M29
Hypericum elodes-Potamogeton polygonifolius soakway
Hyperico-Potametum polygonifolii (Allorge 1921) Braun-Blanquet & Tüxen 1952

Synonymy
Valley moor plashes Rankin 1911*b p.p.*; *Hyperico-Potamogetonetum sensu* Birse 1980, Ratcliffe & Hattey 1982, Dierssen 1982; Flushing Water Community NCC New Forest Bogs Report 1984 *p.p.*

Constant species
Hypericum elodes, *Juncus bulbosus/kochii*, *Potamogeton polygonifolius*, *Ranunculus flammula*, *Sphagnum auriculatum*.

Rare species
Galium debile, *Pilularia globulifera*.

Physiognomy
The *Hyperico-Potametum polygonifolii* has a very distinctive appearance, typically consisting of low creeping or floating mats of *Hypericum elodes* and *Potamogeton polygonifolius*, the former prominent with its soft tomentose shoots, the flowering ones shortly erect, against the olive-green foliage of the latter, lying flat on the surface of the water or the wet soil of the small runnels and pools in which this vegetation characteristically grows. Very often, except where the ground has been badly trampled by grazing animals, a feature of some of the stands included in Ratcliffe & Hattey (1982) and the NCC New Forest Bogs Report (1984), these two constants are set in a carpet of more or less submerged *Sphagnum auriculatum*, sometimes accompanied by *S. cuspidatum*, *S. palustre* or *S. recurvum*, and very occasionally with small patches of *S. papillosum* growing on the slightly raised areas. But other bryophytes are typically sparse: some stands show a modest local abundance of *Polytrichum commune* or *Aulacomnium palustre*, and *Drepanocladus exannulatus*, *D. revolvens* and *Calliergon cuspidatum* can also be found, but enrichment of this element of the vegetation is rare.

Neither is the associated vascular flora very extensive or consistent, being frequently confined to scattered plants of a variety of bog and poor-fen herbs, growing among the dominants or projecting above them as a very open canopy. Only *Juncus bulbosus* (very occasionally recorded as *J. kochii*) and *Ranunculus flammula* attain constancy among the companions but, of smaller species, *Hydrocotyle vulgaris*, *Anagallis tenella*, *Drosera rotundifolia*, *Narthecium ossifragum* and *Galium palustre*, all occur with moderate frequency, together with such sedges as *Carex demissa*, *C. echinata*, *C. panicea* and *C. nigra*. Then, there can be sparse shoots or small patches of *Molinia caerulea*, *Agrostis canina* ssp. *canina*, *Juncus articulatus*, *J. effusus*, *J. acutiflorus*, *Eleocharis multicaulis*, *Eriophorum angustifolium* and *Rhynchospora alba*. *Carex rostrata* can also be found in some stands, occasionally with small amounts of *Equisetum fluviatile*, *Menyanthes trifoliata* and *Potentilla palustris*. Typically, all these plants remain of minor structural importance although many of them are abundant in other vegetation types that can occur in close association with the *Hyperico-Potametum*, so they sometimes figure a little more prominently in samples from stands that are found in fine mosaics or more ill-defined zonations.

Apart from *H. elodes*, the community also provides an occasional locus for other Oceanic West European plants like *Scutellaria minor* and, in south-west Scotland, *Carum verticillatum* (Birse 1980). *Scirpus fluitans*, largely confined in this country to more westerly localities, can also be found here, sometimes with very considerable abundance, co-dominant in the floating carpet. And the nationally-rare *Galium debile* is confined to the *Hyperico-Potametum* and closely-related vegetation in its major British locality in the New Forest in Hampshire, and was formerly recorded in this kind of soakway in Devon: it closely resembles *G. palustre*, but can be distinguished from it by its narrower leaves, particularly on submerged shoots, and by the fact that its fruiting shoots are never reflexed.

Other interesting plants that can be found in association with *Hyperico-Potametum* species are *Baldellia ranunculoides*, looking rather like a slim version of

Alisma plantago-aquatica and, in the same way, growing emergent from shallow pools and soaks, and a more truly aquatic element with *Apium inundatum*, *Sparganium angustifolium*, *Myriophyllum alternifolium* and the rare fern *Pilularia globulifera*. For the present, such distinctive stands have been retained here, but further sampling may well characterise them as a distinct sub-community of the *Hyperico-Potametum* of wetter and muddier situations or as a separate community altogether.

Habitat

The *Hyperico-Potametum* is characteristic of shallow soakways and pools in peats and peaty mineral soils with fluctuating waters, moderately acid to neutral and probably quite oligotrophic. It is a community of southern and western Britain, occurring in seepages and runnels around mires and in heathland pools at moderate altitudes. It is sometimes grazed and trampled.

The situations occupied by this vegetation are very distinctive but little understood. The waters are typically fresh and clear, still or only gently-flowing and with a pH in available samples generally between 4 and 5.5. Calcium concentrations are probably low in most cases and the character of the vegetation suggests that low availability of phosphorus and relatively slow turnover of nitrogen limit growth, but these suppositions would well repay investigation. Certainly, there is a general similarity in the associated flora with the bog-pool communities of the Rhynchosporion and the poorer water-tracks of the Caricion nigrae, with the extensive *Sphagnum* carpet and scattering of bog and poor-fen herbs. But one important difference between the habitats is that here there is a fluctuating water-table, subject to seasonal variation, and perhaps also to more short-term changes through the year. The vegetation is thus inundated to shallow depth for much of the time, but at or above the water-level for most of the summer months, particularly in smaller hollows which can dry out completely then. It is such conditions that can be so well exploited by the distinctive dominants of the community, *H. elodes* and *P. polygonifolius*, and also by *J. bulbosus/kochii* and the less common *Scirpus fluitans*, all rhizomatous or nodal-rooting plants able to form extensive mats, whether submerged or over the surface of damp ground. And differences in the degree of wetness probably have some influence on floristic variation within the community, with such species as *Apium inundatum*, *Sparganium angustifolium*, *Baldellia* and *Pilularia* characteristic of a lower tier in a depth-related zonation.

In general terms, then, this type of vegetation is typical of more base- and nutrient-poor soils where fluctuation of the water-table, often also with a modest through-put, ameliorates the extremes of stagnant waterlogging and superficial drying-out. But it also shows quite a striking geographical confinement, being characteristic of the warm oceanic parts of the country, where February minima are usually at least a degree above freezing (*Climatological Atlas* 1952). Such a zone, which runs along the south coast of England and then takes in the South-West Peninsula, most of the Welsh lowlands, the fringe of Cumbria and the western Scottish seaboard, corresponds more or less with the distribution of *H. elodes*, an Oceanic West European plant which is strongly preferential to this kind of vegetation throughout its range (Braun-Blanquet & Tüxen 1952, Schoof van Pelt 1973, Dierssen 1975). Other oceanic features of the community are the abundance of *Sphagnum auriculatum*, also the typical species in western Rhynchosporion and Caricion nigrae vegetation, and the occasional occurrence of *Scutellaria minor* and *Carum verticillatum*.

Throughout this region, by far the most widespread kind of habitat where the general requirements of the *Hyperico-Potametum* are met, is provided by seepage areas on or around valley mires and base-poor flushes at low to moderate altitudes and along the shelving margins of slow-moving moorland streams, where the soils are typically peats or gleys with a humic top. The community can also be found much more locally over the latter type of profile in shallow seasonal pools on heathlands. These habitats, and particularly the pools, often present small, fragmented and isolated situations, something which probably has an influence on the considerable variation that can be seen in the composition of stands from place to place, with fine local differences in environmental conditions and also chance influencing colonisation.

Trampling by grazing animals, which often have free access across the kind of landscapes in which the community occurs, can also play a part in keeping the vegetation open and varied, though heavy poaching can be deleterious to the *Sphagnum* carpet (Ratcliffe & Hattey 1982, NCC New Forest Bogs Report 1984). Grazing may also set back direct invasion of the ground by woody plants. Conditions are anyway too impoverished to support colonisation by an abundance of the grazing-sensitive tall herbs characteristic of fens, but the moist soil surface can present a congenial environment for the germination of the seeds of trees such as *Salix cinerea* and seedlings could perhaps get away if they were to escape both flooding and being bitten off.

Zonation and succession

The *Hyperico-Potametum* typically occurs as small and sometimes fragmentary stands in close association with bog, wet heath, poor fen and aquatic vegetation in zonations and mosaics which probably reflect the duration and extent of inundation and the base- and nutrient-richness of the ground waters. With continuing

impoverished conditions, it is probably essentially stable, though in transitional situations grazing may be important in curtailing any successional developments.

In its most common situation on valley mires in southern and south-western Britain, the community is usually found within or around tracts of the *Narthecio-Sphagnetum*, the characteristic vegetation type of the acid peats of this region accumulating under stagnant waterlogging. Where lines of surface seepage across the peats are clear, the mosaic of communities can be accordingly well-defined, with patches of the dominant *H. elodes* and *P. polygonifolius* picking out the stands, scattered over or snaking across the bog. But, in other cases, where the influence of the trickling and fluctuating waters is diffuse, transitions are much less obvious, with *Sphagnum auriculatum* and such herbs as *Narthecium*, *Drosera rotundifolia*, *Eriophorum angustifolium* and *Rhynchospora alba* providing strong continuity with the wetter lawns of the mire surface and its *Sphagnum auriculatum* bog pools.

Quite often, these kinds of *Hyperico-Potametum* soakways are concentrated in a distinct zone on such valley mires. Sometimes, where waters seeping from the slopes around are channelled along the bog edge, the community marks out a marginal belt between the *Narthecio-Sphagnetum* and the *Ericetum tetralicis* wet heath that characteristically occupies the seasonally gleyed soils of slightly higher ground. In other situations, it can occur along the inner side of the *Narthecio-Sphagnetum*, between it and an axial strip of swamp and woodland: here there can also be some seepage and fluctuation of waters, but little enrichment beyond the immediate fringes of the central line of the mire where flow is concentrated.

In both these types of zonation, variations on which are well shown in the NCC New Forest Bogs Report (1984), the *Hyperico-Potametum* is usually clearly marked off from the wet heath, swamp and woodland communities that bound it on the side away from the *Narthecio-Sphagnetum*. But, where there is gradual enrichment of the waters as they flow from less impoverished ground, or concentrate the nutrients from ever-wider areas, transitions can be more complex. Then, some kind of poor-fen or Junco-Molinion vegetation often occurs in close association with the community. Among the former, the *Carex echinata-Sphagnum* and *Carex rostrata-Sphagnum* mires can both be found grading to the *Hyperico-Potametum*, the *Sphagnum* carpet running throughout, but species such as *C. rostrata*, *C. demissa*, *C. echinata*, *C. nigra*, *C. panicea*, *Juncus effusus* or *J. acutiflorus* thickening up as dominants or co-dominants. *Molinia* can also be locally prominent within such vegetation, but it is much more abundant, often as vigorous tussocks, in the *Molinia-Potentilla* mire and the *Cirsio-Molinietum*, both of which, and particularly the former, can mark out zones of soligenous enrichment on somewhat drier ground adjacent to the *Hyperico-Potametum*, with associates such as *Succisa pratensis*, *Angelica sylvestris* and *Cirsium palustre* becoming frequent.

Similar patterns to these latter can be found throughout the south and west of Britain, on lowland heaths and the moorland fringes, where the community marks out seepage and fluctuation zones around base-poor flushes and basins (e.g. Ratcliffe & Hattey 1982). Locally, the *Hyperico-Potametum* is also seen in seasonally-flooded pools within tracts of wet heath and poor fen and, where these are sufficiently deep, there can be the kind of zonation within stands of the community mentioned earlier. Such layering represents the beginning of a transition to truly aquatic vegetation that occurs more fully where soakways run out of tracts of poor fen and heath into the margins of permanent streams and pools. In the former, where there is an increase in water flow, the aquatic vegetation is often sparse, but around the shelving shores of pools and lakes, the *Hyperico-Potametum* can pass downwards to other Littorelletea communities with plants like *Littorella uniflora* itself, *Myriophyllum alternifolium* and *Isoetes lacustris* and *I. setacea*.

Even in their more fully-developed form, such sequences probably rarely, if ever, represent a hydroseral succession and in most situations the community appears to be a stable vegetation type marking out zones where accumulation of any nutrient capital, whether by concentration of dissolved salts or by silting, is unlikely to proceed very far. Where there is some modest enrichment, grazing and trampling may help continually set back any tendency to succession.

Distribution

Available samples of the *Hyperico-Potametum* extend in a well-defined zone from west Surrey, through the New Forest to the South-West Peninsula, up through Wales and into Galloway. It seems likely that the full range of the community roughly matches that of *H. elodes*, so occurrences might be expected further north through the Inner and Outer Hebrides and at its scattered localities in eastern England.

Affinities

This is a little-described vegetation type but one which has been readily characterised from among the suites of bog and poor-fen communities with which it is usually found (Ratcliffe & Hattey 1982, NCC New Forest Bogs Report 1984) and which has also been recorded in almost identical form from Ireland (Braun-Blanquet & Tüxen 1952), where it has provided one locus for the introduced *Hypericum canadense* (Webb 1957, Webb & Halliday 1973), and from other parts of western Europe (Schoof van Pelt 1973, Dierssen 1975), where it has been

designated as a modified version of the *Hyperico-Potametum polygonifolii* (= *oblongi*) Allorge (1926).

Such vegetation clearly belongs among the Littorelletea but there are considerable difficulties in characterising it from among what are probably best regarded as impoverished stands lacking one or other of the few constants, and in separating it from stands in which such associates as *Eleocharis multicaulis*, *Baldellia ranunculoides*, *Pilularia globulifera* and *Scirpus fluitans* are dominant with some of the same occasionals as are recorded here. This kind of vegetation has certainly been under-sampled in the project and further study may well characterise the variety of communities recognised in Ireland by White & Doyle (1982). Meanwhile, related stands are grouped together in the next ill-defined assemblage.

Floristic table M29

Hypericum elodes	V (3–9)	*Sphagnum cuspidatum*	I (3–7)
Potamogeton polygonifolius	IV (2–7)	*Succisa pratensis*	I (2–4)
Ranunculus flammula	IV (1–6)	*Utricularia minor*	I (2–4)
Sphagnum auriculatum	IV (1–10)	*Campylium stellatum*	I (1–4)
Juncus bulbosus	IV (2–5)	*Potentilla erecta*	I (1–3)
Hydrocotyle vulgaris	III (2–5)	*Sphagnum papillosum*	I (1–3)
Molinia caerulea	III (1–5)	*Rhynchospora alba*	I (1–2)
Eleocharis multicaulis	III (1–5)	*Cirsium dissectum*	I (3–4)
Eriophorum angustifolium	III (2–4)	*Nardus stricta*	I (3)
Agrostis canina	III (3–7)	*Juncus acutiflorus*	I (1–2)
Anagallis tenella	II (1–4)	*Myosotis secunda*	I (1–3)
Juncus articulatus	II (2–5)	*Pedicularis palustris*	I (1)
Carex demissa	II (1–4)	*Juncus bufonius*	I (3–4)
Carex echinata	II (1–4)	*Equisetum palustre*	I (3–4)
Carex panicea	II (1–5)	*Drosera intermedia*	I (3–4)
Drosera rotundifolia	II (1–3)	*Aneura pinguis*	I (2)
Juncus effusus	II (1–8)	*Drepanocladus revolvens*	I (2)
Carex nigra	II (1–5)	*Carex hostiana*	I (4–6)
Narthecium ossifragum	II (1–4)	*Salix cinerea* seedling	I (1–2)
Equisetum fluviatile	II (1–3)	*Aulacomnium palustre*	I (5–7)
Galium palustre	II (1–4)	*Calliergon cuspidatum*	I (2–4)
Lotus uliginosus	II (1–4)	*Potentilla palustris*	I (1–2)
Drepanocladus exannulatus	I (2–3)	*Sphagnum palustre*	I (4–5)
Erica tetralix	I (1–3)	*Glyceria fluitans*	I (2–3)
Menyanthes trifoliata	I (2–3)	*Eleocharis palustris*	I (2–4)
Viola palustris	I (1–5)	*Pilularia globulifera*	I (3–5)
Holcus lanatus	I (1–3)	*Sparganium angustifolium*	I (2)
Scutellaria minor	I (2–4)	*Apium inundatum*	I (1–7)
Polytrichum commune	I (2–4)	*Baldellia ranunculoides*	I (2)
Agrostis stolonifera	I (2–4)	*Galium debile*	I (3)
Scirpus fluitans	I (1–8)	Number of samples	29

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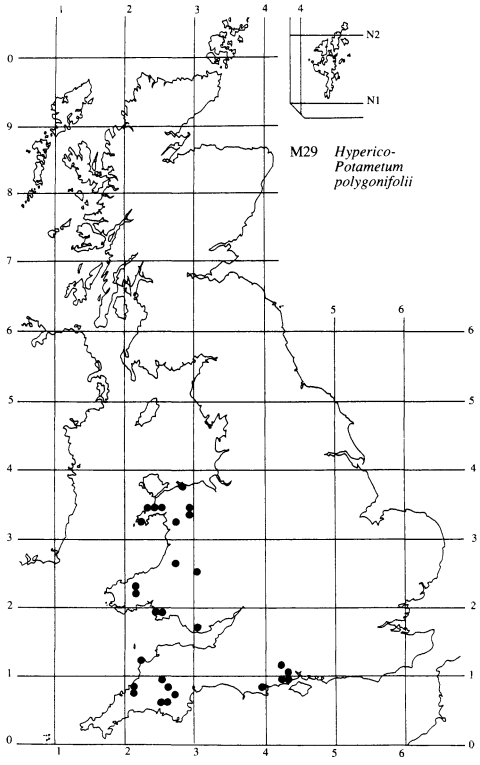

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