

Towards an Understanding of Marsupial Interchange between Australia and New Guinea

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ABSTRACT. A review of the geology, palaeontology, genetic, and morphology studies indicates that during the mid-Miocene to Pliocene, New Guinea consisted of four island Blocks (Vogelkop, Maokop, Central, and Southeastern). The initial dispersal of marsupials from Australia was into the Vogelkop Block. The ancestors of at least six genera (*Dactylonax*, *Microperoryctes*, *Myoictis Pseudochirops*, *Spilocuscus*, *Tous*) and three species (*Dendrolagus inustus*, *Dendrolagus ursinus*, *Dorcopsis muelleri*) of endemic New Guinean marsupials are likely to have reached New Guinea via this route. The *Dendrolagus dorianus* complex and two marsupial genera (*Dactylopsila* and *Phalanger*) may have reached New Guinea via the Maokop Block, with *Thylogale* arriving either via the Maokop or Southeastern Block. Four species, or species complexes, of marsupials in the genera *Dendrolagus*, *Dorcopsis*, *Murexia*, and *Peroryctes* may have arrived via the Southeastern Block. The Central Block lacks evidence of Tertiary marsupial transfers from Australia, and may not have been connected with Australia prior to its incorporation into New Guinea. Two possum taxa (*Tous ayamaruensis* and *Dactylonax kambuayai*), which occur in the Vogelkop lowlands, are hypothesized to have been restricted from expansion into the slopes of the Central Cordillera by a combination of tectonics and ecological barriers. A further two species pairs/triplets (*Dactylonax palpator/ernstmayri*, *Pseudochirops albertisii/coronatus/cupreus*) provide evidence of a highly unusual pattern of dispersal within New Guinea, whereby the high-elevation members of each pair have dispersed and speciated, while the mid-elevation members have not. Finally, marsupial distributions indicate that in the early Pleistocene a contiguous mountain range, named here the Northern Cordillera, extended from Vogelkop to the Torricelli Mountains.

Introduction

Australasian marsupials

Marsupials constitute a moderately diverse group of mammals with limited over-water dispersal ability. The Australasian genera *Phalanger* and *Spilocuscus* of the family Phalangeridae and bandicoots of the family Peroryctidae have dispersed over water to non-landbridge islands where they are represented by distinctive insular taxa (Flannery, 1995a; Helgen & Flannery, 2004). Many other insular populations of these and other marsupials are now known

to have originated as prehistoric and historic human introductions (e.g., Flannery & White, 1991; Williams, 1999). The vast majority of Australasian marsupials occur on continental landmasses, or islands of continental origin. Many Melanesian, and a few Australian, taxa are limited to higher elevations, and some clades have unusual distributions that hint to their zoogeographic histories. All of these factors make the marsupials an ideal group with which to investigate faunal interchange between Australia and New Guinea.

It has long been accepted that the marsupial fauna of New Guinea originated from Australia (Schodde & Calaby, 1972;

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