




The high taxonomic diversity of the Palaeogene hystricognath rodents (Caviomorpha) from Santa Rosa (Peru, South America) framed within a new geochronological context

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ABSTRACT

Hystricognath rodents arrived in South America from Africa during the Paleogene. The oldest South American rodents (Caviomorpha) were intensively studied in recent years. One of these assemblages is the caviomorph paleofauna from Santa Rosa, Peru. Their age was originally estimated as ?Eocene. Here, we report new caviomorph fossils from Santa Rosa and review the previously described rodents taking into account new dates and updated caviomorph information. We identified 18 genera and 22 species, including one new genus and species (*Vucetichimys pretrilophodonia* gen. et sp. nov.), and two new species (*Shapajamys minor* sp. nov. and *Ucayalimys amahuacensis* sp. nov.). All taxa are brachydont, with visible cusps, and thin crests. The Santa Rosa rodents are one of the oldest and the most diverse caviomorph paleofaunas known from low latitudes of South America. Similarities between these caviomorphs and other Paleogene assemblages lead us to propose an early Oligocene age for those rodents from the Yurúa River (Brazil) and a close temporal relationship with the oldest known levels from Contamana. This new biochronological scenario has deep implications in the origin and early evolution of caviomorphs. A middle Eocene? entrance of one or several waves of African rodents arriving in South America is possible.

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Introduction

Caviomorphs are hystricognath rodents endemic to the Neotropics (Wood 1955). It is postulated that they arrived to the continent sometime during the middle Eocene, whereupon they rapidly evolved into several lineages, becoming one of the most abundant, diverse, and successful group of mammals in South America (Poux et al. 2006; Antoine et al. 2012; Arnal and Vucetich 2015; Vucetich et al. 2015a; Boivin et al. 2019). Palaeogene records of caviomorphs are broadly distributed throughout South America, with the oldest localities restricted to low latitudes (Figure 1). These earliest known rodent assemblages have been intensively studied in the last fifteen years, with a great increase in the number of known taxa (Frailey and Campbell 2004; Antoine et al. 2012; Boivin et al. 2017, 2018, 2021; Assemat et al. 2019; Arnal et al. 2019a). Several of these early rodents do not all fall clearly into the four main caviomorph lineages recognised today [e.g. Pan-Octodontoidea, Caviioidea, Chinchilloidea, and Erethizontoidea (Arnal and Vucetich 2015; Patton et al. 2015)], indicating a complex early evolutionary history. These rodents are best characterised by having low-crowned cheek teeth with evident cusps, low crests, and quadrangular occlusal outlines.

By the late Oligocene, caviomorphs were distributed throughout South America for the first time (Figure 1; e.g. Hoffstetter and Lavocat 1970; Wood and Patterson 1959; Patterson and Wood 1982; Vucetich et al. 2015b; Boivin et al. 2016; Pérez et al. 2018). They were more abundant than previously, and they displayed a great morphological diversity. By this time, representatives of the four main extant clades and also several other controversial lineages that are now extinct were recognised (e.g. *Changuin woodi* Vucetich

et al. 2014 and *Sallamys pascuali*; Hoffstetter and Lavocat 1970; Wood and Patterson 1959; Patterson and Wood 1982; Arnal et al. 2014; Arnal and Vucetich 2015; Boivin et al. 2016; Pérez et al. 2018).

Santa Rosa is a low-latitude locality in the tropical lowlands of eastern Amazonian Peru (Figure 1; Campbell et al. 2004). A middle-late ?Eocene–early Oligocene age was initially estimated for this local fauna based on the stage of evolution of the various mammals from the locality (Goin and Candela 2004; Frailey and Campbell 2004; Shockey et al. 2004; Ciancio et al. 2013; Bond et al. 2015; Seiffert et al. 2020). Later, a late ?Eocene age for the Santa Rosa caviomorph assemblage was suggested because of its similarities with the rodents of the Contamana localities CTA-27 and CTA-29 of eastern Peru, which were postulated to be of upper middle Eocene age (Antoine et al. 2012; Arnal et al. 2019a). Nevertheless, recent detrital zircon dates indicate a lower Oligocene age for the fossiliferous levels of Santa Rosa, and call into question the middle Eocene age proposed for the oldest fossiliferous levels of Contamana (Campbell et al. 2021). Santa Rosa shares with these oldest Contamanan horizons the presence of rodents with a proposed plesiomorphic caviomorph molar morphology (i.e. *Cachiyacuy* and *Canaanimys*) that was postulated to document the earliest steps of evolution of South American hystricognaths (Antoine et al. 2012). The main differences between the Santa Rosa rodent assemblage and the Contamana rodent assemblages are that the former is considerably more abundant in terms of the number of specimens, and it is taxonomically more diverse as well, with the presence of a few more derived taxa (e.g. *Eoincamys*, *Eodelphomys*; Arnal et al. 2019a).