M32
Philonotis fontana-Saxifraga stellaris spring
Philonoto-Saxifragetum stellaris Nordhagen 1943

Synonymy
Philonotis association Smith 1911 *p.p.*; *Philonotis-Saxifraga stellaris* bryophyte flush Pearsall 1950; *Philonoto-Saxifragetum stellaris sensu* McVean & Ratcliffe 1962, Eddy *et al.* 1969, Birks 1973; *Poa annua-Montia fontana* nodum Eddy *et al.* 1969; *Philonotis fontana-Saxifraga* nodum Edgell 1969; *Philonotis* flushes Meek 1976; *Philonotis* springs Ferreira 1978; *Philonotis-Chrysosplenium-Poa subcaerulea* hanging mats Ferreira 1978; *Chrysosplenium-Montia* springs Ferreira 1978; *Scapania undulata-Philonotis fontana* nodum Huntley 1979; *Montio-Philonotidetum fontanae* (Bük & Tüxen in Bük 1942) Birse 1980; *Nardia compressa* Community Birse 1980 *p.p.*

Constant species
Saxifraga stellaris, *Philonotis fontana*.

Rare species
Alopecurus alpinus, *Cerastium cerastoides*, *Epilobium alsinifolium*, *Koenigia islandica*, *Myosotis stolonifera*, *Phleum alpinum*, *Sedum villosum*, *Bryum schleicheri* var. *latifolium*, *B. weigelii*, *Oncophorus virens*, *Pohlia ludwigii*, *P. wahlenbergii* var. *glacialis*, *Splachnum vasculosum*, *Scapania paludosa*, *Tritomaria polita*.

Physiognomy
The *Philonoto-Saxifragetum stellaris* comprises bryophyte-dominated springs, flushes and rills of very striking appearance. *Philonotis fontana* is the usual dominant, its fresh-green picking out stands of the community from a distance, but often abundant too are *Dicranella palustris*, luxuriant and golden-green, and *Scapania undulata*, forming patches which range from vivid-green to reddish-purple (those at the latter extreme once being classified as *S. dentata*, as in McVean & Ratcliffe's (1962) samples). The cover is sometimes broken by patches of wet soil, but often densely swollen into hummocks or plush mats or forming hanging carpets over steep dripping ground. Less consistent through the community as a whole, but also able to show local prominence, catching the eye as splashes of pink, bronze or deep green, are *Sphagnum auriculatum*, *Scapania uliginosa*, *Calliergon sarmentosum*, *Drepanocladus exannulatus*, *D. fluitans* and, not very frequent overall but rather characteristic of this vegetation, *Jungermannia exsertifolia*. *Bryum pseudotriquetrum* is also quite common and patchily abundant but it is not so consistent here as in more base-poor springs and *Cratoneuron commutatum* and *C. filicinum*, typical dominants in such situations, are noticeably scarce.

Other bryophytes found occasionally at generally low covers include *Nardia scalaris* and *N. compressa*, the latter especially where the community occurs around bouldery rills, *Polytrichum commune*, *Calliergon cuspidatum*, *C. stramineum*, *Chiloscyphus polyanthos*, *C. pallescens*, *Brachythecium rivulare*, *B. plumosum*, *Rhizomnium punctatum*, *Sphagnum squarrosum*, *Pellia epiphylla* and *Aneura pinguis*. Then, among rarer taxa, the vegetation provides a locus for *Oncophorus virens*, *Bryum weigelii*, *B. schleicheri* var. *latifolium*, *Scapania paludosa* and *Tritomaria polita* (Eddy *et al.* 1969, Birks 1973, Birse 1980). *Splachnum vasculosum*, and perhaps also *Aplodon wormskjoldii*, two species characteristic of wet rotting animal dung, are particularly associated with this kind of spring (Pigott 1956*a*, McVean & Ratcliffe 1962). *Pohlia wahlenbergii* var. *glacialis* and *P. ludwigii* can also be found in some stands, though they are much more typical of the closely-related *Pohlietum glacialis* snowbed springs.

The associated vascular flora of the *Philonoto-Saxifragetum* is rather varied in its composition and cover, though typically it is species-poor and of low total abundance. The only constant species is *Saxifraga stellaris* but, though this is by no means confined to this community, its scattered rosettes and delicate white flowers, set off against the moss carpet, are very characteristic and it provides a strong floristic link with similar Arctic-Alpine flushes in other parts of Europe. Its British distribution is generally coincident with that of

the community, though, both within its heartland and towards the fringes of its range, stands can be found from which it is lacking but which are otherwise of this same general character (e.g. Meek 1976, Birse 1980).

Other herbs frequent throughout are few but *Deschampsia cespitosa* (with ssp. *alpina* at higher altitudes: McVean & Ratcliffe 1962) is often found in small quantities and there are commonly some scattered plants of *Stellaria alsine*. More occasional overall are *Festuca rubra*, *Anthoxanthum odoratum*, *Agrostis stolonifera* and *A. canina*, all usually at low cover, with sparse *Viola palustris*, *Nardus stricta*, *Carex bigelowii* and *C. panicea*. However, in stands over substrates which are perhaps less base-poor, there is a distinctive enrichment in this element of the vegetation, with *Montia fontana* and *Chrysosplenium oppositifolium* becoming very frequent and locally abundant and *Caltha palustris* and *Cardamine pratensis* heading a substantial list of associates which help diagnose this less impoverished kind of spring.

Of rarer vascular plants, the *Philonoto-Saxifragetum* provides a locus for a variety of high-montane species. Among Arctic-Alpines, this is an important vegetation type for *Epilobium alsinifolium* and the rather more widespread *E. anagallidifolium*, for *Cerastium cerastoides* (though this is more frequently found in the *Pohlietum glacialis*) and for *Phleum alpinum*. In some sites, as at Caenlochan, this last can be found around these springs with another very rare grass, the Arctic-Subarctic *Alopecurus alpinus*, which seems to prefer the somewhat wetter spots in the middle of the rills (Raven & Walters 1956). *Sedum villosum* and *Myosotis stolonifera* have also been recorded here and, around The Storr on Skye, where it was first found only in 1934, *Koenigia islandica* can sometimes be seen on stony patches within flushes of this kind (Raven & Walters 1956, Birks 1973).

Sub-communities

***Sphagnum auriculatum* sub-community:** *Philonoto-Saxifragetum*, *Sphagnum* facies McVean & Ratcliffe 1962. In this, very much the more species-poor kind of *Philonoto-Saxifragetum*, the bryophyte mat consists of mixtures of *P. fontana*, *S. undulata* and *D. palustris* with *Sphagnum auriculatum* strongly preferential and often abundant, *Calliergon sarmentosum* and *Scapania uliginosa* occasional and locally prominent, and *Polytrichum commune* and *Hygrohypnum ochraceum* also occurring at low frequencies. Among the vascular plants, only *S. stellaris* and *D. cespitosa* are constant but other grasses, such as *Agrostis stolonifera*, *A. capillaris*, *Anthoxanthum* and *Festuca rubra* are quite frequent as scattered tufts and *Stellaria alsine* and *Viola palustris* are occasional.

***Montia fontana-Chrysosplenium oppositifolium* sub-community:** *Philonoto-Saxifragetum*, species-rich facies McVean & Ratcliffe 1962. Vascular plants in particular are more numerous and varied in this sub-community, although bryophytes still generally have overall dominance. As before, *P. fontana*, *D. palustris* and *S. undulata* are all very common and each, especially the first, can be abundant in the carpet, though *S. auriculatum* and the other low-frequency bryophytes preferential to the *Sphagnum* sub-community are very scarce. Here, by contrast, *Bryum pseudotriquetrum* becomes frequent and *Jungermannia exsertifolia* occasional and each can have locally high covers. *Drepanocladus exannulatus*, *D. fluitans* and *D. revolvens* are all occasional and sometimes quite abundant and there can be records too for *Calliergon cuspidatum*, *C. stramineum*, *Chiloscyphus polyanthos*, *C. pallescens*, *Brachythecium rivulare*, *Pellia epiphylla* and *Aneura pinguis*.

Striking among the herbs is the high frequency, along with *S. stellaris*, of *Montia fontana* and *Chrysosplenium oppositifolium*, which occur very occasionally in the *Sphagnum* sub-community but which are here constant and sometimes abundant among the bryophytes. Then, along with the community species *Stellaria alsine*, there are very often some plants of a diminutive form of *Caltha palustris* (sometimes elevated to ssp. *minor*: Clapham *et al.* 1962), of *Cardamine pratensis* and occasionally of *Ranunculus flammula*, *R. acris*, *Cerastium fontanum* and *Equisetum palustre*. *Epilobium palustre* can sometimes be found but more distinctive is the quite frequent occurrence of *E. alsinifolium* and *E. anagallidifolium*, the small Arctic-Alpine willow-herbs with noticeably drooping flowers.

Grasses and sedges can be quite common, too, with *Deschampsia cespitosa* often joined by *Anthoxanthum* and *Agrostis canina*, less commonly by *Festuca rubra*, *F. ovina*, *Poa annua*, *P. trivialis* and *P. subcaerulea*, and *Carex nigra*, *C. echinata*, *C. demissa*, *C. bigelowii*, *C. panicea* and *Eriophorum angustifolium*. Typically, these all occur at fairly low covers, though occasionally members of this group can be more abundant: in some stands at Moor House in Cumbria, for example (Eddy *et al.* 1969), *Poa annua* is especially prominent, and small sedges and grasses can thicken up around the edges of springs where there is a transition to flushed grassland.

With the fairly modest base-enrichment that seems to be characteristic of even these richer stands of the *Philonoto-Saxifragetum*, calcicoles are not strongly represented but some springs can be found in which species such as *Cratoneuron* spp., *Pinguicula vulgaris*, *Selaginella selaginoides*, *Carex pulicaris* and *Saxifraga hypnoides* bring the community close to Cratoneurion vegetation.

Habitat

The *Philonoto-Saxifragetum* is a community of springs and rills at moderate to high altitudes where there is continuous irrigation with circumneutral and oligotro-

phic waters. The harsh montane environment has a strong influence on the composition of the community and, though stands can be grazed and trampled, climatic and soil conditions probably play the major part in maintaining the vegetation as an effective climax.

This is one of the most common and widespread types of spring vegetation in the uplands of north-west Britain and it is ultimately dependent on the kind of sustained and fairly vigorous irrigation by ground waters that is commonplace in the rainier parts of the country. Throughout the range of the community, annual precipitation is almost everywhere in excess of 1600 mm (*Climatological Atlas* 1952), with at least 180 wet days yr^{-1} (Ratcliffe 1968), and, in this zone, it marks out places where such heavy and consistent rainfall feeds permanent springs of a well-defined character, more diffuse flushes and seepage lines, rills and small streams and occasionally steep, dripping ground. In some sites, too, snow-melt is an important source of irrigating waters, though this community is not so consistently associated with such situations as is the closely-related *Pohlietum glacialis*.

Where flushing is more vigorous, the *Philonoto-Saxifragetum* can be found on almost level ground but sloping sites are more usual, either over evenly aggraded hill slopes or valley sides or where there are declivities as at the foot of screes or cliffs. The soils are often of a primitive character, sometimes little more than fragmentary accumulations of silt among stones with decaying organic matter beneath the bryophyte carpet, but the community can also be found on flushed peats and over gleys around springs. The profiles are, however, typically waterlogged to the surface or often submerged for most of the year, and the constancy of irrigation is reflected in the general luxuriance of the mosses and liverworts and in the prevalence among them of species such as *Philonotis fontana*, *Dicranella palustris*, *Scapania undulata*, *Bryum pseudotriquetrum*, *Brachythecium rivulare* and *Calliergon* spp., characteristic of sodden or continually splashed ground in a variety of flush and stream habitats.

The number of other plants, particularly vascular species, which find such conditions congenial is limited, but there are two further factors which constrain the character of the associated flora. The first is temperature, both of the air and of the spring waters, for this is a community of the colder reaches of our uplands, limited in general to sites above 450 m and reaching over 1000 m, in north Wales, the Pennines and the Lake District, southern Scotland and the Highlands. Throughout this range, annual accumulated temperatures are generally less than 800 day-degrees C (Page 1982) with mean annual maxima always below 24 °C, less than 22 °C over much of the heartland of the community in Scotland (Conolly & Dahl 1970). The irrigating waters are likewise consistently cold, though probably not as frigid as in the *Pohlietum glacialis*. The best single indicator of such conditions here is *Saxifraga stellaris*, but other Arctic-Alpines like *Epilobium alsinifolium*, *E. anagallidifolium* and the rarer montane herbs and bryophytes show a similar response and help give this kind of spring its distinctive character. *Myosotis secunda*, on the other hand, which towards the northern part of its European range is not really a plant of high mountains, and *Ranunculus omiophyllus*, an Oceanic West European species, hardly ever figure here, though they occur commonly enough in similar Montion springs in the less cold upland fringes of south-west Britain.

A few other herbs of this community have a widespread distribution throughout Britain but show tolerance of the lower temperatures here. *Deschampsia cespitosa* (with ssp. *alpina* at higher altitudes) and *Stellaria alsine* are the most common of these, the latter in particular providing floristic continuity with similar vegetation at lower altitudes. Apart from these, however, the herbaceous element of the community is further limited by the chemical character of the irrigating waters, particularly by their base-poverty, perhaps also by their poor trophic state. By and large, the waters here are circumneutral, with pH in available samples ranging from about 4.5 to 6.0, and the vegetation is thus found over a wide variety of rock types, including shales, sandstones, quartzites, schists and granite, but it is generally absent from limestone landscapes except where there is seepage from patches of decalcified drift or weathering residues. This is what strictly limits the contribution of calcicolous herbs and bryophytes here, a potentially large spring and flush flora, even at these altitudes.

Even within the fairly narrow range of base-richness encompassed by the community, soil reaction seems to have some effect on floristic variation within it. Thus, the *Sphagnum* sub-community, with its very impoverished vascular element, occurs mainly on the harder acidic quartzites and sandstones of the north-west Highlands and indeed may be the only type of *Philonoto-Saxifragetum* in that area. The *Montia-Chrysosplenium* sub-community, on the other hand, is associated with a diversity of substrates perhaps only marginally more base-rich but sufficiently so to favour the quite luxuriant growth of *Montia fontana*, *Chrysosplenium oppositifolium* and its other numerous preferentials. The irrigating waters in this kind of spring may also be somewhat less impoverished in major nutrients than those flushing the *Sphagnum* sub-community.

In general, however, conditions here are oligotrophic and this, together with the harsh climatic regime is probably sufficient to prevent any seral succession. Stands are often open to grazing, though, and, particularly at lower altitudes, cropping of the herbage and trampling of the ground may help set back the growth of any invading shrubs or trees.

Zonation and succession

The springs and flushes that characteristically support the *Philonoto-Saxifragetum* can arise in and flow through a wide variety of vegetation types around our upland fringes and through the montane zone. Either on its own, or in association with other kinds of spring, it can pass to mire, heath or grassland or, at higher altitudes, to bryophyte and lichen communities and snow-bed vegetation. It is essentially a permanent community though, at lower altitudes, could perhaps show some successional development in ungrazed situations.

Very often, the *Philonoto-Saxifragetum* itself marks out the head of a spring or core of a flush, frequently occurring as a small stand of just a few square metres' extent, sometimes much less, or extending as a very narrow strip down rills and the sides of small streams. Quite commonly, a series of such stands will occur across a slope or at its foot, marking some geological disjunction, and, where these are grouped close to one another, they can form a single complex mosaic with the local vegetation types. In very vigorous springs, particularly those on steeper ground where the gradient of waterlogging can die away rapidly, boundaries between the *Philonoto-Saxifragetum* and its context can be very sharp with next to no floristic continuity between the vegetation types: such stark patterning is often visible in a marked colour contrast between the fresh-green of the spring and the dull-green or russet of its surrounds. In other situations, flushing is more diffuse, with the stands more extensive but much less well-defined from their context, something which is again often visible to the eye from a distance but evident at close quarters in a gradual zonation between the community and its neighbouring vegetation.

Even in these latter situations, however, the typical bryophytes of the *Philonoto-Saxifragetum* and species such as *Montia fontana* and *Chrysosplenium oppositifolium* rarely extend far out of the spring or flush core and continuity is generally provided by the grasses and sedges that occur in the community. Transitions thus tend to be most gradual where flushes occur within tracts of Nardo-Galion swards such as the *Festuca-Agrostis-Galium* and *Nardus-Galium* grasslands which extend into the higher reaches of the sub-montane zone. More abrupt switches can be seen where the *Philonoto-Saxifragetum* occupies springs emerging in a variety of Nardo-Callunetea dry heaths, Ericion tetralicis wet heath and Erico-Sphagnion blanket mire and among Caricetea curvulae communities of high altitudes.

Complications arise where the *Philonoto-Saxifragetum* passes to other vegetation types of waterlogged ground where the water-flow is less vigorous or where there is some increase in base- or nutrient-richness along the length of a flush or water-track, and such communities can form a transition zone around the spring core. At lower altitudes, the *Philonoto-Saxifragetum* can occur at the head of *Carex echinata-Sphagnum* mires but in the montane zone it is more often found in association with the *Carex-Sphagnum russowii* mire which can surround a spring or rill and grade from it to *Calluna-Eriophorum* mire. In other cases, high-altitude stands occur with vegetation types of snow-beds or melt-water flushes and streams, such as the *Sphagno-Anthelietum*, in which there is less vigorous irrigation, and the *Pohlietum glacialis*, where there is longer snow-lie and colder waters.

Distribution

The community is common and widespread above 450 m through the Scottish Highlands, the Southern Uplands, the Lake District and north Wales and over the non-calcareous parts of the Pennines. At lower altitudes throughout its range and particularly towards the southern limit of its distribution, fragmentary stands can be found which lack the more specifically montane element but which are otherwise of the same general character.

Affinities

This kind of spring vegetation was early recognised as of a distinctive character (*e.g.* Smith 1911*b*, Pigott 1956*a*, Pearsall 1968) though not systematically described until the account of Scottish Highland stands provided by McVean & Ratcliffe (1962). The description here has used their data, together with samples from other parts of Scotland (Birks 1973, Meek 1976, Ferreira 1978, Huntley 1979, Birse 1980), Wales (Edgell 1969) and northern England (Eddy *et al.* 1969), characterising more sharply what McVean & Ratcliffe recognised as a crude distinction between stands with *Sphagnum auriculatum* and the rest. The former could perhaps be seen as a floristic transition to the spring vegetation of the Anthelion but, in general, the affinities of the community are clearly with the Cardamino-Montion and, more particularly, with the sub-alliance Montion which includes higher-altitude springs and flushes of unshaded situations in which such plants as *Montia fontana*, *Saxifraga stellaris*, *Stellaria alsine*, *Epilobium alsinifolium*, *Philonotis fontana*, *Bryum weigelii* and *B. schleicheri* occur. For us, the *Philonoto-Saxifragetum* constitutes the most widespread and common of our Montio-Cardaminetea communities and is therefore the standard against which related vegetation types can be judged. From this perspective, stands with little more than *P. fontana* and *D. palustris*, which are widespread in the uplands of south Wales and also found in south-west England, look to be very fragmentary forms of the community. *Bryum weigelii* springs, which have been recorded from the Long Mynd in Shropshire, could also perhaps be

regarded in this light. Further work on such vegetation would be well worthwhile.

Meanwhile, it is possible to see the *Philonoto-Saxifragetum* as a fairly well-defined and consistent unit with its closest relative in the *Montia-Ranunculus* spring which largely replaces it in the more lowland and oceanic climate of south-west Britain. It is fairly well marked off from the more base-rich springs and flushes of the Cratoneurion by the absence or great scarcity here of *Cratoneuron* spp. themselves, *Philonotis calcarea* and *Saxifraga aizoides*, although some of the more catholic Montio-Cardaminetea herbs maintain their frequency in both communities. As McVean & Ratcliffe (1962) noted, the vegetation included in the community is virtually identical with the *Philonoto-Saxifragetum* as first described by Nordhagen (1943) from Norway and later by Dahl (1956), Persson (1961) and Fransson (1963) from other parts of Scandinavia, from Greenland (Böcher 1954), from Iceland (Hadač 1971) and from central Europe (Braun-Blanquet 1948, Oberdorfer 1957), and incorporating essentially similar vegetation described in an early account from the Faroes (Ostenfeld 1908).

Floristic table M32

	a	b	32
Philonotis fontana	V (1–10)	V (1–8)	V (1–10)
Saxifraga stellaris	IV (1–5)	IV (1–5)	IV (1–5)
Sphagnum auriculatum	IV (1–10)	I (1–5)	II (1–10)
Agrostis stolonifera	III (1–5)	I (1–4)	II (1–5)
Calliergon sarmentosum	II (1–9)	I (1–9)	I (1–9)
Polytrichum commune	II (1–3)	I (1–3)	I (1–3)
Scapania uliginosa	II (1–9)		I (1–9)
Agrostis capillaris	II (1–5)		I (1–5)
Juncus bulbosus	I (1–5)		I (1–5)
Hygrohypnum ochraceum	I (1–3)		I (1–3)
Jungermannia sphaerocarpum	I (1)		I (1)
Sphagnum teres	I (1)		I (1)
Montia fontana	I (1–4)	IV (1–8)	III (1–8)
Chrysosplenium oppositifolium	I (1–5)	IV (1–5)	III (1–5)
Anthoxanthum odoratum	II (1–3)	III (1–5)	II (1–5)
Agrostis canina canina	I (1–4)	III (1–4)	II (1–4)
Caltha palustris	I (1–4)	III (1–4)	II (1–4)
Bryum pseudotriquetrum		III (1–6)	II (1–6)
Cardamine pratensis		III (1–4)	II (1–4)
Carex nigra		III (1–5)	II (1–5)
Epilobium alsinifolium		III (1–2)	II (1–2)
Epilobium palustre	I (1–2)	II (1–3)	II (1–3)
Eriophorum angustifolium	I (1–3)	II (1–3)	II (1–3)
Epilobium anagallidifolium	I (1–3)	II (1–2)	II (1–3)
Cerastium fontanum		II (1–4)	II (1–4)
Jungermannia exsertifolia		II (1–7)	II (1–7)
Calliergon cuspidatum		II (1–4)	II (1–4)
Ranunculus acris	I (1–3)	II (1–4)	I (1–4)
Carex echinata	I (1–4)	II (1–3)	I (1–4)
Carex demissa	I (1–3)	II (1–6)	I (1–6)
Chiloscyphus polyanthos	I (1–3)	II (1–4)	I (1–4)
Ranunculus flammula		II (1–3)	I (1–3)
Poa annua		II (4–8)	I (4–8)
Equisetum palustre		II (1–3)	I (1–3)

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Floristic table M32 *(cont.)*

	a	b	32
Pellia epiphylla		II (1–3)	I (1–3)
Festuca ovina		II (1–4)	I (1–4)
Brachythecium rivulare		II (1–4)	I (1–4)
Cratoneuron filicinum		II (1–6)	I (1–6)
Sagina procumbens		I (1–4)	I (1–4)
Poa trivialis		I (1–4)	I (1–4)
Aneura pinguis		I (1–3)	I (1–3)
Alopecurus alpinus		I (1–4)	I (1–4)
Rumex acetosa		I (1–4)	I (1–4)
Calliergon stramineum		I (1–3)	I (1–3)
Drepanocladus revolvens		I (1–4)	I (1–4)
Juncus articulatus		I (1–4)	I (1–4)
Cardamine flexuosa		I (1–4)	I (1–4)
Bryum weigelii		I (1–4)	I (1–4)
Alchemilla glabra		I (1–4)	I (1–4)
Veronica serpyllifolia		I (1–3)	I (1–3)
Drepanocladus fluitans		I (1–7)	I (1–7)
Selaginella selaginoides		I (1–3)	I (1–3)
Pinguicula vulgaris		I (1–3)	I (1–3)
Galium palustre		I (1–3)	I (1–3)
Geum rivale		I (1–3)	I (1–3)
Marchantia polymorpha		I (1–3)	I (1–3)
Chiloscyphus pallescens		I (1–3)	I (1–3)
Saxifraga hypnoides		I (1–4)	I (1–4)
Thalictrum alpinum		I (1–4)	I (1–4)
Polygonum viviparum		I (1–4)	I (1–4)
Plagiomnium ellipticum		I (1–4)	I (1–4)
Juncus effusus		I (1–4)	I (1–4)
Sphagnum subnitens		I (1–5)	I (1–5)
Myosotis stolonifera		I (1–4)	I (1–4)
Carex pulicaris		I (1–4)	I (1–4)
Juncus triglumis		I (1–4)	I (1–4)
Prunella vulgaris		I (1–6)	I (1–6)
Euphrasia frigida		I (1–3)	I (1–3)
Cratoneuron commutatum		I (1–3)	I (1–3)
Brachythecium plumosum		I (1–4)	I (1–4)
Bellis perennis		I (1–3)	I (1–3)
Scapania undulata	IV (1–7)	III (1–4)	III (1–7)
Deschampsia cespitosa	IV (1–4)	III (1–4)	III (1–4)
Dicranella palustris	III (1–9)	IV (1–9)	III (1–9)
Stellaria alsine	II (1–3)	III (1–4)	III (1–4)
Festuca rubra	II (1–4)	II (1–4)	II (1–4)
Drepanocladus exannulatus	II (1–9)	II (1–6)	II (1–9)
Viola palustris	I (1–3)	I (1–3)	I (1–3)
Nardus stricta	I (1–3)	I (1–4)	I (1–4)

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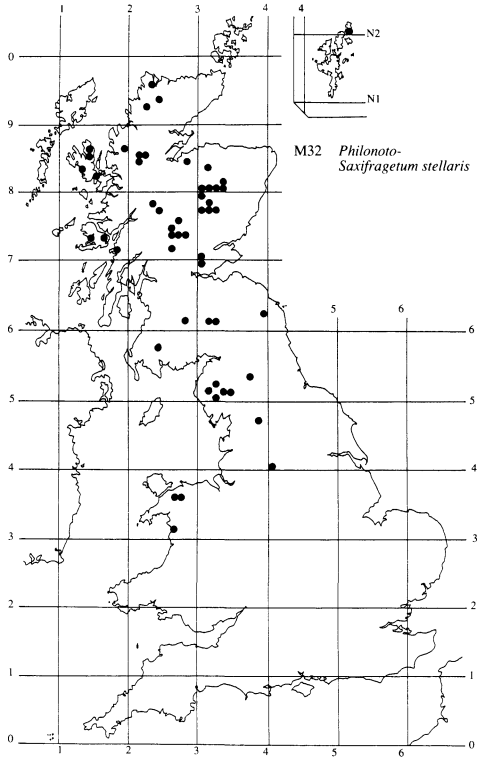
Carex bigelowii	I (1–3)	I (1–3)	I (1–3)
Carex panicea	I (1–3)	I (1–4)	I (1–4)
Nardia scalaris	I (1–3)	I (1–4)	I (1–4)
Leontodon autumnalis	I (1–3)	I (1–3)	I (1–3)
Rhizomnium punctatum	I (1–3)	I (1–3)	I (1–3)
Sphagnum squarrosum	I (1–3)	I (1–5)	I (1–5)
Rhytidiadelphus squarrosus	I (1–3)	I (1–8)	I (1–8)
Juncus squarrosus	I (1–3)	I (1–3)	I (1–3)
Number of samples	28	52	80
Number of species/sample	11 (5–24)	22 (6–42)	18 (5–42)
Altitude (m)	729 (210–1129)	686 (138–976)	701 (138–1129)
Slope (°)	7 (0–90)	14 (0–45)	12 (0–90)

a *Sphagnum auriculatum* sub-community
b *Montia fontana-Chrysosplenium oppositifolium* sub-community
32 *Philonoto-Saxifragetum stellaris* (total)



https://doi.org/10.1017/9780521391658.036 Published online by Cambridge University Press