

Description of Soil and the Climatic Conditions of the Experimental Place in Tashkent Region of Blueberry Plant

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Annotation: Common blueberry is included among plants that are not so demanding on soil properties. However, sandy soils where water remains in the soil or, on the contrary, quickly absorbs water, are not suitable for blueberries. In addition, blueberries can only grow in an acidic soil pH environment. These and other soil factors should be taken into account when growing blueberries.

Keywords: Blueberries, soil, climate, variety, harvest, laboratory, seedlings, fruits, biochemical composition.

INTRODUCTION

Blueberry is one of the most valuable berries that is becoming very popular worldwide. This is because of its incomparable taste, vitamin richness, and healing properties. Today, the total production volume of this berry fruit plant is more than 1 million tons. According to world experts, its area will increase further in the next 2 years, and its export potential is predicted to reach nearly 3 billion dollars by 2025. The leading countries are the USA, Canada, and Chile, and these countries account for 70% of the world's total production of pigeon peas. In recent years, the cultivation of pigeons has been increasing in China, France, the CIS, South Africa, and other countries.

Theoretical research and main field experiments on the topic of the developed research were carried out in 2020-2022 at the Department of Fruit and Viticulture of Tashkent State

Agrarian University and in the experimental field of the “Educational and Scientific Experiment Department” under Tashkent State Agrarian University. The center is located in Kibrai district of Tashkent region. Therefore, information on climatic conditions was given in the region.

The Tashkent region, where the main field experiments were conducted, is located in the North-Eastern part of the Republic of Uzbekistan, which includes the Western Tien-Shan mountains and highlands, the Angren and Chirchik river valleys. The territory of this province is located at 68⁰39' north latitude and 71⁰2' east longitude of 42⁰17' and 40⁰15' northern hemisphere. The borders of the region cover the territory of the Republic of Kazakhstan in the north and northwest, the Republic of Kyrgyzstan in the east and southeast, the Republic of Tajikistan in the south, and the Syrdarya region of the republic in the west.

The “Educational-Scientific Experimental Department” of the Tashkent State Agrarian University, where the main field experiments were conducted, is located in the upper terrace of the Chirchik River. The height of the area where the center is located is 486 m above sea level. The seepage waters of the central experimental fields are located at a depth of 5-8 m and are weakly mineralized. Drainage of underground water is discharged into the Salar River.

Light and temperature are one of the important ecological factors for blueberry. The average duration of sunlight in the central region is 2893 hours per year. In the summer season, it reaches 360-395 hours per month, and in winter, due to the shortening of the day, it averages 105-130 hours. The amplitude of change of the average overnight temperature reaches 7-15 in January and 25-30 in July.

The coldest months in the field experiments are December, January and February. During this period, the lowest temperature was observed to decrease to 0.3°C on average. In some years, the temperature can drop to -25-30°C. Snowy days mainly fall in December-February season. The snow cover is not very thick and stable, its average thickness often does not exceed 5-10 cm.

Spring is early, from the end of February to the beginning of March. During this period, the average monthly temperature increased from 6.7 to 12.5 °C. In the first month of spring, i.e., in March, frequent return of frosts and late spring (end of March - beginning of April) frosts are also observed.

Late spring frosts can be observed in the last ten days of March, and the first autumn frosts in the second ten days of October. The average duration of the frost-free period was 217-235 days in the years of the study. The duration of the period when the overnight average temperature was higher than 10 °C was 212-225 days, and the duration of the period when the temperature was higher than 15 °C was 169-175 days.

During the research period, summer was characterized by hot, dry and continuous climate of the region. In the hottest months - June, July and August, the average temperature was 26.5-30.9 °C. The period when the average monthly temperature was above 10 °C lasted from the end of March to April and lasted until October. From November onwards, a decrease in temperature was observed and the average monthly temperature was below 10 °C (see Table 1).

The data in Table 1 below shows that although the average monthly temperature in July, the hottest month, was 29.3-30.9 °C, it was noted that the daytime temperature sometimes rose to 35 and even 41-45 C.

Table-1

Average monthly temperature indicators of the Tashkent region in the years of the study, °C (2020-2022 years)

Year	Months												Annual average
	jan.	feb.	march	apr.	may	june	july	aug.	sep.	okt.	nov.	dec.	
2020	2,3	7,1	12,5	16,4	22,8	27,2	29,3	26,8	20,3	13,1	4,8	0,3	15,2
2021	2,8	8,6	9,9	16,6	24,6	29,0	30,9	28,7	23,5	12,2	6,8	7,2	16,7
2022	5,2	6,7	9,0	21,0	22,1	28,0	30,1	26,5	23,8	15,0	9,0	1,1	16,5

The dynamics of the average monthly temperature during the last three years of the climate of the region where the experiment was carried out is presented in Figure 1 below.

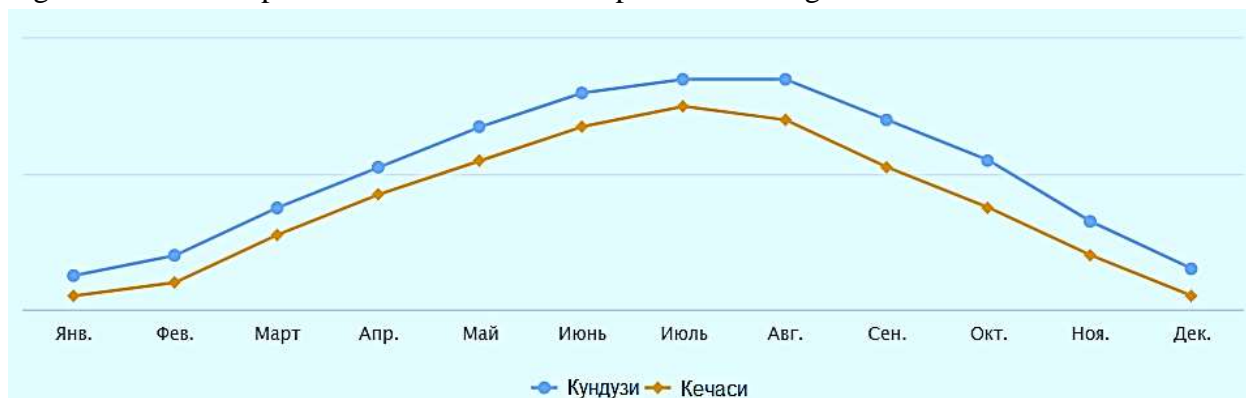


Figure 1. The dynamics of changes in the average monthly temperature during the night and day in the last three years in the Tashkent region, 2020-2022

The air of the experimental field is relatively dry. The relative humidity of the air fluctuated within the range of 40-75% during the year. However, during hot daytime hours in July, it sometimes fell below 30%, and in November, when rainfall was abundant, it was observed to exceed 85-90%.

In the experimental field, the most precipitation was observed in March and November. During this period, the maximum amount of precipitation was 101-179 mm monthly average. The lowest amount of atmospheric precipitation mainly fell on summer months and September, the first month of autumn. During this period, the average monthly precipitation did not exceed 0.0-22 mm. The amount of precipitation gradually increased from October. From the second half of the month, steady rain began to fall. From the second half of November, a lot of precipitation is observed, and it averaged 1015 mm. The maximum amount of atmospheric precipitation reached 179 mm in March (see Table 2).

Table 2

Average monthly precipitation of Tashkent region in the years of the study, mm (2020-2022 years)

Year	Months												Annual average
	jan.	feb.	march	apr.	may	june	july	aug.	sep.	okt.	nov.	dec.	
2020	31	96	24	82	50	4	7	18	0.8	0.0	54	20	387
2021	20	37	91	32	12	0.1	0.5	0.1	0.0	30	24	42	288
2022	50	54	179	9	45	22	0.0	0.2	0.0	52	101	24	535

The data in the above table shows that the gradual decrease in the amount of precipitation started from the first half of April. Since March, the amount of atmospheric precipitation has decreased sharply, and in 2021 it did not even exceed 12 mm. The tabular data shows that the precipitation was mostly from the end of autumn to the middle of spring.

During the vegetation period, when plants grow rapidly, it is seen to be extremely low (see

Fig. 2).

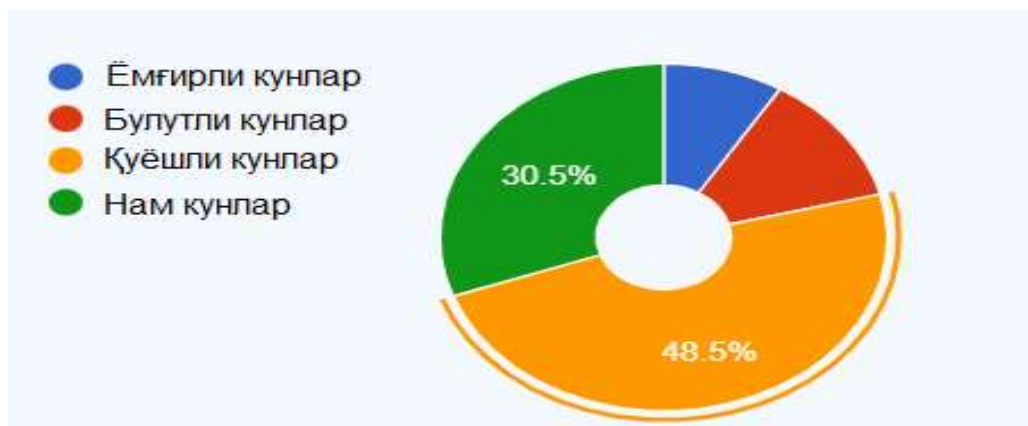


Figure 2. Probability of annual rainfall in Tashkent region, 2020-2022 years.

The information in the above picture shows that artificial irrigation is extremely necessary for the successful cultivation of this moisture-loving blueberry plant in the conditions of Uzbekistan. Because the period during which atmospheric precipitation is likely to fall does not exceed 10% during the year.

Wind speed has a negative effect in most cases when growing seedlings of fruit plants. Because the root system of seedlings transplanted to the main place is not yet well established in the soil, and it is very important to keep the soil moist during this period. Wind speed increases transpiration in the leaves to a certain extent, and also causes rapid evaporation of moisture from the soil.

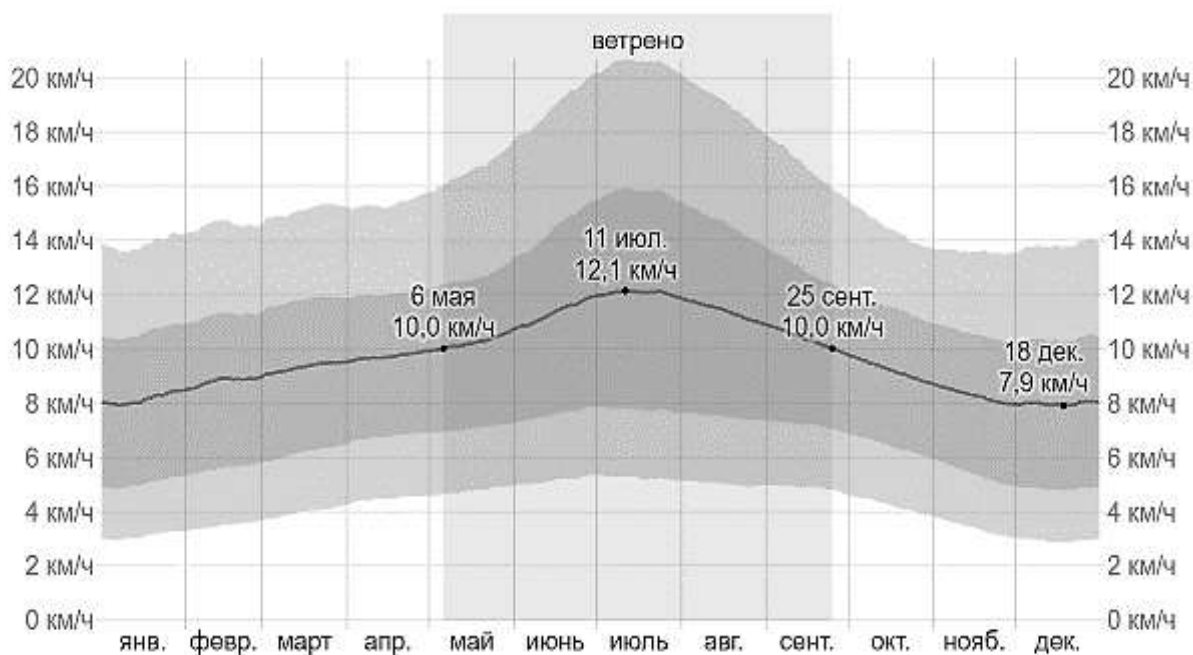


Figure 3. Average monthly wind speed indicators of Tashkent region in the years of research, km/h (2020-2022 year)

Data from the above image shows that in the hottest summer months - July, the wind speed reached up to 12 km per hour. This caused rapid drying of the soil during this period and frequent watering of blueberry seedlings.

Soil. Common blueberry is included among plants that are not so demanding on soil properties. However, sandy soils where water remains in the soil or, on the contrary, quickly absorbs water, are not suitable for blueberries. In addition, blueberries can only grow in an acidic

soil pH environment. These and other soil factors should be taken into account when growing blueberries.

Most of the soils of Uzbekistan have an alkaline pH environment, which is not suitable for growing blueberries. For this reason, it is possible to cultivate blueberries in our country only in systems with trays or trenches filled with a special sour soil substrate. Taking these factors into account, we provide information below about the optimal soil substrate for blueberry.



The main requirement of the blueberry for the soil is the presence of a good ditch that protects the plants from standing water. The proximity of underground water does not pose a threat to blueberries, but prolonged standing of water in the surface layer of the soil where the roots are spread can have a fatal effect on blueberries.

For the moisture-loving blueberry, there should be no competitors for moisture, so the blueberry is not planted near large fruit trees. For blueberry, loamy soils and peaty soils covered

with a decayed layer of last year's leaves are the most suitable.

The ideal soil for blueberry should have the following composition:

top peat (50%),
humus based on juniper leaves,
soil taken from under palm trees.

A soil mixture with the following composition is also acceptable for blueberry: leaf humus, top peat, river sand, sawdust or bark of pine trees. In this case, this soil mixture should be loose and sour. If the soil of the field has a neutral or alkaline pH environment, then in such soils, blueberry cannot grow fully. In such cases, the pH of the soil is artificially raised to 4 degrees. Because blueberry is a plant that is extremely demanding on the acidic environment of the soil. The most favorable pH value for him is 4.5. Usually, very few field crops require such an acidic soil environment. At the same time, the amount of humus for blueberry should not be less than 4%.

Summary In such cases, the pH of the soil is artificially raised to 4 degrees. Because blueberry is a plant that is extremely demanding on the acidic environment of the soil. The most favorable pH value for him is 4.5. Usually, very few field crops require such an acidic soil environment. At the same time, the amount of humus for blueberry should not be less than 4%.

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