

# 7.3

## Succession

Describing one example of primary succession resulting in a climax community: sand dunes

### Succession

Any change in a community of organisms can cause a change in their habitat. Any change in a habitat can also cause a change in the make-up of the community. These ideas can help to explain why gradual directional changes happen in a community over time. Such a process of directional change is called **succession**.

#### Surtsey

The island of Surtsey (Iceland) was created by a volcanic eruption, and is now home to a community of plants. Development of such communities from bare ground is known as *primary succession*, and comes about as follows:

- algae and lichens begin to live on the bare rock (these make the **pioneer community**)
- erosion of the rock, and a build-up of the dead and rotting organisms produces enough soil for larger plants, mosses and ferns, to grow, which replace (or *succeed*) the algae and lichens
- in a similar way, larger plants succeed these plants until a final, stable community called the **climax community** is reached



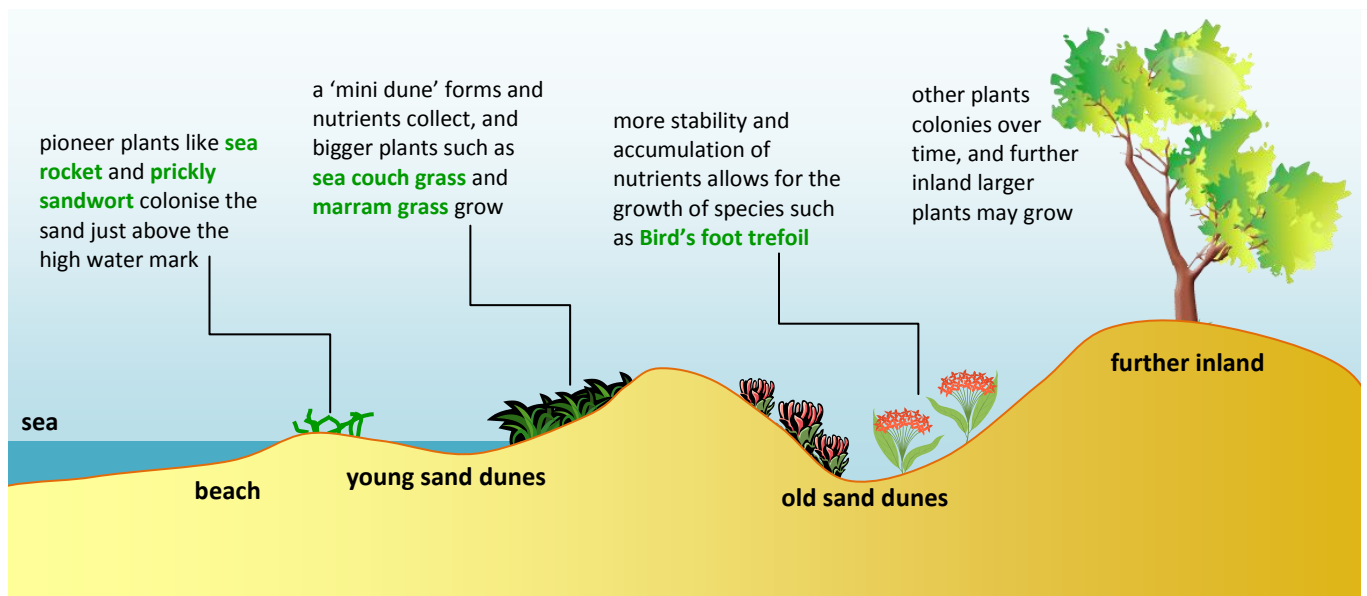
Succession does not have to happen in such a way from bare ground, it can occur on previously colonised (but disturbed or damaged) habitat. This is called *secondary succession*.



#### Sand dunes

Sand dunes are interesting because they display all the same stages of succession in one place at the same time. Looking at the beach and sand dunes, you see different sections. Sand is deposited on the beach by the sea, and so we know that the areas of sand closest to the shore are more recent than the ones further inland.

This means that the sand just above the high tide mark is just starting its process of succession, whereas areas more inland have already reached their climax communities.



Eventually, a dune's community may develop into a grassland community, and then a woodland community (as shown in the final stage of the diagram on the previous page), although this takes much longer and is usually a fair bit inland. This is representative of the UK as a whole, as most climax communities in the UK are grassland ecosystems.

The following steps outline the succession process for a sand dune, shown in the diagram on the previous page:

- 1 Pioneer plants such as **sea rocket** and **prickly sandwort** colonise the sand just above the high water mark: these are able to tolerate the little salt water spray they receive, the lack of fresh water, and the unstable sand (which other species cannot tolerate, and so only these pioneer species exist here)
- 2 Wind-blown sand builds up around the base of these plants, forming a 'mini dune', and as plants die and decay, nutrients accumulate in this mini dune – as the dune gets bigger and bigger, plants like **sea couch grass** and **marram grass** (which you may remember from your studies of transpiration and xenophytes) colonise there (these plants often have their own root systems which help to stabilise this small environment)
- 3 With more stability and further accumulation of nutrients, plants like **Hare's foot clover** and **Bird's foot trefoil** start to grow
- 4 As the sand dune and nutrients continue to build up, other plants may then colonise the sand
- 5 Eventually, the dune areas far inland may become grassland, and overtime woodland, allowing the much larger species of plant, including large trees, to grow