
Archaeobiogeography of extinct rice rats (*Oryzomyini*) in the Lesser Antilles during the Ceramic Age (500 BC to 1500 AD)

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Abstract

In the Lesser Antilles, rice rats (*Oryzomyini* tribe) – now extinct in the region – were one of the few non-flying terrestrial mammals to be present and eaten by the pre-Columbian ceramic societies inhabitants (between 500 BC to 1500 AD), before the arrival of European settlers. Rice rats have a dual interest, both biological and cultural. As extinct taxa, their morphologies, as well as their past distribution and diversity in the region are poorly known, yet they allow to study the diet of pre-Columbian humans. We aim to characterize the spatiotemporal distribution of rice rats, complete their systematics and taxonomy, and assess their relationship with humans. We used an integrative approach combining geometric morphometrics, genetics and zooarchaeology. Using a two-dimensional sliding semi-landmark based geometric morphometric approach, we quantified and visualized tooth size and shape differences between chronological cultural periods and between islands. To test whether the phenotypic groups reflect environmental adaptations or phylogenetic history, we conducted ancient DNA analysis on the mitochondrial genome (Cytochrome b gene) of 70 archaeological specimens originating from all studied islands. From the 659 archaeological specimens representing seven different islands of the Lesser Antillean archipelago, three morphological groups emerged. They were geographically consistent and present from the beginning of the Ceramic Age: one in Saint-Martin in the northern part of the archipelago characterized by

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very small molars, one in Martinique in the south, and one in the central region (*i.e.* Antigua, Barbuda and the Guadeloupe archipelago: Basse-Terre, Grande-Terre and Marie-Galante). Within the central region each island has its own morphotype. Our morphometrics data reveal a archaeobiogeographic signal defined by a clear pattern of past distribution of Oryzomyines in the archipelago, stable over time. It suggests a limited human influence on the spatiotemporal distribution of this rodent. The wet and hot environmental condition typical of the tropical regions do not favor DNA preservation and likely preclude DNA analysis of the ancient remains we have studied so far. Yet, the phenotypic geographic distribution appeared consistent with DNA clusters from previous studies and indicates that new taxonomic classifications should be designated for the extinct archaeological populations of Saint-Martin and Marie-Galante.

Keywords: geometric morphometrics, genetics, teeth, Rodents, island evolution