

## Remarks on the bat ectoparasitic mite species belonging to *Macronyssus crosbyi* group (Mesostigmata: Gamasina: Macronyssidae)

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The article presents the results of the authors' revision of specimens belonging to the parasitic mite species *Macronyssus crosbyi* (Ewing & Stover, 1915) (Mesostigmata: Gamasina: Macronyssidae). It contains a revised species differential diagnosis of *Macronyssus crosbyi* and identification key to the most similar species belonging to the “crosbyi” species group in the Old World, as well as a complete updated list of host and geographical records (including the new data obtained by the authors) of *M. crosbyi*.

**Key words:** *Macronyssus crosbyi*, parasitic mites, Macronyssidae, bat ectoparasites, new records, new hosts.

### INTRODUCTION

Family Macronyssidae Oudemans, 1936, includes species parasitizing on mammals, birds and reptiles (Radovsky 2010). Associated with Chiroptera, the genus *Macronyssus* Kolenati, 1858, is one of the most thriving genera of the family and numbers more than 50 species distributed around the world (Radovsky 2010). According to F. Radovsky (1967), the *crosbyi*-group includes 9 species: *Macronyssus crosbyi* (Ewing, Stover, 1915), *M. corethroproctus* (Oudemans, 1902), *M. diversipilis* (Vitzthum, 1920), *M. flavus* (Kolenati, 1857), *M. kolenatii* (Oudemans, 1902), *M. longisetosus* (Furman, 1950), *M. meridionalis* Radovsky, 1967, *M. unidens* Radovsky, 1967, and *Macronyssus* sp., which has been described but not named (Radovsky, 1967). However, later descriptions of new species (*M. heteromorphus* Dusbábek et Radovsky, 1972, *M. macrodactylus* Radovsky & Beck, 1971, *M. leislerianus* Fain, Walter & Heddergott, 2003) also appear to belong to this group. Therefore, the group currently consists of 12 species, among which the most difficult differential diagnoses are between *Macronyssus crosbyi*, *M. heteromorphus*, *M. corethroproctus*, *M. flavus*, *M. macrodactylus*, and *M. leislerianus*. Identification of the mites is also complicated by Chiroptera's tendency to form mixed colonies, which results in the exchange in parasites, so that the articulation of a detailed differential diagnosis is needed.

The majority of species of the *Macronyssus* genus are highly specific, but *Macronyssus crosbyi* is pleioxenic and parasitizes on the species belonging to

several genera of Vespertilionidae family (*Myotis* spp., *Plecotus* spp., *Eptesicus* spp.). The species has a wide Holarctic distribution range and is highly polymorphic (Radovsky 1967, 2010), in particular, distinguished several morphs among *Macronyssus crosbyi* males. Furthermore, the status of a number of East Palearctic bat species has changed and requires a revision of their host-parasite associations.

A large part of the *M. crosbyi* area is within the Russian Federation, many federal regions of this country being bigger than European states. For this reason, the finds need to be detailed according to Russia's regions.

Therefore, our article aims to clarify the morphological differences between close species within *Macronyssus crosbyi* group.

Body part	Measurement	New World (Radovsky, 1967)	Old World (this paper), n=10
Idiosoma	Length	-	570-758
	Width	-	336-477
Dorsal shield	Length	505-595	544-596
	Width	-	247-275
Sternal shield	Length	-	54-66
	Width	-	169-198
Seta St1	Length	43-66	41-51
Genital shield	Length	-	233-253
	Width	-	117-130
Anal shield	Length	102-114	114-134
	Width	65-97	77-85

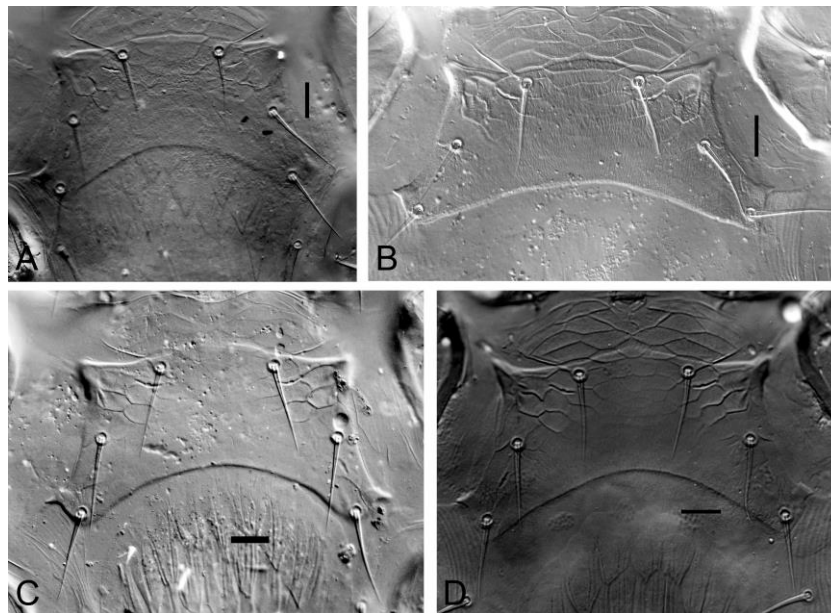
**Table 1. Comparative measurements of *Macronyssus crosbyi* from Old and New World.**

**Таблица 1. Сравнительные измерения *Macronyssus crosbyi* из Старого и Нового Света.**

#### MATERIALS AND METHODS

We have examined 45 specimens (of them 28 females) of the *Macronyssus crosbyi* species from different parts of Russia, as well as those from Mexico. The material was collected between 2001 and 2019. Bats were collected using mist nets and Borissenko's mobile trap (Borissenko 1999). All animals were released into the wild after their identification and ectoparasite sampling. For each bat, we recorded the following information: sex, age (juvenile or adult), forearm length (mm), body mass (g), and reproductive status (non-reproductive, reproductive, pregnant, or lactating). Bats were morphologically

identified using taxonomic descriptions by Ditz et al. (2009). The body (front, back, tail, wings, ears, tail membrane, etc.) of all the animals were thoroughly and systematically surveyed in hand and examined for ectoparasites using an LED headlamp. All the ectoparasites were removed with forceps, pooled into one sample for each individual bat, and preserved in 70% ethanol before the bats were released. The slides were made according to the standard method in Faure-Berlese fluid (Whitaker 1988). The material is stored as part of the mite collection of the Zoological Museum of the All-Russian Research Institute of Veterinary Entomology and Arachnology (Tyumen, Russia). In the course of our research, we also used materials from the collection of parasitic arthropods of the Zoological Institute of the RAS (Saint Petersburg).



**Fig. 1.** *Macronyssus crosbyi*, sternal shields, scale bar 20  $\mu\text{m}$ . A. Karelia Republic (European Russia). B. Sverdlovsk Province (the Urals). C. Tuva Republic (Southern Siberia). D. Irkutsk Province (Eastern Siberia).

**Рис. 1.** *Macronyssus crosbyi*, стеральные щитки, масштаб 20  $\mu\text{m}$ . А. Республика Карелия (Европейская часть России). В. Свердловская обл. (Урал). С. Республика Тыва (юж. Сибирь). Д. Иркутская обл. (Вост. Сибирь).

The material we used in our comparative description of *M. crosbyi* and other species of the *crosbyi*-group is represented in Table 2. Our field and literature data on the finds of *Macronyssus crosbyi* are represented in Supplement 1. Having no specimens of *Macronyssus macrodactylus* at our disposal, we used

the description of Radovsky and Beck (1971) as reference for our key to the most similar species of the *crosbyi*-group. Measurements of the *M. crosbyi* females are given in the Table 1.

## RESULTS

### ***Macronyssus crosbyi* (Ewing, Stover, 1915)**

*Liponyssus crosbyi* Ewing & Stover, 1915: 109.

*Leiognathus crosbyi* – Ewing, 1923: 7.

*Ichoronyssus hasei* Vitzthum, 1932: 23 (synonymy by Radovsky, 1966).

*Ichoronyssus kolenatii* Fonseca, 1948: 280 (synonymy by Radovsky, 1966).

*Ichoronyssus crosbyi* – Fonseca, 1948: 299; Yunker & Radovsky, 1966: 98.

*Ichoronyssus britanicus* – Furman, 1950: 480 (misidentification).

*Ichoronyssus quadridentatus* Strandtmann & Hunt, 1951: 462; Baker & Strandtmann, 1959: 225 (synonymy by Radovsky, 1966).

*Macronyssus crosbyi*.– Radovsky, 1966: 94; 1967: 119; Anciaux de Fa-  
veaux, 1971: 52; Hoffmann et al., 1972: 153; Whitaker, 1973: 1149; Yunker et  
al., 1975: 252; Whitaker et al., 1983; Whitaker & Maser, 1985: 73; Stanjuko-  
vich, 1990: 197; Ritzi et al., 2001: tabl.; Reeves et al., 2007: 53; Jaunbauere et  
al., 2008: 40; Radovsky, 2010: 56.

### Female

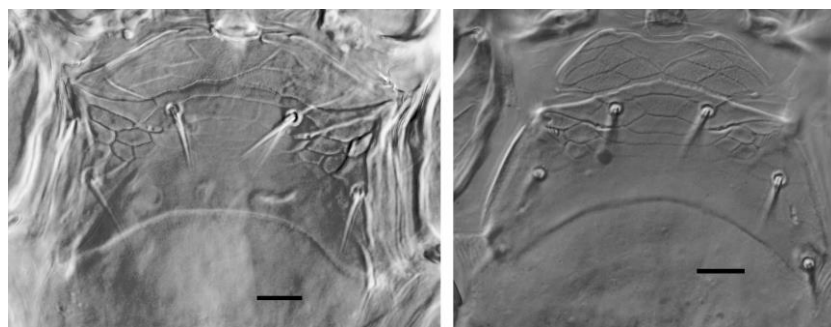
Differential diagnosis. *Macronyssus crosbyi* is similar to several species (so called *crosbyi* species group), but has a number of marked features distinguishing it from each of them: setae St1 do not reach posterior margin of sternal shield (Fig. 1; vs. *M. corethroproctus* (Fig. 2), *M. flavus* and *M. leislerianus* (Fig. 3), and in many cases *M. heteromorphus*); sternal glands are composed of coarse striations in 2-4 large angular cells (vs 6-7 closed cells in *M. flavus* and *M. leislerianus*, vs 3-4 small rounded cells in *M. macrodactylus* and vs crumpled folds with small strokes in *M. corethroproctus*); and posterior margin of epigynial shield has weakly sclerotized extension of tip bearing seta (Fig. 4A), the seta occasionally being on cuticle, not on the shield (vs epigynial shield without weakly sclerotized tip and seta on integument in *M. heteromorphus* – Fig. 4B).

Distribution. Russia: Karelia Republic, Leningrad Province, Voronezh Province, Mordovia Republic (new), Samara Province (new), Sverdlovsk Province, Khanty-Mansi Autonomous Region, Altai Region, Khakassia Republic, Tuva Republic, Krasnoyarsk Region, Irkutsk Province, Buryatia Republic, Khabarovsk Region, Magadan Province. Canada, USA, Mexico, Argentina, Panama, Brazil, Venezuela, Paraguay, Chile, Latvia, Estonia.



**Fig. 2.** *Macronyssus corethroproctus*, sternal shield, scale bar 20  $\mu\text{m}$ .

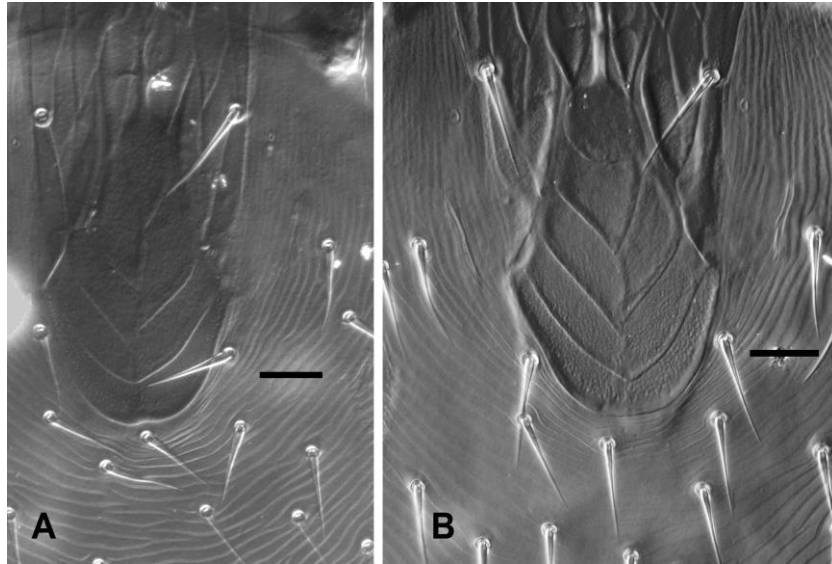
**Рис. 2.** *Macronyssus corethroproctus*, стернальный щиток, масштаб 20  $\mu\text{m}$



**Fig. 3.** A. *Macronyssus flavus*, sternal shield; B. *Macronyssus leislerianus*, sternal shield; scale bars 20  $\mu\text{m}$ .

**Рис. 3.** А. *Macronyssus flavus*, стернальный щиток; В. *Macronyssus leislerianus*, стернальный щит; масштаб 20  $\mu\text{m}$ .

Hosts: *Eptesicus nilssonii*, *E. fuscus* (Beauvois, 1796), *E. furinalis* (d'Orbigny, 1847), *Myotis dasycneme* (Boie, 1825), *M. mystacinus* (Kuhl, 1817), *M. brandtii* (Eversmann 1845), *M. nattereri* (Kuhl, 1917), *M. sibiricus*



**Fig. 4. A.** Unpaired median seta on weakly sclerotized extension of tip of epigynal shield, scale bar 20  $\mu\text{m}$ . **B.** Seta on unsclerotized integument, scale bar 20  $\mu\text{m}$ .

**Рис. 4. А.** Непарная щетинка на слабо склеротизированном продолжении заднего края генитального щитка, масштаб 20  $\mu\text{m}$ . **В** Щетинка на кутикуле, масштаб 20  $\mu\text{m}$ .

Kastshenko, 1905, *M. ikonnikovi* Ognev, 1912, *M. lucifugus* (Le Conte, 1831), *M. septentrionalis* Trouessart, 1897, *M. yumanensis* (Allen, 1864), *M. californicus* (Audubon and Bachman, 1842), *M. thysanodes* Miller, 1897, *M. keenii* (Merriam, 1895), *M. sodalis* Miller & Allen, 1928, *M. ciliolabrum* (Merriam 1886), *M. occultus* Hollister, 1909, *M. evotis* (H. Allen, 1864), *M. volans* (H. Allen, 1866), *M. austroriparius* (Rhoads, 1897), *M. velifer* (Allen, 1890), *M. fortidens* (Miller & Allen, 1928), *M. chiloensis* (Waterhouse, 1838), *M. nigricans* (Schinz, 1821), *M. ruber* (É. Geoffroy, 1806), *M. albescens* (É. Geoffroy, 1806), *M. riparius* Handley, 1960, *Pipistrellus nathusii* (Keyserling & Blasius, 1839), *P. pygmaeus* (Leach, 1825), *Vespertilio murinus* Linnaeus, 1758, *Plecotus auritus* (Linnaeus, 1758), *Pl. ognevi* Kishida, 1927, *Corynorhinus rafinesquii* (Lesson, 1827), *C. townsendii* (Cooper 1837), *Noctilio albiventris* Desmarest, 1818, *Diaemus youngi* (Jentink, 1893), *Platyrrhinus lineatus* (E. Geoffroy, 1810), *Eumops patagonicus* Thomas, 1924, *Molossops temminckii* (Burmeister, 1854), *Molossus ater* E. Geoffroy, 1805, *M. molossus* (Pallas, 1766), [*Clethrionomys gapperi* (Vigors, 1930)].

Full list of distributional and host records is provided in the Supplement 2.

Key to females of the *crosbyi* species group

## Dorsal shield with 28 setal pairs

1. Pattern of sternal glands shaped as cells with marked striations directed from the corner to the center of the shield. In the corner of the front margin of the shield, a sclerotized cylinder is clearly seen (Fig. 5). Setae St1 reach posterior margin of sternal shield ..... *Macronyssus* sp. n.  
     Sternal shield is evenly thin, having no marked sclerotization at the front margin; striation is absent or differs ..... 2
2. Sternal glands with moderate striations directed from the middle of front margin to the side margins of the shield. Setae St1 reach or almost reach posterior margin of sternal shield, in some cases above posterior margin (Fig. 6) ..... *M. heteromorphus*  
     Pattern of sternal glands shaped as cells without marked striations ..... 3
3. Setae St1 reach posterior margin of sternal shield (Fig. 2) ..... *M. corethroproctus*  
     St1 does not reach posterior margin of sternal shield ..... 4
4. Sternal glands constituting 6-7 cells ..... 5  
     Sternal glands constituting 3-4 cells ..... 6
5. Length of dorsal shield more than 550  $\mu\text{m}$ , width more than 270  $\mu\text{m}$  ..... *M. flavus* (Fig. 3A)  
     Length of dorsal shield less than 550  $\mu\text{m}$ , width less than 270  $\mu\text{m}$  ..... *M. leislerianus* (Fig. 3B)
6. Sternal glands composed of coarse striations in 2-4 large angular cells often with longitudinal or transverse hatching ..... *M. crosbyi* (Fig. 1)  
     Sternal glands composed of coarse striations in 3-4 small rounded cells without hatching (Radovsky, Beck, 1971) ..... *M. macrodactylus*

## DISCUSSION

In the Old World, *Macronyssus crosbyi* has been found in Latvia, Estonia and 15 regions of Russia, including 3 regions for which it is being described for the first time (Supplement 2).

Although the species under discussion can be clearly distinguished from the other species by a complex of features, many of those are difficult to identify, variable within the species and cannot be applied separately. The essential distinctive feature of *M. crosbyi* is the configuration of sternal glands. Notably, female specimens from the Old World appear to have almost no striation of sternal glands described for this species by Radovsky (1967) (Fig. 1). In the presented material sternal glands are shaped as 2-4 big and relatively intact cells without any length- or cross-wise striations. St1 setae do not reach the posterior margin of sternal field.

We have not identified any intraspecific morphs among the females, which might be due to the females' higher genetic stability as compared to that of males.

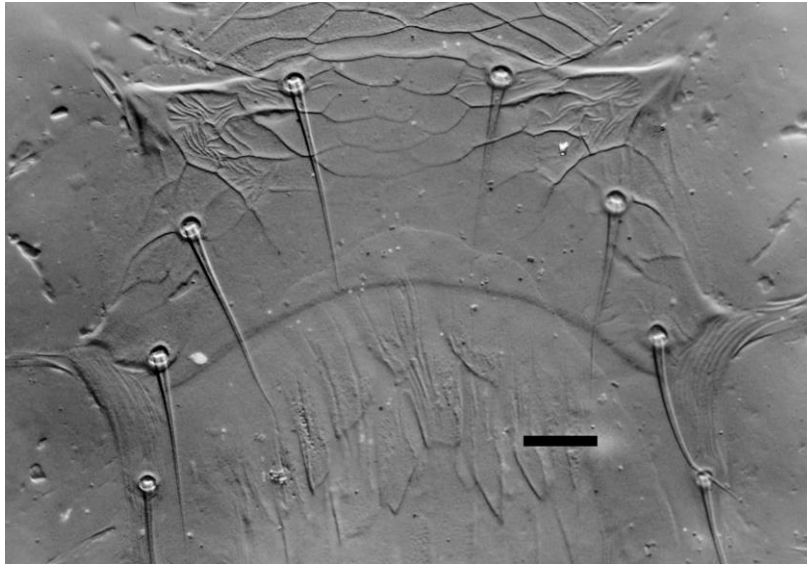


Fig. 5. *Macronyssus* sp. n., sternal shield, scale bar 20  $\mu$ m.

Рис. 5. *Macronyssus* sp. n., стернальный щиток, масштаб 20  $\mu$ m.



Fig. 6. *Macronyssus heteromorphus*, sternal shield, scale bar 20  $\mu$ m.

Рис. 6. *Macronyssus heteromorphus*, стернальный щиток, масштаб 20  $\mu$ m.



Specimens from Yakutia, which were earlier identified as *M. crosbyi* (Orlova et al. 2017), are now to be considered as belonging to *M. heteromorphus*. Records of *M. crosbyi* on common long-eared bat, *Plecotus auritus* in the Russian Far East (Medvedev et al. 1991) are currently should be attributed to the Siberian long-eared bat, *P. ognevi*, with three of them belonging to the putative new species *Macronyssus* sp., which is also classified among the *crosbyi* species group. The sternal glands pattern of the new species is visibly distinctive (see above).

In conclusion, we should note that a number of issues related to *Macronyssus crosbyi* remain unresolved. That includes unclear status of *M. yesoensis* described by K. Ushikava (1979) in Japan from *Eptesicus nilssonii* (Keyserling and Blasius, 1839) (as *Eptesicus parvus* Kishida, 1932) and several species of *Myotis*; in our opinion, this species might appear to be a junior synonym of *M. crosbyi*.

#### ACKNOWLEDGMENTS

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#### SUMMARY

Орлова М.В., Станюкович М.К., Орлов О.Л. 2021. Обсуждение статуса эктопаразитических гамазовых клещей (Mesostigmata: Gamasina: Macroonyssidae), принадлежащих к группе видов *crobyi*. – Plecotus et al. **24**: 50–66.

В статье представлены результаты ревизии особей паразитического гамазового клеща *Macroonyssus crobyi* (Ewing & Stover, 1915) (Mesostigmata: Gamasina: Macroonyssidae). Представлены обновленный дифференциальный диагноз *Macroonyssus crobyi* и определительный ключ для наиболее схожих между собой видов, принадлежащих к группе видов «*crobyi*» в Старом Свете. Приведен полный список хозяев и находок *M. crobyi* (включая наши собственные новые данные).

Key words: *Macroonyssus crobyi*, паразитические клещи, Macroonyssidae, эктопаразиты рукокрылых, новые находки, новые хозяева.

**Supplement 1. Materials on mites from *M. crosbyi* species group used in the study.**

**Приложение 1. Материалы по клещам из группы видов *M. crosbyi*, использованные в исследовании.**

Country	Region	Locality	Material	Date, leg.	Host species	Coordinates
Mexico	Colima	Cuyutlan	♀	5 V 2017, M.M. Ramirez Martinez	<i>Myoitis fortidens</i>	18°05' N 104°04' W
Mordovia republic	Mordovian State Nature Reserve named after P. G. Smidovich	2 ♂♂	22 VI 2016, D.G. Smirnov	<i>Myoitis daubentonii</i>	54°49' N 43°20' E	
						Samara province
Sverdlovsk province	Cave Konovalovskaya	4 ♀♀	18 III 2011, 3 XII 2011, O.L. Orlov, M.V. Orlova	<i>Eptesiscus nilssonii</i>	60°08' N 59°56' E	
						Khaty-Mansi autonomous region
Irkutsk province	Cave Okhotnichiya	5 ♀♀, 3 ♂♂	15 VII 2018, 4 VIII 2019, A.A. Tomishina	<i>Myoitis brandtii</i> , <i>Eptesiscus nilssonii</i>	62°23' N 64°04' E	
						Russia
<i>Macronyssus</i> sp.			<i>Pleocotus ognevi</i>	47°04' N, 136°31' E		

**Supplement 1. Continuation.**  
**Приложение 1. Продолжение.**

Country	Region	Locality	Material	Date, leg.	Host species	Coordinates
<i>Macromyssus heteromorphus</i>						
Russia	Altai region	State nature reserve "Tigirekskiy"	♀	9 VI 2016, A.V. Zhigalin	<i>Myotis sibiricus</i>	51°16' N 83°02' E
	Yakutiya republic	Nature Park "Lenskiye Stolby"	2 ♀♀	1-31 VII 2015, E.S. Zakharov, I.S. Troeva	<i>Myotis sibiricus</i>	61°06' N 127°12' E
<i>Macromyssus corethroproctus</i>						
Germany	State of Schleswig-Holstein	Kiel city outskirts	6 ♀♀	F. Kruger, 19 VII 2004	<i>Myotis dasycneme</i>	54°19' N 10°08' E
Poland	Pomeranian voivodeship	Mylof	8 ♀♀	A. Zappart, 5 VII 2012	<i>Myotis dasycneme</i>	53°46' N 17°43' E
Russia	Altai region	State nature reserve "Tigirekskiy"	♀	2 III 2016	<i>Myotis dasycneme</i>	51°16' N 83°02' E
<i>Macromyssus flavus</i>						
Russia	Dagestan republic	Shaytan-Kazak, lake wetland	4 ♀♀	19 V 2019, D.G. Smimov, V.P. Vekhnik, A.M. Lukyanenko	<i>Nyctalus noctula</i>	43°19' N 46°57' E
<i>Macromyssus leisterianus</i>						
Russia	Dagestan republic	Samur wildlife sanctuary of Dagestan Nature Reserve	2 ♀♀	27 V 2019, D.G. Smimov, V.P. Vekhnik, A.M. Lukyanenko	<i>Nyctalus leisteri</i>	41°52' N 48°33' E

**Supplement 2. Records of *M. crosbyi* (original and literature data).** \* new regional record; \*\* – host-parasite association recorded for the first time; \*\*\* – non-chiropteran host.

**Приложение 2. Находки *M. crosbyi* (собственные и литературные данные).** \* новая региональная находка; \*\* – первое указание паразита для данного хозяина; \*\*\* – хозяин, не относящийся к рукокрылым.

State	Locality	Host	Reference
Latvia		<i>Eptesicus nilssonii</i> <i>Myotis dasycneme</i>	Stanyukovich, 1990 Jaunbauere et al., 2008
Estonia		<i>Myotis dasycneme</i> <i>Myotis mystacinus</i> <i>Myotis brandtii</i> <i>Pipistrellus nathusii</i> <i>Vespertilio murinus</i>	Stanyukovich, 1990
Russia	Karelia republic	<i>E. nilssonii</i>	Lebedeva et al., 2020
	Leningrad province	<i>Myotis dasycneme</i> <i>Myotis mystacinus</i> <i>Myotis brandtii</i> <i>Myotis daubentonii</i> <i>E. nilssonii</i> <i>Plecotus auritus</i>	Stanyukovich, 1990
	Voronezh province *	<i>Pipistrellus pygmaeus</i> **	This paper
	Mordovia republic *	<i>Myotis daubentonii</i>	This paper
	Samara province *	<i>Myotis nattereri</i> **	This paper
	Sverdlovsk province	<i>E. nilssonii</i> <i>M. brandtii</i>	This paper
	Khanty-Mansi autonomous region	<i>M. brandtii</i> <i>E. nilssonii</i>	This paper
	Altai region	<i>P. ognevi</i> <i>M. sibiricus</i>	Orlova et al., 2017; this paper
	Khakassia republic	<i>M. sibiricus</i>	Orlova et al., 2017
Tuva republic	<i>E. nilssonii</i>	This paper	

Russia	Krasnoyarsk region	<i>P. ognevi</i> <i>E. nilssonii</i> <i>M. sibiricus</i>	Orlova et al., 2017
	Irkutsk province	<i>E. nilssonii</i> <i>M. sibiricus</i> <i>P. ognevi</i>	Orlova et al., 2017; this paper
	Buryatia republic	<i>M. sibiricus</i> <i>M. ikonnikovi</i>	Orlova et al., 2017
	Khabarovsk region	<i>P. ognevi</i> (as <i>Plecotus auritus</i> )	Medvedev et al., 1991
	Magadan province	<i>P. ognevi</i> (as <i>Plecotus auritus</i> )	Medvedev et al., 1991
Canada	<i>Myotis lucifugus</i> <i>Myotis septentrionalis</i> <i>Myotis sp.</i> <i>Clethrionomys gapperi</i> ***	Radovsky, 1967; Wright, 1979 Czenze, Broders, 2011	
USA	Alaska	<i>Myotis lucifugus</i>	Radovsky, 1967
	Missouri	<i>Myotis sp.</i>	
	Pennsylvania	<i>Myotis sp.</i>	
	California	<i>Myotis yumanensis</i> <i>Myotis californicus</i> <i>Myotis lucifugus</i> <i>Corynorhinus townsendii</i> (as <i>Plecotus townsendii</i> ) <i>Myotis thysanodes</i>	
	Montana	Host unknown	
	Illinois	<i>Myotis lucifugus</i> <i>Myotis keenii</i>	
	Indiana	<i>Myotis lucifugus</i> <i>Myotis sodalis</i> <i>Myotis keenii</i>	Whitaker, 1973

USA	Michigan	<i>Myotis lucifugus</i> <i>Myotis sp.</i> <i>Myotis keenii</i>	Radovsky, 1967; Dood, Kurta, 1982
	Colorado	<i>Myotis occultus</i>	Valdez et al., 2009
	New Mexico	<i>Myotis ciliolabrum</i> <i>Myotis occultus</i>	Ritzi et al., 2002; Valdez et al., 2009
	Oregon	<i>Myotis californicus</i> <i>Myotis evotis</i> <i>Myotis lucifugus</i> <i>Myotis yumanensis</i> <i>Myotis volans</i> <i>Myotis sp.</i> <i>Eptesicus fuscus</i>	Radovsky, 1967; Whitaker et al., 1983; Whitaker, Maser, 1985
	Tennessee	<i>Corynorhinus</i> <i>rafinesquii</i> <i>Myotis lucifugus</i> <i>M. septentrionalis</i>	Reeves et al., 2007
	Kansas	<i>Myotis septentrionalis</i>	Schumann, 2019
	Ohio	<i>Myotis sodalis</i>	Whitaker et al., 2000
	Oklahoma	<i>Myotis velifer</i>	Radovsky, 1967; Reisen et al., 1976; Veal, 1983
	Georgia	<i>Eptesicus fuscus</i> <i>Myotis lucifugus</i>	Strandtmann, Hunt, 1951; Yunker, 1958; Radovsky, 1967
	Florida	<i>Myotis austroriparius</i>	Radovsky, 1967
	Texas	<i>Myotis lucifugus</i> <i>Myotis velifer</i>	Radovsky, 1967
	Arizona	<i>Myotis velifer</i>	Radovsky, 1967



Mexico	<i>Myotis fortidens</i> **	This paper
	Host unknown	Hoffmann et al., 1972
Argentina	<i>Myotis chiloensis</i> <i>Myotis nigricans</i>	Mauri, 1982
Panama	<i>M. chiloensis</i>	Radovsky, 1967
Brazil	<i>Myotis ruber</i>	Radovsky, 1967
Venezuela	<i>Myotis nigricans</i>	Radovsky, 1967
Paraguay	<i>Noctilio albiventris</i> <i>Diaemus youngi</i> <i>Platyrrhinus lineatus</i> <i>Eptesicus furinalis</i> <i>Myotis albescens</i> <i>Myotis riparius</i> <i>Myotis nigricans</i> <i>Eumops patagonicus</i> <i>Molossops</i> <i>temminckii</i> <i>Molossus ater</i> <i>Molossus molossus</i>	Presley, 2004
Chile	Host unknown	Radovsky, 1967; Hoffmann, López-Campos, 2000