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ANALYSIS OF THE NATURAL AND CULTURAL DENDROFLORA OF THE NORTH-WESTERN ZONE OF THE GREATER CAUCASUS

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АНАЛИЗ ПРИРОДНОЙ И КУЛЬТУРНОЙ ДЕНДРОФЛОРЫ СЕВЕРО-ЗАПАДНОЙ ЗОНЫ БОЛЬШОГО КAVKAZA

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Abstract. The role of specially protected natural monuments in the conservation of biological diversity is irreplaceable. Many reserves have been established in order to expand the network of specially protected natural areas of the Republic of Azerbaijan, to preserve biodiversity, and to use natural resources efficiently. Along with the State Nature Reserves, new parks and gardens have recently been built, with Eldar pine, acacia, alder, beech, etc. in the natural flora. Along with plants, trees and shrubs of the world flora (new species of catalpa, juniper, pine, cypress, etc.) were widely used. The research revealed that 81 species of natural flora and 36 species of alien flora were used in landscaping. Among the plants belonging to the alien flora, lilac catalpa, Kokatan tecoma, Japanese daisy, evergreen cypress plays a dominant role in the cultural flora on landscaping. The most commonly used species of local flora are oak, juniper, white acacia, sycamore, maple, hornbeam, ash, linden. The cultural dendroflora of Zagatala-Balakan region is represented by 44 taxa and 117 species of trees and shrubs of 91 genera; including 4 families, 7 genera and 16 species of gymnosperms; according to their life-stages: 42 species of trees, 51 species of shrubs, 5 species of lianas, 13 species of ornamental flowers, 1 species of cover plants; There are 80 species of natural flora and 37 species of alien flora.

Аннотация. Роль особо охраняемых природных памятников в сохранении биологического разнообразия незаменима. Многие заповедники созданы для расширения сети

особо охраняемых природных территорий Азербайджанской Республики, сохранения биоразнообразия и эффективного использования природных ресурсов. Наряду с государственными природными заповедниками в последнее время создаются новые парки и сады, в природной флоре которых эльдарская сосна, акация, ольха, бук и др. Так же используются деревья и кустарники мировой флоры (новые виды катальпы, можжевельника, сосны, кипариса и др.). В ходе исследований установлено, что в озеленении использован 81 вид природной и 36 видов чужеродной флоры. Среди растений, принадлежащих к чужеродной флоре, доминирующую роль в культурной флоре при озеленении играют катальпа сиреневая, текома кокатанская, маргаритка японская, кипарисовик вечнозеленый. Наиболее часто используемые виды местной флоры: дуб, можжевельник, белая акация, платан, клен, граб, ясень, липа. Культурная дендрофлора Закатало-Балаканского района представлена 44 таксонами и 117 видами деревьев и кустарников 91 рода; в том числе 4 семейства, 7 родов и 16 видов голосеменных растений; по жизненным формам: 42 вида деревьев, 51 вид кустарников, 5 видов лиан, 13 видов декоративных цветов, 1 вид почвопокровных растений; насчитывается 80 видов природной и 37 видов чужеродной флоры.

Keywords: biodiversity, nature reserves, relict species, endemic plants, cover plants, gymnosperms, life-stages.

Ключевые слова: биоразнообразие, природоохранные территории, реликтовый вид, эндемичные растения, почвопокровные растения, голосеменные, жизненные формы.

Introduction

The main purpose of our research is to study and compare the taxonomic composition of newly built parks and gardens, green areas. The following is a brief description of the natural and cultural dendroflora of the regions. Gakh, Zagatala and Balakan, located in the north-western zone of the Greater Caucasus, have a special place due to their natural resources. Flora biodiversity includes mainly Caucasian, boreal, ancient, steppe and xerophytic flora elements. It is rich in relicts and endemics of the Arctoalpine and Ice Ages, reflecting the characteristics of the forest, high mountain meadow regions of the Greater Caucasus. Trautvetter maple (*Acer trautvetteri* Medw.), Nizami rose (*Rosa nisamii* Sosn.), Azerbaijan rose (*Rosa azerbaijdzhanica* Novopokr. & Rzazade) and others. The climate of these regions is moderately hot and humid. The subtropical climate manifests itself [1–9].

In the territory of Balakan, Zagatala, Gakh regions, which are included in the north-western slope of the Greater Caucasus, the vegetation changes as it rises above sea level in accordance with the law of high zoning of mountainous areas. These areas include alder (*Alnus*), wingnut (*Pterocarya pterocarpa* (Michx.) Kunth), poplar (*Populus hybrida* M. Bieb.), long-stemmed oak (*Quercus pedunculiflora* K. Koch), juniper (*Juniperus*) sparse and partially Iberian pistachio. is coming. Iberian oak (*Quercus iberica* Steven) and *Carpinus caucasica* Grossh. predominate in the low mountain-forest belt of the mountainous zone at an altitude of 1000–1100 m above sea level. Oriental beech (*Fagus orientalis* Lipsky), Caucasian oak (*Quercus macranthera* Fisch. & C. A. Mey. ex Hohen.), Trautvetter maple (*Acer trautvetteri* Medw.) and birch (*Betula*) forests in the mountain-forest zone of 1800–2000 m. In this zone, small areas of Caucasian rhododendron (*Rhododendron caucasicum* Pall.), which is the only one for the territory of our republic, are found in the Zagatala reserve [8, 9].

In the mountainous part of the southern slopes of the Greater Caucasus, mainly beech (*Fagus*) 85.6 thousand ha, oak (*Quercus*) 45.6 thousand ha and hornbeam (*Carpinus*) 45.8 thousand ha are spread. Forest of other tree species (birch — *Acer*, elm — *Ulmus*, birch — *Betula*, walnut — *Juglans*,

chestnut — *Castanea*, Christ's-thorn — *Paliurus spina-christi*, linden — *Tilia*, blackberry — *Taxus baccata*, Caucasian date — 81% lot) *Diospyros*, artificial trees make up only 19%. *Pinus hamata* (Steven) Fomin trees grow on the rocky passes and steep bare rocks at an altitude of 800–1000 m above sea level in the Filizchay (Balakenshay) basin on an area of about 10 hectares. These candles are relics of the ice age. In the territory of Gakh, Zagatala, Balakan districts, mainly oak-hornbeam and beech-hornbeam forests dominate. In the plain forests, apple (*Malus* Mill.), cherry plum (*Prunus divaricata* Ledeb.), maple (*Acer caucasica* L.), European ash (*Fraxinus excelsior* L.), hornbeam (*Carpinus caucasica* L.), jasmine (*Syringa vulgaris* L.), hawthorn (*Crataegus* L.), cornelian cherry (*Cornus mas* L.), Byzantine filbert (*Corylus colurna* L.), walnut (*Juglans regia* L.), oak (*Quercus macranthera* F.), willow (*Salix* L.), linden (*Tilia* R.), mulberry (*Mespilus* L.), European cranberrybush (*Viburnum opulus* L.), beech (*Fagus orientalis*), blackberry (*Taxus baccata* S. F. Gray) and others plants are also found. Cornelian cherry (*Cornus mas* L.) is more widespread along the slope in the protection zone. At the foot of the slope (at an altitude of 772 m above sea level, the common cornel is 2.4–6.0 m high, with a trunk diameter of 14–34 cm) is closely intertwined with other plants: hawthorn (*Crataegus* L.), apple (*Malus* Mill.), chestnut (*Castanea sativa* Mill.), oak (*Quercus* L.) and cherry plum (*Prunus cerasifera* Ehrh.).

The nature of Zagatala region is very rich. About half of the territory of Zagatala is covered by forests. The relief of the region is mountainous and plain. There are many forests in the region, but they are mainly located in the mountains and foothills. The flora of Zagatala region is rich in various valuable tree species. More than 900 plant species are distributed in Zagatala State Nature Reserve. 11 species of plants are included in the “Red Book” of the Republic of Azerbaijan due to their rarity and scarcity. Here grows a coniferous blackberry, a hooked pine tree and Caucasian rhododendron, which is unique to the flora of Azerbaijan and is of great scientific interest and belongs only to the Zagatala reserve [7].

Due to such richness of nature, Zagatala State Nature Reserve was established in 1930. Heydar Park, one of the recreation and tourism zones in Zagatala, was built in 1947 and covers an area of 13 hectares. There are 27 species of trees. The Balakan region is characterized by a humid subtropical and mountain-tundra climate. There are 4 climate zones in the region. It is temperate and semi-humid in the plains and foothills, cold and humid in the highlands. 65% of the region has a subtropical climate zone. Balaka's rich forest cover makes up 5% of the country's forest resources. In their forests, oak, hornbeam, beech, alder, acacia, etc. trees grow. 3/4 of the Zagatala reserve, the second largest in Azerbaijan, falls on the territory of Balakan region. Average temperature in January –1.5; –7.8 degrees, in July +10.5; +24.5 degrees. Annual precipitation ranges from 600 to 1400 mm. The maximum temperature is usually observed in July and can reach +37 degrees.

Gakh region is mainly known as the region of berries (hazelnuts, chestnuts, walnuts). Abundant water resources, normal moisture balance, fertile lands, forests, alpine and subalpine meadows, winter pastures ensure the development of agriculture and livestock. The region is one of the most important forest resources of the Republic. Oak, hornbeam, elm, walnut, chestnut, various fruit trees, medicinal plants are the rich resources of the forests here. In order to protect and increase this wealth, Ilisu State Nature Reserve was established. Most of the reserve falls on the village of Agchay [1, 2].

Material and methodology

The analysis of the life forms of trees and shrubs in the newly established parks and gardens, greenery in the studied areas was carried out according to the system of I. G. Serebryakov [10, 11], C. R. Raunkier [12].

Annual growth of old plants V. V. Smirnov, A. A. Molchanov [3], phenological observations were carried out according to generally accepted methods [2], the obtained results were analyzed. To assess the prospects of introducing plants, Sokolov S. Ya., Shishkin B. K. method [13], the indicators of plants in the new conditions were collected and the degree of perspective was determined [14]. In Gakh, Zagatala and Balakan regions, 4 species of trees and shrubs used in the newly established park and garden ecosystem, 16 species of 7 genera belong to gymnosperms, and 101 species of 84 genera belonging to 40 genera belong to 40 species, including 4 families and 10 genera of 10 species. The species belongs to the ornamental flowers. During the biomorphological analysis, it was found that 42 species of trees, 57 species of shrubs, 5 species of lianas, 2 species of lawns were used in the formation of the park-garden ecosystem in those areas (Table 1).

Table 1

LIFE-STAGES OF PLANTS USED IN LANDSCAPING

Number of species	Life-stages of plants			
	Tree	Bush	Lian	Herbs
117	42	57	5	13



Figure 1. *Nandina domestica* Thunb. and *Centranthus ruber* (L.) DC.

The research revealed that 81 species of natural flora and 36 species of foreign flora were used in landscaping. Among the plants belonging to the foreign flora, lilac catalpa, Kokatan tecoma, Japanese daisy, evergreen cypress plays a dominant role in the cultural flora — landscaping. The most commonly used species of local flora are oak, juniper, white acacia, sycamore, maple, hornbeam, ash, linden (Table 2).

New species introduced during the study: *Lagerstroemia indica* L., *Euonymus japonica* L., *Spiraea japonica* L., *Weigela florida* (Bunge) A. DC., *Photinia serrulata* Lindl., *Arbutus unedo* L., *Nandina domestica* Thunb., *Symphoricarpos albus* (L.) S. F. Blake, *Magnolia grandiflora* L., *Centranthus ruber* (L.) DC. and so on. growth and development phases were compared with the conditions of Zagatala-Balakan region and Absheron and it was found that the stages of growth and phenological development of these species start 7–10 late in those regions compared to Absheron, annual growth is 10–12 cm more (Table 3, Figure 2).

Table 2

TAXONOMIC COMPOSITION OF PLANTS USED

<i>Family</i>	<i>Genus</i>	<i>Species</i>
Gymnosperms		
<i>Cupressaceae</i>	3	8
<i>Pinaceae</i>	2	6
<i>Taxodiaceae</i>	1	1
<i>Taxaceae</i>	1	1
Angiosperms		
<i>Celastraceae</i>	1	1
<i>Fagaceae</i>	1	4
<i>Rosaceae</i>	3	5
<i>Moraceae</i>	2	2
<i>Aceraceae</i>	1	4
<i>Oleaceae</i>	3	4
<i>Asteraceae</i>	7	7
<i>Buxaceae</i>	1	1
<i>Arecaceae</i>	2	2
<i>Tiliaceae</i>	1	1
<i>Berberidaceae</i>	2	2
<i>Leguminosae</i>	5	5
<i>Caprifoliaceae</i>	4	6
<i>Bignoniaceae</i>	2	2
<i>Asparagaceae</i>	1	1
<i>Ericaceae</i>	2	2
<i>Platanaceae</i>	1	1
<i>Betulaceae</i>	1	1
<i>Cannaceae</i>	1	1
<i>Vitaceae</i>	2	2
<i>Malvaceae</i>	3	3
<i>Salicaceae</i>	2	2
<i>Magnoliaceae</i>	1	1
<i>Lamiaceae</i>	1	1
<i>Lamiaceae</i>	2	2
<i>Ebenaceae</i>	1	2
<i>Musaceae</i>	1	1
<i>Juglandaceae</i>	2	2
<i>Corylaceae</i>	2	3
<i>Anacardiaceae</i>	2	2
<i>Lauraceae</i>	1	1
<i>Punicaceae</i>	1	1
<i>Cornaceae</i>	1	1
<i>Ulmaceae</i>	1	1
<i>Agavaceae</i>	1	1
<i>Euphorbiaceae</i>	1	1
<i>Salicaceae</i>	1	1

Family	Genus	Species
<i>Hamamelidaceae</i>	1	1
<i>Ranunculaceae</i>	1	1

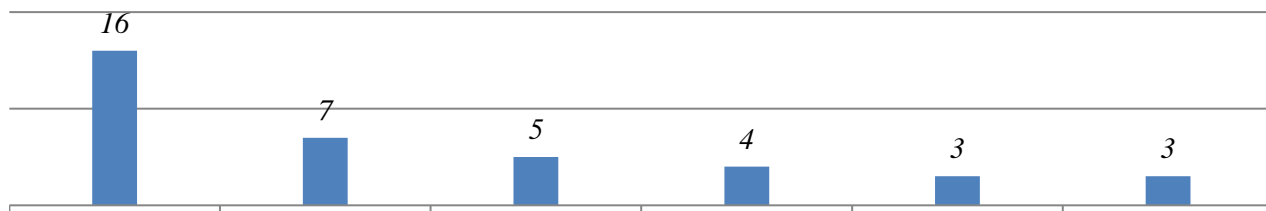


Figure 2. Genus represented by species

Table 3

COMPARATIVE ANALYSIS OF PHENOLOGICAL DEVELOPMENTAL STAGES
 OF SOME NEWLY INTRODUCED SPECIES

Species	Opening of leaves	The beginning of growth	Budding	Flowering		Seed ripening	Annual height increase, cm
				start	end		
<i>Lagerstroemia indica</i> L.	10.IV±8	03.V±8	08.VIII±5	15.VIII±5	25.VIII±4	28.IX±7	16,0 ±4
<i>Euonymus japonicus</i> Thunb.	04.III±5	25.III±5	12.IV±5	18.V±4	29.V±4	10.IX±6	11,0±5
<i>Spiraea japonica</i> L. f.	10.IV±5	18.IV±5	15.VI±4	10.VII±4	30.VIII±3	18.X±4	9,5 ±4
<i>Weigela florida</i> (Bunge) A. DC.	01.IV±8	16.IV±4	14.V±7	25.V±7	10.IX±6	05.X±5	12,5±8
<i>Photinia serratifolia</i> (Desf.) Kalkman	30.III±5	15.IV±3	19.IV±6	03.V±6	25.V±5	11.IX±5	17,0±5
<i>Arbutus unedo</i> L.	02.IX±8	07.IX±6	12.VII±6	24.IX±6	23.XII±5	10.VII±5	12,5±5
<i>Symphoricarpos albus</i> (L.) S.F. Blake	01.IV±5	20.IV±5	05.V±5	25.V±5	14.VI±4	07.IX±4	7,0±4
<i>Magnolia grandiflora</i> L.	27.III±8	15.IV±8	07.VI±6	27.VI±7	20.VIII±6	20.IX±6	37,0±5
<i>Centranthus ruber</i> (L.) DC.	29.III±6	20.IV±5	25.V±5	10.VI±5	15.VIII±5	10.X±5	15,0±6

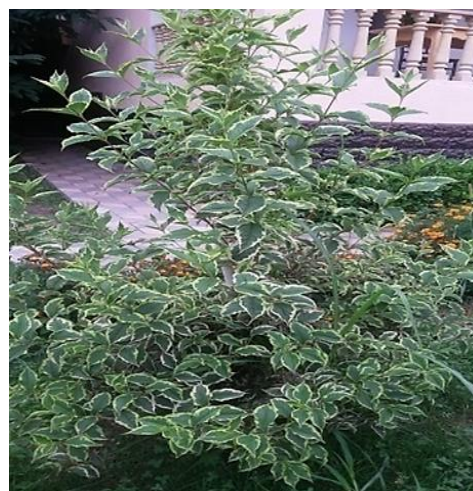


Figure 3. *Lagerstroemia indica* L. and *Cornus mas* L.



Figure 4. *Actinidia chinensis* Planch. and *Juniperus scopulorum* Sarg.

Conclusion

The cultural dendroflora of Zagatala-Balakan region is represented by 44 taxa and 117 species of trees and shrubs of 91 genera; including 4 families, 7 genera and 16 species of gymnosperms; according to their life forms: 42 species of trees, 51 species of shrubs, 5 species of lianas, 13 species of ornamental flowers, 1 species of lawn plants; There are 80 species of natural flora and 37 species of foreign flora.

References:

1. Mamedov, T. S. (2007). Entsiklopediya komnatnykh rastenii. Baku.
2. Vasilchenko, I. T. (1979). Opredelitel' vskhodov sornykh rastenii. Leningrad. (in Russian).
3. Molchanov, A. A., & Smirnov, V. V. (1967). Metodika izucheniya prirosta drevesnykh rastenii. Moscow. (in Russian).
4. Beideman, I. N. (1974). Metodika izucheniya fenologii rastenii i rastitel'nykh soobshchestv. Novosibirsk. (in Russian).
5. Zaitsev, G. N. (1981). Fenologiya drevesnykh rastenii. Moscow. (in Russian).
6. Misnik, G. E. (1982). Kalendar' tsveteniya i plodonosheniya derev'ev i kustarnikov. Moscow. (in Russian).
7. Volf, E. V., & Maleeva, O. F. (1968). Mirovye resursy poleznykh rastenii. Leningrad. (in Russian).
8. Mamedov, T. S. (2011). Dendroflora Azerbaidzhana. II-III. Baku. (in Russian).
9. Mamedov, T. S. (2010). Derev'ya i kustarniki Apsheronu. Baku. 468 s.
10. Serebryakov, I. G. (1952). Morfologiya vegetativnykh organov vysshikh rastenii. Moscow. (in Russian).
11. Serebryakov, I. G. (1962). Zhivye formy vysshikh rastenii i ikh izuchenie. *Polevaya geobotanika*, 3. Moscow. (in Russian).
12. Raunkiaer, C. (1934). The life forms of plants and statistical plant geography; being the collected papers of C. Raunkiaer. *The life forms of plants and statistical plant geography; being the collected papers of C. Raunkiaer*.

13. Sokolov, S. Ya., & Shishkin, B. K. (1949-1965). *Derev'ya i kustarniki SSSR: Dikorastushchie, kul'tiviruemye i perspektivnye dlya introduktsii*. Moscow. (in Russian).
14. Plotnikova, L. S. (1972). *Metodika fenologicheskikh nablyudenii v botanicheskikh sadakh SSSR*. Moscow. (in Russian).

Список литературы:

1. Мамедов Т. С. Энциклопедия комнатных растений. Баку, 2007. 397 с.
2. Васильченко И. Т. Определитель всходов сорных растений. Л.: Колос, 1979. 344 с.
3. Молчанов А. А., Смирнов В. В. Методика изучения прироста древесных растений. М.: Наука, 1967. 95 с.
4. Бейдеман И. Н. Методика изучения фенологии растений и растительных сообществ. Новосибирск: Наука, 1974. 155 с.
5. Зайцев Г. Н. Фенология древесных растений. М.: Наука, 1981. 120 с.
6. Мисник Г. Е. Календарь цветения и плодоношения деревьев и кустарников. М.: Лесная промышленность, 1982. 144 с.
7. Вольф Е. В., Малеева О. Ф. Мировые ресурсы полезных растений. Л., 1968.
8. Мамедов Т. С. Дендрофлора Азербайджана. Т. II-III. Баку: Наука, 2011. С. 311–392.
9. Мамедов Т. С. Деревья и кустарники Апшерона. Баку, 2010. 468 с.
10. Серебряков И. Г. Морфология вегетативных органов высших растений. М.: Советская наука, 1952. 392 с.
11. Серебряков И. Г. Живые формы высших растений и их изучение // Полевая геоботаника. Т. 3. М.-Л.: Изд. АН СССР, 1962.
12. Raunkiaer C. The life forms of plants and statistical plant geography; being the collected papers of C. Raunkiaer. 1934.
13. Соколов С. Я., Шишкин Б. К. Деревья и кустарники СССР: Дикорастущие, культивируемые и перспективные для интродукции. М.; Л.: Изд-во АН СССР, 1949–1965.
14. Плотникова Л. С. Методика фенологических наблюдений в ботанических садах СССР. М.: Изд-во ГБС, 1972.

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