

BIOLOGY

Moss on Surtsey, Summer 1969

By

ÁGÚST H. BJARNASON and
STURLA FRIDRIKSSON*

* The Agricultural Research Institute, Reykjavík, Iceland

It was first in the middle of August 1969 that moss really became conspicuous on Surtsey. During the first part of the summer some small moss patches were admittedly to be seen, but about and after mid-August large areas became covered with it. It is possible that the frequent rains caused this enormous increase in development.

The following moss species were found on Surtsey. These were analysed by Bergthór Jóhannsson.

- 1) *Bryum argentum*
- 2) *Bryum caespiticium*
- 3) *Bryum capillare*
- 4) *Funaria hygrometrica*
- 5) *Leptobryum pyriforme*
- 6) *Pogonatum urnigerum*
- 7) *Racomitrium canescens*.

The areas in which moss was found were in the following quadrats:

1) *HI 7-10 and J 10* — This area is on the slopes of the crater Surtur II. In the lava round the crater there is still an emission of heat and steam. Most of the lava, or about 80%, is sand-covered, and there the moss is most abundant. It grows there in many places in large patches with a cover of about 40–50%. On the lava slopes of the outer side of the crater the moss is scanty and the cover very small. There one specimen of *Pogonatum urnigerum* was discovered.

2) *MN 13 — OPQ 12-14* — Area stretching from the crater Surtur I for about 500 m in a SSE direction. This part of the lava is not sand covered except in small caverns and hollows. Some moss grows on the lava but especially in the sand hollows. Although it is widespread, it nowhere

forms patches bigger than the palm of the hand. The total cover is less than 5%. There is a slight emission of heat and steam in that part of the lava. This however does not always effect the distribution of the moss. Some of the *Funaria hygrometrica* which grew there had spore capsules.

3) *M 3* — In this quadrat *Funaria hygrometrica* was growing on the sand, forming a patch of about 15x15 cm. There is no heat in the area.

4) *H 13-14* — Moss was found growing in and near the Strompur lava crater and near a small emission hole up on Vestri Bunki. Where the moss was found growing the craters are very sandy and there is great emission of heat and steam.

5) and 6) *J 13-K and K 12* — In this area the mosses grow in sandy craters on the slope north of Surtur I. There is great emission of heat and steam up through the lava and the moss is found mainly on ground over which the steam drifts. The cover is about 5–10%.

7) *KL 15* — In these quadrats the moss grows in the sand almost exclusively in small caverns. This place is close to one of the plastic containers set up for trapping fresh-water microorganisms, around which some algae are growing as well as four plants of *Cochlearia officinalis*. It is probable that the moss is in this particular place because of these unnatural moisture conditions. There is no emission of heat or steam. The cover in the caverns is in many places 5–10%.

8) *L 12* — This quadrat is on the cinder slopes of Surtur I. The moss grows in isolated patches over much of the lava, but the cover is nowhere extensive. Although there is heat and steam emission very nearby, it in all probability has no effect on the moss in this quadrat.

It is clear from this survey that the moss growth areas may be divided into the following classes:

A) *Bare lava*, where there is *no* effect from heat and steam emission. Hitherto, the moss has nowhere formed large or dense areas of growth in this substrate (e.g., L 12 and MN 13 — OPQ 12—14).

B) *Bare lava*, where there *is* an effect from heat and steam emission. In this substrate the temperature does not seem to effect the distribution of moss (e.g. H 13—14).

C) *Lava hollows and caverns*, in which the sand has accumulated but where the lava is otherwise relatively bare. In this substrate there is no heat or steam emission and no movement of sand where moisture is most abundant. The areas grown by moss are small and scattered. On the whole, the total cover is small.

D) *Sandy lava*, where there is much heat and

steam emission. It is here that the moss zones are most extensive and the cover densest (e.g., HI 7—10, J 10, and H 13—14).

It is almost impossible to describe the distribution of each individual species. The most common is *Funaria hygrometrica*, which grows almost everywhere. Then come *Bryum argenteum* and *Leptobryum pyriforme*. *Racomitrium canescens* is not very common and only found on bare lava. *Pogonatum urnigerum* was found only in one place in the middle of the cinder slopes of Surtur II.

Moss is most common in areas where there is heat and steam emission. The vapour stabilizes the sand and keeps a constant moisture in the substrate. It is thus far more probable that the moisture in the steam has a much bigger effect than the heat.