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First record of *Sminthopsis psammophila* (Marsupialia: Dasyuridae) from Western Australia

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Abstract

Five specimens, one female and four males, of *Sminthopsis psammophila* Spencer, 1895 were caught at a site in the south-western corner of the Great Victoria Desert (29°58'S, 123°38'E). This discovery considerably increases the known modern range of the species. Previously only five *S. psammophila* have been collected; a single specimen from south-western Northern Territory and four from southern South Australia. The Western Australian animals differ significantly in some skull and external characters from the previous specimens. The habitat of the animals is compared with previous descriptions.

Introduction

Five specimens of *Sminthopsis psammophila* Spencer, 1895 were collected in the Great Victoria Desert within 15 km of 29°58'S, 123°38'E from 19 June to 2 July 1985. Four were caught in drift line pit traps of 160 x 550 mm PVC pipe and one was caught in an Elliott trap (after Biological Surveys Committee 1984). The specimens are lodged in the Western Australian Museum.

Five specimens of this species have previously been collected; one from Lake Amadeus (south-western Northern Territory) in 1895, and four from two sites on the Eyre Peninsula (southern South Australia) in 1969. These specimens have been discussed by Aitken (1971) and Archer (1981). Archer also discusses material from owl deposits of unknown age collected from Ayers Rock, which is near Lake Amadeus.

The new specimens have been examined and compared with published descriptions of the previous specimens.

The specimens

Skull and external measurements (as for Aitken *op. cit.*) are given in Table 1. We are able to compare 23 skull measurements in the four Western Australian males with those of the two males described by Aitken *(op. cit.)*. Nineteen of

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the measurements are shorter in the Western Australian animals but only 10 are significantly different (t-test, $p < 0.05$). We are able to compare the whole body measurements of the four Western Australian males with three males from Aitken *(op. cit.)*. The body and tail lengths of the Western Australian males are shorter and the foot and ear lengths are longer, but only body and ear length are significantly different ($p < 0.01$, $p < 0.05$, respectively).

The Western Australian specimens agree with the description of skull and teeth given by Archer (1981).

The colour and external morphology of the Western Australian specimens agree with those in Aitken (1971) except as follows (colours follow Ridgway [1912]):

Character	Aitken's specimens	Western Australian specimens
Dorsal hairs	Medium 3 mm drab grey	Tilleul buff
Dorsal spines	Basal 8 mm dark mouse grey, thickened apical 10 mm fuscous black	Lengths reversed
Dorsal fur	Drab, brindled	Chaetura drab to hair brown, brindled
Ear	An antero-external patch of fuscous black bristles	Bristles black in one male, white with black tips in other specimens
External inter-digital pad on hind foot	Horseshoe-shaped	Two parallel lobed, one considerably larger
Dorsal tail colour	Brindled, drab-grey with vinaceous buff toning	Vinaceous buff speckled fuscous black, not brindled
Terminal crest of tail	Hairs fuscous black, drab grey with fuscous black tips, or vinaceous buff with fuscous black tips	Similar, or wholly vinaceous buff. The dorsal and ventral hairs are dissimilar in four specimens
Mystacial vibrissae	Black	Black dorsally and posteriorly. White ventrally and anteriorly
Facial vibrissae	Two, black	Two groups. A dorsal pair which are dark brown but variable. A ventral set of two, three or four; variable in colour but typically one brown and the others white.

Table 1 Skull and whole body measurements (mm) and weights (g) of *Sminthopsis psammophila* from Western Australia.

	Animals				
Specimen no.	M23226	M23230	M23228	M23229	M23227
Sex	♀	♂	♂	♂	♂
Parameter					
Greatest length of skull (from tip of pre-maxilla)	31.7	33.5	32.5	34.2	32.0
Basilar length	28.1	30.3	29.1	30.6	29.4
Zygomatic breadth	16.5	18.6	17.1	17.7	18.8
Cranial breadth	13.1	14.0	13.0	13.6	13.6
Least interorbital constriction	6.3	6.6	6.0	6.5	6.4
Rostral breadth	4.2	4.5	4.2	4.5	4.2
Greatest width across upper molars	10.1	10.7	10.2	10.6	10.3
Depth of cranium	11.9	12.6	11.6	12.1	12.1
Palatilar length (inc. spine)	17.7	18.6	19.0	19.1	18.3
Greatest breadth of alisphenoid bulla	4.7	4.8	4.6	4.9	4.8
Length of incisive foramen	-	4.1	4.1	3.8	4.0
Length of anterior palatine foramen	3.9	3.8	4.1	3.8	4.3
Length of posterior palatine foramen	1.3	1.5	1.4	1.1	1.1
Width of posterior palatine foramen	1.6	1.6	1.6	1.6	1.5
Length of nasals	13.1	13.4	13.5	14.0	13.1
Greatest width of nasals	2.5	3.1	2.2	2.2	2.4
Dorsal length of pre-maxilla	8.6	8.2	8.1	9.0	8.7
Length of mandible (exc. teeth)	24.4	25.9	24.7	25.7	24.9
Crown length of I^1	0.6	0.6	0.6	0.6	0.6
Crown length of I^{2-4} (inc.)	2.0	1.85	1.9	1.95	1.9
Crown lengths of P 1/1	1.5/1.5	1.35/1.4	1.4/1.45	1.3/1.25	1.4/1.4
P 3/3	1.6/1.8	1.6/1.65	1.6/1.7	1.6/1.6	1.6/1.55
P 4/4	1.7/1.5	1.8/1.5	1.7/1.4	1.8/1.5	1.7/1.45
Crown heights of P 1/1	1.15/1.1	1.3/1.3	1.1/1.2	1.2/1.1	1.25/1.2
P 3/3	1.3/1.4	1.5/1.3	1.3/1.4	1.25/1.4	1.4/1.4
P 4/4	1.6/1.3	1.9/1.3	1.7/1.35	1.6/1.35	1.9/1.55
Crown length of M^{1-3} (inc.)	6.2	6.0	6.0	6.1	6.0
Crown length of M^{1-4} (inc.)	6.85	6.85	6.9	6.9	6.85
Body length	85	93	97	100	99
Tail length	107	114	120	118	110
Length of hind foot (inc. claw)	25.5	26.5	27	26.5	25
Length of ear (from notch)	25	26.5	28	28	28.5
Weight	25.7	32.7	26	35.0	29.8

The single Western Australian female is in good condition, nulliparous and non-pregnant. The nipples are in two opposed semicircles of four each side, narrowly separated, so that the eight nipples almost form a circle.

The five Western Australian specimens appear to be adult; they all had fully erupted dentition and slight to moderate tooth wear.

The anterior half of the external skin of the ear is black in the Western Australian animals and forms a broad stripe.

Habitat

The area where the Western Australian animals were caught is a mosaic of woodland of *Eucalyptus gongylocarpa* and mallee, both over spinifex *(Triodia basedowii)* and some shrubs. Smaller areas of other vegetation units are present throughout the area. The soils are deep sand (mostly yellow but with some red) and small areas of heavier earths. The landscape is flat to gently undulating with some sand ridges. The ridges are generally low but there are occasional large, well-defined sand dunes.

The five animals were caught at four sites as follows:

1. (29°53′20″S, 123°35′00″E) Two animals were caught in a small area (a few hectares) of low *Melaleuca uncinata* shrubland. The shrubs were up to 2.5 m tall and had a projected foliage cover of greater than 30 per cent. *Triodia basedowii* was present but represented only about 1 per cent cover. Also present were scattered emergent mallees (5-7 m) and *Acacia colletioides* (to 1.5 m). The soil was a deep yellow-red sand. No sand ridges were nearby.

2. (29°53′40″S, 123°30′30″E) One animal was caught in *Eucalyptus gongylocarpa* woodland. The trees were up to 6 m tall with odd individuals to 15 m, and gave about 1 per cent cover. *Triodia basedowii* gave less than 30 per cent cover. Mallees gave 10-30 per cent cover. *Acacia* spp. and other shrubs were also present. The soil was deep yellow sand. A low sand ridge was adjacent.

3. (29°55′30″S, 123°31′40″E) One animal was caught in an open mallee of *Eucalyptus leptophylla* and *E. concinna.* The mallees were 2-4 m high and gave less than 10 per cent cover. *Triodia basedowii* gave about 20 per cent cover. *Melaleuca uncinata* and other shrubs were present but scattered. The soil was deep yellow sand. A low sand ridge was adjacent.

4. (30°01′20″S, 123°46′10″E) One animal was caught in a mallee of *Eucalyptus leptophylla.* The mallee was 2.5-3 m tall and had a cover of 10-30 per cent. *Triodia basedowii* gave a cover of 30 per cent. *Acacia* spp. and other shrubs were present but scattered except for *Acacia jutsonii* which gave 10-30 per cent cover. The soil was deep yellow sand. No sand ridges were nearby.

All these trapsites had about 50 per cent bare ground.

Two trapsites were placed on well-defined sand dunes and two on small areas of heavier soils, but no *S. psammophila* were caught there.

The vegetation was in poor condition with few species flowering, but small mammals appeared to be present in large numbers. Two factors may be relevant. The area had not been burnt for at least eight years. There are no complete weather records in the general area, but from an examination of incomplete and unofficial figures collected by the Bureau of Meteorology (Perth) there has been at least one major summer rainfall in each of the three preceding summers. While these recorded rainfalls are not exceptionally high they do indicate that the total annual rainfall has at least been moderate for the three years preceding these captures.

The spinifex was in small clumps, on average, about 30 cm high.

Discussion

The discovery of *S. psammophila* in Western Australia considerably increases the known range of the species.

The quantitative results for the skull and whole body measurements show that the Western Australian animals are smaller than other specimens in most measurements. The Western Australian specimens are significantly larger only in ear length. Aitken (1971) gives a cranial depth of at least 12 mm as 'diagnostic' but in the Western Australian animals the range is 11.6 to 12.6 mm and the mean is only 12.1 mm. The length of the upper molars does not overlap between the Western Australian and other specimens, regardless of age or sex. Our specimens and those of Aitken (1971) suggest that females are slightly smaller than males but there are insufficient data to analyse this. Archer (1971) thought that the Northern Territory specimen was smaller than the South Australian specimens and speculated on a wet-dry cline, but from Aitken's measurements the Northern Territory specimen is smaller only in body length. It easily exceeds all of the Western Australian specimens in body length.

The three known localities of *S. psammophila* are approximately 1000 km from each other and the differences reported here in colour and surface anatomy cannot be assessed.

The habitat of the Western Australian *S. psammophila* is sandy country but not restricted to sand ridges. They were caught in woodland, mallee and shrubland, with spinifex present in all cases.

Aitken (1971, 1983) has described the habitat of previous captures. In both cases the habitat was sand ridge country with spinifex, with interdunal vegetation of scattered Desert Oak groves in the Northern Territory and mallee/*Melaleuca uncinata* open scrub in South Australia.

The habitat of the Western Australian specimens agrees well with that described by Aitken, except that sandy soil rather than sand ridges would appear

to be sufficient, and the range of vegetation types is now woodland, mallee, shrubland and spinifex, but with spinifex present in all cases.

The conservation status of *S. psammophila* is uncertain. Potentially suitable habitat is widespread, but there has been very little animal trapping in the Great Victoria Desert (Burbidge *et al.* 1976, McKenzie and Burbidge 1979, Morris and Rice 1981) and the results are inadequate to describe the distribution or abundance of the species in Western Australia.

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