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Original article

# A new species of *Celebochoerus* (Suidae, Mammalia) from the Philippines and the paleobiogeography of the genus *Celebochoerus* Hooijer, 1948☆

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ABSTRACT

*Celebochoerus* is a unique suid having extremely large upper tusks, and which was to date only known from the Pliocene-Pleistocene of Sulawesi Island in Indonesia. Here, we report on the discovery of a canine fragment referable to *Celebochoerus* from the Cagayan Valley of Luzon, Northern Philippines. We name a new species, *Celebochoerus cagayanensis* nov. sp., which differs from the Sulawesi species *Celebochoerus heekereni* in having mesial and distal enamel bands on the upper canines. We see these characteristics as symplesiomorphic in suids and propose a migration route from the Philippines to Sulawesi, possibly out of Taiwan, which would have occurred independently from the better known Pleistocene migration route from India into Java.



## 1. Introduction

The Cagayan Valley (Northern Luzon Island, Philippines; Fig. 1) is known for its Pleistocene fauna (von Koenigswald, 1956) since 1936 (Beyer, 1947: p. 214). The fossil fauna has been associated, somewhat questionably, with the "Cabalwanian" pebble tools (von Koenigswald, 1958). The long history of archaeological surveys and excavations in this area (Tobias, 1999) has yielded a considerable collection of fossils, including very few Suidae remains, which have remained largely undescribed (von Koenigswald, 1956; de Vos and Bautista, 2003; Liscaljet, 2012). We report here on the surface discovery of a suid upper canine fragment during one of our recent (2012) surveys in the Cagayan Valley. Based on its morphology we attribute this specimen to a new species: *Celebochoerus cagayanensis* nov. sp., and review the paleobiogeography of the genus.

In his description of the Pleistocene fauna from the Philippines, von Koenigswald (1956: p. 314) reported, with regard to suids, that only a modern boar tusk from an Iron Age layer in Novaliches was known. A few years later in his description of the Cabalwanian industry, von Koenigswald (1958) mentioned the existence in the National Museum collections of *Sus* along with elephant and tektites from Anda (Pangasinan province), but without further details. Since Beyer (1955) does not mention *Sus* specimens among the Pleistocene mammal finds in the Philippines, the suid specimen referred to by von Koenigswald (1958) was almost certainly found in 1957. The only other mention of Suidae from Pleistocene layers of the Philippines was made by Fox and Peralta (1974: p. 100) under a generic reference of "pigs" found on the surface during a survey on the western side of the Cagayan Valley, along the Pleistocene anticlines. As part of the same Early Man Project in Cagayan Valley, Mathisen (1981: p. 125) reported the discovery of pig on the northeastern flank of the Panggul anticline (Fig. 1). Fox and Peralta (1974) commented that those collections would be studied by D.A. Hooijer. However, to the best of our

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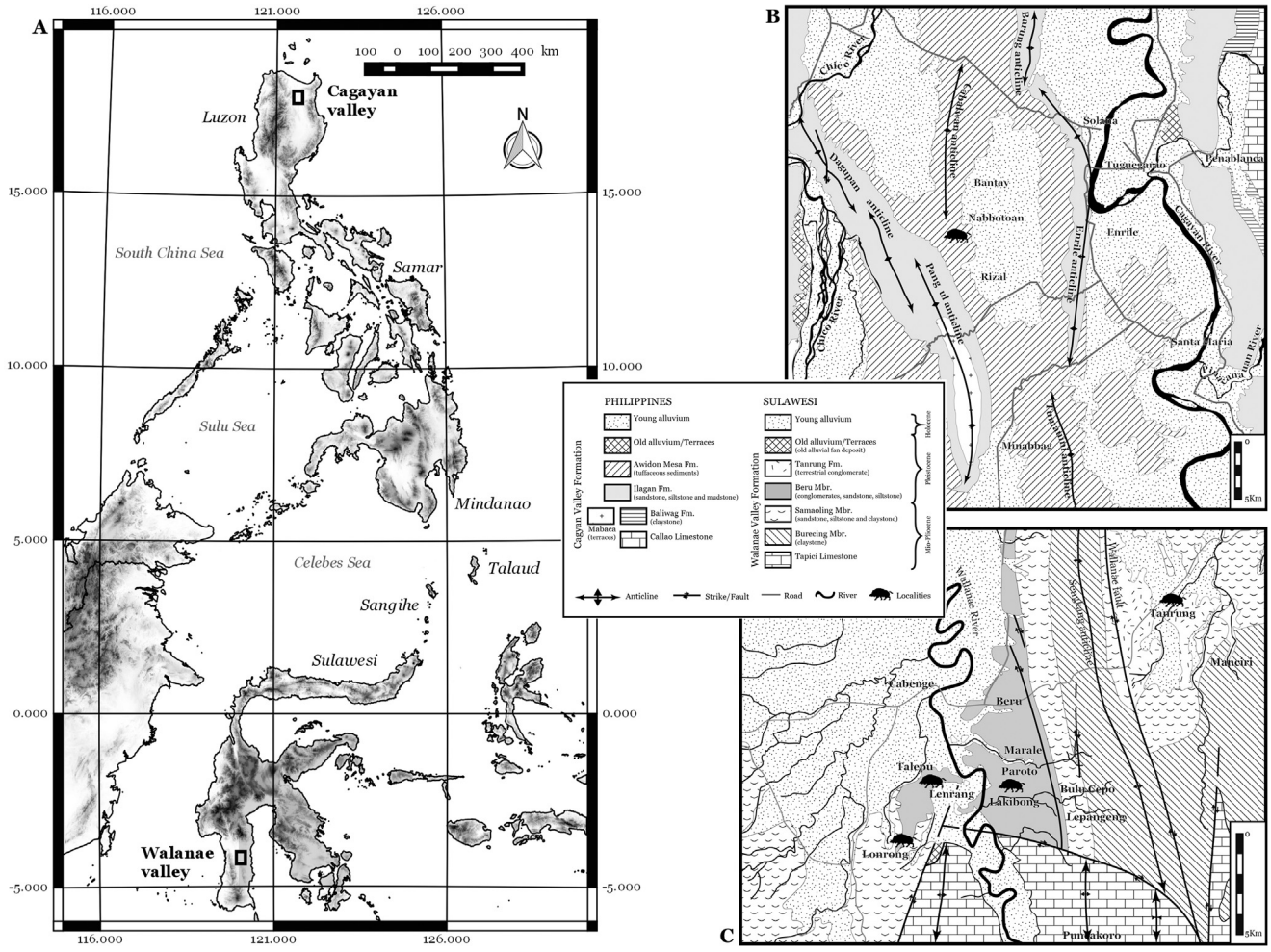


**Fig. 1. A**. Map showing the origin of *Celebochoerus* fossils in Southeast Asia. **B**. Geological map of the Cagayan Valley in Luzon Island, Philippines. **C**. Geological map of the Walanae Valley in Sulawesi, Indonesia.

knowledge, Hooijer never published about them and appears not to have ever studied these collections.

While studying the entire Pleistocene faunal collection present in the National Museum of the Philippines, de Vos and Bautista (2003) were the first to describe all of the Suidae teeth, which only included three isolated lower left third molars. They noted that the Suidae specimens were labelled: "new species *C. cagayanensis*". They nevertheless concluded that "although they look similar to *Celebochoerus*, as there are only three lower molars, it is, based on three specimens, not wise to give a specific determination. So, the best option is to indicate the molars as *Sus* sp." (de Vos and Bautista, 2003: p. 17). Excavations subsequently conducted in the Cagayan Valley (Bondoc, 1979) did not yield any additional suid remains (Bautista and de Vos, 2001; Jago-on, 2009). Apart from our own survey resulting in the newly-discovered upper canine fragment, the three lower left third molars labelled as "*C. cagayanensis*" remained the only other known suid fossils, which have never been described before.

The genus *Celebochoerus* was erected by Hooijer (1948) based on some characteristic upper canine specimens collected by H.R. van Heekeren in the Walanae Valley in Southwest Sulawesi, Indonesia (Fig. 1). The diagnosis for the genus and species *Celebochoerus heekereni* was based on a left upper canine (Hooijer, 1948). In the following years, more complete descriptions of this taxon were given, based on additional finds of teeth and postcranial remains (Hooijer, 1951, 1954). According to Hooijer (1950) the *Celebochoerus* incisors are similar to those of *Sus*, but in van der Made's assessment (1997) these incisors differ from *Sus* in being wider, while the premolars are more akin to those of *Potamochoerus*. Our assessment of the *Celebochoerus* molars, however, indicates they are very simple, more similar to those of *Babyrousa*, and quite distinct from *Sus*.

The most distinctive characteristics of *Celebochoerus* are the very large upper canines that are much wider than those of the extant endemic suids of Sulawesi, *Sus celebensis* and *Babyrousa celebensis*, with the permanent canines of the latter being devoid of any enamel. Hooijer (1950) noted some sexual dimorphism in *C. heekereni* with the females having canines three-fourths as large as those of males, a feature that was later contested by Aziz (1990: p. 40). Later it was noted that size-based sexual dimorphism can only be distinguished when comparing individuals from the same locality, since the average size of the dentition appears to decrease with time (van den Bergh and Aziz, 1995). Taken together, these characteristics, as well as some distinctive cranial features (Suyono, 2009), make *C. heekereni* unique among Suidae, and apart from our excavation, had only been found in Sulawesi.

Pickford (1993) considers *Celebochoerus* as a sister taxon to *Sus* and *Babyrousa* and positions it as a possible ancestor to the latter, with all three genera being grouped as a basal lineage of the Suini tribe. Classification of *Celebochoerus* among Suinae is not, however, consensual. van der Made (2010) views *Celebochoerus* as a babyrousine together with *Babyrousa* and *Potamochoerus*. We