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SELECTION OF TREE AND SHRUB SPECIES FOR LANDSCAPING THE SURKHANDARYA REGION.

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Abstract. The selection of tree and shrub species for landscaping the territory of Surkhandarya Region was carried out by testing tree species resistant to local unfavorable conditions, including saline soils and mineralized groundwater. When selecting local and introduced ornamental trees and shrubs for Surkhandarya conditions, the natural and geographical conditions of the site must be taken into account. This is because the conditions of each area differ (strongly saline, moderately and slightly saline soils, plains, and uneven tugai woodlands). The selection of local and introduced trees for landscaping such lands requires deep knowledge and experience.

Keywords. Tree and shrub, Robinia pseudoacacia, Saphora japanica, Ulmus pumila, phytomass, Populus nigra and Morus alba.

Introduction. Certain studies have been conducted in Surkhandarya Region on the bioecological characteristics of trees and shrubs. However, studies have not been carried out on selecting tree and shrub species suitable for the region for afforestation and landscaping activities, determining their response to climatic factors, and identifying their sanitary and hygienic properties. The Development Strategy of New Uzbekistan for 2022-2026 defines the tasks of "protecting ecology and the environment, improving the ecological situation in cities and districts, and implementing the nationwide Yashil Makon project." In this regard, because the summers of Surkhandarya Region are very hot, its winters are very cold, and its soils are saline to varying degrees, research on selecting resistant tree and shrub species for landscaping is considered relevant.

The present dissertation research, to a certain extent, serves to provide a scientific basis for the tasks set out in the Resolution of the President of the Republic of Uzbekistan No. PQ-3262 dated 11 September 2017 "On measures to improve the system of architectural and landscape design and landscaping of highways," Resolution No. PQ-4850 dated 6 October 2020 "On approval of the Concept for the development of the forestry system in the Republic of Uzbekistan until 2030," and other regulatory legal documents.

The selection of tree species for cultivation on saline areas has been studied at leading scientific centers of countries around the world. In particular, scientifically based methods have been developed in India to increase the efficiency of croplands using P. juliflora, P. alba, P. chilensis, P. cineraria, P. pallida and P. tamarugo; in Indonesia using Leucaena leucocephala; and in China using Robinia pseudoacacia. In other countries, special attention has been paid to selecting tree species by developing geographical maps of such areas and to developing agrotechnology for their cultivation. The results obtained on the basis of these scientific

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developments are important for increasing the efficiency of using saline areas and are relevant from both theoretical and practical perspectives.

Relevance of the topic. Globally, attention to afforestation and landscaping of human settlements is increasing from year to year. These measures are implemented not only on forest fund lands, but also on areas unsuitable for growing agricultural crops. As a result of the improper use of croplands by people, such areas become unsuitable, and at present "an average of 1.5 million hectares of arable land on the Earth becomes unusable every year." This causes a sharp reduction in the area of green plantations that are beneficial to human health. Under the conditions of global climate change occurring worldwide, selecting biologically resistant tree and shrub species for landscaping activities and assessing their response to environmental factors is relevant.

Research methods. The study of the height growth and development of local and introduced trees in landscaping sites was carried out through the establishment of experimental plots. The seasonal development of tree species was studied according to N.E. Bulgin (1979), phenological observations in trees and shrubs according to I.N. Beydeman (1974), the study and evaluation of ornamental properties according to N.I. Shtonda (2012), assessment of the condition of trees growing under salinity conditions according to V.S. Nikolavskiy (1999), and the effectiveness of trees and shrubs recommended for landscaping according to V.M. Kan (1989). Statistical analysis of the results obtained in field experiments was performed using the Microsoft Excel computer program in accordance with the methodology recommended by B.A. Dospekhov (1986).

Research results. Survival and growth of tree and shrub species grown under different soil conditions. The selection of tree and shrub species for landscaping the territory of Surkhandarya Region was carried out by testing tree species resistant to local unfavorable conditions, including saline soils and mineralized groundwater. It is difficult to select tree species that equally meet all of the listed characteristics. Therefore, their salt tolerance and tree height were taken as the main criteria in selecting tree species.

The trial was conducted on lands with moderate and slight salinity. However, observations showed variability in the degree of salinity within the experimental plot.

Salts that affect various life processes and physiological functions ultimately influence plant growth. The phenomenon of slow plant growth in saline soils is widespread. According to many authors, such a decrease in growth is strictly proportional to the increase in the osmotic pressure of the soil solution, and dry matter accumulation also decreases.

Thus, in the physiology of plants growing in saline soils, it has been confirmed that salinity causes slow growth, a reduction in leaf surface area, a decrease in the rate of dry matter accumulation, an increase in the osmotic pressure of plant sap, and succulence.

At the end of each vegetation period, the height of the tested trees and stem diameter at the soil surface were measured, and their survival rate was determined. At the end of the vegetation season, in the control plot in Termez city, the height of 5-year-old seedlings of Populus alba, Ulmus pumila and Robinia pseudoacacia was 453.5±24.52, 421.0±17.41 and 402.5±22.02 cm, respectively; according to average indicators, Salix australior and Populus nigra reached 303.5±19.06 and 306.2±17.65 cm. The lowest indicators were recorded in Gleditsia triacanthos, Fraxinus pensylvanica and Maclura aurantiasa, at 223.0±17.37, 219.1±16.97 and 107.5±11.24 cm, respectively. Growth in Saphora japanica was considerably slower, at 76.8±6.12 cm. In the

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control plot in Termez district, the highest indicators were observed in Populus alba and Ulmus pumila (420.1±21.11 and 401.1±16.42 cm). Average indicators were recorded in Fraxinus pensylvanica and Gleditsia triacanthos (206.1±14.74 and 199.1±12.41 cm), while the lowest indicator was found in Saphora japanica (68.7±8.22 cm).

Regarding stem diameter at the root collar, the highest values in Termez city were observed in Populus alba (7.6 cm) and Robinia pseudoacacia (7.0 cm). Average values were recorded in Ulmus pumila (6.3 cm), Salix australior (6.2 cm) and Populus nigra (6.1 cm), and the lowest values were observed in Fraxinus pensylvanica (3.6 cm), Gleditsia triacanthos (3.1 cm), Saphora japanica (2.6 cm) and Maclura aurantiasa (2.6 cm). In Termez district, the highest values were determined in Populus alba (6.5 cm) and Ulmus pumila (5.5 cm), average values in Fraxinus pensylvanica (3.3 cm) and Gleditsia triacanthos (2.5 cm), and the lowest value in Saphora japanica (1.9 cm). The average increase in diameter was 2.6 cm in Populus alba; lower increases were recorded in Ulmus pumila (2.0 cm), Robinia pseudoacacia (2.0 cm), Salix australior (2.0 cm), Fraxinus pensylvanica (1.8 cm) and Populus nigra (1.8 cm); and the lowest increases were observed in Gleditsia triacanthos, Maclura aurantiasa and Saphora japanica (0.8, 0.7 and 0.6 cm, respectively).

In terms of the high survival rate of the selected trees, Populus alba was recorded in both Termez city and Termez district (88% and above 80%), followed by Gleditsia triacanthos (80%, 71%), Maclura aurantiasa (86%), Ulmus pumila (82%, 77%), Robinia pseudoacacia (80%), Salix australior (70%), Fraxinus pensylvanica (63%, 62%) and Populus nigra (59%). The lowest survival rate was observed in Saphora japanica (44%, 41%) (see Figure 1).

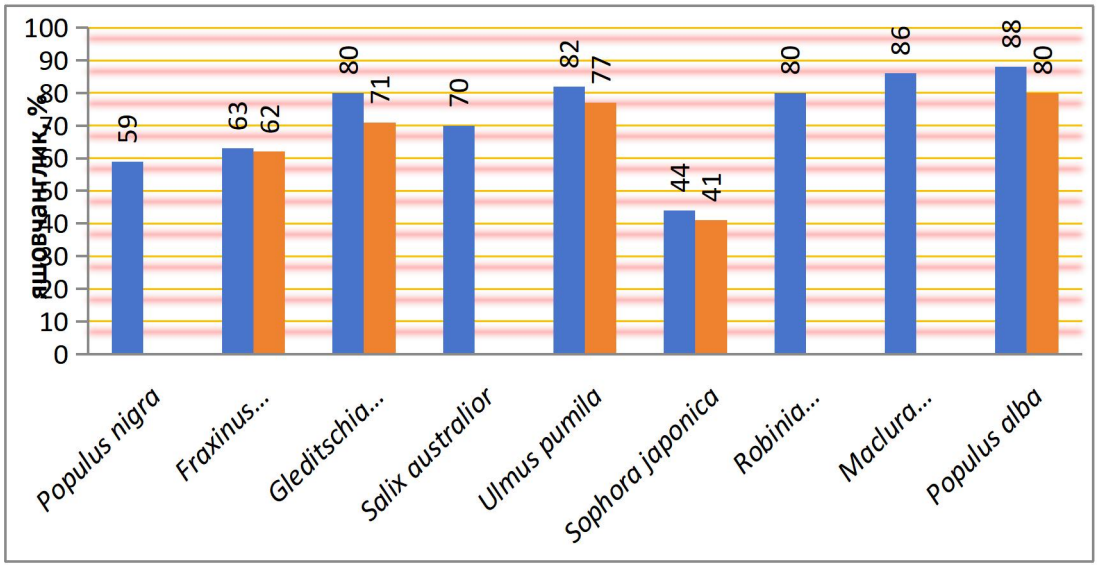


Figure 1. Survival indicators of the selected trees

(Termez city and Termez district, 2025.)

To determine phytomass by fractions, a model tree of each species was selected based on average biometric indicators.

In the control plot in Termez city, the largest phytomass was recorded in Robinia pseudoacacia (leaves 578.6 g, stem 1381.0 g, crown 1331.8 g and roots 448.9 g, total 3740 g). In Ulmus pumila, the corresponding values were 332.8 g, 855.8 g, 545.6 g and 412.9 g, total 2147 g. In Salix australior, they were 269.5 g, 499.5 g, 915.0 g and 359.6 g, total 2044 g. Populus alba

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had 412.0 g, 681.9 g, 115.3 g and 417.7 g, total 1627 g. Populus nigra had 339.0 g, 65.7 g, 170.4 g and 430.8 g, total 1006 g. The lowest phytomass was observed in Gleditsia triacanthos (370 g), Fraxinus pensylvanica (total 292 g), Maclura aurantiasa (total 173 g) and Saphora japanica (total 105 g) (see Figure 2).

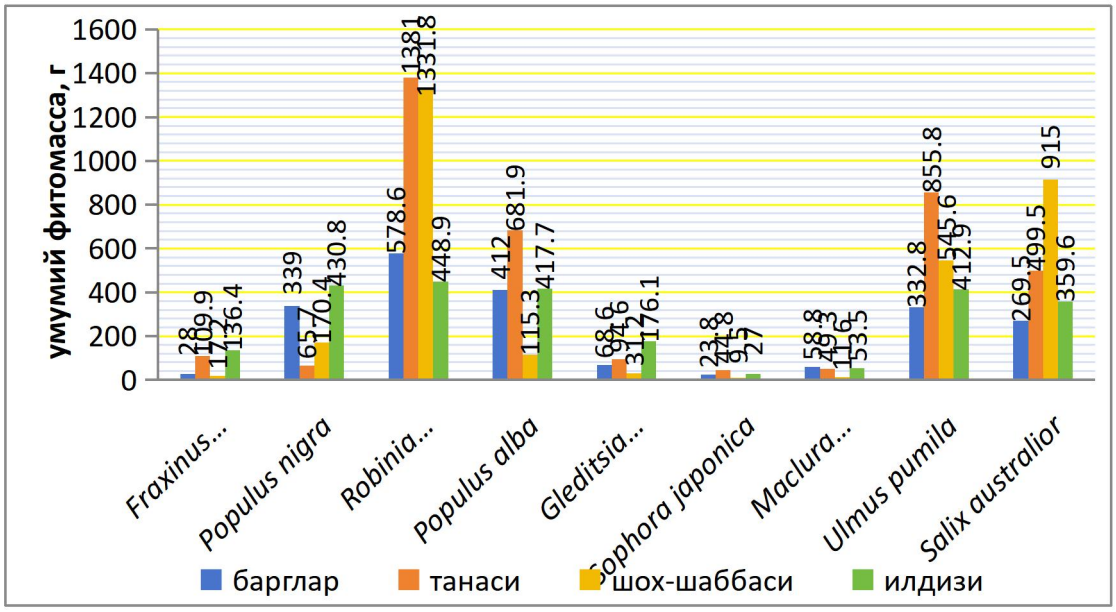


Figure 2. Phytofraction weight of tree species cultivated under Termez conditions (2025.)

In the control plot in Termez district, the largest phytomass was recorded in Ulmus pumila (leaves 844.5 g, stem 2038.5 g, crown 1653.8 g and roots 652.6 g, total 5189.4 g). In Fraxinus pensylvanica, the values were 60.4 g, 729.9 g, 136.2 g and 446.8 g, total 1380.4 g. In Populus alba, 174.0 g, 588.0 g, 384.0 g and 140.2 g were observed, total 1286.2 g. Species with low phytofraction values were Gleditsia triacanthos (50.5; 456.0; 132.1; 138.4 g, total 777.0 g) and Saphora japanica (12.0; 119.8; 46.5; 108.9 g, total 287.2 g) (see Figure 3).

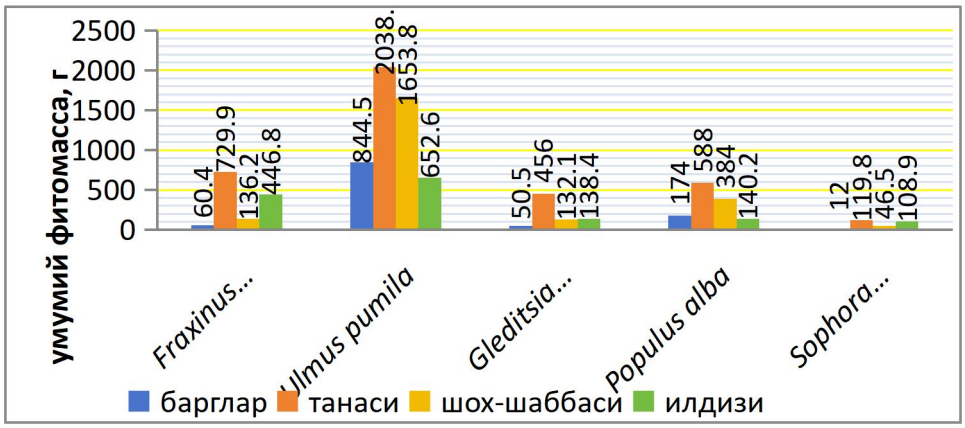


Figure 3. Phytofraction weight of tree species cultivated under the conditions of Termez district (2025.)

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Figure 4. Processes of measuring tree crowns.

Thus, according to all examined indicators, absolutely high values were recorded in Populus alba, Robinia pseudoacacia and Ulmus pumila, while the absolutely lowest value was found in Saphora japanica.

Although Maclura aurantiasa had a high survival rate, its biometric indicators were not high. In Populus nigra, the opposite was observed: although its survival rate was not good, its biometric indicators were not poor (59%). The remaining three species occupied an intermediate position according to these indicators.



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Figure 5. Processes of measuring the diameter of a pine tree.

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