A Reassessment of Taxonomic Diversity and Geographic Patterning in the Melanesian Mammal Fauna

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Frontispiece: *Pteralopex flanneryi* Helgen, 2005, in mossy montane forest on Bougainville Island in the northern Solomon archipelago (Papua New Guinea).

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Abstract

Comprehensive morphology-based taxonomic revisions are presented for four mammal genera endemic to the Australo-Papuan region. These include *Pseudohydromys* Rümmler, 1934 and *Mallomys* Thomas, 1898, small- and large-bodied rodent genera, respectively, endemic to montane areas on mainland New Guinea; the marsupial genus *Spilocuscus* Gray, 1862, distributed throughout lowland areas of mainland New Guinea, on most adjacent island groups, and in tropical northern Australia; and *Pteralopex* Thomas, 1888, a genus of large-bodied fruit-bats endemic to the Solomon and Fijian Archipelagos of outer Melanesia.

Museum specimens of "moss-mice" traditionally classified in the genera *Pseudohydromys, Microhydromys* Tate and Archbold, 1941, *Neohydromys* Laurie, 1952*,* and *Mayermys* Laurie and Hill, 1954 are here referred to three generic-level lineages, *Pseudohydromys* (11 species)*, Microhydromys* (one recognized species)*,* and *Mirzamys* new genus (for two newly-described species). The 11 species of *Pseudohydromys* recognized here include six that are newly described. Much of this newly-characterized biological diversity is sympatric diversity. For example, samples attributed in the past to *Pseudohydromys murinus* Rümmler, 1934 include two species, *P. berniceae* n. sp. and *P. eleanorae* n. sp., which have been collected syntopically with true *P. murinus.* Likewise, samples attributed in the past to *Pseudohydromys occidentalis* Tate, 1951 are also shown to represent a number of "cryptic" lineages sympatric with true *P. occidentalis*, including *P. patriciae* n. sp. and *Mirzamys louiseae* n. sp., as well as an additional overlooked allopatric taxon, *Mirzamys norahae* n. sp.

Within *Mallomys,* the nature and extent of sympatric interactions between the giant-rats *M. rothschildi* Thomas, 1898, *M. aroaensis* (De Vis, 1907), and *M. istapantap* Flannery, Aplin, and Groves, 1989 are reviewed and clarified. Subspecific boundaries within *M. rothschildi* are re-assessed, and in total seven species of *Mallomys* are recognized, including *M. hercules* Thomas, 1912*,* an allospecies endemic to the outlying mountain ranges of the Huon Peninsula, and two newly-described species from other

outlying mountain blocks (the Arfak Mountains of western New Guinea and Mt. Bosavi in south-central New Guinea).

The spotted cuscuses, genus *Spilocuscus*, are difficult to classify at species-level because most taxa in the genus are distributed allopatrically or parapatrically. A minimum of seven geographic "morphs" can be recognized in the genus on the basis of size and pelage characters. The oldest name in the genus, *S. maculatus,* is shown to refer to dark-spotted cuscuses from the Moluccas and southern New Guinea, not to the orange and white cuscuses from northern New Guinea, as traditionally applied. A review of craniometric and qualitative morphological traits confirms that each of these "morphs" (as delineated by external morphology) is characterized by other distinctive morphological attributes; this fact and the lack of evidence for introgression between any of these various taxa is used to argue that most of these seven morphologically-distinctive lineages should be recognized as distinct allospecies. Only two taxa in the genus co-occur sympatrically—the large-bodied, black-saddled/spotted taxon *S. rufoniger* and a smaller, orange and white species, both of which are shown to be widely distributed in both northern and western New Guinea. No scientific name is available for the latter taxon, which is newly designated as *Spilocuscus tardus* n. sp.

Taxa traditionally classified in *Pteralopex* are referred here to two distinct genera, *Pteralopex,* comprising only those species endemic to the Solomon Archipelago, and *Mirimiri* Helgen, 2005, for the monotypic Fijian representative *M. acrodonta* (Hill and Beckon, 1978). Five species of *Pteralopex* are recognized in total. Museum specimens traditionally identified as "*Pteralopex anceps"* are shown to represent two sympatric species, *P. anceps* Andersen, 1909 and *P. flanneryi* Helgen, 2005 (the largest species in the genus), both of which are endemic to islands in the north-eastern Solomon Islands that were once part of a larger Pleistocene landmass; insular co-occurrence of *P. atrata* Thomas, 1888 and the recently-described *P. taki* Parnaby, 2002 on New Georgia is also newly documented.

Each of these revisions highlights sympatric interactions and substantial undiagnosed biological diversity overlooked by previous reviewers, and illuminates intraregional biogeographic boundaries more accurately as a result. Before I began this study four years ago, a total of 17 mammal species were formally recognized within the

genera *Pseudohydromys, Neohydromys, Mayermys, Microhydromys, Mallomys, Spilocuscus,* and *Pteralopex* (Flannery 1995a, 1995b). This thesis defends the recognition of 33 species within those same generic lineages, which suggests that the magnitude of biological diversity across the Melanesian mammal fauna could well be underestimated by fully one-half. Preliminary results reflecting complementary discoveries of overlooked sympatric diversity in other Melanesian mammal genera (*Uromys, Microperoryctes, Myoictis, Pteropus, Nyctimene, Leptomys,* and others) are also briefly discussed. Similar comprehensive reviews, analysing morphometric attributes and qualitative anatomical characters of all available museum specimens, are still needed for all remaining Melanesian mammal genera before any reasonable holistic portrayal of community ecology and historical biogeography can be developed for the Melanesian mammal fauna as a whole.

Statement

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being made available in all forms of media, now or hereafter known.

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