BIOLOGICAL SCIENCES

COMPARATIVE ANALYSIS OF PLANT ASSOCIATIONS RECORDED WITH THE PRESENCE OF *JUNIPERUS FOETIDISSIMA* WILLD. IN AZERBAIJAN

Gurbanov E.
Corresponding member of NAS of Azerbaijan
Doctor of Biological Sciences, Baku State University , Baku, Azerbaijan
Mammadova Z.
Doctor of Biological Sciences, Baku State University , Baku, Azerbaijan
Rzayeva A.
PhD, Baku Engineering University Baku, Azerbaijan
Huseynova H.
PhD, Baku State University Baku Azerbaijan
https://doi.org/10.5281/zenodo.14003796

Abstract

Ecological monitoring and evaluation of coenopopulations of rare and endangered species are very relevant in terms of enrichment and protection of wild flora. In this regard, we paid special attention to the ecological evaluation of *Juniperus foetidissima* Willd. included in the Red Book of Azerbaijan. In the wild flora, this plant is distributed in the territory of the republic in the Nakhchivanchay basin, in the territory of the Lesser Caucasus and Shamkir region, in the lower and middle mountainous belt of the Dubrar mountain, in the territory of Gobustan and in the territory of the Turyanchay State Nature Reserve**.**

Juniperus foetidissima Willd. is a species that requires little care and is included to the Red Book of Azerbaijan under categories A4a; Bb (ii, iii, iv)[126] [132]. Depending on the life form, they are sometimes up to 16 m tall, pyramid-shaped umbrella trees or 1.5 m tall shrubs. The branches of the plant are quite dense and form an oval umbrella. The branching is mostly monopodial and the branches are curved upwards in an arcuate direction. The bark is gray, in young trees it becomes brownish-reddish. The branches are dense, quadrangular, the bark can be easily turn off. Coniferous leaves are all scaly, dark green in color, elongated rhomboid or lanceolate rhomboid in shape, 2-10 mm long, not tightly joined to the stem. The tips of the conifers are usually sharp and give off an unpleasant smell when crushed. In some cases, young trees with conifers arranged in three-by-three balls are also encountered, in this case, the length of the conifers is 4-10 mm and the width is 2 mm. The plant is monoecious or dioecious. The berry-shaped cones are about 10 mm in diameter, egg-shaped or yellow, black-reddish, in most cases black with a wax-like covering. The seeds are 1-2, rarely 3, oval-shaped, light-brown in color.

Among the methods used for the biomorphological description of the age periods of plants, the system proposed by Gatsuk is both very practical and suitable for conifers with variable life forms such as juniper. The Gatsuk system can be described for the juniper plant as follows

1. Berry-like cone: It takes at least three years for the shell to fall to the ground and the seeds to germinate. Seeds undergo long-term stratification before germination.

2. Germ stage: The formation of sprouts from seeds takes place in about 10 years. During this period, the main root is actively developing. Over 10 years old, the growth of the main root stops or becomes very weak, instead, the development of side and additional roots accelerates. The growth rate is 2.7-2.9 cm per year.

3. Juvenile period: age 10-15 years, height varies between 0-3 meters depending on life form. A juvenile plant is distinguished by its unbranched or monopodial branching stem from the seedling. The root system consists of vertical main roots and lateral side roots. Juvenile plant stands out for its shade tolerance. During this period, growth is about 7-7.5 cm per year

It should be noted that the structure of the leaves of the juniper plant changes during the ontogenetic periods. In a 15-year-old juvenile plant, the leaves are needle-shaped, unlike the reproductive plant.

4. Immature period. This period covers 20-30 years. Although it has the external structure characteristic of an old plant, such a plant cannot produce seeds and fruits or produces very few.

5. Early maturity period: trees that begin to reproduce at the age of 30-50 belong to this category.

6. Mature reproductive period: Junipers reach their maximum fertility at the age of 80-100

The main botanical and ecological characteristics of the coenopopulation recorded during the study are reflected in table 1. The table also lists the altitude of the coenopopulations above sea level, degree of isolation, soil types, recorded plant communities and percentage of total vegetation cover.

As can be seen from the list, the first SP1 coenopopulation was recorded in the Nakhchivanchay basin at an altitude of 600-1000 m above sea level. Annual rainfall is 250-300 mm and the area is dominated by semi-desert and desert vegetation. This coenopopulation is well isolated and the vegetation density is low.

SP2 is observed in the Lesser Caucasus region in the northwest of the Republic of Azerbaijan. It is subjected to high anthropogenic pressure and the rate of precipitation here ranges from about 300-350 mm.

SP3 occupies well-isolated areas on Mountain Dubrar. The influence of the anthropogenic factor is moderate here. Mostly this region is used by tourists every year, but the wild vegetation has been preserved in the highlands.

SP4 Gobustan is located 450-500 m above sea level in a very small area with very high impact of anthropogenic factor and very low nutrient soil conditions.

The SP5 coenopopulation, distinguished by a high percentage of isolation, covers the territory of the Turyanchay State Nature Reserve. This area was established in 1958 to protect rare pistachio-juniper arid forests. The density of vegetation in the area is quite high. The soil cover is clay and the amount of rainfall in this area is low.

The naming of plant communities in the table is adapted to the system proposed by Mucina and others.

Table 1.

Main characteristics of the studied coenopopulations of *Juniperus foetidissima* Willd

Coenopopulations	CP1	CP2	CP3	CP4	CP5
Attitude	600-1000	300-350	400-420	450-500	400-650
Exposure	High	Low	Low	Medium	High
Topography	Black	Black	Black	Sandy	Clay
Plant associations	SAB-03B Juniperion excelso-foetidissimae Em.ex Matevski et al. 2010 *Junipero-Crataegnosum*	SAB-03B Juniperion excelso-foetidissimae Em.ex Matevski et al. 2010 *Junipero-Crataegnosum*	RHA-01I Brachypodio pinnati-Juniperion communis Mucina all. nov. hoc loco *Junipereta-Astragalosum*	SAB-03B Juniperion excelso-foetidissimae Em.ex Matevski et al. 2010 *Juniperotum*	SAB-03B Juniperion excelso-foetidissimae Em.ex Matevski et al. 2010 *Juniperotum Elaeagnosum*
Density ind./m^2	4	12	4	2	7
Cover	35%	65%	40%	20%	40%

References:

1. Gatzuk, L. E. Ontogenetic stages of trees: an overview / L.E. Gatzuk, O.V.Smirnova, L.I. Vorontzova, L.B. Zaugolnova, L.A. Zhukova // Journal of Ecology , - 1980, 68 (3), - p. 675–696.

2. Gurbanov E.M. Rzayeva A.A. Evaluation Of Decorative Properties Of Some Coniferous Plants Introduced to Absheron Peninsula. Acta Botanica Caucasica . 2022 December pages 3-7

3. Gurbanov E.M. , Naglaa Y , Abdallah, Mammadova Z.J. Asadova K.A. , Ahmed Elkordy Floristic Diversity and Phytogeography of Mil steppe-Azerbaijan, Journal of ecology of Health & Environment 2019 pages 21-30

4. Gurbanov E.M. Rzayeva A.A. Biomorphological Analysis and Identification of Subspecies of Juniperus communis in Azerbaijan. Asian Journal of Plant Science and Research, 2017 , 7(3) page 14-16

5. Gurbanov E.M. Rzayeva A.A. Comparative analysis of Juniperus communis L. (Cupressaceae) berry oils in Azerbaijan. International Conference "Chemical Science and Education, Problems and Prospects of Development", Dedicated to the International Year of the Periodic Table of Chemical Elements. Makhachkala,2019 , pages 150-153

6. Rzayeva A.A. Seed propagation of Juniperus foetidissima Willd.in Absheron. Bulletin Of Science and Practice 2021.№ 1 pages 55-58

7. Huseynova H.Z. New distribution areas of some species of plants on the southern part of the Caspian coast. Biosystems diversity Oles Honchar Dnipro National University Ukraine 2023 31 (1) p 123-130

8. Huseynova H.Z. Vegetation of the southern part of the Caspian coast and its nutritional value. Biosystems diversity Oles Honchar Dnipro National University Ukraine 2022 31 (3) p 205-212

9. Mammadova Z. J. Seed Productivity of Some Leguminous Plants Studied at the Level of Cenopopulation in Azerbaijan, Bulletin Of Science and Practice 2020, .№ 6 pages 58-65

10. Vegetation of Europe: hierarchical floristic classification system of vascular plant, bryophyte, lichen and algal communities /L. Mucina et al. // Applied Vegetation Science , -2016, -Volume 19 (Supplement 1) ,-p. 24-190