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To cite this article: A G Bakiev *et al* 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **817** 012008

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Steppe-runner *Eremias arguta* (Reptilia: Lacertidae): new encounters at the northern boundary of range in the Trans-Volga region

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Abstract. The information about the northern range boundary of the steppe-runner *Eremias arguta* (Pallas, 1773) has changed in recent decades. Based on the reliable recordins in 2001-2020 from 12 locations the northern range boundary between Volga and Ural was specified. It runs through the Engelsky District of the Saratov Region, through the Stavropolsky, Kinelsky, Bogatovsky and Borsky Districts of the Samara Region, through the Buzuluksky and Tashlinsky Districts of the Orenburg Region of Russia. The northern limit of the range should be considered the Volga above-floodplain slope in the left-bank part of the Stavropolsky district in Samara region. All specimens encountered had body coloration typical of *Eremias arguta deserti* (Gmelin, 1789). The locations of steppe-runner are confined to open spaces treeless and without a dense herbaceous vegetation on the southern sandy slopes.

1. Introduction

The perceptions about the northernmost location and the northern range boundary of steppe-runner *Eremias arguta* (Pallas, 1773) have been constantly changing in recent decades. Thus, the northernmost limit was noted in review works in different locations. It was shown either in the basin of the Belaya River, on the territory of modern Bashkortostan [1] (although here the species has never been recorded by anyone), then in the south of Western Siberia, in the Kulunda steppe [2-4] (allegedly based on the publication [5], in which the steppe-runner was not even mentioned). In Zhiguli [6] it was noted based on publications [7-9], however, since the middle of the 20th century, there have been no reliable records on Samarskaya Luka, but the recent habitation of the species has been confirmed by paleontological data from the Samarskaya Luka National Park [10] and the Zhigulevsky Reserve [11]. The shift of the northern range boundary in the right bank of the Volga to the south of 52° the northern latitude in the last decades [12] is associated with the dynamics of abiotic factors of intra-century and century-old scales [13, 14]. Currently, the northern limit of the range should be considered the Volga above-floodplain slope in the left-bank part of the Stavropolsky district in Samara region [15-17].

The aim of this work is to clarify the distribution of the species on the northern range boundary in the Trans-Volga region (the Volga-Ural interfluve) at the beginning of the 21th century.



2. Materials and methods

The material included our data and reports of colleagues during 2001-2020. We used only material with exact coordinates, confirmed by photographic or collectible evidence.

3. Results and Discussion

The steppe-runner was found in 12 locations of the Saratov (1), Samara (7) and Orenburg (4) regions of Russia (figure 1; table 1). The species in these regions is located on the northern boundary of the range and is considered rare. It is included in the regional Red Lists of these three regions [18-20].

These locations of steppe-runner are confined to open spaces on the southern sandy slopes. All specimens encountered had body coloration typical of *Eremias arguta deserti* (Gmelin, 1789), on the back there are longitudinal rows of light dots and dashes, between which dark spots are located (Fig. 2). This geographical form lives on sandy and soft soils [2]. I.I. Lepekhin [21, p. 515] described it from the southern part of the Volga-Ural interfluvium without assigning a scientific name to it. P.S. Pallas [22, p. 522] called it "Lacerta arenaria" ("sandy lizard" in translation from Latin). The southern exposure of the slopes provides a high level of solar radiation reaching the soil surface on the northern range boundary of steppe-runner. The body temperature of the lizards [4] and, obviously, the temperature regime for incubating their eggs depends on temperature of soil surface.

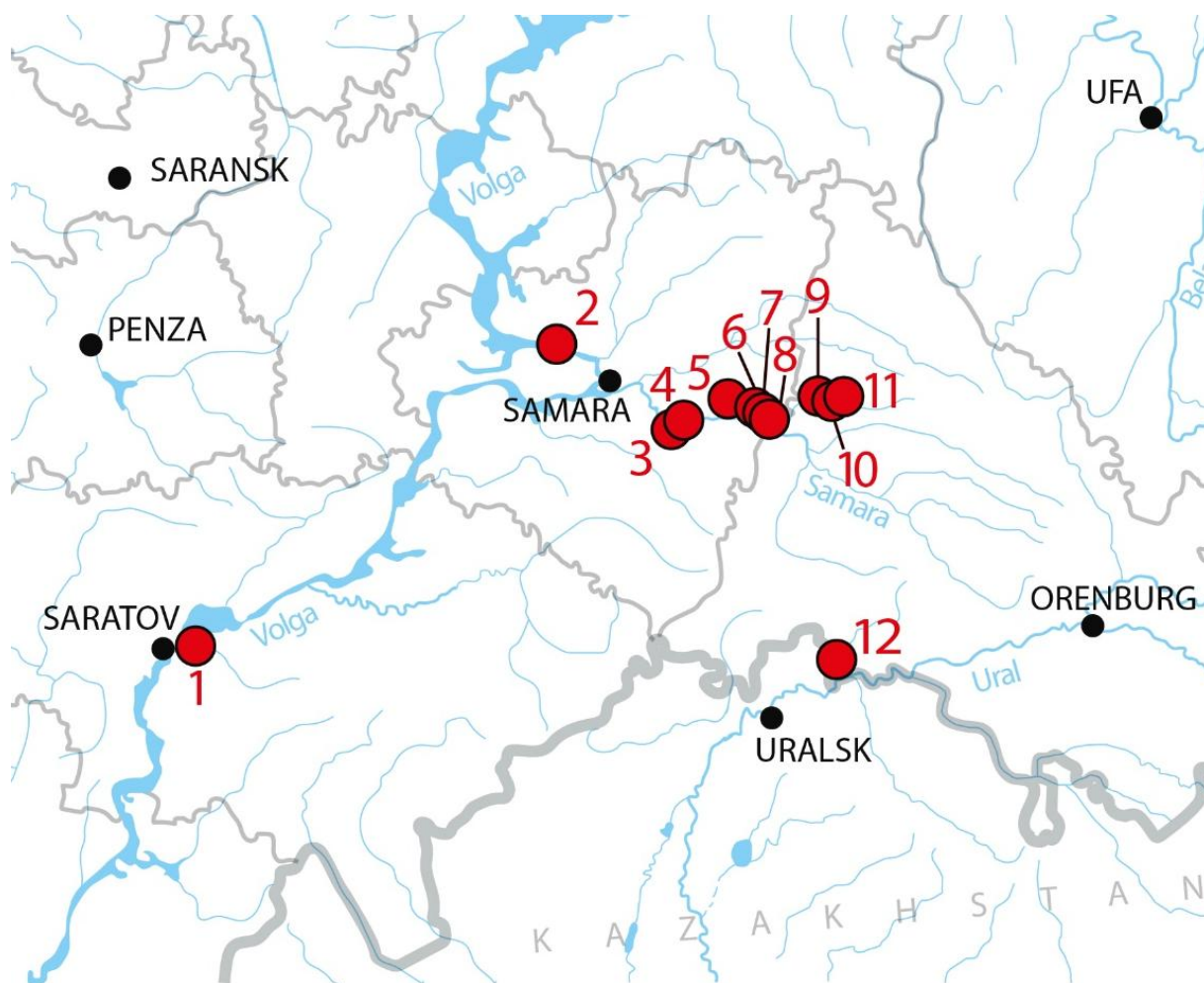


Figure 1. The sites of encounters with *Eremias arguta* (the inventory is in table 1).

Table 1. The inventory of encounters with *Eremias arguta* in 2001–2020.

Site number	Region, district	Coordinates (N, E)	Date	Information source
1	Saratov Region, Engelsky District	51.519014°, 46.266285°	12.08.2006	V.G. Tabachishin (personal communication)
2	Samara Region, Stavropolsky District	53.4739°, 49.695683°	26.04.2001, 22.09.2001, 20.04.2003, 20.04.2004, 09.06.2004, 15.04.2005, 04.10.2008	our data
3	Samara Region, Kinel'sky District	52.9654°, 51.010983°	12.05.2001, 12.05.2003	our data
4	Samara Region, Bogatovsky District	53.040278°, 51.121389°	27.09.2020	A.S. Kireeva, A.E. Kuzovenko (personal communication)
5	Samara Region, Borsky District	53.084153°, 51.557346°	05.08.2020	our data
6	Samara Region, Borsky District	53.030715°, 51.658125°	05.08.2020	our data
7	Samara Region, Borsky District	53.029286°, 51.724803°	05.08.2020	our data
8	Samara Region, Borsky District	53.005909°, 51.758513°	05.08.2020	our data
9	Orenburg Region, Buzul'sky District	53.0879558°, 52.2192658°	04.05.2020	T.N. Pomogaybenko (personal communication)
10	Orenburg Region, Buzul'sky District	53.079694°, 52.246667°	05.09.2019	our data
11	Orenburg Region, Buzul'sky District	53.085928°, 52.280369°	07.08.2016	our data
12	Orenburg Region, Tashlinsky District	51.564417°, 52.649194°	30.08.2020	our data

All the sites of species recordings were near dirt roads, some sites were in the places of asphalt roads construction (figure 3a) or sand extraction (figure 3b, c). Apparently, the broken sandy ground makes it easier for steppe-runner to burrow in sand in case of danger and renew their own burrows if necessary.

At sites 1-3 and 5-12 the steppe-runner occurred together with sand lizard *Lacerta agilis* Linnaeus, 1758. Unlike the latter it preferred micro-plots treeless and without a dense herbaceous vegetation.

Three sites are in specially protected natural areas, in the Buzul'sky Bor National Park (figure 1, 9-11) and the regional Ilmen Natural Monument (figure 1, 12).



Figure 2. Steppe-runners *Eremias arguta* from sites 5 (a), 6 (b) and 11 (c).

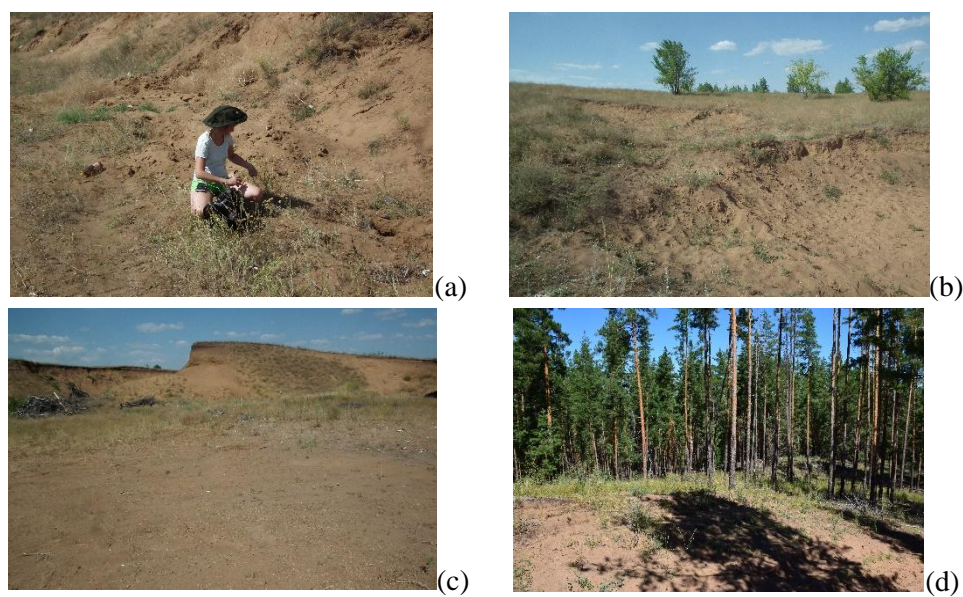


Figure 3. The habitats of *Eremias arguta*: (a) – site 7; (b) – site 5; (c) – site 6; (d) – site 11.

4. Conclusion

The current northern range boundary of *E. arguta* in Trans-Volga Region runs through the Engelsky District of the Saratov Region, through the Stavropolsky, Kinel'sky, Bogatovsky and Borsky Districts of the Samara Region, through the Buzuluksky and Tashlinsky Districts of the Orenburg Region. The current habitation of the steppe-runner in the Krasnogvardeysky and Sorochinsky districts of the Orenburg region, noted by A.A. Chibilev [23] on the sands in the lower of River Malyi Uran, and in the Kuvandyksky district of the Orenburg region, noted by V.V. Anikin [24] in the vicinity of the village Podgornoye, requires confirmation.

Acknowledgments

The authors are grateful to A.S. Kireev, A.E. Kuzovenko, T.N. Pomogaibenko and V.G. Tabachishin for the data provided.

This work was done as part of the Steppe Institute Theme (#GP AAAA-A21-121011190016-1) and Institute of Volga Basin Ecology, Russian Academy of Sciences Theme (#GP AAAA-A17-117112040040-3).

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