M14
Schoenus nigricans-Narthecium ossifragum mire

Synonymy

Schoenetum Newbould 1960; Roydon Common Zone 5a Daniels & Pearson 1974 *p.p.*; *Schoenetum nigricantis* Ivimey-Cook *et al.* 1975; *Schoeno-Juncetum subnodulosi ericetosum* (Allorge 1922) Wheeler 1980*b p.p.*

Constant species

Anagallis tenella, *Erica tetralix*, *Molinia caerulea*, *Narthecium ossifragum*, *Schoenus nigricans*, *Aneura pinguis*, *Campylium stellatum*, *Scorpidium scorpioides*, *Sphagnum auriculatum*, *S. subnitens*.

Physiognomy

The *Schoenus nigricans-Narthecium ossifragum* mire includes mildly calcicole *Schoenus* vegetation of south-west lowland Britain which cannot readily be integrated in the *Schoenetum*. As in that community, *Schoenus* is usually a strong dominant here, and its grey-green, semi-evergreen foliage often enables stands to be picked out at a distance from their usual context of brown- or straw-coloured *Sphagnum*-dominated vegetation or heaths. And the tussock habit of the plant, with its robust rootstocks crowned by densely-caespitose clumps of shoots (Sparling 1962*a*, 1968), again gives the vegetation its distinctive structural character, with stools packed at varying densities and separated by systems of runnels. The tussock tops provide their characteristic niche for calcifuges but, in this community, the calcicolous element is confined to areas of close contact with the irrigating waters, other distinctive plants making an appearance around the bases of the tussocks.

Species occurring frequently in both communities are few in number and the most obvious is *Molinia caerulea*, which is generally abundant here, reinforcing the tussocky character of the vegetation. Typically, mixtures of *Schoenus* and *Molinia* cover the bulk of the ground without any *Juncus subnodulosus*, a species that is quite often co-dominant in the *Schoenetum*. Indeed, no other rushes or sedges of medium stature play an important role in this community: there is occasionally some *J. acutiflorus*, but it is not usually abundant. Other elements conspicuous by their absence are the various small sedges and other herbs that commonly line the runnels of the *Schoenetum* and provide much of its calcicolous stamp, and the taller mesophytic plants that give that community much of its colour: of these only *Carex panicea* and *C. demissa* are occasionally found, and sometimes *Dactylorhiza incarnata* ssp. *pulchella*.

Among other vascular plants represented here, only *Anagallis tenella* provides a floristic link between the two communities. More preferential to this vegetation type, and sometimes occurring in modest abundance, is *Narthecium ossifragum* and, less commonly, there can be some *Drosera rotundifolia* growing on *Sphagnum* cushions and sometimes, in wetter places, *D. intermedia*, *Eriophorum angustifolium*, *Rhynchospora alba*, *Eleocharis multicaulis* and *Pinguicula lusitanica*. Then, growing on the *Schoenus* or *Molinia*, there is very often some *Erica tetralix* and occasionally *Calluna vulgaris*. Some stands also have a local abundance of *Myrica gale* forming a low, bushy canopy.

Bryophytes are variable in their cover but this component, too, shows a shift towards a less calcicolous character. With the *Schoenetum*, the community shares frequent records for *Campylium stellatum* and *Aneura pinguis* and these, together with *Scorpidium scorpioides* and, less commonly, *Drepanocladus revolvens*, can form quite extensive mats in the wetter runnels, over very young *Schoenus* tussocks or around the bases of older, larger ones. By contrast, *Calliergon cuspidatum*, *Cratoneuron commutatum* and *C. filicinum*, which are a common feature in the runnels of the *Schoenetum*, and *Bryum pseudotriquetrum* and larger Mniaceae which figure often on the tussock sides, are either scarce or absent here. Certain Sphagna, on the other hand, which make but an infrequent appearance in the *Schoenetum*, become a consistent feature of this vegetation, growing on the tussocks or on top of a mat of other bryophytes raised a little above the level of the moister ground.

Sphagnum subnitens is the commonest species, but *S. auriculatum* is also frequent and there is occasionally some *S. papillosum*, *S. palustre*, *S. tenellum* or *S. recurvum*. *Hypnum jutlandicum* is also preferential to this community and there are sometimes patches of hepatics like *Kurzia pauciflora*, *Calypogeia* spp. (variously recorded as *C. muellerana*, *C. trichomanis* or *C. fissa*) and, less commonly, *Odontoschisma sphagni*, *Cephalozia connivens* and *C. bicuspidata*.

Habitat

The *Schoenus-Narthecium* mire is characteristic of peats and mineral soils irrigated by moderately base-rich and calcareous ground waters. It can be associated with more markedly soligenous zones within valley mires, but occurs more characteristically as isolated flushes among wet heath and moorland vegetation. It is largely a community of the oceanic south-west of Britain, its floristics betraying the influence of the relatively mild climate there.

By and large, *Schoenus* is a plant of base-rich habitats in the southern lowlands of Britain, not penetrating far into more acidic environments until the climate becomes markedly oceanic, first in the north-west of Scotland, where it can be found in flushed areas within blanket mires, and then in Ireland, where it occurs on the bog plane proper, a trend which Sparling (1962*b*, 1967*a*, *b*) has related to climatic amelioration of aluminium concentrations in the substrate. In the *Schoenetum*, in which most of the southerly stands of *Schoenus* mire fall, the vegetation thus takes most of its character from the influence of the calcareous substrate and the moderately Continental climate on the associated flora. The *Schoenus-Narthecium* mire, on the other hand, includes *Schoenus* vegetation from habitats which show a distinct shift towards the more base-poor and oceanic conditions prevailing further to the north and west, and it is the differences in these two edaphic and climatic factors that primarily determine the floristics of the community.

Typically, here, the pH of the flushing waters is in the range 5 to just over 7 (compared with 6.5–8 for the *Schoenetum*), with dissolved calcium levels rather variable, but mostly from 5 to 35 mg l^{-1} (compared with 60–200 mg l^{-1}) (Newbould 1960, Daniels & Pearson 1974, Wheeler 1983). This means that, even where the vegetation is in close contact with the water table, characteristically maintained at high levels throughout the year in the runnels, any calcicolous expression is limited. More basiphile species are best represented among the mat-forming bryophytes but, even there, are few in number and can themselves serve as an insulating layer upon which calcifuge plants can readily establish (cf. Clapham 1940). Thus, although there is the same structural diversity as in the *Schoenetum*, the edaphic character of the different microhabitats – runnels, tussock sides and tops – is more uniform and the total flora less varied and rich. The positive response to the difference in soil conditions is , in fact, not so marked as is the absence of calcicoles, but nonetheless represents a decisive move towards the kind of vegetation in which *Schoenus* occurs in western ombrogenous mires, with the increase in Sphagna and bog herbs such as *Narthecium* and *Drosera rotundifolia*. Among the former, however, major peat-builders such as *S. papillosum* are not well represented. In the typical habitats of the *Schoenus-Narthecium* mire, an increase in such species in a luxuriant ground carpet marks a move to more acidic and stagnant conditions inimical to the vigour of *Schoenus* in southern Britain.

Continuous irrigation with moderately base-rich and calcareous waters is an uncommon phenomenon in lowland Britain and it usually occurs within tracts of largely lime-poor rocks and superficials, where flushing provides a local amelioration of prevailingly acidic soil conditions. In many cases, the specific geological contribution to base-enrichment is a modest one, increase in pH and calcium being mostly a reflection of the concentration of the flushing waters along lines of strong soligenous flow. Stands of the community can be found in such situations on Eocene clays, sands and gravels in south Dorset and Hampshire, on the Triassic pebble-beds of Devon and on the metamorphosed Killas shales in Cornwall.

In such situations, the *Schoenus-Narthecium* mire can be found on a variety of soil types, provided the general edaphic requirements are met. In slope flushes, the profile is usually some kind of wet mineral soil, on occasion very ill-structured, sloppy and gravelly, in other cases a better differentiated surface water gley, with or without a humic top. From such soils, there is a complete transition through to the moderately deep peats that have accumulated in elongated hollows under the influence of soligenous seepage to form valley mires. The profiles under the *Schoenus-Narthecium* mire are characteristically very poor in major nutrients, particularly phosphorus, and, if there is any eutrophication, as with the regular deposition of allochthonous silt, this vegetation is sharply replaced by some sort of Phragmitetalia fen, with its suite of helophytes, large sedges and tall dicotyledons.

The *Schoenus-Narthecium* mire is found on this range of soil types only within central southern and south-west England. Increased oceanicity in this region with its relatively high humidity may play some part in the extension of *Schoenus* into the moderately base-poor conditions typical here. Climate certainly plays some part in the occurrence of plants with a predominantly western distribution in Britain, like *Anagallis tenella*, and, also characteristic of *Schoenus* flushes in north-west Scottish blanket mires, *Drosera intermedia* and *Pinguicula lusitanica*. By contrast with the *Schoenetum*,

more Continental species are poorly represented though, since some of these are calcicolous or mesophytic plants, this may be a coincidental effect of the differing edaphic conditions.

Even within this part of Britain, the community is very local, partly because of the natural scarcity of suitable habitats, but also because of the reduction in their extent by human activity. Occasional burning or light grazing, still of common occurrence over the tracts of heath in which this kind of mire usually occurs, are probably not very damaging: indeed, they may help maintain the vegetation by repeatedly setting back any invasion of woody plants. Stands on wetter ground within valley mires are protected to some extent from the worst effects of such treatments, though can be brought under their influence by draining. This is very damaging to flush and bog sites alike and has often been a prelude to agricultural improvement of areas of heathland in which the community may have been well represented.

Zonation and succession

The *Schoenus-Narthecium* mire is typically found in zonations and mosaics with valley bog and heath communities whose distribution reflects edaphic and hydrological variation. Some stands would probably progress to woodland in the absence of burning or grazing.

Where the community occurs in valley mires, it typically occupies the zones of moderate soligenous enrichment with bases and calcium, passing laterally to the *Narthecio-Sphagnetum* on more impoverished and acid peats with a more stagnant water-table, the transition being marked by the disappearance of *Schoenus* and the extension of the carpet of peat-building Sphagna. *Molinia* and *E. tetralix* continue to be well represented on the more raised areas and *Rhynchospora alba* becomes common, particularly around wetter hollows, where *Sphagnum auriculatum* pools can be found. Base-poor soligenous tracts in such sequences can have Littorelletea vegetation like the *Hyperico-Potametum*.

Characteristically, the *Narthecio-Sphagnetum* gives way around valley mires to the *Ericetum tetralicis* and, in some places, this community can be found in direct contact with the *Schoenus-Narthecium* mire, grading to it through the *Succisa-Carex* sub-community. Such vegetation may also form a surround to the community where it occurs as slope flushes within tracts of heath, but often it grades in such situations to some kind of Junco-Molinion grassland, in which *Molinia* is an overwhelming dominant and where *Schoenus* can be sporadically represented, a pattern well seen on the Aylesbeare Common heaths in Devon, described by Ivimey-Cook *et al.* (1975). Throughout such sequences as these, variations in base-richness and the amount of calcium are probably often quite small (Newbould 1960).

In contrast to related vegetation on north-western blanket bogs, the *Schoenus-Narthecium* mire is probably not a climax community. Succession has never been followed but might be expected to involve invasion by *Salix cinerea*, *Betula pubescens* and perhaps *Alnus glutinosa* and the eventual development of some sort of wet woodland.

Distribution

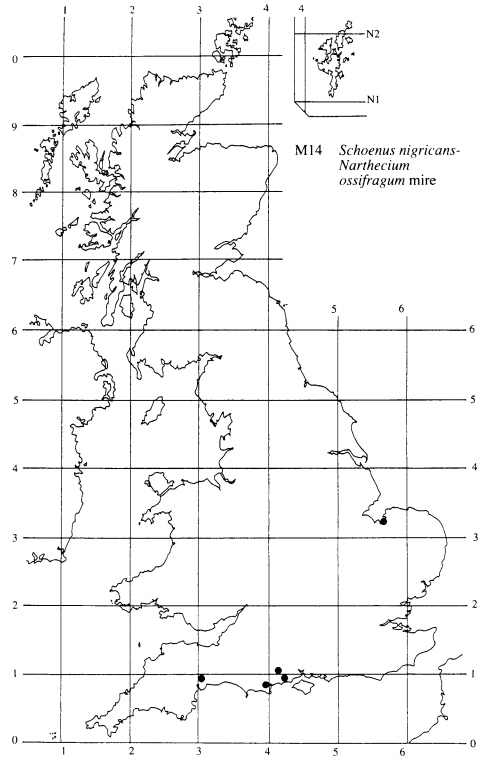
The community occurs very locally in Cornwall, east Devon, south-east Dorset and the New Forest. Some 'mixed mire' vegetation with *Schoenus* in west Norfolk could perhaps be accommodated here (e.g. Daniels & Pearson 1974); but is probably better regarded as leached fragments of the *Schoenetum*. It has not been sampled in Wales, though could well be found there, but is replaced in comparable situations on north-western blanket bogs by *Schoenus*-dominated stands of the *Scirpus-Erica* wet heath.

Affinities

Although the Schoenus-Narthecium mire shows some floristic continuity with the *Schoenetum*, certain stands being rather difficult to place, the two vegetation types are quite distinct in their characteristic expression and, in contrast to Wheeler (1975, 1980*b*), who included both within his *Schoeno-Juncetum*, are here considered as worth separating. Apart from Wheeler's account, this kind of *Schoenus* vegetation has figured only occasionally in descriptions of British vegetation, although Newbould (1960) and Ivimey-Cook *et al.* (1975) both recognised its essential character and place in the striking mire and heath zonations of southern Britain. Phytosociologically, it is difficult to place. Analogous vegetation on north-western blanket mires has been included in the *Scirpus-Erica* wet heath of the Ericion tetralicis, but the *Schoenus-Narthecium* community seems to occupy a more equivocal position on the borderline between that alliance and the Caricion davallianae, where the *Schoenetum* fairly obviously belongs.

Floristic table M14

Schoenus nigricans	V (6–8)
Molinia caerulea	V (6–8)
Erica tetralix	V (5–6)
Narthecium ossifragum	V (4–5)
Sphagnum subnitens	IV (4–5)
Anagallis tenella	IV (2–3)
Campylium stellatum	IV (4–5)
Aneura pinguis	IV (2–4)
Scorpidium scorpioides	IV (2–5)
Sphagnum auriculatum	IV (1–4)
Hypnum jutlandicum	III (1–3)
Kurzia pauciflora	III (1–2)
Drosera rotundifolia	III (1–2)
Juncus acutiflorus	II (1–4)
Calypogeia spp.	II (1–2)
Calluna vulgaris	II (1–4)
Sphagnum papillosum	II (3–4)
Eriophorum angustifolium	II (1–3)
Carex panicea	II (1–2)
Eleocharis multicaulis	II (1–3)
Drosera intermedia	II (1–2)
Riccardia multifida	II (1–2)
Pinguicula lusitanica	II (2–3)
Potentilla erecta	II (1–2)
Sphagnum palustre	II (2–4)
Rhynchospora alba	II (1–2)
Myrica gale	II (2–4)
Polygala serpyllifolia	I (1–2)
Odontoschisma sphagni	I (1–2)
Drepanocladus revolvens	I (1–2)
Sphagnum tenellum	I (1)
Ulex gallii	I (1)
Juncus bulbosus/kochii	I (1)
Ctenidium molluscum	I (1)
Pinus sylvestris seedling	I (1–2)
Pedicularis sylvatica	I (1)
Number of samples	15
Number of species/sample	17 (15–19)
Herb height (cm)	50 (30–90)
Herb cover (%)	81 (75–100)
Ground height (mm)	100
Ground cover (%)	15 (5–30)
Altitude (m)	55 (11–110)
Slope (°)	7 (5–10)
Soil pH	5.4 (5.0–5.9)



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