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On the occurrence of *Rhinolophus lepidus* in West Turkestan: data from the Zoological Museum of the Moscow State University

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Abstract. Fourteen specimens of the small-sized representatives of the genus *Rhinolophus* (all originally identified as *R. hipposideros*) originating in West Turkestan were found in the mammal collection of the Zoological Museum of the Moscow State University (ZMMU) and examined for potential presence of *Rhinolopus lepidus*. The examination showed two species within this set of specimens, five *R. hipposideros* (from Turkmenistan, Uzbekistan and Tajikistan) and nine *R. lepidus* (coming from Uzbekistan, Kirghizstan and Tajikistan). This revision brought four new locality records of *R. lepidus* from West Turkestan, now known from this region from nine sites in total. Two ZMMU records from Uzbekistan newly delimited the northern and western margins of the known distribution range of this bat in West Turkestan, shifting the northern margin by some 150 km further to the north (Ugom river valley in the Tian Shan Mts., ca. 41° 43' N) and the western margin by ca. 30 km to the west (Sentâb in the Nuratau Mts., 66° 41' E).

Distribution, range, Kirghizstan, Tajikistan, Uzbekistan

Introduction

The Blyth's horseshoe bat, *Rhinolophus lepidus* Blyth, 1844, has been traditionally considered an Oriental species (Corbet & Hill 1992, Bates & Harrison 1997, Csorba et al. 2003). In Central Asia, it is reported to occur in Afghanistan, north-eastern Pakistan and north-western India, where some fifteen localities are known in total, see the review by Benda & Gaisler (2015). However, *R. lepidus* is known marginally also from mountain areas of the south-eastern part of West Turkestan. First indications on the occurrence of this bat in Kirghizstan were given in the karyologic studies by Zima et al. (1991, 1992) and later on, mentioned briefly by Horáček & Zima (1996). Finally, Horáček et al. (2000) referred the respective populations from Kirghizstan to a still undescribed species from the *Rhinolophus lepidus* group and, slightly confusedly, they used for it the names *R. lepidus*, *R.* aff. *lepidus* and *R. kirgisorum*. Here, the name *R. lepidus* is used concerning this rather enigmatic bat, similarly as in the previous papers (Benda et al. 2011, Benda & Gaisler 2015) and in accordance with Aellen (1959), Felten et al. (1977), Bates & Harrison (1997) and Csorba et al. (2003), who used this name evaluating populations from Afghanistan.

However, the distribution of *R. lepidus* in West Turkestan is still rather poorly known. In this area this species was for a long time misidentified as *R. hipposideros* (Borkhausen, 1797), see the review by Benda et al. (2011). Until present, five localities of *R. lepidus* have been known from the region. Benda et al. (2011) reported three sites – two from south-western Kirghizstan, Kara-

Kokty and Toâ-Moûn (both near Oš), and one from central Uzbekistan, Aman-Kutan (south of Samarkand). Recently, two other sites of *R. lepidus* have been published by Habilov & Tadžibaeva (2016) from Tajikistan: Šing in the north-western part of the country (Zaravšon Mts.) and Altyn-Topkan (nowadays Zarnisor) in the northernmost part of Tajikistan (Kuramin Mts.), see Table 2 for the accurate positions of the sites.

On the other hand, Habilov & Tadžibaeva (2016) suggested – besides the continuation of the field research – that the available collections of bats from West Turkestan should be checked for an additional evidence of *R. lepidus*. Since this species can be well differentiated from *R. hipposideros* using the external and/or cranial dimensions (see Benda et al. 2011), the revision of collection specimens can represent a useful tool to establish the distribution range of *R. lepidus* in the region as accurately as possible.

Hence, we examined the complete collection of the small-sized horseshoe bats from West Turkestan housed in the Zoological Museum of the Moscow State University (ZMMU) in attempt to find possible misidentified specimens of *R. lepidus* hidden among those labelled as *R. hipposideros*. Indeed, several specimens of *R. lepidus* were actually found in the ZMMU and these new records slightly shift the knowledge of the extent of the distribution range of this bat in West Turkestan.

Abbreviations

External dimensions. LAt = forearm length; McIII = length of third metacarpal of the wing; $PhIII_1$ = length of proximal phalanx of the third wing finger; $PhIII_2$ = length of medial phalanx of the third wing finger; $PhIII_3$ = length of distal phalanx of the third wing finger; McIV = length of fourth metacarpal of the wing; $PhIV_1$ = length of proximal phalanx of the fourth wing finger; $PhIV_2$ = length of medial phalanx of the fourth wing finger; $PhIV_3$ = length of distal phalanx of the fourth wing finger; III FR = third wing finger ratio (McIII / $PhIII_1$+$PhIII_2$+$PhIII_3$); IV FR = fourth wing finger ratio ($PhIV_2$ / $PhIV_1$).
Cranial dimensions. LCr = greatest length of skull (incl. praemaxilla); LOc = occipitocanine length of skull; LCc = condylocanine length of skull; LaZ = zygomatic width; LaI = width of interorbital constriction; LaInf = infraorbital width of rostrum; LaN = neurocranium width; LaM = mastoidal width of skull; ANc = neurocranium height; LBT = largest horizontal length of tympanic bulla; CC = rostral width between canines (incl.); M^3M^3 = rostral width between third upper molars (incl.); CM^3 = length of upper tooth-row between CM^3 (incl.); LMd = condylar length of mandible; ACo = height of coronoid process; CM_3 = length of lower tooth-row between CM_3 (incl.).
Other abbreviations. A = alcoholic preparation; B = stuffed skin (balg); M = mean; max., min. = dimension range margins; n = number of cases; S = skull; SD = standard deviation.

Identification

In the ZMMU mammal collection, only 14 specimens of small-sized representatives of the genus *Rhinolophus* coming from West Turkestan are present (see the Material examined below). Twelve of them are represented by skulls, eight of them associated with dry skins, while three skulls are accompanied with alcohol bodies. Two specimens are alcohol bodies without skulls extracted. One specimen originates from Kirghizstan, four from Tajikistan, one from Turkmenistan and seven specimens from Uzbekistan. One specimen (skull) is labelled only as "Central Asia"; however, it was collected in 1945–1950 by Oleg P. Bogdanov, who worked mainly in Tajikistan and Uzbekistan at that time (cf. Bogdanov 1950, 1952, 1953a, b, 1954, 1956, 1968, etc.) and the origin of the respective bat is most probably in one of these countries.

Benda et al. (2011) mentioned five groups of characters which can be effectively used for the differentiation of *R. lepidus* from *R. hipposideros*: body and skull size, shape of noseleaf, relative lengths of the wing segments, shape of skull, and size and shape of the unicuspid teeth. The shape of noseleaf is a less useful character in the collection specimens, and in the dry skins it is useless at all. On the other hand, the relative and absolute size characters could be well efficient, see

Table 1. Basic biometric data on the examined specimens of small-sized representatives of the genus *Rhinolophus* from the Zoological Museum of the Moscow State University (ZMMU) and comparative samples from Central Asia (only adult individuals are included); see Abbreviations for explanations
Tab. 1. Základní biometrické údaje vyšetřených jedinců malých zástupců rodu *Rhinolophus* uložených v Zoologickém museu Moskevské státní university (ZMMU) a srovnávacích jedinců ze střední Asie (zahrnuti jsou jen dospělí jedinci); vysvětlení zkratek rozměrů viz Abbreviations

	Rhinolophus lepidus														
	West Turkestan ZMMU					West Turkestan Benda et al. (2011)					Afghanistan Benda & Gaisler (2015)				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	M	min	max	SD
LAt	8	**40.74**	39.1	42.1	1.112	9	**41.47**	38.6	43.1	1.300	22	**42.87**	40.9	44.5	0.941
Mc III	8	**30.10**	28.7	31.1	0.795	9	**30.51**	28.8	31.9	0.968	21	**31.00**	29.5	32.0	0.736
Ph III_1	8	**11.94**	11.2	12.6	0.534	9	**12.07**	11.6	12.7	0.444	21	**12.53**	11.6	13.4	0.453
Ph III_2	8	**14.65**	13.7	15.2	0.510	9	**15.01**	14.6	15.7	0.310	19	**15.79**	15.2	16.6	0.359
Ph III_3	8	**3.14**	2.6	3.8	0.421	9	**3.06**	2.6	3.9	0.368	19	**3.13**	2.1	3.9	0.496
Mc IV	8	**31.46**	30.3	32.3	0.746	9	**31.89**	30.2	32.9	0.805	19	**32.35**	31.0	33.6	0.665
Ph IV_1	8	**8.71**	8.4	9.4	0.300	9	**9.22**	8.6	9.4	0.254	19	**8.91**	8.3	9.6	0.386
Ph IV_2	8	**10.08**	9.3	10.8	0.468	9	**10.30**	9.2	11.1	0.534	19	**10.59**	9.4	11.3	0.492
Ph IV_3	8	**1.39**	0.9	1.7	0.318	9	**1.47**	1.2	1.8	0.173	19	**1.62**	0.9	3.3	0.473
LCr	5	**17.31**	17.02	17.64	0.233	6	**17.09**	16.84	17.27	0.152	17	**16.75**	16.31	17.33	0.284
LOc	8	**16.21**	15.88	16.78	0.278	8	**16.33**	16.21	16.44	0.088	19	**16.39**	15.90	16.75	0.209
LCc	7	**14.44**	14.18	14.74	0.180	8	**14.45**	14.18	14.64	0.135	17	**14.56**	14.09	14.83	0.181
LaZ	8	**8.09**	7.93	8.24	0.115	8	**8.15**	8.04	8.24	0.072	20	**8.12**	7.83	8.32	0.146
LaI	8	**1.98**	1.91	2.08	0.069	8	**1.95**	1.88	2.02	0.051	20	**2.06**	1.92	2.22	0.078
LaInf	8	**4.20**	4.16	4.28	0.045	8	**4.21**	4.14	4.32	0.059	20	**4.24**	3.87	4.46	0.117
LaN	8	**7.02**	6.66	7.32	0.203	8	**7.17**	7.04	7.32	0.092	20	**7.16**	6.87	7.57	0.158
LaM	8	**8.02**	7.74	8.16	0.131	8	**8.02**	7.94	8.08	0.058	20	**8.08**	7.86	8.29	0.114
ANc	7	**5.13**	5.02	5.31	0.105	8	**5.02**	4.67	5.19	0.159	19	**5.09**	4.83	5.37	0.157
LBT	6	**2.69**	2.58	2.75	0.061	8	**2.77**	2.58	2.99	0.144	20	**2.78**	2.56	3.08	0.130
CC	7	**4.04**	3.96	4.31	0.123	7	**4.07**	3.88	4.39	0.183	20	**4.10**	3.81	4.28	0.116
M^3M^3	7	**6.08**	5.85	6.28	0.137	8	**6.04**	5.94	6.12	0.059	20	**6.15**	5.83	6.38	0.124
CM^3	8	**5.87**	5.64	6.09	0.137	8	**5.91**	5.76	6.12	0.105	20	**5.93**	5.68	6.17	0.112
LMd	8	**10.32**	10.19	10.58	0.126	8	**10.49**	10.36	10.78	0.138	20	**10.50**	10.23	10.69	0.124
ACo	8	**2.29**	2.21	2.41	0.060	8	**2.31**	2.24	2.42	0.063	20	**2.34**	2.19	2.48	0.073
CM_3	8	**6.08**	5.83	6.22	0.145	8	**6.18**	6.07	6.33	0.085	20	**6.22**	5.93	6.42	0.142

Table 1 for identification of the ZMMU specimens according to comparison of mere dimensions of wing and skull.

The examination of the relative lengths of particular segments of the wing fingers clearly identified thirteen ZMMU specimens, where the dry skin or alcohol body were available (i.e. all specimens but the single skull from “Central Asia”). A comparison of the relative length of the third wing finger (length of the third metacarpal / length of the third digit; III FR) against the relative length of the proximal and medial phalangi of the fourth wing finger (length of medial phalanx / length of proximal phalanx; IV FR) seems to be most efficient (Fig. 1). Since this test compares relative dimensions, it allows to mix alcohol and dry specimens and juvenile and adult

bats. It works well in juvenile specimens in which the cartilaginous parts of bones of the wing segments are still present and comparison of the absolute dimensions of their wing segments with these dimensions from adult bats is useless. This is the case of two ZMMU specimens of *R. hipposideros* s.str. (S-103801, S-103802) in which the comparison of other dimensional characters was not possible (Table 1). Thus, the comparison of III FR and IV FR clearly separated the ZMMU specimens into two groups and undoubtedly identified all of them as one of the two species (Fig. 1). Five bats fit by their wing characters to the dimensions of *R. hipposideros* from various parts of Central Asia and eight bats fit to the dimensions of the specimens of *R. lepidus* from West Turkestan and Afghanistan (see also Table 1).

The examination of skull dimensions enabled to identify ten ZMMU specimens representing complete adult skulls (Fig. 2). A comparison of the relative length of rostrum (length of upper tooth-row / condylocanine length of skull) against the relative width of rostrum (infraorbital width of rostrum / condylocanine length of skull) separated the ZMMU specimens into two groups and undoubtedly identified them as one of the two species (Fig. 2), three bats fit by their skull shape to the characters of other specimens of *R. hipposideros* from Central Asia and seven bats fit to the skull shapes of the specimens of *R. lepidus* from West Turkestan and Afghanistan (see also Table 1). In comparison to the results by Benda et al. (2011), this test of the relative skull dimensions is less effective, as a more numerous material of specimens from Central Asia was

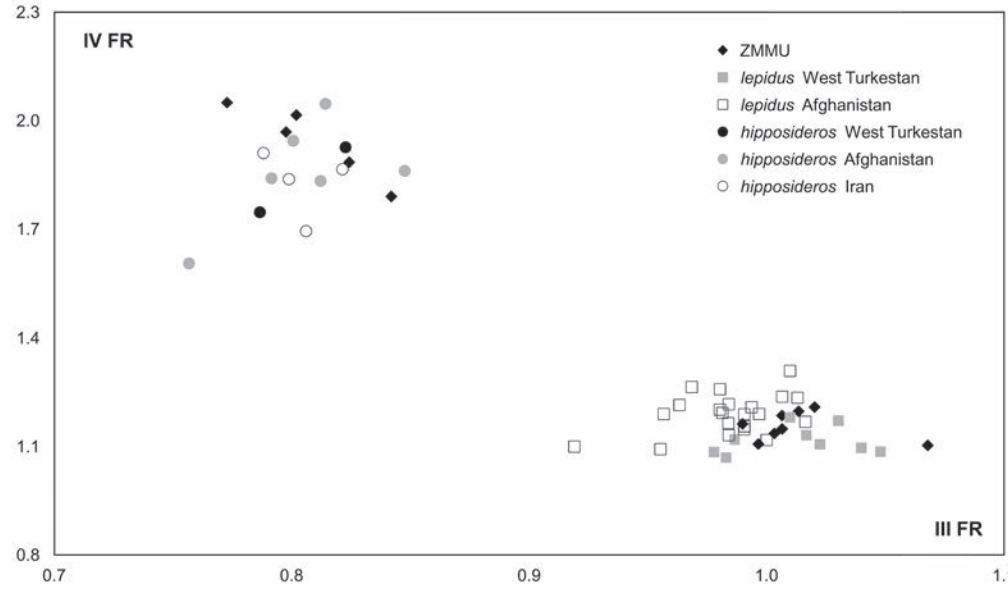

Fig. 1. Bivariate plot of the examined specimens of small-sized representatives of the genus *Rhinolophus* from the Zoological Museum of the Moscow State University (ZMMU) and comparative samples from Central Asia: relative length of the third wing finger (length of the third metacarpal / length of the third digit; III FR) against relative length of the proximal and medial phalangi of the fourth wing finger (length of medial phalanx / length of proximal phalanx; IV FR).
Obr. 1. Grafické srovnání rozměrů vyšetřených jedinců malých zástupců rodu *Rhinolophus* uložených v Zoologickém museu Moskevské státní university (ZMMU) a srovnávacích jedinců ze střední Asie: relativní délka třetího prstu křídla (délka třetího záprstního článku / soborná délka článků třetího prstu; III FR) proti relativní délce prvního (proximálního) a prostředního prstního článku čtvrtého prstu křídla (délka prostředního článku / délka prvního článku; IV FR).

Table 1. (continued)
Tab. 1. (pokračování)

	Rhinolophus hipposideros														
	West Turkestan ZMMU					Afghanistan Benda & Gaisler (2015)					Iran & West Turkestan Benda et al. (2011, 2012)				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	3	**37.40**	36.6	38.3	0.854	11	**39.93**	38.3	41.0	0.801	8	**38.70**	37.7	40.1	0.723
Mc III	3	**25.03**	24.5	25.5	0.503	5	**27.14**	25.8	27.8	0.847	6	**26.53**	25.8	27.0	0.480
Ph III_1	3	**12.10**	11.2	12.7	0.794	5	**13.02**	12.4	13.3	0.370	6	**12.78**	11.7	13.3	0.567
Ph III_2	3	**16.57**	14.0	18.1	2.237	5	**19.10**	18.2	20.5	0.872	6	**18.70**	18.0	19.3	0.502
Ph III_3	3	**2.47**	1.3	3.9	1.320	5	**1.26**	0.8	1.6	0.358	6	**1.53**	1.1	1.7	0.225
Mc IV	3	**28.27**	27.6	28.7	0.586	5	**30.74**	29.7	31.3	0.658	6	**30.05**	29.3	30.6	0.558
Ph IV_1	3	**6.20**	6.0	6.4	0.200	5	**6.98**	6.4	7.2	0.349	6	**6.95**	6.7	7.5	0.327
Ph IV_2	3	**12.10**	11.1	12.9	0.917	5	**13.28**	12.7	14.0	0.476	6	**12.70**	12.2	13.1	0.363
Ph IV_3	3	**0.87**	0.7	1.1	0.208	5	**0.80**	0.7	0.9	0.071	6	**0.87**	0.8	1.0	0.082
LCr	1	15.31				1	15.98				7	**16.07**	15.64	16.31	0.237
LOc	2	**14.97**	14.91	15.02	0.078	9	**15.50**	15.17	15.94	0.228	8	**15.25**	14.89	15.57	0.254
LCc	2	**13.32**	13.25	13.38	0.092	10	**13.78**	13.49	14.23	0.208	9	**13.64**	13.29	13.96	0.255
LaZ	2	**7.26**	7.24	7.28	0.028	10	**7.54**	7.21	7.93	0.203	9	**7.41**	7.17	7.66	0.161
LaI	2	**1.47**	1.46	1.48	0.014	10	**1.62**	1.41	1.75	0.122	9	**1.61**	1.43	1.77	0.089
LaInf	2	**3.43**	3.38	3.47	0.064	9	**3.65**	3.32	3.92	0.165	8	**3.60**	3.42	3.75	0.113
LaN	2	**6.29**	6.24	6.34	0.071	10	**6.46**	5.98	6.82	0.225	9	**6.46**	6.18	6.73	0.192
LaM	2	**7.21**	7.14	7.27	0.092	9	**7.38**	7.21	7.62	0.116	9	**7.39**	7.26	7.51	0.098
ANc	2	**4.53**	4.42	4.64	0.156	10	**4.64**	4.38	4.92	0.152	9	**4.61**	4.34	4.82	0.179
LBT	2	**2.29**	2.24	2.33	0.064	10	**2.36**	2.13	2.69	0.161	9	**2.49**	2.27	2.92	0.225
CC	2	**3.43**	3.32	3.54	0.156	9	**3.64**	3.31	3.92	0.189	7	**3.52**	3.28	3.64	0.122
M^3M^3	2	**5.16**	4.88	5.43	0.389	9	**5.62**	5.43	5.91	0.141	8	**5.45**	5.21	5.58	0.114
CM^3	2	**5.20**	5.18	5.22	0.028	10	**5.49**	5.34	5.81	0.140	9	**5.46**	5.27	5.62	0.118
LMd	1	9.33				10	**9.97**	9.69	10.22	0.179	9	**9.75**	9.36	10.24	0.270
ACo	1	1.86				10	**2.08**	1.88	2.83	0.278	9	**1.97**	1.66	2.12	0.143
CM_3	2	**5.45**	5.32	5.57	0.177	10	**5.75**	5.52	6.02	0.151	9	**5.66**	5.47	5.93	0.155

used here for comparison (instead of European bats), but still works well for separation the two respective species (Fig. 2).

Material examined

***Rhinolophus lepidus* Blyth, 1844**

Kirghizstan: 1 ♂ (ZMMU S-147196 [S+B]), Oš, Tuâ-Muûn [= Toâ-Moûn], 10 October 1986, leg. S. Rybin. – **Tajikistan**: 1 ♂ (ZMMU S-132285 [A]), 60 km VSV ot Dušanbe, istok r. Kafirnigan-Romit [= Ramit, Kofarnihon river spring, 60 km ENE of Dushanbe], 17 June 1983, leg. I. Â. Pavlinov; – 1 ♀ (ZMMU S-94701 [S+B]), okr. Stalinabada [= vicinity of Dushanbe], 14 August 1954, leg. O. P. Bogdanov. – **Uzbekistan**: 1 ♂ (ZMMU S-168988 [S+B]), pos. Sentâp, okr. Nuratinskogo Zapovednika [= Sentâb village, vicinity of the Nuratau Reserve], 5 August 2000, leg. R. A. Nazarov; – 1 ♂, 3 ♀♀ (ZMMU S-94697–S-94700 [S+B]), Zap. Tân'-Šan', sr. čast' dol. r. Ugam [= western Tian Shan Mts., middle part of the Ugom river valley],

8–9 June 1949, leg. O. P. Bogdanov. – **Central Asia**: 1 ind. (ZMMU S-163850 [S]), Sred. Aziâ [= Central Asia], 1945–1950, leg. O. P. Bogdanov.

***Rhinolophus hipposideros* (Borkhausen, 1797)**

Tajikistan: 2 ♂♂ (ZMMU S-103801, 103802 [S+A]), okr. Stalinabada, lessovaâ pešera [= vicinity of Dushanbe, loess cave], 4 August 1935, leg. A. P. Kuzâkin. – **Turkmenistan**: 1 ♂ (ZMMU S-169662 [A]), Aj-Dere, Kara-Kalskij r-n [= Aydere Valley, Garrygala District], May 1982, collector unlisted. – **Uzbekistan**: 1 ♂ (ZMMU S-13789 [S+B]), Nuratau, Pariš, 26 May 1934, leg. R. N. Meklenburcev; – 1 ♂ (ZMMU S-103804 [S+A]), Taškent [= Toshkent], 1929, collector unlisted.

Discussion

Among the fourteen ZMMU specimens, five bats were identified as *R. hipposideros*, i.e. in accordance with their original labelling, but nine as *R. lepidus* (see the Material examined for particular specimen identifications). The specimens of *R. lepidus* originate from five sites in three countries, Kirghizstan, Tajikistan and Uzbekistan (Fig. 3, Table 2). However, from these countries, this bat was already known to occur (Benda et al. 2011, Habilov & Tadžibaeva 2016). The only ZMMU specimen from Kirghizstan comes from the same locality as some of the specimens published by Benda et al. (2011), Toâ-Moûn near Oš. Two new sites are available from Tajikistan, both from the western central part of the country from a proximity of the capital Dushanbe. These sites represent

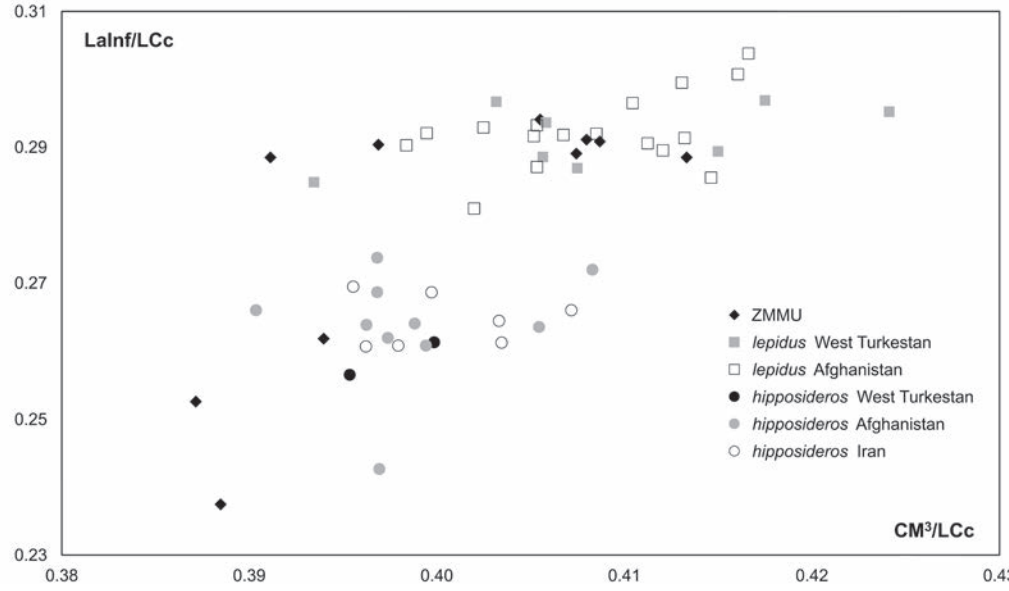

Fig. 2. Bivariate plot of the examined specimens of small-sized representatives of the genus *Rhinolophus* from the Zoological Museum of the Moscow State University (ZMMU) and comparative samples from Central Asia: relative length of rostrum (CM^3/LCc) against relative width of rostrum (LaInf/LCc).

Obr. 2. Grafické srovnání rozměrů vyšetřených jedinců malých zástupců rodu *Rhinolophus* uložených v Zoologickém museu Moskevské státní university (ZMMU) a srovnávacích jedinců ze střední Asie: relativní délka rostra (CM^3/LCc) proti relativní šířce rostra (LaInf/LCc).

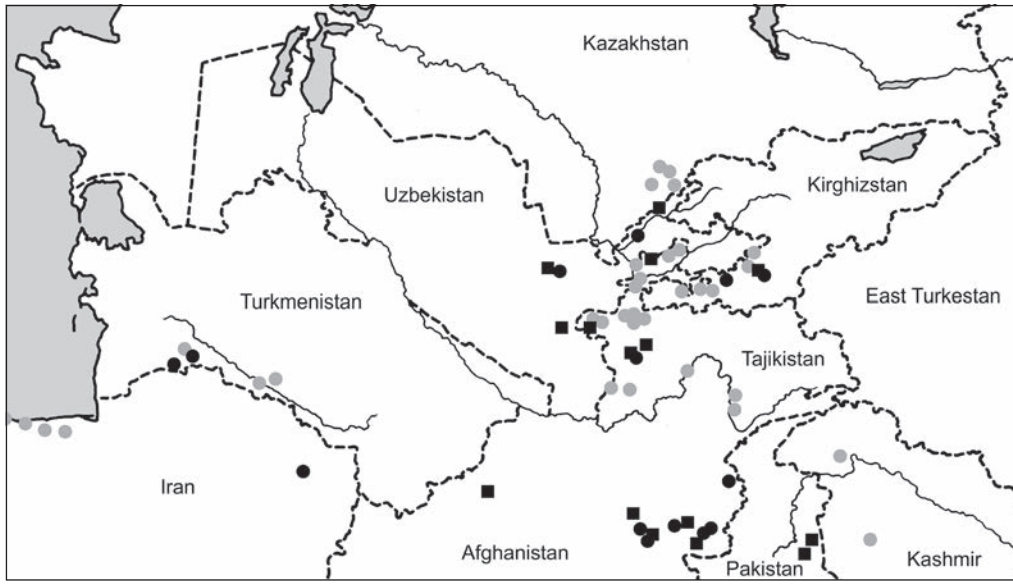

Fig. 3. Records of small-sized representatives of the genus *Rhinolophus* in Central Asia. Explanations: grey dots = published records referred to *Rhinolophus hipposideros*; black squares = records of *R. lepidus*; black dots = revised records of *R. hipposideros*. Based on the data by Bogdanov (1953a, 1968), Topál (1974), Strelkov et al. (1978), Rybin et al. (1989), Habilov (1992), Roberts (1997), Šajmardanov (2001), Ghosh (2008), Benda et al. (2012), Nadeem et al. (2013), Benda & Gaisler (2015), Habilov & Tadžibaeva (2016), and new data. In some cases, one symbol represents more than one site.
Obr. 3. Nálezy malých zástupců rodu *Rhinolophus* ve střední Asii. Vysvětlivky: šedivé kroužky = nálezy publikované pod jménem *Rhinolophus hipposideros*; černé čtverce = nálezy *R. lepidus*; černé kroužky = revidované nálezy *R. hipposideros*. Založeno na údajích Bogdanova (1953a, 1968), Topála (1974), Strelkova et al. (1978), Rybina et al. (1989), Habilova (1992), Robertse (1997), Šajmardanova (2001), Ghoshe (2008), Bendy et al. (2012), Nadeema et al. (2013), Bendy & Gaislera (2015), Habilova & Tadžibaevy (2016) a na nových údajích. V některých případech zahrnuje jeden symbol více než jednu lokalitu.

the southernmost known spots of occurrence of *R. lepidus* in West Turkestan and interconnect the Turkestani and Afghanistani parts of the species distribution range (Fig. 3). They are situated in the catchment area of the Amu Darya river, similarly as the Zarmast Cave near Maymana, the only record site of *R. lepidus* in northern Afghanistan (Benda & Gaisler 2015).

On the other hand, the new records from Uzbekistan significantly shift the margins of the whole distribution range of *R. lepidus* in Asia. The record from Sentâb in the Nuratau Mts. currently represents the westernmost known spot of the species range in West Turkestan, situated at 66° 41' E, i.e. ca. 30 km west of Aman-Kutan (66° 56' E), the westernmost site reported by Benda et al. (2011). Similarly, the record from the Ugom river valley in the Tian Shan Mts. currently represents the northernmost site of the whole range of *R. lepidus*, situated at ca. 41° 43' N, i.e. ca. 120 km north of Zarnisor that was reported as the northernmost point by Habilov & Tadžibaeva (2016).

Benda et al. (2011) expected the southern slope of the Far'gona Basin in Kirghizstan as the northernmost and easternmost extensions of the Turkestani part of the distribution range of *R. lepidus*. While the new evidence from ZMMU did not bring any record situated more to the east than from the Oš region, the northern margin of this species range is now shifted by 150 km to the

Table 2. Record sites of *Rhinolophus lepidus* in West Turkestan
Tab. 2. Nálezové lokality vrápence Blythova (*Rhinolophus lepidus*) v Západním Turkestanu

site lokalita	site name in the Soviet maps jméno lokality v sovětských mapách	coordinates koordináty	altitude nadmořská výška
Kirghizstan			
Kara-Kokty	Кара-Кокту	40° 21' N, 72° 37' E	1104 m
Toâ-Moûn	Тюя-Муюн	40° 21' N, 72° 37' E	1200 m
Tajikistan			
Dushanbe	Душанбе	38° 31' N, 68° 47' E	750 m
Ramit, Kofarnihon spring	Ромит, Кафирниган	38° 43' N, 69° 19' E	1190 m
Šing	Шинг	39° 17' N, 67° 48' E	1370 m
Zarnisor	Алтын-Топкан	40° 38' N, 69° 36' E	1300 m
Uzbekistan			
Aman-Kutan	Аманкутан	39° 19' N, 66° 56' E	1533 m
Sentâb	Сентяп	40° 37' N, 66° 41' E	620 m
Ugom (middle part)	Угам	41° 43' N, 69° 56' E	900 m

north, to the western edge of the massif of the Tian Shan Mts. In this respect – localisation of the eastern and northern margins of the range in the eastern part of West Turkestan – the distribution of *R. lepidus* resembles those of other bats species, e.g. *Rhinolophus ferrumequinum* (Schreber, 1774) or *Myotis emarginatus* (Geoffroy, 1806) (see Butovskij et al. 1985, Rybin et al. 1989), and well follows the range of *R. hipposideros* (Fig. 3). Thus, the occurrence of *R. lepidus* could be well possible also in south-eastern Kazakhstan, similarly as is it in all the latter three species (Butovskij et al. 1985, Šajmardanov 2001). On the other hand, all the latter three species occur also in Turkmenistan, where the occurrence of *R. lepidus* is rather improbable, since this bat does not occur in Iran (Benda et al. 2012).

From the three sites known at that time, Benda et al. (2011) reported the altitudinal distribution range of *R. lepidus* in West Turkestan as 1104–1533 m a. s. l., with the mean altitude of 1279 m. From Afghanistan, bordering West Turkestan in the south, Benda & Gaisler (2015) reported the altitude range of *R. lepidus* records to be 1250–2150 m a. s. l., with the mean altitude 1694 m (n=6). The altitude range of all nine records currently available from West Turkestan is 620–1533 m a. s. l., mean altitude 1107 m. This shows that in more northward situated territories, *R. lepidus* selects localities in rather lower situated areas. The range span is almost identical in Afghanistan and West Turkestan, 900 m and 913 m, respectively.

Interestingly, based on the whole material revised, *R. lepidus* is now a more frequent bat of West Turkestan than *R. hipposideros**; while the former bat was confirmed from nine sites (Benda et al. 2011, Habilov & Tadžibaeva 2016, this review; see Table 2), the latter species only from seven sites (Benda et al. 2011, this review). Nevertheless, the sympatric occurrence of these species is documented at least from three areas of West Turkestan, and thus, it seems to be a regular phenomenon of their distribution pattern (Fig. 3). Besides the already documented sympatry of these bats in the Oš region of Kirghizstan (Benda et al. 2011), sympatric occurrence is here reported also

* A revision of several specimens of the small-sized representatives of the genus *Rhinolophus* from West Turkestan being deposited in the collection of the Zoological Institute of the Russian Academy of Sciences (ZIN) at Saint-Petersburg showed one locality of *R. lepidus* (**Kirghizstan**: Oš region, ZIN 64603; corresponding with the known sites of Kara-Kokty and Toâ-Moûn) and three localities of *R. hipposideros* (**Turkmenistan**: 30 km SW of Garrygala, ZIN 54846; **Uzbekistan**: Šahimardan, 43 km S of Far'gona, ZIN 22261; **Tajikistan**: vicinity of Dushanbe, ZIN 22339–22343; cf. Bogdanov 1953a, 1956, Strelkov et al. 1978).

from the Nuratau Mts. (central Uzbekistan) and from the Dushanbe region (western Tajikistan). The sympatry of *R. lepidus* and *R. hipposideros* is known also from three regions of Afghanistan, i.e. the Kabol, Nangarhar, and Zabol Provinces (Benda & Gaisler 2015).

Souhrn

K rozšíření vrápence Blythova (*Rhinolophus lepidus*) v Západním Turkestanu: údaje ze Zoologického musea Moskevské státní university. V Zoologickém museu Moskevské státní university (ZMMU) bylo nalezeno celkem 14 jedinců malých zástupců rodu *Rhinolophus* pocházejících ze Západního Turkestanu a označených jako vrápenec malý (*R. hipposideros*). Všechny jedince byly důkladně vyšetřeny, zda některý z nich snad ve skutečnosti nepředstavuje jedince vrápence Blythova (*Rhinolopus lepidus*). Vyšetření vymezilo v souboru dva druhy (obr. 1, 2), pět kusů vrápenců malých (*Rhinolophus hipposideros*) z Turkmenistanu, Uzbekistanu a Tadžikistanu, a devět kusů vrápenců Blythových (*Rhinolophus lepidus*) z Uzbekistanu, Kirgizstanu a Tadžikistanu. Jedince ze ZMMU representují čtyři nové lokality vrápence Blythova v Západním Turkestanu, dnes v tomto regionu známého celkem z devíti míst (obr. 3, tab. 2). Dvě nové lokality jedinců z Uzbekistanu nově vymezily známý areal rozšíření vrápence Blythova v Západním Turkestanu – severní hranice se posunula o 120 km na sever, po střední tok řeky Ugam v západním Ťan-šanu (zhruba po 41° 43' N) a západní hranice asi o 30 km na západ, po vesnici Senťab v pohoří Nuratau (66° 41' E). Nejvýchodnějším bodem arealu rozšíření zůstává region Oše v jihozápadním Kirgizstanu (Benda et al. 2011).

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References

Aellen V., 1959: Contribution à l'étude de la faune d'Afghanistan 9. Chiroptères. *Revue Suisse de Zoologie*, **66**: 353–386.

Bates P. J. J. & Harrison D. L., 1997: *Bats of the Indian Subcontinent*. Harrison Zoological Museum, Sevenoaks, xvi+258 pp.

Benda P. & Gaisler J., 2015: Bats (Mammalia: Chiroptera) of the Eastern Mediterranean and Middle East. Part 12. Bat fauna of Afghanistan: revision of distribution and taxonomy. *Acta Societatis Zoologicae Bohemicae*, **79**: 267–458.

Benda P., Hanák V. & Červený J., 2011: Bats (Mammalia: Chiroptera) of the Eastern Mediterranean and the Middle East. Part 9. Bats from Transcaucasia and West Turkestan in collection of the National Museum, Prague. *Acta Societatis Zoologicae Bohemicae*, **75**: 159–222.

Benda P., Faizolâhi K., Andreas M., Obuch J., Reiter A., Ševčík M., Uhrin M., Vallo P. & Ashrafi S., 2012: Bats (Mammalia: Chiroptera) of the Eastern Mediterranean and Middle East. Part 10. Bat fauna of Iran. *Acta Societatis Zoologicae Bohemicae*, **76**: 163–582.

Bogdanov O. P., 1950: O nahoždenii šir okouhogo skl adčat oguba (*Tadarida teniotis* Rafinesq.) v Bab-Tage [On a finding of the European free-tailed bat (*Tadarida teniotis* Rafinesq.) in the Bab-Tag Mts.]. *Izvestiâ Akademii Nauk Uzbekskoj SSR*, **1950**(4): 129–130 (in Russian).

Bogdanov O. P., 1952: Dopolneniâ k faune nasekomoâdnyh i rukokrylyh Tadžikistana [Addenda to the fauna of insectivores and bats of Tajikistan]. *Izvestiâ Akademii Nauk Uzbekskoj SSR,* **1952**(2): 95–96 (in Russian).

Bogdanov O. P., 1953a: *Fauna Uzbekskoj SSR. Tom III. Mlekopitaûšie. Vyp. 2. Rukokrylye* [*Fauna of the Uzbek Soviet Socialist Republic. Volume III. Mammals. No. 2. Bats*]. Izdatel'stvo Akademii Nauk UzSSR, Taškent, 159 pp (in Russian).

Bogdanov O. P., 1953b: K èkologii belobrûhogo strelouha [On the ecology of the desert long-eared bat]. *Trudy Instituta Zoologii i Parazitologii Akademii Nauk Uzbekskoj SSR,* **2**: 82–83 (in Russian).

Bogdanov O. P., 1954: O zimovkah letučih myšej v okresnostâh Stalinabada [On the hibernation of bats in the surroundings of Dushanbe]. *Doklady Akademii Nauk Tadžikskoj SSR,* **13**: 17–19 (in Russian).

Bogdanov O. P., 1956: Letučie myši Tadžikistana [Bats of Tajikistan]. *Doklady Akademii Nauk Tadžikskoj SSR*, **15**: 69–75 (in Russian).

Bogdanov O. P., 1968: Novye dannye po rasprostraneniû rukokrylyh v Srednej Azii (gory Nuratau) [New data on the distribution of bats in Central Asia (Nuratau Mts.)]. *Zoologičeskij Žurnal*, **47**: 643–644 (in Russian, with a summary in English).

Butovskij P. M., Šajmardanov R. T. & Strelkov P. P., 1985: Otrâd rukokrylye – Chiroptera Blumenbach, 1779. Pp.: 125–260. In: Bekenov A., Butovskij P. M., Kasabekov B. B., Lankin P. M., Strelkov P. P., Stogov I. I., Fedosenko A. K., Šajmardanov R. T. & Šubin I. G. (eds.): *Mlekopitaûšie Kazahstana v četyreh tomah. Tom četvertyj. Nasekomoâdnye i rukokrylye*. Nauka Kazahskoj SSR, Alma-Ata, 280 pp.

Corbet G. B. & Hill J. E., 1992: *The Mammals of the Indomalayan Region: A Systematic Review*. Oxford University Press & British Museum (Natural History), Oxford & London, [vi]+488 pp.

Csorba G., Ujhelyi P. & Thomas N., 2003: *Horseshoe Bats of the World* (*Chiroptera*: *Rhinolophidae*). Alana Books, Bishop's Castle, xxxii+160 pp.

Felten H., Spitzenberger F. & Storch G., 1977: Zur Kleinsäugerfauna West-Anatoliens. Teil IIIa. *Senckenbergiana Biologica*, **58**: 1–44.

Ghosh M. K., 2008: Catalogue of Chiroptera in the collection of Zoological Survey of India (Part-II: Microchiroptera). *Records of the Zoological Survey of India*, *Occasional Paper*, **281**: 1–399.

Habilov T. K., 1992: *Fauna Respubliky Tadžikistan. Tom XX. Čast' VII. Mlekopitaûšie. Rukokrylye* [*Fauna of the Republic of Tajikistan. Volume XX. Part VII. Mammals. Bats*]. Izdatel'stvo Doniš, Dušanbe, 352 pp (in Russian).

Habilov T. K. & Tadžibaeva D. È., 2016: Indijskij podkovonos (*Rhinolophus lepidus* Blyth, 1844) – novyj vid fauny rukokrylyh Tadžikistana [Blyth's horseshoe bat (*Rhinolophus lepidus* Blyth, 1844) – new species of the bat fauna of Tajikistan]. P.: 102. In: Anonymous (ed.): *Aktual'nye voprosy sovremennoj zoologii i èkologii životnyh* [*Current Questions in the Contemporary Zoology and Animal Ecology*]. Izdatel'stvo PGU, Penza, 118 pp (in Russian).

Horáček I. & Zima J., 1996: Evolutionary divergence in the lesser horseshoe bat. P.: 26. In: Lina P. & Smeenk C. (eds.): *VIIth European Bat Research Symposium. 12–16 August 1996*, *Veldhoven*, *The Netherlands. Programme*, *Abstracts*, *List of Participants*. Bat Research Agency, Veldhoven, [ix]+112 pp.

Nadeem M. S., Zafar S., Kayani A. R., Mushtaq M., Azhar Beg M. & Nasir M. F., 2013: Distribution and roosting habitats of some microchiropteran bats in Rawalpindi district, Pakistan. *Pakistan Journal of Zoology*, **45**: 565–569.

Roberts T. J., 1997: *The Mammals of Pakistan*. Oxford University Press, Karachi, 552 pp.

Rybin S. N., Horáček I. & Červený J., 1989: Bats of southern Kirghizia: distribution and faunal status. Pp.: 421–441. In: Hanák V., Horáček I. & Gaisler J. (eds.): *European Bat Research 1987*. Charles University Press, Praha, 720 pp.

Šajmardanov R. T., 2001: Novye nahodki (1985–1993) redkih i maloizvestnyh dlâ fauny Kazahstana vidov rukokrylyh [New records (1985–1993) of bat species (Chiroptera) rare and less known in the fauna of Kazakhstan]. *Plecotus et al*., **4**: 82–83 (in Russian, with a summary in English).

Strelkov P. P., Sosnovceva V. P. & Babaev H. B., 1978: Letučie myši (Chiroptera) Turkmenii [Bats (Chiroptera) of Turkmenistan]. *Trudy Zoologičeskogo Instituta Akademii Nauk SSSR*, **79**: 3–71 (in Russian).

Topál G., 1974: Field observations on Oriental bats. Sex ratio and reproduction. *Vertebrata Hungarica*, **15**: 83–94.

Zima J., Červený J., Horáček I., Červená A., Průcha K., Macholán M. & Rybin S. N., 1991: Standard karyology of eighteen species of bats (Rhinolophidae, Vespertilionidae, Molossidae) from Eurasia. *Myotis*, **29**: 31–33.

Zima J., Volleth M., Horáček I., Červený J., Červená A., Průcha K. & Macholán M., 1992: Comparative karyology of rhinolophid bats (Chiroptera: Rhinolophidae). Pp.: 229–236. In: Horáček I. & Vohralík V. (eds.): *Prague Studies in Mammalogy*. Charles University Press, Praha, 246 pp.

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