Journal of Archaeological Science 38 (2011) 3518–3523

Contents lists available at SciVerse ScienceDirect

Journal of Archaeological Science

journal homepage: http://www.elsevier.com/locate/jas

The Emirate of Córdoba (756–929 AD) and the introduction of the Egyptian mongoose (*Herpestes ichneumon)* in Iberia: the remains from Muge, Portugal

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ARTICLE INFO

Article history:
Received 31 May 2011
Received in revised form
17 August 2011
Accepted 18 August 2011

Keywords:
Egyptian mongoose
Herpestes ichneumon
Muge shell middens
Emirate of Córdoba
Iberian Peninsula

ABSTRACT

We describe new finds of *Herpestes ichneumon* (Egyptian mongoose) from an archaeological context in Portugal, directly ^{14}C dated to *c.* 800 AD. This is at least two centuries older than a previously reported find of this species from Andalusia (southern Spain; Riquelme-Cantal et al., 2008). Our finding provides further support to the hypothesis that the Muslims introduced this animal to the Iberian Peninsula. In particular, we suggest that Berber settlers might have brought it some time during the Umayyad conquest of Iberia or with the establishment of the Emirate of Córdoba.

1. Introduction

Riquelme-Cantal et al. (2008) reported a cranium of Egyptian mongoose directly dated by AMS to between the 11th and 13th centuries AD (1030–1220 cal AD – Table 1), found in the Cave of Nerja (Málaga – Fig. 1), an important Palaeolithic art site in Southern Iberia (Bicho et al., 2007). Although one of the chambers (the Torca Room) at Nerja has evidence of an Islamic occupation, the *Herpestes ichneumon* skull derives from a surface Chalcolithic layer in a different cave chamber, "Sala de Los Fantasmas" (Simon Vallejo, 2003).

This carnivore remain is important, not only because it became the oldest known element of the Egyptian mongoose in Iberia (and in the European mainland), but also because it suggested the introduction of the species during the late Islamic occupation of Iberia.

Here we present four mongoose bones from the Muge Mesolithic shell middens (central Portugal – Fig. 1), one of them an ulna (Fig. 2) directly dated to 780–970 Cal AD (Table 1). Hence, the ulna, found with the other *H. ichneumon* remains in a 1930s excavation at Cabeço da Amoreira and Moita do Sebastião, supports the idea that the Egyptian mongoose was introduced by the Islamic occupants of Iberia, but three centuries before than previously thought. It also opens the possibility that the Egyptian mongoose may have been brought by the first Muslim invaders of Iberia, but most likely it was introduced during the independent Umayyad Emirate of Córdoba (756–929 AD).

The finds from Nerja and Muge both come from layers older than their direct C14 dating (Riquelme-Cantal et al., 2008; this study), clearly illustrating how the burrowing behavior of the species can easily disturb the stratigraphic record.

2. The Egyptian mongoose

The Egyptian mongoose is a 2–4 kg animal, with a head-body length of 50–60 cm and tail length of 45–60 cm. The pelage is grizzled gray, with darker head and black on the lower limbs, and the hair is coarse. It has a slender body, with relatively short legs, a long head with pointed muzzle and short rostrum, and the tail ends in a black tassel. The head is topped by small, rounded ears barely above the skull cap (MacDonald and Barrett, 1993; Wilson and Mittermeier, 2009). Presently, the Egyptian mongoose is distributed over the African continent, in the Levant from the Sinai Peninsula to southern Turkey, and in Europe in the southwest of the Iberian Peninsula (Cavallini and Palomares, 2008).

The earliest remains of *Herpestes* (Herpestidae) are from the 7 million year-old Late Miocene fossiliferous area of Toros-Menalla in Chad (Peigné et al., 2005a, b, 2008). However, a recent molecular

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doi:10.1016/j.jas.2011.08.014

Table 1
Early AMS dates of *Herpestes ichneumon* from Iberia.

Region	Site	Lab Code	Age BP	Cal AD (1σ)	Cal AD (2σ)
Central Portugal	Cabeço da Amoreira	Wk-26799	1168 ± 30	780–890	780–970
Andalucia (Spain)	Nerja[a]	Ua-32892	885 ± 40	1050–1210	1030–1220

[a] (Riquelme-Cantal et al., 2008).

phylogenetic study inferred an origin around the Early to Middle Miocene boundary (≈16 million years ago) for both the genus *Herpestes* and the lineage leading to *H. ichneumon* (Patou et al., 2009).

The Egyptian mongoose is first known from Laetoli (Pliocene) and then possibly at Olduvai (Pleistocene) (Petter, 1973, 1987). Klein (1974) reported the presence of *H. ichneumon* in several South African Pleistocene sites, such as Klasies River, Nelson Bay and Elandsfontein. In the Levant, the oldest known specimens come from the Ubeidiya formation (1.6–1.2 m.y.) in Israel (Tchernov, 1988; Belmaker, 2006). Remains of this mongoose were also found in the Natufian of the el-Wad (16,000–13,000 cal BP) and Raqefet caves (13,000–11,500 cal BP) (Mount Carmel, Israel) (Yeshurun, in prep.).

Egyptian mongoose bones have been found in a number of Holocene sites throughout Africa (e.g., Sudan, Algeria and Morocco; Gautier & Van Neer, 1997; Bouchud, 1969; Monod, 1970; Ouchaou, 2000). It is also reported in the early Neolithic from the Egyptian complex of sites of Nabta Playa (Gautier, 1980) dated to *c.* 11 to 9 kyr cal BP (Wendorf and Schild, 1998). Also in Egypt, Osborn and Osbornová (1998) describe mummies and skulls of the species at Bubastis (20th Dynasty), Dendereh and Abydos (Roman period).

In Europe, no mongoose remains have been found from before the Holocene (Kurtén, 1968). The earliest remain is a humerus found in Sant'Antioco Island (Sardinia, Italy), in a cistern mainly used during the Punic period and associated to materials from the 4th-5th to the 1st-2nd century BC (Campanella and Wilkens, 2004; Masseti, 2009).

However, given the semi-fossorial habits of the species and the fact that the humerus was not directly dated, the possibility of stratigraphic uncertainty remains. Even if the Egyptian mongoose was introduced in Sardinia some time before the Roman era, the species has never been found in any other part of Italy, Corsica and mainland France, or in the Balearic Islands, which suggests that this introduction is not at the root of Europe's extant population of this species in southwestern Iberia.

Egyptian mongooses are known to become good pets if reared from an early age (Mendelssohn and Yom-Tov, 1999). In the Middle East, the species is known as the 'Pharaoh's rat' and, according to Harrison (1968), was venerated for eating Nile crocodile eggs and fighting the Egyptian cobra. The ability of *H. ichneumon* to tackle snakes was indeed well known in antiquity (Zeuner, 1963). For example, Pliny the Elder describes a mongoose from Egypt in his work *Natural History* (Book 8, Chapter 36 – 1st century AD) and Isidore of Seville's *Etymologiarum* (XII, 2–37 – 7th century AD) also refers the species. Although Isidore of Seville lived in Iberia before the Muslim invasion, this does not mean that he observed the species locally. Isidore's method was essentially bookish and encyclopaedic, as typical of Late Antiquity writers, rather than based on direct observation of phenomena (Boledón, 1989). Oros-Reta and Marcos-Casquero (1994) show that the passage of the *Etymologiarum* dedicated to the Egyptian mongoose in fact came from an incorrect copy of a text by Draconcio (a prolific poet born near Cartago in the 5th century AD; see Boledón, 2000), which

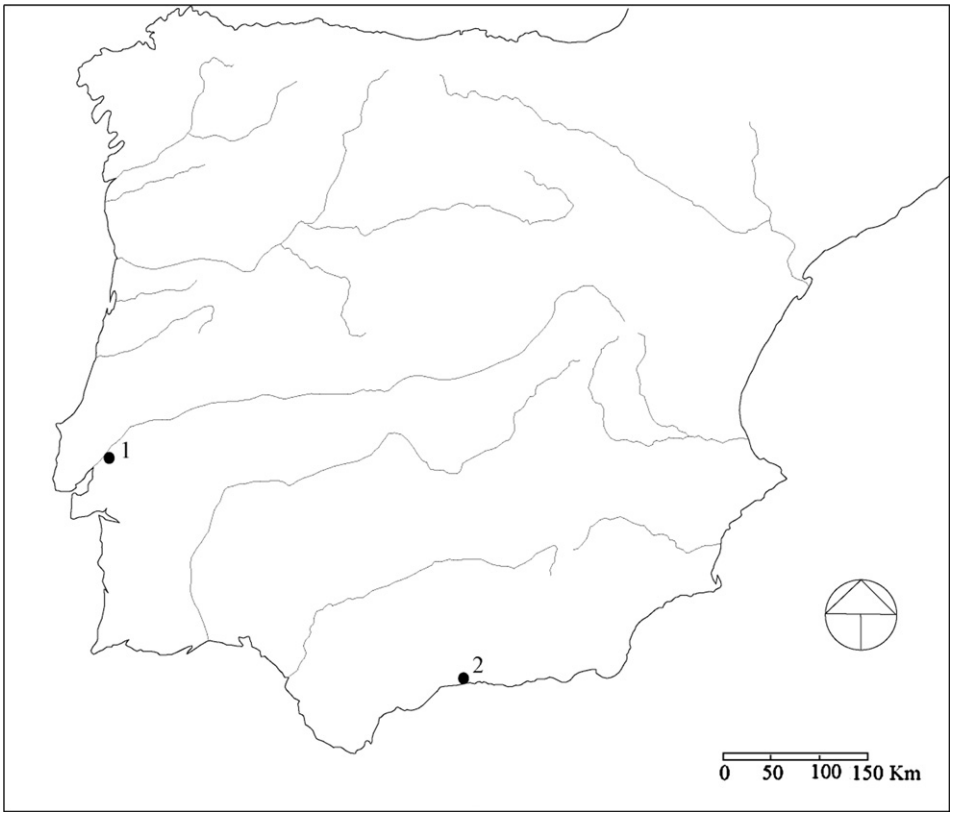

Fig. 1. Location of the Muge Shell middens (1) and Cave of Nerja (2).

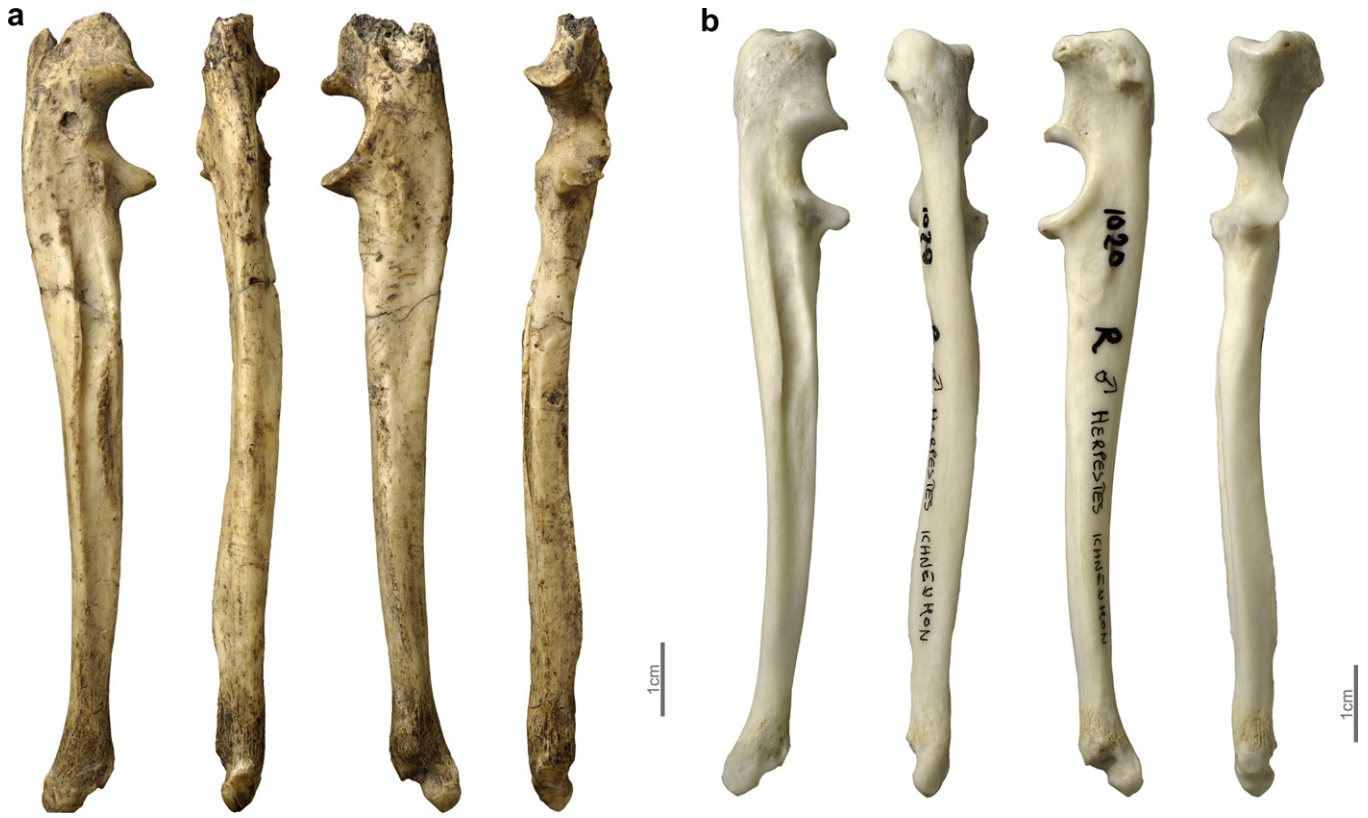

Fig. 2. Complete ulna from *Herpestes ichneumon*. On the left the archaeological remain from Cabeço da Amoreira and on the right the specimen from the comparative collection in IGESPAR Zooarchaeology lab (IGESPAR, Lisbon). Photo by JPRUAS.

originally does not even mention the species. Therefore, Isidore's reference cannot be considered reliable evidence for the presence of *H. ichneumon* in the Hispania of his time.

3. The Muge archaeological remains of Herpestes ichneumon

The remains described here come from the excavations of the very large Muge shell middens - a complex of open-air sites dated to the Mesolithic of the lower Tagus valley north of Lisbon, Portugal (Fig. 3). These sites were occupied since 8.000 cal BP (Bicho et al., 2010, in press) by hunter-gatherers that had no domestic animals except the dog (Detry and Cardoso, 2010). The shell middens were discovered in 1863 and excavated in subsequent years by Carlos Ribeiro (1884), and have been intermittently excavated since by several archaeologists (for a more detailed history of the excavations see Cardoso and Rolão, 1999/2000).

The mongoose remains all come from early excavations at Cabeço da Amoreira and Moita do Sebastião. The site of Cabeço da

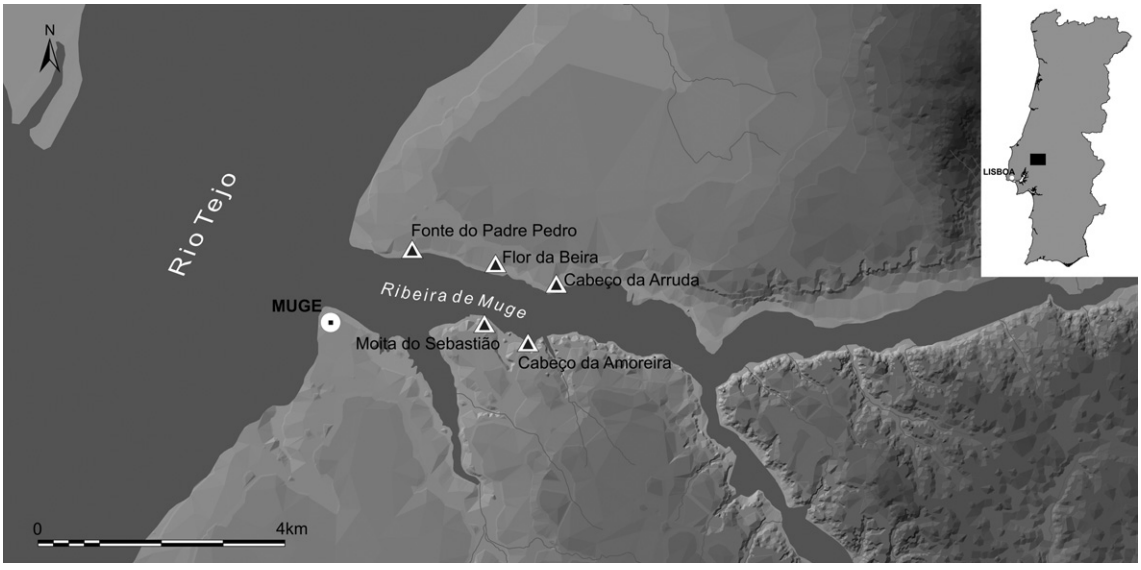

Fig. 3. Location of the Muge shell middens individual sites. Adapted from Gonçalves (in press).

Amoreira is a large shell midden, forming an oval with about 2000 square meters. The stratigraphy, with between 20 and 30 different shell layers depending on the area of the midden, reaches a height of just over 3 m. Recently, the whole sequence was AMS dated (Bicho et al., in press), and it is now securely dated by 22 new dates to between c. 8000 and 7600 cal BP. Moita do Sebastião was partially destroyed and its top section was removed in the early 1950's for the construction of a rice processing plant. Although there is no clear description of the morphology of Moita do Sebastião, the plan view published by Roche (1972), as well as older plans from 1880 (Jackes and Alvim, 2006), indicate that the shell layers originally spread over an area between 1500 and 2000 square meters. Also, by analogy with both Cabeço da Amoreira and another shell midden still existent in the area, Cabeço da Arruda, it is likely that Moita do Sebastião raised to a height of about 3 m.

After almost 150 years of excavations, with very little material analysis performed, Detry (2007) studied some 20,000 animal remains from the Muge Mesolithic sites. Artiodactyls (red deer, roe deer, wild boar and aurochs), perissodactyls (horse), together with several thousands of estuarine bivalve shells, are very common in the faunal collections from the early excavations of the 19th and first half of the 20th century, housed in the Museu Geológico (Lisbon) and Museu Antropológico e Etnológico (Porto). A complete dog skeleton, the oldest found in Portugal (Detry and Cardoso, 2010), and remains of red fox, badger, otter and Iberian lynx were also found. In most cases there was evidence for the human consumption of these animals (Detry, 2007).

Among the carnivore remains, four *H. ichneumon* bones were found: one cranium from Moita do Sebastião (Fig. 4), one pelvis (acetabulum), and two complete right ulnae (one of them dated to 780–970 cal AD: Table 1, Fig. 2) from Cabeço da Amoreira. The dated ulna, since it only weighed 2 g, was completely consumed by the AMS analysis. Therefore, given the destructive nature of sampling for C14 dating, we could not obtain permission to date the other three elements.

The ulnae and the pelvis, excavated by Mendes Corrêa in the 1930's, stratigraphic provenience is known, coming from the basal layer of Cabeço da Amoreira. The cranium comes from the excavations of J. Roche and O. V. Ferreira at Moita do Sebastião in the 1950's (Roche, 1972; Roche and Ferreira, 1967). Excavations at Moita do Sebastião were only undertaken in the deepest layers (dated to c. 8000 Cal BP), as the overlying ones had been destroyed (Roche, 1972), and thus the skull was also found in the basal layers of the midden. None of the four mongoose remains had any evidence of burning or cut marks. Further, they showed no signs of calcrete ($CaCo_3$) on the surface of the bone, which is very typical of the remains coming from the Muge shell middens.

4. Discussion

People tamed and domesticated various species of carnivores through the ages and introduced some of them, such as cats, ferrets and mongooses, in several areas, particularly for pest control (Zeuner, 1963). For instance, Vigne et al. (2004) found a cat (*Felis silvestris* cf. *lybica*) burial in Shillourokambos, Cyprus, dated to

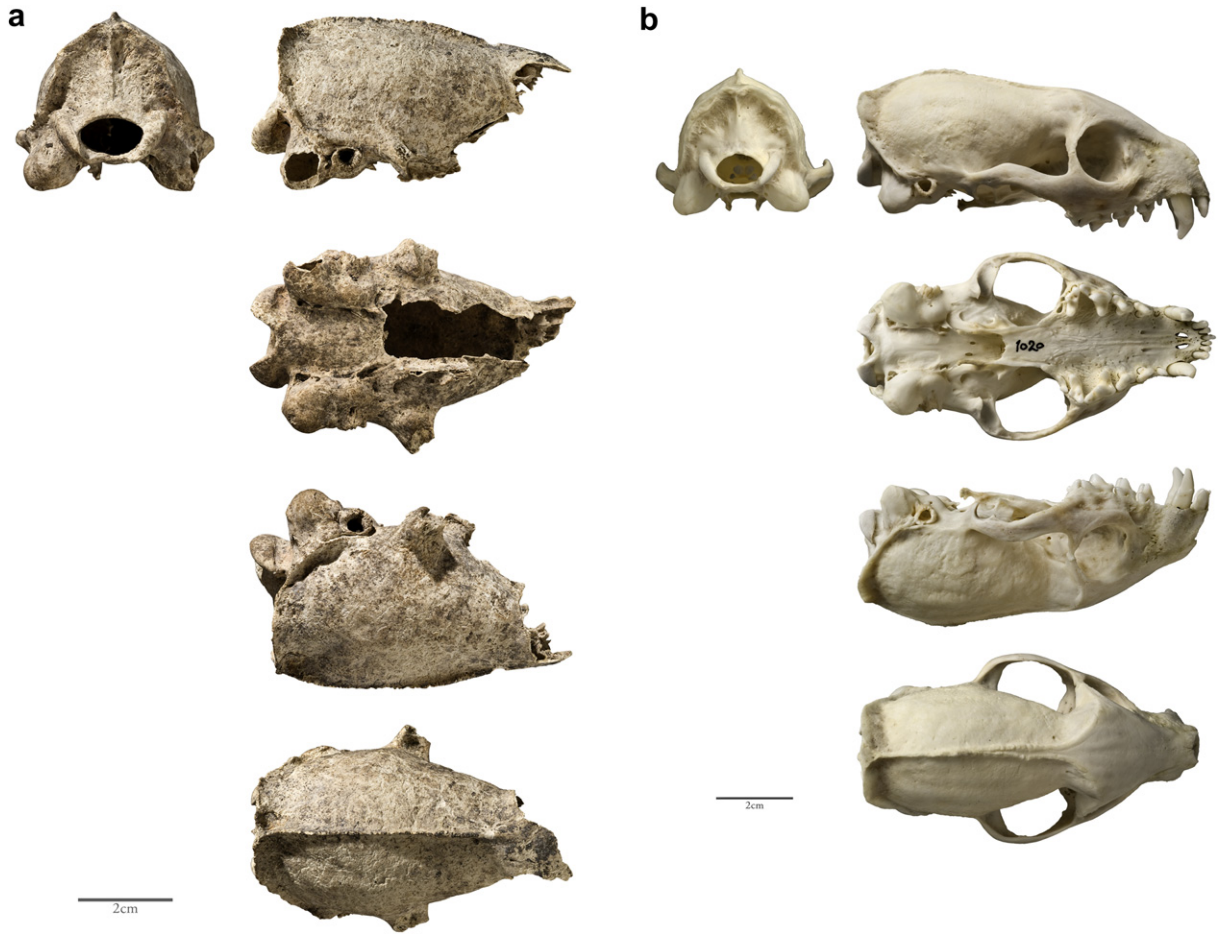

Fig. 4. Fragment of the cranium from *Herpestes ichneumon* found at Moita do Sebastião (on the left) and a recent specimen (on the right) from the comparative collection in IGESPAR Zooarchaeology lab (IGESPAR, Lisbon). Photo by JPRUAS.

9.500–9.200 years ago. Although it shows no signs of domestication, its deliberate burial associated with human remains suggests that it might have been tamed and introduced into the island. Ferrets (*Mustela furo*) are often used to hunt rabbits (Clutton-Brock, 1999) and, in Africa and India, mongooses are tamed and kept inside the house to control rodents and reptiles (Burton, 1859; Harrison, 1968).

Small Asian Mongooses (*Herpestes javanicus*) were introduced into several Caribbean islands, Fiji and Hawaii, to control rats and snakes (Walker, 1975; Simberloff et al., 2000). In each island, the mongooses were introduced in small numbers and rapidly established abundant populations (Simberloff et al., 2000). Generally, they became pests because they prey upon a wide variety of birds and mammals (Walker, 1975). Similarly, Riquelme-Cantal et al. (2008) suggested that the Egyptian mongoose was probably introduced into Iberia as a domestic animal to help in the control of rodents and snakes in human settlements.

The dating results presented here support the hypothesis that the Egyptian mongoose was introduced into the Iberian Peninsula by Muslim immigrants from North Africa (Dobson, 1998; Riquelme-Cantal et al., 2008). The C14 dates (780–970 AD − 2σ, see Table 1) correspond to the Córdoba Emirate and beginning of the Caliphate period. According to this timeframe and the distribution of the Egyptian mongoose in the most likely source areas (Maghreb and the eastern Mediterranean) for their introduction into Iberia, we discuss two possible explanations, which are not necessarily mutually exclusive, for how the species may have been brought to the Iberian Peninsula.

The first scenario, the "Arab/Oriental hypothesis" envisages that the mongoose could have been imported from the Levantine region controlled by the Umayyad dynasty, which ruled al-Andalus after 756. Among the many possible circumstances for the introduction, the species could have been transported with the invasion force that arrived in Iberia with the Arab governor Musa Ibn Nusayr in 712, during the rule of the Syrian general Balj ibn Bishr al-Qushayri in 742, or even later during the period of massive orientalization of al-Andalus starting in 822 with the ascent of Abd-ar-Rahman II to Emir of Córdoba and the arrival of the influent polymath Ziryab to his court.

However, there is no documentary evidence to support this hypothesis, which is unexpected if it were to be correct, given the detailed writings of the period, such as the book *Muqtabis* (Hayyan, 2001) that describe extensively Ziryab's work. Nor is the role of the Egyptian mongoose in Arab cultural and livelihood traditions mentioned in the several scientific and particularly agronomical writings of the 10th century al-Andalus. Also, although Arab scientists of the time showed no interest in writing about animals, the introduction of a species for the sole purpose of controlling pests would have been certainly recorded (Álvarez de Morales, 1990, López and López, 1990; Dozy and Pellat, 1961). Finally, a recent phylogeographic study using mitochondrial DNA (Gaubert et al., 2011) indicates that the Egyptian mongooses from the Levant are genetically more distant from the Iberian ones than the ones from the Maghreb.

The second explanation is the "Berber hypothesis". Following the Muslim conquest of Iberia (711 AD), many Berber immigrants came to the Peninsula. The range of estimated dates for the ulna coincides with this period of colonization, including the great Berber revolt of 740 AD against the governors of Córdoba, which allowed the Berbers to settle in areas further south than those that were initially assigned to them (Marques, 1993). The regions inhabited by the Berbers were primarily rural, while the main cities were essentially populated by Arab families. Although it is impossible, with the available data, to determine the exact date and agent of the introduction of the Egyptian mongoose in Iberia, it is more likely that it occurred within an agricultural rather than an urban setting.

According to Tahiri (2010), Berber tribes like the Sanhaja, from the northern part of the Maghreb, were of particular importance in the occupation of rural parts of the Algarve (southern Portugal). Other areas of intense Berber occupation were the Tagus and Sado river estuaries, regions dominated by the tribe Masmuda (De Felipe, 1997), which controlled not only rural areas but also some of the castles. The closest urban center to Muge was Santarém and the Tagus River and valley was a much-used thoroughfare for transport and commerce between Lisbon and this town, with Muge being an important harbor since Roman times in that route (Pimenta and Mendes, 2008). This area also has archaeological evidence of Islamic occupation at least since the 10th century AD from the site Horta do Cadaval (Gustavo Lopes, personal communication).

The Tagus valley was covered by extensive plains and was renowned for its agricultural fertility (Conde, 2007), specially in the area were Muge is located, which the geographer Idrisi described as an alluvial flood plain dedicated to cereal production (ed. Dozy and De Goeje, 1866). The presence of the Egyptian mongoose in this area suggests an introduction in the early Islamic period as a way to control rodent pests in connection with the agricultural development of the region.

Gaubert et al. (2011) suggested that the Egyptian mongoose crossed the Strait of Gibraltar and invaded the Iberian Peninsula by sweepstake dispersal in the Late Pleistocene. However, the fact is that the zooarchaeological evidence (Riquelme-Cantal et al., 2008; this study) does not support this hypothesis. Although, at this moment, we cannot rule out completely the hypothesis of an earlier arrival, it is certainly remarkable that the two available C14 dates for Iberian fossils of the species are both Medieval, in agreement with historical lines of evidence, and not from any earlier period within the wide time window stretching from the Late Pleistocene to the Middle Ages.

5. Conclusion

The Egyptian mongoose remains from Muge and Nerja were recovered in much older deposits, respectively in Mesolithic and Chalcolithic horizons, than their true age. Their accurate dating was only possible through direct AMS analysis. Given the habit of the Egyptian mongoose to use burrows as resting sites (Palomares and Delibes, 1993), it is not surprising to find remains coming from more recent contexts in older layers, as in the case of the Muge and Nerja specimens.

The Muge finds reinforce the conclusion of Riquelme-Cantal et al. (2008) that the Egyptian mongoose was introduced to the Iberian Peninsula by Muslims in Medieval times. However, the new AMS date for the Muge ulna places the introduction of the Egyptian mongoose in Iberia three centuries earlier than previously thought, in a timeframe that coincides with the Umayyad Emirate of Córdoba (756–929 AD). This fact suggests that, if not before, the mongoose was introduced during this phase of the Islamic occupation.

Acknowledgments

This work was funded by the Fundação para a Ciência e a Tecnologia (FCT-MCTES, Portugal) as part of the project: "The last hunter-gatherers of the Tagus valley: the Muge shell middens", PTDC/HAH/64185/2006. CD was funded by the FCT grant (SFRH/BPD/43911/2008). CF acknowledges support from FCT-MCTES through the Ciência 2007 researcher fellowship C2007-UL-342-CBA1. We would like to thank Dr. Maria José Cunha and the Natural History Museum of the Faculty of Sciences of Porto, and Professor M. Magalhães Ramalho of the Geological Museum in Lisbon for providing access to collections under their care. Both Museums were very helpful in our study. We would also like to express our gratitude to the IGESPAR Zooarchaeology Laboratory in Lisbon by allowing us access to their comparative collection.

We thank Simon Davis and Michele Wollstonecroft for editing earlier versions of this article, José Paulo Ruas for the photos and Célia Gonçalves for the Muge shell middens map. We also thank Helene Jousse, Reuven Yeshurun, Barbara Wilkens and Nadja Pöllath for providing important information concerning the distribution of the Egyptian mongoose in archaeological sites as well as the anonymous referees for their very helpful comments.

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