NCERT Solutions for Class-XII Biology

Chapter -13

NCERT Biology Class 12

1. Name the three important components of biodiversity.

1. Biodiversity refers to the variability of living organisms on Earth. The main biological components or levels of biodiversity are:

- Genetic diversity: It is the genetic variability among a species.
- Species diversity: It refers to the number of species that live in a particular place.
- Ecological diversity: It refers to the variation in ecosystems in a particular region or variation in ecosystem across the planet.

2. How do ecologists estimate the total number of species present in the world?

2. The diversity of living organisms present on the Earth is very vast. According to an estimate by researchers, it is about seven millions.
The total number of species present in the world is calculated by ecologists by statistical comparison between a species richness of a well-studied group of insects of temperate and tropical regions. Then, these ratios are extrapolated with other groups of plants and animals to calculate the total species richness present on the Earth.

3. Give three hypotheses for explaining why tropics show greatest levels of species richness.

3. Scientists have proposed various hypotheses to justify the higher species diversity in tropics. They are as follows:

- Tropical regions have been relatively undisturbed for millions of years compared to temperate region which have been subjected to glaciations in past which led to higher species diversification as it got more evolutionary time.
- Tropical regions have more constant and predictable climate compared to temperate which can promote niche specialization and higher species diversity.
- Solar energy is available more to tropics causing higher productivity and leading to higher diversity.

4. What is the significance of the slope of regression in a species − area relationship?

4. The slope of regression (z) has a great significance in order to find a species-area relationship. It has been found that in smaller areas (where the species-area relationship is analysed), the value of slopes of regression is similar regardless of the taxonomic group or the region. However, when a similar analysis is done in larger areas, then the slope of regression is much steeper.

5. What are the major causes of species losses in a geographical region?

5. There are four major causes that can lead to species loss in an area.

- Habitat loss and fragmentation: Changes caused in a habitat due to uncontrolled and unsustainable human activities such as deforestation, slash and burn agriculture, mining, and urbanization can result into breaking up of the habitat into small pieces, which effects various species and the movement of migratory animals. This leads to decrease in the genetic exchange between populations leading to decreased population of species. It is the most important cause leading to species extinction.
- Over-exploitation: Human greed has led to over-exploitation of various natural resources which has led to endangering and extinction of various species over years.
- Alien species Invasions: Alien species that the introduced unintentionally or delibrately can become invasive and can cause declination or extinction of indigenous species.
- Co-extinctions: Various species can be connected to each other in an obligatory way. When one species gets extinct, other plants or animal species associated with it also gets extinct.

6. How is biodiversity important for ecosystem functioning?

6. An ecosystem with high species diversity is much more stable than an ecosystem with low species diversity. Also, high biodiversity makes the ecosystem more stable in productivity and more resistant towards disturbances such as alien species invasions and floods.

If an ecosystem is rich in biodiversity, then the ecological balance would not get affected. As we all know, various trophic levels are connected through food chains. If any one organism or all organisms of any one trophic level is killed, then it will disrupt the entire food chain. For example, in a food chain, if all plants are killed, then all deer's will die due to the lack of food. If all deer's are dead, soon the tigers will also die. Therefore, it can be concluded that if an ecosystem is rich in species, then there will be other food alternatives at each trophic level which would not allow any organism to die due to the absence of their food resource.

Hence, biodiversity plays an important role in maintaining the health and ecological balance of an ecosystem.

7. What are sacred groves? What is their role in conservation?

7.

- Sacred grooves are communally protected forest fragments that usually have a religious importance attached to it.
- In India sacred groves are found in certain regions of Rajasthan, Western Ghats of Karnataka, Maharashtra, Meghalaya, and Madhya Pradesh.

- Sacred grooves help in protection of various rare and threatened species as deforestation is strictly restricted in such areas.

8. Among the ecosystem services are control of floods and soil erosion.
How is this achieved by the biotic components of the ecosystem?

8. The biotic components of an ecosystem include the living organisms such as plants and animals. Plants play a very important role in controlling floods and soil erosion. The roots of plants hold the soil particles together, thereby preventing the top layer of the soil to get eroded by wind or running water. The roots also make the soil porous, thereby allowing ground water infiltration and preventing floods. Hence, plants are able to prevent soil erosion and natural calamities such as floods and droughts. They also increase the fertility of soil and biodiversity.

9. What measures, as an individual, you would take to reduce environmental pollution?

9.

- Animals are more diverse than plants because they have adapted better to the changing environment.
- Animals have more complex body structure and brain capacity as compared to the plants.
- Animals are locomotive and can migrate.

Hence, species diversity of plants is less compared to that if the animals.

10. Can you think of a situation where we deliberately want to make a species extinct?
How would you justify it?

10. Yes, there are various kinds of parasites and disease-causing microbes that we deliberately want to eradicate from the Earth. Since these micro-organisms are harmful to human beings, scientists are working hard to fight against them. Scientists have been able to eliminate small pox virus from the world through the use of vaccinations. This shows that humans deliberately want to make these species extinct. Several other eradication programmes such as polio and Hepatitis B vaccinations are aimed to eliminate these disease-causing microbes.