THE FLORA OF LANGSTONE HARBOUR AND FARLINGTON MARSHES

By M. BRYANT

INTRODUCTION

LANGSTONE HARBOUR is a tidal basin extending over an area of more than 5,000 acres and lying between Portsea and Hayling Islands in south-east Hampshire. At high water the harbour resembles a large and almost land-locked lake with a shoreline of almost fifteen miles. At low water extensive mudflats and two sandflats (Sword and Sinah Sands) are exposed, drained by two main channels (Langstone and Broom Channels) which join in the south of the harbour to make a common and very narrow exit to the sea. Farlington Marshes comprises some 280 acres of rough grazings and brackish marsh intruding into the harbour proper from the north-west.

Farlington Marshes and Langstone Harbour have been recognised together as an outstandingly interesting biological system. Most of the published scientific information relating to the area, however, refers to its bird populations and the intention in this paper is to place on record an accurate account of the flora of the area for reference by future workers.

GEOLOGY

The chalk, exposed at Portsdown Hill, underlies the northern parts of Portsea and Hayling Island, and Langstone Harbour. To the south, the underlying deposits are Eocene formations: Reading Beds, London Clay, Bagshot Beds and others. South of Portsdown the chalk and other strata are overlaid by brickearth, a superficial Pleistocene deposit. The most recent deposits are alluvium, in the form of harbour mud, shingle and blown sand.

The Solent represents the drowned valley of a river, of which the present Frome, Stour, Avon, Test and Itchen were tributaries, which flowed into the sea somewhere south of what is now Selsey Bill. At that time, in place of the present harbours of Portsmouth, Langstone and Chichester must have been streams flowing in shallow valleys cut into the coastal plain. After the last glaciation, the land slowly sank, flooding the valley of the Solent river and finally separating the Isle of Wight from the mainland. The harbours originated from the flooding of the shallow valleys of the coastal plain, and subsequent erosion has increased their area. The brickearth plain which forms the harbour shores is nowhere more than a few feet above high water mark so that erosion takes place rapidly wherever this soft material is exposed to wave action.

The general easterly drift of shingle along the Solent shores tends, especially at the streams' mouths, to form spits running east, as at Calshot and Needs Oar. At the harbour mouths there is the same tendency for spits to form to close the mouths, but the powerful currents flowing in and out of the narrow entrances disturb the general easterly flow. The results are small spits running back into the harbours as at Black Point and East Head (Chichester Harbour), and outside the entrances submerged

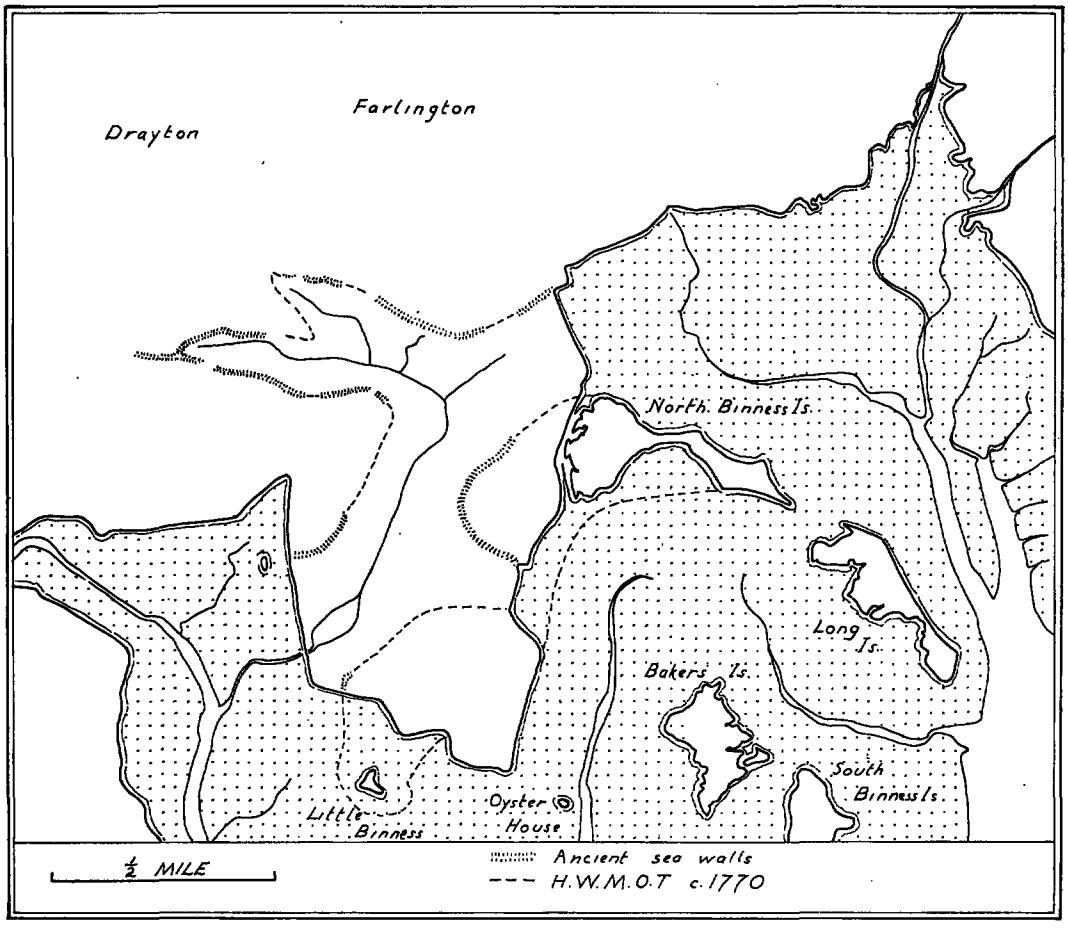

Fig. 1. Farlington Marshes

banks of shingle on either side of the harbour mouths (the Winners). At Hayling there is more fine sand than shingle and at the western end this is blown into low dunes.

Historical Background

A map of about 1600[1] shows the outline of Langstone Harbour very much as at present, but the creeks and islands in the north-western corner look very different. Instead of the Farlington Marshes peninsular the map shows a broad branching creek lying between the mainland at Drayton and a large S-shaped island with a cluster of smaller islands. A number of creek branches run inland towards the hamlets of Drayton and Farlington, and salterns are shown near Farlington.

[1] Portsmouth Record Office, 44A/1.

On this map the owner of the large island is shown as a Mr. Pound. The Pound family were lords of the manor of Farlington until 1684, when the manor passed to Thomas Smith. In 1769 it passed from the Smith family to a Mr. Peter Taylor. The map of Lemprier of 1716[2] shows the large S-shaped island reduced (presumably by erosion) to a thinner edition of its earlier self, and called Binster Island. A map of 1773 shows Farlington Marshes with its present outline as a result of banks constructed to join the remnants of Binster Island to the mainland. The intervening creeks are marked 'mudlands enclosed by P. Taylor', and the walls must therefore have been built some time in the four years since Taylor obtained the land. The north-easternmost limb of Binster Island remained outside the new sea wall and is now known as North Binness Island. It is separated from the sea wall by a broad and regular channel, and it seems possible that this is artificial and was dredged out to provide material for the new sea wall or to provide new access by boat from the north to the south of the island. I have, however, found no written evidence of this.

Within the new sea wall a stream now follows the course of the reclaimed creek, and the part of Binster Island enclosed within the wall is the higher ground to the east and south-east of this stream. Fed by springs arising towards the base of Portsdown Hill branches leading into this central stream probably originally marked the branches of the old creek, but reclamation of the marshlands for development and playing fields as well as the ditching of the streams, has obscured the pattern.

The lowest levels enclosed are shown on the 1773 map as 'mud' representing the open mud flats first flooded by the tide. They are now the low gently sloping strips of land bordering the central stream. Drains and ditches now cross this area, but there are no traces on the ground of any former creeks save for the stream itself. The low ground extends practically to the eastern sea wall on the site of what was formerly the west-facing bay on the west shore of Binster Island, and probably at the time of the reclamation erosion had almost cut off the southern arm of the island along the line of this creek. All drainage on the marshes leads in ditches eventually to the central stream and thence through a sluice into the harbour, except for drainage of the extreme north corner which leads out to a sluice at Chalk Dock Lake. Drainage on Drayton Marshes is gathered into ditches leading through a sluice into Portcreek west of the Eastern Road Bridge.

The higher ground reclaimed by Mr. Taylor was either saltmarsh or marsh pasture, and no doubt similar to the present salt marsh of North Binness. As reclaimed it now forms rather hummocky grassland with plentiful traces of former winding creeks and saltpans. These can be seen on the east of the stream on the lands formerly part of Binster Island, both opposite the present North Binness and again on the block of higher ground at the southern tip of the marshes. Traces of some form of embankment, perhaps with adjoining ditches can be plainly seen on the western edge of the more northerly of these blocks of high ground; this may be the trace of an old sea wall at the western end of the old Binster Island, although nothing similar can be seen on the inner edge of the southern block.

On the mainland side of the old creek, the old sea walls which faced the old creek

[2] Portsmouth Record Office, G/MN/421.

remained very little disturbed for about 180 years, although the railway cut across the northern part of the old creek. The surviving old walls north of the railway line were gradually all levelled in the course of development of the Farlington Industrial estate in the 1950s, and when the Farlington playing fields were extended in 1963. Those sections within the boundaries of Farlington Marsh Farm still (1967) remain fairly intact, although the middle section has disappeared, perhaps as a result of works connected with Farlington Racecourse. This was built about 1890 on land now under the Eastern Road playing fields, but extended onto the present marshes near the missing section of old sea wall.

The north-eastern corner of the marshes now retains the least indications of reclamation. Some banks and ditches could be related to old sea walls, and a strip of lower marshy ground appears to carry on the line of a creek from the north-east corner towards the railway and Lower Farlington Farm.

A good deal of salt marsh remained outside the new wall of 1773, notably, of course, the remaining islands. The 1773 map shows salt marsh extending across what is now the bay between the west shore of the marshes and the playing fields and in fact there are still two small islets of marsh surviving in this bay as remnants. They are still being eroded away. Another fairly large area seems to have remained outside the wall at the south-west tip of the old Binster Island. It is now represented by a fairly large area of firm mud which rises to a small island, the Little Binness, which only submerges at high water springs.

The smaller Oyster House island seems likely to have been artificially constructed as a site for the Oyster House (now destroyed), built for the watchman who guarded the former oyster fisheries from poachers.

The remaining islands must be eroded shadows of their former selves, and are now low-lying salt marsh. Old maps show pasture and even houses on some of them. At high water springs very little of them remain above the water. Erosion is still taking place wherever the sea can attack them, and at the west end of North Binness there are miniature coves and stacks in the clay. On the sides of Long Island and South Binness facing the main Langstone Channel, and on the shores of South Binness and Baker's Islands, facing the open harbour, shingle beaches have formed.

In a great many places around the islands except in the most exposed places, the island shores are now protected by beds of the hybrid grass, *Spartina townsendii*. This fertile, or male sterile hybrid arose in Southampton Water about 1870 as a cross between a small native species, *S. maritima*, and a much larger American introduction, *S. alterniflora*. It proved more vigorous then either parent, with an ability to colonise softer more exposed mud. It now forms nearly pure fields in the harbours, although subject to periodic dieback. It has unrivalled ability to colonise open mud and build up mud banks, and now covers approximately one-sixth of the total area of the harbour. Although tolerant of submersion in sea-water at high tide it prefers only the highest levels of the flats, and in addition to forming its own *Spartina* islands on the higher flats in the southern part of the harbour, it has also naturally tended to form a fringe around the harbour shore and around each of the existing islands. It may therefore have assisted in retarding the rate of erosion in the years since its appearance.

Flora

The harbour supports a number of species of seaweeds and other algae; the largest species tending to be found in the deep water channels and along the sea walls, these being the places where the largest stones are available as anchorages. On the open mud the habitat is suitable only for smaller algae, which however often cover big areas of mud, and probably provide the brent geese and other vegetarian birds with their staple diet. The only flowering plants on the open mud are the hybrid Cord Grass, *Spartina townsendii*, already mentioned, and three species of Eel Grass.

The largest Eel Grass, *Zostera marina*, I have so far found only in two pools of permanent water in channels between the islands. The medium Eel Grass, *Z. angustifolia*, and the smallest one, *Z. noltii*, occur on the open mud, and are exposed for long periods at low tide. In general the small plant is found at higher levels on the mud than the medium one, and the medium one is often especially abundant opposite the outfalls of creeks on the Binness Islands. Both plants seem to prefer the firm mud near the islands, but it is difficult to look for them on the soft open mud far out in the harbour.

The harbour islands and other unbanked salt marsh of the harbour supports a typical salt marsh flora, including the following typical species:

Spergularia marina	Sea Spurrey
Spergularia media	Larger Sea Spurrey
Atriplex hastata	Hastate Orache
Atriplex littoralis	Shore Orache
Halimione portulacoides	Sea Purslane
Suaeda maritima	Seablite
Salicornia spp.	Glassworts
Limonium vulgare	Sea Lavender
Limonium humile	Lax-flowered Sea Lavender
Armeria maritima	Sea Pink, Thrift
Glaux maritima	Sea Milkwort
Plantago maritima	Sea Plantain
Aster tripolium	Sea Aster
Artemisia maritima	Sea Wormwood
Inula crithmoides	Golden Samphire
Triglochin maritima	Sea Arrowgrass
Juncus gerardii	Mud Rush
Juncus maritimus	Sea Rush
Puccinellia maritima	Salt-Marsh Grass
Puccinellia distans	Reflexed Salt-Marsh Grass
Agropyron pungens	Sea Couch
Spartina townsendii	Hybrid Cord Grass

In addition, the Long-leaved Scurvy Grass, *Cochlearia anglica*, is frequent in muddy salt marsh on the islands. It does not occur anywhere within the sea wall.

Inula crithmoides, perhaps the least common of the above named species in Britain is frequent in Langstone Harbour. It seems to prefer a well-drained situation at the edge of a creek or clay cliff; it also occurs along the outside of sea walls, in sheltered places

and in a few spots inside the sea wall on the edges of ditches. Its preferred sites are in many ways similar to those of *Halimione portulacoides*, which may be found fringing creeks and banks in all parts of the salt marsh, but the Inula seems to tolerate situations more exposed to spray than the Halimione. Another scarce plant of the islands is the Perennial Glasswort, *Salicornia perennis*. This is found, often at the edges of the open mud on gravelly mud in a few places around the shores of the harbour and islands.

The highest parts of Long and South Binness Islands are the shingle banks, and on these, and on the shingle patches on the other islands, additional species include Sea Beet, *Beta maritima*, Danish Scurvy Grass, *Cochlearia danica*, and Seaside Mayweed, *Tripleurospermum maritimum*. Where the shingle forms really large patches, notably at the south ends of Long and South Binness Islands some typical shingle beach flora has become established, including Biting Stonecrop, *Sedum acre*, Sea Campion, *Silene maritima*, a local umbellifer the Bur Chervil, *Anthriscus caucalis*, and the rare Little Robin, *Geranium purpureum*. Except on pure open shingle, the Sea Couch forms dense growth on the shingle ridges and other high parts of the islands.

On the North Binness there is sufficient high ground untouched by the high tides for a greater variety of non-salt marsh plants, including Oaks, *Quercus robur*, Blackthorn, *Prunus spinosa*, and Gorse, *Ulex europaeus*, forming a small thicket. Other species present here include Slender Tare, *Vicia tetrasperma*, Hemlock Water-dropwort, *Oenanthe crocata*, Toadflax, *Linaria vulgaris*, Crow Garlic, *Allium vineale*, and Reed, *Phragmites communis*.

Before the reclamation of 1773, the lands now within the sea wall at Farlington Marshes must have resembled the lands still outside – open mud or salt marsh, with the reservation that the grass *Spartina townsendii* did not then exist. Reclamation has of course drastically changed the flora. The marshes are now damp grassland, although some ploughing has been carried out in the past (with little success), most recently just after the second World War.

Where the central stream escapes into the sea a lagoon has formed, somewhat saline as a result of leaks through the sluice and through the bank itself. The pond and central stream are fringed with the Reed, *Phragmites communis*. It does not entirely surround the pond and exhibits occasional die-back there – but not up the stream – probably due to exceptional concentrations of salt following especially bad leaks through the sluice. Other plants fringing the lake and stream are *Spartina townsendii* and Sea Club Rush, *Scirpus maritimus*, the latter an extremely common plant in all ponds and ditches within the sea wall. Less frequent is the Glaucous Bulrush, *Schoenoplectus tabernaemontani*, which seems to prefer slightly less saline situations.

Some, but not all, of the salt marsh plants common on the harbour islands are frequent in the lowest levels near the stream and in similar places over the marshes, especially the *Salicornias*, *Triglochin maritima*, *Aster tripolium*, *Plantago maritima*, *Suaeda maritima*, *Spergularia marina* and *S. media* and the Salt-Marsh Grass *Puccinellia maritima*. This last survives even on mud heavily trampled by cattle. Where less heavily trampled it forms a dense turf at the lowest levels and survives frequent winter flooding.

At a slightly higher level on rather less waterlogged ground there is a gradual replacement of those species with others including the Mud Rush, *Juncus gerardii*, almost dominant over some places, Sea Milkwort, *Glaux maritima*, two local sedges, *Carex distans* and *C. divisa*, Reflexed Salt-Marsh Grass, *Puccinellia distans*, Sea Hard-Grass,

Parapholis strigosa, and Squirrel-tail Grass, *Hordeum marinum*. Salt-Marsh Water-Dropwort, *Oenanthe lachenalii*, also occurs in this zone, but only in places not exposed to heavy grazing or trampling. Along ditches especially are Wild Celery, *Apium graveolens*, and Celery-leaved Buttercup, *Ranunculus sceleratus*. *Eleocharis uniglumis* is found in one or two patches.

Further from the central stream grassland species take over. There is a wide zone dominated by the Meadow Barley, *Hordeum secalinum*, and Strawberry Clover, *Trifolium fragiferum*, with some Narrowleaved Birdsfoot Trefoil, *Lotus tenuis*. Dominant grasses over the higher parts of the marsh are the bents, especially *Agrostis stolonifera* with some *Agrostis canina* and Meadow Grass, *Poa pratensis*. Also widely distributed over the upper levels are Buckshorn Plantain, *Plantago coronopus*, Parsley Water Dropwort, *Oenanthe pimpinelloides*, Spiny Restharrow, *Ononis spinosa*, and Hairy Hawkbit, *Leontodon taraxacoides*. *Phleum nodosum*, Small Timothy, is reasonably common.

Scattered over the marshes are many damp hollows and some permanent ponds. In them, in addition to some of the plants from the lower levels already mentioned, such as *Glaux maritima* and *Juncus gerardii*, typical plants are the Hastate Orache, *Atriplex hastata*, Hairy Buttercup, *Ranunculus sardous*, and the very common Marsh Foxtail, *Alopecurus geniculatus*. *Puccinellia distans* is fairly common, and three rare grasses which favour this type of habitat are Borrer's Salt-Marsh Grass, *P. fasciculata* (first described from Gosport), Bulbous Foxtail, *Alopecurus bulbosus*, and Annual Beard Grass *Polypogon monspeliensis*, recorded from the adjoining Drayton Marshes since 1605. The very rare grass, *Agropogon littoralis*, a hybrid between Polypogon and the very common *Agrostis stolonifera*, also occurs, although once thought to be lost.

The flora of the various permanent ponds differs widely, probably due to variations in salinity. In many of them stand the Water Plantain, *Alisma plantago-aquatica*, Sea Club Rush, *Scirpus maritimus*, and *Schoenoplectus tabernaemontani*. Less frequent are Lesser Reedmace, *Typha angustifolia*, Bur-reed, *Sparganium erectum*, and Pink Water Speedwell, *Veronica catenata*. Floating species include in most ponds the Brackish Water Crowfoot, *Ranunculus baudotii*, Duckweed, *Lemna minor*, Water Starwort, *Callitriche stagnalis*, and Flote Grasses, *Glyceria fluitans*, *G. plicata* and *G. declinata*. Less frequent is the Broad-leaved Pondweed, *Potamogeton natans* and in one or two ponds only, Fat Duckweed and Ivy Duckweed, *Lemna gibba* and *L. trisulca*, and in another Water Crowfoot, *Ranunculus trichophyllus*. Submerged in ponds and ditches are Stoneworts, *Chara spp.*, Horned Pondweed, *Zanichellia palustris*, and, in the most saline ones, Fennell-leaved Pondweed, *Potamogeton pectinatus*, and Tassell Pondweed, *Ruppia maritima*. The alga *Enteromorpha intestinalis* covers the surface of many of the brackish ponds and ditches.

Many plants are confined to the old banks and sea walls, perhaps because of the better drainage or protection from heavy grazing. Such are the local clovers, Soft Clover, *Trifolium striatum*, and Burrowing Clover, *T. subterraneum*, and the rare Sea Clover, *T. squamosum*, a speciality of these marshes. Others are the Grass Pea, *Lathyrus nissolia*, Calvary Clover, *Medicago arabica*, Dark Green Mouse-ear, *Cerastium atrovirens*, Knotted Bur-parsley, *Torilis nodosa*, and Slender Hares-ear, *Bupleurum tenuissimum*. All these, except *Lathyrus nissolia*, have a decidedly submaritime distribution in Britain. As chalk has evidently been used to make up the bank in places it is not surprising that in some places such species as Bee Orchid, *Ophrys apifera*, Centaury, *Centaurium erythraea*, and Yellowwort, *Blackstonia perfoliata*, are found.

On the seaward side of the sea walls salt marsh, rock and shingle species occur, including *Beta martima*, *Atriplex hastata* and *A. littoralis*, *Halimione portulacoides*, *Sedum acre*, *Inula crithmoides*, *Tripleurospermum maritimum* and *Agropyron pungens*, with a very few plants of Rock Samphire, *Crithmum maritimum*. Especially typical of the dry muddy paths at the top of the sea walls are two rare grasses, Curved Hard Grass, *Parapholis incurva*, and Procumbent Salt-Marsh Grass, *Puccinellia rupestris*. The latter also occurs in dry muddy places in other parts of the marsh.

The northernmost fields near the railway have a different character from the southern part of the marshes. Here the influence of the sea is less apparent, and the fields are more broken with hedges and fences. There has been less heavy grazing, and fresh water flows from springs along the ditches to the central stream. Near the streams are typical freshwater plants such as Brooklime, *Veronica beccabunga*, Fools Watercress, *Apium nodiflorum*, Spike-rush, *Eleocharis palustris*, Marsh Arrowgrass, *Triglochin palustris*, and many others. In the hedges are Cuckoo Pint, *Arum maculatum*, Butchers Broom, *Ruscus aculeatus*, Stone Parsley, *Sison Amomum*, and Corn Parsley, *Petroselinum segetum*.

A number of meadow plants, rare or absent on the highest levels of Farlington Marshes, are (or were before recent tipping and development) found on Drayton Marshes, and reappear in the north-east corner of Farlington Marshes and continue in suitable places in the fields between the sea and the railway at Bedhampton. Probably grazing or trampling has removed them from places on Farlington Marshes which seem suitable. They include the Cowslip, *Primula veris*, Pepper Saxifrage, *Silaum silaus*, Vervain, *Verbena officinalis*, Dyers Greenweed, *Genista tinctoria*, Earthnut, *Conopodium majus*, Green-winged Orchid, *Orchis morio*, and grasses such as *Festuca pratensis*, *Festuca arundinacea*, *Helictotrichon pratense* and *Phleum pratense*.

There are few trees on the marsh, the only one which is at all common being the Hawthorn, *Crataegus monogyna*. This, with a little Blackthorn, *Prunus spinosa*, forms thickets on the higher parts of Drayton Marshes, extending on to the west part of Farlington Marshes, in the extreme north-east corner of Farlington Marshes, and along the ungrazed sea walls of Drayton Marshes and Bedhampton shore. There is little Hawthorn on the higher parts of the south-east of Farlington Marshes, and probably there has always been sufficient grazing or cultivation of these parts to prevent much growth of scrub. In association with the Hawthorn are typical hedgerow plants as Nettle, *Urtica dioca*, Tufted Vetch, *Vicia cracca*, Ivy, *Hedera helix*, Woody Nightshade, *Solanum dulcamara* and Bramble, *Rubus fruticosus agg.*

Conclusion

The most striking feature of the flora of Langstone Harbour is its rich variety. Over 300 species have been recorded excluding all but the most frequent casuals. Many additional species are casuals in the areas of waste and 'made' ground near the Eastern Road. Only a very few of the 300 are not found on Farlington Marshes themselves (e.g. the Zosteras, confined to the harbour). Of the 300 species, over fifty are grasses, slightly more than one third of all the species of Graminae recorded in Britain. Grasses of the seashore and salt marsh are of course especially well represented, many of them rare or only locally distributed in Britain.

Salt marsh plants as a whole, are well represented, and the harbour islands may support the finest surviving salt marsh flora on the south coast. A fourth and final reason for the interest of this area to the botanist is the presence of large numbers of submaritime, or less strictly salt marsh plants. Plants in this category are:

Ranunculus sardous
Ranunculus baudotii
Cerastium atrovirens
Linum bienne
Medicago arabica
Trifolium fragiferum
Trifolium squamosum
Lotus tenuis
Anthriscus caucalis
Torilis nodosa
Bupleurum tenuissimum
Apium graveolens
Oenanthe lachenalii
Plantago coronopus
Potamogeton pectinatus
Ruppia maritima
Typha angustifolia
Eleocharis uniglumis
Schoenoplectus tabernaemontani
Carex distans
Carex divisa
Puccinellia fasciculata
Puccinellia rupestris
Hordeum marinum
Polypogon monspeliensis
Agropogon littoralis
Alopecurus bulbosus

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