BIOECOLOGICAL PROPERTIES OF CORN

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Corn grows well, develops, and yields high yields when environmental factors are suitable for it. Therefore, it is important to correctly determine and adequately meet the environmental requirements of corn.Drought and soil salinity pose serious challenges to global agricultural production, posing a serious threat to food security and livelihoods.[1,2,3].The ongoing impact of climate change is leading to increased threats through more frequent occurrences of extreme weather events, such as long-term reductions in precipitation and increased soil salinity, among others [4.5].

Negative environmental stresses such as the above are increasingly affecting crop growth and productivity. Therefore, extensive research is urgently needed to address these important issues. Maize (Zea mays L.), a staple crop in many regions of the world, is particularly susceptible to problems related to water scarcity and salt stress. The world population is expected to reach 9.8 billion by 2050, leading to an increase in demand for food, including maize.[6,7].

Maize has higher yields than wheat (Triticum aestivum L.) and rice (Oryza saliva L.), but higher yields are accompanied by higher water requirements.[8].Management aimed at maximizing water use efficiency is an important tool for properly organizing irrigation work and managing water resources in water-scarce arable lands.[9].This approach strategically allocates limited water resources to critical stages of crop growth and promotes rapid growth of young leaves to maximize light[10].

A healthy corn seed germinates when the soil temperature, air and humidity are sufficient. The seed begins to germinate when it absorbs 44-45% of its own mass of water. First, a physical process occurs (absorption), the seed swells, increases in size. Later, after absorbing 70-80% of the water it needs, biochemical processes begin, the needs and complex nutrients in the seed endosperm (protein, oils, starch, etc.) are broken down by special enzymes and converted to a simple state. Seed germination begins at 6-8 ℃, and accelerates somewhat at 10-12 ℃. At temperatures above 8 ℃, the seed germinates. The optimal temperature for normal germination and the formation of a seedling is 18-20 ℃, the maximum temperature is 30 ℃.

When the 10 cm layer of soil is moist, airy, and the temperature is 10-12 °C, corn seeds begin to germinate optimally. Usually, first, a single root sprout emerges from the seed sprout, then the shoot begins to grow. The shoot is covered with a special cap. The cap is the first bud leaf of the corn, the leaf of which has not developed, only the leaf sheath has been preserved. When the grass is formed, young green leaves appear. In some cases, the color of the young leaf is white or yellow. This indicates that the planted seed is not healthy, is damaged by fungi, or lacks microelements. Later, plants with pale leaves do not develop and die. This leads to thinning of the plant. Good seeds are sown in areas where such plants are common.

The germination rate of corn seeds depends on the depth of planting, the moisture, heat, and air in the soil. Sowing corn seeds shallowly (6-7 cm) in the spring and deeper (10-12 cm) in the summer gives good results. The germination of the seed is also affected by air temperature. At a depth of 10 cm of soil, the temperature should be 14-15oSWhen the seed is planted in non-saline soil, it will germinate after 4-5 days, and in saline soil - after 6-8 days. This is because the seed is planted not in pure water, but in the soil solution, which contains various salts and other substances, which slightly hinder the germination of the seed. Seed germination is affected not by the chemical composition of the salts, but by the osmotic pressure they create. That is why seeds planted in saline soil germinate 2 days later than seeds planted in non-saline soil.

Soil density and planting method also affect the germination of corn seeds to some extent. As soil density increases, the movement of water through the capillary tubes in the soil accelerates. The growth and development of corn is divided into several phases: ear formation, ear formation, ear flowering, milky, milky-wax, waxy and full maturity of the grain, depending on the characteristics of the long or short phase intervals, weather conditions and cultivation technology. The corn plant grows very slowly from the moment it emerges from the ground until it forms the first stem joint above the ground, that is, for 30-35 days. This is considered its biological feature. After the formation of the first above-ground joint (after 30-35 days), the corn plant grows faster and reaches the highest growth rate in the ear formation phase. At this time, the stem grows by 12-15 cm per day. When the flowers of the ear open (lasts 3-5 days), the stem stops growing. The flowers of the cornflower and the sorghum open best in the morning. After flowering, the sorghum buds wither. For the plant to bloom and set seed normally, the air humidity must be high. To do this, the corn should be watered frequently during the flowering period. This reduces air movement and increases humidity. All this improves the pollination process.

After 15-20 days after the flowers of the pods are formed, the grains reach a milky state, that is, the inside of the future grain is filled with a milky white liquid that is easily crushed. After 35-45 days, the waxy maturity period of the grain begins. The swollen grain hardens in 5-10 days and enters the full maturity period. During this period, the leaves of the plant and the pod

shell turn yellow, and the plant begins to dry out. The stems and leaves of some hybrids and varieties remain green during this period.

During full maturity, the grain evaporates excess moisture and finally shrinks slightly. This facilitates the process of crushing the grain in the cobs. The corn plant accumulates 75% of the organic matter it absorbs during the entire growing season within 10 days before flowering and 20 days after flowering, that is, within a month. Therefore, during the flowering and budding periods of corn, insufficient or excessive moisture in the soil and a lack of nutrients impair the budding process and lead to incomplete grains in the cobs. The highest green corn yield is during the milky ripeness period, and the dry matter yield is at the end of the waxy ripeness phase. The growing season of corn can be 75-180 days or more, depending on the variety. Depending on the growing season, corn plants are divided into early maturing (980-90 days), mid-maturing (100-115 days), late maturing (130-150 days), and very late maturing (more than 150 days) groups.

Corn is a thermophilic plant. Its seeds germinate at 8-10 ℃. 10-12 ℃atproduces grass. If planted too early in very wet and cold soil, the seeds will rot and the bush will become sparse. 20-27 ℃ is considered the most favorable temperature for plant growth. If the temperature is higher than 30-35 ℃ during the flowering phase, the pollen loses its pollination properties. As a result, the sow will have sparse grains. Cold temperatures of 2-3 ℃ damage the grass, and in autumn - the leaves. Corn is more tolerant to spring frosts than to autumn frosts.

At a temperature of 3-4 ℃, the mature corn plant is frost-bitten, but the immature plants of the sown corn are severely damaged, lie down, and the nutritional value of the green mass is also sharply reduced. For corn, a temperature above 10 ℃ is considered effective, if the air gets colder than this, the plant practically stops growing and developing. Thus, the biologically useful temperature for the corn plant was calculated to be 1800-2000 ℃ for early-ripening varieties, and 2300-2600 ℃ for medium-ripening and late-ripening varieties.

Corn is a light-loving short-day plant. If the day length is more than 12-14 hours, its growing season is prolonged. Corn requires good lighting, especially when it is young. If it is planted too thickly, weeds will overwhelm it, and the yield of the crop will decrease sharply. The light period of corn, depending on the variety and hybrid, lasts 30-40 days. In the north, the light period is prolonged. In the south, the opposite is true. In our conditions, the light period of corn planted in spring passes more slowly than that of corn planted in summer. When the light duration is 9-10 hours, corn blooms quickly. When it exceeds 12-14 hours, its growing season is significantly prolonged. It requires strong light, especially in the early stages.

For corn to flower and set grain, the light intensity should be at least 1400-1800 lux. When corn is planted thickly, the middle, especially the lower leaves of the plant, do not receive enough light. The net productivity of photosynthesis decreases by 15-30%. When corn does not have enough light, the formation of fruit bodies is delayed, the flowering of paternal and

maternal inflorescences is prolonged, and the number of grainless plants in the field increases. When conditions are favorable for the growth and development of corn, a leaf area of 40-50 thousand m2 is sufficient to obtain high yields. When the leaf area increases due to an increase in plant thickness, the light regime deteriorates and the yield decreases.

The productivity of corn depends on the rapid formation of leaves, their total surface area and photosynthetic activity. Because 95.5% of the dry mass of organic matter produced in a plant is primarily formed in the leaves. Temperature has a certain effect on the course of the photosynthesis process. When there is sufficient moisture, the photosynthesis process proceeds rapidly at 23-27 °C. Then, with an increase in temperature, this process slows down. When the temperature reaches 45 °C, photosynthesis stops. When the light is strong and high, the photosynthesis process in corn plants occurs even at 4.5-9 °C. The rapid course of photosynthesis in corn coincides with its rapid growth period.

As can be seen from the above data, the photosynthetic activity of corn depends on several factors, including climate, soil conditions, temperature, moisture, nutrients, seedling thickness, and root activity. Therefore, by creating adequate conditions for the growth and development of corn, its photosynthetic activity can be significantly improved, thereby increasing its productivity.

During our experiments, in laboratory conditions,The effect of soil moisture and salinity levels on the initial growth and morphophysiological characteristics of the varieties Uzbekistan-601, Uzbekistan-100, Uzbekistan-300, Kelajak-100, Esdalik-80 was studied. In this study, seed germination, plant height, root length and volume were determined in all varieties in the control and experimental variants. As a result of decreasing soil moisture and increasing salinity, changes were observed in the values of the above-identified indicators. It was noted that such changes vary depending on the biological and varietal characteristics of the varieties. Corn seeds require a lot of oxygen during germination. To get a high yield from this plant, the soil must contain at least 18-20% oxygen during its growth period. When the oxygen in the soil drops to 10%, the roots of corn grow slowly, and when it drops to 5%, they do not grow at all. In this case, the plant's absorption of water and nutrients, and the metabolic processes in the roots and stems are disrupted. The ability of the roots to absorb water depends on their respiratory energy. Aerobic respiration is the source of energy for the root's absorption process. Corn can grow on all soils that can be sown. Saline and marshy soils are not suitable for corn cultivation. In such lands, it is necessary to improve the land reclamation condition before planting corn, that is, to wash away the salt and drain excess water. Corn does not grow well on cold soils with light mechanical composition (loam) and heavy mechanical composition, which poorly permeable to water. The mechanical composition of such soils should be improved by applying organic fertilizers.

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