
H17

Calluna vulgaris-*Arctostaphylos alpinus* heath

Synonymy

Arctostaphylos mat Crampton 1911; *Loiseleuria-Arc-tous* sociation Poore & McVean 1957; *Arctoeto-Callu-netum* McVean & Ratcliffe 1962, Prentice & Prentice 1975; *Alectorio-Callunetum vulgaris* (Birse & Robertson 1976) Birse 1980 *p.p.*; *Vaccinio-Ericetum cinereae* (Birse & Robertson 1976) Birse 1980 *p.p.*

Constant species

Arctostaphylos alpinus, *Calluna vulgaris*, *Deschampsia flexuosa*, *Huperzia selago*, *Racomitrium lanuginosum*, *Cladonia arbuscula*, *C. uncialis*.

Rare species

Arctostaphylos alpinus, *A. uva-ursi*, *Loiseleuria procum-bens*, *Cetraria norvegica*.

Physiognomy

Arctostaphylos alpinus occurs with some frequency and occasionally with local abundance in various kinds of dwarfed sub-shrub vegetation, but, through the heart of its range, it is most typical of this *Calluna vulgaris*-*A. alpinus* heath where it is a constant, though generally a subordinate one, in the woody mat. Characteristically here, this is very low, almost always less than a decimetre thick, sometimes just a couple of centimetres and often discontinuous with stretches of bare stones between. It is usually dominated by *Calluna*, the bushes stunted or flattened in the direction of the wind, with the much-contorted branches finely interlocked. *A. alpinus* almost always contributes less than 25% of the cover of the mat, but its prostrate stems can grow beneath the heather and they put up little branched sprigs with rather striking bright green reticulate leaves. *A. uva-ursi*, of generally similar growth habit though with evergreen foliage, also occurs very occasionally in small amounts.

One or other of the crowberries is also very frequent, though of only low to moderate cover, with the creeping stems ramifying among the mat: *Empetrum nigrum* ssp.

hermaphroditum is strongly preferential to the higher altitudes from which this kind of vegetation was first described, and ssp. *nigrum* largely confined to lower situations. *Loiseleuria procumbens*, another creeping evergreen Arctic-Alpine, is also characteristically found with ssp. *hermaphroditum* here, the *Calluna*-*A. alpinus* heath providing its major locus in the western part of its range. *Erica cinerea*, on the other hand, is a frequent companion of ssp. *nigrum* in lower-altitude stands of the community.

Vaccinium myrtillus occurs commonly throughout, but typically as sparse shoots, and *V. uliginosum* and *V. vitis-idaea* are only very occasionally found. *Salix herbacea* is sometimes seen as small scattered sprigs. *Juniperus communis* ssp. *nana* occurs in some stands, but the generally small contribution of this plant here helps distinguish this vegetation from the *Calluna*-*Juniperus* heath.

As with other dwarfed sub-shrub communities, few herbs occur frequently throughout the *Calluna*-*A. alpinus* heath and hardly ever does this element have any abundance. *Huperzia selago* is the commonest of the group and it is often accompanied at higher altitudes by *Diphasium alpinum*, *Carex bigelowii* and *Antennaria dioica*. *Deschampsia flexuosa* is also frequent throughout, though more so in lower situations where *Potentilla erecta*, *Scirpus cespitosus* and *Carex pilulifera* occur most commonly. *Carex panicea*, *Galium saxatile* and *Solidago virgaurea* can be found very occasionally throughout.

More conspicuous than these are the lichens which form a patchy mosaic growing among and over the sub-shrub mat, sometimes of considerable total cover. *Cladonia arbuscula* and *C. uncialis* are constant, the former often in abundance, and also characteristic, though strongly preferential to higher altitudes, are *Cetraria glauca*, *C. islandica*, *Cornicularia aculeata*, *Alectoria nigricans* and *Sphaerophorus globosus*. The rare *Cetraria norvegica* is a distinctive occasional and there is some-

times a little *Cladonia coccifera* growing on exposed humus with *Ochrolechia frigida* spreading over the vegetation mat. In contrast to the *Calluna*-*Racomitrium* heath, which has many species in common with this community and a generally similar geographical distribution, mosses are not of great variety or abundance. *Racomitrium lanuginosum* is constant though in small amounts and *Hypnum jutlandicum* becomes frequent at lower altitudes but, apart from these, there is just very occasional *Dicranum scoparium* and *Frullania tamarisci*.

Sub-communities

Loiseleuria procumbens-*Cetraria glauca* sub-community:

Loiseleuria-*Arctous* sociation Poore & McVean 1957; *Arctoeto-Callunetum* McVean & Ratcliffe 1962. In this more distinctive kind of *Calluna*-*A. alpinus* heath, mixtures of *Calluna* with subordinate *A. alpinus*, *Loiseleuria* and *E. nigrum* ssp. *hermaphroditum* make up the bulk of the mat with scattered shoots of *V. myrtillus*, occasional *V. vitis-idaea*, *Arctostaphylos uva-ursi*, *Juniperus communis* ssp. *nana* and *Salix herbacea*. *Carex bigelowii* and, less commonly, *Deschampsia flexuosa* occur as usually sparsely-distributed individuals with *Antennaria dioica*, *Diphasium alpinum* and, more occasionally, *Euphrasia frigida*, *Lotus corniculatus*, *Festuca vivipara* and *Pinguicula vulgaris* preferential.

Usually small patches of *Racomitrium lanuginosum* are frequent but very much more obvious here is the rich and extensive lichen flora with *Cladonia arbuscula*, *C. uncialis*, *Cetraria glauca*, *C. islandica*, *Alectoria nigricans* and *Sphaerophorus globosus* all very common, *Cladonia coccifera*, *C. pyxidata*, *C. bellidiflora*, *C. gracilis*, *Cetraria norvegica*, *Ochrolechia tartarea* and *O. frigida* occasional.

Empetrum nigrum ssp. *nigrum* sub-community: *Arctoeto-*

Callunetum Prentice & Prentice 1975; *Alectorio-Callunetum*, *Agrostis canina* ssp. *montana* subassociation Birse 1980 p.p.; *Vaccinio-Ericetum cinereae*, *Cladonia* subassociation Birse 1980 p.p. *Loiseleuria* is found occasionally in this sub-community but there is a noticeable shift away from this plant and *E. nigrum* ssp. *hermaphroditum* as associates in the sub-shrub mat to *E. nigrum* ssp. *nigrum* with *Erica cinerea* also quite common. But *Calluna* still dominates with *A. alpinus* maintaining its constant but usually low cover contribution and, though the mat can be a little thicker, the general appearance is still of very closely wind-pruned vegetation. *Vaccinium myrtillus* again occurs as sparse shoots and *A. uva-ursi* is occasional.

Carex bigelowii is less common here than in the other sub-community but *Deschampsia flexuosa* increases in frequency, *Potentilla erecta* is strongly preferential and

they are often accompanied by small amounts of *Scirpus cespitosus* and *Carex pilulifera* and more occasionally by *Nardus stricta* and *Agrostis canina* (mostly recorded as ssp. *montana*).

Lichens are not so varied or abundant in this sub-community but *Cladonia arbuscula* and *C. uncialis* remain very common and there is sometimes a little *Cornicularia aculeata* and *Alectoria nigricans* as well as the community occasional *Ochrolechia frigida* and *Cladonia coccifera*. *Hypnum jutlandicum* frequently joins *Racomitrium lanuginosum* and there are scarce records for such oceanic hepatics as *Diplophyllum albicans* and *Scapania gracilis*.

Habitat

The *Calluna*-*A. alpinus* heath is the typical climax sub-shrub vegetation of rather base-poor moder soils over very exposed ridges and crests at moderate to fairly high altitudes in the cold and humid climate of the mountains of north-west Scotland.

Compared with the *Calluna*-*Racomitrium* heath, the distribution of which is roughly similar to that of this community, the environmental demands of the *Calluna*-*A. alpinus* heath are a little more tightly drawn. Both are essentially vegetation types of the low-alpine zone (Poore & McVean 1957) in those parts of Scotland beyond the Great Glen, but the *Calluna*-*A. alpinus* heath is rather more strongly confined to higher ground and hence spread over not so great a geographical area. Thus, it can be found along the north Scottish coast and on Orkney at altitudes down to about 250 m or even less, but generally speaking stands are concentrated between 500 and 750 m, with some exceptional localities up to around 900 m. Absent from many of the lower-level spurs along the seaward edge of the north-west Highlands, the *Calluna*-*A. alpinus* heath is thus concentrated in the mountains between the Torridan hills to the west and Ben Wyvis in the north with a further cluster of sites through central Sutherland.

Throughout this geographical area, mean annual maxima are for the most part below 21 °C (Conolly & Dahl 1970), so this vegetation often takes *Calluna* to its altitudinal limit and up into the climatic zone where Arctic-Alpines like *A. alpinus*, *E. nigrum* ssp. *hermaphroditum*, *Loiseleuria* and *Carex bigelowii* and other montane plants such as *Antennaria dioica*, *Diphasium alpinum*, *Euphrasia frigida*, *Cetraria islandica*, *C. norvegica*, *Alectoria nigricans* and *Ochrolechia tartarea*, reflect the generally harsh conditions. These are the preferentials of the *Loiseleuria*-*Cetraria* sub-community which formed the core of early definitions of the *Calluna*-*A. alpinus* heath (Poore & McVean 1957, McVean & Ratcliffe 1962) and which is the most widespread form of this vegetation towards its upper altitudinal limits.

Compared with similar levels in the eastern Highlands, the winter climate through the range of the community is not so bitterly cold, so annual temperature fluctuations are somewhat reduced and the growing season a little longer. Even in the *Loiseleuria-Cetraria* sub-community, the presence of *Cetraria glauca* as a frequent member of the lichen mat presents a floristic contrast to the *Calluna-Cladonia* heath which is the characteristic dwarfed sub-shrub vegetation at similar altitudes in the more continental east. But, it is in the other sub-community that the influence of the more equable regional climate is best seen. Here are included essentially similar mats of *Calluna* and *A. alpinus* which take the distribution of the community below 500 m, where the mean annual maxima can rise above 21 °C (Conolly & Dahl 1970) and where February minima are not so low as in the mountainous heartland of the north-west of Scotland. In such situations, *E. nigrum* ssp. *nigrum* takes over as the typical crowberry, the more extreme Arctic-Alpines become increasingly sporadic, and such plants as *Erica cinerea*, *Scirpus cespitosus* and *Carex pilulifera* give a more oceanic or sub-montane look to the vegetation. It is here, too, that the bryophyte component makes its maximal contribution with *Hypnum jutlandicum* often joining *Racomitrium lanuginosum*, the community providing an occasional locus, too, for some Atlantic hepatics.

In such situations, where a milder regional climate is combined with very humid atmospheric conditions, the *Calluna-A. alpinus* heath most closely approaches the *Calluna-Racomitrium* heath, where such vascular associates are more uniformly common and where a carpet of bulky pleurocarpous mosses is usually very conspicuous. However, despite the fact that, through the range of the *Calluna-A. alpinus* heath, annual precipitation is usually over 1600 mm (*Climatological Atlas* 1952) with generally more than 180 wet days yr⁻¹ (Ratcliffe 1968), the balance of dominance among the cryptogams here is almost always with the lichens, as in the *Calluna-Cladonia* heath. The very marked local exposure to winds, even more severe here than in the *Calluna-Racomitrium* heath, probably plays a part in this, not only producing a stunted and pruned mat of sub-shrubs but also leading to increased evapo-transpiration with no prospects of shelter under winter snow. Even in its low-altitude stations, then, this community is essentially a lichen-heath rather than a moss-heath, characteristic of severely wind-blasted spurs and ridges, flat or gently-sloping, or steeper very exposed crests.

There is perhaps also some slight edaphic difference between the habitats of the *Calluna-A. alpinus* and *Calluna-Racomitrium* heaths. Again, here, the parent materials are generally very lime-poor though lithologically varied, including bedrocks and morainic debris of Torridonian sandstones and Cambrian quartzite to the

west, Moine schists through the central and eastern parts of the range, and, on Orkney, Devonian Old Red Sandstone. Typically, these weather to humic rankers, sometimes very fragmentarily disposed over fairly fine detritus with solifluctional disturbance, or occasionally more mature podzolised profiles. Superficial pH is still only 4–5 such that the flora is prevailingly calcifuge but the humus seems distinctly moder-like, so there is perhaps the same amelioration of extreme edaphic impoverishment as is found beneath heaths with *A. uvaurisi* in eastern Scotland.

In general, however, this is a very inhospitable environment and the harsh climatic conditions maintain the vegetation as a climax. The community may provide an occasional bite for sheep and deer, but this probably has little effect on the floristics or physiognomy. Burning, though, is very deleterious and may cause damage from which recovery is extremely slow or perhaps impossible where erosion of the exposed surface is initiated. This kind of heath may have been eliminated from many sites through its range, though it does not seem to have such a relic distribution as the *Calluna-Juniperus* heath.

Zonation and succession

The *Calluna-A. alpinus* heath is typically found with other kinds of sub-shrub vegetation, snow-bed communities, mires and montane sedge-heaths in zonations and mosaics which reflect variations in climate and soils with altitude and local topography and, towards its lower limits, the impact of treatments. With the geographical shift towards the more continental eastern parts of Scotland, there is a replacement of many of the elements in these more oceanic vegetation patterns.

The characteristic position of the *Calluna-A. alpinus* heath, occupying the most exposed situations in the low-alpine zone of the north-west Highlands, is well seen around Beinn Eighe (Ratcliffe 1977). There the community is found on windswept stony moraines on gentle mid-altitude slopes with, below, over the more sheltered drift-covered hillsides, a transition to the *Vaccinium-Rubus* heath or, on steeper sunless slopes with constantly high humidity, the *Calluna-Vaccinium-Sphagnum* heath. *Calluna* usually remains dominant in both these vegetation types and *E. nigrum* ssp. *hermaphroditum* continues as a constant but *Vaccinia*, particularly *V. myrtillus*, become more prominent and beneath the taller, more luxuriant canopy of sub-shrubs, there is a rich and extensive carpet of pleurocarpous mosses and Atlantic hepatics, especially in the *Calluna-Vaccinium-Sphagnum* heath which gives well-developed stands a strikingly different appearance.

In some places, as above Loch Maree, fragments of the *Pinus-Hylocomium* woodland give a clue as to the original forest cover of this zone of damp heather-moor

but usually the vegetational variety towards the submontane slopes is provided by transitions to *Scirpus-Erica* wet heath on moist peaty soils and then to *Scirpus-Eriophorum* mire on the low-level ombrogenous bogs. Direct zonations from the *Calluna-A. alpinus* heath to the *Scirpus-Erica* heath sometimes show considerable floristic continuity where *Calluna*, *Erica cinerea*, *Scirpus cespitosus* and *Racomitrium lanuginosum* run on with an abundance of lichens over the eroding margins of a peat mantle on stony morainic material.

In the north-west Highlands, the *Calluna-A. alpinus* heath overlaps altitudinally with the *Calluna-Juniperus* heath and, though this is now a much more local community, the two can sometimes be found in close proximity, as over the north-east slopes of Beinn Eighe, the latter tending to occur a little lower down the mountain sides and best developed on slopes with some shelter and shade. In both composition and physiognomy, the vegetation types are very close with *Calluna*, *E. nigrum* ssp. *hermaphroditum*, *A. alpinus* and *A. uva-ursi* all maintaining high frequency in a dwarfed sub-shrub cover, but *Juniperus communis* ssp. *nana* is scarce in the *Calluna-A. alpinus* heath and the distinctive hepatics of the juniper heath, *Pleurozia purpurea*, *Diplophyllum albicans* and *Frullania tamarisci* hardly ever occur in the more exposed situations at these altitudes.

The *Calluna-Juniperus* heath is a chionophobous community and in hollows among stretches of *Calluna-A. alpinus* heath where snow accumulates, there can be sharp transitions to *Nardus-Carex* vegetation of various kinds. This community can run on up into the mid-alpine zone where shelter is sufficient to allow a snow cover to remain but, very typically through the north-west Highlands, the *Calluna-A. alpinus* heath gives way over exposed rounded high-altitude spurs and summits to the *Carex-Racomitrium* heath, the characteristic moss-heath and fell-field vegetation of our cold oceanic mountains. Again, there can be some floristic continuity through *Racomitrium lanuginosum* and the lichens and *Carex bigelowii*, *Vaccinium myrtillus* and *Deschampsia flexuosa* and the physiognomic similarity of the communities is well seen where solifluction and wind erosion combine to fragment the cover of the heath into a mosaic of vegetation among stretches of bare morainic gravel. Typically, however, heather does not extend to the higher altitudes and, though *Loiseleuria* can occasionally be found, the summit vegetation is typically moss-dominated and often distributed over striking tracts of open ablation surfaces. In fact, over the rugged peaks of Beinn Eighe, the *Carex-Racomitrium* heath is not nearly so extensive in the zone above the *Calluna-A. alpinus* heath as on Beinn Lair in Letterewe, over the Fannich Hills, on the massive rounded tops of Beinn Dearg and, towards the north-western limit of the mainland range of the community, on Ben Klibreck. On the last site, too,

can be seen an alternative transition over high-altitude plateau to *Calluna-Eriophorum* blanket mire.

Throughout this main part of its range, though again more obviously on some of these other mountains than on Beinn Eighe, the *Calluna-A. alpinus* heath overlaps geographically and altitudinally with the closely-similar *Calluna-Racomitrium* heath. Sometimes, as along the seaboard of the north-west Highlands, where broad exposed spurs extend down to relatively low altitudes, it is this latter community that is predominant, with the *Calluna-A. alpinus* heath prevailing with the shift into the higher, mountainous heartland. But, as in the Letterewe Hills and Beinn Dearg and also on Hoy in Orkney, the two can occur contiguously, the moss-heath perhaps occupying the somewhat less sheltered situations with mor soils but sometimes showing no apparent habitat preference. Towards the eastern margin of the range of the *Calluna-A. alpinus* heath there is a further complication in that the geographical ranges of the western heaths overlap there with that of the *Calluna-Cladonia* heath. On Ben Wyvis and Ben Klibreck, for example, the latter occurs in mosaics with the *Calluna-A. alpinus* heath, the distribution of the alpine bearberry often effectively serving to distinguish the two.

All these three dwarfed sub-shrub heaths are climatic climax communities but they are often contiguous below with vegetation markedly influenced by treatments, particularly the burning and grazing associated with hill-pasturing. The *Calluna-A. alpinus* heath thus sometimes gives way below, or towards its lower altitudinal limits is surrounded by plagioclimax *Nardo-Galion* swards, such as the *Festuca-Agrostis-Galium* or *Nardus-Galium* grasslands, in which sub-shrubs may survive patchily but where dominance lies with the grasses and dicotyledons which make but an occasional appearance here.

Distribution

The *Calluna-A. alpinus* heath is confined to northern Scotland where the *Loiseleuria-Cetraria* sub-community is widespread and local through the north-west Highlands, with the *Empetrum* sub-community extending the range to lower altitudes along the northern Scottish coast and Orkney.

Affinities

Poore & McVean (1957) provided the first detailed diagnosis of this kind of vegetation, known previously just from Crampton's (1911) account of Caithness: McVean & Ratcliffe's (1962) *Arctoeto-Callunetum* included essentially the same assemblage and is largely preserved here as the more typical and widespread *Loiseleuria-Cetraria* sub-community. But it also seems sensible to include with this the kinds of heather-bearberry mats described from lower altitudes by

Prentice & Prentice (1975) and Birse (1980): this dilutes somewhat the floristic definition provided in the early accounts but illuminates the transitions to the more oceanic *Calluna-Racomitrium* and *Calluno-Erica* heaths.

Both McVean & Ratcliffe (1962) and Prentice & Prentice (1975) saw their *Arctoeto-Callunetum* as belonging to the *Caricetea curvulae*, rather than the sub-

montane heaths, and a variety of dwarfed sub-shrub communities of generally similar type has been described from Scandinavia: the Dichte *Calluna*-Assoziation and *Cetraria nivalis*-*Alectoria ochroleuca*-reiche *Loiseleuria* Assoziation from Sylene (Nordhagen 1928) and the *Alectorio-Arctostaphyletum uvae-ursi* and *Cetrarietum nivalis typicum* of the Rondane (Dahl 1956).

Floristic table H17

	a	b	17
<i>Calluna vulgaris</i>	V (4–8)	V (5–10)	V (4–10)
<i>Arctostaphylos alpinus</i>	V (1–6)	V (1–6)	V (1–6)
<i>Racomitrium lanuginosum</i>	V (1–6)	V (1–5)	V (1–6)
<i>Cladonia uncialis</i>	V (1–4)	V (1–4)	V (1–4)
<i>Huperzia selago</i>	IV (1–3)	IV (1–3)	IV (1–3)
<i>Cladonia arbuscula</i>	IV (1–6)	IV (1–4)	IV (1–6)
<i>Deschampsia flexuosa</i>	III (1–3)	V (1–4)	IV (1–4)
<i>Loiseleuria procumbens</i>	V (1–6)	II (1–4)	III (1–6)
<i>Cornicularia aculeata</i>	IV (1–3)	II (1–3)	III (1–3)
<i>Alectoria nigricans</i>	IV (1–4)	II (1–4)	III (1–4)
<i>Carex bigelowii</i>	IV (1–4)	II (1–4)	III (1–4)
<i>Cetraria glauca</i>	V (1–4)	I (1)	III (1–4)
<i>Sphaerophorus globosus</i>	V (1–3)	I (1)	III (1–3)
<i>Cetraria islandica</i>	V (1–4)	I (1–3)	III (1–4)
<i>Empetrum nigrum hermaphroditum</i>	IV (1–5)		III (1–5)
<i>Antennaria dioica</i>	III (1–3)	I (1–3)	II (1–3)
<i>Diphasium alpinum</i>	III (1–3)		II (1–3)
<i>Festuca vivipara</i>	II (1–3)	I (1–4)	I (1–4)
<i>Cladonia gracilis</i>	II (1–3)	I (1)	I (1–3)
<i>Ochrolechia tartarea</i>	II (1–3)		I (1–3)
<i>Cladonia pyxidata</i>	II (1–3)		I (1–3)
<i>Euphrasia frigida</i>	II (1–3)		I (1–3)
<i>Cladonia bellidiflora</i>	II (1–3)		I (1–3)
<i>Cetraria norvegica</i>	II (1–3)		I (1–3)
<i>Lotus corniculatus</i>	II (1–3)		I (1–3)
<i>Juniperus communis nana</i>	II (1–4)		I (1–4)
<i>Vaccinium vitis-idaea</i>	II (1–3)		I (1–3)
<i>Pinguicula vulgaris</i>	II (1–3)		I (1–3)
<i>Juncus trifidus</i>	I (1–4)		I (1–4)
<i>Cladonia rangiferina</i>	I (1–4)		I (1–4)
<i>Hypnum jutlandicum</i>	I (1–3)	V (1–4)	III (1–4)
<i>Empetrum nigrum nigrum</i>	I (4)	IV (1–4)	III (1–4)
<i>Potentilla erecta</i>	I (1)	IV (1–3)	III (1–3)
<i>Scirpus cespitosus</i>	II (1–3)	III (1–4)	II (1–4)
<i>Erica cinerea</i>	I (1–3)	III (1–6)	II (1–6)
<i>Carex pilulifera</i>	I (1–3)	III (1–3)	II (1–3)
<i>Nardus stricta</i>	I (1)	II (1–3)	I (1–3)

<i>Agrostis canina</i>	I (1)	II (1–4)	I (1–4)
<i>Diplophyllum albicans</i>	I (1)	II (1–3)	I (1–3)
<i>Scapania gracilis</i>		I (1–3)	I (1–3)
<i>Vaccinium myrtillus</i>	III (1–3)	III (1–4)	III (1–4)
<i>Cladonia coccifera</i>	II (1–3)	II (1–4)	II (1–4)
<i>Salix herbacea</i>	II (1–3)	II (1–4)	II (1–4)
<i>Ochrolechia frigida</i>	II (1–9)	II (1–4)	II (1–9)
<i>Arctostaphylos uva-ursi</i>	II (1–3)	II (1–4)	II (1–4)
<i>Carex panicea</i>	II (1–4)	II (1–4)	II (1–4)
<i>Dicranum scoparium</i>	I (1–3)	I (1–3)	I (1–3)
<i>Hypogymnia physodes</i>	I (1–3)	I (1–3)	I (1–3)
<i>Galium saxatile</i>	I (1–2)	I (1–3)	I (1–3)
<i>Frullania tamarisci</i>	I (1–3)	I (1–3)	I (1–3)
<i>Vaccinium uliginosum</i>	I (1)	I (1–4)	I (1–4)
<i>Festuca ovina</i>	I (1–3)	I (1–3)	I (1–3)
<i>Solidago virgaurea</i>	I (1–3)	I (1–3)	I (1–3)
Number of samples	24	18	42
Number of species/sample	24 (9–31)	18 (10–24)	21 (9–31)
Vegetation height (cm)	3 (1–10)	6 (1–10)	5 (1–10)
Vegetation cover (%)	89 (50–100)	83 (50–90)	86 (50–100)
Altitude (m)	658 (518–890)	331 (185–490)	531 (185–890)
Slope (°)	3 (0–10)	5 (0–32)	5 (0–32)

a *Loiseleuria procumbens*-*Cetraria glauca* sub-community

b *Empetrum nigrum nigrum* sub-community

17 *Calluna vulgaris*-*Arctostaphylos alpinus* heath (total)

