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Indicator for Analysis of Tolerance of Unabi Trees to Soil-Climatic Conditions

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Abstract
the article deals with the analysis indicators of the tolerance of unabi trees to soil and climate conditions.

Keywords: Unabi tree, soil-climate, condition, tolerance, analysis, indicator.

UNABI DARAXTLARINI TUPROQ-IQLIM SHAROITLARIGA BARDOSHLIGINI TAHLILI KO‘RSATKICHARI

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Annotatsiya:
maqolada unabi daraxtlarini tuproq-iqlim sharoitlariga bardoshligini tahlili ko‘rsatkichari haqida gap boradi.

Kalit so’zlar: Unabi daraxti, tuproq-iqlim, sharoit, bardoshlik, tahlil, ko’rsatkich.

INTRODUCTION

On the territory of the republic, attention is being paid to the organization of fruit growing, in particular unabi plantations, and the systematic establishment of high-yield and high-quality fruits. In this regard, it is wise today to establish gardens in the republic from intensive-type seedlings imported from abroad, to implement modern agrotechnical measures, in particular, to pay special attention to each plant, taking into account their growth phases, in order to obtain a high-quality harvest. is an important factor in agriculture.

Paragraph 3.30 of Decree No. PF-60 dedicated to the rapid development of the national economy and ensuring high growth rates of the development strategy of New Uzbekistan for 2022-2026 on the further development of the Republic of Uzbekistan Issues of "increasing the income of peasants and farmers by at least 2 times, bringing the annual growth of agriculture to at least 5%" were determined separately. In the decision of the President of the Republic of

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Uzbekistan dated January 28, 2020 PQ 455-75 "On measures to implement the tasks set in the strategy for the development of agriculture of the Republic of Uzbekistan for 2020-2030", the prospects for the development of the sector and issues of expansion of new types of fruit plants have been determined in our republic. Decision of the President of the Republic of Uzbekistan dated March 20, 2019 No. PQ-4246 "On measures for the further development of horticulture or intensive fruit and vegetable growing and greenhouse farming in the Republic of Uzbekistan" and other normative - this dissertation research serves to a certain extent in the implementation of tasks defined in legal documents.

The scientific novelty of the research is as follows:

Seasonal growth and development dynamics of unabi trees in Kashkadarya soil and climate conditions were studied;

frost damage of perennial branches of the unabi plant is 0.5% in 2-3-year-old plants - 0.7% of one-year branches and shoots up to 0.8%, most of the 7-8-year-old plants of unabi it was determined that annual branches were damaged by 0.2%, skeletal branches by 0.4% and shoots by 0.6% (28-30 0C);

Unabi varieties grown on Melkoplodny grafting have been proven to be resistant to drought (Mayabaizao and Jihinzao varieties);

when unabi plants were grown at water salinity levels with 0.1 and 0.2% chloride ion NaCl solution, 80% in Ta-yang-zao variety, 82% in U-sin-hun variety, and 82% in Mayabaizao variety 86%, 88% in Jixinzao variety, and 84% in Zanhuangdazao variety have been proven to tolerate seedlings.

The economic efficiency of unabi cultivation in the soil-climatic conditions of the Kashkadarya oasis was determined.

The practical results of the research are as follows:

The morpho-biological characteristics of the growth and development of unabi trees were evaluated from an economic and biological point of view;

frost damage of perennial branches of the unabi plant is 0.5% in 2-3-year-old plants - 0.7% of one-year branches and shoots up to 0.8%, most of the 7-8-year-old plants of unabi damage level of annual branches is 0.2%, skeletal branches are damaged up to 0.4% and shoots up to 0.6% (28-30 0C) based on the results of experiments;

when unabi plants were grown at water salinity levels with 0.1 and 0.2% chloride ion NaCl solution, 80% in Ta-yang-zao variety, 82% in U-sin-hun variety, and 82% in Mayabaizao variety 86%, 88% in Jihinzao variety, and 84% in Zanhuangdazao variety, and the efficiency of seedlings was proved.

Determination of drought resistance of Unabi varieties

Ecological and physiological aspects of adaptation to drought of Unabi varieties are unique characteristics of these varieties and are observed to be different in different varieties. Adaptation of the unabi plant to drought conditions occurs due to a number of changes in the plant and certain characteristics. In particular, it is evaluated by the change of certain morphological features of the plant, the physiological processes taking place in the plant, and their tolerance to the environmental external environment. Adaptation of plants to

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drought conditions occurs during changes in population, organism and plant tissues and cells.

Dehydration of plant organs is observed when plants are maintained in drought conditions. In areas with arid soil and climate conditions, the condition of plants, their growth and development, fruiting, and manifestation of variety characteristics depend on the soil and climate conditions of the area where the plant is cared for, air temperature and relative humidity, and plant care. It depends on the composition and rate of organic and inorganic fertilizers.

In our experiments, the following indicators were analyzed to study the resistance of unabi varieties to water regime and drought. Water deficit in the plant body, ability to retain water, colloid-osmotic properties of protoplasm were studied. The research showed that the analysis of the water content of all studied varieties of unabi shows their resistance to drought in the conditions of the Kashkadarya oasis, as it was found that the vegetation period of the plants has changed slightly.

The average amount of water in the leaves of plants during the growing season was 51.2-61.3%. The highest amount of water in the leaves of the Unabi plant is observed in the first decade of June, and it was found that this situation was related to the total moisture reserve in the soil. The decrease in the amount of water in the leaves of the unabi plant is explained by the decrease in soil moisture.

In varieties with a low water-holding capacity of plant cell protoplasm, as a result of a decrease in soil moisture in growing conditions, large changes in the amount and composition of water in plant leaves are observed. This situation shows that the varieties are resistant to drought. Small-fruited varieties (U-sin-khun) were observed to be more stable in terms of water content of leaf tissues despite the decrease in soil moisture. It was found that the amount of water in plant leaves changed by only 2.6-3.4% in years with relatively favorable climatic conditions (2022, 2023). In the dry period (2021), it was observed that the water content of leaf tissues changed to 4.1-4.6%. The highest amount of water in plant leaf tissues is observed in June, which means that it is associated with active moisture reserves in the soil. It was observed that the samples of Zanhuangdazao and Jixinzao varieties were significantly more tolerant to the decrease of air and soil moisture. It was found that the amount of water in the leaves of these varieties changed by ¬5.2-5.5% during the season in the wettest year of 2021, and by 7.4-8.7% in the driest year of 2022. When comparing the changes in the total water content of the leaves under the influence of unfavorable plant factors, it was observed that the varieties with relatively small fruits were the most resistant to moisture deficiency and wilting. At the same time, in our experiments, compared to non-grafted plants, it was observed that grafted plants showed positive results in water content changes, i.e. drought tolerance. (See Table 1).

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1-table Analysis of total water content in leaves of Unabi cultivars (% by weight), (2021-2023).

Varieties of Unabi	Years of research								
	2021 year			2022 year			2023 year		
	VI	VII	VIII	VI	VII	VIII	VI	VII	VIII
unabi cultivars propagated from vegetative cuttings (control)									
Ta-yang-zao	59,6± 2.78	56,5± 1.88	53,3± 2.10	63,2± 1.40	58,5± 2.54	57,5± 1.91	61,2± 1.49	56,65 1.11	53,4± 0,91
U-sin-xun	61,9± 1.38	59,4± 2.25	56,3± 1.59	63,8± 0,97	60,3± 0,84	59,1± 1.30	62,0± 1.57	58,8± 1.75	56,1± 1.65
Mayabaizao	61,4± 1.33	58,4± 2.21	54,3± 1.51	62,8± 0,91	60,1± 0,82	59,8± 1.31	62,2± 1.59	57,5± 1.75	55,2± 1.65
Jixinzao	61,2± 1.37	60,4± 2.24	59,3± 1.58	63,5± 0,95	60,4± 0,87	59,6± 1.32	62,1± 1.58	58,2± 1.74	56,3 1.62
Zanhuangdazao	61,5± 1.41	59,8± 2.24	56,8± 1.56	63,2± 0,98	60,5± 0,86	59,4± 1.31	62,2± 1.55	58,6± 1.75	56,5± 1.61
Varieties of unabi grown on small-plod grafts									
Ta-yang-zao	60,2± 2.69	57,2± 1.92	54,1± 2.11	63,8± 1.42	59,7± 2.58	58,2± 1.92	61,8± 1.49	57,62 1.13	54,2± 0,95
U-sin-xun	62,3± 1.40	59,8± 2.27	56,6± 1.61	64,2± 0,99	61,2± 0,88	59,8± 1.32	62,6± 1.60	60,2± 1.80	58,2± 1.69
Mayabaizao	61,9± 1.38	59,4± 2.25	56,3± 1.59	63,8± 0,97	60,3± 0,84	59,1± 1.30	62,0± 1.57	58,8± 1.75	56,1± 1.65
Jixinzao	61,8± 1.36	59,2± 2.22	56,2± 1.55	63,5± 0,94	60,1± 0,81	58,5± 1.25	62,1± 1.58	58,4± 1.70	56,2± 1.66
Zanhuangdazao	61,6± 1.39	59,9± 2.26	57,3± 1.62	64,1± 0,99	60,8± 0,87	59,6± 1.35	62,4± 1.61	58,9± 1.80	56,6± 1.68

As we know, there is conflicting information about the importance of water deficit in the life of plants (Doroshenko T.N. [24]), due to water deficit, the intensity of photosynthesis decreases and the processes of plant growth are negatively affected. ensure that it shows. Water shortage in the plant is related to the availability of water, and the ability of the plant to adequately respond to the water shortage and survive in the conditions of water shortage depends on the efficiency of the protective mechanisms. It is explained by the loss of its turgor at the level of water deficit in the plant cell.

When there was a shortage of water in the area where the plant was being cared for, a decrease in turgor was observed in the leaves of the plant, that is, a shortage of water.

The ability of the leaves of the unabi plant to hold water, as well as the water regime in the plant body, varies depending on other indicators, that is, the variety, the region and the time of determining the amount of water.

With severe dehydration in the plant body, the lack of water leads to an increase in the concentration of soluble substances, and then to damage of protoplasmic structures. Therefore, changes in the colloid-osmotic properties of the protoplasm of its cells are observed during plant dehydration. Dehydration of plant cells increases the permeability of protoplasm for electrolytes.

During the conducted experiments, it was observed that the loss of water in large-fruited plants was accelerated. It should be said that the indicators of electrolyte productivity depend on the amount of water lost during drying, and this experience is reflected in the disruption and change of the colloidal and osmotic properties of the protoplasm of plant samples. At the same time, it was observed that with the wilting of leaves with high water

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holding capacity, the yield of electrolytes increased to a lesser extent compared to the leaves of samples with low water holding capacity compared to the control.

Unabi plant in drought conditions (air temperature +42 ° C, relative humidity up to ¬14%), lack of moisture causes damage to protoplasmic structures. This situation sharply reduces the resistance of the plant to hot temperatures in the summer season.

During the study, unabi plant varieties were divided into 3 groups according to drought resistance: low (4.21-4.68), medium (¬3.9-3.59), high (1.62-1 .95) (Fig. 5.2) allowed to separate.

It was found that small-fruited varieties of Unabi varieties grow well, develop and quickly adapt to chestnut soils. It was noted that the growth processes of unabi varieties with medium and larger fruits were a little slow. This process is suitable for comparative evaluation of plants' resistance to drought and helps to solve problems of saving resources by using the most adapted varieties, as well as to control the irrigation regime of plants even during the extremely dry period of the year.

Watering norms are determined depending on the age of the plants. This helps to increase the resistance of plants to adverse environmental conditions. Under the influence of dry air (humidity up to 15%) and high temperature (35-40°C), plants show xeromorphism as an indicator of adaptation to drought conditions. This is explained by the thickening of the edges of the plant leaf, the cell shells of the epidermis, the formation of loose mesophyll and the development of a strong cuticle.

Studying the tolerance of Unabi varieties to low temperatures

Unabi plant is a subtropical plant. When assessing their winter resistance, unabi plants are affected by several adverse factors during winter, such as the duration of low temperatures, sudden changes in the air, the duration and frequency of frosts, the size of the snow cover, and other natural factors. organs are damaged. The resistance of various organs of the plant to low temperatures is unique. In the conditions of the Kashkadarya oasis, it is possible to determine the resistance of different varieties of unabi to dry and low temperatures in the winter season.

As mentioned above, unabi is a type of subtropical fruit crop. Therefore, it is necessary to pay attention to the complex effect of unfavorable medical factors in the cultivation of varieties and creation of artificial ecosystems. Studying the low temperature resistance of the unabi plant in the regions with severe soil and climate conditions, determining the area of its distribution, the low temperature resistance of the varieties was determined. In the central region of the republic (Tashkent, Samarkand), it was mentioned that the plant branches were not damaged at temperatures as low as -30-32 °C.

During the years of research, in 2021-2022, it was observed that the air temperature was at a low level of -24-26 °C on certain days in the winter season. In this process, it was observed that the one-year branches of our unabi varieties, which are being studied in the experiment, are not fully biologically ripe. Of course, like all fruit plants, the knabi plant shows that the branches grown in September are not fully ripe.

Sorting Unabi cultivars by age according to the degree of adaptation to low temperatures on the basis of Euclidean distances makes it possible to identify short-resistant

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(stenobionts) and more resistant (euribionts) and to determine optimal cultivation conditions and the level of ecological plasticity.

In the experiments, it was observed that three-year-old plant samples have a higher level of adaptation than ten-year-old ones. In the winter season of 2023, it was found that Ta-yang-zao (large-fruited variety) was damaged by frost. Small-fruited Mayabaizao variety was less affected by cold. Due to the low temperature in the winter season of 2023, it was observed that the beginning of bud growth was recorded in May. This shows the good regenerative ability of dormant (spare) buds of unabi varieties.

Unabi navlarining ma'lum bir organlarida hroratni keskin past bo'lishi natijasida zararlanishlar kuzatildi. Bunda asosan 2-3 yoshli va 7-8 yoshli unabi navlarining bir yillik va ko'p yillik novdalari, ko'rtaklarining zararlanish darajalari vizual kuzatuvlar natijasida aniqlandi. 2023 yil yanvar oyida havo harorati o'rtacha -32-34 va undan ham past bo'lgan vaqtlar kuzatildi.

Bunda o'simlikning ko'p yil novdalarini sovuqdan zaralanish holati 2-3 yoshli o'simliklarda 0,5 % - bir yillik shoxlarining 0,7 % va kurtaklar 0,8 % gacha zararlanganligi kuzatildi. Unabining 7-8 yoshdagi o'simliklarining ko'p yillik novdalarini zararlanishi darajasi 0,2%, skelet shoxlarining 0,4 % va kurtaklar 0,6 % gacha zararlanganligi tajribalarimiz davomida kuzatildi. Uzoq yillik novdalarni umumiy zararlanishi darajasi juda past ko'rsatkichda (0,1-0,2 %) bo'lganligi aniqlandi.

Qashqadaryo vohasi tuproq-iqlim sharoitida olib borilgan tashribalar shuni ko'rsatdiki turli navlarni past haroratga chidamliligi o'simlik yoshiga bog'liq hlda oshib borishi aniqlandi. Agar 2-3 yoshli unabi daraxtlarining ma'lum bir organlari (bir yillik novdalar, vkgktativ va generativ kurtaklar) shikastlanishi kuzatilgan bo'lsa, o'simlik 8-10 yoshda bo'lganda bir yillik novdalar va ma'lum bir kurtaklarni sovuqdan (-32 ° C) zararlanishi kuzatiladi (2-jadvalga qarang).

2-table 2-3 and 7-8-year-old trees of Unabi varieties, one-year and multi-year branches and buds according to the level of frost resistance (2023)

Varieties of Unabi	Analysis of Unabi tree frost resistance level %					
	2-3 year old trees			7-8 year old trees		
	branches for many years	annual branches	buds	branches for many years	annual branches	buds
unabi cultivars propagated from vegetative cuttings (control)						
Ta-yang-zao	0,7	0,9	0,10	0,6	0,7	0,8
U-sin-xun	0,6	0,8	0,9	0,5	0,7	0,8
Mayabaizao	0,5	0,7	0,8	0,5	0,6	0,7
Jixinzao	0,6	0,7	0,9	0,5	0,6	0,7
Zanhuangdazao	0,7	0,8	0,10	0,6	0,7	0,8
Varieties of unabi grown on small-plod grafts						
Ta-yang-zao	0,5	0,7	0,8	0,3	0,5	0,6
U-sin-xun	0,4	0,6	0,7	0,2	0,4	0,5
Mayabaizao	0,3	0,5	0,6	0,2	0,4	0,5
Jixinzao	0,5	0,6	0,6	0,3	0,4	0,5
Zanhuangdazao	0,6	0,6	0,7	0,3	0,5	0,5

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As noted in the table, when the 2-3-year-old unabi varieties propagated from vegetative cuttings were analyzed for low temperature resistance, in the Ta-yang-zao variety perennial branches 0.7%, annual branches 0.9%, buds 0, Up to 10% damage was observed. When the 7-8-year-old Ta-yang-zao variety was analyzed for low temperature resistance, it was found that perennial branches were affected by 0.6%, one-year branches by 0.7%, and shoots by 0.8%.

When analyzing the resistance to low temperature of the 2-3-year-old variety of Unabi, it was observed that 0.6% of perennial branches, 0.8% of annual branches, and 0.9% of shoots were damaged, 7-8 when analyzing the low temperature resistance of the unabi tree, it was found that 0.6% of perennial branches, 0.8% of one-year branches, and 0.9% of shoots were damaged.

When the Mayabaizao 2-3-year-old variety of unabi was analyzed for its low temperature resistance, it was observed that perennial branches were damaged up to 0.5%, annual branches up to 0.7%, shoots up to 0.8%, while the unabi tree of 7-8 years old was less when temperature resistance was analyzed, it was found that perennial branches were damaged up to 0.5%, one-year branches up to 0.6%, shoots up to 0.7%.

When analyzing the resistance to low temperature of Jixinzao 2-3-year-old unabi variety, it was observed that 0.6% of perennial branches, 0.7% of annual branches, and 0.9% of shoots were affected, while 7-8-year-old unabi tree was less when temperature resistance was analyzed, it was found that perennial branches were damaged up to 0.5%, one-year branches up to 0.6%, shoots up to 0.7%.

When the 2-3-year-old Zanhuangdazao variety of unabi was analyzed for low temperature resistance, it was observed that perennial branches were damaged up to 0.7%, annual branches up to 0.8%, and shoots up to 0.10%, while the unabi tree aged 7-8 years was low during the analysis of temperature resistance, it was observed during our experiments that 0.6% of multi-year branches, 0.7% of one-year branches, and 0.8% of shoots were damaged.

In our experiments, when 2-3-year-old unabi cultivars grown in Melkoplodny grafting were analyzed for low temperature resistance, it was observed that perennial branches of Ta-yang-zao variety were damaged up to 0.5%, annual branches up to 0.8%, shoots up to 0.8%. When analyzing the resistance of 7-8 year old trees to low temperature, it was found that 0.3% of perennial branches, 0.5% of annual branches, and 0.6% of shoots were damaged.

When analyzing the resistance to low temperature of the 2-3-year-old variety of Unabi, it was observed that 0.4% of perennial branches, 0.6% of annual branches, and 0.7% of shoots were damaged, 7-8 When analyzing the resistance of the unabi tree to low temperature, it was found that 0.2% of multi-year branches, 0.4% of one-year branches, and 0.5% of shoots were affected.

When the Mayabaizao 2-3-year-old variety of unabi was analyzed for low temperature resistance, it was observed that perennial branches were damaged up to 0.3%, annual branches up to 0.5%, and shoots up to 0.6%, while the unabi tree of 7-8 years old was less when temperature resistance was analyzed, it was found that perennial branches were damaged up to 0.2%, one-year branches up to 0.4%, shoots up to 0.5%.

When analyzing the resistance to low temperature of Jixinzao 2-3-year-old variety of unabi,

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it was observed that perennial branches were affected by 0.5%, annual branches by 0.6%, and shoots by 0.6%, while unabi tree aged 7-8 years was low when temperature resistance was analyzed, it was found that perennial branches were damaged up to 0.3%, one-year branches up to 0.4%, shoots up to 0.5%.

When the Zanhuangdazao 2-3-year-old variety of Unabi was analyzed for low temperature resistance, it was observed that perennial branches were damaged up to 0.6%, annual branches 0.6%, shoots up to 0.7%, while Unabi tree aged 7-8 years was low during the analysis of temperature resistance, it was observed during our experiments that 0.3% of multi-year branches, 0.5% of one-year branches, and 0.5% of shoots were damaged.

Conclusion:

1. When the low temperature tolerance of unabi varieties was studied, damage was observed in certain organs of unabi varieties as a result of a sharp drop in temperature. It should be noted that damage levels of annual and perennial branches and buds of 2-3-year-old and 7-8-year-old unabi varieties were determined as a result of visual observations.
2. The cold tolerance of annual and multi-year branches and shoots of 7-8 year old unabi trees grown from unabi cuttings and grown in Melkoplodny grafting was analyzed, and the presence of certain differences was found when comparing the varieties to plants grown in aro and grafting. was studied.
3. Unabi varieties showed the ability to grow even under salinity conditions. In order to determine the degree of tolerance of unabi varieties to salt, certain levels of growth and development of unabi plants during the growing season were analyzed in chloride-saline soil-climate conditions. In our experiments, it was determined that the studied unabi varieties are resistant to saline soil conditions due to the comparison of seedlings propagated from vegetative cuttings and seedlings propagated in grafting.

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