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## Notes on *Mastomys pernanus* (Kershaw, 1921)

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**Abstract.** A complete list of all known specimens of *Mastomys pernanus*, a distribution map and measurements are presented. On the basis of external and skull characters *pernanus* is a *Mastomys*. Also from a principle component analysis, using skull measurements, *pernanus* has apparently most affinities with the genus *Mastomys*.

**Key words.** Mammalia, Muridae, *Mastomys*, East Africa.

### Introduction

In 1921 Kershaw described *Rattus pernanus* from two male specimens collected in Kenya. At that time Kershaw wrote: "The indications are that it will prove to belong to the subgenus *Mastomys*, since it has little in common with the other African subgenera of *Rattus*. In general appearance it is like a dwarf *R. (Mastomys) coucha*, ...".

Allen (1939) considered these as *Myomys*, while Ellerman (1941) placed this species under *Rattus* subgenus *Mastomys*, *coucha* group and section *pernanus*.

In 1964 Misonne & Verschuren reported about seven more specimens collected in different localities in Serengeti (Tanzania). These authors were not sure about the generic identity of *pernanus* and propose to leave it in the genus *Mastomys*.

Rosevear (1969) tried to separate *Myomys* and *Mastomys* on skull characters and decided that *pernanus* seemed to be a *Mastomys*. In Honacki et al. (1982) *pernanus* is placed in the genus *Praomys*, subgenus *Mastomys* with a remark of D. Schlitter that it probably should be placed in the subgenus *Myomys*. Robbins & Van der Straeten (1989) thought that it may be a *Myomys* but were not sure. Musser and Carleton (1992) stated that it is a *Mastomys*.

During my studies in different museums I have seen and studied some more specimens of *Mastomys pernanus*. Here I give the measurements of all known specimens, a distribution map and a principle component analysis comparing *Mastomys pernanus* with the *Praomys*, *Mastomys*, *Myomys*, *Myomyscus* and *Hylomyscus* holotypes.

### Material and Methods

Specimens of the following museums were studied: American Museum of Natural History, New York (AMNH), Carnegie Museum of Natural History, Pittsburgh (CI), Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussel (KBIN), Koninklijk Museum voor Midden Africa, Tervuren (KMMA) and the The Natural History Museum, London (NHM).

The following specimens were studied:

Kenya: Amala river (NHM male 21.9.6.15 holotype [mandible missing], 21.9.6.14 paratype; Masai Sand River (AMNH male 114439 young adult).

Tanzania: Banagi (KBIN male 15591); Dakawa (KMMA male M96036–4687); Kuka nord (KBIN male 15590); Kyasirori (KBIN male 15593); Rusumo falls, 5 km east (CI male 41936); Seronera (KBIN female 15592 juvenile); Tabora south (KBIN male 15545 juvenile, male 15589).

Table 1: Measurements of adult specimens in mm; number of specimens, mean, range and standard deviation. The external measurements are those shown on the museum labels.

Code	Variable	holotype	all adult specimens
HB	head and body length	76,0	7; 78,6 (73,0–88,0) 6,3
HL	length of tail	65,0	6; 66,8 (60,0–78,0) 6,2
HL+N	length of hind foot + nail	15,0	7; 16,1 (15,0–18,4) 1,2
EL	length of ear	14,0	7; 14,9 (14,0–16,0) 0,7
GRLE	greatest length of skull	23,15	3; 24,08 (23,15–25,10) 0,98
PRCO	prosthion-condylion (condylobasal length)	21,05	3; 21,77 (21,05–22,60) 0,78
HEBA	henselion-basion (basilar length)	17,40	3; 18,17 (17,40–18,95) 0,77
HEPA	henselion-palation (palatilar length)	10,00	6; 10,58 (10,00–10,90) 0,38
PAF	length of palatal foramina	4,85	6; 5,38 (4,85–5,80) 0,31
DIA 1	length of diastema	5,50	6; 6,15 (5,50–6,65) 0,40
DIA 2	distance between the anterior border of the alveolus of M <sup>1</sup> and the edge of upper incisor	6,15	6; 6,85 (6,15–7,35) 0,40
INT	interorbital breadth	3,75	6; 3,67 (3,50–3,75) 0,09
ZYG	zygomatic breadth on the zygomatic process of the squamosal	11,80	3; 12,13 (11,80–12,45) 0,32
PAL	palate breadth between M <sup>1</sup> s	2,10	6; 2,34 (2,10–2,60) 0,20
UPTE	length of upper cheekteeth	3,90	6; 4,02 (3,75–4,35) 0,21
UPDE	breadth of upper dental arch (breadth across M <sup>1</sup> s)	—	5; 4,98 (4,75–5,35) 0,24
M <sup>1</sup>	breadth of first upper molar (crown breadth)	1,15	7; 1,21 (1,15–1,30) 0,05
ZYPL	breadth of zygomatic plate	2,80	7; 2,84 (2,65–3,05) 0,14
BNAS	greatest breadth of nasals	2,60	6; 2,66 (2,60–2,80) 0,08
LNAS	greatest length of nasals	8,60	6; 9,52 (8,60–10,20) 0,58
LOTE	length of lower cheekteeth	—	6; 3,63 (3,50–3,70) 0,08
CHOA	breadth of choanae (mesopterygoid fossa)	0,60	6; 0,41 (0,30–0,60) 0,11
BUL	length of auditory bulla	4,30	5; 4,37 (4,20–4,50) 0,13
BRCA	braincase breadth	10,15	3; 10,70 (10,15–11,45) 0,67
DIN	depth of incisors	1,40	7; 1,44 (1,30–1,50) 0,07
ROH	rostrum height at anterior border of M <sup>1</sup>	5,40	6; 5,89 (5,40–6,50) 0,41
ROB	rostrum breadth at anterior border of zygomatic plate	4,15	6; 4,47 (4,15–4,90) 0,26
PCPA	distance between the extreme points of coronoid process and angular process	—	5; 7,26 (6,90–7,60) 0,26

All specimens with dry skin and skull with the exception of NHM 21.9.6.14 (skin only).

Measurement definition and descriptions follow Van der Straeten & Van der Straeten-Harrie (1977) and Van der Straeten & Dieterlen (1987). External body measurements were recorded from the specimen labels.

### Description

**External characters:** The soft pelage has all characters mentioned by Rosevear (1969) as typical *Mastomys*. Kershaw (1921) gives a comprehensive and exact description of the skin. The hairs of the belly are grey with white tips giving the belly its greyish aspect. In most of the specimens the belly is slightly washed with buff and some specimens have a small completely white speck on the chest. There is a very prominent spot of white hairs behind the ears. Due to preparation, these characters are not so clear in the specimens of the KBIN. The hairs in the middle of the thickly clothed tail are 1,5 mm long. The mammary formula is not known, as the only female specimen is a juvenile.

The specimen from Dakawa has some aberrant characters. It lacks an ochraceous stripe between the flanks and the underparts and has a 18,4 mm long foot, whereas the average footlength of the other adult specimens is 15,75 mm (15,00–17,00),  $n=6$ .

**Measurements:** see table 1.

**Skull:** The anterior palatal foramina reach from just between the molars up to the beginning of the middle root of  $M^1$  and the palatine bone from the junction of  $M^1$  and  $M^2$  to the middle of  $M^2$ , both as in typical *Mastomys*. The interorbital region also has the typical *Mastomys* structure.

The mesopterygoid fossa is very narrow on the posterior margin of the palatine, becoming relatively wide towards the end; as a result this fossa has a triangular aspect (fig. 1a).

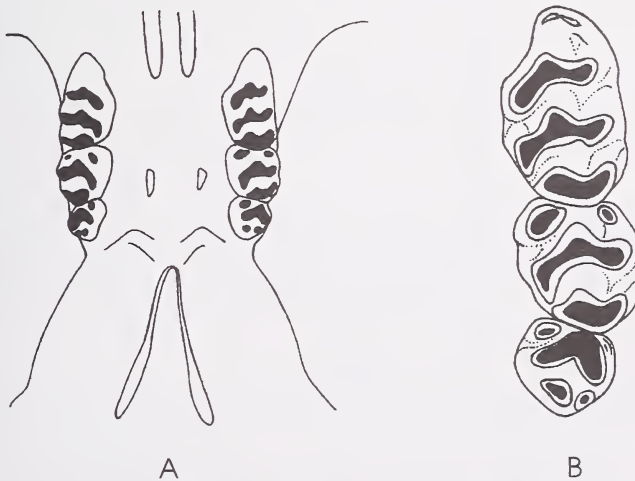


Fig. 1: *Mastomys pernanus* KMMA M96036–4687; A: mesopterygoid fossa; B: left upper molar row.

Comparing the different holotypes of *Mastomys*, a great variation in curvature of the front edge of the zygomatic plate is observed. In *M. pernanus* it is straight and almost vertical. Each of the upper molars is 3-rooted.  $M^1$ : in the first lamina the t1 is shifted to the rear, also a typical *Mastomys* character; the front edge of t2 carries a supplementary cusp, mostly even a ridge; t3 is somewhat smaller than t1 and t9 is clearly present; t7 is lacking and replaced by a faint ridge.

In  $M^2$  the t9 is prominent and the t3 is small to very small (absent in one specimen); also here the t7 is a faint ridge.

Only in two specimens there is a very small t3 in  $M^3$ . This  $M^3$  has the third lamina with 2 cusps.

### Distribution

All known specimens were collected in the north of Tanzania and the south of Kenya (see fig. 2). One exception is the specimen from Dakawa, a locality about 550 km more to the south (not on the map). Misonne & Verschuren (1964) mentioned the presence of *M. pernanus* in owl pellets from Rwanda (Parc de l'Akagera) and a skull from Campi Ya Mawe in Tanzania. This material could not be recovered in the KBIN (per. com. G. Lenglet).

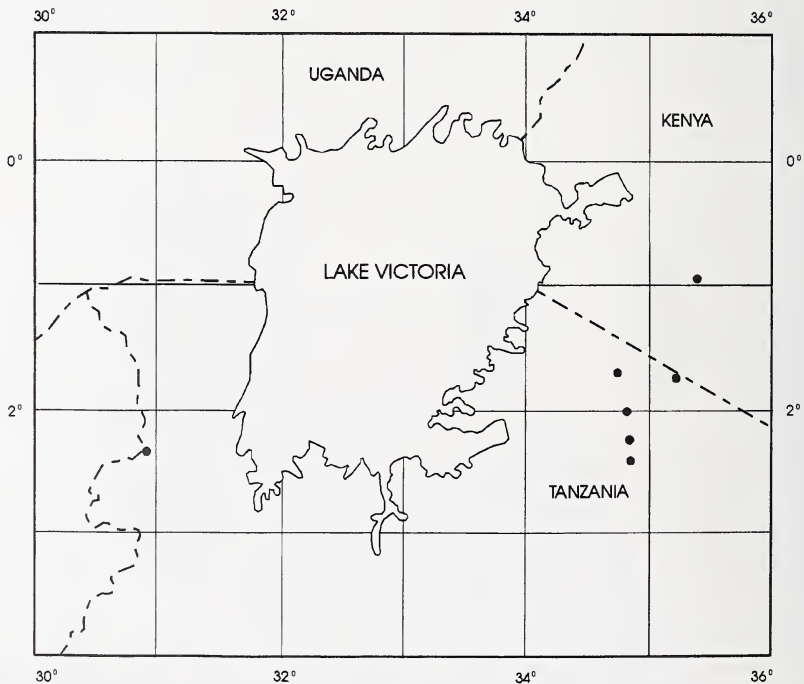


Fig. 2: Distribution map of *Mastomys pernanus* (see text).



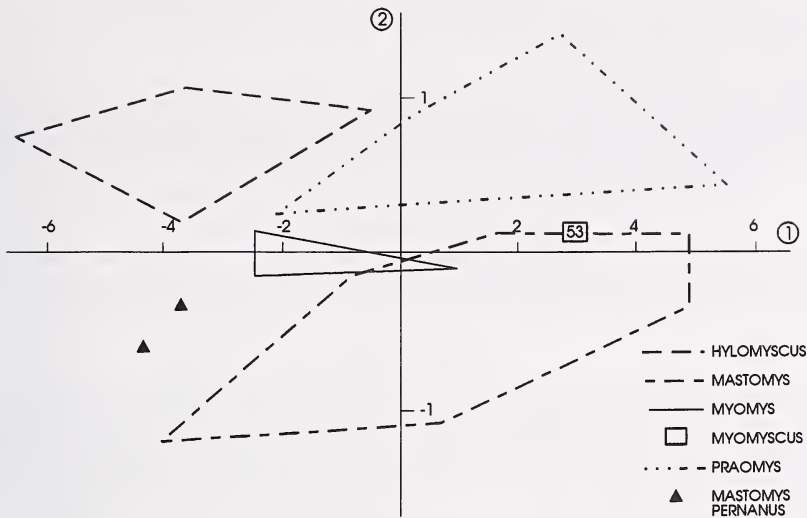


Fig. 3: Principle component analysis with 59 type specimens and two *Mastomys permanus* using 18 skull measurements; factor 1 (X axis) and 2 (Y axis).

### Principle Component Analysis

To evaluate the possible relationship of *Mastomys permanus* with *Mastomys*, *Myomys*, *Myomyscus*, *Praomys* and *Hylomyscus* the appropriate specimens were put on the graphical presentation of the principle component analysis with all holotypes of these genera as published by Van der Straeten & Robbins (1997). Only two specimens (CI 7610 and KMMA M96036–4687) could be used as most of the skulls are more or less damaged. Figure 3 gives the results with 18 measurements for the component factors one and two. It is clear that biometrically both specimens show strongest resemblance with the *Mastomys* holotypes and comport as a dwarf *Mastomys*. On the graph showing the component factors two and three (not figured) both specimens fall within the *Mastomys* holotypes.

On morphological and biometrical characters *Mastomys permanus* shows most similarity with the specimens of the genus *Mastomys*, as already suggested by Kershaw (1921). However, to define the precise status, additional analyses as DNA sequences will be very useful (Granjon et al. 1997).

### Gazetteer

Amala (or Mara) river rising at Sotik (Kenya) and entering Lake Victoria Nyanza (Tanzania) at 1°30'S–34°E (K)00°58'S 35°24'E;  
 Banagi (T) 02°15'S 34°49'E;  
 Dakawa (T) 07°27'S 37°44'E;  
 Kuka nord (T) 01°42'S 35°15'E;  
 Kyasirori (T) 02°00'S 34°50'E;  
 Masai, Sand River (K) not located;

Rusumo falls (5 km east) (T) 02°22'S 30°51'E;

Scronera (T) 02°20'S 34°49'E;

Tabora south (T) 01°43'S 34°46'E;

K = Kenya; T = Tanzania.

Kershaw (1921) did not mention the exact locality of the holotype but the description as given in this gazetteer. Following Misonne & Verschuren (1964), Amala is the name for the upper course of the Mara river situated at 00°58'S and 35°24'E.

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#### Zusammenfassung

Es werden eine vollständige Liste aller bekannten Exemplare von *Mastomys pernanus*, eine Verbreitungskarte sowie Meßergebnisse vorgestellt. Hinsichtlich äußerer und Schädelmerkmale ist *pernanus* der Gattung *Mastomys* zuzuordnen. Auch eine Hauptkomponentenanalyse von Schädelmaßen weist darauf hin, daß *pernanus* die meisten Affinitäten zur Gattung *Mastomys* besitzt.

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