Taxonomical notes on the West-African *Myomys* with the description of *Myomys derooi* (Mammalia — Muridae)

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Introduction

The taxonomy of *Myomys* has become in the last fifty years a very complicated and confusing problem mainly because from the start the description of this genus has been deficient.

It was Thomas who described in 1915 *Myomys* as a subgenus of *Epimys* (and he mentioned the mammary formula 3—2=10 as sole diagnocstical character). He indicated further *Mus colonus* Smith as typical species but it has now become nearly certain that in fact he meant to designate *Mus colonus* Brants.

In 1942 Shortridge decided to raise *Myomys* to the generic level and introduced the new subgenus *Myomyscus* as part of *Myomys*. It was Roberts who in 1951 attempted to sort out the exact status of *Myomys colonus* (Brants) but Ellerman, Morrison-Scott and Hayman (1953) rejected his reasoning and they came to the conclusion that *Myomys colonus* is "not certainly identifiable and the name '*Myomys*' having no status", and consequently they put *Myomyscus* as introduced by Shortridge (1942) in its place.

At this time *Myomys* as well as *Myomyscus* are being used indifferently, but so many problems remain in our opinion to be solved in the greater context of the *Mastomys-Myomys-Myomyscus-Praomys* genus complex that we prefer to use, in this publication, the older name *Myomys* in order not to complicate even more this taxonomical puzzle.

Two forms of *Myomys* were described from the West-African area: *Mus daltoni* Thomas, 1892 from Gambia and *Myomys daltoni saturatus* Ingoldby, 1929 with the type-locality Kintampo (Ghana). In 1941 Ellerman decided however that the genus *Myomys* had to be included in the genus *Rattus*. Because the name *saturatus* was preoccupied in the genus *Rattus* he included *Myomys daltoni saturatus* under the new name *Rattus daltoni ingoldbyi*.

Heim de Balsac (1967) studying a *Myomys*-population from Lamto (Ivory Coast) states that they are identical to "*Myomys daltoni saturatus*". However he finds the morphological differences with typical *Rattus (Myomys) daltoni* so important that he considers *ingoldbyi (= saturatus)* as a separate species *Rattus (Myomys) ingoldbyi* which he erroneously attributes to Hayman.

For the moment *Myomys* is generally considered to have the status of separate genus or to be a subgenus of *Praomys* in which case the name *saturatus* becomes again available. In order not to further complicate this situation unnecessarily by introducing *saturatus* again, we will adopt in this paper the name *Myomys daltoni ingoldbyi*.

By revising all of the old material and the recent collections made in Togo and the Ivory Coast, we were in the position to clarify certain aspects of the taxonomy of the West-African representatives of this Murid-genus.

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One of the main results of this study is the description of a new species of *Myomys*. We are very pleased to name it after our deeply regrettet colleague Antoon de Roo who died some years ago and who was one of the most active members of our fieldteam.

Material and methods

For this study we had at our disposal the *Myomys*-material from the British Museum (Natural History) (BMNH, London, England), from the Muséum National d'Histoire Naturelle (MNHN, Paris, France) and of the National Museum of Natural History, Smithsonian Institution (SI, Washington, U.S.A.).

Next to these we could also rely on the very important Lamto-collections made by our friend and colleague Dr. L. Bellier during the period 1963—71 and kindly put at our disposal by the authorities of the ORSTOM (Paris, France).

Our own material collected during our three Togo-expeditions (1968—70) and registered at the Koninklijk Museum voor Midden-Afrika (KMMA, Tervuren, Belgium) has permitted us to describe the new species *Myomys derooi*.

We listed extensively all the studied material of the new species so that ulterior verification and completion of our data should be possible.

Myomys (476 specimens)

Myomys daltoni: 184 specimens (distribution see fig. 1)

K.M.M.A.: 4 specimens.
B.M.N.H.: 57 specimens.
7 specimens described as *Myomys daltoni saturatus.*
Coll. Bellier: 106 specimens.
M.N.H.N.: 10 specimens.

Myomys derooi (292 specimens)

K.M.M.A. (217 specimens)

♂♂ coll. nr 367; 372; 548; 549; 550; 556; 560; 563; 585; 1059; 1060; 1062; 1063; 1171; 1172; 1173; 1174; 1208; 1212; 1224; 1275; 1283; 1505; 1509; 1513; 1514; 1518; 1519; 1521; 1782; 2284; 2699; 2701; 2715; 2716; 2718; 2719; 2720; 2721; 2754; 2755; 2774; 2775; 2777; 2778; 2804; 2805; 2807; 2808; 2809; 2813; 2815; 2817; 2822; 2823; 2827; 2832; 2833; 2837; 2839; 2841; 2842; 2868; 2875; 2876; 2878; 2879; 2882; 2883; 2890; 2892; 2893; 2897; 2901; 2902; 2903; 2905; 2907; 2914; 2924; 2926; 2927; 2928; 2930; 2934; 2941; 2942; 2943; 3002.

♀♀ coll. nr 173; 182; 368; 534; 575; 1028; 1030; 1034; 1035; 1061; 1064; 1065; 1156; 1157; 1194; 1203; 1207; 1209; 1210; 1222; 1238; 1239; 1267; 1269; 1274; 1280; 1281; 1282; 1284; 1288; 1507; 1515; 1520; 1589; 1682; 2177; 2195; 2553; 2697; 2698; 2700; 2702; 2703; 2704; 2705; 2714; 2717; 2722; 2725; 2731; 2732; 2735; 2736; 2737; 2739; 2743; 2776; 2779; 2780; 2803; 2806; 2810; 2811; 2812; 2814; 2816; 2818; 2819; 2820; 2821; 2824; 2825; 2826; 2828; 2829; 2830; 2831; 2834; 2835; 2836; 2838; 2840; 2867; 2869; 2870; 2871; 2872; 2877; 2880; 2881; 2884; 2887; 2888; 2889; 2891; 2894; 2898; 2899; 2900; 2904; 2906; 2908; 2909; 2910; 2911; 2912; 2913; 2916; 2921; 2922; 2923; 2925; 2929; 2931; 2932; 2933; 2938; 2944; 2945; 2991; 2992; 3001; 3003; V1063; V1082; V1142; V1240; V1848.

B.M.N.H. (7 specimens)

♀♀ R.G. nr 46.476; 46.588; 56.470; 60.1906; 60.1907; 60.1908; 60.1911.

M.N.H.N. (4 specimens)

♂♂ R.G. nr 1963/1259.

♀♀ R.G. nr 1964/356; 1964/357; 1964/359.

S.I. (64 specimens)

♂♂ R.G. nr. 404 375; 410 035; 410 040; 410 041; 410 044; 410 045; 410 046; 410 047; 410 049; 410 051; 410 053; 410 268; 413 082; 413 084; 413 085; 413 088; 413 089; 435 941; 435 942; 435 943; 435 955; 435 957; 435 958; 435 964; 435 965; 435 966; 435 968; 438 641; 439 733.

♀♀ R.G. nr. 404 377; 410 036; 410 037; 410 038; 410 039; 410 042; 410 043; 410 048; 410 050; 410 052; 410 054; 413 077; 413 083; 413 086; 413 087; 429 575; 429 576; 435 928;

435 929; 435 930; 435 931; 435 932; 435 933; 435 940; 435 944; 435 950; 435 951; 435 953; 435 956; 435 967; 435 969; 435 970; 438 645; 439 734; 439 735.

The external measurements of the *Myomys* captured by the Belgian Expeditions to Togo (1968—1970) were taken on the specimens after they had been formolized. All the other external measurements were obtained from the labels attached to the studied skins. The full description of the skull measurements has been published in Van der Straeten and Van der Straeten-Harrie (1977) (see table 1 and 2). The craniometrical data were obtained in millimeter, and measured to the nearest 0,05 mm.

All statistical analyses were carried out with the IBM 1130 computer of the Rijksuniversitair Centrum in Antwerp. The basic statistics (minimum, maximum, mean, standard deviation, variation coefficient and t-test) were obtained with the formulae published in Simpson et al. (1960). The discriminant analyses after Fisher were realized as worked out by Hebrant (1973). For the canonical analyses we used the method of Seal (1964) further adapted by Hebrant (1974).

Description of *Myomys derooi* sp. n.

Holotype

Adult ♀ (with 3 embryos in uterus); spirit specimen and skull (fixation formalin, conservation alcohol); collectors number 2912.

Type locality: Borgou (alt. 160 m) in Togo, obtained 9 December 1969 by E. Van der Straeten and F. de Vree.

Specimen in the collection of the Koninklijk Museum voor Midden-Afrika (Tervuren, Belgium).

Paratypes

All specimens, except those obtained by Cansdale (B.M.N.H), Giban (M.N.H.N.) and Robbins (S.I.), in the collection of the Koninklijk Museum voor Midden-Afrika (Tervuren, Belgium). All the Tervuren-paratypes are adult spirit specimens with skull (fixation in formalin, conservation in alcohol) from Togo.

Collected by E. Van der Straeten and F. de Vree in Borgou on 8-9-10 December 1969: coll. nrs 2815 (♂), 2837 (♂), 2872 (♀), 2900 (♀), 2923 (♀), 2925 (♀) and 3001 (♀).

Collected by W. Verheyen, J. Hulselmans and F. Puylaert in

— Namoundjoga: coll. nrs 1269 (♀) and 1284 (♀) respectively on 30 and 31 July 1969.
— Fazao: coll. nr 1682 (♀) on 24 August 1969.

Obtained by Cansdale in Oda (Ghana), B.M.N.H. 46.588, ad. ♀, skin and skull, no date mentioned.

Obtained by Giban in Kandé (Togo) on 17 February 1963, M.N.H.N. 1964/356 (♀) and 1964/357 (♀), both with skin and skull.

Obtained by Robbins in

— Porga (Bénin) on 3 May 1968, S.I. 439 735, ♀, skin and skull.
— Soubroukou (Bénin) on 23 April 1968, S.I. 438 734, ♀ skin and skull.
— Padori (Togo) on 18 May 1968, S.I. 438 645, ♀ skin and skull.

External characters

The general texture of the pelage is soft. The dorsal pelage shows a rather wide color-variation going from light brown to dark grey-brown. The flanks are lighter than the back and the transition to the grey ventral side is rather gradual. The individual hairs of the belly are uniformally grey. Many specimens possess a white

irregular spot (from a few mm to several cm in diameter) on the chest; the hairs in this region are completely white.

The tail is longer than the body (mostly 115—120 % of the Head-Body-length). The unicoloured tail is covered with scales of about 0,5 mm length and carries rather large dark hairs which in the middorsal region attain a length of 1,2 mm; on the ventral side the hairs are shorter so that one gets the impression that this part of the tail is lighter coloured; at the tailtip the hairs are longest.

Concerning the external measurements, we found sexual dimorphism in earlength; the females being clearly bigger than the males.

The mammary formula is 2(3—2).

Cranial and palatal characters

Myomys derooi has a smaller skull than *M. daltoni* except for the interorbital breadth, the breadth of the zygomatic plate and the nasalia-length. All the craniometrical differences are highly significant except for the length and breadth of the nasalia.

Myomis derooi shows a sexual dimorphism in cranial dimensions, the females being bigger; these differences are statistically significant only for the zygomatic and the nasalia-breadth.

Table 1

Measurements in mm of adult *Myomys derooi*

Number of specimens, range and mean are given. For the exact description of the measures we refer to Van der Straeten-Harrie (1977)

Variable nr	Description	*M. derooi holotype*	*M. derooi* ♂♂	*M.* derooi ♀♀
HB	head and body length	110.0	43; 97.2(81.0—124.0)	67; 96.9(73.0—111.0)
TL	length of tail	129.0	37; 114.4(84.0—136.0)	51; 116.3(98.0—135.0)
HL	length of hind foot + nail	22.4	42; 21.5(19.0—23.1)	67; 21.3(19.5—23.1)
EL	length of ear	15.0	43; 14.7(12.0—17.7)	66; 14.0(11.7—16.8)
1	greatest length of skull	27.40	43; 26.58(23.95—30.20)	66; 26.84(24.00—29.50)
2	prosthion-condylion	25.40	43; 24.37(21.80—27.75)	66; 24.60(21.65—27.65)
3	henselion-basion	21.45	43; 20.64(18.00—23.90)	66; 20.83(17.95—23.70)
4	henselion-palation	11.20	43; 11.06(9.90—12.85)	66; 11.17(9.85—12.75)
5	length of palatal foramina	5.30	43; 5.53(4.85—6.25)	67; 5.50(4.80—6.25)
6	length of diastema	6.95	43; 6.85(5.85—8.10)	67; 6.93(5.70—8.40)
7	distance between the anterior border of the alveole of M^1 and the edge of upper incisor	7.55	43; 7.49(6.25—9.00)	67; 7.56(6.15—9.10)
8	interorbital breadth	4.20	43; 4.20(3.90—4.75)	67; 4.24(3.70—4.95)
9	zygomatic breadth on the zygomatic process of the squamosum	13.30	43; 12.28(11.25—14.00)	66; 12.58(11.30—13.95)
10	palate breadth between M^1	2.85	43; 2.66(2.20—3.10)	67; 2.66(2.30—3.15)
11	length of upper cheekteeth	4.45	43; 4.35(4.00—5.10)	67; 4.34(3.95—4.75)
12	breadth of upper dental arch	5.60	43; 5.37(5.05—5.95)	67; 5.38(4.75—5.95)
13	breadth of M^1	1.25	43; 1.27(1.20—1.35)	67; 1.27(1.15—1.40)
14	breadth of zygomatic plate	3.40	40; 2.87(2.45—3.45)	66; 2.96(2.45—3.55)
15	greatest breadth of nasals	2.95	43; 2.68(2.40—3.25)	67; 2.77(2.30—3.30)
16	greatest length of nasals	10.75	43; 10.28(8.50—12.35)	67; 10.52(8.90—12.45)
17	length of lower cheekteeth	3.85	43; 3.92(3.55—4.20)	67; 3.92(3.45—4.30)
18	breadth of choanae	1.15	43; 1.03(0.70—1.40)	64; 1.09(0.75—1.40)
19	length of auditory bulla	4.40	43; 4.42(4.00—5.00)	67; 4.41(4.00—4.90)
20	braincase breadth	11.20	43; 11.03(10.40—11.70)	66; 11.02(10.30—11.65)

Table 2

The skull measures symbols and the skull measures of *Myomys daltoni*

For further details see table 1

Variable nr	Canonical analysis variable nr	Code	*M. d. daltoni*	*M. daltoni ingoldbyi*	*M. daltoni* pop. Lamto
HB	—	HB	49; 99.0(76.0—120.0)	4; 104.7(95.0—120.0)	69; 106.3(88.0—132.0)
TL	—	TL	39; 120.0(93.0—153.0)	4; 114.5(98.0—128.0)	58; 107.7(70.0—141.0)
HL	—	HL	50; 20.3(17.0—23.0)	7; 20.1(19.0—21.0)	67; 21.8(20.0—23.0)
EL	—	EL	44; 16.4(13.5—19.0)	7; 16.3(13.0—19.0)	54; 15.8(13.0—18.0)
1	1	GRLE	51; 27.92(24.25—31.10)	7; 28.94(27.05—30.40)	58; 27.27(23.35—31.50)
2	2	PRCO	51; 25.62(21.80—28.90)	7; 26.56(24.95—27.65)	60; 25.06(21.20—29.30)
3	3	HEBA	50; 21.78(18.35—24.65)	7; 22.45(20.85—24.00)	60; 21.27(17.65—25.20)
4	4	HEPA	65; 11.87(10.05—13.70)	7; 12.34(11.55—13.20)	70; 11.39(9.80—13.30)
5	5	PAF	65; 6.17(4.90—6.95)	7; 6.36(5.90—7.15)	72; 5.92(4.70—6.90)
6	6	DIA1	64; 7.31(6.00—8.40)	7; 7.40(6.65—7.85)	71; 7.13(5.95—8.60)
7	7	DIA2	62; 8.07(6.50—9.50)	7; 8.19(7.40—8.70)	71; 7.75(6.25—9.35)
8	8	INT	65; 4.11(3.75—4.50)	7; 4.15(4.00—4.30)	72; 4.09(3.55—4.55)
9	9	ZYG	55; 13.18(11.80—14.85)	6; 13.81(12.70—14.40)	62; 12.73(10.75—14.55)
10	—	PAL	65; 2.87(2.20—3.35)	7; 2.94(2.70—3.10)	65; 2.86(2.45—3.40)
11	10	UPTE	67; 4.70(4.20—5.20)	7; 4.91(4.70—5.10)	72; 4.61(4.25—5.45)
12	11	UPDE	61; 5.78(5.15—6.55)	6; 5.88(5.65—6.10)	63; 5.73(5.20—6.30)
13	12	M^1	66; 1.32(1.15—1.45)	7; 1.34(1.30—1.40)	70; 1.39(1.25—1.50)
14	—	ZYPL	65; 2.86(2.30—3.35)	7; 3.02(2.80—3.40)	65; 2.77(2.35—3.45)
15	13	BNAS	63; 2.88(2.40—3.30)	7; 2.96(2.70—3.50)	61; 2.63(2.15—3.05)
16	14	LNAS	62; 10.42(8.40—12.20)	6; 11.26(10.25—11.85)	65; 10.09(8.30—12.30)
17	15	LOTE	64; 4.22(3.75—4.85)	7; 4.36(4.10—4.55)	72; 4.12(3.80—4.35)
18	—	CHOA	64; 1.17(0.70—1.55)	7; 1.24(0.95—1.50)	63; 1.23(0.90—1.55)
19	16	BUL	58; 4.53(4.20—5.20)	7; 4.69(4.40—4.90)	65; 4.41(4.00—5.00)
20	17	BRCA	57; 11.53(10.70—12.90)	7; 11.74(11.40—12.10)	58; 11.37(10.50—12.45)

In the diastema-region we always find two undivided palatal ridges; between the molar series exist 5 ridges which are divided on the midline of the palate; so the formula of the palatal-ridges is 2+5=7. Many animals present shape irregularities of the ridges; the last two pairs are most subjected to these aberrations.

Dental characters

The best diagnostical characters for the differentiation between *Myomys daltoni* and *M. derooi* are found in the dental measurements. Indeed, *M. derooi* has 1 ° a shorter upper and lower dental series, 2 ° a slenderer M^1 and 3 ° M^3 is clearly smaller.

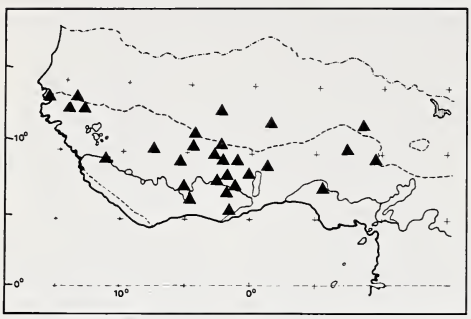
Measurements

For the measurements of the holotype and all other specimens see table 1. The measurements are given in millimeters. The external measurements were taken on the formolized animal.

Distribution

The recorded specimens were obtained in Bénin (B), Ghana (G), Nigeria (N) and Togo (T). *Myomys derooi* is a savannah-species which lives in close contact with man. Indeed, for as far as we know all specimens were captured in human dwelling

or in their immediate surroundings. *Myomys derooi* and *M. daltoni* were collected at the same locality but always in different places or biotopes. For the collecting localities of the studied specimens see fig. 2 and table 3.



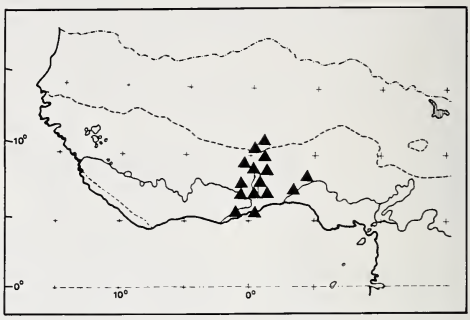


Fig. 1 (left). Distribution of *Myomys daltoni* — *Fig. 2 (right).* Distribution of *Myomys derooi*

Table 3

Collecting localities of *Myomys derooi*

Achimota (G)	05°37′N — 00°14′E	Leklebi Agbesia (G)	06°56′N — 00°29′E
Adina (T)	07°31′N — 01°01′E	Nabogo (G)	09°45′N — 00°45′W
Afon (N)	08°19′N — 04°31′E	Namoundjoga (T)	10°54′N — 00°24′E
Aledjo (T)	09°15′N — 01°12′E	Nanergou (T)	10°55′N — 00°09′E
Añoñoe (T)	07°33′N — 00°36′E	Nkawkaw (G)	06°33′N — 00°44′W
Binaparba (T)	09°14′N — 00°46′E	Oda (G)	05°52′N — 01°00′W
Borgou (T)	10°46′N — 00°35′E	Odomi Youngo (G)	08°15′N — 00°32′E
Dapango (T)	10°59′N — 00°13′E	Padori (T)	10°13′N — 00°25′E
Dedome (T)	07°30′N — 00°39′E	Paio (T)	10°14′N — 00°41′E
Dutukpene (G)	09°33′N — 01°11′E	Parnisau (N)	Northern region
Ebeva (T)	07°32′N — 01°05′E	Piya (T)	09°33′N — 01°11′E
Edifou (T)	07°29′N — 00°57′E	Porga (B)	11°02′N — 00°58′E
Fazao (T)	08°42′N — 00°47′E	Shishe (G)	10°42′N — 00°13′W
Igbo-Ora (N)	07°26′N — 03°17′E	Soubroukou (B)	09°41′N — 01°35′E
Inhounabe (T)	07°34′N — 00°59′E	Tetetou (T)	07°01′N — 01°30′E
Kandé (T)	09°58′N — 01°03′E	Wulasi (G)	08°39′N — 00°80′E
Kode (G)	06°06′N — 00°51′W	Wulehe (G)	08°39′N — 00°01′E
Kodegbe (T)	07°31′N — 01°03′E		

Data on the reproduction of *Myomys derooi*

All of the material collected during the Belgian Expeditions to Togo were examined with respect to reproduction. However our data are fragmentary since we could only dispose of specimens from the months July—August (rainy season), November (beginning of dry season) and December (dry season). Our data are compiled in table 4.

There can be no doubt that reproduction starts in the rainy season but that it comes to full development in the dry season. Indeed, during December not less than 55 % of the adult females are pregnant or lactating and many juveniles are found in the studied population.

The mean of the number of embryos per pregnant female is 3.75 with a maximum of 5 and a minimum of 2 (maximum of embryos per cornu of uterus 4, minimum 0).

Table 4

Number of adult, pregnant and lactating females of *Myomys derooi* as well as the number of juveniles captured

	adult females	pregnant	lactating	juvenile animals
July	27	3	4	—
August	7	2	1	2
November	5	1	—	—
December	66	26	10	29

Canonical analysis of the craniometrical data

For the canonical analysis we could make use of 208 specimens divided over six groups (see table 5). A posteriori five specimens, determined by INGOLDBY himself as *Myomys daltoni saturatus* [= *M. daltoni ingoldbyi* (Ellerman, 1941)] were individually added to the graphics using the calculated eigenvectors.

Table 5

Groups and number of specimens involved in the canonical analysis

group nr	Sex	species	Number specimens
1	♂♂	*Myomys daltoni daltoni*	25
2	♀♀	*Myomys daltoni daltoni*	17
3	♂♀	*Myomys daltoni* (pop. of Lamto)	25
4	♀♂	*Myomys daltoni* (pop. of Lamto)	32
5	♂♂	*Myomys derooi*	43
6	♀♀	*Myomys derooi*	66

Out of the 20 measures we started with, 17 were selected for the canonical analyse, as for 3 of them the measuring fault was too important (see table 2). There are five canonical variates, only three of which are significantly different from zero. These three contain together 97,7 % of the total variation.

As the results of the canonical analysis we mention the eigenvalues of the canonical transformation (table 6) and the eigenvectors for the 17 measures in the three selected canonical variates (table 7). Going from these values a diagram was drawn. In

Table 6

Eigenvalues of the canonical transformation with test of significance

Nr	Eigenvalue	Relative % importance	chi-square	degrees of freedom	probability
1	148.533	71.6	509.761	85	1.000
2	45.124	21.8	208.189	64	1.000
3	8.971	4.3	61.571	45	0.952
4	2.753	1.3	22.367	28	0.236
5	2.007	1.0	9.478	13	0.263

Table 7

Eigenvectors of 17 variables for the first three canonical variates

canonical analysis variable nr	1	2	3
1	—0.1264	0.6161	—0.4388
2	0.6264	—0.6972	—1.2903
3	—0.1674	0.1119	0.8507
4	0.2858	1.2790	—0.3065
5	—0.9724	0.5088	—0.5445
6	—1.6490	—3.1061	2.5479
7	—0.4918	1.5987	—2.2693
8	4.6695	—2.6075	—0.7843
9	—0.2202	0.2226	3.1626
10	—2.0069	0.0217	0.7170
11	—1.5916	—1.1755	—0.6556
12	—2.9943	—12.2033	2.5035
13	1.0119	5.0649	0.3354
14	0.9900	—0.9157	0.8810
15	—0.7004	1.2901	0.8544
16	—0.1887	1.5286	—1.4700
17	—1.0876	—0.0302	—1.1626

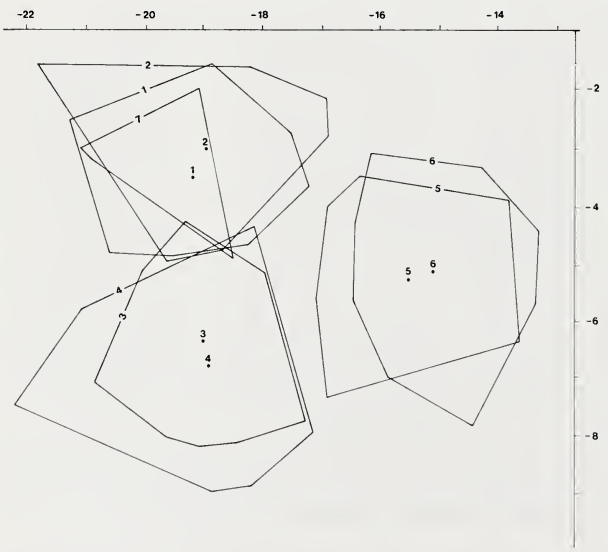


Fig. 3. Canonical analysis: canonical means (solid circles) and extreme limit of each cloud of points; canonical variates: 1 (abscis) and 2 (ordinate); 1 = *Myomys daltoni daltoni* ♂♂; 2 = *Myomys daltoni daltoni* ♀♀; 3 = *Myomys daltoni* (population of Lamto) ♂♂; 4 = *Myomys daltoni* (population of Lamto) ♀♀; 5 = *Myomys derooi* ♂♂; 6 = *Myomys derooi* ♀♀; 7 = *Myomys daltoni ingoldbyi*

order not to complicate too much this diagram we recorded for each group only the centre and the extreme limit of each cloud of points. Figure 3 shows the diagram for the first and second canonical variate.

Considering the first canonical variate we see that we can clearly distinguish *Myomys daltoni* and *Myomys derooi*. On the other hand the second canonical variate divides the *Myomys daltoni*-group in two subgroups 1 ° the typical *M. daltoni daltoni* 2 ° the specimens belonging to the Lamto-population. The five specimens of *M. daltoni ingoldbyi* fall clearly within the range of typical *M. d. daltoni*.

As to the third canonical variate it separates the males from the females.

We obtain similar results when we consider the same species (namely *Myomys d.*

daltoni, M. daltoni from Lamto and *Myomys derooi*) but now classified following their relative age, using tooth wear classes. The first and second variates give the same results but the third variate separates the groups following their relative age.

Diagnostical characters and discriminant analysis

At first view *Myomys derooi* can easily be confused with the dark bellied house-dwelling form of *Mastomys,* especially when one considers only its pelage coloration. A closer look reveals however that *Myomys derooi* is clearly a smaller animal, has a shorter and more slender hindfoot and a somewhat longer tail (115—120 % of H+B-length). Moreover the fifth toe is somewhat larger than half of the fourth whereas in *Mastomys* it reaches only to the basis of the fourth toe or only a little further. Finally the mammary formula of 2(3—2) of *M. derooi* contrasts sharply with what is known for *Mastomys.*

When one disposes of the skulls only, determination can become extremely difficult. Indeed, not only confusion with *M. daltoni* but also with certain *Praomys*-skulls becomes possible. In order to eliminate such errors as much as possible we formed two discriminant functions.

The first discriminant function makes it possible to differentiate between west-african *Myomys* and *Praomys tullbergi.* Using craniometrical data of 213 *Myomys* and 105 *Praomys tullbergi* we were able to establish the following function based on only 3 factors of the 17 available:

$$K = -4.624 \times GRLE + 4.917 \times DIA\ 2 + 13.141 \times BUL + 34.86$$

When the obtained K-value is bigger than 0 then the skull is a *Myomys;* if it is smaller than 0 then we have to do with a *Praomys tullbergi* skull. The chance of an erroneous determination with this function is 3,9 % (however, if all of the 17 available factors are used to make the discriminant function, then this percentage drops to 0,2 %).

The second discriminant function allows us to distinguish between craniological material of *Myomys daltoni* and *Myomys derooi* (we used respectively 104 and 109 skulls to elaborate the function). The discriminant function is based on 5 factors of the 17 available and gives a change on an erroneous determination of 5,2 %.

$$K = 8.099 \times DIA\ 1 - 15.553 \times INT + 10.815 \times UPTE - 4.492 \times LNAS + 4.249 \times BRCA - 42.055$$

If $K > 0$ then the studied skull belongs to *Myomys daltoni;* if $K < 0$ then we deal with a *Myomys derooi* skull (a discriminant function for all of the 17 factors gives a chance of erroneous determination of 3,2 %).

Discussion

When we compare *M. daltoni* with *derooi* we find such differences (external, craniological and craniometrical) that it leaves in our opinion not the slightest doubt that we have to deal with two well defined species. Specimens of our grey-bellied *M. derooi* were already studied and reported earlier by Heim de Balsac (1967) and Rosevear (1969) both of whom considered that they had to deal with a commensal form of *Myomys daltoni* but neither of them taxonomically stressed the rather obvious differences between both forms.

It is a fact that all of our *Myomys derooi* were captured in, or in the immediate neighbourhood of human dwellings but this is also true, if we believe the data on

the BMNH-labels, for many specimens of *M. daltoni*. In the literature also we find records of *Myomys daltoni* being captured in huts (Rosevear 1969; Happold 1970).

Thomas and Hinton mentioned already in a 1920 publication that they received three melanistic specimens from Kano (Nigeria). However, a careful biometrical study with use of canonical analysis of the two skulls (without skin) that we were able to find back in the BMNH-collections revealed that these melanistic specimens fall clearly in the range of typical *Myomys daltoni* and are far removed from *M. derooi*.

Also the specimens that Ingoldby (1929) considered to belong to "*M. daltoni saturatus*" show from a biometrical point of view no difference with typical *daltoni*. Indeed, if one makes the canonical analysis both forms are identical. On the other hand if we compare the means of the skull measurements by using the t-test we find that *M. daltoni ingoldbyi* has a slightly bigger skull but also that the differences with the *M. daltoni daltoni* group are not statistically significant (maybe these differences can be explained by the fact that the available specimens of *M. d. ingoldbyi* are slightly older).

Comparing the dorsal pelage of both *ingoldbyi* and typical *daltoni* we find that the former shows a somewhat more intense red-brown coloration. In this respect *ingoldbyi* resembles closely to the population of *M. daltoni* from Lamto. It is in our opinion obvious that this small colour difference with typical *daltoni* cannot in itself be a sufficient reason to maintain *ingoldbyi* as a separate subspecies. Consequently we suggest that *ingoldbyi* be put in synonymy with *M. daltoni daltoni*.

Another point that we want to stress in the rather big craniometrical differences we find between the *M. daltoni*-population of Lamto and all the for the moment available other material from Western African *Myomys daltoni*. As already noted in the introduction Heim de Balsac (1967) considered the animals from Lamto as being *Rattus (Myomys) ingoldbyi* and in order to stress this point of view he enumerated some differences with *M. daltoni*. We found however that the population from Lamto is biometrically different from *M. daltoni* but also from *ingoldbyi* as shown by the canonical analysis. So it becomes obvious that we cannot agree with the statement of Heim de Balsac (1967).

Biometrically we found that *M. daltoni* is 1 ° significantly bigger that the Lamto-population for the zygomatic breadth 2 ° much bigger for the palatum-length, the length of the upper cheekteeth, the greatest breadth of the nasals and the length of the auditory bulla and 3 ° significantly smaller for the breadth of M^1. For all the other cranial measurements we could not find statistically significant differences but generally speaking typical *daltoni* seem to be bigger than the Lamto-population.

Finally, as already noted concerning the general coloration of the dorsal pelage, the Lamto-population resembles closely the specimens described as *ingoldbyi*.

For the time being we consider the described differences between typical *daltoni* and the *Myomys* from Lamto as being differences on the population-level. It is however not to exclude that, when more data become available, the *Myomys* from Lamto will appear to belong to a new yet underscribed subspecies of *daltoni*.

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Summary

The study of a large West-African *Myomys* collection using biometry, canonical analysis and discriminant analysis led to the following conclusions 1. *Myomys derooi* n. sp. is described 2. *Myomys daltoni ingoldbyi* is put in synonymy with *M. daltoni daltoni* 3. differences are described between *Myomys d. daltoni* and the *Myomys daltoni*-population from Lamto; these differences are considered as being on the population-level.

Zusammenfassung

Über die Taxonomie von Myomys aus West-Afrika und eine Beschreibung von Myomys derooi (Mammalia — Muridae)

Mit biometrischen Methoden (kanonische Analysen und Diskriminanz-Analysen) wurde ein umfangreiches Material westafrikanischer *Myomys*-Vertreter untersucht. Es ergaben sich 1. eine Beschreibung von *Myomys derooi* n. sp.; 2. *Myomys daltoni ingoldbyi* muß als Synonym von *Myomys daltoni daltoni* bewertet werden; 3. zwischen *Myomys d. daltoni* und einer *Myomys daltoni*-Population von Lamto ließen sich Unterschiede nachweisen, welche vermutlich auf dem Niveau von Populationsunterschieden liegen.

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