

A New Species of *Murina* from Japan (Chiroptera, Vespertilionidae)

By

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Murina ussuriensis OGNEV, 1913 was recorded from Japan for the first time by Glover M. ALLEN in 1920. He examined a specimen collected from the island of Yaku (Yakushima), south of Kyushu, by Mr. Edward H. WILSON, and identified it as this species without any hesitation. Most of the Japanese mammalogists, such as KURODA (1940), IMAIZUMI (1949), MAEDA (1980), etc., followed this view and identified the tube-nosed bats of the *aurata* group, collected from Honshu, Tsushima and Hokkaido with this species.

However, TATE (1941) expressed a different opinion on the status of the Japanese little tube-nosed bat in his review of this group. He examined a specimen of this bat collected from Japan and recognized it a species different from *M. ussuriensis* OGNEV. IMAIZUMI (1960) and WALLIN (1969) also doubted the status of this bat.

Recently, I had a fortunate opportunity to examine one of the two syntypes of *Murina ussuriensis* OGNEV, a skull and a skin preserved in spirit, collected from Dorf Evseevka, Kreis Imansky district, Ussuri-land, eastern Siberia, in the Zoological Museum of Moscow Lomonosov State University. This specimen is in many respects similar to the two specimens in the National Science Museum (NSMT-M7650, NSMT-M7651) which were collected by Dr. YOSHIKURA from Sakhalin. They are clearly conspecific. Unfortunately I was unable to examine the color of the fur of OGNEV's specimen. But OGNEV's and Sakhalin specimens are evidently different from the Japanese little tube-nosed bat in several external and cranial characters.

Because the Japanese tube-nosed bat is also different from *M. aurata* MILNE-EDWARDS, 1872 from Himalaya, which is a remaining form of the *M. aurata* group from East Asia, it is described as a new species as follows.

Murina silvatica sp. nov.

[Nihon-kotengukômorij]

Holotype. NSMT-M16690, old female, skin & skull, collected in a forest on the eastern shore of Oze-numa Lake, alt. 1,680 m, Hinoemata-mura, Minamiaizu-gun, Fukushima Pref. by Mizuko YOSHIYUKI. The type is preserved in the National Science Museum, Tokyo.

Measurements (in mm) of the holotype. Forearm 31.3, head and body 46.0, tail

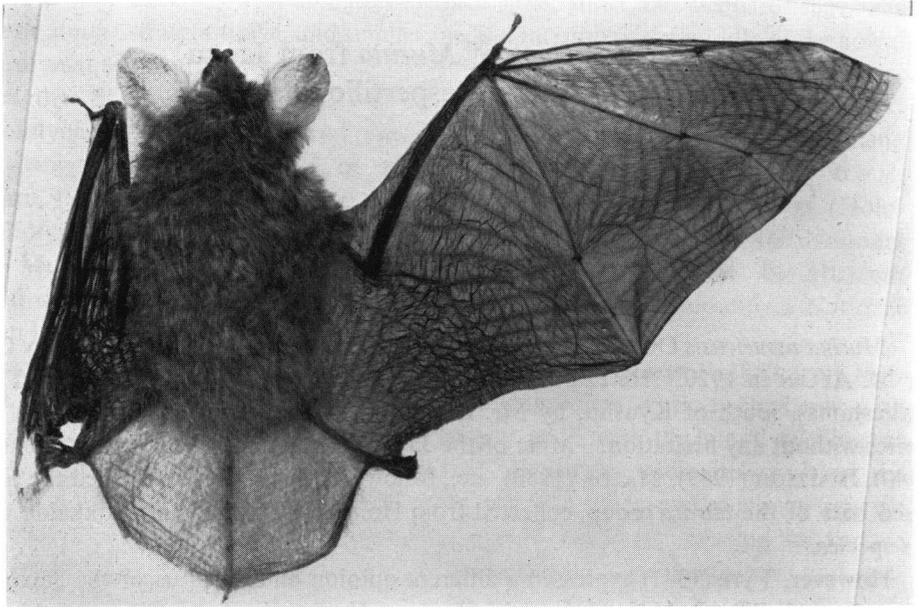


Fig. 1. Dorsal aspect of *Murina silvatica* sp. nov., holotype, NSMT-M16690, ♀.

29.6, tail percent 64.3%, hind foot cum unguis 8.0, hind foot sine unguis 7.5, tibia 13.0, ear 15.5, tragus 8.5, third metacarpal 27.5, fourth metacarpal 27.2, fifth metacarpal 27.5, greatest length of skull with I 15.20, condylobasal length of skull with I 14.10, zygomatic width 8.10, mastoid width 7.20, interorbital breadth 4.31, postorbital constriction 4.10, breadth of braincase 6.90, condylo-nuchal depth 4.10, mandible with I 9.71, width across canines (C^1-C^1) 3.60, width across molars (M^3-M^3) 5.00, upper cheek teeth (C^1-M^3) 5.00, lower cheek teeth (C_1-M_3) 5.40.

Diagnosis. Belongs to the *aurata* group of TATE (1941). Similar to *Murina ussuriensis* OGNEV, 1913, but ear much longer, tragus pointed and strongly turned outwards, tail shorter, and pelage much darker. Frontal swellings of skull decidedly lower than top of braincase, squamosal parts of braincase normal without any swellings, anterior narial and palatal emarginations much deeper than wide, and basicochlear fissures between cochleas and basioccipital bone distinct. The distance between condylar and angular processes exceedingly deep, anterior upper premolar (P^2) about two-thirds of posterior upper premolar (P^4) in height. The ratio of outer width C^1-C^1 to outer width M^3-M^3 72%.

Description. Tubular nostrils long, projecting outwards about 1.5 mm from base. Internarial region narrow and deep. Ear large, ovate, and broadly rounded at tip, anterior border projecting abruptly at middle, posterior border nearly straight to a slight notch at middle, then convex to base. The widest part of ear slightly lower than middle of anterior border. Ear with scattered papiloses on its frontal surface. Tragus

more than a half of ear in height, widest at level of anterior base, tapering towards pointed and outwardly turned tip, and with a small but well defined posterior basal lobe.

Wing comparatively wide. Thumb very large, about 10 mm in length and about 35.5% of forearm length. The third, fourth, and fifth fingers 55, 43 and 43 mm in length, respectively. In the third finger, the first and the second phalange nearly of the same length, the third about a half of their length.

Wing membrane attached to the second phalange of the first toe. Calcar stout extending to about middle of free border of interfemoral membrane. Terminal lobe of calcar distinct but posterior lobe absent. Tail much shorter than head and body length, 64.3% of the latter, about 1 mm of its terminal portion free from membrane.

The fur very soft, wavy, woolly, and glossy. Overhairs about 10 mm and underhairs about 6 mm in length at middle of back. Dorsal surfaces of interfemoral membrane, endopatagium, propatagia, hind legs, and posterior border of interfemoral membrane thickly covered with fur, but dorsal surfaces of dactylopatagia only covered with scattered hairs. Ventral surfaces of interfemoral membrane and endopatagia also covered with fur.

Dorsally, overhairs are Prout's brown at base tipped with ochraceous orange underhairs similar to overhairs at base, tipped with ochraceous buff, with a slightly paler subapical band. Ventral hairs mummy brown at base tipped pale ochraceous salmon at middle, lateral sides tawny. The colour of hairs on dorsal surfaces of wing and interfemoral membranes glossy ochraceous orange, those of ventral surfaces shorter and pearl gray in coloration.

Sagittal and temporal ridges of skull low and not distinct, but lambdoid crest remarkable. The anterior narial emargination much longer than wide, extending to the level of the posterior border of P^2 . Anteorbital foramen large, its posterior border extending to the level of the middle of M^1 . In dorsal profile, facial portion slightly concave and the anterior part of frontal bone rising abruptly, forming a frontal swelling somewhat similar to eyebrow, and cranial portion evenly convex. The frontal swelling much lower than the top of braincase. The paroccipital processes not attached to the petrosus.

In ventral view, the anterior palatal emargination smaller than the anterior narial emargination and extending to the level of the middle of upper canine. Palate relatively short, distance from end of the third molar to tip of pterygoid process shorter than half of cheek teeth length. Basioccipital pits very deep, extending posteriorly beyond middle of cochlears. The basicochlear fissures between basioccipital bone and cochlears narrow but distinct. Auditory bullae large, covering about two-thirds of cochlears. The paroccipital and mastoid processes small, anterior border of foramen magnum extending beyond posterior border of cochlears.

Ventral border of mandible convex, condylar process higher than the level of the lower canines. Angular process long, projecting postero-ventrally. Emargination between condylar and angular processes remarkably deep, its depth more than two-fifths

of distance between condylar and angular processes. The coronoid process large, triangular in lateral view, top not pointed.

Inner upper incisor (I^2) smaller than outer one (I^3), about a third of the latter in crown area, and with a small secondary cusp. Upper canine separated from upper outer incisor (I^3) relatively large, higher than large upper premolar (P^4). Its shaft somewhat squarish in cross section, with broad postero-internal concavity. Anterior upper premolar (P^2) and posterior upper premolar (P^4) similar in form, crown area of the former about half of the latter.

Lower incisors rather strongly imbricate, about a third of crown overlapping, forming a broad U-shaped row between canines. Lower canine higher than slightly posterior lower premolar (P_4).

Variation. There are two colour phases, a rufous phase similar to the type-specimen and a gray brown phase. The ratios of the two phases in the examined material are about 50 percent each and there is no correlation observed between the phases and sexes, ages, seasons or localities. Color of hair of mental and oral regions variable, blackish, brownish or gray brownish according to individuals.

Forearm and mandible of females are slightly longer than in males in mean values but there are no differences between males and females in other dimensions. Differences in these dimensions between populations from Honshu and Hokkaido are not evident, either. Measurements of examined specimens of this species are shown in Table 1.

Baculum. There are remarkable age variations. Adult and subadult stages: The greatest length and width of baculum in 6 adults and subadults; 2.11 ± 0.17 and 1.18 ± 0.11 mm. In dorsal and ventral aspects outlines of the bones X-shaped, proximal and distal borders concave at middle. Width of proximal part broader than distal part, lateral sides slightly concave with a constriction about one-third of the greatest width. Size of subadult similar to that of adult stage, but concavities of proximal and distal borders and lateral sides shallower. Juvenile stage: The bone is very small, only 0.6 mm in length and 0.73 mm in width ($N=1$) and nearly roundish in dorsal and ventral aspects.

Remarks. This new species undoubtedly belongs to the *aurata* group of TATE (1941) and can easily be distinguished from the other species of the group by the following key.

- A. Tragus tapered and strongly turned outwards with sharply pointed tip.
 - Anterior narial emargination distinctly deeper than wide.
 - Anterior upper premolar about two-thirds of posterior upper premolar in height.
 - Anterior border of foramen magnum extending forwards beyond postero-inner corner of cochlea.
 - Fissure between cochlea and basioccipital always distinct.
 - Dorsal fur uniform ochraceous orange or dark grayish brown.
 - Ears relatively long (mean 14.6 mm)

.....*Murina silvatica*

Table 1. External measurements of selected specimens of *Murina silvatica* sp. nov., *Murina ussuriensis* OGNEV, 1913 and *Murina aurata* MILNE-EDWARDS, 1872.

Museum number	Sex	Age	Locality	Forearm	Head and body	Tail	Hind foot (c.u.)	Tibia	Ear	Tragus	Measured by
<i>Murina silvatica</i> sp. nov.											
NSMT-M16690											
Type	♀	old	Oze Lake	31.30	46.00	29.60	8.00	13.00	15.50	8.50	YOSHIYUKI
2535	♂	ad	Aizankei	30.00	40.00	31.00	8.00	15.00	14.50	—	Ditto
3008	♀	ad	Ditto	32.00	40.00	33.00	8.00	15.00	14.00	8.00	Ditto
12653	♀	old	Sounkyo	32.50	45.50	28.50	8.00	15.00	14.00	8.00	Ditto
23380	♀	ad	Kushiro	30.90	46.00	37.00	10.00	15.00	16.00	8.50	Ditto
2610	♂	sub	Kuzukawa	28.60	43.00	32.00	7.60	14.30	15.00	6.70	Ditto
3030	♂	old	Ditto	28.50	51.00	32.00	8.00	16.00	15.00	8.50	Ditto
16825	♂	ad	Ditto	29.40	44.00	28.00	8.00	14.00	13.50	8.00	Ditto
2607	♀	ad	Ditto	31.00	41.00	31.00	8.00	—	15.00	7.00	Ditto
16826	♀	old	Ditto	31.80	44.00	32.00	10.50	14.50	14.50	8.00	Ditto
11896	♂	ad	Yonezawa	28.40	38.00	30.00	8.00	14.00	15.50	9.00	Ditto
16828	♂	old	Ditto	29.60	48.00	28.00	9.00	14.00	13.50	7.50	Ditto
21517	♂	ad	Ashiro	28.50	38.10	31.00	7.80	—	15.00	8.00	Ditto
16827	♀	juv	Hayachine	29.90	38.00	26.00	8.50	13.50	12.50	7.60	Ditto
19660	♂	ad	Mt. Zao	29.50	44.00	31.00	8.30	14.00	17.00	8.00	Ditto
16661	♀	juv	Oze Lake	30.00	46.00	31.00	8.00	13.00	14.50	8.00	Ditto
16662	♀	juv	Ditto	29.60	43.00	30.00	8.00	12.50	14.50	8.50	Ditto
17205	♀	ad	Ditto	31.00	46.50	30.00	9.20	—	15.60	9.00	Ditto
16276	♂	sub	Mt. Fuji	—	42.00	34.00	9.50	14.50	15.50	9.50	Ditto
16340	♂	ad	Ditto	31.00	43.50	31.50	9.00	13.00	15.00	9.50	Ditto
16859	♂	ad	Ditto	29.80	45.00	27.00	9.50	12.50	—	8.00	Ditto
16868	♂	ad	Ditto	30.70	46.00	32.00	9.50	14.50	16.00	9.00	Ditto
11891	♀	ad	Ditto	31.70	49.00	31.00	9.00	14.00	15.00	8.50	Ditto
11332	♂	ad	Enzan	31.00	50.00	29.00	7.00	13.50	13.00	9.00	Ditto
22520	♂	ad	Mt. Yatsu	29.40	—	—	8.00	12.00	13.00	8.00	Ditto
12423	♀	sub	Ditto	31.10	43.00	31.00	7.00	15.00	14.50	9.00	Ditto
1200	♀	old	Otari	32.50	47.00	32.00	9.00	—	12.00	6.00	Ditto
23793	♂	old	Oki I.	31.50	43.00	33.00	10.00	15.00	15.00	7.50	Ditto
<i>Murina ussuriensis</i>											
MUZM-N96368	♂		Evseevka	31.50	36.50	26.50	9.00	13.20	11.50	6.50	YOSHIYUKI
Syntype				32.00	37.00	29.00	10.80	15.80	10.20	8.00	OGNEV
	♀		Odarka	31.20	42.10	35.00	11.30	16.40	12.70	7.70	Ditto
NSMT-M 7650	♀	ad	Sakhalin	31.00	41.00	35.00	7.50	—	13.20	8.00	YOSHIKURA
7651	♀	ad	Ditto	29.50	40.00	31.00	7.50	—	13.00	7.00	Ditto
			Ditto								
<i>Murina aurata</i>											
NSMT-M 9548	♀	ad	East Nepal	30.50	—	29.00	7.70	12.30	13.50	7.00	YOSHIYUKI

Table 2. Cranial and dental measurements of selected specimens of *Murina silvatica* sp. nov., *Murina ussuriensis* OGNEV, 1913 and *Murina aurata* MILNE-EDWARDS, 1872.

Museum number	Sex	Age	Locality	Greatest length of skull with I	Condylobasal length of skull with I	Zygomatic width	Postorbital constriction	Breadth of braincase	Condylonuchal depth	Mandible with I	C ¹ -C ¹ (crown)	M ³ -M ³ (crown)	C ¹ -M ³ (crown)	Measured by
<i>Murina silvatica</i> sp. nov.														
NSMT-M16690 Type														
2535	♀	old	Oze Lake	15.20	14.10	8.10	4.10	6.90	4.60	9.71	3.60	5.20	5.00	YOSHIYUKI
3008	♂	ad	Aizankei	—	—	7.60	4.00	—	—	9.75	3.00	4.85	4.86	Ditto
12653	♀	ad	Ditto	—	—	7.84	4.13	—	—	9.90	3.45	4.76	5.30	Ditto
14991	♀	old	Sounkyo	—	14.55	8.15	4.32	6.80	—	9.70	3.55	5.10	5.15	Ditto
23380	♀	ad	Nukahira	15.15	13.65	7.60	4.20	6.90	4.60	9.92	3.50	5.01	5.00	Ditto
2610	♂	ad	Kushiro	—	14.48	8.54	4.28	7.36	5.39	9.80	—	5.15	5.06	Ditto
3030	♂	sub	Kuzukawa	14.60	13.40	7.47	3.84	6.66	4.74	9.37	3.37	4.64	4.70	Ditto
16825	♂	old	Ditto	14.70	13.46	7.68	4.12	7.15	4.40	9.32	3.56	5.06	4.85	Ditto
2607	♀	ad	Ditte	—	—	—	4.06	7.15	—	9.32	3.20	4.85	4.60	Ditto
16826	♀	ad	Ditto	14.55	13.40	7.76	4.30	7.30	4.26	9.20	3.30	4.72	4.76	Ditto
11896	♂	old	Ditto	15.60	14.15	8.20	4.35	7.07	4.65	10.15	3.25	5.26	5.10	Ditto
21517	♂	ad	Yonezawa	15.00	13.65	7.85	4.30	7.22	4.65	9.66	3.45	5.05	4.77	Ditto
16827	♀	ad	Ashiro	—	—	—	4.12	—	—	—	3.37	4.92	5.00	Ditto
	♀	juv	Hayachine	—	—	7.56	—	—	—	9.59	3.05	4.60	4.96	Ditto

19660	♂	ad	Mt. Zao	15.20	13.90	7.45	4.28	6.85	5.00	9.70	3.62	5.10	4.85	Ditto
16661	♀	juv	Oze Lake	—	13.80	7.70	4.10	7.05	—	9.60	3.50	5.10	4.80	Ditto
16662	♀	juv	Ditto	—	13.60	7.70	3.80	—	—	9.38	3.40	4.80	4.40	Ditto
17205	♂	ad	Ditto	15.70	14.32	7.93	4.12	7.10	4.82	10.10	3.45	5.10	4.92	Ditto
16276	♂	sub	Mt. Fuji	15.05	13.92	7.74	4.00	7.15	4.65	9.60	3.32	5.16	4.80	Ditto
16340	♂	ad	Ditto	14.87	13.74	7.87	4.00	7.05	4.84	9.23	3.34	4.95	4.80	Ditto
16859	♂	ad	Ditto	14.60	13.30	7.75	4.05	7.06	4.60	9.35	3.22	4.90	4.62	Ditto
16868	♂	ad	Ditto	15.95	14.55	7.85	4.25	7.40	5.20	10.00	3.60	5.10	5.20	Ditto
11891	♀	ad	Ditto	15.50	14.42	7.75	4.10	6.92	4.73	10.00	3.45	5.01	4.76	Ditto
11332	♂	ad	Enzan	15.15	14.00	8.10	4.57	7.30	5.10	9.72	3.55	5.05	4.70	Ditto
22520	♂	ad	Mt. Yatsu	—	—	7.40	4.15	7.06	4.40	9.13	3.05	4.70	4.46	Ditto
12423	♀	sub	Ditto	15.25	14.06	7.65	3.90	6.90	4.15	10.00	3.27	4.66	4.80	Ditto
1200	♀	old	Otari	15.72	14.50	8.20	4.22	7.12	4.65	10.15	3.60	5.35	5.10	Ditto
23793	♂	old	Oki I.	15.85	14.52	8.34	4.24	7.17	4.75	10.07	3.62	5.30	5.10	Ditto
<i>Murina ussuriensis</i>														
MUZM-N96368	♂		Evseevka	16.20	14.00	—	5.00	8.00	5.00	—	4.00	6.00	5.20	YOSHUYUKI
	♀			16.00	15.00	9.30	5.00	7.80	—	—	—	—	—	OGNEV
Ditto														
NSMT-M 7650	♀	ad	Odarka	15.70	14.20	8.70	4.80	7.70	—	—	—	—	—	OGNEV
7651	♀	old	Sakhalin	15.60	14.12	8.30	4.36	7.20	4.90	9.68	3.55	5.20	5.11	YOSHUYUKI
<i>Murina aurata</i>														
NSMT-M 9548	♀	ad	Nepal	14.30	12.70	7.40	3.95	6.60	4.65	8.95	3.05	4.45	4.30	Ditto

Hokkaido, Honshu, Oki, Tsushima, ? Yakushima*.

- B. Tragus not distinctly tapered and straight or only slightly turned outwards. Anterior narial emargination never deeper than wide. Anterior upper premolar about a half of posterior upper premolar in height. Anterior border of foramen magnum barely extending to postero-inner corner of cochleae.

Ears relatively short (about 12.6 mm)

- B1. Skull larger, mean of the greatest length of skull 15.7 mm.
Dorsal fur light yellowish gray.
Fissure between cochlea and basioccipital absent.

..... *Murina ussuriensis*
Southeastern Siberia, Sakhalin, Korea.

- B2. Skull smaller, the greatest length of skull about 14.5 mm.
Dorsal fur blackish sprinkled with orange yellow hairs.
Fissure between cochlea and basioccipital distinct.

..... *Murina aurata*
Southwestern China, Burma, Nepal.

Acknowledgement

I wish to express my cordial thanks to Dr. Olga L. ROSSOLIMO and Dr. I. Ya POVLINOV, Zoological Museum of Moscow Lomonosov State University, for giving me the opportunity to study OGNEV's specimens.

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* A specimen from Yakushima Is. reported by ALLEN (1920) may not be this species but *Murina tenebrosa* YOSHIYUKI, 1970 described from Tsushima Is.

Explanation of Plate 1

Skull of *Murina silvatica* sp. nov., holotype, NSMT-M 16690, ♀,
by stereophotographs ($\times 4$).

- A. Dorsal aspect of cranium.
- B. Ventral aspect of cranium.
- C. Ventral aspect of mandible.
- D. Lateral aspect of skull.

