*Alchemilla filicaulis* Buser ssp. *vestita* (Buser)Bradshaw	4c	BO	Ea
32	*Alchemilla glomerulans* Buser	1c	LO	Ea
	Alchemilla vestita (Buser)Raunk. (see *A. filicaulis* ssp. *vestita*)			
340	*Alchemilla wichurae* (Buser)Stefánsson	11a	LO	Ea
268	*Alnus crispa* (Aiton)Pursh ssp. *crispa*	9d	BC	We
281	*Alopecurus aequalis* Sobol. ssp. *aequalis*	10g	B	Ci
293	*Amerorchis rotundifolia* (Pursh)Hultén	10e	BC	We
316	*Andromeda polifolia* L. ssp. *glaucophylla* (Link)Hultén	11b	B	We
114	*Angelica archangelica* L. ssp. *archangelica*	3e	LO	Ea
	Angelica archangelica L. ssp. *norvegica* (Rupr.) Nordh. (see *Angelica archangelica* ssp. *archangelica*)			
294	*Antennaria affinis* Fern.	10e	LC	En
	Antennaria boecheriana A. Porsild (see *A. canescens*)			
75	*Antennaria canescens* (Lange)Malte	1c	LO	Am
312	*Antennaria compacta* Malte	11a	A'	We
314	*Antennaria ekmaniana* A. Porsild	11a	AC	We
196	*Antennaria hansii* A. Kerner	5b	LO	En
179	*Antennaria intermedia* (Rosenv.) Porsild	5b	L"	En
	Antennaria porsildii Ekman (see *A. canescens*)			
	Antennaria sornborgeri Fern. (see *A. canescens*)			
158	*Anthoxanthum odoratum* L. ssp. *alpinum* (Á. & D. Löve) B. Jones & Meld.	4b	B"	Ea
68	*Arabis alpina* L.	1c	LO	Ea
251	*Arabis arenicola* (Richardson) Gelert	7d	AM	We
295	*Arabis holboellii* Hornem. var. *holboellii*	10e	LC	We
309	*Arenaria humifusa* Wahlenb.	11a	AM	We
178	*Armeria maritima* (Miller) Willd. ssp. *maritima*	5c	BO	Ea
266	*Armeria maritima* (Miller) Willd. ssp. *sibirica* (Boiss.) Nyman	8a	AC	Ci
	Armeria scabra Pallas ssp. *sibirica* (Boiss.) Hylander (see *A. maritima* ssp. *sibirica*)			

Map no.	Taxon (see Appendix II)	SDT	CDT	HDT
271	*Artemisia borealis* Pallas	9b	LC	Ci
233	*Asplenium viride* Hudson	7b	BO	Ci
80	*Athyrium distentifolium* Opiz s.l.	2c	LO	Ci
330	*Athyrium filix-femina* (L.) Roth var. *filix-femina*	11b	B'	Ci
277	*Atriplex longipes* Drejer ssp. *praecox* (Hülph.) Tureson	10b	B'	Ea
112	*Bartsia alpina* L.	3e	LO	Ea
103	*Betula glandulosa* Michaux	3e	L	We
317	*Betula nana* L.	11a	LC	Ea
202	*Betula pubescens* Ehrh. ssp. *tortuosa* (Ledeb.) Nyman	5c	BO	Ea
123	*Botrychium boreale* Milde var. *boreale*	3d	LO	Ci
205	*Botrychium lanceolatum* (S. Gmelin) Ångström var. *lanceolatum*	5b	LO	Ci
92	*Botrychium lunaria* (L.) Sw. ssp. *lunaria*	2d	B	Ci
307	*Botrychium multifidum* (S. Gmelin) Rupr.	11b	B'	Ci
241	*Botrychium simplex* E. Hitchc.	7c	B	Am
321	*Cakile edentula* (Biegelow) Hook. ssp. *edentula*	11b	B'	We
110	*Calamagrostis canadensis* (Michaux) P. Beauv. ssp. *langsdorfii* (Link) Hultén	3e	BS	Ci
	Calamagrostis hyperborea Lange (see *C. inexpansa* var. *robusta*)			
159	*Calamagrostis inexpansa* A. Gray var. *robusta* (Vasey) Stebb.	4e	B	We
	Calamagrostis langsdorfii (Link) Trin. (see C. *canadensis* ssp. *langsdorfii*)			
	Calamagrostis neglecta (Ehrh.) Gaertner *et al.* (see *C. stricta*)			
267	*Calamagrostis poluninii* T. Sørensen	8b	LC	En
328	*Calamagrostis purpurascens* R. Br.	11a	AC	We
217	*Calamagrostis stricta* (Timm) Koeler *s.l.*	6e	B	Ci
212	*Callitriche anceps* Fern.	6c	B	We
150	*Callitriche hamulata* Koch	4e	B	Ea
216	*Callitriche palustris* L.	6c	B	Ci
59	*Campanula gieseckiana* Vest *s.l.*	1c	L	Ci
260	*Campanula uniflora* L.	8a	AM	We
235	*Capsella bursa-pastoris* (L.) Medikus	7c	B'	Ci
122	*Cardamine bellidifolia* L. ssp. *bellidifolia*	3b	A	Ci
144	*Cardamine pratensis* L. *s.l.*	4e	L	Ci
252	*Carex abdita* E. Bickn.	8c	B	We
130	*Carex atrata* L. ssp. *atrata*	4e	LO	Am
296	*Carex bicolor* All.	10e	L	Ci
47	*Carex bigelowii* Schwein *s.l.*	1c	L	Ci
90	*Carex brunnescens* (Pers.) Poiret var. *brunnescens*	2d	L	Ci
297	*Carex buxbaumii* Wahlenb. ssp. *buxbaumii*	10e	B	Am
	Carex canescens L. (see *C. curta*)			
188	*Carex capillaris* L. ssp. *capillaris*	5b	L	Ci
	Carex capillaris L. ssp. *fuscidula* (T. Egor.) Á. & D. Löve (see *C. capillaris* ssp. *capillaris*)			
97	*Carex capitata* L. ssp. *arctogena* (Harry Smith) Hiit.	2d	L	We
323	*Carex chordorrhiza* L.f.	11b	B'	Ci
16	*Carex curta* Gooden.	1d	B	Ci
85	*Carex deflexa* Hornem.	2d	BS	We
310	*Carex disperma* Dewey	11b	B	Ci
262	*Carex glacialis* Mackenzie var. *glacialis*	8a	AC	Ci
42	*Carex glareosa* Wahlenb. ssp. *glareosa*	1c	L	Ci
222	*Carex gynocrates* Drejer	6b	LC	We
338	*Carex krausei* Boeckeler ssp. *porsildiana* (Polunin) Á. & D. Löve	11a	LC	We
54	*Carex lachenalii* Schk.	1c	L	Ci
332	*Carex lyngbyei* Hornem.	11b	BO	Ci
256	*Carex mackenziei* V. Krecz.	8c	B	Ci
156	*Carex macloviana* Urv. ssp. *macloviana*	4e	L"	Am
218	*Carex magellanica* Lam. ssp. *irrigua* (Wahlenb.) Hiit.	6c	B	Ci
209	*Carex maritima* Gunnerus *s.l.*	5c	A	Ci
211	*Carex microglochin* Wahlenb.	5c	LC	Am
192	*Carex nardina* Fries var. *nardina*	5b	AC	We
227	*Carex nigra* (L.) Reichard *s.l.*	6c	B	Ea
240	*Carex norvegica* Retz. *s.l.*	7d	LO	Am
249	*Carex panicea* L.	7c	BO	Ea
285	*Carex praticola* Rydb.	10f	BC"	We
51	*Carex rariflora* (Wahlenb.) Smith var. *rariflora*	1c	L	Ci
280	*Carex rostrata* Stokes	10g	B	Ci
20	*Carex rufina* Drejer	1c	LO	Ea
236	*Carex salina* Wahlenb. var. *salina*	7c	B	Am
107	*Carex saxatilis* L. *s.l.*	3e	A	Ci
135	*Carex scirpoidea* Michaux var. *scirpoidea*	4e	L	We
3	*Carex stylosa* C. Meyer var. *nigritella* (Drejer) Fern.	1d	BO	We
128	*Carex subspathacea* Wormsk.	4c	L	Ci
263	*Carex supina* Wahlenb. ssp. *spaniocarpa* (Steudel) Hultén	8b	LC	We
313	*Carex trisperma* Dewey	11b	B	We
289	*Carex viridula* Michaux	10c	B	We
304	*Catabrosa aquatica* (L.) P. Beauv. var. *aquatica*	11b	B	Ea
65	*Cerastium alpinum* L. ssp. *lanatum* (Lam.) Asch. & Graebner	1c	L	Am
62	*Certastium arcticum* Lange *s.l.*	1b	A	Am
28	*Cerastium cerastoides* (L.) Britton	1c	LO	Ea
180	*Cerastium fontanum* Baumg. *s.l.*	5d	BO	Ea
	Chamaenerion angustifolium (L.) Scop. (see *Chamerion angustifolium*)			
	Chamaenerion latifolium (L.) Sweet (see *Chamerion latifolium*)			
66	*Chamerion angustifolium* (L.) Holub	1d	BS	Ci
60	*Chamerion latifolium* (L.) Holub	1b	A	Ci
	Cochleraria groenlandica L. (see *C. officinalis s.l.*)			
2	*Cochlearia officinalis* L. *s.l.*	1d	B	Ci
	Comarum palustre L. (see *Potentilla palustris* (L.) Scop.)			
29	*Coptis trifolia* (L.) Salisb. ssp. *groenlandica* (Oeder) Hultén	1d	BS	We
198	*Corallorhiza trifida* Châtel.	5d	BC"	Ci
164	*Cornus canadensis* L.	5a	BS	We
5	*Cornus suecica* L.	1d	BO	Ci
48	*Cystopteris fragilis* (L.) Bernh. ssp. *fragilis*	1d	B	Ci
287	*Cystopteris montana* (Lam.) Desv.	10d	BC	Ci

Map no.	Taxon (see Appendix II)	SDT	CDT	HDT
336	*Danthonia spicata* (L.) Roemer & Schultes	11b	B	We
21	*Deschampsia alpina* (L.) Roemer & Schultes	1c	LO	Ea
113	*Deschampsia flexuosa* (L.) Trin. var. *montana* (L.) Ledeb.	3e	BS	Am
39	*Diapensia lapponica* L. ssp. *lapponica*	1c	L	Am
40	*Diphasiastrum alpinum* (L.) Holub	1c	LO	Ci
284	*Diphasiastrum complanatum* (L.) Holub *s.l.*	10f	BC	Ci
210	*Draba aurea* Hornem.	5d	LC	We
319	*Draba cinerea* Adams	11a	LC	Ci
298	*Draba crassifolia* Graham	10e	AM	We
151	*Draba incana* L. *s.l.*	4e	LO	Am
308	*Draba lactea* Adams	11a	A	Ci
195	*Draba nivalis* Lilj. *s.l.*	5b	A	Ci
76	*Draba norvegica* Gunnerus *s.l.*	1c	LO	Am
181	*Drosera rotundifolia* L. *s.l.*	5c	B	Ci
223	*Dryas integrifolia* Vahl *s.l.*	6b	AC	We
142	*Dryopteris abbreviata* (DC.) Newman	4d	BS'	Ea
4	*Dryopteris assimilis* S. Walker	1d	BS	Am
152	*Dryopteris filix-mas* (L.) Schott	4e	BS	Am
237	*Eleocharis acicularis* (L.) Roemer & Schultes	7d	B	Ci
248	*Eleocharis quinqueflora* (F. Hartmann) O. Schwarz	7c	B	Am
299	*Eleocharis palustris* (L.) Roemer & Schultes ssp. *palustris*	10e	B	Ci
333	*Eleocharis uniglumis* (Link) Schultes	11b	B	Ci
322	*Elymus arenarius* L.	11b	B'	Ea
70	*Elymus mollis* Trin.	1d	L	We
203	*Elymus trachycaulus* (Link) Shinn. ssp. *virescens* (Lange) Á. & D. Löve	5b	B	En
288	*Elymus violaceus* (Hornem.) J. Feilberg	10c	LC	We
33	*Empetrum nigrum* L. ssp. *hermaphroditum* (Hagerup) Böcher	1c	L	Ci
12	*Epilobium anagallidifolium* Lam.	1c	LO	Ci
136	*Epilobium hornemannii* Reichb.	4e	LO	Ci
101	*Epilobium lactiflorum* Hausskn.	3e	LO	Am
175	*Epilobium palustre* L. *s.l.*	5d	B	Ci
115	*Equisetum arvense* L. *s.l.*	3e	B	Ci
278	*Equisetum scirpoides* Michaux	10b	LC	Ci
193	*Equisetum sylvaticum* L. var. *pauciramosum* J. Milde	5c	BS	Ci
343	*Equisetum sylvaticum* L. var. *sylvaticum*	11b	BS'	Ci
228	*Equisetum variegatum* Weber & Mohr	6b	L	Ci
	Erigeron borealis (Vierh.) Simmons (see *E. uniflorus s.l.*)			
244	*Erigeron compositus* Pursh	7c	AC	We
331	*Erigeron humilis* Graham	11a	AM	We
77	*Erigeron uniflorus* L. *s.l.*	1c	LO	Ea
41	*Eriophorum angustifolium* Honck. ssp. *subarcticum* (V. Vassiljev) Hultén	1d	B	Ci
37	*Eriophorum scheuchzeri* Hoppe	1b	A	Ci
311	*Eriophorum spissum* Fern.	11b	L	We
138	*Euphrasia frigida* Pugsley	4e	L	Ea
96	*Festuca brachyphylla* Schultes *s.l.*	2b	A	Ci
108	*Festuca rubra* L. *s.l.*	3e	L	Ci
43	*Festuca vivipara* (L.) Smith ssp. *hirsuta* (Lange) Frederiksen	1c	LO	Am
324	*Galium boreale* L.	11b	B	Ci
242	*Galium brandegei* A. Gray	7c	BC	We
157	*Galium triflorum* Michaux	4e	BS	We
	Gentiana amarella L. (see *Gentianella amarella*)			
	Gentiana aurea L. (see *Gentianella aurea*)			
	Gentiana detonsa Rottb. (see *Gentianella detonsa*)			
119	*Gentiana nivalis* L.	3e	LO	Ea
315	*Gentianella amarella* (L.) Boerner ssp. *acuta* (Michaux) J. M. Gillet	11b	B'	We
199	*Gentianella aurea* (L.) Harry Smith	5b	B	Ea
291	*Gentianella detonsa* (Rottb.) Don ssp. *detonsa*	10d	B	Ea
230	*Geranium sylvaticum* L.	7c	BS	Ea
341	*Geum rivale* L.	11b	B	Ea
22	*Gnaphalium norvegicum* Gunnerus	1c	LO	Ea
10	*Gnaphalium supinum* L.	1c	LO	Ea
253	*Gnaphalium uliginosum* L.	8c	B'	Ci
61	*Gymnadenia albida* (L.) Rich. ssp. *straminea* (Fern.) Løjtnant	1d	BO	We
44	*Gymnocarpium dryopteris* (L.) Newman	1d	BS	Ci
67	*Harrimanella hypnoides* (L.) Cov.	1c	LO	Am
	Hieracium acranthophorum Omang (see *H. laevigatum*)			
131	*Hieracium alpinum* L.	4e	LO	Ea
	Hieracium amitsokense (S. Almq.) Dahlst. (see *H. prenanthoides*)			
	Hieracium devoldii Omang (see *H. laevigatum*)			
	Hieracium eugenii Omang (see *H. laevigatum*)			
	Hieracium groenlandicum (Arv.-Touv.) S. Almq. (see *H. prenanthoides*)			
	Hieracium hyparcticum S. Almq. (see *H. nigrescens*)			
	Hieracium ivigtutense (S. Almq.) Omang (see *H. prenanthoides*)			
155	*Hieracium laevigatum* Willd. *s.l.*	4e	B	Ea
	Hieracium lividorubens S. Almq. (see *H. nigrescens*)			
	Hieracium musartutense Omang (see *H. laevigatum*)			
	Hieracium nepriocratum Omang (see *H. laevigatum*)			
84	*Hieracium nigrescens* Willd. *s.l.*	2d	BS	Ea
109	*Hieracium prenanthoides* Villars	3e	B	Ea
	Hieracium rigorosum (Laest.) S. Almq. (see *H. laevigatum*)			
	Hieracium scholanderi Omang (see *H. prenanthoides*)			
	Hieracium stiptocaule Omang (see *H. laevigatum*)			
	Hieracium sylowii Omang (see *H. prenanthoides*)			
	Hieracium trigonophorum Ósk. (= *H. alpinum x nigrescens*)			
334	*Hierochloë alpina* (Willd.) Roemer & Schultes ssp. *alpina*	11a	AC	Ci

Map no.	Taxon (see Appendix II)	SDT	CDT	HDT
93	*Hierochloë alpina* (Willd.) Roemer & Schultes ssp. *orthantha* (T. Sørensen) Hultén	2d	LO	We
329	*Hierochloë odorata* (L.) Beauv. *s.l.*	11b	B	Ci
	Hierochloë orthantha T. Sørensen (see *H. alpina* ssp. *orthantha*)			
83	*Hippuris vulgaris* L.	2d	B	Ci
145	*Honkenya peploides* (L.) Ehrh. var. *diffusa* (Hornem.) Ostenf.	4e	B	Ci
38	*Huperzia selago* (L.) Schrank & Mart. ssp. *arctica* (Grossh.) Á. & D. Löve	1b	A	Ci
	Isoëtes echinospora Durieu (see *I. setacea*)			
273	*Isoëtes lacustris* L. ssp. *lacustris*	10a	B	Ea
169	*Isoëtes setacea* Lam. ssp. *muricata* (Durieu) Holub	5d	B	We
286	*Juncus alpinus* Villars ssp. *nodulosus* (Wahlenb.) Lindman	10d	B	Ci
207	*Juncus arcticus* Willd. ssp. *arcticus*	5c	L	Ci
257	*Juncus arcticus* Willd. ssp. *balticus* (Willd.) N. Hylander	8c	B'	Ea
141	*Juncus biglumis* L.	4d	A	Ci
74	*Juncus filiformis* L.	1d	B	Ci
327	*Juncus gerardii* Loisel ssp. *gerardii*	11b	B	Ea
283	*Juncus ranarius* Perr. & Song.	10d	B	Ci
274	*Juncus squarrosus* L.	10a	BO	Ea
165	*Juncus subtilis* E. Meyer	5c	B	We
55	*Juncus trifidus* L.	1c	LO	Am
190	*Juncus triglumis* L. *s.l.*	5d	A	Ci
18	*Juniperus communis* L. ssp. *nana* (Willd.) Syme	1d	B	Ci
250	*Kobresia myosuroides* (Villars) Fiori	7a	LC	Ci
258	*Kobresia simpliciuscula* (Wahlenb.) Mackenzie	8b	LC	We
1	*Koenigia islandica* L. *s.str.*	1a	A	Ci
147	*Lathyrus japonicus* Willd. ssp. *japonicus*	4c	B	Ci
	Lathyrus maritimus (L.) Bigelow (see *L. japonicus* ssp. *japonicus*)			
166	*Ledum groenlandicum* Oeder	5d	B	We
264	*Leontodon autumnalis* L. *s.l.*	8c	B	Ea
	Leucorchis albida (L.) E. Meyer ssp. *straminea* (Fern.) Á. Löve (see *Gymnadenia albida* ssp. *straminea*)			
225	*Ligusticum scoticum* L. ssp. *scoticum*	6b	BO	Am
276	*Limosella aquatica* L.	10g	B	Ci
232	*Linnaea borealis* L. ssp. *americana* (Forbes) Hultén	7d	BS	We
102	*Listera cordata* (L.) R. Br.	3e	BS	Am
19	*Loiseleuria procumbens* (L.) Desv.	1c	LO	Am
221	*Lomatogonium rotatum* (L.) Nyman	6b	L	We
71	*Luzula confusa* Lindeb.	1b	A	Ci
86	*Luzula multiflora* (Retz.) Lej *s.l.*	2d	B	Ci
	Luzula multiflora (Retz.) Lej. ssp. *frigida* (Buch.) Krecz. (see *L. multiflora s.l.*)			
148	*Luzula parviflora* (Ehrh.) Desv. ssp. *parviflora*	4e	BS	Ci
56	*Luzula spicata* (L.) DC. ssp. *spicata*	1c	LO	Am
58	*Lychnis alpina* L. ssp. *americana* (Fern.) J. Feilberg	1c	LO	We
111	*Lycopodium annotinum* L. ssp. *alpestre* (Hartman) Á. & D. Löve	3e	BS	Ci
176	*Lycopodium clavatum* L. ssp. *monostachyon* (Grev. & Hook.) Selander	5c	BS	Ci
	Matricaria maritima L. ssp. *borealis* (Hartman) Á. & D. Löve (see *M. maritima* ssp. *maritima*)			
197	*Matricaria maritima* L. ssp. *maritima*	5c	B'	Am
191	*Menyanthes trifoliata* L.	5c	B	Ci
345	*Mertensia maritima* (L.) Gray	11a	L	We
98	*Minuartia biflora* (L.) Schinz & Tell.	2b	L'	Ci
30	*Minuartia groenlandica* (Retz.) Ostenf.	1c	LO	We
201	*Minuartia rubella* (Wahlenb.) Hiern *s.l.*	5b	A	Ci
116	*Montia fontana* L. ssp. *fontana*	3d	B"	Ci
183	*Myriophyllum alterniflorum* DC.	5d	B	Am
318	*Myriophyllum spicatum* L. ssp. *exalbescens* (Fern.) Hultén	11b	B	We
100	*Nardus stricta* L.	3c	BO	Ea
	Oxycoccus palustris Pers. ssp. *microphyllus* (Lange) Á. & D. Löve (see *Vaccinium oxycoccos* ssp. *microphyllum*)			
49	*Oxyria digyna* (L.) Hill	1b	A	Ci
239	*Papaver radicatum* Rottb. *s.l.*	7a	A	Ci
300	*Parnassia kotzebuei* Sprengel	10e	L	We
78	*Pedicularis flammea* L.	1c	L	We
306	*Pedicularis labradorica* Wirs.	11a	LC	We
272	*Pedicularis lapponica* L.	9b	LC	Ci
134	*Phegopteris connectilis* (Michaux) Watt	4e	BS	Ci
81	*Phippsia algida* (Sol.) R. Br.	2a	A	Ci
17	*Phleum alpinum* L. ssp. *alpinum*	1c	LO	Ci
	Phleum commutatum Gaud. (see *P. alpinum* ssp. *alpinum*)			
14	*Phyllodoce caerulea* (L.) Bab.	1c	LO	Ci
87	*Pinguicula vulgaris* L.	2d	B	Am
45	*Plantago maritima* L. *s.l.*	1d	B	Ci
139	*Platanthera hyperborea* (L.) Lindley *s.l.*	4e	BS	We
73	*Poa alpina* L.	1c	LO	Am
137	*Poa annua* L. *s.l.*	4c	B'	Ci
162	*Poa arctica* R. Br. var. *arctica*	4a	AC	Ci
118	*Poa glauca* Vahl *s.l.*	3e	A	Ci
208	*Poa nemoralis* L.	5b	BS	Ci
53	*Poa pratensis* L. *s.l.*	1d	B	Ci
186	*Polygonum aviculare* L. *s.l.*	5c	B'	Ci
34	*Polygonum viviparum* L. var. *viviparum*	1b	A	Ci
275	*Polypodium virginianum* L.	10d	B'	We
	Polypodium vulgare L. (see *P. virginianum*)			
11	*Polystichum lonchitis* (L.) Roth	1c	LO	Am
229	*Potamogeton alpinus* Balbis ssp. *tenuifolius* (Raf.) Hultén	6c	B	We
224	*Potamogeton filiformis* Pers. var. *borealis* (Raf.) St. John	6b	B	Am
226	*Potamogeton gramineus* L. *s.l.*	6c	B	Ci
337	*Potamogeton natans* L.	11b	B	Ci
219	*Potamogeton pusillus* L. ssp. *groenlandicus* (Hagstr.) Böcher	6b	B	En
254	*Potentilla anserina* L. *s.str.*	8c	B'	Ci

Map no.	Taxon (see Appendix II)	SDT	CDT	HDT
94	*Potentilla crantzii* (Crantz) Fritsch	2d	LO	Ea
132	*Potentilla egedii* Wormsk. *s.l.*	4e	L	We
247	*Potentilla nivea* L. ssp. *nivea*	7a	AC	Ci
185	*Potentilla palustris* (L.) Scop.	5c	B	Ci
301	*Potentilla ranunculus* Lange	10e	BO	We
52	*Potentilla tridentata* Sol.	1d	B	We
302	*Primula egaliksensis* Wormsk. f. *egaliksensis*	10e	LC	We
172	*Puccinellia coarctata* Fern. & Weath. *s.l.*	5d	L	Am
168	*Puccinellia maritima* (Hudson) Parl.	5d	B	Ea
6	*Puccinellia phryganodes* (Trin.) Scribner & Merr.	1a	A	Ci
182	*Pyrola grandiflora* Radius	5d	AC	Ci
8	*Pyrola minor* L.	1d	BS	Ci
170	*Ranunculus acris* L. ssp. *acris* *Ranunculus confervoides* (Fries) Fries (see *R. trichophyllus* ssp. *eradicatus*)	5d	B	Ci
99	*Ranunculus hyperboreus* Rottb. ssp. *hyperboreus*	3a	A	Ci
305	*Ranunculus lapponicus* L.	11a	LC'	Ci
140	*Ranunculus pygmaeus* Wahlenb. *s.l.*	4e	AM	Ci
204	*Ranunculus reptans* L. var. *reptans*	5c	B	Ci
189	*Ranunculus trichophyllus* Chaix ssp. *eradicatus* (Laest.) C. D. K. Cook	5b	L	Ci
282	*Rhinanthus minor* L. ssp. *borealis* (Sterneck) Á. Löve *s.l.*	10g	B	Am
127	*Rhinanthus minor* L. ssp. *groenlandicus* (Chab.) Neuman	4e	B	Am
129	*Rhinanthus minor* L. ssp. *minor* *s.l.*	4e	B	Am
57	*Rhodiola rosea* L. ssp. *rosea*	1c	LO	Ea
95	*Rhododendron lapponicum* (L.) Wahlenb.	2d	A"	We
303	*Rorippa islandica* (Oeder) Borbás ssp. *islandica*	10e	B	Ci
342	*Rubus chamaemorus* L.	11b	B	Ci
344	*Rubus saxatilis* L.	11b	BS	Ea
214	*Rumex acetosa* L. *s.l.*	6d	B	Ea
187	*Rumex acetosella* L. *s.l.*	5d	B	Ci
238	*Rumex longifolius* DC.	7c	B'	Ci
234	*Sagina caespitosa* (J. Vahl) Lange	7d	AM	We
69	*Sagina intermedia* Fenzl	1b	A	Ci
292	*Sagina nodosa* (L.) Fenzl	10d	B	Ea
153	*Sagina procumbens* L. ssp. *procumbens*	4c	B	Ea
120	*Sagina saginoides* (L.) Karsten	3d	LO	Ci
215	*Salix arctophila* Cockerell	6e	L	We
25	*Salix glauca* L. *s.l.*	1c	L	Ci
23	*Salix herbacea* L.	1c	LO	Ea
259	*Salix uva-ursi* Pursh	8d	LO	We
160	*Saxifraga aizoides* L.	4d	L	Am
124	*Saxifraga cernua* L.	3b	A	Ci
31	*Saxifraga cespitosa* L. *s.l.*	1b	A	Ci
269	*Saxifraga foliolosa* R. Br.	9a	A"	Ci
125	*Saxifraga hyperborea* R. Br.	3b	A"	Ci
121	*Saxifraga nivalis* L. *s.str.*	3e	A	Ci
117	*Saxifraga oppositifolia* L. ssp. *oppositifolia*	3e	A	Ci
91	*Saxifraga paniculata* Miller ssp. *neogaea* (Butters) D. Löve	2d	L	We
46	*Saxifraga rivularis* L. *s.str.*	1c	L	Ci
7	*Saxifraga stellaris* L. ssp. *stellaris*	1c	LO	Ea
213	*Saxifraga tenuis* (Wahlenb.) Harry Smith	6a	A	Ci
27	*Scirpus cespitosus* L. ssp. *cespitosus*	1d	BO	Ci
88	*Sedum annuum* L. *Sedum rosea* (L.) Scop. (see *Rhodiola rosea* ssp. *rosea*)	2d	LO	Ea
194	*Sedum villosum* L.	5b	B'	Ea
326	*Selaginella rupestris* (L.) Spring	11b	BC	We
200	*Selaginella selaginoides* (L.) Link	5d	LO	Ci
9	*Sibbaldia procumbens* L.	1c	LO	Ci
64	*Silene acaulis* L. *s.l.*	1b	A	Ci
184	*Sorbus groenlandica* (Schneider) Á. & D. Löve	5d	BS	We
245	*Sparganium angustifolium* Michaux	7c	B	Am
177	*Sparganium hyperboreum* Beuerling	5d	L	Ci
106	*Stellaria calycantha* (Ledeb.) Bong. *s.l.*	3e	BS"	We
82	*Stellaria humifusa* Rottb.	2d	A	Ci
243	*Stellaria longipes* Goldie *s.l.*	7d	L	We
89	*Stellaria media* (L.) Villars ssp. *media* *Stellaria monantha* Hultén (see *S. longipes s.l.*)	2d	B'	Ci
171	*Streptopus amplexifolius* (L.) DC. ssp. *americanus* (Schultes) Á. & D. Löve	5d	BO	We
173	*Subularia aquatica* L. *s.l.*	5c	B	Am
	Taraxacum atroglaucum M. P. Christiansen (see *T. croceum*)			
	Taraxacum brachyceras Dahlst. (see *T. croceum*)			
63	*Taraxacum croseum* Dahlst. *s.l.*	1c	LO	Ea
	Taraxacum cyclocentrum M. P. Christiansen (see *T. croceum*)			
	Taraxacum dilutisquameum M. P. Christiansen (see *T. croceum*)			
	Taraxacum islandiciforme Dahlst. (see *T. croceum*)			
265	*Taraxacum lacerum* Greene *s.l.*	8c	LC	We
	Taraxacum latispinulosum M. P. Christiansen (see *T. croceum*)			
	Taraxacum naevosum Dahlst. (see *T. croceum*)			
143	*Thalictrum alpinum* L.	4e	LO	Ci
133	*Thymus praecox* Opiz ssp. *arcticus* (E. Durand) Jalas	4e	BO	Ea
50	*Tofieldia pusilla* (Michaux) Pers. ssp. *pusilla*	1c	L	Ci
174	*Triglochin palustris* L.	5d	B	Ci
79	*Trisetum spicatum* (L.) K. Richter ssp. *spicatum*	1b	A	Ci
105	*Trisetum spicatum* (L.) K. Richter ssp. *pilosiglume* (Fern.) Hultén *s.l.* *Trisetum triflorum* (Bigelow) Á. & D. Löve (see *T. spicatum* ssp. *pilosiglume*)	3e	L	Am
346	*Utricularia intermedia* Hayne	11b	B	Ci
290	*Utricularia minor* L.	10d	B	Ci
339	*Vaccinium myrtillus* L.	11b	BS	Ea
167	*Vaccinium oxycoccos* L. ssp. *microphyllum* (Lange) J. Feilberg	5d	B	We
15	*Vaccinium uliginosum* L. var. *pubescens* Lange	1c	L	Ci
231	*Vaccinium vitis-idaea* L. ssp. *minus* (Lodd.) Hultén	7c	B"	Ci

Map no.	Taxon (see Appendix II)	SDT	CDT	HDT
126	*Vahlodea atropurpurea* (Wahlenb.) Hartman ssp. *atropurpurea*	4e	LO	Am
24	*Veronica alpina* L. var. *alpina*	1c	LO	Ea
335	*Veronica alpina* L. var. *australis* Wahlenb.	11b	B'	Ea
13	*Veronica fructicans* Jacq.	1c	LO	Ea
104	*Veronica wormskjoldii* Roemer & Schultes	3e	LO	We
261	*Vicia cracca* L. ssp. *cracca*	8c	B	Ea
206	*Viola canina* L. ssp. *montana* (L.) Hartman	5c	B	Ea
154	*Viola labradorica* Schrank	4e	B	We
35	*Viola palustris* L. ssp. *palustris*	1d	BO	Ea
270	*Viola selkirkii* Goldie	9c	BC	Ci
	Viscaria alpina (L.) Don ssp. *americana* (Fern.) Böcher (see *Lychnis alpina* ssp. *americana*)			
325	*Woodsia alpina* (Bolton) S. F. Gray	11a	L	Am
320	*Woodsia glabella* R. Br.	11a	A	Ci
72	*Woodsia ilvensis* (L.) R. Br.	1c	L	Ci

South Greenland distribution types

Based upon occurrences in the regions and districts, all taxa are classified into eleven South Greenland distribution types (SDT) (Table 4, Fig. 10), each again divided into several subtypes. Distribution type 1 and 2 comprise taxa distributed in all South Greenland. Type 3 to 9 successively comprise taxa with smaller and smaller distributions, which are more and more concentrated around the western regions, ending up with taxa confined to region W. Type 10 comprises taxa confined to the southern part of the province, and type 11 includes the remaining taxa. The distribution of each separate type has been compared with climatic distribution types (Tables 5 and 6), with holarctic distribution types (Table 7) and the CI values have been analysed (Table 8).

Table 4. Definition of South Greenland distribution types (SDT), and number of taxa assigned to each category. 1–10: each type documented by three or more dots; at least three dots in one district. 11: three or fewer dots scattered in two or three districts. Parentheses: districts with facultative occurrences of taxa.

SDT	Definition	No. of taxa
1.	In all regions and districts	79
2.	In region W + SW + S + (SE) + (district Danell) + district Anoritôq	19
3.	In region W + SW + (S) + (SE) + district Danell	27
4.	In region W + SW + S + SE	38
5.	In region W + SW + (district Frederiksdal) + district Kap Farvel	48
6.	In region W + SW + district Frederiksdal	18
7.	In region W + (district Tugtutôq + Narssarssuaq) + district Tasermiut	22
8.	In region W + (district Tugtutôq) + district Narssarssuaq	16
9.	In region W	5
10.	In one, two or three of the regions SW, S, SE	31
11.	Scattered or isolated occurrences	43

Table 5. Relative frequencies (percentages) between oceanic, intermediate and continental distributed taxa of each SDT.

SDT	Climatic distribution type: Oceanic	Intermediate	Continental	n
1	53	47	–	79
2	32	68	–	19
3	48	52	–	27
4	42	55	3	38
5	25	65	10	48
6	6	83	11	18
7	23	59	18	22
8	6	56	38	16
9	–	20	80	5
10	6	65	29	31
11	12	70	19	43
Mean	30	59	11	–
n	103	204	39	346

Table 6. Relative frequencies (percentages) between arctic, low-arctic and boreal distributed taxa of each SDT.

SDT	Climatic distribution type: Arctic	Low-arctic	Boreal	n
1	16	60	24	79
2	21	47	32	19
3	30	37	33	27
4	8	34	58	38
5	13	23	65	48
6	11	22	67	18
7	23	18	59	22
8	19	31	50	16
9	20	40	40	5
10	3	23	74	31
11	19	21	60	43
Mean	16	35	49	–
n	54	121	171	346

Table 7. Relative frequencies (percentages) between widespread, "eastern", "western", and endemic taxa of each SDT. See text p. 17.

SDT	Holarctic distribution type: Wi	Ea	We	En	n
1	70	20	10	–	79
2	58	16	26	–	19
3	70	19	11	–	27
4	53	29	18	–	38
5	60	15	19	6	48
6	44	17	33	6	18
7	63	9	28	–	22
8	38	19	38	6	16
9	60	–	40	–	5
10	45	16	35	3	31
11	42	21	37	–	43
Mean	57	18	23	2	–
n	198	64	78	6	346

Three larger groups emerged:

a. Mostly low-arctic, oceanic and widespread taxa, with a mean CI below or around one. More eastern than western taxa. Extremely few continental taxa. Type 1 to 4.
b. Mostly boreal, intermediate (as to continentality) and widespread taxa, with a mean CI around two. More western than eastern taxa. The percentages of continental and oceanic taxa balance. Type 5 to 6.
c. Mostly boreal, intermediate (as to continentality) and widespread taxa, with a mean CI around four. More western than eastern taxa, and more continental than oceanic taxa. Type 7 to 10.

Distribution type 1. (Table 4, Fig. 10, Map Nos 1–79).

High percentages of taxa with eastern, oceanic and low-arctic distribution. (Tables 5–7). 74 taxa occur in both West and East Greenland, whereas five are missing in East Greenland (Appendix II, Nos 4, 5, 30, 41 and 74). The mean CI is very low (Table 8).

Table 8. Relative frequencies (percentages) between three CI classes of each SDT. See text p. 17.

SDT	CI ≤0.5	CI 0.5–2.0	CI ≥2.0	mean	n
1	48	52	0	0.56	79
2	18	76	6	0.86	17
3	30	59	11	0.95	27
4	11	73	16	1.12	37
5	9	60	31	2.03	45
6	6	44	50	2.20	16
7	13	20	67	4.06	15
8	0	10	90	4.00	10
10	0	0	100	4.11	14
Mean	24	54	22	1.49	–
n	60	135	55	–	250

Type 1 is rather homogenous, yet, four subtypes may be recognized:

a. Arctic ubiquists, preferring the outer coast: Nos 1 and 6.
b. Arctic ubiquists, preferring alpine habitats: Nos 31, 34, 37, 38, 49, 60, 62, 69, 71 and 79.
c. Low-arctic, mostly oceanic taxa, evenly distributed in the province: Nos 7, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22, 23, 24, 25, 26, 28, 30, 32, 33, 36, 39, 40, 42, 43, 46, 47, 50, 51, 54, 55, 56, 57, 58, 59, 63, 64, 65, 67, 68, 72, 73, 75, 76, 77, 78.
d. Boreal, mostly oceanic or sylvicolous taxa, preferring lowland habitats: Nos 2, 3, 4, 5, 8, 16, 18, 27, 29, 35, 41, 44, 45, 48, 52, 53, 61, 66, 70 and 74.

Distribution type 2. (Table 4, Fig. 10, Map Nos 80–98).

The percentage of western taxa is high, and the percentage of oceanic taxa rather low (Tables 5 and 7). The small number of taxa may explain this. All taxa occur both in West and East Greenland, and most of them are widely distributed. The mean CI is but a little higher than in type 1 (Table 8).

Four subtypes are separable:

a. Arctic and chionophilous ubiquist, preferring alpine habitats and settlements: No. 81.
b. Arctic or low-arctic ubiquists, preferring alpine habitats: Nos 96 and 98.
c. Low-arctic, oceanic and chionophilous taxon, preferring region S and SE: No. 80. (The one and only taxon with this preference).
d. More or less oceanic taxa, evenly distributed in the province: Nos 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95 and 97.

Distribution type 3. (Table 4, Fig. 10, Map nos 99–125).

In most aspects type 3 is similar to type 1. The differences are greatest in the arctic and low-arctic columns and CI (Tables 6 and 8). All taxa occur in both West and East Greenland.

Six subtypes are recognizable

a. Arctic and nitrophilous helophyte, preferring the outer coast: No. 99.
b. Arctic ubiquists, preferring alpine habitats: Nos 122 and 124.
c. Arctic taxon, preferring alpine habitats in region W and SW: No. 125.
d. Low-arctic or boreal ubiquists, preferring region SW and S: Nos 116, 120 and 123.
e. More or less evenly distributed in the area: Nos 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 117, 118, 119 and 121.
f. Boreal taxon, preferring Tasermiut district and region S, and SE: No. 100.

Distribution type 4 (Table 4, Fig. 10, Map Nos 126–163).

The only type with coincident abundance of boreal and oceanic taxa, and the type with the highest percentage of eastern taxa (Tables 5, 6 and 7). Twentysix taxa occur in both of the adjacent provinces. Eight taxa are missing in East Greenland, one taxon is missing in West Greenland and three are in this country confined to South Greenland.

Five subtypes are recognizable:

a. Arctic and continental taxon, preferring alpine habitats: No. 162.

b. Boreal taxa, preferring Tugtutôq and Narssarssuaq districts: Nos 158 and 161.
c. Boreal ubiquists, preferring region SW and S: Nos 128, 137, 147, 153 and 163.
d. Evenly distributed in the area, but missing in Qôrnoq district: Nos 141, 142 and 160.
e. Evenly distributed in all of the area: Nos 126, 127, 129, 130, 131, 132, 133, 134, 135, 136, 138, 139, 140, 143, 144, 145, 146, 148, 149, 150, 151, 152, 154, 155, 156, 157 and 159.

Distribution type 5. (Table 4, Fig. 10, Map Nos 164–211).

This type (and the following one) reflect typical boreal distributions in South Greenland (Table 6). Thirtythree taxa occur in both West and East Greenland. Eleven taxa are missing in East Greenland and three taxa are (in Greenland) limited to South Greenland. The mean CI is about twice as high as for the preceding type (Table 8).

Four subtypes are recognizable:
a. Boreal, oceanic and western taxon, preferring the outer coast: No. 164.
b. More or less evenly distributed in the area, but missing in Qôrnoq district: Nos 179, 188, 189, 192, 194, 195, 196, 199, 201, 203, 205 and 208.
c. Preferring region SW and S: Nos 165, 173, 176, 178, 185, 186, 191, 193, 197, 202, 204, 206, 207, 209 and 211.
d. More or less evenly distributed in all of the area: Nos 166, 167, 168, 169, 170, 171, 172, 174, 175, 177, 180, 182, 183, 184, 187, 190, 198, 200 and 210.

Distribution type 6. (Table 4, Fig. 10, Map Nos 212–229).

Half of the taxa referred to this type has a CI $\geq$ 2, although only eleven percent are classified as continental. (Tables 5 and 8). Eight taxa occur both in West and East Greenland, seven are missing in East Greenland and three taxa are (in Greenland) confined to South Greenland.

Five subtypes may be selected:
a. Arctic ubiquists, preferring alpine habitats: No. 213.
b. Rather evenly distributed in the area, but missing in Qôrnoq district: Nos 219, 221, 222, 223, 224, 225 and 228.
c. Boreal taxa, preferring region SW: Nos 212, 216, 218, 220, 226, 227 and 229.
d. Rather evenly distributed in the area, but missing in Tasermiut district: No. 214.
e. More or less evenly distributed in all of the area: Nos 215 and 217.

Distribution type 7. (Table 4, Fig. 10, Map Nos 230–251).

The group of taxa referred to this type has the lowest percentages of low-arctic and eastern taxa (Tables 6 and 7). Thirteen taxa occur in both of the adjacent provinces, five taxa are missing in East Greenland, and four taxa are restricted to South Greenland.

Four subtypes may be selected:
a. More or less continental and alpine taxa with a hiatus in Qôrnoq district: Nos 239, 247 and 250.
b. Boreal and oceanic taxon, preferring region W: No. 233.
e. Boreal taxa preferring region SW: Nos 230, 231, 235, 236, 238, 241, 242, 244, 245, 246, 248 and 249.
d. Taxa with more or less even distribution in all of the area: Nos 232, 234, 237, 240, 243 and 251.

Distribution type 8. (Table 4, Fig. 10, Map Nos 252–267).

The group of taxa referred to this type has the highest percentages of continental and western and the lowest percentages of widespread and oceanic taxa (Tables 5 and 7).

Six taxa are restricted to South Greenland, four taxa occur also in West Greenland, and six occur in both West and East Greenland.

Four subtypes are recognizable:
a. Arctic taxa preferring alpine habitats: Nos 260, 262 and 266.
b. Continental and low-arctic taxa, with a hiatus in Qôrnoq district: Nos 258, 263 and 267.
c. Mostly boreal taxa, preferring Tugtutôq and Narssarssuaq districts: Nos 252, 253, 254, 255, 256, 257, 261, 264 and 265.
d. Oceanic and low-arctic taxon with no clear preference within the area: No. 259.

Distribution type 9. (Table 4, Fig. 10, Map Nos 268–272).

Four of the taxa referred to this type have continental distributions (Table 5), however, the number of taxa are so limited, that no definite conclusion can be made. As the type contains taxa with distributions far from the inland reference area, the CI is not calculated.

Three taxa occur only in West and South Greenland, while the remainder occur in all three provinces.

Four subtypes may be recognized:
a. Arctic ubiquist: No. 269.
b. Continental, low-arctic taxa occurring in Kvanefjord district only: Nos 271 and 272.
c. Continental and boreal taxon evenly distributed in Kvanefjord and Neria districts: No. 270.
d. Continental and boreal taxon, preferring Neria district: No. 268.

Distribution type 10. (Table 4, Fig. 10, Map Nos 273–303).

The group of taxa referred to this type has the highest percentage of boreal elements (Table 6).

Twelve taxa occur in West and South Greenland, having their southern limits in region SW. Ten taxa are restricted to South Greenland, and nine occur in all three provinces. The mean CI is the highest of all types (Table 8).

Seven subtypes are recognizable:
a. Boreal and eastern taxa, confined to or preferring region S: Nos 273 and 274.
b. Confined to the inland part of Tasermiut district: Nos 277 and 278.
c. Western taxa confined to Narssarssuaq and Tasermiut districts: Nos 288 and 289.
d. Boreal taxa limited to Tugtutôq and Narssarssuaq districts: Nos 275, 283, 286, 287, 290, 291 and 292.
e. Limited to Narssarssuaq district: Nos 293, 294, 295, 296, 297, 298, 299, 300, 301, 302 and 303.
f. Boreal and continental taxa confined to region SW: Nos 284 and 285.
g. Boreal taxa preferring region SW: Nos 276, 279, 280, 281 and 282.

Distribution type 11. (Table 4, Map Nos 304–346).

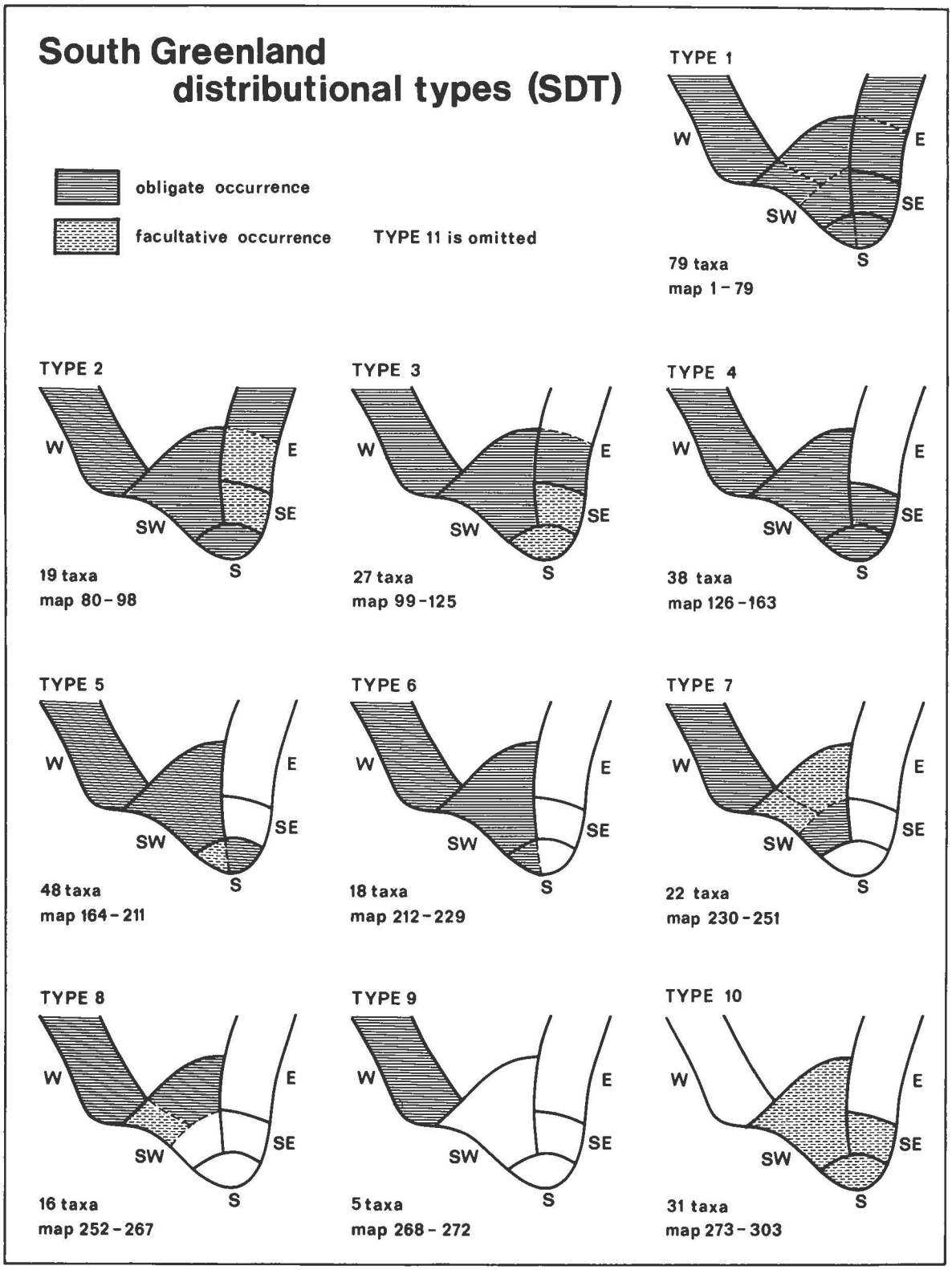

Fig. 10. The South Greenland distribution types (see Table 4).

This type includes all taxa incompatible with the preceding types.

Two subtypes may be recognized:

a. Arctic and low-arctic taxa, considered arctic pioneers or late glacial relicts in South Greenland: Nos 305, 306, 308, 309, 312, 314, 317, 319, 320, 325, 328, 331, 334, 338, 340 and 345.
b. Taxa considered boreal pioneers or relicts from the Holocene warmth period in South Greenland: Nos 304, 307, 310, 311, 313. 315, 316, 318, 321, 322, 323, 324, 326, 327, 329, 330, 332, 333, 335, 336, 337, 339, 341, 342, 343, 344 and 346.

Delimitation of the South Greenland flora province

In order to find a natural northern limit of South Greenland, Tugtutôq district was compared with the other districts of region W and SW. Tugtutôq district has more taxa in common with Neria district than with the adjacent district Tasermiut (Table 9), and this close floristical affinity is my reason for extending South Greenland northwards, as compared with previous definitions (Böcher *et al.* 1978). The exact placing of the limit was determined after considering all Greenland limits between 62° and 63° n. lat. On the west coast (Fig. 11). A more natural limit of the province appears just south of the big glacier, Frederikshåb Isblink, and not in the middle of it, as could be expected. On the east coast, a northern limit seemed natural near the glacier Puisortoq, as it is the northern limit on that coast of five taxa (Fig. 12). The latitude of 62°20′ N was then selected.

Interprovincial significance of the local borderlines

The country-wide importance of individual South Greenland borderlines can be seen if the Greenland distributions of taxa with limits within South Greenland are considered. A total of 70 taxa have southern or northern limits within the province, and additional 47 are restricted to it. These 117 taxa represent 164 limits (Fig. 12, sum of numerators), 87 northern and 77 southern.

Table 9. Comparisons between the districts in region W and SW.

Disticts	No. of taxa in common
Tugtutôq – Narssarssuaq	267
Tugtutôq – Neria	254
Tugtutôq – Tasermiut	248
Tugtutôq – Kvanefjord	228
Tugtutôq – Qôrnoq	199

Most of the borderlines are one-way barriers and of significance in a country-wide view. Three borderlines are of local significance only: Anoritôq/Danell, Qôrnoq/Tugtutôq and Neria/Qôrnoq.

Intraprovincial distribution

Considerable variation exists between the floras of the South Greenland districts (Fig. 12, the denominators), mainly as results of diverging physical conditions. To a minor degree the different sampling intensity, and the scatterness of the localities play a role. In order to analyse the distributions, correlations between these and climate, topography, rocks, and soil are made.

Climatical correlations

These correlations can be studied by means of the CI values (Appendix II), which are ranging between 0.04 and 17.0 with a mean of 1.49 (Table 8). In general, the CI values reflect the climatical distribution types (Table 10), though exceptions are found, e.g. the oceanic distributed taxa, Nos 123, 200, 202, 209, 225, 249, with remarkable high CI values, due to their warmth demands, and the continental distributed taxa, Nos 182 and 192, with remarkable low CI values, due to their tolerance for cold climates.

Judged from the satellite pictures, Qôrnoq district has a rather humid climate, which may be the principal cause for the relative "poorness" of that district (almost 25% of the South Greenland taxa are missing here, e.g. Nos 188, 194, 199, and 205).

A few taxa, Nos 80, 100, and 274, prefer the southern district due to the high precipitation here, of which the greater part falls as snow.

Topographical correlations

Like Frederikshåb Isblink (Fig. 11), Puisortoq and the glaciers north and south of Lindenow Fjord are supposed to be barriers to some taxa with wide distributions in West and/or South Greenland, Nos 4, 5, 30, 41, 74, 127, 129, 148, 154, 166, 167, 176, 179, 180, and 193.

Geological and edaphical correlations

An interpretation of the relation between the occurrence of a taxon and the geology is difficult. The rock surface has been disturbed by repeated glaciations, and the chemical composition of the degradating rock changes through weathering processes. Still it seems possible to interpret some characteristic distributions of calcicole taxa by means of a large scaled geological map (1:100 000), Nos 209, 223, 228, 233, 234, 244, 258, 278, and 296. Other characteristic distributions are found among the halophytes and coprophytes (Salomonsen

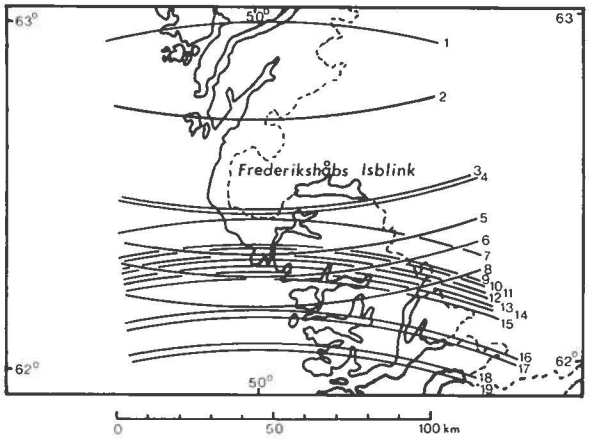

Fig. 11. Distribution limits found in the area between 62° and 63° N. lat. on the west coast: 1 (Map No. 168, Appendix II), 2 (*Draba groenlandica* Ekm.), 3 (*Juncus castaneus* Sm.), 4 (*Arnica angustifolia* M. Vahl), 5 (No. 305), 6 (No. 271), 7 (No. 180), 8 (No. 306), 9 (No. 131), 10 (No. 100), 11 (No. 256), 12 (No. 142), 13 (No. 159), 14 (No. 184), 15 (No. 214), 16 (No. 241), 17 (No. 230), 18 (No. 255) and 19 (No. 311).

1978), e.g. Nos 99 and 132. Likewise, some coastal distribution may be equally well edaphically conditioned, e.g. Nos 100, 164, and 166.

Affinities to European and American floras

The affiliation of the Greenland flora has been much discussed. Warming (1888) argued that the whole of Greenland belonged to the Arctic-American flora-element though also being a little of its own. Denmark Strait was the boundary between the above-mentioned and the European flora-element. Contrary, Nathorst (1890) considered Southeast Greenland a European province, and the Inland Ice a major boundary. Böcher *et al.* (1959) favoured Nathorst's view, stating that the east coast from Lindenow Fjord to Scoresby Sund (70°30′ n. lat.) had a higher percentage of eastern than of western taxa.

A statement of the holarctic distribution types (HDT) (Table 11) shows that the districts Anoritôq, Danell, Lindenow, Kap Farvel, Frederiksdal, Tasermiut and the coastal parts of the districts Tugtutôq and Qôrnoq (Fig. 12, hatched areas) have a higher percentage of eastern than of western taxa. All other areas show dominance of western taxa. This result supports the views of Nathorst (1980) and Böcher *et al.* (1959), with a little modification concerning four districts belonging to the west coast.

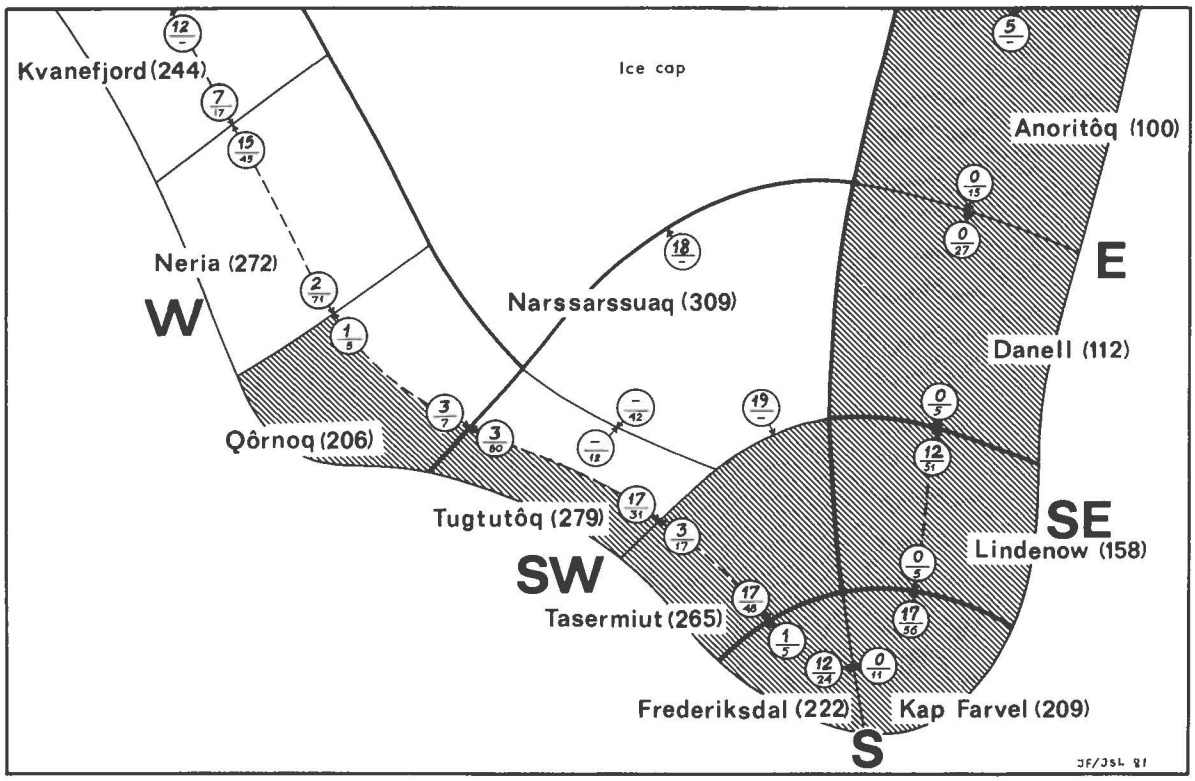

Fig. 12. Formalized map of South Greenland, showing a) No. of taxa in the districts (brackets), b) No. of distribution limits in the districts (numerators), c) difference in number of taxa between a district and the adjacent one (denominators), and prevailing flora element (eastern hatched). Further explanation in the text.

Table 10. Relative frequencies (percentages) between five CI classes of each of two CDT. See text p. 21.

	CI classes					
CDT	CI≤0.5	0.5<CI≤1	1<CI<2	CI≤2	CI –	n
"Oceanic" taxa	36	40	6	10	9	101
"Continental" taxa	0	3	3	45	50	40

Acknowledgements

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Table 11. Relative frequencies (percentages) between widespread, "eastern", "western" and endemic taxa of each district and part.

District	Part	Wi	Ea	We	En	n
Kvanefjord	coastal	64	16	18	1	224
	inland	63	17	18	2	209
Neria	coastal	62	17	18	2	218
	inland	60	18	20	2	256
Qôrnoq	coastal	66	19	15	–	159
	inland	59	19	21	1	177
Tugtutôq	coastal	61	20	17	2	237
	inland	62	18	19	1	269
Narssarssuaq		60	17	21	2	309
Tasermiut	coastal	63	18	17	1	191
	inland	62	19	18	1	249
Frederiksdal		62	20	17	–	222
Kap Farvel		64	21	14	1	209
Lindenow	coastal	62	23	15	–	149
	inland	66	22	12	–	134
Danell		71	18	12	–	112
Anoritôq		68	18	14	–	100

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Appendix I

Abbreviations and symbols

a–g Subtypes of the South Greenland distribution types (p. 17 to p. 21).
A Arctic, widespread distribution.
AC Arctic, continental distribution.
Am Amphi-Atlantic distribution.
AM Medium-arctic distribution.
B Boreal, widespread distribution.
BC Boreal, continental distribution.
BO Boreal, oceanic distribution.
BS Boreal, sylvicolous distribution.
CDT Climatic distribution type, e.g. AC and LO.
Ci Circumpolar distribution.
CI Chorological index (p. 11).
E Region E or (on the distribution maps) northern limit in East (and North) Greenland.
Ea Eastern distribution, i.e. having the widest distribution in the old world.
En Endemic to Greenland.
HDT Holarctic distribution type, e.g. Ea and En.
L Low-arctic, widespread distribution.
LC Low-arctic, continental distribution.
LO Low-arctic, oceanic distribution.
S Region S
SDT South Greenland distribution type.
SE Region SE.
SW Region SW.
W Region W, or (on the distribution maps) northern limit in West (and North) Greenland.
We Western distribution, i.e. having the widest distribution in the New World.
Wi Widespread, i.e. Ci + Am.
' A species, not characterized as regards distribution type in Böcher (1975).
" Change of the distribution type proposed by Böcher (1975).
– (on the maps), lacking in the area in question and/or CI not calculated.
∞ (on the maps), lacking in the coastal reference area.
( ) (in the definitions of types and groups), facultative occurrence.

Appendix II

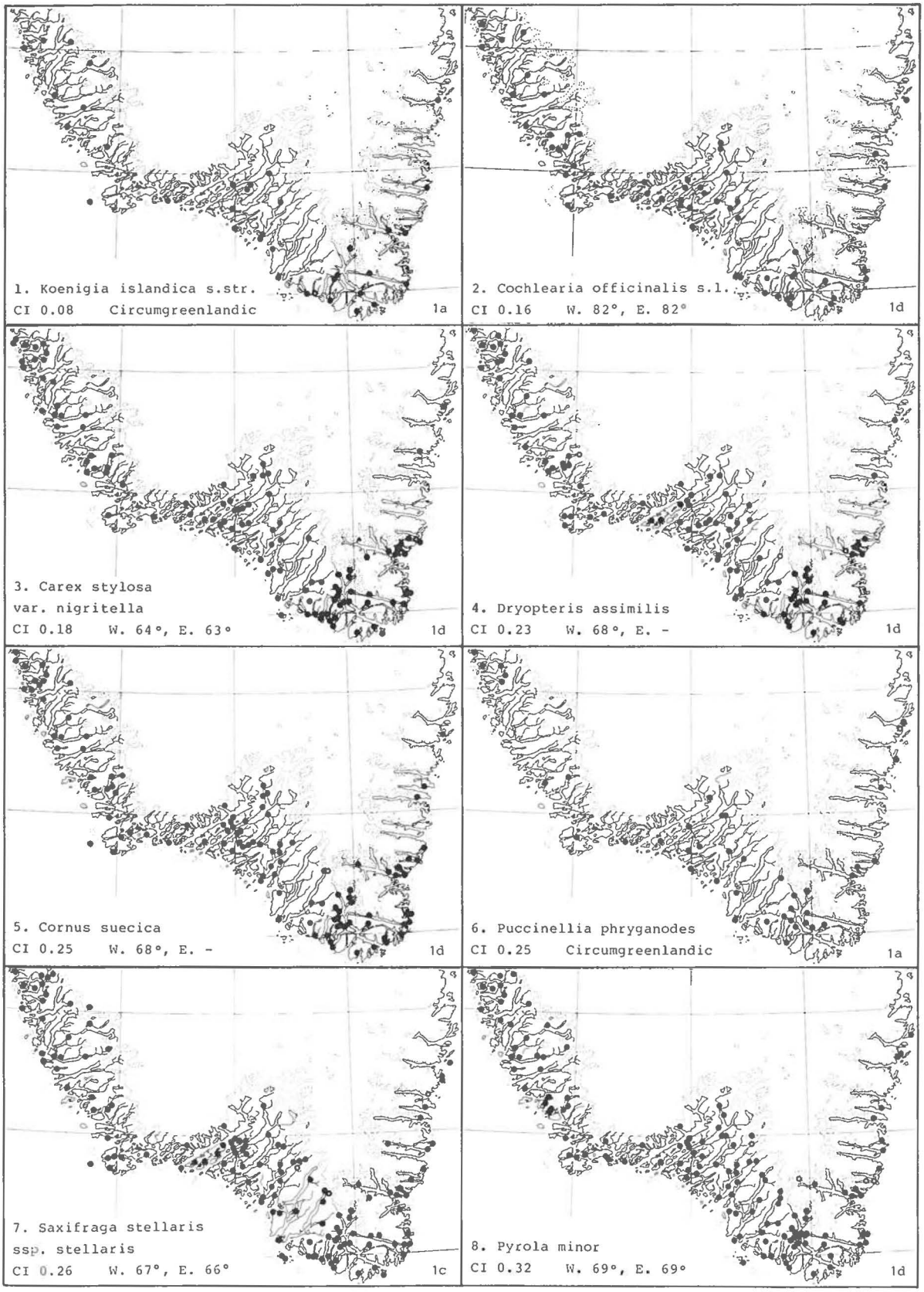
Explanation to the maps

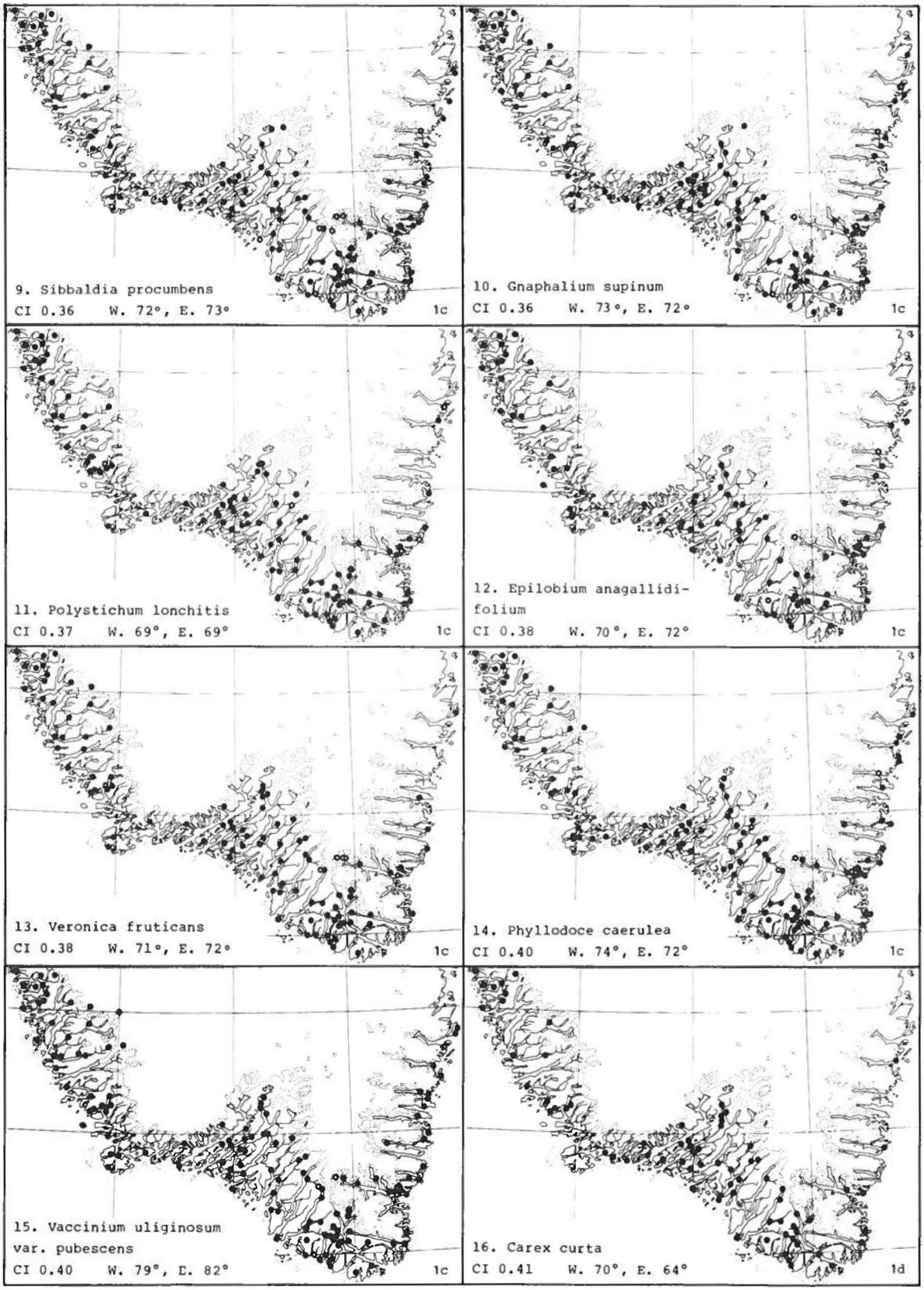
The maps are arranged according to the South Greenland distribution types 1 to 11 (Table 4, Fig. 10). Within each type the taxa are placed according to increasing CI values (p. 11) (the higher CI value, the greater inland preference). When no CI is calculated, the placing is estimated. However, the taxa in group 11 are arranged according to decreasing geographical latitude of the northernmost occurrence on the West Coast. Each map is labelled with number, name of taxon, CI and a formula giving the approximate northern limits (if any) outside the province. A taxon is described as "Circumgreenlandic" when occurring in all four provinces of Greenland. The South Greenland distribution type and subtype is given in the lower, right corner of the maps.

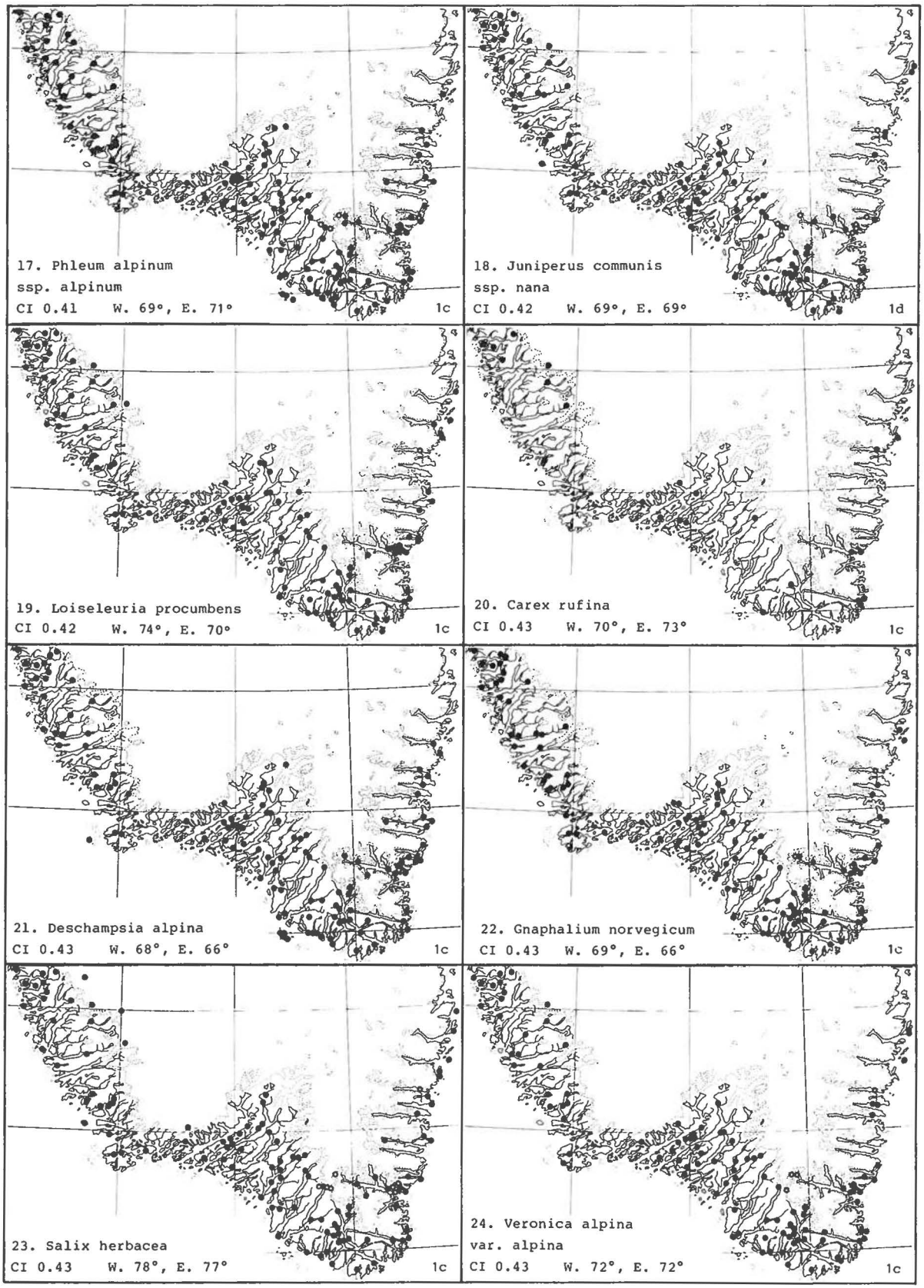
Specimens seen are marked as dots and recent literature reports are marked as circles (only when the species are taxonomically clear, and when the specimens are precisely cited and deposited in a known, accessible herbarium). Further abbreviations are mentioned in Appendix I.

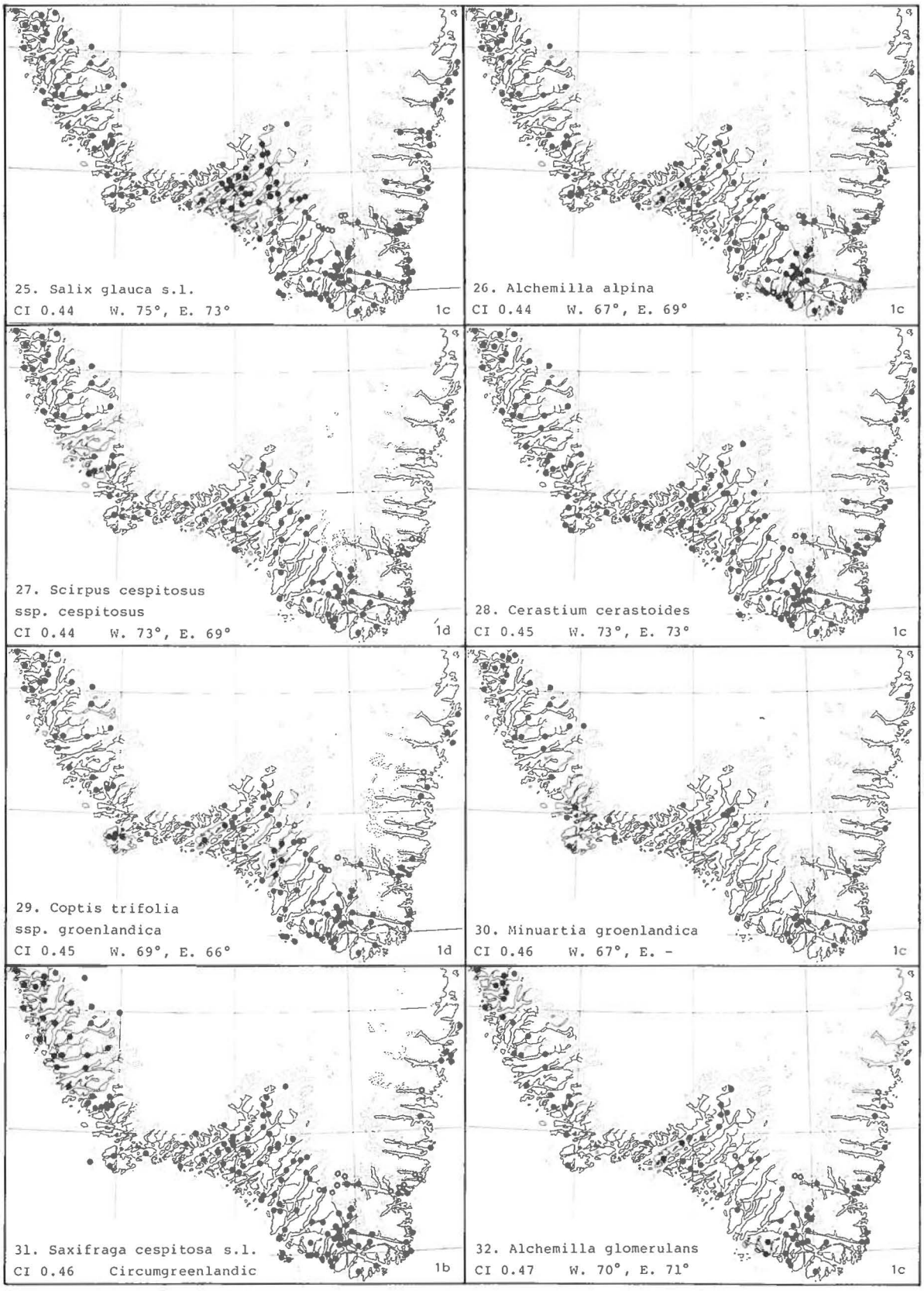
Addendum

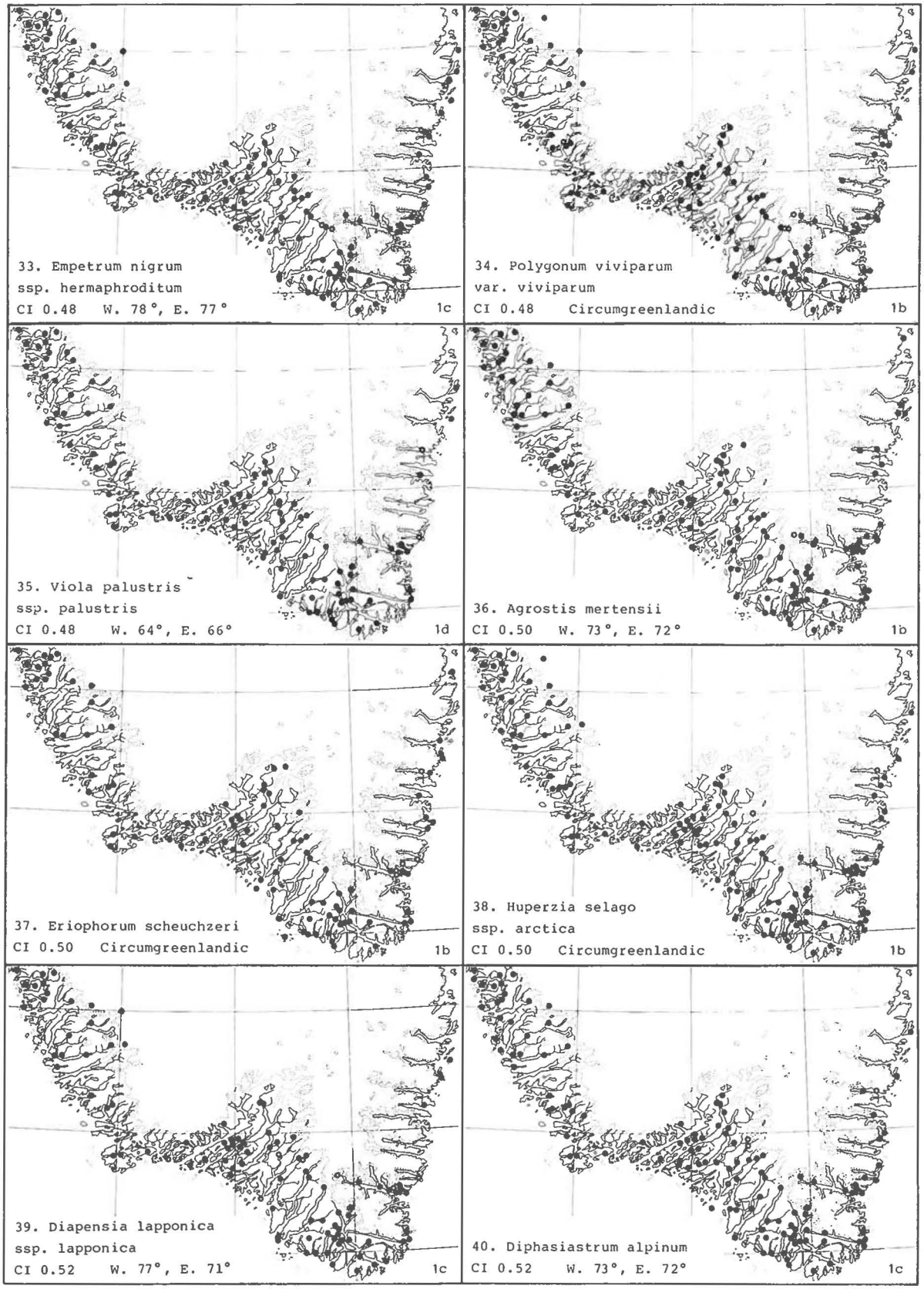
After finishing the maps, Signe Frederiksen (1983) published a new taxon occurring in South Greenland too: *Festuca saximontana* Rydb., which heretofore has been included in *Festuca brachyphylla* Schultes (Map No. 96 in Appendix II).

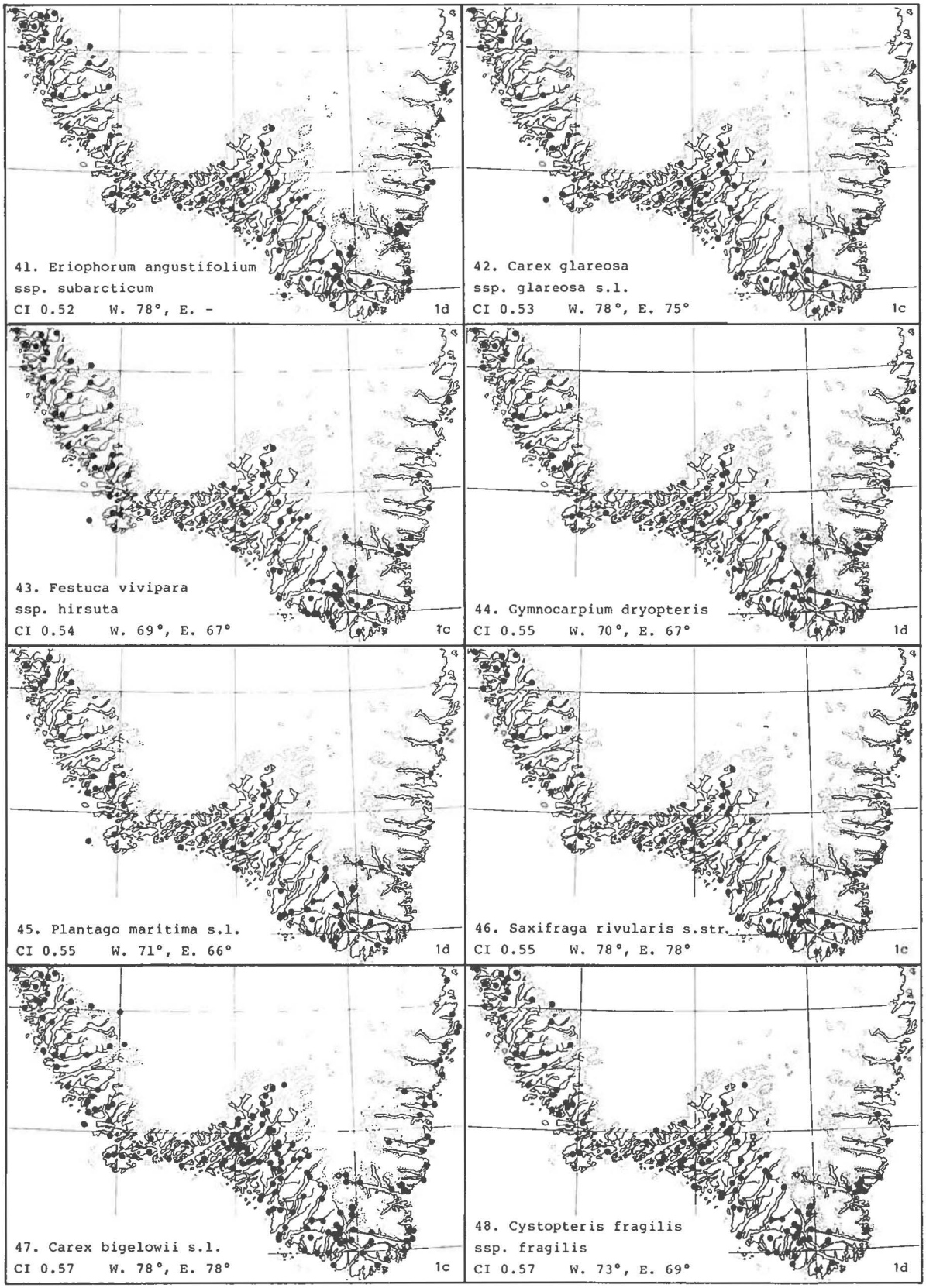

1. Koenigia islandica s.str.
CI 0.08 Circumgreenlandic 1a
2. Cochlearia officinalis s.l.
CI 0.16 W. 82°, E. 82° 1d
3. Carex stylosa
var. nigritella
CI 0.18 W. 64°, E. 63° 1d
4. Dryopteris assimilis
CI 0.23 W. 68°, E. - 1d
5. Cornus suecica
CI 0.25 W. 68°, E. - 1d
6. Puccinellia phryganodes
CI 0.25 Circumgreenlandic 1a
7. Saxifraga stellaris
ssp. stellaris
CI 0.26 W. 67°, E. 66° 1c
8. Pyrola minor
CI 0.32 W. 69°, E. 69° 1d

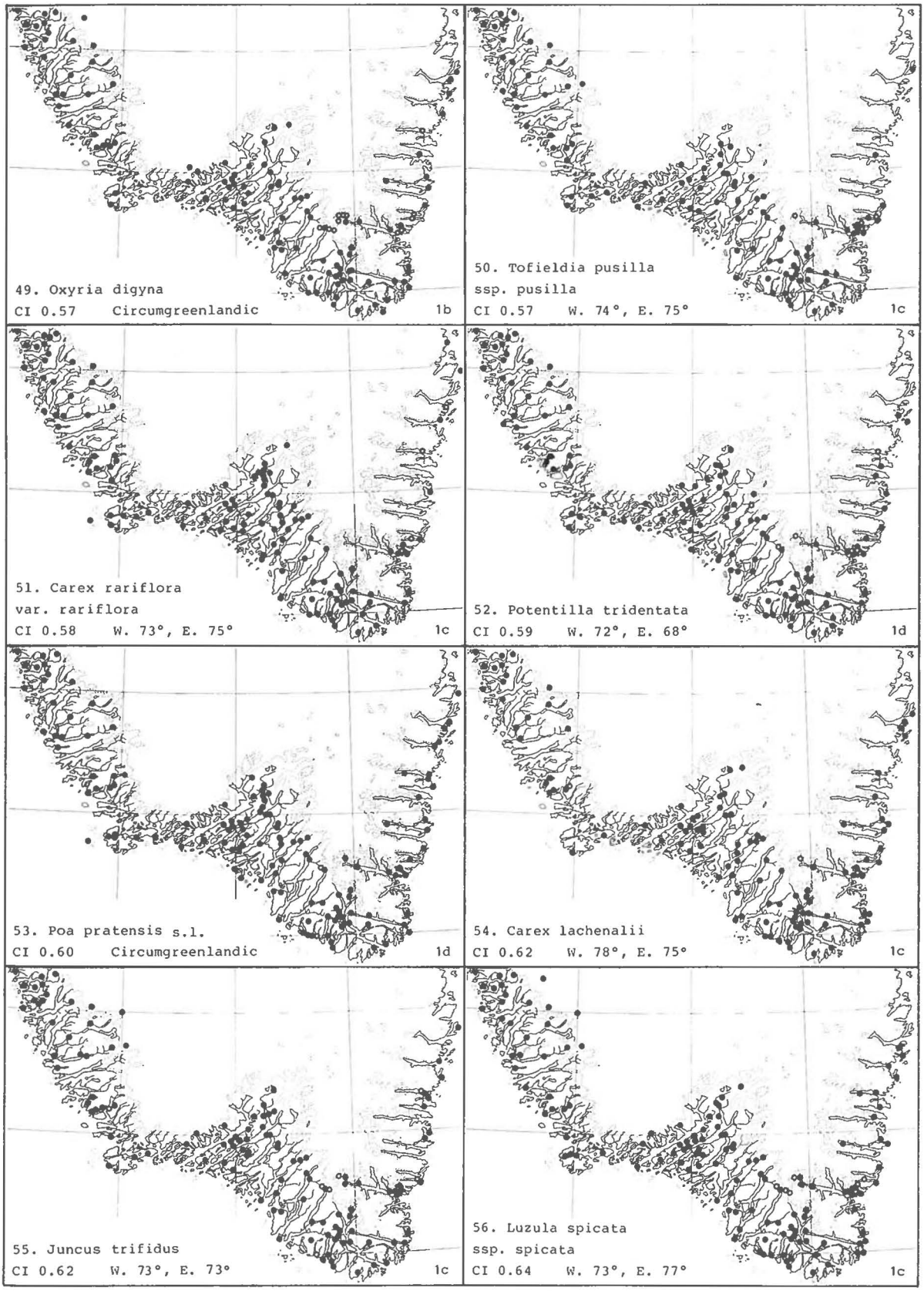

9. Sibbaldia procumbens
CI 0.36 W. 72°, E. 73° 1c
10. Gnaphalium supinum
CI 0.36 W. 73°, E. 72° 1c
11. Polystichum lonchitis
CI 0.37 W. 69°, E. 69° 1c
12. Epilobium anagallidi-
folium
CI 0.38 W. 70°, E. 72° 1c
13. Veronica fruticans
CI 0.38 W. 71°, E. 72° 1c
14. Phyllodoce caerulea
CI 0.40 W. 74°, E. 72° 1c
15. Vaccinium uliginosum
var. pubescens
CI 0.40 W. 79°, E. 82° 1c
16. Carex curta
CI 0.41 W. 70°, E. 64° 1d

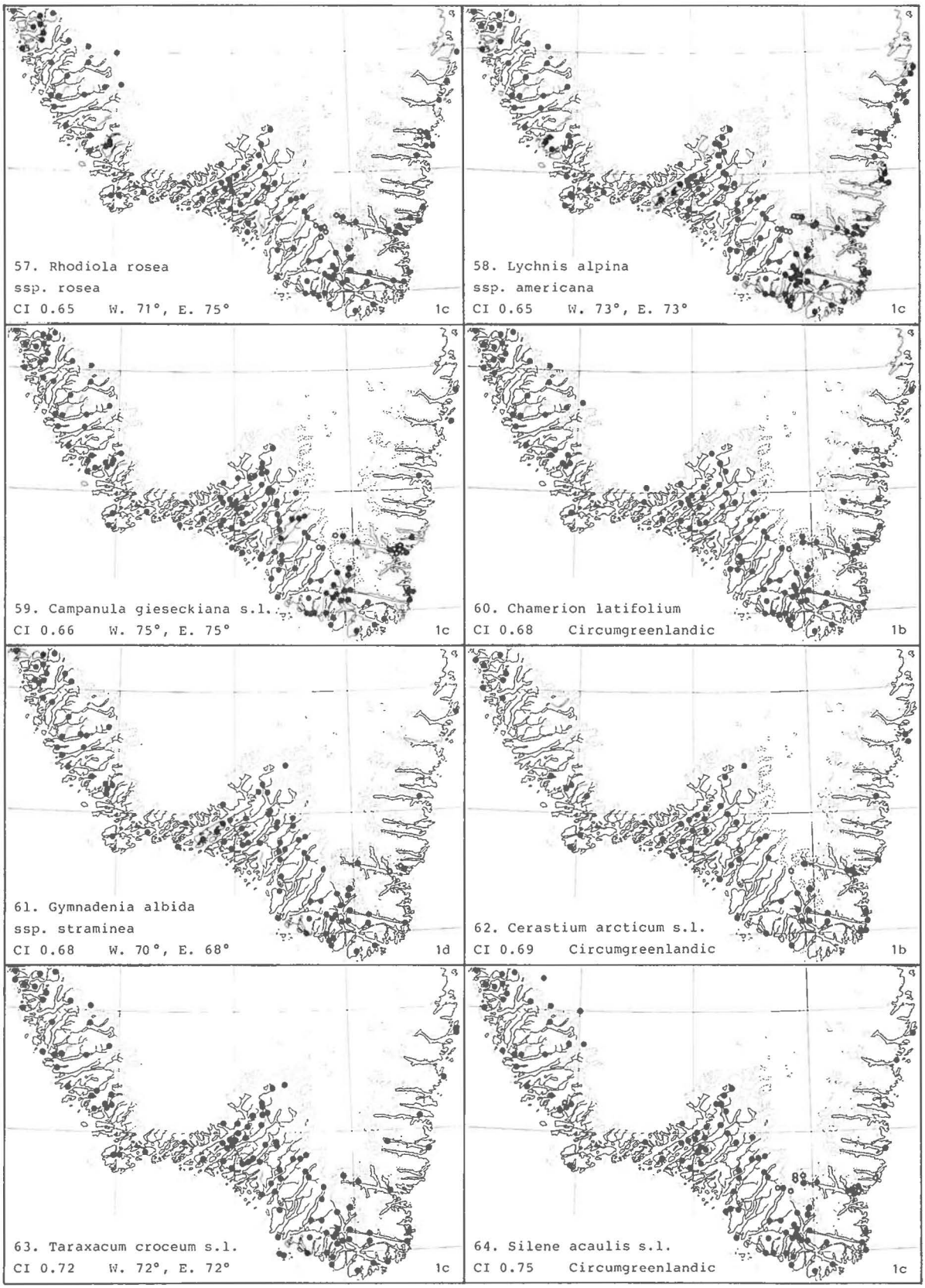

17. Phleum alpinum
ssp. alpinum
CI 0.41 W. 69°, E. 71° 1c
18. Juniperus communis
ssp. nana
CI 0.42 W. 69°, E. 69° 1d
19. Loiseleuria procumbens
CI 0.42 W. 74°, E. 70° 1c
20. Carex rufina
CI 0.43 W. 70°, E. 73° 1c
21. Deschampsia alpina
CI 0.43 W. 68°, E. 66° 1c
22. Gnaphalium norvegicum
CI 0.43 W. 69°, E. 66° 1c
23. Salix herbacea
CI 0.43 W. 78°, E. 77° 1c
24. Veronica alpina
var. alpina
CI 0.43 W. 72°, E. 72° 1c

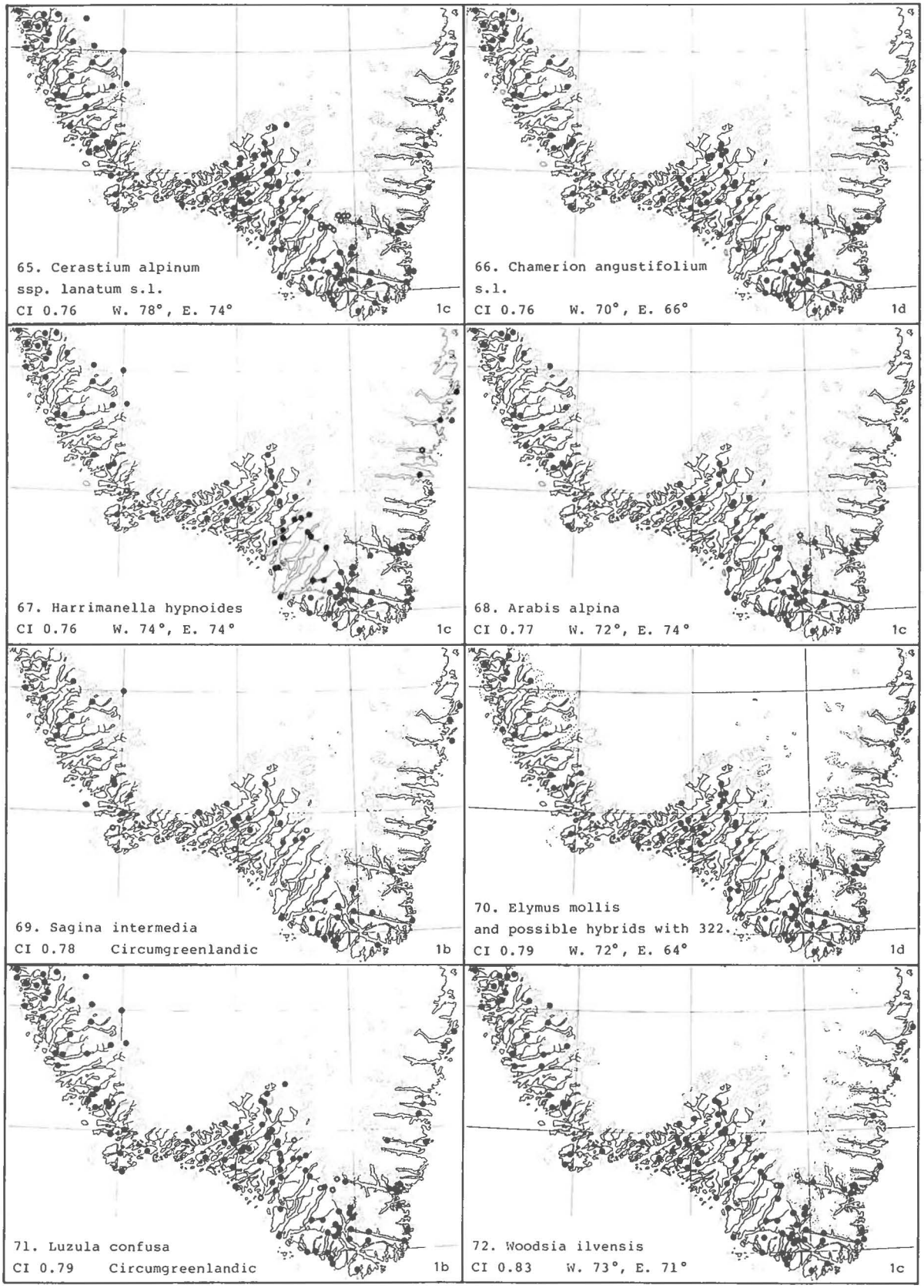

25. Salix glauca s.l.
CI 0.44 W. 75°, E. 73° 1c
26. Alchemilla alpina
CI 0.44 W. 67°, E. 69° 1c
27. Scirpus cespitosus
ssp. cespitosus
CI 0.44 W. 73°, E. 69° 1d
28. Cerastium cerastoides
CI 0.45 W. 73°, E. 73° 1c
29. Coptis trifolia
ssp. groenlandica
CI 0.45 W. 69°, E. 66° 1d
30. Minuartia groenlandica
CI 0.46 W. 67°, E. - 1c
31. Saxifraga cespitosa s.l.
CI 0.46 Circumgreenlandic 1b
32. Alchemilla glomerulans
CI 0.47 W. 70°, E. 71° 1c

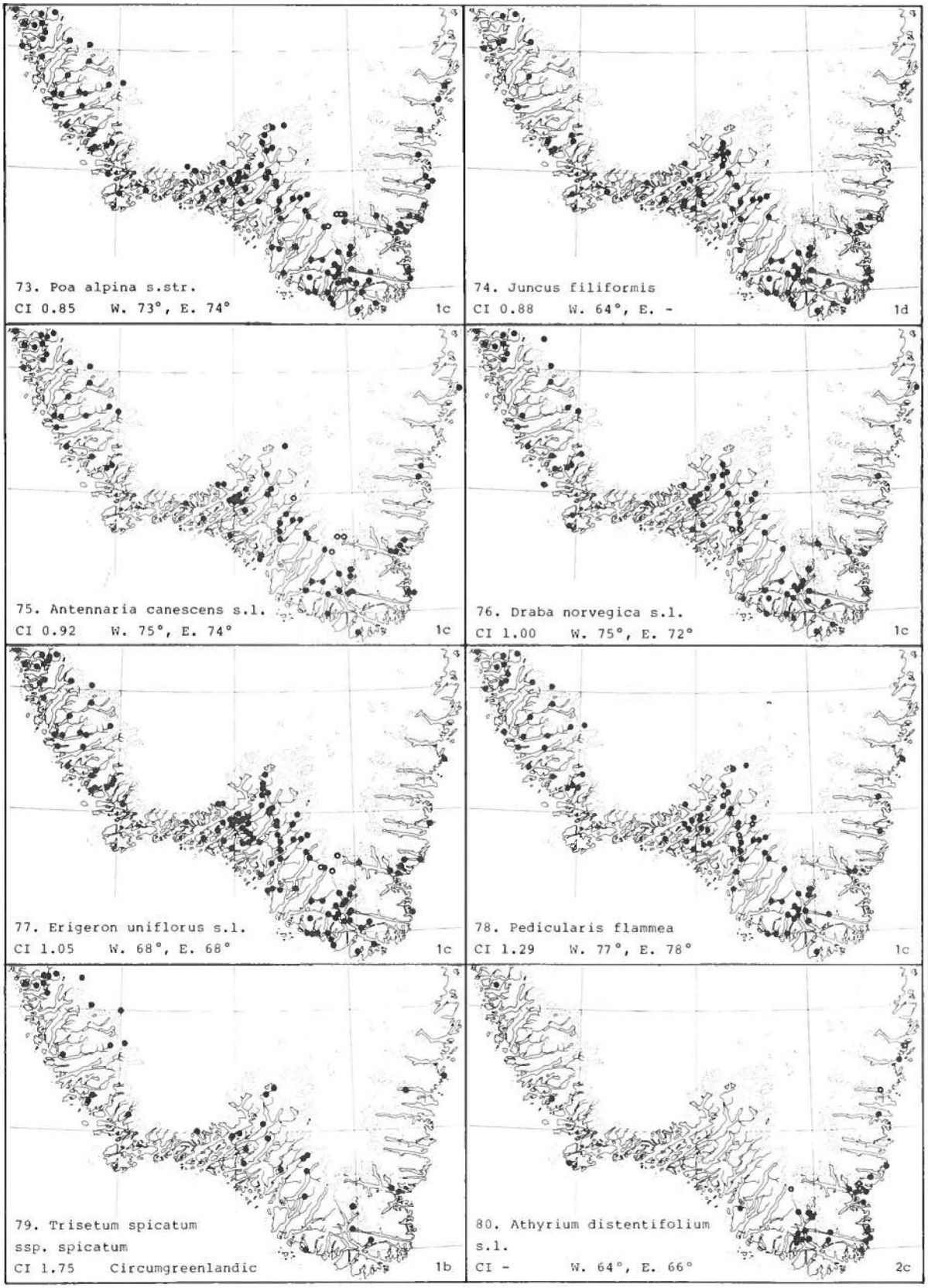

33. Empetrum nigrum
ssp. hermaphroditum
CI 0.48 W. 78°, E. 77° 1c
34. Polygonum viviparum
var. viviparum
CI 0.48 Circumgreenlandic 1b
35. Viola palustris
ssp. palustris
CI 0.48 W. 64°, E. 66° 1d
36. Agrostis mertensii
CI 0.50 W. 73°, E. 72° 1b
37. Eriophorum scheuchzeri
CI 0.50 Circumgreenlandic 1b
38. Huperzia selago
ssp. arctica
CI 0.50 Circumgreenlandic 1b
39. Diapensia lapponica
ssp. lapponica
CI 0.52 W. 77°, E. 71° 1c
40. Diphasiastrum alpinum
CI 0.52 W. 73°, E. 72° 1c

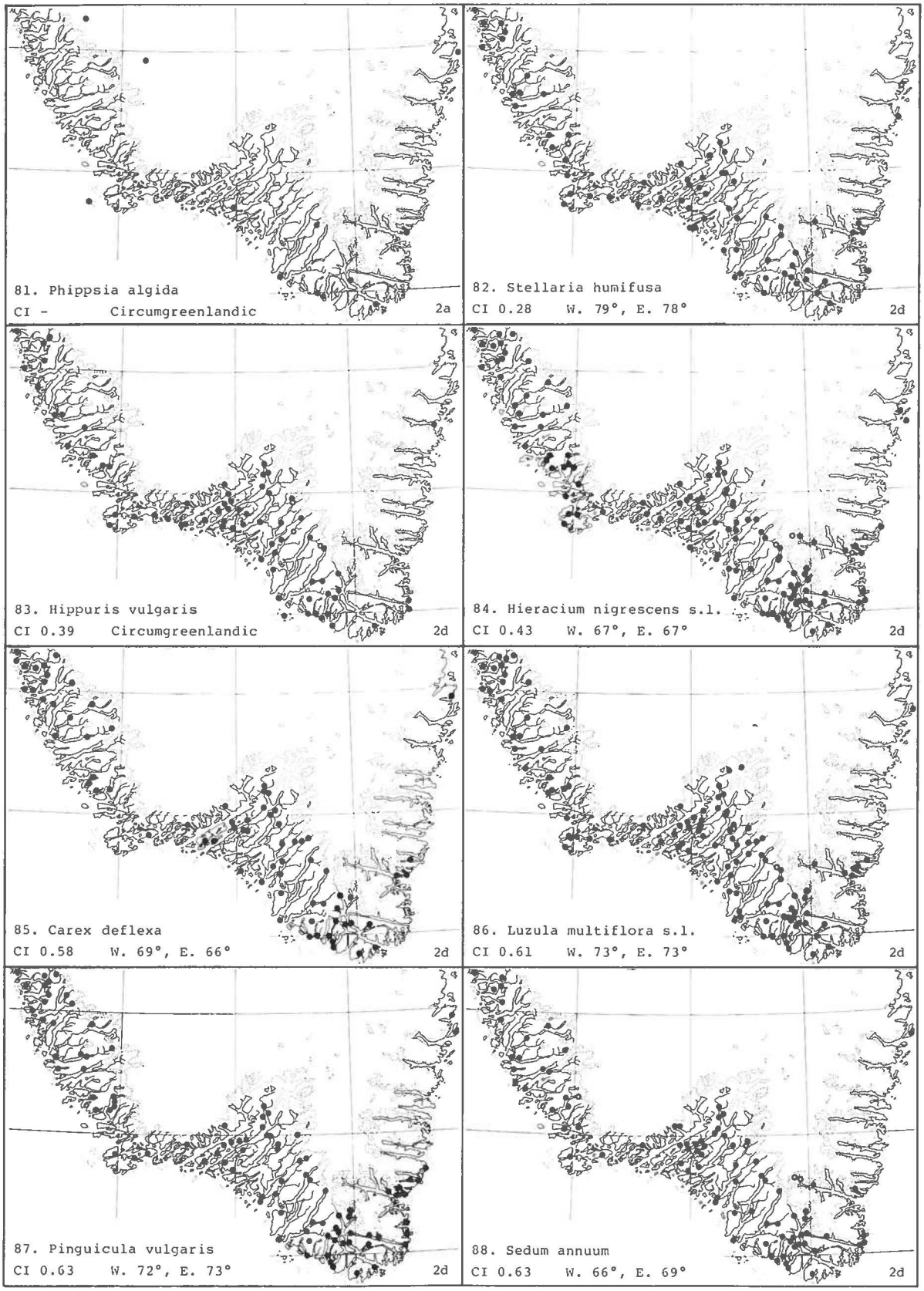

41. Eriophorum angustifolium
ssp. subarcticum
CI 0.52 W. 78°, E. -
1d
42. Carex glareosa
ssp. glareosa s.l.
CI 0.53 W. 78°, E. 75°
1c
43. Festuca vivipara
ssp. hirsuta
CI 0.54 W. 69°, E. 67°
1c
44. Gymnocarpium dryopteris
CI 0.55 W. 70°, E. 67°
1d
45. Plantago maritima s.l.
CI 0.55 W. 71°, E. 66°
1d
46. Saxifraga rivularis s.str.
CI 0.55 W. 78°, E. 78°
1c
47. Carex bigelowii s.l.
CI 0.57 W. 78°, E. 78°
1c
48. Cystopteris fragilis
ssp. fragilis
CI 0.57 W. 73°, E. 69°
1d

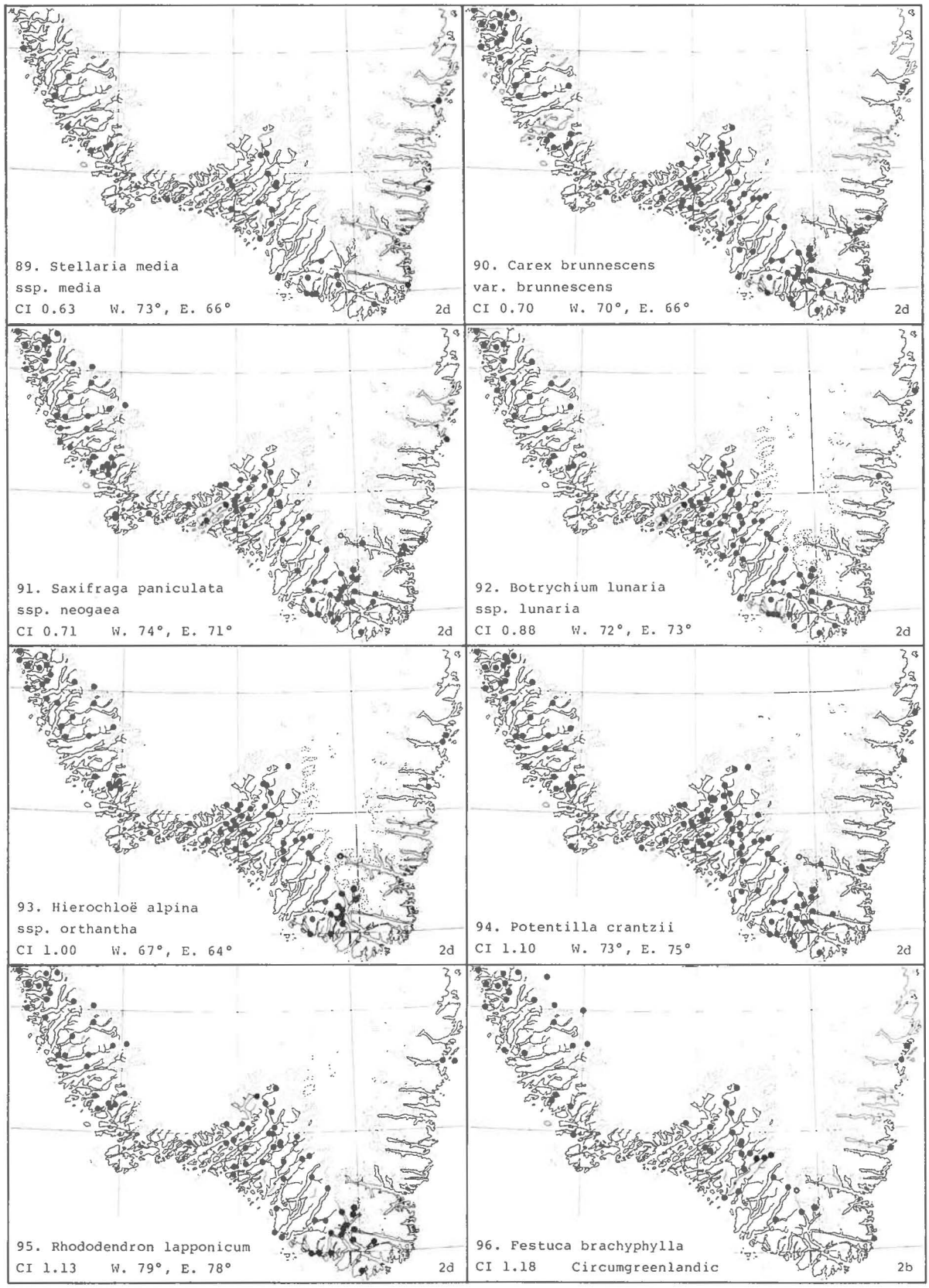

49. Oxyria digyna
CI 0.57 Circumgreenlandic 1b
50. Tofieldia pusilla
ssp. pusilla
CI 0.57 W. 74°, E. 75° 1c
51. Carex rariflora
var. rariflora
CI 0.58 W. 73°, E. 75° 1c
52. Potentilla tridentata
CI 0.59 W. 72°, E. 68° 1d
53. Poa pratensis s.l.
CI 0.60 Circumgreenlandic 1d
54. Carex lachenalii
CI 0.62 W. 78°, E. 75° 1c
55. Juncus trifidus
CI 0.62 W. 73°, E. 73° 1c
56. Luzula spicata
ssp. spicata
CI 0.64 W. 73°, E. 77° 1c

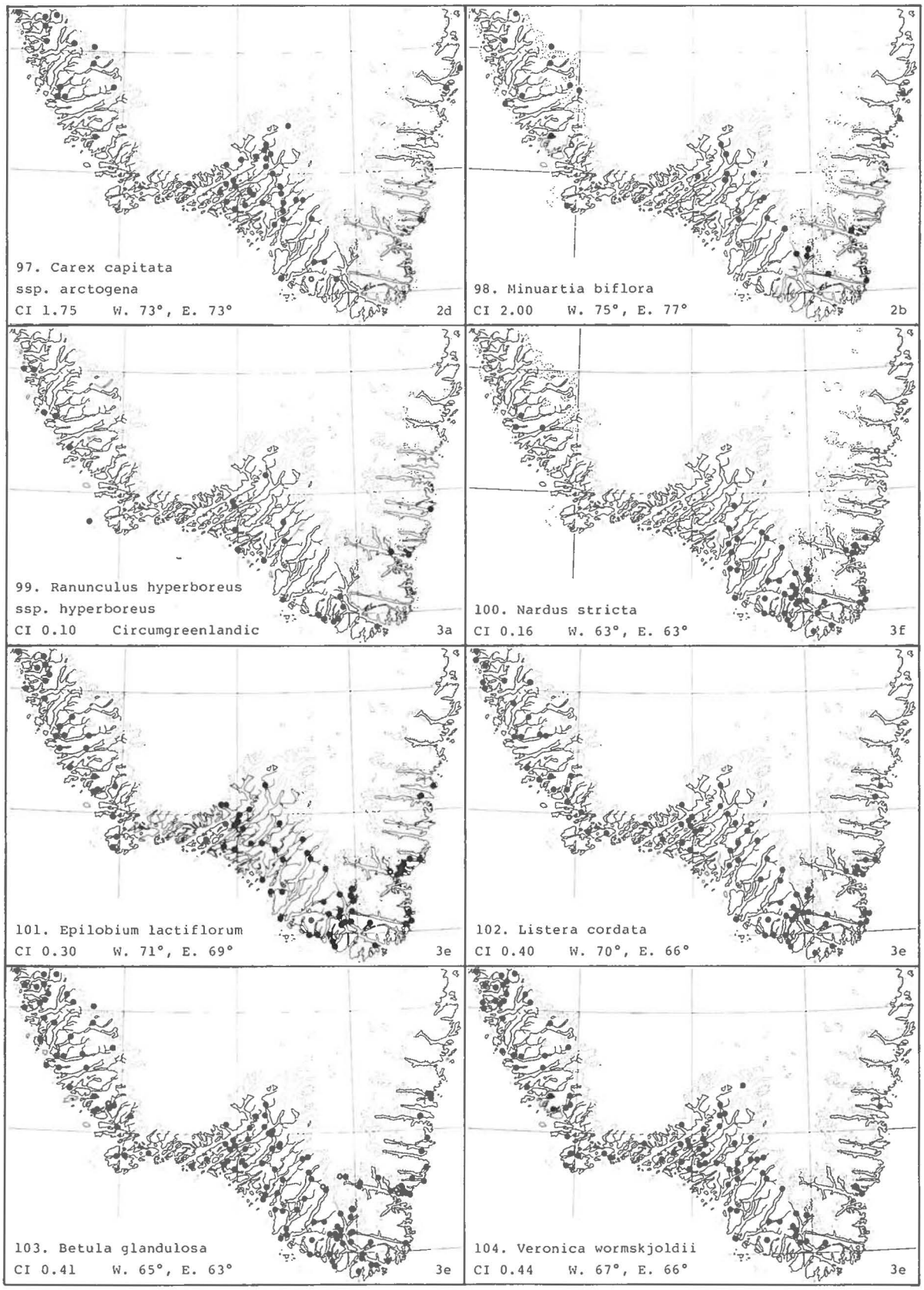

57. Rhodiola rosea
ssp. rosea
CI 0.65 W. 71°, E. 75° 1c
58. Lychnis alpina
ssp. americana
CI 0.65 W. 73°, E. 73° 1c
59. Campanula gieseckiana s.l.
CI 0.66 W. 75°, E. 75° 1c
60. Chamerion latifolium
CI 0.68 Circumgreenlandic 1b
61. Gymnadenia albida
ssp. straminea
CI 0.68 W. 70°, E. 68° 1d
62. Cerastium arcticum s.l.
CI 0.69 Circumgreenlandic 1b
63. Taraxacum croceum s.l.
CI 0.72 W. 72°, E. 72° 1c
64. Silene acaulis s.l.
CI 0.75 Circumgreenlandic 1c

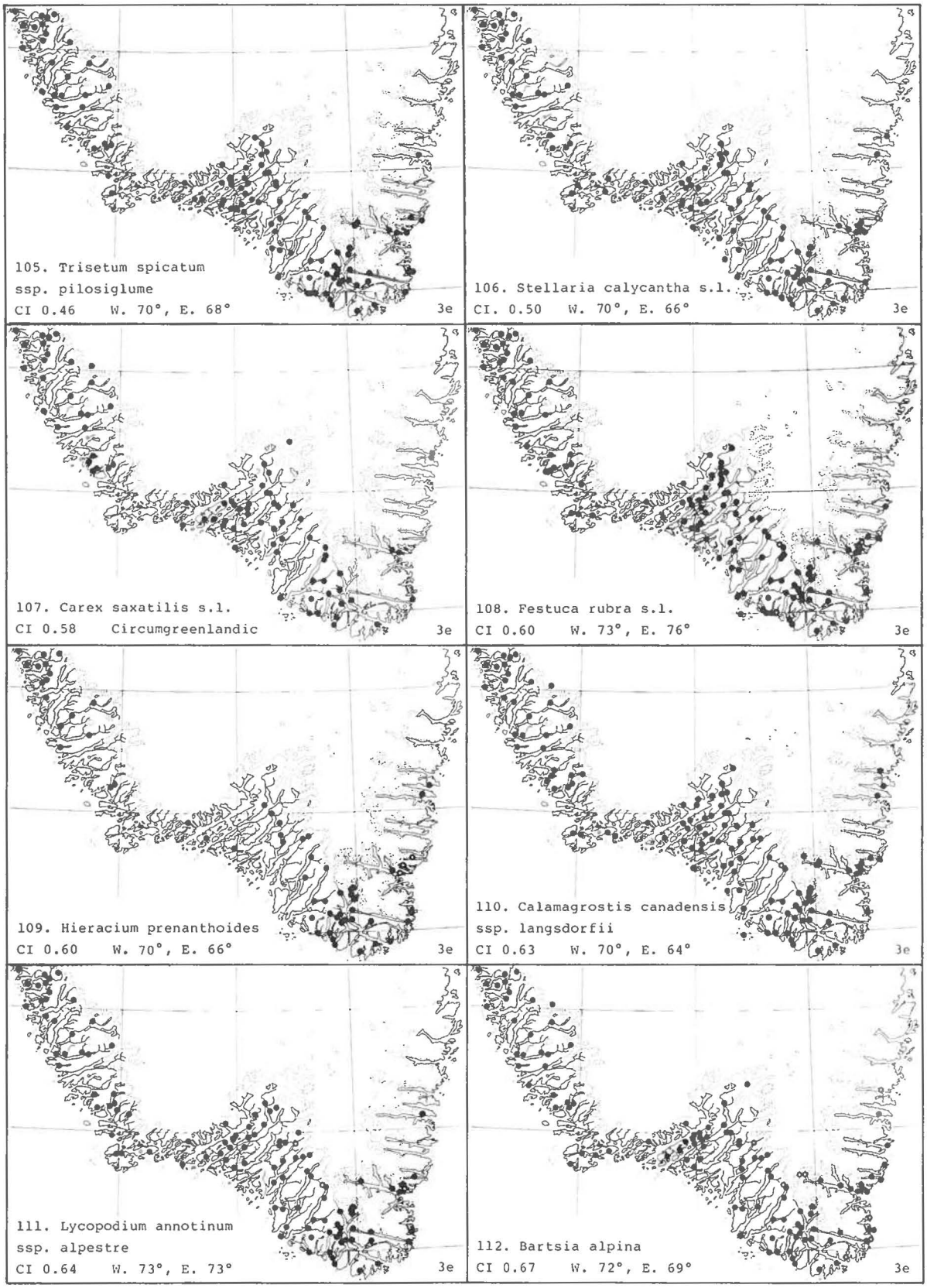

65. Cerastium alpinum
ssp. lanatum s.l.
CI 0.76 W. 78°, E. 74° 1c
66. Chamerion angustifolium
s.l.
CI 0.76 W. 70°, E. 66° 1d
67. Harrimanella hypnoides
CI 0.76 W. 74°, E. 74° 1c
68. Arabis alpina
CI 0.77 W. 72°, E. 74° 1c
69. Sagina intermedia
CI 0.78 Circumgreenlandic 1b
70. Elymus mollis
and possible hybrids with 322.
CI 0.79 W. 72°, E. 64° 1d
71. Luzula confusa
CI 0.79 Circumgreenlandic 1b
72. Woodsia ilvensis
CI 0.83 W. 73°, E. 71° 1c

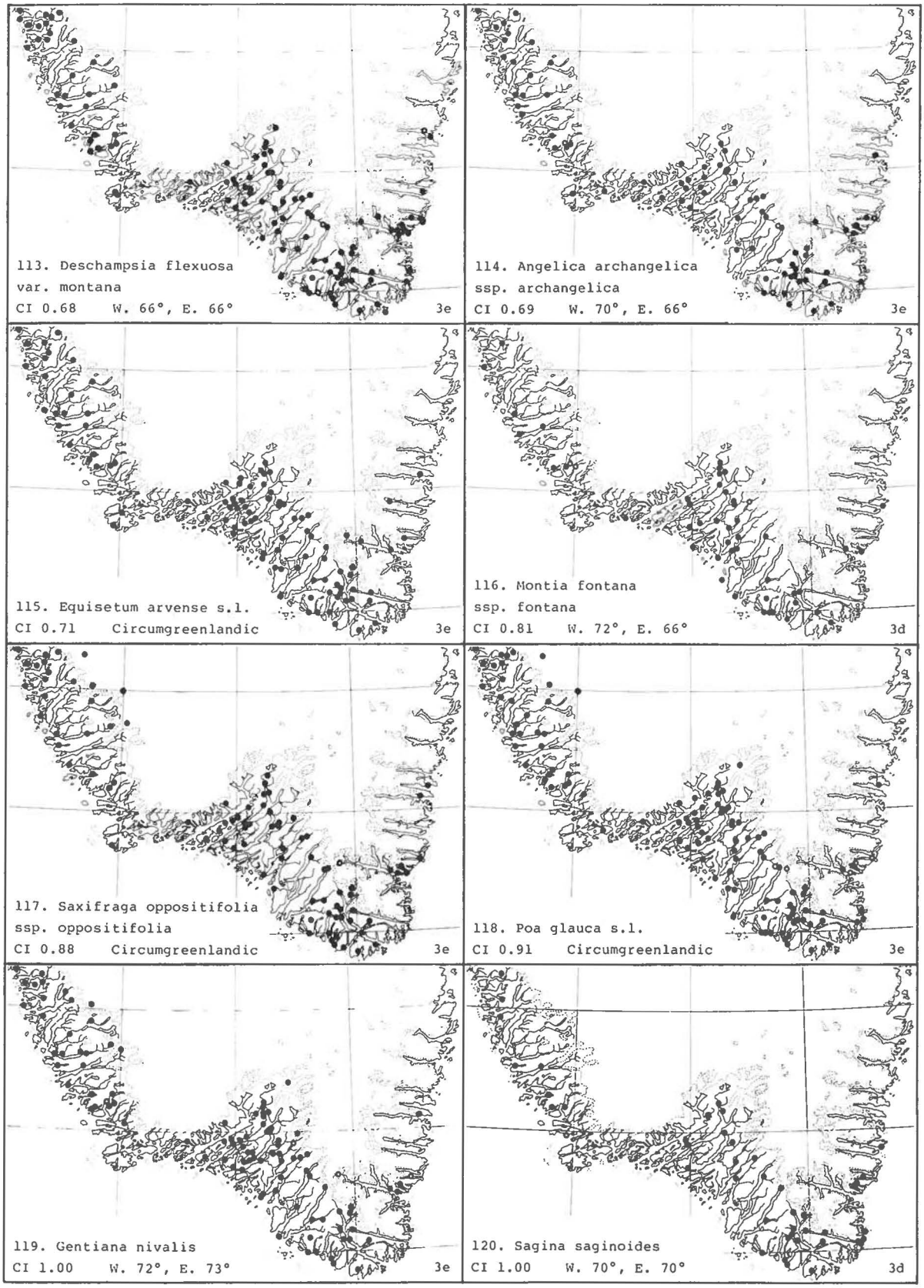

73. Poa alpina s.str.
CI 0.85 W. 73°, E. 74° 1c
74. Juncus filiformis
CI 0.88 W. 64°, E. - 1d
75. Antennaria canescens s.l.
CI 0.92 W. 75°, E. 74° 1c
76. Draba norvegica s.l.
CI 1.00 W. 75°, E. 72° 1c
77. Erigeron uniflorus s.l.
CI 1.05 W. 68°, E. 68° 1c
78. Pedicularis flammea
CI 1.29 W. 77°, E. 78° 1c
79. Trisetum spicatum
ssp. spicatum
CI 1.75 Circumgreenlandic 1b
80. Athyrium distentifolium
s.l.
CI - W. 64°, E. 66° 2c

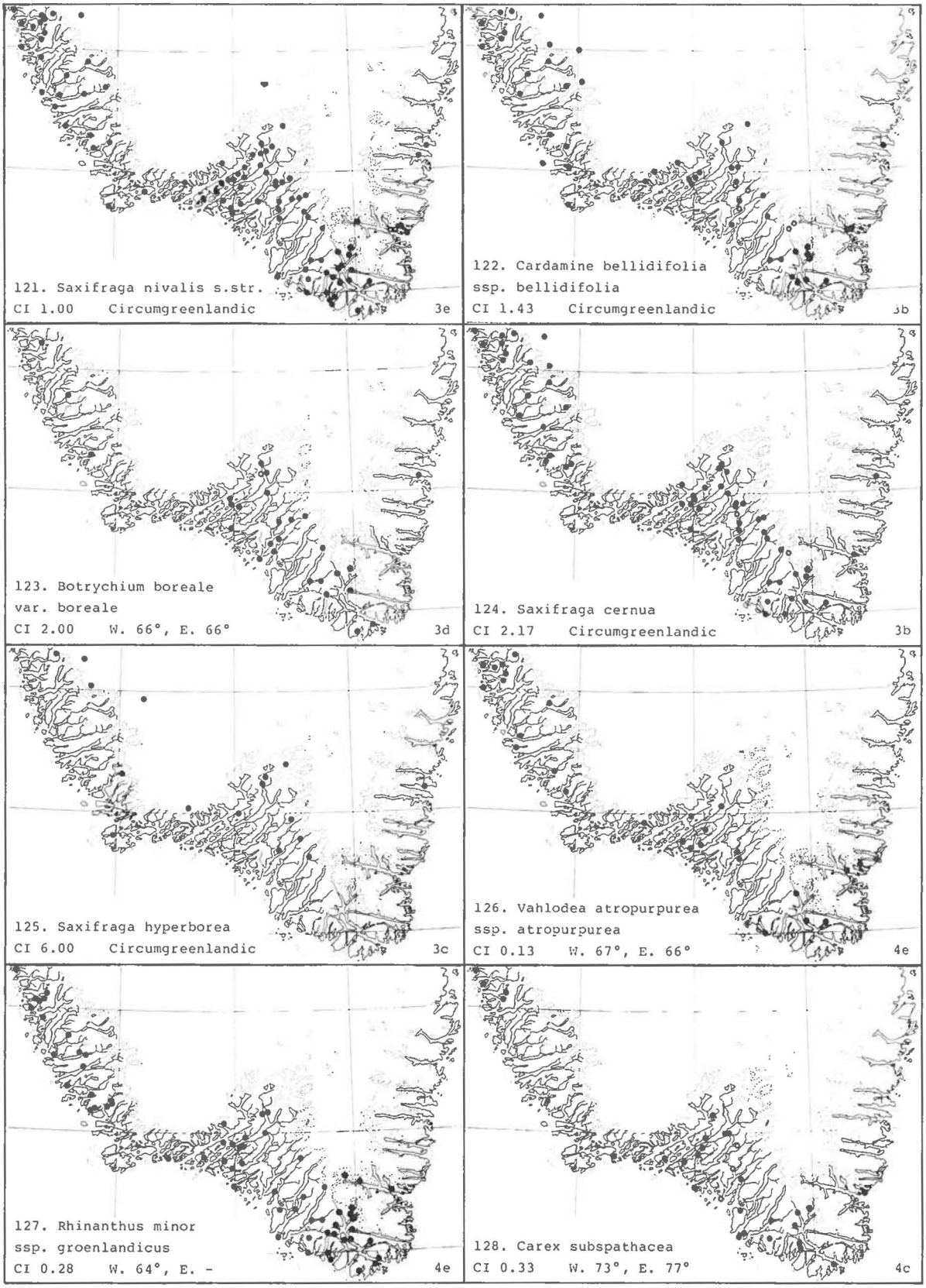

81. Phippsia algida
CI - Circumgreenlandic 2a
82. Stellaria humifusa
CI 0.28 W. 79°, E. 78° 2d
83. Hippuris vulgaris
CI 0.39 Circumgreenlandic 2d
84. Hieracium nigrescens s.l.
CI 0.43 W. 67°, E. 67° 2d
85. Carex deflexa
CI 0.58 W. 69°, E. 66° 2d
86. Luzula multiflora s.l.
CI 0.61 W. 73°, E. 73° 2d
87. Pinguicula vulgaris
CI 0.63 W. 72°, E. 73° 2d
88. Sedum annuum
CI 0.63 W. 66°, E. 69° 2d

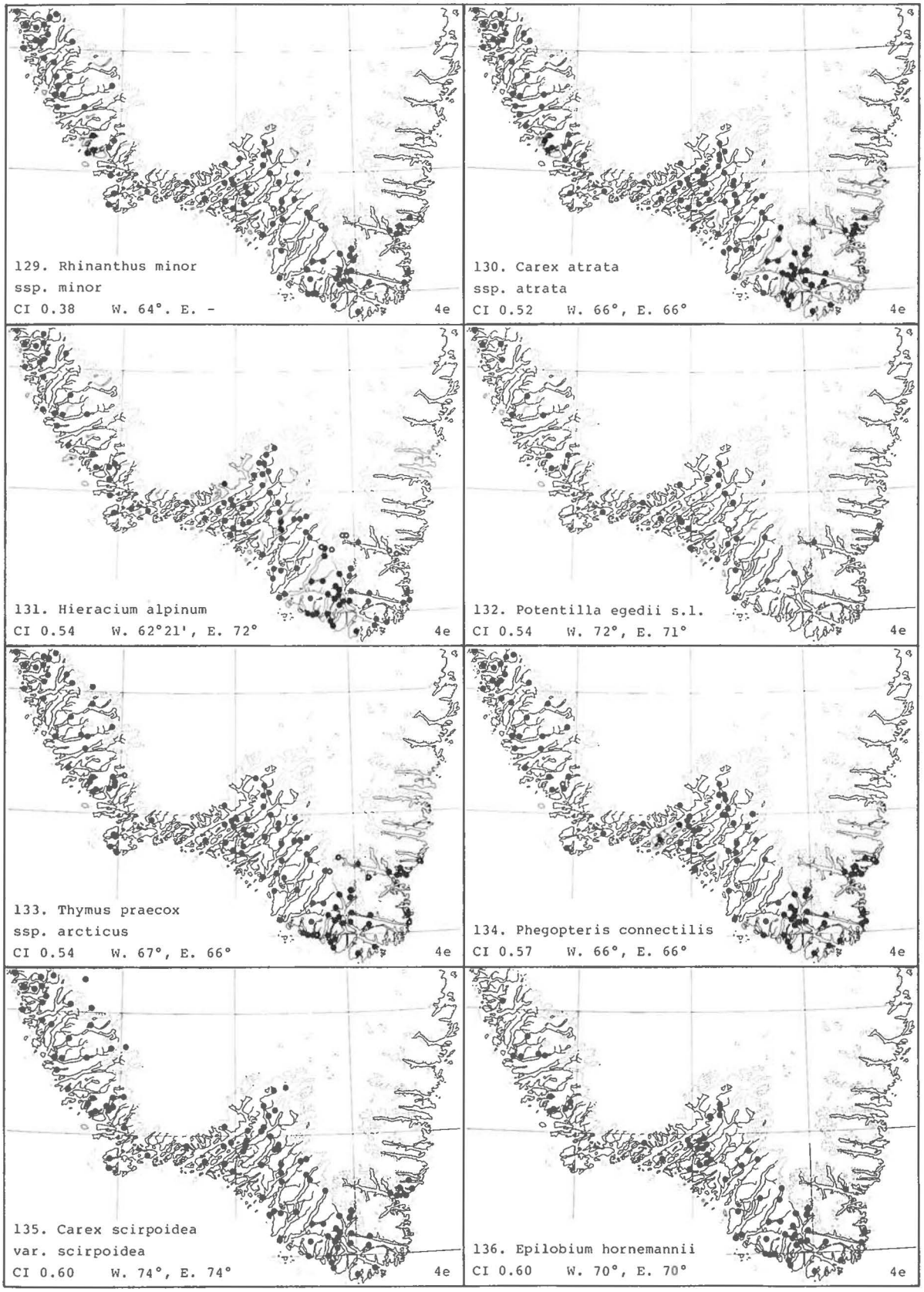

89. Stellaria media
ssp. media
CI 0.63 W. 73°, E. 66° 2d
90. Carex brunnescens
var. brunnescens
CI 0.70 W. 70°, E. 66° 2d
91. Saxifraga paniculata
ssp. neogaea
CI 0.71 W. 74°, E. 71° 2d
92. Botrychium lunaria
ssp. lunaria
CI 0.88 W. 72°, E. 73° 2d
93. Hierochloë alpina
ssp. orthantha
CI 1.00 W. 67°, E. 64° 2d
94. Potentilla crantzii
CI 1.10 W. 73°, E. 75° 2d
95. Rhododendron lapponicum
CI 1.13 W. 79°, E. 78° 2d
96. Festuca brachyphylla
CI 1.18 Circumgreenlandic 2b

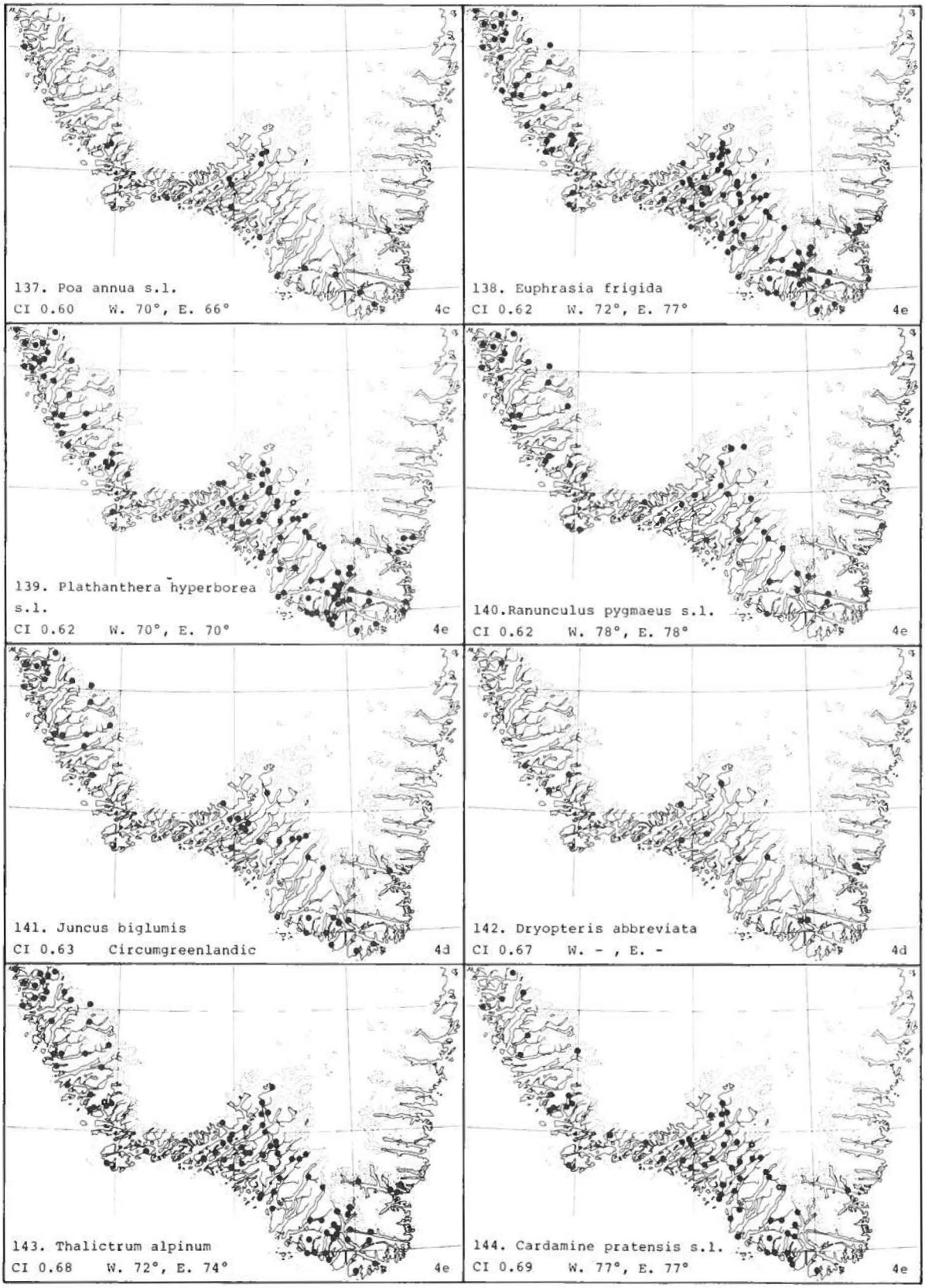

97. Carex capitata
ssp. arctogena
CI 1.75 W. 73°, E. 73° 2d
98. Minuartia biflora
CI 2.00 W. 75°, E. 77° 2b
99. Ranunculus hyperboreus
ssp. hyperboreus
CI 0.10 Circumgreenlandic 3a
100. Nardus stricta
CI 0.16 W. 63°, E. 63° 3f
101. Epilobium lactiflorum
CI 0.30 W. 71°, E. 69° 3e
102. Listera cordata
CI 0.40 W. 70°, E. 66° 3e
103. Betula glandulosa
CI 0.41 W. 65°, E. 63° 3e
104. Veronica wormskjoldii
CI 0.44 W. 67°, E. 66° 3e

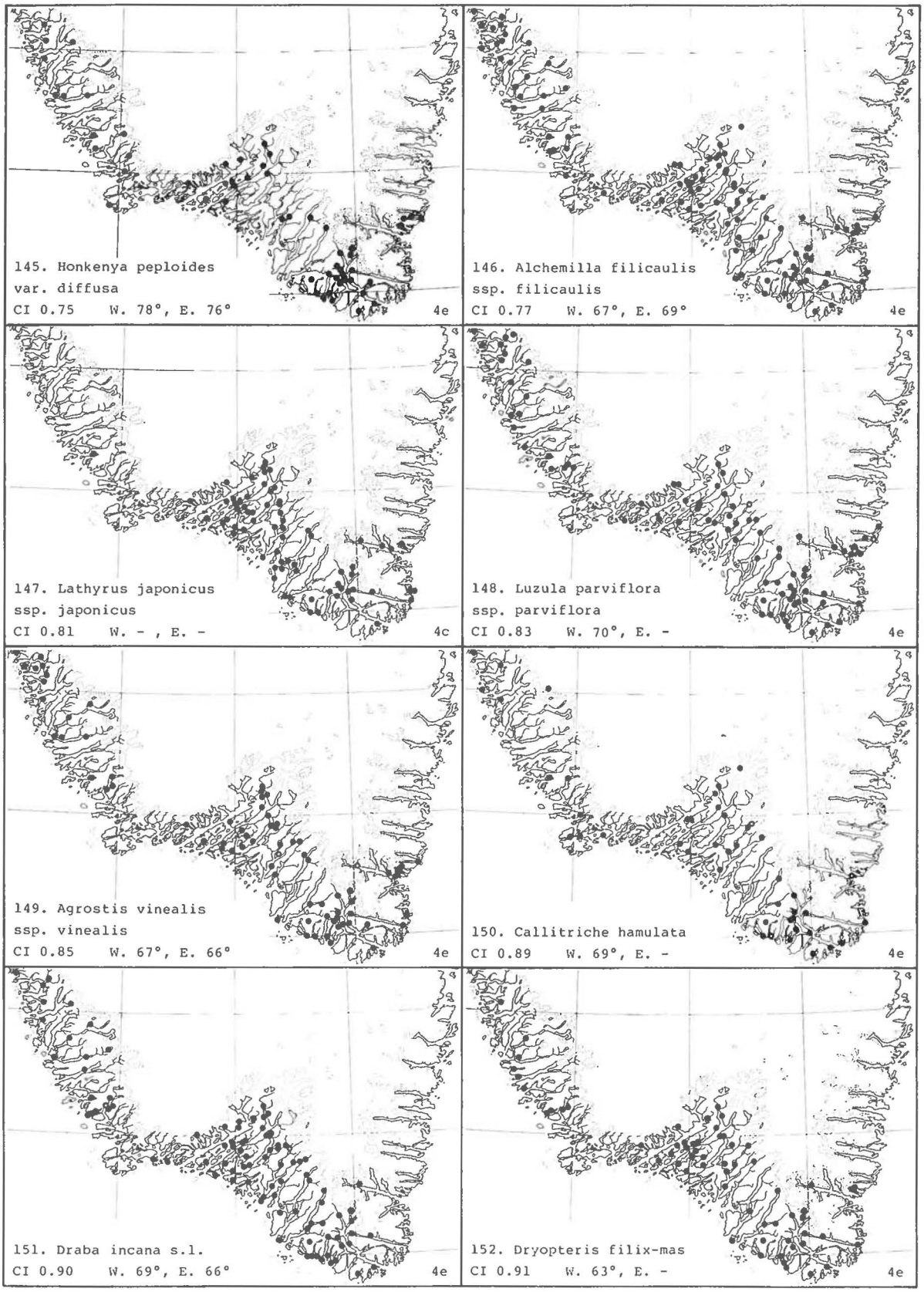

105. Trisetum spicatum
ssp. pilosiglume
CI 0.46 W. 70°, E. 68° 3e
106. Stellaria calycantha s.l.
CI. 0.50 W. 70°, E. 66° 3e
107. Carex saxatilis s.l.
CI 0.58 Circumgreenlandic 3e
108. Festuca rubra s.l.
CI 0.60 W. 73°, E. 76° 3e
109. Hieracium prenanthoides
CI 0.60 W. 70°, E. 66° 3e
110. Calamagrostis canadensis
ssp. langsdorfii
CI 0.63 W. 70°, E. 64° 3e
111. Lycopodium annotinum
ssp. alpestre
CI 0.64 W. 73°, E. 73° 3e
112. Bartsia alpina
CI 0.67 W. 72°, E. 69° 3e

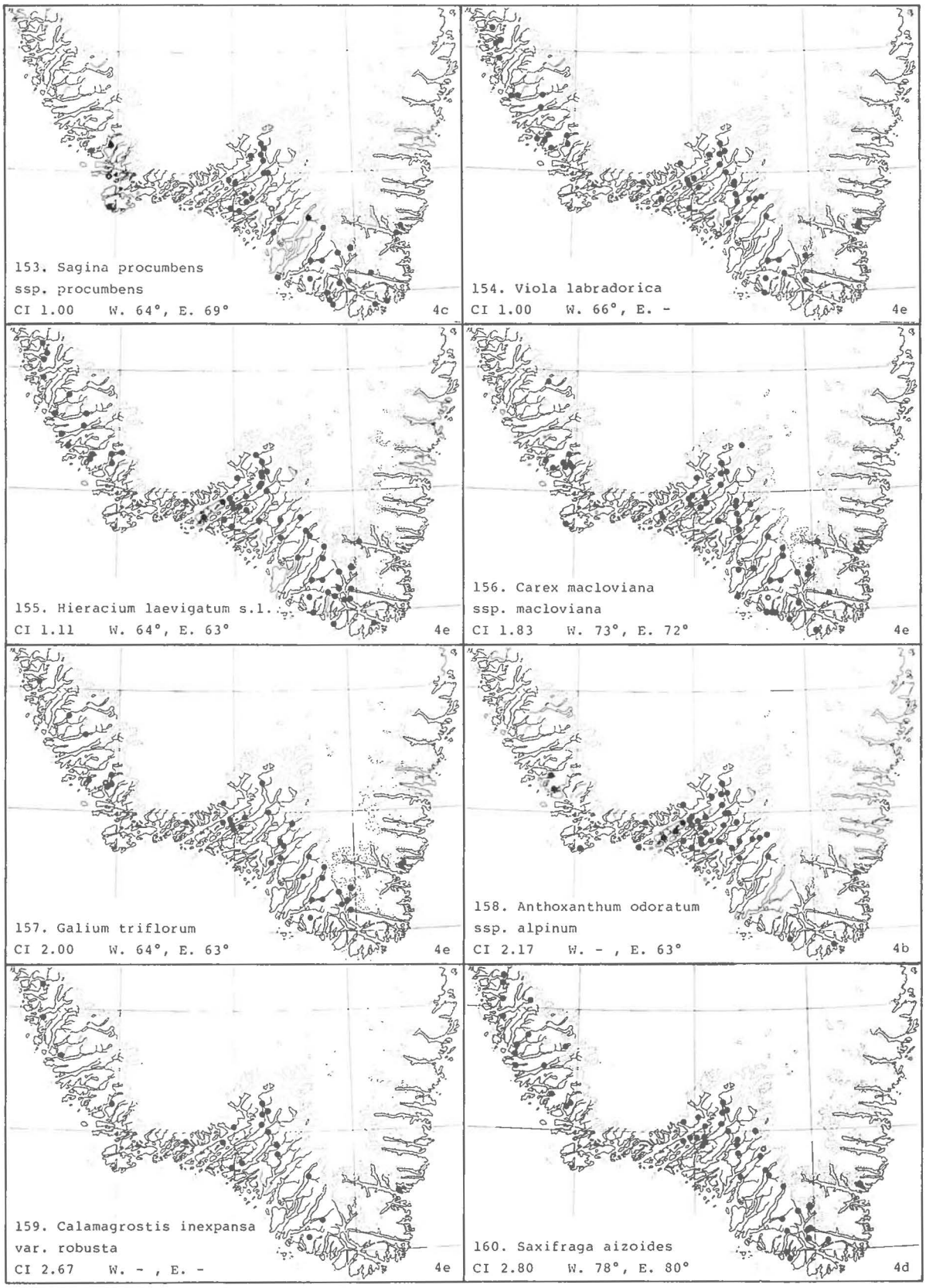

113. Deschampsia flexuosa
var. montana
CI 0.68 W. 66°, E. 66° 3e
114. Angelica archangelica
ssp. archangelica
CI 0.69 W. 70°, E. 66° 3e
115. Equisetum arvense s.l.
CI 0.71 Circumgreenlandic 3e
116. Montia fontana
ssp. fontana
CI 0.81 W. 72°, E. 66° 3d
117. Saxifraga oppositifolia
ssp. oppositifolia
CI 0.88 Circumgreenlandic 3e
118. Poa glauca s.l.
CI 0.91 Circumgreenlandic 3e
119. Gentiana nivalis
CI 1.00 W. 72°, E. 73° 3e
120. Sagina saginoides
CI 1.00 W. 70°, E. 70° 3d

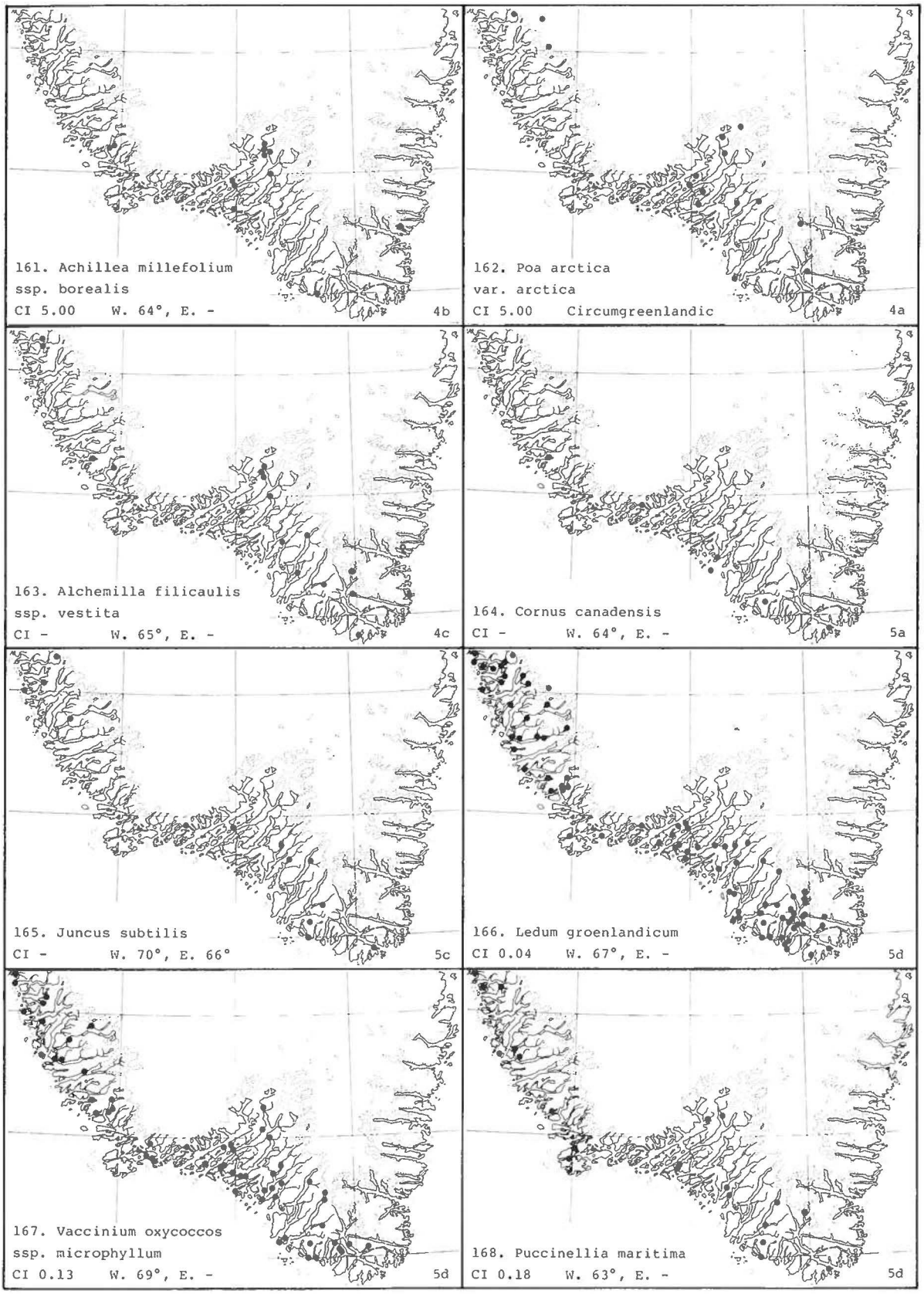

121. Saxifraga nivalis s.str.
CI 1.00 Circumgreenlandic 3e
122. Cardamine bellidifolia
ssp. bellidifolia
CI 1.43 Circumgreenlandic 3b
123. Botrychium boreale
var. boreale
CI 2.00 W. 66°, E. 66° 3d
124. Saxifraga cernua
CI 2.17 Circumgreenlandic 3b
125. Saxifraga hyperborea
CI 6.00 Circumgreenlandic 3c
126. Vahlodea atropurpurea
ssp. atropurpurea
CI 0.13 W. 67°, E. 66° 4e
127. Rhinanthus minor
ssp. groenlandicus
CI 0.28 W. 64°, E. - 4e
128. Carex subspathacea
CI 0.33 W. 73°, E. 77° 4c

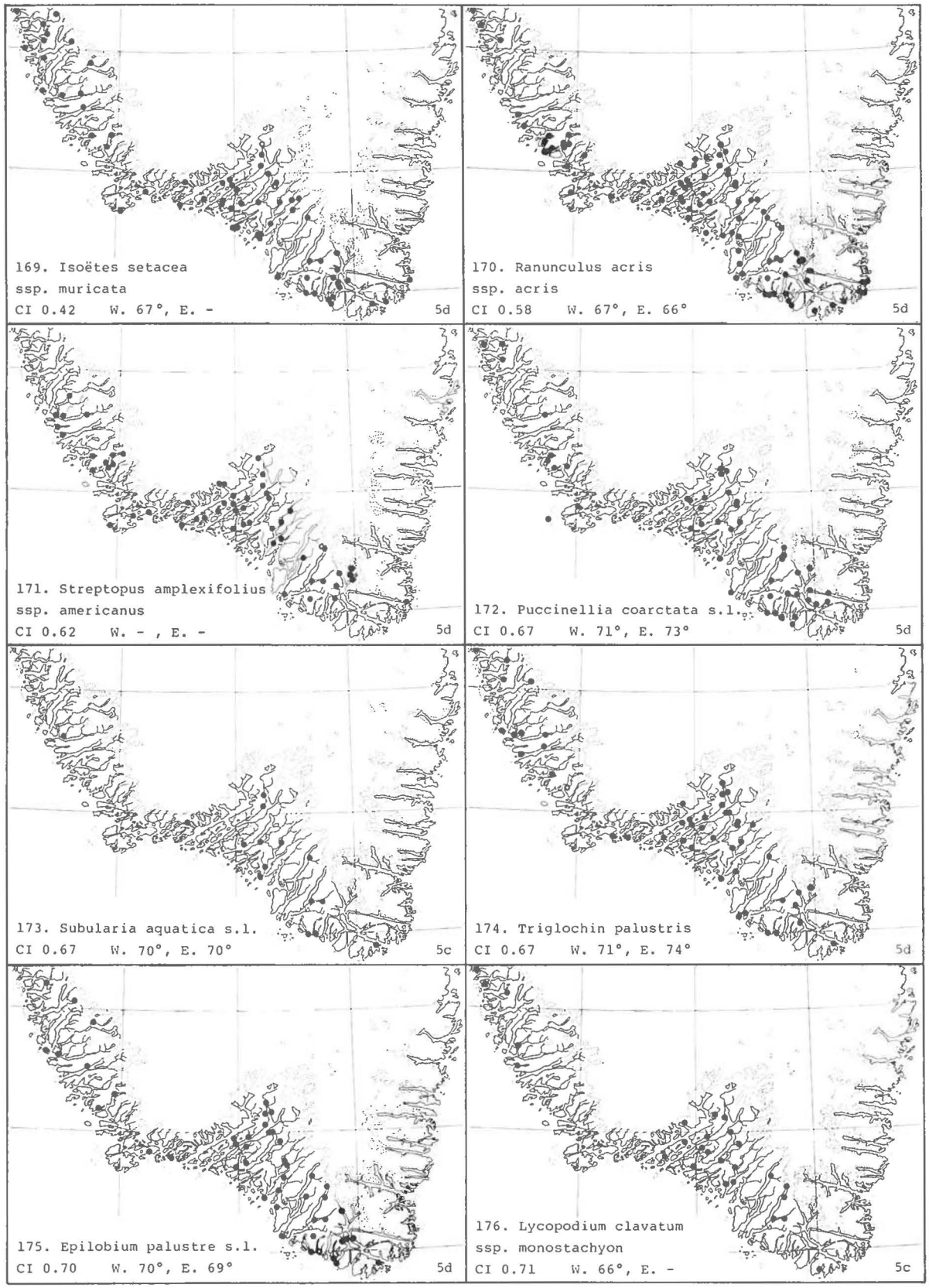

129. Rhinanthus minor
ssp. minor
CI 0.38 W. 64°. E. -
4e
130. Carex atrata
ssp. atrata
CI 0.52 W. 66°, E. 66°
4e
131. Hieracium alpinum
CI 0.54 W. 62°21', E. 72°
4e
132. Potentilla egedii s.l.
CI 0.54 W. 72°, E. 71°
4e
133. Thymus praecox
ssp. arcticus
CI 0.54 W. 67°, E. 66°
4e
134. Phegopteris connectilis
CI 0.57 W. 66°, E. 66°
4e
135. Carex scirpoidea
var. scirpoidea
CI 0.60 W. 74°, E. 74°
4e
136. Epilobium hornemannii
CI 0.60 W. 70°, E. 70°
4e

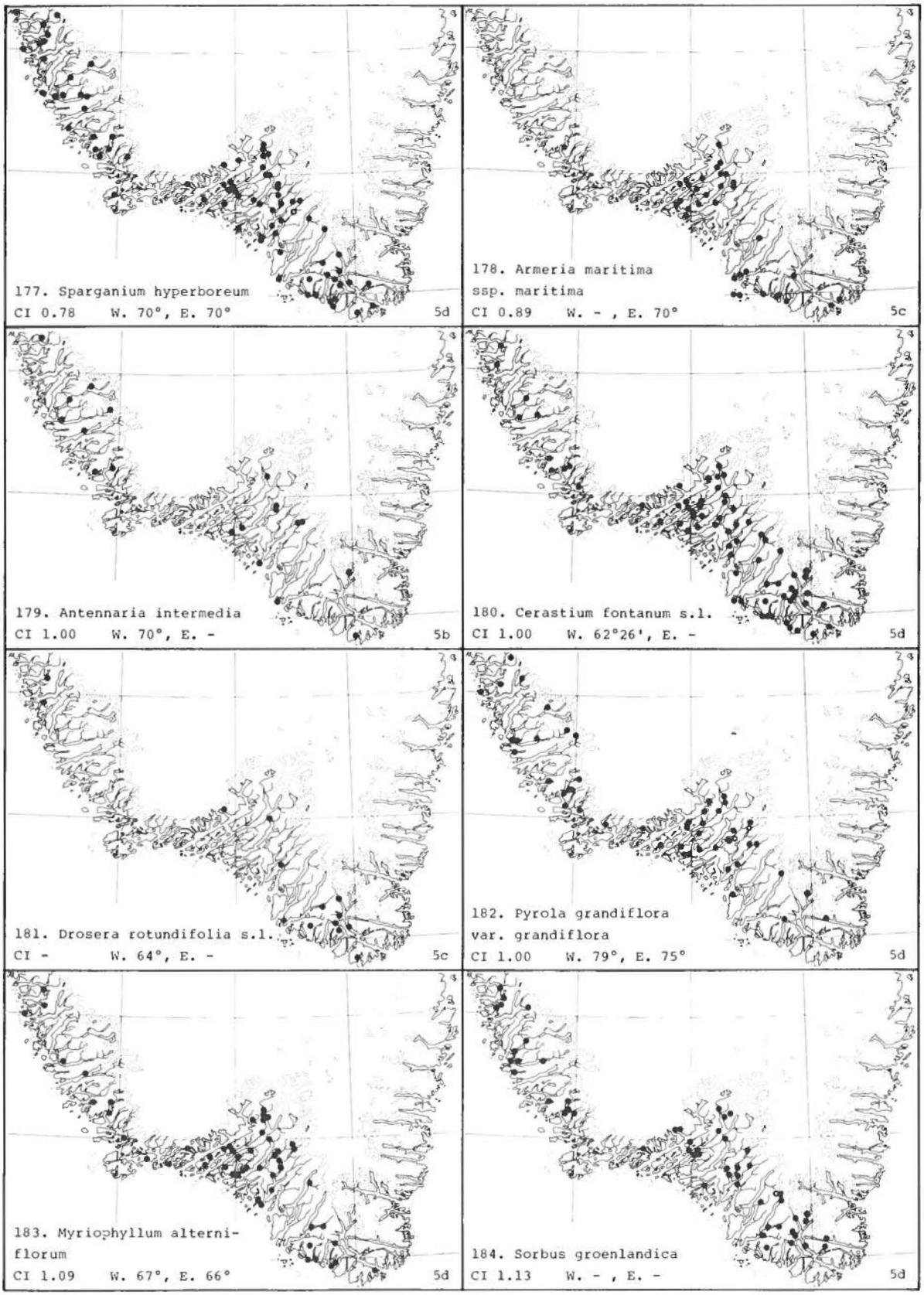

137. Poa annua s.l.
CI 0.60 W. 70°, E. 66° 4c
138. Euphrasia frigida
CI 0.62 W. 72°, E. 77° 4e
139. Plathanthera hyperborea s.l.
CI 0.62 W. 70°, E. 70° 4e
140.Ranunculus pygmaeus s.l.
CI 0.62 W. 78°, E. 78° 4e
141. Juncus biglumis
CI 0.63 Circumgreenlandic 4d
142. Dryopteris abbreviata
CI 0.67 W. - , E. - 4d
143. Thalictrum alpinum
CI 0.68 W. 72°, E. 74° 4e
144. Cardamine pratensis s.l.
CI 0.69 W. 77°, E. 77° 4e

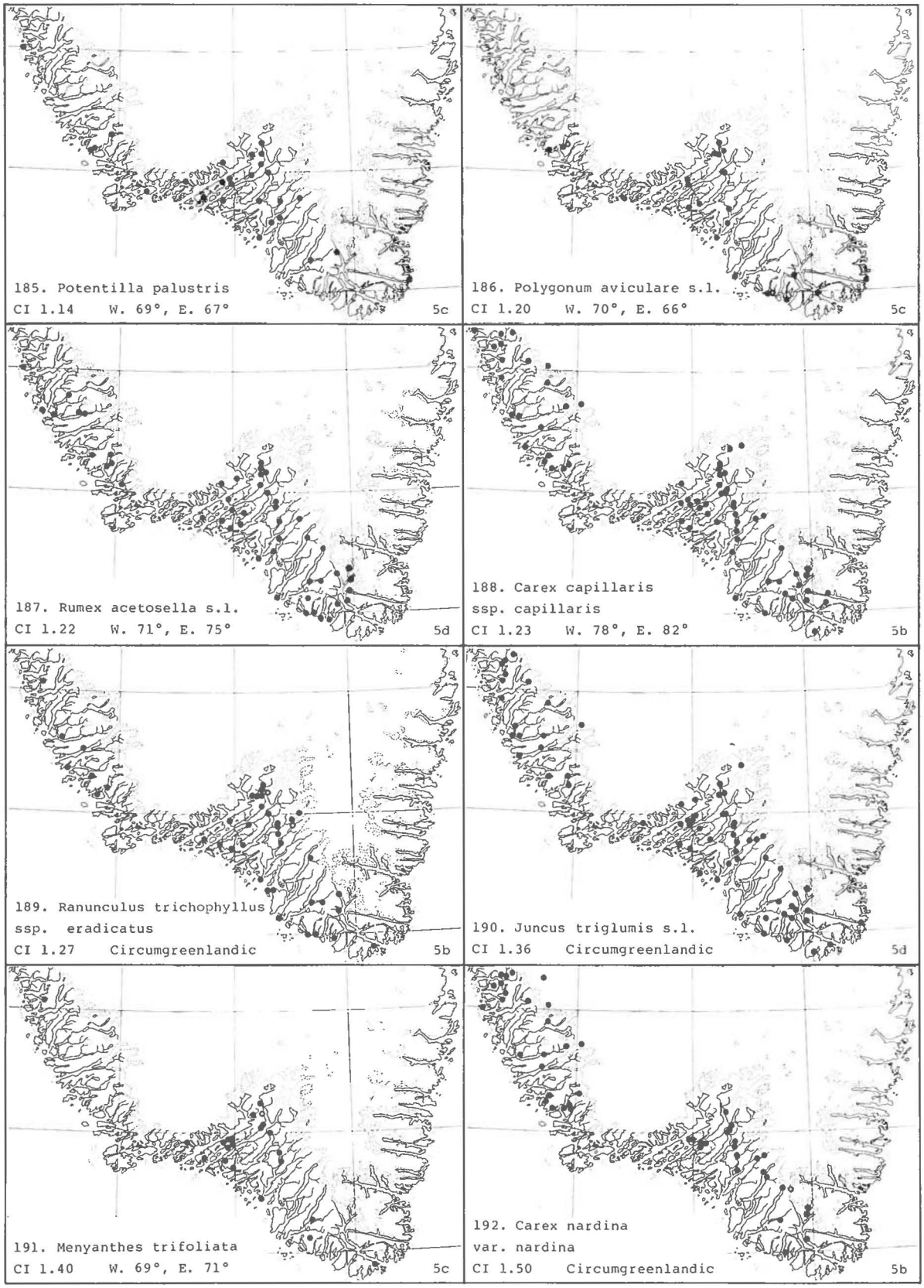

145. Honkenya peploides
var. diffusa
CI 0.75 W. 78°, E. 76° 4e
146. Alchemilla filicaulis
ssp. filicaulis
CI 0.77 W. 67°, E. 69° 4e
147. Lathyrus japonicus
ssp. japonicus
CI 0.81 W. - , E. - 4c
148. Luzula parviflora
ssp. parviflora
CI 0.83 W. 70°, E. - 4e
149. Agrostis vinealis
ssp. vinealis
CI 0.85 W. 67°, E. 66° 4e
150. Callitriche hamulata
CI 0.89 W. 69°, E. - 4e
151. Draba incana s.l.
CI 0.90 W. 69°, E. 66° 4e
152. Dryopteris filix-mas
CI 0.91 W. 63°, E. - 4e

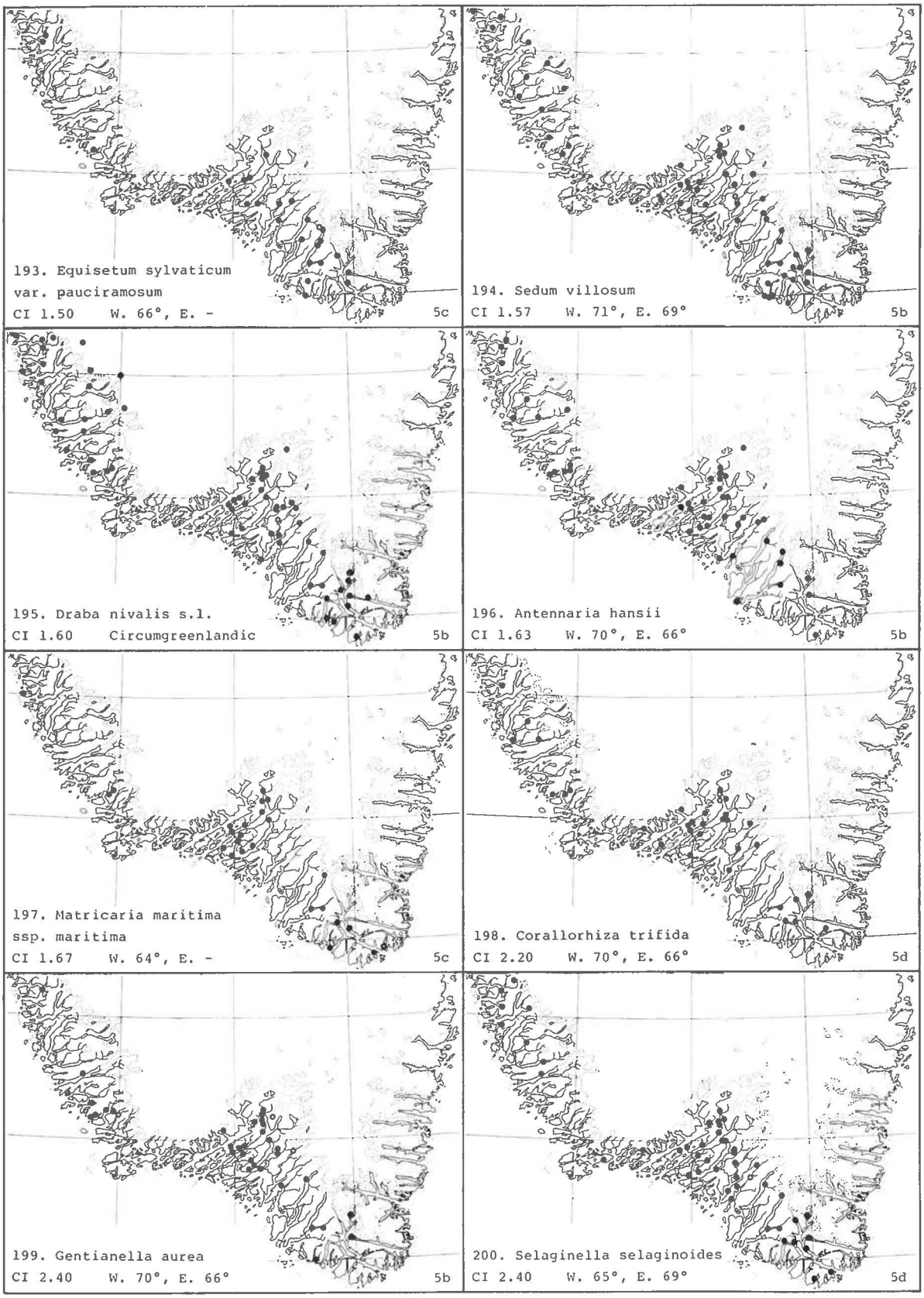

153. Sagina procumbens
ssp. procumbens
CI 1.00 W. 64°, E. 69° 4c
154. Viola labradorica
CI 1.00 W. 66°, E. - 4e
155. Hieracium laevigatum s.l.
CI 1.11 W. 64°, E. 63° 4e
156. Carex macloviana
ssp. macloviana
CI 1.83 W. 73°, E. 72° 4e
157. Galium triflorum
CI 2.00 W. 64°, E. 63° 4e
158. Anthoxanthum odoratum
ssp. alpinum
CI 2.17 W. - , E. 63° 4b
159. Calamagrostis inexpansa
var. robusta
CI 2.67 W. - , E. - 4e
160. Saxifraga aizoides
CI 2.80 W. 78°, E. 80° 4d

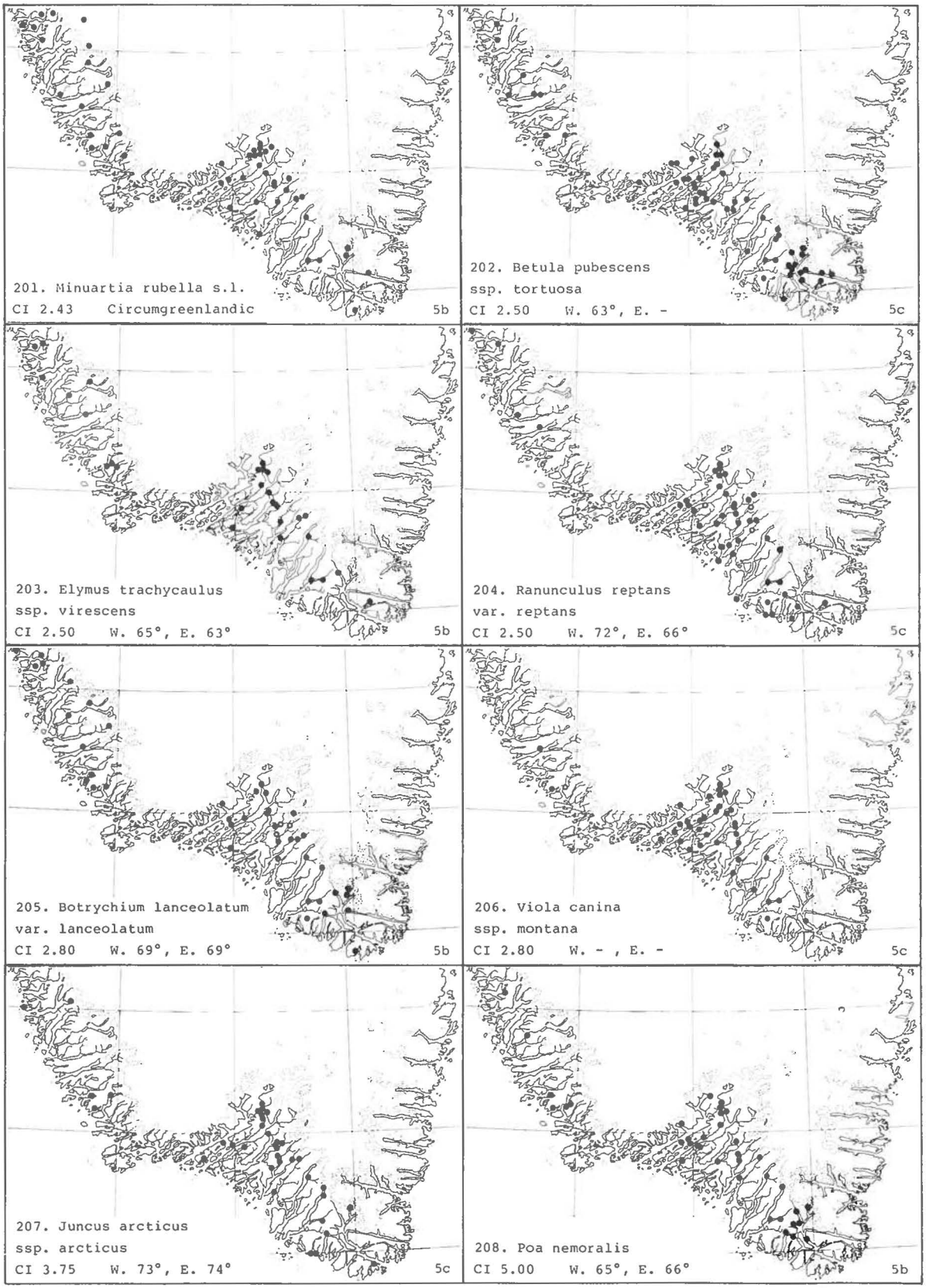

161. Achillea millefolium
ssp. borealis
CI 5.00 W. 64°, E. -
4b
162. Poa arctica
var. arctica
CI 5.00 Circumgreenlandic
4a
163. Alchemilla filicaulis
ssp. vestita
CI - W. 65°, E. -
4c
164. Cornus canadensis
CI - W. 64°, E. -
5a
165. Juncus subtilis
CI - W. 70°, E. 66°
5c
166. Ledum groenlandicum
CI 0.04 W. 67°, E. -
5d
167. Vaccinium oxycoccos
ssp. microphyllum
CI 0.13 W. 69°, E. -
5d
168. Puccinellia maritima
CI 0.18 W. 63°, E. -
5d

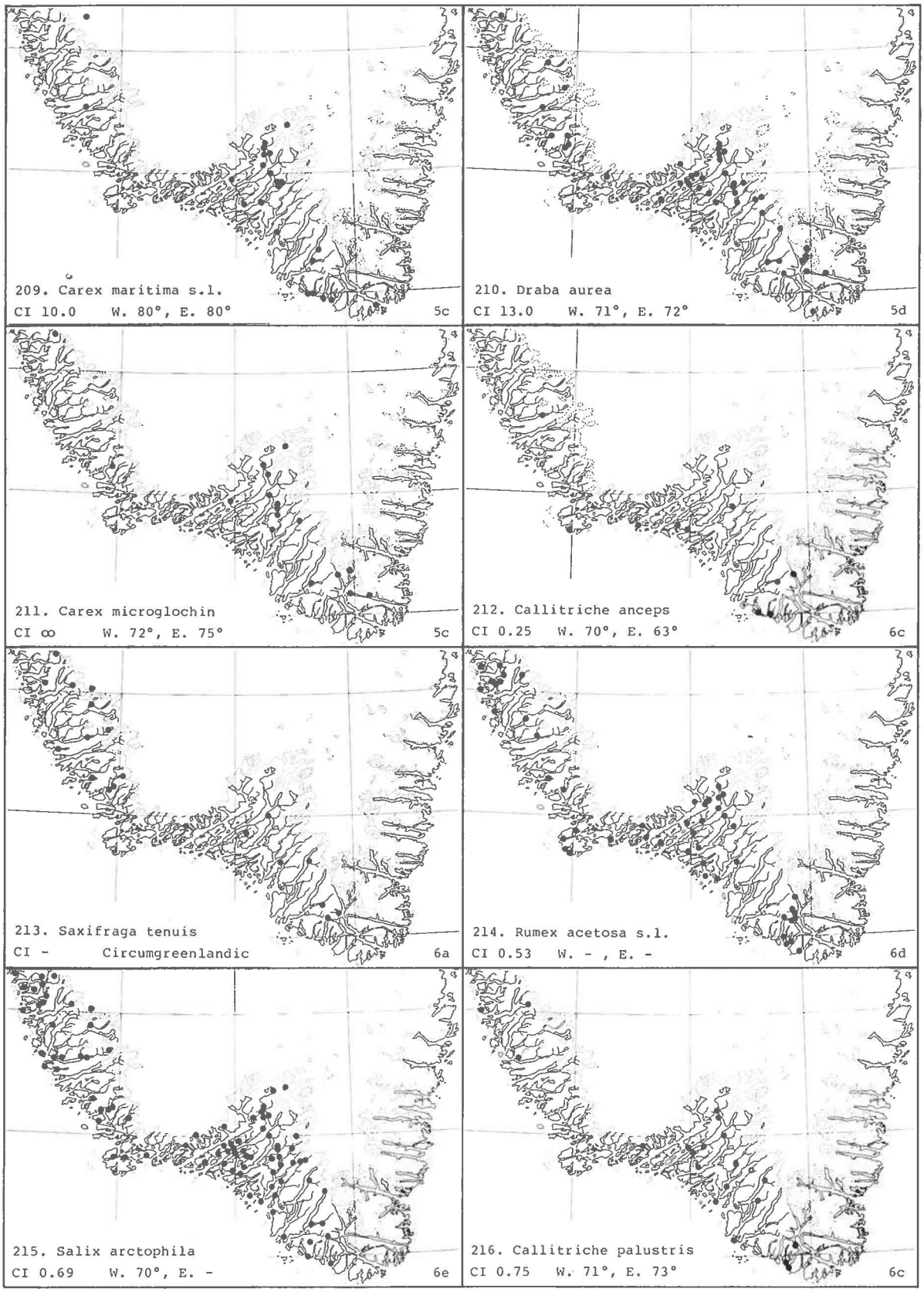

169. Isoëtes setacea
ssp. muricata
CI 0.42 W. 67°, E. -
5d
170. Ranunculus acris
ssp. acris
CI 0.58 W. 67°, E. 66°
5d
171. Streptopus amplexifolius
ssp. americanus
CI 0.62 W. - , E. -
5d
172. Puccinellia coarctata s.l.
CI 0.67 W. 71°, E. 73°
5d
173. Subularia aquatica s.l.
CI 0.67 W. 70°, E. 70°
5c
174. Triglochin palustris
CI 0.67 W. 71°, E. 74°
5d
175. Epilobium palustre s.l.
CI 0.70 W. 70°, E. 69°
5d
176. Lycopodium clavatum
ssp. monostachyon
CI 0.71 W. 66°, E. -
5c

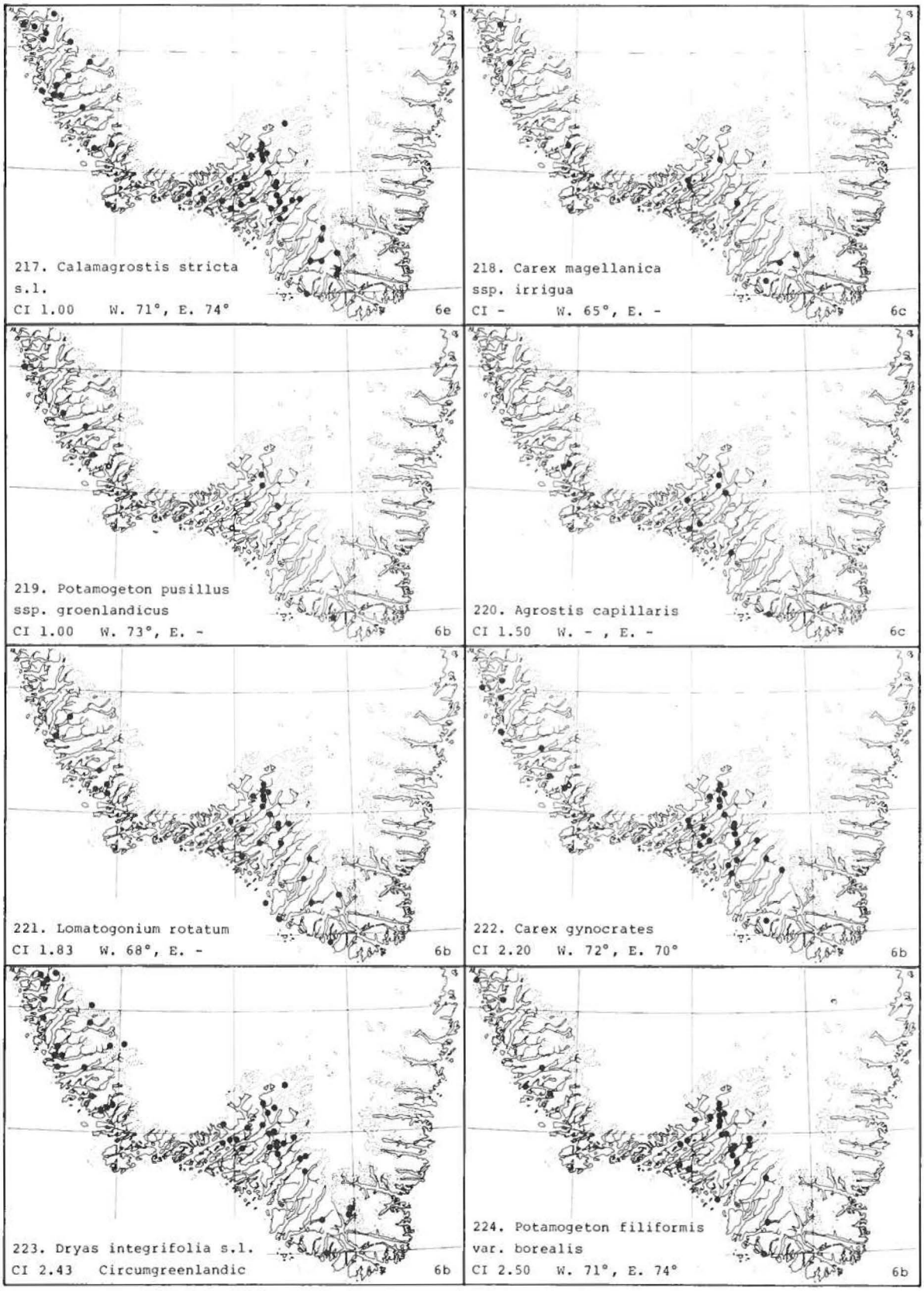

177. Sparganium hyperboreum
CI 0.78 W. 70°, E. 70° 5d
178. Armeria maritima
ssp. maritima
CI 0.89 W. - , E. 70° 5c
179. Antennaria intermedia
CI 1.00 W. 70°, E. - 5b
180. Cerastium fontanum s.l.
CI 1.00 W. 62°26', E. - 5d
181. Drosera rotundifolia s.l.
CI - W. 64°, E. - 5c
182. Pyrola grandiflora
var. grandiflora
CI 1.00 W. 79°, E. 75° 5d
183. Myriophyllum alterni-
florum
CI 1.09 W. 67°, E. 66° 5d
184. Sorbus groenlandica
CI 1.13 W. - , E. - 5d

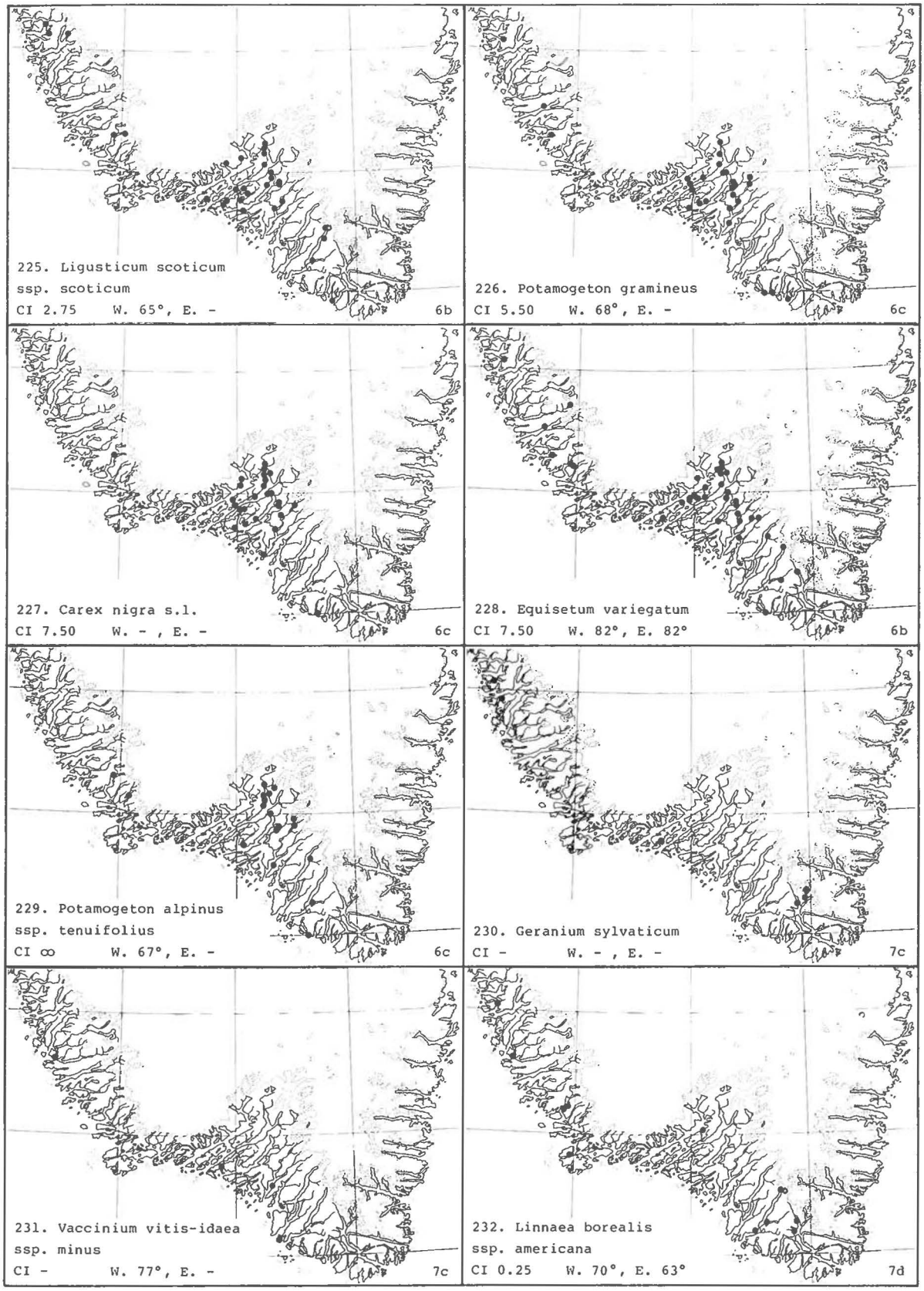

185. Potentilla palustris
CI 1.14 W. 69°, E. 67° 5c
186. Polygonum aviculare s.l.
CI 1.20 W. 70°, E. 66° 5c
187. Rumex acetosella s.l.
CI 1.22 W. 71°, E. 75° 5d
188. Carex capillaris
ssp. capillaris
CI 1.23 W. 78°, E. 82° 5b
189. Ranunculus trichophyllus
ssp. eradicatus
CI 1.27 Circumgreenlandic 5b
190. Juncus triglumis s.l.
CI 1.36 Circumgreenlandic 5d
191. Menyanthes trifoliata
CI 1.40 W. 69°, E. 71° 5c
192. Carex nardina
var. nardina
CI 1.50 Circumgreenlandic 5b

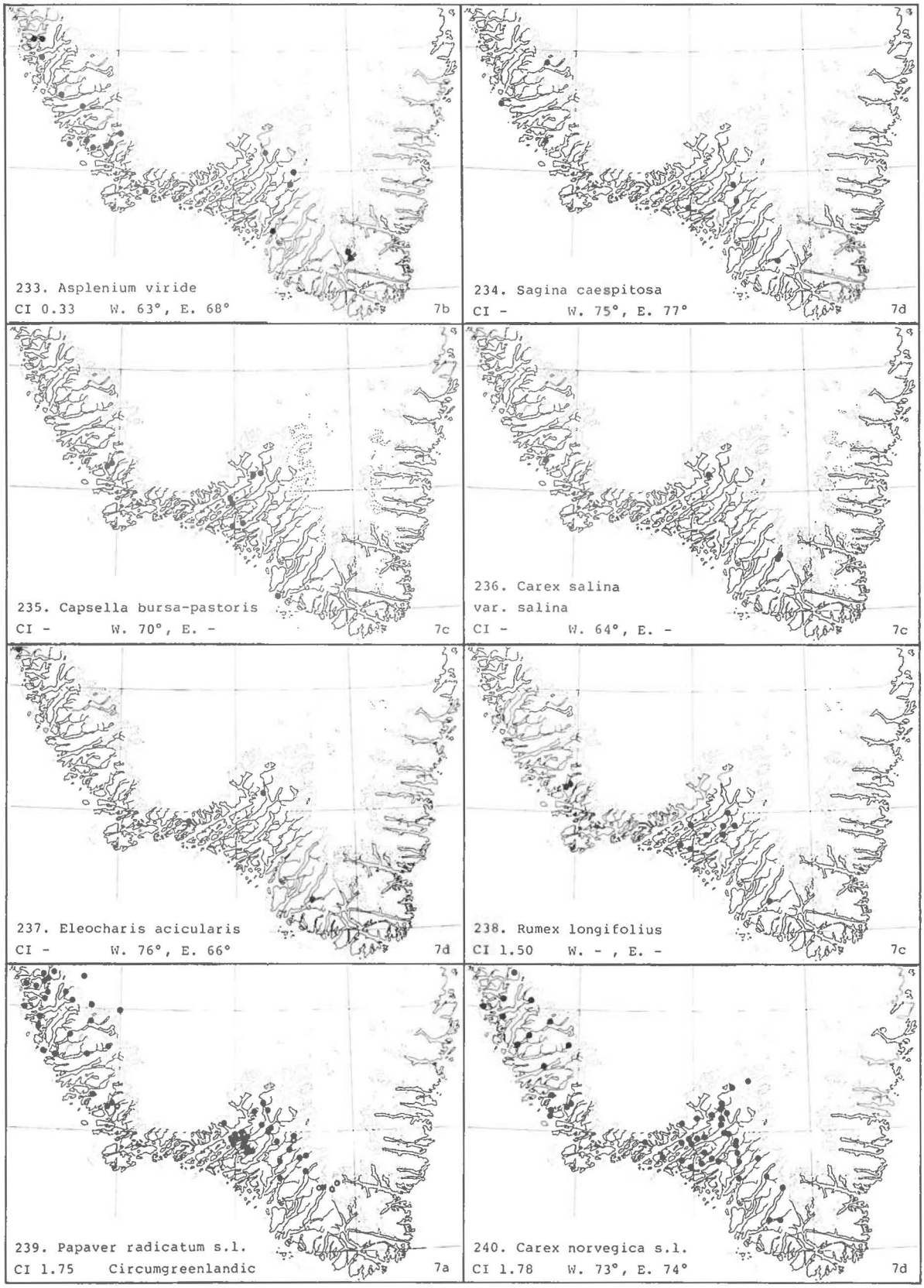

193. Equisetum sylvaticum
var. pauciramosum
CI 1.50 W. 66°, E. -
5c
194. Sedum villosum
CI 1.57 W. 71°, E. 69°
5b
195. Draba nivalis s.l.
CI 1.60 Circumgreenlandic
5b
196. Antennaria hansii
CI 1.63 W. 70°, E. 66°
5b
197. Matricaria maritima
ssp. maritima
CI 1.67 W. 64°, E. -
5c
198. Corallorhiza trifida
CI 2.20 W. 70°, E. 66°
5d
199. Gentianella aurea
CI 2.40 W. 70°, E. 66°
5b
200. Selaginella selaginoides
CI 2.40 W. 65°, E. 69°
5d

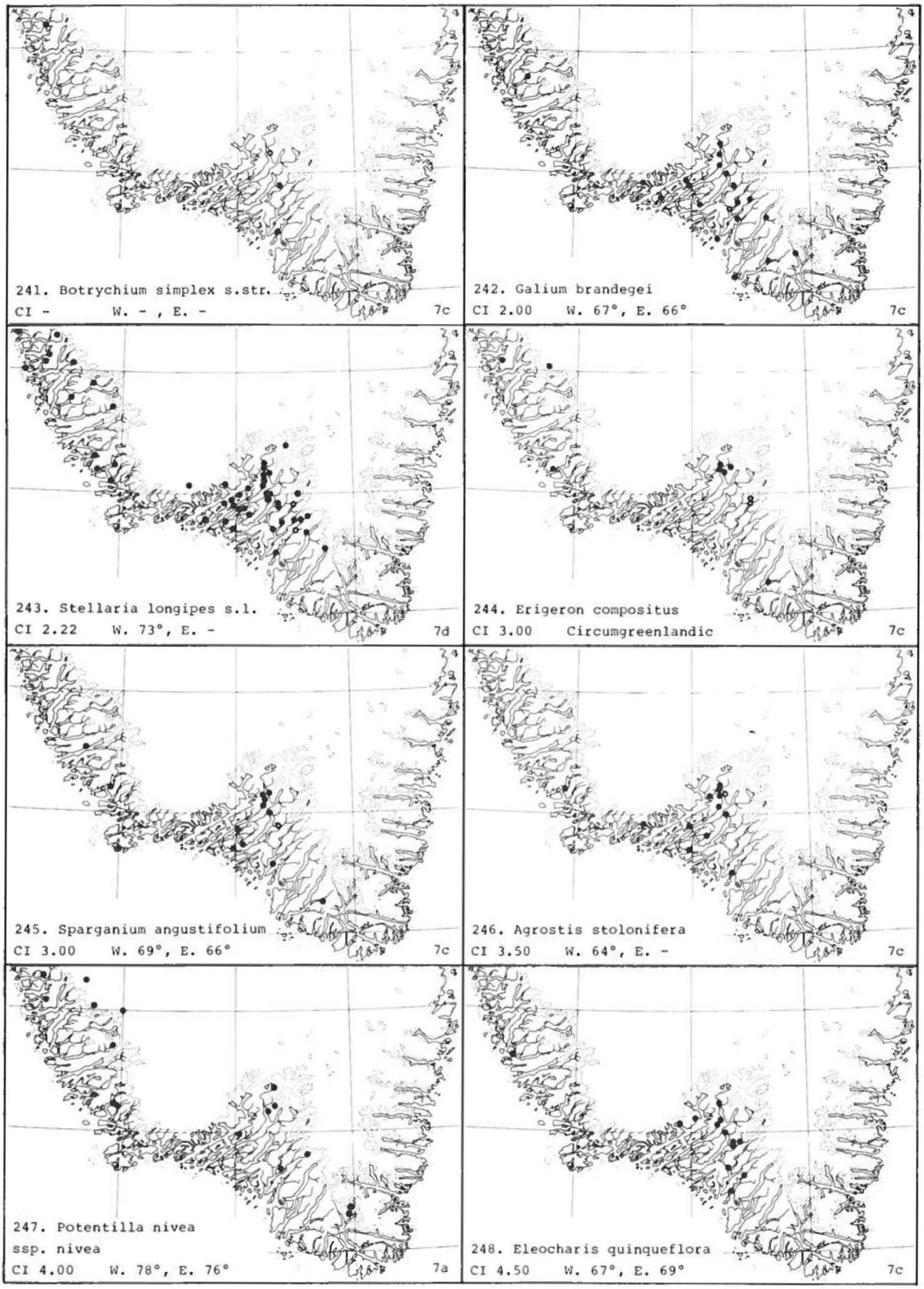

201. Minuartia rubella s.l.
CI 2.43 Circumgreenlandic 5b
202. Betula pubescens
ssp. tortuosa
CI 2.50 W. 63°, E. - 5c
203. Elymus trachycaulus
ssp. virescens
CI 2.50 W. 65°, E. 63° 5b
204. Ranunculus reptans
var. reptans
CI 2.50 W. 72°, E. 66° 5c
205. Botrychium lanceolatum
var. lanceolatum
CI 2.80 W. 69°, E. 69° 5b
206. Viola canina
ssp. montana
CI 2.80 W. - , E. - 5c
207. Juncus arcticus
ssp. arcticus
CI 3.75 W. 73°, E. 74° 5c
208. Poa nemoralis
CI 5.00 W. 65°, E. 66° 5b

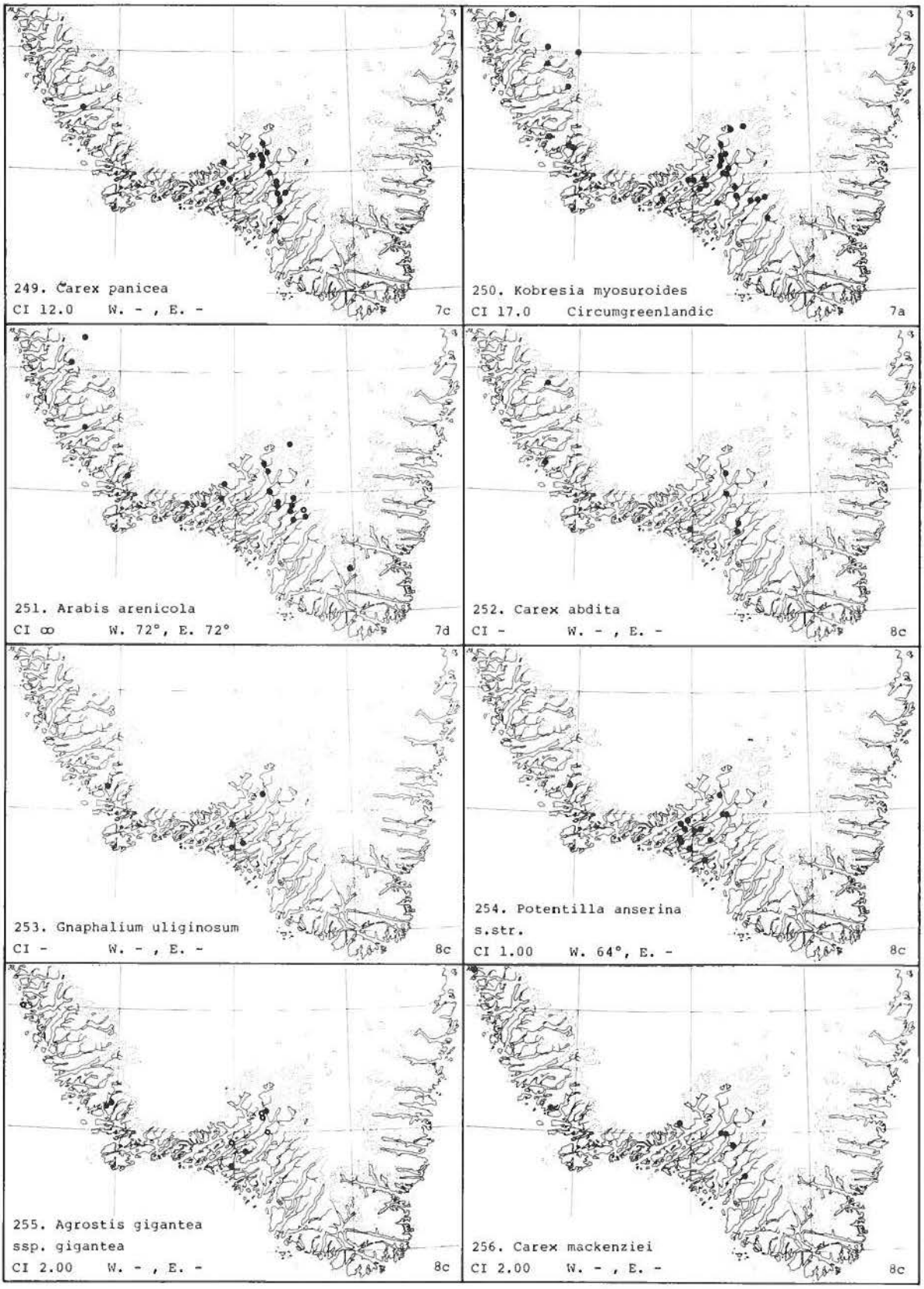

209. Carex maritima s.l.
CI 10.0 W. 80°, E. 80° 5c
210. Draba aurea
CI 13.0 W. 71°, E. 72° 5d
211. Carex microglochin
CI ∞ W. 72°, E. 75° 5c
212. Callitriche anceps
CI 0.25 W. 70°, E. 63° 6c
213. Saxifraga tenuis
CI - Circumgreenlandic 6a
214. Rumex acetosa s.l.
CI 0.53 W. - , E. - 6d
215. Salix arctophila
CI 0.69 W. 70°, E. - 6e
216. Callitriche palustris
CI 0.75 W. 71°, E. 73° 6c

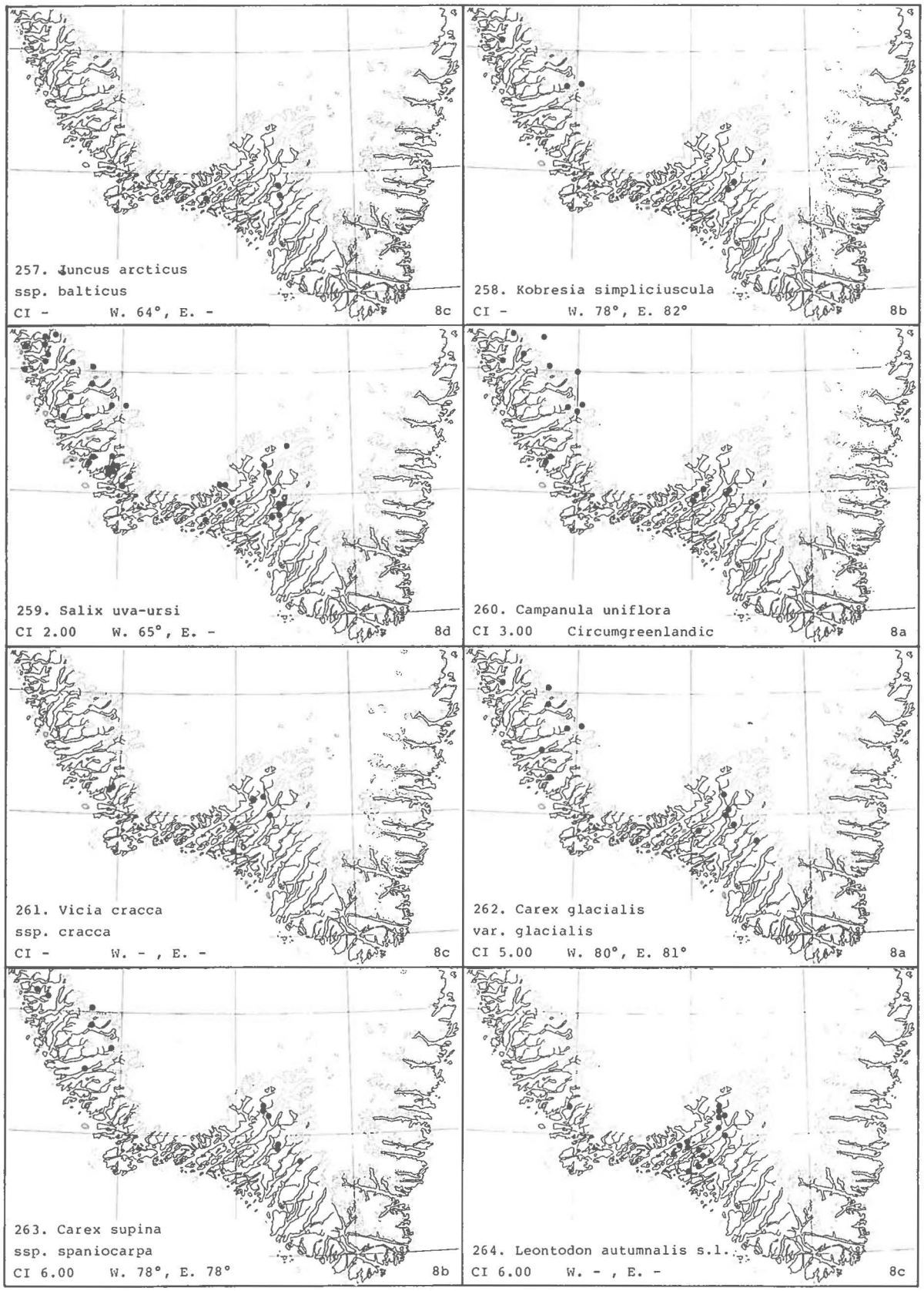

217. Calamagrostis stricta
s.l.
CI 1.00 W. 71°, E. 74°
6e
218. Carex magellanica
ssp. irrigua
CI - W. 65°, E. -
6c
219. Potamogeton pusillus
ssp. groenlandicus
CI 1.00 W. 73°, E. -
6b
220. Agrostis capillaris
CI 1.50 W. - , E. -
6c
221. Lomatogonium rotatum
CI 1.83 W. 68°, E. -
6b
222. Carex gynocrates
CI 2.20 W. 72°, E. 70°
6b
223. Dryas integrifolia s.l.
CI 2.43 Circumgreenlandic
6b
224. Potamogeton filiformis
var. borealis
CI 2.50 W. 71°, E. 74°
6b

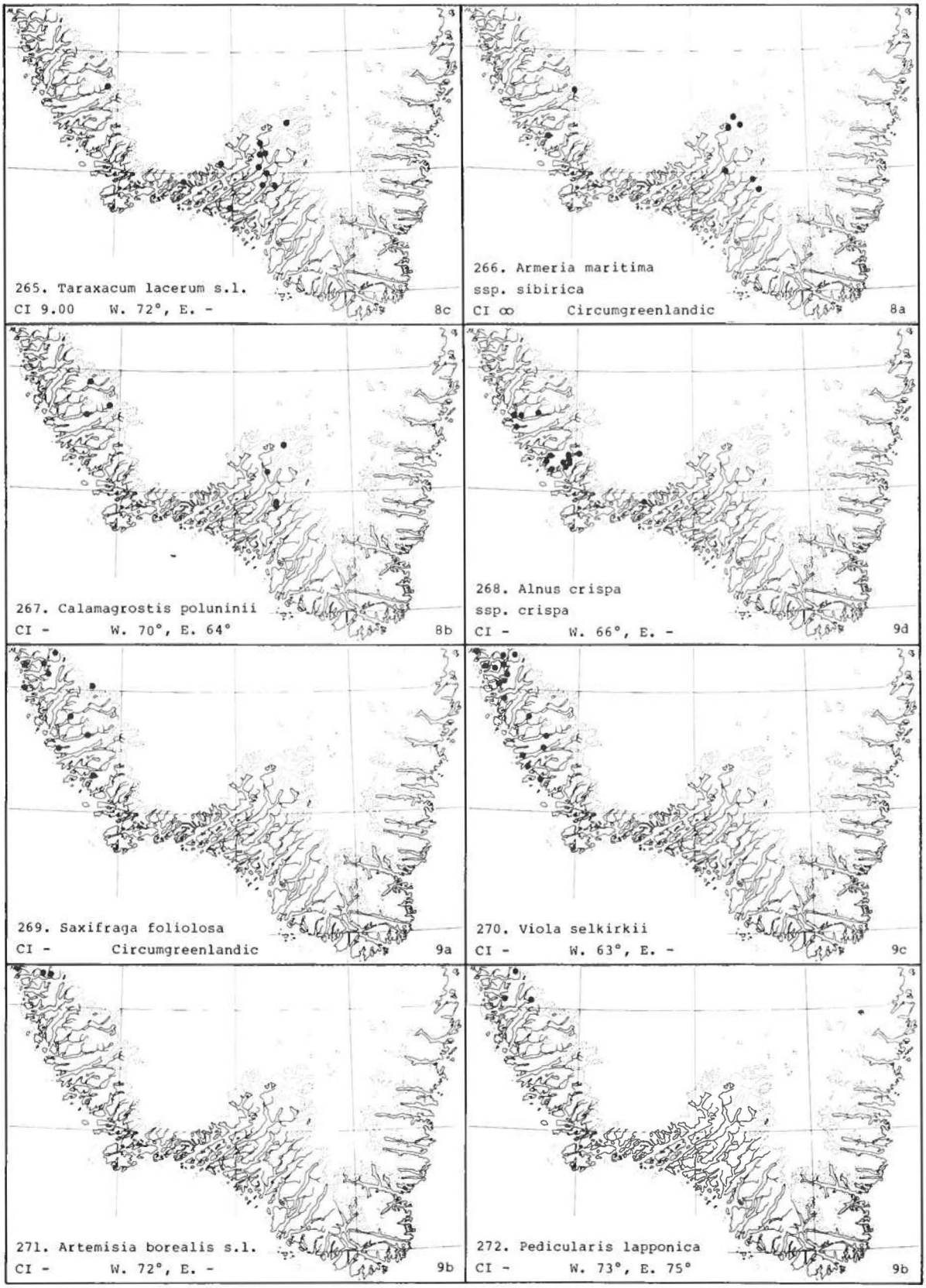

225. Ligusticum scoticum
ssp. scoticum
CI 2.75 W. 65°, E. -
6b
226. Potamogeton gramineus
CI 5.50 W. 68°, E. -
6c
227. Carex nigra s.l.
CI 7.50 W. - , E. -
6c
228. Equisetum variegatum
CI 7.50 W. 82°, E. 82°
6b
229. Potamogeton alpinus
ssp. tenuifolius
CI ∞ W. 67°, E. -
6c
230. Geranium sylvaticum
CI - W. - , E. -
7c
231. Vaccinium vitis-idaea
ssp. minus
CI - W. 77°, E. -
7c
232. Linnaea borealis
ssp. americana
CI 0.25 W. 70°, E. 63°
7d

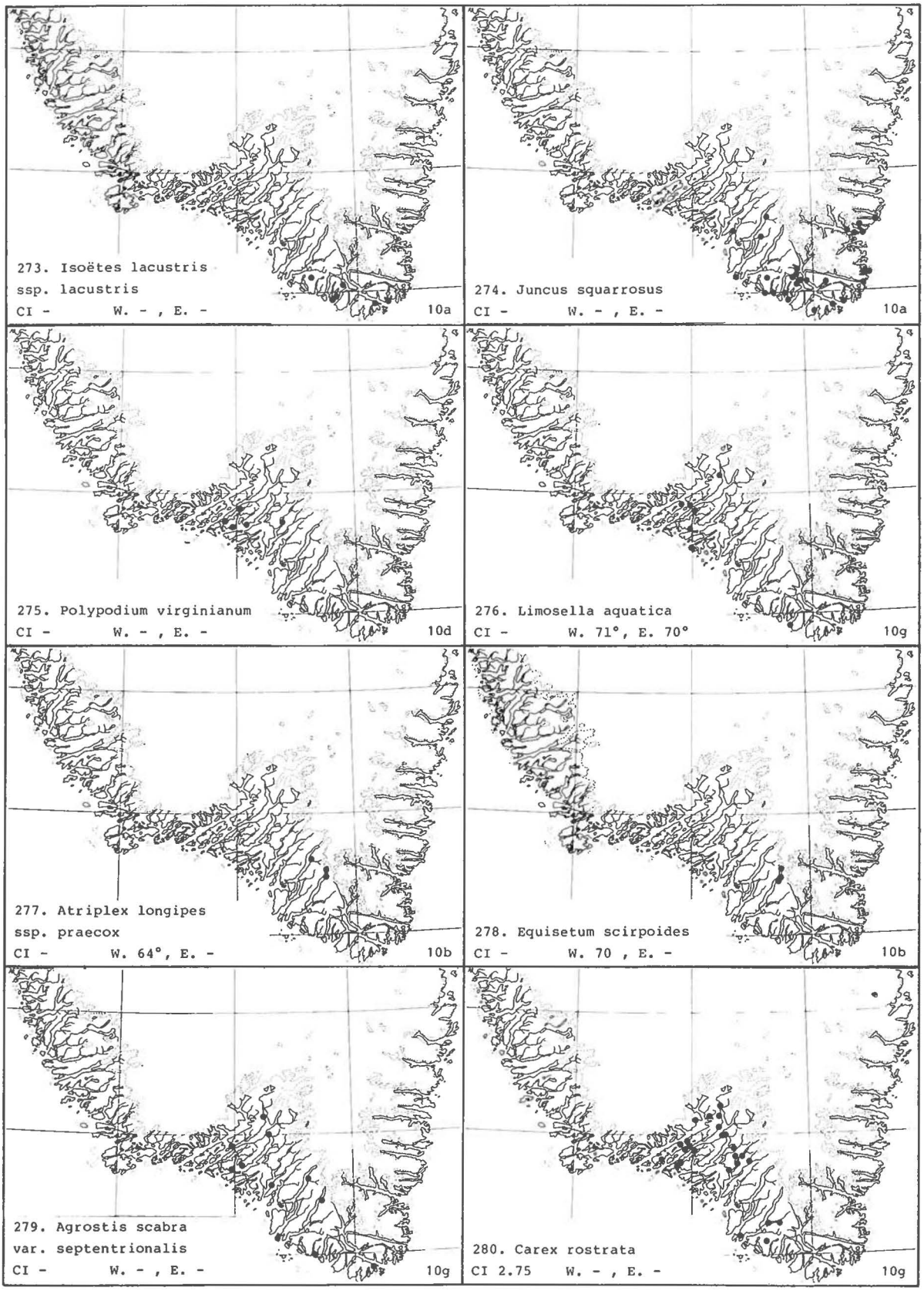

233. Asplenium viride
CI 0.33 W. 63°, E. 68° 7b
234. Sagina caespitosa
CI - W. 75°, E. 77° 7d
235. Capsella bursa-pastoris
CI - W. 70°, E. - 7c
236. Carex salina
var. salina
CI - W. 64°, E. - 7c
237. Eleocharis acicularis
CI - W. 76°, E. 66° 7d
238. Rumex longifolius
CI 1.50 W. - , E. - 7c
239. Papaver radicatum s.l.
CI 1.75 Circumgreenlandic 7a
240. Carex norvegica s.l.
CI 1.78 W. 73°, E. 74° 7d

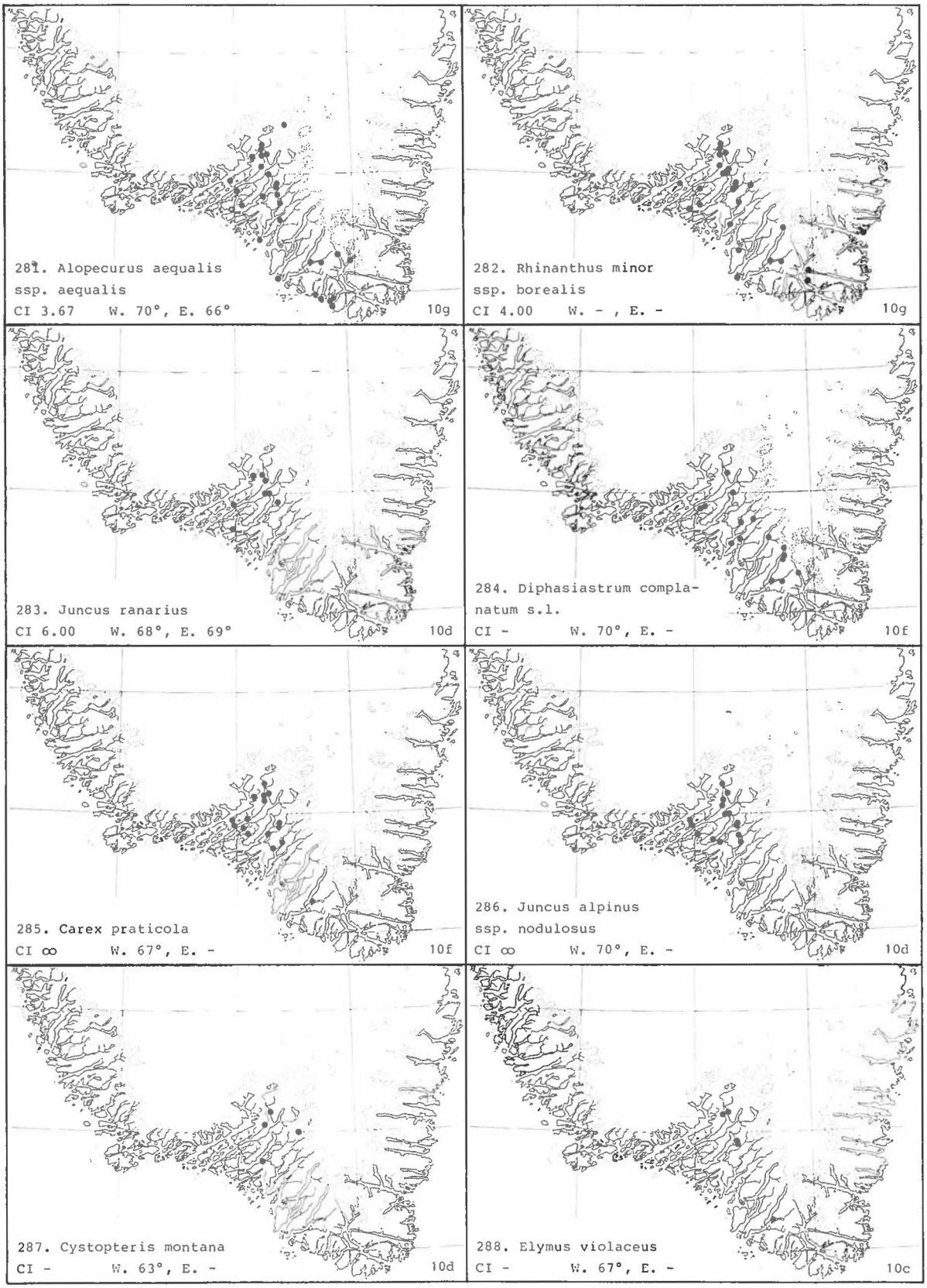

241. Botrychium simplex s.str.
CI - W. - , E. - 7c
242. Galium brandegei
CI 2.00 W. 67°, E. 66° 7c
243. Stellaria longipes s.l.
CI 2.22 W. 73°, E. - 7d
244. Erigeron compositus
CI 3.00 Circumgreenlandic 7c
245. Sparganium angustifolium
CI 3.00 W. 69°, E. 66° 7c
246. Agrostis stolonifera
CI 3.50 W. 64°, E. - 7c
247. Potentilla nivea
ssp. nivea
CI 4.00 W. 78°, E. 76° 7a
248. Eleocharis quinqueflora
CI 4.50 W. 67°, E. 69° 7c

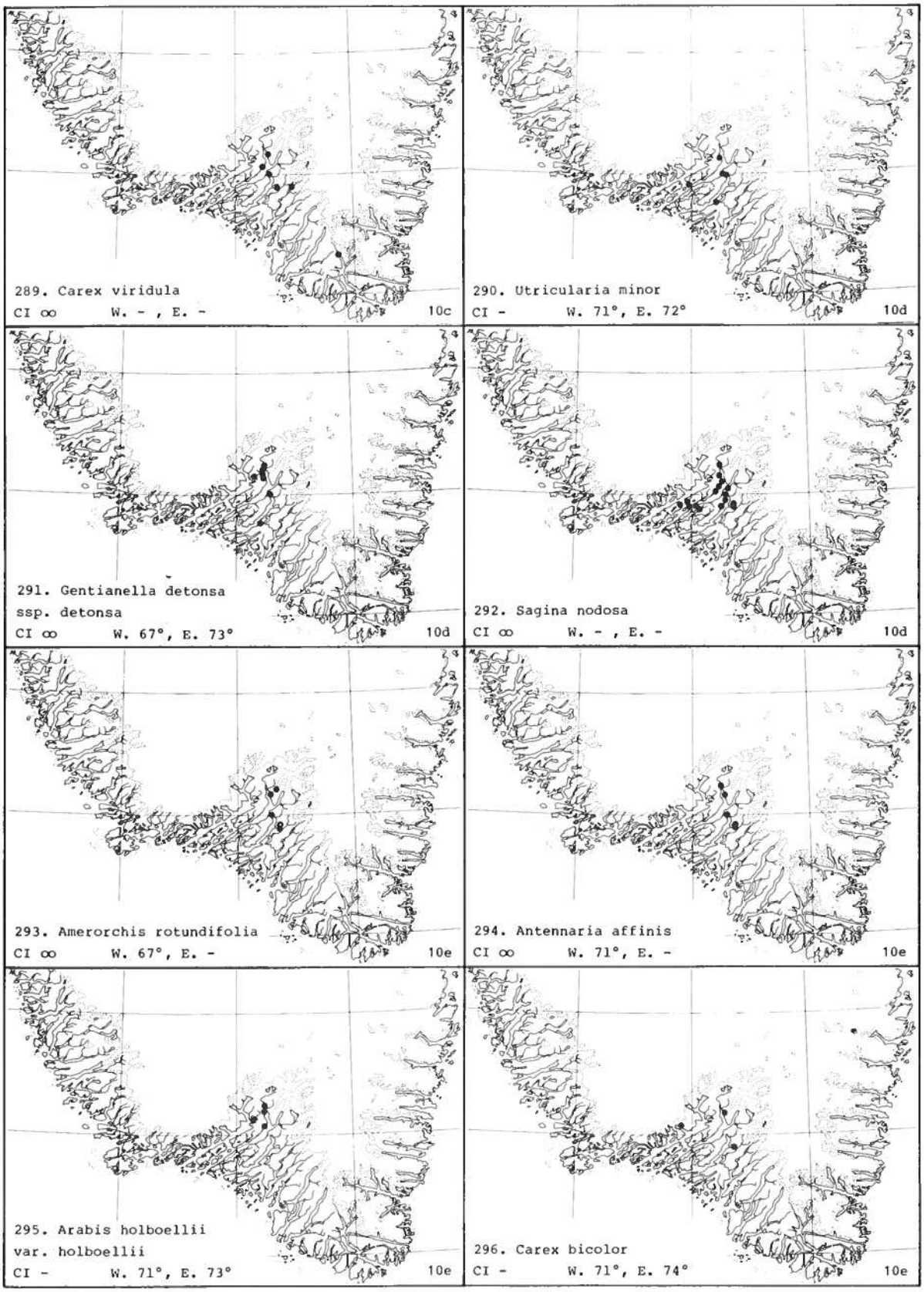

249. Carex panicea
CI 12.0 W. - , E. -
7c
250. Kobresia myosuroides
CI 17.0 Circumgreenlandic
7a
251. Arabis arenicola
CI ∞ W. 72°, E. 72°
7d
252. Carex abdita
CI - W. - , E. -
8c
253. Gnaphalium uliginosum
CI - W. - , E. -
8c
254. Potentilla anserina
s.str.
CI 1.00 W. 64°, E. -
8c
255. Agrostis gigantea
ssp. gigantea
CI 2.00 W. - , E. -
8c
256. Carex mackenziei
CI 2.00 W. - , E. -
8c

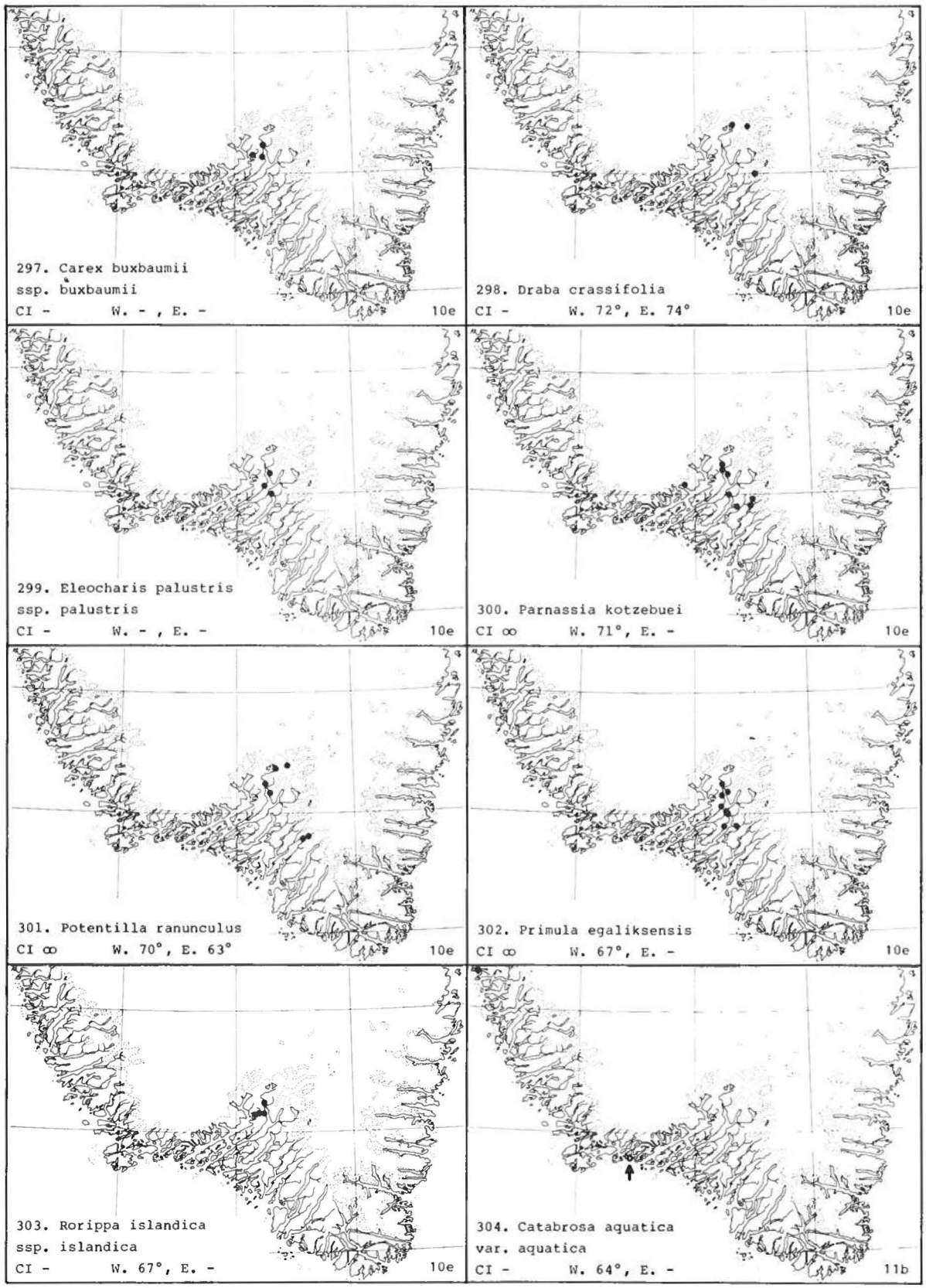

257. Juncus arcticus
ssp. balticus
CI -
W. 64°, E. -
8c
258. Kobresia simpliciuscula
CI -
W. 78°, E. 82°
8b
259. Salix uva-ursi
CI 2.00
W. 65°, E. -
8d
260. Campanula uniflora
CI 3.00
Circumgreenlandic
8a
261. Vicia cracca
ssp. cracca
CI -
W. - , E. -
8c
262. Carex glacialis
var. glacialis
CI 5.00
W. 80°, E. 81°
8a
263. Carex supina
ssp. spaniocarpa
CI 6.00
W. 78°, E. 78°
8b
264. Leontodon autumnalis s.l.
CI 6.00
W. - , E. -
8c

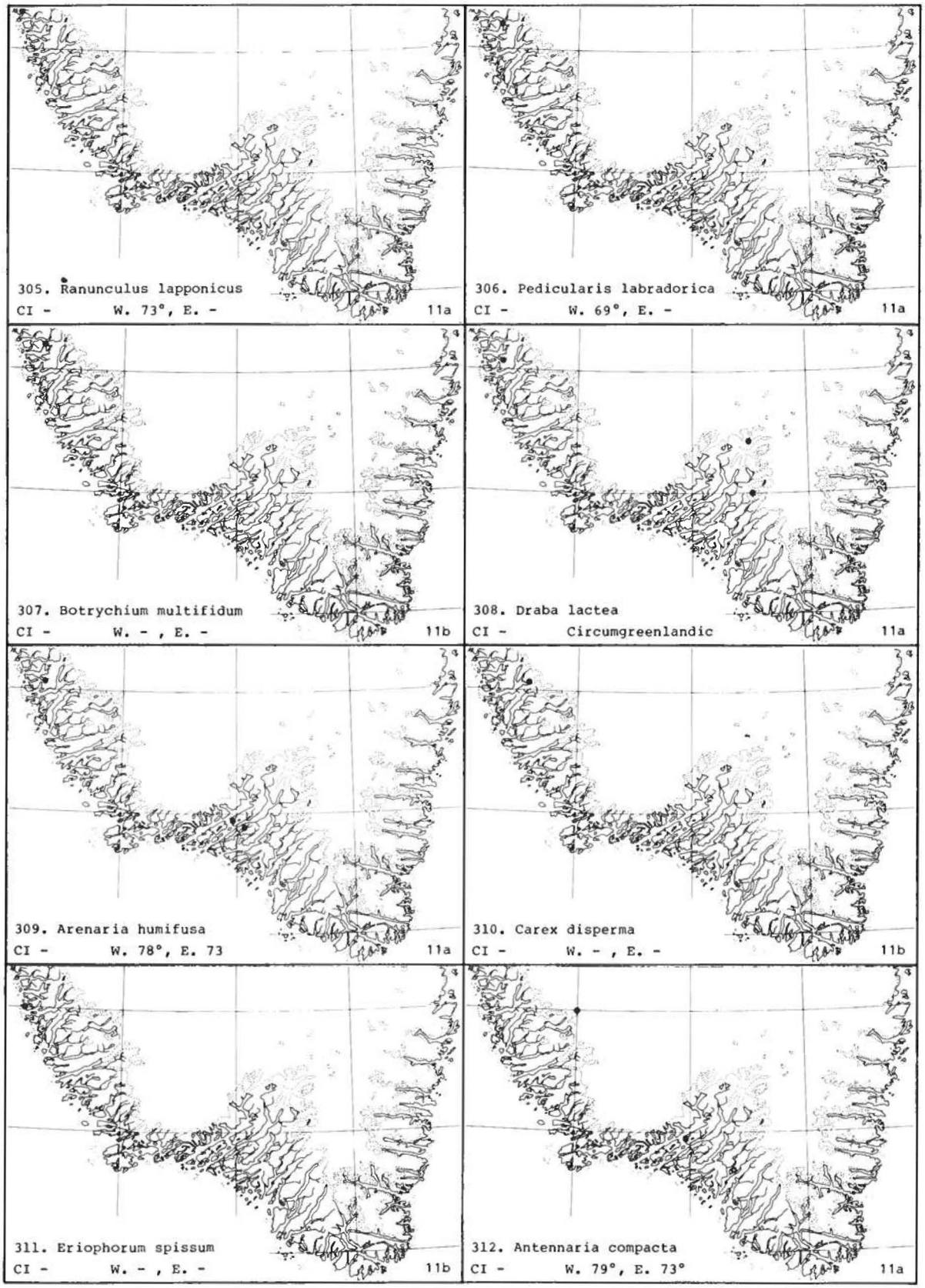

265. Taraxacum lacerum s.l.
CI 9.00 W. 72°, E. -
8c
266. Armeria maritima
ssp. sibirica
CI ∞ Circumgreenlandic
8a
267. Calamagrostis poluninii
CI - W. 70°, E. 64°
8b
268. Alnus crispa
ssp. crispa
CI - W. 66°, E. -
9d
269. Saxifraga foliolosa
CI - Circumgreenlandic
9a
270. Viola selkirkii
CI - W. 63°, E. -
9c
271. Artemisia borealis s.l.
CI - W. 72°, E. -
9b
272. Pedicularis lapponica
CI - W. 73°, E. 75°
9b

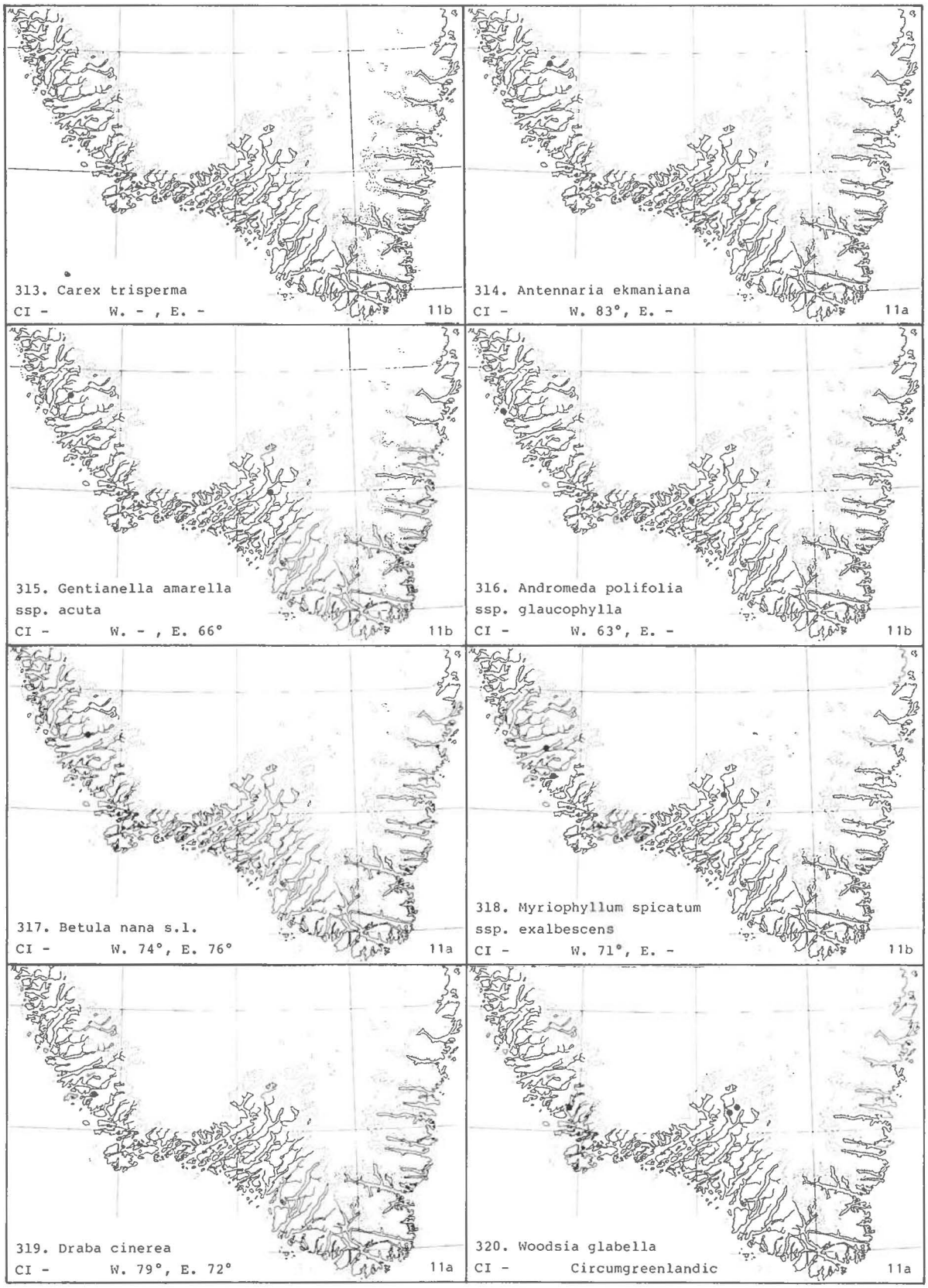

273. Isoëtes lacustris
ssp. lacustris
CI -
W. - , E. -
10a
274. Juncus squarrosus
CI -
W. - , E. -
10a
275. Polypodium virginianum
CI -
W. - , E. -
10d
276. Limosella aquatica
CI -
W. 71°, E. 70°
10g
277. Atriplex longipes
ssp. praecox
CI -
W. 64°, E. -
10b
278. Equisetum scirpoides
CI -
W. 70 , E. -
10b
279. Agrostis scabra
var. septentrionalis
CI -
W. - , E. -
10g
280. Carex rostrata
CI 2.75
W. - , E. -
10g

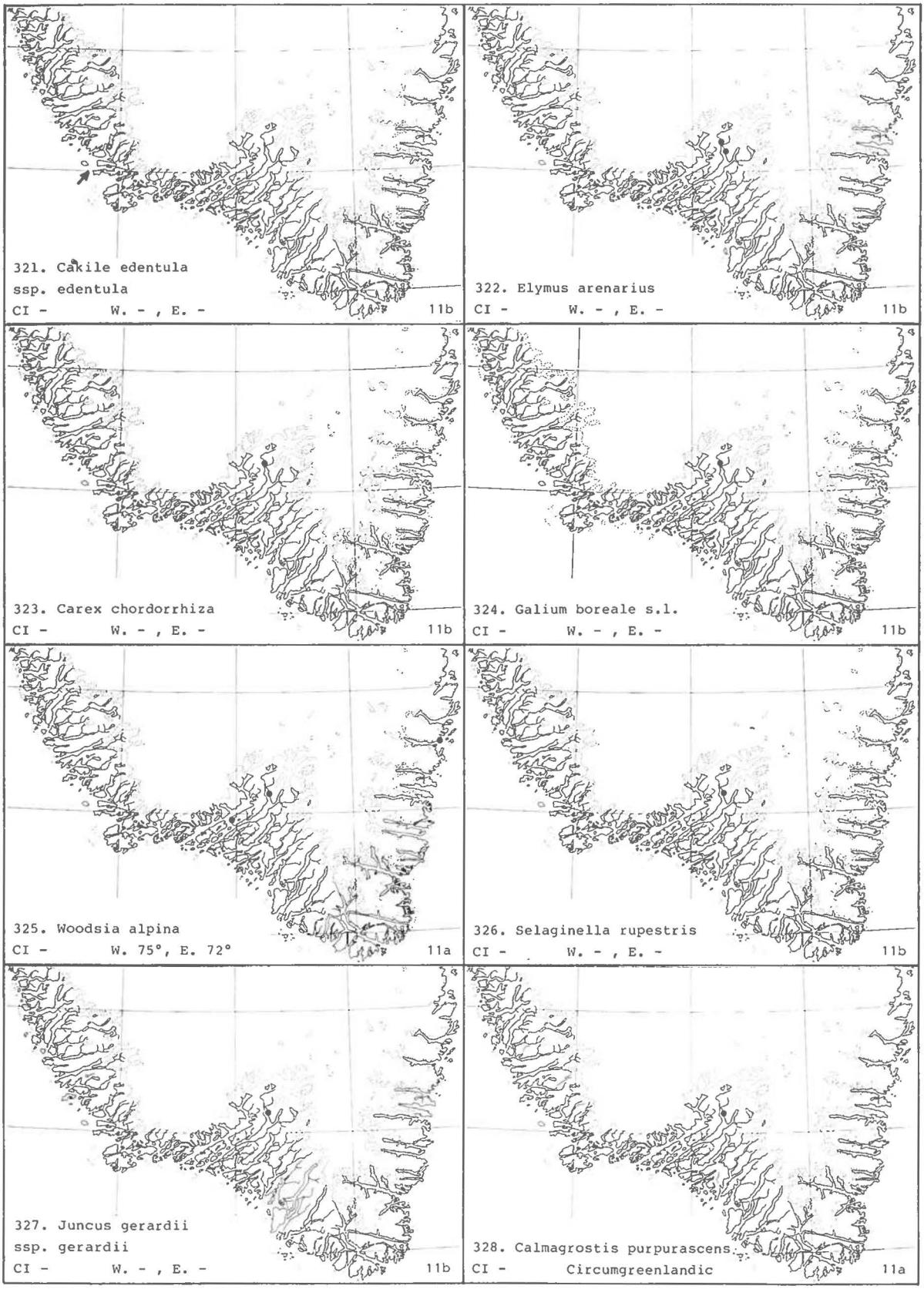

281. Alopecurus aequalis
ssp. aequalis
CI 3.67 W. 70°, E. 66° 10g
282. Rhinanthus minor
ssp. borealis
CI 4.00 W. - , E. - 10g
283. Juncus ranarius
CI 6.00 W. 68°, E. 69° 10d
284. Diphasiastrum complanatum s.l.
CI - W. 70°, E. - 10f
285. Carex praticola
CI ∞ W. 67°, E. - 10f
286. Juncus alpinus
ssp. nodulosus
CI ∞ W. 70°, E. - 10d
287. Cystopteris montana
CI - W. 63°, E. - 10d
288. Elymus violaceus
CI - W. 67°, E. - 10c

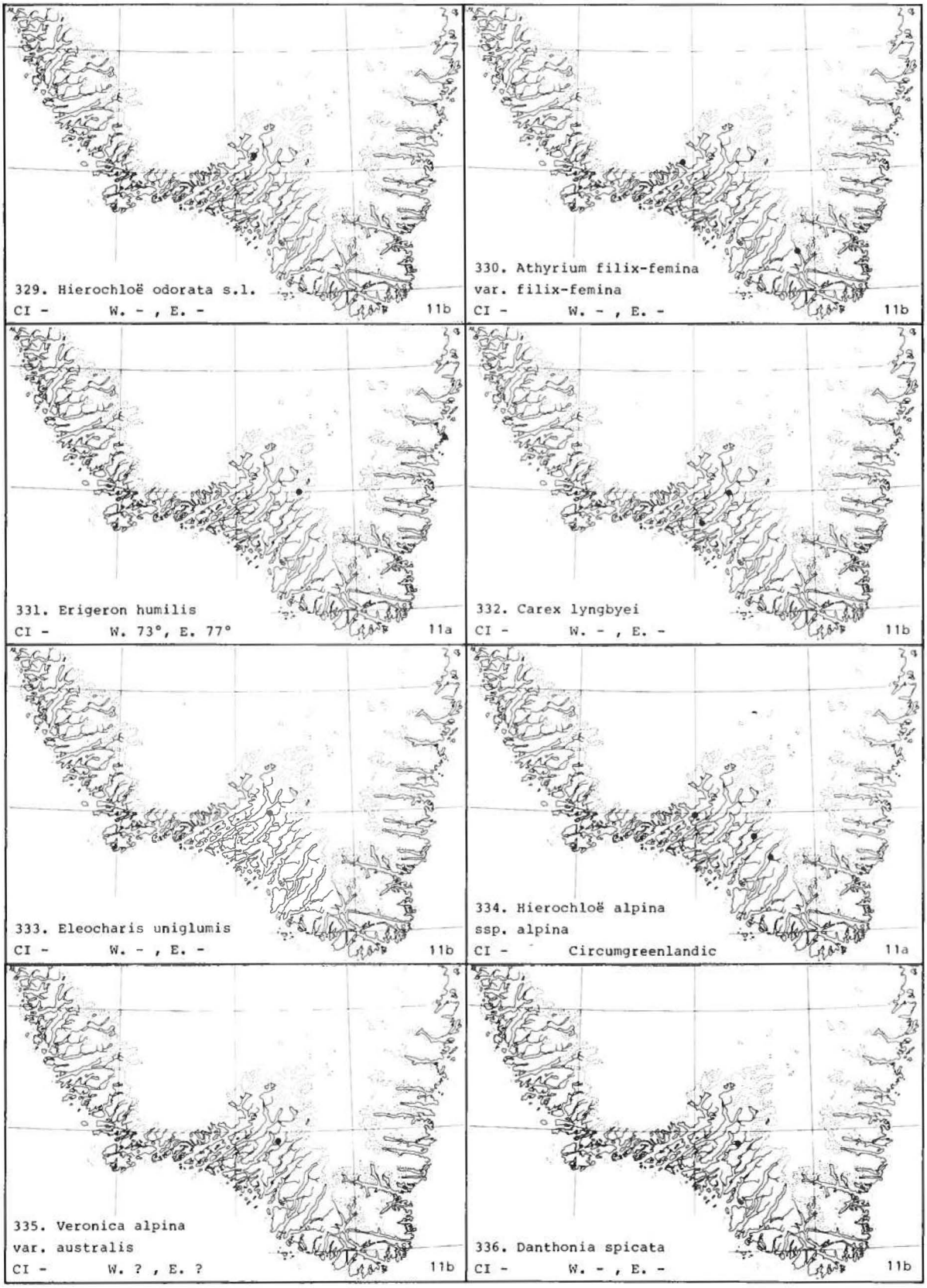

289. Carex viridula
CI ∞ W. - , E. - 10c
290. Utricularia minor
CI - W. 71°, E. 72° 10d
291. Gentianella detonsa
ssp. detonsa
CI ∞ W. 67°, E. 73° 10d
292. Sagina nodosa
CI ∞ W. - , E. - 10d
293. Amerorchis rotundifolia
CI ∞ W. 67°, E. - 10e
294. Antennaria affinis
CI ∞ W. 71°, E. - 10e
295. Arabis holboellii
var. holboellii
CI - W. 71°, E. 73° 10e
296. Carex bicolor
CI - W. 71°, E. 74° 10e

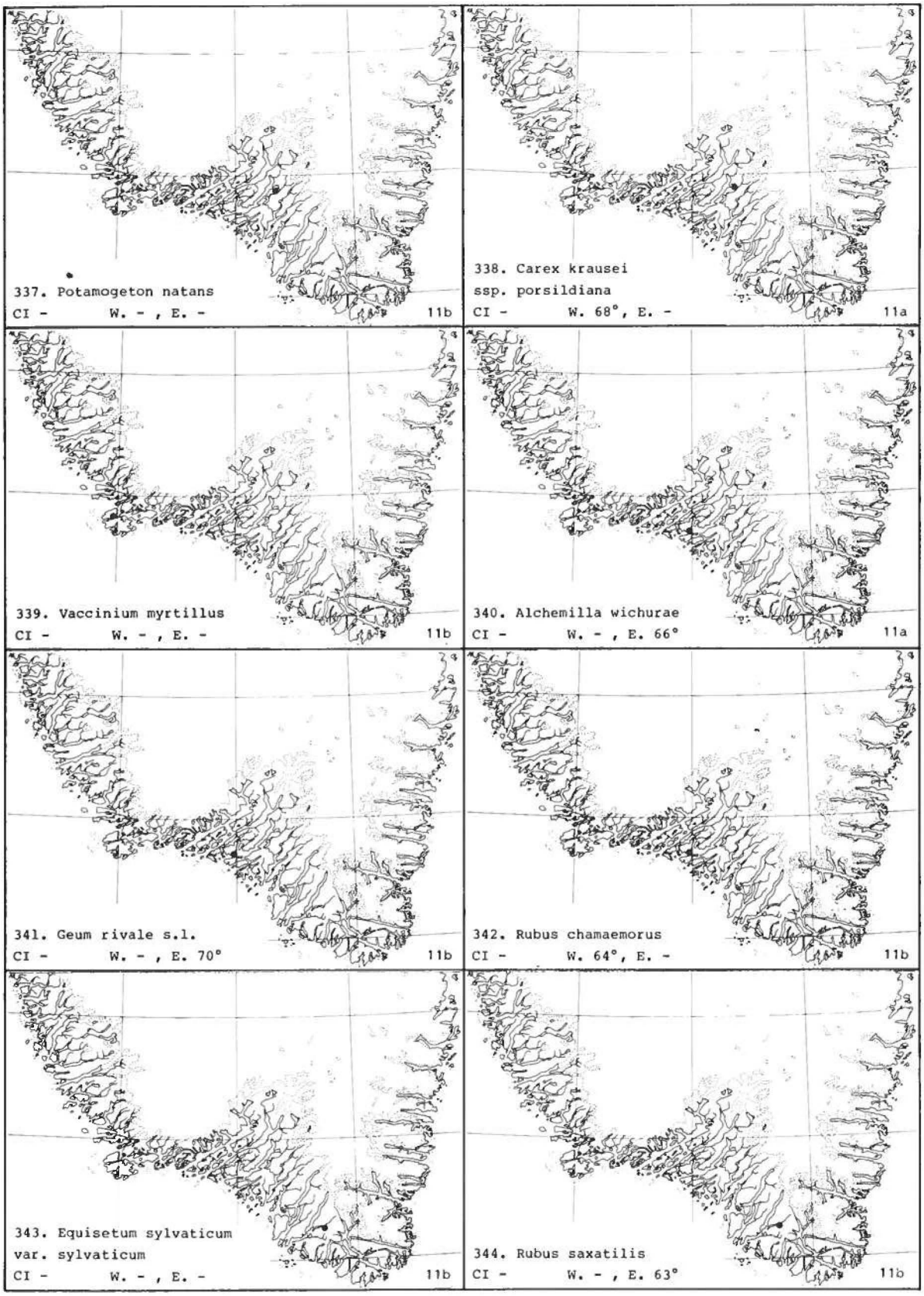

297. Carex buxbaumii
ssp. buxbaumii
CI -
W. - , E. -
10e
298. Draba crassifolia
CI -
W. 72°, E. 74°
10e
299. Eleocharis palustris
ssp. palustris
CI -
W. - , E. -
10e
300. Parnassia kotzebuei
CI ∞
W. 71°, E. -
10e
301. Potentilla ranunculus
CI ∞
W. 70°, E. 63°
10e
302. Primula egaliksensis
CI ∞
W. 67°, E. -
10e
303. Rorippa islandica
ssp. islandica
CI -
W. 67°, E. -
10e
304. Catabrosa aquatica
var. aquatica
CI -
W. 64°, E. -
11b

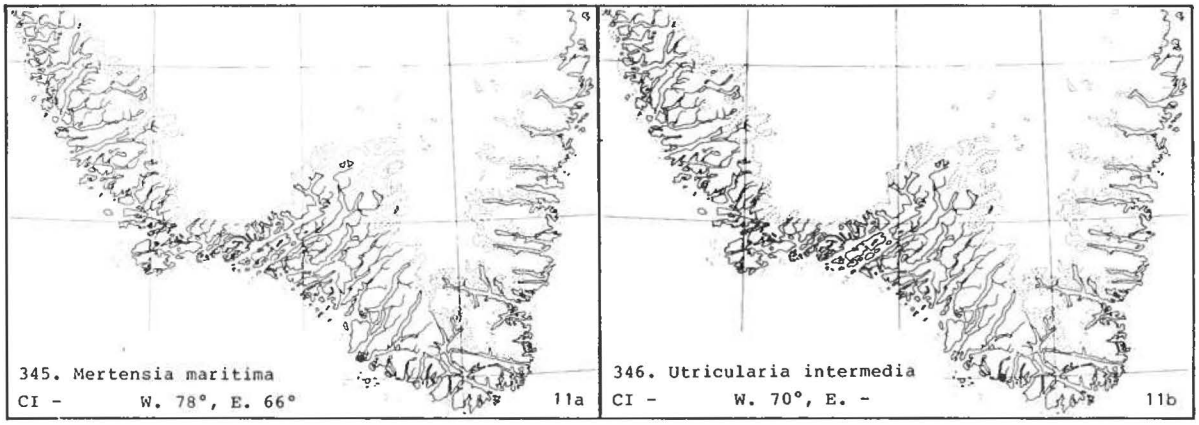

305. Ranunculus lapponicus
CI - W. 73°, E. -
11a
306. Pedicularis labradorica
CI - W. 69°, E. -
11a
307. Botrychium multifidum
CI - W. - , E. -
11b
308. Draba lactea
CI - Circumgreenlandic
11a
309. Arenaria humifusa
CI - W. 78°, E. 73
11a
310. Carex disperma
CI - W. - , E. -
11b
311. Eriophorum spissum
CI - W. - , E. -
11b
312. Antennaria compacta
CI - W. 79°, E. 73°
11a


313. Carex trisperma
CI - W. - , E. - 11b
314. Antennaria ekmaniana
CI - W. 83°, E. - 11a
315. Gentianella amarella
ssp. acuta
CI - W. - , E. 66° 11b
316. Andromeda polifolia
ssp. glaucophylla
CI - W. 63°, E. - 11b
317. Betula nana s.l.
CI - W. 74°, E. 76° 11a
318. Myriophyllum spicatum
ssp. exalbescens
CI - W. 71°, E. - 11b
319. Draba cinerea
CI - W. 79°, E. 72° 11a
320. Woodsia glabella
CI - Circumgreenlandic 11a


321. Cakile edentula
ssp. edentula
CI - W. - , E. - 11b
322. Elymus arenarius
CI - W. - , E. - 11b
323. Carex chordorrhiza
CI - W. - , E. - 11b
324. Galium boreale s.l.
CI - W. - , E. - 11b
325. Woodsia alpina
CI - W. 75°, E. 72° 11a
326. Selaginella rupestris
CI - W. - , E. - 11b
327. Juncus gerardii
ssp. gerardii
CI - W. - , E. - 11b
328. Calmagrostis purpurascens
CI - Circumgreenlandic 11a


329. Hierochloë odorata s.l.
CI - W. - , E. - 11b
330. Athyrium filix-femina
var. filix-femina
CI - W. - , E. - 11b
331. Erigeron humilis
CI - W. 73°, E. 77° 11a
332. Carex lyngbyei
CI - W. - , E. - 11b
333. Eleocharis uniglumis
CI - W. - , E. - 11b
334. Hierochloë alpina
ssp. alpina
CI - Circumgreenlandic 11a
335. Veronica alpina
var. australis
CI - W. ? , E. ? 11b
336. Danthonia spicata
CI - W. - , E. - 11b


337. Potamogeton natans
CI - W. - , E. - 11b
338. Carex krausei
ssp. porsildiana
CI - W. 68°, E. - 11a
339. Vaccinium myrtillus
CI - W. - , E. - 11b
340. Alchemilla wichurae
CI - W. - , E. 66° 11a
341. Geum rivale s.l.
CI - W. - , E. 70° 11b
342. Rubus chamaemorus
CI - W. 64°, E. - 11b
343. Equisetum sylvaticum
var. sylvaticum
CI - W. - , E. - 11b
344. Rubus saxatilis
CI - W. - , E. 63° 11b


345. Mertensia maritima
CI - W. 78°, E. 66°
11a
346. Utricularia intermedia
CI - W. 70°, E. -
11b

1982

9. Eric Steen Hansen:
»Lichens from Central East Greenland«, 33 pp.

A total of 600 samples of 167 species of macro- and microlichens were collected mainly by Pauline Topham and Geoffrey Halliday on botanical expeditions to Central East Greenland in the years 1961, 1962, 1968, 1971, 1974 and 1980. Three of the species, viz., *Caloplaca tornoensis* Magnusson, *Rhizocarpon pusillum* Runem, and *Verrucaria thalassina* (Zahlbr.) Zsch. are additions to the known lichen flora of Greenland. The following eleven species have not previously been reported from East Greenland: *Catillaria philippea* (Mont.) Massal., *Cladonia luteoalba* A. Wilson & Wheldon, *C. macroceras* (Delise) Ahti, *Coelocaulon divergens* (Ach.) R. H. Howe, *Diploschistes muscorum* (Scop.) R. Sant., *Leprocaulon subalbicans* (Lamb) Lamb & Ward, *Peltigera kristinssonii* Vitik., *Pertusaria octomela* (Norman) Erichsen, *Rhizocarpon intermediellum* Räsänen, *Solorina saccata* (L.) Ach. and *Thelidium papulare* (Fr.) Arnold.

Information is provided on climatic conditions at two meteorological stations situated in the area investigated. Thirtyeight collecting localities are listed, together with brief notes on their geology. The localities are situated between the southernmost part of Liverpool Land and Jameson Land, c. 70°N, and the middle of Lyell Land and Traill Ø, c. 73°N.

A survey is given of some important ecological, phytosociological and distributional characteristics for the lichen species, together with information on the presence of perithecia or apothecia.

Lichens of particular interest are discussed in the special part of the paper.

A number of commonly used synonyms are listed in the Appendix.

1982

10. F. J. A. Daniëls:
»Vegetation of the Angmagssalik District, Southeast Greenland, IV. Shrub, dwarf shrub terricolous lichens«, 78 pp.

This paper deals with part of the results of the Dutch phytosociological expeditions in 1968 and 1969 to the Angmagssalik District, Southeast Greenland.

Shrub, dwarf shrub and terricolous lichen vegetation is treated here. The general part contains a description of the Angmagssalik District with emphasis on the applied methods.

The vegetation has been studied according to concepts of the French–Swiss School. The typology is based on about 250 records. The procedure of differentiation and classification of the plant communities is discussed. The term "decisive" differential taxon is introduced and defined. The association concept is considered from a regional point of view. The plant communities are arranged in a floristic hierarchic system.

Concerning habitat factors, the altitude a.s.l., slope and wind direction were measured. Other factors were roughly estimated. The soil types are indicated.

The following part contains a discussion of the vegetation units, with their floristic composition and physiognomy, habitat and distribution, and syntaxonomic position. This includes 24 vegetation units, 1 complex of communities, 11 communities and 12 associations. These are designed to the classes Oxycocco–Sphagnetea, Scheuchzerio–Caricetea, Betulo–Adenostyletea, Loiseleurio–Vaccinietea, Carici–Kobresietea, Salicetea herbaceae and Juncetea trifidi. Eight new associations and 1 new alliance are presented. Some syntaxa have been revised or validated.

The classification by Molenaar (1976) of mire vegetation and chionophytic herb communities is discussed and a new classification is proposed. Dwarf shrub vegetation with *Empetrum hermaphroditum* and/or *Vaccinium microphyllum* on acid, mainly mineral soil is extremely varied in composition and physiognomy and is considered a zonal formation, which largely determines the aspect of the region. The *Empetrum–Vaccinium* community is the climax vegetation of the district.

The greater part of the communities and associations can be assigned to alliances described from Scandinavia, and the phytosociological relationship with that region is emphasized. Only the Dryadion integrifoliae and the Cladonio–Viscarion all. nov. are not known from Scandinavia. The vegetation of the Angmagssalik District has its own character, as shown on the association level by the Sphagno–Salicetum, the Rhododendro–Vaccinietum, the Gymnomitrio–Loiseleurietum, the Carici–Dryadetum and the Cladonio–Viscarietum (all new), which are actually restricted to the area. The other 7 associations are also found at the southern and western coasts of Greenland. Most vegetation types (associations and communities) have a lowarctic-oceanic distribution. A few types are also found in Iceland and Scandinavia.

1983

11. Tyge W. Böcher:
»The allotetraploid *Saxifraga nathorsti* and its probable progenitors *S. aizoides* and *S. oppositifolia*.« 22 pp.

Saxifraga nathorsti is an endemic Greenland species geographically restricted to Northeast Greenland. Morphologically it is intermediate between *Saxifraga oppositifolia* with purplish petals and *S. aizoides* with yellow petals. A hybrid between these two species is difficult to obtain and is not known from Greenland or anywhere else.

New material from Northeast Greenland has been cultivated and studied cytologically. One strain of typical *S. nathorsti* corresponded to the material studied previously. It also had 52 chromosomes and showed a high degree of pairing during meiosis. It was fertile, but exhibited several meiotic irregularities. Another strain seemed morphologically more closely related to *S. oppositifolia*. It was sterile and had the triploid number 2n = 39. It was assumed to have two genomes from *S. oppositifolia* and one from *S. aizoides*. It appears most probable that triploids of this kind after fertilization with pollen from *S. aizoides* can give rise to *S. nathorsti*.

Anatomical studies of the structure of epithem hydathodes in *S. nathorsti* and its two possible ancestors, *S. oppositifolia* and *S. aizoides*, show that *S. nathorsti* in several important hydathode characters occupies an intermediate position between *S. oppositifolia* and *S. aizoides*. Thus, all available facts support the theory of the origin and stabilization of *S. nathorsti* as an allotetraploid species.

1984

12. Ole G. Norden Andersen:
»Meroplankton in Jørgen Brønlund Fjord, North Greenland.« 25 pp.

Meroplanktonic larvae of at least 41 species of bottom invertebrates in Jørgen Brønlund Fjord, North Greenland (82°10'N, 30°30'W) are described with respect to species identification, occurrence, reproduction, development, growth, settlement, and relations to depth, light, hydrography, and primary production. A few holoplankters and some "pseudoplanktonic" nematodes are included. The occurrence of such a large number of species with pelagic larvae does not invalidate "Thorson's rule" of 1950, stating that the number of species having pelagic larval development decreases, as one moves from the equator to the pole, but it does lead to a less strict interpretation of it. Several species have lecithotrophic pelagic development. The short period of primary production, however meager, seems vital to many of the planktotrophic larvae, in promoting growth and settling, although the spawning of many species is not stricktly linked to this period. Larvae of *Hiatella striata* (Fleuriau) seem able to live in the plankton for a year, even surviving the long dark, winter.

13. Thomas K. Kristensen:
»Biology of the squid Gonatus fabricii (Lichtenstein, 1818) from West Greenland waters.« 17 pp.

Three hundred adult and subadult *Gonatus fabricii* and about 7000 juveniles from West Greenland waters were examined. In spring and early summer large numbers of juvenile *G. fabricii* hatch in Davis Strait. Their abundance fluctuates from year to year. In Disko Bugt the juveniles hatch in autumn and early winter. Juvenile *G. fabricii* hatch over a large area in Davis Strait at depths exceeding 200 m. At night juveniles south of the polar circle perform vertical upward migrations. Likewise it seems that shoals of juveniles disperse at the same time. The number of juvenile *G. fabricii* is found to be about the same as the number of larvae of the Greenland halibut, *Rheinhardtius hippoglossoides*, a common commercial fish. The growth of *G. fabricii* was found to be 8–9 mm per month. The development of the gonads in relation to pen length is describable by the allometric equation. The testis begins to develop at a pen length of about 8–10 cm, the penis at a pen length of 3–5 cm. The largest mature male measured 29.3 cm pen length. The ovary begins to develop at a pen length of 6–8 cm. No mature females were found. In Greenland waters males probably mature at about 20 cm pen length, females between 25 and 30 cm pen length.

51% of specimens had empty stomachs, 27% were half full and 22% full. Crustaceans, fish and cephalopods were found in the stomachs and crustaceans were the most important. The protein percent was found to be 12.5 and in the liver the lipid percent was 63.

Spawning and predators of *G. fabricii* are also discussed.

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