

Некоторые принципы использования растений в ландшафтной архитектуре Апшерона

Поступила 10.01.2023 г. / Принята к публикации 30.03.2023 г.

© Ахмадзаде Гюнель Тарлан кызы 

Бакинский центральный ботанический сад, г. Баку, Азербайджанская Республика

Аннотация. Целью исследования был анализ факторов, влияющих на выбор и использование растений в ландшафтной архитектуре в природно-климатических условиях Апшеронского полуострова. Предметом исследования стали факторы окружающей среды, влияющие на различные виды растений, используемых в озеленении. Отмечается, что естественная растительность Апшеронского полуострова относится к полупустынному типу растительности. Поэтому растения для озеленения территории должны быть выбраны правильно. С этой целью биологические и экологические характеристики используемых растений должны быть подробно изучены. Потому что большинство растений, используемых в озеленении Апшеронского полуострова, в настоящее время импортируются из отдельных ботанико-географических районов. Отмечается, что при посадке и выращивании растений следует учитывать ряд условий: почвенный фактор; климатические факторы; тип грунта; вновь привезенные растения; интенсивность солнечных лучей других факторов. Например, тип почв Апшеронского полуострова не подходит для многих растений, включая растения, завезенные из других стран в последние годы. Следует также учитывать естественные формы жизни растений. Естественная форма жизни растений определяет к какой группе относится растение и зависит от их происхождения, среды произрастания и биоморфологических характеристик, которые они приобрели в течение эволюции. Жизненные формы растений включают такие группы как растения древесного типа; растения кустарникового типа; растения травяного типа; лианы. В статье приводятся примеры растений используемых в ландшафтном озеленении, например, сосна (*Pinus eldarica*), сосна итальянская (*Pinus pinea*), кипарис вечнозеленый (*Cupressus sempervirens* L.), кипарис аризонский (*Hesperocyparis arizona*) и другие. Отмечается, что во многих случаях возникает необходимость в ландшафтных восстановительных работах. Восстановительные работы должны проводиться таким образом, чтобы не было слишком большого ущерба ранее посаженным и растущим растениям.

Ключевые слова. Ландшафт, ландшафтная архитектура, биоэкологические свойства, биоморфологические характеристики, Апшеронский полуостров, озеленение, растения, климат, почвы, экология, кустарник, дерево, газон.

Some principles of using plants in landscape architecture of Absheron

Received on January 10, 2023 / Accepted on March 30, 2023

© Ahmadzade Gyunel Tarlan kzy 

Baku central botanic garden, Baku, Republic of Azerbaijan

Abstract. The purpose of the study was to analyze the factors affecting the choice and use of plants in landscape architecture in the natural and climatic conditions of the Absheron Peninsula. The subject of research was environmental factors affecting various types of plants used in landscaping. It is noted that the natural vegetation of the Absheron Peninsula belongs to the semi-desert type of vegetation. Therefore, plants for landscaping the territory must be chosen correctly. To this end, the biological and ecological characteristics of the plants used should be studied in detail. Because most of the plants used in the landscaping of the Absheron Peninsula are currently imported from separate botanical and geographical areas. It is noted that when planting and growing plants, a number of conditions should be taken into account: soil factor; climatic factors; soil type; newly brought plants; intensity of sunlight from other factors. For example, the soil type of Absheron is not suitable for many plants, including plants brought here from different countries in recent years. The natural life form of plants determines which group the plant belongs to and depends on their origin, the environment of growth and the biomorphological characteristics that they acquired during evolution. Life forms of plants include groups such as tree-type plants; shrub-type plants; herbal-type plants; lianas. Examples of plants used in landscape landscaping, for example, eldar pine (*Pinus eldarica*), italian pine (*Pinus pinea*), evergreen cypress (*Cupressus sempervirens* L.), Arizona cypress (*Hesperocyparis arizona*) and others are given in the article. It is noted that in many cases there is a need for landscape

restoration work. Restoration works should be carried out in such a way that there is not too much damage to previously planted and surviving plants.

Keywords. Landscape, landscape architecture, bioecological properties, biomorphological characteristics, Absheron Peninsula, landscaping, plants, climate, soils, ecology, shrub, tree, lawn.

Introduction. The vegetation of the Absheron Peninsula belongs to the semi-desert vegetation type. There are almost no trees and shrubs growing naturally here with the exception of some shrubs. The natural flora is mainly dominated by grass and shrub-type plants. It is known that the vegetation of each zone is significantly affected by the local soil and climate conditions. Therefore, a number of conditions should be taken into account when planting and cultivating trees and shrubs in Absheron [1, 3, 10]:

- the soil factor;
- climatic factors;
- the soil type;
- the newly brought plants;
- intensity of the sun's rays
- other factors

The soil factor is as important and important for trees and shrubs as its essence is for basic buildings. That is, there are many difficulties in cultivating any plant there without studying the composition, structure and other characteristics of the soil. As the soil type of the Absheron peninsula is very diverse, it is dominated by chalky, grey-brown and grey-brown soils. The amount of organic and mineral substances in these soils is relatively low. Therefore, most decorative and fruit plants grow poorly here. Many cultivated plants cannot express their bioecological properties normally [7, 9].

In addition to the soil factor, *climatic factors* – light, air, temperature, humidity, etc. – play a big role in the formation of plants. Those mentioned factors are called life factors of plants. The special importance of each of these factors for the plant is possible only when all of them act together. All of them are important for the plant and one cannot replace the other. Although other vital factors for seed germination (moisture, light, food, air, etc.) are normal, if there is no heat, the seed will not germinate. Therefore, the plant can grow in conditions where all life factors are provided. The need to study and regulate life factors serves this purpose. These factors, which are necessary for the plant, are specific for individual zones of the republic [1, 3, 8].

The soil type of Absheron is not suitable for many plants, including plants brought here from different countries in recent years. Those plants

grow better in structured (well-permeable water and air), nutritious, light soils. Therefore, if they are planted directly in the usual sandy-coniferous soil of Absheron, they soon dry out and perish [7].

The newly brought plants either do not develop, or develop unilaterally and fall into an ugly shape, not continuing the northern winds of Absheron. It is very difficult to create any decorative form in plants in Absheron without considering the wind factor.

In the summer months, *the scorching intensity of the sun's rays* causes burns on the leaves of most plants and hinders their development, as well as damages their external, decorative appearance. The burning of plants due to high heat is especially noticeable in inner-city alleys. Here, since the refracted rays from asphalt and concrete floors have a burning effect, burns are more often observed in urban plants.

Along with *other factors*, the humidity factor and the water supply of plants are among the issues that are kept in mind when organizing the landscape with plants. It is known that the amount of annual natural precipitation in Absheron does not exceed 250 mm.

The purpose of the study was to analyze the factors affecting the choice and use of plants in landscape architecture in the natural and climatic conditions of the Absheron Peninsula. **The subject of research** was environmental factors affecting various types of plants used in landscaping.

Materials and methods. Natural and geographical conditions of Absheron, the rules of planting greenery in Absheron, the characteristics of soil and climate conditions, the correct selection of trees, shrubs, decorative grasses according to the conditions, and agrotechnics of cultivation have been thoroughly studied by scientists I.V. Figurovsky (1926), S.A. Zakharov (1927), V.P. Smirnov-Loginov (1930), A.A. Grosgame (1934), A.S. Priobrajensky (1934), A.I. Mikhailevsky (1935), N.A. Aliyev, V.R. Volobuyev (1953), M.V. Brzeziskiy, G.M. Gadyrov, L.I. Prilipko (1956), A.A. Madatzade (1960), U.M. Agamirov, A.R. Aliyev, I.S. Safarov (1971, 1976), A.D. Eyyubov (1979), A.S. Allahverdiyev (1991), V.D. Hajiyevev (1992), G.S. Mammadov, M.P. Babayev and etc. The trees, bushes and decorative grasses used in landscaping in Absheron are of great importance in the richness

of the flora of Absheron. The selection of trees, shrubs and herbs for the decorative design of parks in the greening of Baku city and its regions is determined by soil and climatic conditions.

Results and discussion. In such conditions, it is impossible to grow plants here without artificial irrigation. It should be watered only with fresh water to ensure the normal development of plants. Fresh water is a natural resource, as experts have pointed out. Today, fresh water supply in Absheron is one of the urgent problems not only for plants, but also for people and animals. Plants are constantly damaged by the lack of fresh water for this reason and cases of drying due to thirst often occur [1, 3].

Thus, the strict regulation of the above-mentioned life factors in the arrangement of the landscape with plants requires deep knowledge, experience and skills from specialists. We present some ways of regulating those factors.

First of all, landscape plants should be chosen correctly. That is, the bioecological characteristics of the plants to be used should be studied in detail. Because most of the plants used in the Absheron landscape are currently imported from separate botanical-geographical areas. First of all, the natural life forms of plants should be considered. Natural life form refers to natural plant groups derived from their origin, the environment in which they were formed, and the biomorphological characteristics they acquired during life. These are:

- tree-type plants;
- shrub-type plants;
- grass-type plants;
- liana plants.

It should be noted that researchers also show transitional groups between these groups. Thus, they distinguish between trees and shrubs, shrub-type trees, between shrubs and grasses, semi-shrub and shrub-type plants, as well as aquatic plants. However, the first 4 groups are mainly used in landscape architecture. Undoubtedly, when working with landscape plants, that is, the selection of plants, their placement in the area, their transfer from one place to another, their location in the landscape, food area (in the air and in the soil), etc. the group characteristic of plants should be considered as the main factor in the works [5, 6].

Tree-type plants are tall, wide-spreading, long-lived, and remain where they are planted for many years. Accordingly, the root system of these plants also requires a larger area of land. Taking into account these characteristics, tree-type plants should be allocated a larger nutrient area (20...30 m²) both in the soil and in the air. Planting depth of plants should be taken more (50...60 cm) than shrubs and grass plants [6].

The height of *bush-type (shrub-type) plants* does not exceed 5...6 m. Most of them are 3...5 m high. In bushes, the area occupied by the umbrella is less than in trees. Accordingly, the root system in this type of plants is relatively small. Depending on the origin of their creation, many of them, for example, *Dovsan Almasi*, *Daphne*, *Azalea (Rhododendron)*, etc. they grow better in shade and semi-shade areas. At the same time, they require less nutrient space in the air and soil than tree plants.

Grass-type plants are planted close to each other, in some cases very densely (50...100 plants per 1 m²), requiring little food space.

Although the composition of *liana plants* is made up of the above-mentioned groups, they have a number of different characteristics: they grow quickly, require little land area, can be used in places where other groups of plants cannot be planted, reinforced concrete surfaces, etc. they are used more in the greening of places [4].

Thus, their other bioecological characteristics, such as soil fertility requirements, light and shade tolerance, wind resistance, etc. is studied after correctly identifying the life forms of plants.

As mentioned above, soil is the main source of nutrients for plants. A plant that does not have normal nutrition is less resistant to adverse effects of the environment (pathogens, pests, frosts, winds, etc.). For this reason, additional nutritious forest soils and other nutrients (organic-mineral nutrients) are needed for planting and cultivating plants in Absheron lands. In many cases, forest soil is mistakenly given to plants in its pure state (without mixing juicy sand and organic fertilizers). Especially in the summer months, in the sunny and windy climate of Absheron, the clean, black forest soil dries up and hardens, hindering the development of the root system of newly planted plants. The black forest soil brought from outside should be mixed with the juicy sand of Absheron (1:0.5 ratio) in order not to encounter such an unpleasant situation and then used. At the same time, the chemical composition of the soil under the plants (acidity, alkalinity, nitrogen, phosphorus, potassium reserves) should be studied in advance. Applying any type of fertilizers to the soil without studying the composition (in specialized laboratories) is not allowed [1, 2].

Attention should also be paid to the reaction of plants to light (sun). If light-loving plants are planted near or under the canopy of other large plants, in the future that plant will gradually die out. The same situation occurs when planting shadow lover species in an open area. For this reason, light-loving and shade-tolerant species should be chosen correctly.

In Absheron, the wind affects plants more strongly than in other regions of the Republic.

Strong winds rapidly evaporate moisture, causing the soil to compact and harden, and at the same time, water evaporates from leaves and branches and causes them to dry. Due to strong wind and heat, the moisture balance in plants is disturbed, the amount of water evaporated from the leaves increases compared to the water entering from the roots, and the plants dry out in summer and freeze in winter [1].

Proper placement of landscape plants is of great importance in reducing the negative impact of strong winds. Tall, wide-umbrel, wind-resistant species (eldar pine (*Pinus eldarica*), italian pine (*Pinus pinea*), evergreen cypress (*Cupressus sempervirens* L.), Arizona cypress (*Hesperocyparis arizonica*), stone (rock) oak (*Quercus petraea*), etc.) on the edge of the area, mainly in the northwest, wind-resistant, short ones (indian lilac (*Azadirachta indica*), serrated photinia (*Photinia serratifolia*), bellflower abelia (*Abelia, Vesalea*), chinese camellia (*Camellia sinensis*), etc.) and it is planted in the southeast and in the middle tier [1, 2].

In many cases, there is a need for restoration work in the landscape of the area. That is, since the plants in the area were planted much earlier, due to various reasons, some of them are dry or deformed due to neglect. It should be noted that restoring a vegetated landscape is a very responsible task.

Restoration works should be carried out in such a way that there is not too much damage to previously planted and surviving plants. Such plants, which have adapted to Absheron's soil and climate for many years, are considered durable species. Restoration work begins with the removal of dried, aged, stunted plants from the field. Then the species that are promising for the area are determined. The correct selection of plant species and the correct determination of neighboring species are also of great importance in the landscape [1].

One of the important elements of landscape architecture are lawns (green, living grass). The lawn is an indispensable living tool for the cleanliness of the area, its beautiful appearance and coolness in the heat.

Absheron's parks and gardens, roadsides, etc. lawn areas have been expanding in recent years. On the one hand, this is certainly admirable. However, in the conditions of Absheron, it is not considered efficient in many cases from an economic point of view. Lawn plants are water-demanding plants. Especially in the spring and summer months, lawn plants require intensive watering.

As mentioned above, the amount of annual natural precipitation in Absheron is very low. Therefore, lawn areas must be watered with fresh water every day. Since Absheron Peninsula's own source

of fresh water does not provide plants, people and animals, fresh water is brought here from other regions of the republic. The difficulty of delivering irrigation water to lawn plants that require intensive irrigation is clearly visible here. At the same time, due to frequent watering, the lawn grass grows quickly and becomes rough, the color turns yellow, the old grass becomes bare, and the lawn loses its decorativeness. In order to preserve the beauty of the area, lawn plants should be mowed every 7–10 days during the entire vegetation period (up to 180–200 days). The experts have from time to time agreed that the expansion of lawn areas in Absheron is not profitable from an economic point of view [1, 3]. Frequent mowing and cleaning of lawn areas, transportation of mowed grass, etc. itself requires additional funds. It should be noted that it is necessary to evaluate the possibility of reducing the use of lawns or obtaining a better effect when using other plants. It should be noted that now, in many cases, in the areas where fruit plants are planted in private backyards, we witness that the bottom of the plants is covered with lawn from head to toe. First of all, in areas covered with lawns, the roots of fruit plants are not aerated normally and their development is weakened, as lawn grasses form a dense, difficult air-permeable grass layer. Second, lawn plants require watering almost every day during the spring and summer months. It is natural that fruit plants are also watered in such frequently irrigated areas. This causes their gradual destruction. Unequivocally, the use of lawn grass is not permitted in areas where not only fruit plants, but also most tree species are cultivated. In addition, it is more appropriate to plant decorative trees and shrubs instead of large lawns in relatively large landscapes. Watering of plants in such crops is carried out by drip method and water loss is not allowed. Finally, in most areas under Absheron conditions, lawn plants can be replaced with drought-resistant perennial flowering plants and shrubs. There are enough flowers and bushes that meet this demand both in our natural flora and brought from different countries, which can be easily propagated [1, 3].

Conclusions

Wooden-shrub introducers play an important role in the formation of the city's lashedshaft architecture, and the foundation of Absheron flora. Along with decoration architecture using new decoration plants in the greening of new industrial, bridges, roads and residential areas in Baku, it is a key factor in improving the social conditions of people. This type of greenery plays an important role in increasing biodiversity in plant protection and restoration of environmental balance.

Авторские права на публикуемые материалы принадлежат редакции журнала и авторам статей / The editorial Board and the authors of the articles own the copyrights of the published materials.

Мнение редакции может не совпадать с мнением автора / Editorial opinion may not coincide with the opinion of the author.

Автор заявляет об отсутствии конфликтов интересов / The author declares that there are no conflicts of interest

Библиографический список

1. Mammadov T.S. Trees and shrubs of Absheron. Baku: Science and Education, 2010. 127 p.
2. Yusifov E., Isayeva N., Askerov F. Natural monuments of the Absheron peninsula. Baku, «Nurlar» publishing and printing center, 2007. P. 18.
3. Biomorphological Changes of Some Tree and Shrubs Species in the Saline Soils of the Absheron Peninsula / H. Asadov, T. Mammadov, I. Mirjalalli, H. Ataeva // Bulletin of Science and Practice. 2022. Vol. 8, No. 4. P. 58–65. doi: 10.33619/2414-2948/77/06. EDN EUSKAJ.
4. Асадов Г. Г., Багирова С. Б., Мирджалаллы И. Б., Эфендиева Р. Р., Атаева Х.М. Солеустойчивость интродуцированных древесно-кустарниковых видов на засоленных почвах Апшеронского полуострова Азербайджана // Бюллетень науки и практики. 2021. Т. 7. №2. С. 52–60. doi: 10.33619/2414-2948/63/04.
5. Askerova P. Stages of Phenological Development of the Magnolia L. Some Species in Absheron // Бюллетень науки и практики. 2022. Т. 8. №2. С. 47–54. doi: 10.33619/2414-2948/75/06.
6. Удовенко Г.В., Гончарова Э.А. Принципы и приемы диагностики устойчивости растений к экстремальным условиям среды // Сельскохозяйственная биология. 1989. Т. 24. №1. С. 18–24. EDN: XXGIRH.
7. Алиев А., Волобуев В.Р. Почвы Азербайджанской ССР. Баку: Изд-во Акад. наук АзССР, 1953. 451 с.
8. Мамедов Н.М. Экология и устойчивое развитие. М., 2013. 365 с. EDN: SQQGWB.

9. Генкель П.А. Солеустойчивость растений и пути ее направленного повышения. Вып. 12. М.: Изд-во Акад. наук СССР, 1954. 84 с.

10. Mammadov T., Ashrafova Sh. Climate Change Impact on the Absheron Peninsula Vegetation // Бюллетень науки и практики. 2022. Т. 8. №5. С. 102–111. doi: 10.33619/2414-2948/78/12.

References in roman script

1. Mammadov T.S. Trees and shrubs of Absheron. Baku: Science and Education, 2010. 127 p.
2. Yusifov E., Isayeva N., Askerov F. Natural monuments of the Absheron peninsula. Baku, «Nurlar» publishing and printing center, 2007. P. 18.
3. Biomorphological Changes of Some Tree and Shrubs Species in the Saline Soils of the Absheron Peninsula / H. Asadov, T. Mammadov, I. Mirjalalli, H. Ataeva // Bulletin of Science and Practice. 2022. Vol. 8, No. 4. P. 58–65. doi: 10.33619/2414-2948/77/06. EDN EUSKAJ.
4. Asadov G. G., Bagirova S. B., Mirdzhalally I. B., Efendieva R. R., Ataeva H. M. Soleustoychivost' introducirovannyh drevesno-kustarnikovykh vidov na zasolennykh pochvakh Apsheron'skogo poluoostrova Azerbaydzhana // Byulleten' nauki i praktiki. 2021. T. 7. №2. S. 52–60. doi: 10.33619/2414-2948/63/04.
5. Askerova P. Stages of Phenological Development of the Magnolia L. Some Species in Absheron // Byulleten' nauki i praktiki. 2022. T. 8. №2. S. 47–54. doi: 10.33619/2414-2948/75/06.
6. Udovenko G.V., Goncharova E.A. Principy i priemy diagnostiki ustoychivosti rasteniy k ekstremal'nyim usloviyam sredy // Sel'skokozyaystvennaya biologiya. 1989. T. 24. №1. S. 18–24. EDN: XXGIRH.
7. Aliev A., Volobuev V.R. Pochvy Azerbaydzhanskoy SSR. Baku: Izd-vo Akad. nauk AzSSR, 1953. 451 s.
8. Mamedov N.M. Ekologiya i ustoychivoe razvitiye. M., 2013. 365 s. EDN: SQQGWB.
9. Genkel' P.A. Soleustoychivost' rasteniy i puti ee napravlennoy povysheniya. Vyp. 12. M.: Izd-vo Akad. nauk SSSR, 1954. 84 s.
10. Mammadov T., Ashrafova Sh. Climate Change Impact on the Absheron Peninsula Vegetation // Byulleten' nauki i praktiki. 2022. T. 8. №5. S. 102–111. doi: 10.33619/2414-2948/78/12.

Дополнительная информация

Сведения об авторе:

Ахмадзаде Гюнель Тарлан кызы, магистр; Бакинский центральный ботанический сад, Азербайджанская Республика; AZ1073, Азербайджанская Республика, г. Баку, Бадамдарское шоссе, 40.



В этой статье под лицензией Creative Commons Attribution 4.0 International License, которая разрешает копирование, распространение, воспроизведение, исполнение и переработку материалов статей на любом носителе или формате при условии указания автора(ов) произведения, защищенного лицензией Creative Commons, и указанием, если в оригинальный материал были внесены изменения. Изображения или другие материалы третьих лиц в этой статье включены в лицензию Creative Commons, если иные условия не распространяются на указанный материал. Если материал не включен в лицензию Creative Commons, и Ваше предполагаемое использование не разрешено законодательством Вашей страны или превышает разрешенное использование, Вам необходимо получить разрешение непосредственно от владельца(ев) авторских прав.

Для цитирования: Ахмадзаде Г.Т.к. Некоторые принципы использования растений в ландшафтной архитектуре Апшерона // Экология и строительство. 2023. № 1. С. 4–9. doi: 10.35688/2413-8452-2023-01-001.

Additional Information

Information about the author:

Ahmadzade Gyunel Tarlan kyzy, Master degree; Baku central botanical garden, Republic of Azerbaijan; AZ1073, Azerbaijan Republic, Baku, Badamdar highway, 40..



This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

For citations: Ahmadzade G.T.k. Some principles of using plants in landscape architecture of Absheron // Ekologiya i stroitelstvo. 2023. № 1. P. 4–9. doi: 10.35688/2413-8452-2023-01-001.