

PLANT SUCCESSION

INTRODUCTION → Plant communities are never static but dynamic. They are never found permanent in complete balance with their component species or with the physical environment. The gradual replacement of one type of plant community by the other is referred to as plant succession.

"According to Colum Plant succession is an orderly process of community change in an area. Salisbury defines plant succession as follows —

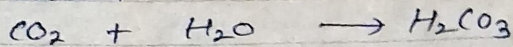
"Plant succession is a competitive drift in which at each phase until the climax is the constant species surrounds the habitat more favourable to their successors than to themselves.

According to "Clement" Plant succession is a natural process by which the same locality becomes successively colonised by different groups of plant communities.

Process of natural selection

Xerose → The different stages are as follows:
1. Crustose lichen stage → The rocks are known to be most inhospitable conditions for the growth of plants. They are completely devoid of moisture and nutrients and are subjected to extreme temperature. In this hopeless condition, the crustose lichen, the pioneer plant or xerose. The lichens of this stage are species of *Rizocarpon*, *Rinodius*, *Leckia*, *Lecanora* etc. The lichens secrete carbonic acid in excess. That acid is formed when excess CO_2 liberated in respiration combines

with water.



This carbonic acid corrode and decompose the rock. Supplementing the other forms of weathering the dead remains of lichens get mixed up with the rock particles. This soil formation facilitate the growth of other vegetation. This crustose lichen is replaced foliose lichen. The process is very slow.

2. **Foliose lichen stage** → These lichen include species of *Parmelia*, *Dermatocarpon*, *Umbilicaria* etc. Having large leaves they overtop the crustose lichen. They can absorb and retain more water and enable to accommodate dust particles which help in further build up of the substratum. Rock is also eaten by carbonic acid gradually there is change in habitat due to formation of their layers of soil.

3. **Moss stage** → When the habitat is changed the existing foliose lichen start disappearing and in that area xerophytic mosses grow and become dominant. These xerophytic mosses developed rhizoids that penetrate deep into the rocky soil. The decaying older parts of the mosses form a thick mat over the rock surface. As this mat becomes more thick it increase the water holding capacity of soil. Thus, the habitat becomes relatively more wet. Now xerophytic community i.e. herbs replace mosses.

4. Herbs stage → Increased moisture content of soil favours the growth of herbs. The roots of these plants penetrate down almost to the level of unfractured rock where they secrete acids and celebrate the process of rock disintegration. Decaying parts of the plant become deposited on the soil surface in the form of humus. In this way thickness of soil increases considerably and water holding capacity is also increased. These reactions make the habitat more suited for woody plants than to existing herbs.

5. Shrub stage → With the change in habitat xerophytic shrub (sp of Physocarpus etc) migrate to the area from adjoining areas with the help of seeds etc. The shrub soon develops into dense "vegetation". Year after year there is more destruction of rock and there is more deposition of humus. The increased soil ^{depth} attain greater capacity for holding water. The soil is shaded and therefore evaporation of water is considerably reduced. The humidity is increased over such area. All these favours the growth or seeding of tree which starts invading the area.

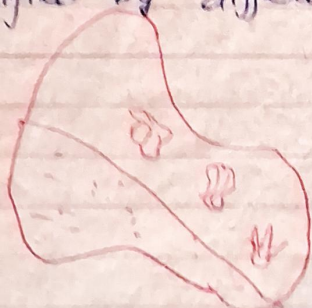
6. Climax forest → Pioneer species of trees are relatively xeric. They are distributed and are ^{shunted} because the conditions are still not very suitable to them with the passage of time the rocks are further weathered and a deep layer of soil is formed. The

favours the growth of much larger no of trees. The climax forest is thus developed. These vegetation become more and more mesophytic with the accumulation of humus of generation of forest worked over by an ever increasing mass of soil organisation.

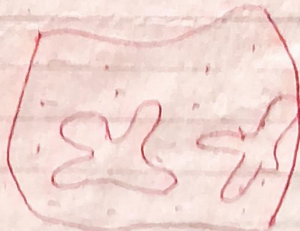
Succession of an bare area do not always advance exactly in sequence described above. If on a bare rock sand and gravel are deposited and succession starts or if their possibilities are there that some beginning stages may not develop at all and herbs shrubs or even trees may appear as initial colonizers on such a habitat.

Succession on sand dunes start with drought resistant grasses. The grass vegetation is followed by shrubs and trees. Primary succession on open land may lead to a grass land vegetation rather than a forest climax.

Primary climax vegetation may be modified by different biotic condition to produce



Crustose lichen stage



Foliose lichen stage.

secondary climax vegetation. In this way a barren rock is converted into a green forest.