

NCERT Solutions for Class 12 Biology Chapter 15 Biodiversity and Conservation

Q1. Name the three important components of biodiversity.

Answer:

Biodiversity refers to the vast variety present among the various life forms. The three components of biodiversity are

1. Genetic diversity
2. Species diversity
3. Ecosystem diversity

Q2. How do ecologists estimate the total number of species present in the world?

Answer:

In order to estimate the number of species present on earth, ecologists statistically compare species richness of well-studied group of insects of tropical and temperate regions and these ratios are extrapolated with other groups of plants and animals to estimate the species richness found on Earth. As per estimates, about 7 million species are present on Earth.

Q3. Give three hypotheses for explaining why tropics show greatest levels of species richness.

Answer:

Tropics show the greatest level of species richness due to the following reasons (hypotheses)

1. The climate of tropical areas is more stable as compared to temperate areas. So the local populations, continuously live in the absence of natural disturbances.
2. Tropical communities are highly productive and can support a wide range of other species. This is mainly because tropics receive more solar energy.
3. In tropics, there is warm temperature and high humidity. Such conditions are favourable for a number of varieties of fungi, plants and algae.

Q4. What is the significance of the slope of regression in a species – area relationship?

Answer:

The slope of regression has a major role in determining the species-area relationship. In smaller areas slope of regression is similar regardless of the taxonomic group or region. On the other hands, in case of larger areas, curve us steeper. Biodiversity also increases from higher to lower altitudes.

Q5. What are the major causes of species losses in a geographical region?

Answer:

The major causes of species losses in a geographical region are as follows;

1. Habitat loss and fragmentation
2. Over-exploitation

3. Alien species invasion\

4. Co-extinction

Q6. How is biodiversity important for ecosystem functioning?

Answer:

Importance of biodiversity in ecosystem functioning

1. Biodiversity is important for maintaining stability, productivity, resilience, alternative pathways and overall health of a particular ecosystem.

2. A scientist named David Tilman confirmed that higher the biodiversity higher will be the productivity of the ecosystem as more plants are there to photosynthesize and more decomposers are there to recycle the waste of the ecosystem. He also proved that if biodiversity of an area is high then a year to year variation in total biomass will be lesser contributing to the overall stability of an ecosystem.

3. Rich biodiversity provides resilience against natural as well as man-made disturbances.

4. To clarify the importance of rich biodiversity on ecosystem functioning, River Popper hypothesis was proposed by Paul Ehrlich. He cited that the way in an aeroplane all parts are joined by thousands of rivets, in an ecosystem all components are joined by species. As more and more rivets are removed the parts of aeroplane disassemble. Similarly, as species are removed the functioning of the ecosystem also gets affected.

Q7. What are sacred groves? What is their role in conservation?

Answer:

Sacred groves are the traditionally protected patches of forests around places of worship where local tribal communities actively participate to protect these regions and do not allow to cut even a single branch of the tree because of religious reasons.

Sacred groves in India are found in Western Ghats of Karnataka, Maharashtra, Khasi and Jaintia hills in Meghalaya, Aravali hills in Rajasthan and Sarguja, Chanda and Bastar areas of Madhya Pradesh.

Role of sacred groves on the conservation of biodiversity

1. Sacred groves help in the protection of a number of rare, endangered and endemic species.
2. In these regions, deforestation is strictly prohibited and thus they are biodiversity-rich areas.

Q8. Among the ecosystem services are control of floods and soil erosion. How is this achieved by the biotic components of the ecosystem?

Answer:

Ecosystem services refer to good or benefits that we get from the ecosystem. Prevention of soil erosion and floods comes under benefits provided by the ecosystem to us. The ecosystem includes both abiotic and biotic components. The biotic components are the living organisms present in an ecosystem. Biotic components play a role in providing ecosystem services. some of these roles are as follows:

1. The roots of plants hold the soil particles very tightly. This prevents the erosion or degradation of the top layer of soil
2. Plants increase soil fertility and biodiversity.

3. Presence of plants also help in controlling the flow of floods and lead to minimal destructions.

4. roots of plants make the soil porous thus allowing water to seep in the soil.

5. The carbon dioxide and oxygen balance are maintained in the ecosystem via plants and animals.

Q9. The species diversity of plants (22 per cent) is much less than that of animals (72 per cent). What could be the explanations to how animals achieved greater diversification?

Answer:

Animals have achieved greater diversification than animals due to following reasons:

1. Animals possess a nervous system to receive stimuli and show a response against them.

2. Animals are motile and they can avoid competition thus leading to greater diversification.

3. Animals are subjected to less seasonal variations as compared to plants.

Plants are fixed and they require more evolutionary adaptations in order to obtain their requirements of water, minerals, sunlight, avoiding of herbivory etc. Thus, there is higher diversity among animals than plants.

Q10. Can you think of a situation where we deliberately want to make a species extinct? How would you justify it?

Answer:

Yes, some harmful pathogens i.e. disease-causing organisms with little or no role in the ecosystem can be made to get extinct. Their extinction will not lead to any effect on the ecological balance. These pathogens may include smallpox virus etc, Poliovirus is about to get eradicated. There are efforts to make this world free from diseases such as TB, AIDA, Malaria etc. Since the microorganisms causing these disease have no role to play in the environment, they can be made to get eradicated.