Xerosere on Rock or Lithosere

Succession begins on a dry place where there is extreme deficiency of water termed as Xeroarch and different stages of development collectively called xerosere.

1. Pioneer Stage or Crustose-lichen stage.

The rocks are dry and hard substrata. fully exposed to the sun, violent fluctuations in temperature and rapid changes in moisture conditions. Such a habitat is unsuitable for most plants but for blue-green algae and lichens the pioneer species. The blue green algae Scytonema are found to adhere to the rocks by their mucilaginous cell walls. These algae tolerate extremes of temperature and moisture and can utilise the atmospheric nitrogen. Crustose lichens like Rhizocarpon, Rinodina and Lecanora are common pioneers. They produce some acids which brings weathering in the rocks. The dead organic matter of algae and lichens get mixed with small particles of rocks to form the very thin layer of moist soil on the rocks. The crustose lichens are then replaced by foliose type lichens.

2. Foliose - Lichen Stage

As soon as a little soil gets accumulated on the rocks, some foliose lichens Dermatocarpon, Umbilicaria and Parmelia appear on the rocks. Their expanded leaf like thalli may overshadow the crustose lichens and may die and decay. Water and humus gets accumulated, evaporation is decreased and gradually a thin layer of soil is formed which consists of rock particles, remains of lichens and particles of dust. This makes the condition possible for other plants like mosses etc.

3. Moss Stage

The development of thin layer on rock surface, in the crevices and depressions in favours the growth of some xerophytic mosses such as Polytrichum, Tortula, Grimmia. They compete with the lichens. Due to their death and decay there is further addition of organic matter in the soil. The thickness of the soil layer now increases. This can hold greater amounts of water and this along with soil makes the habitat suitable for herbs.

4. Herbaceous Stage

The soil forming and soil holding reactions of the mosses are so pronounced that many herbs, first short-lived annual and later biennial and perennial and xerophytic grasses make their appearance.

The processes of rock disintegration and accumulation of humus and nutrients are greatly accelerated as the tangled network of root increases and the soil becomes shaded. Evaporation and temperature are decreased and drought periods are shortened. Due to death and decay of these herbaceous or grassy plants like Poa, Festuca, Solidago etc. increases the humus.

5. Shrub stage

Due to much accumulation of soil, the habitat becomes suitable for shrubs with start migrating in the area. These are species of Rhus, Phytocarpus etc. They overshadow the herbaceous vegetation. The soil is further enriched by this dense shrubby growth. These in turn are finally replaced by trees which make up the climax community.

6. Climax Forest Stage.

The first species of trees are relatively xeric. Their growth is stunned and are widely spaced. Their seedlings are sun-loving. Further weathering of rocks and increasing humus content of the soil favour the arrival of more trees and vegetation finally becomes mesophytic. Thus there develops finally a forest community.