



<http://dx.doi.org/10.11646/zootaxa.3640.3.2>

<http://zoobank.org/urn:lsid:zoobank.org:pub:0101E600-90AB-4EDE-9F3C-5C9075BE6066>

Anthropogenic extinction of Pacific land snails: A case study of Rurutu, French Polynesia, with description of eight new species of endodontids (Pulmonata)

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Abstract

Faunistic surveys are fundamental in the conservation of land mollusks, particularly as a means of achieving accurate estimates of species richness and levels of extinction of endangered taxa. The family Endodontidae comprises one of the most diverse groups of indigenous land snails of Pacific Islands. Due to anthropogenic degradation of their habitats, most members of the family are now extinct or severely endangered. In Rurutu, French Polynesia, 11 species of Endodontidae were previously described (10 endemics), but only 1 is known to have been extant during the first half of the 20th Century. Extensive collections made in Rurutu in 2003 recovered only empty shells of these 11 species, as well as of an additional 8 endemic species of endodontids not known to previous investigators: *Australdonta oheatora* sp. nov., *A. annea* sp. nov., *A. sibleti* sp. nov., *A. florencei* sp. nov., *A. pakalolo* sp. nov., *A. teaae* sp. nov., *Minidonta boucheti* sp. nov. and *M. bieleri* sp. nov. The radiation of endodontids in Rurutu was thus much larger than previously envisaged. However, we hypothesize that all species of the family are now extinct in the island.

Key words: Conservation, biodiversity, endangered, islands, systematics, mollusk

Introduction

Mollusks account for more than half of extinctions recorded in the current biodiversity crisis (Régnier *et al.* 2009). Within the phylum, the indigenous land snail fauna of Pacific islands—characterized by high levels of species richness and endemism—comprises the most vulnerable group (Lydeard *et al.* 2004). Mainly due to habitat loss and introduction of alien species, these unique faunas are rapidly disappearing (Bauman 1996; Cowie 2001; Cowie & Robinson 2003).

Of the thirteen major families of land snails native to the Pacific islands (Cowie 1996, table 1), Endodontidae Pilsbry, 1895 may have been the most speciose (Solem 1976). Endodontids are essentially ground dwellers characterized by a small, depressed shell, with the aperture typically narrowed by ridge-like barriers. In the Austral Islands, French Polynesia, the family went through a spectacular radiation before being almost completely demised by anthropogenic degradation of its habitats (Solem 1976).

Mostly based on material from the Bishop Museum's Mangarevan Expedition (Gregory 1935, 1936), Solem (1976, 1983) recorded 2 species of Endodontidae inhabiting Rimatara, 7 in Rurutu, 3 in Tubuai, 7 in Raivavae and 24 in Rapa. The malacofauna of most Austral Islands was not surveyed again throughout the 20th Century.

Faunistic surveys and taxonomic studies are paramount in the conservation of land mollusks, particularly as a means of achieving an accurate estimate of the true levels of species richness and extinction (Lydeard *et al.* 2004). In 2003, extensive collections were made in Rurutu as part of a multi-disciplinary effort to inventory and assess the conservation status of the biodiversity of the island (Gargominy & Fontaine 2003; Meyer & Claridge in press). Twelve species of Endodontidae not known to previous investigators were present in the recovered material. Four of these were formally described by Zimmermann *et al.* (2009), and the eight remaining comprises the subject of this paper. All of them, as hypothesized here, went extinct before being known to science.