

# RIZVI COLLEGE OF ARTS SCIENCE AND COMMERCE

## PLANT SUCCESSION BASIC

USBO503

PAPER 3

SEM V

Dr NITESH JOSHI

DEPT OF BOTANY

# SUCCESSION

- Succession means when one thing is replaced by the other and the process is continued till a final stage is reached. The process of occupation of a particular area by different plant communities from their birth to maturity is known as plant succession.
- CLEMENTS was the first to recognize that a relatively large number of **pioneer plant** communities give way to a comparatively small number of relatively stable communities (**climax community**).

# Types of succession:

- Succession may begin in many different ways:
- There are 2 Types
  - **Primary succession** : Occurs on a site previously not occupied by any community. E.g. newly exposed surface, rock surface etc.

# Secondary succession

- Occurs on a previously occupied by site following disturbance. It occurs where the vegetation cover has been disturbed by humans or animals (an abandoned crop field or cut-over forest, or natural forces such as water, wind storms, and floods). Secondary succession is usually more rapid as the colonizing area is rich in leftover soil, organic matter and seeds of the previous vegetation. Whereas in primary succession the soil itself must be formed, and seeds and other living things must come from outside the area.

## **Initial causes**

### Primary succession

- Erosion
- Physiography
- Elevation

### Secondary succession

- Climatic
- Biotic
- Topographic

# Succession

Is the process of change in the **species** structure of an **ecological community** over time.

The time scale can be decades or even millions of years after a mass extinction due to some disturbances.

Succession may be initiated due some of the disturbances such a lava flow or a severe landslide , or by some form of disturbance of a community, such as from a fire, severe wind throw.

- **Pioneer stage:** First stage in a sere which is dominated by opportunist species.
- **Sere / seral community:** A set of intermediate stages found in ecological succession in an ecosystem. Seral community is a name given to each group of plants within the succession.
- **Climax stage:** Final stage in a sere where all species are in balance. The climax represents a community at some equilibrium or steady state with the physical and biotic environment that continues to reproduce itself in the absence of disturbance.

Depending on the nutritional and energy contents, a seral community can be:

- 1. Autotrophic** – The initial seral stages are dominated by autotrophic green plants converting inorganic components into organic matter in substratum.
- 2. Heterotrophic** - The initial seral stages are dominated by heterotrophic organisms e.g. bacteria, actinomycetes, fungi, converting organic components into inorganic matter declining energy.

Depending on the **substratum and climate**, a seral community can be one of the following:

- 1. Hydrosere:** Community in freshwater
- 2. Xerosere:** Community in dry area. It is of 2 types:
  - a) Lithosere:** Community on rock
  - b) Psammosere:** Community on sand
- 3. Halosere:** Community in saline body (e.g. marsh)

**Succession** Gradual replacement of one community by another in the development of vegetation towards a climax

**Sub components**

Nudation

Migration

Ecesis

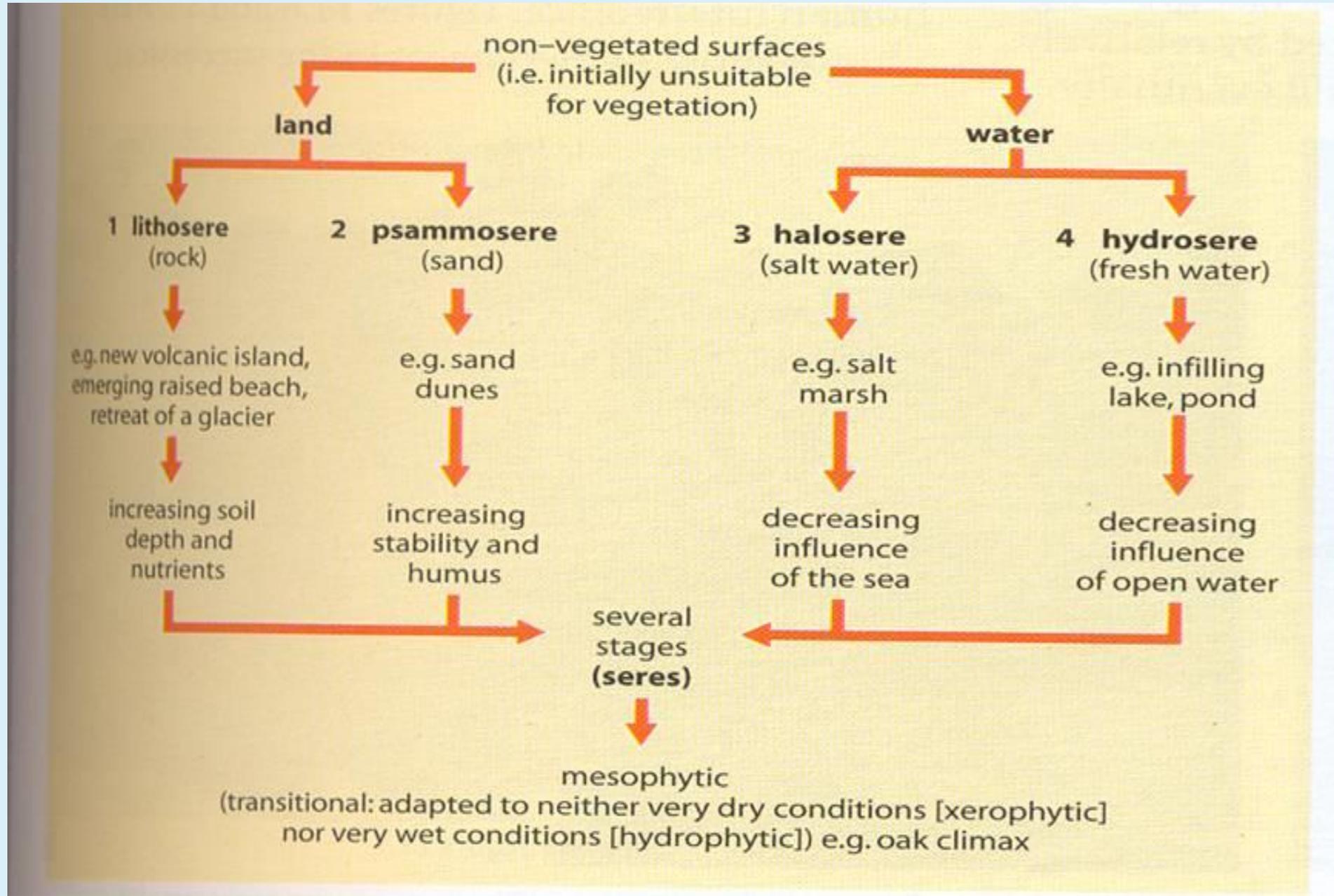
Competition

Reaction

Final stabilization

**Pioneers** : Species invades bare area such as newly exposed soil or rock surface

**Sere** : stages in the successional process



# Primary Successions

## Clement's theory of succession / Mechanisms / process of succession (Clement, 1916) (Classical Ecological Theory)

Succession involves following phases:-

- ❖ **Nudation:** Succession begins with the development of a bare site, called Nudation (disturbance). It may be caused due to several agents e,g, physiographic, climatic and biotic agents.
- ❖ **Invasion:** successful establishment of a species in an area migrated from some other area is called invasion.

❖ **Migration:** It refers to arrival of propagules

❖ This is the arrival of reproductive bodies such as **seeds, spores** and **propagules** of plants from other places.

This is affected by **wind, water** and **animals**.

The **nature of the bare area** determines the type of plants that can grow there.

e.g. the bare area is a **pond** the seeds of **water plants** can germinate.

In case the bare area is a **desert** the seeds of **xerophytes** will germinate. So the condition of the bare area determines the type of initial vegetation it can afford.

**Ecesis:** It involves establishment and initial growth of vegetation.

**Aggregation:** increase in number of individuals of invaded species.

**Competition:** As vegetation became well established, grew, and spread, various species began to compete for space, light and nutrients. This phase is called competition.

**Reaction:** During this phase autogenic changes affect the habitat resulting in replacement of one plant community by another.

**Stabilization:** Reaction phase leads to development of a climax community.