The various biotic factors acting on plant

The living things in an ecosystem are called biotic factors. Living things include plants, animals, bacteria, fungi and more. The non living parts of an ecosystem are called abiotic factors. In an ecosystem some abiotic factors are **sunlight**, **temperature** atmospheric gases water and **soil**.

**Biotic components** are the living things that shape an [ecosystem](https://en.wikipedia.org/wiki/Ecosystem).

Biotic components usually include:

* Producers, i.e. [autotrophs](https://en.wikipedia.org/wiki/Autotroph): e.g. [plants](https://en.wikipedia.org/wiki/Plant), they convert the energy [from photosynthesis (the transfer of sunlight, water, and carbon dioxide into energy), or other sources such as hydrothermal vents] into food.
* Consumers, i.e. [heterotrophs](https://en.wikipedia.org/wiki/Heterotroph): e.g. animals, they depend upon producers (occasionally other consumers) for food.
* [Decomposers](https://en.wikipedia.org/wiki/Decomposer), i.e. [detritivores](https://en.wikipedia.org/wiki/Detritivore): e.g. [fungi](https://en.wikipedia.org/wiki/Fungi) and [bacteria](https://en.wikipedia.org/wiki/Bacteria), they break down chemicals from producers and consumers (usually dead) into simpler form which can be reused.

A **biotic factor** is any living component that affects the population of another [organism](https://en.wikipedia.org/wiki/Organism), or the environment. This includes [animals](https://en.wikipedia.org/wiki/Animal) that consume the organism, and the living [food](https://en.wikipedia.org/wiki/Food) that the organism consumes. Biotic factors also include human influence, pathogens and disease outbreaks. Each biotic factor needs energy to do work and food for proper growth.

All species are influenced by biotic factors in one way or another. For example, If the number of predators will increase, the whole food web will be affected (the population number of organisms that are lower in the food web will decrease). Similarly, when organisms have more food to eat, they will grow quicker and will be more likely to reproduce, so the population size will obviously increase. Pathogens and disease outbreaks, however, are most likely to cause a decrease in population size. Humans make the most sudden changes in an environment (e.g. building cities and factories, disposing of waste into the water). These changes are most likely to cause a decrease in the population of any [species](http://socratic.org/biology/the-elements-of-an-ecosystem/species), due to the sudden appearance of pollutants.

Biotic components are contrasted to [**abiotic components**](https://en.wikipedia.org/wiki/Abiotic_component)**,** which are non-living components that influence population size and the environment. Examples of abiotic factors are: [temperature](https://en.wikipedia.org/wiki/Temperature), [light](https://en.wikipedia.org/wiki/Light) intensity, [moisture](https://en.wikipedia.org/wiki/Moisture) and water levels, [air currents](https://en.wikipedia.org/wiki/Air_current), carbon dioxide levels and the pH of water and soil.

The factors mentioned above may either cause an increase or a decrease in population size, depending on the organism. For example, rainfall may encourage the growth of new plants, but too much of it may cause flooding, which may drastically decrease the population size.

**Biotic factors** refer to the living organisms, both macro- and micro-organisms, including the various ways in which they affect plant growth and development. These organisms are the living components of the environment which influence the manifestation of the genetic factor on phenotypic expression. Macroorganisms refer to the animals such as humans and other mammals, birds, insects, arachnids, molluscs, and plants while microorganisms include fungi, bacteria, virus and nematodes.

The effects of these living factors on plant expression may be advantageous or disadvantageous, depending on how they interact with the plant. These interactions include mutualism, herbivory, parasitism, and allelopathy.

Mutualism

Mutualism is a species-to-species interaction in which both the biotic factor and the plant are benefited by the relationship. Examples of beneficial influence on plant growth and development through mutualism are:

**(1)** The symbiotic relationship of the Rhizobium bacteria and leguminous plants. The rhizobia live in the roots of the legume and obtain their supply of energy from the host plant. In exchange, the rhizobia fix atmospheric nitrogen and supplies it to the plant in absorbable form. Nitrogen is an essential macronutrient for plant growth and development. It is a component of enzymes, DNA, and the chlorophyll molecule.

Grasses and legumes also develop a mutual association.

**(2)** Forest and fruit trees and other plants including annual crops associate with micorrhizal fungi which aid in the absorption of water and nutrients, such as phosphorus and zinc, from the soil.

**(3)** Birds, insects and bats serve as vectors of [pollination](http://www.cropsreview.com/types-of-pollination.html), the transfer of pollen from an anther to a stigma, which is a precondition for the development of fruits and seeds from [flowers](http://www.cropsreview.com/flower.html) in the angiosperms. As a reward, the pollinators feed on the nectar that the flower secretes or obtain some other benefit from the plant.

Herbivory

In herbivory, plant-eating organisms called **herbivore**, such as ruminant animals, rodents, insects, and molluscs feed on plant parts. Herbivores with significant deleterious effects on crop growth and yield are called **pest**. Damage caused by these biotic factors are varied such as death of the entire plant or organs, reduced root, stem, leaf or inflorescence mass, total defoliation, bores and holes on plant parts, and other marks of feeding.

It has been observed that continuous grazing by ruminant animals results to miniaturization of leaves and dwarf stature of [molave](http://www.cropsreview.com/molave.html) (*Vitex parviflora*) and other trees growing in pasture lands. Some insects are associated with plant diseases that may reduce crop yield or kill the entire plant. The aphids, mealy bugs, and scale insects are associated with the sooty mold.

To prevent damage from herbivores, plants have evolved *anti-herbivory* defenses including chemical and physical strategies. Various plants produce toxic compounds such as nicotine, morphine, caffeine, cyanogenic substances like atropine; mustard oils, terpenoids and phenylpropanes. Some plants produce high amounts of tannins and resins in leaves that prevent the digestion of food (Stiling 1999). Others have spines, as in cacti, and stinging hairs

Parasitism  
Parasitism is an interaction between two organisms in which one organism, called *parasite*, is benefited but causes harm to another, called *host*. The parasite steals its food from the host. Microorganisms such as fungi, bacteria and virus injure crops by causing diseases and are called **pathogens**.

Examples of **parasitic plants** are the dodder, mistletoe, Rafflesia, and some orchids.

**Allelopathy** refers to the beneficial or harmful effects of one **plant** on another **plant**, both crop and weed species, from the release of biochemicals, known as allelochemicals, from **plant** parts by leaching, root exudation, volatilization, residue decomposition, and other processes in both natural and agricultural systems ...

**Allelopathy** is a biological phenomenon by which an organism produces one or more [biochemicals](https://en.wikipedia.org/wiki/Biochemical) that influence the germination, growth, survival, and reproduction of other organisms. These biochemicals are known as **allelochemicals** and can have beneficial (positive allelopathy) or detrimental (negative allelopathy) effects on the target organisms and the community. Allelochemicals are a subset of [secondary metabolites](https://en.wikipedia.org/wiki/Secondary_metabolites),[[1]](https://en.wikipedia.org/wiki/Allelopathy#cite_note-Stamp-1) which are not required for metabolism (i.e. growth, development and reproduction) of the allelopathic organism. Allelochemicals with negative allelopathic effects are an important part of [plant defense against herbivory](https://en.wikipedia.org/wiki/Plant_defense_against_herbivory).[[1]](https://en.wikipedia.org/wiki/Allelopathy#cite_note-Stamp-1)[[2]](https://en.wikipedia.org/wiki/Allelopathy#cite_note-Fraenkel-2)