SMINTHOPSIS YOUNGSONI (MARSUPIALIA: DASYURIDAE) THE LESSER HAIRY-FOOTED DUNNART, A NEW SPECIES FROM ARID AUSTRALIA

N. L. McKenzie and Michael Archer

McKenzie, N. L. and Archer, M., 1982. *Sminthopsis youngsoni* (Marsupialia: Dasyuridae), the Lesser Hairy-footed Dunnart, a new species from arid Australia. *Aust. Mammal.* **5**: 267-79.

A new species of dunnart, *Sminthopsis youngsoni*, is described. It is smaller than, but most similar to the Hairy-footed Dunnart, *S. hirtipes*. These two species form a subgroup of arid-adapted species within *Sminthopsis*. The new species comes from habitats on sandy surfaces throughout arid tropical areas of Western Australia.

N. L. McKenzie, Western Australian Wildlife Research Centre, P.O. Box 51, Wanneroo, Western Australia, Australia 6065. M. Archer, School of Zoology, University of New South Wales, P.O. Box 1, Kensington, New South Wales, Australia 2033. *Manuscript received 1 June, 1982.*

DURING a biological survey of the Great Sandy Desert in April and May, 1979, seventeen specimens of a small species of *Sminthopsis* were captured in pit-fence traps. Although these were at first thought to be sub-adult *S. hirtipes*, the capture of a female with six pouch young near the Edgar Ranges (18°50'S, 123°05'E), on the northern edge of the Great Sandy Desert in September, 1980, indicated that they represented a distinct species that was at least smaller than *S. hirtipes*.

In the most recent revision of the genus, Archer (1981) recognizes twelve species (thirteen including *Sminthopsis* (*Antechinomys*) *laniger*) but notes that there may be several additional species represented in collections by material too inadequate to base species descriptions upon. Apart from M18145, the specimens we report here represent a species previously unrepresented, as far as we know, in existing collections.

Terminology of external, cranial and molar crown morphology, follow Archer (1981). Tooth numbers follow Archer (1978). Specimens are lodged in the modern mammal collections of the Western Australian Museum.

SYSTEMATICS

Sminthopsis Thomas

Sminthopsis youngsoni n.sp. (Figs 1-4)

Holotype: Western Australian Museum No. 24552, adult male, dry skull and dentaries, carcase in alcohol, collected 25 September, 1980, by N. L. McKenzie.

Type locality: 18°49'50"S and 123°04'30"E, near the Edgar Ranges, on the northern edge of the Great Sandy Desert, Western Australia.

Diagnosis: This species is most similar to *S. hirtipes* but differs from it in being smaller (by about 15% in most dimensions), particularly so in hindfoot length (see Table 1), in having the soles and pads of the hindfeet more granulated and less hairy (McKenzie 1982), in having less completely fused interdigital pads on the hindfeet, in having a relatively (with respect to HB length) shorter tail, shorter hind foot and shorter ear (Table 2), in having proportionately smaller bullae (Table 3), proportionately smaller premaxillary vacuities (Table 4), proportionately shorter I^1-P^3 length (Table 4), C^1 with posterior cingular cusp (only 1 in 6 specimens of *S. hirtipes* examined

showed this cingular cusp), P_{1-3} are closer together, and the pterygoid hamular process is simple and short (it is more spinose in *S. hirtipes*). *Sminthopsis youngsoni* differs from other species of *Sminthopsis* in more obviously distinctive features as follows: it differs from *S. murina* and *S. leucopus* in having brownish-yellow fur on the back, in having an incrassated tail, in having the interdigital pads on the hindfoot fused to their apices, in having hair on these pads, in lacking a medial row of either enlarged or striated apical granules, in having granular terminal pads on the digits, in having premaxillary vacuities which do not extend posteriorly beyond a point level with the C^1 alveolus, and in having larger alisphenoid and periotic tympanic wings. It differs from *S. ooldea* in having a proportionately shorter and incrassated tail, in having hindfoot pad structures that differ as from *S. murina*, in having less reduced talonids and paracones, and in having relatively unspecialized elongate lower premolars. It differs from *S. longicaudata* in having an incrassated tail that is much less than twice the HB length, in lacking striated pads on the hindfeet, in having short premaxillary vacuites that do not extend posteriorly beyond the edge of the C^1 alveolus, in having a relatively less enlarged alisphenoid hypotympanic sinus, in having wider and shorter upper molars, and in having more reduced entoconids. It differs from *S granulipes* in its smaller size, in its darker colouration, in having premolariform C^1 and C_1, in having a premolar row which is more compressed anteroposteriorly, in lacking a distinctly bilobed I_3, in having much shorter and wider molars, and in having a proportionately larger alisphenoid hypotympanic sinus. It differs from *S. psammophila* in being much smaller, in lacking a crest on the tail, in having hair on the interdigital pads of the hindfeet, in lacking a medial row of enlarged apical granules on the interdigital pads, in having a larger alisphenoid hypotympanic sinus, a proportionately shorter premolar row, premolariform canines, smaller entoconids, and wider and shorter upper molars. It differs from *S. macroura* in lacking an enlarged apical granule on the interdigital pads of the hindfeet, in having hair on the interdigital pads, in lacking a pronounced head stripe and in lacking enlarged entoconids. It differs from *S. virginiae* and *S. douglasi* in being much smaller, in lacking a pronounced head stripe, in lacking an enlarged apical granule on the interdigital pads of the hind feet, in having a premolariform canine, in having a smaller alisphenoid hypotympanic sinus, and in lacking well-developed entoconids. It differs from *S. butleri* in having an incrassated tail, in lacking a medial row of enlarged granules on the interdigital pads of the hindfoot, in having hair on those pads, in having granular terminal pads of the digits and in having a larger alisphenoid hypotympanic sinus.

Description (terminology as in Archer 1981): Tail (Fig. 1): The tail is stout to mildly incrassated. Tail lengths (TV) are given in Table 1. There are no crests or other distinctive features.

	S. youngsoni		*S. hirtipes*	
	Males	Females	Males	Females
HB (head to vent length)	68.2(3.4)8	69.0(1.6)3	77.8(6.0)3	74.0(4.9)5
TV (tail to vent length)	65.6(2.9)8	64.7(1.9)3	86.3(7.2)4	89.8(6.6)5
E (ear from canal, stretched)	18.0(0.8)7	17.6(0.1)2	22.7(0.2)2	21.3(0.4)2
HF (hindfoot, excluding claw)	13.6(0.3)8	13.2(0.2)3	18.2(0.5)4	18.6(1.0)5
W (weight in grams)	9.9(1.1)8	10.3(1.4)3	14.9(0.7)3	17.8(1.1)2

Table 1. Adult external measurements (mm) made (except for weight) on spirit specimens of *Sminthopsis youngsoni* and *Sminthopsis hirtipes*. The sample mean is followed (in parentheses) by the standard deviation, and then the sample number.

Length Ratios	*Sminthopsis youngsoni*	*Sminthopsis hirtipes*	t-test Significance Level
TV/HB*	0.95(0.03)11	1.18(0.08)8	0.001
HF/HB†	0.20(0.01)8	0.24(0.01)3	0.05
E/HB†	0.27(0.01)7	0.30(0.004)2	0.002

Table 2. Comparison of external proportions of *Sminthopsis youngsoni* and *Sminthopsis hirtipes*. * Males and females are combined to increase sample size; † Males only.

Hindfoot (Fig. 2): The hallux is clawless. There are no post-interdigital pads and no hallucal pad. The ventral surface of the terminal portion of digits 2-5 is granular and there is a median row of anteroposteriorly oriented enlarged granules. The interdigital pads are fused to their apices but still distinct as three pads. There are no enlarged medial granules or distinct medial rows of granules. The entire sole is covered in long hairs including the surface of the interdigital pads (although this hair is not as long in older individuals — e.g. M24552), and in this regard is clearly similar to *S. hirtipes*. Only the apices of the terminal pads of the digits are free of hair.

Forefeet: The granular and hairy structure of the pads are similar to those of the hindfeet. The terminal pads of the digits of the manus are also granular with a medial row of enlarged apical granules.

Nose: The nose has a medial groove extending from the posteroventral edge of the rhinarium to just short of the posterodorsal edge of the rhinarium. A narrow hairless ridge surrounds the posterolateral edge of each side of the rhinarium and

Fig. 1. Sminthopsis youngsoni (M22607) photographed in natural habitat near the Edgar Ranges.

Fig. 2. Hindfoot of *Sminthopsis youngsoni* (M22607) lateral view. (Photography by A. G. Wells).

extends from the ventral notch of the nostril to the posteroventral end of the medial groove. The nose is bicoloured, being pale (probably light pink in life) medially and ventrally, and pigmented (?grey) around the rims of the nostrils and transversely across the posterior edge of the rhinarium.

Ear: The ear is well-haired on the inside and outside. The distal half of the outer and inner surface is a pale grey colour. The supratragus is curled.

Nipple number: Six (based on counts for five individuals).

Pelage: There is a diffuse head stripe (more in the nature of a dark patch) on the forehead which does not extend anteriorly beyond the eyes. The eyes have a ring of dark hairs surrounding them. Behind the eyes and anterior to the ears, there is a warm brownish-coloured area. The fur of the back and sides is a brownish-yellow with slaty bases. The undersurface is whitish although the hairs have slaty bases. The hairs of the tail are white below and above but with a fine sprinkling of dark tipped hairs above. The hairs of the upper and lower surfaces of the hind and forefeet are white.

Dentition (Fig. 3): The I^1 is the tallest upper incisor and set off from I^2 by a diastema equal in length to the crown of I^1. The I^{2-4} increase in crown length from I^2 to I^4. The I^4 lacks a posterior cusp or lobe. A diastema separates I^4 from C^1. The C^1 has posterobuccal, posterolingual and anterior cingula. The C^1 normally has a small posterior cingular cuspule but in one specimen (M22612) it is barely visible. The C^1, when unworn, is only slightly taller than or approximately the same height as P^3. The P^1 is subequal in height to or lower-crowned than P^2 which is distinctly lower-crowned than P^3. The P^1 is shorter-crowned than P^2 which is shorter-crowned than P^3. The P^1 and P^2 have poorly-developed lingual and buccal cingula. The P^{1-3}

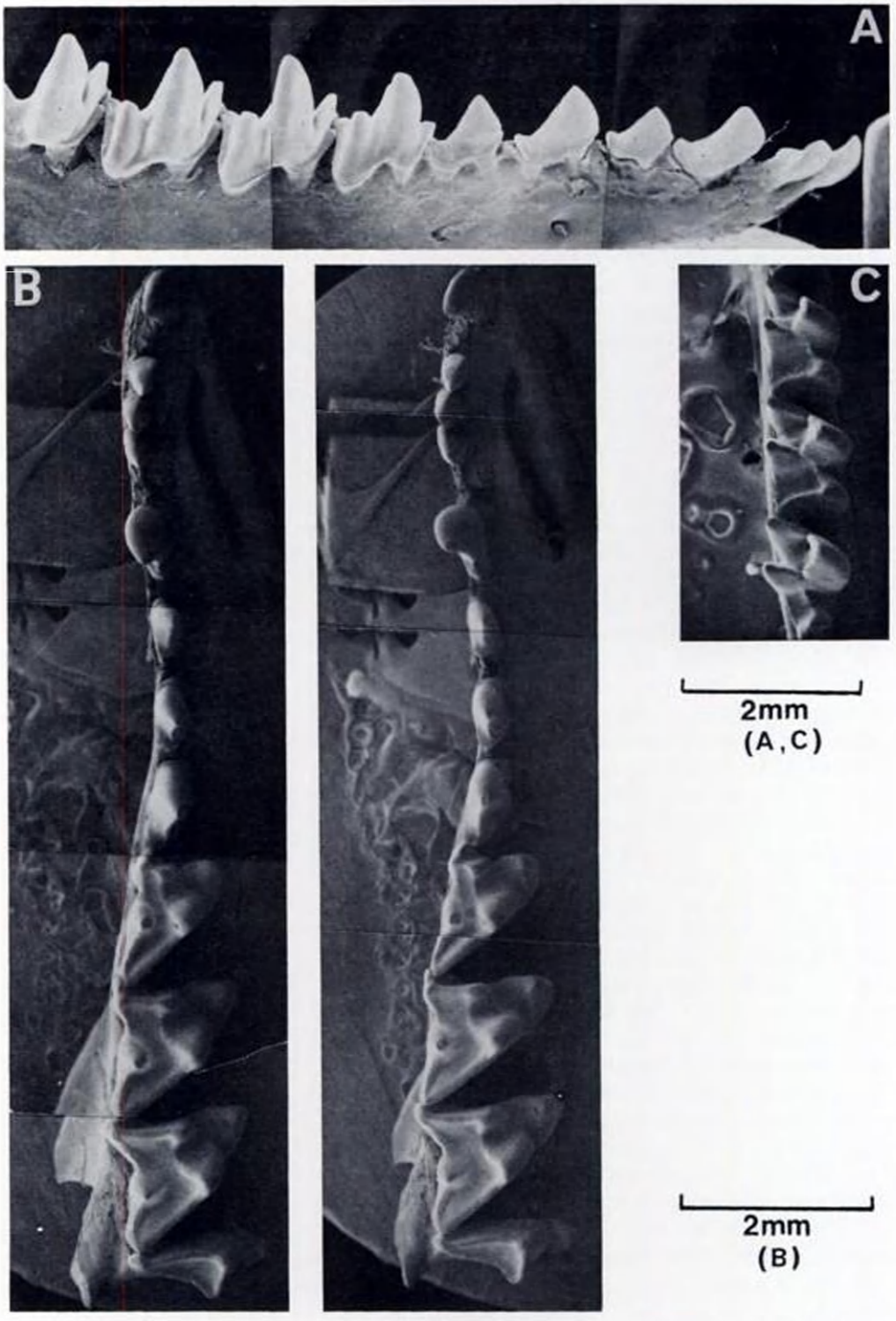

Fig. 3. The dentition of paratype FW1005 of *Sminthopsis youngsoni*. A, buccal view of right dentary with I_{1-3}, C_1-M_3 (I_3 is missing). B, stereophotographs of occlusal view of right I^1-M^5. C, occlusal view of right M_{3-5}.

have better-developed posterolingual and posterobuccal cingula. The unworn P^3 commonly (perhaps always) has a distinctive cuspule developed on the slope of the postparacrista between the paracone and the posterior corner of the crown. In at least one instance (M24551), there is a rudimentary carnassial notch developed between this distinctive cusp and the paracone. There is a variably developed anterior cingulum on P^{1-3} which in some instances appears as a low anterior cuspule. The morphology of M^1 is unknown. On M^{2-4}, the metacone is taller than stD, which is taller than the paracone, which is taller or subequal to stB, which is taller than the protocone. The preprotocrista terminates on the anterolingual base of the paracone. The anterobuccal cingulum does not extend lingually to contact the preprotocrista. A variably developed buccal crest unites the parastylar corner of the tooth to stB, then to the base of stD, then from the posterior base of stD to the metastylar corner of the tooth. The preparacrista connects the paracone directly to stB. The postprotocrista terminates against the posterolingual base of the metacone. There is no posterior cingulum. There is no distinctive proto- or metaconule. On M^2, the pre- and postparacrista are subequal. The premetacrista is about twice the length of the postparacrista but less than half the length of the postmetacrista. On M^3, the postparacrista is about half the length of the preparacrista. The premetacrista is about three times the length of the postparacrista and about slightly less than half the length of the postmetacrista. On M^4, the preparacrista is more than twice the length of the postparacrista. The premetacrista is barely twice the length of the postparacrista and about half the length of the postmetacrista. On M^5, the protocone is very reduced and there is no trace of a metacone. The stD is a mere bulge in the external ectoloph. The preparacrista is about half the length of the postparacrista, these being the only significant crests on M^5. Meristic gradients from M^2 to M^5 are as follows. The paracone and preparacrista increase in height and length posteriorly. The metacone and protocone remain about the same size from M^2 to M^4, but are both reduced on M^5. The stD of M^2 is smaller than that of M^3 but larger than that of M^4. The postparacrista of M^{2-4} are subequal and shorter than that crest on M^5. The premetacrista of M^2 is shorter than that crest on M^3 but about subequal to that crest on M^4. The postmetacrista of M^2 is just shorter than that crest on M^3 and subequal to that crest on M^4. The ectoloph of M^{2-4} becomes more markedly indented on either side of stD from M^2 to M^4. The anterior width of the M^2 crown is much shorter than the posterior width which is just longer than the buccal crown length. The anterior width of M^3 is subequal to the buccal crown length which is much shorter than the posterior crown width. On M^4, the anterior width is much longer than the buccal crown length and only just shorter than the posterior crown width.

The I_1 is taller-crowned than I_2 which is subequal in crown height to I_3. The I_3 is not distinctly bilobed although there is a small, low posterior cingular cuspule that bridges the gap otherwise left between the anterior edge of C_1 and the main body of the I_3. The C_1 is premolariform. There are complete lingual and posterobuccal cingula and a complete posterior cingulum which terminates in a distinct posterior cingular cusp. The C_1 is subequal in height to the P_2 and P_3. In adult specimens, very short diastemata separate C_1 to P_3. The P_1 is lower-crowned than P_2 which is just lower-crowned or subequal in height to P_3. There are very narrow but (in unworn specimens) complete buccal and lingual cingula on P_{1-3}. All three lower premolars have a small posterior cingular cusp. The M_1 morphology is unknown. On M_2, the protoconid is taller than the metaconid which is taller than the subequal hypoconid and paraconid which are much taller than the hypoconulid. There is no entoconid development at all. The protocristid is much longer than the metacristid which

is subequal in length to the cristid obliqua. The hypocristid is subequal in length to the protocristid. The hypocristid extends transversely across the talonid until it nears the posterolingual corner of the crown where it turns sharply to contact the hypoconulid and form the posterolingual corner of the tooth. The talonid basin is enclosed by a buccal ridge which is probably homologous with the entoconid of other species. There is a posterior and anterior but no buccal cingulum. The morphology of $M_{3\text{-}4}$ is similar to that of M_2 except that the paraconid is taller than the hypoconid and the protocristid is oriented more anterolingually than anteroposteriorly. The M_5 is similar to M_4 except that the talonid is greatly reduced, having only a reduced hypoconid and hypoconulid. Meristic gradients from M_2 to M_5 are as follows. The subequal protocristids of $M_{3\text{-}5}$ are longer than that crest in M_2. The metacristid of M_4 is longer than that of M_5 which is longer than that of M_3 which is longer than that of M_2. The subequal hypocristids of M_3 and M_4 are longer than that crest on M_2. The cristids obliqua of $M_{2\text{-}4}$ are subequal in length. The talonid of M_2 is wider than the trigonid. The trigonid and talonid of M_3 are subequal in width. The trigonid of M_4 is wider than its talonid. The trigonid of M_4 is wider than the trigonid of M_3 which is wider than the trigonid of M_2 which is much wider than the trigonid of M_2. The protoconid is (compared with metaconid height) highest on M_4, then M_5, then M_3 and lowest on M_2. Paraconid height (relative to metaconid height) increases posteriorly from M_2 to M_5, being subequal to the metaconid height on M_2.

Skull and dentary (Fig. 4): Only characters whose different states appear to usefully diagnose species within *Sminthopsis* are noted here. The premaxillary palatal vacuities do not extend posteriorly beyond the posterior edge of the canine alveolus. There are very few interdental palatal fenestrae. The alisphenoid tympanic wing makes a broad contact with the periotic tympanic wing and extensively covers (but not completely) the ectotympanic ring. The periotic tympanic wing is enlarged to enclose a moderate periotic hypotympanic sinus. The mastoid portion of the periotic is expanded and encloses a large sinus. The dorsal surface of the skull is not domed. There are no postorbital processes. In the dentary, the distance between the tip of the angular process and the articular condyle is considerably greater than the

	Code	*Sminthopsis youngsoni* Males	*Sminthopsis youngsoni* One Female	*Sminthopsis hirtipes* Males	*Sminthopsis hirtipes* Two Females
Basicranial length	A	20.86(0.71)4	20.55	24.17(1.38)4	23.85, 23.78
Outside bullae distance	B	8.75(0.39)4	8.80	10.50(0.32)4	10.40, 10.82
Inside bullae distance	C	2.79(0.29)4	2.74	2.89(0.11)4	2.70, 2.86
C^1-M^5	D	8.59(0.23)4	8.67	10.35(0.39)4	10.48, 10.20
$M^{2\text{-}5}$	E	4.81(0.05)4	4.93	5.48(0.22)4	5.63, 5.46
LM^1-RM^1	F	7.03(0.36)4	7.10	8.50(0.36)4	8.30, 8.56
Inter-orbital width	G	4.35(0.20)4	4.20	5.22(0.24)4	5.02, 5.30
Maximum nasal length	H	8.22(0.36)4	7.58	9.38(0.34)4	9.68, 9.46
Mamixum nasal width	I	1.82(0.12)4	1.80	2.24(0.22)4	2.42, 2.30
Skull depth	J	6.46(0.24)4	6.35	7.64(0.10)4	7.78, 7.71
Mamixum length of premaxillary vacuity	K	2.05(0.11)4	2.10	2.73(0.12)4	2.99, 2.65
Height of I^1 above buccal alveolus	L	1.48(0.16)4	1.36	2.01(0.27)4	1.59, 1.65
Zygomatic width	M	12.44(0.90)4	12.50	14.79(0.77)4	14.10, 14.67
Greatest length	N	23.07(0.71)4	22.57	26.87(1.32)4	26.11, 26.18
$M2^{2\text{-}1}$	O	4.25(0.06)4	4.30	4.77(0.18)4	4.88, 4.68
$P^{1\text{-}3}$	P	2.89(0.20)4	2.91	3.68(0.29)4	3.85, 3.76

Table 3. Adult cranial measurements (mm)* of *Sminthopsis youngsoni* and *Sminthopsis hirtipes*.

* Mean, (standard deviation), sample size.

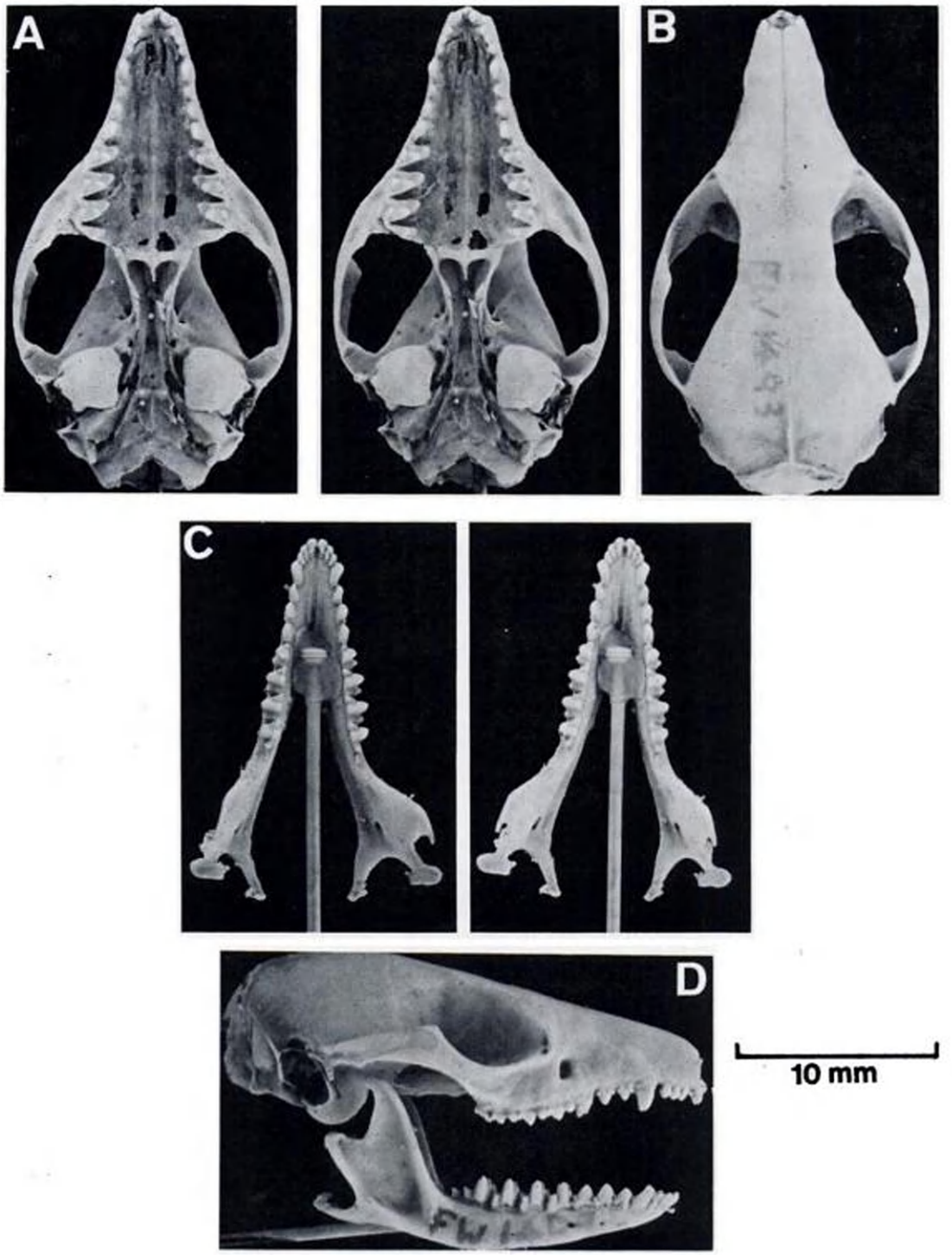

Fig. 4. The skull and dentaries of the holotype (AM M24552) of *Sminthopsis youngsoni*. A, stereophotographs of the ventral view of the skull. B, dorsal view of the skull. C, stereophotographs of the occlusal view of the dentaries. D, lateral view of the skull and dentaries.

Cranial Ratios*†	*Sminthopsis youngsoni*	*Sminthopsis hirtipes*	t-test Significance Level
Bullae width: (B-C)/A	28.77(0.92)5	31.95(0.83)6	0.001
Premaxillary vacuity length: K/A	9.93(0.64)5	11.48(0.74)6	0.01
I^1 to P^4 length: (D-E)/A	18.10(0.37)5	20.14(0.58)6	0.001

Table 4. Comparison of cranial proportions of adult†† *Sminthopsis youngsoni* and *Sminthopsis hirtipes*. * Measurement codes from Table 3; †† Female and male measurements are combined; † Percentages.

distance between the articular condyle and the tip of the ascending ramus. The anterior border of the ascending ramus and the posterior border of the masseteric fossa diverge (i.e. are clearly unlike the condition seen in *S. crassicaudata* or *S. laniger*).

Reproduction: None of the April/May, 1979, or June, 1980, female specimens from the Great Sandy Desert were obviously pregnant, lactating or had enlarged nipples. However, all three females taken in September, 1980, from the Edgar Ranges area, on the interface between the Great Sandy Desert and the South-west Kimberley district, were actively reproducing. Two were pregnant; one had seven uterine young (2.5 to 3.5 mm in crown-rump length); the uteri of the other were not dissected. The third was suckling six 13mm (crown-rump) young at the time of capture.

Habitats: *Sminthopsis youngsoni* capture sites in the Gibson, Little Sandy and Great Sandy Deserts, and in the South-west Kimberley district, had sandy soil profiles to depth, although light clay, fine gravel and loam were sometimes mixed with the sand. In these sandplain, sand dune and interdune swale situations, the Dunnarts were captured in shrub and hummock grass formations of varying density and height (Figs. 5A and 5B). Plant species commonly associated with *S. youngsoni* sites (Fig. 5) were the hummock grasses *Plectrachne schinzii, Triodia pungens* and *Triodia basdowii*, the tussock grass *Eragrostis eriopoda* and the shrubs *Thryptomene maisonneuvii, Grevillea stenobotrya, Newcastelia cladotricha, Acacia ligulata* and *Melaleuca glomerata*. Detailed descriptions of *S. youngsoni* (as *S.* sp.) habitats in the Edgar Ranges area are provided by Youngson, Henry and McKenzie (1981:40). The Kennedy Range specimen (M18451) was captured in "hummock grass on red sandplain with rocks".

Distribution: Specimens of *Sminthopsis youngsoni* so far known have a tropical arid distribution (Fig. 6) and occupy the northern (18° to 25°S) habitat equivalents of those occupied by the more temperate (22° to 31°) *S. hirtipes*. Otto Lipfert's specimens of *S. hirtipes* from Well 29 (22°33'S; 123°52'E) on the Canning Stock Route suggest that their ranges may overlap, at least marginally.

An examination of the Western Australian Museum collections yielded two additional specimens referable to *Sminthopsis youngsoni*. One (M18451) came from near the Kennedy Range and the other (M18145) from Giralea Homestead. Both localities are in the Carnarvon Basin, Western Australia.

All specimens of *S. youngsoni* and *S. hirtipes* examined during this study are listed in Table 5.

Etymology: The species name is in honour of Mr W. Ken Youngson who helped capture the 1979 specimens and who, for nine years, assisted in biological survey work throughout Western Australia. He also extensively collaborated in preparing many of the skulls of dunnarts in the Western Australian Museum which formed the basis for the recent revision of the genus *Sminthopsis* (Archer 1981).

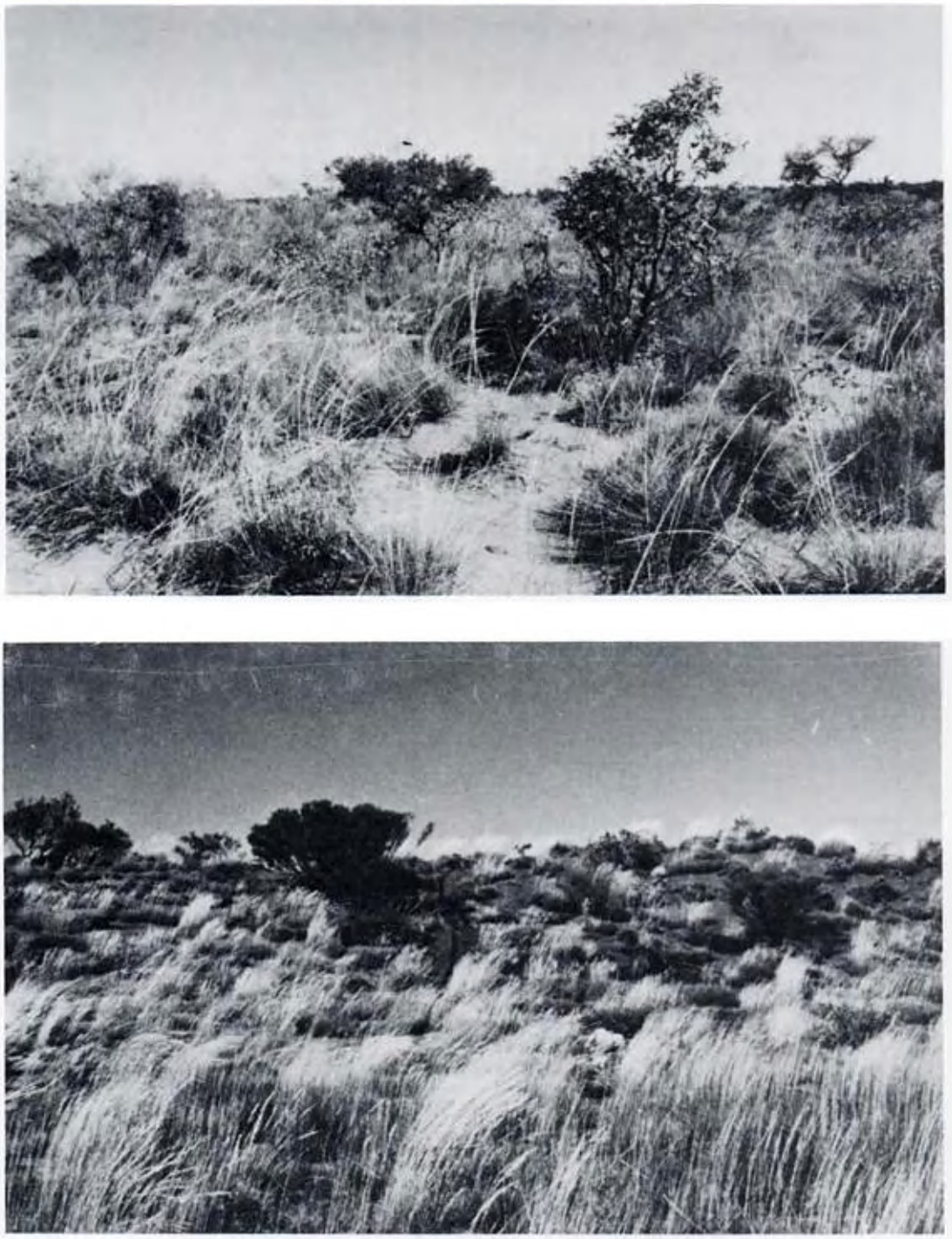

Fig. 5. Typical habitats of *Sminthopsis youngsoni*. A (above): *Plectrachne schinzii* on sand dunes near Lake Auld in the Great Sandy Desert. B (below): low open-woodland of *Eucalyptus zygophylla, Gardenia* sp. and *Grevillea pyramidalis* over a variety of shrubs, mixed *Plectrachne schinzii* and tussock grasses on red-brown loamy sand in an interdune swale near the Edgar Ranges.

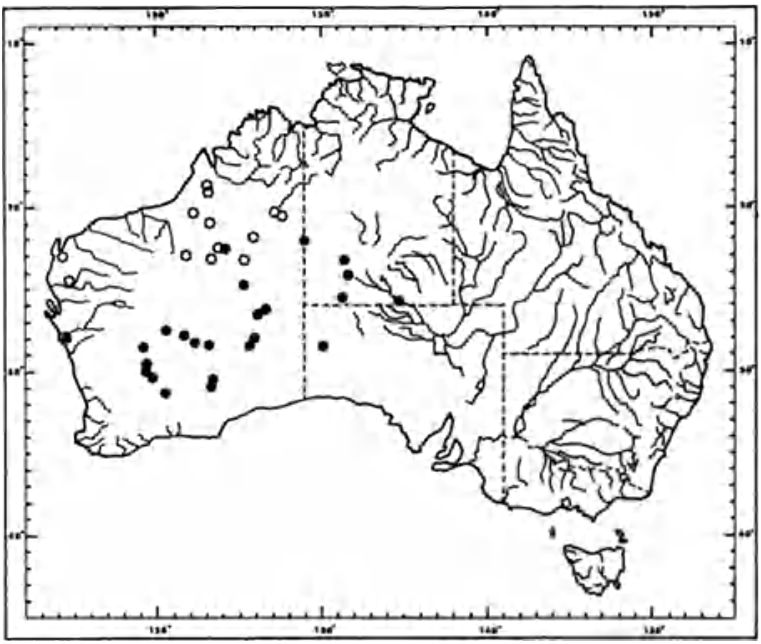

Fig. 6. Distribution of *Sminthopsis youngsoni* (open circles) and *S. hirtipes* (solid dots) based on specimens examined by us (see Table 5).

Other names: Dr A. A. Burbidge informs us that the Gogadja (or Kokatja) Aboriginals of the northeastern Great Sandy Desert call this species "Djudumuwa", "Malabuba" and "Djudububa". We recommend "Lesser Hairy-footed Dunnart" as an appropriate vernacular name for this species.

DISCUSSION

Since publication of Oldfield Thomas's catalogue (1888), there has been an erratic but continuous recognition of new forms of *Sminthopsis*. As recently as 1979, two new species were described (Archer 1979). Discovery of most of the more recent forms has resulted from zoological investigation of previously little-known areas of northern Australia. *Sminthopsis youngsoni* is yet another taxon of this kind and, no doubt, there will be others. We clearly have much to learn about the species-level diversity of the small mammals of Australia's tropical north.

The affinities of this beautiful little Dunnart appear clear. It most closely resembles the Hairy-footed Dunnart, *Sminthopsis hirtipes*. But, it most obviously differs from *S. hirtipes* in its smaller size. Thomas (1906) describes *Sminthopsis stalkeri* as being similar to *S. hirtipes* but with less hairy feet. On the basis of the literature, this taxon might be a senior synonym of *S. youngsoni*. However, in his revision of the genus, Archer (1981) points out that the syntypes of *Sminthopsis stalkeri* share the characters of *S. macroura* (e.g. large entoconids) and are therefore distinctly unlike *S. hirtipes*. In the same shared characters, the syntypes of *stalkeri* differ from *S. youngsoni*.

Archer (1981) notes a specimen from the George Gill Range of the Northern Territory (Northern Territory Museum No.

Specimen No.*	Collection date	Locality		Age	Body Weight (g)
Sminthopsis youngsoni					
M18145 ♂	16 Dec., 1978	22°42'S,	114°22'E	Juvenile	—
M22611 ♀	25 Sept., 1980	18°27'20"S,	123°03'00"E	Adult	9.5
M24552 ♂	25 Sept., 1980	18°49'50"S,	123°04'30"E	Adult	12.0
M22609 ♀	27 Sept., 1980	18°49'50"S,	123°04'30"E	Adult	12.0
M22610 ♀	25 Sept., 1980	18°44'50"S,	123°07'20"E	Adult	9.5
M22608 ♂	26 Sept., 1980	18°44'50"S,	123°07'20"E	Adult	10.5
M22607 ♂	28 Sept., 1980	18°26'40"S,	123°03'00"E	Adult	10.0
M22613 ♂	22-26 Apr., 1979	22°52'S,	121°57'E	Sub-adult	—
M22612 ♀	22-26 Apr., 1979	22°52'S,	121°57'E	Sub-adult	7.5
M22624 ♀	22-26 Apr., 1979	22°52'S,	121°57'E	Sub-adult	6.0
M22620 ♀	22-26 Apr., 1979	22°52'S,	121°57'E	Sub-adult	7.0
FW1005* ♂	2-5 May, 1979	23°07'S,	123°20'E	Adult	8.5
M22623 ♂	2-5 May, 1979	23°07'S,	123°20'E	Adult	10.5
M22626 ♂	2-5 May, 1979	23°07'S,	123°20'E	Sub-adult	6.5
M22625 ♀	2-5 May, 1979	23°07'S,	123°20'E	Sub-adult	6.5
M22614 ♂	8-11 May, 1979	22°27'S,	123°54'E	Sub-adult	7.5
M22621 ♂	8-11 May, 1979	22°27'S,	123°54'E	Adult	9.0
M22622 ♂	8-11 May, 1979	22°27'S,	123°54'E	Sub-adult	6.2
M24551 ♂	15 May, 1979	20°23'S,	122°06'E	Adult	10.0
M22627	1978/1979	23°04'S,	125°16'E	—	—
FW1070	1978/1979	23°04'S,	125°16'E	—	—
M22618 ♂	26 Apr., 1979	20°20'S,	127°26'E	Adult	9.0
M22617 ♀	5 May, 1979	21°45'S,	125°40'E	Sub-adult	5.5
M22616 ♂	9-13 May, 1979	20°57'S,	123°16'E	Sub-adult	7.5
M22615 ♂	9-13 May, 1979	20°57'S,	123°16'E	Sub-adult	6.0
M22619 ♀	6 June, 1980	20°42'S,	127°48'E	Sub-adult	8.7
M18451 ♂	18 Aug., 1979	24°34'S,	115°11'E	Adult	—
Sminthopsis hirtipes					
M1548-1 ♀	29 Aug., 1930	22°33'S,	123°52'E	Adult	—
M8083 ♀	15 May, 1968	24°22'S,	125°08'E	Adult	—
M10208 ♂	12 May, 1973	27°51'S,	114°29'E	Adult	—
M8943 ♀	11 Aug., 1967	28°19'S,	125°49'E	Adult	18.5
M5783 ♀	August, 1963	26°07'S,	126°35'E	Adult	—
M17614 ♀	May, 1979	27°47'S,	121°39'E	Adult	17.0
FW5080 ♂	28 July, 1979	29°29'S,	119°36'E	Adult	14.5
FW1404 ♂	13 May, 1980	28°27'S,	122°15'E	Adult	14.5
FW5179 ♂	8 Sept., 1980	29°59'S,	119°34'E	Adult	15.7

Table 5. Specimens examined. *FW1005, Department of Fisheries and Wildlife field number — these specimens will be accessed into Western Australian Museum; M22611, Western Australian Museum registration number.

1899) that was similar to *S. hirtipes* but distinctly smaller than any other specimen of that species. In view of the undoubted distinction of *S. youngsoni* from *S. hirtipes*, the status of the George Gill Range specimen should be re-examined.

Sminthopsis youngsoni appears, in a number of characters, to be more primitive than *S. hirtipes*. For example, the feet and ears are less hairy, the alisphenoid hypotympanic sinus is much less enlarged, and the canines are distinctly more premoliariform. Accordingly, as a less autapomorphically specialized species than *S. hirtipes*, *S. youngsoni* would probably serve better for determination of the affinities of this distinctive species group within *Sminthopsis*. In his recent review of dasyurid relationships, Archer (1982) postulates that *S. hirtipes* may be the sister-species of *S. butleri*. This hypothesis is not clearly contradicted by any of the character-states of *S. youngsoni*.

Both *Sminthopsis youngsoni* and *S. hirtipes* appear to show numerous "arid-adapted" character-states (e.g. bullar enlargement, hairy feet, fat tails, reduced entoconids, raised and fused interdigital pads on the hind feet, etc.). The taxonomic distribution of these states within

Sminthopsis has been interpreted by Archer (1981) as evidence for polyphyletic arid adaptation within the genus. However, the fact that both *S. youngsoni* and *S. hirtipes* share these states suggests that their common ancestor was also arid-adapted and that this particular event occurred after the onset of aridity in some area of central Australia.

ACKNOWLEDGEMENTS

Nearly all specimens of *S. youngsoni* listed herein were collected during biological survey work funded by the Western Australian Department of Fisheries and Wildlife. Dr A. A. Burbidge provided the Aboriginal names. Mr J. Rolfe assisted in compiling the habitat data. Messrs A. S. George and A. S. Mitchell determined the plants. Dr M. Dickson produced the scanning election microphotographs. Mr R. Arnett produced the light photographs of the skull of the holotype.

REFERENCES

ARCHER, M., 1978. The nature of the molar-premolar boundary in marsupials and a reinterpretation of the homology of marsupial cheekteeth. *Mem. Qd Mus.* **18:** 157-64.

ARCHER, M., 1979. Two new species of *Sminthopsis* Thomas (Dasyuridae: Marsupialia) from northern Australia, *S. butleri* and *S. douglasi*. *Aust. Zool.* **20:** 327-45.

ARCHER, M., 1981. Results of the Archbold Expeditions. No. 104. Systematic revision of the marsupial dasyurid genus *Sminthopsis* Thomas. *Bull. Amer. Mus. Nat. Hist.* **168:** 61-224.

ARCHER, M., 1982. Review of the dasyurid (Marsupialia) fossil record, integration of data bearing on phylogenetic interpretation, and suprageneric classification. Pp.397-443 *in* "Carnivorous marsupials", ed. by M. Archer. Roy. Zool. Soc. New South Wales: Sydney.

MCKENZIE, N. L., 1982. A new dunnart from Australia's tropical sandy deserts. S.W.A.N.S. **11**(4): 9-12.

TATE, G. H. H., 1947. Results of the Archbold Expeditions. No. 52. On the anatomy and classification of the Dasyuridae (Marsupialia). *Bull. Amer. Mus. Nat. Hist.* **88:** 101-55.

THOMAS, O., 1888. "Catalogue of the Marsupialia and Monotremata in the collection of the British Museum (Natural History)". British Museum (Natural History): London.

THOMAS, O., 1906. On mammals from northern Australia presented to the National Museum by Sir. Wm. Ingram Bt., and the Hon. John Forrest. *Proc. Zool. Soc. Lond.* **1906:** 536-43.

YOUNGSON, W. K., HENRY, J. AND MCKENZIE, N. L., 1981. Mammals. *In* "Wildlife of the Edgar Ranges area, South-west Kimberley, Western Australia", ed. by N. L. McKenzie. Wildl. Res. Bull. West. Aust. No. **10** (Dept. Fish. Wildl.: Perth).