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Dating the human colonisation of Mangaia, southern Cook Islands, using the commensal Pacific rat (Rattus exulans)

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An accurate age for initial human settlement in East Polynesia is the key to understanding the timing and patterns of human dispersal from West Polynesia, and the ecological and social transformations that followed on each island. However, the age for initial settlement on many islands in East Polynesia remains poorly resolved and highly debated. The southern makatea island of Mangaia in the southern Cook Islands provides one such example. Whereas charcoal curves and vegetation disturbance documented in sediment records from Mangaia have been radiocarbon dated to ~500 BC and attributed to earliest human activity, the oldest archaeological material excavated from Tangataatu, the largest rock shelter sequence on Mangaia, only dates to ~1000 AD. This discrepancy between the different dated records has not been adequately explained, and has resulted in proposed settlement chronologies for the Cook Islands that vary by as much as 1500 years. To resolve the debate about the date of settlement in Mangaia, we use AMS radiocarbon dating of Pacific rat (Rattus exulans)-gnawed woody seeds of native trees, and high resolution charcoal analyses from new sediment records to pinpoint the timing of initial arrival of people on the island.

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