

Know Your Stuff

Sand dune plants

If you're fond of sand dunes and salty air then Spring is a wonderful time of year to explore one of the many sites found around the coast of Britain. Sand dunes become alive in the spring as flowers break from their winter dormancy and the warmer and brighter conditions stimulate their regrowth. Coastal sand dunes provide an opportunity to discover a wealth of brightly coloured flowers and a great variety of habitats in a relatively small area making them biodiversity hotspots well worthy of investigating.

Coastal sand dunes develop where sand is blown inland and deposited above the high tide mark. This then becomes trapped by objects on the beach allowing specialised dune-building grasses to establish which then grow up through successive layers of deposited sand. As the sand accumulates they often form into a series of low ridges.

Sand dunes often provide a wide range of habitats as environmental conditions vary from the dry, windswept ridges to the more humid, protected hollows and from the peaty soils developing in the damper 'slacks' to the more acidic dune heaths created by leaching. Sand dunes are consequently of exceptionally high nature conservation interest and many have national and international designations.



Sand dunes do not come without their threats however. They are a dynamic ecosystem, robust to wind and natural environmental conditions but susceptible to trampling, excessive grazing and rabbit burrowing. These activities often lead to a reduced stability and damage to the thin protective plant cover leading to rapid erosion. Many techniques have been traditionally used to manage sand dunes and the balance of dune stability and the protection of habitat and species diversity is an ongoing concern for national nature conservation.

As such they form an ideal outdoor learning environment for school groups who not only investigate their habitats and conservation but concepts such as succession, following a timeline of development from the younger dunes by the beach to the older and more stabilized habitats further inland.

Embryo dunes

The earliest colonisers are termed the pioneers and these help in developing embryo dunes. The environment here is very harsh being windy, lacking nutrients and water in the soil and the salt spray promotes desiccation. Among the plants found here:

Sea Rocket (*Cakile maritime*) has fruits that are dispersed by the tide. It lives off nutrients which it finds from decaying vegetation in the sand. It has succulent leaves to assist with the drying effect of sea spray and very long roots helping it survive high tides and wave action.





Sand couch grass (*Agropyron junceiforme*) is a salt-tolerant (halophyte) plant and spreads by sending out horizontal shoots from its rhizome. It has an ability to survive sand accumulation of about 50cm per year.

Mobile dunes

The pioneer plants have allowed other plants to establish here and help to develop the sand dunes. The mobile dunes are constantly moving around and changing shape. One of the most important and common dune building plants is Marram grass.

Marram grass (*Ammophila arenaria*) is well adapted to the dry (xerophytic) environment. Its leaves roll in when it's dry and open when it's more humid preventing water loss and aiding stability in the wind. Its roots are associated with a fungi allowing exchange of sugars and nutrients to occur (mycorrhiza) in an otherwise nutrient poor soil. It also grows quickly through rhizome activity keeping it above the growing dunes.



Lyme grass (*Elymus arenarius*) is often seen with Marram grass it is a dune builder. Its leaves roll inwards in dry weather enclosing its stomata reducing water loss. It loses its leaves in autumn.



Sea spurge (*Euphorbia paralias*) is a succulent plant with thick leathery leaves. Its leaves fold together in dry weather. Like other members of the Spurge family it has a white, milky sap.



Sea holly (*Eryngium maritimum*) is a member of the carrot family with blue umbel flowers. It is a salt-tolerant plant and has a fleshy tap root able to store significant quantities of water. Its root system is upto 2m in length. Its leaves are leathery with a thick cuticle to reduce water loss, its grey-green colour is due to a wax coating. Its buoyant seeds are dispersed by tides.

Fixed dunes

Further inland are older, more stable dunes where the vegetation is more continuous. The fixed grey dunes are the richest in plant species as conditions are less harsh further inland.

Rest harrow (*Ononis repens*) has sticky, glandular hairs, often coated in sand grains, which help to reduce water loss. Its long shallow root system can absorb rainfall and dew quickly. Another member of the Pea family it has the ability to fix nitrogen in its root nodules therefore it has an advantage in living in nutrient poor soils.





Seaside centuary (*Centaurium littorale*) has a pink flower and is related to the Gentians. Its niche lies along a gradient of wet-dry sand and is capable of being a pioneer on bare, saline sand.

Birds-foot trefoil (*Lotus corniculatus*) has a yellow flower usually tinged with red. It is a creeping low-lying plant with an extensive root system

used to obtain nutrients. It is also a legume with the ability to 'fix' nitrogen through specialised root cells, nodules, containing a symbiotic bacteria which convert nitrogen to ammonia which the plant can utilise.



Lady's bedstraw (*Galium verum*) has a large tap root with many branches helping it retain water and also get good anchoring in the sandy environment. It likes dry, infertile, sandy soils and has needle-like leaves helping it reduce water loss.



Dewberry (*Rubus caesius*) is a low, sprawling plant closely related to the

Brambles. It likes sandy soils and lots of sunlight and can be found on woodland edges and in dune slack and scrub environments.

Dune slacks

Dune slacks are low-lying areas within dune systems that are seasonally flooded and where nutrient levels are low. They occur primarily on the larger dune systems in the UK, especially where a wetter climate favours their development.



Creeping willow (*Salix repens*) can dominate the slack and grow into dense bushes. Its extensive root system assists in obtaining nutrients from the poor soil. It cannot survive permanent waterlogging and enjoys the seasonal fluctuation in the water table.



Silverweed (*Potentilla anserina*) possesses fine hairs all over the surface of its leaves which keep a layer of moist air close to the stomata to reduce water loss. Its silvery appearance is from these fine hairs. It has runners that increase its surface stability and its presence usually indicates that the ground is prone to flooding.



Meadowsweet (*Filipendula ulmaria*) is found in areas of the slack which are seasonally flooded but not permanently waterlogged. It is a tall plant and has a sweet smell in the summer months.

