

Composition and Abundance of Reptile Species in Bukhara Region and Adjacent Territories

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Received 2021 October 25; **Revised** 2021 December 20; **Accepted** 2021 December 24

Annotation: Global environmental problems that are observed all over the world, in particular, the increased influence of anthropogenic factors on nature affect the distribution and bioecological characteristics of reptiles in biotopes. This leads to a shrinkage of the distribution area of reptiles, a reduction in their number in the territories located in the steppe zone of the Republic. The research analyzes the diversity, abundance, distribution by biotope and seasonal changes in the species composition of reptiles in the Bukhara region and its borders: Navoi, Kashkadarya, Khorezm regions

Introduction. A comprehensive study of reptiles which possess an essential role in nature aids to control their number as well as to preserve of ecological sustainability and diversity of reptiles. Thus, since the first years of independence, special attention has been paid to the issues of environmental protection, biodiversity conservation and rational use of biological resources in our republic. There are no enough studies conducted to learn composition, abundance, biotopic distribution, reproduction, seasonality and life expectancy of reptiles in the Bukhara region and adjacent territories. Our observations in order to determine the species composition of the reptile fauna in the Bukhara region and adjacent territories have been carried out from 2012 to 2022.

Material and methodology: Generally accepted [1] methods were used to determine the number of reptiles. The length and width of the passage varied depending on the characteristics of the biotope, day and night time. During days, the width of the route was set to 10 meters in natural landscapes, 2 meters in developed territories, 2 meters at night. The number of the lizards which are active at night, was counted after the daytime route, at different hours of the night after sunset and complete blackout. Calculations of the night route were carried out using conventional diode lights. 72 cases were counted in various natural biotopes - steppes, semi-deserts, foothills, natural reservoirs, gallery forests, partially altered territories, agricultural landscapes and developed urban zones by stationary and route method also by counting, observation, collection of samples carried out in different seasons of the year (spring, summer, autumn and winter). the works were carried out [2;3;4;6]. The studied territory is mostly made up of clay soils, rocky deserts, salt marshes and sand dunes. [12;13]. The captured reptiles were fixed with 5% formalin. Collections of reptiles (kept in the zoo museum of Bukhara State University) captured in different years were also used.

Climacopteraferganica, *Chenopodium album*, *Ceratocarpusutriculosus* grow in the saline desert, *Tamarix*, *Haloxylonpersicum*, *Haloxylonaphyllum*, *Descurainiasophia*, *Alhagipseudalhagi*, *Ammodendronconollyioccur* grow in the sandy desert, while in the clay desert *Artemisia diffusa*, *Anabasis eriopoda* and similar ephemerae. [7;8;9;14;15]. In recent years, construction and transport in these regions, as well as the construction of railways, gas pipelines have had an impact on the biodiversity of the region.[11;10]

Result and discussion. Based on the analysis of the field materials collected, it was found that there are 34 species of reptiles in Bukhara belonging to 2 large order (*Testudines*,*Squamata*), 3 suborder (*Sauria*, *Serpentes*, *Cryptodira*) and 11 families (*Geckkonidae*,*Agamidae*, *Angidae*, *Varanidale*, *Lacertidae* ,*Scincidae*,*Boidae*, *Colubridae*, *Elapidae*, *Viperidae*, *Testudinidae*) (Table 1). Territorial distribution of reptiles in the Bukhara region (2012-2022).

Table 1

S/n	Species	Protective status	Natural biotopes	Partially developed -	Urbanized biotopes
	Class. Reptilia				
	Order Squamata				
	Suborder. Sauria				
	Family. Gekkonidae				
1	<i>Crossobamoneversmanni</i>		+	+	
2	<i>Cyrtopodioncaspius</i>		+	+	
3	<i>Cyrtopodionfedtschenkoi</i>		+	+	
4	<i>Cyrtopodionrussowi</i>		+	+	
5	<i>Teratoscincusscincus</i>		+	+	
	Family. Agamidae				
6	<i>Phrynocephalushelioscopus</i>		+		
7	<i>Phrynocephalusinterscapularis</i>		+		
8	<i>Phrynocephalusmystaceus</i>		+		
9	<i>Phrynocephalus reticulatus</i>		+		
10	<i>Stelliolehmanni</i>		+		
11	<i>Trapelussanguinolentus</i>		+	+	+
	Family. Anguidae		+		
12	<i>Pseudopus apodus</i>				
	Family. Varanidale				

13	<i>Varanusgriseus</i>	UzRDBCITESI	+	+	
	Family. Lacertidae				
14	<i>Eremiasvelox</i>		+	+	+
15	<i>Eremiascripta</i>		+		
16	<i>Eremiaslineolata</i>		+	+	+
17	<i>Eremiasintermedia</i>				
18	<i>Eremiasgrammica</i>		+	+	+
	Family. Scincidae				
19	<i>Ablepharusdeserti</i>		+		
	Suborder.Ophidia				
	Family. Boidae				
20	<i>Eryxtataricus</i>	UzRDBCITESII	+		
21	<i>Eryxmiliaris</i>	UzRDBCITESII	+	+	
	Family. Colubridae				
22	<i>Boigatrigonatum</i>	UzRDB	+	-	-
23	<i>Coluberkarelini</i>		+		
24	<i>Coluber ravergieri</i>		-	+	+
25	<i>Lytorhynchusridgewayi</i>	UzRDB	+		
26	<i>Spalerosophisdiadema</i>		+	+	+
27	<i>Psammophislineolatus</i>		+	+	
28	<i>Coluberrhodorrhachis</i>		+		
29	<i>Natrixtessellata</i>				
30	<i>Elaphedione</i>		+		
	Family. Elapidae				
31	<i>Najaoxiana</i>	UzRDBRLCITESII	+		
	Family. Viperidae				
32	<i>Echismultisquamatus</i>		+		
33	<i>Viperalebetina</i>		+		
	Order Testudines				
	Suborder. Cryptodira				
	Family. Testudinidae				
34	<i>Agrionemyshorsfieldii</i>	UzRDBRLCITESII	+	+	+
	All	7	31	15	7

Note:

UzRDB - species (subspecies) listed in the Red Book of the Republic of Uzbekistan (2019)

RL-species (subspecies) listed in the Red Book of the International Union for Conservation of Nature and Natural Resources (IUCN) (2004)

CITES I, CITES II - species (subspecies) included in the annexes of the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

The reptiles were not formed uniformly relating to the ecological features of the area. The fauna of natural biotopes is rich in fauna compared to the partially developed biotopes and fully developed territories, more precisely 31 species of reptiles are found in the natural biotope, 15 in the partially developed biotope, and 7 species in fully developed urban landscapes (Table 1).

7 species of the reptile fauna of the Bukhara region and adjacent territories (*Varanus griseus*, *Eryxtataricus*, *Eryx miliaris*, *Boigatrigonatum*, *Lytorhynchusridgewayi*, *Najaoxiana*, *Agrionemishorsfieldi*) are listed in the Red Book of the Republic of Uzbekistan, 2 species of them (*Najaoxiana*, *Agrionemishorsfieldi*) are listed in the IUCN Red List, 5 species (*Varanus griseus*, *Eryxtataricus*, *Eryx miliaris*, *Najaoxiana*, *Agrionemishorsfieldi*) are included in Appendix I and II of CITES. [5].

3 suborder of reptiles (*Sauria*, *Serpentes*, *Cryptodira*) have been identified in the Bukhara region and adjacent areas. The leading suborder is Sauria including 19 species. (Table 2).

The spectrum of the leading orders of reptiles of Bukhara region and adjacent territories.

Table 2

S/n	Order	Number of species	%
1	<i>Sauria</i>	19	56
2	<i>Ophidia</i>	14	41
3	<i>Cryptodira</i>	1	3
	All	34	

According to the results obtained, 19 species of the 34 reptile species identified in the Bukhara region and adjacent areas belong to Sauria order (56%) and 14 species to Ophidia (41%), 1 species to Cryptodira (3%). (Fig.1).

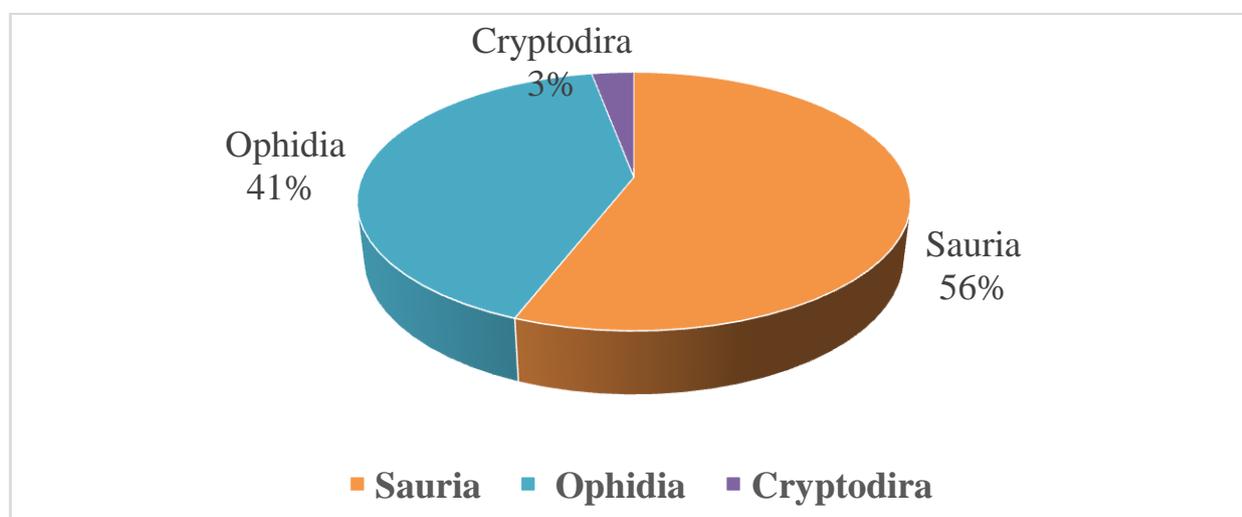


Figure 1. Distribution of reptiles in the Bukhara region and adjacent territories by orders.

The leading reptile families of the Bukhara region and adjacent territories include 4 families with 5 or more species. Those leading families of reptiles includes 25 species (73.5%), the remaining 7 families comprise 9 species (26.5%) In the remaining families, the species are distributed as follows: there are 2 families consisting of 2 species - *Viperidae*, *Boidae*, and 5 families consisting of 1 species - species (*Anguidae*, *Varanidale*, *Scincidae*, *Elapidae*, *Testudinidae*). (Table 3)

Taxonomic composition of reptiles in the Bukhara region and adjacent areas.

(Table 3)

S/n	Class	Order	Family	Species
1	Reptilia	Sauria	<i>Gekkonidae</i>	<i>Crossobamoneversmanni</i>
				<i>Cyrtopodioncaspius</i>
				<i>Cyrtopodionfedtschenkoi</i>
				<i>Cyrtopodionrussowi</i>
				<i>Teratoscincusscincus</i>
			<i>Agamidae</i>	<i>Phrynocephalushelioscopus</i>
				<i>Phrynocephalusinterscapularis</i>
				<i>Phrynocephalusmystaceus</i>
				<i>Phrynocephalus reticulatus</i>
				<i>Stelliolehmanni</i>
				<i>Trapelussanguinolentus</i>
			<i>Anguidae</i>	<i>Pseudopus apodus</i>
			<i>Varanidale</i>	<i>Varanusgriseus</i>
			<i>Lacertidae</i>	<i>Eremiasvelox</i>
				<i>Eremiascripta</i>
		<i>Eremiaslineolata</i>		
		<i>Eremiasintermedia</i>		
		<i>Eremiasgrammica</i>		
		<i>Scincidae</i>	<i>Ablepharusdeserti</i>	
		Ophidia	<i>Boidae</i>	<i>Eryxtataricus</i>
				<i>Eryxmiliaris</i>
			<i>Colubridae</i>	<i>Boigatrigonatum</i>
				<i>Coluberkarelini</i>
				<i>Coluber ravergeri</i>
				<i>Lytorhynchusridgewayi</i>
<i>Spalerosophisdiadema</i>				
<i>Psammophislineolatus</i>				
<i>Coluberrhodorhachis</i>				
<i>Suvilon-Natrixtessellata</i>				
<i>Elaphedione</i>				
<i>Elapidae</i>	<i>Najaoxiana</i>			
<i>Viperidae</i>	<i>Echismultisquamatus</i>			

				<i>Viperalebetina</i>
		<i>Cryptodira</i>	<i>Testudinidae</i>	<i>Agrionemyshorsfieldii</i>

The category of widespread species includes *Trapelussanguinolentus*, *Eremiasvelox*, *Eremiaslineolata*, *Spalerosophisdiadema*, *Agrionemyshorsfieldii*, *Natrixtessellata*, *Crossobamoneversmanni*. *Varanusgriseus*, *Agrionemyshorsfieldii* are considered as an endangered species, whereas the category of locally common species includes *Lytorhynchusridgewayi*, *Boigatrigonata*. And *Eryxmiliaris*, *Eryxtataricus*, *Najaoxianabelong* to mosaic common species.

The state cadastre of wildlife objects is a systematized and qualitative report containing information about the diversity, classification, dynamics, degree of study of reptiles and other information necessary for the organization of measures for the protection and sustainable use of them. Nowadays, the data of the state cadastre of reptiles do not allow us to obtain accurate information about the total number of reptiles found in Uzbekistan, including in the Bukhara region. Therefore, practical work in this direction is considered appropriate.

Periodic changes in the number of reptile populations are associated with the change of seasons; rare changes in the number of populations are due to natural inconveniences observed in environmental conditions - drought, the usual severe winter frosts and a reduction in food sources due to high temperatures in summer. Unfortunately, there is a decrease in the number of representatives of the animal world in the region in recent decades, related to the economic activity of humans in the territories where our observations were carried out, such adverse phenomena as the formation of settlements, road construction and railways, grazing of livestock in excess of the norm on pastures, complete cutting of reed beds around reservoirs or arson of reed beds and gallery forests observed in the steppe zone of the region as well as trapping animals by poachers-hunters. As a result, animals are often forced to change the territory of their habitat. Thus, it can be concluded that the formation of fully adapted stable populations of mammals is still ongoing in the observed steppe biocenoses.

Conclusion. Considering that every activity that humanity provides to nature has its positive and negative sides, it is necessary to establish regular monitoring on the ground. In order to reduce collisions of reptiles with vehicles:

- the introduction of tunnels under highways and railway networks crossing the territory, special "crossings" for the passage of animals;
- limiting the speed of vehicles in places where representatives of the fauna of the steppe zone congregate, especially on highways passing through territories inhabited by rare species;
- any types of anthropogenic activities carried out in natural biotopes (construction of settlements and cities, highway construction, oil and gas pipelines) should be guided by the scientific conclusions of the employees of the regional Department of ecology and Environmental Protection and scientists-specialists.

REFERENCES

1. Dinesman L.G., Koletskaya M.P. Methods of quantitative accounting of amphibians and reptiles // Methods of accounting for the number and geographical distribution of terrestrial invertebrates.- Moscow, Publishing House of the USSR, 1952.-pp. 329-341.
2. Turaev.M.M New information on the ecology of the caraway (*Plegadis falcinellus* L.1766). Ecological problems of biodiversity of the Republic of Uzbekistan Proceedings of the Republican scientific-practical conference. Navoi. 2006. pp. 48-50
3. Turaev Mukhtor Ekological change in the Aral region; adaptations by the spoonbill and blackcrowned night heron. Disaster by Design; The Aral Sea and its Lessons for Sustainability. Emerald 2012, P. 283-290
4. Turaev M., Shernazarov E. Nesting birds of the Tudakul reservoir (South-West Uzbekistan) // Kazakhstan Zoological Yearbook Selevinia. 2006, 206-208 p.
5. The Red Data Book of Uzbekistan. Volume 2. Tashkent, 2019. P. 102-175
6. Turaev M.M, Rakhmonov.R. “Data on the ecology of the distribution of the *Cygnus olor* g.1789 in the waters of the southern Kyzylkum”, Bulletin of the Khorezm Mamun Academy, 2021-5. P. 88-93.
7. Turayev M.M, Shokir Qizi SS. Seasonal Dynamics of Bird Differences and Numbers in the South Western Kizilkum Reservoirs".Scholars Academic and Scientific Society. South Asian Research Journal of Biology and Applied Biosciences (Sarjbab), 2021;3(2): P.31-35.
8. Turaev MM, Rakhmonov RR. “Peculiarities of colonies of nesting birds in the water basins of the desert zone of Uzbekistan”, Bulletin of the Khorezm Mamun Academy, 2019-3 / 1,P.49-55.
9. Turaev Mukhtor Murodovich, Kholliyev Askar Ergashovich. The role of environmental factors in the rebreeding of waterfowl in the steppe zone. Asian Journal of Multidimensional Research., Trans Asian Research Journals <http://www.tarj.in> 2019,P 71-79 .
10. Rayimov A.R. Rakhmonov R.R., Nurova H.K., Rustamova M.A, Taxonomic Analysis of Hunting Milk Markers in Uzbekistan. Middle European Scientific Bulletin, Vol.13, 2021, P. 103-108
11. Rayimov A.R. Rakhmonov R.R., Nurova H.K., Rustamova M.A, Date on the distribution and ecology of Sandstone *Lepus Capensis* in Bukhara region//Universum; ximiya I biologiya 2021-№ 7 (85)<https://7universum.com/ru/nature/archive/item/12047>
12. Rakhmonov. R.R., Rayimov A.R. Ecological positions of hunting species in Bukhara region // International Journal of Genetic Engineering. – 2019.–№7 (1). – P. 15-18. <http://doi:10.5923/j.ijge.20190701.03>
13. Rakhmonov R.R., Rayimov A.R. Structure and distribution of animals in the Bukhara region // Nature of inner asia 2019. – № 2 (11). – P. 65-68.<http://doi:10.18101/2542-0623-2019-2-65-68>
14. Rayimov A.R , Rakhmonov R.R, Nuriddinova G.A,Sanoqulov R.A Bukhara region and its related territories ' species of reptiles part and numbers' in spring (Ayokogitma, Kandim, Ayoqgujrumli, Kyzylkum State Nature Reserve) //Universum; ximiya I biologiya 2021-№ 5 (83) P. 62-65.[http:// DOI-10.32743/Uni Chem.2021.83.5.11680](http://DOI-10.32743/Uni Chem.2021.83.5.11680)
15. Rayimov A.R , Rakhmonov R.R, Nuriddinova G.A,Sanoqulov R.A.Around territories of Dengizkul, Kora-Kir and Zamonbobo lakes' species of reptiles part and numbers' in spring, Academicia – An International Multidisciplinary Research Journal, 2021. Vol.11, P. 800-804..<http://10.5958/2249-7137.2021.0069.3>