



# IJSRM

INTERNATIONAL JOURNAL OF SCIENCE AND RESEARCH METHODOLOGY

An Official Publication of Human Journals



Human Journals

**Research Article**

December 2017 Vol.:8, Issue:2

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## Eco-Biological Characteristics of the Main Components of the Eldar Plain Vegetation Cover of Azerbaijan



**IJSRM**  
INTERNATIONAL JOURNAL OF SCIENCE AND RESEARCH METHODOLOGY  
An Official Publication of Human Journals



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**Submission:** 19 November 2017  
**Accepted:** 29 November 2017  
**Published:** 30 December 2017



HUMAN JOURNALS

[www.ijsrm.humanjournals.com](http://www.ijsrm.humanjournals.com)

**Keywords:** phytocenosis, dominant, subdominant, xerophyte, *Pistacia mutica*, *Pinus eldarica*, *Pyrus eldarica*, relic, endemic

### ABSTRACT

The article describes the edifice and subdirector species (*Pinus eldarica*, *Pyrus eldarica*, *Pistacia mutica* etc.), which forms the basis of plant phytocenosis in the Eldar Plain located in the Minor Caucasus botanical-geographical region of the Republic of Azerbaijan, it was found that most of them are relic, endemic and subdirector plants. Bioecological, phytocenological characteristics of edifier and subdirector species have been determined, also their role as a mediator was mentioned. The physiological characteristics of relic endemic and rare plants spreading in Eldar Plain Area were studied, it was determined that the condition of the plant complexes in the conservation area is satisfactory.

## INTRODUCTION

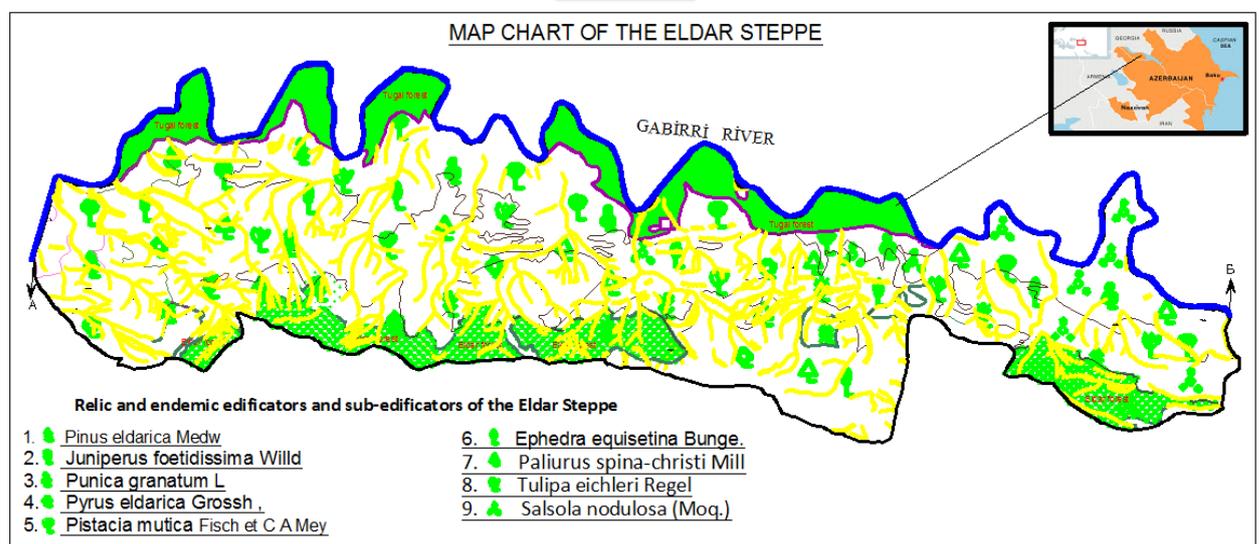
Eldar Plain is located in the Republic of Azerbaijan, and included in the Crimean peoples of the Caucasus, Transcaucasian depression province, Kura Province, Gabrire-Acinohur semi-province, Jeyranchol district according to the geomorphological division. Chobandagh (890m) and Palantukan (585m) ranges create complexity in the spelling of the territory. The surface trends vary in the range of 30-45-60o. Geomorphological structure consists of arid denudation badlands [Morfo-genetics of Azerbaijani lands., 2004]. Area belongs to Jeyranchol-Bozdagh district according to geobotanical division with majority of mountain xerophytes, degenerates semi-deserts, and the advantage of mountain xerophytic plant complex, degenerated wormwood composed of semi-deserts. The main elements of the area are landscape-type semi-desert, dry desert, and mountain-xerophytes. Territory has been geologically exposed to moderate exogenous processes. It is included in VIII-point seismic zone. 5 points earthquakes were recorded in the study area in 1972-1982. The sedimentary rocks, soil erosion, surface erosion, pseudo carbs prevail in the area [Shakuri et al., 2004]. Geological Paleocene and Middle Miocene systems are encountered in the area. It's mostly natural oil, bitumen is rich in oil and gas and the area is included in oil-gas prospective regions [Akhundova, 2007]. The lands of Eldar Plain are partly rotten, sulfate, lime and fully developed mountainous grayish, slightly dark and ordinary chestnut, gray-brown and saline grass and gray-brown soils. Soil solution is a substrate. [Mammadov *et al.*, 2001]. There are medium water and wind erosion in mountain chestnut and gray-brown soils, and weak wind and water erosion spread in meadow forest (Tugai forest) and brown soils. The soil's water-carrying capacity is poor and is between 0.5-1.0 mm [Aliyev, 2001]. Its territory is practically anhydrous. A small amount of atmospheric precipitation, uneven distribution of rainfall over seasons, fragmentation of the relief, widespread development of the raven and grid network, bad water conductivity of the rocks do not allow the collection of groundwater. The banks of the Iori River are covered with carbonate (tugai meadow-forest) soils. Climate type is temperate, mild, semi-desert and dry desert climate. Natural climate is inconvenient. Total photosynthetic active radiation is 64-68 kcal/cm<sup>2</sup>. The wind speed is 2.0-3.0 m / sec. in Eldar desert, including the white ridge zone. Mostly northern and eastern winds prevail. The average annual air temperature is 120 C, and the maximum temperature is 450 C.

Flora richness of the area with rare and endemic species has been repeatedly mentioned when studying vegetation of Azerbaijan [Ibadullayeva, 2011].

The study of Eldar Plain has been set as a goal based on the Decree of “State Program on Effective Use of Pastures and Desertification Prevention” by the President of the Republic of Azerbaijan dated 22 May 2004 [Decree by the President of the Rep. Of Azerb., 2004].

## MATERIALS AND METHODS

The research was carried out by geobotanical methods in Eldar Plain in 2006-2017 [Yareshenko,1953; Shennikov, 1964]. Desert studies were carried out with detail-route method and in the direction of laying of semiconductors, appointment of the collected materials in the cameral conditions. Researchers were carried out on 7 rounds within 168 days in spring, summer and autumn of each year. More than 1000 herbarium samples were prepared and 214 geobotanical descriptions were made. Depending on the complexity of the relief and the characteristics of the vegetation, the dimensions of the sample grounds were varied. For the first time, the geobotanical map of the area has been compiled, and the fields of permanent sample areas are shown on the geobotanical map (Map-scheme 1).



Map-scheme 1. Geobotanical map of Eldar Plain

## RESULTS AND DISCUSSIONS

Most of the ingredients and subdirectories that generate the phthalococcos of all plant complexes in the flora of the Eldar Plain are made up of relic endem and rare plant species.

Studies have shown that edificators place other plant species found in phytocenosis in their own environment, the species that are incompatible with the environment created are being spoiled. Edificators make more than 60-70% of productivity in phytocenosis created. Plants that form clusters in tier 2 are subdirectories. Subedificators are dominant plants on second half.

Edificators create favorable living conditions for survival of other species at the level of trophic relationships adopting a large part of energy and matter. The destruction of the edifier species means the disintegration of the ecosystem. Research has shown that there are only plants in the area that are never found on the planet. Therefore, they are called relic, endemic and subendic species.

Formations and groupings created by species of *Pinus eldarica*- *Juniperus foetidissima*, *Juniperus oxydisima*, *Juniperus polycarpus*, *Punica granatum*, *Pyrus eldarica*, *Pistacia mutica*, *Berberis iberica*, *Ephedra distachya*, *Ephedra procera* and etc. in Eldar pine forests are not found in any geographical area other than this area.

From woody plants, first of all, deserves attention *Pinus eldarica* creates independent cenoses Eldar pine-one of the most interesting species of Azerbaijan that is a tertiary relic. It is an endemic plant for Azerbaijan and a representative of the Red Book of the World and Azerbaijan Flora. This very interesting breed has long attracted the attention of many researchers. The only natural grove of the Eldar pine in the world on this Ridge was discovered in 1882. The Ellar Oyughu ridge, on which the Eldar pine grows, is located in the southeastern part of the Eldar steppe, on the right bank of the Iori River in the Samukh district of Azerbaijan, the territory is under the state reserve.

The arid spruce forest, dominated by Eldar, differs from other arid species spread in Azerbaijan with its specific features. Regular research of Eldar Plain Flora indicates that xerophyte sparse forest in this area has deep botanical-geographical roots. Associations created by species of *Pinus eldarica*+*Juniperus foetidissima*+*J.sabina*+*J.polycarpus*+*Punica granatum* + *Pyrus eldarica*+ *Pistacia mutica* and *Pinus eldarica* + *Berberis iberica*+ *B.vulgaris*+*Ephedra distachya*+ *E. procera* and etc. in Eldar pine forests are not found in any geographical area other than this area.

*Pinus eldarica* (Medw.) is evergreen tree. It has 10-15(25) m. height, straight or curved hull. Needles are in 8-10 (15) cm length. 2-4 groats are sometimes together, and sometimes they are

apart. The length of groats is 6-8 (12) cm. Grown groats have short stubs. Sometimes it is a seamy, longitudinal-oval or oval-cone shape. Seeds are dark brown, wingy with light brown color in a length of 6-9 (9) mm. It is dusted in April-May. Groats grow in August-September in the second year. Reproduces with seeds only. Dusting is anemophilous. Xerophyte. It is resistant to drought and heat in the Arid climate of research area. It is not demanding for land-ground conditions, they are resistant to land salinity. It grows on cracks and slopes of sandstone rocks and limestone rocks of the Eldar plain. The total area of the sparse arid forest that the gum tree and various juniper species formed in the research area is about 400 ha. *Pinus eldarica* dominates in the area of only 100-110 ha. In the remaining area, pine trees are formed by groups, with different types of juniper and gum tree, individually. Pine trees are located between 2, 4, 6 meters apart. It is Azerbaijan's relic, endemic type and is included in the "Red Book". "Those which is close to a hazardous level" refer to NT category [Red Book of Azerbaijan, 2013].

In the study area, there are three types of juniper (*Juniperus foetidissima*, *J. ohydissima*, *J. pollicarpo*). The species of *J. foetidissima* and *J. Pollycpoons* form a clean hemp in some areas, and in some areas it is encountered in a mixed association with other kinds of juniper.

*Juniperus foetidissima* (Willis) is a tree of 5-6 (12-15) m in height or a bush of 1.3-3 m. In height. Its Groats stand upright and slightly shaking. It is dusted in April-May. Reproduces with seeds. Groats fully grow in October-December for the second year. Xerophyte. Resistant to the drought and heat of the air. It is not demanding for soil-ground conditions, it is resistant to soil salinity. Lives up to 300-350 years. In the study area, it spread on low mountains up to 500 m above sea level. It forms sparse forests on dry slopes and ends in individual and grouped deciduous-carbonate, gray-brown soils, on stony and clay slopes, cliffs and rocks. Juniper and wild pistachio are one of the main plant species of sparse forest. In very few cases these dominate the forests.

It is the rare, relict species of Azerbaijan. In the red list of Azerbaijan, "Those which is close to a hazardous level" refer to NT category [Red Book of Azerbaijan, 2013]. Global IUCN Status is LC.

*Pyrus eldarica* (Grossh) flourishes in April. Its fruits grow in August-September. Cleavage is entomophily. Reproduces with seeds and root spots. It participates as edificator and sub edificator in associations with eldar pine and juniper on dry, rocky slopes of arid, sparse woods,

at altitudes of 300-600 m above sea level. The category and status of the species according to the IUCN Red List refer to the category of "Those which are under critical danger" - CR A2 abc; C1. It is a rare species of Azerbaijan. It is Caucasian endemic.

*Pistacia mutica* (Fisch. et C.A.Mey) is a tree with round umbrella and a height of up to 12m. Its stem is deep cracky. Its stem bark is gray-brown. The leaf is a complex single feather-like. Flowering is ahead of making leaves. It was formed on dry, leafy-chestnut spruce, broad-wooded synovase, gravel-arc thin, and forest synovases mainly in smaller areas of Ellar Oyughu hill of Eldar plain. In the Eldar plain, there is a wide range of dry, shrubbery-gum tree sparse forest synovase and large, gum tree- junipery sparse forest synovase is formed in small areas. *Pistacia mutica* is the most common type of both synovase. This spices is a key element of the association in a synovase with *Punica garanatum*+ *Berberis iberica*+*B. vulgaris*+*Pyrus eldarica*, together with these, 20-25 species of herbs are also make up a component. There are a lot of xerophytic herbaceous plants (*Dactylis glomerata*, *Poa bulbosa* and etc.) in their botanical composition. *Pistacia mutica* type is dominant, flourishing in April, fruits grow in August-September. Increases with seeds and stumps. It is drought-resistant, light loving, and soil demanding.

It belongs to "Those who are close to the interruption of a generation" - NT category. It is a rare type of relic of Azerbaijan.

*Paliurus spina-christi* Mill. is a relict plant. Of shrubs in the creation of vegetation Eldary, special attention deserves *P.spina-christi*. It is widespread not only in the east, the range of its distribution almost coincides with the area of pistachio. Currently, *P.spina-christi* Eldari creates as independent groupings against the background of a steppe grass cover and participates in the composition of arid sparse forests, foothills and plains and floodplain forests.

*P. spina-christi* is a very viable plant that easily adapts to various conditions, undemanding to soils; *P.spina-christi*, like a pistachio and a carcass, begins to become obliquely late from the second decade of April. Blossoms in May-June fructifies in September. Seeds have good germination. Seedlings are found everywhere within the distribution of *P. spina-christi*, even in the turfed bearded groups; it is a photophilous plant, therefore, forests occupy open spaces between trees and forest edges. In the forest, the number of stems undergrowth of shrubs is small, an average of 3-5; sometimes its height reaches to 3 m. In open areas in the undergrowth,

the stems develop more abundantly and reach 2 m in height. *P. spina-christi* has a highly developed root system, which in most cases branches from the root neck and extends to 5-6 m or more in depth. The diameter of the stem rarely reaches to 5-6 cm. The diameter of the root often exceeds 10 cm. Of course, a plant with such a powerfully developed root system in arid climatic conditions can exist only due to precipitating precipitation and can easily transfer the dry summer period.

*Punica granatum* (L.) is a high shrub in 2-4 m out, characterized by multi-stems and rapid growth. Short branches usually end in spines. Whole narrow, non-rigid leaves are not very abundant. In the pomegranate, as well as in the other above mentioned shrubs, the root system with lateral rhizomes is strongly developed. 06-The listing starts after everyone, from the 2nd half of April. Blooms in May-June, characterized by a very long flowering period. Fruits ripen in October. Propagated as seeds, as well as vegetatively by the roots. Garnet, although it grows in arid climate, cannot be attributed completely to xerophilic plants, since its habitats (stony bank of the river, cliff foot, cone-bearing stands, river forests) indicate that it uses a filtration-moisture. For a long drought, it responds with an early leaf fall. With regard to the frost-hardiness of the grenade, we can safely say that of the examined tree species is the most thermophilic distribution, so garnet in the upper part of the plateau, for example, in open spaces never occurs. It does not enter the floodplain forests of Alazani, where thermal inversions are noted. It is found on dry slopes in the Eldar plain, in valleys of Dabirry River, in the lower mountain ranges. Sometimes this plant creates small groupings.

The pomegranate, although it grows in arid climate, cannot be attributed completely to xerophilic plants, since its habitat is the stony bank of the river. Propagated as seeds, as well as vegetatively by radical growth.

It belongs to "Those who are sensitive to the interruption of a generation" -VU B1ab(i, ii, iii, v) + 2ab(i, ii, iii, v) category. It is a rare type of relic of Azerbaijan. Global IUCN status- LC.

*Junipers plicarpus* Koch. is twin, sometimes indivisible plant. It is a small tree with a height of 5-9 (12) m, or a bush with 1.5-4 m height. Its width is pyramidal and dense. In open places begins from the surface of the earth. Is a species loving light, drought-resistant, not demanding soil. *J. Polycarpus* in Eldar plain differs from the fact that there are more xerophytes, on dry slopes, they often form sparse forest with *Pyrus eldarica* and other Xerophyte bushes. It finishes

on stone-rocky slopes, cliffs individually and in groups. The areas with the multicolored juniper are rich in humus. In years with mild winters the upper part of the soil is covered with shabby and moss. It is resistant to saline soils of Eldar Plain.

*Tulipa eichleri* Regel is found in the preserved part of the research area in all the plant complexes and ends on stony and grassy slopes. It is flowering in April, fruiting occurs in May.

The bulging gets through the bulb and seed. It is a mesocerotit. It is a medicinal and ornamental plant. In recent years the abundance has increased in the reserve areas.

"Those who are sensitive to the interruption of a generation" belongs to VU A2c + 3c. category, unique for Azerbaijan, the endemic species of the Caucasus.

*Salsola nodulosa* (Moq.) primary small shrub, up to 30 cm tall, bush diameter 15-20 cm, from the base spread-branchy. Leaves are regular, small, up to 5 mm long, early falling off. Leaflets of the perianth are of two colors - purple and yellow-brown. Vegetation begins in the spring, from March, ends in September-October. Subendem plant. Salsoletum form on the Eldar plain plays an important role in the phytocenosis of winter pastures and performs earth-protective function by spreading on bare clay slopes. The type of *S.nodulosa* varies according to the morphogenesis characteristics in different environmental conditions.

Thus, according to the research conducted, in the unprotected part of Eldar Plain desert and semi-desert phytocenosis as part of winter pastures in surrounding areas are the main feed base by creating unique plant species, they are exposed to degradation process as a result of strong anthropogenic impact and this process is increasingly intensified and cause rare, endemic, useful, and so on. plant genetic resources in botanical composition of natural vegetation cover to fail.

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