SCOPE AND SUBDIVISION OF ECOLOGY

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Definition

- Ecology is a Greek word which means the study of the habitation of living organisms (oikos=habitation, logos=discourse).
- The word ‘ecology’ was first proposed in the year 1869 by Ernst Haeckel.
- Ecology is the study of the interactions of organisms with each other and with their physical environment.
- The most comprehensive definition of ecology will be “a study of animals and plants in their relation to each other and to their environment”.

Scope of Ecology

- Helps to tackle the environmental problems- pollution, floods, variation in seasonal patterns, global problems like Green house effects, Ozone depletion, Acid rains, Deforestation etc.
- Necessary in maintaining ecological balance and understanding different biochemical cycles like Carbon, Oxygen, Water, Nitrogen cycles etc.
- Helps in protecting flora and fauna
- By study of ecology we can maintain balance in nature and can prevent many ecological disasters.
- Important role in human benefit, agriculture, pest control, management of grassland, forestry, and conservation of wild life.

Subdivision of Ecology

Two major subdivisions were preferred by ecologists. In first subdivision, the whole subject was divided into autecology and synecology :

i) ***Autecology:*** It is the study of individual species or individuals in relation to the environment.

There are two approaches to autecological studies:

(a) autecology of species where individual species are studied

(b) population ecology where individuals of the same species are studied.

ii) *Synecology:* A study of the groups of organisms in relation to their environment is called synecology. Here the unit of study are the groups of species.

- The difference between autecology and synecology could be explained by the following example. If a neem tree (or several peem trees) or a crow (or several crows) are studied in relation to the environment then this would be an autecological study. However, if the study deals with a forest community as a whole in which many different buds, trees and animals share the same area, then it would be called a synecological approach.
- Synecological studies can be of two types:

a) **Community ecology**: Community ecology is concerned with the study of biotic (living) community comprising of interdependent plants and animals in a particular area

b) **Ecosystem ecology**: It deals with the community of living organisms and their environment as an integrated unit of nature.

- Another subdivision may also be made according to the habitat, taxonomic divisions and level of organization. The subject can be studied through following branches of ecology:

1. **Population ecology:** It deals with the growth, trophic structure, metabolism and regulation of a population.
2. **Community ecology:** It deals with the ecology of different populations in the same habitat and same environmental conditions.
3. **Taxonomic ecology:** It is concerned with the ecology of different taxonomic groups, viz. microbial ecology, mammalian ecology, insect ecology and so on.
4. **Habitat ecology:** It includes the study of animals and plants in different habitats. According to habitat, it can be further divided into freshwater ecology, marine ecology, terrestrial ecology, forest ecology and desert ecology.
5. **Human ecology:** It deals with the effects of human activities on environment and vice versa.

6. **Applied ecology:** It deals with the application of ecological concepts to human needs including wild life management, biological control, forestry and conservation of natural resources.
7. **Chemical ecology:** It is concerned with the chemical affinity or preferences shown by different, organisms.
8. **Physiological ecology (ecophysiology):** Physiological adaptation according to ecological conditions are dealt in ecophysiology.
9. **Palaeo-ecology:** It deals with the environmental conditions and life of the past ages. Palaeontology and radioactive dating have aided significandy in the study of palaeo-ecology.
10. **Evolutionary ecology:** It deals with evolutionary problems like speciation and segregation.
11. **Gynaecology (ecological-genetics):** Relationship of environment with genetic variability are considered in gynaecology.
12. **Eco-geography:** It studies the geographical distribution of plants and animals in different environments—collectively called as biomes.
13. **Pedology:** It deals with the study of soil and refers to its nature like acidity, alkalinity, humus contents, mineral contents, soil types and so forth.
14. **Ethology**: It is the study of animal behaviour in different environments under their natural conditions.
15. **Sociolog**: When ecology and ethology are combined it becomes sociology.
16. **System ecology**: When the structure and function of an ecosystem is analysed using applied mathematics, statistics or computer, it is called as system ecology.


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