A12
Potamogeton pectinatus community

Synonymy
Potamogeton pectinatus-Gesellschaft Oberdorfer 1977.

Constant species
Potamogeton pectinatus.

Physiognomy
The *Potamogeton pectinatus* community comprises species-poor vegetation dominated by this fine-leaved pondweed. It overwinters as fruits or small tuberous buds, but can make rapid growth in early summer to form bushy clumps, up to 2 m or so long and often very luxuriant, among which there are but few and typically only sparse associates. Small patches of duckweed thalli, with *Lemna gibba* and/or *L. minor*, are sometimes found floating above the stands in quieter waters, but submerged there are generally just scattered individuals of such plants as *Callitriche stagnalis*, *Myriophyllum spicatum*, *Elodea canadensis* and *Ceratophyllum demersum* with infrequent *E. nuttallii*, *L. trisulca* and *Zannichellia palustris*. In brackish water, the last can be joined by *Ruppia spiralis* and, in Scottish sea lochs, by *Fucus ceranoides*. Other *Potamogeton* spp. are rare, but *P. perfoliatus* has been recorded very occasionally.

Habitat
This kind of vegetation is characteristic of still to quite fast-moving, eutrophic waters, often with some measure of artificial enrichment, and frequently polluted and turbid. It is widespread through the warmer lowlands of Britain and has become increasingly common in pools and canals, dykes and streams as these have been contaminated by agricultural and industrial effluents and sewage.

P. pectinatus is a frequent plant through much of lowland England and the milder parts of the north and west, where the mean annual maximum temperature is for the most part above 25 °C (Conolly & Dahl 1970). Through these regions, it is characteristic of various kinds of aquatic vegetation in sites that are naturally rich in cations and nutrients, and sometimes attains the sort of overwhelming dominance typical of this community in such unpolluted situations. Vigorous stands can be found, for example, in clean, standing or sluggish waters with clay or silt beds, habitats once common enough in the subdued scenery over softer, sedimentary rocks in the south and east of the country. But *P. pectinatus* seems especially well able to capitalise on the eutrophication that is now so widespread in our intensive agricultural landscapes and around settlements and industrial developments. It is also tolerant of various kinds of chemical pollution, indeed will actually grow more luxuriantly at certain levels of contamination with some effluents, provided the waters are not too fast-moving, shallow or very turbid (Haslam 1978). Under such conditions, most other aquatics suffer a marked decline, and those which are able to persist somewhat better may be overwhelmed by the bushy growth of pondweed, leaving the sort of impoverished stands typical here. With very heavy pollution, however, even *P. pectinatus* fails and, in our most strongly contaminated rivers and pools it is usually very sparse stands of this community that mark the limit of the vegetated reaches.

In cleaner waters, this kind of vegetation remains most common in the lower stretches of hill rivers to the west of the country and in the middle reaches of some chalk-clay streams but, in such moving waters, fast flow and spate exert another check on the vigour of *P. pectinatus*. Young plants are readily uprooted in their early weeks of spring growth and, though the deep and extensive rhizome system that develops by the summer gives some protection against erosion from the bed, the shoots remain quite susceptible to turbulence and are easily damaged. Individuals can grow large in slow flows but, in more quick-moving waters, growth may be balanced by loss, and the species is intolerant of continual fast flow or frequent spates (Haslam 1978).

In especially congenial conditions, this vegetation may become so luxuriant as to choke the flow in smaller

water-courses, such that cutting becomes necessary. Two or even three cuts during the summer are sometimes needed, but one usually suffices and *P. pectinatus* will not recover if chopped back late in the season. The plant can become abundant after dredging early in the year and is moderately tolerant of the turbidity that disturbance produces (Haslam 1978).

Zonation and succession

In highly eutrophicated and polluted sites, this community may be the only kind of aquatic vegetation to survive but, in cleaner conditions, it can be found with various other submerged, floating and floating-leaved assemblages typical of richer waters.

In more base-rich pools, dykes and streams, the *P. pectinatus* community can sometimes be clearly seen as an impoverished form of the *Potamogeton-M. spicatum* vegetation, developed where this particular species of pondweed has attained local luxuriance, and grading to the richer assemblage with an increase in the frequency and cover of *M. spicatum*, *Elodea canadensis* or *E. nuttallii* and other *Potamogeton* spp., such as *P. perfoliatus*, *P. crispus*, *P. pusillus* and *P. lucens*. The *Elodea* spp. may themselves thicken up patchily into species-poor stands, and there can also be stretches among these mixtures dominated by the *Ceratophylletum demersi*. The *Polygonum amphibium* community may also form a canopy of floating leaves in the shallower waters, with *Nuphar lutea* stands occurring further out in deeper pools, dykes and slow-moving waters. Mats of the *Lemnetum gibbae* and the *Lemnetum minoris* may occur in sheltered situations. A variety of emergents can invade the margins of such open waters, with communities like the *Sparganietum erecti*, the *Typhetum latifoliae*, the *Phragmitetum* and the *Glycerietum maximae* developing as a zone in the shallows or as clumps distributed along the edges of dykes and streams. These may persist around the fringes of eutrophicated and polluted waters, where the aquatic element is reduced to clumps of the *P. pectinatus* community and sparse *Elodea* vegetation and *Ceratophylletum demersi*.

In brackish situations, the *P. pectinatus* community may again be the sole surviving vegetation where there has been some contamination of the waters but, in cleaner dykes and pools in, for example, coastal marshes, it can occur with the richer *Potamogeton-M. spicatum* assemblage and dense stands of the *Ceratophylletum submersi*. In this latter, *P. pectinatus* can maintain its constancy but it yields in abundance to plants such as *Ceratophyllum submersi*, *Zannichellia palustris* and *Ranunculus baudotii*. Floating mats of the *Lemnetum minoris* can also occur over such vegetation and there can be colonisation by the *Scirpetum maritimi* or *Scirpetum tabernaemontani*.

Fragmentary patterns of the kind described for fresh waters will persist in quite swift flows, as in mill races, watercress bed feed-streams and the upper reaches of rivers and, in such situations, there is often some zonation to patches of the *Callitriche stagnalis* community or various kinds of crowfoot vegetation. There can also be some seasonal variation in the prominence of the different dominants too, with *C. stagnalis* and the *Ranunculus* spp. showing luxuriance in late spring and early summer, *P. pectinatus* reaching its peak of abundance later in the year, along with the Glycerio-Sparganion vegetation that frequently trails into the margins of such waters. In chalk streams, some of these marginal plants, like *Apium nodiflorum* and *Nasturtium officinale*, together with various crowfoot taxa, can penetrate to the higher reaches, while the *Callitriche* and *P. pectinatus* communities peter out at lower levels. Along waters draining sandstone rocks and shales, *Callitriche* vegetation can replace the *P. pectinatus* community with the shift to swifter flows upstream.

Distribution

The community has a wide distribution through the lowlands of southern Britain, with more sporadic records in the west and north, and has become much commoner with the pollution of open waters.

Affinities

Vegetation of this kind, little described except in recent surveys of ditch aquatics, is best seen as an impoverished form of the sort of Parvopotamion assemblages included in the *Potamogeton-M. spicatum* community. Oberdorfer (1977) has characterised a comparable association from similar situations in Germany.

Floristic table A12

Potamogeton pectinatus	V (4–10)
Lemna gibba	II (1–4)
Lemna minor	II (1–4)
Callitriche stagnalis	I (2–4)
Myriophyllum spicatum	I (2–4)
Ceratophyllum demersum	I (1–3)
Elodea canadensis	I (3–5)
Lemna trisulca	I (2)
Zannichellia palustris	I (3)
Ruppia maritima	I (2–3)
Elodea nuttallii	I (3)
Groenlandia densa	I (2)
Polygonum amphibium	I (3–4)
Potamogeton perfoliatus	I (1–4)
Ranunculus peltatus	I (2)
Number of samples	52
Number of species/sample	1 (1–8)

https://doi.org/10.1017/9781107340817.016 Published online by Cambridge University Press