Ecological Succession

Ecological succession is a predictable pattern of gradual change over time in the types of species in a community following a disturbance.

There are two basic types of succession:

- **Primary succession** – Begins on sites that have not previously had plants growing on them, such as beaches, larva flows, severe landslips, ponds and bare rock.
- **Secondary succession** – Begins in areas where a disturbance removes some or all species but the soil remains.

Community structure is not static, it is determined over time by succession that takes place as a result of the following:

- **Disturbances**
  - These can be caused by physical disasters, humans or animals and climate change.
  - They create opportunities for new species to move in. These new species will alter the character of the community, creating an environment suitable even newer species.

- **Competitive interactions**
  - These occur between organisms in a community. Eg. Predation.

The order of change during succession is not random. Communities initially have a small number of simple species. This, over time, changes to communities with a large number of more complex species. There are the following three stages in ecological succession:

1. **Pioneer species stage**
   The bare ground conditions favour pioneer plant species. These species grow best where there is little competition for space and resources. Their features include:
   - Ability to withstand extreme variations in temperature and moisture
   - Ability to establish quickly, although they often are slow-growing
   - Have spores or seeds that can disperse over long distances
   - Do not grow in shade

   Pioneers species then affect their surrounding environment. These changes allow other species to grow and eventually replace the pioneer species, which then disappear. They change the environment by:
   - Building up, stabilising and enriching the soil
   - Altering the amount of light by providing shade

   There are two types of succession after this. They are called **primary** and **secondary succession**.

2. **Intermediate species stage**
   Ecological conditions change because:
   - The soil can hold more water and is more fertile
   - Temperatures are less extreme as there is more shade

   Because of these changes, a greater variety and number of organisms are able to move in.
As the soil builds up, small hardy wood plant species develop, and in turn larger woody shrubs and bushes develop.
Larger herbivores, small carnivores, snakes and raptors also join the community

3. Climax community
This is the last semi-stable stage or endpoint of succession. Climax communities vary extensively. The animal species in the climax community are the most diverse and include the large herbivores and carnivores.

It is important to note that everything is in a stage of transition. Future disturbances can cause the species of a community to change. Hence the term semi-stable.

Factors that determine an endpoint
There are many factors that cause a community to reach a variety of different successional endpoints. These can depend on environmental fluctuations:

- Rainfall
  The amount of rain is the most important factor determining successional endpoints. For examples, very heavy rainfall will result in a forest community as an endpoint. Should there be a drought the community will change and other species will thrive.

- Overgrazing
  Overgrazing can also change a community. Grazers often choose one grass species. This means that the un-eaten species will become dominant and form the endpoint.

- Draining of wetlands
  The drainage of wetlands for building or crop planting permanently alters the environment. This results in the disappearance of wetland climax species.

- Climate change
  Climate change will definitely affect successional endpoints. The change in climate will in turn change the composition of climax communities.