

Chapter 3

Ecosystems

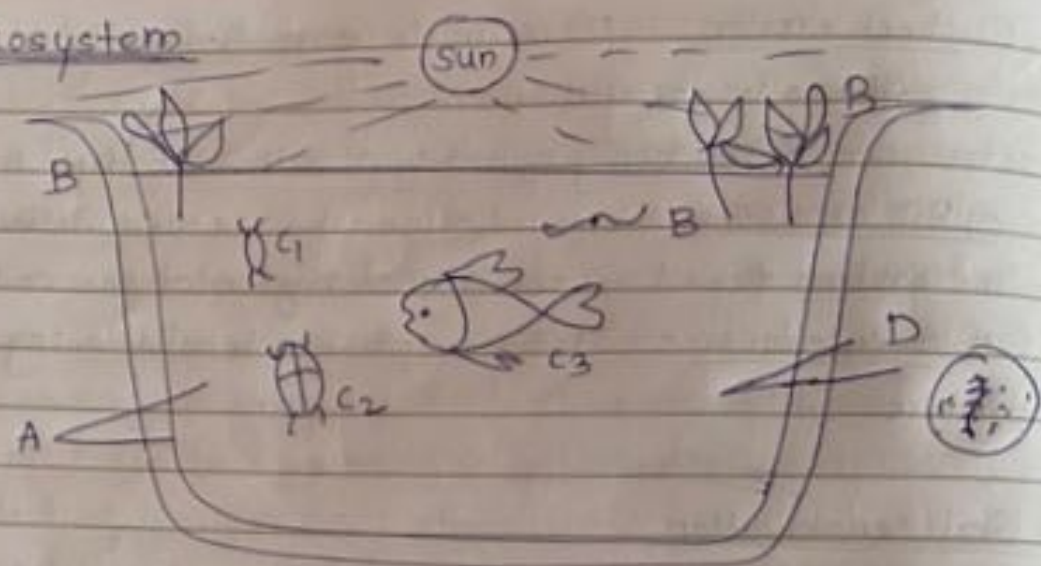
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* Ecosystem



A - Abiotic Component

B - Producers

C₁ - Primary consumers

C₂ - Secondary consumers

C₃ - Tertiary consumers

D - Decomposers (bacteria & fungi).

- The concept of ecosystem is very broad & gives an idea about interrelationship of living organism.
- There is interaction between autotrophic & heterotrophic components.
e.g. The photosynthesis predominantly takes place in autotrophic & they take energy from biomass & accumulated biomass in heterotrophs on which the food chain sustains.
- Hence, the interaction between autotrophs & heterotrophs is responsible for having unique structure to the ecosystem.
- The abiotic components are non-living & biotic components are living.
- The abiotic components such as C, N, H, O, S, P etc. form the organic compounds such as carbohydrates, proteins & lipids etc.

Structure & functions of an ecosystem

1. Abiotic substances

Carbon dioxide, water, nitrogen, calcium, phosphate all of which are involved in the material cycles are called inorganic components.

Organic components are proteins, amino acids, lipids & carbohydrates.

2. Biotic components

a. Producers - Green plants, which are able to manufacture food from simple inorganic substance are called producers. Bacteria, algae of various types, grasses, herbs & trees contribute in the total production of an ecosystem.

b. Consumers - These are the heterotrophic organisms, the animals that eat other organisms or organic matter. They are also called as macro consumers.

c. Decomposers / reducers - Heterotrophic organisms, bacteria & fungi, that breakdown the complex compounds. They are also called as micro consumers.

Function point of view - two components

(1) Autotrophs (self nourishing)

The component is constituted mainly by green plants, including photosynthetic bacteria. Members of the autotrophic component are known as producers.

(2) Heterotrophs (other nourishing)

In these utilization, rearrangement & decomposition is occurred. The organisms involved are known as consumers, as they consume the matter built up by the producers.

* Pond Ecosystem

Refer Unit test - 2 Notes page no. 2

* Sw. Ecological Succession

The natural process by which the same locality becomes successively colonised by different groups or communities of plants.

Causes

1. Initial causes: These are climatic as well as biotic. The factors are erosion, deposits, wind, fire etc. caused by lightning or volcanic activity.
2. Continuing causes: These are the processes such as migration, aggregation, reaction etc.
3. Stabilising cause: These cause the stabilisation of the community.

An ecological succession proceeds the 4 lines.

1. a continuous change in the kinds of plants & animals
2. an increase in the diversity of species.
3. an increase in the organic matter & biomass supported by the available energy flow.
4. decrease in net community production.

Types of succession

Refer Environmental studies Book page no. 62, 63

* Food chain

Refer Unit test - 2 Notes page no. 6, 7

* Ecological Pyramids

There is a trophic structure. Interaction of food chain & the size of metabolism relationship between the linearly arranged various biotic components of an

ecosystem.

Ecological pyramids are three general types.

1. Pyramids of numbers

They show the relationship between producers, herbivores & carnivores at successive trophic levels in terms of their numbers.

There are three different kinds of ecosystems. Grassland, pond & forest ecosystem.

Actually, the pyramids of numbers do not give a true picture of the food chain as they are not very functional.

They do not indicate the relative effects of the geometric, food chain & size factors of the organisms.

They generally vary with different communities with different types of food chains in the same environment. for dig refer p. 74.

2. Pyramids of biomass

They are comparatively more fundamental, they have geometric factor, show the quantitative relationships of the standing crops.

In grassland & forest there is generally a gradual decrease in biomass of organisms at successive levels. However, in a pond as the producers are small organisms, their biomass is least, & this value gradually shows an increase towards the apex of the pyramid. for dig refer p. 76.

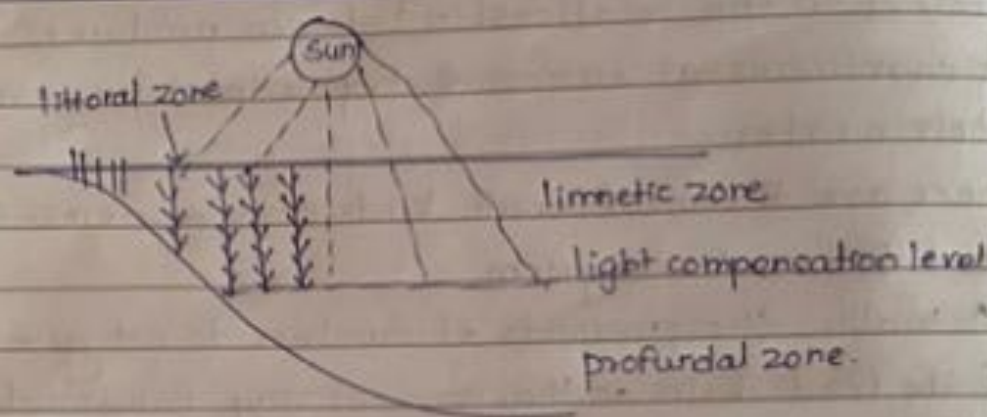
3. Pyramid of energy

The energy pyramids give the best picture of overall nature of the ecosystem. Here, number & weight of organisms at any level depends not on the amount of fixed energy present at any one time in the level.

In shape it is always upright, as in most of the cases there is always a gradual decrease in the energy content at successive trophic levels from the producers to various consumers.

Fig. Refer page no. 77

* The three zones of a lake



1. Littoral zone

This is the shallow water region where light can reach upto the bottom. It is occupied by rooted plants.

2. Limnetic Zone

This is the open water zone up to the depth of effective light penetration. It includes plankton, nekton & neustons.

Total illuminated stratum including littoral & limnetic zones is called as euphotic zone.

3. Profundal Zone

The bottom of the deep water area where light does not penetrate is called as profundal zone. This zone is often absent in ponds.

Organisms of fresh water conveniently classified as producers, consumers & decomposers.

Benthos - Organisms those living in the bottom sediments.

Periphyton - Those living on the projected surfaces such as stems & leaves.

Plankton - Those swimming freely with the water current are called.

* Fresh water Environment

Refer From Unit test-2 Notes p.g.no 9.

* Ocean Ecosystems

70% of the earth's surface is covered by the sea. The marine habitat is thicker as well as greater in area than the land & fresh water portions of the biosphere. Total marine biomass is far greater than the combined biomass of land & fresh water.

Sea influences is occur due to climates of land areas but is dominated by waves. The tides produced by the pull of moon & sun.

The sea water is salty. In average salt content is 3.5% usually written as 35‰ where as fresh water has a salinity of less than 0.5‰.

Monsoon brings major changes in the hydrology & biology of the oceans & seas around India sub-continent. which is around 7000 km wide & represents a little cover 2.0% of the total area of the global oceans.

The Indian marine waters are rich in flora & fauna i.e. planktons, algae, sea grasses, mangrove diversity, fishery, ocean associated animal diversity.