

**METABOLISM, GROWTH AND DEVELOPMENT OF PLANTS UNDER THE
INFLUENCE OF HIGH TEMPERATURES***Sh.A.Tursunova**Kokand State University**G.Sh. Abdurahmonova, M.M.Olimjonova**Biology student*

Resistance to high temperatures in many cases depends on the period of exposure and its absolute value. Most agricultural crops begin to suffer when the ambient air temperature reaches 35-40 °C. At this and higher temperatures, a number of physiological processes occurring in the plant cease, and when it approaches 50 °C, the cell cytoplasm liquefies and dies. An increase in temperature above the optimum temperature for a plant leads to partial or complete denaturation of proteins in the cell. This leads to the destruction of the protein-lipid complex of the plasmolemma and a negative effect on the functioning of other membranes in the cell. The resulting result is a violation of the osmotic properties of the cell. Many functions of the cell are disrupted, and the rate of various physiological processes slows down. For example, at a temperature of 20 °C, mitosis occurs in all plant cells at the rate of division, but when the air temperature rises to 38 °C, mitosis occurs in one in seven cells, and when the temperature reaches 42 °C, only one in 513 dividing cells divides. The effect of high temperature on the protein-lipid complex in cells and tissues is seen in the following: at a temperature of 22 °C, nuclear fission does not occur at all. When the temperature rises to 38 °C, in 5.3% of the studied cells, and when it reaches 50 °C, practically all nuclei disintegrate. When the maximum temperature for a plant occurs, the consumption of organic substances in the process of respiration exceeds their formation. Carbohydrates in the plant decrease and it begins to decompose. This situation is clearly manifested in wheat, potatoes and other home crops grown in temperate climates. "Draining" the plant from the ground increases its susceptibility to fungal diseases. High temperatures affecting plants primarily have a stronger negative effect on photosynthesis than on respiratory processes. A number of reactions that carry out photosynthesis are somewhat more sensitive to high air temperatures than on respiratory processes. At temperatures below the optimum, plant growth and the process of photosynthesis practically stop photoassimilation. This process is associated with disturbances in the activity of enzymes. At this time, gas exchange during respiration increases, its energy efficiency decreases, and protoplasm is poisoned by decomposition products (ammonia). All these processes lead to the plant "exhausting" and straining. Signs of "burning" appear in some parts of the leaf. In plants that are genetically adapted to the effects of high temperatures, compounds are formed that bind substances such as excess ammonia, which in such cases cause poisoning. In the cells of plants directly exposed to high temperatures, proteins are synthesized that can withstand stress. Plants in open areas are more resistant to the effects of high temperatures than those in the shade. Even a short exposure to slightly higher temperatures (43-45 °C) can have a disastrous effect on the plant, causing it to wither. Preventing overheating of the plant is

achieved by providing it with irrigation water, which increases the transpiration process through the leaves. As a result, water exchange in the plant increases, which cools it. As a result of transpiration through the leaves, the temperature in the plant sometimes drops by 10–15 °C. Plants with closed leaf surfaces and wilting quickly dry out faster than those with sufficient water supply. The plant tolerates dry heat more easily than humid heat. When the air humidity is high and the temperature is also quite high, the control of leaf temperature by transpiration is limited.

An increase in air temperature is especially dangerous for the plant when its illumination is strong. To reduce the level of exposure to sunlight, the plant positions its leaves with their edges facing the light. This position is called the erectoid state. When sunlight strongly affects the leaf, the movement of chloroplasts in the cell accelerates, thereby switching to a self-protective state. The plant protects itself from the strong influence of sunlight by forming the following morphological and physiological changes:

1. It rolls up its leaves and closes them.
2. It forms soft hairs or scales on the surface of the leaf to protect the internal tissues from overheating.
3. The phloem and cambium become thinner to protect them.
4. The cuticle thickens in the bark of the stem.
5. Carbohydrates increase in the cytoplasm of the cell, reducing the amount of water.

When a plant is dehydrated and thirsty in the field, high temperatures have a disastrous effect on it. When the leaves or the entire body of the plant withers, in addition to profound changes in the processes of photosynthesis and respiration, a number of physiological processes are also disrupted. The tolerance of a plant to high temperatures of atmospheric air depends on its ontogenesis - the periods of growth and development. The greatest destructive effect of high temperatures occurs during the early stages of growth and development. Young, actively developing tissues are less tolerant to high temperatures than old, senile, and dormant tissues. Different parts of the plant also have different tolerances to high temperatures: the underground part is less tolerant, while the stems, branches, and shoots are somewhat more tolerant.

References:

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