

UDC 581.9.  
AGRIS P01

<https://doi.org/10.33619/2414-2948/62/04>

## RESEARCH AND PROTECTION OF THE COASTAL PSAMMOPHYTE-DESERT VEGETATION OF ABSHERON NATIONAL PARK

©*Gurbanov E.*, Baku State University, Baku, Azerbaijan, [elshadqurbanov@bsu.edu.az](mailto:elshadqurbanov@bsu.edu.az)

©*Guseinova H.*, Institute of Botany of Azerbaijan NAS,  
Baku, Azerbaijan, [humirahuseynova@bsu.edu.az](mailto:humirahuseynova@bsu.edu.az)

## ИССЛЕДОВАНИЕ И ЗАЩИТА ПРИБРЕЖНОЙ ПСАММОФИТНО-ПУСТЫННОЙ РАСТИТЕЛЬНОСТИ АПШЕРОНСКОГО НАЦИОНАЛЬНОГО ПАРКА

©*Гурбанов Э. М.*, Бакинский государственный университет, г. Баку, Азербайджан,  
[elshadqurbanov@bsu.edu.az](mailto:elshadqurbanov@bsu.edu.az)

©*Гусейнова Х. З.*, Институт ботаники НАН Азербайджана,  
г. Баку, Азербайджан, [humirahuseynova@bsu.edu.az](mailto:humirahuseynova@bsu.edu.az)

*Abstract.* Absheron National Park was established based on Absheron State Nature Lowland in 783 hectares of the territory of Khazar district of Baku city by the decree of the president of the country on February 08, 2005; the main purpose is to provide the protection of environment, efficient use, protection of endangered rare plant species, the development of ecotourism, organization of the tourism and recreation zones and environmental enlightenment. For this purpose, the geobotanical research of the psammophyte-desert vegetation formed in the ecosystem (biogeocenosis) of Absheron National Park which located in the part of Suiti cape and Shahdili of the Caspian Sea in Absheron peninsular were executed by the method of “route” on May-June of 2018–2019 and the following were identified. As it can be seen from “The classification of the vegetation of Northern and southern Caspian coast” made up by us for the first time, 2 formation classes, 4 formation groups and 7 associations have been determined in the psammophyte-desert vegetation that formed in the territory of Absheron National Park.

*Аннотация.* Апшеронский национальный парк создан на базе Апшеронского государственного природного заповедника на 783 га территории Хазарского района г. Баку Указом Президента Азербайджанской Республики от 8 февраля 2005 года. Основная цель: обеспечение защиты окружающей среды, эффективное использование, защита редких видов растений, находящихся под угрозой исчезновения, развитие экотуризма, организация туристско-рекреационных зон и экологическое просвещение. С этой целью в мае-июне 2018–2019 гг. были проведены геоботанические исследования псаммофитно-пустынной растительности, сформировавшейся в экосистеме (биогеоценозе) Апшеронского национального парка на мысе Суити и Шахдили методом «маршрутов». Как видно из составленной нами впервые классификации растительности северного и южного побережья Каспия, в псаммофитно-пустынной растительности, сформировавшейся в 2015 г., выделено 2 класса формаций, 4 группы формаций и 7 ассоциаций на территории Апшеронского национального парка.

*Keywords:* biocenoses, phytocenoses, formation, association, dominant, subdominant.

*Ключевые слова:* биоценозы, фитоценозы, формация, ассоциация, доминант, субдоминанты.



### Introduction

Geobotanical research of psammophyte-desert vegetation formed in the ecosystem of Absheron National Park located in Shahdili and Suite cape of the Caspian Sea in Absheron peninsula [1] were carried out by “route” method in May–June 2018–2019.

To make efficient use of the natural ecosystem, the phytocenological structure of the region was studied by conducting geobotanical studies on the Caspian coast, as well as an ecological-geobotanical map was compiled (Figure).

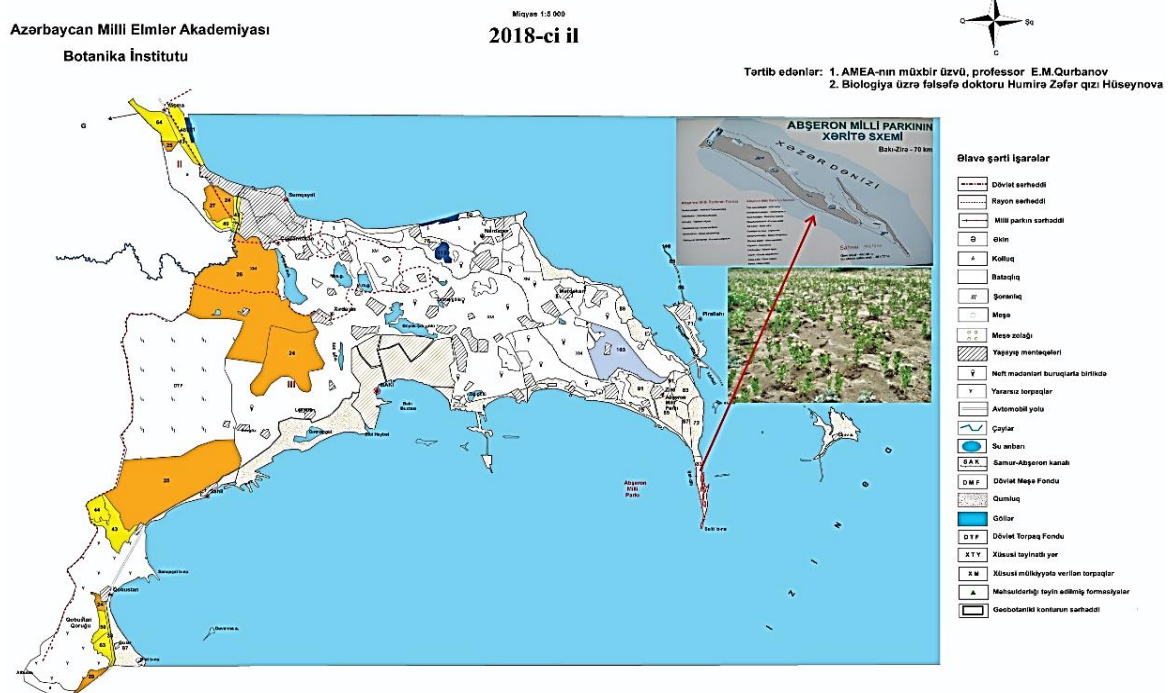


Figure. Ecological-geobotanical map.

During the field research, the species composition of vegetation, modern phytocenological classification of plants, endemic, rare, endangered and included in the “Red Book” [2], as well as dominant and subdominant species distributed in the National Park vegetation It is reflected in the electronic map and recommendations on sand protection measures have been prepared.

### Materials and methodology

It was recorded in the coastal psammophyte-desert phytocenosis of the Caspian coastal strip of Absheron National Park [3], as well as geobotanical parameters of ivy-argusion (*Convolvuletum–Argusiosum*) formations selected as “object of study” [4] were studied according to the methodologies.

Numerous herbariums collected from the vegetation of the National Park in the chamber stage [5] in accordance with systematic taxa [6] “Synopsis of the flora of Azerbaijan” [7], “Natural monuments of the Absheron Peninsula” [8], based on “geobotanical descriptions”.

In the Absheron peninsula [9], 29 endemic species from the Caucasus and Azerbaijan are found in the species composition of phytocenoses with more than 500 plant species; 5 of them are endemic plants of Absheron.

The climatic conditions of the National Park are of the dry desert and dry steppe type in summer; The average annual temperature varies between 10–14 °C and the amount of precipitation reaches 130–140 mm. The climatic conditions of the area have a direct negative impact on the

structure and productivity of plants. Here formed on weakly saline gray-brown and sandy soils [10] psammophyte and littoral vegetation are distributed at altitudes of –26 to +60 meters above sea level. The sands were formed as a result of sediments and abrasions of the sea [11] Factors that directly affect vegetation in the sand dunes depending on the environment and relief are wind erosion or deflation and sea transgression.

According to the results of the scientific research, in the territory of the National Park, it was observed that the annual grass was left under the sand and dried due to the wind. However, wind-resistant shrubs and semi-shrubs complete their vegetation on the sand. Here, coastal psammophyte groups are formed in a wider area than the phytocenoses of meadows and swamps [12], which are characteristic of intrazonal vegetation [6].

### *Results and its discussion*

For the first time, we have identified 2 formation classes, 4 formation groups and 7 associations in the psammophyte-desert plant formed in the territory of Absheron National Park. Also, based on the results of the research, a “Map of the Middle Part of the Caspian Coast” was compiled at a scale of 1: 5,000 (Figure 1).

The phytocenological classification of the studied coastal-psammophyte desert vegetation is given below:

#### I. Type Psammophyte–Desert

##### I. Formation class *Psammophyte–Littoral*

*A. form. gr. — Artemisietum–Astracomthosum*

*A.-1.-a) ass. — Artemisietum arenaria – Astracanthosum igniarius*

*A.-2.- a) ass. — Artemisietum scoparia – Astracanthosum caspica*

*B. form. gr. — Juncusetum–Artemisiosum*

*B.-1.-a) ass. — Juncusetum acutus – Artemisiosum arenaria*

*C. form. gr. — Alhagietum–Artemisiosum*

*C.-1.-a) ass. — Alhagietum pseudoalhagi – Artemisiosum scoparia*

*C.-2.-a) ass. — Alhagietum pseudoalhagi – Artemisiosum arenaria*

##### II. Formation class *Littoral–Argusiosum*

*D. form. gr.— Convolvuletum–Argusiosum*

*D.-1.-a) ass. — Convolvuletum arvense – Argusiosum sogdiana*

*D.-2.- a) ass. — Convolvuletum persica – Argusiosum*

The species composition and structure of the vegetation cover is noted in the Absheron National Park, as well as in the Pirallahi Island, taking into account the prevalence of the ivy-argusia formation in the widest dry and moist sands.

There are 19 species of higher plants in the species composition of the *Convolvuletum-Argusiosum* formation (Table).

As can be seen from the geobotanical description, out of 19 recorded plant species, 4 species (21,0%) are shrubs, 10 species (52,6%) are perennial grasses, 1 species (5,3%) are biennial grasses and 4 species (21,0%) are annual grasses. According to ecological groups, 9 species (47,4%) are psammophytes, 3 species (15,8%) are xerophytes, 2 species (10,5%) are mesophytes, 2 species (10,5%) are mesoxerophytes, 2 types (10,5%) are hydrophytes and 1 type (5,3%) are halophytes.

The dominance of the formation is *Argusia sogdiana* (Bunge) Czer. The abundance is 3–4 points, and the subdominant is *Convolvuletum persicus* L., which is estimated at 2–3 points.

Due to its structure, *Tamarix ramosissima*, *Calligonium aphyllum*, *Ephedra distachya* shrubs are found on the first floor or tier of the phytocenosis, the average height of these shrubs reaches 100–200 cm.

Table.

*Convolvuletum–Argusiosum* FORMATION OF ABSHERON NATIONAL PARK WITH  
*Argusia sogdiana* (Bunge) Czer. DOMINANCE

№	Biomorph species	Ecological groups	Abundance (with points)	Surface floor and height	Phenological phases
<i>Hands</i>					
1	<i>Tamarix ramosissima</i> Lebed.	mesoxerophyte	1–2	I	flow.
2	<i>Calligonum aphyllum</i> (Pall.)	psammophyte	1–2	I	veg.
3	<i>Ephedra distachia</i> L.	xerophyte	1	I	veg.
4	<i>Astragalus igniarius</i> Popov	psammophyte	1	II	veg.
<i>Perennial grasses</i>					
5	<i>Argusia sogdiana</i> (Bunge) Czer.	psammophyte	1	III	flow.
6	<i>Convolvulus persicus</i> L.	psammophyte	3–4	III	flow.
7	<i>Juncus littoralis</i> C. A. Mey		1–2	I	veg.
8	<i>Artemisia arenaria</i> DC.	psammophyte	1–2	II	veg.
9	<i>Glycyrrhiza glabra</i> L.	mesophyte	1–2	II	flow.
10	<i>Phragmites austrosilis</i> (Cav.) Trin. ex Steud.	hydrophyte	1	I	veg.
11	<i>Alhagi pseudalhagi</i> (Biab.) Fisch.	mesoxerophyte	1	II	veg.
12	<i>Melilotus polonicus</i> (L.) Pall	psammophyte	1	II	flow.
13	<i>Xanthium strumarium</i> L.	xerophyte	1	II	flow.
14	<i>Aeluropus reflexaristata</i> (Nevski) Nevski	mesophyte	1	III	veg.
<i>Biennial grasses</i>					
15	<i>Tripholium vulgare</i> (L.)	psammophyte	1–2	III (20)	flow.
<i>Unity horses</i>					
16	<i>Lolium rigidum</i> Gaudin.	xerophyte	1–2	III (25)	flow.
17	<i>Petrosimonia brachiata</i> Pall.	halophyte	1–2	III (15)	veg.
18	<i>Ammochloa palaestina</i> Boiss.	psammophyte	1	III (10)	flow.
19	<i>Plantago arenaria</i> Waldst. et Kit.	psammophyte	1	III (5)	flow.

On the second floor of the vegetation there are *Astragalus igniarius* Popov, *Artemisia scoparia* and others. The abundance of species is 1–2 points, the height corresponds to 80–30 cm.

On the third floor there are *Argusia sogdiana*, *Convolvuletum persica* (considered the dominant and subdominant of the formation), *Lolium rigidum*, etc. the average height of the species varies between 30–10 cm; *Ammochloa palaestina*, an endemic plant of Azerbaijan, is spread on this floor one by one (1 point) and its height is 10 cm [7, 12].

The average height of grass cover is 20–40 cm, and the total project cover is 60–80%.

Discussion of results. According to the results of scientific research, due to the intensification of anthropogenic and man-made impacts of the coastal psammophyte-desert vegetation of the Absheron National Park, the species composition of the phytocenosis has weakened, its structure has become sparse and secondary vegetation has formed there. Therefore, psammophytes spread in the absorbed sandy areas.

It is recommended to implement the following comprehensive protection measures to prevent the possible environmental hazards caused by wind erosion and vegetation degradation on the Caspian Sea coast in the territory of the National Park:

–*Salix caspica*, *Elaeagnus angustifolia*, *Tamarix ramosissima*, *Juncus littoralis*, *Phragmites*

*australis*, *Artemisia scoparia*, etc., depending on the degree of salinity of groundwater in the consolidation of coastal sands (phytomeliorative works). Creation of a forest strip using psammophyte species.

–Regular phytocenological research in “semi-stationary” conditions by studying the bioecological characteristics of psammophyte plants in the area.

–Creation of a buffer zone between the Zira administrative-territorial district on the border of the park, as well as the elimination of the prohibition of grazing, anthropogenic and man-made impacts.

–Application of the above-mentioned recommendations on measures for the protection of psammophyte-desert vegetation on a scientific and practical basis will create a basis for the protection of phytocenoses and purification of the ecosystem of the Absheron National Park.

#### References:

1. Gurbanov, E. M. (2013). Ecological and geobotanical map of vegetation of the Absheron Peninsula (M 1: 1000000). Baku. (in Azerbaijani).
2. (2013). Red Book of the Republic of Azerbaijan. Baku, 676.
3. Agadzhanov, S. D. (1969-1971). Psammofitno-litoral'naya rastitel'nost' pribrezhnoi polosy Azerbaidzhana. Baku. (in Russian).
4. Yaroshenko, P. D. (1961). Geobotanika: Osnovnye ponyatiya, napravleniya i metody. Moscow, Leningrad, 474. (in Russian).
5. Cherepanov, S. K. (1995). Sosudistye rasteniya Rossii i sopredel'nykh gosudarstv (v predelakh byvshego SSSR). St. Petersburg, 990. (in Russian).
6. (1950-1961). Flora Azerbaidzhana. Baku, vol. I-VIII. (in Russian).
7. Askerov, A. M. (2011). Konspekt flory Kavkaza (s dopolneniyami i izmeneniyami, 1961-2009). Baku, 204. (in Russian).
8. Yusifov, E. F., Isaev, N. S., & Askerov, F. S. (2003). Natural Monuments of the Absheron Peninsula. Baku, 424.
9. Akhundova, A. A. (2012). Bioecology, protection and restoration of vegetation of the Absheron Peninsula: Ph.D. diss. Baku.
10. Mailov, A. I., & Alieva, S. M. (1997). Puti uplotneniya peskov, vynosimykh na kaspiskom poberezh'e Apsherona. Baku. (in Russian).
11. Gakhramanova, M. Kh. (2004). Ecological analysis of psammophytic-littoral flora of the Absheron Peninsula and its geographical connections. *Proceedings of the Institute of Botany of the Azerbaijan*, vol. XXV, Baku, 324-327.
12. Efendieva, Sh. M. (2009). On the biological study of the flora of the acquired Caspian sands. *Proceedings of the Institute of Botany of the Azerbaijan*, vol. XXIX, Baku, 306-310.

#### Список литературы:

1. Гурбанов Е. М. Эколого-геоботаническая карта растительности Апшеронского полуострова (М 1: 1000000). Баку, 2013. (на азерб. яз.).
2. Красная Книга Азербайджанской Республики. Баку, 2013. 676 с.
3. Агаджанов С. Д. Псаммофитно-литоральная растительность прибрежной полосы Азербайджана. Баку, 1969-1971.
4. Ярошенко П. Д. Геоботаника: Основные понятия, направления и методы. М.; Л.: Изд-во Акад. наук СССР. 1961. 474 с.

5. Черепанов С. К. Сосудистые растения России и сопредельных государств (в пределах бывшего СССР). СПб: Мир и семья-95, 1995. 990 с.
6. Флора Азербайджана. Баку, 1950-1961. Т. I-VIII.
7. Аскеров А. М. Конспект флоры Кавказа (с дополнениями и изменениями, 1961–2009). Баку, 2011. 204 с.
8. Юсифов Э. Ф., Исаев Н. С., Аскеров Ф. С. Памятники природы Апшеронского полуострова. Баку, 2003. 424 с.
9. Ахундова А. А. Биоэкология, защита и восстановление растительности Апшеронского полуострова: дисс. ... канд. биол. наук. Баку, 2012.
10. Маилов А. И., Алиева С. М. Пути уплотнения песков, выносимых на каспийском побережье Апшерона. Баку. 1997.
11. Гахраманова М. Х. Экологический анализ псаммофитно-литоральной флоры Апшеронского полуострова и ее географических связей // Труды института ботаники НАН Азербайджана. Т. XXV. Баку, 2004. С. 324-327.
12. Эфендиева Ш. М. К биологическому изучению флоры приобретенных песков Каспия // Труды института ботаники НАНА. 2009. Т. XXIX. С. 306-310.

*Работа поступила  
в редакцию 07.12.2020 г.*

*Принята к публикации  
12.12.2020 г.*

---

*Ссылка для цитирования:*

Gurbanov E., Guseinova H. Research and Protection of the Coastal Psammophyte-Desert Vegetation of Absheron National Park // Бюллетень науки и практики. 2021. Т. 7. №1. С. 49-54. <https://doi.org/10.33619/2414-2948/62/04>

*Cite as (APA):*

Gurbanov, E., & Guseinova, H. (2021). Research and Protection of the Coastal Psammophyte-Desert Vegetation of Absheron National Park. *Bulletin of Science and Practice*, 7(1), 49-54. <https://doi.org/10.33619/2414-2948/62/04>