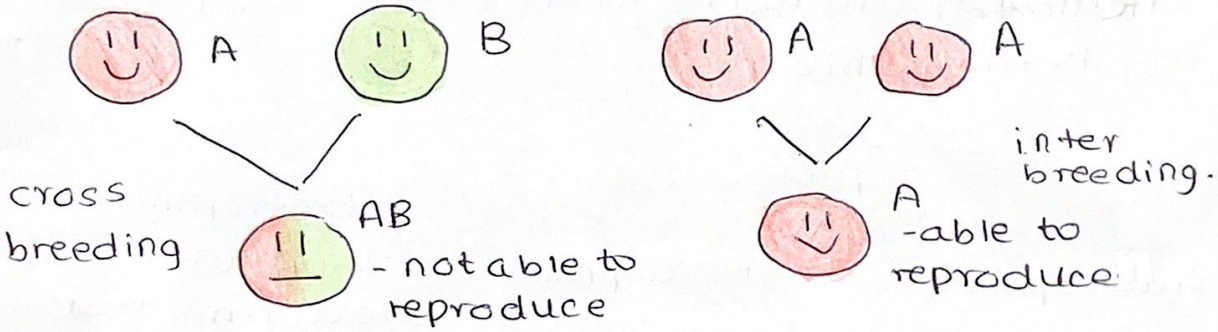
ECOLOGY

4.1 SPECIES, COMMUNITIES AND ECOSYSTEMS

SPECIES

→ Group of organisms that can potentially interbreed to produce fertile, viable offsprings.

→ Members of one species cannot produce fertile and viable with other species. Even if they do produce offsprings, its called crossbreeding.



POPULATIONS

A population is a group of organisms of the same species that are living in the same area at the same time.

If they do live in different areas, they are less likely to interbreed but if they would still be able to and will remain the members of the same species.

AUTOTROPHIC AND HETEROTROPHIC MODE OF NUTRITION

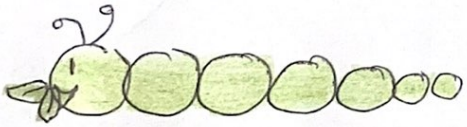
Autotrophs

- The organisms that can make their own carbon compounds from substances like CO_2 are called autotrophic.
- They are able to make their own food using sunlight & CO_2.

Heterotrophs

- The organisms that are dependent on other organisms/autotrophs for their carbon compounds are heterotrophic.

autotrophic



heterotrophic

Mixotrophic

- unicellular organisms that can use both autotrophic & hetero trophic modes of nutrition depending on their resources are called mixotrophs.

Eg. Euglena

CONSUMERS

They are heterotrophs that feed on living organisms by ingestion.

→ Herbivores: consumers that feed on plants.

carnivores: consumers that feed on animal matter.

Omnivores: consumers that feed on plants & animals.

DETRIVORES

They are heterotrophs that obtain organic nutrients from detritus by internal digestion.

- dead leaves & parts of plants
- parts of dead animals
- feces from animals.

SAPROTROPHS

- Heterotrophs that obtain nutrients from dead organic matter by external digestion.

SCAVENGERS

Feed on dead organisms rather than hunting live organisms.

COMMUNITIES

- A group of populations living together and interacting with each other in a specific area.
- All species are dependent on each other for their long term survival and cannot live in isolation.

Eg. coral reef

ECOSYSTEMS

- A community forms an ecosystem by its interactions with the abiotic environment.
- Living organisms can also influence the abiotic environment.

INORGANIC NUTRIENTS

Living organisms obtain nutrients from their abiotic environment.

For making carbohydrates, lipids & carbon compound
Carbon, Hydrogen & Oxygen

Nitrogen & Phosphorus

→ Autotrophs obtain these nutrients from the abiotic environment.

→ Heterotrophs obtain carbon compounds from autotrophs but get Nitrogen & phosphorus from the environment.

NUTRIENT CYCLES

- Maintains the inorganic supply of nutrients by nutrient cycle.
- Supply is limited and needs to be recycled.

- Inorganic nutrients are obtained from water, soil (abiotic environment) and is converted into organic compounds by autotrophs.
- These organic compounds are ingested by the heterotrophs and are used for growth & respiration (metabolic processes.)
- saprotrophs decompose & convert the dead animal matter into inorganic nutrients for the soil.

SUSTAINABILITY OF ECOSYSTEMS

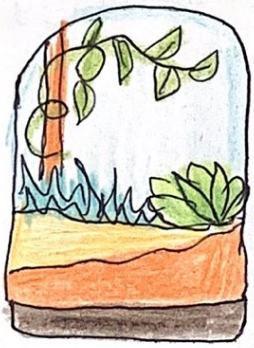
- When something can be used indefinitely, its said to be sustainable.
- Human practices are becoming unsustainable.

Requirements for sustainability in ecosystems

- nutrient availability - decomposers
- detoxification of waste products - bacteria
- energy availability - light from sun

Mesocosms

- enclosed environments
- allow a small part of a natural environment to be observed under controlled conditions.



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