

# Water as an Enviromental Factor

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B-35 group

Water is a very important environmental factor in plant life, since all physiological processes occur with its participation.

The role of water in plant life is as follows:

Water plays an important role as a solvent, since minerals enter the plant and move in it in the form of solutions.

Water is involved in the synthesis of organic substances.

The amount of water entering the plant determines the appearance of the plant, its vital state;

Water affects the spread of plants on Earth.

For many plants, water is a habitat.

Water affects plants from the outside in various forms: in the form of rain, fog, artificial irrigation, groundwater. Get plants water from the soil and atmosphere. But atmospheric moisture in most cases plays an indirect role, reducing the evaporation of water from the soil.

Only a few plants are able to absorb water from the atmosphere: mosses, lichens, epiphytes growing in the tropics on the trunks of trees. In deserts dew is of great importance in plant life, which is the main source of water in summer.

Rain, the main source of water entering the soil, and soil moisture is of paramount importance in the life of plants. Since the moisture regime in different parts of the earth's surface is not the same, this leads to the appearance of various ecological groups of plants adapted to a particular water regime.



# Hydrophytes

Hydrophytes - aquatic flowering plants. They have developed various adaptations to life in water:

- parts of plants, immersed in water and towering above it, differ in structure and form;
- there are no mechanical fabrics;
- air spaces in stalks are well developed;
- cuticle poorly developed, water can be absorbed by the entire surface of the organs;
- root systems are absent or poorly developed;
- leaf mesophyll not differentiated into column and spongy parenchyma



Водокрас лягушачий (*Hydrocharis morsus ranae*) — hydrophyte

The following ecological groups of plants are distinguished:

- **hydrophytes**
- **hygrophytes**
- **mesophytes**
- **xerophytes.**



**Hydrophytes** refer to water-bearing plants. Some of them are completely and others are half-drowned. They either hang on the bottom of the water or swim in the water. Their outer surface is large, with thinner leaves, no cuticles, large intercellular cavities, air filled, tube badly mature.

Hygrophyte refers to plants that grow in high humidity. They do not have adaptability to limit the evaporation of water. The epidermis cell membranes and cuticles are thin, and the crumpled apparatus is large, loose and loose cells that are united on the surface of the leaf surface. Depending on the light, the ecological group is a shadow-loving plant. The plants belonging to this group grow throughout the shade. These are mostly perennial herbaceous plants that form the lower ranges of the forest. Their stitches are thin, long, tissue defective, and chlorophyll is less. At the level of the hinge of one plant divides the luminous and shady-like leaves. Most labels of light-bearing leaves correspond to xerophytes. Because in the open day, the plants are emitted lightly at all times and heated, resulting in water evaporation. Symptoms of the leaves in the shaded area are often characteristic of hygrophyte.

# Белокрыльник болотный (*Calla palustris*) — Hygrophyte





## Xerophytes

Xerophytes are habitat plants with insufficient moisture. They have a variety of devices that increase their drought tolerance. Xerophytes are able to drastically reduce transpiration in the dry period, have adaptations for extracting water when it is deficient in the soil, and can also create water reserves during a long break in the water supply. A decrease in the intensity of transpiration is achieved by reducing the leaf surface, developing a thick layer of cuticle or wax coating, densely pubescent shoots, and stomata deepening into the mesophyll (Fig. 58). With the extraction of water from the soil is associated with a powerful development of the root system inland and in the horizontal direction. The water supply may be contained in the leaf tissue (in aloe, stonecrop) or the stem (cacti).



*Лапчатка серебристая*  
(*Potentilla argentea*) —  
Xerophytes



*Очиток едкий (Sedum acre) —*  
*succulent*



**Mesophytes** is a word with Greek roots (from mesos - middle, intermediate). The plants of this ecological group feel well in conditions of moisture, but not its overabundance. They fade easily. These include most cereals and legumes: hard, soft wheat, oats and maize, peas and soybeans. Even in the examples: beets and hemp, most fruits (except almonds and grapes), many vegetables (cabbage, carrots, tomatoes and others)

The mesophytes of meadows, steppes and other habitats well illuminated by the sun have pronounced features of light-loving plants (heliophytes); mesophytes of the lower tier of shade-tolerant forests (sciophytes).

The mesophytes also include most of the ephemera - annual plants that live in semi-desert and desert zones and complete their life cycle in a very short period of time (2-4 months), that is, during the winter-spring season, when enough precipitation falls.

The overwhelming majority of agricultural plants (sweet corn, wheat) are mesophytes.



important cereals

cereals



**Ephemera** - dry steppes and desert plants. They are adapted to survive in such situations, only in short periods of time when they have moisture in the environment, carrying out their lifestyle. At the beginning of the drought, ephemeres complete their life cycle and remain underground under the seed or onion and the roots, waiting for the next wet season of the year.

Ephemeras are an ecological group of herbaceous annual plants with a very short growing season (some complete their full development cycle in just a few weeks). These are usually very small plants of deserts and semi-deserts or steppes. They intensively develop, bloom and give fruit during the wet period (spring or autumn) and die off completely during the summer drought.



**Проломник северный** (*Androsace septentrionalis*) - a modest rosette plant with an umbrella of small white flowers, towering on numerous flowering stems, - ephemeral of northern forests





**Thanks for attention!**