SAND DUNE ECOSYSTEMS

HOW DO SAND DUNE PLANTS SURVIVE HOSTILE CONDITIONS ON THE COAST?

a) List five ways in which the sand dune environment is hostile to living things:

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b) Which major world environment or **BIOME** do the Channel Coast sand dunes remind you of most?

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c) In what ways do the Channel Coast sand dunes differ from this biome?

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ADAPTATIONS OF PLANTS AND ANIMALS

Some of the plants that manage to survive on the dunes also bind the sand together, helping to stabilise the dunes!

d) On a separate sheet of paper, design a plant that would:

- Survive the conditions (1) to (5) that you have described above.
- Bind the sand together to stabilise the dunes.

Draw the plant and label it to show its adaptations

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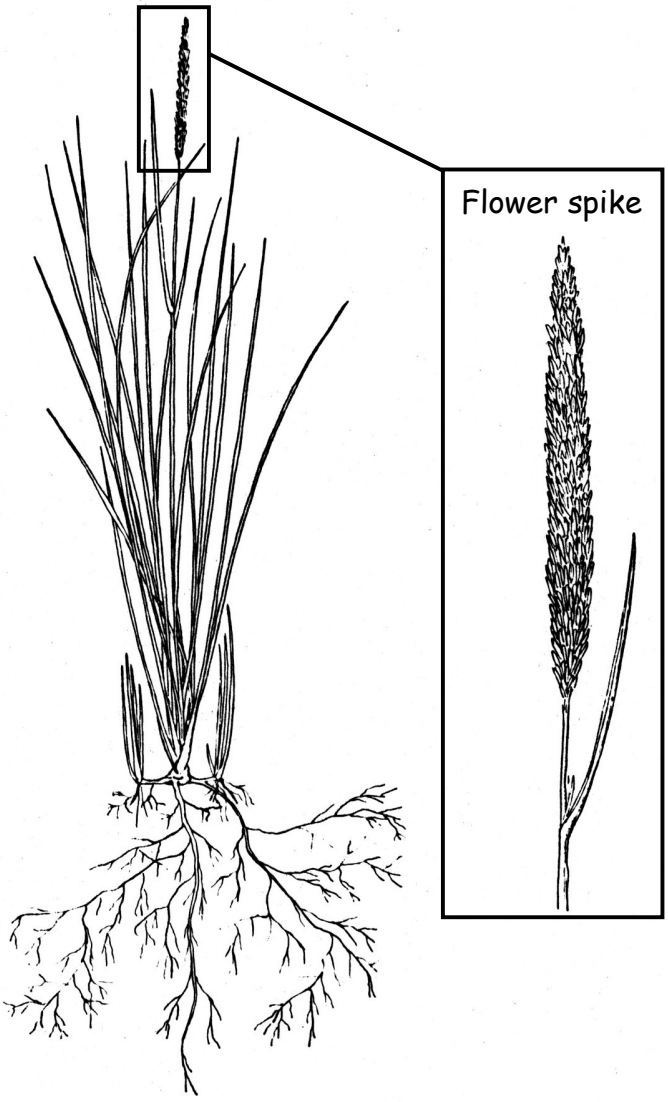
e) How similar is your plant to **MARRAM**, the most important coloniser of coastal sand dunes?



Marram, Plage-Ste-Cécille, France

Marram is the silvery coarse grass that can cut your legs if you walk through it.

HOW DOES MARRAM SURVIVE THE STRONG WINDS AND HIGH EVAPORATION RATES?

- Because the leaves can roll inwards to reduce their surface area and cut down evaporation from their surface.
- Because the cuticle or outer layer of the leaf blades is very thick and hard, which cuts down on water-loss.
- The cuticle is shiny to reflect heat away.
- The leaves are very tough and flexible to stand up to buffeting by the wind. They can align themselves so they present only a narrow blade to the wind.

HOW DOES MARRAM ABSORB ENOUGH WATER?

- By having very long, wide, spreading root systems.
- The root system branches out at different levels in the sand, so that all possible water can be absorbed as it soaks down through the sand.

HOW DOES IT SURVIVE AS EXTRA LAYERS OF SAND ACCUMULATE AROUND IT WHEN THE WIND BLOWS?

- By growing upwards as fast as the sand is deposited.

HOW DOES IT HELP TO BIND THE SAND AND STABILISE THE DUNES?

- It has widespread tillers, or underground stems, that run just under the sand and almost form a net that holds the sand together. From these tillers, new buds develop into new plants that grow up above the sand.

Biting Stonecrop

f) How does the plant in the photograph above survive on dunes?

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SEA-BUCKTHORN

Sea-buckthorn is well adapted to growing in sand. It is a tough, spiny shrub with narrow greyish leaves that cut down on evaporation losses. It has a strong root system, binding the sand together. The roots can extend laterally for several metres and give rise to many suckers, which form almost impenetrable thickets.

Along the roots are nodules that contain nitrogen-fixing bacteria. These release nitrates into the sand, which, with the added humus from the shrub's dead leaves, results in much improved soil, giving a more diverse flora.

Sea-buckthorn

In autumn and winter Sea-buckthorn is covered in orange berries, a feast for Thrushes, Starlings and other birds. The birds excrete the seeds which helps disperse the Sea-buckthorn. Seeds that have passed through birds have a higher rate of germination than uneaten seeds

The spiny thickets form safe retreats for numerous rabbits and small mammals, and protect them to some extent from predators such as hawks.

But the Sea-buckthorn can be "too successful" relative to other vegetation, changing the composition of the specialised dune vegetation forever.

g) Why is Sea-buckthorn often regarded as a 'thug'?

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h) How easy would it be to clear Sea-buckthorn?

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