

About the reptiles of the Karabakh territories liberated from occupation and their habitats

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The presented article provides information about the reptiles (Reptilia) of Karabakh and the ecological changes that occurred in their habitats during the occupation. 37 species of reptiles are distributed in Karabakh. Of the reptiles, there are 3 species of turtles (Testudines), 19 species of lizards (Sauria) and 15 species of snakes (Serpentes). In Karabakh, reptiles are mainly distributed in the semi-desert, dry-steppe, xerophyte-steppe, forest-shrub landscapes (200-1500 m above sea level) of the plains, low and medium highlands. Reptiles are rarely found in subalpine and alpine meadows of the highlands (1900-3000 m above sea level), and in forest and meadow-shrub landscapes of the middle highlands (700-1500 m above sea level). In the Karabakh territories, which were subjected to looting and the destructive effects of war factors (I and II Karabakh wars) for a long time, fauna species, including the habitats of reptiles, have undergone quality changes. Densely populated settlements with intensive human activity (city, village, settlement, etc.), which are anthropogenic biotopes, are unfavorable for most reptile species. However, the natural landscape was restored in the ruins of uninhabited and destroyed cities and villages during the occupation period, and natural biotopes suitable for reptiles were created. In these biotopes, where there is no human presence, there are food resources that are important for the settlement of reptiles and shelters (ruins) suitable for hiding, laying eggs, and wintering. The creation of suitable habitat for reptiles in the ruined areas of the liberated Agdam, Fuzuli, Jabrayil, Zangilan and Gubadli regions of Karabakh has led to the dense settlement of reptiles in these areas. The widespread reptile species of these areas are dominated by snakes, especially the Levantine viper, which is a venomous species of snake. In the periods of high activity of reptiles (spring-summer months), there are more cases of encounters with these snakes, and it is appropriate to consider this factor from the point of view of the safety of people working in the areas.

Keywords: Occupation, reptiles, habitats, ruins, settlement

INTRODUCTION

Karabakh is one of the geographical areas of Azerbaijan rich in reptiles (Reptilia). The role of reptiles is important for the stability of fauna diversity in ecosystems. They are included in the feed ration of birds of prey and mammals, and at the same time, they participate in the regulation of the number balance of these species by feeding on small mammals (rodents), birds and chicks, and various invertebrates. Reptiles also benefit crops

and agriculture by eating and destroying pests and rodents. In this respect, they are also useful for forest protection, agriculture and horticulture. Therefore, the complications that occur in the reptile fauna do not go unnoticed for both nature and the population.

The territories of Karabakh were subjected to Armenian occupation for nearly 30 years, cities and villages were looted and turned into ruins, and were subjected to the destructive effects of war factors (I and II Karabakh wars).

Undoubtedly, all this has led to the diversity of fauna, including species of reptiles, qualitative changes in their habitats (vegetation, fauna composition, relief, calmness factors, etc.). Considering that reptiles are more sensitive representatives of the fauna to changes in the quality of their habitat, occupation factors are expected to have a greater impact on this fauna.

RESULTS AND DISCUSSION

The study of the available literature shows that 37 species of reptiles are distributed in the plains, foothills, mountainous areas and forests of Karabakh (Aleksperov, 1978; Aleksperov, 1982; Jafarova, 1984; Jafarova et al., 2014; Taxonomic spectrum of Azerbaijani fauna (Vertebrates, 2020). This is 58.7% of the reptile fauna of Azerbaijan (63 species). Among the reptiles, 3 species of turtles, 19 species of lizards and 15 species of snakes are common. In Karabakh, reptiles are mainly distributed in the semi-desert, dry-steppe, xerophyte-steppe, forest-shrub landscapes (200-1500 m above sea level) of the plains, low and medium highlands. In the subalpine and alpine meadows of the high highlands (1900-3000 m above sea level), in the forest and meadow-shrub landscapes of the middle highlands (700-1500 m above sea level), reptiles are rarely found (striped lizard - *Lacerta strigata*, true grass-snake - *Natrix tessellata*, *Natrix natrix* - ordinary grass snake, *Coronella austriaca* - common brown snake, South Caucasian rattlesnake - *Zamenis hohenackeri*).

3 species of reptiles (*Lacerta strigata*, *Natrix tessellata*, *Natrix natrix*) are found in all landscapes. Levantine viper (*Macrovipera lebetina obtusa* Dwigubsky, 1832), a poisonous snake dangerous for human life and agricultural animals, is widespread in the plains, foothills and mountainous arid areas of Karabakh (Aghdam, Fuzuli, Jabrayil, Zangilan, Gubadli). In the steppe-xerophytic and xerophytic mountainous areas of Karabakh (Kalbajar plains), another poisonous snake species belonging to the shield viper (*Vipera/Pelias*) - the Yerevan viper (*V. eriwanensis* Reuss, 1933) is also likely to spread (Aleksperov, 1982). During the Soviet period, hundreds of Levantine vipers were hunted every year from the arid areas of the plains and foothills of Karabakh

and used for the production of snake venom (Isgandarov, 2013, 2016). This supply was important for density regulation in viper snake populations in those areas.

6 species from the reptile fauna of Karabakh (Mediterranean tortoise - *Testudo graeca*, desert agama - *Trapelus ruderatus*, Asian naked eye - *Ablepharus pannonicus*, common brown snake - *Coronella austriaca*, Urartian elaphe - *Elaphe urartica* (= *Elaphe sauromates*) and South Caucasian elaphe - *Zamenis hohenackeri*) Included in the "Red Book" of the Republic of Azerbaijan (2013). Mediterranean turtle - *Testudo graeca* vulnerable (VU), Rostombeyov's lizard - *Darevskia rostmbekovi* are included in the "Red List" of the International Union for Conservation of Nature (IUCN) with the status of critically endangered (CR) species. *Testudo graeca* is also included in the list of species prohibited from international trade (CITES). Among the snakes, *Zamenis hohenackeri* and *Elaphe urartica* are endemic species of the Caucasus.

Reptiles are representatives of the fauna that are more sensitive to quality changes and pollution of the habitat. Degradation of habitat quality (disruption of natural vegetation, reduction of fauna composition, influence of anthropogenic factors, etc.) weakens and gradually destroys reptile populations. The elimination of anthropogenic impacts on the habitat and the restoration of a natural landscape favorable for reptiles strengthens the reptile population.

The monitoring carried out in the liberated areas of Eastern Zangezur (Fuzuli, Zangilan, Jabrayil and Gubadli) showed that biotopes suitable for reptiles were created in the place of ruined settlements (Figure).

Deterioration of the quality of habitats is mainly related to the human factor and occurs as a result of the transformation of natural areas into agrocenoses and anthropogenic biotopes (residences, fields and gardens). In agrocenoses and anthropogenic biotopes, the habitat conditions of reptiles only deteriorate, they are destroyed by people because of negative attitudes. Therefore, reptiles move away from such biotopes (cities, settlements, villages, gardens, fields, etc.) and settle more in areas with less anthropogenic load and human presence. Although the species of reptiles were mainly distributed in natural landscapes in the

pre-occupation period, the biotope landscape was different in the post-occupation period, and the transformation of anthropogenic biotopes (city,

town, village, etc.) into "natural" biotopes (ruins) during the occupation period changed the nature and range of the habitat of reptiles, including snakes.



Fig. Ruined settlements and restored natural landscape (grassy thickets) in liberated Fuzuli region, September 2022. Photo: G. Gasimova; *Levantine viper* (*Macrovipera lebetina obtusa* Dw.,1832). Photo: T.Iskenderov

During the period of occupation, information on Armenians' hostile attitude towards natural ecosystems, especially forests and rivers (deforestation, pollution of rivers, looting of natural resources, etc.), serious damage to nature, diversity of flora and fauna, destruction of territories and turning them into ruins were widely reported in the local press. It is known that in the absence of human presence and activity, a disturbed natural landscape or biotope (vegetation and fauna) gradually recovers itself. Therefore, during the occupation of Karabakh, natural biotopes recovered in these ruins without human presence and activity. In the areas of Agdam, Fuzuli, Jabrayil, Zangilan and Gubadli regions

that were freed from occupation, over time, densely populated areas and intensive economic activity, the characteristic vegetation (grass and bushes) of the natural landscape (semi-desert and steppe) has been restored, followed by the characteristic fauna composition (small mammals, birds, lizards, etc.) formed, endless ruins turned into "snakes crawling" deserts. In these restored natural biotopes, small mammal fauna (Mammalia) belonging to the groups *Insectivora* and Rodents - *Rodentia*, which are the feeding objects of reptiles, ground feeders belonging to the groups *Galliformes*, *Columbiformes* and *Passeriformes* of the bird fauna (*Aves*) and species that nest on the ground, in bushes, on

rocks, and on roofs are settled. Countless building ruins in the area are convenient shelters for reptiles to hide, lay eggs and hibernate. All these are biotic and abiotic factors that determine the dense settlement of reptiles in areas freed from invasion. Therefore, in the liberated territories of Karabakh (ruins and adjacent territories), a high density of reptiles, including snakes, is observed.

On the other hand, the influence of war factors (I and II Karabakh wars) on the nature of the distribution of reptiles in the territories freed from occupation should also be taken into account. During the active periods of the wars, the destruction caused by artillery, aviation and tank fires on the ground, and countless large and small defense fortifications and trenches, which were built, damaged the relief of the area. This type of terrain damage has a negative impact on populations by making it difficult for reptiles with limited mobility to move biotopes during feeding, breeding and wintering periods. As a result of the impact of such disturbing war factors, the reptiles were forced into the areas where these effects are less - the ruined areas, and the settlement in the ruined areas increased.

Thus, a dense population of reptiles can be observed in the liberated areas of Karabakh, especially in the ruined areas of Agdam, Fuzuli, Jabrayil, Zangilan and Gubadli regions. Among the widespread reptiles of these areas, snakes predominate, especially the Levantine viper, a species of venomous snake. During the periods when reptiles are more active (spring-summer months), there are more cases of encounters with snakes, and it is reasonable to consider this factor in terms of the safety of people working in the areas.

INNOVATIONS

In the studies, the species diversity of the reptile fauna in the Karabakh territories freed from occupation, the influence of biotic and abiotic factors related to occupation and war factors on the habitat of reptiles, the nature of distribution and settlement in the area were analyzed from an ecological aspect. Self-restoration of natural biotopes in settlements that were freed from occupation and turned into ruins, the absence of the

human factor created conditions for the dense population of reptiles, including snakes, in these areas. It is appropriate to consider the results of this study from the point of view of the safety of the people working in the construction stage in the occupied territories and the population during the "great return"

CONCLUSION

1. There are 37 species of reptiles in the liberated territories of Karabakh. 3 species of them are turtles, 19 species of lizards and 15 species of snakes. 6 species of reptiles common in the territories of Karabakh were included in the "Red Book" of the Republic of Azerbaijan (2013).
2. In Karabakh, reptiles are mainly distributed in lowland, semi-desert, dry steppes, as well as xerophyte-steppe, forest-shrub landscapes (200-1500 m above sea level). Reptile species are mostly settled in the territories of Agdam, Fuzuli, Jabrayil, Zangilan and Gubadli regions.
3. The lack of human presence and activity in the territories of Karabakh, which were reduced to ruins as a result of the occupation for many years led to the restoration of natural steppe and semi-desert biotopes (characteristic plant cover - grass and bushes, characteristic fauna - small mammals, birds, lizards, etc.) and so caused the dense population of reptiles in those areas.

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İşğaldan azad edilmiş qarabağ ərazilərinin sürünənləri (*Reptilia*) və onların yaşayış yerləri barədə

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Təqdim olunan məqalədə Qarabağın sürünənləri (*Reptilia*) və işğal dövründə onların yaşayış yerlərində baş verən ekoloji dəyişikliklər barədə məlumat verilir. Qarabağ ərazilərində 37 növ sürünən yayılmışdır. Sürünənlərdən 3 növ tısbağalar (*Testudines*), 19 növ kərtənkələlər (*Sauria*) və 15 növ ilanlardır (*Serpentes*). Qarabağda reptililər əsasən düzənliklərin, alçaq və orta dağlığın yarımsəhra, quru-bozqır, kserofit-bozqır, meşə-kol landşaftlarında (d.s.h. 200-1500 m) yayılıb. Yüksək dağlığın subalp və alp çəmənliklərində (d.s.h. 1900-3000 m), orta dağlığın meşə və çəmən-kol landşaftlarında (d.s.h. 700-1500 m) sürünənlərə az rast gəlinir. Uzun müddət işğal altında qalaraq talançılığa və müharibə amillərinin (I və II Qarabağ müharibələri) dağıdıcı təsirlərinə məruz qalmış Qarabağ ərazilərində fauna növlərinin, o cümlədən sürünənlərin yaşayış yerlərinin keyfiyyət dəyişmələri baş vermişdir. İşğal dövründə insan yaşamayan, viran edilmiş şəhər və kəndlərin xarabalıqlarında təbii landşaft bərpa olmuş, sürünənlər üçün əlverişli təbii biotoplar yaranmışdır. İnsan iştirakı olmayan bu biotoplarda, sürünənlərin məskunlaşması üçün vacib olan yem resursları və gizlənmək, yumurta qoymaq, qışlamaq üçün yararlı sığınacaqlar (xarabalıqlar) vardır. Qarabağın işğaldan azad edilmiş Ağdam, Füzuli, Cəbrayıl, Zəngilan və Qubadlı rayonlarının xarabalığa çevrilmiş ərazilərində sürünənlər üçün əlverişli yaşayış mühitinin yaranması bu ərazilərdə sürünənlərin sıx məskunlaşmasına səbəb olmuşdur. Geniş yayılmış sürünən növləri arasında ilanlar, xüsusən zəhərli ilan növü olan Levantin gürzəsi üstünlük təşkil edir. Sürünənlərin yüksək fəallıq dövrlərində (yaz-yay ayları) ilanlarla rastlaşma hallarına daha çox rast gəlinir və bu amilin ərazilərdə çalışan insanların təhlükəsizliyi baxımından nəzərə alınması məqsədəuyğundur.

Açar sözlər: *İşğal, sürünənlər, yaşayış yerləri, xarabalıqlar, məskunlaşma*

О рептилиях (*Reptilia*) и их местообитаниях на освобожденных от оккупации территориях Карабаха

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В статье представлена информация о пресмыкающихся (*Reptilia*) Карабаха и экологических изменениях, произошедших в местах их обитания во время оккупации. На территории Карабаха распространено 37 видов пресмыкающихся: 3 вида черепах (*Testudines*), 19 видов ящериц (*Sauria*)

и 15 видов змей (*Serpentes*). В Карабахе рептилии в основном, распространены в полупустынных, сухостепных, ксерофитно-степных, лесокустарниковых ландшафтах (200-1500 м над ур. м.) равнин, низких, средних и высоких гор. Рептилии редко встречаются на субальпийских и альпийских лугах высокогорий (1900-3000 м над уровнем моря), а также в лесных и лугово-кустарниковых ландшафтах среднегорья (700-1500 м над уровнем моря). На карабахских территориях, подвергшихся разграблению и разрушительному воздействию военных факторов (I и II Карабахские войны), в течение длительного времени местообитания видов фауны, в том числе рептилий, претерпели качественные изменения. Населенные пункты с большой плотностью населения и интенсивной деятельностью человека (город, деревня, поселок и др.) являются антропогенными биотопами, и неблагоприятны для большинства видов рептилий. Однако на руинах необитаемых и разрушенных в период оккупации городов и сел в настоящее время восстановлен природный ландшафт, созданы естественные биотопы, пригодные для рептилий. В этих биотопах, где нет человека, есть пищевые ресурсы, важные для расселения рептилий, и убежища (руины), пригодные для укрытия, откладывания яиц и зимовки. Создание подходящей среды обитания для рептилий на разрушенных территориях освобожденных Агдамского, Физулинского, Джебраильского, Зангиланского и Губадлинского районов Карабаха привело к плотному их расселению в этих районах. Среди широко распространенных видов рептилий в этих районах преобладают змеи, особенно левантийская гадюка, которая относится к ядовитым видам змей. В периоды высокой активности пресмыкающихся (весенне-летние месяцы) случаев встреч с этими змеями больше, и этот фактор целесообразно учитывать с точки зрения безопасности людей, работающих на участках.

Ключевые слова: *Оккупация, рептилии, местообитание, руины, поселение*