

BIOLOGY LESSON PLAN FOR WEEK EIGHT (8)

SUBJECT: Biology
CLASS: SS2
TOPIC: Ecological Management and Tolerance

PROCEDURE:

Step I: Biological Associations

In a community, there exist different kinds of biological associations between organisms of different species. Some of these biological associations are beneficial; some are neutral while others are harmful.

Types of associations

Symbiosis:

This is a close association between two organisms in which one or both of them benefit from each other. Symbiosis is a beneficial association and each member is called a symbiont. This association can be further divided into

1. Mutualism
2. Commensalism

Mutualism

Mutualism is the association between two organisms in which both of them benefit from each other.

Examples of mutualism include:

Algae and fungi in lichen;

Protozoa in the intestine of termites;

Nitrogen-fixing bacteria in the root nodules of leguminous plants;

Bacteria in the rumen of ruminants.

Commensalism

Commensalism is a relationship between two organisms of different species, in which one (commensal) benefits while the other (host) neither gains nor loses. Examples of commensalism Remora fish and the shark, oyster and crab, man and intestinal bacteria.

Parasitism

Parasitism is a close association between two organisms in which one, known as the parasite, lives in or on the body of another; the host, deriving benefits from and causing harm to it while the host loses in the process. The parasite benefits from the association while the host usually suffers harm or may die. The benefits the parasite derives from a host may include food, oxygen, living space and support.

Examples of parasitism
Man and the tapeworm:

Competition

The competition involves the interactions among two organisms of the same or different species in which one outgrows the other and survives. Competition is often based on limited environmental resources which can be in short supply such as food, water, nutrients, gases, light and space. During the competition, one organism controls one or more of these resources which enable it to grow and survive while the other neither grow nor survive to lead to its elimination.

When the competition is between members of the same species, it is called intraspecific competition while it is called interspecific competition if it is between members of different species.

Examples of Competitive Associations (a) Flowering plants and grasses: flowering plants due to its size and numerous branches and leaves are capable of eliminating the grasses by depriving the grasses of nutrients, space and sunlight. The grasses may eventually be eliminated

Predation

Predation is a type of association between two organisms in which the predator kills the other, called the prey and directly feeds on it. The predator which is usually larger in size and always stronger than the prey benefits by deriving its food while the prey is completely eliminated.

Examples of Predation

The hawk and chicks of domestic fowls, the leopard and antelope, the lion and gazelle

Step II: Ecological Tolerance

Tolerance is the ability of living organisms to withstand or tolerate little unfavourable changes in the environment which affect their survival. It can also be defined as – ability of organisms to withstand or survive prevailing adverse conditions within certain minimum and maximum limit in the habitat. Too little or too much of certain environmental factors such as light, heat, cold, acidity and alkalinity might produce unfavourable conditions.

Step III: Tolerance and Geographical range

Tolerance range

Tolerance range is defined as the range between the minimum and maximum limits to which organisms can tolerate certain changes in their environment to survive. It is the range of environmental conditions that are tolerable for survival in a species. In other words, too little or too much of a specific environmental condition may result in death.

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death. Death occurs beyond this range. For example, for most animals, the minimum temperature, the limit is 0 degrees Celcius while the maximum limit is 42oC. Their tolerance range is 0 – 42oC. Below 0oC or above 42oC, the organisms may die. Take temperature, for example. Polar bears survive very well in low temperatures but would die from overheating in the tropics.

Geographical range

Geographical range refers to the areas where specie of organism can only be found within the minimum and maximum limits of its tolerance. Different abiotic factors like rainfall, temperature, light intensity, availability of food, relative humidity, day length, wind, etc are often responsible for the geographical boundaries of species of organisms. Many other abiotic factors can determine a species range, including dissolved oxygen, canopy cover, conductivity, alkalinity and pH. Also, Interactions between species can cause limitations to a species geographic range. The most obvious interaction that limits range expansion is predation, where prey species do not move beyond their range to avoid predator attack and mortality. Geographic range edges can also be determined by competition, where less competitive species are forced into suboptimal conditions within the range to avoid the stress of reduced food and habitat.

SUMMARY: The interactions between plants and animals in their environment are usually described as biotic interactions or associations. There is a close association between the biotic and abiotic components of the environment. Both affect each other and are equally important for the ecosystem. Tolerance is the ability of an organism to survive when subjected to certain abiotic factors or biotic factors. Living organisms can only live in a particular habitat if they can tolerate the ranges of the abiotic factors that operate in it.

HOME WORK

- List and explain the different biological associations in ecological management
- Explain biological tolerance
- Differentiate between Tolerance and geographic range