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First occurrence of the extinct deer *Haploidoceros* in the Iberian Peninsula in the Upper Pleistocene of the Cova del Rinoceront (Castelldefels, Barcelona)

Première découverte du cerf fossile Haploidoceros *en péninsule Ibérique dans la séquence Pléistocène supérieur de la grotte des Rhinocéros (Castelldefels, Barcelona)*

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ABSTRACT

The Cova del Rinoceront is the first site in the Iberian Peninsula where the genus *Haploidoceros* has been documented. This discovery of abundant remains is also its first recorded occurrence in Europe during the Upper Pleistocene. The new fossil record strengthens claims that this genus was widely distributed during the Pleistocene, occupying a longer time span at least until MIS 5. Cranial and post-cranial skeletal remains ascribed to this species were recovered from the uppermost layers of the Cova del Rinoceront. The diagnostic features that allow these remains to be unequivocally assigned to *H. mediterraneus*, include their cranial morphology and antler shape, comprising two sickle-shaped beams, curving backwards and laterally, and a long frontal basal tine. This paper highlights the problems of deer systematics and identification given the high degree of fragmentation of the genus, their relatively homogeneous morphology, a virtual absence of reliable characters and the overlap of measurements between species.

RÉSUMÉ

La grotte du Rhinocéros est le premier site ibérique livrant des restes abondants du genre *Haploidoceros*. Il s'agit également de la première mention de ce genre dans le Pléistocène supérieur européen. Cette nouvelle découverte démontre que ce genre était largement distribué au Pléistocène, avec une survivance jusqu'au MIS 5. Plusieurs crânes et éléments post-crâniens proviennent des niveaux supérieurs de la séquence de la grotte des Rhinocéros, et l'attribution est bien confirmée par la morphologie crânienne et des bois en fourche simple, dirigés vers l'arrière et sur le côté, et un andouiller frontal très long. De plus, des questions sur la systématique des cervidés et le problème de leur identification

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sont soulevées, en rapport avec le fort degré de fragmentation dans la documentation fossile, la morphologie relativement homogène de cette famille ou l'absence de caractères diagnostiques bien définis, ainsi que le chevauchement des mesures entre différents genres et espèces.

1. Introduction

Remains of medium-sized deer from two Late Middle Pleistocene sites in the South of France have been attributed to a new genus with a single species, *Haploidoceros mediterraneus* (Croitor et al., 2008). The two sites are, respectively, Lunel-Viel (Hérault), where the taxon was initially identified as *Euctenoceros mediterraneus* (Bonifay, 1967), and Igue-des-Rameaux (Tarn-et-Garonne), situated 190 km to the west, where the species was identified for a second time (Brugal *in* Rouzaud et al., 1990). The key element permitting the diagnosis of the genus is the shape of the deer's antlers, which present a simple, primitive morphology comprising two branches: a sickle-shaped antler beam that curves backwards and laterally, and a long frontal tine, indicative of a degree of specialization that differs from that of all other known genera of deer. Indeed, the antlers of *H. mediterraneus* are proportionally larger than those of other similar-sized deer. Other features that allow this deer to be distinguished from *Cervus elaphus* include its dental and post-cranial bones (Croitor et al., 2008; Noury, 1997). Additionally, the proportions of its fore- and hind limbs are indicative of the locomotion of a saltatorial runner, similar in this respect to *Dama clactoniana* (Croitor et al., 2008).

According to Croitor et al. (2008) and following the chronology proposed by Bonifay (1981), the medium-sized deer found at these two sites in France date from the Middle Pleistocene (estimated at ~300–350 ka BP by biochronology). Both sites yielded species, such as *Hyaena prisca* and the small wolf *C. lupus lunellensis* (Brugal and Boudadi-Maligne, 2011). Although *Haploidoceros* remains have hitherto been unidentified in the Iberian Peninsula, an earlier origin in the Lower Pleistocene has been proposed. The deer materials recovered from various Iberian sites, including Venta Micena-2 and Atapuerca (TD6), could be good candidates for ancestors; however, the remains are poor and often too fragmented to confirm their taxonomic status and verify this hypothesis (Croitor et al., 2008). It should be noted that the first paleontological studies undertaken by Bonifay (1967) suggested a Villafranchian origin for the remains, providing a preliminary identification as *Euctenoceros* (= *Eucladoceros*) *mediterraneus*. However, as it is apparent in the taxonomic names used by this author, there was some uncertainty regarding the genus name. The presence of distinct, infrequent remains of the cervid genus *Haploidoceros* in the South of France in the Middle Pleistocene, as well as the absence of any evidence of this deer in other geographical areas, suggest its endemic distribution.

Cervids remains are relatively common taxa in Pleistocene archaeological and paleontological sites; yet, because they are usually fragmentary, and because their morphology is relatively homogeneous with few diagnostic characters at lower taxonomic levels, deer systematics remains somewhat imprecise, especially for the small- to medium-sized deer record (Lister, 1990). The taxonomy is based largely on antler morphology, which generally provides the most reliable characters for identifying genera and species, while correlations with post-cranial elements are often uncertain.

In the Iberian Peninsula, where *H. mediterraneus* has hitherto remained unrecorded, the presence of various small- to medium-sized deer during the Upper Pleistocene has been recorded at several sites, although in many cases, taxonomic attribution is controversial. At Las Majolicas (southern Iberian Peninsula), a small *Cervus elaphus* has been identified, its size being attributed to the climatic differences faced by northern and southern populations, while the size of the smallest specimens in this set has been attributed to sexual dimorphism (Domingo and Alberdi, 2004). In the centre of the Iberian Peninsula, various medium-sized deer have been documented in Cueva del Camino (Pinilla del Valle). The most frequent is the fallow deer, *Dama dama* cf. *geiselana* (Álvarez-Lao et al., 2013; Arsuaga et al., 2012; Van der Made, 2001), although previous studies classified the species as *D. clactoniana* (Buitrago-Villaplana, 1992), with well-documented post-cranial and cranial remains (e.g., antlers), followed by the red deer, *Cervus elaphus*, and a few remains of the roe deer, *Capreolus capreolus*. In other areas of the Iberian Peninsula, such as the central Mediterranean coast, *Dama dama* and *Cervus elaphus* have been identified, for example, at Bolomor, dated from MIS 5 (Martínez del Valle, 2001). However, in Cova Negra, Martínez del Valle (1996) discussed the difficulties of assigning fallow deer to a species level, revising the paleontological identification to *Dama* sp. and proposing an intermediate form between the Middle Pleistocene and the modern fallow deer for this site. A similar discussion followed at the Middle Pleistocene site of Solana del Zamborino (Martín-Penela, 1987). In Portugal, fallow deer remains are scarce and fragmentary (Cardoso, 1993). The situation is similar at various Middle and Late Pleistocene sites in southern Europe, where potential confusion has been noted between different genera, including *Cervus*, *Dama* (Brugal and Yravedra, 2005–2006) and, now presumably, also *Haploidoceros*.

The discovery of a large sample of *Haploidoceros mediterraneus* and the completeness of these skeletal remains (cranial and post-cranial) from the Upper Pleistocene layers of the Cova del Rinoceront (Northeast of the Iberian Peninsula) provide new information about the morphology and systematics of this species and enable us to propose, extending its geographical and chronological distribution. The occurrence highlights the persistence of this small- to medium-sized deer until the beginning of the