# MG8
# *Cynosurus cristatus-Caltha palustris* grassland

**Synonymy**
Water meadows Fream 1888*a*, Duffey *et al.* 1974, Ratcliffe 1977, all *p.p.*; *Senecioni-Brometum racemosi* R.Tx. & Preising 1951.

**Constant species**
*Anthoxanthum odoratum*, *Caltha palustris*, *Cerastium fontanum*, *Cynosurus cristatus*, *Festuca rubra*, *Holcus lanatus*, *Leontodon autumnalis*, *Poa trivialis*, *Ranunculus acris*, *Rumex acetosa*, *Trifolium repens*.

**Physiognomy**
The *Cynosurus-Caltha* community is a species-rich and varied grassland with no single species consistently dominant. Grasses generally account for most of the cover and all five of the constant species may be abundant. A variety of other grasses may be present but these are much less frequent and only occasionally prominent: *Festuca pratensis*, *Lolium perenne*, *Agrostis stolonifera*, *A. capillaris*, *Dactylis glomerata* and *Briza media*. There are almost always some sedges in the sward, although some of these are smaller species with far-creeping rhizomes and easily under-estimated in sampling. *Carex panicea* and *C. disticha* are the most frequent and abundant with occasional records for *C. flacca*, *C. nigra*, *C. demissa*, *C. ovalis* and *C. hirta*. Junci are uncommon in this vegetation and never dominate.

Dicotyledons are generally well represented and certain species are sometimes sufficiently abundant to give a distinctive stamp to the physiognomy. Notable among these are *Caltha palustris* which is unpalatable to stock and whose large leaves are often prominent in the sward and *Filipendula ulmaria* which, when flowering, may protrude above the other herbage. *Ranunculus acris*, *R. repens*, *Trifolium repens* and *T. pratense* are frequent and sometimes abundant with usually smaller amounts of *Leontodon autumnalis*, *Cerastium fontanum*, *Bellis perennis* and *Plantago lanceolata*. Among the occasionals are species characteristic of relatively unimproved meadows (e.g. *Sanguisorba officinalis*, *Lathyrus pratensis*, *Leucanthemum vulgare*, *Centaurea nigra*, *Alchemilla glabra* and *A. xanthochlora*) and a wide range of poor-fen species (e.g. *Cardamine pratensis*, *Achillea ptarmica*, *Lotus uliginosus*, *Lychnis flos-cuculi*, *Angelica sylvestris*, *Valeriana dioica*, *Galium palustre* and *G. uliginosum*). Other notable species at low frequency are *Geum rivale*, *Senecio aquaticus*, *Myosotis scorpioides* and, to the north and west, *Crepis paludosa* and *Trollius europaeus*. Although not recorded in the sampling, the rather local *Bromus racemosus* occurs in this community.

Bryophytes are somewhat patchy but *Calliergon cuspidatum* may be conspicuous with, less frequently, *Brachythecium rutabulum*, *Eurhynchium praelongum* and *Plagiomnium rostratum*.

**Habitat**
The community is characteristic of periodically inundated land which has been treated in traditional fashion, usually as pasture. It is most frequent and extensive on the flat or slightly sloping ground by rivers and streams which show seasonal flooding but it also occurs as more fragmentary stands below springs, flushes and seepage lines which produce a trickle of moderately calcareous water. Such sites typically carry gleyed brown earths, gleyed brown calcareous earths or surface-water gleys, of rather silty texture above and sometimes with a humose topsoil.

The soils are naturally enriched by an input of salts from deposited silt or moving water and they do not generally seem to have been improved by anything other than organic manures. The community is characteristically managed as pasture, being grazed by cattle and horses, though not usually by sheep for which the land is often too wet. Poaching may be a severe problem if the vegetation is heavily grazed while the ground is wet. Occasionally a hay crop is taken.

This community seems to be the naturally occurring vegetation which was managed in the past as water-meadow. This type of land use was developed in the

sixteenth and seventeenth centuries as a means of providing a much-needed supplement to spring grazing for the increasing numbers of sheep on the southern Chalk. In its primitive form, a water-meadow comprised a sloping hillside along whose contours was dug a series of channels or leats fed from a damned stream. Water was released from the leats through sluices and trickled down over the sward. In time, more sophisticated arrangements extended the system to the gently-sloping land of valley bottoms. In some places, wide valleys were subject to a controlled inundation by 'drowning' or 'floating upwards' where damned water was forced back over entire meadows. More usually, the leat system was developed into a complex series of graded channels running along the tops of ridges through the fields. The aim in 'floating downwards' was to ensure a continuous movement of water along the full channels, down over the gently-sloping sides of the ridges and back along the furrows into the stream or river. The neglected physical remains of these systems, which reached the peak of their development between 1700 and 1850, are widely distributed in southern chalkland valleys and, less extensively, in the Midlands (Taylor 1975).

The value of the water-meadow system was that it provided a supply of water to warm and enrich the soils in spring and so stimulate an early bite from the sward. The vegetation was usually laboriously hand-weeded to remove any of the coarser and unpalatable species and this selected for a grass-dominated sward which was highly productive and palatable. A comparison between the list provided from water-meadows by Fream (1888*a* in Tansley 1939) and the vegetation included here shows a close correspondence except that certain grasses, notably *Festuca pratensis*, *F. arundinacea* and their hybrids with *Lolium perenne*, are not normal constituents of the *Cynosurus-Caltha* community, although they still occur in the vegetation of some surviving water-meadow stands. Nowadays, these species are much more frequently encountered in other kinds of flood-pasture.

**Zonation and succession**

Enclosed stands of the community in riverside pastures may be subject to uniform treatment and show no zonations to other vegetation types. In some cases, however, improvement and management have been restricted by difficult topography and an inability to prevent flooding. Here, and around the more fragmentary spring and flush stands, there may be zonations related to soil moisture conditions. A usual pattern is for the *Cynosurus-Caltha* community to give way to inundation communities on the bare substrates of river banks or pool-sides or to small-sedge mires of the Caricion davallianae in base-rich flushes. On drier ground, there may be a transition to the *Lolium-Alopecurus-Festuca* flood-pasture or, where there has been extensive improvement, directly to *Lolio-Cynosuretum*. Such a sequence can be seen on the drained levels of West Sedgemoor in Somerset.

Artificial drainage can mediate a successional sequence from the *Cynosurus-Caltha* community to drier pasture types but neglect permits a fairly rapid invasion of *Salix* spp. and other shrubs and trees of wet woodland.

**Distribution**

The community has a widespread but rather local distribution throughout the British lowlands. Most water-meadow stands have been either totally neglected or drained and improved and water-meadows worked in the traditional fashion are now very rare although a few remain in chalkland valleys in Wiltshire, Dorset and Hampshire (Ratcliffe 1977).

**Affinities**

The *Cynosurus-Caltha* community has attracted attention in British descriptive accounts almost exclusively in the modified form of the vegetation which survives in water-meadows. Even in its more natural form, it is, however, a distinctive vegetation type with its combination of Cynosurion pasture species and poor-fen dicotyledons. Other broadly similar communities can generally be distinguished from the *Cynosurus-Caltha* grassland by the physiognomic dominance of *Deschampsia cespitosa* (*Holcus-Deschampsia* community) or Junci (*Holco-Juncetum*).

Vegetation of this kind has been described from West Germany and The Netherlands as the *Senecioni-Brometum racemosi* (Tüxen & Preising 1951, Westhoff & den Held 1969, Ellenberg 1978) and placed in the Calthion. This is a rather ill-defined alliance on the Atlantic fringe of western Europe (O'Sullivan 1965, Werger 1973) and the two original character species of the *Senecioni-Brometum*, *Bromus racemosus* and *Senecio aquaticus* are of restricted distribution in Britain and are not confined to the *Cynosurus-Caltha* community. Nonetheless, this vegetation type remains quite well defined among the more mesotrophic swards and rushy vegetation of the Molinietalia in the constancy of *Caltha palustris* and the preferential occurrence here of *Carex disticha* (Van Schaik & Hogeweg 1977). With further sampling among mire vegetation, it would be worth examining the relationship between the community and the grassier assemblages included within the *Juncus subnodulosus-Cirsium palustre* fen-meadow.

## Floristic table MG8

| | 8 | x |
|---|---|---|
| *Cynosurus cristatus* | V (2–5) | + |
| *Caltha palustris* | V (1–4) | + |
| *Festuca rubra* | V (2–7) | + |
| *Holcus lanatus* | V (1–6) | + |
| *Ranunculus acris* | V (2–4) | + |
| *Trifolium repens* | V (1–7) | + |
| *Cerastium fontanum* | IV (1–3) | + |
| *Poa trivialis* | IV (1–6) | + |
| *Rumex acetosa* | IV (1–4) | + |
| *Anthoxanthum odoratum* | IV (2–5) | + |
| *Leontodon autumnalis* | IV (1–3) | + |
| *Bellis perennis* | III (1–3) | + |
| *Plantago lanceolata* | III (2–4) | + |
| *Ranunculus repens* | III (2–5) | |
| *Trifolium pratense* | III (1–5) | + |
| *Carex panicea* | III (3–4) | |
| *Filipendula ulmaria* | III (1–9) | + |
| *Agrostis stolonifera* | II (2–5) | + |
| *Euphrasia officinalis* agg. | II (2–3) | |
| *Lolium perenne* | II (2–4) | + |
| *Taraxacum officinale* agg. | II (1–2) | + |
| *Cardamine pratensis* | II (1–3) | + |
| *Festuca pratensis* | II (1–3) | + |
| *Rhinanthus minor* | II (1–4) | |
| *Sanguisorba officinalis* | II (3–4) | |
| *Carex disticha* | II (4–5) | |
| *Eleocharis palustris* | II (2–8) | + |
| *Juncus articulatus* | II (1–4) | |
| *Leontodon hispidus* | II (1–4) | + |
| *Prunella vulgaris* | II (1–3) | + |
| *Veronica chamaedrys* | II (1–2) | + |
| *Calliergon cuspidatum* | II (2–7) | |
| *Lychnis flos-cuculi* | I (1–2) | + |
| *Equisetum palustre* | I (1–2) | |
| *Valeriana dioica* | I (1–2) | + |
| *Crepis paludosa* | I (1–2) | + |
| *Agrostis capillaris* | I (4–7) | + |
| *Alchemilla glabra* | I (2–3) | |
| *Bromus hordeaceus hordeaceus* | I (2) | + |
| *Carex flacca* | I (2–3) | |
| *Carex nigra* | I (2–6) | |
| *Galium palustre* | I (1–2) | + |
| *Luzula campestris* | I (1–2) | |
| *Succisa pratensis* | I (1–3) | |
| *Avenula pubescens* | I (2) | + |
| *Achillea ptarmica* | I (1–3) | |
| *Angelica sylvestris* | I (2) | |
| *Cirsium palustre* | I (1–2) | + |
| *Galium uliginosum* | I (2) | |
| *Juncus effusus* | I (2) | |
| *Lotus uliginosus* | I (2–3) | + |
| *Trollius europaeus* | I (2) | |
| *Geum rivale* | I (2–3) | + |
| *Myosotis scorpioides* | I (2) | + |
| *Leucanthemum vulgare* | I (2) | + |
| *Alchemilla xanthochlora* | I (3–4) | |
| *Glyceria declinata* | I (2) | |
| *Mentha aquatica* | I (2–4) | |
| *Senecio aquaticus* | I (2) | + |
| *Brachythecium rutabulum* | I (1–4) | |
| *Dactylis glomerata* | I (1–3) | |
| *Briza media* | I (2–3) | + |
| *Equisetum arvense* | I (1–2) | |
| *Centaurea nigra* | I (3–4) | |
| *Lotus corniculatus* | I (3–4) | + |
| *Eurhynchium praelongum* | I (2) | |
| *Carex demissa* | I (2–3) | |
| *Plagiomnium rostratum* | I (1–4) | |
| *Carex ovalis* | I (3–4) | |
| *Juncus acutiflorus* | I (3) | + |
| Number of samples | 15 | |
| Number of species/sample | 26 (15–41) | |

8 *Cynosurus cristatus-Caltha palustris* grassland

x Water meadows (Fream 1888*a*)

https://doi.org/10.1017/9780521391665.012 Published online by Cambridge University Press