U9
Juncus trifidus-Racomitrium lanuginosum rush-heath

Synonymy
Rhacomitrium-Carex bigelowii heath, *Juncus trifidus-Salix herbacea* facies Poore & McVean 1957; *Juncetum trifidi scoticum* Ingram 1958 *p.p.*; *Cladineto-Juncetum trifidi* McVean & Ratcliffe 1962.

Constant species
Carex bigelowii, *Juncus trifidus*, *Racomitrium lanuginosum*.

Rare species
Loiseleuria procumbens, *Luzula arcuata*, *Cetraria delisei*.

Physiognomy
Juncus trifidus occurs in quite a wide variety of montane communities, sometimes with locally high cover, but it is in certain kinds of *Carex-Racomitrium* vegetation and particularly in this *Juncus-Racomitrium* rush-heath that it has the opportunity to play a more important role. Here, in contrast to the former moss-dominated heath, it is usually the most abundant plant, though both *Carex bigelowii* and *Racomitrium lanuginosum* occur frequently and, in more sheltered situations, the latter can be co-dominant.

In this respect, then, the community is defined more broadly than Ingram's (1958) *Juncetum trifidi*, where very open stands predominated. These do occur here, the cover then consisting of little more than widely-scattered rush plants over a virtual wilderness of stony ground and hardly relieving the greyish tone of the landscape. But, in this scheme, the *Juncus-Racomitrium* heath also takes in some denser patchworks of vegetation and bare gravel and virtually continuous swards; and, even in these last, *J. trifidus* generally gives a distinct stamp to the heath. It is a rhizomatous perennial, extending by monopodial branching and though, in more sheltered situations, it can spread as a loose turf with shoots over a decimetre tall, exposure to wind and erosion often induces particular growth forms and distinct mosaics of plants over patterned ground (Ingram 1958). Most striking is the ability of the rush to grow as a compact tussock, the tips of the rhizomes being repeatedly inturned by the wind to form a confined and contorted mass of branches up to 20 or 30 cm in diameter. It is such a habit that enables *J. trifidus* to survive in the mobile gravel of the high montane slopes where freeze-thaw, frost-heave and solifluction are prevalent, and to respond to environmental instability in some striking ways. Constant removal of gravel, for example, by wind and churning tends to make the tussocks grow raised and convex, exposing the dead middle parts even more to the cutting blast of the gales, such that they blow away to leave an annular or crescentic remnant. Conversely, where detritus is being deposited, the tussock margin rises as it spreads out, leaving a central depressed area and eventually coalescing with its neighbours to form an open reticulum of live rhizomes with sunken patches between. Then, over steeper ground, where *J. trifidus* is often an early coloniser of detritus newly exposed in talus slides, the slipping material tends to roll over the tussocks as they shift downslope.

The distribution of the rush plants, with their raised and sunken portions, sheltered and eroded sides, often has a controlling influence on the patterning among the associates in this vegetation, particularly in the more exposed reaches of its range, but a number of other plants in the community also develop a similar tussock habit. Most frequent among these, though not usually growing so large as *J. trifidus*, are *Deschampsia flexuosa* and *Festuca ovina* (often with obvious *F. vivipara*), the former apparently less resistant to erosion than the rush and more common at somewhat lower altitudes and on less gravelly ground, the latter extending higher and tending to replace *D. flexuosa* altogether towards the upper altitudinal limit of the heath. In some situations, where these grasses occur in this vegetation with such other tussock herbs as *Luzula spicata*, which is frequent here, and *Armeria maritima* and *Silene acaulis*, which are locally common, the *Juncus-Racomitrium* heath

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approaches what McVean & Ratcliffe (1962) called the *Juncus-Festuca* nodum. In this scheme, that predominantly north-western Scottish vegetation is subsumed within the *Carex-Racomitrium* heath, where *J. trifidus* can be quite abundant, though much less consistently than here and usually in the company of a variety of chionophobous cushion herbs. Other tussocky plants which can occur in the *Juncus-Racomitrium* heath are *Nardus stricta*, which is fairly frequent here, usually at low cover, and the rare Arctic-Subarctic *Luzula arcuata*, a more compact plant than *L. spicata* and of more restricted geographical and phytosociological range, being virtually confined to this kind of vegetation.

Some other common plants of the community are rhizomatous but, though these can occur with modest local abundance, they are nothing like so well able to tolerate the shifting gravels of the high exposed plateaus as is *J. trifidus* and are more prominent at lower altitudes or where there is some measure of shelter locally. *C. bigelowii* behaves in this way, as does *Vaccinium myrtillus*, the latter able to grow in the lee of boulders on the most open summits. *Salix herbacea* also tends to occur, with more frequent records for these two species in one particular kind of *Juncus-Racomitrium* heath which seems a little more chionophilous, tending towards the *Salix* + hepatic crust that Ingram (1958) described from the sunken centres of expanding rush tussocks where snow accumulated.

Other vascular associates are few in number and of occasional frequency only, especially in more exposed situations. Among other sub-shrubs, *Empetrum nigrum* ssp. *hermaphroditum*, *V. uliginosum* and *V. vitis-idaea* occur in more sheltered stands, often just as scattered stunted individuals, though thickening up and becoming rather more vigorous in transitions to heaths at lower altitudes, while the rare *Loiseleuria procumbens* can sometimes be found further into the open. Then, there can be sparse plants of *Alchemilla alpina*, *Galium saxatile*, *Huperzia selago*, *Diphasium alpinum*, *Agrostis capillaris* and *Carex pilulifera* growing in the shelter of the tussocks.

The most important moss in this vegetation is *R. lanuginosum*, though this can never grow extensively out in the open, being restricted to the lee of rocks and vascular plants, and becoming abundant only where there is more general shelter but no long accumulation of snow (McVean & Ratcliffe 1962). Less frequently, and not usually with any but sparse cover, *Dicranum fuscescens* and *Polytrichum alpinum* can be found, occasionally with some *Ptilidium ciliare* or *Pleurozium schreberi*, and *Polytrichum piliferum* growing on dead tangled rhizomes of the old rush tussocks. *Racomitrium heterostichum* and encrusting hepatics such as *Diplophyllum albicans* and *Gymnomitrion concinnatum*, which are typical of areas of late snow-lie, occur only infrequently, though they can sometimes be found within old tussock centres which have sunk down and hold snow a little longer than is usual.

With the *R. lanuginosum*, it is various lichens that are the most obvious component of the often patchy ground carpet, particularly in the kind of *Juncus-Racomitrium* heath on which McVean & Ratcliffe (1962) concentrated. Commonest among these are *Cladonia uncialis*, *C. arbuscula*, *C. bellidiflora*, *C. gracilis* and *Cetraria islandica*, with *Ochrolechia frigida* and *O. tartarea* encrusting the gravel and moss shoots. The balance among these species varies with the amount of shelter provided by topography and the vascular plants, particularly the rush tussocks, and in very exposed situations some markedly chionophobous lichens, such as *Cetraria nivalis*, make an occasional appearance.

Sub-communities

***Cladonia arbuscula-Cetraria islandica* sub-community:** *Cladineto-Juncetum trifidi* McVean & Ratcliffe 1962. Even in the more closed swards included in this kind of *Juncus-Racomitrium* heath, *J. trifidus* is usually the most abundant plant, although *R. lanuginosum* and lichens sometimes form an extensive carpet among the tussocks, being on occasion co-dominant. Among the lichens strongly preferential here, *Cladonia uncialis*, *C. arbuscula* and *C. gracilis* are generally the most abundant, with smaller amounts of *Cetraria islandica*, *Cladonia bellidiflora*, *C. pyxidata*, *C. rangiferina*, *C. coccifera* and *Ochrolechia frigida*, and occasional locally prominent patches of *C. crispata*, *Cornicularia aculeata* and *Thamnolia vermicularis*. It is here, too, that the rare *Cetraria delisei* is found. Apart from *R. lanuginosum*, other bryophytes are rather sparse, but both *D. fuscencens* and *P. alpinum* occur fairly frequently and *P. piliferum* and, less commonly, *Ptilidium ciliare* are preferential. *Diplophyllum albicans* is sometimes joined by *Barbilophozia floerkii* and *Gymnomitrion concinnatum*.

Against this background occur scattered patches of *C. bigelowii*, thickening up where snow collects, frequent small tussocks of *Deschampsia flexuosa* and *Festuca ovina/vivipara*, sprigs of *V. myrtillus* and occasional *E. nigrum* ssp. *hermaphroditum*, *Nardus*, *Huperzia* and *Alchemilla alpina*. With increasing exposure, these latter in particular thin out in their frequency and cover, leaving a sparse open mosaic of rush tussocks and associated cryptogams.

***Salix herbacea* sub-community:** *Rhacomitrium-Carex bigelowii* heath, *Juncus trifidus-Salix herbacea* facies Poore & McVean 1957. In this sub-community, *J. trifidus* and *R. lanuginosum* are usually co-dominant in the more extensive swards, with *C. bigelowii* and *V. myrtillus* both often occurring with moderately high

cover. Then, there is frequently a little *Salix herbacea* with *Galium saxatile*, *Armeria maritima* and *Deschampsia cespitosa* often joining *D. flexuosa*, *F. ovina/vivipara*, *Nardus* and *Luzula spicata*. *E. nigrum* ssp. *hermaphroditum* is uncommon but *V. uliginosum* occasionally occurs. The cryptogams are much less diverse than in the *Cladonia-Cetraria* sub-community with the characteristic lichens of that vegetation being all either very scarce or absent here, though *Sphaerophorus globosus* and *Stereocaulon vesuvianum* are sometimes found. Among mosses, only *Pleurozium schreberi* occurs with occasional *P. alpinum* and *D. fuscescens* and the constant *R. lanuginosum*.

Habitat

The *Juncus-Racomitrium* rush-heath belongs in one of the bleakest mountain landscapes to be found in Britain, being confined to fields of shifting gravel over high-altitude slopes and plateaus exposed to very severe cold and wind. It is strongly centred on the Cairngorms, where tracts of such ground are most extensive and where the community characteristically occurs at the limit of the vegetated zone over less snow-bound slopes and summits.

Although, in its few outlying stands in locally congenial situations in western Scotland, this kind of vegetation can be seen below 900 m, it is typically a feature of the middle-alpine zone, centred around 1000 m in the Cairngorms and extending up, towards the highest summits there to 1200 m or so, beyond which it peters out. At such altitudes in this part of the east-central Highlands, the climate is extremely harsh, with annual accumulated temperatures as low as anywhere in the country, usually less than 250 day-degrees C (Page 1982), long, bitter winters and brief, cloudy summers in which mean maxima rarely rise above 21 °C (Conolly & Dahl 1970, Chandler & Gregory 1976). Under such a temperature regime, few plants of the sub-montane can subsist with any vigour and many of the most distinctive members of the flora here are Arctic-Alpines, well adapted to the short growing season: *J. trifidus*, *C. bigelowii*, *L. spicata*, *F. vivipara*, *S. herbacea*, *Alchemilla alpina*, *Diphasium alpinum* and *Polytrichum alpinum*.

More particularly, at these high altitudes in these mountains, the *Juncus-Racomitrium* rush-heath is confined to ground which is more exposed to the strong winds and severe frosts typical of the montane climate, factors which influence the vegetation directly and through their impact on the substrate, and which favour the development of this community partly by the exclusion of species more vulnerable to their concerted effects. The winds, for example, are enormously strong and relentless in their limitation of the extent and vigour of the vegetation cover at these levels, wherever their blast is unbroken by topography or clumps of resistant plants. Over the open, massively rounded landscape of the Cairngorms, they blow largely unhindered, although their impact is strongly concentrated on western and south-western aspects, from which directions the winds mainly come (*Climatological Atlas* 1952). It is over these slopes, then, that the *Juncus-Racomitrium* rush-heath is most extensive, a pattern very evident from the map in Ingram (1958), and where the community is most clearly seen as an altitudinal replacement for low-alpine heaths with increased exposure. Essentially, the *Juncus-Racomitrium* vegetation takes over as the continuous mossy sub-shrub carpet characteristic of such heaths becomes progressively unable to maintain an intact cover in the very windy conditions, being first cut into ribbons which run upslope, and then becoming increasingly fragmented over the highest ground. The most persistent survivor here from the continuous turf of less exposed situations is *R. lanuginosum*, which can retain a co-dominant role at the lower altitudes and in the locally sheltered sites more typical of the *Salix* sub-community, but which at higher levels is progressively more patchy in its occurrence until finally eliminated. Sub-shrubs characteristically abundant in the low-alpine heaths, such as *V. myrtillus* and, even more so, *E. nigrum* ssp. *hermaphroditum* and *V. uliginosum*, are more quickly reduced in cover and tend to disappear earlier, although the last may be as much inhibited here by the infertile substrates as by exposure (Ingram 1958).

As the proportion of bare, windswept gravel increases, species tolerant of the inhospitable environment assume greater importance in the vegetation, most notably the tussock plants with their thin, pliant shoots, *J. trifidus*, *F. ovina/vivipara*, *L. spicata* and *D. flexuosa*. Within the altitudinal limits of the *Juncus-Racomitrium* heath, such more tolerant plants themselves provide a modicum of shelter for the less, particularly the more bulky rush and, as its ageing tussocks get blown away by the wind, a variety of distinctive niches is exposed for colonisation by the cryptogams of the community. With increasing exposure, however, these species too become progressively restricted in frequency and size and ever more dependent on local topography, such as the presence of scattered boulders, for their survival until, over the bleakest slopes, they also die out.

A second important effect of the wind is to keep the vegetation relatively free of deep and long-lying snow. Precipitation through the heartland of the *Juncus-Racomitrium* heath is relatively light, with often not much more than 1600 mm yr^{-1} (*Climatological Atlas* 1952) and around 180 wet days annually (Ratcliffe 1968). But, over higher ground, much of this is received as snow through the winter months, with more than 100 days of observed snow-fall a year over the tops of the Cairngorms (Manley 1940); and, wherever there is any shelter, particularly within a large gathering ground,

this accumulates and, on less sunny slopes, persists long. In general, though, in the windy situations favoured by the *Juncus-Racomitrium* heath there is at most an intermittent cover of fairly shallow snow, an early melt and, with the pervious character of the substrate, little tendency to ensuing waterlogging of the surface even over more gently sloping ground. In floristic terms, then, although the community is more chionophilous than the *J. trifidus* vegetation of the north-west Highlands (McVean & Ratcliffe 1962), there is a limited contribution here from such species as *C. bigelowii*, *Nardus*, *S. herbacea* and more snow-tolerant bryophytes characteristic of the *Nardus-Carex* grass-heath and the late snow-beds. This is particularly so with the *Cladonia-Cetraria* sub-community which is typical of the higher altitudes attained by the *Juncus-Racomitrium* heath, and which usually has a patchy cover of up to 50 cm of powdery snow (McVean & Ratcliffe 1962). The *Salix* sub-community looks somewhat more chionophilous, with its better representation of these plants and its association with lower altitudes and locally sheltered spots. It can be seen as a transition to the snow-field vegetation which, on a large scale, replaces the *Juncus-Racomitrium* heath at similar altitudes on the northern and eastern slopes of the Cairngorms, in the lee of the prevailing winds and well shaded by their inclination; and which, in finer mosaics, develops within stands of the community in slight concavities and distinct hollows and even, as tiny patches, within the sunken centres of individual ageing rush tussocks (Ingram 1958).

In fact, *J. trifidus* is tolerant of considerably greater snow covers than are characteristic of even the more chionophilous stands of *Juncus-Racomitrium* heath: it persists, though usually at low cover, as a common member of a variety of snow-field communities. What is distinctively favourable for it here is the combination of relatively light snow cover with the mobile gravel substrate, this latter itself dependent upon exposure to wind and frost. At these altitudes, and particularly where there is little protection from the harsh winter temperatures, freeze-thaw is a very powerful weathering agency, especially effective in producing fields of shattered rock with a material like the Cairngorm granite, coarsely crystalline and well jointed. Larger fragments of this material are important in providing local shelter for the plants of the community, but the main benefit to the tussock-forming species, and especially to *J. trifidus*, is that these are unusually tolerant of the shifting around of the finer material by wind and solifluction. The granite detritus can often scarcely be said to constitute a soil: some of the stands examined by McVean & Ratcliffe (1962) were on humus/mineral mixtures with a surface crust but, in gales, sand and gravel are often picked up, blown away and deposited elsewhere over these slopes. Any plant which can withstand being scoured out below or swamped above by such material and suffer its abrasive blast, thus has a particular advantage here. Added to this, there is the often more dramatic movement of detritus by cryoturbation and solifluction, processes which have left a variety of features such as terraces and patterned ground dating from periglacial times, but which continues today with the churning of the gravel and its shifting around in talus slides and outwash fans. Again, *J. trifidus* seems especially well able to tolerate the movement in the loose erosion surfaces that characterise many of these high slopes and summits, and it is often the first coloniser of loose screes, the fine and very mobile gravel of which rolls downslope until hindered by larger stones, and the outwash detritus that can sometimes be seen flooded out for perhaps a hundred metres or more over gentler inclines after heavy rain or a big snow-melt (Ingram 1958). These processes contribute to the development of the distinct growth forms in the rush mentioned earlier, creating vegetation mosaics, and produce newly-exposed material for colonisation by the community.

Zonation and succession

The *Juncus-Racomitrium* heath is characteristically found at the limit of the vegetated zone, terminating an altitudinal sequence of sub-shrub and grass-dominated heaths and occurring with snow-field communities in zonations and mosaics that largely reflect the degree of exposure in shifting on to higher ground and less sheltered aspects.

Where there is some relief from the incessant wind and harsh frosts characteristic of the environment of the *Juncus-Racomitrium* heath, the community usually gives way to the *Nardus-Carex* grass-heath. The two vegetation types show considerable floristic continuity through frequent records in both for *C. bigelowii*, *V. myrtillus*, *D. flexuosa*, *R. lanuginosum*, *Cetraria islandica*, *Cladonia arbuscula* and *C. uncialis*, but *J. trifidus* is very scarce in the *Nardus-Carex* heath and *Nardus* is generally very abundant, often with frequent *E. nigrum* ssp. *hermaphroditum* and *V. uliginosum* and plants indicative of soil wetness induced by snow-melt. On a large scale, the *Juncus-Racomitrium* heath is replaced by the more chionophilous community in moving to the northern and eastern slopes of the Cairngorms, in the lee of the prevailing winds and where the ground receives much less insolation, and in shifting down into the low-alpine zone. There the *Nardus-Carex* heath represents a transition to sub-shrub heaths like the *Vaccinium-Deschampsia* vegetation which are moderately chionophilous but developed over less windy and more humid slopes than the *Juncus-Racomitrium* heath.

More locally, however, the *Nardus-Carex* heath takes over from the *Juncus-Racomitrium* heath wherever slight shifts in topography induce a little more accumulation

and persistence of snow, as in hollows or behind spurs and bluffs. And, where there is marked snow-lie in particularly sheltered and shady spots, this may in turn give way to a late snow-bed community, producing sometimes finely-grained mosaics of less and more chionophilous vegetation. Within patches of the *Nardus-Carex* heath, for example, there can be a central zone of the *Carex-Polytrichum* sedge-heath with its striking carpets of *Polytrichum alpinum* and *Dicranum fuscescens*, of the *Polytrichum-Kiaeria* moss-heath with abundant *K. starkei*, or of the *Salix-Racomitrium* community with *R. heterostichum* and crusts of hepatics and the dwarf willow. Or, in more sudden zonations, the *Juncus-Racomitrium* heath may pass directly to one or other of these kinds of vegetation. Especially distinctive are the very small-scale patterns produced by the local development of tiny patches of the *Salix-Racomitrium* community within the depressed centres of old rush tussocks (Ingram 1958). In other places, fields of windswept gravel contain sheltered stretches of boulders where the *Cryptogramma-Athyrium* community marks out late snow-lie.

This particular range of vegetation types shows its full development only over the higher slopes and plateaus of the Cairngorms. Outlying stands of the *Juncus-Racomitrium* heath can be found in similar zonations elsewhere in the central Highlands and, in the form of the *Salix* sub-community, at a very few localities further west, but even around the Cairngorms there is a tendency for this kind of vegetation to be replaced in these sequences by the *Carex-Racomitrium* heath in situations that are a little more sheltered and, moving towards the more oceanic western Highlands, this community quickly prevails, eventually extending on to even the bleakest ablation surfaces. The change is already visible in shifting to the western spurs and ridges of the Cairngorms above Glen Feshie and, on exposed ground over the high plateaus of Lochnagar, there are extensive transitions between the *Cladonia-Cetraria* sub-community of the *Juncus-Racomitrium* heath and Typical *Carex-Racomitrium* heath, the switch from the one vegetation type to the other being marked by a reduction in lichen cover, an increase in the abundance of *R. lanuginosum* and the loss of *J. trifidus*.

Distribution

Apart from a few far-flung stands of the less distinctive *Salix* sub-community in the western Highlands, the *Juncus-Racomitrium* heath is confined to the central Highlands, particularly to the east and most extensively in the Cairngorms.

Affinities

In this scheme, the more striking *Cladonia-Cetraria* sub-community of the *Juncus-Racomitrium* heath corresponds roughly with McVean & Ratcliffe's (1962) *Cladineto-Juncetum*, the *Salix* sub-community being transitional to the *Salix-Racomitrium* snow-bed, fragments of which Ingram (1958) included in his *Juncetum*, but which are best kept separate. Similar vegetation has been recorded from Scandinavia by Nordhagen (1928), who described a *Cetraria-Cladonia-Juncus* Association from Sylene, and by Dahl (1956) who found a *Juncetum trifidi nudum* in Rondane. These Norwegian communities experience a similar snow-lie regime, with a reliable but only moderately deep and long-lasting cover, although the soils remain moister than here in the summer and are somewhat deeper, being developed among boulders.

Floristic table U9

	a	b	9
Juncus trifidus	V (4–9)	V (4–6)	V (4–9)
Racomitrium lanuginosum	V (1–9)	V (1–8)	V (1–9)
Carex bigelowii	V (1–4)	V (1–4)	V (1–4)
Cladonia uncialis	V (1–6)	II (1–3)	III (1–6)
Cetraria islandica	V (1–4)	I (1–3)	III (1–4)
Cladonia arbuscula	V (1–4)		III (1–4)
Cladonia bellidiflora	IV (1–3)	II (1–3)	III (1–3)
Ochrolechia frigida	IV (1–4)	I (1)	III (1–4)
Cladonia gracilis	IV (1–6)		II (1–6)
Cladonia pyxidata	III (1–3)	I (1–3)	II (1–3)
Polytrichum piliferum	III (1–3)		II (1–3)
Empetrum nigrum hermaphroditum	II (1–6)	I (1)	II (1–6)
Cladonia coccifera	II (1–4)	I (1)	II (1–4)

Ptilidium ciliare	II (1–3)	I (1)	II (1–3)
Cornicularia aculeata	II (1–4)		I (1–4)
Cladonia rangiferina	II (1–4)		I (1–4)
Thamnolia vermicularis	II (1–3)		I (1–3)
Cladonia crispata	II (1–4)		I (1–4)
Barbilophozia floerkii	II (1–4)		I (1–4)
Cetraria delisei	I (1–3)		I (1–3)
Vaccinium myrtillus	III (1–4)	V (1–6)	III (1–6)
Salix herbacea		IV (1–4)	II (1–4)
Galium saxatile	I (1–4)	III (1–3)	II (1–4)
Armeria maritima		III (1–3)	II (1–3)
Deschampsia cespitosa	I (1)	II (1–3)	I (1–3)
Pleurozium schreberi	I (1)	II (1–3)	I (1–3)
Sphaerophorus globosus		II (1–3)	I (1–3)
Vaccinium uliginosum		II (1–3)	I (1–3)
Polygonum viviparum		I (1)	I (1)
Stereocaulon vesuvianum		I (1–2)	I (1–2)
Deschampsia flexuosa	III (1–4)	III (1–3)	III (1–4)
Festuca ovina/vivipara	III (1–4)	III (1–4)	III (1–4)
Dicranum fuscescens	III (1–3)	II (1–3)	III (1–3)
Luzula spicata	II (1–3)	III (1–3)	II (1–3)
Nardus stricta	II (1–3)	II (1–4)	II (1–4)
Polytrichum alpinum	II (1–3)	II (1–3)	II (1–3)
Alchemilla alpina	II (1–4)	II (1–3)	II (1–4)
Huperzia selago	II (1–3)	I (1–3)	II (1–3)
Loiseleuria procumbens	I (1–4)	II (1–3)	I (1–4)
Ochrolechia tartarea	I (1–4)	II (1–3)	I (1–4)
Agrostis capillaris	I (1–3)	II (1–3)	I (1–3)
Diplophyllum albicans	I (1–3)	I (1–3)	I (1–3)
Silene acaulis	I (1–3)	I (1–3)	I (1–3)
Cetraria nivalis	I (1–3)	I (4)	I (1–4)
Carex pilulifera	I (1–3)	I (1)	I (1–3)
Vaccinium vitis-idaea	I (1)	I (1)	I (1)
Diphasium alpinum	I (1)	I (1)	I (1)
Number of samples	17	10	27
Number of species/sample	19 (13–25)	16 (9–22)	18 (9–25)
Vegetation height (cm)	10 (5–15)	7 (2–13)	9 (2–15)
Vegetation cover (%)	85 (45–100)	78 (25–100)	82 (25–100)
Altitude (m)	1048 (915–1159)	903 (1033–1097)	920 (915–1159)
Slope (°)	7 (3–15)	6 (0–21)	7 (0–21)

a *Cladonia arbuscula-Cetraria islandica* sub-community

b *Salix herbacea* sub-community

9 *Juncus trifidus-Racomitrium lanuginosum* rush-heath (total)

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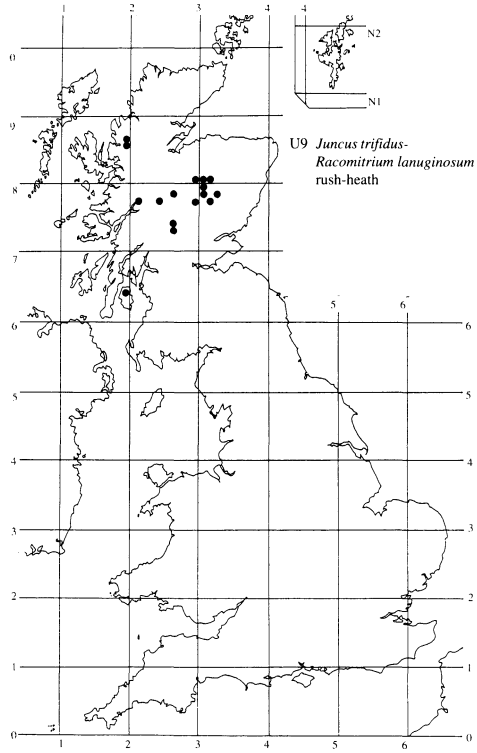

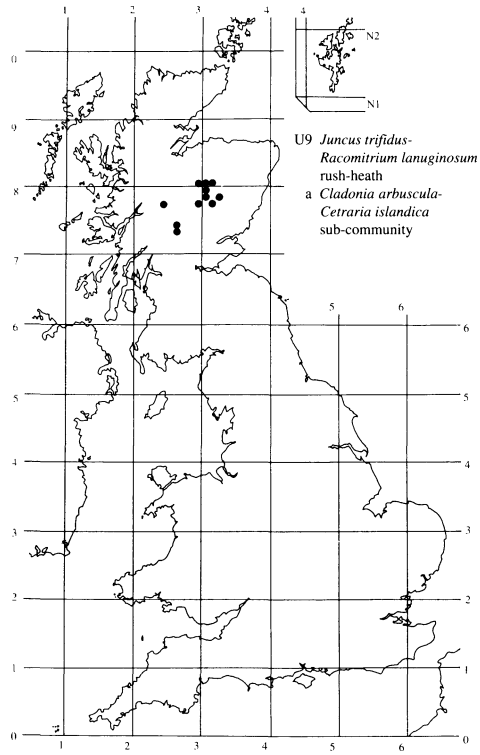

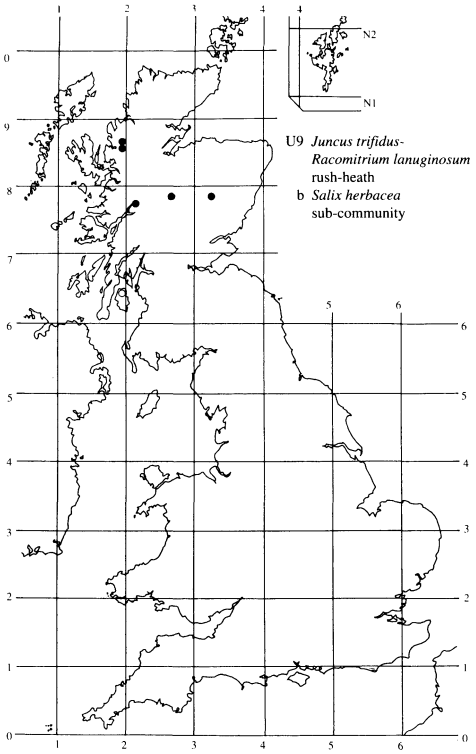

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