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## A19

### *Ranunculus aquatilis* community *Ranunculetum aquatilis* Géhu 1961

#### Synonymy

Vegetation of nearly stagnant waters Tansley 1911  
*p.p.*

#### Constant species

*Ranunculus aquatilis*.

#### Physiognomy

The *Ranunculetum aquatilis* is dominated by clumps or patches of *Ranunculus aquatilis*, a very variable annual or perennial crowfoot, able to grow submerged, when the shoots are spreading to erect, as a delicate floating plant or terrestrially on moist ground, when it is loosely caespitose (Haslam 1978, Rich & Rich 1988). Cover is very variable and many stands are small, but in suitable conditions this species can make luxuriant growth, becoming most abundant in early summer.

The vegetation often grows in intimate association with various other aquatics and amphibious plants, including stands of *Ranunculus peltatus*, which is morphologically very similar to and readily confused with *R. aquatilis* (Holmes 1979, Rich & Rich 1988). But the most frequent companions in denser stands are various stone-worts, particularly *Callitriche stagnalis* and *C. obtusangula*, patches of which can become prominent with the crowfoot early in the season, and *Glycerio-Sparganium* herbs, which increase their cover later. Commonest among these latter are smaller *Glyceria* spp., especially *G. fluitans*, and *Apium nodiflorum*, but *Nasturtium officinale*, *Veronica beccabunga* and *Berula erecta* can also be found, and each of these can grow in vigorous patches among the submerged plants or as floating or emergent shoots. *Myriophyllum spicatum*, *Ceratophyllum demersum* and *Elodea canadensis* are sometimes seen, and there can be floating-leaved mats of *Potamogeton natans* with patches of duckweed thalli caught among the vegetation on the water surface or wet mud.

#### Habitat

The *Ranunculetum aquatilis* is typically found in and around the margins of mesotrophic to fairly nutrient-

rich waters, sometimes quite fast-moving, in other cases standing or sluggish. It probably occurs through much of southern Britain outside the highland zone, extending into streams around the upland fringes, but becoming much more common in streams, dykes, canals and pools in the lowlands. It tolerates periodic or seasonal drying and will colonise disturbed or ephemeral water-margin habitats.

The difficulty of identifying *R. aquatilis* with certainty and in particular the problem of separation from *R. peltatus* (Holmes 1979, Rich & Rich 1988), makes it hard to define precisely the geographical or environmental limits of this vegetation. It seems to occur through most of the lowlands and the upland fringes, and is concentrated in shallower waters, often much less than 1 m deep and sometimes fluctuating, with fertility that avoids the extremes of impoverishment and marked eutrophication. *R. aquatilis* has tough anchoring rhizomes, becomes well rooted in sandy or gravelly substrates and has fine-leaved submerged shoots that are very resistant to turbulence, so it can extend into quite fast-flowing waters (Haslam 1978).

In the foothills of the north and west, then, the *Ranunculetum aquatilis* can be seen towards the upper reaches of streams, and there the substrates are generally resistant rocks with drainage waters that are more acidic and nutrient-poor. The community becomes much more common, however, in the south and east of the country, where the waters tend to be more fertile, and generally more base-rich. It is quite well represented, for example, in the mesotrophic stretches of Chalk streams where winter flow can be fairly rapid, but it occurs widely, too, in the more sluggish waters of canals, dykes and pools. Its frequent presence in farm ponds has led to the suggestion that *R. aquatilis* may prefer more eutrophic habitats than *R. peltatus* (Rich & Rich 1988), but the community disappears from highly enriched and polluted waters.

The tolerance that *R. aquatilis* shows for periodic or seasonal drying of the ground gives it an important advantage in fluctuating waters. This kind of vegetation

will stand the summer droughting in the upper reaches of Chalk streams, for example, and persist around the margins of ponds that dry up from time to time, provided it is not shaded by bulkier opportunist invaders. The disturbance that grazing stock provide around farm ponds is probably important in maintaining more open moist ground on which this vegetation can prosper.

### Zonation and succession

The *Ranunculetum aquatilis* can be found with various other kinds of submerged aquatic vegetation, and sometimes with floating-leaved communities, the mosaics and zonations being influenced by the depth and speed of the waters and the character of the substrates. Towards water margins, transitions to Glycerio-Sparganion vegetation or certain types of swamp are usual, and taller emergents eventually overwhelm the community where they are invading shallower waters. Often, however, turbulence or fluctuation of the waters, or disturbance of the margins, helps maintain the *Ranunculetum aquatilis* as a more or less permanent feature.

In faster-moving shallows, the community may be the major element among the submerged vegetation of coarser sands and gravelly beds, or occur with patches of the *Callitriche stagnalis* vegetation. In more base-poor streams, such as are found through the upland fringes of the north and west, the *Myriophyllum alterniflorum* community can also figure, these two kinds of vegetation generally extending much further into the torrential and spatey reaches upstream. In deeper waters with stable, stony beds, the *Ranunculetum aquatilis* can give way to the *Ranunculetum fluitantis*, and this vegetation may replace it entirely in wider stretches of river downstream, where the substrate consists of consolidated pebbles and boulders. Slacker reaches, with some deposition of finer mineral material, can have stands of the *Potamogeton-M. alterniflorum* community and floating-leaved *Nuphar lutea* or *Potamogeton natans* vegetation. Along the water margins, there are often fragments of Glycerio-Sparganion assemblages or *Phalaridetum* swamp.

In more calcareous, swift-flowing waters, notably in Chalk streams, the *Ranunculetum aquatilis* is not usually so abundant as the *Ranunculetum peltati* (Haslam 1978), but both these vegetation types comprise an important element in the stream beds of the upper reaches, often mixed with *Callitriche stagnalis* stands, and generally

bordered or interrupted by clumps of Glycerio-Sparganion communities. The ability of the two crowfoot assemblages to withstand the late-summer drying-up of these streams gives them an important competitive advantage against *Ranunculus penicillatus* ssp. *pseudofluitans*, though this becomes increasingly important with the move downstream into reaches that have perennial flow. With the shift into the more eutrophic stretches of these streams, where there is often much clay amongst the substrate, and where vegetation like the *Potamogeton-M. spicatum* community can become important, these crowfoot communities generally disappear.

In the shallows of sluggish and standing waters of quite high fertility, the *Ranunculetum aquatilis* can maintain a presence, though it sometimes assumes a frail, floating form and often makes but a small contribution among luxuriant stands of submerged vegetation like the *Elodea canadensis*, *Ceratophyllum demersum* and *Potamogeton pectinatus* communities. However, fluctuation in such waters or disturbance of the margins can favour its persistence and, around the margins of such pools and dykes, it often occurs in patchy mosaics with *Callitriche stagnalis* vegetation, sparse duckweed mats, Glycerio-Sparganion herbs and *Sparganietum erecti* swamp. In these situations, succession is repeatedly set back, but where more slow-moving waters are prone to invasion by emergents, the *Ranunculetum aquatilis* is quickly shaded out in dense covers.

### Distribution

Careful diagnosis of *R. aquatilis* is needed to establish the exact distribution of this vegetation, but it is probably widespread through the lowlands and upland fringes of Britain.

### Affinities

Early descriptive accounts of British aquatics included stands of *R. aquatilis* among more broadly defined assemblages (e.g. Tansley 1911) and in phytosociological schemes it has sometimes been included with *R. peltatus* vegetation in a *Ranunculetum peltati* (Segal 1967, Westhoff & den Held 1969). Other Continental workers have maintained distinct associations for the two species (Sauer 1937, Géhu 1961). Whichever solution is adopted, this kind of vegetation clearly belongs with other crowfoot assemblages in the *Callitriche-Batrachion* (or *Ranunculion fluitantis* of Ellenberg 1978).

**Floristic table A19**

<i>Ranunculus aquatilis</i>	V (2–8)
<i>Glyceria fluitans</i>	III (2–5)
<i>Apium nodiflorum</i>	II (1–2)
<i>Myriophyllum spicatum</i>	II (5–6)
<i>Fontinalis antipyretica</i>	II (1–4)
<i>Potamogeton natans</i>	II (1–5)
<i>Callitriche stagnalis</i>	II (3)
<i>Callitriche obtusangula</i>	II (4–7)
<i>Glyceria</i> × <i>pedicellata</i>	II (5)
<i>Callitriche hamulata</i>	I (4)
<i>Lemna gibba</i>	I (4)
<i>Myriophyllum alterniflorum</i>	I (4)
<i>Ceratophyllum demersum</i>	I (2)
<i>Ranunculus fluitans</i>	I (2)
<i>Elodea canadensis</i>	I (3)
<i>Potamogeton pectinatus</i>	I (5)
<i>Lemna trisulca</i>	I (2)
<i>Polygonum amphibium</i>	I (2)
Number of samples	8
Number of species/sample	6 (3–8)