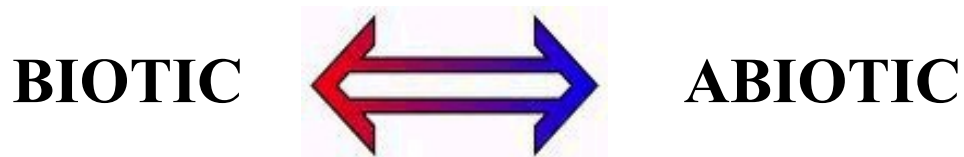


How Does the Natural Environment Sustain Itself ?

(An introduction to the science of Ecology)



This question is studied by scientists called “**ecologists**”. Ecology is the study of the relationships living things (**biotic factors**) have with each other and their nonliving environment (**abiotic factors**).

These two groups can be thought of as two teams playing an ongoing game with no end in sight. To win, the biotic team tries to get what it needs to thrive in an environment (survive and reproduce as much as possible...reach your “biotic potential”). The abiotic team tries to prevent this from happening, because large populations demand more from their environment and may harm it.

Another analogy could use a see saw....only instead of sitting on it, stand under it and try to push your side up. Abiotic factors at one end, biotic factors at the other end.



1. Is this unbalanced situation “sustainable” ?
2. What kinds of situations could create an unbalanced natural environment ?

The natural environment is too large to study as one whole piece, so the part where life is found (the “**biosphere**”) is broken into several pieces :

BIOSPHERE ⇒ LITHOSPHERE
 ⇒ ATMOSPHERE
 ⇒ HYDROSPHERE

These pieces are still very big, so can be broken down even farther....into “**ecosystems**”, which can come in many different sizes. Ecosystems are places where groups of living creatures interact with each other and the nonliving environment. The biotic and the abiotic parts in any environment affect and change each other at all times.

ABIOTIC FACTORS INCLUDE.....

- amount of physical space
- light
- temperature
- oxygen
- water
- levels of available nutrients
- pressure

Physical Space :

Organisms need enough room to meet their resource needs. Their stress levels often increase as well when crowding occurs. Reproduction can be affected too.

Temperature :

Body temperatures will be affected by the temperature of the environment, which can affect body chemistry. The temperature range a creature is best suited to is called its “**range of tolerance**”.

Oxygen level :

Oxygen is needed in most creatures for a process called “**cell respiration**”, to release energy stored in food.



Light :

Drives the process of photosynthesis, which is the creation of food energy in most environments. Light can also affect the development or behavior of some species.

Water :

Needed for most chemistry in a creature's body (dissolving substances), for temperature control, and moving things around. A population's “**distribution**” is determined by the amount of water available.

Nutrient levels :

Things like potassium, phosphates, magnesium, nitrates, carbon, and others can come from rocks being weathered and eroded, or from recycling or decomposing “organic material”. Important to soil microorganisms in soil (affecting its fertility), and can also affect the chemistry of water. These things determine where species can or can't exist (plants especially !)

Good soil is:

- Dark Brown/Black
- Has a lot of rotting things in it
- Is soft/moist
- Smells like ****

BIOTIC FACTORS INCLUDE.....

- detritus
- diseases
- relationships with other creatures

Detritus :

This is the decomposing bodies of plants and

/ or animals, plus the wastes creatures make. This forms food for bacteria and fungi in soils, and recycles important nutrients back into food chains through plants.

Diseases :

Most are caused by living creatures, and serve to reduce the number of creatures in a population.

Relationships with other creatures :

- predator / prey relationships
- competitive relationships
- symbiotic relationships

Competition...

Two or more creatures struggling over some resource that's in short supply (Ie; food, water, Habitats, mates, attention, dominance, territory.)

How do creatures compete ?

Ex's... Banging heads/Locking horns,

Biting/Snapping, Changing your looks (Displays: Colors, Dancing), Making yourself look bigger, Singing, Marking territory, etc.

There are 2 kinds of competition...

1. intraspecific: The creatures involved are of the same species. (Ie; Black bears fishing in a brook.
2. interspecific: The creatures involved come from different species' (Ie; Eagle and an osprey both diving after a fish.)

Symbiotic relationships...

Add to the interdependence of any ecosystem,

and increase its stability. The greater the diversity of life in an ecosystem, generally the more stable the ecosystem is.

Types of symbiosis : -commensalism
 -parasitism
 -parasitoidism
 -mutualism

All of the above relationships involve the interaction of organisms in some way that serves to change the size of the populations involved. Some populations benefit and thrive, while others are harmed and decrease.