




# Ecology: Introduction

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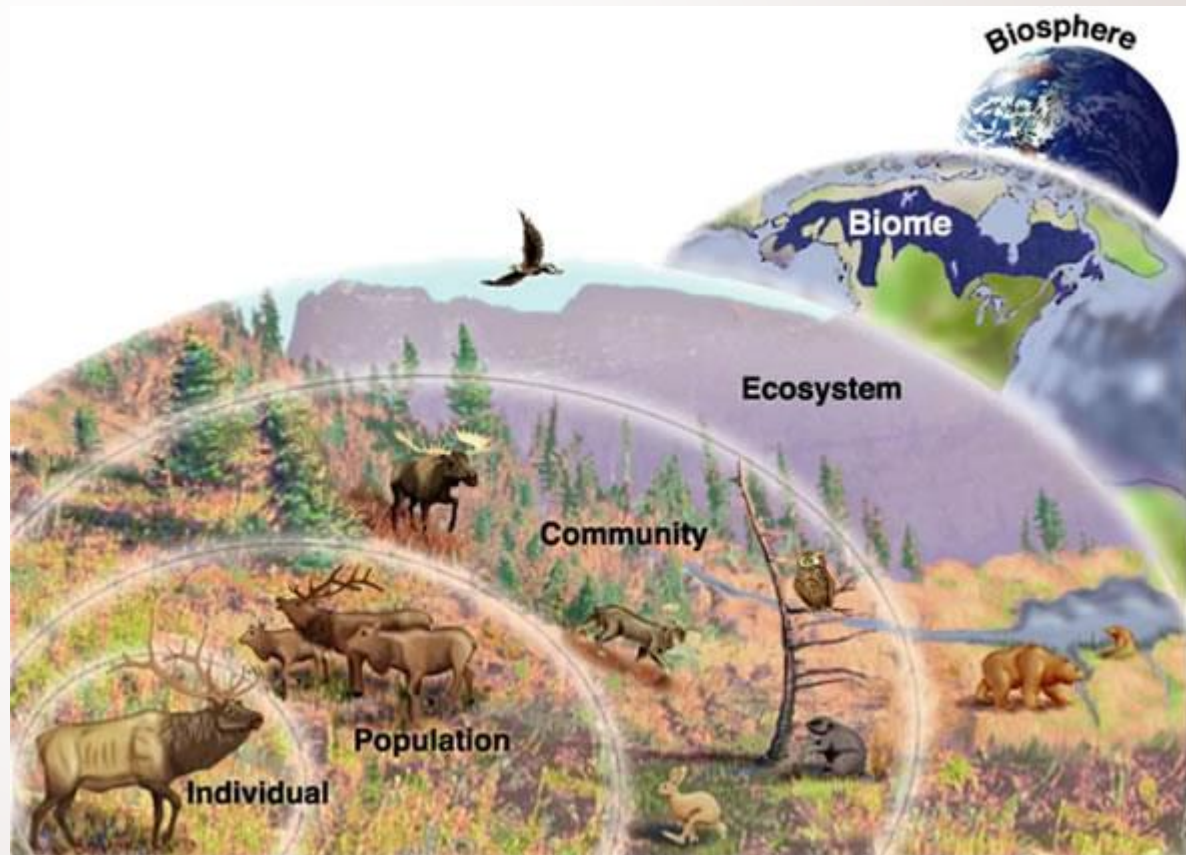
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- ▶ Primitive men knew their surroundings in a manner to survive: **NATURAL HISTORY** (eg. a domesticated animal may get infected by wild animals - Eskimo - sledge dog -> wild Arctic fox)
  - ▶ Scientific organization of these knowledge and application of scientific methods in natural history- Ecology
  - ▶ Ecology is the scientific study of the interactions of living organisms and their environments
  - ▶ Ecology - Greek 'oikos' - home/ 'a place to live', 'logos' - knowledge/ study..... the study of household. Ernst Haeckel (1869) defined Oekologie as "the study of reciprocal relations between living organisms and their environment".... later the term Oekologie was replaced by Ecology

# Definition of Ecology

- “Ecology is the total relations of animals to both their organic and inorganic environment” (Ernst Haeckel 1869)
- “Ecology is the study of animals and plants in relation to their habits and habitats” (Charles Elton 1927)
- “Ecology is the study of structure and function of nature, it being understood that mankind is part of nature” (E. P. Odum 1971)
- “Ecology is a multidisciplinary science which deals with the organisms and its place to live and which focuses on the ecosystems” (R. L. Smith 1977)
- “Ecology is the study of the relations between organisms and the totality of physical and biological factors affecting them or influenced by them” (Eric R. Pianka 1988)

# Levels of Organization

➤ Cells -> Tissues-> Organ-> System-> Organism-> Population-> Community-> Ecosystem-> (Landscape)-> Biome-> Biosphere





# Autecology

- ▶ The study of interaction between individuals and its environment is known as “autecology” or “ecology of individual”
- ▶ In autecology, at a given time, we study the influence of individual's reactions to its natural environment and requirements together and affects of its interacting environment
- ▶ Individual species contribute as the unit of autecology study
- ▶ In autecology, we study in details the morphology of individual effected by its prevailing environment, its geographical distribution based on the surrounding, influence of environment on the life cycle and growth of organism, its taxonomical position and several factors including those which effects different developmental stages of individual's life cycle
- ▶ Example: Lizards, crocodiles and several other reptiles can hatch their eggs and sex of the baby is determined by the temperature

# Synecology

- In 1896, Schroeter and Kirchner coined the term Synecology
- Organisms of different species living in a group can affect each other's life in any possible way under their natural conditions
- It's a more complex condition, in synecology "group of organisms" are considered as the unit of study
- Synecology can be divided into community ecology, biome and ecosystem ecology
- An example of synecology is eutrophication

<b>Autecology</b>	<b>Synecology</b>
It is the study of individual organism or individual species or a population in relation to their environment	It is the study of group of organisms or many species or communities in relation to their environment
It is also called as population ecology	It is also called as community ecology
The study is at the level of an individual, a population or an entire species	Synecology is concerned with study of the highest level of biological organization; many populations in an area (called as community) interacting with each other and also with the environment. It can even be the study of an ecosystem
Autecology is comparatively simple experimental and inductive.	Synecology is complex, philosophical and deductive. (Refer: Inductive vs Deductive)
Autecology studies can be accommodated in a laboratory setup and data is interpreted using conventional mathematical tools**	Synecology studies refers to the interaction of a whole system and that cannot be accommodated in a laboratory setup as the system is naturally formed after interactions of hundreds of years such as a forest ecosystem
Example: Study of Zebra population in relation to its environment (may be factors like rainfall, hunting, lion population etc in a grassland ecosystem) see the figure (in dotted black lines)	Example: Study of entire grassland ecosystem (including all the species or communities) see the figure (in green thick border)



# Study questions



- ▶ Define ecology. Explain why study of ecology is significant for human beings.  $2+3=5$
- ▶ What is autecology? Give details of the aspects of species which are investigated in autecology.  $2+3=5$
- ▶ Define synecology. Write about the various components of the study of synecology.  $2+3=5$
- ▶ What are the aims of the science ecology? Comment on the levels of organization which are included in the study of ecology.