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Pogonomys championi n.sp., a new murid (Rodentia) from montane western Papua New Guinea

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ABSTRACT. *Pogonomys championi* n.sp. is a medium-sized montane *Pogonomys* with grey-based ventral fur. It shares similarities with both *Pogonomys macrourus* and *Pogonomys sylvestris*, but also has some unique features. Thus far *P. championi* n.sp. is known only from the Telefomin and Tifalmin Valleys, Papua New Guinea, at altitudes of between 1,400 and 2,300 m. At these localities the species is common, and in the Telefomin area at the lower end of its altitudinal range, it is probably sympatric with *P. macrourus*.

Pogonomys championi n.sp. nests communally underground, with up to seven individuals sharing a nest. They ascend into trees at night to feed.

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Dennis & Menzies (1979) clarified a long-standing confusion in murid taxonomy when they demonstrated, on the basis of morphometrics and chromosomes, that *Chiruromys* and *Pogonomys* are two distinct and not closely-related genera. In their concept of *Pogonomys* within New Guinea, three species were recognised: *P. macrourus* (Milne-Edwards, 1877), a medium-sized species from low-mid altitudes which has pure white ventral fur; *P. loriae* (Thomas, 1897), the largest species, also from low-mid altitudes and which almost always has pure white ventral fur; and *P. sylvestris* Thomas, 1920, the smallest, which is found at high altitudes and has grey-based ventral fur.

The aim of this study is to modify Dennis and Menzies' scheme by the recognition of a fourth species. This species is known only from mid-high altitudes in the western part of Papua New Guinea. When I first obtained specimens during 1984 I assumed they were *P. sylvestris*, but further study, and comparison with material held in the Australian Museum and the American Museum of Natural History, indicate that they represent an undescribed taxon.

Colours where capitalised follow Ridgway (1886). AM M = Australian Museum mammal specimen. AMNH = American Museum of Natural History mammal specimen. MZB = Bogor Museum (Indonesia) mammal specimens. All measurements are in millimetres, and weights in grams. Dental nomenclature follows Musser (1981).

Systematics

Pogonomys Milne-Edwards, 1877

Pogonomys championi n.sp.

Figs 1, 2, 5, Tables 1, 2

Type material. HOLOTYPE AM M13502, male puppet skin and skull with dentaries. Collected by S. Van Dyck on 10 Feb 1984 at Ofektaman, Telefomin Valley, West Sepik Province, Papua New Guinea (5°04′S 141°34′E; P.N.G. Topographic survey sheet No. 7282 Telefomin, 1:100,000 series). Alt. 1,400 m. PARATYPES (n = 1) Sol River Valley, 2,300 m, (5°05′S 141°35′E), coll. T. Flannery, 14 Feb 1984: AM M13646, adult male skin and skull. (n = 13) Ofektaman, 1,400 m, (5°04′S 141°34′E), coll. S. Van Dyck, 9–12 Feb 1984: AM M13463-4, M13660, M13664, male skins and skulls; AM M13640, M13646, female skin and skulls; AM M13718-9, M13721-4, whole males in spirit; AM M13720, whole female in spirit. (n = 13) Tifalmin, 1,800 m, (5°07′S 141°25′E), coll. T. Flannery, L. Seri, 11 Apr 1987: AM M17727, M17729, M17731, males in spirit; AM M17728, M17730, M17732-3, females in spirit; AM M17721-2, M17725-6, male skins and skulls; AM M17723-4, female skins and skulls.

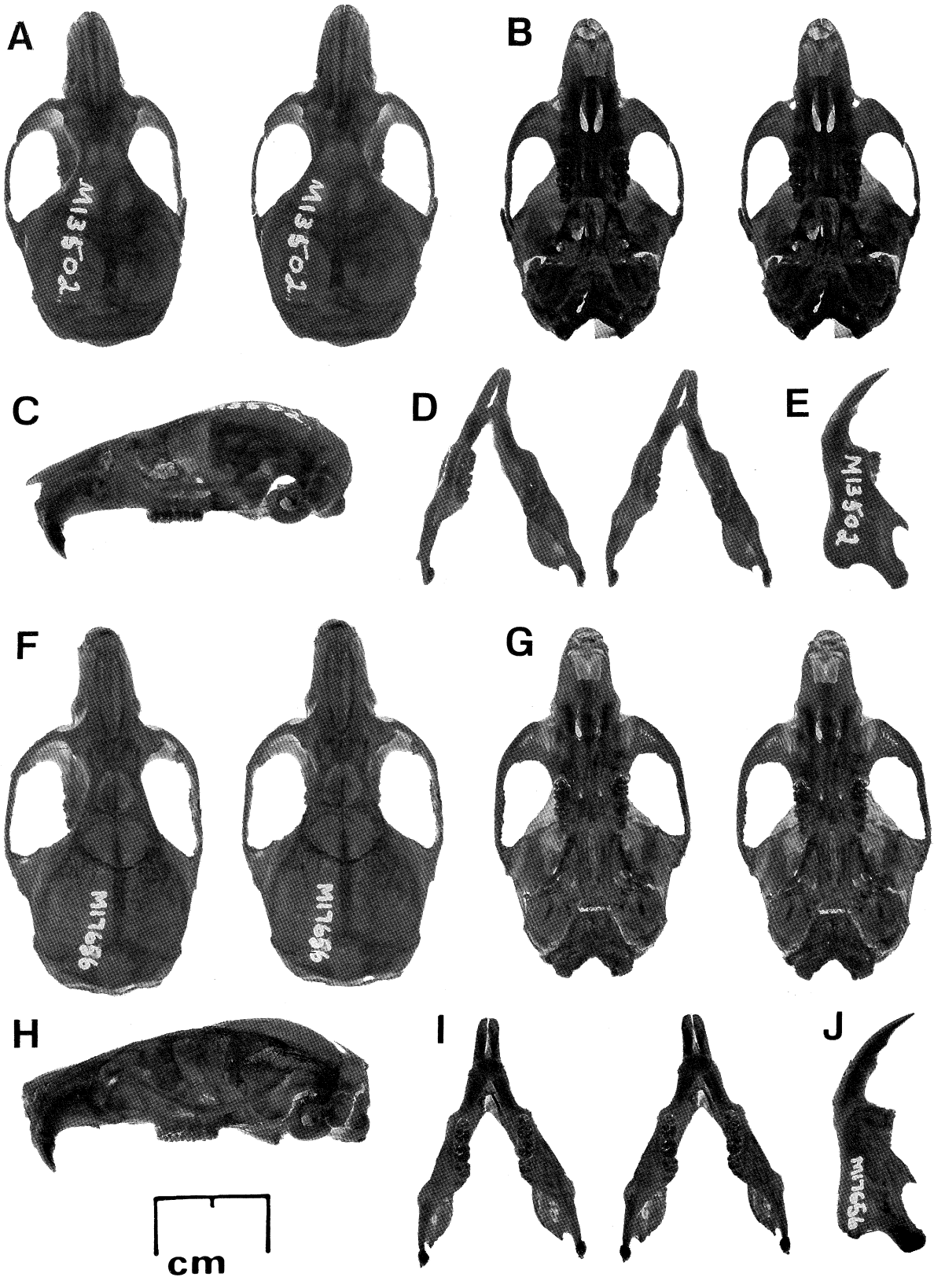
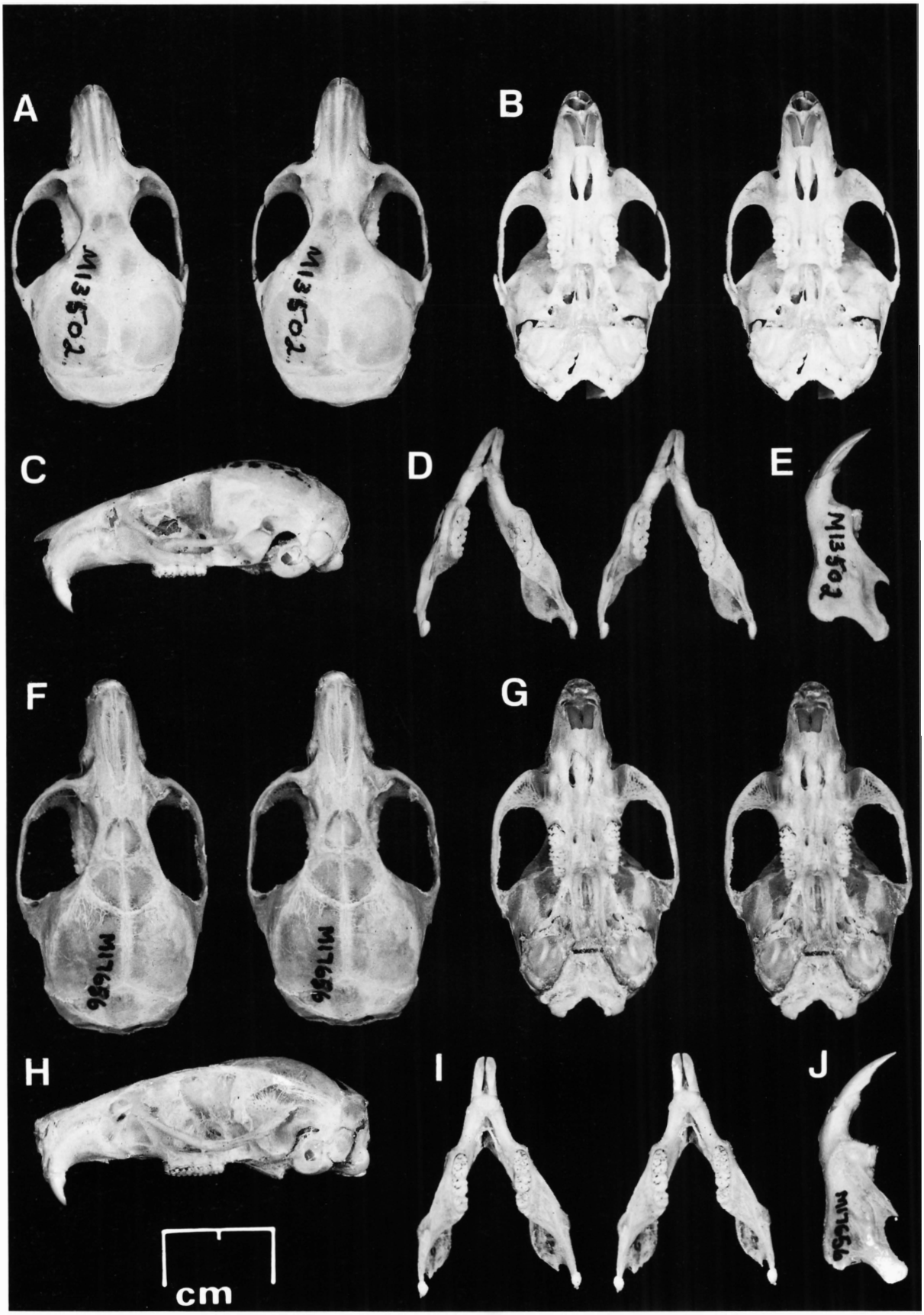


Fig.1. A, stereopair of dorsal C, lateral, and B, occlusal view of skull of the holotype of *P. championi* n.sp. (AM M13502: male); D, stereopair of occlusal view and E, buccal view of the dentary of AM M13502. F, stereopair of dorsal, H, lateral and G, stereopair of occlusal view of AM M17656, Male *P. macrourus*, Munbil, Star Mts, West Sepik Province. I, stereopair of occlusal view, and J, lateral view of dentary of AM M17656.



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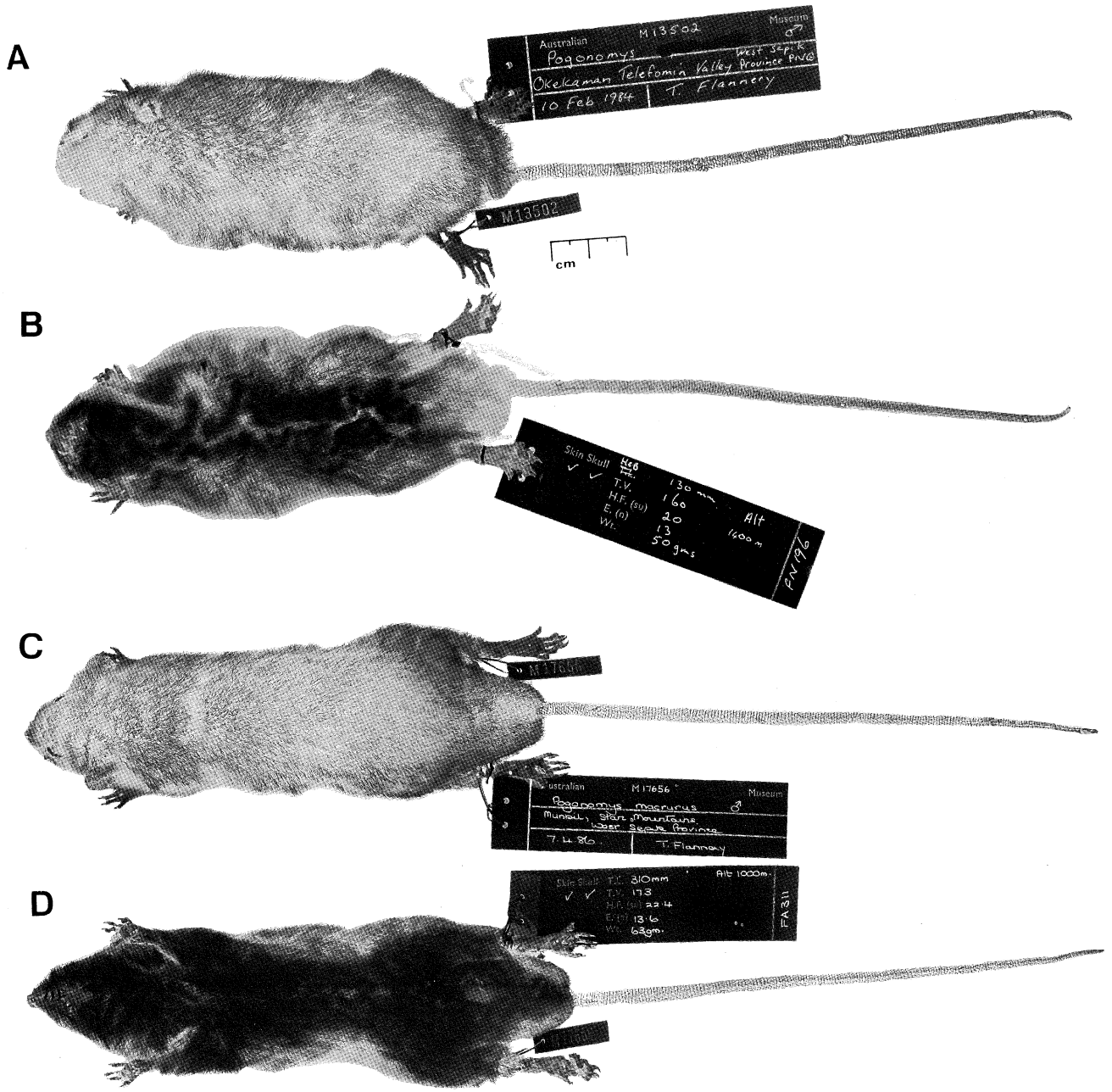

Fig.2. A, dorsal view and B, ventral view of puppet skin of the holotype of *P. championi* n.sp. (AM M13502), C, dorsal view and D, ventral view of puppet skin of AM M17656, *P. macrourus*, Munbil, Star Mts.

Diagnosis. *Pogonomys championi* n.sp. is unique within its genus in that the tail lightens, beginning from the distal end, with age. There is no clearly demarkated white tail tip, but rather the tail lightens imperceptably distally. In aged individuals almost the entire tail can be ivory in colour.

Pogonomys championi n.sp. further differs from *P. loriae* in its much smaller size (see Tate, 1951), lack of white mottling on the tail, in always possessing grey-based ventral fur, in having a reddish tinge to the body sides, a drab brownish dorsal colouration, and less well-developed superorbital crests. It further differs from *P. macrourus* in its lighter weight and shorter tail (Table 2), in possessing an ivory-coloured distal portion to the tail which gradually shades into the darker base, in having shorter, more rectangular tail scales (mean = 14.3 per cm opposed to mean = 12 for *P. macrourus*) which are generally arranged in more annular rings (Fig. 3), less well-developed supraorbital crests, grey-based ventral fur, and in being less rufescent dorsally and laterally. It further differs from *P. sylvestris* in having wider zygomata

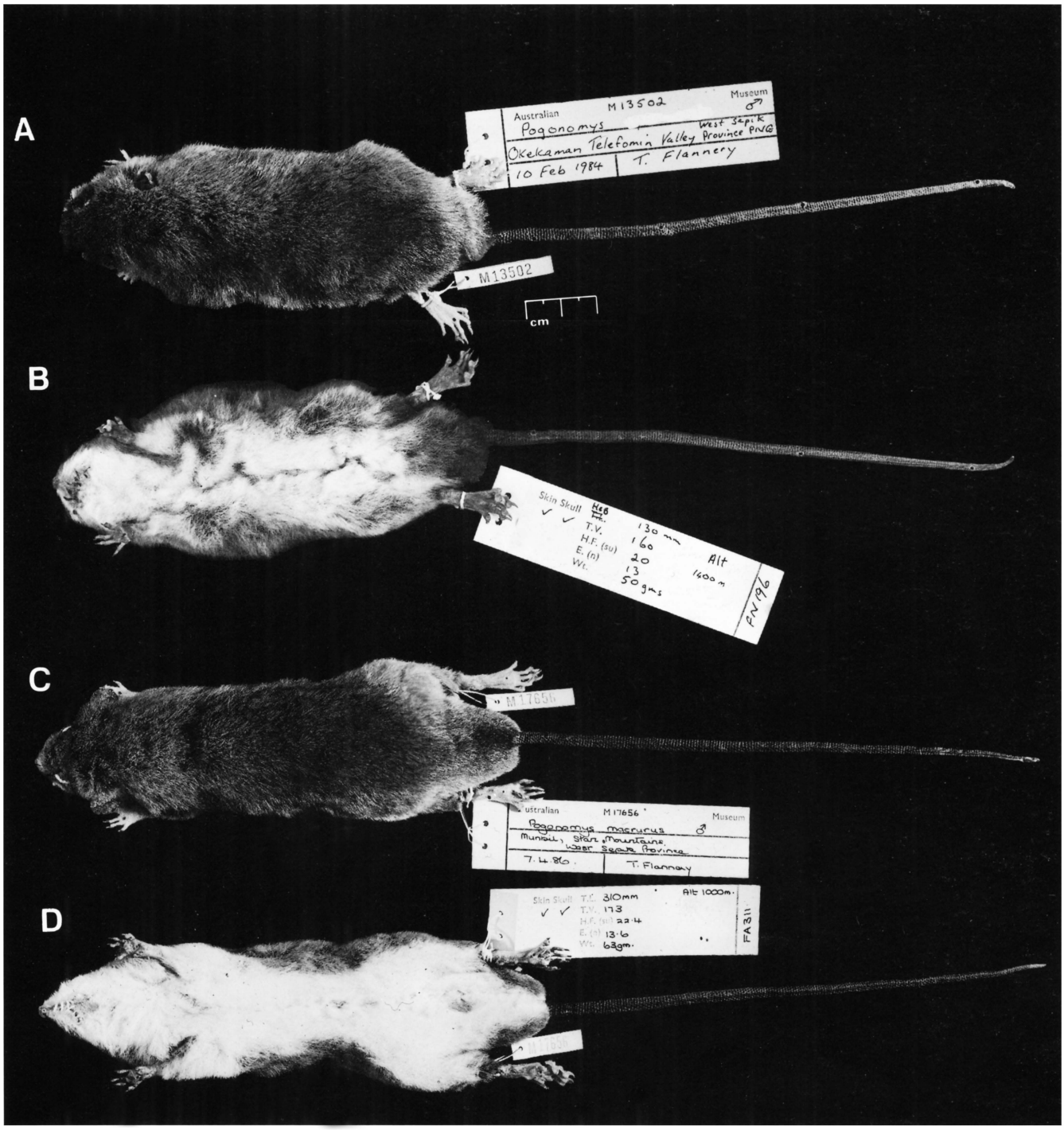

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Table 1

Cranial and Dental Measurements (in mm) for *P. championi*. CBL = condylobasal length, BZW = Bizygomatic width, $M^{1-3}L$ = length of upper molar row, M^1L = length of M1/, M1/W = width of M1/, IW = interorbital width, NL = nasal length, PL = palatal length, ZYG PW = zygomatic plate width, RH = rostrum height, X = mean, R = range, N = sample size, STD = standard deviation.

Total Sample			Holotype				Holotype
CBL	X	30.0	29.5	BZW	X	17.4	17.3
	R	28.5-30.9	5		R	16.8-18.4	
	N	13			N	12	
	STD	0.87			STD	0.50	
$M^{1-3}L$	X	5.1	5.1	M^1L	X	2.3	2.3
	R	4.9-5.3			R	2.1-2.4	
	N	14			N	14	
	STD	0.12			STD	0.09	
M^1W	X	1.7	1.8	IW	X	4.5	4.6
	R	1.6-1.8			R	4.3-4.8	
	N	14			N	14	
	STD	0.06			STD	0.17	
Nasal L	X	10.5		PL	X	14.0	13.4
	R	10.0-11.4	10.7		R	13.4-14.8	
	N	14			N	14	
	STD	0.38			STD	0.49	
Zyg. Plate W	X	3.1	3.2	RH	X	5.8	5.8
	R	2.7-3.4			R	5.3-6.0	
	N	14			N	14	
	STD	0.19			STD	0.21	

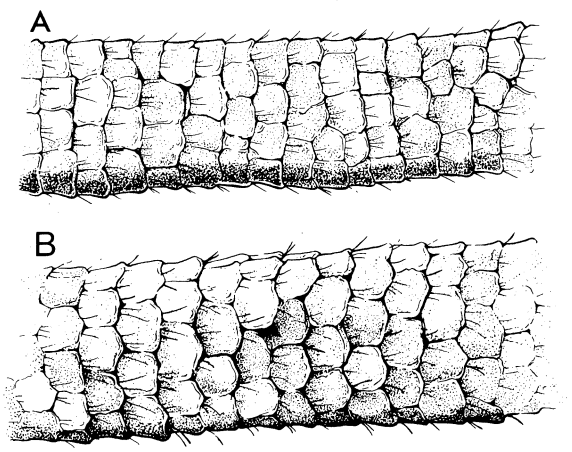

Fig.3. Tails of A, *Pogonomys championi* n.sp. (holotype, AM M13502) and B, *P. macrourus* (AM M17656, Star Mts) at 60 mm from tail base. X12.

(Table 1), tail scales which are arranged in a less annular pattern (Fig. 3), in lacking a distinct white tail tip (but rather having the pale distal portion of the tail intergrade into the darker base), in possessing more extensive white tipping on the ventral fur, and in being more rufescent on the body sides and dorsum.

Description. The following description is based upon the holotype. Variation within the paratype series is noted where it occurs.

Skull: incisive foramina short, bowed as in other *Pogonomys*, terminating 0.8 mm anterior to M1/. Two small palatal foramina present opposite M2/ on palate. Rostrum narrow, but not as foreshortened as in species of *Chiruromys*. Palate terminates opposite T8–9 on M3/, no palatal thickening or postpalatal spine. Nasals do not overhang premaxillae, zygomatic plate of moderate breadth. Bullae are small. No supraorbital beading, only faint ridging on older specimens. Skull largely resembles that of *P. sylvestris*, but differs in broader zygomata (Table 1, Fig. 4). Dentary resembles that of other species of *Pogonomys*. No incisor tubercle.

Incisors: incisors do not differ in morphology from those of other species of *Pogonomys*. Enamel of lowers yellow, uppers deeper orange tinge.

Molars: molar cusps distinct, well defined as in all *Pogonomys* species. On M1/, T1–9 all present, usually form discrete conical entities. In some specimens (including holotype) T1 forms discrete cusp. On others is united with T2 by high enamel ridge. On holotype, accessory cuspules are present between T1–2 and T2–3, cuspules lacking or less well developed on other specimens. Distinct posterior cingulum extends posterobuccally from T8 also present on M1/.

M2/ shorter than M1/, consists of T1, T3–9. T3 greatly reduced or absent in some specimens. Distinct posterior cingulum present.

M3/ shorter and narrower than M2/. Consists of T1, 3, 4, 6, 8 and 9. T3 very small, present on all specimens examined. Tiny posterior cingulum projects directly posteriorly from between T8–9.

M/1 is a complex tooth. Prominent anterolingual and anterobuccal cuspid present, anterior to these are 2 small though distinct cuspules. These are similar in morphology to the anterolingual and anterobuccal cuspids, form miniature replicas of

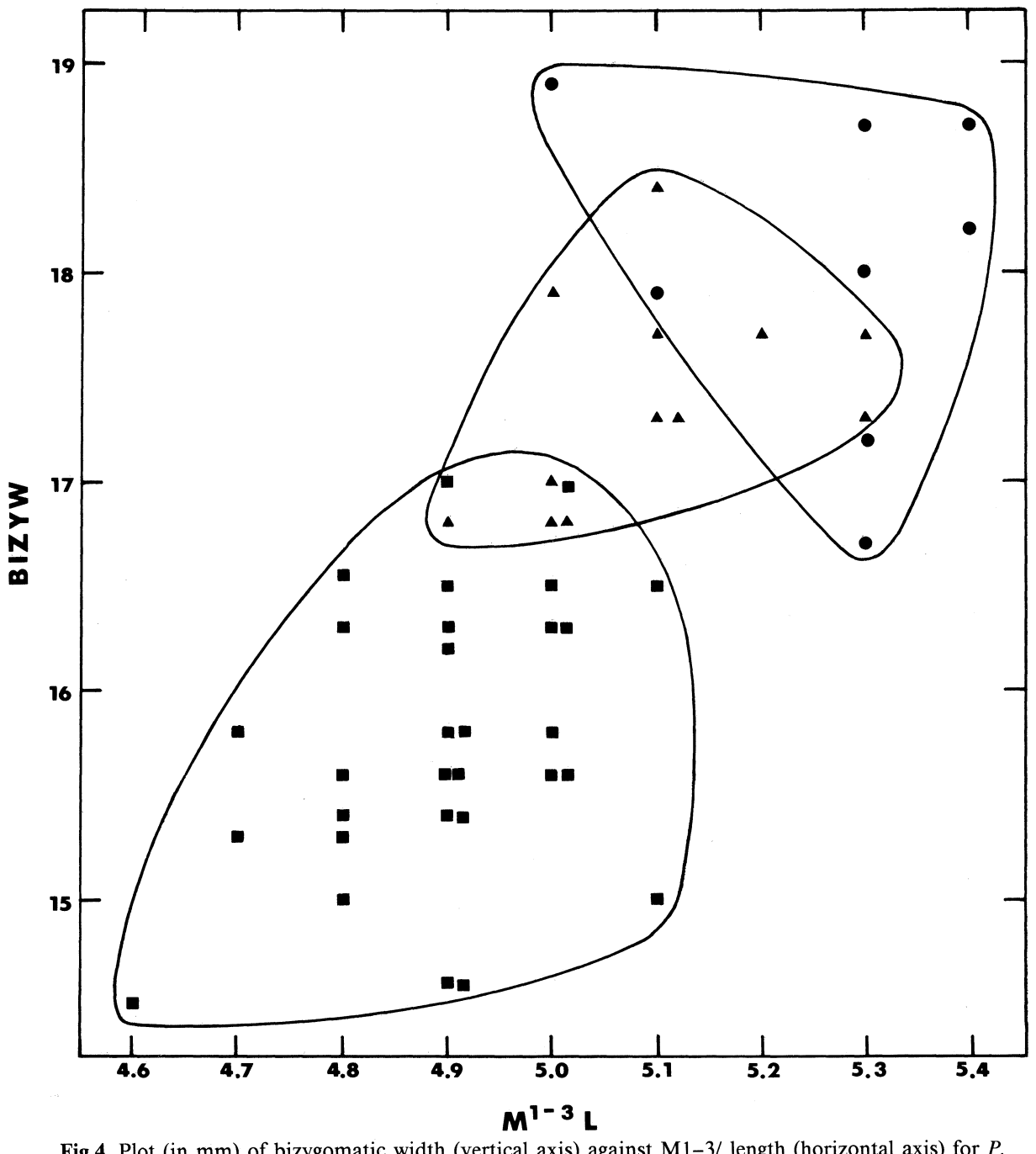

Fig.4. Plot (in mm) of bizygomatic width (vertical axis) against M1–3/ length (horizontal axis) for *P. championi* n.sp. (triangles), *P. macrourus* from the Telefomin area (circles) and *P. sylvestris* (PNG sample) (squares), adults only included.

them. Protoconid and metaconid subequal in size, similar in morphology to anterolingual and anterobuccal cuspids. Hypoconid and entoconid fused to form low transverse crest which narrows in median section, unlike more anteriorly-positioned cuspids. Low posterior cingulum oval-shaped, with long axis oriented transversely. Anteroposteriorly oriented anterobuccal crest positioned buccal to protoconid, subovate posterolabial cuspule positioned buccal to hypoconid. Overall, M/1 gives impression of being anteroposteriorly elongate structure which is ornamented by 5 transversely oriented sets of crests, each composed of 2 cusps with exception of posterior cingulum.

M/2 shorter than M/1. Consists of protoconid and metaconid which are united to form transverse crest, hypoconid and entoconid which are likewise joined. These 4 cuspids subequal in size. Small, subovate posterior cingulum oriented as in M/1. Dumbell-shaped anterolabial ridge present labial to protoconid, subovate posterolabial cusp buccal to hypoconid.

M/3 shorter and narrower than M/2. Consists of protoconid and metaconid which are united to form transversely-oriented crest as in M/2. Hypoconid and entoconid fused to form short, low crest. Subovate anterolabial cusp present buccal to protoconid.

Fig.5. Live male *Pogonomys championi* n.sp. from Tifalmin. (Photo H. Cogger).

Pelage: dorsal surface Sepia (Fig. 5). This overall appearance created by admixture of darker-tipped and more prominent guard hairs overlying Straw tipped underfur. Upon close inspection dorsal surface of pelage has "peppered" appearance. For basal four fifths of their length, hairs of dorsal surface are Blackish Slate. Sides of body have rufescent tinge, owing to more richly-tipped underfur, and thinning of guard hairs. Change to ventral colouration abrupt. Venter without guard hairs, underfur hairs being usually white tipped for distal third, with a Blackish Slate base. Underfur pure white on chin, in few specimens there is very small pure white patch on chest.

Distinct dark eye ring present, vibrissae black. Hands and feet sparsely covered dorsally with white hairs. Pads of feet and hands similar in position and size to those of other *Pogonomys*, unstriated. Mammary formula is 1 + 2 = 6.

In middle of tail are 14.3 scales per cm (R = 12–17, N = 11, STD = 1.35) as opposed to 12.0 (R = 10–13, N = 7, STD = 1.00) for *P. macrourus* from the Telefomin area, and 12.2 (R = 10–14, N = 19, STD = 1.12) for *P. sylvestris* from the Bele River. Scales approximately 1 to 2 times as broad as long, roughly rectangular; arranged in distinct rings. 3 short hairs per tail scale (half to three quarters of scale length) that are barely visible with naked eye. Segment approximately 20 mm long on dorsal side of tail tip is prehensile. Juvenile specimens tail uniformly dark. Adult specimens tip lightens with age. No distinct white tip, rather tail lightens imperceptibly from tip to base. Old individuals most of tail Ivory in colour.

Etymology. I take great pleasure in naming this species in honour of Mr. Ivan Champion who has contributed so much to the development of Papua

Table 2

A. External measurements (in mm and gms) for *Pogonomys championi* (entire adult sample) and *Pogonomys macrourus* from the Telefomin area. All measurements taken on specimens in the field.

		P. macrourus		*P. championi*	
		♂	♀	♂	♀
head body length	X	126.2	122.2	123.7	120.5
	R	119-134	98-133	114-135	112-136
	N	5	12	20	8
	STD	5.85	9.50	7.24	9.96
tail vent length	X	174.7	163.5	157.6	158.3
	R	167-184	151-179.8	150-165	149-170
	N	5	12	19	8
	STD	7.26	7.81	4.06	6.73
hindfoot length	X	21.8	22.0	22.0	21.4
	R	19.0-22.8	20.8-24.3	20.0-24.0	20.5-23.0
	N	5	12	20	8
	STD	1.40	1.08	1.25	0.75
ear length	X	13.1	13.3	13.5	13.3
	R	12.4-13.5	12.4-14.5	12.0-16.0	11.0-14.0
	N	5	12	19	8
	STD	0.46	0.86	1.23	1.05
weight (grams)	X	59.4	58.8	49.4	51.5
	R	50-65	48-74	40-66	41.0-59.5
	N	5	12	16	11
	STD	5.94	7.73	8.09	6.02

B. External measurements for holotype of *P. championi.*

head body length	= 130
tail vent length	= 160
hindfoot length	= 20
ear length	= 13

New Guinea. Champion was the first European to cross New Guinea from the Fly to the Sepik, entering the Telefomin Valley in 1926. Thus it is fitting that one of the region's most attractive murids should bear his name.

Discussion

Systematics. *Pogonomys championi* n.sp. exhibits the diagnostic features of the genus *Pogonomys.* These are possession of a tail with non-overlapping scales which is upwardly prehensile; complex multicuspidate molars; and short, bowed incisive foramina.

Unfortunately, it has not been possible during the course of this study to examine the holotypes of *P. sylvestris* and *P. macrourus*, which are held in the British and Paris Museums respectively, because of lack of travel funds. The Mammal Section of the British Museum refuses to allow the loan of types, so the material could not be borrowed. However, the detailed descriptions and measurements of both types given in Tate (1951), along with the original descriptions, satisfy me that neither could be confused with *P. championi* n.sp. Furthermore, I have examined near topotypical material of *P. sylvestris*, which does not differ from the larger samples available to me from Papua New Guinea. Thus I am satisfied that current concepts of these taxa are correct.

Of the three currently recognised species of *Pogonomys* (*loriae, macrourus* and *sylvestris*), *P. championi* n.sp. is most similar to *P. macrourus* and *P. sylvestris.* Indeed, the morphology of *P. championi* n.sp. is in many respects intermediate between the condition seen in these taxa. For example, *P. championi* n.sp. usually has some development of supraorbital ridges in older adults, while such features are absent in *P. sylvestris* but better developed in *P. macrourus.* The bi-zygomatic width is greater than is seen in *P. sylvestris* but smaller than in *P. macrourus* (Table 2, Fig. 4). The pelage and tail are likewise intermediate in some aspects of their morphology and colouration. For example, the dorsum of *P. championi* n.sp. is a richer red than in *P. sylvestris* but not as rufescent as in *P. macrourus.* The scales of the tail are arranged in rings, which are more distinct than in *P. macrourus*, but not as distinct as those of *P. sylvestris.* Unfortunately, the determination of polarity of many of these features within *Pogonomys* is not clear, so it is difficult to speculate regarding relationships.

Because of altitudinally correlated morphological variation in some New Guinean mammals (e.g. see Taylor *et al.* 1985) the possibility must be considered that *P. championi* n.sp. represents the end of an altitudinal cline involving it and *P. macrourus.* Many factors suggest that this is highly unlikely. A major one is that there is no clinal variation in the *P. macrourus* and *P. championi* n.sp. samples available to me from western Papua New Guinea. *Pogonomys macrourus* from 900 m are closely similar to those from 1,500 m, while *P. championi* n.sp. from 1,400 m

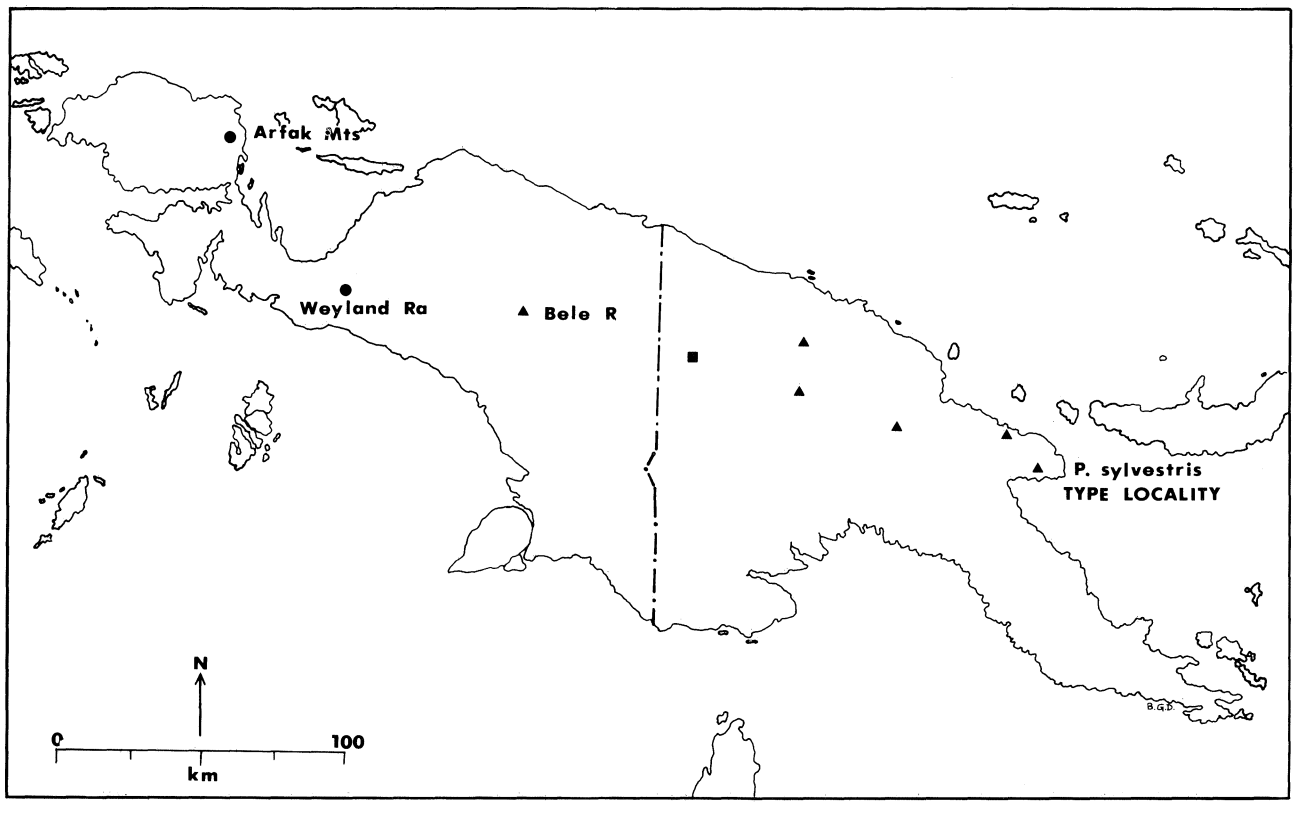

Fig.6. Distribution of *Pogonomys championi* n.sp. (square) and *P. sylvestris* samples (triangles) examined by me during this study, along with localities mentioned in the text.

are indistinguishable from the specimen from 2,300 m. Unless it is an extremely rapid step-wise one, these data make the existence of a cline seem unlikely. Furthermore, although the two species have not yet been found in sympatry, there is some indication that they overlap in altitudinal range. *Pogonomys macrourus* has been found at 1,350 m at Bogalmin village 3 km south of Telefomin Station, and *P. championi* n.sp. has been found at 1,400 m, 8 km northeast of the station (both in the Telefomin Valley). It would seem to be only a matter of time before they are found in sympatry. Furthermore, no intermediate or possible hybrid animals have been identified in the samples available to me.

Zoogeography. In an attempt to locate other samples of *Pogonomys championi* n.sp. I have examined records that may possibly relate to this species. Figure 6 shows the distribution of *P. championi* n.sp., samples of *P. sylvestris* used for this study, and the locations of other records of *Pogonomys* discussed here. As can be seen, records of *Pogonomys* with grey based ventral fur from western New Guinea are few. In the past, all have been referred to *P. sylvestris.* However, Rummler (1938) mentions some *P. macrourus* from the Weyland Range which have a fringe of grey based hairs around the margin of the venter. These animals probably are *P. macrourus*, but more information is needed before a firm assessment can be made. Records of *P. sylvestris* from western New Guinea include those of Dollman (1930) from the Arfak Mountains, Rothschild & Dollman (1933) from the Weyland Range, and Tate (1951) from the Bele River and nearby Lake Habbema areas. Dollman's (1930) record has not been checked by recent reviewers. However, Tate (1936) reports upon the only two of the six animals available to him that were referred to *P. sylvestris* by Rothschild & Dollman (1933). One of these (No. 84) is a *Melomys*, while the other (No. 169) is a *Pogonomys* with pure white ventral fur, probably *P. macrourus.* These data suggest that Dollman was unclear as to the nature of *P. sylvestris*, and thus I consider both the Arfak and remaining Weyland Range records for this species as doubtful.

Nineteen specimens from the large series of *P. sylvestris* collected in the Bele River and Lake Habbema areas by the Third Archbold Expedition were loaned to me for examination. Sixty-four individuals were collected during the Expedition at 2,200 m, 18 km north of Lake Habbema, and a further two at 2,700–2,800 m, 9 km north of Lake Habbema. All material examined by me is from the first locality. Apart from their markedly larger size these specimens closely resemble *P. sylvestris* from Papua New Guinea, differing only in their slightly more drab dorsal colouration. They are probably separable at the subspecies level from *P. sylvestris* from Papua New Guinea. I am reasonably confident that *P. sylvestris* does not occur in southern West Sepik Province (the area from which *P. championi*

n.sp. is known), as a 4 year mammal survey, extending to altitudes of 3,200 m, and resulting in the collection of over 1,000 specimens, failed to reveal its presence there (Flannery & Seri in prep). This pattern of distribution for *P. sylvestris* and *P. championi* n.sp is not readily explicable. More data is clearly needed regarding the distribution of these taxa before the nature of their geographic relationship becomes clear.

Biology. *Pogonomys championi* n.sp. and *P. macrourus* exist in close proximity in the Telefomin Valley. *Pogonomys championi* n.sp. occurs at 1,400 m at Ofektaman at the northern end of the valley, and at 2,300 m in the upper Sol River to the northeast of the valley. I have trapped *P. macrourus* at 1,500 m in the Nong River Valley just south of the Telefomin Valley, and at 1,350 m near Bogalmin Village in the middle of the valley. Although until now the two species have not been taken at the same station, I suggest that it is likely that they are partly sympatric based on the above distributional data. *Pogonomys macrourus* has been found between 900 and 1,500 m in the Telefomin area, while *P. championi* n.sp. occurs between 1,400 and 2,300 m. Thus if a zone of sympatry exists, it should occur at around 1,400–1,500 m.

Van Dyck (1986) describes the burrow of *P. championi* n.sp. under the name *P. sylvestris.* He reports that the burrows consist of an entrance hole 60 mm wide leading to an unbranching tunnel 2 m long. This tunnel terminates in a nesting chamber filled with dry vegetation (in one case dry bamboo). There is a short tunnel with an escape hatch immediately above the nesting chamber. It terminates in an exit hole 20–30 mm in diameter. One such burrow system contained five males and one female, while another contained only a female with two suckling young (in February). I have collected up to seven animals (4 adult males, 1 adult, 2 subadult females) from one burrow at Tifalmin. Specimens (e.g. AM 13646) have been captured feeding in low trees at night.

Summary

Pogonomys championi n.sp. is thus far known only from mid-high altitudes in western Papua New Guinea. It probably occurs sympatrically at approximately 1,500 m in the Telefomin area with *Pogonomys macrourus. Pogonomys championi* n.sp. nests communally in burrows, but ascends at night into trees to feed. Young have been collected in February.

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APPENDIX I

Material examined

Pogonomys sylvestris AM M19185 Duvi, Huon Peninsula, Madang Pro. AM M9624, 9570-80 Tomba, Hagen Ra, Western Highlands Pro. AM M8657, 8594-5, 8644-6, 8648-9, 8655, 8658, 8597-8, 8593, 8646, 8660, 7197, Kaironk Va, Schrader Ra. Madang Pro. AM M15428-9, 16239, 15442-51, Mt Erimbari, Chimbu Pro. AMNH150948-50, 151005-8, 151059-66, 151194-7, Bele R., Irian Jaya. MZB 8624-5 (by K. Aplin on my behalf), Bele R., Irian Jaya. All study skins and skulls.

Pogonomys macrourus AM M17248-53, 17257-67, 17635-6, 17677-8, 17681 Munbil, Star Mts West Sepik Pro. 17245 Bogalmin, Telefomin Va. West Sepik Pro. 17246-7 Yominbip, Thurnwald Ra. West Sepik Pro. 15867 Nong River Valley, West Sepik Pro.

Pogonomys loria AM M15412-3, 15415-26 Mt Erimbari, Chimbu Pro. M9576,8 Korn, Upper Whagi Valley Western Highlands Pro. 15414, 15564, 15574,6 Mt Sisa Southern Highlands Pro. 4135 Mt Lamington Northern Pro.