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Potamogeton natans community

Synonymy

Floating-leaf vegetation Pallis 1911, Butcher 1933, Tansley 1939, all *p.p.*; Shallow water association Matthews 1914 *p.p.*; *Potamogeton natans* consocieties Pearssall 1920; Submerged/floating vegetation Godwin 1923, Butcher 1933 *p.p.*; *Potamogeton natans-Juncus fluitans* sociation Spence 1964 *p.p.*; *Potamogeton natans* Gesellschaft Oberdorfer 1977.

Constant species

Potamogeton natans.

Physiognomy

Potamogeton natans is one of only two widely distributed pondweeds in Britain with floating leaves but the other, *P. polygonifolius*, is generally speaking a fairly small plant, whereas here the leafy stems commonly trail up through the water to lengths of more than 1 m, and anything up to 5 m in really deep places. The plant figures as an occasional in various kinds of aquatic vegetation, and can persist at low frequencies in some more open swamps, but this community includes all those stands where *P. natans* is a clear dominant over the water surface, often to the total exclusion of other free-floating or floating-leaved species and with just very sparse submerged or emergent associates. Where these plants become a little more common, rather ill-defined sub-communities can be recognised, but if the associated floras are consistently rich, the vegetation is best regarded as a mosaic of the *P. natans* community with other aquatic assemblages.

Sub-communities

Species-poor sub-community. Here, *P. natans* is often the sole plant, or very occasionally accompanied by a little *Nymphaea alba*, *Nuphar lutea* or *Lemna minor*.

***Elodea canadensis* sub-community.** The associates above can also occur in this sub-community occasionally, but

more distinctive is the fairly frequent occurrence of *Elodea canadensis*, rarely *E. nuttallii*, occasional *Lemna trisulca* and various starworts, including *Callitriche stagnalis*, *C. platycarpa* and *C. obtusangula*, often difficult to distinguish without fruiting material (Wigginton & Graham 1981). Rarely, too, there can be some water-crowfoots, such as *Ranunculus trichophyllus*, *R. peltatus* and *R. penicillatus* which can also present problems of identification (Holmes 1979). *Myriophyllum spicatum* is sometimes found and there are very occasional records for various pondweeds, such as *Potamogeton crispus*, *P. pectinatus* or *P. filiformis*. Emergents such as *Alisma plantago-aquatica*, *Sparganium erectum*, *Typha latifolia* or *Glyceria fluitans* are often found in close association with the vegetation and, in shallower water, may grow through it.

***Juncus bulbosus*-*Myriophyllum alterniflorum* sub-community.** *Potamogeton natans*-*Juncus fluitans* sociation Spence 1964. A little *Nymphaea alba* can sometimes be found with the *P. natans* here, but more distinctive is the occurrence of *Juncus bulbosus* var. *fluitans* and/or *Myriophyllum alterniflorum*, sometimes with a little *Utricularia vulgaris* or *Potamogeton perfoliatus*. *Sparganium minimum* and *S. angustifolium* also occur occasionally and there can be a sparse sward of *Littorella uniflora* and *Lobelia dortmanna*. Associated emergents are *Equisetum fluviatile* and *Scirpus lacustris*.

Habitat

The *Potamogeton natans* community is typical of mesotrophic to fairly nutrient-poor, standing to moderately fast-flowing waters, sometimes of considerable depth, in ponds, lakes, dykes, streams and rivers through most of Britain.

P. natans has a fairly wide tolerance of different trophic states, but is poorly represented in more eutrophic waters, such as enriched dykes and pools and the lower reaches of rivers on less impoverished rocks. It is quite striking, for example, how this kind of vegetation

replaces the *Nuphar* community in lakes and streams where silting is less marked (Pearsall 1921), although it is possible that, in some places, this also reflects a greater tolerance of turbulence and the sandier materials that accumulate under such rougher water conditions. *P. natans* is certainly fairly indiscriminate in the kinds of substrates it will grow on, occurring on peat and gravel, as well as clays, silts and sands, and, with its deep roots and pliant stems and leaves, it is tolerant of quite marked turbulence and will persist in spatey waters (Haslam 1978). With its predominance of floating as against submerged foliage, it can also survive in fairly turbid conditions. Being not so bulky a plant as the water-lilies, it does not need such large volumes of water in which to make abundant growth, but it can penetrate to considerable depth, being commonly found down to 2 m or more, and often growing beyond the limit of *Nuphar lutea* (West 1910, Spence 1964).

Within such limits, it can attain dominance in this kind of vegetation in dykes cut through peat or clay, in canals and ponds, in lakes and in sluggish to fairly fast-flowing streams on rocks like sandstones. The Species-poor sub-community can be found in all habitats, while the *Elodea* and *Scirpus-Myriophyllum* types tend to occur in mesotrophic and oligotrophic waters respectively, the former being widespread particularly in lowland Britain, the latter being reported only from streams and lakes in the north and west. In each case, the associated floras, sparse as they are, reflect the contrast in trophic state, and associated differences in the turbulence of the waters and their substrates.

Zonation and succession

The *P. natans* community can form the only floating-leaved element in sequences of aquatic vegetation, or occur with other free-floating or floating-leaved communities, when it often occupies the deepest water. It can occur over a variety of less nutrient-demanding submerged assemblages and, in shallower conditions, will persist among more open stands of colonising emergent vegetation.

Although the *Nuphar* community is less tolerant of nutrient-poor conditions than the *P. natans* vegetation, the two can be found together in mesotrophic pools and sluggish streams, often with remnants of the *Lemnetum minoris* or, more locally, the *Spirodela-Hydrocharis* community among the floating leaves. Sometimes, too, the *Polygonum amphibium* community is represented in such mosaics and in narrow dykes and small ponds or where river margins have but a fragmentary fringe of

floating-leaved vegetation, the different assemblages are often found as just small stands in jumbled mosaics (Tansley 1911, 1939, Butcher 1933). In other places, the vegetation can be zoned with the *P. natans* community in deeper water than the *Nuphar* stands or where there is less silting (Godwin 1923). Beneath the *P. natans* in these kinds of patterns, the submerged associates of the *Elodea* sub-community sometimes thicken up to form a stand of *Elodea* vegetation. Associated swamps, colonising shallower waters, but eventually overwhelming the *P. natans* community where terrestrialisation proceeds unhindered, are of the more mesotrophic type, with the *Typhetum latifoliae*, the *Sparganietum erecti* or various kinds of Glycerio-Sparganion assemblage frequently represented (Walker 1905).

Species-poor *P. natans* vegetation can also be found in zonation in more oligotrophic waters of streams and lakes in north-west Britain, although here the *Juncus-Myriophyllum* sub-community is especially characteristic of less turbulent waters. Sometimes, the *Nymphaeetum* occurs with the *P. natans* vegetation or, where there is a little more enrichment, the *Nuphar* community, this latter often marking local deposition of silty material as across the mouths of inflow streams (Pearsall 1921). And, where there is a depth-related zonation, the *P. natans* typically extends out further than the water-lily vegetation (Spence 1964). The *Juncus-Myriophyllum* sub-community can be found over the *Potamogeton perfoliatus-Myriophyllum alterniflorum* vegetation in some places but, quite commonly, there is some kind of *Littorella-Lobelia* sward beneath. A variety of emergents can colonise the margins of standing water bodies with the *Scirpetum lacustris* often penetrating quite deeply, the *Equisetum fluviatilis* and *Caricetum rostratae* occurring in shallower waters. In many lakes, terrestrialisation seems to proceed very slowly away from sites with abundant deposition of silt.

Distribution

The community occurs widely through the British Isles, with the *Elodea* type concentrated in the lowlands, the *Juncus-Myriophyllum* type being found in the north and west.

Affinities

In early descriptive accounts of British aquatic vegetation, *P. natans* was often included in a fairly compendious assemblage of floating-leaved vegetation, here segregated into a number of separate communities (Pallis 1911, Tansley 1911, 1939, Butcher 1933).

Floristic table A9

	a	b	c	9
<i>Potamogeton natans</i>	V (5–10)	V (4–9)	V (6–9)	V (4–10)
<i>Nymphaea alba</i>	I (4–6)		I (1–2)	I (1–6)
<i>Lemna minor</i>	I (1–3)	I (1–3)		I (1–3)
<i>Elodea canadensis</i>		III (4–10)	I (1–2)	II (1–10)
<i>Alisma plantago-aquatica</i>		II (1–4)		I (1–4)
<i>Lemna trisulca</i>		I (5–6)		I (5–6)
<i>Callitriche platycarpa</i>		I (2–4)		I (2–4)
<i>Callitriche stagnalis</i>		I (2–5)		I (2–5)
<i>Glyceria fluitans</i>		I (3–4)		I (3–4)
<i>Ranunculus trichophyllus</i>		I (2–4)		I (2–4)
<i>Sparganium erectum</i>		I (2–3)		I (2–3)
<i>Juncus bulbosus</i>			III (1–4)	II (1–4)
<i>Equisetum fluviatile</i>		I (3)	II (2–8)	I (2–8)
<i>Littorella uniflora</i>			II (1–3)	I (1–3)
<i>Lobelia dortmanna</i>			II (1–3)	I (1–3)
<i>Myriophyllum alterniflorum</i>			II (1–3)	I (1–3)
<i>Sparganium minimum</i>			I (1–3)	I (1–3)
<i>Sparganium angustifolium</i>			I (1–3)	I (1–3)
<i>Scirpus lacustris</i>			I (1–2)	I (1–2)
<i>Utricularia vulgaris</i>			I (1–3)	I (1–3)
Number of samples	23	17	18	58
Number of species/sample	1 (1–3)	4 (2–9)	6 (2–10)	4 (1–10)

a Species-poor sub-community

b *Elodea canadensis* sub-communityc *Juncus bulbosus*-*Myriophyllum alterniflorum* sub-community9 *Potamogeton natans* community (total)