# 6. ELEPHANTS AND HUMANS IN IBERIA: A ZOOARCHAEOLOGICAL APPROACH

Jordi Rosell[1,2,*], Ruth Blasco[2,1]

[1]Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya, 35, 43002, Tarragona, Spain
[2]Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades  URV (Edifici W3), 43007, Tarragona, Spain
[*]jordi.rosellardevol@gmail.com

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## ABSTRACT

Proboscidean remains in Iberian Pleistocene sites were first discovered many centuries ago. Some of them were recovered together with lithic tools, leading researchers to associate them with human activities. However, in recent decades, several taphonomic works have provided new perspectives based on more precise methods and analyses. Elephant skeletal remains are common in open-air sites, where they appear in anatomical or semi-anatomical connections. This is the case in the Early Pleistocene sites of Orce (Granada) and La Boella (Tarragona); the Middle Pleistocene sites of Torralba and Ambrona (Soria), Áridos (Madrid) and Solana del Zamborino (Granada); and the early Late Pleistocene sites of the Manzanares terraces (Madrid). Nevertheless, several caves also show isolated remains of these very large animals, which are sometimes difficult to explain from a taphonomic point of view. Most of them appear in assemblages where anthropogenic activities were dominant, such as the case of Bolomor Cave (Valencia) during the Middle Pleistocene or the Abric Romaní and Teixoneres Caves (Barcelona) at the end of the Middle Palaeolithic. This study reviews the best-known cases with a special focus on the evolution of the relationship between elephants and humans in this specific geographic area.

## 6.1  INTRODUCTION

The energetic and nutritional value that elephant carcasses could provide for prehistoric human groups has always attracted the interest of archaeologists (e.g., Ben-Dor et al., 2011). This interest has been increasing progressively as more archaeological sites with remains of these animals have been discovered; this is particularly the case where the carcasses were presumably associated with anthropogenic artifacts. Currently, these localities can

be found all over the world and are framed within nearly all prehistoric periods, which generate a transversal and interdisciplinary issue. Scholars have known about these sites since the beginning of Prehistory research. Almost all of them are located in fluvio-lacustrine contexts where one or more elephants were found (Arribas, 2004; Sala, 2014). Following the main contemporary paradigms, researchers interpreted the accumulations of elephant bones as a product of anthropogenic traps or sophisticated hunting strategies (e.g., Obermaier, 1925). However, the 1970s paradigms that critiqued the effectiveness and regularity of hunting skills among humans before the Upper Palaeolithic called into question many of the preceding interpretations and forced researchers to look into evidence more in line with the modern scientific methods that were being developed. For example, Shipman and Rose (1983) examined the proboscidean remains from Torralba and Ambrona (Soria, Spain), two Middle Pleistocene sites traditionally considered one of the best examples of elephant kill/butchering sites. These researchers were looking for direct evidence of the relationship between those carcasses and the human activities, mainly cut marks. However, they only observed a low frequency of anthropogenic damage on bones at both sites (~1%), which mainly involved other ungulates, such as deer and horses. From this work, the contact between hominins and elephants at these sites seemed to be infrequent and was probably related to occasional scavenging activities. This study showed the ambiguity that this type of assemblage usually entails and the difficulty in making correct interpretations from a modern perspective. Therefore, a new approach in the research of Pleistocene human–elephant interactions was introduced and required the completion of accurate multidisciplinary studies before achieving definitive conclusions (Haynes, 1991). The Torralba and Ambrona localities, however, are not unique cases in the Iberian Peninsula; there are many other sites that can contribute to our understanding of this issue in the different periods. Most of them are open-air places linked to ancient watercourses or palaeolakes.

Nevertheless, isolated elephant bones (or anatomic portions) are also retrieved in karstic contexts, suggesting different dynamics. This study compiles all evidence of human–elephant interaction on the Iberian Peninsula while analyzing the significance of these megaherbivores for the human communities of the past. With this objective, we have revisited the main Iberian sites, where the human use of elephant carcasses was suggested. Only assemblages with clear human presence and stratigraphic and chronological control are considered.

## 6.2  ELEPHANTS IN IBERIA DURING THE PLEISTOCENE

The Iberian Peninsula has specific orographic characteristics that result in a great diversity of climatic and ecological environments (Floristán, 1990; Martín and Olcina, 2001). Iberia can be considered geomorphologically as the emerged part of an ancient tectonic plate (see Vera Torres, 2004). During the Alpine Orogeny, this plate moved progressively northward due to the pressure exerted from the south by the African plate. This process provoked the clash with the Eurasian plate and the formation of several structural deformations. The most important of these was the formation of several mountain ranges, such as the Pyrenees in the north and the Baetic System in the south. Similarly, a subduction zone was generated in the Gibraltar Strait, which separated Africa from Europe and had several influences on the contact between the Atlantic Ocean and the Mediterranean Sea. Nowadays, the Peninsula shows a large plateau slightly tilted to the west with an average elevation of 600 m a.s.l. and surrounded by rocky and steep coasts in the north, northeast and southeast, and softer coastlines to the southwest and west. This geomorphological unit is connected to the continent by the isthmus formed at the north between the Gulf of Lion in the Mediterranean Sea and the Bay of Biscay in the Cantabrian Sea. This portion of land is fully occupied by the Pyrenees, whose maximum elevation exceeds 3000 m a.s.l. and represents an
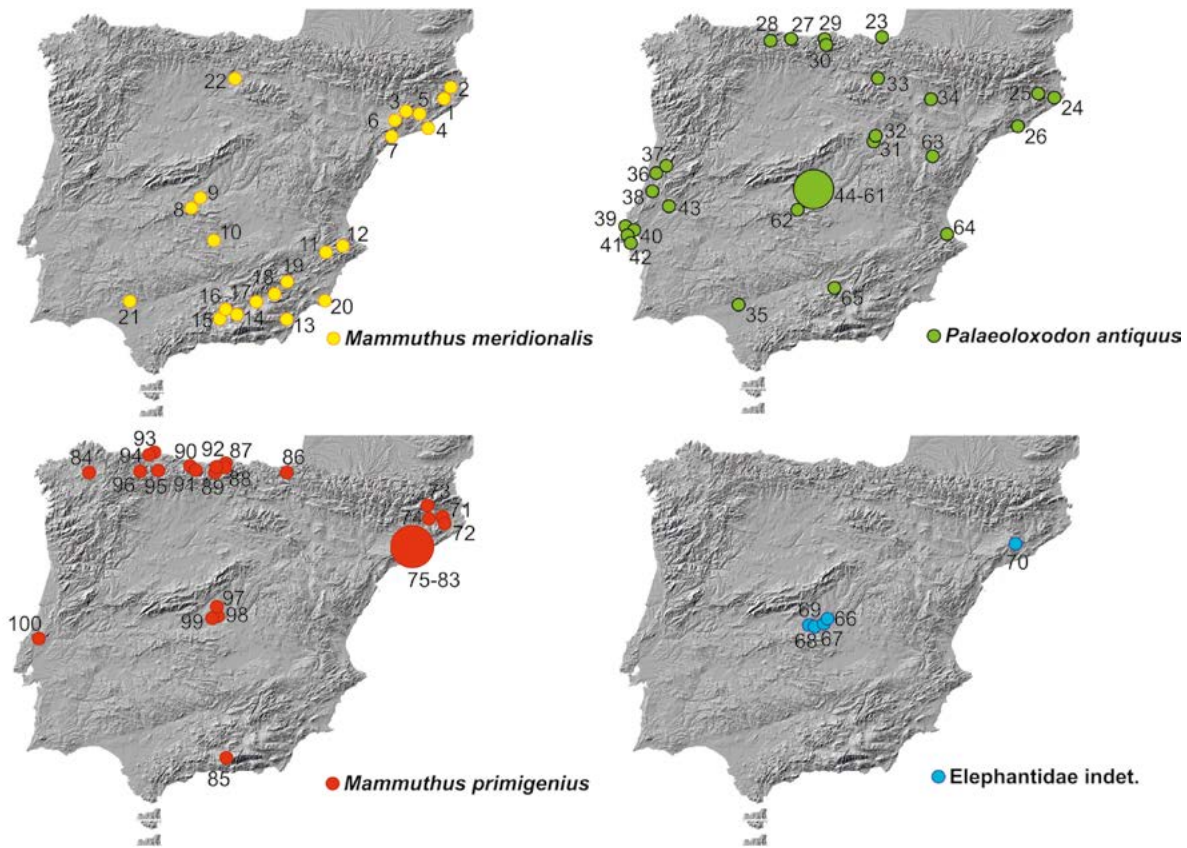
**Figure 6.1:** Location of the main Iberian archaeological sites with proboscidean specimens. The numbers correspond to the localities listed in Tables 6.1–6.4.

important natural border with the rest of the European continent.

Much of the Peninsula is influenced climatically by the Mediterranean Sea, except for the north and northwest, which are dominated by the Oceanic or Atlantic climate. However, this Mediterranean climate has important nuances depending on the geographical situation. For example, the Central Plateau corresponds to a degraded Mediterranean climate that, in many respects, is like a variety of the Continental Climate. The Alpine Climate can also be found in the main mountain ranges, such as in the Central Pyrenees and some areas of the Cantabrian Mountains, the Central System and the Baetic System. On the other hand, the most southeastern area is affected by important African influences —including aridity— and, in many respects, can be considered a semi-desert climate.

In the past, these topographic and climatic characteristics produced several periods in which Iberia was relatively isolated. It was always difficult for the terrestrial biological entities to cross the Gibraltar Strait, and there is not enough conclusive evidence to suggest that this occurred regularly. On the other hand, the Pyrenees played a role as a virtually impassable barrier, mainly at the east. However, the Cantabrian coast seems to have been most permeable, probably because of the lower elevations of the Western Pyrenees and the climatic similarities with the French Atlantic coast. In this respect, Iberia (and the other peninsulas in the south of Europe) could represent important refuge for many temperate taxa, including large mammals, during the cold periods. Elephants were relatively abundant in this highly diversified ecological context (Fig. 6.1, Tables 6.1–6.4). *Mammuthus meridionalis* was present during the Early

Pleistocene until the early Middle Pleistocene. Several sites show the broad dispersion of this species along the eastern coast (Incarcal in Girona and Molí Serelles in Alicante), the South Sub-Plateau (Valdelobos in Toledo, Fuensanta del Jucar in Ciudad Real and the Guadix-Baza Basin in Granada) and the North-Plateau (Gran Dolina of Atapuerca, Burgos) (Aguirre, 1989; Arribas, 2004; Ros-Montoya, 2010). However, there are not many detailed reports on *Mammuthus trogontherii* in Iberia. Controversial remains of this species have been documented in the early Middle Pleistocene terraces of the Anoia River (Capellades, Barcelona) and in Buenavista (Toledo) —a revision of these fossils is necessary as they could correspond to advanced

forms of *Mammuthus meridionalis*. The Middle Pleistocene was the period in which *Palaeoloxodon antiquus* existed, mainly during the interstadials and elephant carcasses recovered from many sites, the most famous of which were the Torralba and Ambrona localities (Soria). On the contrary, the Late Pleistocene represented a critical period for the Iberian proboscideans: *Palaeoloxodon antiquus* disappeared at the end of the marine isotope stage (MIS) 3 (Antunes and Cardoso, 1992; Stuart, 2005), and the only taxon that remained in Europe was *Mammuthus primigenius*, which is usually associated with cold environments. Although there are some accounts of this species in Iberia, most of them are located in the Cantabrian region,

| No. | Site | Location | Chronology | Type | Group | Lithics | Anthr | References |
|-----|------|----------|------------|------|-------|---------|-------|------------|
| 1 | Bòbila Ordis | Girona | MIS 19-15 | OA | 1 | | | Galobart et al., 1996 |
| 2 | Incarcal | Girona | EP | C | 1 | | | Galobart et al., 1996 |
| 3 | Cardener's Terraces | Barcelona | EP | OA | 1 | | | Aguirre, 1989 |
| 4 | Sarrià | Barcelona | EP | OA | 1 | | | Aguirre, 1989 |
| 5 | Cal Guardiola and Vallparadís | Barcelona | MIS 21-19 | OA | 1 | ODW | | Martínez et al., 2010; Palombo, 2014 |
| 6 | Capellades | Barcelona | MIS 19-15 | OA | 1 | | | Arribas, 2004 |
| 7 | Barranc de la Boella | Tarragona | MIS 21-19 | OA | 2(?) | E-ACH | cm(?) | Vallverdú et al., 2014; Mosquera et al., 2015 |
| 8 | Valdelobos | Toledo | MIS 19-15 | OA | 1 | | | Arribas, 2004; Silva et al., 2017 |
| 9 | Buenavista | Toledo | MIS 19-15 | OA | 1 | | | Arribas, 2004 |
| 10 | Valverde de Calatrava | Ciudad Real | EP | OA | 1 | | | Arribas, 2004 |
| 11 | Fuensanta del Jucar | Ciudad Real | MIS 19-15 | OA | 1 | | | Arribas, 2004 |
| 12 | Molí Serelles | Alicante | EP | OA | 1 | | | Arribas, 2004 |
| 13 | Cuevas de Vera | Almería | EP | OA | 1 | | | Arribas, 2004 |
| 14 | Albolote | Granada | EP | OA | 1 | | | Arribas, 2004 |
| 15 | Lachar and Fuensanta | Granada | EP | OA | 1 | | | Aguirre, 1989 |
| 16 | Pantano de Cubillas | Granada | EP | OA | 1 | | | Arribas, 2004 |
| 17 | Guadix Bassin | Granada | EP | OA | 1 | | | Arribas, 2004 |
| 18 | Baza Bassin (Orce) | Granada | EP | OA | 2 | ODW | spp | Espigares et al., 2013, 2019 |
| 19 | Huéscar | Granada | EP | OA | 1 | | | Montoya-Ros et al., 2018 |
| 20 | Cueva Victoria | Murcia | EP | C | 1 | | | Aguirre, 1989 |
| 21 | Villanueva del Pítamo | Sevilla | MIS 19-15 | OA | 1 | | | Aguirre, 1989 |
| 22 | Gran Dolina | Burgos | MIS 21-19 | C | 1 | ODW | | Aguirre, 1999 |

**Table 6.1:** Iberian sites with *Mammuthus meridionalis* specimens and references. The location of the sites (numbers) in the Iberian Peninsula can be seen in Figure 6.1.

**Abbreviations**: EP (Early Pleistocene), MP (Middle Pleistocene), L-MP (late Middle Pleistocene), LP (Late Pleistocene), Unc (Uncertain), Cave (C), Open-air (OA), ODW (Oldowan), E-ACH (early Acheulean), ACH (Acheulean), MP (Middle Palaeolithic), AUR (Aurignacian), SOL (Solutrian), GRV (Gravetian), UNC (Unclassified), Anthropogenic evidence (anthr), ac (anthropogenic context), bd (burning damage), cm (cut marks), ivt (ivory tools), spp (spatial pattern).

| No. | Site | Location | Chronology | Type | Group | Lithics | Anthr | References |
|---|---|---|---|---|---|---|---|---|
| 23 | Cantera de Txomiñenea | Guipúzcoa | Uncertain | OA | 1 | | | Altuna, 1971 |
| 24 | Cau del Duc de Torroella | Girona | L-MP | C | 1 | MP | | Estévez-Escalera, 1979 |
| 25 | Mollet I and Mollet III | Girona | MIS 5 | C | 1 | MP | | Maroto and Soler, 1987; Galobart et al., 1996 |
| 26 | Muscle Cave | Barcelona | MIS 5 | C | 1 | | | Estévez-Escalera, 1979; Nadal, 2000 |
| 27 | Dejesa Cave | Asturias | MP | C | 1 | | | Álvarez-Lao, 2003 |
| 28 | Gafares Cave | Asturias | PM | C | 1 | | | Álvarez-Lao, 2003 |
| 29 | El Castillo Cave (?) | Cantabria | MIS 3 | C | 3 (?) | AUR | ac | Arribas, 2004, Stuart, 2005 |
| 30 | Tejera de Saron | Cantabria | MIS 5 | OA | 1 | | | Castaños et al., 2012 |
| 31 | Torralba | Soria | MIS 7 | OA | 1 | ACH | | Villa, 1990; Santonja et al., 2014a |
| 32 | Ambrona | Soria | MIS 9 | OA | 2 | MP | cm, spp | Santonja and Pérez-González, 2006; Santonja et al., 2014a |
| 33 | Logroño's Terraces | La Rioja | MP | OA | 1 | | | Arribas, 2004 |
| 34 | Villanueva de Gállego | Zaragoza | MP | OA | 1 | | | Arribas, 2004 |
| 35 | Cantillana y Rinconada | Sevilla | MP | OA | 1 | | | Arribas, 2004 |
| 36 | Mealhada | Coimbra | MIS 5 | OA | 1 | ACH | | Cardoso, 1993 |
| 37 | Condeixa | Coimbra | MIS 11-9 | OA | 1 | | | Cardoso, 1993 |
| 38 | Meirinha | Leiria | MP | OA | 1 | | | Cardoso, 1993 |
| 39 | Santa Cruz | Lisbon | MP | OA | 1 | | | Cardoso, 1993 |
| 40 | Santo Antão do Tojal | Lisbon | MP | OA | 1 | UNC | | Cardoso, 1993 |
| 41 | Casal do Torquato | Lisbon | MIS 5 | OA | 1 | | | Cardoso, 1993 |
| 42 | Figueira Brava Cave | Algarve | MIS 3 | C | 3 (?) | MP | ac | Antunes and Cardoso, 1992; Cardoso, 1993; Zilhao et al., 2020 |
| 43 | Foz do Enxarrique | Castelo Branco | MIS 3 | OA | 1 | MP | | Antunes and Cardoso, 1992 |
| 44 | San Isidro | Madrid | MIS 6-5 | OA | 2 (?) | ACH | | Santonja et al., 2014b; Rubio-Jara et al., 2016 |
| 45 | Orcasitas | Madrid | MIS 6-5 | OA | 2 (?) | ACH | | Santonja et al., 2014b; Rubio-Jara et al., 2016 |
| 46 | Arenero de Rojas | Madrid | MIS 6-5 | OA | 2 | MP | spp, ac | Santonja et al., 2014b |
| 47 | Transfesa/Tafesa | Madrid | MP | OA | 2 (?) | ACH | spp | Baena et al., 2010; Santonja et al., 2014b; Rubio-Jara et al., 2016 |
| 48 | Valdocarros | Madrid | MIS 9-7 | OA | 1 | ACH | | Yravedra and Domínguez-Rodrigo, 2009; Moreno et al., 2019 |
| 49 | Arriaga IIa | Madrid | MIS 6 | OA | 2 | ACH | spp | Santonja et al., 2014b; Panera et al., 2014 |
| 50 | Áridos 1 and 2 | Madrid | MIS 11 | OA | 2 | ACH | cm, spp | Sesé and Soto, 2002; Yravedra et al., 2010 |
| 51 | Arenero de Manuel Soto | Madrid | MIS 5 | OA | 1 | UNC | spp, ac | Panera et al., 2014 |
| 52 | Arenero de Los Llanos | Madrid | MIS 5 | OA | 1 | ACH | spp, ac | Panera et al., 2014 |
| 53 | Arenero de Santa Elena | Madrid | MIS 7-6 | OA | 2 (?) | ACH/MP | spp, ac | Panera et al., 2014; Rubio-Jara et al., 2016 |
| 54 | Arenero de Pedro Jaro | Madrid | MIS 5 | OA | 1 | UNC | spp, ac | Panera et al., 2014 |
| 55 | Estanque de Tormentas | Madrid | MIS 6 | OA | 1 | ACH | spp, ac | Silva et al., 2012; Panera et al., 2014 |
| 56 | Arenero de Oxígeno | Madrid | MIS 7-6 | OA | 1 | ACH | spp, ac | Panera et al., 2014; Rubio-Jara et al., 2016 |
| 57 | Arenero de Quemadero | Madrid | MIS 5 | OA | 1 | ACH | spp, ac | Panera et al., 2014 |
| 58 | Arenero de los Hijos de Aguado | Madrid | MIS 5 | OA | 2 (?) | ACH | spp, ac | Panera et al., 2014 |
| 59 | Fabrica de Ladrillos | Madrid | MIS 5 | OA | 2 (?) | ACH | spp, ac | Panera et al., 2014 |
| 60 | Arenero del Arroyo Culebro | Madrid | MIS 5 | OA | 2 (?) | ACH | spp, ac | Panera et al., 2014 |
| 61 | Arenero de Alcaraz | Madrid | MIS 5 | OA | 2 (?) | ACH | spp, ac | Panera et al., 2014 |
| 62 | Pinedo | Toledo | MP | OA | 1 | ACH | | Santonja et al., 2014b |
| 63 | Cuesta de la Bajada | Teruel | MIS 9-7 | OA | 3 | MP | ac | Domínguez-Rodrigo et al., 2015 |
| 64 | Bolomor Cave | Valencia | MIS 9-5 | C | 3 | MP | cm, bd, ac | Blasco et al., 2013 |
| 65 | Solana del Zamborino | Granada | MIS 13-9 | OA | 2 | ACH | spp | Botella et al., 1975; Álvarez-Posada et al., 2017 |

**Table 6.2:** Iberian sites with *Palaeoloxodon antiquus* specimens and references. The location of the sites (numbers) in the Iberian Peninsula can be seen in Figure 6.1. For the abbrevations see Table 6.1.

| No. | Site | Location | Chronology | Type | Group | Lithics | Anthr | References |
|-----|------|----------|------------|------|-------|---------|-------|------------|
| 66 | PRERESA | Madrid | MIS 6/7 | OA | 2 | MP | cm, spp, ac | Yravedra et al., 2012; Panera et al., 2014; Moreno et al., 2019 |
| 67 | Arenero de Jesús Fernández | Madrid | Unc | OA | 2 | ACH | spp, ac | Panera et al., 2014 |
| 68 | Arenero de Constantino del Río | Madrid | Unc | OA | 2 | ACH | spp, ac | Panera et al., 2014 |
| 69 | Arenero de Los Pinos | Madrid | MIS 5 | OA | 2 | ACH | spp, ac | Panera et al., 2014 |
| 70 | Abric Romaní | Barcelona | MIS 3 | C | 3 (?) | MP | ac | Rosell et al., 2012 |

**Table 6.3:** Iberian sites with Elephantidae (indet.) specimens and references. The location of the sites (numbers) in the Iberian Peninsula can be seen in Figure 6.1. For the abbrevations see Table 6.1.

which shows the connection with the southwest of France throughout the MIS 3–2, and in Eastern Catalonia. However, woolly mammoth remains are rare in the rest of the Peninsula and are probably related to very cold climatic pulsations and some movement of these animals from the north of the Pyrenees. This is the case for Figueira Brava (Setúbal), Padul (Granada) and the terraces of the Manzanares River (Madrid; Arribas, 2004). Their presence during the MIS 2 is also recorded from the rock art, as can be seen in sites like El Pindal (Asturias), El Castillo (Cantabria), Los Casares (Guadalajara), Reguerillo Cave (Madrid) and Ojo Guareña (Burgos).

## 6.3    EARLY PLEISTOCENE

The human presence in the Iberian Peninsula is documented as far back as 1.4 Ma, as recorded at Fuente Nueva-3 and Barranco León (Orce, Guadix-Baza Basin, Granada; Toro-Moyano et al., 2013) (Fig. 6.2). Both sites contain archaeological assemblages in fluvio-lacustrine environments where lithic artifacts associated with a high diversity of ungulates were retrieved. The accumulations have been interpreted as the result of a natural trophic dynamic around a lacustrine or swampy landscape similar to those observed in Africa, both today and in the past (Espigares et al., 2013, this volume). According to Toro-Moyano et al. (2013), the important water accumulations were regularly visited by the herds of ungulates of the region, which, in turn, attracted a great diversity of preda-

tors. The main carnivores were hyenas (*Pachycrocuta brevirostris*), although wolves (*Canis mosbachensis*) and wild dogs (*Lycaon lycaonoides*), among others, were also present. Several human groups could have been taking advantage of the situation as well, which generated strong competition with other predators. Mammoth (*Mammuthus meridionalis*) fossils from Orce are relatively common, mainly at Fuente Nueva-3. Espigares et al. (2013, 2019, this volume) reported one of the most significant cases for the issue analyzed here. This site yielded a partial mammoth carcass in a thin bed of fine sands, which preserved the articulated rib cage and the pelvis, in addition to one scapula and mandible. Around the elephant, 17 flint flakes (Oldowan) and 34 coprolites were also recovered, suggesting activities of hominins and hyenas related to carcass processing or consumption. One of the main arguments used by the authors to make this association was the lack of limb bones. Espigares et al. (2013) propose that the assemblage is the result of a single event characterized by a rapid burial. The sand was deposited by low-energy water flows that could have produced slight movements of materials, but were not strong enough to make coprolites and lithic artifacts disappear. Therefore, the absence of limbs could be related to the ravaging activities of the predators or scavengers. Nevertheless, damage was not recognized on the mammoth bones, which makes it difficult to infer accurately when each predator had access to the carcass. The stratigraphic location of one coprolite under a rib is the only possible indication of hyena activities before the mammoth event. The authors propose

| No. | Site | w | Chronology | Type | Group | Lithics | Anthr | References |
|---|---|---|---|---|---|---|---|---|
| 71 | Arbreda | Girona | MIS 4/3 | C | 3 (?) | MP | ac | Estévez-Escalera, 1979; Rufi et al., 2018 |
| 72 | Cau de les Goges | Girona | MIS 2 | C | 3 | SOL | ivt, ac | Estévez-Escalera, 1979; Daura et al., 2013 |
| 73 | Vall de Bianya | Girona | LP | OA | 1 | | | Arribas, 2004 |
| 74 | Clot del Llop | Girona | LP | C | 1 | | | Altuna, 1996; Álvarez-Lao and García, 2012 |
| 75 | Fontrubí | Barcelona | MIS 3 | OA | 1 | | | Arribas, 2004 |
| 76 | Sant Vicenç dels Horts | Barcelona | LP | OA | 1 | | | Arribas, 2004 |
| 77 | Congost River | Barcelona | LP | OA | 1 | | | Arribas, 2004 |
| 78 | Vallformosa | Barcelona | LP | OA | 1 | | | Arribas, 2004 |
| 79 | Arenys de Mar | Barcelona | LP | OA | 1 | | | Arribas, 2004 |
| 80 | Teixoneres Cave | Barcelona | MIS 3 | C | 3 (?) | | ac | Álvarez-Lao et al., 2017 |
| 81 | Pedralbes | Barcelona | LP | OA | 1 | | | Altuna, 1996 |
| 82 | Riera dels Canyars | Barcelona | MIS 4 | OA | 1 | | | Daura et al., 2013 |
| 83 | Riera de St. Llorenç | Barcelona | MIS 4 | OA | 1 | | | Daura et al., 2010, 2013 |
| 84 | Buján | Lugo | LP | C | 1 | | | Álvarez-Lao and García, 2012 |
| 85 | Padul | Granada | MIS 3 | OA | 1 | | | Álvarez-Lao et al., 2009; Álvarez-Lao and García, 2012 |
| 86 | Labeko Koba | Guipuzkoa | MIS 3 | C | 3 (?) | AUR | ac | Altuna and Mariezkurrena, 2000; Álvarez-Lao and García, 2012 |
| 87 | Minas de Heras | Cantabria | LP | C | 1 | | | Álvarez-Lao and García, 2012, Castaños et al., 2012 |
| 88 | Cueva Morín | Cantabria | MIS 2 | C | 1 | GRV | ac | Álvarez-Lao and García, 2012 |
| 89 | Udías | Cantabria | LP | C | 1 | | | Álvarez-Lao and García, 2012 |
| 90 | Mina Ángel | Cantabria | LP | C | 1 | | | Álvarez-Lao and García, 2012 |
| 91 | Mina Inadvertida | Asturias | MIS 3 | C | 1 | | | Domingo et al., 2005; Castaños et al., 2012 |
| 92 | El Cierro | Asturias | MIS 2 | C | 3 (?) | SOL | ac | Álvarez-Lao and García, 2012 |
| 93 | La Lloseta | Asturias | MIS 2 | C | 1 | | | Álvarez-Lao and García, 2012 |
| 94 | La Güelga | Asturias | MIS 3 | C | 1 | | | Álvarez-Lao and García, 2012 |
| 95 | Las Caldas | Asturias | MIS 2 | C | 3 (?) | SOL | ac | Álvarez-Lao and García, 2012 |
| 96 | Cueto de la Mina | Asturias | MIS 2 | C | 3 (?) | SOL | ac | Domingo et al., 2005; Álvarez-Lao and García, 2012 |
| 97 | EDAR Culebro | Madrid | MIS 5 | OA | 2 | MP | spp | Panera et al., 2017; Yravedra et al., 2014 |
| 98 | Casa Eulogio | Madrid | LP | OA | 2 (?) | MP | | Álvarez-Lao and García, 2012; Panera et al., 2014 |
| 99 | Arriaga | Madrid | LP | OA | 2 (?) | MP | | Álvarez-Lao and García, 2012; Rubio-Jara et al., 2016 |
| 100 | Algar de João Ramos | Leiria | MIS 2 | C | 1 | | | Antunes and Cardoso, 1992 |

**Table 6.4:** Iberian sites with *Mammuthus primigenius* specimens and references. The location of the sites (numbers) in the Iberian Peninsula can be seen in Figure 6.1. For the abbrevations see Table 6.1.

an anthropogenic primary access, and they reserve the role of secondary consumers for hyenas. This site is a good example for illustrating the difficulties of interpreting this type of assemblages.

A similar degree of competition between hominins and carnivores was proposed for the Barranc de la Boella site (Tarragona; Pineda et al., 2014). This site is magnetostratigraphically dated to post-Jaramillo/pre-Brunhes, and it is known for containing one of the oldest Acheulean records in western Europe (Vallverdú et al., 2014). As in the case of Orce, Barranc de la Boella is also located in a fluvio-lacustrine setting, in which several faunal and lithic remains have been recovered.

Mammoths (*Mammuthus meridionalis*) are also common, along with ungulates, such as horses, different species of deer, hippo, rhinos and wild boar. Several taphonomic processes, such as trampling, seem to have significantly affected the preservation of bone surfaces and the original position of the remains (Pineda et al., 2015). A possible contact between humans and mammoths from two ambiguous cutmarked ribs was suggested by Mosquera et al. (2015). In any case, the site offers an important potential to find clues to bring light to this issue in the near future.

## 6.4    MIDDLE AND LATE PLEISTOCENE

As previously mentioned, Torralba and Ambrona are probably the most well-known sites with elephants associated to artifacts in the Iberian Peninsula. Both sites were discovered at the end of the 19th century and quickly attracted the attention of many researchers (Fig. 6.3A, B). During the second half of the 20th century, the sites acquired great scientific recognition due to the work carried out by an international team (e.g., Howell et al., 1963). Torralba and Ambrona are two Acheulean open-air sites located very close to each other, which are related to the palaeolakes located at the bottom of a karstic plain (polje). Although, originally, both sites were considered contemporaneous, current data show significant chronological differences. Ambrona has been dated by electron spin resonance (ESR) to MIS 11–9 (Falguères et al., 2006), whereas Torralba, dated by optically stimulated luminescence (OSL), seems to be much younger (~MIS 7; Santonja et al., 2014a).

At Torralba, elephants classified as *Palaeoloxodon antiquus* are the most represented large mammal, together with horses. Aurochs, rhinos, hippos and different deer species compose the spectrum of large herbivores. The site also contains charcoal fragments that were initially interpreted as the product of some type of anthropogenic activity; perhaps torches or burned vegetation used to lead the animals to traps located near the lakes. Therefore, the assemblages were long considered as kill sites of elephants, where hominins used large cutting tools to process the carcasses and elaborated pointed tools with their tusks (e.g., Freeman, 1978; Howell and Freeman, 1983). This idea was refuted with
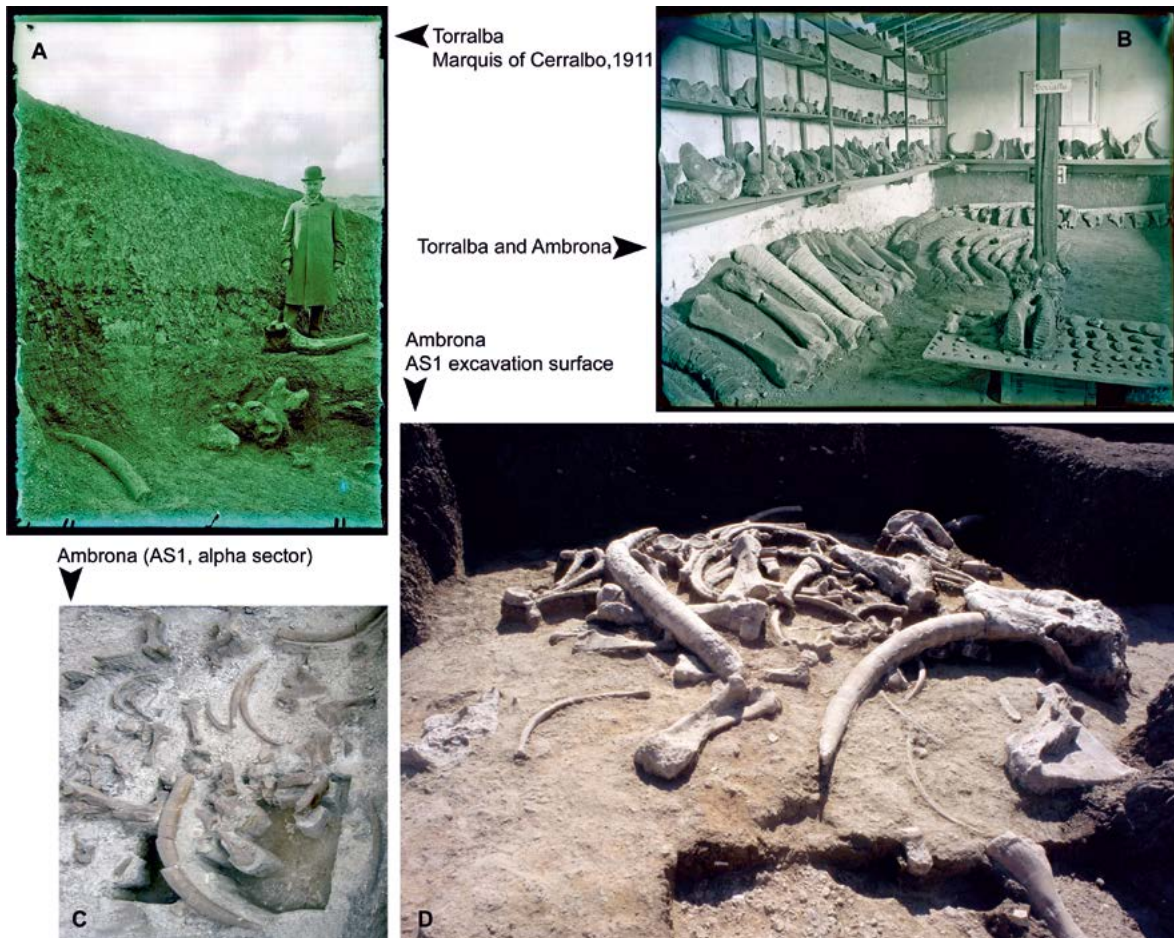
**Figure 6.3: A**, discovery of the first elephant remains in Torralba with the Marquis of Cerralbo during the 1911 fieldworks (photo courtesy of J. Cabré Aguiló); **B**, elephant specimens and lithic tools from Torralba and Ambrona; note the quality and quantity of the archaeo-palaeontological material (photo courtesy of J. Cabré Aguiló); **C**, *Palaeoloxodon antiquus* partial skeleton from Ambrona (AS1, alpha sector) (photo courtesy of M. Santonja); **D**, detail of the Ambrona AS1 excavation surface currently exhibited at the Museum *in situ* of Ambrona (photo courtesy of J. Panera).

taphonomic data collected by Shipman and Rose (1983), and different alternative interpretations were proposed since then. Villa (1990) examined the materials that came from more recent field seasons, reaching conclusions similar to Shipman and Rose (1983). Nevertheless, the poor preservation of most bone cortical surfaces, together with a possible disturbed sedimentary context, led her to question possible interactions between hominins and these animals. In any case, Villa's (1990) study concludes that, based on the taphonomic evidence, Torralba can no longer be considered a kill site of elephants.

Broadly speaking, Ambrona showed similar characteristics (Fig. 6.3C, D). The dominant flu-

vio-lacustrine environment in the assemblages seems to have affected part of the materials, which can be observed especially on the lithics (Santonja et al., 2014a). Anthropogenic damage on bones, mainly cut marks, demonstrates the association between lithics and faunal remains (Villa et al., 2005). However, the evidence of human activities is limited and not strong enough to support the idea of a persistent human population in the region during this period. Even so, the authors suggest that there were recurring visits of human groups to the region for thousands of years, probably attracted by the herds of herbivores that regularly visited the lakes. One of the most significant assemblages found at this site comes from the

**Figure 6.4:** *Palaeoloxodon antiquus* from the Orcasitas site (photo courtesy of Museum of the Origins - San Isidro).

lower stratigraphic member (AS3) in which the partial skeleton of a male elephant was recovered with several lithic artifacts and isolated remains of two other individuals. According to Santonja et al. (2014a), the sedimentary context corresponded to the mud deposited by low-energy water flows on a shallow pond. Taphonomic analyses showed slight dislocation of the materials, probably because the assemblage remained unburied for a time and was exposed to different processes, such as trampling. This phenomenon could explain the disarticulation, displacement and overlapping of several bones. Although trampling striations are common on bones composing the assemblage, several elephant surfaces show cut marks: a maxilla, an ulna and three fragments of femur (Villa et al., 2005). Besides, two limb bone shafts show diagnostic elements of intentional breakage to obtain marrow.

The AS3 evidence is not an isolated case; cut marks on elephant bones were also recognized on some bones from the immediately upper stratigraphic member (AS4), suggesting more regular elephant carcass processing at the site. The elephant event from the AS3 met spatial characteristics similar to those observed at Fuente Nueva-3, with lithics around a partial carcass. The differences lie in the technology used for the elaboration of the artifacts (Oldowan vs. Acheulean) and the presence or absence of anthropogenic bone damage, which seems to be related to bone surface preservation.

Proboscidean specimens were common in the south of the Iberian sub-plateau during the second half of the Middle Pleistocene and the beginning of the Upper Pleistocene (until MIS 4). Several fluvio-lacustrine localities of this geographic area contain assemblages composed of elephant bones

**Figure 6.5:** *Palaeoloxodon antiquus* partial skeleton from Áridos 2 (photo courtesy of M. Santonja).

(showing different preservation degrees), mainly *Palaeoloxodon antiquus* and lithic artifacts related to the Acheulean and post-Acheulean technologies. Some of these sites are located in the Jarama and Manzanares valleys (Madrid), such as San Isidro, Orcasitas, Arenero de Rojas, PRERESA, Transfesa, Valdocarros and Arriaga IIa, or those located in the Tajo Valley, such as Pinedo (Toledo; Santonja et al., 2014b; Yravedra et al., 2012, 2014) (Fig. 6.4). Unfortunately, most of them correspond to old discoveries, and the existing data do not allow for making accurate assessments. In spite of this, some collections have been recently revisited, and interesting taphonomic data have been reported. One of the most significant sites in this area is Áridos in the south of Madrid, which presents two different and practically contemporaneous locations (Áridos 1 and Áridos 2) dated by amino acid racemization (AAR) and ESR in the MIS 11 (Yravedra et al., 2010). Both assemblages correspond to flood-plains where a partial carcass of *Palaeoloxodon antiquus* was found. In the case of Áridos 1, the specimen is a female with several preserved bones scattered around a surface of 50 m2. The assemblage also contains more than 300 lithic Acheulean artifacts, among which flakes, handaxes and percussors stand out. In general, no remarkable differences with previous bone assemblages can be reported. Nevertheless, it is worth mentioning that several lithics were refitted, showing intense knapping activities linked to the configuration and reshaping of large cutting tools at the site. The connections drawn by these refits seem to place the elephant at the center of the anthropogenic actions, suggesting an association between the human groups and the carcass (Santonja et al., 2014b). Although no cut marks on bones were observed, the assemblage was interpreted as a single event of human processing of an elephant in a non-competitive context (Villa, 1990). A similar accumulation is documented at Áridos 2 (~150 m away), although higher hyena activity stands out as a difference (Santonja et al., 2014b; Villa, 1990) (Fig. 6.5). At this site, the elephant specimen was an old male that preserved an articulated part of the rib cage, and the right scapula and humerus. A fragment of the skull was also recovered. Unfortunately, the site was partially destroyed before the discovery, and this situation prevents an adequate assessment of the anatomical profile. The lithics were classified as Acheulean, and their quantity is higher than 30. A re-examination of the assemblage indicated the presence of cut marks clustered on several groups: two on

the ventral side of one rib, and three on different points of the scapula (Yravedra et al., 2010). Carnivore damage was also detected in the form of tooth marks and furrowing at the distal end of the humerus. According to Yravedra et al. (2010), the presence of cut marks related to viscera removal could suggest primary and immediate access by the human groups to the carcass, followed by secondary access by the hyenas.

At the eastern border of the Plateau, the Cuesta de la Bajada site (Teruel) represents a different case. This site is located in a terrace of the Alfambra River dated to MIS 9–8 by OSL and ESR (Santonja and Pérez-González, 2014). Several assemblages were discovered at Cuesta de la Bajada and interpreted as the result of hunting activities by the human groups of the region (Domínguez-Rodrigo et al., 2015). The main prey were horses and red deer, although other ungulates were also recovered, such as aurochs, rhinos, wild goats and chamois. The lithics were configured from local raw materials, and the reduction sequences seem to have been completed on the site. The presence of Quina, discoid and Levallois, as well as side-scrapers and denticulates, place this technology in the early Middle Palaeolithic. The presence of elephants was detected through isolated bones, which allowed identifying at least two individuals: one at CB2 and another at CB3. The individual from CB2 is represented by an isolated phalanx, while the individual from CB3 presents one mandible, three long bones, one carpal, one phalanx and two unidentified fragments. The main difference regarding previous cases is the context in which these specimens were recovered. At Cuesta de la Bajada, the elephants appear mixed with other ungulates that exhibit anthropogenic damage as a reflection of intense human activities there. The assemblage seems to have been formed by the anthropogenic transport of ungulate portions from nearby areas. Nevertheless, the elephant bones do not bear clear human modifications beyond notches on two mid-shafts of ambiguous (human or carnivore) origin. Even so, the high anthropogenic component of the assemblage is clear and could suggest an association between ungulates and human activities.

In the south, the fluvio-lacustrine site of La Solana del Zamborino (Granada) contains three stratigraphic units with isolated remains of elephants in addition to lithic tools and remains of many other ungulates, including horses, red deer, fallow deer, roe deer, aurochs and hippos. These elephants have been classified as *Mammuthus trogontherii* in the upper stratigraphic unit and *Palaeoloxodon antiquus* in the lower two (Botella et al., 1975; Ros-Montoya, 2010). Recent magnetostratigraphic studies suggest a chronology of 480–300 ka (Álvarez-Posada et al., 2017), which is consistent with a late Acheulean and an early post-Acheulean assemblage in western Europe. The site was initially interpreted as a kill site, similar to the first considerations made about Torralba. However, the lack of anthropogenic marks on the elephant remains make it difficult to establish a clear relationship between these animals and the human groups.

The most recent case corresponds to the fluvial location of PRERESA (Madrid), dated to MIS 5 by OSL (Santonja et al., 2014b). The macromammal record is composed of different ungulate taxa, among which horses, aurochs, red deer, fallow deer and roe deer predominate. Carnivores are also present, mainly wolves, foxes, lynx and badgers, although their incidence is very scarce (Yravedra et al., 2012). Lithic artifacts are composed mainly of flakes made on flint and, to a lesser extent, quartz. The reduction sequences are short but complete. The most significant characteristic of PRERESA is the presence of the partial carcasses of an aurochs and an elephant (Elephantidae indet.) scattered on a surface of more than 100 m2. The elephant is represented by 82 bones (cranial, axial and limb bones), suggesting that the whole carcass was probably originally at the site. According to Yravedra et al. (2012), this animal was intensively processed by human groups. Several bones show cut marks (n = 6) and evidence of bone breakage, mainly percussion notches, flakes and percussion marks (n = 7). This case can be considered the first

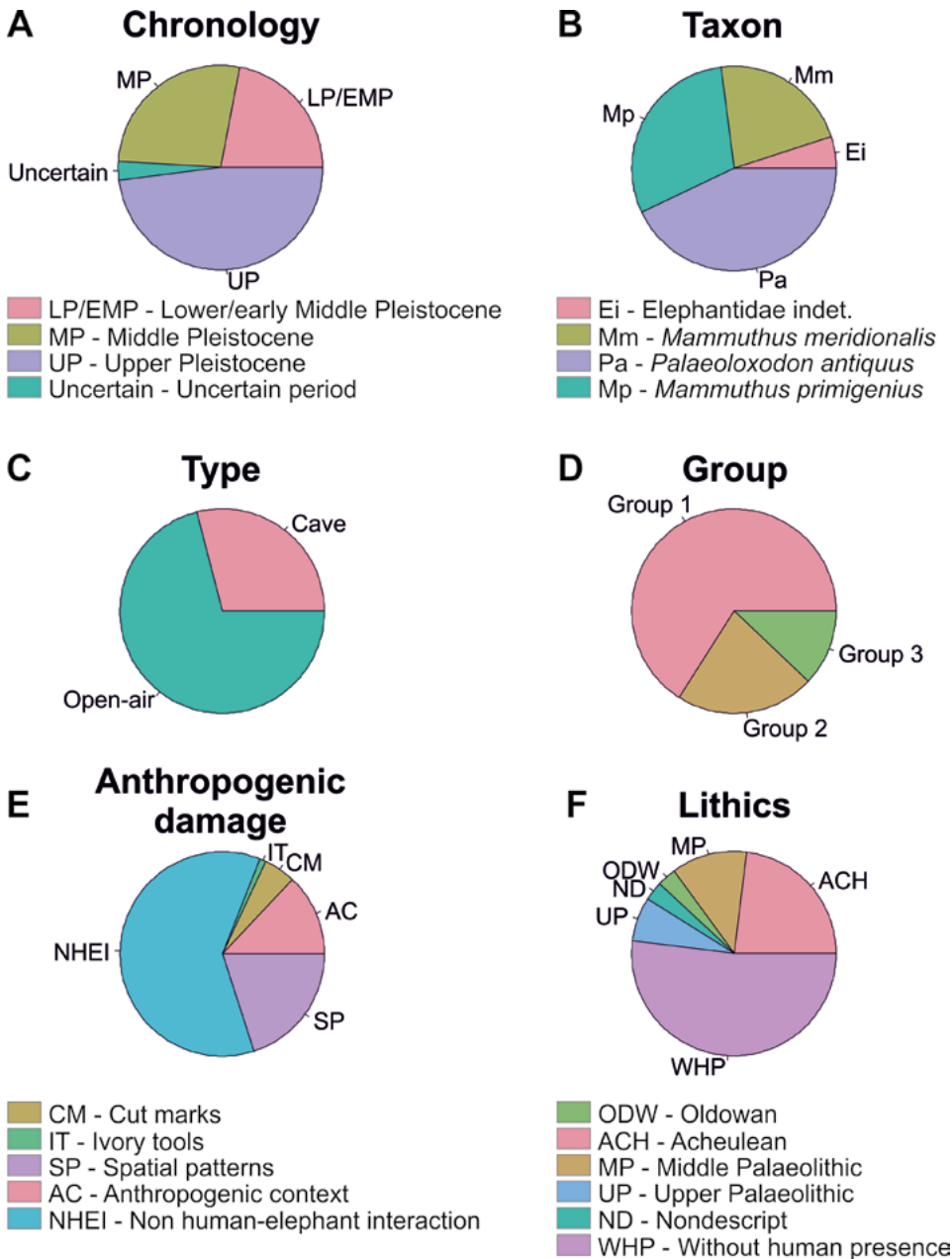**A** **Chronology**



- ■ LP/EMP - Lower/early Middle Pleistocene
- ■ MP - Middle Pleistocene
- ■ UP - Upper Pleistocene
- ■ Uncertain - Uncertain period

**B** **Taxon**



- ■ Ei - Elephantidae indet.
- ■ Mm - *Mammuthus meridionalis*
- ■ Pa - *Palaeoloxodon antiquus*
- ■ Mp - *Mammuthus primigenius*

**C** **Type**



**D** **Group**



**E** **Anthropogenic damage**



- ■ CM - Cut marks
- ■ IT - Ivory tools
- ■ SP - Spatial patterns
- ■ AC - Anthropogenic context
- ■ NHEI - Non human-elephant interaction

**F** **Lithics**



- ■ ODW - Oldowan
- ■ ACH - Acheulean
- ■ MP - Middle Palaeolithic
- ■ UP - Upper Palaeolithic
- ■ ND - Nondescript
- ■ WHP - Without human presence

**Figure 6.6:** Pie charts showing some of the main characteristics of Iberian sites with proboscidean specimens.

example of marrow removal in elephants from the Iberian Peninsula.

On the Mediterranean coast, Bolomor Cave (Valencia) provides a different case for the subject discussed here. This site is a rock shelter located in the mountainous foothills closest to the sea (Blasco et al., 2013; Blasco and Fernández Peris, this volume). The stratigraphic sequence is formed by 17 levels dated between the MIS 9 and 5. Recur-

rent anthropogenic occupations are documented along this sequence with a high diversity of prey and a very rare presence of carnivores. Human occupations are characterized by post-Acheulean technology and by the regular use of fire, especially from unit XIII onwards. Elephants are present in several stratigraphic levels, specifically at Ia, IV, V, XII, XIII and XVII. All of them are represented by isolated remains (teeth, cranial, limb bones,

acropodials and basipodials) of mainly immature individuals. No axial bones (vertebrae or ribs) were recovered. Cut marks were identified on a mandible (level XII), as well as fresh bone breakage and burning damage (levels I, IV). The main characteristics of the remains, together with the rest of the faunal assemblage, suggest anthropogenic transport of selected anatomical portions to the site (Blasco et al., 2013; Blasco and Fernández Peris, this volume).

The MIS 4 represents a turning point for the Iberian elephants, as their presence decreases significantly in the taxonomic lists from archaeological sites. This phenomenon could be caused by the low number of open-air fluvio-lacustrine locations with well-preserved faunal specimens and the cold climatic conditions during the MIS 4 and the subsequent MIS 3. However, this seems to be inconsistent with the last occurrence of *Palaeoloxodon antiquus* in Iberia, which was dated to ~33 ka BP at Foz do Enxarrique (Castelo Branco; Aguirre, 1968, 1969a, b; Antunes and Cardoso, 1992). Besides, the coldest pulsations could have represented several entries of woolly mammoths (*Mammuthus primigenius*) to the Peninsula from the Pyrenees and the Cantabrian Mountains, establishing occasional relict populations that could last over time (Álvarez-Lao and García, 2012). The last occurrence for this taxon in Iberia is dated to 14 ka BP at Algar de João Ramos (Leiria; Antunes and Cardoso, 1992). Even so, the presence of proboscidean specimens in anthropogenic contexts is not common during the Iberian Late Pleistocene, and most of the cases correspond to isolated bones that make it difficult to establish an association with human groups. Reports about these megaherbivores are most common in the north of the Iberian Peninsula, mainly along the Cantabrian coast at archaeological sites such as Labeko Koba (Basc Country), Minas de Heras, Pámanes, Cueva Morín, Udías, Mina Ángel, El Cierro, La Lloseta and La Güelga in Cantabria; Las Caldas in Asturias; or Bujan in Galicia (Álvarez-Lao and García, 2012). Along the Mediterranean coast, the presence of these animals has been identified at sites

framed within the end of the MIS 3, such as Arbreda, Cau de les Goges, Teixoneres Cave and Abric Romaní in Catalonia (Arribas, 2004; Rosell et al., 2012, Álvarez-Lao et al., 2017; Rufi et al., 2018). The Central Plateau contains remains of this taxon at sites such as Casa Eulogio, Arriaga and Butarke in Madrid (Arribas, 2004). Mammoths also arrived at the Atlantic coast from Portugal, specifically at the Extremadura sites, such as Figueira Brava and the aforementioned Algar de João Ramos (Antunes and Cardoso, 1992). The southernmost case corresponds to the Baetic Mountain Range, specifically at Padul (Granada). However, none of these sites offers enough guarantees to infer direct (and regular) contact between elephants and humans during the Upper Pleistocene in Iberia.

## DISCUSSION AND CONCLUSIONS

The regular exploitation of proboscideans in Europe during the Palaeolithic has been a long-debated topic, especially for the implications it has for establishing the evolution of the subsistence behavior of human communities (e.g., Frison, 1978; Frison and Todd, 1986; Gaudzinski et al., 2005; Surovell et al., 2005; Surovell and Waguespack, 2008; Konidaris and Tourloukis, this volume). With few exceptions, as in the case of La Cotte de St Brelade (UK; Smith, 2015) or Lehringen (Germany; Thieme and Veil, 1985), well-documented reports of elephant-human interactions during the Lower and Middle Palaeolithic on the continent are scarce and often difficult to interpret, which can lead to some confusion (Haynes, 2005; Giusti, this volume). The data previously exposed show how some archaeological sites of the Iberian Peninsula have contributed to the debate since its beginning, such as Torralba, which was long considered a kill site. This geographical area had, in the past, a continuous presence of different proboscidean species that were distributed in different climatic domains during all the Pleistocene periods (Fig. 6.6A). Even during the colder pulsations of the Upper Pleistocene, when the northern moun-

tain ranges functioned as a biogeographic barrier for many mammals (e.g., reports on reindeer at the south of the Pyrenees and the Cantabrian Mountains is very rare), woolly mammoths expanded throughout the territory, reaching the south, as is the case of Padul in Granada (Fig. 6.6B). This phenomenon can only be understood by the versatility and high adaptability of this taxonomic group.

From a zooarchaeological perspective, the Iberian Peninsula could be a good setting to understand the evolution of the relationships between humans and proboscideans throughout Prehistory. However, the evidence recovered so far is limited and does not allow for inferring basic aspects, such as the procurement methods, frequency of exploitation, or carcass processing techniques. This shortage of evidence could be due to several factors that are not mutually exclusive. First, a large part of the localities are open-air sites in fluvial-lacustrine environments and yield the typical bone modifications from these types of context, including those generated by exposure to weather and water runoff, which are among the most common (Fig. 6.6C). These conditions usually mask possible previous evidence left by both humans and carnivores, making interpretations difficult. This case has been well studied in the Barranc de la Boella at the experimental level, where the authors have determined that the site formation processes, which include leaching and rolling due to water runoff, generate similar morphologies between possible cut marks and marks generated by the friction of sediment particles on the bone surface (Pineda et al., 2014). Second, it should be remembered that many sites were excavated during the early years of exploration, without an adequate archaeological methodology, and at a time of development of the discipline in which the chronocultural classification of sites was prevalent. This caused some cases of overinterpretation, as in Torralba (Villa, 1990), but it is also possible that some assemblages went unnoticed due to the impossibility of recognizing signs of human presence beyond lithic industry. Third, it is worth remembering the low frequency of cut marks on megaherbivore bones, as experi-

mentally and ethnographically detected by several researchers (e.g., Frison and Todd, 1986; Frison, 1989; Haynes, 1991, 2005). According to these studies, the thickness of the muscle masses and periosteum of these animals usually prevents stone tools from contacting the bone surface during the defleshing process with the same frequency that occurs in other smaller size animals. Thus, although the reports of proboscidean use as food are scarce and sometimes dubious, there may be unknown cases that should be reviewed in the future. Finally, it is also important to highlight that the use of the elephant bones as raw material for the configuration of tools has not been identified in the Iberian Peninsula, at least not as it has been registered in many other places in the Old World (e.g., Anzidei, 2001; Gaudzinski et al., 2005; Rabinovich et al., 2012; Boschian and Saccà, 2015). Tools made with ivory were initially described at Torralba (Howell, 1966; Howell and Freeman, 1983), although they were soon discussed and refuted by other researchers (e.g., Binford, 1987; Haynes, 1991; Villa and d'Errico, 2001). To date, this type of tools in Iberia is only recognizable in the Upper Palaeolithic, as is the case of a punch made on a fragment of mammoth ivory from Cau de les Goges (Girona) (Pallarès and Wernert, 1915–20).

With all this in mind, the oldest so far evidence of elephant exploitation in the Iberian Peninsula (as well as in Europe) is possibly recorded in the Lower Pleistocene site of Fuente Nueva-3, in Orce. According to Espigares et al. (2013, 2019, this volume), humans and hyenas would have competed for access to an elephant carcass. However, the poor preservation of bone surfaces makes the identification of cut and carnivore tooth marks difficult, as well as establishing the action sequence. The same occurs in the Barranc de la Boella, as previously discussed. In this latter case, the elephant remains appear widely dispersed, and causal association with the lithic industry is difficult to establish. Both archaeological sites can be considered examples of the interpretative difficulties in the open-air assemblages, as many questions remain open.

The localities we register here allow us to establish three main groups (Fig. 6.6D). The first group (group 1) includes sites without human activity or those where the indications observed so far are insufficient to relate human activities to the proboscidean carcasses. This would be the case of Torralba, where human action seems to be mainly focused on other ungulates. The second group (group 2) corresponds to those sites with whole or partial elephant carcasses, with a high degree of articulated or semi-articulated bones, and with clear contact evidence between lithic artifacts and elephant bones. This would be the case of Ambrona, Áridos 2 and PRERESA, where cut marks and intentional bone breakage have been identified. Áridos 1 and the Solana del Zamborino could also be included within this category because clear knapping and shaping activities of lithic artifacts (and traces) were identified around the elephant carcass. The third group (group 3) would correspond to those sites with predominantly anthropogenic contexts, where elephants are represented by isolated remains along with other dominant taxa (in most cases horses and deer) and interpreted as the product of anthropogenic accumulation. This group would include the Cuesta de la Bajada and Bolomor Cave.

Based on this, the two groups with human signatures (groups 2 and 3) are used here to analyze the main objective of this work (Fig. 6.6E, F). The main differences between them are the taxonomic diversity observed in the faunal assemblages, the minimum number of individuals (MNI), the integrity of the carcasses and the duration of the events. The group 2 sites are usually characterized by one elephant individual, with high integrity of its skeleton (sometimes with high proportion of articulated bones) and by being interpreted as very short-term events. From an ethnoarchaeological point of view, there are interesting parallels that can be used to include them within the category of kill or butchering sites, and which show that the processing patterns of megaherbivores (>1000 kg) have undergone few variations since ancient times (Crader, 1983; Bunn et al., 1988; O'Connell et

al., 1988a, b; Bartram, 1993). According to these observations, the presence of a very large carcass usually motivated the mobilization of all or a large part of the group members to the place where it was obtained in order to process the animal and consume it entirely. This situation occurred regardless of the procurement method (hunting or scavenging, including intermediate phases) and did not usually require the use of complex technologies beyond the lithic tools used by butchers. In some specific cases, the transport of selected anatomical portions occurred and may have included large packages of meat and fat and isolated bones, such as phalanges, metapodials and some long bones. The most common result was the abandonment of articulated carcasses that were subject to the ravaging and atmospheric agents. Thus, the sites belonging to group 2 in the peninsular archaeological record could be registering similar processes, in which the only observed variation is the lithic technology used and the development of more or fewer knapping activities at the site. The absence of appendicular elements at some sites could be related both to anthropogenic transport towards the habitat place and the subsequent carnivore action or natural agents. Among all the Iberian localities, only Áridos 2 allows for inferring some activity beyond the defleshing and bone breakage to obtain marrow. In this case, the cut marks observed on the ventral surface of ribs could suggest viscera removal and, therefore, early human access to the carcass. On the contrary, group 3 (i.e., those sites with isolated elephant bones accumulated together with other ungulates) seems to complement the ethnoarchaeological parameters previously described. The best representatives of this group, Cuesta de la Bajada and Bolomor Cave, have been interpreted as places where human groups accumulated the remains of their prey. The different assemblages were formed by a succession of events of a relatively long duration, where domestic activities linked to butchery and consumption of prey were developed. The retrieved specimens correspond to autopodial bones, some long bones and mandibles. With the exception of mandibles,

the rest are those that, according to ethnoarchaeological observations, are liable to be moved. From this point of view, the importance of elephants in these sites could be underrepresented because human transport decisions could include only meat and fat and exclude most or all of the bones. This could significantly alter the zooarchaeological perception of the assemblages (Ben-Dor and Barkai, this volume).

At this point, it is worth highlighting the case of Bolomor Cave. This site yields several isolated elephant bones in some archaeological levels and is the only one located in a karstic context. Another peculiarity of this locality is the presence of hearths in several archaeological levels, which point to the use of fire as a possible central point in domestic activities (Fernández Peris et al., 2012). The taxonomic diversity in the main faunal assemblages (e.g., I, IV, XI, XII, XVII) is high and has been interpreted as the product of the territorial stability of human groups in a rich environmental context (Blasco et al., 2013). The proboscidean remains, although not very abundant, correspond mainly to immature individuals and can be clearly associated with human activities due to the presence of cut marks and/or burning damage (Blasco and Fernández Peris, this volume). In this case, perhaps, the lower weight of immature individuals could have facilitated a higher rate of transport of selected parts, which would be significantly reduced with adult individuals.

Another important aspect to highlight in the Iberian Peninsula is the absence of clear human–elephant relationships from the MIS 4. During this period, coexistence with woolly mammoths seem to have been frequent in much of Europe during the late Middle Palaeolithic (e.g., La Cotte de St Brelade), and these are multiplied significantly from the Upper Palaeolithic onwards. However, the shortage of remains of this species in the southern Pyrenees and the Cantabrian Mountains has always been explained by the southern climatic characteristics of this geographical area, which would have represented a refuge for temperate-adapted species and a barrier for

cold-adapted ones. Thus, sites whose faunal lists indicated the presence of this species were used to contain isolated bones that did not represent the focus of the studies. Their presence in these sites, together with some graphic representations of mammoths during the MIS 2 (e.g., the Casares site, Guadalajara, Spain; Arribas, 2004), were explained as sporadic entries during the colder pulsations. Nevertheless, the geographical and temporal distribution of the sites with mammoth remains suggests a more continuous presence of this taxon in the Iberian landscape throughout the Upper Pleistocene. The absence of contact evidence with human groups could be explained by other phenomena, such as the low presence of open-air sites with preserved fauna.

In summary, there are many limiting factors that make it difficult to assess human–elephant relationships during the Palaeolithic in Iberia. Besides the poor preservation of bone cortical surfaces due to taphonomic causes, it is necessary to add the time of formation of the assemblages, which frequently prevents establishing secure associations. This occurs, for example, in Torralba, where the presence of several elephants concentrated in the same area could be the result of a significant diachrony. In this line, Haynes (2005) indicates the difficulty of explaining synchronic accumulations of several individuals in the same place due to natural causes. Anthropogenic phenomena that could produce accumulations of this type, such as episodes of communal hunting or mass predation, are rare in contexts prior to the late Upper Palaeolithic and, therefore, are difficult to justify in the Middle Pleistocene without a battery of clear evidence.

The evidence from Iberia shows that elephants were included in the human diet since the Early Pleistocene. Nevertheless, the available evidence does not guarantee regularity in the exploitation of these animals. Most of the sites do not seem to correspond to hunting activities, at least as had been initially suggested in some localities from group 2, with the use, for example, of mud traps (see the first interpretations for Torralba, Am-

brona or Solana del Zamborino). From a zooarchaeological point of view, it is most prudent to think in terms of: 1) fortuitous encounters based on a low rate of dead carcasses, 2) the complete (or practically complete) carcass processing at the procurement place, and 3) the occasional transport of selected anatomical portions due to different reasons, such as animal body weight and distance to the habitat location (in the case of group 3).

## ACKNOWLEDGEMENTS

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