
SD2

Honkenya peploides-*Cakile maritima* strandline community

Synonymy

Strand plants association Tansley 1911; Foreshore communities Tansley 1939; *Salsola kali*-*Atriplex glabriuscula* Association Tx. 1950; *Atriplici*-*Polygonetum raii* Tx. 1950; *Cakile maritima*-sociatie Boerboom 1960; Sociation à *Salsola kali* Géhu & Géhu 1969; Sociatie van *Honkenya peploides* Westhoff & den Held 1969; *Honkenietum peploidis* Géhu & Géhu 1969.

Constant species

Cakile maritima, *Honkenya peploides*.

Rare species

Polygonum oxyspermum ssp. *raii*.

Physiognomy

The *Honkenya peploides*-*Cakile maritima* community occurs as patchy strips of strandline vegetation in which *Honkenya peploides*, *Cakile maritima* and various *Atriplex* spp. are the most consistent elements. *Honkenya* is a perennial and low clumps of its succulent, creeping shoots can be a conspicuous feature here all the year round, being firmly anchored in the sandy gravel substrate, able to accumulate a little wind-blown sand and tolerant of the very occasional, brief inundations by seawater that come with extreme high tides and winter storms. Other characteristic species are more ephemeral, but they too can become abundant in summer, especially where organic detritus has been deposited along the tidal limit or incorporated beneath a shallow covering of beach material, and they may give a distinctive appearance to particular stretches of the community. Among these annuals, *Cakile* is very frequent and sometimes plentiful and there is usually one or other, or a mixture, of the common *Atriplex* spp. of strandline habitats, quite often in locally dense populations which have sometimes been treated as the basis of separate vegetation types (e.g. Birse 1980). These plants can be difficult to identify (Taschereau 1985), but *A. prostrata* seems to be the most widespread species in the community, apart

from in northern Scotland where it tends to be replaced by *A. glabriuscula*, with *A. laciniata* found more locally in this vegetation right around the coast. *A. patula* and also *A. littoralis*, which is more usually a salt-marsh plant, are more occasional, and in a few localities around the heads of sheltered inlets in north-west Scotland and Shetland, the rare *A. praecox* can be seen in intimate association with the *Honkenya*-*Cakile* community, colonising downshore towards the tidal algal zones (Taschereau 1985).

Common associates of *Atriplex* spp. in other kinds of strandline vegetation, such as *Beta vulgaris* ssp. *maritima* and *Matricaria maritima*, are usually no more than occasional in this community, though they can be moderately abundant and sometimes overwinter establish as perennials. More distinctive and fairly common here except in the far north is *Salsola kali*, another annual chenopod, whose prickly decumbent shoots can form quite far-spreading open patches. This vegetation also provides an important locus along our southern and western coasts for *Polygonum oxyspermum* ssp. *raii*, a rare and decreasing species with us (Lousley & Kent 1981) that has sometimes been regarded as characteristic of a discrete assemblage of strandline annuals (Géhu & Géhu 1969, Birse 1980). Then, there can be occasional plants of other ephemerals like *Senecio vulgaris*, *Cerastium diffusum* ssp. *diffusum*, *Stellaria media* and *Poa annua*.

Scattered individuals of bigger perennial herbs such as *Rumex crispus* var. *littoreus*, *Silene vulgaris* ssp. *maritima*, *Eryngium maritimum*, *Sonchus arvensis* and *Cirsium arvense* are sometimes seen in this vegetation but, among the longer established plants, a number of grasses are more characteristic. *Elymus farctus* ssp. *boreali-atlanticus* is especially common and often quite abundant, particularly where the *Honkenya*-*Cakile* strandline merges imperceptibly with lines of incipient foredunes. *Leymus arenarius* and *Ammophila arenaria* are also quite frequent, and more occasionally there can be tussocks of *Festuca rubra*, *Elymus repens* and *Agrostis stolonifera*.

Habitat

The *Honkenya-Cakile* community is the characteristic pioneer vegetation of sand and fine shingle strandlines on flat or gently-sloping beach tops all around the British coast. Periodic additions of organic detritus along the tidal limit encourage the development of the vegetation, particularly the more nitrophilous ephemerals which are able to exploit the warmer and more settled conditions in summer. Local accretion of sand may favour the invasion of dune-building grasses, but very often the exposure to strong salt-laden winds and occasional tidal inundations keep the vegetation in a perpetually immature state.

Some of the plants found in this community, such as *Eryngium maritimum*, *Beta vulgaris* ssp. *maritima* and *Polygonum oxyspermum* ssp. *raii*, have an Oceanic Southern distribution through Europe (Matthews 1955) and lend a distinctive character to stands in the south and west, while others, like *Atriplex glabriuscula*, become more important towards the cooler north. Most of the commoner species in this vegetation, however, extend right around the British seaboard, or nearly so, and the occurrence of the community along particular stretches of coast is more a reflection of the suitability of the beaches than of any direct influence of regional climate on plant growth. Sandy and fine shingle substrates are much preferred, and these must be beyond the reach of all but the most extreme high tides and storm surges to support the more than a fleeting and fragmentary development of the vegetation. Typically, then, the *Honkenya-Cakile* community is found along the flatter tops of beaches in what is often a very narrow zone between the tidal limit and the stable or accreting hinterland of the shore. On long strands, such as border some stretches of soft, low coastline, interrupted strips of this vegetation can extend for considerable distances, but frequently the stands are much more patchy, even here, and around the tidal margins of little bays and in the heads of sandy creeks the assemblages can be very fragmentary, though the shelter in such situations may favour locally luxuriant growth. Especially well developed stands are sometimes seen along the strandlines on the lee side of barrier islands or spits (Chapman 1976).

Wind and water are both important in the dissemination of propagules into such strandline habitats, but continuing exposure to salt-spray and occasional inundation by the sea exert a strong limitation on the kinds of plants that can gain a hold on the raw sand and gravel soils. This accounts for the strongly halophytic, or at least salt-tolerant, nature of this vegetation, with important species here having provision in their leaf tissues (*Honkenya*, *Cakile*) or special hairs (*Atriplex* spp.) for the retention of moisture while their roots subsist in markedly saline ground water (Salisbury 1952, Chapman 1976). Also very important for the develop-

ment of the community is the ability of many species, especially the summer annuals, to capitalise upon the periodic additions of nutrients, particularly nitrogen, that come with the driftline detritus. Often, the *Honkenya-Cakile* vegetation clearly marks out the highest and most stable of a series of lines of tidal debris cast up on the beach top, and even where such material cannot be seen, excavation frequently reveals that the plants are rooted in a layer of rotting wrack from an old driftline that has been buried beneath a few centimetres of sand (Gimingham *et al.* 1948, Gimingham 1951).

The dead remains of the annuals, as well as the perennial clumps of *Honkenya*, are able to accumulate a little wind-blown sand (Tansley 1939) and patches of this may present the appearance of tiny low dunes along the strandline. These offer congenial sites for invasion by *Elymus farctus* which, like the plants of the *Honkenya-Cakile* community, can stand occasional, brief submergence by the sea, but which more readily encourages the accretion of sand and so may initiate the development of foredunes, within which *Ammophila* can gain a hold. Frequently, though, this process is offset by tidal and wind erosion, the firmly-anchored *Honkenya* surviving to form the basis of a newly-developing stand of the community around deposited drift. Trampling by humans, scuffing their way along the strandline, may in the end be more damaging, particularly to the survival of rare plants like *P. oxyspermum* ssp. *raii* (Lousley & Kent 1981).

Zonation and succession

Along some stretches of shore, the *Honkenya-Cakile* community is the only kind of maritime vegetation to be seen above the tidal limit, but elsewhere it occurs in zonations with other sand and shingle communities, the patterns being strongly dependent on the deposition and erosion of beach material of different grades, and the frequency of addition of organic detritus. Most existing stands can be regarded as perpetually renewed pioneer vegetation, although where opportunity arises, the progressive accumulation of sand over and around the community can initiate a dune succession.

On beaches that are naturally narrow, or where the shore hinterland has become occupied by settlements or converted to agricultural or recreational use, often behind some sort of sea defence, the *Honkenya-Cakile* community can occur isolated as a narrow open zone of vegetation just above the tidal limit. In such situations, stands may be very fragmentary and, along any one stretch of beach, not very long-lived, with the additional threat of trampling where beach use is heavy. Even here, however, there can be considerable floristic differences between and along stands, particularly in the varying development of the summer annuals, with species such as *P. oxyspermum* ssp. *raii* and *A. glabriuscula* giving some

measure of regional contrast. And, where there is a shift from sand to coarser shingle in moving along beaches, a common feature where longshore drift operates on extensive lengths of coast, the community can give way to other kinds of strandline vegetation. In southern Britain, its counterpart on drift-enriched pebbles is the *Atriplex-Beta* community, where *Atriplex* spp., particularly in this case *A. prostrata*, remain common and abundant, but where *Cakile* and *Honkenya* are much reduced in frequency, *B. vulgaris* ssp. *maritima* and *Matricaria maritima* greatly increased. To the north, along sheltered shingly strandlines in Scotland, there is an analogous switch to the *Matricaria-Galium* community, with *A. glabriuscula* this time providing some floristic similarity, but where *M. maritima*, *Galium aparine* and *Stellaria media* become a more or less constant feature.

Where a sandy beach top runs along the front of shingle deposits that are beyond the reach of all but very extreme tides, the *Honkenya-Cakile* community can be replaced by open *Rumex-Glaucium* vegetation. There, *Honkenya* can persist with some vigour on sandy patches, its stolons sometimes burrowing down into the underlying pebbles (Tansley 1939) and *Atriplex* spp. may thrive on local accumulations of organic detritus, but it is coarse perennial hemicryptophytes like *R. crispus* var. *littoreus*, *Glaucium* and *Crambe* that provide most of the character of the shingle assemblage.

In other places, a shingle spine or low hinterland behind a beach top has provided a suitable base for the development of dunes by the accretion of sand blown in from flats exposed at low tide. In such situations, the *Honkenya-Cakile* vegetation can form a narrow, interrupted front to sequences of dune communities, the sandy patches around the plants giving way to a broken line of *Elymus farctus* foredunes, these in turn passing to *Ammophila* yellow dunes, with *Leymus arenarius* playing an important part in these younger stages at sites down the east coast. *Honkenya*, *Cakile*, *Salsola* and *Atriplex* spp. can persist for some time in these kinds of vegetation as accretion progresses, but they are quickly overwhelmed as bigger mobile yellow dunes develop. In many of our dune systems, however, it is clear that both the *Honkenya-Cakile* stands and the *Elymus* foredunes are repeatedly renewed as bouts of fierce wind erosion

and occasional tidal surges destroy the beach-top vegetation and set back any advance of the sere.

Distribution

The *Honkenya-Cakile* community occurs around all parts of the British coast where suitable substrates exist.

Affinities

As characterised in this scheme, the *Honkenya-Cakile* community corresponds to the rather broadly-defined assemblages of sandy strandlines described in early accounts of British coastal vegetation (Tansley 1911, 1939). It thus subsumes most of the fine variation, often reflected in the local frequency and abundance of individual species, particularly the annual plants, that has been used in Continental schemes to distinguish a range of separate vegetation types. In mainland Britain, only Birse (1980, 1984) has pursued this approach although from Ireland Braun-Blanquet & Tüxen (1952), Ivimey-Cook & Proctor (1966) and Beckers *et al.* (1976) have described various assemblages (summarised in White & Doyle 1982) and Géhu & Géhu (1969), in their account of French communities of this kind, made passing reference to the occurrence of some of them around the coasts of the British Isles.

Essentially, the core of the *Honkenya-Cakile* community is equivalent to what European ecologists have traditionally defined as a perennial *Honkenietum* (Géhu & Géhu 1969), together with populations of annuals variously grouped into sociations or simple associations of *Cakile* (Boerboom 1960, Westhoff & de Held 1969), *Salsola* (Géhu & Géhu 1969), different *Atriplex* spp. (Tüxen 1950, Westhoff & Beertink 1950, Géhu & Géhu 1969), *Polygonum oxyspermum* ssp. *raii*, or mixtures of these (Nordhagen 1940, Tüxen 1950, Braun-Blanquet & Tüxen 1952, Ivimey-Cook & Proctor 1966, Géhu & Géhu 1969, Birse 1980, 1984). A case has been made (Géhu & Géhu 1969) for locating strandlines with prominent *Honkenya* among the perennial foredune vegetation of the Elymo-Honkenion, an *Ammophiletea* alliance, but the *Honkenya-Cakile* community as defined here clearly belongs among the annual *Salsola*-*Honkenion* assemblages, within the *Cakiletea* foreshore vegetation.

Floristic table SD2

<i>Honkenya peploides</i>	V (1–8)
<i>Cakile maritima</i>	IV (1–8)
<i>Elymus farctus</i>	III (2–8)
<i>Atriplex prostrata</i>	III (1–8)
<i>Atriplex glabriuscula</i>	II (1–6)
<i>Leymus arenarius</i>	II (1–4)
<i>Atriplex laciniata</i>	II (1–5)
<i>Ammophila arenaria</i>	II (1–5)
<i>Salsola kali</i>	II (1–5)
<i>Matricaria maritima</i>	II (1–5)
<i>Rumex crispus</i>	I (1–4)
<i>Eryngium maritimum</i>	I (1–4)
<i>Festuca rubra</i>	I (1–4)
<i>Elymus repens</i>	I (1–5)
<i>Potentilla anserina</i>	I (1–6)
<i>Sonchus arvensis</i>	I (1–5)
<i>Agrostis stolonifera</i>	I (1–6)
<i>Atriplex patula</i>	I (1–3)
<i>Silene vulgaris maritima</i>	I (1–5)
<i>Beta vulgaris maritima</i>	I (3–4)
<i>Hypochoeris radicata</i>	I (1)
<i>Senecio vulgaris</i>	I (1–4)
<i>Achillea millefolium</i>	I (1–4)
<i>Arrhenatherum elatius</i>	I (1–2)
<i>Atriplex littoralis</i>	I (2)
<i>Cerastium diffusum diffusum</i>	I (3)
<i>Cirsium arvense</i>	I (1–3)
<i>Poa annua</i>	I (1–4)
<i>Polygonum oxyspermum</i>	I (1–2)
<i>Sedum acre</i>	I (3–5)
<i>Stellaria media</i>	I (1–3)
Number of samples	39
Number of species/sample	5 (2–10)

