



## THE NATURAL BIOCOENOSIS BIODIVERSITY AND ITS PROTECTION IN THE VILLAGE OF *SHEKI, BASH SHABALID*

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### Abstract

The results of the exploration, scientific research and biological research works that have been carried out in the spring-summer-fall seasons of 2015 in the North-West region of Azerbaijan, near the specially protected natural area of the village of *Bash Shabalid*, located in the *Shaki* region- the southern slope of the Greater Caucasus have been presented for the first time in this paper.

The results of the exploration of the landscape characteristics of the area belonging to the *Shinchay* basin, its land relief, physical and geographical conditions, geomorphological structure, soil structure, hydrological network and dendroflora are to be found here.

According to the obtained data the scheme plan of the landscape have been compiled and intended to be used for future research and for protection measures. The preliminary obtained data about the area and the results of the research give grounds to say that the area meets all criteria specific for the natural biocoenosis and it is regarded unique nature with its required components, interesting and scientifically important, wild and cultivated, with rich biodiversity relic and endemic plants and the need for protection of the gene pool.

The article also provides information about the protection of the area in the future and implementable ways of innovative approach and the methods ensuring the efficient use of all natural resources.

**Key words:** natural biocoenosis, landscape, hydrological network, dendroflora, biodiversity.

### MATERIALS AND METHODS

The results of exploration, scientific research and biological research works that have carried out in spring-summer-fall seasons of 2015 in the North-West region of Azerbaijan, near the specially protected natural area of *Bash Shabalid* village that is located in *Shaki* region- the southern slope of the Greater Caucasus is submitted for the first time in this manuscript (Pic. 1).

### RESULTS AND DISCUSSION

There are given the results of exploration of landscape characteristics of the area belonging to *Shinchay* basin, its land relief, physical and geographical conditions, geomorphological structure, soil structure, hydrological network and dendroflora.

Vegetation cover of the research area characterizes a variety of plantcoenosis as well as the vegetation of the Greater Caucasus, according to the principle of vertical zonal it started from plains and replace each other till the low and middle mountain zone [4].

### Geomorphology of the area and the physical-geographical condition

Arm range of Central mountainous zone (1000-1200 *m*) of the area at first stretches right up to 450-500 *m* from the North-West to the South-East in arched way. Then the same series of arms creates a pass of 90-100 *m* and leans toward from the NE to the NW. Again lengthen to the NE direction in 700-800 *m* this range continues to the North, it gradually reduces its height (up to 700-750 *m*) and gets to the *Sabalıdcay* river valley.

Though mountain slopes exposure is close to 50-60° in most areas, exposure of 30-40° areas dominate in this place. The indication of latitude and longitude values of natural reserve is according to 300-320 *m* and 650-700 *m*, the area is approximately equal to 19 000-20 000 *m*<sup>2</sup> (19-20 hectares).

The base of structural folding that matches to the syncline of *Khanyaylagi* forms carbonated sediments of sand and clay belonging to the lower Cretaceous period of *Valanjin* layer on the basis of *Shabalid* and *Kishchay* [8].



**Picture 1.** Geomorphology and the physical-geographical condition of Sheki, Bash Shabalid.  
Photo taken google map

According to the climate features one can distinguish low and high mountain zones in the area. The intensity of solar radiation is  $5,0-5,5 \cdot 10^6 C/sm^2$  in lower foothills and highlands. As the investigated natural landscape of Bash Shabalid covers the north slope of the middle and low mountains the solar radiation is lower than average of  $4,2-6,3 \cdot 10^5 C/sm^2$  in this area.

The average annual temperature amplitude varies between 20-25°C. According to A.C Eyubov (1998) the average temperature in July is 10-20°C in the mountainous areas, in the lower mountains reaches it is 20-25°C. The average annual precipitation is considered 600-800 mm, it does not differ from the characteristics of the climate of South slope of the Greater Caucasus but it may be exposed to temporary flood because of the geomorphological structure of the area. Such natural phenomena can be found in the spring and fall seasons includes with plenty of torrential rains that the daily amount is more than 20 mm.

Considering the fact that the daily amount of rain that is much more than 20 mm is typical for heights of 2200-2400 m and according to the study

the presence area is 800-1200 m and there is little opportunity for flood unlike the other areas of the Greater Caucasus.

Chemical composition of the soil types also changes depending on geomorphological factors as well as changing climate characteristics because of the heights. [7] Three types of soil differ from each other in the area. In the first place brown meadow soils spread on the river terrace (700-850 m height) formed by thick accumulative sediments. Soil layer thickness is 60-70 cm, as the amount of organic carbon is 5.95% this type of soil can be considered to be fertile soil in the NE region of Azerbaijan.

#### **Hydrological network of the area**

Hydrological network connecting the river system of Bash Goynukcay, Sabalidcay and located settlements around them is much more interesting.

Shin River Basin is equal to 306 sq. km. It is surrounded by Qaflan (2753 m) and the Great Erzenek Mountains (2376 m) from the west, Chahlı (3470 m) and Incedag Mountains (1714 m) from the east. The northern part of the basin along the border of Dagestan AR of Russian Federation



forms Greater Caucasus ridge. Here are Gara-gaya mountain (3466 m) from the west, Salavat pass (2852 m) in the central part and Seyidyurd mountain (3690 m) in the west. Shin River takes its beginning from water of melting snow of the Seyidyurd mountain slopes. Its Seyidyurdchay, Karakayachay and Chahilchay tributaries in the upper streams are much muddy and watery. Water level tributaries of Bash Goynukchay, Kuruchay and Shabalidchay are much less, they have teamed up under the name of the river Murdarçay and dump to Ayrichay together with the separated tributaries of Shinchay [3].

Inside the natural protected area of Bash Shabalid there are opportunities to create underground water resources because of atmospheric precipitation and absorption of collected melting snow on the ground in winter. Subsoil waters passing through the western and northern part of the area and flowing towards the river valley even creates flood when approaches to the joint of Shabalidchay. Depending on the area's landscape in several places from the mountainous part to the water ditch there are eroding and dense tree cover valleys. The bottom of the creeks are washed even in the eastern part of the conservation area and low water flows can be visible in the bottom of the creeks in the areas released from the soil.

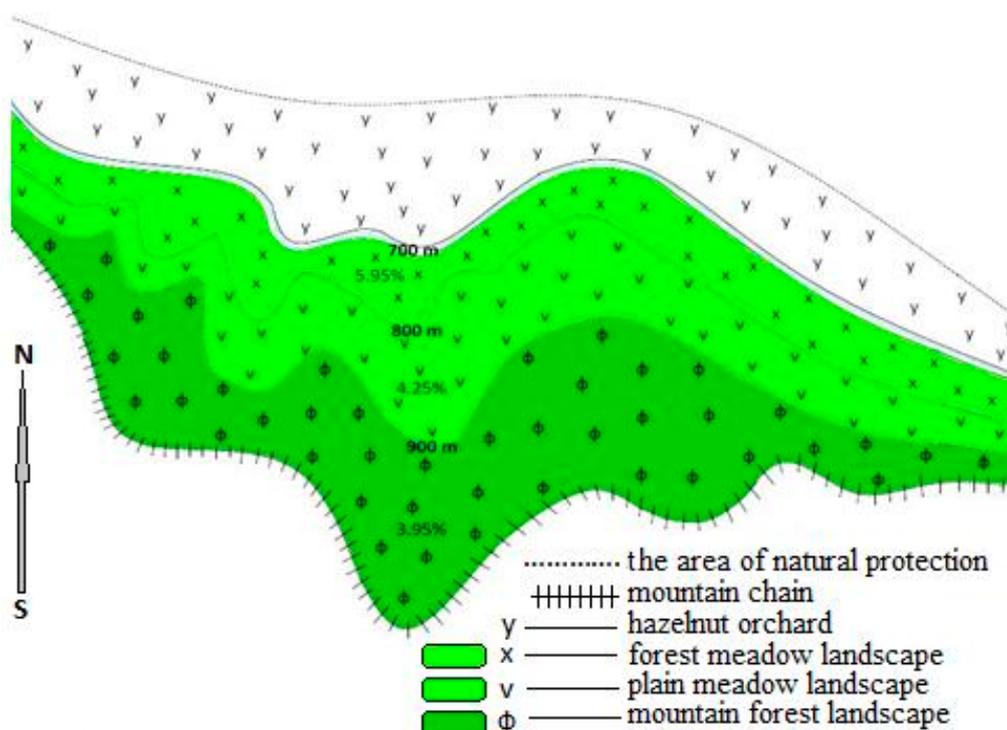
### Landscape features of the area and its dendroflora

Landscape features of natural protected area of Bash Shabalid generally signifies for its number of unique features and recreational characteristics in the southern slope of the Greater Caucasus [2].

The highest areas rising up to 1200-900 m cover the average density of mountain forests. Parts of the trees in the forest are specially hornbeam, beech and oak trees but there are also chestnut, poplar, birch trees. The lower levels of the mountain slopes grow to a height of about 900 m. Approximately 800 m below of this height from the East to the West direction the low-lying forest landscape area begins.

The main tree species is hornbeam. There are also second grade number of tree species. Oak, poplar, walnut, hazelnut, chestnut, apple, pear, hawthorn, ash, dogwood, buckthorn, plum trees are dominating in this area. At an altitude of 700-800 m low-lying forest meadow landscape stretches from east to west in the parallel direction of low-lying forests.

Hornbeam trees play main cause in the role of creative landscape [1, 4]. The whole tree species representing low-lying forest landscape and in addition to more or less represented type of landscape include hips, barberry, bilberry, blackberry bushes and many herbs (Pic. 2).



Picture 2. The schematic description of the natural landscape protection area of Bash Shabalid

Existence of different types of clover and plantain in herbs reports healthy type of landscape. The most interesting aspect for plain forests, meadow and forest types of landscape is in availability of existing walnut, hazelnut and chestnut trees in one place which is hardly met in the South Caucasus. This unique association union is possibly formed in connection of positional status that have created because of the average indicators of biocoenosis in South slope which is observable in lithological composition of climate, landscape and rocks of Bash Shabalid natural protected area.

Here the nut plant develops in the land formed due to calcium rock strata erosion belonging to the lower part of the Cretaceous period. Aluminum element mostly takes leading place in the flysch erosion of carbonate rocks soil belonging to the Teton range of Upper Jurassic era.

There are opportunities for development of nut plant in this kind of soils. Chimeric eroded soils by old flysch silicate rocks of The Upper Jurassic period are rich with magnesium. There are favorable conditions for the spread and development of chestnut plants in this type of soils.

#### Low altitude mountain

Here includes the area between the elevations which is 600-900 m above sea level. Humid, relatively warm and warm temperate climate types are available in this zone. Vegetation (forest) cover sharply differs from the low-lying zones. The following xerophyte and mesophyte plant species are found in the composition of grass cover plant compositions in the low altitude mountain: annual timothy (*Phleum paniculatum* L.), bladder-senna (*Colutea komarovi* L.), meadow fescue (*Festuca pratensis* H.), red clover (*Trifolium fragiferum* L.), horsemint (*Mentha longifolia* L.), dandelion (*Traxacum officinale* L.), cinquefoils (*Potentilla caucasica* L.), alfalfa (*Medicago sativa* L.), perennial rye-grass (*Lolium perenne* L.), shepherd's purse (*Capsella bursa-pastoris* L.), hop (*Humulus lupulus* L.), ripple grass (*Plantago major* L.), crabgrass (*Digitaria heist* L.), stargrass (*Cynodon dactylon*), wild strawberry (*Fragaria vesca* L.), cocksfoot grass (*Dactylis glomerata* L.), arum (*Arum albispatum* L.), evel (*Rumex konfertus* L.), elderberry (*Sambucus nigra* L.), garden orache (*Atriplex nitens* L.), carnation (*Aqrostemma qithaqo* L.), greater burdock (*Arktium transcasicum* L.), burweed (*Xanthium strumarium* L.) mountain-sorrel (*Oxyria hill* L.), lily-of-valley (*Convallaria transcasicica* L.), peppermint (*Mentha piperita* L.), tumbleweed (*Amaranthus albus* L.), redrootpigweed (*Amaranthus retroflexus yuqlans* L.) yellow gentian (*Gentiana caucasica* L.), winter cherry

(*Physalis alkekenqi* L.), male fern (*Dryopteris flix mas Schott*, L.) are widely spread. Wild buckwheat (*Polygonum convolvulus* L.), health-pea (*Vigia sativa* L.) blackberry (*Rubus vulgaris* L.), guelder rose (*Viburnum opulus* L.), garland thorn (*Paliurus spinachristi*), barberry (*Berberis vulqaris* L.), medlar (*Mespilus germanica* L.), purging buckthorn (*Rhamnus cathartica* L.) take the main place as shrubs. Within these plant-coenosis common hop (*Humulus lupulus* L.), garland thorn (*Paliurus spinachristi* L.) are considered to be endemic for the low altitude mountain.

Crap apple (*Malus orientalis* L.), plum (*Prunus divaricata* L.), hawthorn (*Crataegus caucacica* L.), cornelian cherry (*Cornus mas* L.), plum (*Prunus domestica* L.), common hazel (*Corylus Avellana* L.), hornbeam (*Capinus caucasica* L.), common chestnut (*Castanea sativa* L.), medlar (*Mespilus germanica* L.), walnuts (*Yuqlans regia* L.) were determined as wild trees, plants in the low mountain altitude [5].

#### Average mountain zone (partial)

This girdle covers an area between the elevations of 900-1200 m above the sea level. The climate is humid temperate, very humid and relatively mild. Vertical girdle regularities are observed for formation of plantcoenosis.

Oak-hornbeam, beech-hornbeam woodlands dominate in the South slopes. In addition to the composition of the forest field maple (*Acer Lind caucasiuca* L.) wild apple (*Malus orientalis* L.), plum (*Prunus divaricata* L.), hawthorn (*Crataegus caucasica* L.), cornelian cherry (*Cornus mas* L.), the hazelnut (*Corylus colurna* L.), oak (*Quercus maranthera* F.), hornbeam (*Capinus caucasica* L.), linden (*Tilia caucasica Rupr* L.), sweet chestnut (*Castanea sativa Mil* L.), medlar (*Mespilus germanica* L.), common ash (*Farxins excelsior* L.), cherries (*Cerasus avinum* L.), willow (*Salix caucasica* L.), walnuts (*Yuqlans regia* L.) Caucasian xurniyi (*Diasporos lotus* L.), yew (*Taxus baccata* L.), buckthorn (*Rhamnus cathartic* L.), peanuts (*Faqous orientalis* L.), elm (*Ulmus elliptica* L.) plants are widespread [6].

The oldest plants belonging to the end of the third period like turkish hazel (*Corulus colurna* L.), maple (*Acer Lind caucasica* L.), oriental nuts (*Faqous orientalis* L.), chestnut oak (*Quercus castanefolia* L.), yew (*Taxus baccata* L.), wing nut (*Pterocarya pterocarpa* L.), Birch (*Betula Pendula* L.) are widespread in this area as endangered relic species.

Thus preliminary bio research works carried out in the specially protected natural area of Bash Shabalid prove that the area is rich with endemic and relict plant species and protectio of biodiversity is needed.



Observations carried out in the area and soil and climatic, landscape features of the area, geomorphological structure, underground and surface water resources, rich dendroflora allows a gradual settlement process of other rare plants in the area with innovative methods, to enrich its flora and to ensure its protection.

Moreover in accordance with its landscape, the hydrological network of the area allows to implement the process of settlement of other wetland plants and hydrophilic plants at the expense of underground water resources through the establishment of an artificial lake in the area.

As a result of the initial research of the area there are discovered lianas with 8-10 cm in diameter which is typical for the tropical forests, also a number of wetland, ivy plants and moss and their range are planned to increase in the future.

Initially it is intended to enrich biodiversity through resetting the following meso and megaphanerophyte tree plants: Yuglans walnut (*Yuqlans manschurica Maxim L.*), gum tree (*Pistacia lentiscus L.*), nettle tree (*Celtis caucasica L.*), parrotia (*Parrotia persica L.*), acacia (*Acacia willd L.*), horse chestnut (*Aesculus hippocastanum L.*), buckthorn (*Hippophae Rhamnoides L.*), pear (*Sorbus caucasica L.*), bay (*Laurus nobill L.*), cherry laurel (*Laurocerasus roem L.*), cocculus indicus (*Paniculata koelreuteriya L.*), yellow sterculia (*Sterculia platanafolia L.*).

Preparation of the above-mentioned plants materials will be carried out by using the existing plants of Sheki Regional Research Center's gene pool garden.

## CONCLUSIONS

1. The nature area of Bash Shabalid village of Sheki region differs for its geomorphology, physical and geographical conditions, hydrological network and landscape. It covers flat, low and middle mountain girdles and is measured as unique nature area.

2. The initial bio research works prove that the area is rich in dendroflora and there are relic and endemic plant resources.

3. The area meets all the criteria that are specific to the natural biogeocoenose and it has required components, rich biodiversity and protection of gene pool is needed.

4. The settlement of other phanerophyte, hemicryptophyte, homefit, xerophyte, mezophite, hydrophite plants by innovative methods, to enrich its gene pool and to strengthen the protection of biodiversity are considered to be reasonable.

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