

The Colonization of Vascular Plants on Surtsey in 1968

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METHOD OF INVESTIGATION

As in previous years, botanical investigations were carried out on Surtsey during the summer of 1968. Continuous observations were performed during the period from April 16 to May 10 and June to September 17. From June 11 and throughout August two students, Sigurdur Richter and Ágúst H. Bjarnason, were engaged in recording the colonization of vascular plants on the island.

Daily tours of inspection were made and the northern part of the island was especially investigated. As new individuals were found, their location and stage of growth were recorded and their progress of development followed during the summer. As described in last year's report (Sturla Fridriksson, Björn Johnsen, 1968), every plant was marked with a stake bearing a number. The positions of all plants were then plotted on an aerial photograph. Photographs were similarly taken of individual plants for recording purposes.

A grid had been mapped over the island with checkers that were identified numerically and alphabetically. This is shown on the accompanying map. From the grid four fixed quadrates were selected for a more detailed and a long term examination. These quadrates were selected in such a way that they would represent the four typical substrates found on the island, i. e., tuff, old lava overlaid with cinder, new bare lava, and beach sand. The four respective quadrates are marked D11, J3, K18, and F15.

The nature of the various substrates has previously been described and a more detailed description given of the fixed quadrates. The topography of the island in general is, however, constantly changing. The tuff and cinder cone is

gradually eroding, and so is the lava on the southern shore, whereas on the northern side of the island the loose, eroded fragments continue to build up a coastal strip. The new lagoon (lagoon II on the map) was thus filled up during the winter of 1968–69, and the old lagoon (lagoon I) is getting considerably smaller. Organic material is constantly being washed ashore in the form of seaweed, driftwood, and various remains of marine organisms, and the seabirds continue to fertilize with their excreta. In that respect the substrate is becoming more suitable for plant growth.

DESCRIPTION OF VEGETATION

In previous reports the colonization of vascular plants on Surtsey has been described from year to year since 1965, when 30 plants of the species *Cakile edentula* were found growing on the northern shore (E14). In 1966 only 5 vascular plants were discovered on the island, and in 1967 the total number of vascular plants was 52 of 4 species, beside two species of *Bryophyta*.

During the summer of 1968 the number of vascular plants that were recorded rose to 114 individuals of 4 species. These are listed in table I, with location, date of discovery, and the maximum stage of development.

The four species discovered and individual number of plants were as follows:

<i>Honkenya peploides</i>	(103)
<i>Elymus arenarius</i>	(6)
<i>Mertensia maritima</i>	(4)
<i>Unidentified</i>	(1)

The unidentified plant may have been a small seedling of *Matrecaria maritima*, which is new to Surtsey. The rest of the species have previously

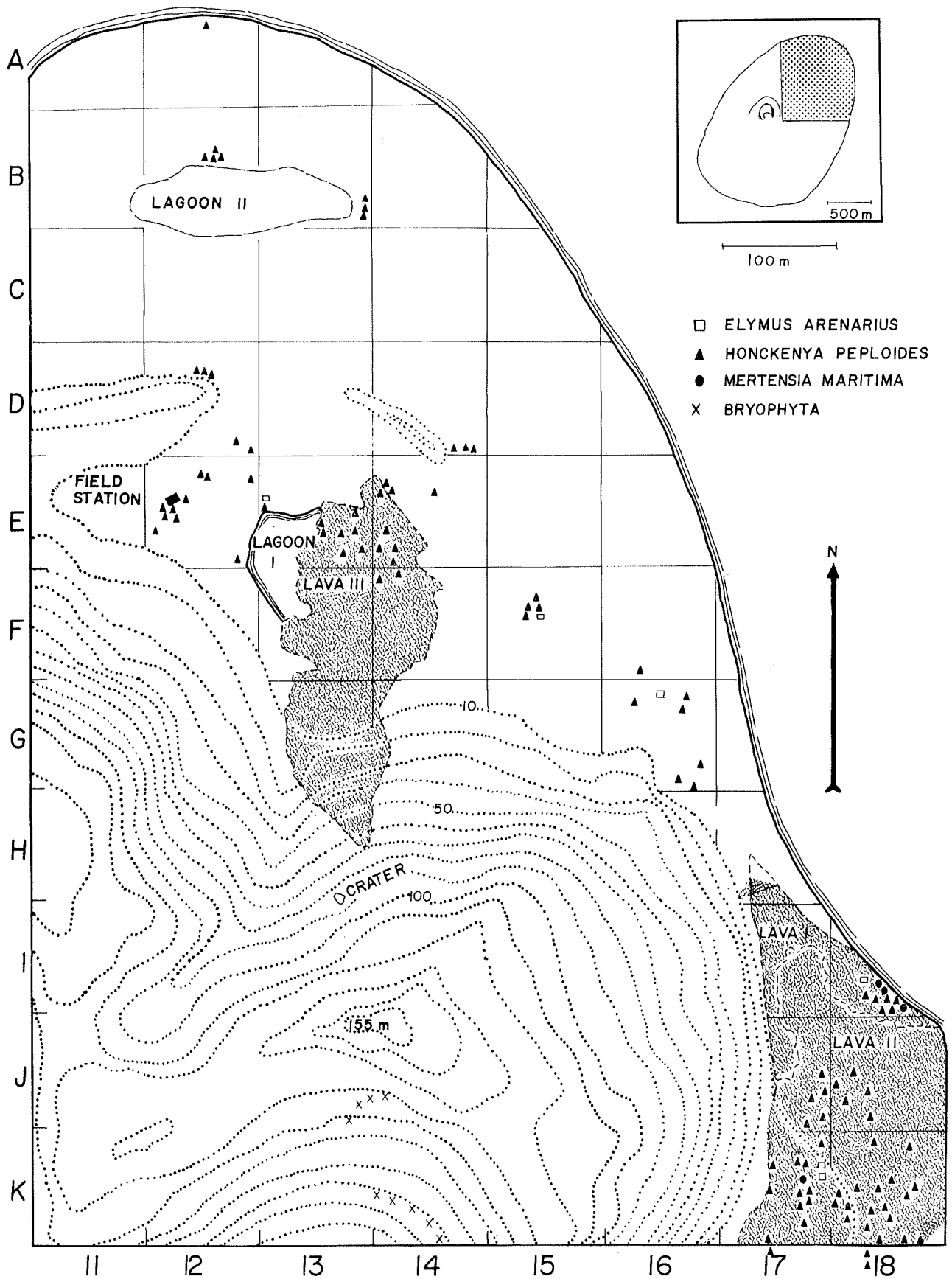


TABLE I
List of plants found on Surtsey in 1968

No.	Species	Location	Date of discovery	Maximum stage of growth
1.	<i>Honckenya peploides</i>	K 18	11/6	2 branches with 8 leaves
2.	<i>Honckenya peploides</i>	K 18	11/6	1 stem with 10 leaves
3.	<i>Honckenya peploides</i>	K 18	11/6	1 stem with 8 leaves
4.	<i>Honckenya peploides</i>	K 18	11/6	1 stem with 10 leaves
5.	<i>Honckenya peploides</i>	I 18	11/6	Cotyledons
6.	<i>Honckenya peploides</i>	K 18	12/6	1 stem with 10 leaves
7.	<i>Honckenya peploides</i>	K 18	12/6	1 stem with 5 leaves
8.	<i>Honckenya peploides</i>	K 18	13/6	1 stem with 8 leaves
9.	<i>Honckenya peploides</i>	K 18	13/6	1 stem with 10 leaves
10.	<i>Honckenya peploides</i>	K 18	13/6	1 stem with 6 leaves
11.	<i>Honckenya peploides</i>	K 18	13/6	1 stem with 8 leaves
12.	<i>Honckenya peploides</i>	K 18	13/6	1 stem with 10 leaves
13.	<i>Elymus arenarius</i>	K 17	13/6	3 leaves
14.	<i>Honckenya peploides</i>	K 18	13/6	1 stem with 8 leaves
15.	<i>Honckenya peploides</i>	K 18	13/6	1 stem with 14 leaves
16.	<i>Honckenya peploides</i>	B 13	13/6	1 stem with 2 leaves
17.	<i>Honckenya peploides</i>	B 13	10/6	1 stem with 10 leaves and 2 cotyledons
18.	<i>Honckenya peploides</i>	B 12	10/7	3 branches with 30 leaves and 2 cotyledons
19.	<i>Honckenya peploides</i>	B 12	10/7	1 stem with 14 leaves
20.	<i>Honckenya peploides</i>	B 12	10/7	1 stem with 8 leaves and 2 cotyledons
21.	<i>Honckenya peploides</i>	K 17	10/7	1 stem with 16 leaves
22.	<i>Honckenya peploides</i>	K 17	10/7	1 stem with 8 leaves
23.	<i>Honckenya peploides</i>	K 17	10/7	1 stem with 8 leaves
24.	<i>Honckenya peploides</i>	K 17	10/7	1 stem with 12 leaves
25.	<i>Honckenya peploides</i>	E 13	10/7	1 stem with 14 leaves
26.	Unidentified	D 12	10/7	2 leaves
27.	<i>Honckenya peploides</i>	B 12	10/7	1 stem with 12 leaves and 2 cotyledons
28.	<i>Honckenya peploides</i>	F 15	10/7	5 branches with 34 leaves
29.	<i>Elymus arenarius</i>	F 15	10/7	9 leaves
30.	<i>Honckenya peploides</i>	K 18	10/7	1 stem with 18 leaves
31.	<i>Honckenya peploides</i>	E 12	31/7	1 stem with 10 leaves
32.	<i>Honckenya peploides</i>	E 14	11/7	1 stem with 6 leaves
33.	<i>Honckenya peploides</i>	G 16	11/7	1 stem with 12 leaves
34.	<i>Honckenya peploides</i>	F 15	11/7	2 branches with 28 leaves
35.	<i>Honckenya peploides</i>	E 14	11/7	1 stem with 12 leaves
36.	<i>Honckenya peploides</i>	E 1	11/7	1 stem with 10 leaves and 2 cotyledons
37.	<i>Honckenya peploides</i>	E 12	15/7	1 stem with 18 leaves
38.	<i>Honckenya peploides</i>	D 12	15/7	1 stem with 17 leaves
39.	<i>Honckenya peploides</i>	D 12	16/7	1 stem with 12 leaves
40.	<i>Honckenya peploides</i>	D 12	16/7	2 branches with 20 leaves
41.	<i>Honckenya peploides</i>	E 12	31/7	1 stem with 6 leaves
42.	<i>Honckenya peploides</i>	E 12	16/7	1 stem with 6 leaves
43.	<i>Honckenya peploides</i>	E 14	16/7	1 stem with 2 leaves and 2 cotyledons
44.	<i>Honckenya peploides</i>	E 14	16/7	1 stem with 2 leaves
45.	<i>Honckenya peploides</i>	E 12	22/7	1 stem with 4 leaves
46.	<i>Honckenya peploides</i>	J 17	31/7	1 stem with 6 leaves
47.	<i>Elymus arenarius</i>	K 17	25/7	2 leaves
48.	<i>Honckenya peploides</i>	E 12	31/7	1 stem with 7 leaves
49.	<i>Honckenya peploides</i>	A 12	31/7	2 branches, 14 leaves
50.	<i>Honckenya peploides</i>	E 12	31/7	2 branches, 29 leaves
51.	<i>Honckenya peploides</i>	E 14	24/7	1 stem, 4 leaves
52.	<i>Honckenya peploides</i>	E 13	31/7	1 stem with 4 leaves and 2 cotyledons
53.	<i>Honckenya peploides</i>	G 16	20/7	1 stem with 10 leaves
54.	<i>Honckenya peploides</i>	K 17	25/7	1 stem with 10 leaves
55.	<i>Honckenya peploides</i>	K 17	31/7	1 stem with 10 leaves
56.	<i>Honckenya peploides</i>	J 18	31/7	1 stem with 10 leaves
57.	<i>Honckenya peploides</i>	J 18	31/7	1 stem with 10 leaves

No.	Species	Location	Date of discovery	Maximum stage of growth
58.	<i>Honckenya peploides</i>	J 18	31/7	1 stem with 8 leaves
59.	<i>Honckenya peploides</i>	J 18	31/7	1 stem with 2 leaves
60.	<i>Honckenya peploides</i>	J 18	31/7	1 stem with 4 leaves
61.	<i>Honckenya peploides</i>	J 17	31/7	1 stem with 8 leaves
62.	<i>Honckenya peploides</i>	J 17	31/7	1 stem with 8 leaves
63.	<i>Honckenya peploides</i>	J 17	31/7	1 stem with 24 leaves
64.	<i>Honckenya peploides</i>	J 17	31/7	1 stem with 12 leaves
65.	<i>Honckenya peploides</i>	F 14	31/7	1 stem with 10 leaves
66.	<i>Honckenya peploides</i>	F 14	31/7	1 stem with 8 leaves and 2 cotyledons
67.	<i>Honckenya peploides</i>	E 13	31/7	1 stem with 6 leaves
68.	<i>Honckenya peploides</i>	E 13	31/7	1 stem with 6 leaves
69.	<i>Honckenya peploides</i>	K 17	31/7	1 stem with 14 leaves
70.	<i>Honckenya peploides</i>	L 18	31/7	1 stem with 12 leaves
71.	<i>Honckenya peploides</i>	I 18	31/7	1 stem with 8 leaves
72.	<i>Mertensia maritima</i>	I 18	31/7	5 leaves
73.	<i>Honckenya peploides</i>	I 18	31/7	1 stem with 10 leaves
74.	<i>Honckenya peploides</i>	E 12	31/7	1 stem with 10 leaves
75.	<i>Honckenya peploides</i>	B 13	14/8	1 stem with 10 leaves and 2 cotyledons
76.	<i>Honckenya peploides</i>	E 13	14/8	1 stem with 5 leaves
77.	<i>Honckenya peploides</i>	E 13	14/8	1 stem with 6 leaves and 2 cotyledons
78.	<i>Honckenya peploides</i>	G 16	14/8	1 stem with 6 leaves
79.	<i>Honckenya peploides</i>	I 18	14/8	2 branches with 4 leaves and 1 cotyledon
80.	<i>Honckenya peploides</i>	I 18	14/8	1 stem with 12 leaves
81.	<i>Honckenya peploides</i>	L 17	14/8	1 stem with 20 leaves
82.	<i>Honckenya peploides</i>	K 17	14/8	1 stem with 12 leaves
83.	<i>Honckenya peploides</i>	K 17	14/8	1 stem with 14 leaves
84.	<i>Honckenya peploides</i>	K 17	14/8	1 stem with 8 leaves
85.	<i>Honckenya peploides</i>	K 18	14/8	1 stem with 8 leaves
86.	<i>Honckenya peploides</i>	K 18	14/8	1 stem with 6 leaves
87.	<i>Honckenya peploides</i>	K 17	14/8	1 stem with 12 leaves
88.	<i>Mertensia maritima</i>	K 17	14/8	4 leaves
89.	<i>Honckenya peploides</i>	K 18	14/8	1 stem with 13 leaves
90.	<i>Honckenya peploides</i>	K 18	14/8	1 stem with 4 leaves
91.	<i>Honckenya peploides</i>	F 16	14/8	2 branches with 8 leaves
92.	<i>Mertensia maritima</i>	I 18	14/8	7 leaves
93.	<i>Mertensia maritima</i>	I 18	14/8	4 leaves
94.	<i>Honckenya peploides</i>	F 15	14/8	1 stem with 16 leaves
95.	<i>Honckenya peploides</i>	F 15	14/8	4 branches with 29 leaves
96.	<i>Honckenya peploides</i>	E 14	14/8	1 stem with 6 leaves
97.	<i>Elymus arenarius</i>	I 18	28/8	3 leaves
98.	<i>Honckenya peploides</i>	E 12	28/8	1 stem with 4 leaves
99.	<i>Honckenya peploides</i>	E 12	28/8	1 stem with 6 leaves
100.	<i>Honckenya peploides</i>	E 13	28/8	1 stem with 6 leaves
101.	<i>Honckenya peploides</i>	G 16	28/8	3 branches with 28 leaves
102.	<i>Honckenya peploides</i>	G 16	28/8	1 stem with 10 leaves
103.	<i>Honckenya peploides</i>	G 16	28/8	1 stem with 8 leaves
104.	<i>Elymus arenarius</i>	E 13	29/8	1 leaf
105.	<i>Honckenya peploides</i>	E 13	29/8	Cotyledonous
106.	<i>Honckenya peploides</i>	L 18	29/8	1 stem with 4 leaves
107.	<i>Elymus arenarius</i>	G 16	29/8	1 leaf
108.	<i>Honckenya peploides</i>	D 14	29/8	1 stem with 16 leaves
109.	<i>Honckenya peploides</i>	D 14	29/8	1 stem with 12 leaves
110.	<i>Honckenya peploides</i>	D 14	29/8	1 stem with 6 leaves
111.	<i>Honckenya peploides</i>	D 12	29/8	1 stem with 6 leaves
112.	<i>Honckenya peploides</i>	D 12	29/8	1 stem with 6 leaves
113.	<i>Honckenya peploides</i>	E 14	29/8	1 stem with 8 leaves
114.	<i>Honckenya peploides</i>	E 14	29/8	1 stem with 4 leaves

been found growing on the island. These are all perennial species common on the coasts of Iceland.

The location of growth was, as in previous years, the coastal area on the northeastern shore of Surtsey where in fact the beach is becoming rather favourable to plant colonization due to the organic material washed up from the sea that is decomposing and mixing with the sand.

The majority of the individual plants grew from seeds that apparently were washed up by the tides, as a number of plants were found growing in line at the high-tide mark. One plant of *Elymus arenarius*, in quadrat F15, however, overwintered. The distribution of plants differed from last year's in the fact that more plants were found on the lava areas, which have partly been covered with drifting sand. Thus the fixed quadrat K18 which was bare in 1967 now had a colony of 18 *Honckenya* plants.

It is noteworthy that no *Cakile* plants were found in 1968. *Cakile edentula* was the first vascular plant to colonize Surtsey and in 1967 it flowered and bore matured seed. The species, which is an annual, thus had an advantage over others in having multiplied locally. However, none of the local seeds and no new seed succeeded in growing in 1968. On the other hand, plants of *Honckenya peploides* completely dominated the colony of 1968. The first plant was observed growing from seed June 8th, and new seedlings kept on showing up till middle of August. These young plants remained rather small and did not

develop any flowers. Of the six *Elymus* individuals found, the plant that overwintered in F15 developed to form nine leaves. Others apparently grew from seed and remained smaller. None of the four *Mertensia* plants reached beyond the seedling stage.

MOSSES RECORDED ON SURTSEY 1968

On the accompanying map are also shown the locations of mosses discovered on Surtsey in 1968. These were identified by Bergthór Jóhannsson, of the Museum of Natural History, Reykjavík:

Species:	Location:
<i>Leptobryum piriforme</i> (Hedw.) Wils	By lava crater
<i>Pohlia bulbifera</i> (Warnst.) Warnst.	By lava crater
<i>Bryum argenteum</i> Hedw.	Edge of new lava and lava crater
<i>Funaria hygrometrica</i> Hedw.	—
<i>Ceratodon purpureus</i> (Hedw.) Brid.	On lava along w. <i>Bryum</i>

No lichens have as yet been found growing on the island.

ACKNOWLEDGEMENTS

The work on which this paper is based was sponsored by the Surtsey Research Society with a grant from the U.S. Atomic Energy Commission, Environmental Branch, under contract No. AT (30-1)-3549.

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- Fridriksson, S. and Johnsen, B. 1968: The Colonization of Vascular Plants on Surtsey in 1967. Surtsey Research Progress Report IV, pp. 31-38.