
Early colonisation of the Philippine islands

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Abstract

Past dispersal patterns of terrestrial vertebrates towards and within the Philippine archipelago remain a widely debated topic. As none of these islands has ever been connected to mainland Southeast Asia, even during the most severe quaternary sea level drops, the question of ancient island hopping is still controversial. A West-East main flow from Borneo via Palawan Island seems preferred by scholars nowadays while older studies were favoring a North-South way from China via Taiwan – this latter island being connected to the continent during some glacial periods while the whole Philippines were not. An almost complete skeleton of the controversial "*Rhinoceros philippinensis* von Koenigswald, 1956" was recently discovered at Kalinga site (Northern Luzon) from a 709 ± 68 kya archeological layer along with butchery marks and lithic artefacts. This early Middle Pleistocene individual considerably adds to the knowledge of the Philippine rhinocerotid species. The completeness of the specimen further allows us to test the different phylogenetic and subsequently paleobiogeographic scenarios at hand. 309 cranio-mandibular, dental, and postcranial characters robustly support the unsuspected existence of a Southeast Asian Pleistocene clade, including the Philippine rhino. It is closely related to the Sumatran rhino + *Rhinoceros* clade and groups *Rhinoceros fusuiensis* from Asian mainland and *Rhinoceros hayasakai* from Taiwan. Our phylogenetic results strongly suggest an island-hopping dispersal hypothesis for this clade, from China toward Luzon via Taiwan by early Pleistocene times. The phylogenetically-constrained reconstructed body mass and gracility of the new rhino genus clearly points to a tendency to dwarfism from the continental species present in China, through the continental island species on Taiwan and until the oceanic island species in the Philippines. This rhino is the first perissodactyl supporting the island rule hypothesis, with body weight and limb bone robustness significantly decreasing from Asian mainland to Luzon.

Keywords: Rhino, Kalinga, early middle Pleistocene

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