ECOLOGICAL SUCCESSION

HYDRARCH SUCCESSION

Process of succession initiated in a wet area is termed hydrarch succession and the successional stages are known as hydrosere. This is of two types:

HYDROSERE: Succession taking place in freshwater ecosystems (ponds, lakes, pools, marshes).

HALOSERE: Succession taking place in saline water habitats (mangroves, estuaries, coral reefs).

XERARCH SUCCESSION

The process of succession initiated in dry areas is termed xerarch succession and successional stages known as xerosere. This is of two types:

LITHOSERE: Succession taking place on bare rocks (shown below)

PSAMMOSERE: Succession taking place in a sandy area (like sand dunes)

Pioneer Community

ECOLOGICAL PROGRESSION

Climax Community

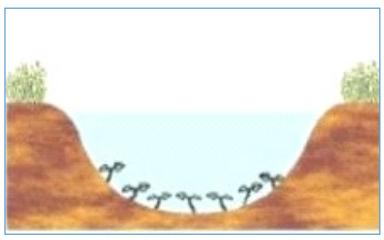
PHYTOPLANKTON

The water is poor in nutrient and incapable of supporting larger lifeforms, phytoplanktons consisting of microscopic blue green algae, green algae, diatoms and bacteria etc. are the first organism to colonise the primitive medium of the pond (*the pioneer community*). Phytoplankton followed by zooplankton.

BARE ROCK

SUBMERGED ROOTED PLANT STAGE

As a result of death and decomposition of phytoplanktons, a muddy layer at the bottom of pond develops. The now shallower and richer in nutrients habitat, with some light availability upto a certain depth becomes amiable for the growth of rooted submerged hydrophytes like, *Hydrilla, Vallisneria, Ceratophyllum* etc.



LICHEN-MOSS STAGE (Pioneer Species)

Colonisation by pioneer species; Crustose lichen followed by Foliose lichen and then moss stage.

ROOTED FLOATING STAGE

At this stage the pond is colonised by the plant species which are rooted in mud with their large leaves floating on the water surface. These include species of *Nymphaea, Trapa, Monochoria* etc. Some free floating species as Azolla, Lemma, Wolffia, etc, also become associated with the rooted plants. Water depth is almost 2-5 feet now; floating species sooner or later disappear from the area.

ANNUAL HERB STAGE (Pioneer)

Small annual plants start establishing themselves on the barren land.

REED-SWAMP STAGE

Also termed the "Amphibious Stage", as the plants are rooted but majority parts of their shoots remain exposed to air. Species of Typha, *Sagittaria* and *Phragmites* etc, are the chief plants of this stage. Plants in this stage have well- developed rhizomes and form dense vegetation over the area which prevent light penetration to the lower portion.

PERENNIAL HERB STAGE (Pioneer)

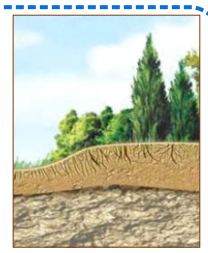
Decomposition creates a layer of top soil; grasses grow and displace the pioneer species. Grasses, weed, and mixed herbaceous plants become prominent.

MARSH (SEDGE)-MEDOW STAGE

Successive decrease in water level and further changes in the substratum, paves way for Cyperaceae and Gramineae species such as *Carex, Cyperus, Eleocharis, Juncus* to colonize the area. They form a mat like vegetation courtesy of their heavily branched rhizomatous system. Owing to high transpiration rates, rapid loss of water, and sooner or later, the mud becomes exposed to air, causing nutrients such as ammonia, sulphides etc, to oxidize. The condition in the area gradually changes from marshy to mesic and marshy vegetation disappears gradually.

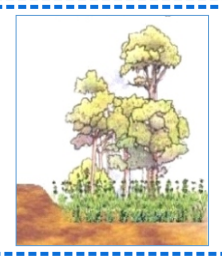
SHRUB STAGE (Intermediate species)

More nutrients in soil pave way for shrub growth. Grasses, shrub and shade-intolerant tress like pine establish themselves.



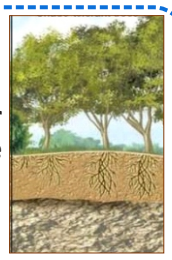
WOODLAND STAGE

Disappearance of marshy vegetation, soil becoming drier over time favours development of wet woodland. Area is now invaded by the terrestrial plants, like some shrubs (*Salix, Cornus*) and trees (*Populus, Alnus*). The mineralization of the soil (humus accumulation) supports the arrival of new tree species in the area leading to the climax stages.



FOREST STAGE (Climax Community)

Increase in soil depth allows for growth of shade-tolerant trees like oak.



FOREST STAGE

The woodland community is invaded by a variety of large tree forms which soon develops into climax community. The nature of the climax community (forest) depends upon the climate of the region. In tropical climates with heavy rainfall, tropical rain forest develop, while in temperate regions mixed forests of *Acer, Ulmus , Quercus* develop. In regions of moderate rainfall, tropical deciduous forest or monsoon forest develops.