

4- Ecological factors

An **ecological factor** is any element of the environment (temperature, light, soil pH, predator...) capable of acting directly or indirectly on living beings (individual, species, community) at least during part of their development.

Thus, every living being must be considered within its environmental context which conditions its life, and the study of ecosystems requires knowing how these Ecological factors are at play.

Traditionally, we distinguish:

- **abiotic** factors such as climate, the chemical composition of a soil;
- **biotic** factors such as predation or parasitism...etc

4-1- Abiotic factors : These are climatic, topographical and edaphics

4.1.1 Climatic factors : climate plays a fundamental role in the distribution and the life of living beings.

It depends on many factors: temperature, rainfall, humidity, wind, light, atmospheric pressure, terrain, proximity to and distance from the sea.

a-Light

Light plays a crucial role in the unfolding of many processes fundamental biological factors. In higher plants, the intensity of light conditions **photosynthetic activity**, therefore growth, its duration, is linked the respective importance of day and night (**photoperiodism**), plays a role in the flowering phenomenon.

Thus, the geographical and situational distribution of plants is a function of their respective requirements with regard to this factor. According to the light intensity which

Suitable for their development, we distinguish light-loving species: **heliophilous** (example: Rosemary, Rockrose...), and shade-loving species: **sciaphile**

b- The temperature

Temperature, a fundamental factor, directly controls respiration, the photosynthesis... and essentially determines the distribution of species and communities due to its significant fluctuations, latitudinal, altitudinal and seasonal.

This factor of primary importance can be identified by its annual average $-T$ in $^{\circ}\text{C}$ - or the average of the coldest month - m in $^{\circ}\text{C}$ "the minimum" - or the warmest - M in $^{\circ}\text{C}$ "of the maximum" - or by the number of days without frost.

c-Humidity and rainfall

Water makes up 70 to 90% of the tissues of many species in a state of active life.

Water supply and loss reduction are problems

fundamental ecological and physiological needs. Depending on their water requirements, and

Therefore, based on their distribution in different environments, we can distinguish:

- Hygrophilous species that live in humid environments
- Mesophilic species with moderate water requirements that tolerate alternating dry and wet seasons;
- Xerophytic species that live in dry environments where water is scarce accentuated (desert species).

4-1-2-Edaphic factors

The soil, or soil cover, forms the loose surface layer that covers the bedrock. Its thickness varies from a few centimeters to a few meters. It is

The plant needs a support and a nutrient-rich environment.

The soil study is carried out based on observations made in the field, continued at laboratory analysis of samples taken.

The edaphic factor has a determining influence on the floristic composition of a forest, its regeneration capacity, the quality of the wood produced, and the longevity of species.

In principle, on rich soils, one finds mixed forests made up of several species and in which tree growth is high, the trunks have a good shape. On the other hand, pure forests are found on poor soils. made up of undemanding species (example: Aleppo pine forests).

4-1-2-1--Physical properties of the soil:

Forest species are demanding with regard to the physical properties of the soil.

a- Soil depth:

It's the thickness of soil that roots can penetrate without difficulty. In general the thickness of a forest floor varies between 0.15m and 2.5m.

Example :

- The white alder (*Alnus incana*) is content with very superficial soils (0.15 m of depth) and can reach a height of 10 to 15m.
- The Aleppo pine thrives in soils 0.60m deep
- However, the pedunculate oak requires soils exceeding 1 m in depth.

b- Porosity:

This is the proportion of empty space occupied by air or water. Good soil has a porosity of 50%. Soil with low porosity becomes suffocating. Soil with high porosity dries out. quickly because it is made up of a large proportion of coarse elements.

- Soil texture and structure play a very important role in the development and distribution of vegetation

c-pH:

Living organisms such as protozoa can tolerate variations in pH of 3.9 to 9.7 depending on the species: some are rather acidophilic while others are Basophils. Neutrophils are the most represented in nature.

4-1-2-2-The chemical properties of the soil

The various types of soil have very diverse chemical compositions. The elements...

Chlorides and calcium.

Saline soils, having high sodium chloride content, have a flora and a very particular fauna. The plants of saline soils are halophytes.

Depending on their preferences, plants are classified as calcicolous (species capable of withstanding high levels of limestone), and calcifuges (species that do not support only slight traces of calcium).

4-1-3-Topographical factors:

a- Altitude:

Altitude elevation affects certain climatic factors, according to the Seltzer study. (1946) in northern Algeria, every 100m of altitude, the minimum temperature m decreases by $0.4\text{ }^{\circ}\text{C}$ and the maximum temperature M decreases by $0.7\text{ }^{\circ}\text{C}$, rainfall increase by 40mm.

Indeed, at high altitudes, snow is more frequent and persistent, the Frost and fog become frequent and winds are more violent.

All these variations affect the length of the growing season and the composition In forest floristics, we talk about the vegetation zone (we will see this concept in the chapter 4).

b- The exhibition

It is defined by the orientation of a place along its steepest slope. Rainfall, Sunlight and wind are functions of exposure.

On a south-facing exposure, for example, the ground receives more solar radiation, Light, temperature and evaporation are higher, so the trees will have a slow growth and dense wood.

Facing north, light and heat are of low intensity, evaporation is

The soils are weak, they will be loose. Vegetation grows quickly and the wood is of good quality.
quality.