



## A new genus of oribatid mite, *Spineremaeus* gen. nov. and three new species of *Scapheremaeus* (Acari: Oribatida: Cymbaeremaeidae) from Norfolk Island, South-west Pacific, and their biogeographical affinities

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### Abstract

A new genus of oribatid mite, *Spineremaeus* is erected and its type species, *S. smithi* sp. nov., is described from Norfolk Island, as well as three new species belonging to the genus *Scapheremaeus*. *Spineremaeus* is morphologically closest to the Emarginatus species-group of *Scapheremaeus*, found in Australia, Java and New Zealand. *Scapheremaeus pinguis* sp. nov. is closest morphologically to *S. emarginatus* from New Zealand. *Scapheremaeus pacificus* sp. nov. and *S. tumidus* sp. nov., members of the Carinatus species-group, are closest morphologically to each other and to *S. insularis*, also from New Zealand. Thus all four cymbaeremaeid species from Norfolk Island show strongest biogeographical affinities with the oribatid fauna of New Zealand rather than Australia.

**Key words:** Mite, oribatid, taxonomy, morphology, dispersal, biogeography

### Introduction

The Norfolk Island group, consisting of Norfolk Island (29°S, 168°E), and the nearby Philip and Nepean Islands, is located 1440 km east of the coast of New South Wales and 772 km north of New Zealand and is the eroded remains of a 2.3–3 million year-old series of volcanos (Jones & McDougall, 1973). The biogeographical significance of Norfolk Island is that it is isolated, oceanic, volcanic and recent and located between the much older Gondwanan continental land masses of Australia, New Zealand and New Caledonia. Together with Lord Howe Island, 910 km to the east south-east, Norfolk Island represents an important location for the testing of models of biogeographical dispersal in the South-west Pacific region (Holloway, 1990).

The recent volcanic origin of Norfolk Island has led to the prevailing view that the biota is entirely a product of biogeographical dispersal events over the last three million years. For example, Gressitt (1961) remarked that the insect fauna of Norfolk Island seemed more typical of young isolated oceanic islands and that much extinction (due to vulcanism) had probably occurred. Turner *et al.* (1968) made a comparison with the Galapagos and Hawaii groups and, like them, considered Norfolk Island had been colonised by recent transoceanic dispersal following its emergence from the sea. Holloway (1977) stated that the geological history of Norfolk Island indicated that all colonisation has taken place at most over the last three million years and that lower sea levels during late Pleistocene glaciation events would have increased the land area available to organisms dispersing from New Caledonia and New Zealand as a series of potential stepping stones emerged, facilitating range expansion.

The natural history of Norfolk Island has been the subject of a great deal of research, considering the small size of the island (34 square kilometres) and its relatively recent geological origin (Holloway, 1977; Green, 1994; Smithers, 1998; Endersby, 2003). This effort has been prompted in part by its endemic species and concerns for their conservation due to grazing pressure and increases in tourism and development since the 1960s (Turner *et al.*, 1968). But the biogeographical and phylogenetic relationships of the fauna have received far less attention, with examples including moths (Holloway, 1977), sciapodine flies (Bickel, 1996), cicadas (Arensburger *et al.*, 2004) and freshwater shrimps (Page *et al.*, 2005).