

## A NEW SPECIES OF *MELOMYS* (RODENTIA: MURIDAE) FROM KAI BESAR ISLAND, MALUKU TENGAH, INDONESIA

D.J. Kitchener\* and I. Maryanto\*\*

### ABSTRACT

Four specimens of *Melomys* recently collected from Kai Besar Island, eastern Indonesia, are herein described as a new species.

### INTRODUCTION

The genus *Melomys* Thomas, 1922 is currently in a state of considerable taxonomic confusion, despite several attempts to review the group (Rümmler 1938; Tate 1951) and several other pertinent taxonomic considerations (Laurie and Hill 1954; Menzies and Dennis 1979).

In particular, there is great taxonomic uncertainty relating to the group of smaller *Melomys* with: head and body length usually less than 120mm; white or pale coloured abdominal fur; moderately long anterior palatal foramen; and with three or occasionally two or three hairs/tail scale in the mid tail region. This group is usually taken to represent *Melomys lutillus*, a species considered to have as many as 11 subspecies by Tate (1951) or as few as 5 subspecies by Rümmler (1938).

In October 1992, a team of vertebrate biologists from the Western Australian Museum and the Museum Zoologicum Bogoriense collected four specimens of *Melomys* from Kai Besar Island (Figure 1) that were most allied to *Melomys lutillus*. In this paper we detail a comparison of these Kai specimens with all 11 forms that have been placed in *M. lutillus* by previous workers at some time, as well as with several other species that could conceivably be confused taxonomically with the Kai Besar *Melomys*. As a consequence of these comparisons we conclude that the Kai Besar *Melomys* are a new species which we herein describe.

### METHODS

Weight of the Kai Besar specimens was recorded in the field prior to their fixation. External measurements were all recorded from the specimens following their fixation and preservation. All measurements (in mm) were taken with digital dial calipers: external to 0.1 mm; skull and dental to 0.01 mm. Measurement points follow Tate (1951). Pelage and colour descriptions follow Smithe (1975). Comparison of the Kai specimens with other forms with which they might be confused depended on descriptions of these other forms in Rümmler (1938), Tate (1951), Menzies and Dennis (1979) and the original type descriptions (referenced

---

\* Western Australian Museum, Francis Street, Perth, Western Australia 6000

\*\* Museum Zoologicum Bogoriense, Jln. Ir. H. Juanda 9, Bogor, Indonesia 16122

in Tate 1951)). Adult condition was judged on the basis of fused basioccipital and basisphenoid suture and appearance of reproductive organs.

## TAXONOMY

### *Melomys bannisteri* sp. nov.

Figures 2-4

#### Holotype

Western Australian Museum specimen number (WAM) M42669; adult female carcass fixed in 10% formalin

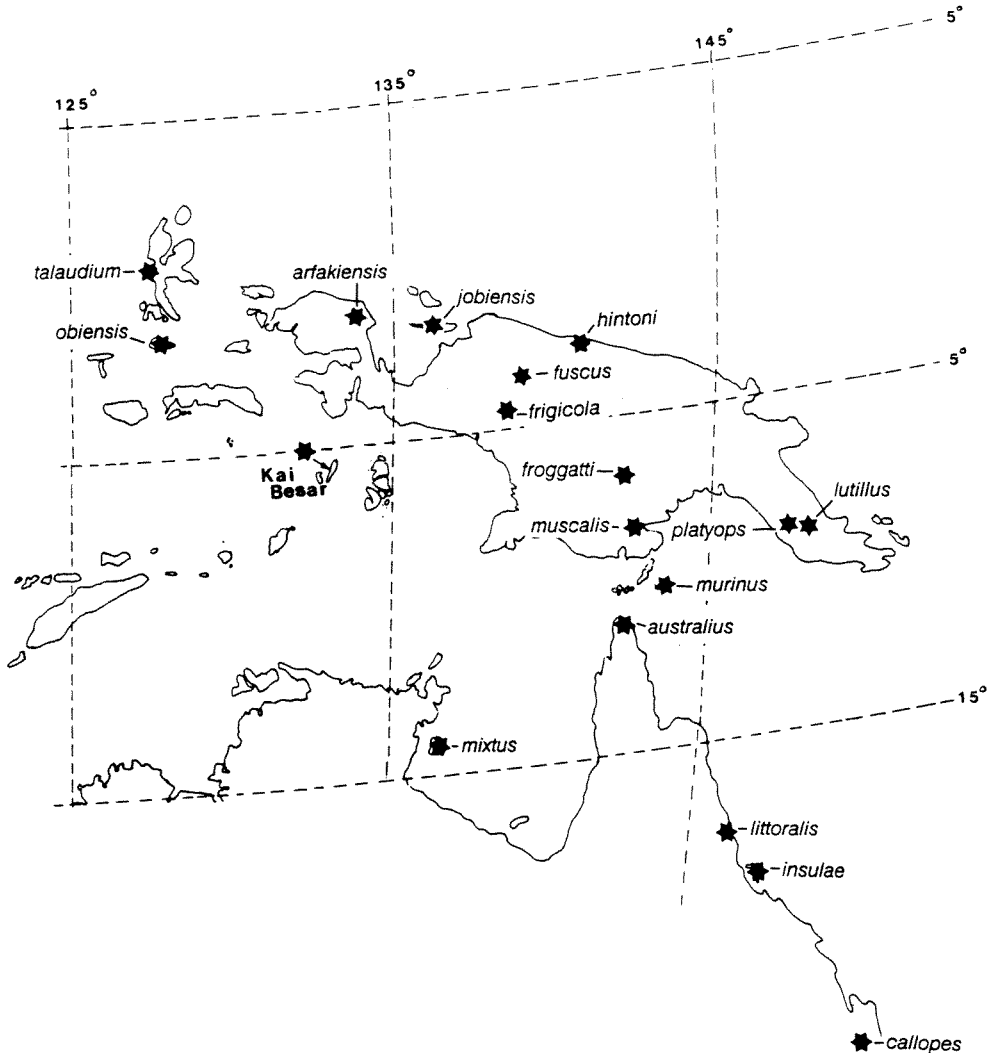


Figure 1 Type locality of *Melomys bannisteri* sp. nov. and of other forms of *Melomys* referred to in text.

and preserved in 70% ethanol; skull separate; liver preserved in ultrafreeze. Collected in break-back trap on 13 October 1992 by D.J. Kitchener and Island Maryanto.

#### Type locality

2km west Fakoi, Kai Besar Island, Maluku Tengah, Indonesia (5°38'50"S, 133°02'00"E); altitude 200m; in disturbed partially open low evergreen rainforest with a ground cover of bracken fern and low sedges.

#### Paratypes

WAM 42132, adult female, collected at Desa Mun (5°26'50"S, 133°03'50"E), Kai Besar Island, by R.A. How and R.E. Johnstone on 15 October 1992.

WAM M42678 and WAM M42689 (both adult males), collected 2 km. west of Desa Fakoi, Kai Besar Island, by D.J. Kitchener and Island Maryanto on 14 and 15 October 1992. All specimens preserved as holotype.

#### Diagnosis

*Melomys bannisteri* is distinguished from all other small or moderate sized *Melomys* with pale coloured underfur; and moderate length anterior palative foramina by the following combination of characters: head to body length <120; tail to vent length <120; pes length <27; pes broad (Figure 4); tail hairs 2-3/scale; tail scales large <13/cm at mid point of tail; tail hairs very short, <30% length of tail scales; belly fur pure white; C<sup>1</sup>-M<sup>3</sup> tooth row length >5.8; anterior palatal foramen does not reach posteriorly to M<sup>1</sup> anterior alveolus margin; moderate supraorbital ledges; M<sup>1</sup> and M<sup>2</sup> posterior cingulum broad and prominent; zygomatic plate breadth >3.7.

It differs from *Melomys lutillus lutillus* (Thomas, 1913), which has similar external measurements, in having ventral hairs generally pure white rather than white hairs restricted to "border spots in the neck and inguinal region," and "irregularly distributed along the belly midline" (Rümmler 1938); tail scales larger 11-12 v. 15 scales/cm; skull generally larger: e.g., zygomatic width 15.8-16.6 v. 14.6-14.7; nasal length 10.6-11.5 v. 9.8-10.1; zygomatic plate breadth 4.0-4.6 v. 2.9-3.1; palatal length 15.7-16.2 v. 14.5-14.7; tooth row longer: e.g., C<sup>1</sup>-M<sup>3</sup> length 5.9-6.2 v. 5.2-5.3 and teeth broader: e.g., M<sup>1</sup> breadth 1.8-1.9 v. 1.6-1.7; anterior palatal foramen relatively shorter, terminates posterior to M<sup>1</sup> anterior face rather than at or slightly posterior to M<sup>1</sup> anterior face; and posterior margin of palate terminates at M<sup>3</sup> mid-point rather than at M<sup>3</sup> posterior face.

It differs from *Melomys lutillus australius* Thomas, 1924, in having external measurements generally slightly smaller: e.g., head to vent length 111.6-114.5 v. 123, tail to vent length 106.4-117.6 v. 125, pes length 23.2-25.5 v. 27; larger tail scales 11-12 v. 16 scales/cm; tail hairs shorter 20-30% v. 75% of tail scale length; belly fur white rather than generally strongly buffy except for mid-line where it is pure white or pale fawn; palate posterior margin terminating at mid point rather than posterior edge of M<sup>3</sup>; anterior palatal foramen shorter (4.8-5.0 v. 5.4) and does not extend to M<sup>1</sup> anterior face.

It differs from *Melomys lutillus callopes* Finlayson, 1942, which has similar external measurements, in having larger scales on tail 11-12 v. 15 scales/cm; shorter anterior palatal foramen (4.8-5.0 v. 5.1-6.1) which does not reach M<sup>1</sup> anterior alveolus; supraorbital ledges moderate and that region not with smoothly rounded edges; anterior edge of zygomatic plate slopes posteriorly and not anteriorly from anterodorsal aspect; interorbital breadth larger relative to condylobasal length 0.162-0.176 v. 0.156; ear shorter 12.8-15.1 v. 18.0; bulla shorter 4.5-4.6 v. 4.7-4.8.

It differs from *Melomys lutillus frigidicola* Tate, 1951, in having head to vent smaller 111.6-114.5 v. 130; tail to vent length smaller 106.4-117.6 v. 142 and pes length smaller 23.2-25.5

v. 29; dorsal pelage with shorter hair 11 v. 15-17; tail scale hairs shorter; anterior palatal foramen shorter (4.8-5.0 v. 5.1) and not reaching M<sup>1</sup> anterior alveolus; bulla shorter 4.5-4.6 v. 4.8; zygomatic plate broader 4.0-4.6 v. 3.5; mastoid narrower relative to condylobasal length 0.378-0.397 v. 0.424.

It differs from *Melomys lutillus froggatti* Troughton, 1937, which has similar external measurements, in having tail hairs shorter 20-30% v. 50-100% of tail scale length; larger scales 11-12 v. 13/cm; pelage of undersurface contrasts, rather than toning in with that of flanks; belly fur white not grey; interorbital region not broadly concave; cranium not abruptly rounded anteriorly.

It differs from *Melomys lutillus hintoni* Rümmler, 1935, in having external measurements slightly larger: e.g., tail to vent length 106.4-117.6 v. 100; pes length 23.2-25.5 v. 22. Skull generally larger; e.g., condylobasal length 28.8-30.6 v. 26.8; zygomatic plate broader 4.0-4.6 v. 3.2, but zygomatic width narrower relative to condylobasal length 0.535-0.548 v. 0.567. Teeth larger: e.g., C<sup>1</sup>-M<sup>3</sup> length 5.9-6.2 v. 5.2

It differs from *Melomys lutillus insulae* Troughton and le Souef, 1929, in having a tail that is not markedly bicoloured and subequal to rather than shorter than head to vent length; tail scales larger 11-12 v. 13-14 cm; belly fur white rather than pale grey base tipped with light pinkish cinnamon; pes white not pinkish cinnamon. Skull generally larger: e.g., greatest skull length 32.7-32.8 v. 30.2 and zygomatic width 15.8-16.6 v. 15.4. However the holotype of *insulae* may not be an adult (Rümmler 1938).

It differs from *Melomys lutillus littoralis* (Lönnerberg 1916) in having pes length shorter 23.2-25.5 v. 28; belly fur pure white and not light buff; tail scales larger 11-12 v. 18-19 scales/cm; larger body and tail measurements: e.g., head to vent length 111.6-114.5 v. ±90 and tail to vent length 106.4-117.6 v. ± 90; zygomatic plate broader 4.0-4.6 v. 3.6; anterior palatal foramen does not extend to M<sup>1</sup> anterior face. Teeth slightly shorter: e.g., C<sup>1</sup>-M<sup>3</sup> length 5.9-6.2 v. 6.3.

It differs from *Melomys lutillus mixtus* Troughton, 1935 which, based on the holotype which Rümmler (1938) considered is probably subadult, has similar external measurements. Tail hairs much shorter 20-30% v. 100% of scale length. Skull larger; e.g., greatest skull length 32.4-32.8 v. 28.6; anterior palatal foramen does not extend to M<sup>1</sup> anterior face; teeth both longer: e.g., C<sup>1</sup>-M<sup>3</sup> length 5.9-6.2 v. 5.5 and broader, e.g., M<sup>1</sup> breadth 1.8-2.0 v. 1.6.

It differs from *Melomys lutillus murinus* (Thomas, 1930), which has similar external measurements, in having larger tail scales 11-12 v. 14-15 cm; skull generally larger: e.g., condylobasal length 28.8-30.6 v. 25.5-27.0, zygomatic width 15.8-16.6 v. 14.8; supraorbital ridge absent but a horizontal ledge present in older specimens; palate posterior margin terminates at M<sup>3</sup> mid point rather than level with M<sup>3</sup> posterior face; anterior palatal foramen relatively shorter, does not reach posterior to M<sup>1</sup> anterior alveoli; and teeth much larger: e.g., C<sup>1</sup>-M<sup>3</sup> length 5.9-6.2 v. 5.1-5.3.

It differs from *Melomys lutillus muscalis* (Thomas, 1913), which has similar body measurements, in having larger tail scales 11-12 v. 15/cm; slightly larger skull measurements: e.g., condylobasal length 28.8-30.6 v. 26.2-27.9; zygomatic width 15.8-16.6 v. 13.9-15.0, interorbital breadth 4.9-5.1 v. 4.2-4.7; zygomatic plate breadth 4.0-4.6 v. 3.2-3.4; anterior palatal foramen posterior edge much closer to M<sup>1</sup> rather than terminating nearly half their length anterior of M<sup>1</sup> anterior edge, and teeth much larger: e.g., C<sup>1</sup>-M<sup>3</sup> length 5.9-6.2 v. 4.5-5.3.

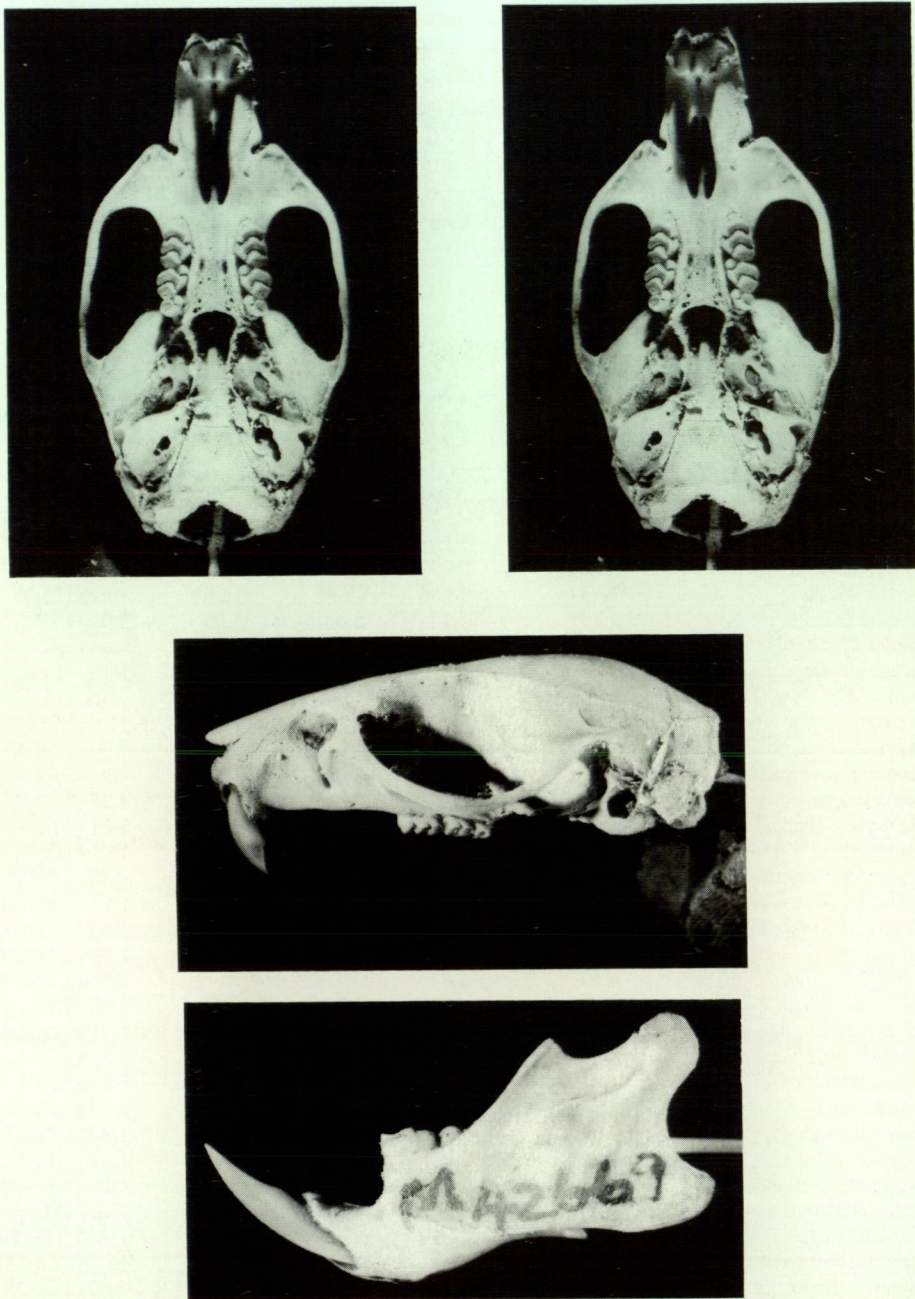
It differs from *Melomys platyops* (Thomas, 1906) in having 2-3 rather than 1 hair/tail scale

although Tate (1951:284) states that "occasional specimens of northern *platyops* (*M. p. mamberanus*) specimens having some scales one-haired and others three-haired can be noted, as well as individuals having three-haired tail scales and other individuals with one-haired tail scales". It differs also in having larger tail scales 11-12 v. 13-19 scales/cm and ventral fur pure white rather than grey black based fur tipped with greyish white or yellow brown colour.

It also differs from *M. platyops platyops* and *M. p. fuscus* Rümmler, 1935 in having external and skull measurements much smaller: e.g., head to vent length 111.6-114.5 v. >135, pes length 23.2-25.5. v. >28, condylobasal length 28.8-30.6 v. >34, zygomatic width 15.8-16.6 v. >17.5.

**Table 1** Measurements (in mm) of the skull, dentition, and externals and weight of *Melomys bannisteri* sp. nov., holotype and paratypes.

CHARACTER WAM NUMBER / SEX	HOLOTYPE		PARATYPES		MEAN (RANGE)
	M42669 ♂	M42689 ♂	M42678 ♂	M42132 ♀	
Age	Young adult	Adult	Adult	Adult	
Greatest skull length	32.76	-	-	32.74	32.75 (32.74-32.76)
Condylobasal length	30.62	30.01	28.80	30.45	29.97 (28.80-30.62)
Condyloincisive length	30.22	29.79	28.71	30.16	29.72 (28.71-30.22)
Zygomatic width	16.54	16.06	15.79	16.61	16.25 (15.79-16.61)
Interorbital breadth	4.89	5.10	5.05	5.06	5.03 (4.89-5.10)
Interparietal breadth	9.67	9.63	-	10.22	9.84 (9.63-10.22)
Braincase breadth	13.62	13.79	13.83	13.94	13.80 (13.62-13.94)
Mastoid width	11.58	11.45	11.44	11.93	11.60 (11.44-11.93)
Nasal length	10.61	-	-	11.46	11.04 (10.61-11.46)
Nasal breadth	4.35	-	-	3.58	4.00 (3.58-4.35)
Zygomatic plate breadth	4.44	4.12	3.98	4.57	4.28 (3.98-4.57)
Diastema length	8.80	8.44	7.88	8.38	8.38 (7.88-8.80)
Height muzzle (behind ant. pal. for.)	8.22	8.13	7.84	8.35	8.14 (7.84-8.35)
Palatal length	16.23	16.20	15.74	16.22	16.10 (15.74-16.23)
Ant. palatal foramen length	4.90	4.96	4.83	4.82	4.88 (4.82-4.96)
Ant. palatal foramen breadth	1.80	1.85	1.87	1.80	1.83 (1.80-1.87)
Mesopterygoid fossa breadth	2.86	2.83	-	2.37	2.69 (2.37-2.86)
M <sup>1</sup> -M <sup>1</sup> breadth (inside)	2.48	2.70	2.57	2.77	2.61 (2.48-2.77)
Bulla length	4.59	4.64	4.45	-	4.56 (4.45-4.64)
M <sup>1</sup> -M <sup>2</sup> crown length	5.86	6.20	5.90	6.02	6.00 (5.86-6.20)
M <sup>1</sup> -M <sup>2</sup> alveoli length	6.08	6.38	6.06	6.33	6.21 (6.06-6.38)
M <sup>1</sup> crown length	3.01	3.34	3.14	3.10	3.15 (3.01-3.34)
M <sup>1</sup> crown breadth	1.92	1.96	1.84	1.79	1.88 (1.79-1.96)
M <sup>2</sup> crown length	2.02	2.20	2.10	2.03	2.09 (2.03-2.20)
M <sup>2</sup> crown breadth	2.04	1.89	1.75	1.81	1.87 (1.75-2.04)
M <sup>3</sup> crown length	1.15	1.29	1.23	1.18	1.21 (1.15-1.29)
M <sup>3</sup> crown breadth	1.33	1.28	1.28	1.16	1.26 (1.16-1.33)
Head to vent length	111.7	114.5	113.1	111.6	112.7 (111.6-114.5)
Tail to vent length	117.6	113.7	110.3	106.4	112.0 (106.4-117.6)
Ear length (from basal notch)	15.1	-	12.8	13.3	13.7 (12.8-15.1)
Pes length (without claw)	25.0	24.3	25.5	23.2	24.5 (23.2-25.5)
Tibia length	32.9	32.9	31.1	31.3	32.1 (31.1-32.9)
Weight (gms)	61.5	56.0	48.8	45.0	52.8 (45.0-61.5)



**Figure 2** Plates of ventral (as stereopairs) of the skull and lateral surface of the skull and dentary of holotype of *Melomys bannisteri* sp. nov.

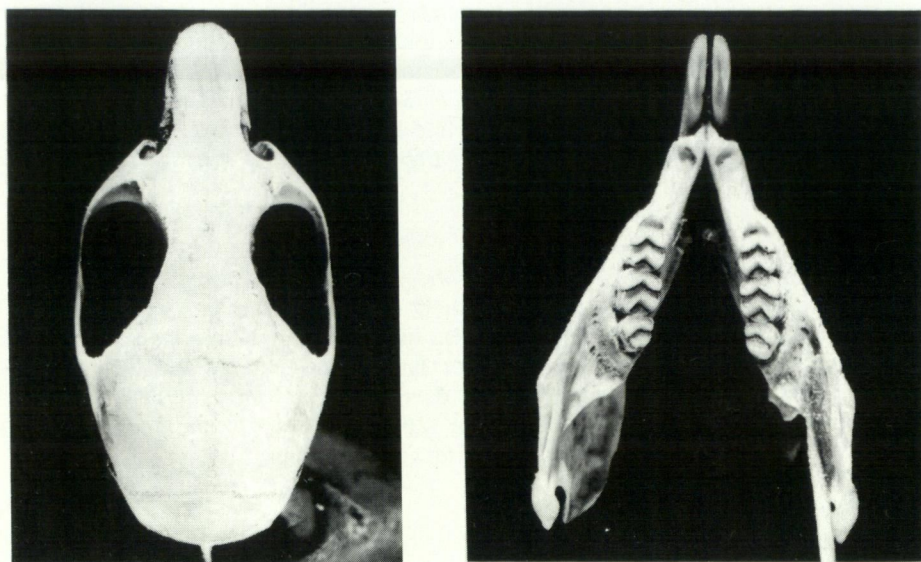


Figure 3 Plates of dorsal of the skull and dentary of holotype of *Melomys bannisteri* sp. nov.

It also differs from *M. p. arfakiensis* Rümmler, 1935, which is similar in general body and skull dimensions, in having tail subequal in length to head and body rather than 18% longer, pes shorter 23.2-25.5 v. 27-29 and bulla longer relative to condybasal length 0.150-0.154 v. 0.140.

It also differs from *M. p. jobiensis* Rümmler, 1935 which has similar external dimensions, in having zygomatic width greater 15.8-16.6 v. 14.7, narrow interorbital breadth 4.9-5.1 v. 5.7; shorter palatal length 15.7-16.2 v. 16.7-17.3, much longer anterior palatal foramen 4.8-5.0 v. 4.1; narrower between  $M^1M^1$  internal surfaces 2.5-2.8 v. 3.1;  $C^1-M^3$  crown length longer 5.9-6.2 v. 5.6-5.7;  $M^3$  not as reduced;  $M^3$  anteriorlingual cusp separate.

It differs from *Melomys obiensis* (Thomas, 1911) and *M. fulgens* (Thomas, 1920) (including *talaudium* (Thomas, 1921)) in being much smaller overall; e.g., head to vent length  $\ll 140$ , tail to vent length  $\ll 150$ , pes length  $< 28$ , greatest skull length  $\ll 38$ , interorbital breadth  $\ll 5.6$ , anterior palatal length  $\ll 5.7$ ,  $C^1-M^3$  length  $< 6.4$ .

### Description

Measurements of skull, dentition and externals presented in Table 1.

#### Skull (Figures 2-3)

Skull small, dorsal outline gently curved in lateral profile from nasal distal tip to parietal mid point, which is moderately inflated; interparietal not inflated, lambdoidal crest slight; interorbital region very slightly concave, moderately wide; nasal moderately narrowed posteriorly; rostrum short; zygomatic arch moderately wide, squamosal part narrowed; zygomatic plate broad, leading edge slopes slightly posterior from anterior apex; infraorbital

foramen moderately wide; lachrymal bones moderate, post squamosal hook not well developed posteriorly, forms a vertical ridge with lateral occipital and mastoid; supraorbital lateral shelf posterior from mid constriction of interorbital region, also a slight vertical beading on this shelf which is perceptible to one third length of parietal; anterior palatal foramen moderately long and elongate, does not reach  $M^1$  alveolus; mesopterygoid fossa moderately wide, pterygoid bones narrow slightly posteriorly; parapterygoid fossa narrow but deep; bulla moderately long and little inflated.

*Dentition* (Figures 2-3)

Molars large,  $M^3$  not noticeably reduced for *Melomys*;  $M^1$  anterior and posterior lamellae with well developed lophs; posterior lamella without lingual loph but with well developed and spacious posterior cingulum with the appearance of a central vestigial cusp;  $M^2$  with only large anterolingual cusp remaining of anterior lamella, second lamella well developed, approximates that of  $M^1$  but again with a well developed posterior cingulum with vestigial cusp;  $M^3$  with anterolingual cusp well developed, separate from posterior lamella; molar rows diverge slightly posteriorly from each other; incisors opisthodont.

*Externals* (Figure 4)

A small to moderate sized *Melomys*: head and body length (112.7) subequal with tail length (112.0); ears moderately long (13.7); and pes broad, length moderate (24.5).

*Pelage*

Dominant colour of dorsal surface Cinnamon Brown resulting from Cinnamon Brown and/ or Black tipping to the Medium Neutral Gray colour of basal three-quarters of hairs. Hairs in mid dorsum 11mm long while those in mid forehead 5mm long; flanks Buffy Yellow tipping to the Medium Neutral Gray colour of basal one-half of hairs. Lips, throat, chest, abdomen to anus, inside of thigh and pes upper surface White, hairs 5-6mm long, outer leg surface, manus upper surface and cheeks Cream Colour. Distal half of ear pinna lightly furred inside

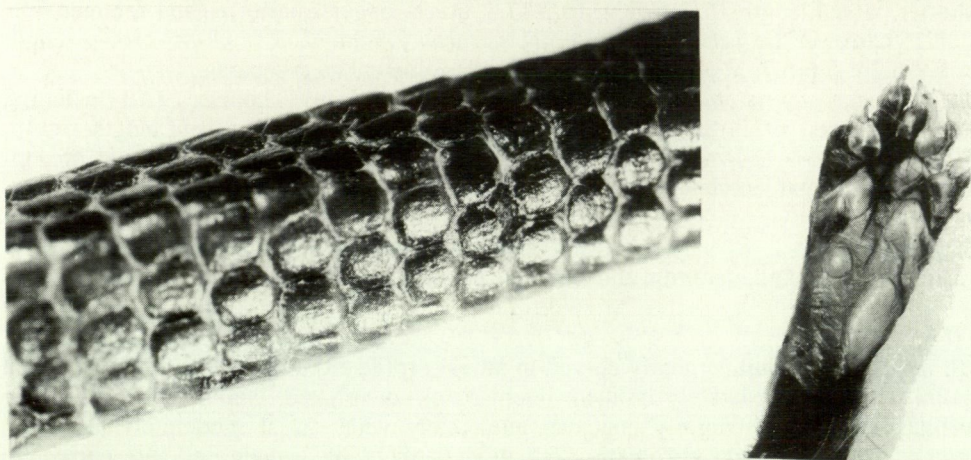


Figure 4 Plate of tail and pes plantar surface of holotype of *Melomys bannisteri* sp. nov.



and outside with Cinnamon Brown, external basal half well haired with Cinnamon Brown. Tail dorsal and lateral surface Greyish Brown, undersurface a paler Dark Neutral Gray.

Hairs on dorsal surface of tail usually 3, frequently 2 and occasionally 1 per scale; on ventral and lateral surfaces 3 per scale; tail hairs short, less than 30% scale width. Scales typical of *Melomys* of the *lutillus* group (Figure 4). On head numerous Black mystical vibrissae up to 40 long; numerous short (up to 12mm) White submental vibrissae; two moderately long (up to 7.5) White interramal vibrissae; a single long (up to 22) Black genal vibrissa; several long (up to 23) Black supraorbital vibrissae and 2-3 long (up to 10) Black with White tipped ulnar vibrissae.

### Reproduction

Only one male (WAM M42678), weighing 45gm, had scrotal testes; these were large and 12.6mm long, with well developed caudal epididymis and considerable fat deposits surrounding the caput epididymis. The other two males were heavier. The larger of these (WAM M42669, holotype) weighing 61.5gm, had inguinal testes that were slightly smaller (10.5mm long) than WAM M42678. The other, WAM M42689, had large (12.6mm long) abdominal testes.

The female, WAM M42132, weighing 45gm, had recently given birth and was lactating. Its four inguinal teats were enlarged, 3.8mm long, and with enlarged mammary glands. The uterine horns had recently involuted; the left uterine horn had two implantation scars.

### Etymology

Named after Mr John Bannister, recently retired after 17 years as the Director of the Western Australian Museum, in recognition for his continued interest and support of research in Nusa Tenggara, Indonesia, and for his efforts over many years towards improving the collections of the mammal section, Western Australian Museum.

### ACKNOWLEDGEMENTS

We gratefully acknowledge the support of Mr J.L. Bannister, Director, Western Australian Museum; Drs M. Amir, Director Balitbang Zoologi (LIPI) and the Director of the Indonesian Department immediately responsible for the conservation of wildlife in Maluku Tengah, Ir. Jus Rustandi

Thanks also to our colleagues Dr Richard How and Mr Ron Johnstone, Western Australian Museum for their tireless support and good company in the field. Dr Ken Aplin, Western Australian Museum, provided stimulating discussion and Mr John Edwards Hill, Kent, England, kindly read the manuscript. Mrs Susan Dalton typed the manuscript.

Expedition costs were defrayed by grants to D. Kitchener from: National Geographic Society, Washington and Australian National Parks and Wildlife Service, Canberra; and a grant to L. Schmitt, D. Kitchener and R. How from the Australian Research Council, Canberra. Garuda Indonesia kindly defrayed freight costs of the expeditions.

### REFERENCES

- Laurie, E.M.O. and Hill, J.E. (1954). *List of land mammals of New Guinea, Celebes and adjacent islands 1758-1952*. British Museum, Natural History, London.

A new species of *Melomys*

- Menzies, J.L. and Dennis, E. (1979). *Handbook of New Guinea rodents*. Wan Ecology Institute Handbook No. 6: 1-68.
- Rümmler, H. (1938). Die systematik und verbreitung der Muriden Neuguineas. *Mitt. Zool. Mus. Berl.* 23: 1-297.
- Smithe, F.B. (1975). *Naturalists' colour guide*. American Museum Natural History, New York.
- Tate, G.H.H (1951). The rodents of Australia and New Guinea. *Bull. Am. Mus. nat. Hist.* 97: 183-430.