

Genetic Variation in Archaeological *Rattus exulans* Remains from the Emily Bay Settlement Site, Norfolk Island

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ABSTRACT. Analyses of mitochondrial DNA variation in archaeological samples of *Rattus exulans* obtained during the 1997 excavations at Emily Bay, Norfolk Island suggest a high degree of variation in the prehistoric populations on the island. The ten samples sequenced produced five unique haplotypes. This result is consistent with a scenario of multiple introductions of the species to the island. There are clear affiliations with East Polynesian and New Zealand samples, however other lineages also appear to be present on Norfolk Island. Three haplotypes that had previously not been identified in tropical East Polynesia appear on Norfolk. One of these has also been identified in an archaeological sample from New Zealand. The other two haplotypes have yet to be identified elsewhere.

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It has been argued that patterns of genetic variation in Pacific populations of the Pacific rat, *Rattus exulans*, serve as a model for prehistoric human movement in the region. Specifically they have been valuable for identifying points of origin for voyages of exploration, colonization and later contact (Matisoo-Smith *et al.*, 1998). More recently, analyses of degrees of genetic variation in archaeological and modern samples of *R. exulans* have been used to assess the degree of contact with and isolation of particular island groups within Polynesia (Matisoo-Smith *et al.*, 1999). Both of these approaches are applied here to archaeological

samples collected during the 1997 Emily Bay excavations on Norfolk Island (see Anderson, Smith and White, this vol.).

Materials and methods

A total of 33 *Rattus exulans* bone samples were provided for analysis. From this material, 13 samples were considered to be large enough and in good enough condition for ancient DNA extraction. We were able to obtain enough DNA from 10 of these samples to amplify, using the Polymerase Chain Reaction (PCR), and directly sequence a 175 base-pair (bp)