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SPECIAL COMPOSITION AND ECOLOGY OF LACERTILIA CENTRAL KYZYLKUM (AKTAU-TOMDI RESERVE)

Abstract: *this study analyzes the species composition and certain ecological characteristics of lizards (Lacertilia) distributed within the territory of the Aktau-Tomdi State Reserve in the Central Kyzylkum. The studies were conducted in 2024–2026 in various biotopes using the route method. As a result, 12 species belonging to the families Agamidae, Geckonidae, Lacertidae, and Varanidae were recorded in the area. The identified species are distributed in sandy, stony, and shrubby desert biotopes; their distribution, frequency, and ecological characteristics have been studied. The research results will serve as an important scientific basis for enriching information on the herpetofauna of the Central Kyzylkum and for the conservation and monitoring of the biological diversity of the Aktau-Tomdy State Reserve. The obtained data can be used in*

environmental education work with students, which corresponds to the objectives of modern education in the field of environmental culture and sustainable development.

Keywords: *Central Kyzylkum, Aktau-Tomdy State Reserve, Lacertilia, herpetofauna, biological diversity.*

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ВИДОВОЙ СОСТАВ И ЭКОЛОГИЯ ЯЩЕРИЦ (LACERTILIA)

ЦЕНТРАЛЬНЫХ КЫЗЫЛКУМОВ (НА ПРИМЕРЕ

ЗАПОВЕДНИКА АКТАУ-ТОМДЫ)

Аннотация: *в исследовании анализируется видовой состав и некоторые экологические характеристики ящериц (Lacertilia), распространенных на территории Актау-Тамдынского государственного заповедника в Центральном Кызылкуме. Исследования проводились в 2024–2026 годах в различных биотопах с*

использованием маршрутного метода. В результате в этом районе было зарегистрировано 12 видов, относящихся к семействам *Agamidae*, *Geckonidae*, *Lacertidae* и *Varanidae*. Выявленные виды распространены в песчаных, каменистых и кустарниковых пустынных биотопах; изучены их распространение, частота и экологические характеристики. Результаты исследования послужат важной научной основой для обогащения информации о герпетофауне Центрального Кызылкума, а также для сохранения и мониторинга биологического разнообразия Актау-Тамдынского государственного заповедника. Полученные данные могут быть использованы в эколого-образовательной работе со студентами, что соответствует задачам современного образования в области формирования экологической культуры и устойчивого развития.

Ключевые слова: Центральный Кызылкум, Актау-Тамдынский государственный заповедник, *Lacertilia*, герпетофауна, биологическое разнообразие.

Introduction. The Kyzylkum Desert is one of Central Asia's major desert ecosystems, distinguished by its biodiversity, particularly the richness of its reptile fauna. The Aktau-Tomdi State Reserve, established in 2022, is an important natural area that serves to protect the unique flora and fauna of the Central Kyzylkum. Many animal and plant species listed in the Red Data Book of Uzbekistan are found within the territory of the reserve, which further enhances its significance in preserving biodiversity. The total area of the territory is currently 68,500 hectares. Scientific data on reptiles found in the Kyzylkum region are available in Kazakhstan (Lambert 2002; Bondarenko 2024), Turkmenistan (Schammakov et al., 1993) and some regions of Uzbekistan.

In recent years, research has been conducted on the herpetofauna of the Kyzylkum region, highlighting the influence of anthropogenic factors on the composition and distribution of reptiles, the characteristics of their occurrence in various biotopes, and conservation issues (Clemann et al., 2008; Bondarenko, 2024; Shernazarov and Jumayev, 2021). Furthermore, the species composition, habitat biotopes, and occurrence periods of the herpetofauna of the Central Kyzylkum have been studied across specific territories (Martin et al., 2017; Showler 2018).

However, information on the species composition and ecological characteristics of lizards in the territory of the Aktau-Tomdi State Reserve of the Central Kyzylkum has not been sufficiently generalized, and to date, it is not possible to sufficiently clarify the species composition. In this regard, the purpose of this study is to determine the species composition of lizards distributed within the territory of the Aktau-Tomdi State Nature Reserve and to study some of their ecological characteristics.

Materials and Methods. The research was conducted in 2024–2026 within the territory of the Aktau-Tomdi State Reserve in the Central Kyzylkum. The study area is characterized by sandy, stony, and shrubby desert landscapes. Field observations were conducted in various biotopes to study the species composition and ecological characteristics of lizards. The study was conducted in 18 hospitals using the regular route method. These selected areas will be provided with artificial water wells and food products. Therefore, the density of living organisms here is high. The study area is completely isolated from anthropogenic impact. (Fig 1).

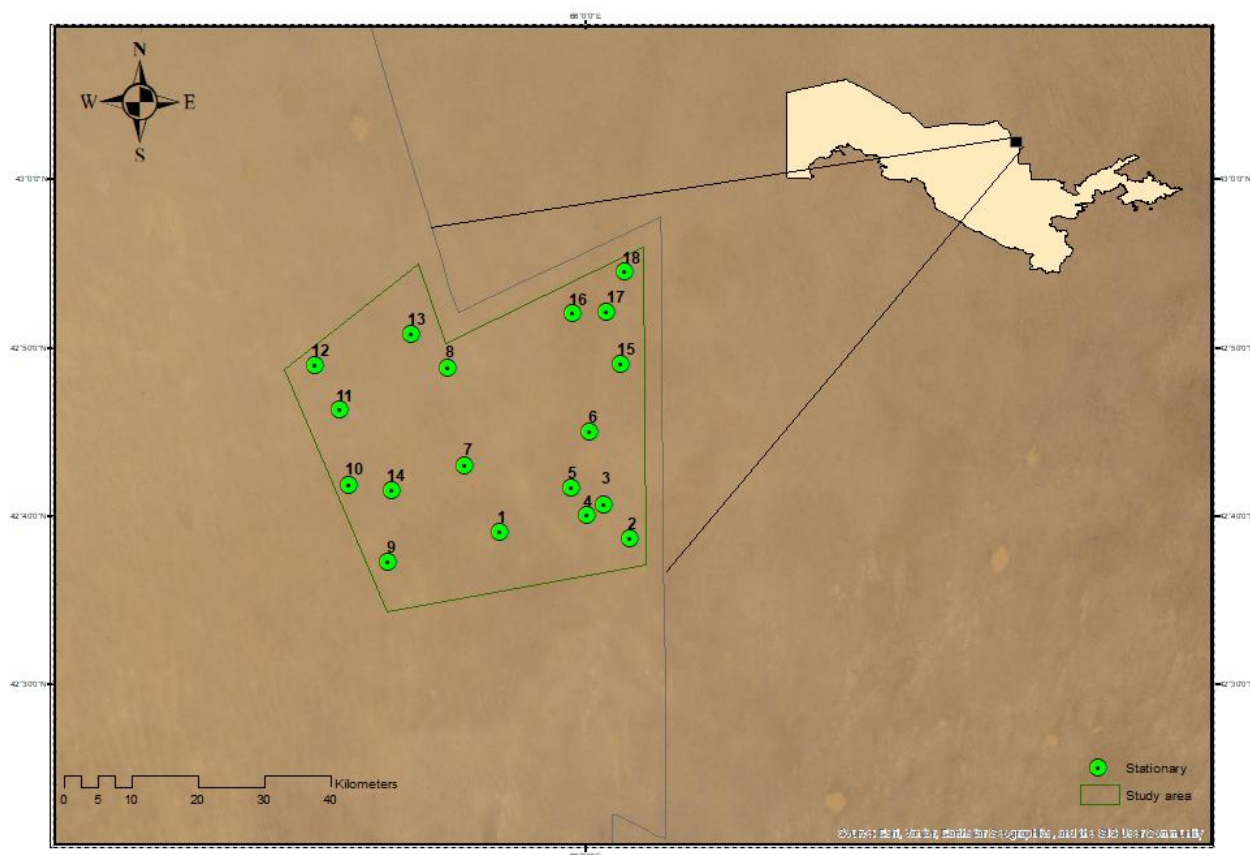


Fig. 1. The studied stationary territories (Moldamen-1, Janatalab-2, Balapan 2–3, Balapan1–4, Kilichkuduk-5, Kuchkarkuduk-6, Izimbet-7, Karadala-8,

Zhilshibay-9, Yangikuduk-10, Shagoldkuduk-11, Ashshapkin-12, Biruli-13, Ashi-14, Kushkuduk-15, Tulkinkuduk-16, Nodirkuduk-17, Uzunkuduk-18) were studied.

Observations were conducted during the spring, summer, and autumn seasons at various times of the day (06:00–10:00, 18:00–24:00 and 00:00–03:00) to identify species with diurnal and nocturnal activity. Routes were organized covering various biotopes, ranging in length from 2 to 5 km and in width from 2 to 8 m depending on the biotope type (Dinesman et al., 1952). The lizards were recorded by visual observation, and the locations, biotope, and time of activity were recorded in logs.

The relative density of lizards was estimated by the number of individuals per hectare (ind./ha) (Bondarenko et al., 1996).

Results. During route surveys conducted in 2023–2026 within the Aktau-Tomdi State Reserve of the Central Kyzylkum, 10 species belonging to 4 families of lizards were recorded. The identified species belong to the families Varanidae, Gekkonidae, Lacertidae, and Agamidae, and are distributed in the sandy, stony, and shrubby biotopes of the region.

Agamidae.

Phrynocephalus interscapularis (Lichtenstein, 1856).

More than 80% of the study area consists of sands, and the habitat of this species is a mass of shifting sands, which was frequently noted along the route (Clemann 2008). The seasonal density of *Phrynocephalus interscapularis* averaged 4.3 ind./ha in spring, 7.7 ind./ha in summer, and 4.1 ind./ha in autumn. When the air temperature is high, it feeds on various insects in the shade of plants (Fig. 2, A).

Phrynocephalus mystaceus (Pallas, 1776).

The additional sickle-shaped appendages formed on the leg help prevent drowning in the sand and allow for rapid movement in case of danger. The number of individuals of this species in summer averaged 1.6 ind./ha. During the daytime routes, we recorded only on unreinforced sand dunes near the nest (Fig. 2, D).

Phrynocephalus reticulatus (Eichwald, 1831).

It is found at the boundaries of fine-gravel biotopes merging with sandy ones. In spring, the density was 0.9 ind./ha, and in summer, it was 1.1 ind./ha. In the studies

of D.A. Bondarenko on the distribution of *Phrynocephalus reticulatus* in the Kyzylkum, its coordinates were absent in the region we noted (Bondarenko 2012).

Trapelus sanguinolentus (Pallas, 1814).

One of the most widespread species, the number of young individuals is extremely high during the summer months. This species was counted in almost all hospitals. The average species density was 2.6 ind./ha in spring, 4.9 ind./ha in summer, and 3 ind./ha in autumn (Fig. 2, B).

Gekkonidae.

Crossobamon eversmanni (Wiegmann, 1834).

On night routes, an average of 2.9 individuals per 1 ind./ha are found in loose sands. Furthermore, it constitutes a high % in the diet of nocturnal owls. During the daytime route, individuals of this species were found in the nest of *Athene Noctua* (Fig. 2, F).

Tenuidactylus caspius (Eichwald, 1831).

It is one of the rarest recorded species, observed only on daytime routes when feeding on various small insects in shaded areas of well crevices.

Teratoscincus scincus (Schlegel, 1858).

On semi-reinforced dunes and loose sands, the average density is 1.9 ind./ha. A nocturnal species, its pupils reflect light. Therefore, it is easy to spot this species at night using a flashlight (Fig. 2, E).

Lacertidae.

Eeremias velox (Pallas, 1771).

In fortified and stony biotopes with a high vegetation cover, the density of this species averages 2.2 ind./ha. The only limiting factor for *Eeremias velox* in the study area is the biotope. Along the route, a census was conducted in areas with dense vegetation around old livestock plots (Fig. 2, C).

A – *Phrynocephalus interscapularis*B – *Trapelus sanguinolentus*C – *Eremias velox*D – *Phrynocephalus mystaceus*E – *Teratoscincus scincus*F – *Crossobamon everesmanni*

Fig. 2. Some species recorded during the study

Eremias grammica (Lichtenstein, 1823).

A small, typical species found in unstabilized sands. Along with the fact that body color serves a protective function in sandy areas, it is much easier to notice due to the relative size of the body. Its density is 1.3 ind./ha in spring, 2.8 ind./ha in summer, and 1.6 ind./ha in autumn. The presence of this species can also be determined by the tracks it leaves in the sands.

Eremias lineolata (Nilolsky, 1896).

A numerous species found in quicksands. Its main habitat is salt marshes and takyr soils bordered by loose sands. Its average density is 1.7 ind./ha. This species is well-adapted to air temperatures (Cherlin 2019).

Eremias scripta (Strauch, 1867).

In unstrengthened biotopes with vegetation cover, the average density is 1.3 ind./ha. In the study, it was observed that this species appears on plant branches when the air temperature is above 40.

Varanidae.

Varanus griseus (Daudin, 1803).

It is a small, vulnerable, and declining species. In sandy deserts, the density is 0.7 ind./ha. Primary habitats: rodents survive by expanding their burrows. During the route, its tracks, skin fragments, and young individuals were identified.

Discussion.

The conducted research showed that the lizard fauna of the Aktau-Tomdi State Reserve in the Central Kyzylkum is characteristic of desert ecosystems in terms of species composition. The majority of the 12 species recorded in the area belong to the families Agamidae and Lacertidae, which confirms that the sandy and semi-fortified biotopes of the Kyzylkum are a favorable habitat for representatives of this group. The predominantly nocturnal activity of members of the Gekkonidae family indicates their ecological adaptation to high daytime temperatures.

It was established that the distribution of species across biotopes depends on their ecological specialization. *Phrynocephalus interscapularis*, *Phrynocephalus mystaceus*, and *Teratoscincus scincus* were primarily found in shifting and semi-reinforced sandy massifs, while *Eremias velox* and *Trapelus sanguinolentus* were more frequently recorded in sandy and stony areas with relatively developed vegetation cover.

The small number of *Varanus griseus* specimens indicates that the natural population density of the species is low and requires constant monitoring.

During the study, it was observed that the frequency of occurrence and population density of certain species differ across seasons and biotopes. This condition is closely related to microclimatic conditions, the food base, vegetation cover, and substrate

characteristics. The results obtained provide a scientific basis for assessing the current state of the herpetofauna of the Central Kyzylkum, clarifying the distribution of species, and protecting them.

Conclusion.

As a result of research conducted on the territory of the Aktau-Tomdi State Reserve in 2024–2026, 12 species belonging to 4 families of lizards were recorded. It was established that the identified species are distributed differently in the sandy, stony, and shrubby biotopes of the desert, and the frequency of their occurrence depends on the characteristics of the habitat. The families Agamidae and Lacertidae have relatively high species diversity in the area. The results obtained indicate that the Aktau-Tomdi State Reserve is an important natural area for the conservation of the herpetofauna of the Central Kyzylkum. The results of the study will serve as an important scientific source for further scientific research on organizing long-term monitoring of lizard populations, protecting rare and rare species, and assessing the biodiversity of desert ecosystems.

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