
SM8

Annual *Salicornia* salt-marsh community *Salicornietum europaeae* Warming 1906

Constant species

Several distinct taxa can be recognised among the British annual *Salicornias* but diagnosis below the level of the three groups *S. europaea*, *S. procumbens* and *S. pusilla* is difficult for non-specialists. Here, all annual taxa encountered are described under *Salicornia* agg. and this is the sole constant of the community.

Rare species

Arthrocnemum perenne.

Physiognomy

The community comprises ephemeral stands of annual *Salicornias* sometimes with no other species. The vegetation is invariably somewhat open and though *Salicornia* agg. is always conspicuous, the density of plants is variable: around The Wash, for example, *Salicornia* agg. cover is high whereas at sites with sandier substrates the density can be very low. There is often an algal mat over the substrate surface but vascular companions are usually very few. Scattered plants of *Puccinellia maritima*, *Suaeda maritima* and *Spartina anglica* occur frequently with occasional records for a variety of other lower marsh species. At a few sites (Blakeney Point, for example), *Fucus vesiculosus* ecad *caespitosus* is abundant.

Sub-communities

With careful identification of distinct taxa, it may be possible to define a range of communities within this broad general unit as a number of Continental authors have done (see, for example, Géhu & Delzenne 1975). Ball & Tutin (1959) recommend collecting a dozen specimens from populations in September/October when the characteristic colours have developed. Where particular taxa have been ascribed distinct ecological preferences *in litt.* these have been noted below.

Habitat

Annual *Salicornias* germinate in May from seeds widely dispersed over whole marsh surfaces. The lower limit of

establishment appears to be set by the time necessary for the seedlings to become firmly anchored: Wiehe (1935) showed that, in the Dovey estuary, two to three days' exposure between tidal flooding was necessary for sufficient root growth to take place. The speedier radical growth of *Salicornia dolichostachya* over *S. europaea sensu stricto* may give the former an establishment advantage in such situations: in the Dee estuary, *S. dolichostachya* is certainly the commoner species in the open habitats of the lower marsh (Ball & Brown 1970; see also Ball & Tutin 1959).

Salicornia agg. is tolerant of frequent tidal submerision, enduring around 600 flooding tides/year at its lower limits where it forms the familiar pioneer stands. The community is also characteristic of other bare marsh habitats such as creek sides, borrow pits and other disturbed areas in the upper marsh. Here seedlings grow rapidly and by August the plants are bushy, green and up to 15–20 cm high. Although certain taxa, *S. europaea s. s.* for example, appear less susceptible than others to competition from perennial grasses (Ball & Brown 1970), growth in the upper marsh is generally slow and the restrictions may be due to the lack of competition for sediment nutrients, especially nitrogen, with established perennials (Pigott 1969, Stewart *et al.* 1972). Addition of nutrients to *Salicornia* plants within the other high marsh communities stimulates growth to levels characteristic of the lower marsh stands, though a lag in response is suggestive of a determinate growth pattern genetically adapted to an environment with a cyclical but delayed suitability: such sites are not flooded again after *Salicornia* germination until the autumn equinox (Jefferies *et al.* 1979).

Within suitable sites, the community can flourish on a variety of substrates from hard clay to shelly sand, occasionally even on shingle but only rarely are very soft sediments colonised. Where *Spartina anglica* has become well established, the low-marsh *Salicornia* stands tend to be restricted to thin gravels or shingles over hard clay (Perraton 1953). Where wind-blown sand is abundant,

plants tend to adopt a decumbent habit and can survive virtual burial for most of the summer (Tüxen 1974). In brackish areas behind sea walls, which we have not examined closely but where annual *Salicornias* may flourish, *S. ramosissima* and *S. prostrata* appear to be the common taxa (Ball & Tutin 1959).

Annual *Salicornia* stands occur on both grazed and ungrazed marshes. All species are highly susceptible to oil and refinery effluent spills being killed by a single inundation (Baker 1979). On a few marshes in south-east England (principally around The Wash) *Salicornias* are harvested as ‘samphire’ for human consumption.

Zonation and succession

Salicornia stands may form a distinct zone in the lower marsh, sometimes hundreds of metres deep. At some sites, particularly those on sandy substrates, patches of *Salicornia* may be separated from the main marsh front by several hundred metres of bare flat. The community can also occur in a mosaic with the *Puccinellietum maritimae* or with the *Spartinetum townsendii*. The expansion of the latter has much reduced the area of lower marsh available for pioneer *Salicornia* establishment especially in south-east England.

Although the annual *Salicornietum* is generally the

lowest marsh community proper it may rarely initiate a succession because summer accretion can be offset by ablation after the stands have disappeared in the winter. Chapman (1957) has, however, produced a cartographic record of changes in the distribution of *Salicornia* marsh at Scolt Head, Norfolk with ageing of open and closed marshes.

Distribution

The community is widely distributed around the British coastline. On the sandy marshes of the west coast occurrences are local, though extensive open stands occur in some estuaries. The very local distribution in western Scotland is largely a reflection of the lack of suitable habitats: many loch-head marshes are fronted by cobble beaches rather than sand flats and these carry a dense cover of free-living fucoids.

Affinities

Equivalent communities have a widespread distribution in Europe. Although various divisions have been made with the *Salicornietum europaeae*, the general composition and habitat relationships of the vegetation types accord with the British community (see, for example, Beeftink 1962, 1965, 1972, 1977a).

Floristic table SM8

<i>Salicornia</i> agg.	V (4–9)
Algal mat	III (3–8)
<i>Puccinellia maritima</i>	III (1–7)
<i>Suaeda maritima</i>	II (1–5)
<i>Spartina anglica</i>	II (1–5)
<i>Halimione portulacoides</i>	I (1–3)
<i>Aster tripolium</i> var. <i>discoideus</i>	I (1–4)
<i>Aster tripolium</i> (rayed)	I (1–3)
Number of samples	81
Mean number of species/sample	3 (1–7)
Mean vegetation height (cm)	7 (2–20)
Mean total cover (%)	53 (5–95)

