

On the Vegetation of the Outer
Westman Isles, 1966

by

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Introduction

About the middle of July Björn Johnsen and Thorbjörn Broddason visited the Westman Isles on behalf of the biological section of the Surtsey Research Society, under the supervision of Dr. Sturla Fridriksson, to continue the research started in 1965 on the vegetation of these islands. Ten islands and skerries were visited in the period 16/7 - 9/8 1966. On this occasion it proved much easier to travel to the outer islands than in the previous year. The weather was rather unfavorable at the start of the research period, but improved as time went on.

Method of research

The object of the expedition was to continue investigations of the vegetation of the outer islands of the Westman Islands group, begun in the summer of 1965. An examination of the vegetation of individual islands was undertaken, with a detailed study of the number of species, their distribution and associations. In this connection emphasis was laid on the ecological studies. Plant distribution was measured by two methods. Most frequently used was the point-measurement method for the estimation of coverage of species as given in percentage terms. Secondly, frequency measurements were carried out as described by Raunkær (1907). According to the latter measurement species of plants within a circle of 0.1 square metre in area are recorded. Plant distribution in 25-40 circles was investigated, the centre of each circle being determined by throwing a marker at random. The percentage of each species is then estimated by taking those occurring in all circles as 100% and other according to the number of circles in which they are found. These measurements

were undertaken with a special view to compare with the observations made previously by B. Johnsen og Bjarnarey and Heimaey (1937).

An account will now be given of the plant communities of the outer islands, beginning with the largest island and ending with the smallest. The vegetation has previously been grouped in four associations (Fridriksson & Johnsen, 1966).

Plant Distribution of the Islands

Ellidaey

Ellidaey has an area of about 0.46 sq.km., is somewhat low-lying, but slopes steeply to the sea. In the centre of the island there is a sizeable crater, Bunki, which is covered with vegetation, and on either side of it there are small level spaces or hollows. Dry meadowland predominates on the island, with a puffin colony on the seaward slopes.

The dominant species of the meadowland of Ellidaey was Agrostis tenuis, average 62%, with associated species Festuca rubra 26% and Poa pratensis 12%, see Table II, E 1 and E 2. Stellaria media was also present, although it did not occur in the measurements. It was not noticed during the observations of the previous year. In the puffin colony the dominant species was Festuca rubra, 74%, with associated species Stellaria media 14.5% and Poa pratensis 4%, see Table II, E 3 and E 5. In the measurement E 4, which was taken up on the crater rim, on the outskirts of a puffin colony, Poa pratensis was the dominant species, with 45% coverage, associated species Stellaria media 30%, Festuca rubra 15% and Agrostis tenuis 7.5%. We are concerned here with a marginal strip between puffin colony and dry meadowland proper which occurs frequently. The Agrostis does not grow in the puffin colony, but according to the Raunkær frequency-measurement the Poa appears even more prevalent here

than the point-measurement indicates, see Table III, Ellidaey 2 and 3. On Ellidaey only 22 species of vascular plants have been found (see Table I), which is a rather low number in relation to the size of the island. No moist spots occur there, and this excludes some species that grow on other islands where such conditions occur. Ellidaey is the only one of the outer islands still used for grazing sheep, though most of the islands having vegetation were formerly used for this purpose.

Bjarnarey

Bjarnarey is the second largest of the outer islands, excluding Surtsey, or nearly 0.32 sq.km., and is the highest, about 164 metres, surrounded by cliffs on all sides except the north-east, where landing is easiest. In the centre of the island there is a grass-grown crater with a bowl-shaped depression at its summit. Round it there is some level ground, but otherwise slopes that descend right to the cliff's edge. Dry meadowland dominates on the island but there is also a substantial area grown with puffin colony vegetation on the slopes. Coastal cliff vegetation occurs only at the above mentioned landing place, with sparse growths of *Puccinella* and *Cochlearia*. On the shelf Hvannahilla (Angelica Shelf) there is a special plant community defined by B.J. in 1937. This will be described later.

The flora of Bjarnarey is the richest in plant species of the outer islands. 30 species of vascular plants have been found there, five not occurring on the other islands: *Anthoxanthum odoratum*, *Galium verum*, *Lusula multiflora*, *Potentilla anserina* and *Equisedum arvense*. These all grow in a relatively small area on dry meadowland on the south side of the crater a place well sheltered from salt water spray, which might inhibit their distribution elsewhere. On Bjarnarey 8 point-measurements were taken in all, see Table II. Raunkær frequency-measurements were also made for comparison with the results obtained by B.J. 33 years earlier. The dominant species of the dry meadowland were *Agrostis tenuis*, with about 40% coverage, *Festuca rubra* 37%,

and Poa pratensis 20% on the average. Associated species covered 3%, see Table II, B 1, 2 and 4. Agrostis tenuis appeared to increase in frequency with increased distance from the puffin colony being most abundant where the soil was poorest, which agrees with observations on Ellidaey.

In Table III the results of the 1966 measurements are compared with those of B.J. performed in 1933, showing that there has been little change in the composition of associations during the period. It appears, however, that there has been one change in the dry meadowland inasmuch as Cerastium and Euphrasia have almost disappeared and been replaced by Anthoxanthum. This latter species may have been present before, though not occurring in the 1933 measurements owing to its limited extent. Stellaria observed in 1933 is still present, though not occurring in the present measurements of the area. This change in the flora can be explained by the fact that annual species are generally subject to substantial fluctuations from one year to the next.

There is a large puffin colony on Bjarnarey. The results of point-measurements 3, 5 and 6 in Table II show that the dominant species of the puffin colony is Festuca rubra with about 58% coverage, associated species being Stellaria media 20% average, and Poa pratensis 11% average. The poa is found especially on the fringes of the puffin colony, forming there a kind of marginal strip, as on Ellidaey. Agrostis tenuis grows similarly to some extent on the outskirts of the puffin colony, or about 3%. Other species growing in the puffin colony and covering about 6% in all are: Rumex acetosa, Ranunculus acris and Cerastium caespitosum. In the puffin colony it seems that Cerastium and Poa trivialis have given way to Ranunculus and Rumex since measured in 1933. Two years before our present observation, the grazing of sheep on the island ceased, and this has undoubtedly had some effect on the composition of vegetation. As there have been no sheep present for the last two years to hold the extensive growth of grass in check, the wilted grass accumulated to a still greater extent than before without any appreciable decomposition and

forms a thick organic layer. Underneath this mat the sward may be stifled. Patches of decaying vegetation are thus to be seen in a number of places.

To throw further light on the production of individual plant communities on Bjarnarey, the yield was sampled by three cuttings. Samples taken from the puffin colony gave a yield of 4,700 kg and 4,900 kg per hectare. A sample taken from the dry meadowland gave substantially less, e.g. 2,700 kg. The two former samples were fully comparable with the yield given by cultivated land under regular application of fertilizers.

At Hvannhilla on the northern side of the island the third association is to be found, the Angelica clusters. This area is rather easily reached from the sea, but in general it is difficult to reach such associations which are situated on shelves and in niches on the cliff face. Hvannhilla slopes diagonally up the rock from the sea. At its lower extremity there is little vegetation; then comes a grass slope with a composition similar to that of the puffin colony, see Table II, B 7. The Angelica cluster is at the top of the incline and extending down by the cliff for a short distance. This covers an area of 420 sq.m. The dominant species, Archangelica officinalis was extremely luxuriant, about 120 cm. high and with a coverage of 51%. Its associated species, consisted of Matricaria maritima 12% and Stellaria media 14% which are the undergrowth and Festuca rubra 3%, which grows on the margins, while bare patches measured 10%, see Table II, B 8. The soil of the Angelica clusters was somewhat gravelly and fairly wet, for water drips constantly down the rock. Fulmars frequent this area in particular, supplying natural fertilizer. The Angelica clusters consequently could be named the fulmar colony vegetation. Raunkær frequency-measurements were taken here for comparison with those of B.J. of 33 years earlier, see Table III, B 3, '66, and B 1, '33. Here some changes in distribution seem to have taken place. Three species - Ranunculus acris, Sedum roseum and Cochlearia officinalis - have disappeared, and other associated species

become less frequent. Beside this, the Angelica appears to have thinned somewhat during the 33 years between measurement.

Alsey

Alsey is the third biggest island, or about 0.25 sq.km. It is very precipitous, surrounded by cliff on all sides except the northern. There is no level ground on the island except at its extreme summit, where there is a patch of dry meadowland. This is very small in extent. The dominating species of the dry meadowland are Festuca rubra 42%, Poa pratensis 37% and Agrostis tenuis 10%, see Table II, A 1 and 2. On the crest of the island, however, the Meadow Poa is dominant, see Table II, A 4, and there is a similarity in vegetation there to the marginal strip mentioned in connection with the larger islands. The puffin colony vegetation is the dominating association of the island. It is extremely homogeneous and three species are found there: Festuca rubra 78%, Matricaria maritima 5% and Stellaria media 5%, see Table II, A 3 and A 5. Bare patches measured 8% on the average and are most in evidence where the puffin nests are densest. There the associated species have the greatest ease in taking root. 25 species of vascular plant have been found on Alsey, see Table I, including one not found elsewhere on the outer islands: Saxifraga rivularis. This grows in the so-called Vatnsgil, together with Montia lamprosperma and Saxifraga caspitosa. As the name indicates, there is a small trickle of water in this place. The ratio of life forms and their geographical distribution is similar to that found on the larger islands, see Table IV.

Sudurey

Sudurey is the fourth in order of size: about 0.20 sq. km. in area. It is relatively high - 161 m - and surrounded by cliff

except on the southern side, where the only landing place is situated. This landing place faces the direction of the main breakers, making it extremely difficult to get ashore there. It rises in a steep slope that reaches to the summit of the island. At the bottom there is coastal cliff vegetation, reaching to a considerable height, or about 50 m. Above this comes the puffin colony, which extends all the way to the top. On the northern side of the summit ridge there is a steep bank of mixed dry meadowland with a gradient that becomes easier as it descends, giving way to the puffin colony. There is relatively little slope on the most northerly part of the island. Pure dry meadowland does not exist; only meadow-type margins to the puffin colony.

Point-measurement was taken on the steep slope below the summit. The dominant species of this marginal zone is Festuca rubra 58%, with associated species Poa pratensis 30% and Agrostis tenuis 10%, see Table II, S 2. In the year 1965 point-measurement taken at the most northerly part of the island, close to the cliff edge, showed Poa pratensis to be dominant with 53%, while Festuca rubra was 43%. The marginal strip is very distinct there.

The principal association on the island is the puffin colony where the dominant species is Festuca rubra 58% and associated species Stellaria media 32%, Poa pratensis 2.5% and Matricaria maritima 7.7%. In number of species Sudurey resembles Ellidaey, though not much more than half its size. 23 species of vascular plants have been found there. Some moist spots occur on the island, namely on the sloping marginal zone to the north. At this area are present almost all the species of vascular plants to be found on the island, in addition to several species of moss. The proportion of European species is higher than on the larger islands, see Table IV.

Brandur

The island has an obvious crater formation and is only 0.1 sq. km. in area. There is no level ground on it, only steep grass slopes and cliffs. The principal association is the puffin colony

vegetation. Its dominant species is Festuca rubra 60%, associated species Matricaria maritima 23% and Stellaria media 9%, see Table II, B 1 and 2. There is no appreciable dry meadowland on the island. Poa pratensis grows only on a patch of a few square metres on the crest of the island, about 27%. There is virtually no coastal cliff vegetation, but it is worth noting that there is a small skerry off the main island - actually a crater plug about 5 m high - where Armeria vulgaris grows in dense clusters, together with Cochlearia officinalis and Puccinella maritima. Armeria is comparatively rare in the coastal cliff vegetation of the outer islands. Altogether 11 species of vascular plants have been discovered on Brandur, see Table I.

Hellisey

This island is a small crater, about half of which has been eroded, so that the bowl is open on the south-western side facing the prevailing winds. Hellisey is only 0.1 sq. km. in area, precipitous on the northern and western sides, but with a steep coastal slope, corresponding to the inner wall of the crater bowl, to the south. The principal association is the coastal cliff vegetation, found scattered along the cliffs with plants such as Armeria vulgaris, Puccinella maritima, Atriplex patula, Cochlearia officinalis and Plantago maritima. Higher up on the island the puffin colony vegetation is found. Its dominant species was Festuca rubra, about 45% average, with associated species Matricaria maritima 16%, Atriplex patula 3.5% and Puccinella maritima 3%. Bare patches were extensive, or 33%, see Table II, H 1 and H 2. The puffin colony was completely honeycombed and much trodden by the birds. In many places the droppings had burned away all vegetation, especially where gannets had taken over parts of the puffin colony. It is worth noting that the Puccinella and Atriplex grow well on the edges of areas of droppings and appear to tolerate the high fertility level of the gannet colony even better than the Festuca. No dry meadowland occurs on the island. In all, 9 species of vascular plants have been found there, see Table I.

Súlnasker

Súlnasker is perpendicular on all sides, about 70 m high and 0.03 sq. km. in area. On top of the skerry there is a ridge with some level ground on the summit and slopes to either side of it.

Dry meadowland does not occur. The puffin colony covers most of the skerry, but there is coastal cliff vegetation in a belt below the colony. In several places there are large bare patches, where the gannets have colonized. The dominant species of the puffin colony vegetation is Festuca rubra, with associated species Stellaria media, Matricaria maritima and Cochlearia officinalis. The Festuca is fairly dense on the level ground at the summit, but sparser on the slopes, where the associated species are more in evidence. It may be noted that to the south of the central ridge rainwater collects in a small depression, on the edges of which Poa annua was growing. In the outer margins of the puffin colony and towards the gannet colony Puccinella maritima, Atriplex patula and Cochlearia officinalis were present.

In all, 7 species of vascular plants have been found on Súlnasker, see Table I.

Geirfuglasker

Geirfuglasker is sheer on all sides, about 58 m high and 0.02 sq. km. in area. The rock is for the most part level on top, with scattered vegetation which has clearly been considerably damaged by tephra from the Surtsey eruption. Before this the Puccinella seems to have formed continuous carpets of vegetation, but it was now smothered by the tephra. There was still some growth on higher points and at the cliff edge where the tephra had not been able to lodge. Altogether 4 species of vascular plants were found: Puccinella maritima, Atriplex patula, Cochlearia officinalis and Matricaria maritima. The last mentioned were in flower.

Thridrangar

This is a group of skerries to the north-west of the island of Heimaey. The highest of them, Vitadrangur, is about 40 m and rises sheer from the sea. Here two species of vascular plant have been found: Puccinella maritima and Cochlearia officinalis, though less than a hundred individual plants of each species.

Faxasker

Faxasker is to the north of Yztiklettur on Heimaey. It is rather low, not more than 10 m above sea-level and covered by the breakers in rough weather. There is a shelter for shipwrecked seamen on the rock, and also a light. Three species of vascular plants have been found there, though only a few individual plants of each: Cochlearia officinalis, Puccinella maritima and Stellaria media.

General remarks

A review of the distribution of grass species on the principal associations of the outer islands - the puffin colonies and dry meadowland - shows the dominant species of the former to be Festuca rubra, and of the latter, Agrostis tenuis. On the margins of the puffin colonies Poa pratensis is dominant, cf. Table II, E 4 and A 4.

How is the varying distribution of these species to be accounted for? Temperature, humidity and light seem to more or less the same in both types of associations. No quantitative analysis of the soil was performed, but from simple observation it is clear that the quantity of droppings in the two principal associations differs considerably. In the puffin colony, which the birds constantly frequent, the amount of droppings must be many times greater than that on the dry meadowland. In fact where the puffin nest are densest the growth has been destroyed by droppings. Judging by this the Festuca and its associated species

are the most manure tolerant. After these comes the *Poa*, which flourishes in the marginal zones, but the *Agrostis* is dominant in the dry meadowland where droppings are scantiest. This is especially evident on the largest of the islands, Ellidaey, where the dry meadowland is the most extensive. As the islands decrease in area, the amount of dry meadowland gets less and the proportion of the puffin colony vegetation to the whole increases, until it becomes the predominant association. On islands of medium size such as Alsey and Sudurey true dry meadowland disappears and a marginal strip takes its place, cf. Table II. Three factors are paramount in determining the extent of the puffin colony. First, there must be sufficient depth of soil for the birds to dig their burrows; second, there must be a view of the sea; third, there must be an adequate slope, for the puffin must be able to jump downwards in order to take flight. From this it will be seen that the puffin colony vegetation are to be found specially on the seaward slopes, while the dry meadowland occurs in the middle of the island where there is level ground, or in hollows and places where the soil is shallow.

As the islands become yet smaller, the extent of the puffin colony is reduced and coastal cliff vegetation takes over. This is owing to the increased effect of wind and sea, which makes the formation of top-soil more difficult. It is also clear that the number of species increases roughly in proportion to the area of the islands and the corresponding variety of growth conditions, see Table I. It must be mentioned, however, that number of species and composition of associations are also affected by micro climatic factors, such as humidity, shelter and exposure. The *Angelica* clusters constitute a localized association to the northern side of the islands, where the sun is least effective and there is sufficient moisture. The dominant species of this association is *Archangelica officinalis*, and arctic species that flourishes in low temperatures but demands a fairly large amount of moisture and a soil with a rather high fertility content. Sheep are very partial to the *Angelica* and keep it down wherever they can get to it. For this reason it is only found on cliff faces and in

clefts in the rock where it is hard to reach.

It can be regarded as certain that the grazing of sheep has had a material effect on the vegetation of the islands, both through the carrying of seeds and also by selective grazing through choice of fodder plants, for example the Angelica. With the single exception of Ellidaey, the islands are now no longer used for grazing, and this is bound to bring some changes. The areas of vegetation will tend to revert to their natural balance. Sheep, when grazing, consume part of the annual growth which would otherwise wilt. A great mass of wilted grass suffocates the living, resulting in bare patches as observed in Bjarnarey.

The complex dry meadowland association on Bjarnarey may be a result of special microclimatic factors such as the effect of shelter, conditions not existing elsewhere among the outer islands, or it may be a more advanced succession.

Differences between the islands in number of species and associations have been discussed above with reference to varying conditions of growth. It must, however, be borne in mind that the dispersal routes to individual islands vary in distance, and also that the period of time elapsed since the formation of individual islands in the group may vary considerably. Thus, Ellidaey is relatively poor in species in view of its size and proximity to the mainland, which might seem to indicate that it was of comparatively more recent formation. The dry meadowland of Ellidaey might be expected to be richer in variety of species than that of Bjarnarey, due to the size, and it is therefore possible that on Ellidaey the dry meadowland has not reached the same advancement in succession as that of Bjarnarey.

TABLE I

Floral list from
eleven islets of
the Westman Islands
group

Species

Life forms	Ellidaey	Bjarnarey	Alsey	Sudurey	Brandur	Hellisey	Súlnasker	Geirfuglasker	Thridrangar	Faxasker	Surtsey	
	0.46 km ²	0.32 km ²	0.25 km ²	0.20 km ²	0.10 km ²	0.13 km ²	0.04 km ²	0.02 km ²	0.01 km ²	0.01 km ²	2.5 km ²	
<i>Agrostis stolonifera</i>	H-E ₃	x	x	x	x							
<i>Agrostis tenuis</i>	H-E ₃	x	x	x	x							
<i>Archillea millefolium</i>	H-E ₃		x	x	x							
<i>Archangelica officinalis</i>	H-A ₂	x	x	x	x							
<i>Armeria vulgaris</i>	CH-A ₃	x	x			x	x					
<i>Anthoxanthum odoratum</i>	H-E ₃		x									
<i>Atriplex petula</i>	TH-E ₂			x	x	x	x	x				
<i>Cakile edentula</i>	TH										(x)	
<i>Cerastium caespitosum</i>	CH-E ₃	x	x	x	x	x						
<i>Cochlearia officinalis</i>	H-E ₄	x	x	x	x	x	x	x	x	x		
<i>Galium verum</i>	H-E ₁		x									
<i>Euphrasia frigida</i>	TH-A ₂	x	x		x							
<i>Equisetum arvense</i>	G-E ₂		x									
<i>Festuca rubra</i>	H-E ₄	x	x	x	x	x	x					
<i>Elymus arenarius</i>	G-E ₄										(x)	
<i>Leodonton autumnalis</i>	H-E ₃	x	x	x	x							
<i>Luzula multiflora</i>	H-E ₃		x									
<i>Matricaria maritima</i>	H-E ₃	x	x	x	x	x	x	x				
<i>Montia lamprosperma</i>	TH-E ₄		x	x	x							
<i>Plantago maritima</i>	H-E ₄	x	x	x	x	x	x					
<i>Poa annua</i>	TH-E ₃	x	x	x	x		x					
<i>Poa pratensis</i>	G-E ₃	x	x	x	x	x						
<i>Poa trivialis</i>	H-E ₂	x	x	x	x							
<i>Potentilla anserina</i>	H-E ₄		x									
<i>Puccinella maritima</i>	H-E ₃	x	x	x	x	x	x	x	x	x		
<i>Ranunculus acris</i>	H-E ₄	x	x	x	x							
<i>Ranunculus repens</i>	H-E ₄	x			x							
<i>Rumex acetosa</i>	H-E ₃	x	x	x								
<i>Sagina procumbens</i>	CH-E ₃	x	x	x	x							
<i>Saxifraga caespitosa</i>	CH-A ₃	x	x	x								
<i>Saxifraga rivularis</i>	H-A ₃			x								
<i>Sedum roseum</i>	H-A ₂	x	x	x								
<i>Silene maritima</i>	CH-A ₁	x	x	x	x	x						
<i>Stellaria media</i>	TH-E ₄	x	x	x	x	x	x			x		
<i>Taraxacum acromauris</i>	H-E ₂	x	x	x	x							
No. species per island		23	30	25	23	11	9	7	4	2	3	(2)

TABLE II

Point measurements
of associations from
six islands
(Average of 200 points)

Species	Life forms	BJARNAREY								ELLIDAEY					SUDUREY		ALSEY					BRANDUR		HELLISEY	
		1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	1	2	3	4	5	1	2	1	2
<i>Festuca rubra</i>	H-E ₄	D	D	P	D	P	P	A	A	D	D	P	D	P	P	D	D	D	P	D	P	P	P	P	P
<i>Agrostis tenuis</i>	H-E ₂	32.2	51.5	66.2	25.3	58.3	51.6	51.7	12.8	22.9	27.8	71.0	15.4	77.0	57.9	58.0	61.5	44.8	78.4	21.5	82.5	74.5	46.8	58.8	29.9
<i>Poa pratensis</i>	H-E ₃	42.8	27.8	7.4	51.6	1.1				63.7	60.8		7.5			10.0	10.7	18.7							
<i>Matricaria maritima</i>	H-E ₃	20.5	17.7	7.9	22.6	14.4	12.2	8.0		12.4	11.4	1.6	45.3	7.9	2.5	30.0	23.0	36.5		53.4					
<i>Stellaria media</i>	TH-E ₄		0.5	15.9		15.0	30.0	9.3	13.8	0.5		26.3	29.6	12.9	31.9	1.5			3.2		2.6	5.9	33.9	14.0	18.8
<i>Poa trivialis</i>	H-E ₂												1.7												
<i>Cerastium caespitosum</i>	CH-E ₃					1.6				0.5			0.5	1.1			0.5								
<i>Atriplex patula</i>	TH-E ₂																							6.2	1.0
<i>Cochlearia officinalis</i>	H-E ₄																							1.5	
<i>Anthoxanthum odoratum</i>	H-E ₃	2.8	1.5																						
<i>Taraxacum acromauris</i>	H-E ₂		0.5																						
<i>Rumex acetosa</i>	H-E ₃		0.5		0.5	8.5	2.1	18.4												1.5					
<i>Ranunculus acris</i>	H-E ₄					1.1	2.1																		
<i>Equisetum arvense</i>	G-E ₂	1.1																							
<i>Agrostis stolonifera</i>	H-E ₄							6.9												2.5					
<i>Puccinella maritima</i>	H-E ₃								0.5																4.5
<i>Archangelica officinalis</i>	H-A ₂							4.6	51.3																
<i>Sedum roseum</i>	K-A ₂							1.1																	
Bare patch		0.6		2.6			2.0		9.8			1.1		1.1		0.5	0.3		6.3		14.9	10.0	11.7	19.5	45.8
Total		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

D = Dry meadowland
P = Puffin colony-vegetation
A = Angelica cluster

TABLE III

Plant frequencies measured according to Raunkær's method in association on three islands

Species	Life forms	ELLIDAREY 1 1966 Dry meadowland	ELLIDAREY 2 1966 Puffin colony	ELLIDAREY 3 1966 Puffin colony	BJARNAREY 1 1966 Puffin colony	BJARNAREY 2 1966 Dry meadowland	BJARNAREY 6 1933 Dry meadowland	BJARNAREY 4 1933	BJARNAREY 3 1966 Angelica cluster	BJARNAREY 1 1933 Angelica cluster	SUDUREY 1 1966 Puffin colony	SUDUREY 2 1966 Dry meadowland
<i>Festuca rubra</i>	H-E4	100	100	100	100	100	100	100	17	100	100	100
<i>Poa pratensis</i>	G-E4	90	20	67	90	95	100	80			15	95
<i>Poa stolonifera</i>	H-E3											
<i>Agrostis tenuis</i>	H-E2	95			30	100	100	60				10
<i>Stellaria media</i>	TH-E4	19	100	92	90		100	100	68	100	85	10
<i>Poa trivialis</i>	H-E2	5				10	10	70				
<i>Cerastium caespitosum</i>	CH-E3	5		16			100	100				
<i>Matricaria maritima</i>	H-E3			8					28	80	40	15
<i>Ranunculus repens</i>	H-E4									20		
<i>Ranunculus acris</i>	H-E4				20							
<i>Rumex acetosa</i>	H-E3				10							
<i>Anthoxanthum odoratum</i>	H-E3					45						
<i>Equisedum arvense</i>	G-E4					30		10				
<i>Sedum roseum</i>	K-A2									10		
<i>Galium verum</i>	H-E1					30						
<i>Taraxacum acromauris</i>	H-E2						30					
<i>Euphrasia latifolia</i>	TH-A2						10					
<i>Puccinella maritima</i>	H-E3						40	10	11	70	1.0	
<i>Cochlearia officinalis</i>	H-E4									100		
<i>Archangelica officinalis</i>	H-A2								85			
<i>Montia rivularis</i>	TH-E4							60				5

TABLE IV Life forms and number of species from eleven
members of the Westman Islands.

Locations	No. sp.	A%	E%	CH	H	G	TH	HH
Heimaey	150	26	74	13.4	61.7	8	13.4	3.4
Ellidaey	23	26	74	17.0	65	5	13	
Bjarnarey	30	20	80	17.0	63	7	13	
Aley	25	20	80	12	68	4	16	
Sudurey	23	13	87	13	60	5	22	
Brandur	11	18	82	27	45	10	18	
Hellisey	9	10	90	11	55	11	22	
Súlnasker	7		100		60		40	
Geirfuglasker	4		100		75		25	
Thridrangar	2		100		100			
Faxasker	3		100		70		30	
The smaller is- lands, total	37	20	80	15.0	64	6.0	15.0	

References

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PRÍDRANGAR.

21°40'

21°20'

23°25'

23°25'

WESTMAN ISLANDS.



ELLIBAÆY.

BJARNAÆY.

HEIMAÆY.

ÁLSEY.

BRANDUR
SUDUREY.

STÓRHÖFÐI.

HELLISEY.

GELDUNGUR.

SÚLNASKER.

GEIRFUGLASKER.



SURTSEY.

23°20'

23°20'

21°40'

21°20'

1 = 100000.

