
SM18

Juncus maritimus salt-marsh community

Synonymy

Juncetum maritimi auct. angl. p.p., includes *Juncus maritimus*-*Oenanthe lachenalii* ass. R.Tx. 1937

Constant species

Agrostis stolonifera, *Festuca rubra*, *Glaux maritima*, *Juncus gerardii*, *J. maritimus*.

Physiognomy

The association is dominated by tall dense clumps of *Juncus maritimus* with an understorey of *Agrostis stolonifera*, *Festuca rubra*, *Glaux maritima* and *Juncus gerardii*. There is a rich subsidiary flora in which mesotrophic grassland species (notably *Leontodon autumnalis* and *Trifolium repens*) and weed species (for example, *Atriplex hastata*, *Elymus repens* and *Rumex crispus*) are conspicuous. Bryophytes may be locally abundant with patches of *Calliargon cuspidatum*, *Amblystegium riparium*, *A. serpens* and *Eurhynchium praelongum*. Stands of the association may be based on individual clones of *J. maritimus*, in some cases up to 15 m in diameter, or occur as an extensive zone.

Sub-communities

***Plantago maritima* sub-community:** *Juncetum maritimi* Yapp & Johns 1917; *Festuca rubra*-*Juncus maritimus* nodum Adam 1976. *Plantago maritima* and *Triglochin maritima* attain constancy in the often luxuriant vegetation of this sub-community and there are frequent records for *Leontodon autumnalis*, rayed *Aster tripolium* and *Armeria maritima*. It sometimes occupies extensive areas, notably at Ynys Hir in the Dovey estuary, Dyfed.

***Oenanthe lachenalii* sub-community:** *Juncus maritimus*-*Oenanthe lachenalii* ass. R.Tx. 1937; *Oenanthe lachenalii*-*Juncus maritimus* nodum Adam 1976. *Triglochin maritima*, *Leontodon autumnalis* and *Oenanthe lachenalii* are constant here, the last giving a particularly distinctive appearance to the vegetation in the flowering

season, though it is rarely present in abundance. Individual stands, even those in close proximity, may have singular characteristics and different weed species, germinating in trapped drift litter, are especially variable. Some stands have abundant *Cirsium arvense*, others *Atriplex hastata*, *Sonchus arvensis* or *Urtica dioica*.

***Festuca arundinacea* sub-community:** *Festuca arundinacea*-*Juncus maritimus* nodum Adam 1976. *Oenanthe lachenalii*, remains constant in this sub-community but salt-marsh species like *Glaux maritima*, *Juncus gerardii*, *Plantago maritima* and *Triglochin maritima* are less frequent. However, the most obvious feature here is the constancy of *Festuca arundinacea*, the large tussocks of which may be co-dominant with the *Juncus maritimus*, and of *Leontodon autumnalis*, *Potentilla anserina* and *Trifolium repens* in the understorey. Other mesotrophic grassland species such as *Holcus lanatus*, *Lotus corniculatus*, *Ranunculus acris* and *Vicia cracca* are also frequent.

Habitat

The association is predominantly an upper-marsh community but the sub-communities differ in their tolerance of tidal submersion. The lowest recorded site for the *Festuca arundinacea* sub-community experienced 25 submergences/year while the *Oenanthe* sub-community seems to be able to tolerate at least 150 submergences/year. As the *Plantago* sub-community is normally found seaward of the *Oenanthe* sub-community, its tolerance is presumably even greater.

The association occurs on a variety of substrates but the pH is generally around 7.0 (cf. Bridges 1977 who recorded values down to 5.1). There is normally an appreciable accumulation of organic matter in the top 10–20 cm of the soil and superficial litter trapping may be considerable. This material provides a suitable substrate for colonisation by weed species.

Although the association is common on grazed marshes, *Juncus maritimus* is itself unpalatable and its dense tall growth confers protection on the associated

species. Yapp & Johns (1917) and Tansley (1939) suggested that the luxuriance of vegetation within *J. maritimus* stands may also be due to the higher and more constant humidity levels attained there. Extensive spread of the association on grazed marshes reduces their agricultural value but eradication has been attempted on only a small local scale. Mowing, draining, the use of herbicides and physical removal of *J. maritimus* have all been attempted. Packham & Liddle (1970) have reported some success in control on Cefni Marsh, Anglesey, by cutting close to the ground in early summer.

Oenanthe lachenalii is remarkably resistant to oil and refinery effluent spillage (Baker 1979). Even after repeated oiling, plants respond simply by producing new shoots.

Zonation and succession

At a few sites, there is a zonation within single extensive stands of the association from the *Plantago* sub-community through the *Oenanthe* sub-community to the *Festuca* sub-community. More generally, isolated stands of each of the sub-communities occur within other communities, the *Oenanthe* and *Plantago* sub-communities usually within the *Juncetum gerardi*, though the *Plantago* sub-community may also extend down-marsh into the upper part of the *Puccinellietum maritimae*. Unlike these two sub-communities where stands are sharply defined the *Festuca* sub-community often has rather diffuse boundaries with its neighbouring communities on the upper marsh.

Juncus maritimus can be an aggressive invader. Packham & Liddle (1970) reported the transformation of an area of *Puccinellietum maritimae* within the space of 20 years. It has been conventional in British accounts to regard *Juncus maritimus* salt-marsh, if not as the true climax of succession, then at least as a very stable stage in upper marsh development which can be considered for most purposes as the climax. The association is clearly important on those marshes where it occurs but it is probably better to see it as part of a seral sequence parallel to that involving the *Juncetum gerardi*.

Distribution

The association is widespread on the west coast as far north as Arran but very local in south-east England, though it may occur there on derelict reclaimed land. In

Norfolk, the association is replaced by the *Juncus maritimus*-*Triglochin maritima* salt-marsh.

Affinities

The classification of *Juncus maritimus* vegetation poses a number of problems (Adam 1977). *J. maritimus* occurs widely in British salt-marshes but those vegetation types in which it is dominant or co-dominant are nonetheless distinct. Two of these are best considered as sub-communities of other well-defined associations: the *Halimionetum portulacoidis* and the *Atriplici-Elymetum pycnanthi*. A further community forms the distinctive, partly low-marsh, *Juncus maritimus*-*Triglochin maritima* association.

The three remaining types are those grouped here as the *Juncus maritimus* salt-marsh. The *Juncetum maritimi* of British authors has not been taken up in Continental studies but, although this partly reflects a different approach to classification, it is probably also an indication of the less important role which *J. maritimus* plays outside Great Britain. An alternative approach to these three types of *J. maritimus* salt-marsh would be to consider them as variants of the *Juncetum gerardi* (see Braun-Blanquet & Tüxen 1952, Ivimey-Cook & Proctor 1966, Moore *et al.* 1970 and Moore & O'Reilly 1977 in Ireland). However, although the two associations share a considerable number of species, the *Juncus maritimus* salt-marsh is distinct in containing conspicuous weed species and also in its striking physiognomy. The representation of ruderals has led some workers to place *J. maritimus* vegetation in various taxa of the Elymo-Rumicion *crispi* (e.g. Westhoff & den Held 1969).

There is no single well-described phytosociological equivalent of the association diagnosed here. Tüxen (1937) reported a *Juncus maritimus*-*Oenanthe lachenalii* association from north Germany and similar communities have been encountered from other sites in that region (Libbert 1940, Voderberg 1955, Passarge 1964), from The Netherlands (Westhoff & den Held 1969) and from north Spain (Tüxen & Oberdorfer 1958, Bellot 1966). These have not been fully described or related to British *J. maritimus* vegetation but it may eventually be sensible to incorporate them into a single association.

The general floristic similarities to the *Juncetum gerardi* suggest that the *Juncus maritimus* salt-marsh is best placed within the *Armerion maritimae* of the *Asteretea*.

Floristic table SM18

	a	b	c	18
<i>Juncus maritimus</i>	V (7–9)	V (2–9)	V (5–8)	V (2–9)
<i>Agrostis stolonifera</i>	V (3–8)	V (3–8)	V (4–7)	V (3–8)
<i>Festuca rubra</i>	V (1–8)	V (3–8)	V (5–7)	V (1–8)
<i>Glaux maritima</i>	IV (2–7)	IV (2–6)	III (2–4)	IV (2–7)
<i>Juncus gerardii</i>	IV (3–5)	IV (2–6)	III (3–5)	IV (2–6)
<i>Triglochin maritima</i>	IV (2–5)	IV (2–5)	II (2–3)	III (2–5)
<i>Plantago maritima</i>	V (2–6)	III (2–4)	II (2–3)	III (2–6)
<i>Oenanthe lachenalii</i>	I (1–3)	V (2–5)	V (2–5)	III (1–5)
<i>Leontodon autumnalis</i>	III (2–4)	IV (2–5)	IV (1–4)	II (1–5)
<i>Festuca arundinacea</i>	I (2)	I (2–3)	V (3–7)	II (2–7)
<i>Potentilla anserina</i>	I (3–5)	II (2–7)	IV (2–7)	II (2–7)
<i>Trifolium repens</i>	II (2–6)	III (3–8)	IV (3–5)	III (2–8)
<i>Aster tripolium</i> (rayed)	III (2–4)	II (2–3)	I (2)	II (2–4)
<i>Armeria maritima</i>	III (2–5)	I (2–4)	I (2–3)	II (2–5)
Algal mat	II (4–8)	I (4–5)		I (4–8)
<i>Atriplex prostrata</i>	II (1–5)	III (2–5)	II (2–3)	II (1–5)
<i>Elymus repens</i>	I (4)	II (2–6)	III (3–6)	II (2–6)
<i>Carex distans</i>	I (2–3)	II (2–5)	III (1–4)	II (1–5)
<i>Lotus corniculatus</i>	I (4)	I (2–4)	III (3–5)	I (2–5)
<i>Eurhynchium praelongum</i>	I (3–5)	II (3–6)	III (3–7)	II (3–7)
<i>Carex extensa</i>	II (3–4)	I (1–4)	I (3)	I (1–4)
<i>Poa pratensis</i>	I (3–5)	II (2–5)	I (2–4)	I (2–5)
<i>Rumex crispus</i>	I (1–3)	II (2–3)	I (1–3)	I (1–3)
<i>Samolus valerandi</i>	I (3)	I (2–4)	II (2–4)	I (2–4)
<i>Cirsium arvense</i>		I (2–7)	II (2–3)	I (2–7)
<i>Holcus lanatus</i>		I (2–7)	II (2–7)	I (2–7)
<i>Ranunculus acris</i>		I (2–3)	II (2–4)	I (2–4)
<i>Vicia cracca</i>		I (2–4)	II (1–6)	I (1–6)
<i>Carex otrubae</i>		I (2–4)	I (2–4)	I (2–4)
<i>Cochlearia officinalis</i>	II (2–4)	II (2–3)	II (1–3)	II (1–4)
<i>Amblystegium serpens</i>	I (3–5)	I (3)	I (3–5)	I (3–5)
<i>Galium palustre</i>	I (3)	I (2–4)	I (3)	I (2–4)
<i>Lychnis flos-cuculi</i>	I (3)	I (2–3)	I (3)	I (2–3)
<i>Sonchus arvensis</i>	I (3)	I (2–3)	I (2–5)	I (2–5)
Number of samples	51	71	33	155
Mean number of species/sample	11 (5–20)	13 (7–25)	15 (8–32)	13 (5–32)
Mean vegetation height (cm)	51 (5–100)	49 (30–100)	53 (30–100)	50 (5–100)
Mean total cover (%)	98 (85–100)	99 (70–100)	99 (95–100)	98 (70–100)

a *Plantago maritima* sub-communityb *Oenanthe lachenalii* sub-communityc *Festuca arundinacea* sub-community18 *Juncus maritimus* salt-marsh (total)

