

SEMESTER IV ; BOTA

CORE COURSE-8

ECOLOGY (BOT-A-CC-4-8-TH)

THEORETICAL

Conservation of Biodiversity:

4.1. Level of Biodiversity: genetic, species & ecosystem diversity

Biodiversity is the variation of life forms on Earth. It is sum of all the genes, varieties, species, populations in different ecosystems and their relative abundance. In simple form, biodiversity is the assemblage of different life forms.

It indicates the health of the biosphere and increases the stability of an ecosystem.

Features of Biodiversity :

Climate(temperature, altitude, precipitation, soils etc.) is a regulating factor ; terrestrial biodiversity is usually greater near the equator, which is the result of the warm climate and high primary productivity.

Rapid environmental changes cause mass extinctions.

Biodiversity is not distributed evenly on Earth, and is richest in the tropics. Tropical forest ecosystems contain about 90 percent of the world's species.

There are latitudinal gradients in species diversity.

Biodiversity generally tends to cluster in hotspots.

Biodiversity has been increasing through time, but will be likely to slow in the future.

Level of Biodiversity :

Biodiversity is typically a measure of variation at the genetic, species, and ecosystem level. These can be described likewise :

diversity within species (**Genetic Diversity**);

diversity between species (**Species Diversity**) ;

diversity between ecosystems (**Ecosystem Diversity**).

Genetic Diversity

It refers to the variety of different versions of same genes within a species . It relates the genetic variations seen in the species which is related to shape, size, colour, flavour, disease resistance, structural and functional characters etc.

For example , each human, who is representative of the same species, i.e. *Homo sapiens*, is distinct from another. Similarly, there are many varieties within the same species such as rice, wheat, apples, mangoes, etc. that differ from one another in shape, size, colour of flowers and taste of fruits and seeds due to the variations at the genetic level.

The genetic variability is essential for healthy breeding population which leads to various genetic re-combinations to evolve better varieties. These varieties show the chance of better survival in rapid environmental change.

Species Diversity

It refers to the variety and abundance of different types of species on Earth. Number of different species and relative abundance of each species within a biological community is considered. It includes all the species on Earth, ranging from bacteria, viruses, fungi, different types of plants like algae, bryophytes, pteridophytes, gymnosperms, angiosperms and all the species of animals including unicellular protozoans to mammals.

The term " species diversity " may include species richness, taxonomic or phylogenetic diversity, and/or species evenness. Species richness is a simple count of species. Genetic relationship between different groups of species is indicated by taxonomic or phylogenetic diversity. Species evenness quantifies how equal the abundances of the species are.

Species diversity contributes to ecosystem health. Each species is like a thread holding together an ecosystem. If a species disappears, the impact would be felt through the entire food chain and ultimately the balance of the entire ecosystem would be lost.

Ecosystem Diversity

It deals with the variations in ecosystems within a geographical location and its overall impact on human existence and the environment.

It relates to varieties of ecosystems seen on this earth like; savannas, rain forests, oceans, lakes, marshes, deserts and all other environments where species evolve and live.

Ecological diversity can also take into account the variation in the complexity of a biological community, including the number of different niches, the number of trophic levels and other ecological processes.

Ecological diversity is the largest scale of biodiversity, and within each ecosystem, there is a great deal of both species and genetic diversity.

Significance of Biodiversity:

Biodiversity, besides its ecological significance provides a socio-economic and monetary asset to the nation.

Biological resources not only provide us nourishment, clothing, housing, fuel and medicine but also meet our several other requirements.

If our biodiversity is high enough, we can finally live in a world without hunger.