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Ecology and Environment

INTRODUCTION

Nature has two components, organisms and environment. These two components are interacting, interdependent and dynamic. The branch dealing with the principles governing interaction of organisms and environment constitute ecology.

- Ecology (Oikologie, made of two Greek words, *i.e.*, *Oikos*—house or dwelling + *Logos*—study or discourse). Thus literary meaning of ecology is, **study of organisms at their home.**

Ecology can be defined as the branch which deals with inter-relationship between environment and organisms.

The term ecology was first coined by **E. Haeckel** 1868. Although, first used in literature by **H. Reiter.**

ECOLOGY IN INDIA

Ecological studies in India were first started by **Dudgeon** (1921) at Allahabad, *i.e.*, ecology of upper gangetic plains. Later on these studies were further elaborated by **Saxton** and **R. Mishra.**

- Some famous Indian ecologists are, **Prof. R. Mishra**-Father of Indian ecology, **Prof. K.C. Mishra, Prof. R.S. Ambasht** (all at B.H.U., Varanasi). Besides **Prof. L.P. Mall, Prof. S.C. Pandeya, Prof. Balakrishnan, Prof. Brij Gopal,** etc.
- Most active centre of ecological studies in India is **B.H.U., Varanasi.**
- In 1971, UNESCO started an inter-governmental programme, *i.e.*, **IBP** (International Biological Programme) and this programme was under the guidance of **Prof. R. Mishra** in India.
- Another International programme was **MAB**-Man And Biosphere.

SOME IMPORTANT ECOLOGICAL TERMS

1. Factor (Environmental factor)

Any external force, substance or condition which affects living organism in any way, is known as factor or environmental factor. All these factors together constitute environment or environmental complex.

2. Species

Uniform interbreeding population or group of individuals which freely interbreed among themselves, constitute a species.

- ✪ **Keystone species:** A keystone species is a species or set of species whose impact on its community or ecosystem is much larger and more influential (dominating influence) than would be expected from mere abundance. According to **Paine** (1969), keystone species are those whose role or activities determine community structure.
- ● Keystone species are most easily recognized by removal experiments.

Originally, keystone species were thought to be top predators such as wolves, whose presence limits the abundance of herbivores and thus reduces their grazing or browsing on plants. But recently it has been recognized that less conspicuous species also play essential community roles, *e.g.*, certain tropical figs, bear fruits during seasons when no other fruits are available for **frugivores** (fruit-eating animals). If these figs are removed, many animals would starve to death during period of food scarcity. With the death of these animals, many plant species that depend on them at other times of the year for pollination and seed dispersal would also disappear.

Even micro-organisms can play vital roles (*i.e.*, act as keystone species), *e.g.*, **mycorrhizae** (fungi associated with roots of higher plants) are essential for mineral absorption and mobilization. If these fungi die, the trees and many other species will also die.

3. Population

Monospecific (same species) group of organisms which live together in more or less similar environmental conditions constitute a population.

4. Community

Polyspecific (many species) group of organisms which live together in more or less similar environmental conditions constitute community.

- ✪ The term **biocoenosis** is also used for community, which was coined by **Carl Mobius** (1880).

5. Vegetation

Totality of plants in a particular region is called vegetation and communities are units of vegetation.

6. Flora

Species content of plants of a region (not numerical strength) is known as flora, *i.e.*, flora is listed while vegetation is described.

7. Biome

It is large unit of climax communities present in well defined climatic zone, *e.g.*, **Tundra Biome.**

8. Ecotone

It is zone of transition between two types of communities and represents a zone of special ecological interest, *e.g.*, estuary is ecotone between marine and fresh water communities.

- ✪ Hypersaline water is found in estuaries.

9. Habitat

A living place of an organism is called its habitat.

10. Ecological niche or Niche

It includes habitat as well as functional role of an organism in the community, *i.e.*, trophic structure. Thus ecological niche is the **profession** of the species.

- ✪ Ecological niche is occupied by a population. This term was first used by **Grinnel.**

11. Ecological equivalents

The organisms having similar niche in different geographical regions are known as ecological equivalents, *e.g.*, cow in India and kangaroo in Australia (both herbivores) are ecological equivalents.

12. Autecology

Study of single individual or a population in relation to environment is called autecology.

13. Synecology

Study of group of individuals or a community in relation to environment is known as synecology.

14. Limnology

Study of fresh water ecology is called limnology.