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B.Sc HONS - Part I Paper II

Topic - AN essay on ecological Succession

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Q. Write an essay on ecological succession.

Ans. According to Smith (1966) ecological succession is an orderly and progressive replacement of one community by another till the development of a stable community in that area.

Kinds of Ecological succession : Ecological succession may be of the following type :

(i) Primary succession : When succession begins on an area which has not been previously occupied by a community, it is known as primary succession.

(ii) Secondary succession : When community development is proceeding in an area from which a community was removed and where nutrients and conditions for existence are already favourable, it is termed as secondary succession e.g. cut over forest.

Depending upon the predominance of green plants of heterotrophic organisms in the initial seral stages, succession is distinguished into the following types :

(i) Autotrophic succession : It is wide spread in nature and begins in a predominantly inorganic environment. It is characterized by early and continued dominance by autotrophic organisms.

(ii) Heterotrophic succession : It is characterized by early dominance by heterotrophs such as fungi, bacteria and animals.

Patterns of succession : Depending upon the types of habitat and varying amount of moisture, the successions are variously designated as follows :

(a) Xerosere : One of the best examples of xerosere is the succession which starts on bare rock, wind blown sand, rocky talus and such places where there is deficiency of water. the various stages in xerosere can be enumerated as follows :

(i) Lichen stage : Due to great exposure to sun and extreme deficiency of water, the first pioneers on the bare rock area are a few simple organisms. The most successful of such organisms are crustose lichens. During rainy season they absorb large quantities of water and flourish rapidly. Migration of spores take place by wind. The community formed by the activity of crustose lichens such as foliose lichens appear.

(ii) Moss stage : With the accumulation of dust and humus in small quantities, the environment is altered enough to allow the establishment of secondary communities in a rather definite sequence. Scattered patches of mosses such as Tortula, Grimmia, Bryum, Barfula etc. begin to invade the environment. Among the animals, mites become more varied, some small spider etc. become associated with this secondary community.

(iii) Herbaceous stage : As the mats of mosses become more extensive more soil accumulates, much of the soil is blown in from surrounding areas during windy periods. With the influx of grasses the fauna also becomes varied. Nematodes and larval insects, ants and mites appear in the gradually altered environment.

(iv) Shrub stage : Further modification of the environment provides conditions for the germination and growth of shrubs perennial woody plants such as Acacia, Prosopis, Zizyphus etc.

(v) Climax forest : With the establishment of shrubs more and more soil is formed and environment becomes increasingly humid. This favours the growth of woody trees. Finally a climax forest community is established and a number of terrestrial vertebrates make their appearance.

(b) Hydrosere : Hydrosere succession starts in water. A freshly built pond can be taken as a most suitable example of hydrarch succession. The various stage of hydrosere can be enumerated as follows :

(i) Submerged stage : In initial stages water is poor in nutrients and devoid of life. As water becomes rich in organic and mineral substances, certain rooted submerged hydrophytes make their appearance e.g. Utricularia, Vallisneria etc.

(ii) Floating stage : when water level in the pond remains 6 ft deep about, floating plants begin to appear e.g. Nymphaea, Trapa etc.

(iii) Reed swamp stage : Now reed-swamp plants like typha, Rumex and Sagittaria invade the area.

(iv) marsh meadow stage : As Succession continues, marshy meadows become too dry for swampy plants and these are replaced by herbs or shrubs.

(v) Woodland stage : At time certain smaller species of trees invade area taking the place of the shrubs.

Accordingly, the animal life changes as follows :

Protozoans like paramoecium, Euglena, Amoeba etc. which are the pioneers.

Later on, when the higher forms of vegetation appears, Daphnia Cyclops, Cypris etc. are replaced by other species.

At the reed swamp stage Gill breathing snails replaced by lung breathers such as Lymnaea.

Finally, at the woodland stage most of the terrestrial animals come to occupy the habitat.

(c) Mesosere : The successional series is much shorter because moisture conditions are more ideal. In actuality, the conditions towards which hierarch and terarch communities are gradually progressing are those that prevail in the mesarch series, thus giving the latter type of sequential pattern a head start.