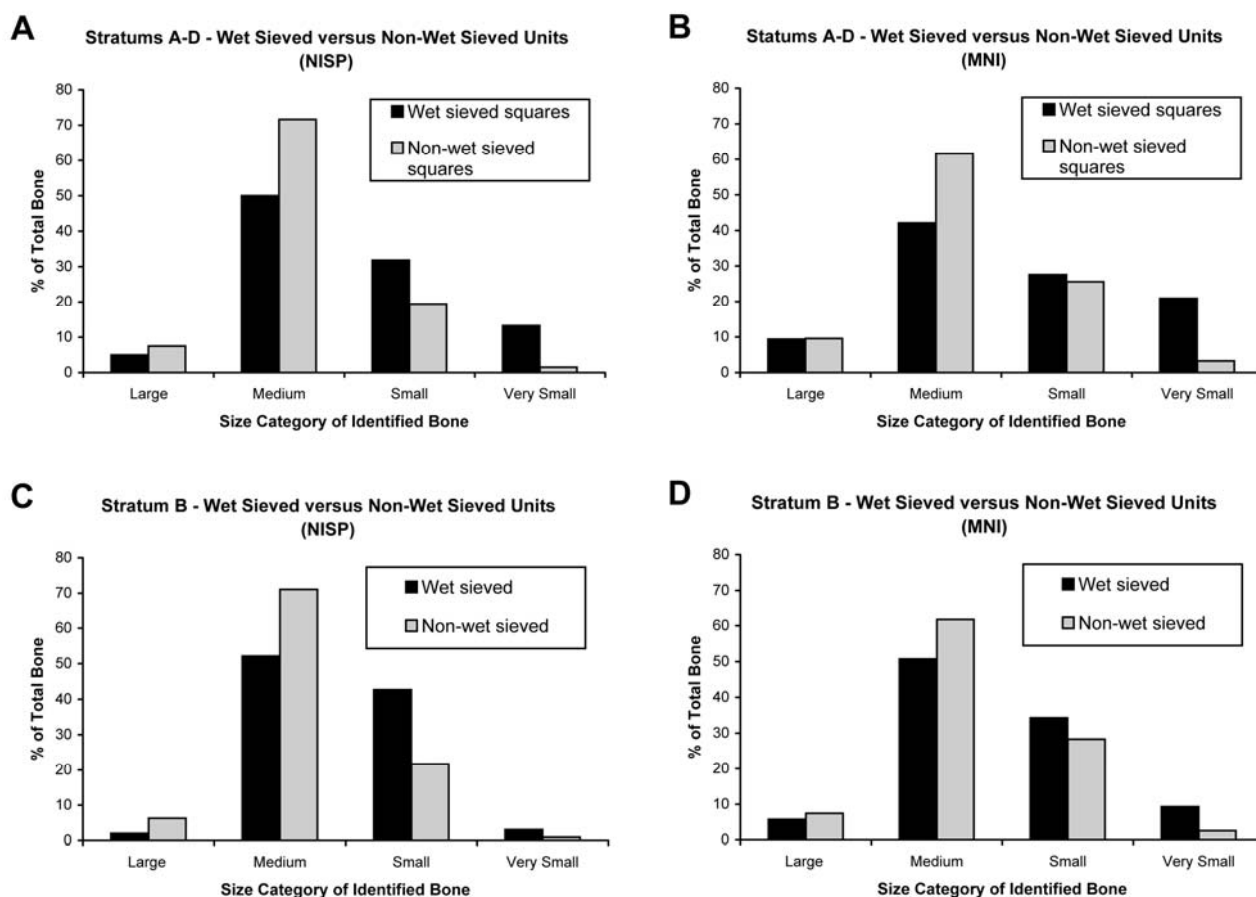


# SUPPLEMENTARY INFORMATION

## Archaeozoological Records for the Highlands of New Guinea: A Review of Current Evidence

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**Figure S1** Comparisons of size class frequencies for wet-sieved and non-wet sieved units at Nombe. (A) Stratums A-D – comparison of wet-sieved versus non-wet-sieved units (NISP). (B) Stratums A-D – comparison of wet-sieved versus non-wet-sieved units (MNI). (C) Stratum B – comparison of wet-sieved versus non-wet-sieved units (NISP). (D) Stratum B – comparison of wet-sieved versus non-wet-sieved units (MNI).

**Table S1** Radiocarbon dating summary (Aplin 1981; Bulmer 1979; Mountain 1991; White 1972).

Site	Lab. No.	Context	Sample	Subsample	<sup>14</sup> C Age (years BP)	Calibrated Age BP 2σ	Probability
Yuku	GX-3111A	Sq. 1A, Layer 3A	Bone (apatite)		6710 ± 265	8050-7000	0.997
						8100-8100	0.001
						8130-8130	0.000
						8150-8140	0.001
	GX-3111B	Sq. 1A, Layer 3A	Bone (collagen I)		4570 ± 220	4770-4620	0.037
						5740-4790	0.963
	GX-3113A	Sq. 1A, Layer 4D	Bone (apatite)		6740 ± 230	8020-7170	1.000
	GX-3113B	Sq. 1A, Layer 4D	Bone (collagen I)		9700 ± 300	12070-10240	1.000
	ANU-358	Main Trench, Layer 4C	Charcoal		9780 ± 150	11720-10700	0.998
						11750-11740	0.002
GX-3112A	Sq. 1A, Layer 5B	Bone (apatite)		9430 ± 340	11750-9700	1.000	
GX-3112B	Sq. 1A, Layer 5B	Bone (collagen I)		12100 ± 350	15080-13290	1.000	
Kiowa	Y-1371	Layer 3	Wood carbon (charcoal)		4840 ± 140	5150-5150	0.002
						5920-5290	0.998
						6590-6567	0.006
	Y-1370	Layer 6	Wood carbon (charcoal)		6100 ± 160	6610-6600	0.003
						7330-6620	0.987
						7410-7400	0.004
						9990-9940	0.011
	Y-1367	Layer 10	Wood carbon (charcoal)		9300 ± 200	10020-10010	0.002
						10060-10040	0.005
						11180-10130	0.982
Y-1368	Layer 10	Wood carbon (charcoal)		9920 ± 200	12110-10740	1.000	
Y-1366	Layer 12	Wood carbon (charcoal)		10350 ± 140	11670-11620	0.013	
					12720-11700	0.987	
Aibura	GaK-622	Lower part of the ash lenses in HI (Base HI, Square VII, Level 4)	Wood carbon		770 ± 100	610-560	0.106
						910-620	0.894
	GaK-623	Lowest level of the black silt in HIII (Lower HIII, Square IX, Level II)	'Lumps of carbon'		3800 ± 110	4450-3890	0.982
						4480-4470	0.001
					4510-4480	0.017	

Site	Lab. No.	Context	Sample	Subsample	<sup>14</sup> C Age (years BP)	Calibrated Age BP 2σ	Probability	
Batari	ANU-39	Hearth complex at top of Horizon I	Wood charcoal (20g)		850 ± 53	830-680	0.804	
						910-840	0.196	
	ANU-38a	Upper part of Horizon IV (layer of fine silt?)	Unidentifiable food bone (500g)	Carbonate	3470 ± 60	3890-3580	1.000	
	ANU-38b			Acid-insoluble fraction	≥ 8230 ± 190	≥ 9540-8650	1.000	
	ANU-40	Lower part of Horizon IV (within matrix containing cultural material, but very close to undisturbed natural sediments containing carbon)	Wood charcoal (6.3g)		16850 ± 700	21830-18790	1.000	
Kafiyawa (Kafiavana)	ANU-42	Base of HII in the upper part of a layer of grey-brown sandy silt	Wood carbon		4690 ± 170	4940-4880	0.025	
						5740-4950	0.975	
	NZ1025	Sample collected from 'ash bands and the material below them' (Lower HVI and most of HVII)	Food bone remains (277g)	Carbonate	6180 ± 125	7330-6750	0.993	
					7370-7360	0.001		
					7410-7400	0.007		
		NZ1026		Collagen	9290 ± 140	10820-10200	0.952	
					10870-10850	0.006		
					11070-10950	0.042		
	ANU-20	Banked silty sands, 250-270cm below the surface in the lower half of HVII	Wood carbon (3 small samples)		> 9500	> 10780-10700	0.993	
						> 10990-10990	0.007	
	ANU-41a	Banked silty sands, 260-310cm below the surface in the lower part of HVII and upper HVIII	Unidentifiable food bone (500g)	Carbonate	≥ 6750 ± 100	≥ 7790-7440	1.000	
	ANU-41b			Acid-insoluble fraction	≥ 10730 ± 370	≥ 11580-11400	0.029	
						≥ 13290-11590	0.971	
Nombe	ANU-3073	Stratum A1, Sq. J71	Charcoal		100.4 ± 0.9%	50-30	0.131	
						80-60	0.220	
						90-90	0.005	
						140-100	0.318	
						260-220	0.326	
		ANU-3685	Stratum A3, Sq. T79	Charcoal		900 ± 80	940-680	0.994
							950-950	0.006
		ANU-2570	Stratum A3, Sq. D79	Charcoal		3420 ± 310	2910-2890	0.004
							4450-2920	0.987
							4520-4460	0.010
	ANU-3689	Stratum B6, Sq. PQR71, Spit 5	Bone <sup>1</sup>		5090 ± 220	5410-5320	0.029	
						6300-5440	0.971	

Site	Lab. No.	Context	Sample	Subsample	<sup>14</sup> C Age (years BP)	Calibrated Age BP 2σ	Probability
Nombe (cont.)	ANU-3684	Stratum B4, Sq. J71, Spit 5	Bone		5340 ± 110	6320-5900	0.993
						6390-6370	0.007
	ANU-3074	Stratum B2, Sq. A1, Spit 2	Bone		5810 ± 180	7030-6280	0.978
						7070-7040	0.006
						7090-7080	0.002
						7160-7110	0.014
	ANU-3075	Stratum B4, Sq. A1, Spit 3	Bone		6380 ± 90	7040-7030	0.007
						7050-7050	0.001
						7080-7070	0.004
						7110-7090	0.011
						7470-7160	0.976
	ANU-3076	Stratum B4, Sq. A1, Spit 4	Bone		5875 ± 115	6970-6410	1.000
	ANU-3688	Stratum B4, Sq. X3, Spit 3	Bone		6740 ± 120	7840-7430	1.000
	ANU-3687	Stratum B8, Sq. C3, Spit 4	Bone		8320 ± 840	11500-7480	0.995
						11610-11520	0.005
	ANU-3686	Stratum B4, Sq. H71, Spit 7	Bone		9650 ± 280	11830-10240	0.982
						11970-11870	0.018
	ANU-2579	Stratum C8, Sq. A4	Flowstone		10250 ± 100	11430-11410	0.005
						11530-11500	0.010
						11550-11540	0.002
					12400-11600	0.970	
					12570-12500	0.014	
ANU-2576	Stratum C8, Sq. X3	Flowstone		10250 ± 100	11430-11410	0.005	
					11530-11500	0.010	
					11550-11540	0.002	
					12400-11600	0.970	
					12570-12500	0.014	
ANU-2569	Stratum C8, Sq. D79	Charcoal		11400 ± 190	13650-12930	1.000	
ANU-2581	Stratum C8, Sq. A4	Flowstone		11850 ± 150	14010-13380	1.000	
ANU-2580	Stratum C8, Sq. A4	Flowstone		14650 ± 150	18210-17010	0.963	
					18480-18310	0.037	
ANU-2578	Stratum D1, Sq. D71, Spit 9	Calcite		24950 ± 550	n/a	n/a	
ANU-2565	Stratum D2, Sq. X3, Spit 6	Snail shell		29600 ± 500	n/a	n/a	
ANU-2566	Stratum D2, Sq. A4, Spit 3	Snail shell		32100 ± 950	n/a	n/a	

Site	Lab. No.	Context	Sample	Subsample	<sup>14</sup> C Age (years BP)	Calibrated Age BP 2σ	Probability
Kamapuk	ANU-1325	Unit IV (Level 7)	Wood carbon (charcoal)		2540 ± 70	2420-2360 2760-2430	0.059 0.941
	ANU-1326	Unit VII (Level 15)	Wood carbon (charcoal)		4340 ± 100	4640-4630 4680-4640 4760-4690 4790-4790 5300-4800	0.005 0.024 0.061 0.000 0.910

**Notes:**

- <sup>1</sup> Dates on bone from Nombe are considered minimum ages. See Mountain (1991:3.13) for discussion.
- Grey shading indicates a date that is considered problematic by the original excavator (see text for appropriate reference).
  - All calibrations undertaken using CALIB version 5.1 (Method B, two sigma; Stuiver and Reimer 1993) and the northern hemisphere calibration dataset (IntCal04; Reimer *et al.* 2004). The northern hemisphere calibration dataset (IntCal04; Reimer *et al.* 2004) extends to 21,381 BP; consequently it is not possible to calibrate radiocarbon ages older than this limit using this dataset.

**Table S2** Earliest record of faunal taxa from seven highlands archaeological sites.

Family	Genus/Species	Common Name	Kamapuk	Nombe	Batari	Aibura	Kafiyawa	Yuku	Kiowa
<b>Mammalia</b>									
Tachyglossidae		Echidnas					TP		EH
	<i>Zaglossus</i> spp.	Long-Beaked Echidnas	MH/LH	LP					
Dasyuridae		Dasyurids/Native Cats					TP		LP/TP
	<i>Murexia</i> spp.	Marsupial Mice	MH/LH			LH			
	<i>Neophascogale</i> sp. <sup>1</sup>	Neophascogales	MH/LH						
	<i>Dasyurus albopunctatus</i> <sup>2</sup>	New Guinea Quoll	MH	LP	TP/EH	MH/LH			
	'Small' dasyurids			LP					
Peroryctidae		Bandicoots			TP/EH	MH/LH	EH		LP/TP
	<i>Microperoryctes longicauda</i>	Striped Bandicoot	MH	LP					
	<i>Peroryctes raffrayana</i>	Raffray's Bandicoot	MH/LH	LP					
	<i>Echymipera kalubu</i>	Common Echymipera	MH/LH	LP					
	<i>Echymipera rufescens</i>	Long-Nosed Echymipera		EH/MH					
Burramyidae		Pygmy Possums							
	<i>Cercartetus caudatus</i> <sup>3</sup>	Long-Tailed Pygmy-Possum	MH/LH		TP/EH	LH			
Acrobatidae		Feather-Tailed Possums							
	<i>Distoechurus pennatus</i>	Feather-Tailed Possum	MH/LH	LP					
Petauridae		Petaurids (Possums)							
	<i>Petaurus breviceps</i>	Sugar Glider	MH	LP	TP/EH	MH/LH			
	<i>Dactylopsila trivirgata</i>	Striped Possum	MH/LH						
	<i>Dactylopsila palpator</i>	Long-Fingered Triok	MH/LH	LP					
	<i>Dactylopsila</i> spp.				TP/EH	LH			
Pseudocheiridae		Ringtail Possums			TP/EH	MH/LH		TP	
	<i>Pseudocheirops corinnae</i>	Plush-Coated Ringtail	MH/LH	LP					
	<i>Pseudocheirops cupreus</i>	Coppery Ringtail	MH	LP					
	<i>Pseudochirulus forbesi</i>	Painted Ringtail	MH	LP					
	<i>Pseudochirulus mayeri</i>	Pygmy Ringtail	MH	LP					
Phalangeridae		Cuscuses			TP/EH	MH/LH		TP	
	<i>Phalanger vestitus</i>	Stein's Cuscus	MH						
	<i>Phalanger carmelitae</i>	Mountain Cuscus	MH	LP					
	<i>Phalanger sericeus</i>	Silky Cuscus		LP					
	<i>Phalanger gymnotis</i>	Ground Cuscus	MH/LH	LP					

Family	Genus/Species	Common Name	Kamapuk	Nombe	Batari	Aibura	Kafiyawa	Yuku	Kiowa
Macropodidae		Macropods			TP/EH	MH/LH	TP		
	<i>Dorcopsulus vanheurni</i>	Small Dorcopsis	MH/LH	LP					
	<i>Thylogale browni</i> <sup>4</sup>	New Guinea Pademelon	MH/LH	LP	TP/EH	MH/LH			
	<i>Dendrolagus dorianus</i>	Doria's Tree-kangaroo	MH	LP					
	<i>Protemnodon tumbuna</i>	(extinct)		LP					
	<i>Protemnodon nombe</i>	(extinct)		LP					
	<i>Dendrolagus noibano</i>	(extinct)		LP					
	<i>Dendrolagus goodfellowi</i>	Goodfellow's Tree-Kangaroo		LP					
	<i>Dorcopsulus</i> spp.					MH/LH		LP/TP	LP/TP
	<i>Dendrolagus</i> spp.					LH		TP/EH	LP/TP
	<i>Thylogale</i> spp.							LP/TP	LP/TP
Thylacinidae		Thylacines							
	<i>Thylacinus cynocephalus</i>	Thylacine (extinct)		LP					EH
Diprotodontidae		Diprotodontids							
	Unidentified small diprotodontid			LP					
Muridae		Mice & Rats							
	<i>Mallomys</i> spp.	Woolly-Rats	MH	LP	TP/EH	MH/LH		LH	TP
	<i>Hyomys goliath</i>	Eastern White-Eared Giant-Rat	MH	LP	EH-LH	MH/LH	EH/MH		TP
	<i>Uromys anak</i>	Black-Tailed Giant-Rat	MH	LP				MH	EH
	<i>Uromys caudimaculatus</i>	Mottled-Tailed Giant-Rat		LP				MH	EH
	<i>Anisomys imitator</i>	Uneven-Toothed Rat	MH	LP		MH/LH			LP/TP
	<i>Parahydromys asper</i>	Waterside Rat	MH	EH/MH					LP/TP
	<i>Xenuromys barbatus</i>	Rock-Dwelling Giant-Rat	MH/LH						
	<i>Abeomelomys sevia</i> <sup>5</sup>	Menzies' Mouse	MH/LH	LP					
	<i>Pogonomys loriae</i>	Large Tree-Mouse	MH/LH						
	<i>Pogonomys sylvestris</i>	Grey-Bellied Tree-Mouse	x						
	<i>Melomys rubex</i>	Mountain Melomys		EH/MH				LH	?LP/EH
	<i>Melomys lutillus</i> *	Grassland Melomys							LP/TP
	<i>Rattus praetor/Rattus steini</i> <sup>6</sup>	Large Spiny Rat / Small Spiny Rat						MH/LH	MH
	<i>Rattus niobe</i> <sup>7</sup>	Moss-Forest Rat							?LP/EH
	<i>Rattus verecundus</i> <sup>7</sup>	Van Deusen's Rat						MH/LH	
	<i>Macruromys major</i>	Greater Small-Toothed Rat							LP/TP
	<i>Macruromys elegans</i> *	Lesser Small-Toothed Rat							TP/EH
	<i>Mallomys</i> spp.							MH	

Family	Genus/Species	Common Name	Kamapuk	Nombe	Batari	Aibura	Kafiayawa	Yuku	Kiowa
	<i>Melomys</i> spp.		MH/LH			MH/LH			
	<i>Uromys</i> spp.				TP/EH	MH/LH	TP		
	<i>Pogonomys</i> spp.					MH/LH			TP/EH
	<i>Rattus</i> spp.					MH/LH			
	<i>Abeomelomys</i> spp.					MH/LH			
	<i>Xenuromys</i> sp.			EH/MH				EH-MH	
	<i>Hydromys</i> spp.			EH/MH					
	Large murids								
	Small murids			LP			TP		
Pteropodidae		Fruit and Blossom Bats			TP/EH	R/LH			
	<i>Aproteles bulmerae</i>	Bulmer's Fruit Bat		x					LP/TP
	<i>Dobsonia magna</i> <sup>8</sup>	Great Bare-Backed Fruit-Bat		LP					LP/TP
	<i>Dobsonia</i> spp.		MH/LH		TP/EH	R/LH			LP/TP
	<i>Nyctimene</i> spp.	Tube Nosed Bats	MH/LH		TP/EH				
	<i>Syconycteris</i> spp.	Blossom Bats	MH/LH		LH				
	<i>Rousettus</i> spp. <sup>9</sup>			LP					
	Pteropodids			LP	TP/EH	R/LH	TP		MH/LH
Microchiroptera (suborder)		Microbats							
	Unidentified Microchiroptera		x						EH
Suidae		Pigs							
	<i>Sus scrofa</i>	Wild Boar	LH	LP	LH	LH	EH/MH		TP
Canidae		Dogs							
	<i>Canis lupus familiaris</i>		?LH	LH		R/LH			
<b>Aves</b>									
Unidentified Aves		Unidentified Birds							
	Small birds		MH/LH	LP					
	Medium-sized birds		MH/LH	LP					
Casuariidae		Cassowaries							MH/LH
	<i>Casuarius bennetti</i>	Dwarf Cassowary		LP					
	<i>Casuarius</i> spp.		MH		TP/EH	?LH			
Accipitridae		Hawks, Eagles, Vultures, Kites							
	<i>Harpyopsis novaeguinae</i>	New Guinea Harpy Eagle		EH/MH					
Megapodiidae		Megapodes							
	<i>Aepyodius arfakianus</i>	Wattled Brush Turkey		LP					

Family	Genus/Species	Common Name	Kamapuk	Nombe	Batari	Aibura	Kafiayawa	Yuku	Kiowa
Tytonidae	<i>Megapodius freycinet</i>	Dusky Scrub Fowl		LP					
		Barn Owls							
Strigidae	<i>Tyto alba</i>	Barn Owl		LP					
	<i>Tyto tenebricosa</i>	Greater Sooty-Owl		EH/MH					
	<i>Ninox</i> spp.	True Owls		LH					
Columbidae spp.		Doves, Pigeons		MH/LH					
Passeriforme (order)		Passerines		LP					
Rallidae		Rails							
Phasianidae	<i>Gallinula tenebrosa</i>	Dusky Moorhen		EH/MH					
	<i>Gallinula</i> spp.	Moorhen spp.		LP					
	<i>Gallus gallus</i>	Pheasants, Fowls, Quails							
		Red Junglefowl (Domestic Chicken)			?LH	LH			
Psittacidae		True Parrots		EH/MH					
<b>Sauropsida</b>									
Lacertilia (suborder)		Lizards		EH/MH	EH/LH		TP		
Agamidae		Agamids	MH/LH		LH	LH			
Varanidae		Monitor Lizards	MH/LH						
Scincidae		Skinks		LP					
Serpentes (suborder)		Snakes		LP	LH				
Boidae		Boas	MH/LH	LP		LH			
Testudines (suborder)		Freshwater Turtle		EH/MH					
<b>Amphibia</b>									
Anura (order)			MH/L	LP					
<b>Osteichthyes</b>									
Osteichthyes		Bony Fish					EH/MH		

Key:

- R Recent (last few hundred years)
- LH Late Holocene (c.3,500 BP to present; c.4,000 cal BP to present)
- MH Mid-Holocene (c.7,000 BP–c.3,500 BP; c.7,800 cal BP–c.4,000 cal BP)
- EH Early Holocene (c.10,000 BP–c.7,000 BP; c.11,500 cal BP–c.7,800 cal BP)
- TP Terminal Pleistocene (15,000 BP–c.10,000 BP; c.18,000 cal BP–c.11,500 cal BP)

LP Late Pleistocene (c.40,000 BP–c.15,000 BP; c.46,000 cal BP–c.18,000 cal BP)  
x Present in assemblage (initial occurrence uncertain)

**Notes:**

<sup>1</sup> Probably *N. lorentzii*, Speckled Dasyure, the only member of the genus *Neophascogale*.

<sup>2</sup> Revised by Kirsch *et al.* (1990); previously known as *Satanellus albopunctatus* (cf. Aplin 1981; White 1972).

<sup>3</sup> Previously known as *Eudromicia caudata* (cf. White 1972); Wakefield (1963) combined *Eudromicia* with the genus *Cercartetus*, which has been retained in subsequent studies.

<sup>4</sup> Previously considered a subspecies of *T. brunii* (cf. Aplin 1981; Mountain 1991; White 1972); revised by Flannery (1992b) and identified as a distinct species. Specimens identified as *T. brunii* are reclassified here as *T. browni* based on known altitudinal limits of both species.

<sup>5</sup> Previously *Pogonomelomys sevia* (cf. Aplin 1981; Mountain 1991); revised by Menzies (1990) and placed within its own genus.

<sup>6</sup> Originally identified as *Rattus ruber* by Bulmer (1979); populations formerly identified as *R. ruber* are now variously identified as *R. praetor*, *R. steini*, *R. novaguineae*, *R. mordax* and *R. giluwensis* (Calaby and Taylor 1980).

<sup>7</sup> Both species have been placed in the genus *Stenomys* in the past (e.g. Flannery 1995); here we follow Robins *et al.* (2007) in placing these species within the genus *Rattus*.

<sup>8</sup> Bergmans and Sarbini (1985; see also Flannery 1995) have given the New Guinean subspecies (*D. moluccensis* ssp. *magna*) specific status as *D. magna*. More recent studies (e.g. Bonaccorso 1998) have retained subspecific status however on the basis of too few data to inform differences between the populations; *D. magna* is used here.

<sup>9</sup> Probably *R. amplexicaudatus*, Rousette Bat, the only member of the genus *Rousettus* in New Guinea.

\* Identification requires reassessment.