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A finding of *Eptesicus gobiensis* in an ancient salt mine in Iran and notes on the status of this bat in the Middle East (Mammalia: Chiroptera)

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Abstract: Two mummified bats were found in an ancient salt mine near Chehrabad, NW Iran. One complete and one partial skeletons, both associated with parts of the pelage, were identified as *Eptesicus gobiensis*, a bat species rare in the Middle East. The comparison of skull and statistical evaluation of craniodental data showed this bat to belong to the identical taxon as the mummified bats previously collected in Qutur Su caves, NW Iran; this part of Iran is thus an area of broader distribution of this bat, the second record reported here confirms its preference for dry upper plateaus. This Iranian population exhibits much similarity with *E. gobiensis bobrinskoi* living in lowland deserts of Kazakhstan, but it simultaneously shows morphological and ecological differences from the Kazakhstani populations. Therefore, the population of Iran is here tentatively identified as *E. g.* cf. *bobrinskoi*. The species rank of *E. gobiensis* was found to be composed of three morphotypes living in three separate ranges, *E. g. gobiensis* in mountain plateaus of Central Asia, *E. g. bobrinskoi* in lowlands of Kazakhstan, and *E. g.* cf. *bobrinskoi* in NW Iran. However, the phylogenetic and taxonomic statuses of the Iranian morphotype still remain to be elicudated.

Keywords: Bats, *Eptesicus*, Iran, archaeozoology, morphometry

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Introduction

The Gobi serotine, *Eptesicus gobiensis* Bobrinskoj, 1926, is a small-sized and pale coloured bat, now considered as occurring across a broad belt of dry areas in Asia, stretching from the Caucasus region in the west to the Gobi Desert in the east. While numerous findings of *E. gobiensis* are available from the Central Asian part of its distribution range, only few sites of records were published from the southern and western parts of the range (Artyushin et al. 2012, Benda & Gaisler 2015).

The Gobi serotine was described based on a single male specimen collected at Burhastejtala (= NE of Cogtcècij, eastern Gobi Altai Mts., south-central Mongolia; ca. 43°50'N, 105°45'E, ~1450 m a. s. l.) by explorer and collector Nikolaj M. Prževalskij in August 1873 (Bobrinskoj 1926, cf. Prževalskij 1888). Originally, this bat was described and for a long time treated as the Central Asian subspecies (sometime as one of three Central Asian subspecies) of *Eptesicus nilssonii* (von Keyserling et Blasius, 1839), endemic to arid steppes of the mountainous plateaus of Mongolia and East Turkestan and mountain ranges of some adjacent countries (Bobrinskoj 1929, Kuzâkin 1944, 1950, 1965, Ellerman & Morrison-Scott 1951, Bannikov 1954, Strelkov 1963, Stubbe & Chotolchu 1968, Corbet 1978, Strelkov & Šajmardanov 1983, Butovskij et al. 1985, Hanák & Horáček 1986, etc.). Westernmost records of this taxon were reported from northern Kashmir, eastern Afghanistan, and western Tajikistan (Scully 1881, Felten 1971, Chakraborty 1983, Strelkov 1986, Benda & Gaisler 2015).

However, based on differences found in the structures of the baculum and skull, Strelkov (1986) suggested to split *E. nilssonii* and *E. gobiensis*; these morphological variances were supported by a significant contrast in ecological requirements of both species – *E. nilssonii* s.str. is a boreal bat, distributed in the forest zone of Eurasia, while *E. gobiensis* is an eremial species, occuring only in dry open habitats. This species separation was then broadly accepted (see e.g. Hill & Harrison 1987, Pavlinov & Rossolimo 1987, Nader & Kock 1990, Corbet & Hill 1992, Horáček et al. 2000, Simmons, 2005).

On the other hand, Strelkov (1986) stressed a morphological similarity of the newly delimited *E. gobiensis* with another Asian congeneric bat, *E. bobrinskoi* Kuzâkin, 1935. The latter form is, similarly to *E. gobiensis*, a strict inhabitant of open arid habitats, namely the deserts and steppes of central and western Kazakhstan. Based on very convincing results of the molecular genetic and thorough morphological comparisons, Artyushin et al. (2012) suggested to consider *E. bobrinskoi* a junior synonym of *E. gobiensis* on the position of a subspecies. These two taxa differ to each other mainly in body size, *E. g. gobiensis* is a large form, with the forearm length (LAt) 37–44 mm and greatest length of skull (LCr) 15.1–16.1 mm, while *E. g. bobrinskoi* is a small bat, with LAt 34–37 mm and LCr 14.4–15.5 mm (for other dimensions see Table 1). These bats also differ in preferred altitude of the inhabited arid habitats, the former bat is known from mountainous areas, while the latter bat is an inhabitant of lowland regions only.

Additionally, bats morphologically very similar to *E. g. bobrinskoi* were documented from the upper areas of the Middle East and Caucasus. Kuzâkin (1944, 1950) mentioned a specimen originating in North Ossetia of the Russian Caucasus and Harrison (1963) reported on a finding of a series of bats from Guter-Su [= Qutur Su], north-western Iran. Although these specimens were identified as *E. bobrinskoi*, the bat of arid lowlands, the habitats of these records are quite unusual for this taxon, subalpine or alpine positions of high mountains (>1,500 m a. s. l. at Fasnal, North Ossetia; >2,500 m a. s. l. at Qutur Su, NW Iran). Due to this unusual ecology and also due to the juvenile age of some of these specimens, Hanák & Horáček (1986) considered these records as not fully grown individuals of *E. nilssonii*. Such an opinion was followed by the subsequent authors (see Koopman 1994, Benda & Horáček 1998, Horáček et al. 2000, Simmons 2005).

However, Benda & Reiter (2006) collected a new series of bats in north-western Iran, under identical conditions as reported by Harrison (1963); three semi-mummified carcasses were found in sulphuric caves on the northern slope of Mount Sabalan near the thermal spa resort of Qutur Su. These caves act as a natural trap for many insects and small vertebrates by killing them with sulphuric fumes – at least seven species of bats, and also insectivores, small rodents, birds, and numerous insects were found dead there (see Benda et al. 2012). The results of a morphological comparison made by Benda & Reiter (2006) of the newly collected bats as well as the series of bats reported by Harrison (1963), showed a close similarity of the Qutur Su bats to the samples of *E. g. bobrinskoi* from Kazakhstani lowland steppes. Similarly, the bat reported from North Ossetia, considered *E. nilssonii* by Hanák & Horáček (1986), was shown by Artyushin et al. (2012) to be morphologically close to *E. g. bobrinskoi*.

These results clearly indicate that a very rare bat of the genus *Eptesicus* lives in the mountain positions of the regions at the western and south-western edges of the Caspian Sea. Only two occurrence sites have been available so far and no living individual was observed. In this contribution we bring description of a new record of this enigmatic bat, found in an ancient salt mine at Chehrabad, north-western Iran. The archeozoological studies of faunal remains collected in this mine brought 132 mammal remains, of them 103 belonged to anthropogenic deposits related to the consumption activities – sheep, goats, cattle, and pigs were the species consumed by the miners (Mashkour 2015). Other faunal remains belong to non anthropogenic deposits, among them six remains of bats were found, two of which were mummified and some represented by small skeletal parts (Mashkour 2015, Mashkour et al. 2020). Since the two mummified bat specimens are of special interest, they are described here.

Material and Methods

Two mummified individuals of small bats were found in an ancient salt mine at the village of Hamzehlu in 2011; one complete skeleton, one partial skeleton (with broken long bones and without skull), both associated with parts of the pelage (Fig. 1). The mine lies 4 km N of Chehrabad (correctly transliterated from the Farsi script as Chehrehabad) that gave its name to the ancient site, and 60 km WNW of Zanjan, Zanjan Province, Iran; 36°54'51"N, 47°51'25"E, ca. 1350 m a. s. l. (Fig. 2).

Fig. 1. Disassembled remains of a mummy of *Eptesicus gobiensis* discovered in the ancient salt mine of Chehrabad; a – parts of the skeleton and pelage; b – lateral view of skull and mandible; c – ventral view of skull and mandible. Skale bars: a = 20 mm, b, c = 10 mm.

The site is located in the Mahneshan Range in the north-western part of the Iranian Plateau; geologically the area belongs to the Central Iran tectonic unit and is characterised by folded and thrusted Miocene marble and sandstone, with occurrences of gypsum and salt. These deformed sediments are discordantly overlain by a thin layer of terrestrial Quaternary, up to boulder sized sediments forming a prominent regional flat surface. The present landscape is mainly the result of late Pleistocene to Holocene dissection of the above mentioned successions and modern valley fill (Aali & Stöllner 2015). The salt mining occurred in the mine during the fifth-fourth centuries BC (Achaemenid period), in the fifth century AD (Sassanian period), and also in the modern times (Aali et al. 2012, Aali & Stöllner 2015). The miners extracted salt by pillar-and-chamber mining (timbering techniques seem not to have been used) and such underground spaces could be used as roost for various animals including bats. The age of the bat mummies is not apparent in any way, because of the suffusion of the bodies with the salt they could be remains of deep history as well as of a recent period.

Fig. 2. The landscape of the ancient salt mine of Chehrabad, Zanjan Province, north-western Iran. A view out of the mine. Photo: M. Mashkour.

The two partly mummified specimens from Chehrabad are here compared with population samples of other small *Eptesicus* bats from Eurasia. This study follows the previous comparison by Benda & Reiter (2006) and is exensively complemented of new comparative material of the relevant populations, including some type specimens. For comparative morphological and morphometrical purposes we used skulls, from external dimensions we took only the forearm length (LAt). The specimens were measured in a standard way using mechanical or optical callipers. Horizontal dental dimensions were taken on cingulum margins. The examined museum comparative material is given in Appendix. We evaluated 15 craniodental dimensions in each skull (13 measurements in the skull and maxillar tooth-row, three measurements in the mandible and mandibular tooth-row; for particular dimensions see Abbreviations) plus five indices that described the skull shape. Statistical analyses were performed using the Statistica 6.0 software.

Abbreviations

Measurements

LAt = forearm length; – LCr = greatest length of skull; – LCb = condylobasal length; – LaZ = zygomatic width; – LaI = width of interorbital constriction; – LaInf = infraorbital witdth; – LaN = neurocranium width; – LaM = mastoidal width; – ANc = neurocranium height; – ACr = skull height (including tympanic bullae); – CC = rostral width between the labial margins of upper canines; – M^3M^3 = rostral width between the labial margins of third upper molars (M^3); – CM^3 = length of upper tooth-row between the mesial margin of canine and distal margin of third molar (M^3); – LMd = condylar length of mandible; – ACo = height of coronoid process; – CM_3 = length of lower tooth-row between the mesial margin of canine and distal margin of third molar (M_3).

Collection acronyms

BMNH = Natural History Museum, London, United Kingdom; – CUP = Department of Zoology, Charles University, Prague, Czech Republic; – NMP = National Museum (Natural History), Prague, Czech Republic; – SMF = Senckenberg Museum and Research Institute, Frankfurt am Main, Germany; – ZIN = Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia; – ZMMU = Zoological Museum, Moscow State University, Moscow, Russia.

Others

A = alcoholic preparation; – B = stuffed skin (balg); – M = mean; – max., min. = dimension range margins; – S = skull; – SD = standard deviation; – ♀ = female; – ♂ = male.

Results and Discussion

Of the remains of two Chehrabad bat individuals, only the bat skeleton with skull associated could be compared morphologically, on the other hand, the bat skeleton without skull but with present more hairs underwent a genetic analysis. However, the isolation of any genetic material from the hairs failed, and thus just one bat was examined properly (hereafter the Chehrabad bat), only with help of the morphometric comparisons. The bone and hair remains from both bats show similar characteristic macroscopically and presumably both bats belong to an identical species.

The Chehrabad bat represents a representative of the genus *Eptesicus* Rafinesque, 1820, posessing its typical characters (single premolar in upper jaw, myotodont molars, broad and flattened neucranium, straight skull profile; Fig. 1), we compared it with representatives of small forms of the genus *Eptesicus* occurring in the Palaearctic southern Asia. All these bats belong to the *E. nilssonii* morpho-group; it comprises three morphotypes, *E. nilsonii*, *E. gobiensis gobiensis*, and *E. g. bobrinskoi*, the latter in two separate populations, of the lowland Kazakhstan and of the mountains of Iran (i.e., sensu Benda & Reiter 2006). The comparison of skull dimensions (Table 1, Fig. 3) showed the Chehrabad bat to be in most respects belonging into the group of small-sized bats of the morpho-group, comprising mixture of the sam-

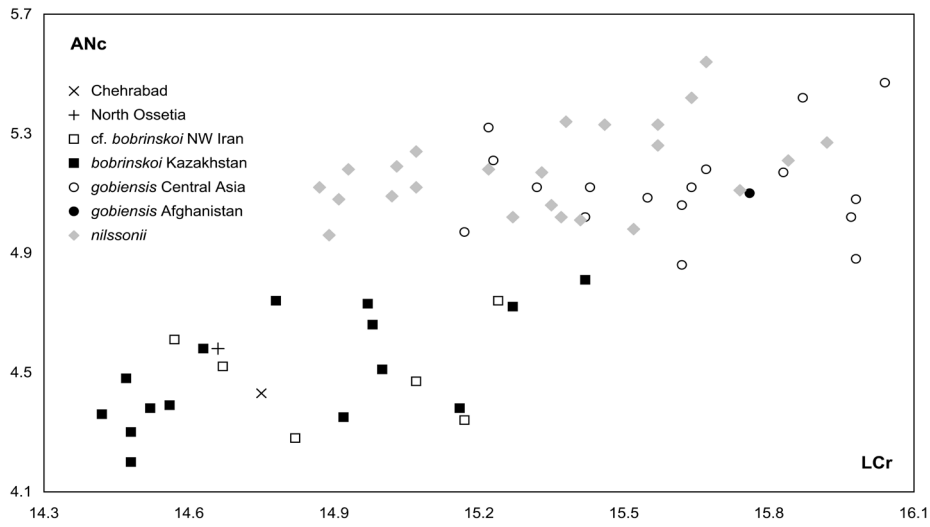

Fig. 3. Scatter plot of the greatest length of skull (LCr) against the height of neurocranium (ANc) in the Chehrabad bat and the comparative samples of the *Eptesicus nilssonii* morpho-group. Data in millimetres.

	Chehrabad bat	*E. g.* cf. *bobrinskoi* (NW Iran)					*E. g. bobrinskoi* (Kazakhstan)				
		n	M	min	max	SD	n	M	min	max	SD
LAt	34.3	2	**35.55**	34.4	36.7	1.626	15	**35.35**	34.0	36.7	0.832
LCr	14.75	6	**14.92**	14.57	15.24	0.277	15	**14.80**	14.42	15.42	0.324
LCb	14.53	6	**14.56**	14.28	14.88	0.260	15	**14.43**	13.97	15.13	0.329
LaZ	8.85	2	**8.97**	8.38	9.56	0.834	13	**9.59**	9.20	10.11	0.261
LaI	3.91	7	**4.06**	3.92	4.19	0.100	15	**3.94**	3.68	4.08	0.130
LaInf	4.42	6	**4.46**	4.28	4.86	0.212	15	**4.57**	4.33	4.88	0.191
LaN	7.71	6	**7.64**	7.16	7.95	0.303	15	**7.76**	7.57	7.98	0.121
LaM	8.13	6	**7.99**	7.77	8.22	0.164	14	**8.24**	7.93	8.56	0.195
ANc	4.43	6	**4.49**	4.28	4.74	0.170	15	**4.51**	4.20	4.82	0.198
ACr	5.52	5	**5.71**	5.48	5.88	0.200	15	**5.76**	5.52	5.98	0.126
CC	4.08	6	**3.94**	3.74	4.32	0.208	14	**4.21**	4.07	4.39	0.114
M^3M^3	5.67	6	**5.81**	5.61	6.04	0.172	14	**6.12**	5.91	6.32	0.109
CM^3	5.12	7	**5.16**	5.02	5.38	0.134	14	**5.21**	5.08	5.35	0.081
LMd	10.25	5	**10.40**	10.14	10.75	0.238	13	**10.35**	9.98	10.76	0.283
ACo	3.03	6	**2.97**	2.81	3.14	0.137	13	**3.26**	3.02	3.48	0.148
CM_3	5.48	5	**5.56**	5.42	5.67	0.105	14	**5.64**	5.47	5.83	0.124
CC/LCr	0.277	5	**0.264**	0.251	0.283	0.014	14	**0.285**	0.267	0.299	0.008
CC/CM^3	0.797	6	**0.762**	0.704	0.829	0.045	14	**0.808**	0.763	0.846	0.024
CM^3/LCb	0.352	6	**0.355**	0.348	0.370	0.008	14	**0.362**	0.356	0.372	0.004
ANc/LCr	0.300	6	**0.301**	0.286	0.316	0.012	15	**0.305**	0.289	0.321	0.010
LaN/LCr	0.523	6	**0.512**	0.491	0.528	0.014	15	**0.525**	0.507	0.538	0.010

	North Ossetian bat	*E. g. gobiensis* (Central Asia)					*E. nilssonii*				
		n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	34.8	17	**40.64**	37.4	43.5	1.935	21	**40.09**	38.3	42.7	1.448
LCr	14.65	17	**15.63**	15.17	16.04	0.292	24	**15.34**	14.87	15.92	0.312
LCb	13.93	17	**15.29**	14.88	15.79	0.286	23	**14.97**	14.44	15.50	0.317
LaZ	–	13	**10.05**	9.61	10.34	0.236	19	**10.04**	9.51	10.44	0.238
LaI	3.84	20	**4.06**	3.76	4.28	0.130	24	**4.04**	3.71	4.28	0.170
LaInf	4.28	19	**4.96**	4.48	5.26	0.203	24	**4.91**	4.62	5.27	0.198
LaN	7.63	19	**7.92**	7.61	8.42	0.188	24	**7.89**	7.57	8.38	0.218
LaM	7.98	17	**8.54**	8.27	8.81	0.160	24	**8.53**	8.21	8.84	0.205
ANc	4.58	17	**5.12**	4.86	5.47	0.166	24	**5.18**	4.96	5.54	0.146
ACr	–	11	**6.39**	6.13	6.68	0.156	23	**6.64**	6.23	6.88	0.161
CC	–	16	**4.59**	4.12	4.83	0.158	24	**4.84**	4.51	5.11	0.157
M^3M^3	–	18	**6.58**	5.98	7.02	0.218	24	**6.38**	6.02	6.63	0.189
CM^3	5.14	20	**5.57**	5.21	5.84	0.146	24	**5.53**	5.21	5.74	0.121
LMd	9.98	19	**11.14**	10.67	11.67	0.302	24	**11.05**	10.73	11.44	0.212
ACo	3.09	19	**3.39**	3.15	3.55	0.118	23	**3.31**	3.03	3.57	0.142
CM_3	5.51	18	**6.09**	5.76	6.36	0.156	24	**5.97**	5.65	6.31	0.150
CC/CM^3	–	16	**0.825**	0.787	0.869	0.022	24	**0.875**	0.826	0.917	0.027
CM^3/LCb	0.369	17	**0.364**	0.347	0.378	0.008	23	**0.371**	0.360	0.387	0.006
ANc/LCr	0.313	17	**0.328**	0.305	0.350	0.012	24	**0.338**	0.321	0.354	0.009
CC/LCr	–	15	**0.293**	0.271	0.305	0.009	24	**0.316**	0.291	0.333	0.011
LaN/LCr	0.521	17	**0.507**	0.476	0.525	0.012	24	**0.515**	0.492	0.531	0.010

Table 1. Biometric data on the Chehrabad bat and comparative samples of *Eptesicus nilssonii* morphogroup. For dimension explanations see Abbreviations.

ples of *E. g. bobrinskoi* from Kazakhstan and from Iran, significantly smaller than the samples of the group of large bats, comprising *E. gobiensis gobiensis* from various parts of Central Asia and *E. nilssonii* occurring in the boreal zone of Eurasia. The most distinct characters which rate the Chehrabad bat among the bats of the *bobrinskoi* morphotype are the small size of skull (LCr 14.75 mm and CM^3 5.12 mm, vs. 14.4–15.5 mm and 5.0–5.4 mm in the *bobrinskoi* morphotype, and 14.8–16.1 mm and 5.2–5.9 mm in the *gobiensis* s.str. and *nilssonii* morpho-

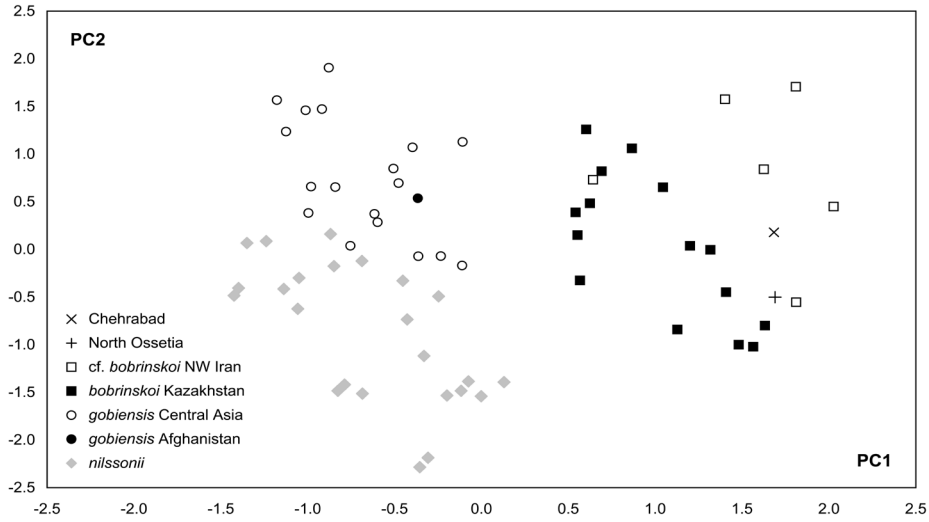

Fig. 4. Scatter plot of results of the principal component analysis of absolute and relative skull dimensions of the Chehrabad bat and the comparative samples of the *Eptesicus nilssonii* morpho-group.

types, respectively), combined with very low braincase (ANc 4.43 mm, vs. 4.2–4.9 mm in *bobrinskoi* and 4.8–5.6 mm in *gobiensis* s.str. and *nilssonii*, respectively), see Fig. 3. The value of the relative height of braincase (ANc/LCr) is rather low in the Chehrabad bat (0.300), i.e. as low as in the *bobrinskoi* morphotype (0.286–0.321), while below the range in the *gobiensis* s.str. and *nilssonii* morphotypes (0.305–0.354).

The principal component analysis of the skull absolute and relative dimensions as presented in Table 1 separated three groups of samples (Fig. 4; PC1 61.91% of variance, PC2 12.49%), the *nilssonii* morphotype, *gobiensis* s.str. morphotype, and *bobrinskoi* morphotype. The Chehrabad bat was placed in the cluster of samples of the latter morphotype. Within the cluster of the *bobrinskoi* samples, two partially overlapping subgroups are present, group of the bats from Kazakhstan and of bats from Iran (including the Chehrabad specimen). This separation within the *bobrinskoi* morphotype seems to be linked to slight differeces between these two populations in the skull shape; the skulls of the Iranian bats are on average slightly larger than the Kazakhstani samples (*E. g. bobrinskoi* s.str.), on the other hand, the Iranian bats have slightly narrower skulls, as present from the absolute values of most of the skull width dimensions (LaZ, LaInf, LaN, LaM, CC, M^3M^3, LaN/LCr, CC/LCr), and absolutely and relatively shorter rostra (CM^3, CM_3, CM^3/LCb) than the bats from Kazakhstan (see Table 1).

The comparison of plain measurements as well as the statistical evaluation of the craniodental data showed coincident results. The species identity of the Chehrabad specimen, which due to presence of skull in the bat remains allowed the identification, seem to be clear, this bat belongs to the identical taxon as the bats collected in Qutur Su during two visits of the site in 1961 and 2006 (Harrison 1963, Benda & Reiter 2006). On the other hand, these Iranian bats known now from two sites, although belonging to the *bobrinskoi* morphotype as defined above, exhibit certain fine morphological and obvious ecological differences from the populations of *E. g. bobrinskoi* s.str. from Kazakhstan (see also the comparison by Benda & Gaisler 2015). Therefore, the population of Iran is here tentatively identified as *E. g.* cf. *bobrinskoi*, since its separate taxonomic status cannot be excluded. The real position of the Iranian population within the species rank of *E. gobiensis* could perhaps be elicudated only

with help of a genetic comparison, which is possible only when a living bat or a fresh cadaver is available (the isolation of a genetic material failed also from the Qutur Su bats collected in 2006, when the analysis of the Palaearctic *Eptesicus* bats was prepared by Juste et al. 2013).

The new Iranian individual (or individuals) of *E. g.* cf. *bobrinskoi* was found in a relative proximity to Qutur Su, the only site where this bat was found in Iran before, lying 158 km directly to north (38°20'06"N, 47°51'24"E) of the Chehrabad mine. Thus, the north-western part of Iran is an area of broader distribution of this bat, and its second record confirms the preference for dry upper plateaus. On the other hand, this population seems to remain isolated in this habitat type of the region.

Another bat from the *E. nilssonii* morpho-group recorded from Iran was originally identified as *E. nilssonii* (Lay 1967), later as *E. nilssonii gobiensis* (DeBlase 1980), and finally as *E. nilssonii nilssonii* (Benda et al. 2012, Yusefi et al. 2019). This bat was collected at Sama (Mazandaran Province) in the forested northern slope of the Alborz Mts. at the altitude of ca. 1110 m a. s. l. Based on the biometric data provided by DeBlase (1980) showing a large-sized individual (LCr 15.9 mm, CM^3 5.3 mm), Benda et al. (2012) excluded a possibility that this bat could represent a member of the *bobrinskoi* morphotype and suggested it belongs to the large-sized forms of the morpho-group (see also Table 1). Of the two species in this category, Benda et al. (2012) concluded that the respective bat pertains rather to *E. nissonii* than to *E. g. gobiensis*, with respect to the biogeographical and ecological conditions. The bat was recorded in the zone of dense forests in the Hyrcanian region of Iran, which directly continues to the Caucasian forest zone in the west, where *E. nilssonii* occurs, while the closest sites of the known occurrence of *E. g. gobiensis* in Tajikistan and Afghanistan, the Mazandaran locality is distant for more than 1500 km as a bee flies. Nevertheless, DeBlase (1980) did not provide dimensions of the braincase of the Mazandran specimen, and thus, the conclusion given by Benda et al. (2012) remains only tentative (although well supported), since only a detailed examination of the skull and braincase shape (besides the genetic data) could help with proper identification of this specimen (currently deposited at the Field Museum, Chicago; DeBlase 1980).

The above described morphometric comparison also enabled us to make an idea about species affiliation of the bat collected from near Fasnal in North Ossetia, Russian Caucasus (ca. 42°56'N, 43°49'E) and identified by Kuzâkin (1944, 1950) as *E. bobrinskoi* (see above). The results of our comparison conform with the conclusions by Artyushin et al. (2012), who suggested this specimen to be a member of the *bobrinskoi* morphotype (see Figs. 3, 4 and Table 1). However, unlike all other populations assigned to *E. gobiensis* in its current sense (including *gobiensis* s.str., *bobrinskoi* and cf. *bobrinskoi*), the Ossetian bat originates from the densely forested northern slope of the Greater Caucasus range, i.e. from environmental conditions completely dissimilar from the ecological and biogeographical points of view to the lowland or montane arid steppes where other populations of the species occur. Moreover, and unlike the Chehrabad bat, the Ossetian specimen is an immature bat with no fully ossified wing joints (see also Artyushin et al. 2012) and its morphological comparison could give only tentative results – this bat certainly belongs to the *nilssonii* morpho-group, but its identity could be proved more likely with a help of molecular genetic analysis than the dimensional comparison. In summary, the Ossetian bat remains a mystery again and thus, the view presented by Hanák & Horáček (1986) could be still valid.

In conclusion, the present morphometric comparison of sufficient amount of specimens from whole distribution range of *E. gobiensis* demonstrated existence of three morphotypes living in three separate ranges with its species rank. The large morphotype, *E. g. gobiensis*, occurs in dry mountain plateaus of Central Asia in the east of the species range. Two small morphotypes live in the western part of the range, *E. g. bobrinskoi* s.str. in lowland deserts of central and western Kazakhstan and *E. g.* cf. *bobrinskoi* in dry mountain plateaus of north-western Iran. However, their mutual phylogenetic relationships and the taxonomic status of the Iranian populations still remain to be determined.

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APPENDIX

List of the material examined

Eptesicus gobiensis cf. *bobrinskoi* Kuzâkin, 1935

Iran (7): 1 ♂, 2 ♀♀, 4 inds. (BMNH 63.1184., 63.1186., 63.1189., 63.1190. [S], NMP 90890–90892 [S+A]), Qutur Su, Mt. Sabalan, 21 August 1961, leg. Aberystwyth University Expedition, 5 June 2006, P. Benda & A. Reiter.

Russia (1): 1 ♂ (ZMMU S-7799 [S+B]), North Ossetia, near Fasnal, 7 August 1926, leg. B. Kornaev.

Eptesicus gobiensis bobrinskoi Kuzâkin, 1935

Kazakhstan (18): 1 ♂ (ZIN 61694 [S+B]), Aryskumy desert, 27 km SSE of Mustafa, 25 July 1974, leg. I. Stogov; – 1 ♀ (ZIN 62247 [S+B]), 10 km NW of Čelkar, 18 June 1975, leg. P. Strelkov; – 1 ♂, 1 ♀ (ZIN 65104, 65121 [S+B]), Sarysu river, between Džilandy and Kense,

120 km SSE of Džezkazgan, 13 June 1977, leg. P. Strelkov; – 1 ♂ (ZIN 68618 [S+B]), Karakum Meteorologic Station, Bokdok Valley, 180 km N of Džusaly, 21 June 1980, leg. P. Strelkov; – 3 ♀♀ (ZMMU, S-5081, S-5082 [S+A], S-5091 [A], type series of *Eptesicus bobrinskoi* Kuzâkin, 1935), Tûlek well, 65 km E of Aralskoe More, 20 June 1928, leg. S. P. Naumov; – 4 inds. (ZMMU S-60608, S-60609 [S+B], S-60610, S-60611 [B]), 30 km N of Yrgyz, tomb, 9 June 1956, leg. Û. Dubrovskij; – 6 ♀♀ (ZIN 62240–62242, 62244–62246 [S+B]), Žetybaj well, 150 km N of Kzyl-Orda, 5 & 8 June 1975, leg. P. Strelkov.

Eptesicus gobiensis gobiensis Bobrinskoj, 1926

Aghanistan (1): 1 ♀ (SMF 38879 [S+A]), Kabul, 1800 m, 3 May 1965, leg. D. Meyer-Oehme.

China (1): 1 ♂ (ZMMU S-195543 [mummy]), Cinhaj, Dulan, fields near Balong; 36.024°N, 97.520°E, date unlisted, leg. A. A. Lisovskij & E. V. Obolenskaâ.

Kazakhstan (4): 2 ♂♂, 2 ♀♀ (ZMMU S-58131–S-58134 [S+B]), Aksiir river, 50 km SE of Zajsan, 14 July 1955, leg. V. Lebedev.

Kirghizstan (6): 6 ♀♀ (CUP CT84/24–29 [S+A]), Ala-Arča reserve, 30 July 1984, leg. J. Červený & I. Horáček.

Mongolia (9): 1 ♂ (ZMMU S-116980 [S+B]), 6 km E of Baân-Unger, Mongolian Altai Mts., 4 August 1978, leg. D. I. Bibikov; – 1 ♂ (ZMMU S-42037 [S+B]), middle zone of Bitgotin'am, Gobi Altai Mts, 2.300 m a. s. l., 30 June 1945, leg. A. G. Bannikov; – 1 ♂, 1 ind. (ZMMU S-42035, S-42036 [S+B]), Čun Hudum, Bajan-Uagan, Southern Mongolian Altai Mts., 7 July 1945, leg. A. G. Bannikov; – 2 ♀♀ (ZMMU S-40127, S-40128 [S]), Kov. Ingen, Sebestej, Džungarian Gobi desert, 30 July 1943, leg. A. G. Bannikov; – 2 ♀♀ (ZMMU S-167530, S-167531 [S]), Tumyn-Cogt, 60 km E of Idermeg, summer 1980, leg. Û. Gorelov; – 1 ind. (ZMMU S-145701 [S]), Mongolia (undef.), 1976, leg. V. M. Neronov.

Eptesicus nilssonii (von Keyserling et Blasius, 1839)

Czech Republic (19): 1 ♂ (NMP 91133 [S]), Dlouhá Ves, Franz-Franz mine, 30 January 1959, leg. V. Hanák; – 1 ♀ (NMP 91144 [S+B]), Malé Karlovice, Tísňavy, 5 June 1973, leg. V. Bejček; – 4 ♂♂, 3 ♀♀ (NMP 91136, 91138, 91139 [S+B], 91123, 91124, 91126, 91127 [S]), Mariánská Hora, Bílá Desná mine, 24 February 1958, 13 February 1962, 2 December 1964, leg. V. Hanák; – 1 ♂ (NMP 91128 [S]), Mikulov u Teplic, 13 March 1958, leg. V. Hanák; – 1 ♂ (NMP 91146 [S+B]), Orlické Záhoří, 10 February 1977, leg. P. Rybář; – 1 ♀ (NMP 91152 [S]), Pohorská Ves, Žofín forest, 16 June 1973, leg. V. Vohralík; – 1 ♀ (NMP 91140 [S]), Rokytnice v Orlických horách, Hanička fortress, 22 January 1965, leg. J. Sklenář; – 1 ♂ (NMP 91132 [S+B]), Suchá Rudná, 30 January 1959, leg. V. Hanák; – 1 ind. (NMP 91151 [S]), Šumava Mts., leg. J. Červený; – 2 ♀♀ (NMP 91121, 91122 [S+B]), Vrbno near Blatná, 4 and 5 June 1956, leg. V. Hanák; – 2 ♂♂ (NMP 91130, 91131 [S]), Zlaté Hory, Poštovní mine, 29 January 1959, leg. V. Hanák.

Slovakia (5): 2 ♀♀ (NMP 91135 [S+B], 91134 [S]), Demänovská Dolina, Dračia cave, 14 February 1961, leg. V. Hanák; – 2 ♂♂ (NMP 91142, 91143 [S+B]), Dobšiná, Dobšinská cave, 16 February 1968, leg. V. Hanák; – 1 ♂ (NMP 91145 [S+B]), Tatranská Javorina, Muránska cave, 13 December 1973, leg. J. Gaisler & V. Hanák.