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Origin of the eastern brownsnake, *Pseudonaja textilis* (Duméril, Bibron and Duméril) (Serpentes: Elapidae: Hydrophiinae) in New Guinea: evidence of multiple dispersals from Australia, and comments on the status of *Pseudonaja textilis pughi* Hoser 2003

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Abstract

Pseudonaja textilis is a widespread and common snake in eastern parts of Australia, but its distribution in New Guinea is poorly understood, and the origin of the New Guinea populations and its timing have been the subject of much speculation. Phylogenetic analysis of mitochondrial DNA sequences from three New Guinea populations of *P. textilis* indicates that New Guinea was colonised from two independent eastern and western migration routes most likely in the Pleistocene. One dispersal event from northern Queensland led to the populations in eastern New Guinea (Milne Bay, Oro and Central Provinces, Papua New Guinea), whereas another, from Arnhem Land to central southern New Guinea, led to the populations from the Merauke area, Indonesian Papua. The results are consistent with the effects of Pleistocene sea level changes on the physical geography of Australasia, and are thus suggestive of a natural rather than anthropogenic origin of the New Guinea populations. The taxonomic status of the New Guinean populations is discussed.

Key words: *Pseudonaja textilis*, New Guinea, Australia, phylogeography, Pleistocene, sea level changes, Lake Carpentaria, taxonomy, mitochondrial DNA

Introduction

In recent years, the advent of molecular markers, and particularly the use of mitochondrial DNA-based phylogeographical approaches, has revolutionised our understanding of the biogeographical history of animal species (Avise, 2000). One region that has received increasing attention in this regard is the Australasian region, including the faunal relationships between Australia and New Guinea. While earlier studies focussed primarily on mammals (e.g., Aplin *et al.*, 1993; Pacey *et al.*, 2001), reptiles, including snakes, have been studied extensively in recent years (Harvey *et al.* 2000; Rawlings & Donnellan, 2003; Rawlings *et al.*, 2004; Kuch *et al.*, 2005; Wüster *et al.*, 2005). The results have revealed a variety of biogeographical patterns, including older exchanges resulting in endemic New Guinean species that are clearly distinct from their Australian sister taxa (e.g., *Acanthophis laevis*, *Pseudechis papuanus* and *P. rossignolii*—Kuch *et al.*, 2005; Wüster *et al.*, 2005), to

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