

Comparative Ecology of Colonizing Species of
Vascular Plants

by

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In 1966 five trips to Surtsey had been planned to study the ecology of the colonizing species. Due to the ash fall from the Jólnir crater, however, which covered the most part of Surtsey for months, the colonization of the island by plants was further delayed and therefore only one trip was made to the island by the present author during 1966.

This trip was made on June 22-23. The whole eastern, southern and western parts of Surtsey were then covered with ash, which had almost filled many of the small depressions and crevices in the lava flows and seemed completely lifeless and sterile. Only the north coast of the island was not covered with ash and some few thalli stumps of Ascophyllum nodosum were found drifted ashore west of the lagoon. On some flat rocks in the tidal zone on the north west coast of Surtsey some clusters of filamentous green algae were found growing.

One trip to a "new" nunatak, which is situated in the Vatnajökull glacier in South East Iceland, had been planned to follow the succession of the vegetation in the nunatak and make comparison with Surtsey.

During an expedition which the present author made to nunatak areas in Vatnajökull in July 1961 it was observed that a new small area situated in Breidamerkurjökull, which is Vatnajökull's biggest southern outlet, at an altitude of 720 m and 13 km from the margin of the outlet was just becoming free of ice (cf. Einarsson, E. 1967). This new nunatak, which has been named Braedrasker, has gradually been getting bigger as the ice melts away from it. It is a part of a mountain slope, mostly built up of basalt, sloping 10° to 20° to the south east. In late September 1966 it was about 100 m broad

and 150 m long, the altitude being from 680-740 m.

In August 1963, two years after the first part of this new nunatak became free of ice, it had been colonized by three species of mosses and one species of vascular plants (Einarsson, E. 1967). In September 1965 15 species of vascular plants were found growing in Braedrasker together with 8 or 9 species of mosses. Vegetation analyses were then carried out in seven plots chosen in the oldest part of the nunatak and clearly marked for further studies of the plant succession (Einarsson, E. 1967). The vegetation cover in all plots was less than 1% and in most of the plots only 1-3 specimens were found. The most common vascular plant was Poa alpina, the most common moss species were Philonotis tomentella and Rhacomitrium canescens, no lichens and no fungi were observed.

Since so many new species had invaded this new nunatak during the two years period from 1963 to 1965, it was considered to be of great importance to visit the area in 1966. The time chosen for the investigation was the last week of August. Because of an exceptionally heavy rainfall in this part of the country in late August, however, this plan had to be given up. A second trip to the nunatak was tried in late September and this time it turned out successfully. The changes which were observed to have taken place in the vegetation since 1965 were even bigger than had been expected. In some of the plots new species were observed and others had disappeared and as a whole 5 new species of vascular plants were found. The vegetation, especially the mosses, is more prominent than before, although the plants in Braedrasker are still so scattered between the boulders of this morain area that at first look the area gives one the impression of being completely without any vegetation at all. Poa alpina is still the most common species of vascular plants with Saxifraga caespitosa on the second place. Of the mosses Rhacomitrium canescens is now the most common moss species and Philonotis tomentella is almost as common. No lichens and no fungi were observed. The results of the investigations are found in table 1 together with the results from earlier investigations in Braedrasker.

The plant species found in Braedrasker have most likely dispersed from the nearest mountain areas or the 30 years old nunatak Kárasker to Braedrasker, the distance between those two nunataks being only about 1 km and the altitude almost the same. The distance to the much older nunatak areas Mávabyggdir and Esju-fjöll, which are situated north of Braedrasker, is respectively 3,5 and 5 km. The distance to the nearest ice free mountain areas east and west of Braedrasker is respectively 9 and 8 km. The present author is of the opinion that diaspores have been wind borne or blown along the surface of the ice to Braedrasker as plant stumps and even whole plant specimens, mostly grasses, with roots and leaves have been found lying on the surface of the ice of Breidamerkurjökull far from the nunataks and the margin of the glacier.

As no makroscopic terrestrial plants have yet established themselves on Surtsey it is too early for comparison of the island and Braedrasker.

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Reference:

Einarsson, E. 1967: Plant Ecology and Succession in some Nunataks in the Vatnajökull Glacier in South East Iceland. UNESCO Symposium on Ecology of Sub-arctic Regions in Helsinki 1966. In print.

TABLE 1

All species of vascular plants and the most prominent moss species found in Braedrasker. The letters A, B and C in column F mean that the species were found for the first time respectively in 1963, 1965 and 1966. The results from the vegetation analysis carried out in 1965 and 1966 in seven plots marked 1 to 7 are found respectively in columns 1 to 7. For cover estimation the Domin scale was used.

Species	F	1		2		3		4		5		6		7	
		65	66	65	66	65	66	65	66	65	66	65	66	65	66
<i>Arabis alpina</i>	B					+									
<i>Cardaminopsis petraea</i>	C														
<i>Cerastium alpinum</i>	B													+]
<i>Cerastium cerastoides</i>	B														
<i>Epilobium lactiflorum</i>	B											+			
<i>Luzula spicata</i>	B														
<i>Minuartia rubella</i>	B														
<i>Oxyria digyna</i>	B				+										
<i>Phleum commutatum</i>	C														
<i>Poa alpina</i> vivip. et non vivip.	B	+	+	+	1					+	+				+
<i>Poa flexuosa</i>	B							+	+						
<i>Poa glauca</i>	B														
<i>Sagina intermedia</i>	B											+	+		+
<i>Sagina procumbens</i>	B											+	+	+	
<i>Saxifraga caespitosa</i>	B		+		+									+	
<i>Saxifraga oppositifolia</i>	C		+												
<i>Silene maritima</i>	C														
<i>Sedum annuum</i>	B											+			
<i>Trisetum spicatum</i>	A														
<i>Veronica fruticans</i>	C													+	
<i>Ceratodon purpureus</i>	A				+										
<i>Philonotis tomentella</i>	B	+	+	+	+		+				+				
<i>Pogonatum urnigerum</i>	C				+										
<i>Pohlia wahlenbergii</i>	A						+						+		+
<i>Polytricum juniperinum</i>	C		+												+
<i>Rhacomitrium canescens</i>	A				+		+	+	+		+				+