

Rediscovery of the Holotype of *Mus bowersii* var. *okinavensis* Namiye, 1909 (Mammalia, Rodentia, Muridae)

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Abstract Holotype of *Mus bowersii* var. *okinavensis* Namiye, 1909, which is currently considered a junior synonym of *Diplothrix legata* (Thomas, 1906) was rediscovered in the mammal collection in Department of Zoology, National Museum of Nature and Science (NSMT). NSMT-M23265 mounted skin and NSMT-M34325 skull and partial skeleton are regarded as the holotype of *M. bowersii* var. *okinavensis*. Because M23265 and M34325 are derived from the same individual, we now discard the number M34325 and renumber the skull and skeleton as parts of NSMT-M23265. From its labeling, it appears that the specimen was initially deposited in the Science College and the Zoological Institute, Science College, Tokyo Imperial University; subsequently, it seems to have been transferred from Tokyo Imperial University to the Kuroda Family, and finally to the National Science Museum, Tokyo (currently National Museum of Nature and Science).

Key words: *Diplothrix legata*, Okinawa-jima Island, holotype, Namiye Motoyoshi, Kuroiwa Tsune.

Introduction

Namiye (1909) (= Motoyoshi Namiye) originally described “*Mus bowersii* var. *okinavensis*, subsp. nov.” based on one specimen captured by hunting dogs and donated by “Kuroiwa Tsune” (黒岩恒) of “Principal of County-established Kunchan Agricultural School of Okinawa Prefecture” (沖縄縣國頭郡郡立農學校長). The specimen was collected near the agricultural school, hence the type locality is “Kunigami-gun, Okinawa Island, Liukiu Islands” (Kaneko and Maeda, 2002; “Kunigami” is also called as “Kunchan”). The position of Principal of Kunchan Agricultural School was held by Mr. Tsune Kuroiwa between 1902 and 1914 (Habe, 1980).

Aoki (1913, 1915) considered *Mus bowersii*

var. *okinavensis* a junior synonym of Ryukyu long-furred rat *Lenothrix legata* Thomas, 1906 described from Amami-oshima Island in the Liukiu (= Ryukyu) Islands. Thereafter, the genus *Diplothrix* was established by Thomas (1916) based on *Lenothrix legata* and has included a single species *D. legata*; *Mus bowersii* var. *okinavensis* has been considered to be a junior synonym of *D. legata* (Kuroda, 1938; Corbet and Hill, 1992; Kaneko and Murakami, 1996; Musser and Carleton, 2005; Iwasa, 2009). The species *D. legata* is endemic to the central Ryukyu Islands (Motokawa, 2000) where it is known from forest habitats on three islands—Amami-oshima Island and Tokuno-shima Island in the Amami Group, and Okinawa-jima Island in the Okinawa Group (Iwasa, 2009). In 1972 the species was desig-

nated a Natural Monument of Japanese Embassy of Culture (Iwasa, 2009).

The holotype of *Lenothrix legata* from Amami-shima Island is still kept in the Natural History Museum in London, with registration number of BM.5.11.3.41 (Kaneko and Murakami, 1996). In contrast, the specimen used by Namiye for the original description of *Mus bowersii* var. *okinavensis* was not identified by a collection registration number and was not formally designated as the holotype (Namiye, 1909). Kaneko and Maeda (2002) noted that the type material of *Mus bowersii* var. *okinavensis* had not been recorded since the original description. More recently, however, Kawaguchi *et al.* (2009) listed NSMT-M34325 as the holotype of *Mus bowersii* var. *okinavensis*, pre-empting in part the new findings reported in full herein.

In this paper, we document the rediscovery of the type material of *Mus bowersii* var. *okinavensis* Namiye, 1909 in the mammal collection in the Department of Zoology, National Museum of Nature and Science, Tsukuba.

Materials and Methods

During a visit to the National Museum of Nature and Science (NSMT; Shinjuku, Tokyo) in April 2006, Motokawa and Aplin attempted to examine all available specimens of *D. legata*. One registered specimen could not be located—NSMT-M23265, a skin of a female adult from “Kunigami, Okinawa Prefecture” collected on “III. 1909”—a specimen that might have represented the undesigned type of *Mus bowersii* var. *okinavensis* Namiye, 1909. However, Motokawa and Aplin did locate one unlabeled and potentially unregistered skull and partial skeleton of *D. legata*. These were found in the same draw as specimens of other rat species reported in Namiye (1909).

In May 2014 in NSMT (Tsukuba, Ibaraki), a mounted rat skin bearing the label M23265 was located by Kawada and Shimoinaba. We examined the skull, skeleton, and skin specimens and compared them with the original description and

illustrations of *Mus bowersii* var. *okinavensis* as provided by Namiye (1909).

Results and Discussion

The mounted specimen M23265 is shown in Fig. 1A compared with “Fig. 1” of Namiye (1909) (Fig. 1B). Namiye (1909) noted that the specimen donated by Mr. Tsune Kuroiwa was examined as an alcohol preserved carcass and his illustration shows a specimen in this state. If M23265 is the specimen described by Namiye, it was presumably prepared as a mounted skin some time after the description. Because of this change in condition M23265 cannot be fully verified as the individual described by Namiye (1909). However, we note that Namiye’s photograph and M23265 both have considerable and closely comparable damage to the tail hairs. Furthermore, the general dimensions and appearance of the mounted skin M23265 are in close agreement with the description provided by Namiye (1909).

The mounted skin M23265 bears four labels as shown in Fig. 2. Among the four labels, a “Sci. Coll. Mus. Spec. No.” label (Fig. 2A) appears to be the oldest and may be the original label as it is the only one that features the original name “*Mus bowersii okinavensis*”, albeit subsequently struck through and replaced by “*Linothrix legata* Thos.”. Other information written in this label is “Loc. Kunchan, Riukiu ♀” in the front side and “沖縄縣国頭農学校長” (= Okinawa Prefecture Kunchan Agricultural School Principal) and “四十二年三月黒岩恒氏寄贈” (42 Year [maybe Meiji 42, = 1909] March, Mr. Kuroiwa Tsune donation) in the back side. The remaining three labels are thought to have been added in the following order.

“Sci. Coll. Mus.” (Fig. 2B) indicating “[No.] 12 [in Japanese character]; *Lenothrix legata*; Kunchan, Riukiu” in the front side and “42 [year] 3 [month]; Okinawa Prefecture Kunchan Agricultural School Principal [in Japanese character]; Mr. Kuroiwa Tsune donation [in Japanese character]” in the back side.

“Coll [ecti] on of Zool. Inst., Sci. Coll., Tokyo



Fig. 1. Rediscovered type material of *Mus bowersii* var. *okinavensis* (colored photos) in comparison with the photos of original description of Namiye (1909) (D, F, H, J are mirror images). A mounted skin NSMT-M23265 and fluid body (A–B); dorsal (C–D), ventral (E–F), and left lateral (G–H) views of maxilla, and mandible (I–J) of the skull (formerly registered as NSMT-M34325 (now part of NSMT-M23265). Bars indicate 10mm.

Imp. Univ.” (Fig. 2C) indicating “Transfer specimens from Todai [Tokyo University] Zoological Institute to Kuroda Family No. 49 [printed with

Japanese character in the first line]; Nos. 9, 12; Kenaganezumi [in Japanese character, meant for long-furred rat]; *Diplothrix legata* (Thomas);



Fig. 2. Four labels (A, B, C, D) attached to the mounted skin of NSMT-M23265. Front and reverse sides are shown in the left and right, respectively.

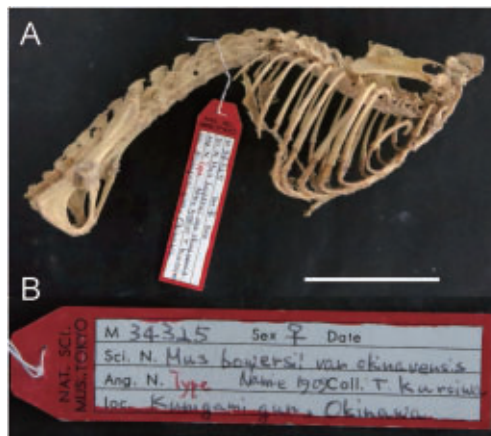


Fig. 3. Partial skeleton (A) and attached label (B) formerly registered as NSMT-M34325 (now part of NSMT-M23265). Bar indicates 50 mm.

Okinawa Prefecture Kunigami [or Kunchan] [in Japanese character]; iii. 1909; ♀ ad” in the front side and “T. Kuroiwa” in the back side.

“Nat. Sci. Mus., Tokyo” (Fig. 2D) indicating “M23265; ♀ ad; III. 1909; *Diplothrix legata*; [Coll.] Mr. Kuroda Nagahisa [in Japanese char-

acter]; Okinawa Prefecture Kunigami [or Kunchan] [in Japanese character]” in front side and “No. 49 (9.12)” in the back side.

The attached label information of M23265 agrees with Namiye (1909)’s description in naming the collector as “Kuroiwa Tsune”, the locality

as “Kunchuan”, and the sex of specimen as “female”. Namiye’s mammal survey on Okinawa-jima Island and Amami-oshima Island was conducted in April 1909 (Namiye, 1909). It is likely that the specimen was collected by Mr. Tsune Kuroiwa in March 1909 or earlier, prior to the arrival of Namiye. In the NSMT registration book, specimen M23265 is recorded as an adult female, collected on “III. 1909” from “Okinawa Kunigami [or Kunchan]” as being donated to NSMT by “Mr. Kuroda Nagahisa”, after it had been transferred from “Department of Zoology, The University of Tokyo” to “Kuroda Family”. The annotation of “No. 49 (9. 12)” is probably a number applied during the period that the specimen was held by the Department of Zoology.

The unlabeled *Diplothrix* skull and partial skeleton located by Motokawa and Aplin in 2006 are now registered as specimen M34325 in the NSMT collection. In comparing the skull to the relevant images in Namiye (1909, figs. 2–4) we found a perfect correspondence if the published images were transformed in mirror image (see Fig. 1D, F, H, J). This comparison is aided by the fact that the specimen shows asymmetric damage both on the dorsal surface (a crack in the right frontal and parietal bones) and ventral surface (partial loss of the left palatine bone). Thus it appears that Namiye’s negative was inverted in the production of the original figure. We confidently conclude that the skull registered as NSMT-M34325 is the specimen described by Namiye (1909) as *Mus bowersii* var. *okinavensis*. The partial skeleton (Fig. 3A) includes an axis vertebra that articulates convincingly with the occipital condyles of the cranium. We infer that, subsequent to Namiye’s examination of the specimen, the alcohol preserved carcass was skinned and made into a stuffed mount and a partial cleaned skeleton. Label of skeleton (Fig. 3B) was prepared by Kawada in April 2006 and the written data (only in the front side) was taken from the original description of Namiye (1909) indicating “M34325; ♀; *Mus bowersii* var. *okinavensis* Namiye 1909; Type; T. Kuroiwa; Kunigami-gun, Okinawa”. We cannot explain why the skull

and skeleton were not registered at the time they were initially transferred to NSMT, other than to suggest that they had become dissociated from the mounted skin that was registered as NSMT-M23265.

From the original description of *M. bowersii* var. *okinavensis* by Namiye (1909) it is clear that the account was based on the single female specimen donated by Mr. Tsune Kuroiwa. Following Article 73.1.2 of the International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature (ICZN), 1999) “If the nominal species-group taxon is based on a single specimen, either so stated or implied in the original publication, that specimen is the holotype fixed by monotypy”, NSMT-M23265 skin and NSMT-M34325 skull and skeleton are regarded as the holotype of *M. bowersii* var. *okinavensis*. Because M23265 and M34325 are derived from the same individual, we now discard the number M34325 and renumber the skull and skeleton as parts of NSMT-M23265.

In summary, we have identified the holotype of *Mus bowersii* var. *okinavensis* Namiye, 1909 in the NSMT collection; it consists of mounted skin, skull, and partial skeleton, all in good condition. From its labeling, it appears that the specimen was initially deposited in the Science College and the Zoological Institute, Science College, Tokyo Imperial University, where Namiye conducted zoological research. Subsequently, it seems to have been transferred from Tokyo Imperial University to the Kuroda Family, and finally to the National Science Museum, Tokyo (currently National Museum of Nature and Science). Further historical studies are needed to clarify the circumstances that underpinned this process of historical transfer of zoological specimens.

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