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Revisiting the classical small mammal assemblage from the Eocene site of Silveirinha: a fresh look at old collections

Revisitando a coleção clássica de pequenos mamíferos do Eocénico inferior de Silveirinha: um novo olhar sobre coleções antigas

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Sumário: O sítio de Silveirinha é uma das localidades de mamíferos mais conhecidas da Paleontologia do Cenozoico de Portugal e da Europa em geral. Graças à sua rica e diversificada associação de mamíferos, com mais de 30 taxa, foi posicionado no Eocénico inferior (início do Ypresiano, MP7, ca. 55,8 M.a.), sendo o local mais antigo da Europa desta Época, devido à presença única de taxa típicos do Paleocénico superior, juntamente com outras espécies já características do Eocénico inferior. Este estudo irá rever o material de pequenos mamíferos deste sítio, conservado na coleção clássica da Universidade Nova de Lisboa, a fim de fazer uma atualização taxonómica à luz das publicações mais recentes.

Palavras-chave: Ypresiano, MP7, Silveirinha (Portugal), coleção histórica, vertebrados

Key words: Ypresian, MP7, Silveirinha (Portugal), historical collection, vertebrates

The Silveirinha site is one of the best-known mammalian sites of the Cenozoic of Portugal and the European Eocene. The first fossils were discovered by Pena dos Reis (1981), during researches on the Cretaceous and Cenozoic stratigraphy of the Mondego Basin. The fossil assemblage was found in a claystone quarry located about 15 km south from Figueira da Foz, and first studied in collaboration with M. Telles Antunes and A. Ferreira Soares (Reis et al., 1981; Antunes & Russel, 1981; Soares & Reis, 1982). They defined the local lithostratigraphic setting as “Areias e argilas de Silveirinha” (“Silveirinha sands and clays”), later renamed as Silveirinha Formation. Since then, the fossil site has been excavated on several occasions, with the largest effort during the summer of 1986, when more than a ton and a half of sediment was extracted. The site was excavated at three different points on the same level (SV1, SV2 and SV3). Based on this abundant material, Estravis (1992) wrote her doctoral thesis. Unfortunately, despite the richness of the fossil material excavated during the years, this site is no longer available for further investigations because the quarry is now infilled, and the fossil horizon is no longer accessible for collecting new material.

In the above mentioned PhD thesis, the following faunistic list was described (in brackets, the points where each taxon has been discovered; no indication is listed when the appearance was in all the localities:

Peratherium cf. *constans*, *Apatemys* sp. I (SV2+3), cf. *Apatemys* sp. II (SV3), *Heterohyus* sp. I and II (SV3), *Russellmys denisae* (SV3), *Leptacodon nascimentoi*, cf. *Leptacodon* sp. (SV3), *Nyctitheriidae* indet. (SV3), ?*Nyctitheriidae* or ?*Dormaliidae* indet. (SV1+2), ?*Talpavus* sp. (SV1), *Didelphodus* sp. (SV3), *Arcius zbyzewskii*, *Eurodon silveirinhensis* (SV2+3), *Donrussellia lusitanica*, cf. *Cantius* sp. and/or cf. *Donrussellia* sp. (SV3), *Creodonta* indet., *Miacis* cf. *latouri*, cf. *Miacis* sp., cf. *Viverravus* sp., *Miacidae* indet., *Microparamys paisi*, *Microparamys* cf. *nanus*, *Meldimys cardosoi*, *Paschatherium marianae*, *Microhyus reisi*, *Diacodexis antunesi*, *Hyracotherium* cf. *vulpiceps*, cf. *Lophiaspis maurettei* (SV3), *Ilerdoryctes* cf. *sigei* (SV3) and *Mammalia* indet. (SV1).

Afterwards, excavations continued for some time, adding new taxa to the list, such as *Archaeonycteris praecursor*, or *Mondegodon eutrigenus* (Tabuce et al., 2009, 2011). The new material also allowed for a more detailed description of previously found taxa,

such as *Diacodexis* or *Microhyus* (Boivin et al., 2018 and references therein). Silveirinha is therefore a site of vital importance in the study of early Eocene fossil mammals, and it is the type locality of eleven mammal species (fig. 1).

However, not all palaeontological studies have focused on mammals, and there are other vertebrates in the faunistic association, such as crocodiles, turtles, birds, amphibians, squamates and fishes. In addition, to complete the context in which this site was deposited, invertebrate and plant remains, such as molluscs, ostracods and charophytes, have been thoroughly studied (Pais et al., 2012 and references herein). The first ones revealed an assemblage typical of low energy freshwater environments with reddish clay substrates drained by small channels with sandy infill (Callapez, 2003).

One of the controversies raised by this site relates to the Eocene boundary, more specifically MP7, being the oldest European site of this age, since there was some doubt as to whether it corresponded to the late Palaeocene or the earliest Eocene. In general, the mammal faunas consist of a combination of primitive elements typical of the Paleocene, together with more modern ones that belong to the early Eocene. According to this combination, the mammal fauna

has been assigned to a more basal Ypresian age (near the Palaeocene-Eocene boundary), more specifically MP7, being the oldest European site of this age.



Fig. 1. The quarry and fossil site of Silveirinha, in 2004.

This study reviews the small mammal materials housed in the classical collection of the Universidade Nova de Lisboa, in order to make a taxonomic update in the light of the most recent studies on this type of mammals during the last few years. This revision plays a major role in a better taxonomical and phylogenetic knowledge of these faunas, since the site is no longer accessible and it will no longer be possible to obtain additional specimens from it.

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