



THE INFLUENCE OF ABIOTIC FACTORS ON THE GROWTH AND DEVELOPMENT OF CUCURBIT CROPS

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Annotation. Today, due to the increase in the population of the world, the demand for food products, including cucurbit crops, is increasing. They are consumed by majority of people, because of its nutritional, tasty and medicinal properties. This article talks about the conditions and abiotic factors that should be paid attention to in order to obtain a high-quality and abundant harvest from cucurbit crops in Khorezm region.

Key words: Minimum, optimal, maximum, statistics, pumpkin, melon, watermelon, temperature, light, humidity, transpiration.

Since the soil and climate conditions of Uzbekistan are favorable for the cultivation of these crops, they have been cultivated since ancient times and are still being cultivated on a large scale. In particular, according to the data of the State Statistics Committee, in January-September 2021, a total of 1.4 million tons of cucurbit crops were grown in the republic, and by 2022, this figure reached 1.6 million tons.

Fruit crops, in particular, melons, watermelons, and pumpkins, are among the products included in the food ration that people need to eat every day. They are close to fruit crops in terms of contained vitamins according to the amount of carotene, the pumpkin plant is several times higher to the red carrot. In medicine, the fruit of that crops are recognized as an easily digestible dietetic food product for diseases of the gastrointestinal tract.

The staff of the Medical Institute of the Academy of Sciences of the Republic of Uzbekistan recommends that the population of our country consume 98 kg of cucurbits per year, and this amount corresponds to 54.5 kg of melon, 36.5 kg of watermelon and 7 kg of pumpkin.

Melon fruit contains 11-20% dry matter, of which is 5-18% sugar. In addition, it contains 0.5% protein, 0.6-0.8% fiber, 0.2% oil, 0.6% ash, a large amount of mineral salts and vitamins. It is also rich in vitamin C, carotene, PP and potassium, calcium, phosphorus, sulfur, iron, cobalt salts. Folic acid in melon is necessary for the production of blood in the human body. Melon fruit is used in the treatment of bronchitis, tuberculosis, rheumatism, heart and kidney diseases [4,5].

Watermelon fruit contains an average of 10-12% dry matter, including 6-11% sugar, 0.5% protein, 0.5% fiber, 0.1% oil, 0.3% ash. It is rich in vitamin C, A, B₁, B₂, PP, another vitamins and iron, calcium, potassium and sulfur salts. Watermelon fruits are used in the treatment of diabetes, cardiovascular diseases, atherosclerosis, anemia, kidney the diseases.

Pumpkin fruit contains 10-15% dry matter, of which is 4-11% sugar. Furthermore, it contains 0.7% fiber, 0.5% protein, 0.2% oil, 0.6% ash. Mineral salts and vitamins are present

in large quantities. Pumpkin fruits are used in the treatment of atherosclerosis, liver, kidney, stomach, heart diseases, and also, a decoction of the seeds has worm-fighting properties.

Also, the seeds of cucurbit crops contain a large amount of medicinal oils, in particular, the seeds of melons and watermelons contain up to 31-56% of oils. 60-100 kg of oil can be obtained from a hectare of melon and watermelon fields, 360-400 kg of oil can be obtained from a hectare of pumpkin crops, and 600-700 kg of oil from some varieties. Pumpkin oil combines several healing properties, it is mainly used for effective treatment of skin diseases, diathesis, dermatitis, eczema and even burns. Consumption of watermelon oil has been found to help in overcoming the prostate and in the treatment of urinary tract inflammation.

Cucurbit crops are widely used as fodder in animal husbandry and, at the same time, they are considered good predecessors for cereals, cotton, vegetables and hay crops [2].

All of the cucurbit crops are heat-loving because they originated from the south, including melons from Central and Asia Minor, watermelons from Africa, and pumpkins from Central and South America. Their growth and development, speed of ripening and productivity depend on soil and air temperature, humidity, light and spectrum composition, mineral nutrition and soil conditions. However, the response of each cucurbit to the above external environmental factors, that is, its demand, durability and susceptibility is different. In order to study the effect of abiotic factors on the growth and development of cucurbit crops, we conducted field experiments in the experimental area of UrSU, selecting melon, watermelon and pumpkin varieties from that crops in Khorezm (Table 1).

Humidity and temperature limits necessary for the germination and normal growth of the main cucurbit crops

Table 1.

Temperature borders Crops	Minimum temperature (t°C)	Optimum temperature (t°C)	Maximum temperature (t°C)	Soil moisture, LFMC, %
Melon	14-16	25-30	42	65-70
Watermelon	15-17	24-27	43	70-80
Pumpkin	9-11	20-22	39	80

Among cucurbit crops, watermelon and melon are demanding on soil and air temperature. Pumpkin is cold resistant compared to watermelon and melon. Based on the table above, watermelon and melon seeds begin to germinate when the soil temperature reaches 14-16 degrees, and pumpkin seeds 9-10 degrees. when the temperature drops below that, the seeds rot in the soil, sparse germination is observed. That is why it is not recommended to plant polys crops too early, that is, before the soil temperature reaches a comfortable level.

The favorable temperature for seed germination is 20°C. At this temperature, the plant starts to appear on the surface of the soil in 5-6 days after sowing. The decrease in temperature delays germination of plants. [1] [6]

A favorable temperature for the growth and development of watermelon and melon seedlings is 25-30°C, pumpkin can grow well at a much lower temperature (20°C). When the



temperature drops to 12-15°C, the flowers of the crops fall, they stop growing and slowly wither. Air temperature at 0°C or -1°C will completely kill the lawns of polys crops, or if it drops to -3-5°C, adult plants will also be affected.

The experiments carried out in the soil and climatic conditions of Uzbekistan show that even if the air temperature rises too much, it will have a negative effect on the cucurbit crops. Protein in watermelon leaves coagulates at 60-62°C when grown under irrigated conditions, and 64-69°C when grown in dry conditions. Protein in melon leaves coagulates at 60°C, in watermelon leaves at 58°C, protein in pumpkin leaves at 65-70°C. However, the transpiration process in watermelon is extremely rapid, so the plant cools. This increases its heat resistance to a certain extent [1, 6, 7].

Cucurbit crops are short day plants. They grow and develop the fastest in 10-12 hours of light. Cucurbit crops, especially melons and watermelons, are very light-loving plants. In the shade, they do not develop well, and as a result, their productivity decreases. Therefore, it is not recommended to plant them together with shade plants or between rows of orchards.

All cucurbits are drought resistant crops. Their drought tolerance depends not only on their low water spending, but also on the amount of water they absorb from the soil through their strong roots. In addition, the use of water in the young stems and fruits of polys crops to maintain their vitality in times of water scarcity also increases drought resistance.

Watermelon and melon are more drought resistant than pumpkin. Because the leaf surface of pumpkin is large, it evaporates a lot of water, especially during the period of strong growth. The coefficient of transpiration is very high in cucurbit crops, especially pumpkin - 834, melon - 621 and watermelon - 600.

In the conditions of Uzbekistan, soil moisture is one of the important factors for obtaining a high yield from cucurbit crops. For example, for melon varieties, soil moisture should not be less than 65-70 percent of the field moisture capacity, for watermelon varieties, it should be 70-80 percent, and for pumpkins, it should not be less than 80 percent [1,8].

Cucurbit crops are not very demanding on the type of soil; they can be grown even on soils that are not suitable for growing some other crops. However, all of them grow well on fertile soils with light mechanical composition and give a high yield. Meadow soils and newly reclaimed lands of Uzbekistan are suitable for planting that crops. It should also be said that cucurbit crops are moderately resistant to soil salinity. An excess of salts damages the roots, the plants become small, and the yield decreases. Color of damaged plants become darker. The edges of the leaves burn under the influence of salts [1,8].

Today, experts in the field are carrying out many effective and visible research works in Uzbekistan to further increase the yield potential of polys crops, to provide the population with polys products as long as possible throughout the year. In the future, as a worthy continuation of such scientific research, it is an important issue of creating new varieties cucurbit crops with high productivity indicators, early ripening and stored for a long time and more resistant to external environmental factors.

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