

## *Vaccinium myrtillus*-*Rubus chamaemorus* heath

### Synonymy

*Vaccinio-Callunetum* Smith 1905 p.p.; *Vaccinium-Chamaepericlymenum* nodum Poore & McVean 1957 p.p.; *Vaccineto-Callunetum suecicosum* McVean & Ratcliffe 1962; *Vaccinietum chionophilum* McVean & Ratcliffe 1962 p.p.; Mountain *Vaccinium* heaths Gimingham 1972 p.p.; *Rubus chamaemorus-Vaccinium myrtillus* nodum Huntley & Birks 1979.

### Constant species

*Calluna vulgaris*, *Cornus suecica*, *Deschampsia flexuosa*, *Empetrum nigrum* ssp. *hermaphroditum*, *Rubus chamaemorus*, *Vaccinium myrtillus*, *V. vitis-idaea*, *Dicranum scoparium*, *Hylocomium splendens*, *Pleurozium schreberi*, *Rhytidiadelphus loreus*, *Sphagnum capillifolium*, *Cladonia arbuscula*.

### Rare species

*Lycopodium annotinum*, *Plagiochila carringtonii*, *Scapania ornithopodioides*.

### Physiognomy

Like the *Calluna-Vaccinium-Sphagnum* heath, the *Vaccinium myrtillus-Rubus chamaemorus* heath has a mixed cover of sub-shrubs over a moist carpet of bryophytes. However, the canopy here is generally somewhat less tall than in that community, mostly between 1 and 3 dm high, and *Calluna vulgaris* is not invariably the dominant: indeed, in one sub-community, it becomes quite patchy in its abundance, with *Vaccinium myrtillus* usually having greater cover. *Empetrum nigrum* ssp. *hermaphroditum* is also constant and locally sub- or co-dominant, *V. vitis-idaea* rather less frequent and almost always sparse. *V. uliginosum* occurs rarely, though it can be quite extensive. In contrast to the *Calluna-Vaccinium-Sphagnum* heath, *Erica cinerea* is not found in this community.

Other distinctive features can be seen among the vascular associates because, along with constant *Deschampsia flexuosa*, there is very frequently a little *Rubus*

*chamaemorus* and *Cornus suecica*, species which figure only occasionally in other montane heaths. *Eriophorum vaginatum* can sometimes be found, too, with local abundance in some stands, and there are records for *Potentilla erecta*, *Melampyrum pratense*, *Listera cordata*, *Juncus squarrosus* and *Nardus stricta*. *Galium saxatile*, *Carex bigelowii* and *Huperzia selago* are only occasional overall but show preferential frequency in the different sub-communities.

Bryophytes are always a conspicuous feature of the vegetation and in some stands are very abundant. *Dicranum scoparium* and the hypnaceous mosses, *Pleurozium schreberi*, *Hylocomium splendens* and *Rhytidiadelphus loreus*, provide the most consistent and often the most extensive element, although *Sphagna*, too, can have high cover, with *Sphagnum capillifolium* especially common, *S. quinquefarium* occasional, *S. subnitens*, *S. russowii* and *S. fuscum* more scarce, though locally abundant. More uneven in their occurrence are *Polytrichum commune*, *Plagiothecium undulatum*, *Hypnum cupressiforme* s.l., *Ptilidium ciliare* and *Racomitrium lanuginosum* and some broadly Atlantic hepatics such as *Anastrepta orcadensis*, *Bazzania tricrenata* and *Diplophyllum albicans*.

Lichens are typically less prominent although *Cladonia arbuscula* is constant and can show modest abundance, and *C. bellidiflora*, *C. uncialis*, *C. leucophaea* and *C. gracilis* become frequent in one sub-community.

### Sub-communities

#### *Polytrichum commune-Galium saxatile* sub-community:

*Vaccinium-Chamaepericlymenum* nodum Poore & McVean 1957 p.p.; *Vaccinietum chionophilum* McVean & Ratcliffe 1962 p.p. *V. myrtillus* is generally dominant in a low sub-shrub canopy, with *Calluna* and/or *E. nigrum* ssp. *hermaphroditum* sub-dominant, *V. vitis-idaea* fairly common but of low cover. *C. suecica* and *R. chamaemorus* are both more consistently frequent here than in the other sub-community though neither is

abundant. *D. flexuosa* is rather patchy in its cover, sometimes attaining local prominence, in other stands being very sparse and *Eriophorum vaginatum*, though only occasional, can have fairly high cover. *Galium saxatile* and *Blechnum* are preferentially common, though present just as scattered individuals.

Hypnaceous mosses, particularly *Hylocomium splendens* and *Rhytidiadelphus loreus*, are plentiful with *Sphagnum capillifolium* or occasionally *S. quinquefarium* patchily abundant. Apart from scattered *Cladonia arbuscula*, lichens are rare.

**Plagiothecium undulatum-Anastrepta orcadensis sub-community:** *Vaccineto-Callunetum suecicosum* McVean and Ratcliffe 1962; *Rubus chamaemorus-Vaccinium myrtillus* nodum Huntley & Birks 1979. *Calluna* is quite often a strong dominant in a taller canopy here with *E. nigrum* ssp. *hermaphroditum* occasionally abundant, *V. myrtillus* usually of low cover and *V. vitis-idaea* rather uneven in its occurrence. *C. suecica*, *R. chamaemorus* and *D. flexuosa* are all more patchy than in the *Polytrichum-Galium* sub-community and, though *E. vaginatum* can be found quite commonly, it is present as just sparse shoots. *Carex bigelowii* and *Huperzia selago* are preferential at low frequencies.

More striking, though, are the cryptogams. As before, both hypnaceous mosses and Sphagna can be prominent, but the former are enriched by frequent *H. cupressiforme* s.l., *Ptilidium ciliare*, *Racomitrium lanuginosum* and, particularly common, *Plagiothecium undulatum*, while among the Sphagna there can be found occasional, locally abundant, *S. subnitens*, *S. fuscum* and *S. russowii*. *Dicranum majus* and *Barbilophozia floerkii* are quite frequent and this vegetation provides a locus for a number of Atlantic hepatics, especially those of wider distribution such as *Diplophyllum albicans*, *Anastrepta orcadensis* and *Bazzania tricenata*, but also some of the rarer species like *Plagiochila carringtonii* and *Scapania ornithopodioides*.

Lichens are more numerous in this sub-community, too, with *Cladonia bellidiflora*, *C. uncialis*, *C. leucophaea*, *C. gracilis* and *C. impexa* occurring along with the constant *C. arbuscula*. Only exceptionally, however, do any of these occur with abundance.

### Habitat

The *Vaccinium-Rubus* heath is characteristic of wet, base-poor peats at moderate to high altitudes, where there is some protection against the extremes of dryness and winter cold by virtue of an oceanic climate or locally prolonged snow-lie. It is almost entirely confined to the Scottish Highlands, with a few outlying stands where conditions are locally suitable. It is a climax vegetation, although sometimes affected by grazing and burning where these treatments are applied to surrounding heaths.

Two climatic features above all favour the development of this kind of vegetation. First, this is a community of only moderately cold montane regions. It occurs generally in areas characterised by a cool summer, with almost all the stands falling within the 22°C mean annual maximum isotherm (Conolly & Dahl 1970), which takes in the bulk of the central and north-west Highlands. Within these areas, however, the *Vaccinium-Rubus* heath is generally confined to the sub-alpine zone (Poore & McVean 1957), most tracts being found between 500 and 800 m, with a mean in available samples of about 650 m and it is best developed where, for one reason or another, there is some shelter from bitter winter cold. Thus, although the Arctic-Alpine sub-shrubs *E. nigrum* ssp. *hermaphroditum* and *V. vitis-idaea* are well represented here and, indeed, the Arctic-Subarctic *R. chamaemorus* and *C. suecica* are particularly distinctive, *Calluna* is still potentially a vigorous plant at these altitudes (Gimingham 1960) and, among the bryophytes, it is hypnaceous mosses rather than *R. lanuginosum* which are generally predominant. This combination of floristic features is what gives the community its stamp.

Towards the north-west part of its range, the required amelioration of the winter conditions is provided by the generally oceanic character of the climate in this part of Scotland. Even at the moderately high levels attained by the *Vaccinium-Rubus* heath at its upper altitudinal limit in this region, winter minima are nothing like so low as in similarly exposed situations in the Central Highlands and frosts not so frequent, nor running so late into the spring (*Climatological Atlas* 1952, Page 1982). With the shift towards the south-eastern area of its distribution, however, the community becomes increasingly associated with the accumulation and persistence of winter snow, and thus more strongly limited to sheltered hollows, the lee sides of crests and ridges and particularly to shady north- and east-facing slopes, in which places it is essentially a vegetation type of early snowbeds (Poore & McVean 1957, McVean & Ratcliffe 1962).

Exactly the same features ensure that the second climatic requirement, for a moist soil and humid atmosphere, is met. In the north-west Highlands, the *Vaccinium-Rubus* heath experiences as much as 3200 mm rain annually (*Climatological Atlas* 1952), with often over 220 wet days yr<sup>-1</sup> (Ratcliffe 1968), such that the habitat is constantly damp, particularly over the cloudy upper reaches of the mountains, and even over those slopes which do not have a cooler, shadier aspect. In the Central Highlands, the climate is much drier, with sometimes less than half as much total precipitation and less than 180 wet days yr<sup>-1</sup> in places (Ratcliffe 1968), but a much greater proportion of this falls as snow, so its effect is concentrated, the lie and subsequent melt keeping the soil and vegetation protected from the effects of

evaporation and restricting the impact of any drought during the short summer.

The effects of these particular features of the habitat of the *Vaccinium-Rubus* heath throughout its range can be seen in the floristics and distribution of the two sub-communities. To the north-west, it is the *Plagiothecium-Anastrepta* sub-community that is the predominant form, with its less montane and more oceanic character. Here, the continuing predominance of a fairly tall cover of *Calluna* to these quite high altitudes, the great luxuriance of the hypnaceous moss carpet and the patchy occurrence of broadly Atlantic hepatics among some Arctic-Alpines and Arctic-Subarctic plants are clearly related to the humid and more equable conditions. To the south-east, this kind of vegetation can still be found quite widely through the Grampians and, way beyond that, at far-flung localities in the Moffat Hills and in the Hen Hole on The Cheviot, where it provides some of the most southerly stations for *C. suecica*, though, with increasing distance from the north-west Highlands, the sites are more concentrated on to shady, humid slopes. And, with that shift, there is a greater tendency for the *Vaccinium-Rubus* heath to develop the more chionophilous character of the *Polytrichum-Galium* sub-community, *Calluna* declining in vigour with the snow-lie and dominance generally passing to *V. myrtillus*, with a decrease in the diversity of hypnaceous mosses and a loss of the Atlantic hepatics. This kind of *Vaccinium-Rubus* heath is virtually limited to the Grampians with only fragmentary stands occurring north of the Great Glen, apart from on Ben Wyvis (McVean & Ratcliffe 1962).

Although high precipitation or flushing with melt-water maintains the soils beneath the community in a permanently moist condition, the drainage on the moderately steep slopes characteristic here is always free. The profiles are typically poorly developed, often consisting of just a layer of bryophyte or ericoid humus resting directly on blocky talus, derived from a variety of pervious bedrocks through the extensive range of this vegetation. Sometimes, deeper peats occur and there can be underlying pockets of leached mineral soil. But, though the *Vaccinium-Rubus* heath can approach ombrogenous mire vegetation in its composition, with *Eriophorum vaginatum* locally abundant and *Sphagna* conspicuous among the hypnaceous mosses, conditions are not such as to tip the balance towards the development of the *Calluna-Eriophorum* bog.

Climatic and edaphic factors maintain the *Vaccinium-Rubus* heath as a climax vegetation in most situations although, as Poore & McVean (1957) noted, at its lowest limits it falls within the altitudinal range of historical pine forest. Some stands may be lightly grazed, but burning is deleterious to the floristic richness of the community. Damp and shady conditions can protect against damage by fire and where surrounding drier heaths are burned, it is even possible that something like

the *Vaccinium-Rubus* heath can extend its cover. Such anthropogenic bilberry vegetation resulting from this treatment often lacks chionophilous plants like *C. suecica* and *Blechnum*, but it is hard to tell where the transition to it occurs.

### Zonation and succession

The *Vaccinium-Rubus* heath is a widespread but local element of the sub-alpine zone in altitudinal transitions throughout the central and north-west Highlands, grading below to sub-montane heaths and mires and passing above to low-alpine sub-shrub vegetation and lichen- or moss-heaths. The amount of local shelter and duration of snow-lie play an important part in determining the patterns at higher levels, and at lower altitudes treatments influence the zonations, though for the most part this vegetation can be considered a climax community.

The general context of the *Vaccinium-Rubus* heath throughout its range is among the middle reaches of the *Vaccinium-Deschampsia* heath, the major sub-shrub community of moist, base-poor soils at moderate to high altitudes through the cold and wet uplands. The two vegetation types come very close floristically and the former can be found as small patches in the latter or in more complex mosaics, the *Vaccinium-Rubus* heath picking out pockets of deeper, wetter peat on shadier slopes or where there is somewhat more prolonged snow-lie among the usually steeper and more rocky ground around (Figure 29). Species such as *Blechnum*, *Cornus suecica*, *Plagiothecium undulatum*, *Sphagnum capillifolium*, *S. quinquefarium* and *Barbilophozia floerkii* occasionally find a place in the *Hylocomium-Rhytidadelphus* sub-community of the *Vaccinium-Deschampsia* heath but their increase in the shift to the *Vaccinium-Rubus* heath, and the additional appearance of *Rubus chamaemorus*, is usually quite marked. In the north-west Highlands, where the *Plagiothecium-Anastrepta* sub-community is the usual representative of the *Vaccinium-Rubus* heath in such zonations, the pattern may be complicated by the occurrence also of the *Calluna-Vaccinium-Sphagnum* heath. In its general floristics, this community falls somewhere between the other two heath types, having an extensive carpet of hypnaceous mosses and *Sphagna*, but usually lacking *C. suecica* and *R. chamaemorus*, but additionally, where it occurs over the shadiest and most humid north- or east-facing slopes, it has the best representation of all these vegetation types of Atlantic hepatics which helps give it a very distinctive appearance among these mosaics.

In the north-west Highlands, these sub-alpine heaths often give way over the lower gently-sloping ground of the foothills, where the peats become thicker and less freely-drained, to mire vegetation, characteristically of the *Scirpus-Eriophorum* type at lower altitudes in this oceanic region. Frequently, there is an intervening zone of *Scirpus-Erica* wet heath, the *Vaccinium* sub-commun-

ity of which, with its increased representation of sub-shrubs and hypnaceous mosses, comes close in composition to the *Vaccinium-Rubus* heath. Patterns of this kind are especially typical of the lower slopes of Foinaven and Ben More Assynt, An Teallach and the Affric-Cannich Hills (McVean & Ratcliffe 1962).

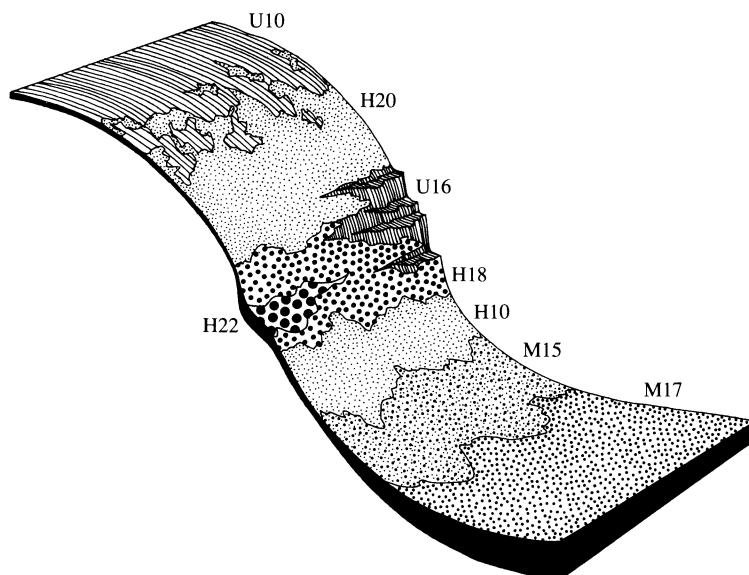
At higher altitudes in these parts of Scotland, the upward transition from the *Vaccinium-Rubus* heath is generally to sub-shrub vegetation in which *Racomitrium lanuginosum* plays an increasingly important part in the ground carpet. Over slopes that are not too exposed, the community usually passes above to the *Vaccinium-Racomitrium* heath, in some stands of which there is an especially marked continuation of the abundance of hypnaceous mosses characteristic of the *Vaccinium-Rubus* heath (the *Rhytidiadelphus-Hylocomium* sub-community), in others a local richness in Atlantic hepatics, where snow cover accentuates the shelter provided by shady aspect (the *Bazzania-Mylia* sub-community). Often, though, the decisive shift to dominance in the sub-shrub canopy of *V. myrtillus* and *E. nigrum* ssp. *hermaphroditum* in the *Vaccinium-Racomitrium* heath is accompanied by an associated vascular

and cryptogam flora characteristic of the high montane moss-heaths, so the floristic transition is a clear one, with plants such as *Carex bigelowii*, *Festuca ovina/vivipara*, *Diphasium alpinum* and *Polytrichum alpinum* all becoming very frequent among the *Racomitrium* carpet. Over more windswept brows above patches of *Vaccinium-Rubus* heath, provided these are not at too inhospitably montane an altitude, *Calluna* can continue its dominance in association with such an assemblage as this. Such *Calluna-Racomitrium* heath is typically blown clear of any winter snow and has a dwarfed and wind-trimmed mat of heather, presenting a very different appearance from the vegetation of more sheltered situations below. *Arctostaphylos uva-ursi* and *A. alpinus* sometimes figure in this kind of transition too, with the distinct *Calluna-A. alpinus* heath being separable at some sites. The upper slopes of Foinaven and Ben More Assynt are again classic sites for this kind of zonation, with more fragmentary examples being seen in the Monar Forest, on Beinn Eighe and the Fannich Hills.

With the geographical move towards the south-east part of the Scottish Highlands, where the *Polytrichum-Galium* sub-community becomes the more widespread kind of *Vaccinium-Rubus* heath, the more oceanic kinds of low-alpine moss-heaths are replaced almost entirely by analogous vegetation types in which there is a predominance of lichens associated with abundant heather or bilberry and crowberry. Complex intermediate kinds of zonation are to be seen on Ben Wyvis but, over the slopes of the Cairngorms and around Clova, in the heart of the Grampians, the shift in the vegetation types is complete, stands of *Vaccinium-Rubus* heath giving way to either the *Vaccinium-Cladonia* heath, over moderately sheltered and snow-bound slopes at higher

Figure 29. Transitions to chionophilous and tall-herb vegetation around snow-bed and crags in a heath/mire sequence in the north-west Scottish Highlands.

- H10 *Calluna-Erica* heath
- H18 *Vaccinium-Deschampsia* heath
- H20 *Vaccinium-Racomitrium* heath
- H22 *Vaccinium-Rubus* heath
- M15 *Scirpus-Erica* wet heath
- M17 *Scirpus-Eriophorum* mire
- U10 *Carex-Racomitrium* moss-heath
- U16 *Luzula-Vaccinium* tall-herb community





altitudes, with a decisive move to overwhelming lichen-dominance in the mat, or, where there is a stronger influence of bitter winds, to the *Calluna-Cladonia* heath, transitions to which can be a little more gradual. At lower altitudes, too, through the Central Highlands, the zonations tend to be different from those in the north-west, the sub-alpine belt of heaths passing over the foothills to *Calluna-Vaccinium* heath and/or *Calluna-A. uva-ursi* heath, both of these often treated as grouse-moor in this part of Scotland.

The other very important feature of the vegetation patterns in which the *Vaccinium-Rubus* heath is found relates to the influence of longer snow-lie in the sub-alpine zone, because here, and particularly in the Gram-pians, the community occurs as a mildly chionophilous vegetation type, marking out hollows or sheltered lee slopes or, where there is late persistence of snow, forming a surround to the bed. Typically, in the latter situations, it gives way under the deepest and longest snow cover, to some type of *Nardus-Carex* vegetation, the Typical or *Empetrum-Cetraria* sub-communities of which, with their patchy abundance of hypnaceous mosses beneath a sparse cover of bilberry, show some continuity with the *Vaccinium-Rubus* heath. Generally, however, the great increase in abundance of *Nardus* itself and/or of *C. bigelowii*, with the local prominence of *Scirpus cespitosus* and chionophilous mosses such as *Dicranum fuscescens* and *Kiaeria starkei*, serves to distinguish the central zone. Such patches, fringed above by a narrow arch of *Vaccinium-Deschampsia* heath and then, on the exposed upper lip, by a strip of *Calluna-Cladonia* heath, the whole embedded in a tract of *Calluna-Eriophorum* mire or low-alpine heath, are very characteristic of the Cairngorms (McVean & Ratcliffe 1962).

Even in such situations as these, there can be some influence on the vegetation pattern from grazing and

burning which McVean & Ratcliffe (1962) suggested might facilitate the expansion of patches of *Vaccinium-Rubus* heath into a fringe of species-poor anthropogenic bilberry vegetation. And at lower altitudes, certainly, such treatments can greatly modify the context in which the community is found, burning of the drier sub-shrub vegetation tending to encourage the development of a patchwork of heather-dominated and impoverished heath, grazing tending to eliminate ericoids and transform the cover into first, a grassy heath of the *Vaccinium-Deschampsia* type, and then a Nardo-Galion sward.

Distribution

The *Vaccinium-Rubus* heath is almost wholly confined to the central and north-west Highlands, with the *Polytrichum-Galium* sub-community being largely restricted to the former area, the *Plagiothecium-Anastrepta* sub-community very much better developed in the latter.

Affinities

The community as defined in this scheme brings together vegetation types which McVean & Ratcliffe (1962) described as distinct, though closely-related, noda, part of their *Vaccinetum chionophilum* forming the basis of the *Polytrichum-Galium* sub-community, and their *Vaccineto-Callunetum suecicosum* (essentially Poore & McVean's (1957) *Vaccinium-Chamaepericlymenum* nodum) being subsumed by the *Plagiothecium-Anastrepta* sub-community. This solution, which emphasises the presence in both vegetation types of the Arctic-Subarctic *R. chamaemorus* and *C. suecica*, together with occasional *E. vaginatum*, seems the preferable one and helps locate the *Vaccinium-Rubus* heath as a whole among the mildly chionophilous communities of what Nordhagen (1943) termed the Phyllodoco-Vaccinon myrtilli (McVean & Ratcliffe 1962).

Floristic table H22

	a	b	22
<i>Vaccinium myrtillus</i>	V (1-10)	V (1-6)	V (1-10)
<i>Empetrum nigrum hermaphroditum</i>	V (1-8)	V (1-8)	V (1-8)
<i>Sphagnum capillifolium</i>	V (1-4)	V (1-10)	V (1-10)
<i>Calluna vulgaris</i>	V (1-8)	V (6-10)	V (1-10)
<i>Pleurozium schreberi</i>	V (1-6)	V (1-4)	V (1-6)
<i>Hylocomium splendens</i>	V (4-5)	V (1-6)	V (1-6)
<i>Dicranum scoparium</i>	V (1-4)	V (1-4)	V (1-4)
<i>Rhytidiadelphus loreus</i>	V (1-6)	V (1-6)	V (1-6)
<i>Rubus chamaemorus</i>	V (1-3)	IV (1-3)	IV (1-3)
<i>Cornus suecica</i>	V (1-4)	III (1-4)	IV (1-4)
<i>Deschampsia flexuosa</i>	IV (1-6)	IV (1-4)	IV (1-6)

Floristic table H22 (*cont.*)

	a	b	22
<i>Vaccinium vitis-idaea</i>	IV (1–3)	IV (1–4)	IV (1–4)
<i>Cladonia arbuscula</i>	III (1–4)	IV (1–6)	IV (1–6)
<i>Polytrichum commune</i>	V (1–4)	II (1–2)	III (1–4)
<i>Galium saxatile</i>	IV (1–3)	I (1–3)	III (1–3)
<i>Blechnum spicant</i>	III (1–4)	I (1–2)	II (1–4)
<i>Carex echinata</i>	I (1–3)		I (1–3)
<i>Plagiothecium undulatum</i>	I (2–3)	V (1–3)	III (1–3)
<i>Ptilidium ciliare</i>	I (1–2)	IV (2)	III (1–2)
<i>Hypnum cupressiforme s.l.</i>	I (3)	IV (1–3)	III (1–3)
<i>Racomitrium lanuginosum</i>	I (2–3)	IV (2–4)	III (2–4)
<i>Anastrepta orcadensis</i>		IV (1–3)	II (1–3)
<i>Carex bigelowii</i>	I (2–3)	III (1)	II (1–3)
<i>Barbilophozia floerkii</i>	I (1–3)	III (1–3)	II (1–3)
<i>Cladonia bellidiflora</i>	I (1)	III (1–2)	II (1–2)
<i>Cladonia uncialis</i>	I (1)	III (1–2)	II (1–2)
<i>Cladonia leucophaea</i>	I (1)	III (1–3)	II (1–3)
<i>Cladonia impexa</i>	I (1)	III (2–3)	II (1–3)
<i>Cladonia gracilis</i>		III (1–2)	II (1–2)
<i>Huperzia selago</i>	I (1)	II (1)	I (1)
<i>Bazzania tricenata</i>		II (2–3)	I (2–3)
<i>Dicranum majus</i>		II (2)	I (2)
<i>Diplophyllum albicans</i>		II (1–2)	I (1–2)
<i>Polytrichum alpinum</i>		II (1)	I (1)
<i>Cornicularia aculeata</i>		II (1–3)	I (1–3)
<i>Cladonia coccifera</i>		II (1)	I (1)
<i>Sphagnum russowii</i>		II (2–3)	I (2–3)
<i>Lepidozia pearsonii</i>		II (1–3)	I (1–3)
<i>Eriophorum vaginatum</i>	II (4–6)	III (1–3)	II (1–6)
<i>Sphagnum quinquefarium</i>	II (1–6)	II (3–4)	II (1–6)
<i>Potentilla erecta</i>	II (1–3)	II (1–3)	II (1–3)
<i>Melampyrum pratense</i>	III (1–3)	II (1–2)	II (1–3)
<i>Listera cordata</i>	II (1–3)	I (1–3)	II (1–3)
<i>Juncus squarrosus</i>	II (1)	I (1)	II (1)
<i>Nardus stricta</i>	I (1–3)	II (2)	II (1–3)
<i>Sphagnum subnitens</i>	I (1–3)	I (1)	I (1–3)
<i>Dryopteris dilatata</i>	I (1–3)	I (1)	I (1–3)
<i>Scirpus cespitosus</i>	I (1)	I (1)	I (1)
<i>Vaccinium uliginosum</i>	I (4–7)	I (2–3)	I (2–7)
<i>Cryptogramma crispa</i>	I (1)	I (1)	I (1)
Number of samples	11	12	23
Number of species/sample	19 (17–23)	28 (20–35)	24 (17–35)
Vegetation height (cm)	13 (12–15)	30 (5–75)	26 (5–75)
Vegetation cover (%)	100	94 (60–100)	96 (60–100)

Altitude (m)	655 (457–833)	649 (442–850)	651 (442–850)
Slope (°)	16 (3–45)	22 (10–33)	20 (3–45)

- a *Polytrichum commune*-*Galium saxatile* sub-community  
b *Plagiothecium undulatum*-*Anastrepta orcadensis* sub-community  
22 *Vaccinium myrtillus*-*Rubus chamaemorus* heath (total)

