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TAPHOZOUS HILLI SP. NOV. (CHIROPTERA: EMBALLONURIDAE), A NEW SHEATH-TAILED BAT FROM WESTERN AUSTRALIA AND NORTHERN TERRITORY

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ABSTRACT

A new species of sheath-tailed bat is described from the Murchison, Pilbara and Gibson Desert regions of Western Australia, and from the vicinity of Tennant Creek, Northern Territory. It is distinguishable from other Australian species of the genus *Taphozous* on the basis of cranial and dental morphology.

INTRODUCTION

Troughton (1925) placed the Australian emballonurids in the genera *Taphozous* and *Saccolaimus*. This was primarily on the basis that *Taphozous* had well developed radio-metacarpal pouches, incomplete antero-internal sides to auditory bullae, outline of the mandible markedly concave beneath premolars, and upper anterior premolars small and not acutely cusped; *Saccolaimus* had no wing pouches, or rudimentary ones, complete auditory bullae, outline of mandible convex beneath premolars, and upper anterior premolars large and acutely cusped. At that time Troughton recognised the following five species of emballonurids in Australia: *Taphozous georgianus* Thomas, 1915; *T. australis* Gould, 1854; *Saccolaimus flaviventris* (Peters, 1867); *S. mixtus* Troughton, 1925 and *S. nudicluniatus* (De Vis, 1905). Tate (1952) reviewed this classification and relegated *Saccolaimus* to a subgenus of *Taphozous*, while still recognising the same species as Troughton. In addition he described another species, *Taphozous troughtoni*. However, Tate examined the female holotype of *T. georgianus* but could find no distinctly differing measurement; he therefore questioned whether *T. georgianus* differed in any substantial way from *T. australis*. Johnson (1964) also considered the possibility that *T. australis* and *T. georgianus* were merely geographic races of one species. McKean and Price (1967) examined this suggestion and concluded that *T. australis* could be distinguished from *T. georgianus* by the presence of a gular pouch in males and a naked area and

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rudimentary edge on the gular region of females. Hill (in litt.) also confirms these and certain other differences in cranial features between *T. georgianus* and *T. australis* recognised earlier by Troughton (1925). McKean and Price considered that while *T. georgianus* had a wide tropical distribution, *T. australis* was restricted to New Guinea and north coastal Queensland; they also tentatively decided that *T. troughtoni* should be retained as a race of *T. georgianus.* Ride (1970) recognised the same five species of *Taphozous* as Troughton (1925) and Tate (1952), with the exception that he followed McKean and Price in not recongising *T. troughtoni* as a full species. Recently J.L. McKean and G.R. Friend have prepared a description, as yet unpublished, of a new species of *Taphozous* from the Northern Territory.

Of the species of *Taphozous* (*sensu stricto*), only *T. georgianus* has been recorded in Western Australia where gular pouches are sometimes reported in males of the species (Ride, 1970). Previously, I had examined specimens of this subgenus in Western Australia as a prelude to the reproductive studies reported in Kitchener (1973, 1976). There were some skull differences between the most southern of the Western Australian populations at Tallering Peak and Murgoo, and those from the Pilbara and Kimberley regions of the State. I concluded that these skull differences represented geographic variation within *T. georgianus* and could find no consistent differences in external measurements. Recently while removing skulls from *Taphozous* I discovered a northern specimen with southern skull characteristics; this came from the same locality (Tambrey Homestead) as specimens with skull characteristics typical of the Pilbara and Kimberley populations. This discovery indicated the need for a re-examination of specimens belonging to the subgenus *Taphozous* in the collections of the Western Australian Museum.

The subsequent recognition of two forms of *Taphozous* (*sensu stricto*) in Western Australia led me to compare them with paratypes of *T. australis*, the holotype of *T. georgianus*, topotypic specimens of *T. troughtoni* and the extensive collection of Asian *Taphozous* in the British Museum (Natural History). In addition J.L. McKean and G.R. Friend loaned me a specimen of their recently discovered *Taphozous* sp.

DESCRIPTION OF MATERIAL

Taphozous hilli sp. nov.
(Fig. 1a-c; Table 1)

Holotype

Western Australian Museum Collection (WAM). Reg. No. M18260, adult female in alcohol with skull removed, collected at 1630 hrs by A. Baynes and C.G. Dawe (by mist-netting) on 7 August 1979.

Type locality

4.8 km 180° from Mt Bruce (22°39'03"S, 118°08'30"E), Hamersley Range National Park (No. A30082), disturbed from roof of test adit at Marandoo minesite.

Paratypes

Eleven females and 10 males — all WAM specimens; listed in Specimens Examined.

Diagnosis

External and cranial characters typical of the subgenus *Taphozous*. Approximately same body proportions as *Taphozous georgianus*. Distinguishable from other Australian species of subgenus by rounded anterior rim of mesopterygoid fossa, angular basisphenoid pits, slender and short upper canines, and less steeply excavated frontal depression between orbits of eyes (Fig. 1a-c).

Description

Body and skull measurements for *Taphozous hilli* are presented in Table 1 with comparable measurements for *T. georgianus* (the species most likely to be confused with *T. hilli*). Comparison is also made with *T. australis*, *T. troughtoni* and the species recently identified by McKean and Friend and referred to here as *Taphozous* sp.

Skull: in *T. hilli* frontal depression less steeply excavated and shallower than in other species; little or no sagittal crest, lambdoidal ridge not as well developed, flattening at its apex to a more rounded crest; postorbital width greater, with exception of *T. australis*; rostrum narrower anteriorly; mastoid region less inflated laterally, producing narrower appearance to back of skull; anterior rim of mesopterygoid fossa very rounded compared to the V shape in other species (sharpest in *T. troughtoni*); basisphenoid pits more angular and relatively long, most rounded in *Taphozous* sp.; lower anterior orbital rim flattened; pterygoid groove, which tends to be constricted posteriorly is (except in *Taphozous* sp.) more pronounced; tympanic bullae incomplete and similar in shape to other species; zygomata slender and constricted posteriorly. Outline of dentary beneath premolars markedly concave to about the same degree as in other species, unlike *Taphozous* sp. with only slightly concave outline.

Dentition: *T. hilli* canines shorter and more slender, with small anterobasal cusp about one-third length of tooth; anterior upper premolar weaker; posterior premolar with small anterobasal cusp and reduced cingulum; molars similar in shape to those of other species.

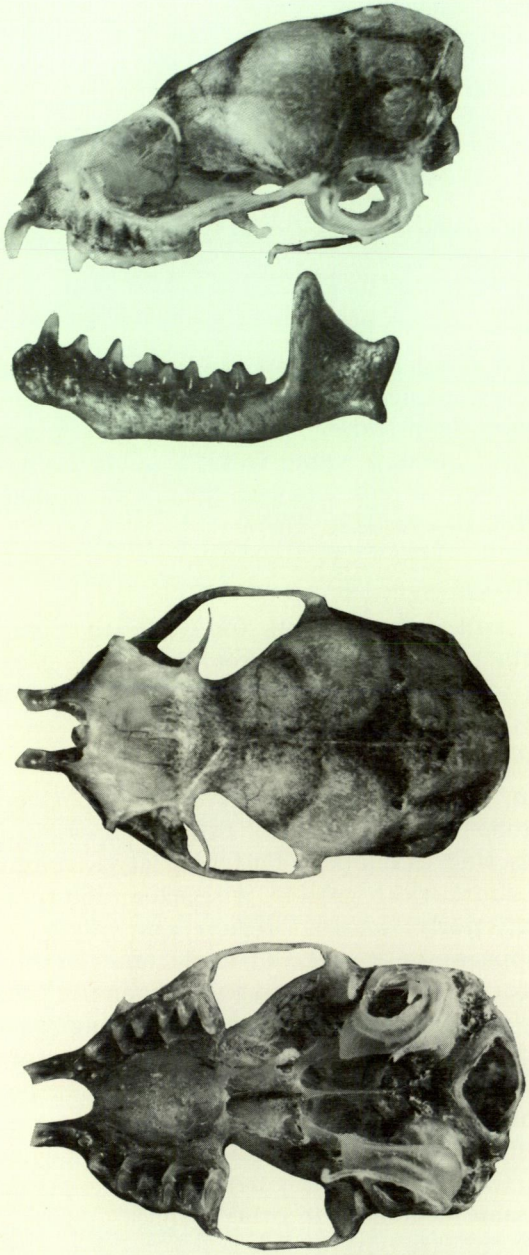

Fig. 1: Skull and dentary of the holotype of *Taphozous hilli* from (a) lateral (b) dorsal and (c) ventral views. X3.

Table 1. Measurements in mm (mean, standard deviation, and range) of *Taphozous hilli* from holotype and paratype specimens (10♂♂, 12♀♀) and of *T. georgianus* (10♂♂, 10♀♀). (all taken from alcohol stores specimens). N = number of measurements. Measurements of the holotype of *T. hilli* are also listed separately.

	T. hilli					*T. georgianus*			
	Holotype	Holotype and Paratypes							
(a) Skull/Dental	M18260	mean	S.D.	range	N	mean	S.D.	range	N
Greatest length (including canine)	22.1	21.4	0.37	20.7- 22.2	22	23.1	0.49	22.1- 24.1	20
Anteorbital width	8.6	8.7	0.25	8.2- 9.1	22	9.0	0.32	8.5- 9.7	20
Least interorbital width	6.1	6.1	0.21	5.7- 6.4	22	6.3	0.33	5.7- 6.8	20
Post orbital width	4.9	4.9	0.22	4.5- 5.4	22	4.3	0.18	3.8- 4.6	20
Zygomatic width	13.0	12.8	0.22	12.3- 13.2	22	13.2	0.28	12.9- 13.9	20
Mastoid width	10.6	10.6	0.15	10.4- 10.8	22	10.9	0.19	10.6- 11.4	20
Rostrum length	7.6	7.4	0.21	6.9- 7.7	22	8.3	0.20	7.9- 8.6	20
Braincase length	13.2	12.8	0.32	12.3- 13.4	22	13.1	0.27	12.7- 13.6	20
Braincase width	10.4	10.1	0.23	9.5- 10.5	22	9.8	0.21	9.4- 10.2	20
Basial pit length	4.6	4.5	0.16	4.2- 4.9	22	4.3	0.17	3.9- 4.6	20
Palatal length	5.8	5.5	0.11	5.4- 5.8	22	6.7	0.19	6.4- 7.1	20
Basicranial length	10.0	9.7	0.23	9.4- 10.4	22	10.2	0.22	9.8- 10.6	20
Bulla length	5.4	5.1	0.14	4.9- 5.4	22	4.9	0.16	4.5- 5.3	20
C^1 height	2.2	2.4	0.13	2.2- 2.6	22	2.9	0.25	2.4- 3.2	20
C^1 - C^1 breadth	3.5	3.4	0.12	3.2- 3.6	22	4.1	0.10	3.9- 4.3	20
C^1 - M^3 length	8.9	8.6	0.14	8.3- 8.9	22	9.7	0.19	9.4- 10.0	20
M^1 - M^3 length	4.9	4.9	0.11	4.6- 5.0	22	9.1	0.24	5.0 - 5.5	20
M^3 - M^3 breadth	9.1	9.0	0.21	8.6- 9.3	22	9.1	0.24	8.7- 9.6	20
M^1 length	2.2	2.2	0.05	2.1- 2.3	22	2.4	0.05	2.4- 2.5	20
M^1 width	2.2	2.2	0.05	2.2- 2.3	22	2.4	0.07	2.3- 2.5	20
Lower tooth row length	11.0	10.7	0.22	10.5- 11.0	22	11.7	0.19	11.4- 12.1	20
(b) Body									
Total length	106.3	101.2	4.62	88.8-109.2	21	103.5	4.10	95.8-112.7	20
Tail length	30.4	30.4	2.33	26.3- 34.4	16	30.5	1.38	28.7- 34.1	20
Ear length	21.4	20.2	1.05	18.4- 21.6	21	20.7	0.89	19.2- 22.1	20
Tragus length	6.2	5.9	0.35	5.2- 6.4	21	5.6	0.36	5.1- 6.1	20
Radius length	69.5	67.9	1.83	63.7- 71.3	20	67.3	1.73	64.3- 70.5	20
Tibia length	27.5	27.1	0.64	25.5- 28.5	21	27.5	1.02	26.2- 29.7	20
Foot length	12.0	12.3	0.35	11.4- 12.9	21	11.7	0.28	11.4- 12.3	20
Weight (gm)	22.0	22.0	2.16	20.0- 25.0	4	23.4	2.72	17.0- 26.5	10

External morphology: in *T. hilli* the general body shape, including wings and ears, is very similar to *T. georgianus* (Table 1) but with a gular pouch present in males.

Pelage and skin colour: described following Ridgway's (1912) colour code, from specimen M18258 while it was alive. There is no marked colour patterning in *T. hilli*. Predominant pelage colour on dorsal surface is Clove Brown on head to sternal region and Clay Color on rump region. These colours are from tips of hairs, the basal two-thirds of are Light Buff — although short hairs of rump and uropatagium to the point where the tail passes dorsally through its sheath are all Clay Color. Hairs on ventral surface are Light Buff tipped with Olive Brown from head to chest and Cartridge Buff tipped with Clay

Color posteriorly; uropatagium furred lightly and only in anal region; propatagium very sparsely covered with Clay Color hairs; plagiopatagium lightly furred with Cartridge Buff hairs along edge of upper arm and forearm, although there is a patch of about 4.0 x 4.5 mm of short dense Clay Color hairs at entrance of radio-metacarpal pouch; there are a few Clay Color hairs scattered on ventral surface of this pouch. Skin of patagium is Dusky Drab while that of rhinarium and lips is Light Seal Brown.

Remarks

Taphozous hilli has a wide distribution in the arid and semi-arid regions of Western Australia but does not appear to penetrate into the Kimberley or sandy deserts. It has been collected from the same site (adit near Mt Bruce, 22°39'03"S, 118°08'20"E) and at the same time as *T. georgianus*; the two species have also been collected on three other occasions from the same locations. As these two species are of similar size, it is of interest to know how they partition available resources; differences in size of their teeth indicate that their food niches may be different.

Taphozous hilli (and *T. georgianus*) has probably expanded its distribution in modern times with the onset of extensive mining in Western Australia; it is frequently collected from adits and mines and seems to utilise such sites soon after they are abandoned by man.

The broad reproductive cycles of *T. hilli* (as "*T. georgianus*") have been described by Kitchener (1976). Briefly, females give birth to young over a five month period between late November and late April. During mid-autumn and winter they are reproductively quiescent but not inactive. Males have active spermatogenesis throughout the year. Although the specimens used by Kitchener (1976) were all *T. hilli*, an earlier study on the reproduction of "*T. georgianus*"(Kitchener, 1973) included specimens of *T. hilli* and will need to be repeated.

SPECIMENS EXAMINED

Taphozous hilli. Paratypes

All WAM specimens, all adults preserved in alcohol and with skulls removed, unless stated otherwise.

Marandoo Mine (22°39'03"S, 118°08'30"E), M18258 (♀), mounted skin with body in alcohol and skull removed, mist netted, entrance of test adit, A. Baynes, 7 August 1979; Peak Hill (25°36'00"S, 118°49'00"E), M10717 (♀), T. Campbell, 19 June 1966; Peak Hill

Goldmine (25°38'00"S, 118°43'30"E), M12212 (♀) and M12213 (♂), J. Dahlberg, 4 September 1974; Wilgie Mia (26°56'05"S, 117°42'00"E), cave, M5963 (♂), A.M. Douglas, 28 February 1963, M10625 (♂) and M10626 (♀), M. Thomas, 29 August 1973; Gahnda Rockhole (26°36'00"S, 125°52'00"E), M5242/001 (♀), W.H. Butler, 21 August 1962; Manunda Rockhole (26°50'50"S, 125°39'30"E), M4626 (♂), W.H. Butler, 30 August 1961; Muggan Rockhole (27°01'00"S, 125°20'00"E), M5241/001 (♂) and M5241/002 (♀), W.H. Butler, August 1962; near Murgoo Homestead (27°28'40"S, 116°22'10"E), M10245 (♂), A.M. and M.J. Douglas, 3 June 1973; Tallering Peak mine adit (28°06'10"S, 115°38'00"E), M10191 (♀), E. Ride, 1500 hrs, 14 May 1973, M10938/001 (♀), M10940 (♀), M11031 (♂) and M12714 (♂), M.J. and A.M. Douglas, 15 December 1973 and 13 January 1974, M13727 (♂), M. Jackson, 31 August 1975; near Tallering Homestead (28°15'00"S, 115°51'00"E), M10676 (♀) and M10685 (♂), A.M. and M.J. Douglas, 12 August 1973; Yalgoo (28°18'45"S, 116°38'30"E), M10120 (♀) breakaway cave, A.M. and M.J. Douglas, 1050 hrs, 21 April 1973.

Taphozous hilli. Other Specimens

(identified from external morphology and from dentition, but skulls not removed from many specimens. All WAM specimens.)

Northern Territory: 16 km W Tennant Creek; M5841-47 (5♂♂, 2♀♀); Peko Mine, near Tennant Creek, M6283-88 (2♂♂, 4♀♀).

Western Australia: Shay Gap, M18255 (♂); Tambrey Homestead, M4747 (♀); Marandoo, M18259, M18261-65, (3♂♂, 3♀♀); Ophthalmia Range, M18041 (♀); 40 km SE Juna Downs Homestead, M18252, M18253/001 and /002 (1♂, 2♀♀); Paraburdoo, M14937 (♀); Browne Range, M14642 (♀); Todd Range, M14640 (♀); Peak Hill, M10716, M10718, M12212-13 (1♂, 3♀♀); Mileura Homestead, M4303 (♀); Gahnda Rockhole, M5242/002 (♀); Manunda, M4601 (unsexed); Wilgie Mia, M3803-08, M4639, M4747, M4990, M5255-56, M5557, M5796, M8187, M9622, M10624, M10627, M10148-51 (14♂♂, 5♀♀, 2 unsexed); Murgoo M9653, M10239-46, Tallering (5♂♂, 4♀♀); Tallering Peak, M10191-92, M10673-75, M10677-88, M10693-98, M10939A, M10941, M11030, M11032, M12459, M12713-20 (16♂♂, 19♀♀, 1J); 5 km NW Yalgoo, M10115-17, M10118, M10119, M10122, M10125-26, M10128, M10130 (4♂♂, 6♀♀).

Taphozous georgianus.

British Museum Catalogue No. 44.2.27. 59, holotype, female collected at King George Sound by Dr Richardson, alcohol specimen — skull

removed. M3270 (♂) Bamboo Creek; M4325 (♀) Ullawarra Station; M4342 (♂) Tambrey Homestead; M7459 (♂) near Whim Creek; M7461 (♀) Tambrey Homestead; M7476 (♂), 9.6 km ENE Yardie Homestead; M9611 (♂), 27 km NNW Argyle Downs Homestead; M9612 (♂) Ord River Basin; M10454 (♂), Boongaree Island; M11038 (♀), Mosquito Creek; M11044 (♀), 34.3 km E Nullagine, M11056 (♂), 10.6 km ESE Nullagine; M11063-64 (♀♀), 29.5 km S Yarrie Homestead; M11465 (♂) 23.3 km N Argyle Downs Homestead; M14384 (♀) 0.8 km ESE Durba Spring; M15240-41 (♂, ♀), near Nullagine; M15415 (♂), Bigge Island.

Taphozous australis

British Museum Catalogue Nos 55.11.7.10-11, paratypes (labelled cotypes). Albany Island, Cape York, Queensland, alcohol specimens — skulls removed.

Taphozous troughtoni

British Museum Catalogue No. 653437, Native Bee Mine, Mt Isa, Queensland (near type locality), female alcohol specimen — skull removed.

Taphozous sp.

CSIRO Wildlife Research Collection, Catalogue No. CM4800, male, collected at 'Kapalga', between South and West Alligator Rivers, Northern Territory, by G. Friend on 20 September 1978, skin and skull.

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