

New geographical records of spinturnicid mites (Mesostigmata: Gamasina: Spinturnicidae) in Kazakhstan


MARIA V. ORLOVA^{1,2,3*}, HELIANA DUNDAROVA⁴, NIKOLAY V. ANISIMOV⁵,
GEORGIY V. SHAKULA⁶, SVETLANA V. BASKAKOVA⁷, FEDOR V. SHAKULA⁷,
STEPAN V. SHAKULA⁷, ILYA V. KUZMINOV⁸,
DANIEL I. BOYARINTSEV⁸

¹ Department of Mobilization Training of Public Health and Disaster Medicine, Tyumen State Medical University, Tyumen, Russia.


² Research and Production Laboratory of Engineering Surveys and Environmental Management Technologies, National Research Tomsk State University, Tomsk, Russia.

³ Federal scientific research institute of viral infections "Virom", Ekaterinburg, Russia.


⁴ Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Sofia, Bulgaria.

 <https://orcid.org/0000-0002-3136-6457>

⁵ Institute X-bio, Tyumen State University, Tyumen, Russia.

 <https://orcid.org/0000-0003-1573-3373>

⁶ Institute of Ecology and Evolution A.N. Severtsov of the Russian Academy of Sciences. Moscow, Russia.


 <https://orcid.org/0000-0001-5594-2431>

⁷ Wild Nature NGO, Zhabagly, Kazakhstan.  <https://orcid.org/0000-0003-0935-0181>,

 <https://orcid.org/0000-0002-4660-8631>,  <https://orcid.org/0000-0002-6588-6039>

⁸ Laboratory of chromatography and element analysis, Tyumen State Medical University, Tyumen, Russia.

 <https://orcid.org/0000-0002-0097-2219>,  <https://orcid.org/0000-0002-5605-1849>

*Corresponding author. E-mail: masha_orlova@mail.ru;  <https://orcid.org/0000-0001-7811-4364>

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Detailed faunistic studies focused on bats in Kazakhstan were organised during the Soviet period of the XXth century. According to this data order Chiroptera is presented by 3 families (Rhinolophidae, Vespertilionidae, Molossidae) divided in 10 genera (Rhinolophidae: *Rhinolophus*; Vespertilionidae: *Myotis*, *Barbastella*, *Plecotus*, *Nyctalus*, *Pipistrellus*, *Eptesicus*, *Vespertilio* and *Otonycteris*; Molossidae: *Tadarida*) with a total of 27 species (Gvozdev et al., 1984; Bekenov et al., 1989; Shakula & Shakula, 2022). Bats in Kazakhstan belong to several faunal complexes (boreal – *Plecotus auritus*, *Eptesicus nilssonii*, nemoral – *Myotis daubentonii*, *M. brandtii*, *M. mystacinus*, *Nyctalus leisleri*, *Pipistrellus nathusii*, submediterranean – *Myotis emarginatus* (E. Geoffroy, 1806), Central Asian – *Barbastella caspica* (Kruskop 2015) and *Otonycteris leucophaea* (Benda et al., 2010). However, despite the diversity of the bat fauna, studies of bat parasitic gamasid mites are represented by scarce articles (Senotrusova 1968; Tagil'tsev 1971; Stanyukovich 1997; Dundarova et al. 2022; most of these articles are devoted to the northern territories of Kazakhstan) and new findings are of particular interest.

Spinturnicid mites (11 genera, 110 species) are obligatory ectoparasites of bats that occur on wing membranes, on the skin of the ears, the uropatagium, or rarely around the anal orifice of their hosts (Rudnick 1960; Morales-Malacara et al. 2018; Beron 2020). The genus *Spinturnix* von Heyden, 1826 has worldwide distribution and is the most species-rich, with nearly 50 nominal species (Uchikawa et al. 1994) associated primarily with vesper bats, family Vespertilionidae Gray, 1821 (Rudnick 1960).

Only five species in the genus *Spinturnix* have been previously reported from Kazakhstan: *S. myoti* (Kolenati, 1856), *S. kolenatii* Oudemans, 1910, *S. acuminata* (Koch, 1836), *S. mystacina* (Kolenati, 1857) (Stanyukovich 1997) and a new species *S. otonycterisi* Dundarova & Orlova, 2022.

Altogether fifty six bats have been examined during our expedition to South Kazakhstan (Turkestan Province of Kazakhstan – Fig. 1A) since 17 to 30 July 2022. Animals were captured using mist-nets of different lengths. Each individual was placed in a separate cloth bag and its field number, identification, sex, date, and collection locality recorded. The host classification follows Benda et al. (2011). Mites were removed using a forceps and preserved in 70% ethanol; the bat hosts were then released into the wild. All of the specimens were obtained from the wings. Mites were mounted on slides with Faure-Berlese's mounting medium (Whitaker 1988). They were identified by the first author, Maria Orlova, following Rudnick (1960) and Stanyukovich (1997).

Photographs of the mites were taken with the digital camera AxioCam ICc5 (Zeiss, Germany) attached to a compound microscope AxioImager A2 (Zeiss, Germany) equipped with a phase-contrast and DIC optics. Drawings were made using a Leica microscope equipped with a camera lucida. Basic metric data of body parts were taken from all studied mites and additionally from mites collected earlier in Caucasus (Orlova et al. 2021) and Russian Far East (Medvedev et al. 1991) deposited in the private collection of the first author and the collection of parasitic arthropods of the Zoological Institute of the RAS (Saint Petersburg). External measurements were taken in micrometers (μm).

Three species belonging to genus *Spinturnix* have been discovered, with the list of them presented below.

Family Spinturnicidae

Spinturnix emarginata (Kolenati, 1856)

Material. 3 ♀♀, 2 ♂♂ (Figs. 1 B, C; Table 1) ex *Myotis emarginatus* (Fig. 1D), from Bazhansay River (Kazakhstan, Karatau Mountains), 43°04' N 69°54' E, 27 VII 2022, leg. H. Dundarova, det. M.V. Orlova.

Distribution. **Kazakhstan (this study, new record).** Russia (Crimea – Orlova & Orlov 2018, Dagestan – Orlova et al. 2021), Bulgaria, the Czech Republic (Dusbábek 1964), Hungary (Beron 1965), France (Deunff 1977), Spain (Peribañez-Lopez et al. 1989), Tajikistan (Stanyukovich 1997), Poland, Slovakia (Křištofik et al. 2012) and Serbia (Burazerović et al. 2017).

Principal host. *Myotis emarginatus* (Orlova & Orlov 2018; this study).

Other hosts. *My. blythii* (Burazerović et al., 2018), *Rhinolophus euryale* (Chiroptera: Rhinolophidae) (Beron 2020).

Remark. Rare, poorly studied species probably distributed over the range of the principal host.

Spinturnix myoti (Kolenati, 1856)

Material. 6 ♀♀, 2 ♂♂, 7 N2, 5 N1 ex *Myotis blythii* from Ak-Mechet' cave, Baralday Rige (Kazakhstan, Karatau Mountains), 43°00' N 69°42' E, 24 VII 2022, leg. H. Dundarova, det. M.V. Orlova.

Distribution. Widely distributed in Eurasia (from Great Britain to Japan and India). Northern Africa (Algeria).

Principal hosts. *Myotis* spp. (Beron 2020).

Other hosts. *Barbastella barbastellus*, *Nyctalus noctula*, *Pipistrellus nathusii*, *Plecotus auritus* (Chiroptera: Vespertilionidae); *Miniopterus schreibersi* (Chiroptera: Miniopteridae); *Rhinolophus euryale*, *Rh. hipposideros*, *Rh. ferrumequinum* (Chiroptera: Rhinolophidae) (Beron 2020; Stanyukovich 1997).

Remark. *Spinturnix myoti* has been reported from Kazakhstan (Tagil'tsev 1971; Stanyukovich 1997).

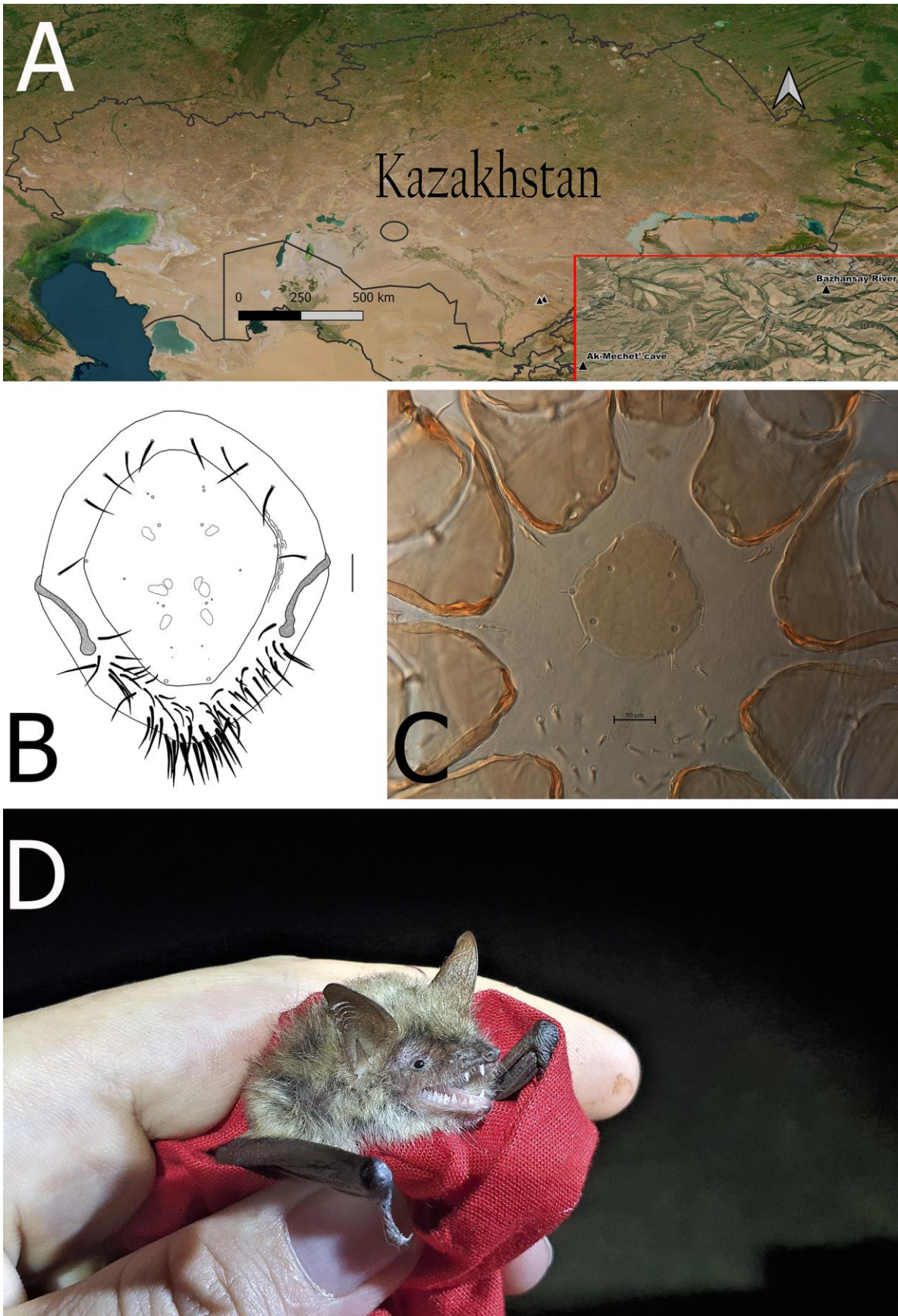


Figure 1. A. Map of Kazakhstan, black triangles mark places of bat capturing. B. *Spinturnix emarginata*, female, dorsal idiosoma, drawing by Maria V. Orlova, scale bar 100 µm; C. sternal shield, photo by Nikolai V. Anisimov. D. *Myotis emarginatus*, photo by Heliana Dundarova.

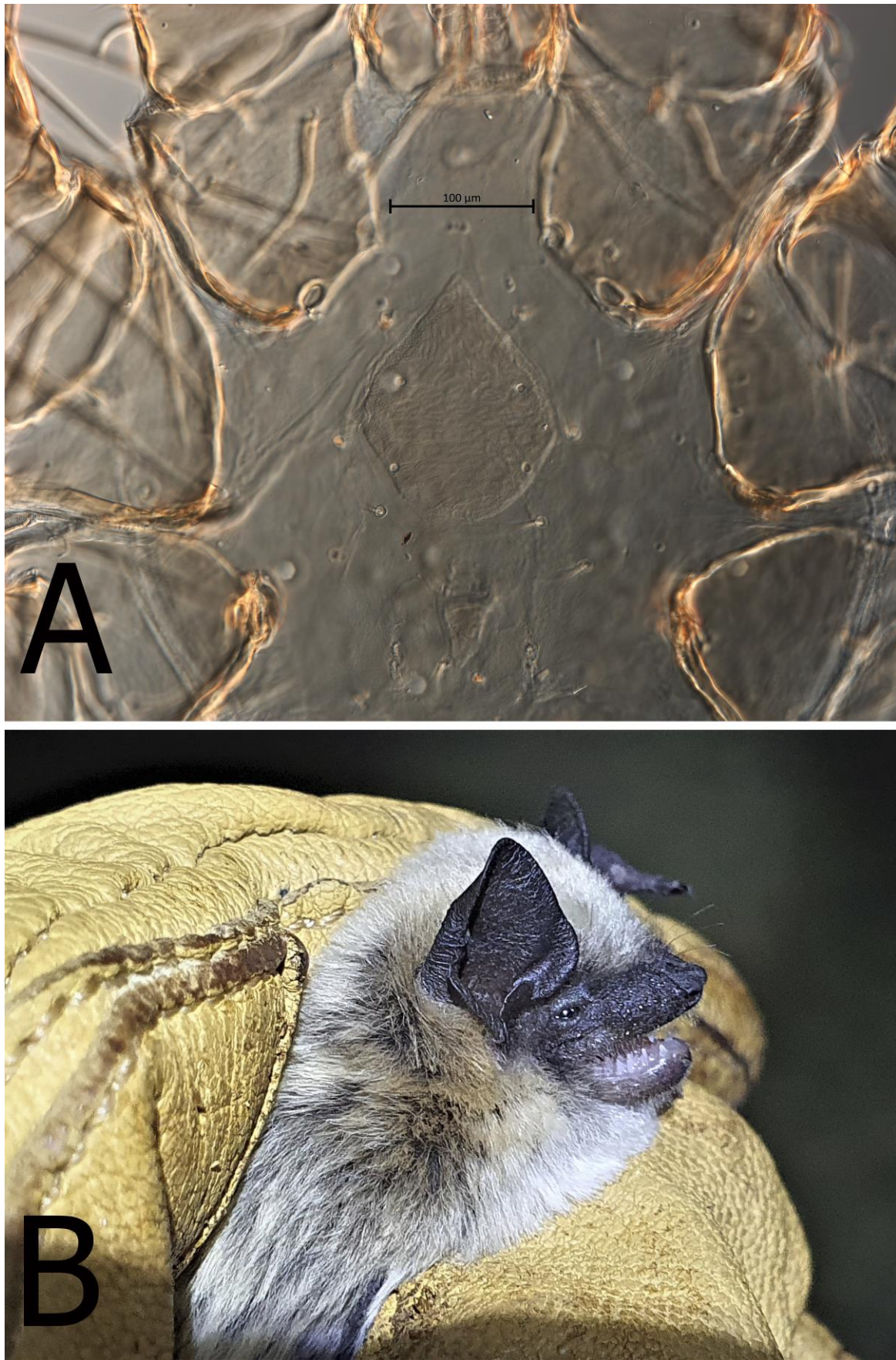


Figure 2. A. *Spinturnix nobleti*, female, sternal shield, photo by Nikolai V. Anisimov. B. *Hypsugo savii*, photo by Heliana Dundarova.

***Spinturnix nobleti* Deunff, Volleth, Keller & Aellen, 1990**

Material. 4 ♀♀ (Fig. 2A; Table 3) ex *Hypsugo savii* (Fig. 2B), from Bazhansay River (Kazakhstan, Karatau Mountains), 43°04' N 69°54' E, 27 VII 2022, leg. H. Dundarova, det. M.V. Orlova.

Distribution. **Kazakhstan (this study, new record).** Russia (Caucasus – Orlova *et al.*, 2021; Far East – Stanyukovich 1997), France (incl. Corsica) (Deunff *et al.* 1990), Mongolia (Scheffler *et al.* 2012), Switzerland (Deunff *et al.* 1990).

Principal hosts. *Hypsugo alaschanicus* (Scheffler *et al.* 2012), *H. savii* (Beron 2020; this study).

Other hosts. Unknown.

Remark. Rare, poorly studied species.

Table 1. Comparison of external measurements of *Spinturnix emarginata* from Poland, Crimea, Caucasus and Kazakhstan.

Body part		Kazakhstan (present paper)	Caucasus (Orlova et al. 2021)	Crimea (Orlova, Orlov 2018)	Poland (Kristofik et al. 2012)
Females					
		n = 3	n = 3	n = 2	
Idiosoma	Length, µm	873–926	852–1004	885, 909	1075–1142
	Width, µm	760–818	758–846	722, 734	940–1015
Dorsal shield	Length, µm	620–674	581–629	623, 630	584–638
	Width, µm	488–515	485–517	484, 498	491–518
Ventral shield	Length, µm	172–175	143–158	156, 174	181–188
	Width, µm	165–171	142–167	169, 184	186–192
Males					
		n = 2		n = 1	
Idiosoma	Length, µm	872, 891	-	904	846–851
	Width, µm	704, 712	-	726	708–716
Dorsal shield	Length, µm	566, 586	-	592	545–572
	Width, µm	490, 506	-	481	502–515
Ventral shield	Length, µm	298, 305	-	304	303–308
	Width, µm	227, 231	-	231	238–242

SPINTURNICID MITES FROM KAZAKHSTAN

Table 2. Comparison of external measurements of *Spinturnix myoti*.

Body part		Kazakhstan (present paper)	Tajikistan (Orlova et al. 2015)	Russia (Altai) (Orlova et al. 2015)	Romania (Pocora et al. 2013)	Czechoslov akia (Dusbabek 1962)	Poland (Haitlinger 1978)	Moldova (Pinchuk 1971)	Spain (Estrada- Peña, Sanchez 1989)	Spain (Peribáñez- López et al. 1989)
Females										
		n=6	n=30	n=17	n=30					
Idiosoma	Length, μm	1212–1291			1100–1829	1453–1607	1210–1650	1250–1466	1190–1722	1083–1827
	Width, μm	932–992			929–1214	1013–1175	880–1200	902–1135	938–1330	809–1458
Dorsal shield	Length, μm	816–878	787–894	850–891	800–900				821–1170	850–922
	Width, μm	576–615	544–739	612–661	571–657				512–1023	620–669
Ventral shield	Length, μm	201–249	192–248	221–251	189–229	228–232	212–254		202–262	213–270
	Width, μm	209–251	192–244	223–262	186–229	217–239	228–256		202–256	217–239
Males										
		n=2		n=3	n=30					
Idiosoma	Length, μm	901, 943			829–1000	972–1000	960–1130	902–1064	1000–1119	1029–1162
	Width, μm	699, 714			636–786	702–743	760–870	792	738–952	840–910
Dorsal shield	Length, μm	654, 671		752–796	643–771				720–821	743–810
	Width, μm	487, 516		518–554	450–600				500–607	527–607
Ventral shield	Length, μm	393, 426		389–446	364–443	351–374	403–468		411–446	354–371
	Width, μm	278, 301		283–291	243–286	266–285	272–320		250–399	266–285

Table 3. Comparison of external measurements of *Spinturnix nobleti* from France and Switzerland, Russian Far East, Caucasus and Kazakhstan.

Body part	Kazakhstan (present paper)	Caucasus (present paper)	Russian Far East (present paper)	France and Switzerland (Deunff et al. 1990)	
Females					
	n = 4	n = 2	n = 1	n = 25	
Idiosoma	Length, μm	935–941	968, 979	1002	1023–1057
	Width, μm	735–753	782, 819	892	746–1192
Dorsal shield	Length, μm	659–705	729, 756	804	731–946
	Width, μm	506–529	568, 591	611	508–684
Ventral shield	Length, μm	165–176	181, 189	198	160–228
	Width, μm	118–153	142, 151	155	136–180

Kazakhstan is a potential region for bat ectoparasite research. Of the three spinturnicid mite species recorded during our surveys, two species, *Spinturnix emarginata*, and *S. nobleti*, are new records for the entire country. The diversity and distribution of bats and their ectoparasites in Kazakhstan are still poorly understood. Further research on bat ectoparasites across this region is necessary to establish their host associations and distributions.

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