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Supplementary Table S1. Species recorded at the different sites in Isfjorden. For information about site numbers, refer to Fig.1.

Site number	1	2	3	4	5	6	7	8	9	10
Chlorophyta										
Acrochaete cf. *viridis* (Reinke) R. Nilsen	x				x	x		x		
Acrosiphonia arcta (Dillwyn) Gain	x	x	x	x		x	x	x		x
Blidingia minima (Nägeli ex Kützing) Kylin							x			
Chaetomorpha linum (O.F. Müller) Kützing	x									x
Chaetomorpha melagonium (F.Weber et D. Mohr) Kützing	x		x	x			x	x	x	
Chlorocythrium inclusum Kjellman					x					
Cladophora sp.			x							
Epicladia flustrae Reinke										x
Pringsheimiella scutata (Reinke) Marchewianka								x		
Rhizoclonium riparium (Roth) Harvey						x				x
Spongomorpha aeruginosa (Linnaeus) van den Hoek		x	x	x			x			
Ulothrix flacca (Dillwyn) Thuret	x	x					x			x
Ulothrix speciosa (Carmichael) Kützing	x									
Ulva sp.			x							
Ulvaria obscura (Kützing) P. Gayral ex. Bliding										x
Ulvaria splendens (Ruprecht) Vinogradova								x		
Urospora pencilliformis (Roth) Areschoug	x						x	x		

Ochrophyta

Alaria esculenta (Linnaeus) Greville		x	x	x			x	x	x	x
Battersia arctica (Harvey) Draisma, Prud´homme van Reine et H. Kawai	x		x	x	x	x	x	x	x	x
Brown crust indet.			x				x			
Chaetopteris plumosa (Lyngbye) Kützing	x	x	x	x		x	x	x	x	x
Chorda filum (Linnaeus) Stackhouse	x	x	x			x		x		x
Chordaria flagelliformis (O.F. Müller) C. Agardh	x		x	x		x	x	x		x
Climacosorus mediterraneus Sauvageau				x		x				x
Delamarea attenuata (Kjellman) Rosenvinge		x								
Desmarestia aculeata (Linnaeus) J.V. Lamouroux	x	x	x	x		x	x	x	x	x
Desmarestia viridis (O.F. Müller) J.V. Lamouroux		x	x		x	x	x	x	x	x
Dictyosiphon foeniculaceus (Hudson) Greville	x	x	x	x		x	x	x	x	x
Ectocarpus fasciculatus Harvey	x	x	x	x	x	x	x	x	x	x
Ectocarpus siliculosus (Dillwyn) Lyngbye						x	x	x		x
Elachista fucicola (Velly) J.E. Areschoug	x	x	x	x	x	x	x	x	x	x
Eudesme virescens (Carmichael ex Berkeley) J. Agardh		x	x							
Fucus distichus Linnaeus	x	x	x	x		x	x	x		x
Fucus vesiculosus Linnaeus			x							
Halosiphon tomentosum (Lyngbye) Jaasund		x	x			x	x	x		
Haplospora globosa Kjellman		x	x	x		x		x		
Istmoplea sphaerophora (Carmichael) Gobi			x							
Laminaria digitata (Hudson) J.V. Lamouroux			x	x			x	x	x	x
Laminaria sp. Juvenil	x					x				x

Laminariocolax aecidioides (Rosenvinge) A.F. Peters								x		
Leptonematella fasciculata (Reinke) P.C. Silva					x					
Litosiphon laminariae (Lyngbye) Harvey		x		x						
Myrionema corunnae Sauvageau										x
Petroderma maculiforme (Wollny) Kuckuck						x		x	x	
Pogotrichum filiforme Reinke	x	x	x	x		x				x
Protohalopteris radicans (Dillwyn) Draisma, Prud´homme & H. Kawai		x	x	x			x	x	x	x
Punctaria latifolia Greville							x			x
Punctaria plantaginea (Roth) Greville										x
Punctaria tenuissima (C. Agardh) Greville		x		x					x	
Pylaiella littoralis (Linnaeus) Kjellman	x	x	x	x		x	x	x	x	x
Pylaiella varia Kjellman		x	x	x		x	x	x	x	x
Saccharina latissima (Linnaeus) C.E. Lane, C. Mayers, Druhel et G.W. Saunders		x	x	x	x	x	x	x	x	x
Saccorhiza dermatodea (de la Pylaie) J. Agardh		x	x	x		x	x	x	x	x
Saundersella simplex (De A. Saunders) Kylin	x	x		x			x			
Scytosiphon lomentaria (Lyngbye) Link		x								
Stictyosiphon tortilis (Ruprecht) Reinke		x	x	x		x	x	x	x	
Stragularia clavata (Harvey) G. Hamel									x	

Rhodophyta

Acrochaetium sp.						x		x		
Ahnfeltia plicata (Hudson) E.M. Fries			x							
Ceramium strictum/cimbricum			x	x		x				x
Ceramium virgatum Roth			x	x			x			x

Coccotylus truncata (Pallas) M.J. Wynne et J.N. Heine			x				x	x		x
Cruoria arctica F. Schmitz					x					
Devaleraea ramentacea (Linnaeus) Guiry	x	x	x	x			x	x		x
Dilsea socialis (Postels & Ruprecht) Perestenko			x							
Euthora cristata (C. Agardh) J. Agardh		x			x		x	x	x	
Harveyella mirabilis (Reinsch) F. Schmitz & Reinke										x
Lithothamnion glaciale Kjellman									x	
Litothamnion tophiforme/glaciale = Rhodoliths					x					
Meiodiscus spetsbergensis (Kjellman) Saunders et Mclachlan									x	
Odonthalia dentata (Linnaeus) Lyngbye		x	x				x	x	x	
Palmaria palmata (Linnaeus) Kuntze			x			x	x			x
Phycodrys rubens (Linnaeus) Batters		x	x		x		x	x	x	
Phymatolithon sp.		x		x			x		x	
Polysiphonia arctica J. Agardh			x		x		x	x		x
Polysiphonia fucoides (Hudson) Greville			x							
Polysiphonia stricta (Dillwyn) Greville			x				x	x		
Porphyra sp.	x							x	x	
Ptilota gunneri P.C. Silva, Maggs et L.M. Irvine		x					x		x	
Ptilota serrata Kützing		x					x	x	x	
Pyropia thulaea I.M. Munda et P.M. Pedersen								x		
Red crust indet.							x			
Rhodochorton purpureum (Lightfoot) Rosenvinge	x		x		x		x	x	x	
Rhodomela confervoides (Hudson) P.C. Silva	x	x	x	x		x	x	x	x	x
Rhodomela lycopodioides (Linnaeus) C. Agardh	x	x	x							x

Scagelia pylaisaei (Montagne) M.J. Wynne		x			x		x		x	
Turnerella pennyi (Harvey) Schmitz					x					
Xanthophyceae										
Vaucheria sp.			x				x			
Total taxa = 88	25	37	45	30	16	29	44	42	32	39

Supplementary Table S2. Bray-Curtis similarity matrix on non transformed data from sites 1– 10.

	1	2	3	4	5	6	7	8	9	10
1										
2	48.4									
3	47.9	62.7								
4	54.5	68.7	65.8							
5	24.4	26.4	25.8	17.4						
6	55.6	54.5	58.7	64.4	26.7					
7	48.6	68.3	72.5	64.0	32.8	51.4				
8	53.7	60.8	68.2	58.3	34.5	64.8	73.6			
9	39.3	64.7	51.9	59.0	38.3	46.7	65.8	65.8		
10	56.3	52.6	63.5	63.8	21.8	67.6	61.9	56.8	42.9	

Taxonomic identification notes

Some genera and species are difficult to identify. Applying molecular analysis to *Ceramium* and *Fucus* provided valuable additional information. Comments to some of the different taxa are relevant in order to clarify our decision in the identification process.

Chlorocythrium inclusum (Fig. 3a) is the diploid stage of *Spongomorpha aeruginosa* and does not represent a separate taxon. It is included here to show its presence in the material. Based on size (> 50 µm) we concluded that the endophyte belongs to *C. inclusum* (Rueness 1977). It was found to be common in *Turnerella pennyi* and in *Euthora cristata* from site 5 (Kapp Wijk).

***Ulothrix* spp**. We have separated this genus into two species based on cells < 0.25 times longer than broad (*U. speciosa*) and > 0.25 times longer than broad (*U. flacca*) in addition to cell diameter: *U. speciosa* > 40 µm and *U. flacca* < 40 µm (Brodie et al. 2007). Pedersen (2011) separates this genus into three different species from Greenland, including the two found in our investigation.

***Ulvaria* sp.** *Ulvaria* is a monostromatic genus in which species identification is difficult. Pedersen (2011) mentions only one species from Greenland, *U. splendens* (Ruprecht) Vinogradova. Based on the presence of several pyrenoids per cell (Fig. 3b) and the fact that this species does not turn brown when dried (Fig. 3c) we have concluded that *U. splendens* occurs in material from site 8 (Vestpynten) in Isfjorden. This is the first time *U. splendens* has been recorded in Svalbard. *Ulvaria obscura*, in contrast, turns brown when it dries (Fig. 3d) and was recorded from site 10 (Colesbukta) in 2012. *Ulvaria obscura* is included in Brodie et al. (2007) from the British Isles.

Brown crusts indet. Thin brown crusts are notoriously difficult to identify, and impossible if they are not fertile. Included in this material are probably species belonging to the genus *Pseudolithoderma*, brown crusts on stones, rocks and shells in the sublittoral. According to Hop et al. (2012), two species of *Pseudolithoderma* were found in Kongsfjorden, *P. extensum* (P.L. Crouan et H.M. Crouan) S. Lund and *P. rosenvingei* (Waern) S. Lund.

Laminariocolax aecidioides. Our material was very similar to Rosenvinge's original description (1893, fig. 27) and we therefore referred to it as *Ectocarpus aecidioides* Rosenvinge. The current name for this species is now *Laminariocolax aecidioides* according to Guiry & Guiry (2014). This tiny endophyte was found in *Saccharina latissima* at site 8 (Vestpynten) in 2012. With the naked eye it is visible as small dots on the lamina. A transverse section of the lamina revealed a small endophyte with only hairs and eventually fertile organs protruding through the epidermis of the host alga (Fig. 3e).

***Fucus* spp**. Three specimens of *F. distichus* and *F. vesiculosus* from site 3 (Bohemanneset) were analysed for two mitochondrial regions. The partial 23S sequences obtained were 360 bp, and varied with one nucleotide (0.3 %) within species and five – six nucleotides (1.4-1.7 %) between the two *Fucus* species. At the site 3 (Bohemanneset) a small turf-like growth form of a fucoid was found in 2010. At first sight it looked like *Fucus distichus* with small apical receptacles. In the laboratory, a cross-section through the receptacles proved that the plants were dioecious (separate male and female plants). Both sexes were found. Based on this fact, and the confirmation of the species identifications using mtDNA sequences (Table 2) it was concluded that this population is a dwarf form of *Fucus vesiculosus* (Fig. 3f).

***Laminaria* spp.** The genus *Laminaria* has been subject to molecular investigations and this study is still in progress. Early results suggest that some of the specimens that previously would have been described as *Laminaria digitata* most probably belong to the entity *Saccharina groenlandica* (Rosenvinge) C.E. Lane, C. Mayers, Druehl & G.W. Saunders (our own unpubl. results). However, in this study, we still use the taxon *Laminaria digitata* for our records of digitate specimens of *Laminaria* spp. from Isfjorden.

***Ceramium* sp.** Red algae of the genus *Ceramium* in Svalbard are not well studied. Vinogradova (1995b) recorded *Ceramium circinatum* (Kützing) J. Agardh from Hornsund, the southernmost part of Svalbard, Fredriksen & Kile (2012) recorded *Ceramium* sp. from the outermost part of Isfjorden since they were unable to identify any species with certainty, and Hop et al. (2012) did not record any *Ceramium* at all from Kongsfjorden. Pedersen (2011) writes that *C. virgatum* and *C. tenuicorne* (Kützing) Waern could be present in Greenland, based on whether the cortex is continuous or not, respectively. In this study, partial nrDNA18S sequences of three specimens (1088 nucleotides) and rubisco spacer sequences of seven specimens (317 nucleotides) of *Ceramium* sp. were obtained. Blastn searches (Altschul et al. 1990) confirmed the identity of all rubisco spacer sequences and 18S sequences to *Ceramium virgatum* (100% similarity for both regions).

Turnerella pennyi. On the rhodolith bottom at site 5 (Kapp Wijk), as the only site, both the bladelike gametophyte stage of the red alga *Turnerella pennyi* and the crustous tetrasporophyte stage (previously described as *Cruoria arctica*) were recorded. The tetrasporophyte has as far as we know not previously been recorded in Isfjorden.

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