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# M11

## *Carex demissa*-*Saxifraga aizoides* mire *Carici-Saxifragetum aizoidis* McVean & Ratcliffe 1962 *emend.*

### Synonymy

*Carex demissa*-*C. panicea* nodum Poore 1955a p.p.; *Cariceto-Saxifragetum aizoidis* McVean & Ratcliffe 1962, Prentice & Prentice 1975; *Carex-Saxifraga aizoides* nodum Birks 1973, Huntley & Birks 1979; *Pinguiculo-Caricetum dioicae* Jones 1973 p.p.; *Saxifraga aizoides*-*Juncus triglumis* nodum Huntley 1979; *Caricetum atrofusco-vaginatae* Dierssen 1982; *Schoenus ferrugineus* stands Wheeler *et al.* 1983 p.p..

### Constant species

*Carex demissa*, *C. panicea*, *C. pulicaris*, *Juncus articulatus*, *Pinguicula vulgaris*, *Saxifraga aizoides*, *Aneura pinguis*, *Blindia acuta*, *Bryum pseudotriquetrum*, *Campylium stellatum*, *Drepanocladus revolvens*.

### Rare species

*Alchemilla filicaulis* ssp. *filicaulis*, *Carex atrofusca*, *C. microglochin*, *C. vaginata*, *Equisetum variegatum*, *Juncus alpinus*, *J. biglumis*, *J. castaneus*, *Kobresia simpliciuscula*, *Salix reticulata*, *Schoenus ferrugineus*, *Calliergon trifarium*, *Meesia uliginosa*.

### Physiognomy

The *Carici-Saxifragetum aizoidis* is typically an open community in which rich mixtures of small sedges, other herbs and bryophytes occur among water-scoured runnels with much exposed silt and rock debris on sometimes steeply-sloping ground. Typically, there is no single vascular dominant, though sedges and other monocotyledons almost always compose an important element of the vegetation, providing a strong floristic link with the *Pinguiculo-Caricetum*. Thus, *Carex demissa*, *C. panicea* and *C. pulicaris* are very frequent almost throughout, and each can attain moderately high cover (usually less than 25%), and *C. flacca* and *C. dioica* become common in particular variants, though not generally with any abundance. *Juncus articulatus* is also a constant, *Eriophorum angustifolium* occurs frequently and, at lower altitudes, *Eleocharis quinqueflora*

becomes very characteristic. In some such stands, the local dominance of *Schoenus nigricans* (or, in some Perthshire localities, *S. ferrugineus*), together with some *Eriophorum latifolium*, can accentuate the similarities between the two communities.

In comparison with the *Pinguiculo-Caricetum*, however, *Carex lepidocarpa* and *C. hostiana* are much less common, and *C. nigra* and *C. echinata* are likewise rather scarce. And, at higher altitudes, an Arctic-Alpine component becomes prominent with *Juncus triglumis* attaining constancy and *Tofieldia pusilla* increasing in frequency. Here, too, the community provides an occasional locus for *Juncus biglumis*, *J. castaneus*, *Carex atrofusca*, *C. microglochin* and, more unusually, *C. vaginata*, and for *Kobresia simpliciuscula*.

Grasses are typically of low cover, though a variety of species can be found. *Festuca ovina*/vivipara is common throughout and *Agrostis stolonifera* occurs occasionally. Then, at higher altitudes, there is often some *Deschampsia cespitosa* (presumably ssp. *alpina*), *Nardus stricta*, *Anthoxanthum odoratum*, *Agrostis canina* ssp. *canina* and *Festuca rubra*. In contrast to the *Pinguiculo-Caricetum*, *Molinia caerulea* is only occasional in this community and only rarely found as more than scattered shoots.

Amongst the other herbaceous species, there is again considerable continuity between the two kinds of mire. *Pinguicula vulgaris* is constant and *Selaginella selaginoides* very frequent and there are occasional records for *Linum catharticum*, *Euphrasia officinalis* agg. (including *E. scottica*) and, in some types of *Carici-Saxifragetum*, *Leontodon autumnalis* and *Thymus praecox*. But the montane character of the vegetation is emphasised by the presence of *Saxifraga aizoides*, generally speaking only an occasional in the *Pinguiculo-Caricetum*, but here constant, often quite abundant and very striking with its yellow summer flowers. This species is confined to Scotland, the Lake District and isolated localities in the northern Pennines, but flushes with very similar vegetation to the *Carici-Saxifragetum* can be found in the

Southern Uplands (Ferreira 1978) and in Snowdonia, and are probably best regarded as impoverished stands of the community. Other montane plants characteristic here are *Thalictrum alpinum*, which is very common at higher altitudes, *Saxifraga stellaris*, *S. oppositifolia* and *Alchemilla filicaulis* ssp. *filicaulis*, which occur more occasionally.

Typically, all these species occur in a rather short, uneven and broken sward, particularly in more strongly-eroded situations at higher altitudes, but at Caenlochan, Huntley (1979) recorded stands of the community which had some of the more luxuriant character associated with the *Saxifraga aizoides*-*Alchemilla glabra* tall-herb community (see below).

Bryophytes are a frequent and varied element of the *Carici-Saxifragetum*, though, again, their cover is typically discontinuous. Species such as *Aneura pinguis*, *Campylium stellatum*, *Drepanocladus revolvens*, *Bryum pseudotriquetrum* and, at lower altitudes, *Cratoneuron commutatum*, *Fissidens adianthoides*, *Ctenidium molluscum* and *Scorpidium scorpioides* are all common (another similarity with many kinds of *Pinguiculo-Caricetum*) and the brown mosses especially can be fairly abundant. However, a good preferential for this community is the montane moss, *Blindia acuta*, which can be especially prominent at higher altitudes. *Calliergon trifarium* also occurs locally (e.g. Poore 1955a) and *Amblyodon dealbatus*, *Catascopium nigrum*, *Meesia uliginosa* and *Orthothecium rufescens* have also been recorded (McVean & Ratcliffe 1962). Spring and rill species such as *Philonotis fontana*, *P. calcarea* and *Dicranella palustris* are occasionally found.

### Sub-communities

***Thalictrum alpinum*-*Juncus triglumis* sub-community:** *Cariceto-Saxifragetum*, typical and high-level facies McVean & Ratcliffe 1962; *Carex-Saxifraga aizoides* nodum Birks 1973 p.p.; *Pinguiculo-Caricetum thalictro-saxifragetosum* Jones 1973; *Saxifraga aizoides*-*Juncus triglumis* nodum Huntley 1979. This is the typical form of the *Carici-Saxifragetum* found at higher altitudes where a montane component is much more obvious in the vegetation, with constant records for *Juncus triglumis* and *Thalictrum alpinum* and correspondingly low frequency of *Eleocharis quinqueflora*. *Alchemilla alpina* also occurs occasionally and there are more commonly some grasses in the cover with *Festuca vivipara* and *Deschampsia cespitosa* frequent. Typically the vegetation is more open than at lower altitudes with scattered herbs and a patchy bryophyte cover disposed in stony flushes. *Saxifraga aizoides*, *Carex demissa* and *C. panicea* are usually the most abundant vascular plants with *Blindia*, *Campylium* or *Drepanocladus* predominating among the mosses. Bryophytes such as

*Cratoneuron commutatum*, *Fissidens adianthoides* and *Scorpidium* are characteristically scarce. Two variants can be distinguished.

***Juncus bulbosus*/kochii-*Saxifraga stellaris* variant:** *Cariceto-Saxifragetum*, typical and high-level facies McVean & Ratcliffe 1962; *Pinguiculo-Caricetum thalictro-saxifragetosum* Jones 1973. In this most widespread form of the *Thalictrum*-*Juncus* sub-community, there is a further enrichment of the Arctic-Alpine element with the frequent presence of small quantities of *Saxifraga stellaris* and, more occasionally, *S. oppositifolia*. *Carex dioica* joins the constant sedges of the community and more open gravelly places provide a niche for such rarities as *C. atrofusca*, *C. microglochin*, *Juncus biglumis* and, especially in the south-western Highlands, *J. castaneus*, species which are largely confined to this vegetation type and the closely similar *Caricetum saxatilis* (McVean & Ratcliffe 1962; see also Raven & Walters 1956). *Kobresia simpliciuscula* also occurs occasionally. Then, there are frequent records for *Juncus bulbosus*/kochii, *Agrostis canina* ssp. *canina*, *Potentilla erecta* and *Ranunculus flammula*, which provide a link with the more base-poor mires of the *Caricion nigrae* and, for *Thymus drucei* and *Plantago maritima*, in somewhat drier areas of turf. Where this kind of flush occurs within a context of ombrogenous mire, quite a common occurrence, *Calluna vulgaris* and *Scirpus cespitosus* can occur; and where water splashes over the vegetation, *Philonotis fontana* can be present among the bryophytes.

***Polygonum viviparum* variant:** *Carex-Saxifraga aizoides* nodum Birks 1973 p.p.; *Saxifraga aizoides*-*Juncus triglumis* nodum Huntley 1979. This variant, recorded largely from Caenlochan (Huntley 1979), preserves the general montane character of the *Thalictrum*-*Juncus* sub-community but lacks frequent records for many of the species of the *Juncus*-*Saxifraga* variant, notably *Juncus bulbosus*/kochii and *Saxifraga stellaris* themselves. *Carex flacca* becomes constant, largely replacing *C. dioica*, and the presence of plants such as *Leontodon autumnalis*, *Polygonum viviparum*, *Alchemilla glabra*, *Angelica sylvestris*, *Crepis paludosa* and the rare Arctic-Alpine dwarf willow, *Salix reticulata*, give something of the feel of a base-rich tall-herb ledge. *Carex vaginata* has been recorded from this variant.

***Cratoneuron commutatum*-*Eleocharis quinqueflora* sub-community:** *Carex demissa*-*C. panicea* nodum Poore 1955a p.p.; *Cariceto-Saxifragetum*, low-level facies McVean & Ratcliffe 1962; *Carex-Saxifraga aizoides* nodum Birks 1973, Huntley & Birks 1979; *Schoenus ferrugineus* stands Wheeler et al. 1983 p.p. It is in this sub-community that the *Carici-Saxifragetum* comes closest to, and grades into, the *Pinguiculo-Caricetum*, with more extreme montane plants, apart from *Saxifraga aizoides* and *Blindia acuta*, much more poorly

represented than above; in more southerly stands, even these species become rare. By contrast, *Eleocharis quinqueflora* becomes constant and, on occasion, it can be quite abundant, rivalling the sedges, among which *Carex hostiana* and, in wetter stands, *C. rostrata* are sometimes found. Vascular plant cover is typically more extensive than in the *Thalictrum-Juncus* sub-community, though only rarely approaching a continuous sward. In some stands, however, *Schoenus nigricans* or, much more locally, *S. ferrugineus*, can dominate and this gives the vegetation a distinctive stamp. The other positive features of this sub-community are to be found among the bryophytes, where *Cratoneuron commutatum* and *Scorpidium* are very common and often the most abundant species with *Fissidens adianthoides* frequent and *Philonotis calcarea* occasional.

### Habitat

The *Carici-Saxifragetum* is characteristic of open, stony flushes, strongly irrigated with moderately base-rich waters, on generally steep slopes in the sub-montane and montane parts of Britain.

Although the community can occur almost at sea-level in the far north-west of Scotland, it is generally confined to high altitudes, overlapping to some extent with the altitudinal range of the *Pinguiculo-Caricetum*, though having a considerably higher mean, at 510 m, and extending to levels never reached by that other kind of base-rich mire. Thus, although both communities have a representation of more catholic Continental Northern plants like *Pinguicula vulgaris*, *Carex pulicaris* and *C. dioica*, an Arctic-Alpine element is much more obvious here, reflecting the extreme character of the climate. Throughout the range of the *Carici-Saxifragetum* the mean annual maximum temperature is almost everywhere less than 23 °C (Conolly & Dahl 1970), with annual accumulated temperatures below 830 day-degrees (*Climatological Atlas* 1952). February minima are sometimes above freezing but winters are characteristically long and harsh, with much snow in the central Highlands, where the community is most common, and late frosts. Within this zone, the *Thalictrum-Juncus* sub-community occurs at the higher levels, with a mean altitude of 573 m and occasionally reaching more than 850 m. Here, mean annual maxima are typically less than 21 °C, the isotherm of which roughly corresponds with the distributions of *Saxifraga aizoides*, *Thalictrum alpinum* and *Juncus triglumis* and includes the stations of Arctic-Alpine rarities like *Carex atrofusca*, *C. microglochin*, *Juncus biglumis* and *J. castaneus* which are confined to this kind of *Carici-Saxifragetum*. Outside this high-montane area, the *Cratoneuron-Eleocharis* sub-community represents a transition to the *Pinguiculo-Caricetum*, extending down to considerably lower levels than the *Thalictrum-Juncus* sub-community, with a

mean altitude of 415 m; not only on the north-west seaboard of Scotland, where February minima are consistently above freezing, but also into the Southern Uplands, the Lake District, the north Pennines and north Wales, where mean annual maxima sometimes reach 25 °C (*Climatological Atlas* 1952, Conolly & Dahl 1970). Towards these limits, *Saxifraga aizoides*, *Thalictrum alpinum* and *Juncus triglumis* become increasingly rare and the community loses its integrity.

Within this climatic zone, the *Carici-Saxifragetum* is confined to soils irrigated with more base-rich waters and is thus consistently associated with calcareous bed-rocks, the occurrence of which is, through much of the region, decidedly local. It is best developed over the Dalradian meta-sediments of the south and east-central Highlands, especially on the Breadalbane range and in the Clova-Caenlochan region (Poore 1955a, McVean & Ratcliffe 1962, Huntley 1979, Huntley & Birks 1979a) with more isolated, though still quite common, occurrences further to the north-west on the Moine meta-sediments and on such calcareous rocks as are present among Lewisian gneiss. It is also found on the Cambrian/Ordovician Durness Limestone along the Moine Thrust and on Skye (Birks 1973) and it occurs in the last site on Tertiary limestones and igneous rocks. Lavas and intrusions provide a local source of base-enrichment in the Borrowdale Volcanics of the Lake District and in Snowdonia (Ratcliffe 1977) and, in Upper Teesdale, there are stands on metamorphosed sugar-limestone (Pigott 1956a, Jones 1973, Bradshaw & Jones 1976). Flushing from such substrates as these generally maintains the soil at a pH of between 5.5 and 7.0, very much as in the *Pinguiculo-Caricetum*, though variations in base-richness may play some part in floristic differences in this community. More calcicolous species such as *Saxifraga aizoides*, *Selaginella selaginoides*, *Carex pulicaris*, *Thalictrum alpinum*, *Linum catharticum* and the bryophytes *Aneura pinguis*, *Campylium stellatum*, *Drepanocladus revolvens*, *Cratoneuron commutatum* and *Fissidens adianthoides* are well represented in one kind of *Carici-Saxifragetum* or another, but there is a somewhat less calcicolous character in the *Juncus-Saxifraga* variant and variations in the soil environment would repay investigation.

The other characteristic feature of the habitat of this mire is that flushing is vigorous. Rainfall or snowfall provide ample supplies of ground water and the community typically occupies more strongly sloping ground than the *Pinguiculo-Caricetum* and/or occurs closer to surface-flowing rills which rarely dry up. Erosion of the surface is therefore often pronounced (and, in some places, perhaps progressive: McVean & Ratcliffe 1962) and the soil cover little more than scoured accumulations of silt and organic matter, with much exposed rock debris, both smaller gravel and,

where drift has contributed to the parent materials, larger boulders. The wet expanses of rotting mica-schist in flushes of this kind in Breadalbane are especially distinctive. The permanence and rate of surface water-flow are probably of particular importance to the extent of the moss cover of the community, which may largely control the humus content of the soil (McVean & Ratcliffe 1962).

### Zonation and succession

The *Carici-Saxifragetum* is found around springs and flushes, often in association with other calcicolous soligenous mire vegetation, among sub-montane and high-altitude grasslands and dwarf herb communities and, more occasionally, within ombrogenous bogs. Typically, the stands are small and the definition of the vegetation sequences depends on the strength of irrigation and the amount of base-enrichment of the flush and its surrounds. Grazing may help maintain the open structure of the community and prevent the development of a woody cover, though colonisation by shrubs and trees on the wet and cold soils characteristic here would probably be slow and, at higher altitudes, this kind of mire is probably a climatic climax.

Where the *Carici-Saxifragetum* marks out flushes within stretches of upland pasture, the general pattern of vegetation is the same throughout its range, running, in its fullest development, from Cratoneurion communities around spring-heads, flush-lines and their associated rills, through the *Carici-Saxifragetum*, then through small-sedge soligenous mire on the less strongly-irrigated surrounds, to the swards of the drier soils beyond. Where vigorous flushes emerge locally on steeper slopes, this kind of pattern can be very well defined, with concentric zones of the different communities elongated downhill; where irrigation is more diffuse and more extensively spread, the zonation may be much less clear, often expressed as a complex mosaic, with the elements associated with stronger water-flow less well developed.

At low altitudes, generally below 500 m, where the *Carici-Saxifragetum* is typically represented by the *Cratoneuron-Eleocharis* sub-community, it is often surrounded by the *Pinguiculo-Caricetum*, usually some variant of the *Carex-Juncus* sub-community or, in the north Pennines where the *Carici-Saxifragetum* occurs very locally, some variant of the *Briza-Primula* sub-community. In such situations, the two kinds of mire can come very close floristically, particularly in those localities beyond the southern limit of *Saxifraga aizoides*, and the transition between the two is consequently very diffuse. Locally, too, an abundance throughout of *Schoenus nigricans* (or, in a few localities in Perthshire, *S. ferrugineus*: Wheeler *et al.* 1983) can give an overlying impression of structural uniformity.

Beyond this zone of more strongly-flushed, often unstable and sometimes heavily stock-poached soils, there is commonly a gradation to some type of calcicolous grassland, with a closing up of the turf, over drier profiles. Most often, this is the *Festuca-Agrostis-Thymus* grassland: *Saxifraga aizoides* and some other hydrophilous herbs can run some way into this pasture in its *Saxifraga-Ditrichum* sub-community (the *Saxifrageto-Agrosto-Festucetum* of McVean & Ratcliffe 1962) which can form a transitional zone to the unflushed sward. At somewhat higher altitudes, and perhaps on somewhat less base-rich soils, the *Festuca-Agrostis-Alchemilla* grass-heath can provide the context, with its *Carex pulicaris*-*C. panicea* sub-community immediately around the flushed areas. In the east-central Highlands, *Betula pubescens* and *Juniperus communis* ssp. *communis* are ready invaders of the less strongly-waterlogged soils of such sequences and the *Carici-Saxifragetum* forms an important part of the ground mosaic beneath open stands of birch and juniper at sites like Morrone (McVean & Ratcliffe 1962, Ratcliffe 1977, Huntley & Birks 1979a).

At higher altitudes throughout its range, the *Carici-Saxifragetum* is represented in such zonations by the *Thalictrum-Juncus* sub-community and, particularly in Breadalbane and more locally to the north-west of Scotland, there is a shift in all the components of the sequence to present a more strikingly montane character. Thus, the *Pinguiculo-Caricetum* in the surrounding zone is replaced by the *Caricetum saxatilis* and it is open stony areas in both this community and the *Carici-Saxifragetum* which provide the major locus for such Arctic-Alpine rarities as *Carex atrofusca*, *C. microglochin*, *Juncus biglumis* and *J. castaneus* and many of the Scottish stations for *Kobresia*. Then, at these high levels, the *Festuca-Alchemilla-Silene* dwarf-herb community often forms the surround to the springs on soils which are not so strongly flushed by the springs, though which are kept continually moist by high rainfall and snow-melt and maintained in a similar unstable state by solifluction and cryoturbation. Complexes of these vegetation types, forming a short, diverse and open cover over sparkling mica-schist soils, make a major contribution to the glory of sites like Ben Lawers (e.g. Poore 1955b, Raven & Walters 1956, McVean & Ratcliffe 1962).

The Cratoneurion communities represented in such sequences are typically low swards like the *Cratoneuron-Festuca* vegetation, in which *S. aizoides* often continues to be very prominent, or the less calcicolous *Cratoneuron-Carex nigra* community. However, where flush waters trickle down very steep rocky faces with ledges, the *Saxifraga-Alchemilla* tall-herb community can occur in close juxtaposition with the *Carici-Saxifragetum*. The two vegetation types are floristically quite



similar and the *Polygonum* variant of the latter community, which Huntley (1979) described from the Clova-Caenlochan area, is floristically intermediate. *Salix reticulata* finds an occasional place in this kind of *Carici-Saxifragetum* and it is possible that these vegetation types represent a grazing-mediated succession on more inaccessible dripping crags that would culminate in the development of the *Salix-Luzula* Arctic-Alpine willow scrub. Even under favourable environmental conditions, however, this sere is, at most, only locally active because of the now very wide dispersal of potential parent bushes.

In zonations of the above types, the continuity of floristic variation, with a gradual lessening of the influence of irrigation and base-enrichment in moving away from the springs, is often very obvious. Where the *Carici-Saxifragetum* marks out flushed sites within ombrogenous mires and related wet-heaths, the soligenous areas are usually much more sharply delineated from their surrounds. The context of flushing can be the *Calluna-Eriophorum* blanket mire or, at lower altitudes towards the west, the *Scirpus-Eriophorum* blanket mire or degraded forms of this bog placed in the *Scirpus-Erica* wet-heath. The *Carici-Saxifragetum* can again be surrounded by a zone of the *Caricetum saxatilis* or, at lower levels, the *Pinguiculo-Caricetum*, but there is typically a very sharp switch from these mires on sloppy mineral soil in the soligenous tracks to the ombrogenous vegetation on the peat around, often with a low, steep bank between. Poore (1955*b*) and McVean & Ratcliffe (1962) both illustrated some very distinctive mosaics of this kind, with isolated hummocks of ombrogenous mire occurring detached from the surrounding bog within the soligenous zone. The latter authors noted how the flushes could isolate such fragments from the effects of burning of the main bog surface, sheltering a refuge for such species as *Sphagnum imbricatum* and *Dicranum bergeri*.

### Distribution

The community is largely confined to Scotland, where it is especially common in the southern and central Highlands with more scattered localities further north-west, but it also occurs in the Lake District and, more locally, in the Southern Uplands, the northern Pennines and in north Wales. The *Thalictrum-Juncus* sub-community is confined to higher altitudes and virtually restricted to Scotland; the *Cratoneuron-Eleocharis* sub-community is also frequent there at lower altitudes and takes in most of the English and Welsh stands. Towards these southern limits of its range, the *Carici-Saxifragetum* grades into the *Pinguiculo-Caricetum*.

### Affinities

The *Carici-Saxifragetum* is largely based on McVean & Ratcliffe's (1962) *Cariceto-Saxifragetum*, taking in additional data from a variety of sources (Poore 1955*a*, Birks 1973, Jones 1973, Prentice & Prentice 1975, Huntley & Birks 1979*a*, Huntley, 1979, Wheeler *et al.* 1983) and making a more well-defined division between high- and low-altitude types. Although there is a considerable continuity with the *Pinguiculo-Caricetum* (within which Jones (1973) placed her Teesdale stands), the community is worth recognising as a distinct vegetation type and, with its strong montane and Arctic-Alpine element, it comes closer to the northern European mires traditionally placed in the Caricion bicolori-atrofuscae (Nordhagen 1928, 1943: see also Coombe & White 1951, Persson 1961, Dierssen 1982). Such species as *Carex atrofusca*, *C. microglochin*, *Juncus biglumis*, *J. castaneus* and *Kobresia* are, however, of rather restricted distribution even within the higher-altitude stands of the community and its more general affinities are perhaps with the Caricion davallianae mires distributed throughout Europe (Poore 1955*b*, McVean & Ratcliffe 1962).

# Floristic table M11

	ai	aii
<i>Carex demissa</i>	V (1–5)	V (1–7)
<i>Saxifraga aizoides</i>	V (1–7)	IV (1–8)
<i>Pinguicula vulgaris</i>	IV (1–3)	IV (1–5)
<i>Blindia acuta</i>	IV (1–5)	IV (1–7)
<i>Aneura pinguis</i>	V (1–3)	IV (1–3)
<i>Carex pulicaris</i>	V (1–5)	IV (1–5)
<i>Carex panicea</i>	II (1–3)	V (1–5)
<i>Drepanocladus revolvens</i>	V (1–5)	III (1–5)
<i>Campylium stellatum</i>	IV (1–5)	III (1–5)
<i>Juncus articulatus</i>	IV (1–3)	III (1–5)
<i>Bryum pseudotriquetrum</i>	V (1–5)	III (1–3)
<i>Thalictrum alpinum</i>	V (1–3)	IV (1–5)
<i>Juncus triglumis</i>	V (1–3)	IV (1–5)
<i>Deschampsia cespitosa</i>	IV (1–3)	III (1–5)
<i>Nardus stricta</i>	III (1–3)	III (1–7)
<i>Anthoxanthum odoratum</i>	II (1–3)	III (1–5)
<i>Alchemilla alpina</i>	II (1–3)	II (1–3)
<i>Caltha palustris</i>	I (1–5)	I (5)
<i>Carex flacca</i>	V (1–5)	I (5)
<i>Leontodon autumnalis</i>	V (1–3)	II (1–3)
<i>Polygonum viviparum</i>	V (1–3)	
<i>Equisetum palustre</i>	IV (1–3)	I (1–3)
<i>Alchemilla glabra</i>	IV (1–5)	I (1–5)
<i>Cerastium fontanum</i>	II (1–3)	I (1–3)
<i>Angelica sylvestris</i>	II (1–3)	I (1)
<i>Sagina procumbens</i>	II (1–3)	I (1)
<i>Campanula rotundifolia</i>	II (1–3)	I (1–3)
<i>Salix reticulata</i>	II (1–3)	
<i>Hieracium</i> spp.	II (1–3)	
<i>Carex dioica</i>	II (1–3)	IV (1–5)
<i>Juncus bulbosus/kochii</i>	I (1)	III (1–3)
<i>Saxifraga stellaris</i>	I (1)	III (1–3)
<i>Thymus praecox</i>	I (1)	III (1–3)

a	b	II
V (1-7)	IV (1-5)	V (1-7)
IV (1-8)	IV (1-8)	IV (1-8)
IV (1-5)	V (1-5)	IV (1-5)
IV (1-7)	IV (1-5)	IV (1-7)
IV (1-3)	III (1-3)	IV (1-3)
IV (1-5)	III (1-5)	IV (1-5)
IV (1-5)	IV (1-5)	IV (1-5)
IV (1-5)	IV (1-5)	IV (1-5)
IV (1-5)	IV (1-5)	IV (1-5)
IV (1-5)	IV (1-5)	IV (1-5)
IV (1-5)	III (1-3)	IV (1-5)
IV (1-5)	II (1-3)	III (1-5)
IV (1-5)	II (1-3)	III (1-5)
III (1-5)	I (1)	II (1-5)
III (1-7)		II (1-7)
III (1-5)		II (1-5)
II (1-3)		I (1-3)
I (1-5)		I (1-5)
II (1-5)	III (1-5)	II (1-5)
II (1-3)	II (1-3)	II (1-3)
II (1-3)		I (1-3)
II (1-3)	I (1-5)	I (1-5)
II (1-5)		I (1-5)
I (1-3)		I (1-3)
I (1-3)		I (1-3)
I (1-3)		I (1-3)
I (1-3)		I (1-3)
I (1-3)		I (1-3)
I (1-3)		I (1-3)
III (1-5)	II (1)	II (1-5)
III (1-3)	I (1)	II (1-3)
III (1-3)		II (1-3)
II (1-3)	I (1-3)	I (1-3)

<i>Plantago maritima</i>		III (1–5)
<i>Agrostis canina canina</i>		III (1–3)
<i>Potentilla erecta</i>		III (1–3)
<i>Festuca rubra</i>		III (1–5)
<i>Ranunculus flammula</i>		III (1–3)
<i>Saxifraga oppositifolia</i>	I (1)	II (1–5)
<i>Philonotis fontana</i>	I (1)	II (1–3)
<i>Scapania undulata</i>	I (1–3)	II (1–5)
<i>Viola riviniana</i>	I (1)	II (1–3)
<i>Rhytidiadelphus triquetrus</i>		II (1–3)
<i>Calluna vulgaris</i>		II (1–3)
<i>Juncus squarrosus</i>		II (1–3)
<i>Scirpus cespitosus</i>		II (1–3)
<i>Geum rivale</i>		II (1–3)
<i>Carex echinata</i>		II (1–3)
<i>Taraxacum officinale</i> agg.		II (1–3)
<i>Hylocomium splendens</i>		II (1–3)
<i>Carex lepidocarpa</i>		II (1–5)
<i>Calliergon sarmentosum</i>		I (1–5)
<hr/>		
<i>Cratoneuron commutatum</i>	II (1–5)	II (1–9)
<i>Eleocharis quinqueflora</i>	I (1)	I (1–3)
<i>Fissidens adianthoides</i>	II (1–3)	I (1–3)
<i>Scorpidium scorpioides</i>		II (1–5)
<i>Carex hostiana</i>		I (1–5)
<i>Triglochin palustris</i>		I (1)
<i>Philonotis calcarea</i>		
<i>Carex rostrata</i>		
<i>Schoenus nigricans</i>		
<hr/>		
<i>Selaginella selaginoides</i>	III (1–3)	III (1–5)
<i>Tofieldia pusilla</i>	III (1–3)	II (1–5)
<i>Linum catharticum</i>	II (1–3)	II (1–3)
<i>Eriophorum angustifolium</i>		III (1–5)
<i>Euphrasia officinalis</i> agg.		III (1–3)
<i>Festuca vivipara</i>		III (1–7)
<i>Ctenidium molluscum</i>		II (1–3)
<i>Molinia caerulea</i>		II (1–5)



II (1-5)	I (1-5)	I (1-5)
II (1-3)	I (1)	I (1-3)
II (1-3)	I (1)	I (1-3)
II (1-5)	I (1-3)	I (1-5)
I (1-3)	I (1)	I (1-3)
I (1-5)	I (1)	I (1-5)
I (1-3)	I (1)	I (1-3)
I (1-5)		I (1-5)
I (1-3)		I (1-3)
I (1-3)	I (1)	I (1-3)
I (1-3)	I (1)	I (1-3)
I (1-3)	I (2)	I (1-3)
I (1-3)	I (1)	I (1-3)
I (1-3)	I (1)	I (1-3)
I (1-3)	I (1)	I (1-3)
I (1-3)		I (1-3)
I (1-3)		I (1-3)
I (1-5)		I (1-5)
I (1-5)		I (1-5)
<hr/>		
II (1-9)	V (1-8)	III (1-9)
I (1-3)	IV (1-10)	II (1-10)
I (1-3)	III (1-3)	II (1-3)
I (1-5)	III (1-7)	II (1-7)
I (1-5)	II (1-7)	I (1-7)
I (1)	II (1-3)	I (1-3)
	II (1-3)	I (1-3)
	II (1-7)	I (1-7)
	II (5-10)	I (5-10)
<hr/>		
III (1-5)	III (1-3)	III (1-5)
II (1-5)	II (1-3)	II (1-5)
II (1-3)	III (1-3)	II (1-3)
II (1-5)	III (1-3)	II (1-5)
II (1-3)	II (1-3)	II (1-3)
II (1-7)	II (1-5)	II (1-7)
II (1-3)	II (1-3)	II (1-3)
II (1-5)	II (1-5)	II (1-5)

Floristic table M11 (*cont.*)

	ai	aii	a	b	11
<i>Agrostis stolonifera</i>	II (1–3)	I (1)	I (1–3)	II (1–3)	I (1–3)
<i>Festuca ovina</i>	I (1–3)	II (1–5)	I (1–5)	II (1–3)	I (1–5)
<i>Tussilago farfara</i>	II (1–3)	I (1)	I (1–3)	I (1–3)	I (1–3)
<i>Dicranella palustris</i>	I (1)	II (1–3)	I (1–3)	I (1)	I (1–3)
<i>Alchemilla filicaulis filicaulis</i>	I (1)	II (1–3)	I (1–3)	I (1–3)	I (1–3)
<i>Calliergon cuspidatum</i>	I (1)	I (1)	I (1)	I (1–3)	I (1–3)
<i>Carex nigra</i>	I (1–5)	I (1–3)	I (1–5)	I (1–5)	I (1–5)
<i>Cardamine pratensis</i>	II (1–3)		I (1–3)	I (1–3)	I (1–3)
<i>Conocephalum conicum</i>	II (1–3)		I (1–3)	I (1)	I (1–3)
<i>Prunella vulgaris</i>	I (1)		I (1)	I (1–3)	I (1–3)
<i>Juncus alpinus</i>		I (1)	I (1)	I (1–3)	I (1–3)
<i>Erica tetralix</i>		I (1–3)	I (1–3)	I (1)	I (1–3)
<i>Pellia endiviifolia</i>		I (1–3)	I (1–3)	I (1–3)	I (1–3)
<i>Narthecium ossifragum</i>		I (1–3)	I (1–3)	I (1)	I (1–3)
<i>Succisa pratensis</i>		I (1–3)	I (1–3)	I (1–3)	I (1–3)
Number of samples	9	26	35	24	59
Number of species/sample	31 (18–38)	29 (12–53)	29 (12–53)	24 (10–40)	26 (10–53)
Herb height (cm)		9 (5–20)	9 (5–20)	28 (10–50)	
Herb cover (%)	30 (20–40)	63 (20–100)	54 (5–100)	80 (15–100)	
Bryophyte height (mm)		30	30	31 (5–50)	
Bryophyte cover (%)		18 (10–25)	18 (10–25)	18 (5–40)	
Slope (°)	61 (30–80)	20 (1–50)	32 (1–80)	21 (0–85)	27 (0–85)
Altitude (m)	764 (740–820)	582 (213–853)	573 (213–853)	415 (30–883)	510 (30–883)
Soil pH		5.5	5.5	6.6	

a *Thalictrum alpinum*-*Juncus triglumis* sub-communityai *Polygonum viviparum* variantaii *Juncus bulbosus/kochii*-*Saxifraga stellaris* variantb *Cratoneuron commutatum*-*Eleocharis quinqueflora* sub-community11 *Carici-Saxifragetum aizoidis* (total)

