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## THE BANDED ANTEATER, *MYRMECOBIUS* WATERHOUSE (MARSUPIALIA)

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### MYRMECOBIUS WATERHOUSE

*Myrmecobius* WATERHOUSE, 1836, Proc. Zool. Soc. London, p. 69 (preliminary description); 1841, Trans. Zool. Soc. London, p. 149 (extended description).

Shortly following the foregoing original descriptions Gould's colored drawing (1845, pl. 8) was published. The text to that drawing was evidently written somewhat later. Gould quoted his collector Gilbert as having observed females carrying as many as seven young attached to the mammary area.

Other authors who have since dealt broadly with the genus are Thomas (1888), Jones (1923b), Finlayson (1933), Fleay (1942), and Troughton (1948).

Detailed anatomical studies were reported on by Leche (1891). Leche dealt with the integument, skeleton, musculature, brain, dentition, and sex organs. Beddard (1887) and Ford (1934) described the sternal gland. The anatomy of the male urogenital system was studied by Fordham (1928) and of the female urogenital system by Hill (1900). The external features of the pouch young were described by Jones (1923a). The prelacteal dentition was discussed by Woodward (1896); the homologies of the teeth by Thomas (1887). The anatomy, from the evolutionary standpoint, was reviewed by Bensley (1903).

The phylogeny of *Myrmecobius* was investigated by Winge (1882) and Bensley (1903), and further opinions were offered by Gidley (1915).

Bensley (1903) sought the relatives of *Myrmecobius* in "*Phascogale*" (which then included *Antechinus*). However, enlargement of the first upper incisors and their separation from  $i^{2-4}$  by

diastemata in both *Phascogale*, *sensu stricto*, and *Antechinus* effectively separate these genera from direct relationship with *Myrmecobius*. In the lower incisors similarities exist in the enlargement of the median pair of incisors as compared with  $i_{2-3}$ . This is true also in *Pseudantechinus*, but in that genus  $i^{1-1}$ , though separated by spaces from the other upper incisors, are not enlarged.

In *Phascogale*, *sensu stricto*, the fourth premolars are unreduced in the upper jaw but considerably reduced in the lower jaw. *Pseudantechinus* has  $p^4$  much reduced and  $p_4$  entirely lacking, a fact that provided me with reasons for classing it with the Dasyurinae (Tate, 1947).

*Antechinus* shows slight enlargement of  $i_1^1$  and no reduction whatever of  $p_4^4$ . In *Murexia* there is some enlargement of  $i^1$ , but none of  $i_1$ ; and  $p_4^4$  are very large teeth. In *Sminthopsis* the first upper and lower incisors are unenlarged; the fourth premolars are unreduced. In *Neophascogale* I find scarcely any enlargement of the incisors, but a certain degree of diminution in the size of  $p_4^4$ .

The deciduous premolars (when known to me) in those genera in which obsolescence of the permanent fourth premolars is not advanced, for example, in *Antechinus* and *Sminthopsis*, are distinctly molariform and are provided with polycuspid triangular crowns. In *Murexia* the same teeth, which become squeezed out of line between  $p_3^3$  and  $m_1^1$ , are smaller and more simplified.

I must agree with Dendorff (1898) and Winge (1882) that the tiny tooth in *Myrmecobius* standing between the third premolar (by count) and the fourth from the last molar (also by count) represents the deciduous tooth of most marsupials, which in *Myrmecobius* is retained as a functional tooth. Its position in the tooth row behind permanent  $p_4^4$  is in accord with the order of appearance in those genera that do not have greatly crowded tooth rows (i.e., in some peramelids; in *Perameles*, *Isoodon*, and other genera,  $dp_4^4$  are reduced to mere spicules, while  $p_4^4$  are still large, triangular teeth). It thus seems to me that the teeth in *Myrmecobius* can be identified as follows:

$$i_1^1 \quad i_2^2 \quad i_3^3 \quad i^4 \quad c_1^1 \quad p_1^1 \quad p_3^3 \quad p_4^4 \quad dp_4^4 \quad m_1^1 \quad m_2^2 \quad m_3^3 \quad m_4^4$$

Bensley (1903) pointed out the extraordinary degree of variability of the teeth, not only between specimen and specimen, but also in certain skulls between the teeth of opposite sides. The

great degree of compression of the molars is noteworthy, as well as the fact that  $m_4^4$  scarcely partake of any shortening of the body of the tooth to become "end-teeth," such as is usual in the Dasyuridae. Such lack of shortening of  $m_4^4$  can also be observed in *Macropus* and its near allies, in which  $m_4^4$  are often the largest teeth in the skull.

In tables 1-3 the cranial dimensions and the lengths of the teeth in the tooth row in nine skulls are set forth for comparison.

The skull of *Myrmecobius* somewhat resembles that of an armadillo. Its profile is low and flat. The interorbital and intertemporal areas are very broad. The postorbital processes are well developed. The palate, much elongated backward, is unfenestrated, and the pterygoids are carried far back, almost to the level of the large bullae (their lengths,  $\approx 6.9$  mm.). There is a deep longitudinal median groove in the roof of the palate, which is  $\approx 1.5$  mm. wide at the anterior end and as much as 5 mm. wide at the posterior end of the palate. The periotics are quite uninflated. The paroccipital processes are so short as to be nearly obsolete and are fused to the mastoids, the occipital (lambdoidal) cresting is weak, the temporal ridges are wide apart.

The dentition is much reduced and modified. Incisors are four upper and three lower. The first incisor is small and slender,  $i^{2-3}$  are rather square in profile, and  $i^4$  is slightly canini-form. The canine is short and without pronounced anterior or posterior cusps.

There are three premolars. The largest is the middle one,  $p^3$ , with  $p^1$  scarcely smaller but  $p^4$  very much smaller. All three have small anterior and posterior cusps, more accentuated in  $p^{3-4}$ .

The molars (in Australian Museum No. 1215) number four normally. The small submolariform tooth behind  $p^4$  is not improbably the persisting  $dp^4$ . The second molar is usually the largest, the fourth the smallest.

Of the lower incisors,  $i_1$  is quite large, proödont, and tusk-like, while  $i^{2-3}$  are subequal ( $i^3$  is not bifid as in the Peramelidae). The canines are erect and spreading, as in *Peroryctes*. The third and fourth premolars are subequal, and each has a large posterior cusp. The first premolar is smaller. Behind the premolars stands what may be a persistent  $dp_4$ .

In regard to the molars,  $m^1$  has three internal and two lower

external cingular cusps;  $m^2$  is larger, with four external cusps and a broad inner cingulum;  $m^3$  has but three external cusps but a similar internal cingulum. The normally last molar,  $m^4$ , is curiously formed. It does not show the shortening usual in terminal teeth (Didelphidae, Dasyuridae) but instead is triangular in outline and broadest at the back. Its cusps, two external, one internal, are highest on the outer side, as in the other molars. The corresponding lower molar,  $m_4$ , agrees with the other lower molars in having its highest cusps on the inner side of the tooth. The trigonid portion comprises three cusps, the two inner ones of which are higher than the outer, the anterior of the two highest of all. The talonid bears a single quite prominent cusp.

The skulls just described correspond with Waterhouse's drawing (1841, pl. 28, fig. 3). I have seen no example with the extra molar shown by him in the same plate (fig. 5). The extra molar is large, as large as  $m^2$  or  $m^3$ , and appears to be intruded anterior to the reduced type of molar which I have described as  $m_4^4$ .

Bensley (1903) pointed out the extreme degree of variability of the teeth. This applies to the often marked differences between molars of the left and right sides of the skull. I have already shown how these lengths vary. But the same applies to the widths of the teeth, which are extremely compressed in some cases, less compressed in others.

Authors have suggested that the form of the very large, complete, backwardly prolonged palate may somehow be connected with the long-tongued condition and the habit of eating termites. This type of palate appears also among the Manidae and the armadillos. Still another character, namely, the total fusion of the paroccipital processes behind the mastoids, is shared by the three termite-eating families; and another, namely, the failure of the palatal branches of the premaxillae to coalesce near the front of the palate, is shared by *Manis gigantea*.

Waterhouse remarked upon the exceptionally wide expanse of the lacrimals outside the orbit. This facial enlargement of the lacrimal coupled with exceptional broadening of the bases of the nasals sometimes brings about actual contact of one lacrimal with the other, such as happens in *Lasiiorhinus*, the hairy-nosed wombat. In *Myrmecobius* (A.M.N.H. No. 155328) such a lacrimo-nasal contact can be observed.

### ***Myrmecobius fasciatus fasciatus* Waterhouse**

*Myrmecobius fasciatus* WATERHOUSE, 1836, Proc. Zool. Soc. London, p. 69; 1841, Trans. Zool. Soc., London, p. 151.

A very excellent account of a Western Australian specimen, which was flown to Healesville, Victoria, and remained alive there for two months, was given by Fleay (1942). Fleay showed that the animal was truly diurnal, and that the preferred food was termites, especially those living in greatly rotted wood.

Glauert (1934) has outlined the geographical range of *fasciatus* in Western Australia very precisely.

MATERIAL: Byford, Western Australia, one male; Jawah County, Western Australia, one female; Western Australia, three skulls without skins.

### ***Myrmecobius fasciatus rufus* Jones**

*Myrmecobius rufus* JONES, 1923, The mammals of South Australia, pt. 1, p. 123.

The name *rufus* was first proposed for the banded anteaters of south central and southern Australia by Waterhouse (1846, p. 149). It is a *nomen nudum*.

Wood Jones revived the name when he recognized that the race of middle Australia was distinguished by its more reddish coloration from the typical race. Apparently the first record of the animal far up in the Australian "center" is that of Stirling and Zietz (1893). Finlayson (1933) gave a detailed account of this form based on 17 specimens from the south and southwest of the Everard Range, latitude 27° S., where it occurred in Mulga sand dunes.

### ***Myrmecobius fasciatus diemenensis* Gray (?)**

*Myrmecobius diemenensis* GRAY, 1843, List of the specimens of Mammalia in the . . . British Museum, p. 100.

The existence of a race of banded anteaters in Tasmania is very doubtful. Waterhouse, in his first account (1836, p. 131), was quite circumstantial: "The animal was brought from Van Dieman's land, and others similar to it were observed scratching at the roots of trees, and feeding upon the insects which are generally abundant in such situations. Their favorite haunts are stated to be localities in which the Port Jackson willow is most

plentiful." However, later (1841) he himself threw doubt on the matter.

According to Waterhouse, it was in this specimen that the "extra" molar tooth was observed.

TABLE 1  
MEASUREMENTS (IN MILLIMETERS) OF THE SKULL IN  
EIGHT SPECIMENS OF *Myrmecobius*

	A.M.N.H. No. 155330, ♂	C.N.H.M. No. 36049, ♂	A.M.N.H. No. 155328	A.M.N.H. No. 155329, ♀	C.N.H.M. No. 36048, ♀	A.M.N.H. No. 155327	A.M.N.H. No. 155326	M.C.Z. No. 37009, juv.
Condylbasal length	56.2	55.0	58.3	—	56.0	54.0	—	42.8
Zygomatic breadth	29.7	31.0	32.0	26.0	31.8	—	—	22.5
Interorbital breadth	13.4	15.0	14.5	13.5	16.5	13.0	13.5	11.0
Interparietal	9.0	9.8	7.9	8.0	7.7	7.2	—	8.9
Breadth braincase	22.3	22.0	21.0	20.5	22.7	21.2	20.5	—
Mastoid breadth	22.5	21.0	22.5	20.0	22.2	21.0	—	14.3
Nasals, length	23.5	21.0	22.8	—	22.2	21.4	21.0	—
Nasals, greatest breadth	6.0	6.5	7.1	5.0	5.4	5.0	—	—
Palatal length	38.2	37.3	40.2	32.5	38.0	35.7	35.0	29.6

TABLE 2  
MEASUREMENTS (IN MILLIMETERS) OF THE UPPER TEETH IN  
NINE SPECIMENS OF *Myrmecobius*

	A.M.N.H. No. 155330, ♂	C.N.H.M. No. 36049, ♂	A.M.N.H. No. 155328	Australian Mus. No. 1215, ♀	A.M.N.H. No. 155329, ♀	C.N.H.M. No. 36048, ♀	A.M.N.H. No. 155327	A.M.N.H. No. 155326	M.C.Z. No. 37009, juv.
i <sup>1</sup> , length	1.0	1.0	1.0	—	0.9	1.0	1.0	0.9	1.0
i <sup>2</sup> , length	1.2	1.2	1.1	1.2	1.2	1.3	1.1	1.0	1.1
i <sup>3</sup> , length	1.1	1.0	1.1	1.1	1.1	1.2	1.0	1.0	1.0
i <sup>4</sup> , length	1.1	1.0	1.1	1.0	1.0	1.1	1.1	1.0	0.9
c, length	1.9	2.0	2.2	2.0	1.4	2.0	1.7	1.7	—
p <sup>1</sup> , length	3.0	2.5	3.2	2.2	2.1	2.9	2.1	2.0	1.6
p <sup>2</sup> , length	2.7	2.5	2.9	2.5	2.2	2.6	2.0	2.4	1.8
p <sup>3</sup> , length	2.3	2.0	1.8	1.1	1.9	2.4	1.6	2.3	1.9
dp <sup>4</sup> , length	1.2	1.7	1.3	1.4	1.5	1.3	1.0	—	1.3
m <sup>1</sup> , length	1.7	2.2	2.0	2.2	2.1	—	1.6	1.7	1.7
m <sup>2</sup> , length	2.0	2.3	2.2	2.2	2.2	—	2.0	2.1	1.8
m <sup>3</sup> , length	1.8	1.8	—	1.7	—	—	1.7	1.9	—
m <sup>4</sup> , length	1.3	1.6	—	—	—	—	1.4	1.5	—

TABLE 3  
MEASUREMENTS (IN MILLIMETERS) OF THE LOWER TEETH IN  
SEVEN SPECIMENS OF *Myrmecobius*

	A.M.N.H. No. 155330, ♂	C.N.H.M. No. 36049, ♂	Australian Mus. No. 1215, ♀	A.M.N.H. No. 155329, ♀	C.N.H.M. No. 36048, ♀	A.M.N.H. No. 155326	M.C.Z. No. 37009, juv.
p <sub>1</sub> , length	3.0	2.3	2.3	—	2.5	2.0	1.7
p <sub>3</sub> , length	3.0	2.5	2.2	—	2.7	2.2	1.8
p <sub>4</sub> , length	2.4	2.1	2.1	—	—	2.1	1.8
dp <sub>4</sub> , length	1.5	1.6	2.0	1.2	—	1.4	1.4
m <sub>1</sub> , length	2.0	2.0	2.4	2.2	—	2.2	1.8
m <sub>2</sub> , length	2.3	2.4	2.7	2.5	—	2.3	2.1
m <sub>3</sub> , length	2.4	2.6	2.3	—	—	2.4	2.5
m <sub>4</sub> , length	2.2	2.3	2.3	—	—	2.3	—

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