

## Process of Succession

The process of succession takes place in a systematic order of sequential steps as follows:

→ (i) Nudation: It is the development of a bare area without any life form. The bare area may be caused due to landslides, volcanic eruption etc. (topographic factor), or due to drought, glaciers, frost etc. (Climatic factor), or due to overgrazing, disease outbreak, agricultural/industrial activities (biotic factors).

→ (ii) Invasion: It is the successful establishment of one or more species on a bare area through dispersal or migration, followed by germination or establishment. Dispersal of the seeds, spores etc. is brought about by wind, water, insects or birds. Then the seeds germinate and grow on the land. As growth and reproduction start, these pioneer species increase in number and form groups or aggregations.

→ (iii) **Competition and coaction**: As the number of individuals grows there is competition, both inter-specific (between different species) and intra-specific (within the same species), for space, water and nutrition. They influence each other in a number of ways, known as **coaction**.

→ (iv) **Reaction**: The living organisms grow, use water and nutrients from the substratum, and in turn, they have a strong influence on the environment which is modified to a large extent and this is known as **reaction**. The modifications are very often such that they become unsuitable for the existing species and favour some new species, which replace them. Thus, reaction leads to several **seral communities**.

→ (v) **Stabilization**: The succession ultimately culminates in a more or less stable community called **climax** which is in equilibrium with the environment.

## FOREST ECOSYSTEM

These are the ecosystems having a predominance of trees that are interspersed with a large number of species of herbs, shrubs, climbers, lichens, algae and a wide variety of wild animals and birds. As discussed above forests are found in undisturbed areas receiving moderate to high rainfall and usually occur as stable climax communities.

Depending upon the prevailing climatic conditions forests can be of various types:

→ (a) **Tropical Rain Forests:** They are evergreen broadleaf forests found near the equator. They are characterized by high temperature, high humidity and high rainfall, all of which favour the growth of trees. All through the year the climate remains more or less uniform. They are the richest in biodiversity. Different forms of life occupy specialized areas (niches) within different layers and spaces of the ecosystem depending upon their needs for food, sunlight, water, nutrient etc.

We come across different types and layers of plants and animals in the tropical rain forests, e.g. (the **emergent layer** is the topmost layer of the tallest broad-leaf evergreen trees, below which lies the <sup>(2)</sup> **canopy** where top branches of shorter trees form an umbrella like cover. Below this is present the <sup>(3)</sup> **understory** of still smaller trees.) On the tree trunks some woody climbers are found to grow which are known as **Lianas**. There are some other plants like **Orchids** which are **epiphytes** i.e. they are attached to the trunks or branches of big trees and they take up water and nutrients falling from above. The orchids have special type of leaves to capture and hold the water. *Some large epiphytes can hold as much as 4 litres of water, equivalent to a small bucket!* Thus, these epiphytes almost act like mini-ponds suspended up in the air, in the forest crown. That is the reason why a large variety of birds, insects and animals like monkeys have made their natural homes (habitats) in these forests.

The understorey trees usually receive very dim sunlight. They usually develop dark green leaves with high chlorophyll content so that they can use the diffused sunlight for photosynthesis. The <sup>④</sup>shrub layer receives even less sunlight and the <sup>⑤</sup>ground layer commonly known as **forest floor** receives almost no sunlight and is a dark layer. Most of the animals like bats, birds, insects etc. occupy the bright canopy layer while monkeys, toads, snakes, chameleons etc. keep on moving up and down in sunny and darker layers. Termites, fungi, mushrooms etc. grow on the ground layer. Warm temperature and high availability of moisture facilitate rapid breakdown (decomposition) of the dropped leaves, twigs etc. releasing the nutrients rapidly. These nutrients are immediately taken up by the **mycorrhizal** roots of the trees.

The Silent Valley in Kerala is the only tropical rain forest lying in India which is the natural habitat for a wide variety of species.

Being the store-house of biodiversity, the forests provide us with an array of commercial goods like timber, fuel wood, drugs, resins, gums etc. Unfortunately there is cutting down of these forests at an alarming rate. Within the next 30-40 years we are likely to be left with only scattered fragments of such forests, thereby losing the rich biodiversity and the ecological uses of forests, discussed earlier in unit II.

→ (b) Tropical deciduous forests: They are found a little away from the equator and are characterized by a warm climate the year round. Rain occurs only during monsoon. A large part of the year remains dry and therefore different types of deciduous trees are found here, which lose their leaves during dry season.

→ (c) Tropical scrub forests: They are found in areas where the dry season is even longer. Here there are small deciduous trees and shrubs.

→ (d) Temperate rain forests: They are found in temperate areas with adequate rainfall. These are dominated by coniferous trees like pines, firs, redwoods etc. They also consist of some evergreen broad-leaf trees.

→ (e) Temperate deciduous forests: They are found in areas with moderate temperatures. There is a marked seasonality with long summers, cold but not too severe winter and abundant rainfall throughout the year. The major trees include broad leaf deciduous trees like oak, hickory, poplar etc.)

→ (f) Evergreen coniferous forests (Boreal Forests): They are found just south of arctic tundra. Here winters are long, cold and dry. Sunlight is available for a few hours only. In summer the temperature is mild, sun-shines for long hours but the season is quite short. The major trees include pines, spruce, fir, cedar etc which have tiny, needle-shaped leaves having a waxy coating so that they can withstand severe cold and drought. The soil is found to get frozen during winter when few species can survive. The leaves, also known as needles, fall on the forest floor and cover the nutrient poor soil. These soils are acidic and prevent other plants from growing. Species diversity is rather low in these forests.