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NEOLITHIC ALEPOTRYPA CAVE IN THE MANI, GREECE

IN HONOR OF GEORGE PAPATHANASSOPOULOS

Edited by

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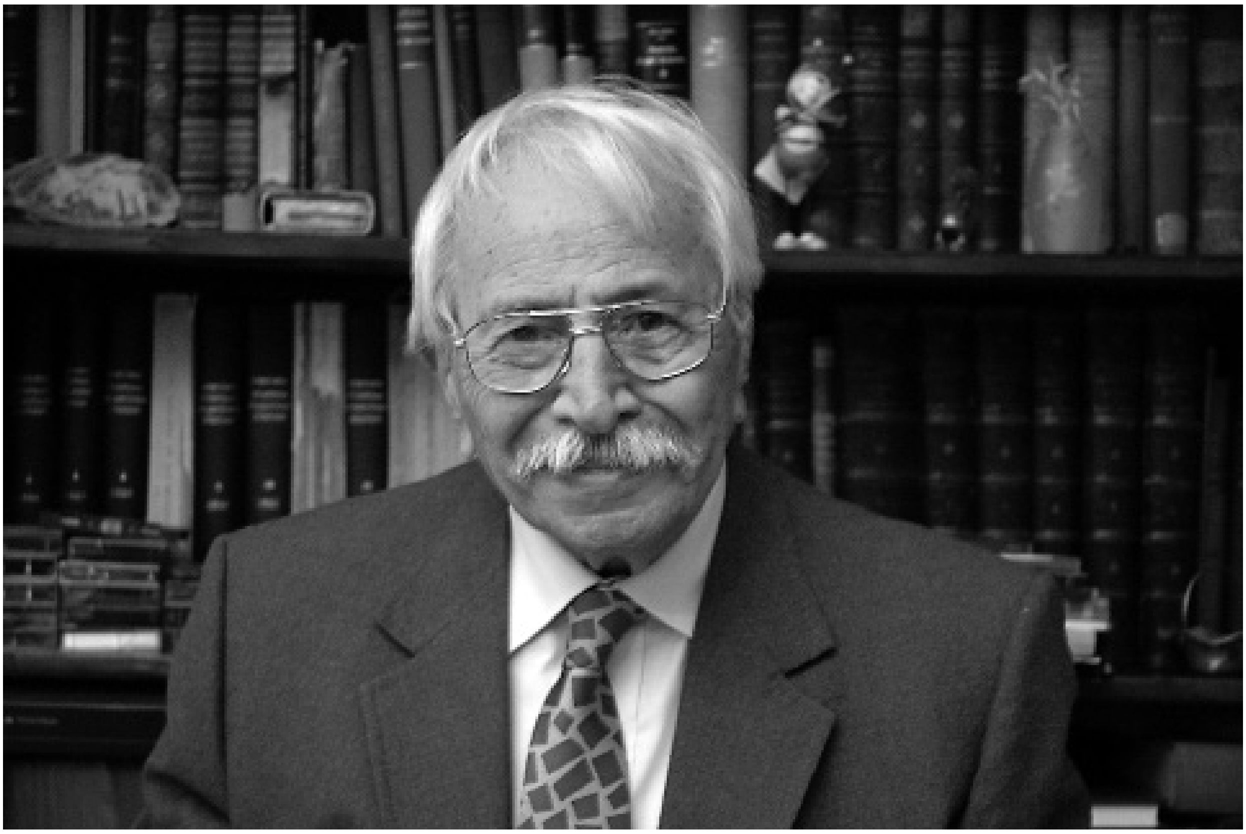
Front cover: Alepotrypa Cave, the Lake (by Andreas Darlas)



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Memories of Alepotrypa Cave, Diros

George Papathanassopoulos

In 1970, the Hellenic Minister of the Interior for the military dictatorship, Stylianos Pattakos, removed me from my position as the Ephor of Antiquities at Olympia. He argued that the opening of the irrigation canal of the dam of the Pinios River, which was to be inaugurated by the head of the military junta, Georgios Papadopoulos, was being delayed due to my extensive excavations in the city of Ancient Elis. The canal was designed to pass through that region. I was unceremoniously removed from my position – while on leave in Athens – and reassigned to the Ephorate of Sparta, where I took office on 25 March 1970.

While in my new position, my interest was attracted to two small marble female figurines of Neolithic date that were displayed in a small case on the wall of the Archaeological Museum of Sparta. These figurines had been found by the speleologist Anna Petrocheilou in Alepotrypa Cave at Diros. I was further intrigued by other artefacts in the back yard of the museum: there were four big baskets full of fragments of broken jars with exceptional relief decoration. These had also been found at Alepotrypa Cave by Anna Petrocheilou. I took photographs of the fragments and recorded them. In addition to these extraordinary findings, in the official correspondence files of the Ephorate of Sparta, I saw references and descriptions with photographs and drawings of ten wall carvings that also had been observed by Anna Petrocheilou in various parts of the same cave system.

Understandably, my interest was piqued. I immediately planned a visit to the place of origin – Alepotrypa Cave at Diros. When I arrived there, I found a group of people, organised by the Philips Company, performing the final testing for the *Son et Lumière* installation. The programme was being organised by the Greek Organization of Tourism (EOT) as part of the forthcoming touristic attractions at the cave.

As a result of my visit, I realised that all ten wall carvings were fake. They had been etched recently at various points throughout the cave, possibly by the same person that had previously produced ‘prehistoric centaurs’ on ‘ancient’ slate tiles and delivered them to the Museum of Volos, claiming them as originals.

I decided that I had to cancel the festive opening of Alepotrypa to tourism: the cave was full of archaeological material that had not been studied by the appropriate service.

***

Thus, after ten years of service at the National Archaeological Museum (1950–1960), followed by ten more at Ancient Olympia and after 1966 as Ephor of Antiquities. I began the third phase of my career as Ephor of Antiquities at Sparta where, from 1970 onwards, I was exclusively involved with the Neolithic Cave of Alepotrypa in Diros. When I entered Alepotrypa, knowing that the cave also had been used by Neolithic man, I could not help but feel strange – wondering about all the impressions and the feelings the cave had aroused in those people that had used it long ago, during the Neolithic period. Walking under the artificial light through the long corridor that winds to the back of the cave, to the lake with the potable water, I imagined a Neolithic man with just a torch in his hand following the same path I was taking. I thought that, just like me, he would have stopped – out of both respect and fear – at the point where the two corridors meet: where the higher level of Hall B descends to the significantly lower Ossuary of the Neolithic community. Then, continuing along the same path, he would have passed the cobbled ‘Niche of the Amphora’ (Niche 14) and entered Hall Z, where two neighbouring niches opened (Niches Z.22 and K.31) *en route* to the great hall of the cave, the Chamber of the Lakes.

The massive size of the cave and the incredible number of ceramic fragments found on the soil surface indicated to me that it was vital that systematic archaeological research should be conducted here. So I asked for the collaboration of my colleague and friend Dimitris Theocharis, who was eminently skilled in the investigation of the Neolithic Age. Unfortunately, however, this was not possible due to serious obligations he had in Thessaly. So our collaboration was limited to just one visit at the very start of the archaeological investigations in the cave. The work began on 15 July 15 1970, with my colleague George Steinhauer, Curator of the Antiquities Ephorate of Sparta, the archaeologist Sophia Eleftheriadou and the experienced excavator Menelaus Paleologos of the Museum of Sparta.

At the beginning of the excavations in Alepotrypa, Spyridon Marinatos, who at the time was General Inspector, came to Alepotrypa accompanied by the French geologist Jean Marie Lambert of the mining operations at Laurion, with his wife Nicole. Marinatos assigned the study and further excavation of Ossuary II to them. Until then, the investigation had been carried out by myself and the biological anthropologist Aris Poulianos, who had also been brought in by Marinatos. The research started with the opening of trial trench B1 at the centre of Chamber B, where the greatest thickness of the undisturbed Neolithic human remains were, impressively, still visible.

Meanwhile, excavation across the whole of the Northern Sector of Chamber B had revealed the surface layer of the fill. As a result, we were able to locate *in situ* significant finds and furnishings established by the users of the cave in the later Neolithic Period. These included two deep circular storage pits lined with clay, similar to the one already revealed by Anna Petrocheilou at a higher level of the same chamber. One of these had a stone-lined rim, as well as a large hearth, and two intact ceramic vessels found *in situ.*

During the course of the excavation, I first lived in a small tent under the portico set up in front of the entrance of the cave; later I had the use of a camper, a kind courtesy of the EOT.

Amongst the general difficulties and vicissitudes of life that the excavation team in Diros had to endure was the lack of drinking water. We resorted to drinking the brackish water pumped from the cave's own lake. As for food, originally we had a roughly installed kitchen near the Chapel of St. Saviour. Later on, when the Ministry of Tourism's restaurant, located near the beach, began its service, we were able to eat there.

All the above-mentioned difficulties were rendered tolerable, however, by the natural beauty of the Gulf of Diros, with Mount Taygetos in the background.

For the safe daily transport of the excavation finds from the cave to the Museum of Sparta, upon my request, a car and a driver from the military unit of Sparta had been assigned to assist us. John Orfanakos, the Mayor of Pyrgos Dirou, Takis Kilakos, who later became Mayor, and local entrepreneurs Koulis Kolokouris and Stavros Tsoukalas all were highly supportive of the project.

***

The examination of the top layer of the Northern Sector of Chamber B gave a good first impression of the conditions, lifestyle, and organisation of those Neolithic people that had used the cave. It seems that the inhabitants of the area and the cave would choose appropriate natural niches in its boundaries as places to reside; they opened circular pits with clay-lined walls and stone-lined rims – invariably of flat slabs of stones – to act as covers, presumably for the food stored therein.

This clear picture of their organizsed daily routine, particularly evident in the Northern Sector of Hall B and in Niche 15 of Chamber D (with its amphora *in situ*), spurred me on to pursue a general exploration of Alepotrypa. For this reason, I approached the pertinent Ministry Department and several other sponsoring bodies; I was successful in raising the finances for the project through the EOT and the Psycha Institution (1970–1971).

Unfortunately, the project was stopped in its tracks when I was held in Korydalos prison and suffered at the hands of the Junta for my political views. Even after my release, my persecution continued: first I became a *persona non grata* and then I was transferred to Agios Nikolaos in Crete, where I was eventually officially dismissed from my duties by a telegraph-message from the Junta.

After the regime change in 1974, I was legally returned to active service. First I served at the headquarters of the Ministry of Culture and then I was assigned to head up the newly-founded Department of Underwater Antiquities, a unit whose creation I had vigorously proposed. Here I served until January 1987, when I officially retired.

The period from 1970 to 1987 was a period of limited archaeological research in Diros but, over time, there was some significant development in the infrastructure. The existing portico was transformed into conservation laboratories, workshops, and a hostel where the excavation crew could live. All the necessities were provided: a kitchen, bathrooms, a study area, a conservation area, and a large storage room which later (1992) became the Diros Neolithic Museum. All this was successfully achieved with the help of the Association of Friends of the Neolithic Museum of Diros: in particular with the assistance of Carmen and Basilis Konstantakopoulos and the Greek-American couple Angelos and Eleni Tsakopoulos.

It must be emphasized that the project would never have succeeded without the dedication – well beyond their official obligations and responsibilities – of the scientific and technical staff who served and continue to do so from 1970 to the present day.

***

The excavation project at Alepotrypa Cave has led to more and more significant finds and continues to hold my interest. In 1988 I broached the possibility of acquiring more substantial funding for additional research and development with the Minister of Culture, Melina Mercouri. By decision of the Minister, a programme for the project was agreed to with the Ministry of Culture, Archaeological Receipts Fund (TAPA) and the Municipality of Diros. The project was funded by grants from the TAPA. In this way, it became possible to recruit archaeologists, designers, administrators, and technical personnel.

The research included the continuation of the excavation in Trench B1: this yielded numerous finds – undecorated and painted pottery, rich skeletal material, figurines, and stone and bone tools. The progress was such that a depth of 5 m of excavation was reached: the stratigraphy of B1 revealed that Neolithic man was using Alepotrypa from *c.* 6,000 BC to 3,200 cal C.

In addition to trench B1, I began excavating in Niche Z22, just before the entrance to the Great Hall of the Lakes. In this area, numerous colourfully painted, broken, pots were revealed: this was an unexpectedly rich and unique cultural treasure. Apart from the archaeological value of these finds, the chance to see and handle them gave me – and even now continues to give me – joy beyond words, a deep satisfaction in that I was fortunate to have discovered them, and so to have ensured their preservation, promotion, and study.

With the Planning Agreement in place and the support of the Association of Friends of the Neolithic Museum of Diros, the excavation and planning work in Diros has been decisively promoted and further advanced by the Archaeological Receipts Fund of the Ministry of Culture. During the summer of 2006 it finally became possible to allow the public to visit Alepotrypa: but only for 6 months as the funding soon came to an end.

However, I persevered in my efforts to advance the scientific work. In 2010, following a ministerial decision, I secured a 5-year programme, with the collaboration of Greek and US scientists and funding from the Institute for Aegean Prehistory, the Wiener-Laboratory, the Wenner-Gren Foundation for Anthropological Research, the National Geographic Society, and the Field Museum of Natural History.

After four decades, since 1970, Alepotrypa is now ranked as one of the most important archaeological sites of Neolithic culture in Europe. The book the site inspired me to write – *Neolithic Diros* – is included as teaching material in the Philosophical Schools of the Universities of Athens and Thessaloniki. I also feel delighted that my colleagues – Greek and foreign scientists of various disciplines – are busy with the study and publication of material acquired from Alepotrypa Cave.

I dream of the development of the infrastructure that Alepotrypa deserves and the building of a large museum nearby that will house and display all the major findings of the excavations. Thus, visitors will be best informed about the culturally sophisticated practices of Neolithic man on the southernmost tip of mainland Greece.

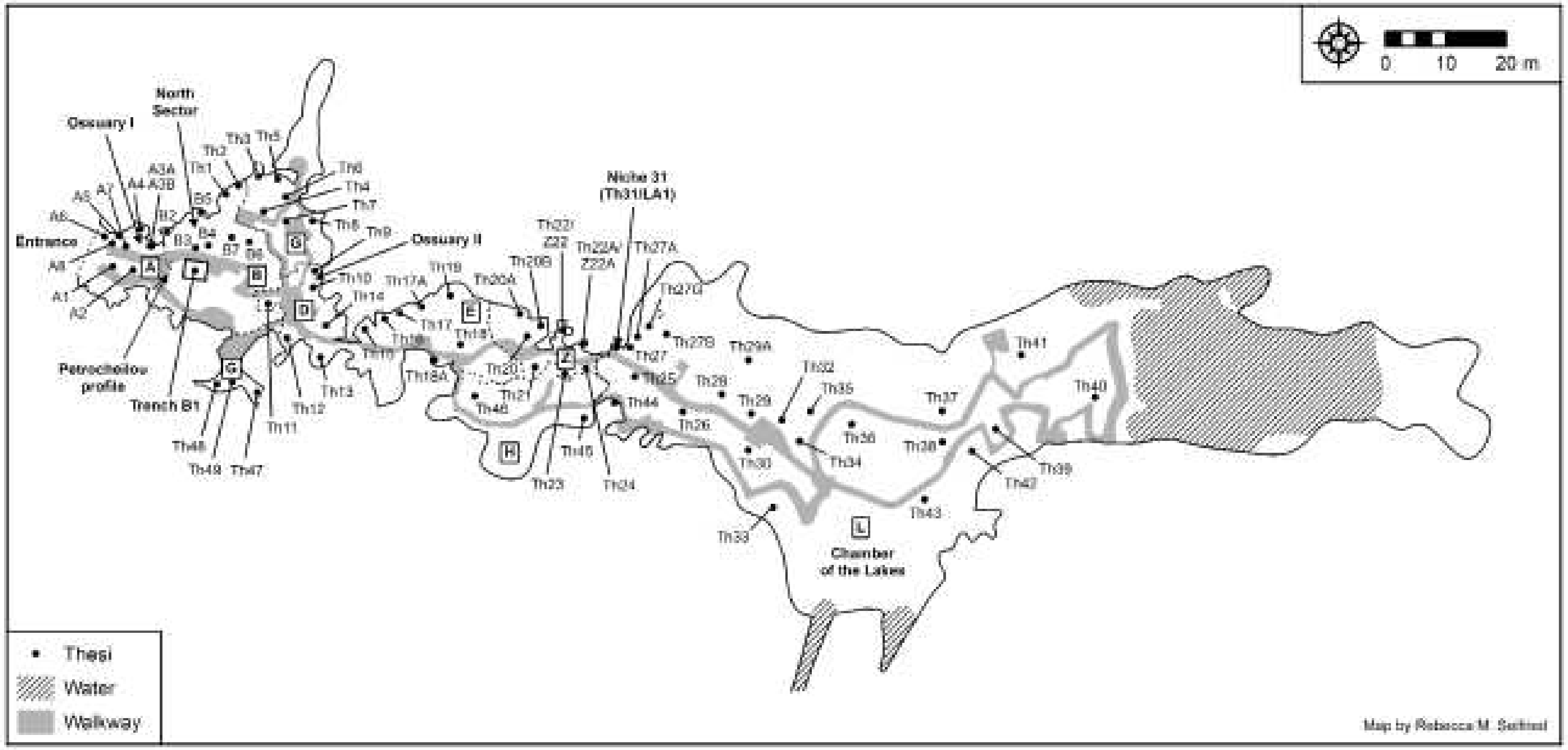

Figure 0.1. Alepotrypa Cave floorplan and archaeological loci. Important note: TH (from Thesi) is the equivalent of Θ (Θέση = locus). Th can also be substituted for the chamber designation letter (i.e. Th/20 is the same as Θ/20 or Z/20). Certain loci may also bear specific names. Furthermore, Niche 31 is the same as LA1 or Th/31 or Θ/31.

14

The macrofaunal assemblage of Alepotrypa Cave

Angelos Hadjikoumis

Introduction

This chapter concerns the study of the macrofaunal remains recovered from the archaeological excavations at Alepotrypa Cave (Lakonia, Peloponnese). Details on the archaeological context and chronology, as well as studies of other categories of materials, are presented and discussed in other chapters in this volume. To get a fuller picture of the different types of interaction that developed between humans and animals at the site, this chapter should be read with the chapters on microfaunal (Papayiannis, this volume) and fish remains (Theodoropoulou, this volume). This study involves substantial macrofaunal samples excavated in Chambers A, B, D and Z of the cave. Most of the material in these samples is dated to one of three Neolithic phases – Early Neolithic (*c.* 6000 cal BC), Late Neolithic (*c.* 5,500–4,500 cal BC), Final Neolithic (*c.* 4,500–3,200 cal BC), or a combination of those. The human–animal interactions explored in this study mainly relate to economic, environmental and cultural themes, each addressing a multitude of specific questions.

The presence of samples of Early, as well as Late/Final Neolithic, date provides an evolutionary perspective to the questions addressed by this study. The economic importance of the husbandry of each domestic species, as well as the significance of the hunting of wild animals, is discussed on the basis of reliably large samples. The large quantity of data recorded for the most common domestic species allow an approach to the animal husbandry strategies employed by the herders of Alepotrypa. Given the enhanced suitability of the cave environment at the site, dairying is specifically examined through age-at-death data. Other archaeological lines of evidence suggest that large groups of people may have congregated seasonally at Alepotrypa, and this possibility is also investigated here through zooarchaeological data. Beyond strictly economic matters, social and cultural issues are explored in this chapter, as well as the Neolithic environment around Alepotrypa.

Materials and methods

The excavation history of the site spans over four decades; thus, the collection strategy for the faunal material has inevitably changed through time. In general, and for most of the time, the site's macrofaunal remains were recovered through hand collection. Coarse dry-sieving was introduced on a regular basis from the late 1980s until 2013, when the excavations were concluded. Due to the nature of the site (*i.e.*, located in a cave), work was so carefully conducted since the late 1970s as to result in good rates of recovery for small animals and small anatomical elements. This claim is supported by the presence in the assemblage of large numbers of newborn animals (mainly sheep, goat and pig), as well as some remains of small mammals (*e.g.*, cat, marten, hedgehog and hare) and birds. However, some loss of small anatomical elements and smaller species is inevitable, as has been proven also in the case of the micromammal remains (Papayiannis, this volume). The extent of the loss is evaluated and discussed wherever relevant in the next two sections of this chapter. Nonetheless, in comparison to most open-air Neolithic sites in Greece, the preservation at Alepotrypa is exceptional. This allows a high degree of identifiability and contributes substantially towards a reliable representation of species and age categories. In the stable cave environment, individual bone density plays a less definitive role in preservation than it does in most open-air sites.

The material was processed at the Ephorate of Palaeoanthropology-Speleology of south Greece and studied at the Wiener Laboratory (American School of Classical Studies at Athens). During the study, identification was facilitated by the comparative faunal collections of the Wiener Laboratory and the Fitch Laboratory (British School at Athens), as well as published anatomical atlases (*e.g*., Schmidt 1972; Barone 1976; Pales and Garcia 1981; Cohen and Serjeantson 1996; Bocheński and Tomek 2009). For the distinction between sheep and goat remains, besides reference specimens available in the two aforementioned comparative collections, the relevant publications by Boessneck *et al*. (1964), Zeder and Lapham (2010), Kratochvil (1969) and Prummel and Frisch (1986) for postcranial remains and those of Balasse and Ambrose (2005), Halstead *et al*. (2002) and Payne (1985) for mandibular teeth were also consulted. The material had already been extensively sorted and partly studied by Thanos Webb, whose prior work on the assemblage has greatly facilitated this study.

For mammals, the anatomical units systematically recorded were: horncore/antler bases; mandible/loose cheek teeth; atlas; axis; scapula; proximal and distal halves of humerus, radius, femur, tibia, metapodia (only III and IV in pigs and II–V in canids); proximal half of ulna; pelvis; astragalus; calcaneum and phalanges 1–3 (excluding lateral phalanges in pigs and phalanges of metapodium I in canids). No attempt has been made to distinguish phalanges into fore- and hind-limb. These anatomical elements have been selected for their durability, identifiability and potential to yield information on human–animal relationships. The quantification of anatomical elements, taxa, age and sex is based on the minimum number of anatomical units (MinAU hereafter) and of butchery and taphonomy on the maximum number of anatomical units (MaxAU hereafter), in both cases according to Halstead (2011). To allow reliable comparisons between species with different numbers of foot bones, pig metapodia have been divided by two and canid metapodia by four, thus becoming analogous to the single metapodium per foot in sheep, goat, cattle and red deer. For the same reason, canid phalanges have been divided by two. Moreover, in order to avoid an underestimation of species that do not have horns or antlers, those anatomical units have been excluded from analyses on species composition. No adaptations were necessary for any other species due to the absence of metapodia and phalanges (or presence only of single specimens). Due to their small number and the limited experience of the author in their study, avian and chelonian remains have been recorded only in terms of number of identified specimens (NISP) instead of MinAU.

Age-at-death was estimated based on the eruption and wear state of teeth, as well as the epiphyseal fusion state of postcranial elements. Eruption and wear stages of mandibular dental remains were recorded following Payne (1973, 1987) for sheep and goats, Grigson (1982) and Halstead's (1985) adaptation of Payne for cattle, Grant (1982) and Bull and Payne (1982) for pig, and Brown and Chapman (1991) for red deer. Eruption ages for mandibular teeth of dog and cat follow Silver (1969), while the attribution of age-at-death based on the wear of dog permanent mandibular M1 follows Horard-Herbin (2000). During quantification, dental specimens attributable to more than one age interval were proportionately assigned. For the rest of the identified species there is little available information concerning eruption and wear. Nevertheless, wherever possible, age-at-death was attempted either in relative terms (*i.e*., permanent dentition worn = adult) or based on relevant published data such as Linhart (1968) on fox and Lüps and Roper (1988) for badger. Age-at-death based on epiphyseal fusion follows Silver (1969) for sheep, goat, cattle and pig, while for the rest of the identified species, samples are too small for elaborate analysis. Pelves of sheep and goat were sexed whenever possible based on their morphology following Boessneck *et al*. (1964) and those of cattle following Grigson (1982). Sex ratios for pig were estimated based on the sexually dimorphic morphology of the permanent mandibular canine (Mayer and Brisbin 1988). Fragmentation, taphonomy and butchery were recorded as described in Halstead (2011) and biometric measurements were taken following von den Driesch (1976), with the addition of the measurements in Table 14.1.

Table 14.1. Additional biometric measurements taken on Alepotrypa faunal material

Element	*Name*	*Description*	*Reference*
Scapula	ASG	Shortest distance from base of spine to edge of glenoid	Boessneck *et al*. (1964)
Humerus	HTC	Minimum diameter of trochlea	Payne and Bull (1988)
	HT	Greatest height of trochlea	Boessneck *et al*. (1964)
Pelvis	MRDA	Depth of medial rim of acetabulum	Davis (1996)
Calcaneus	GD	Greatest depth	Albarella and Payne (2005)
	WCM	Medio-lateral width of medial condyle	Payne (1969)
	WCL	Medio-lateral width of lateral condyle	
	DVM	Antero-posterior diameter of medial verticillus	Boessneck *et al*. (1964)
Metacarpus/ metatarsus	DVL	Antero-posterior diameter of lateral verticillus	
	DEM	Antero-posterior diameter of medial external trochlea	
	DEL	Antero-posterior diameter of lateral external trochlea	Davis (1996)
	BFp	Greatest breadth of proximal articular surface	
	BFd	Greatest width of the distal articulation	

Results

Taxonomic composition

The study of the mammal remains yielded 4562 MaxAU and 3804 MinAU. Beyond mammalian remains, the assemblage also contained a few bird (NISP = 18) and reptile (NISP = 68) remains. Besides the mammalian, avian and chelonian fauna discussed in this chapter, the microfaunal and ichthyofaunal remains recovered at Alepotrypa are presented and discussed in separate chapters in this volume by Papayiannis and Theodoropoulou respectively.

The mammal species present and their frequencies have the potential to shed light on the role and importance of each one of them at Alepotrypa. The largest datasets derive from Chambers B, D, A and Z. The material from each chamber has been analysed separately in order to explore any differences between chambers. For some analyses, samples have been grouped on a chronological basis, wherever they were too small to be analysed individually. The main periods represented are the Early, Late and Final Neolithic.

Starting in chronological order, there are two samples, from Chambers A and B dated to the Early Neolithic occupation of the cave (*i.e.*, *c.* 6000 cal BC). Their mammalian compositions are presented in Figures 14.1 and 2 respectively. The sample from Chamber A (Figure 14.1) is safely dated to the Early Neolithic, as later deposits have been truncated by earlier archaeological operations in the cave. Despite its modest size (MinAU = 263), ten mammalian species are represented. Taking into account the possibilities that wild boar might be present among pig remains and wolf and/or jackal among dog remains, the number of species could be raised to 12 or 13 species. More than half of the sample (62.0%) belongs to sheep (*Ovis aries*) and goat (*Capra hircus*) combined. Sheep and goat are represented in relatively balanced proportions, although sheep are slightly more abundant. Beyond sheep and goat, the only other economically important species is the pig (*Sus domesticus*) at 18.6%, with the probable presence of a few wild boar (*Sus scrofa*) remains. Cattle (*Bos taurus*) remains represent only 4.9% of the assemblage. Beyond these four species, dog (*Canis familiaris*) is unexpectedly abundant (10.3%) in the sample. This raises questions about its role at the site, assuming that all or most of those remains indeed belong to dogs and not, also, to wolves (*Canis lupus*) and/or jackals (*Canis aureus*). In addition to the potential occurrence of wild boar, wolf and jackal, other wild species are definitely present in the sample, but their economic importance appears to have been limited, as their low combined percentage (4.2%) suggests. Red deer (*Cervus elaphus*) was present, as well as fox (*Vulpes vulpes*), badger (*Meles meles*), hare (*Lepus europaeus*) and possibly another small carnivore (smaller than a fox). Chamber A is the nearest to the cave's entrance and this raises the possibility that some of these animals have ended up in the assemblage due to factors other than interaction with humans. Some of these species

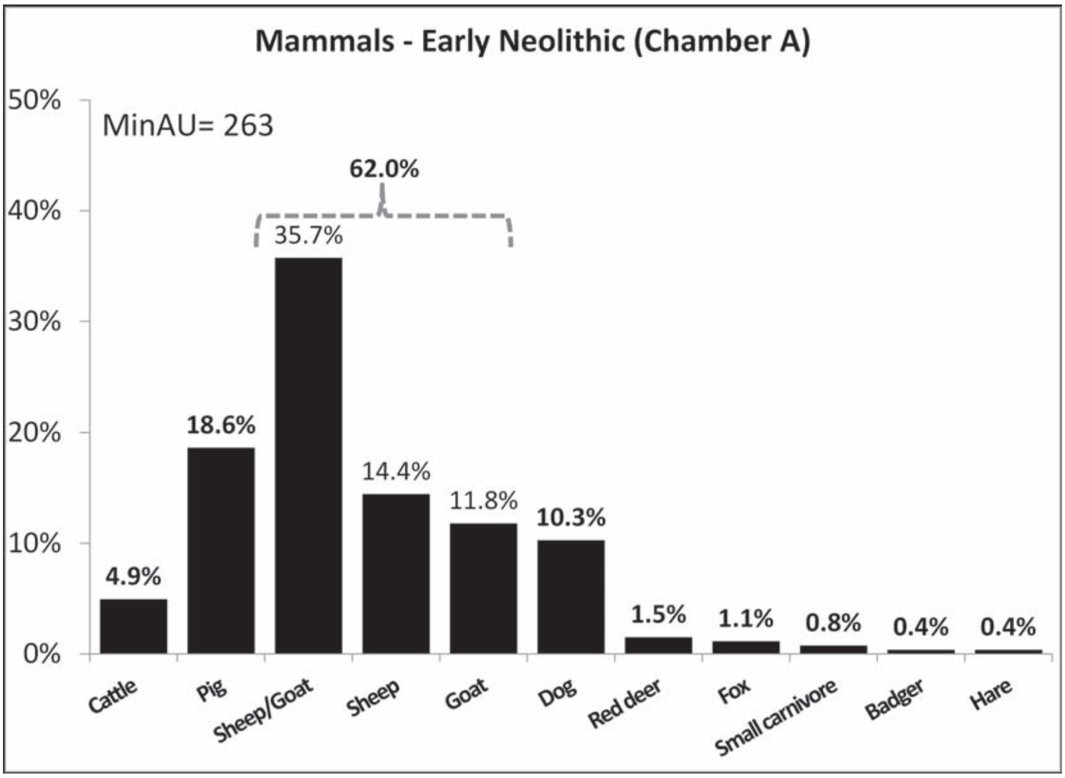

Figure 14.1. Mammalian species composition from Chamber A.

frequently visit caves (*e.g.*, badgers and foxes) while others (*e.g.*, hare and red deer) may have ended up there as hunted or scavenged prey. Nevertheless, strong indications (*e.g.*, in the form of butchery marks) exist to suggest that at least most remains were brought to the cave and utilised by humans, possibly as the result of hunting or trapping activities.

The presence of five bird remains in Chamber A is also of interest. It can be confirmed that at least three species of bird are represented in Chamber A (Table 14.2), the jackdaw (*Corvus monedula*) and possibly another corvid species, a strigiform species (possibly little or tawny owl, *Athene nooctua*/*Strix aluco*), and finally a gruiform or cinoniiform species. In addition, an unidentified specimen of a medium-sized bird could belong to any of the above or to an entirely different species. From these species, the gruiform/ciconiiform species is likely – but not certainly – the result of human predation, while corvid and strigiform species are more likely to have dwelt inside the cave or near its entrance.

Table 14.2. Bird species from Chamber A (EN)

Species	*NISP*
Strigiformes	1
Corvidae	1
Corvus monedula	1
Gruiformes/Ciconiiformes	1
Medium-sized bird	1
Total	5

The Early Neolithic sample from Chamber B is quite small (Figure 14.2). Nevertheless, its faunal composition is compatible with its coeval sample from Chamber A in that sheep/goat account for about 60% of the sample, with an even clearer majority of sheep over goats. Pig is more abundant than in Chamber A, cattle and dog are less so, while red deer is consistently present in small numbers.

The next chronological period for which a reliably large sample is available (MinAU = 463) is the Late Neolithic, represented in Chamber B (Figure 14.3). It should be mentioned that the levels from which the sample derives are not entirely safely attributed to the Late Neolithic (*c.* 5,500–4,500 cal BC), although other contextual and stratigraphic indications do support this chronology. Overall, the faunal composition is similar to that of the preceding Early Neolithic samples, but there are also notable differences. Sheep/goat percentage increases to almost 70% with a clear predominance of sheep over goats, while pig and cattle remain secondary in economic importance at slightly reduced percentages compared to the Early Neolithic samples. Dog remains are significantly reduced to 1.1%. Red deer represents 3.5% of the sample; a range of smaller wild species are represented such as fox, marten (probably stone marten, *Martes foina*), cat (*Felis catus/silvestris*), hedgehog (possibly *Erinaceus roumanicus*) and hare. Despite the small numbers of wild species, the presence of some of them is intriguing. For example, it is unknown whether the cat was a domestic or

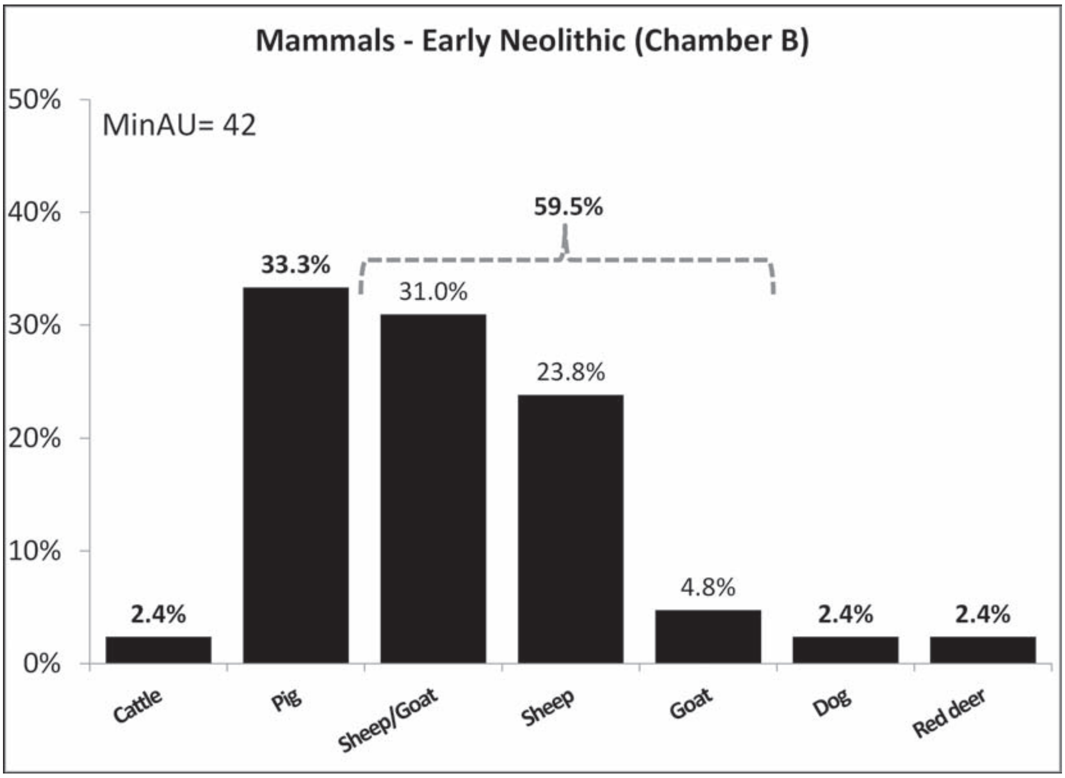

Figure 14.2. Mammalian species composition from Early Neolithic levels of Chamber B.

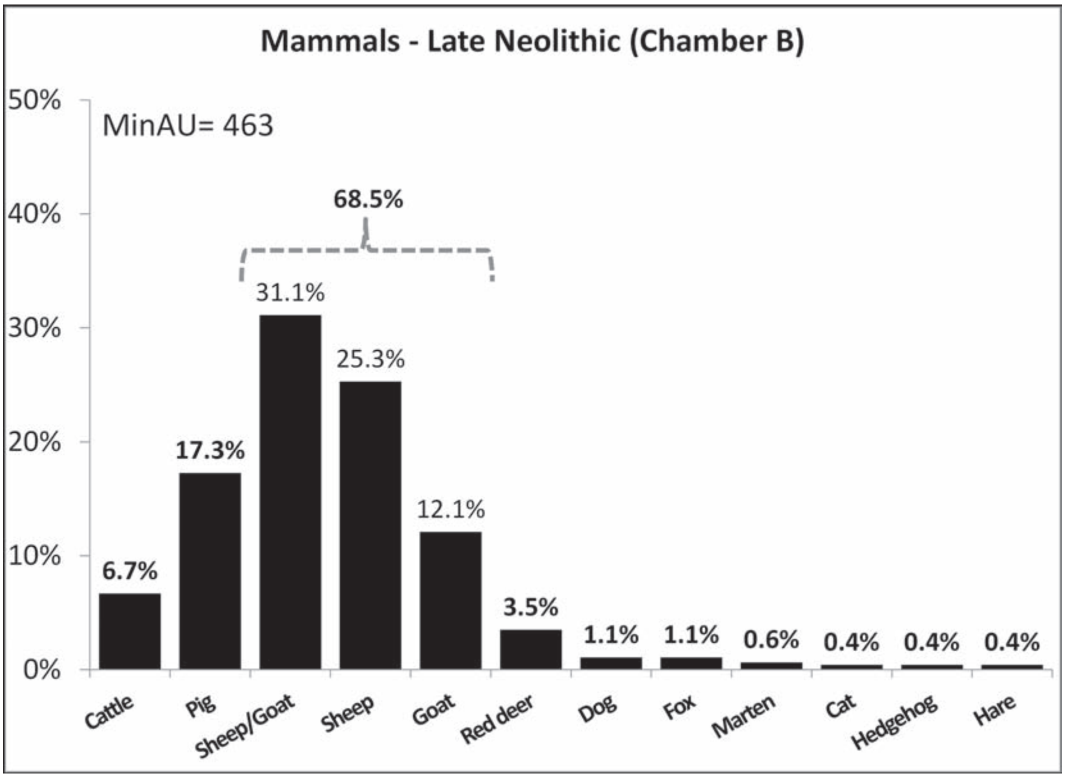

Figure 14.3. Mammalian species composition from Late Neolithic levels of Chamber B.

a wild animal. Butchery marks on the proximal humerus of the specimen can be read as evidence for the latter scenario, but such a reading is far from safe, as butchery marks have also been recorded on domestic dog remains. The traces of butchery on wild carnivores such as fox, badger and marten in this and other samples suggest that the occupants of Alepotrypa were hunting or trapping such animals for their pelts, if not also for their meat. Hares were also occasionally captured as the butchery marks on their bones indicate.

The sample from the Final Neolithic levels (*c.* 4,500–3,200 cal BC) in Chamber B is the largest available from Alepotrypa (MinAU = 1614). In this sample (Figure 14.4) sheep/goat reach 71.7%, thus confirming the trend for an increase in their abundance from the Early to the Late Neolithic. This increase is mainly at the expense of cattle and wild species, while the pig percentage remains stable at just below 20.0%. Despite their low abundance, many wild species have been identified, including red deer, fox, hare, badger, cat, stone marten, hare, hedgehog and possibly wolf, jackal, wild boar and a mustelid species, other than the stone marten. Many of the remains of these species bear butchery marks and it can thus be safely assumed that they were hunted or trapped by humans and brought to the cave. As was the case concerning the cat specimen in the Late Neolithic sample from Chamber B, cat remains in this sample also had butchery marks on them. The only wild species that consistently lacks any signs of butchery is the hedgehog but this does not necessarily exclude its consumption as there is little need to heavily butcher such a small animal.

In addition to the Late and Final Neolithic samples from Chamber B, another sample is broadly dated to both periods (*c.* 5,500–3,200 cal BC). The species composition of this sample (Figure 14.5) is similar to that of the Final Neolithic sample from the same chamber; a near-absolute predominance of sheep/goat (79.3%), a secondary role for the pig (13.5%) and marginal roles, at least economically, for cattle and wild species. The similarity between this and the Final Neolithic sample from the same chamber suggests that it might be chronologically nearer to the Final than the Late Neolithic.

The Late and Final Neolithic samples from Chamber B also yielded a small number of bird remains, which are presented combined in Table 14.3. Crane (*Grus grus*) has been positively identified in this sample, as well as two specimens belonging to pigeon (unknown if wood or rock pigeon), a specimen attributable to a species of gull, three to a galliform species (possibly partridge) and two to accipitriform species. Moreover, four specimens of medium-sized birds remain unidentified.

The Late and Final Neolithic samples have also yielded reptilian (exclusively chelonian) remains. Both marine turtles and land tortoises (Table 14.4) are represented in the sample. The only definitively identified species is the loggerhead sea turtle (*Caretta caretta*). It cannot be confirmed that all sea turtle remains belong to the loggerhead, but it is a likely

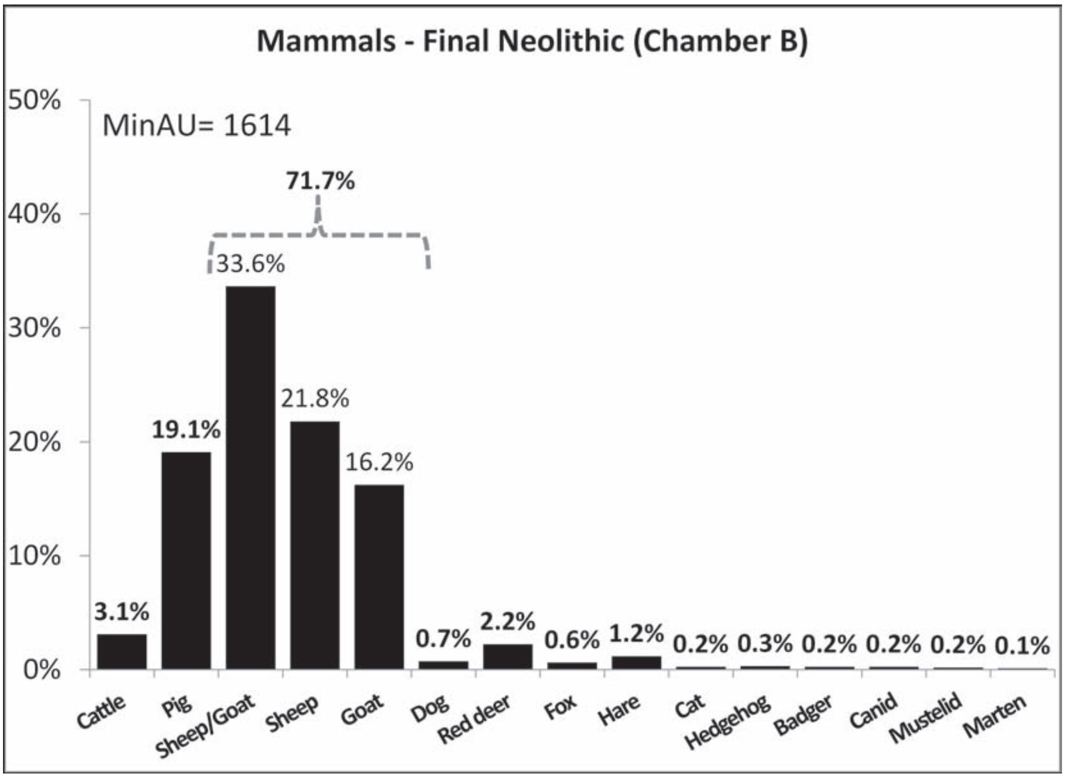

Figure 14.4. Mammalian species composition from Final Neolithic levels of Chamber B.

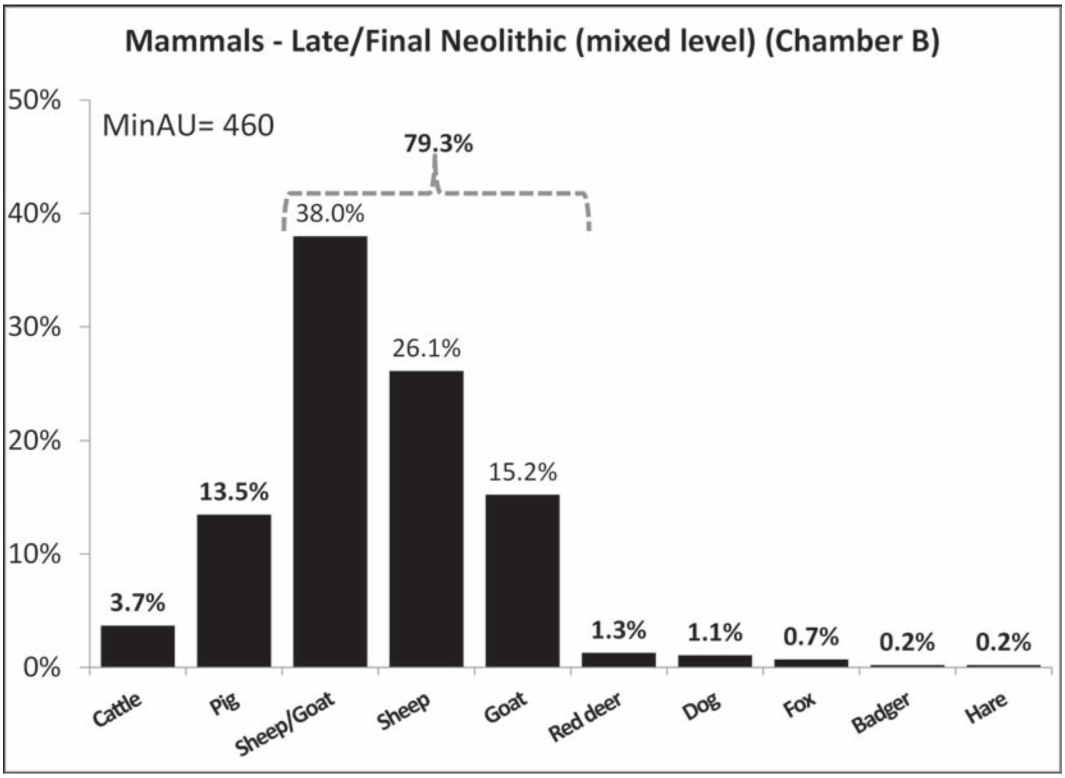

Figure 14.5. Mammalian species composition from Late/Final Neolithic levels of Chamber B.

Table 14.3. Bird species from Late-Final Neolithic Chamber B

Taxon	*NISP*
Grus grus	1
Galliformes	3
Columba sp.	2
Accipitriformes	2
Larus sp.	1
Medium-sized bird	4
Total	13

Table 14.4. Reptilian (chelonian) remains from Late-Final Neolithic Chamber B

Taxon	*Anatomical element*	*NISP*	*Comments*
Marine turtle remains			
Caretta caretta	Carapace (Nuchal)	1	Most or all belong to 1 individual
	Carapace (Pleural)	8	
	Carapace (Peripheral)	9	
	Carapace (Neural)	1	
	Carapace (Suprapygal)	1	
Marine turtle	Carapace (Pleural)	2	1 individual
	Carapace (Peripheral)	2	
	Plastron	12	
	Plastron	1	Unknown part of any of the above individuals
Total		37	
Land tortoise remains			
Testudo sp.	Carapace (Pleural)	4	1 individual
	Carapace (Pleural)	9	
	Carapace (Peripheral)	1	1 individual
	Carapace (Pleural)	11	Mixed, unknown parts of any of the above individuals
	Carapace (Neural)	1	
Total		26	

scenario since it is the only identified species. All land tortoise identifications remain on the generic *Testudo* sp. as it is difficult, at least with the author's skills in the identification of chelonians, to distinguish between the three similar species of land tortoise currently present in Greece, *i.e*., Hermann's (*Testudo hermanni*), marginated (*Testudo marginata*) and spur-thighed (*Testudo graeca*). For both sea turtles and land tortoises, only anatomical elements that form part of the shell (*i.e*., carapace and plastron) have been recorded.

Like Chamber B, Chamber D has also produced a sample dated to the Final Neolithic period. Its faunal composition (Figure 14.6) is quite similar to its coeval sample in Chamber B; a clear predominance of sheep/goat (75.2%) with a strong sheep predominance within that taxon. The secondary, although still important, economic role for pigs and the rather marginal role for cattle are confirmed for Chamber D as well. As in other Late and Final Neolithic samples, dog remains are scarce, around 1%. Wild species are rare but the range of species present is relatively consistent with other chambers. In Chamber D, red deer, fox, hare, cat, hedgehog and marten are also present, thus providing further evidence for the scenario that the remains of these animals were deposited in the cave by humans. Beyond mammals, four land tortoise specimens (*Testudo* sp.) were identified, possibly belonging to the same individual. Moreover, as was the case with the rest of the chelonian remains, all four specimens from Chamber D (one nuchal and one pleural bone from the carapace and two more specimens from the plastron) derive from the tortoise's shell without any limb bones present.

The broad chronological range of the material recovered from Chamber Z dictates that the sample is generally attributed to the Early–Final Neolithic period (*i.e., c.* 6,000–3,200 cal BC). Despite the broad chronological span and small size (MinAU = 152), the sample is worth analysing due to the peculiar context from which it was recovered. The excavated matrix was black and mostly consisted of animal dung (see Karkanas, this volume) and, besides animal bones, a large number of whole, but deliberately broken, ceramic vessels of different types were also recovered. The faunal composition of Chamber Z (Figure 14.7) consists mainly of sheep and goat (80.9%) and, once again, a clear predominance of sheep within that taxon. The pig percentage (15.8%) confirms that a 15–20% range was a constant for this species (possibly with some wild boar remains included) from the Early through to the Final Neolithic. Beyond sheep, goat and pig, other species (*i.e.,* cattle, red deer, dog and hare) are barely present. In this sense, Chamber Z is different but not entirely out of the ordinary, as its overall species composition is reminiscent of the Final Neolithic samples (Figures 14.4 and 6). This similarity can be considered as evidence for a Final Neolithic date of the sample. Beyond mammals, a single land tortoise (*Testudo* sp.) specimen that derived from the carapace (pleural bone) was also recorded.

Besides the substantial samples from Chambers A, B, D and Z, a few faunal remains have also been recovered from other parts of the cave such as the Lake chamber and the 'Neolithic staircase', both in contexts of Final Neolithic chronology. The total MinAU from the Lake Chamber is 34 and consists of three pig and 31 sheep/goat anatomical units, with a strong sheep majority, as has been the case for other Final Neolithic contexts in the cave. The material from the 'Neolithic staircase' consists of five pig, 15 sheep/goat (with equal sheep and goat representation) and one red deer anatomical units. These contexts are too small to offer any significant insights, but they nevertheless show that animal remains were also deposited in those locations by the Final Neolithic occupants of the cave.

The results on a chamber-by-chamber basis presented above allow comparisons that may reveal diachronic patterns in human–animal interactions at Alepotrypa, especially between the Early and Late/Final Neolithic phases. A notable trend is the increase in sheep/goat

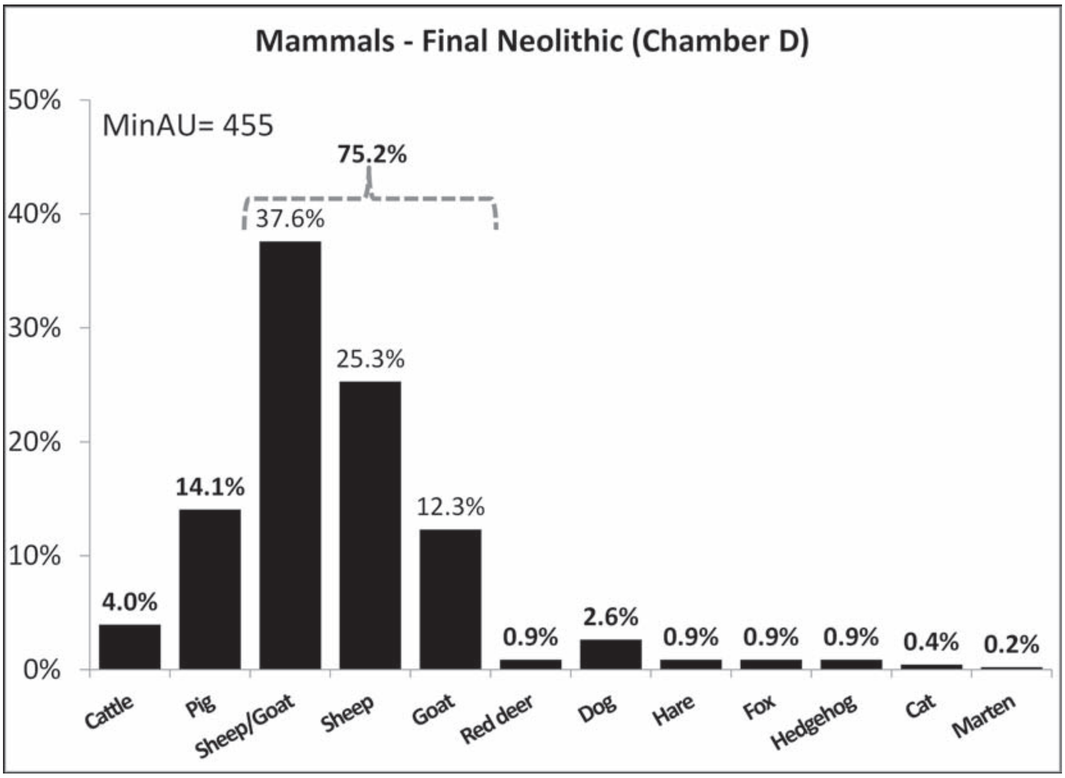

Figure 14.6. Mammalian species composition from Final Neolithic levels of Chamber D.

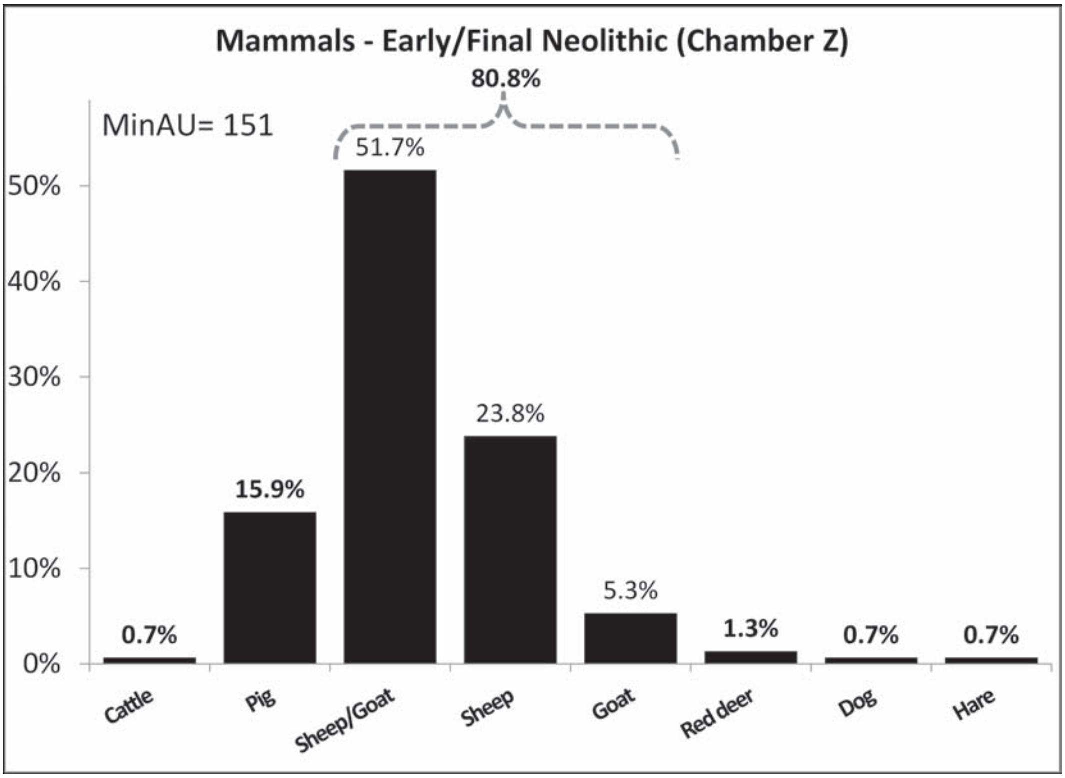

Figure 14.7. Mammalian species composition from Early/Final Neolithic deposits in Chamber Z.

abundance from the Early to the Late and then to the Final Neolithic phases. Moreover, within the sheep/goat category, sheep are consistently more abundant than goats throughout the sequence, but their representation tends to become more balanced in the Late and Final Neolithic periods. Pig percentages appear to be remarkably stable throughout the sequence with percentages in the 15–20% range (Figures 14.1, 14.3–7), with the exception of the small Early Neolithic sample from Chamber B, which yielded a significantly higher percentage (Figure 14.2). Cattle played a rather restricted role with percentages ranging from 3% to 7% and are at their lowest in Final Neolithic samples. In Chamber Z in particular, cattle are almost absent, although the chronological span of this sample is broad (Early-Final Neolithic). The domestic dog is also without fail present in all the samples, but is more abundant in the Early than the Late and Final Neolithic samples. The high dog percentage in Early Neolithic Chamber A, combined with a butchered dog humerus and increased numbers in the context of the ossuary, can be used as evidence to suggest additional roles for dogs other than their usual guard and shepherd 'duties'. The possibility of wolf or jackal remains included among those of dog is open due to their close morphological similarity. This issue is further explored biometrically later on (Figure 14.18).

Anatomical representation

The anatomical representation (see breakdown of anatomical units per species in Appendix 14.1) shows that all body parts were present at the site, at least for the main species (*i.e.*, sheep, goat, pig and cattle). The same can be suggested for the rarer species but it cannot be confirmed, except perhaps for the cases of dog and red deer where most parts of the skeleton are well-represented. Despite the presence of all body parts in the assemblage, there is a consistent 'shortage' of small-sized anatomical elements. Phalanges, astragalus, calcaneus and ulna numbers are particularly low compared to those of long bones. Possible explanations for this pattern include the complete destruction of more of the smaller anatomical elements through gnawing, their disposal in an as yet unexcavated location outside the cave and the higher chance of their being overlooked during work in the trench or in the dry sieve (*cf.* Payne 1972). The last explanation is likely to be the primary reason for the observed pattern as most material was hand-collected, thus making size an important factor in any faunal remains being collected. This explanation is also supported by the observation that small anatomical elements of large species, such as cattle and red deer, are proportionately well-represented when compared to long bones, in contrast to species of medium size such as pig, sheep and goat (Appendix 14.1). Other indications that support a size-related recovery bias include the near-absence of small anatomical elements of small species such as dog, fox, badger, marten, cat, hare and hedgehog, as well as the near-absence of small anatomical elements of neonatal pig, sheep and goat, despite the otherwise large number of long bones of neonatal animals in the assemblage. Nevertheless, the bias against small body parts is not as severe as the data suggest (Appendix 14.1). Moreover, it is probable that other factors contributed to it, such as loss of small bones through gnawing and the possibility of discarding some lower leg bones at locations outside the cave or at kill sites (in the case of hunted animals). Interestingly, there is also a shortage of pig mandibular remains in many samples (*e.g.*, Final Neolithic Chamber B). Summing up the anatomical representation data, it is likely that smaller species are slightly under-represented, while cattle are slightly over-represented. The effect on the overall picture of species frequencies, however, is only a mild one, since the overwhelming majority of the assemblage consists of sheep, goats and pigs (*i.e.,* animals of medium size).

Age-at-death

Sheep and goat

Age-at-death was analysed based on two lines of evidence, epiphyseal fusion and dental eruption and wear. As with species frequencies, age-at-death data were analysed with respect to their chronology and on a chamber by chamber basis. In some cases the combining of chronologically analogous samples from different chambers (or contexts within chambers) was preferred over the analysis of small samples.

The large number of sheep and goat remains yielded six separate samples amenable to analysis of age-at-death data. Before proceeding with the analysis of epiphyseal fusion data, and due to the substantial numbers of neonatal remains, all aged remains were divided into neonatal and post-neonatal (Table 14.5). It is entirely possible that some of the specimens recorded as neonatal are foetal. Neonatal remains are most abundant in Early Neolithic Chamber A (11%) and Late/Final Neolithic Chamber B (12%), while in Late Neolithic Chamber B (5%) and Early/Final Neolithic Chamber Z (3%) they exhibit lower percentages. Final Neolithic Chamber D yielded 6% of neonatal remains while Final Neolithic Chamber B, the largest and most reliable sample in the assemblage, yielded 8%. The recovery bias against the smaller bones, such as those of neonatal animals, means that neonatal remains are probably under-estimated. The degree to which this is true cannot be assessed precisely, but it is unlikely that the observed percentages are too far from reality as most neonatal long bones were complete or in large pieces, which reduces the likelihood of their being missed in the trench or dry sieve.

All aged post-neonatal sheep and goat (combined) remains were further analysed based on their epiphyseal

Table 14.5. Postcranial data for neonatal vs *post-neonatal mortality in sheep and goat (combined)*

Chamber – chronology	*Neonatal*		*Post-neonatal*		*Total MinAU*
	MinAU	*MinAU%*	*MinAU*	*MinAU%*	
A – Early Neolithic	9	11	71	89	80
B – Late Neolithic	8	5	167	95	175
B – Late/Final Neolithic	23	12	171	88	194
B – Final Neolithic	56	8	656	92	712
D – Final Neolithic	13	6	211	94	224
Z – Early/Final Neolithic	2	3	61	97	63
Total	111	8	1337	92	1448

fusion state. The produced results are useful in the interpretation of sheep and goat husbandry practices at Alepotrypa (Figure 14.8). The only substantial Early Neolithic sample from Chamber A is of modest size; it indicates high mortality in the first year (58%) and again between two and four years (reaching 90%). Chronologically, the next is the Late Neolithic sample from Chamber B which shows a similar pattern with somewhat lower mortality peaks (41% and 73% respectively). The sample dated to the Late/Final Neolithic from Chamber B demonstrates similar mortality (46%) in the first year, but the second peak (80%) takes place at a younger age than the previous two samples, *i.e.,* by 18–28 months instead of 30–42 months. An almost identical pattern is produced by analysis of the largest single sample, that of Final Neolithic Chamber B (Figure 14.8). The coeval sample from Chamber D has produced a very similar result with somewhat lower mortality in the first year (29% instead of 47%). The coarsely dated (Early–Final Neolithic) sample from Chamber Z is small and of limited reliability, but exhibits a different pattern from all other samples in that the main mortality occurs between 10 and 16 months. Overall, all graphs consistently show high mortality in the first year (especially if neonatal remains are added to the picture) and 10–25% survivorship beyond the 30–42 months interval.

Possible differences in mortality between sheep and goat can be explored through the mandibular eruption and wear data. Only a few samples yielded enough data for the production of mortality profiles and, in all cases, data from multiple chambers or chronological periods had to be combined to increase the sample size. Early Neolithic data are scarce and, even with the combination of Chambers A and B, only 7 sheep and 7 goat mandibles contributed to the analyses. Nevertheless, the two mortality profiles produced (Figure 14.9) are quite similar with peaks in the 1–2 and 3–4 years intervals. Moreover, some mortality in the first year can be confirmed for both sheep and goat.

The combination of all Late and Final Neolithic data from Chamber B amounts to the largest dataset from a single chamber for both species. The analysis reveals different mortality patterns for sheep and goat (Figure 14.10), which shows that these two species were probably managed under different husbandry strategies. The main difference lies in that goat mortality is much higher in the first year (60%) while sheep mortality is less than half of that (27%). Within the first year, mortality is similar between sheep and goat in the 0–2 months interval (6% and 8% respectively), but in the 2–6 months interval sheep mortality is only half that of goat (8% and 16%) and in the 6–12 months the difference widens further with 13% mortality for sheep and 36% for goats. The main mortality peak for sheep is in the 1–3 years interval (25% for 1–2 and 15% for 2–3 years), while for goats, beyond the main peak at 6–12 months (36%), there is a secondary peak in the 2–3 years interval (21%). Sheep also have a secondary peak in the 4–6 years interval (20%), while for both species survival beyond 6 years is rather low (3–4%). Unfortunately, all other samples are too small for reliable analysis.

Pig

As was the case with sheep and goat, the assemblage contained significant numbers of pig neonatal remains. In order to explore the extent and significance of neonatal mortality, all aged anatomical units were divided into neonatal and post-neonatal (Table 14.6). The absence of neonatal remains in the Early Neolithic samples cannot be considered reliable as the sample is tiny. The Late Neolithic and Late/Final Neolithic samples from Chamber B are somewhat larger and both suggest neonatal mortality around 10%. The largest and most reliable sample from Final Neolithic Chamber B exhibits 25% neonatal mortality, which is the highest in the assemblage. Interestingly, its coeval small sample from Chamber D did not yield any neonatal remains. The smallest sample (Early/Final Neolithic Chamber Z) contained a single neonatal anatomical unit which amounts to 7% of the sample.

As Table 14.6 shows, few samples of aged postcranial remains are large enough to justify further analysis. The Early Neolithic samples only contained 18 aged anatomical units (16 from Chamber A and 2 from Chamber B), which were all unfused, thus indicating the presence of predominately immature animals. The results of the Late, Late/Final and Final Neolithic samples from Chamber B, as well as the Final Neolithic sample from Chamber D, show similar results with particularly high

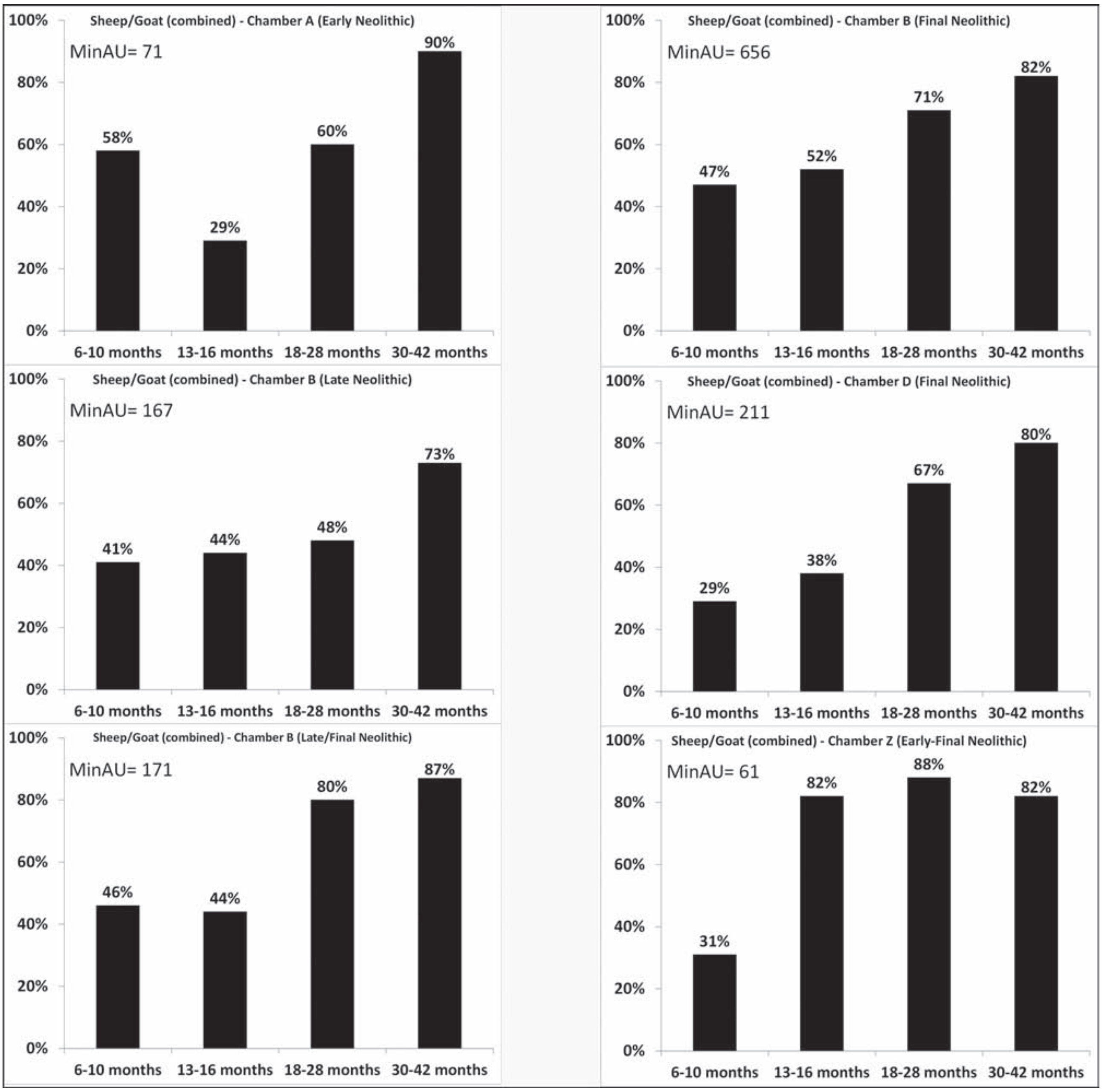

Figure 14.8. Mortality data for sheep and goat (combined) based on epiphyseal fusion. Neonatal remains are excluded (see Table 14.5).

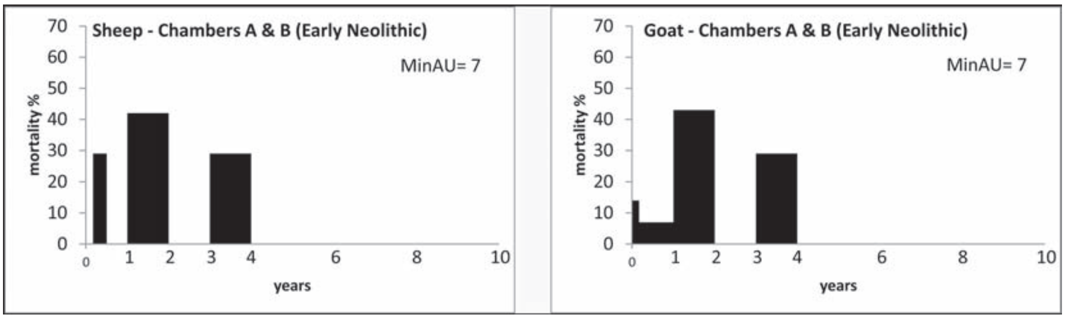

Figure 14.9. Mortality data for sheep and goat based on dental eruption and wear, Early Neolithic period.

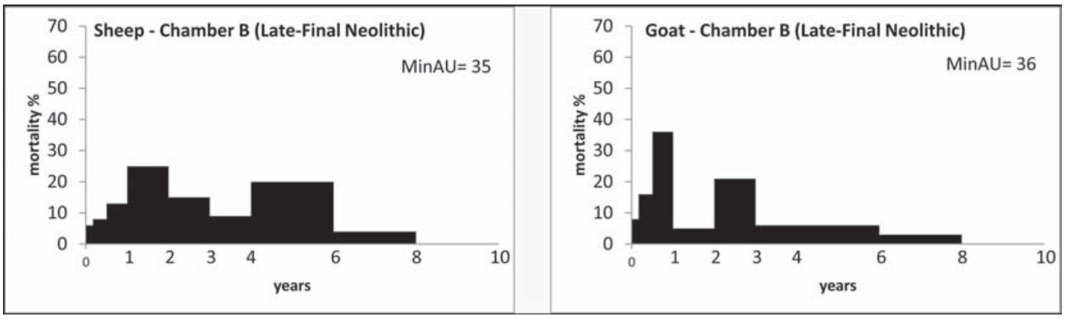

Figure 14.10. Mortality data for sheep and goat based on dental eruption and wear, Late-Final Neolithic period.

Table 14.6. Postcranial data for neonatal vs *post-neonatal mortality in pigs*

Chamber – chronology	*Neonatal*		*Post-neonatal*		*Total MinAU*
	MinAU	*MinAU%*	*MinAU*	*MinAU%*	
A and B – Early Neolithic	0	0	18	100	18
B – Late Neolithic	5	9	48	91	53
B – Late/Final Neolithic	5	11	41	89	46
B – Final Neolithic	57	25	170	75	227
D – Final Neolithic	0	0	39	100	39
Z – Early/Final Neolithic	1	7	14	93	15
Total	68	17	330	83	398

mortality in the first year (54–75%), around 80% by 30 months and 92–100% by 42 months (Figure 14.11).

Besides epiphyseal fusion, pig mortality was explored further through two samples of aged mandibular remains (Figure 14.12). The combination of Early Neolithic samples from Chambers A (MinAU = 9) and B (MinAU = 5) produced a profile with two main mortality peaks, one at 2–6 months (26%) and another at 1–2 years (36%). Overall, almost half the population was slaughtered within the first year (49%), which includes 10% in the first 2 months. Few animals were slaughtered, or hunted if wild, when 2–3 years (9%) or older (7%). The overall pattern does not change significantly in the combined Late, Late/Final and Final Neolithic samples from Chamber B, with an absence of mortality at 0–2 months, a slightly higher and slightly lower mortality at 2–6 months (38%) and 1–2 years (24%) respectively, and a higher survival of animals until 2–3 years (15%). Overall, dental data produce broadly similar results to those obtained by epiphyseal fusion data (Figure 14.11), although the latter slightly differ in that they exhibit higher mortality in the first year and, consequently, lower in older age intervals.

Cattle

As was the case for sheep/goat and pig, neonatal cattle remains are also relatively abundant (Table 14.7). Despite the overall scarcity of cattle in the assemblage, neonatal percentages show broadly similar patterns to those of sheep/goat (Table 14.5) and pig (Table 14.6). For cattle, just as for sheep/goat and pig, Late/Final and Final Neolithic samples from Chamber B consistently exhibit high neonatal mortality, while Final Neolithic Chamber D a consistently low one. Pig exhibits overall the highest neonatal percentage in the assemblage (17%), followed by cattle (11%) and sheep/goat (8%).

Table 14.7 shows that aged cattle postcranial remains are scarce. The only substantial sample derives from Chamber B with the combination of the Late, Late/Final and Final Neolithic samples (Figure 14.13). As in sheep/goat and pig, mortality in cattle is high (50%) within the first year. By 18 months mortality reaches 74% while, taking into account the analyses of the 24–36 months (92%) and 36–48 months (81%) intervals, it can be suggested that around 10–20% of cattle survived beyond 2–4 years. It is also important to bear in mind that the scarcity of epiphyseal fusion data for cattle (*e.g.*, only two anatomical units are included in the 7–10 months interval) and the combination of chronologically different samples render the results described above tentative. Dental eruption and wear data are also scarce (MinAU = 7) but in accordance with epiphyseal fusion. Four anatomical units were aged at 8–18 months, one at 18–30, one at 30–36 and another belonged to a senile animal.

Other species

Age-at-death data for species more rarely encountered than sheep, goat, pig and cattle are scarce. Nevertheless, they have potential to offer some insight into the diversity of relationships developed between humans and animals. All estimations of age-at-death based on eruption and wear data for red deer, dog (also possibly including some jackal), fox, badger, cat, hare, marten and hedgehog are presented in Table 14.8. Concerning red deer, the data suggest the presence of both immature and adult

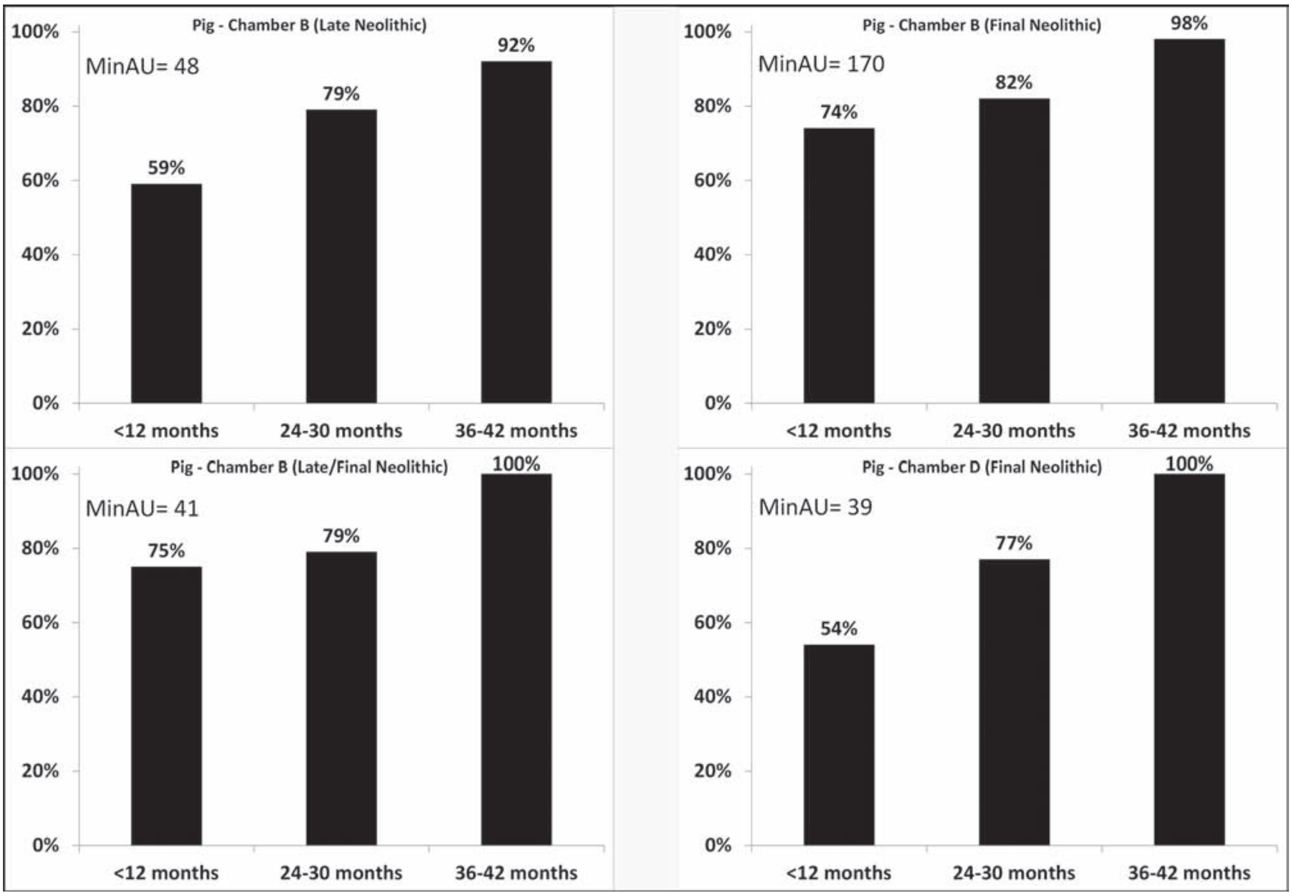

Figure 14.11. Mortality data for pig based on epiphyseal fusion. Neonatal remains are excluded.

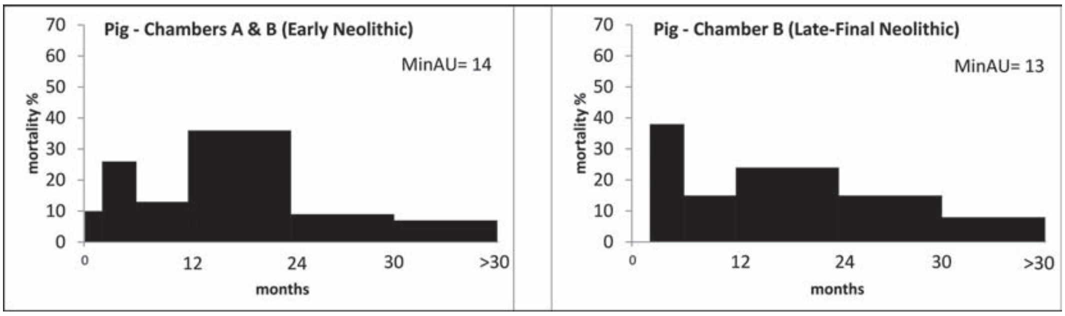

Figure 14.12. Mortality data for pig based on dental eruption and wear.

Table 14.7. Postcranial data for neonatal vs *post-neonatal mortality in cattle*

Chamber – Chronology	*Neonatal*		*Post-neonatal*		*Total MinAU*
	MinAU	*MinAU%*	*MinAU*	*MinAU%*	
A and B – Early Neolithic	0	0	5	100	5
B – Late Neolithic	2	12	15	88	17
B – Late/Final Neolithic	1	8	11	92	12
B – Final Neolithic	5	16	26	84	31
D – Final Neolithic	0	0	8	100	8
Total	8	11	65	89	73

animals, approximately in equal proportions. Dog remains (but possibly also jackal) also indicate the presence predominately of adult animals, but the remains of animals younger than 4 months have also been recorded. The same seems to hold true for foxes. The only cat mandible that could be assigned an age indicated an animal younger than 5–6 months. The rest of the species (*i.e.,* badger, hare, marten and hedgehog) are represented by adult animals. Epiphyseal fusion data are not presented here because samples are as small as those of dental eruption and wear, and the results are similar. The only additional information is the presence of immature hedgehog remains (*e.g.*, unfused distal tibia). Overall, the results shown in Table 14.8 indicate that the majority of carnivores in the assemblage were adults. This is a rather expected result because most small- and medium-sized carnivores are fast-maturing animals. Nevertheless, the presence of immature animals is also confirmed.

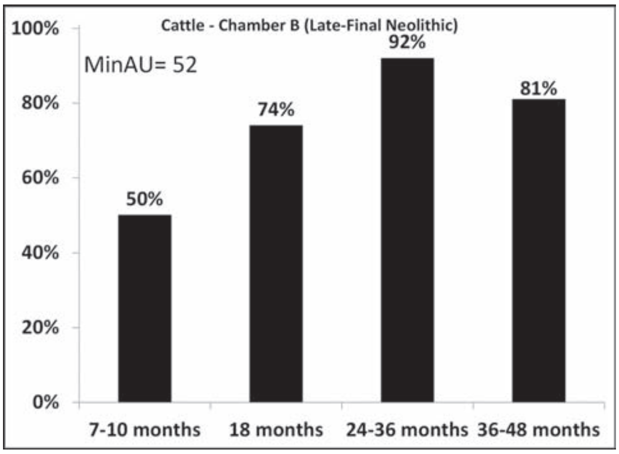

Figure 14.13. Mortality data for cattle based on epiphyseal fusion, Late-Final Neolithic period. Neonatal remains are excluded.

Male:female ratios

Sexed pelves reveal a clear majority of females for sheep and goats (Table 14.9). Especially in the case of goats, the female majority is absolute, as no pelvis with male morphology has been recorded. Nevertheless, the presence of several particularly robust goat metapodia indicates that bucks were present at the site. The unfused state of most of those metapodia also suggests that bucks were slaughtered at a younger age than rams, thus significantly reducing the likelihood of being identified as males. Concerning sheep, male pelves are absent from the Early and Late Neolithic samples, in contrast to later samples.

No cattle pelvis could be attributed to either male or female. The situation concerning pigs is only slightly

Table 14.8. Mortality data for rarer species based on dental eruption and wear

Species	*Element*	*Eruption and wear*	*Age*	*Reference*	*Chamber – Period*
Red deer	Mandible	M2 worn	>18 mths	Brown and Chapman 1991: stage ‘c’ or older	A – Early Neolithic
Red deer	Mandible	M3 lightly worn	50 mths	Brown and Chapman 1991: stage ‘e’	B – Late Neolithic
Red deer	Mandible	dP4-M1 worn	18–27 mths	Brown and Chapman 1991: stages ‘b–c’	B – Late/Final Neolithic
Red deer	Mandible	dP4 worn	5–27 mths	Brown and Chapman 1991: stages ‘a–d’	D – Final Neolithic
Red deer	Mandibular tooth	M1/M2 heavily worn	>50 mths	Brown and Chapman 1991: stage ‘e’ or older	B – Final Neolithic
Red deer	Mandible	P3 lightly worn	>50 mths	Brown and Chapman 1991: stage ‘e’ or older	B – Final Neolithic
Dog?	Mandible	M1 worn	15–36 mths	Horard-Herbin 2000: stage ‘d’	A – Early Neolithic
Dog/Jackal?	Mandible	M3 worn	>7 mths	Silver 1969	B – Late Neolithic
Dog	Mandibular teeth	P3/4 worn	>6 mths	Silver 1969	A – Final Neolithic
Dog	Mandible	dP3-4 unworn, M1 in crypt	<4 mths	Silver 1969	A – Early Neolithic
Dog/Jackal?	Mandible	M3 worn	>7 mths	Silver 1969	D – Final Neolithic
Dog	Mandible	M1-2 worn	>6 mths	Silver 1969	B – Final Neolithic
Dog	Mandible	M1 erupting	<4 mths	Silver 1969	D – Final Neolithic
Fox	Mandible	M1-2 lightly worn	Young adult		B – Late Neolithic
Fox	Mandible	M2 heavily worn	Old adult		B – Late Neolithic
Fox	Mandible	Permanent canine erupting	<17–18 weeks	Linhart 1968	B – Late/Final Neolithic
Fox	Mandible	Permanent dentition erupted	Adult		B – Final Neolithic
Fox	Mandible	M2-3 visible in crypt	<18–19 weeks	Linhart 1968	B – Final Neolithic
Cat	Mandible	M1 erupting	<5–6 mths	Silver 1969	B – Final Neolithic
Badger	Mandible	M1 and M2 lightly worn	Young adult	Lüps and Roper 1988	B – Final Neolithic
Hare	Mandible	Permanent dentition	Adult		B – Final Neolithic
Marten	Mandible	Permanent dentition lightly worn	Young adult		B – Late Neolithic
Hedgehog	Mandible	Permanent dentition	Adult		B – Late Neolithic
Hedgehog	Mandible	Permanent dentition	Adult		B – Late Neolithic
Hedgehog	Mandible	Permanent dentition	Adult		B – Early/Final Neolithic
Hedgehog	Mandible	Permanent dentition	Adult		B – Final Neolithic

Table 14.9. Male and female sexed pelves for sheep and goat

Chamber	*Period*	*Taxon*	*Female (MinAU)*	*Male (MinAU)*
A	Early Neolithic	Sheep	1	0
		Goat	2	0
		S/G combined	4	0
B	Late Neolithic	Sheep	8	0
		Goat	3	0
		S/G combined	14	0
B	Late/Final Neolithic	Sheep	0	0
		Goat	2	0
		S/G combined	2	1
B	Final Neolithic	Sheep	14	3
		Goat	7	0
		S/G combined	21	3
D	Final Neolithic	Sheep	5	2
		Goat	4	0
		S/G combined	9	2
Z	Early/Final Neolithic	Sheep	1	0
		Goat	1	0
		S/G combined	2	0
All chambers and periods combined		Sheep	31	5
		Goat	19	0
		S/G combined	55	6

better, with 16 mandibular canines recorded from all chambers and periods. The majority belonged to male pigs (10 male and 6 female).

Fragmentation

In general, the post-depositional fragmentation of the faunal material from Alepotrypa is low due to the stable cave environment. In most samples, more than 65% of breakage occurred in the past. Excluding specimens that were obviously fragmented during and after excavation as well as neonatal remains that were usually deposited whole, all long bones (*i.e.,* except phalanges, astragalus and calcaneus) of the three most common species have been analysed in terms of their fragmentation state (Table 14.10). Most samples are small, but do indicate that cattle long bones were more heavily processed than those of pig and sheep/goat. This is expected as the larger a bone is the higher the need to be divided into manageable pieces. Not only do cattle have the lowest percentages of whole specimens but also the highest of 'shaft splinters', both indicators of intense fragmentation. In most contexts, pig and sheep/goat are fragmented in a similar way, with relatively high percentages of whole specimens and significant numbers of the 'end&shaft' and 'shaft splinter' categories. The percentages of 'cylinders' are generally low, which suggests that scavengers had limited access to discarded bones. Moreover, the highest percentages of shaft splinters are recorded in the Early Neolithic sample, which might suggest a more intensive processing of carcasses during that period in comparison with later phases.

Taphonomy

In order to evaluate the taphonomic agents that affected the assemblage and to what extent, every recorded specimen (except loose teeth) has been inspected for signs of burning, carnivore (or pig) gnawing, rodent gnawing, ingestion and copper/bronze staining; absence of the above was also noted. Of these, rodent gnawing and copper/bronze staining were absent, while only one sheep/goat specimen and one hare specimen were ingested. Moreover, it should be borne in mind that only sheep/goat and pig are represented by large enough samples. With few exceptions per chamber and period, carnivore gnawing was the most common modification with percentages in the 10–20% range for the most common species (*i.e.*, cattle, sheep/goat and pig) in most samples (Figure 14.14). Another consistent pattern is a tendency for more gnawing on larger species (*i.e.,* cattle specimens are more gnawed than pig specimens and those in turn more gnawed than sheep/goat). In some of the large samples (*e.g.*, Final Neolithic Chamber B) this holds true for red deer remains, which exhibit gnawing marks to a similar or even higher degree than cattle. This tendency is to be rather expected, given the higher probability of the larger, more robust bones to survive gnawing rather than being completely destroyed in the process. Judging from their morphology and size, it is evident that most gnawing marks were caused by dogs and possibly pigs, but there is also evidence that smaller-sized carnivores (*e.g.*, young dog/fox or adult small carnivores such as stone martens) have also gnawed bones of small species such as hare. Despite their overall low numbers, the remains of wild species such as red deer, fox and hare in some contexts (especially the largest sample of Final Neolithic Chamber B) have been more frequently gnawed than those of domestic animals.

Burning marks are consistently below 10% and usually below 5%, if we exclude small samples or rare species within larger samples. Most of the burning marks recorded cover only part of the specimen and thus are indicative of roasting rather than burning after consumption. The vast majority of burning marks have been recorded on cattle, pig and sheep/goat remains with the rest of the species almost unaffected by burning. Burning marks have been occasionally recorded on dog and fox remains, but their location and extent are more compatible with their having been burnt after defleshing rather than during roasting with muscle tissue attached to the bone. No other species, including the relatively common red deer, has been recorded with burning marks.

Pathology

The quantification of pathological conditions on postcranial elements is not presented in detail because of their particularly low occurrence. With the frequency of pathological conditions consistently below 1% of MaxAU

Table 14.10. Frequencies of different fragmentation types for cattle, pig and sheep/goat (combined)

Species	*Cattle*		*Pig*		*Sheep/goat*		*Total*
Fragmentation	*MaxAU*	*%MaxAU*	*MaxAU*	*%MaxAU*	*MaxAU*	*%MaxAU*	
Chambers A and B (Early Neolithic)							
Whole/almost whole	0	0	8	36	18	21	52
End and shaft, end splinter, shaft and end splinter	2	50	5	23	34	40	45
Shaft splinter	2	50	7	32	29	34	38
Shaft cylinder	0	0	2	9	4	5	6
Total	4	100	22	100	85	100	141
Chamber B (Late Neolithic)							
Whole/almost whole	2	10	16	40	56	25	78
Endandshaft, end splinter, shaftandend splinter	11	55	18	45	84	37	122
Shaft splinter	7	35	2	5	43	19	53
Shaft cylinder	0	0	4	10	45	20	49
Total	20	100	40	100	228	100	302
Chamber B (Late/Final Neolithic)							
Whole/almost whole	0	0	30	73	69	29	101
Endandshaft, end splinter, shaftandend splinter	3	43	9	22	93	39	107
Shaft splinter	4	57	1	2	26	11	33
Shaft cylinder	0	0	1	2	49	21	50
Total	7	100	41	100	237	100	291
Chamber B (Final Neolithic)							
Whole/almost whole	2	17	77	47	290	40	381
Endandshaft, end splinter, shaftandend splinter	9	75	58	36	247	34	334
Shaft splinter	1	8	16	10	108	15	132
Shaft cylinder	0	0	12	7	87	12	104
Total	12	100	163	100	732	100	951
Chamber D (Final Neolithic)							
Whole/almost whole	0	0	12	32	102	46	118
Endandshaft, end splinter, shaftandend splinter	4	44	14	38	82	37	108
Shaft splinter	5	56	8	22	32	14	48
Shaft cylinder	0	0	3	8	8	4	13
Total	9	100	37	100	224	100	287
Chamber B (Early-Final Neolithic)							
Whole/almost whole	0	0	4	27	34	36	40
Endandshaft + end splinter + shaftandend splinter	3	75	5	33	20	21	33
Shaft splinter	1	25	4	27	15	16	20
Shaft cylinder	0	0	2	13	26	27	28
Total	4	100	15	100	95	100	121
Chamber Z (Early-Final Neolithic)							
Whole/almost whole	Absent		4	67	12	31	16
Endandshaft, end splinter, shaftandend splinter			2	33	16	41	18
Shaft splinter			0	0	9	23	9
Shaft cylinder			0	0	2	5	2
Total			6	100	39	100	45

for all species, it can be suggested that the health condition of the animals at Alepotrypa was good. Moreover, the overwhelming majority of the recorded pathological conditions involve exostoses, especially on elements of the lower leg such as phalanges, calcaneus and distal tibia.

Another indicator of health condition is the occurrence of Linear Enamel Hypoplasia (LEH) on permanent molars. This condition has been consistently recorded, for sheep/goat and pigs, wherever the entire enamel surface of a tooth was available for inspection. For sheep and goat, due to the larger number of loose teeth, and hence increased visibility from the crown to the enamel-root junction, LEH has been recorded on maxillary (instead of mandibular) permanent molars. Maxillary permanent molars were only recorded concerning the presence of LEH and did not contribute to taxonomic quantification (MinAU or MaxAU) or the analysis of other categories of data. Loose upper first and second molars cannot be safely separated on morphological grounds and, hence, were recorded as ‘M1/2’. Due to the relatively low number of loose maxillary molars with visible enamel surface, all chambers and periods have been combined to produce a, nevertheless, small sample. The inspection of 39 maxillary ‘M1/2’ revealed 12 with LEH (31%). Moreover, 4 out of 8 maxillary third molars

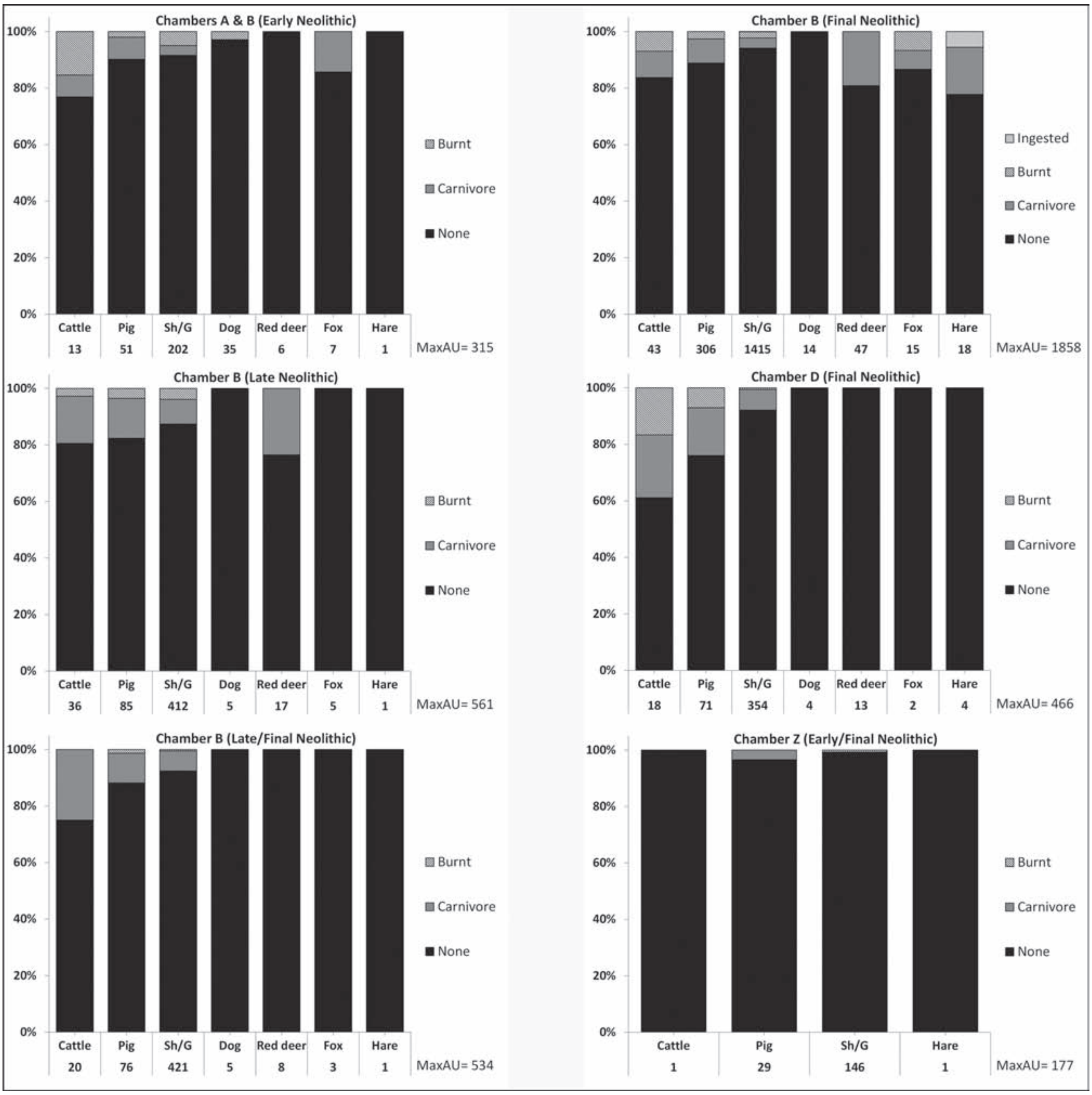

Figure 14.14. Incidence of taphonomic processes on mammal remains. 'Sh/G'= sheep/goat.

(50%) had LEH. Judging by few tentatively reconstructed rows of maxillary molars, the vast majority of LEH in the 'M1/2' category probably derives from second rather than first molars. The crown of mandibular second molars forms within the first year and, logically, the same holds true for maxillary second molars, which makes the LEH recorded on them more likely to have been caused by the hardships of the first winter rather than the first breeding season of the animals. The crown of mandibular third molars forms mostly within the second year (Milhaud and Nezit 1991; Weinreb and Sharav 1964) and hence it is more likely that the LEH occurrence on that tooth is mostly due to the hardships of breeding.

The sample of pig mandibular molars that could be inspected for the presence or absence of LEH is also small, even with all chambers and contexts combined. LEH is infrequent on the first molar (1 out of 11 MinAU or 9%) and absent from the second molar (0 out of 7). Only three third molars could be inspected, one of which was recorded with LEH.

Butchery and bone tool making

The types of butchery recorded are: chopping, dismembering, filleting, skinning and percussion. Moreover, worked and sawn bones have also been recorded. The analysis

(Figure 14.15) showed that butchery marks are present on the remains of all mammal species, except the hedgehog. They are also present on species that are rare such as cat, marten, badger and 'small carnivore'. Butchery marks are absent from bird and reptile remains.

Sheep/goat, pig, cattle and red deer, the most abundant species, exhibit percentages ranging from 25% to 50% for most chambers and periods. In most contexts, red deer remains appear to have been the most heavily butchered. Moreover, as in many other analyses, Chamber Z differs from the rest in that its sample produced lower percentages of butchery marks. The sample is rather small, but even the relatively abundant sheep/goat produced but a low percentage. As far as carnivores (dog/jackal and fox) and hare are concerned, there is clear evidence of butchery on their remains, although their small numbers do not allow the identification of reliable chronological or spatial patterns. Another important aspect of butchery is that the majority of neonatal remains were butchered, which suggests a deliberate slaughter of neonatal animals, although it cannot be excluded that animals which died naturally were also butchered and consumed.

All specimens bearing butchery marks were further analysed to evaluate which types are the most common, thus providing information on carcass processing and consumption (Figure 14.16). On large- (cattle and red

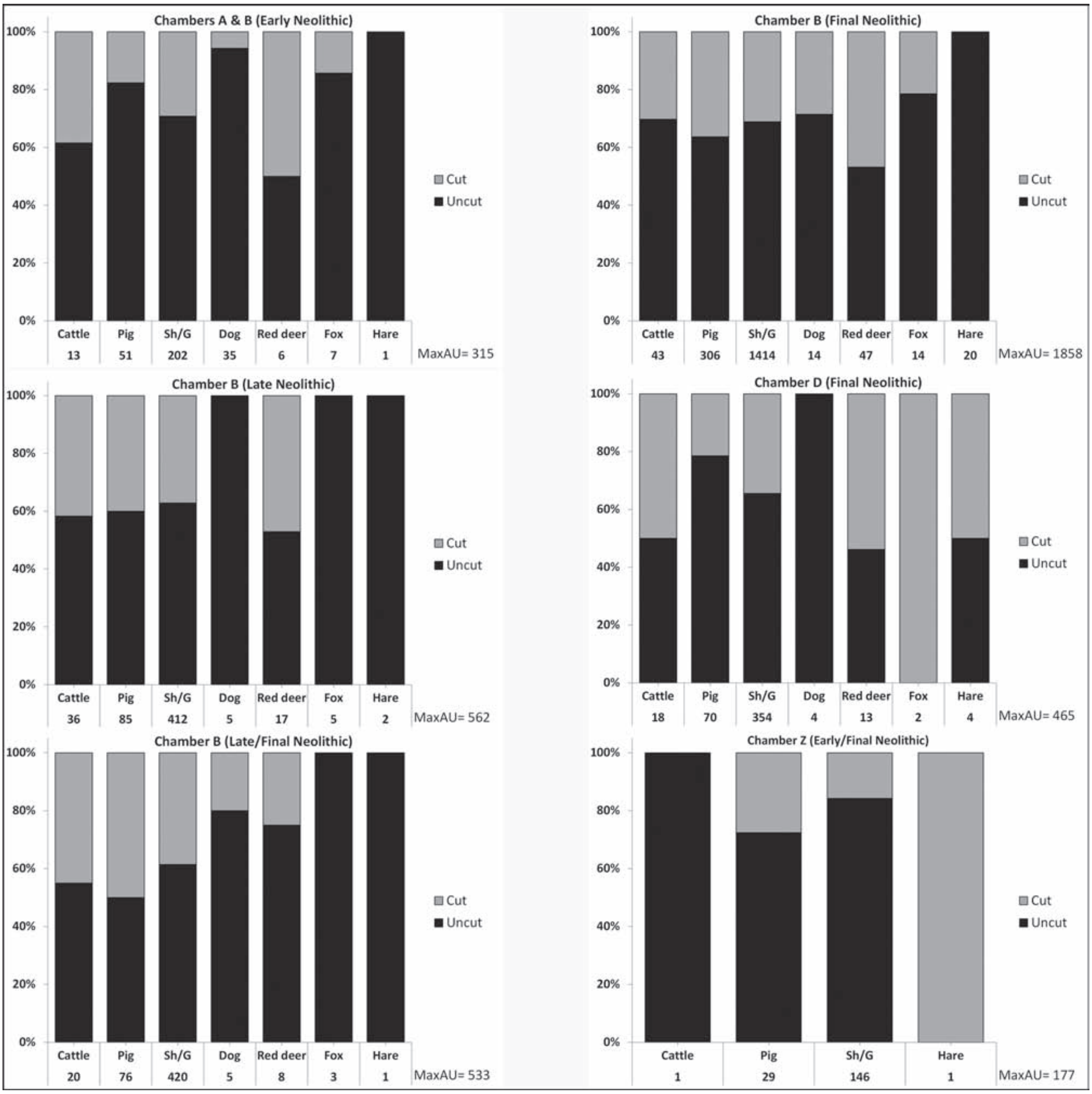

Figure 14.15. Incidence of butchery on mammal remains.

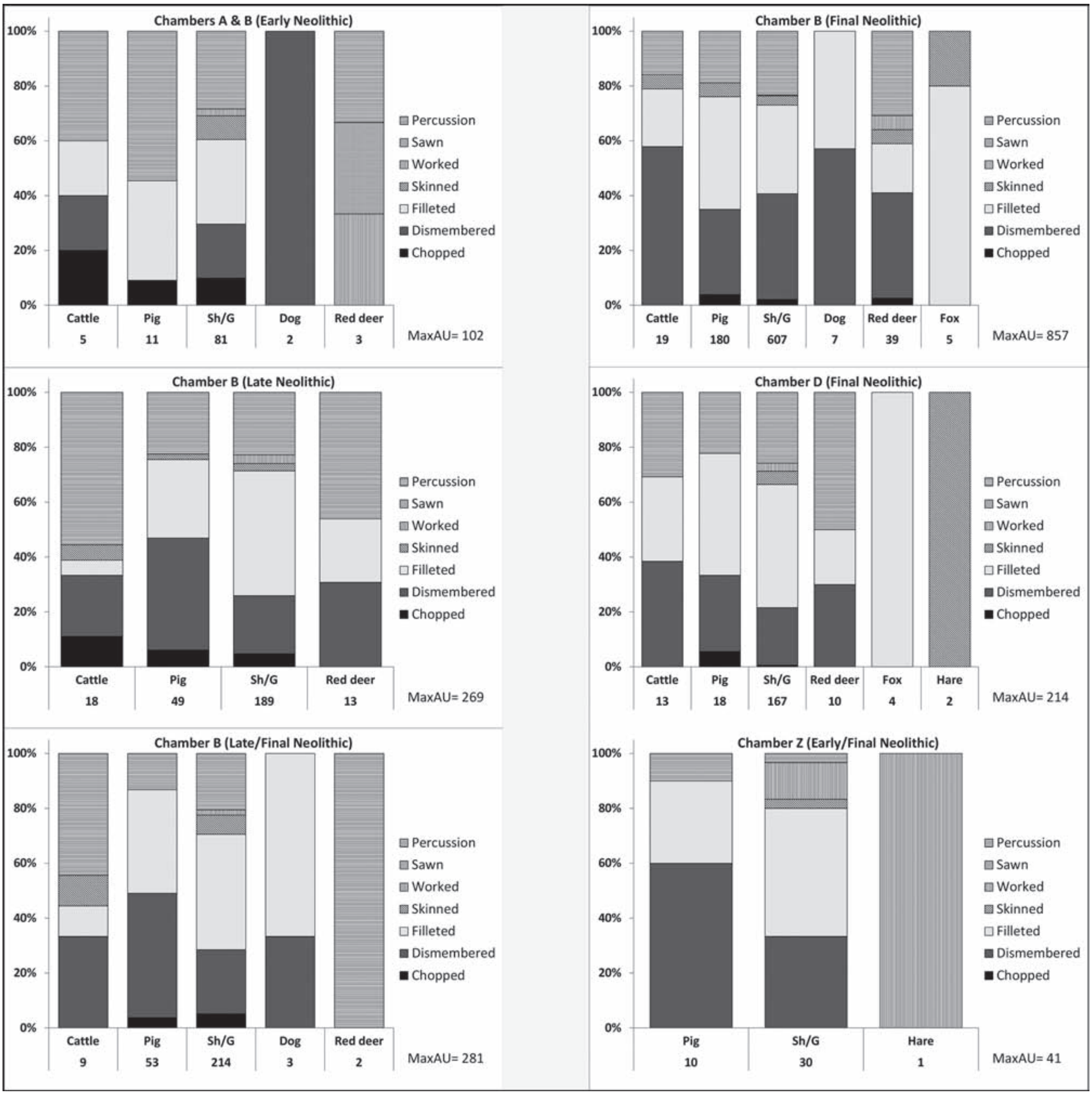

Figure 14.16. Frequencies of different types of butchery marks on mammal remains.

deer) and medium-sized (sheep/goat and pig) animals, the most common types are percussion, dismembering and filleting. Percussion may have been employed to dismember a body part, but it more commonly facilitated access to bone marrow, as the location of such marks in the middle of shafts suggests. The same purposes are also relevant concerning chopping. There is little chronological variation in the types of butchery recorded, with the exception perhaps of percussion and chopping marks being more common in Early, Late and Late/Final Neolithic than in Final Neolithic samples. Moreover, despite its limited reliability due to small sample size, Chamber Z differs from the rest in yet another aspect, as it exhibits less percussion and no chopping marks. In terms of species, there are few differences between the most common domesticates (sheep/goat, pig and cattle), except for the tendency for more dismembering and filleting marks on pig remains for most contexts. Moreover, pig bones appear to be the least preferred for bone tools, in comparison to sheep/goat and red deer. Other noteworthy observations include the processing of dog carcasses exclusively through dismembering and filleting. Moreover, only filleting and skinning marks have been recorded on fox bones, while sawing was mainly recorded on red deer bones. Skinning marks are present on almost all species, and especially on small-sized furry animals such as hare, marten, badger and fox. This indicates the processing and use of skins and pelts for clothing, among other possible uses. Overall, butchery at Alepotrypa included all aspects of carcass processing, from skinning to dismembering to filleting and even the production of tools and other objects made of bone. This can be used as additional evidence for the presence of live animals at the site, which were at some point slaughtered (or hunted nearby), processed and consumed.

Sheep/goat, red deer and hare bones appear to have been preferred for bone tool production. Sawn specimens (*e.g.*, CPII 36) were not recorded as 'worked bone', although they could be considered together, as sawing in most cases formed part of the process of bone tool manufacture rather than carcass processing. The number of worked bones is probably higher than that indicated by the graphs due to the absence of context information for many worked specimens. The most common types of worked bone are pointed tools of different types that indicate textile production and even the knitting of wool, assuming that sheep were of a woolly breed. The smallest type is made of thin bones such as sheep/goat ulna, probably used as needles. A larger type of point is usually made of distal metapodia and tibia of sheep/goat (*e.g.*, CPII 37) and red deer, as well as hare tibia. There are also few examples of red deer metapodia worked into longer points that are reminiscent of knitting needles (CPII 38), although that use cannot be confirmed nor refuted. Besides pointed tools, flat (spatula-like) tools were also produced at Alepotrypa usually made from tibiae and ribs. A few pendants have been retrieved, including a fox canine tooth from Chamber Z (CP II 39).

Biometry

The analysis of biometric measurements is geared towards answering two specific questions. The first one is whether the wild pig is present. To address this question, distal humerus measurements from Alepotrypa have been plotted together with measurements from the slightly later (Early Helladic) site of Koropi-Medical Centre in Attica (Figure 14.17). The analysis shows that the majority of specimens form a cluster at the lower left of the graph. Moreover, there are two specimens from Alepotrypa plotting in the upper right part, with strikingly larger size than the rest. These specimens could represent wild pigs, although it cannot be entirely excluded that they represent male domestic pigs. Nevertheless, the size difference is so striking that the former scenario is the more likely. In addition, there are two specimens from Koropi that are of intermediate size and could represent male domestic pigs or female wild pigs. The inhabitants of Alepotrypa hunted red deer and wild carnivores such as cat and marten and hence it is quite probable that they also hunted wild pigs.

The second question revolves around the possibility of the presence of other canid species (*e.g.,* wolf and jackal) amongst the, clearly more abundant, domestic dog remains. Measurements from fully fused distal humeri

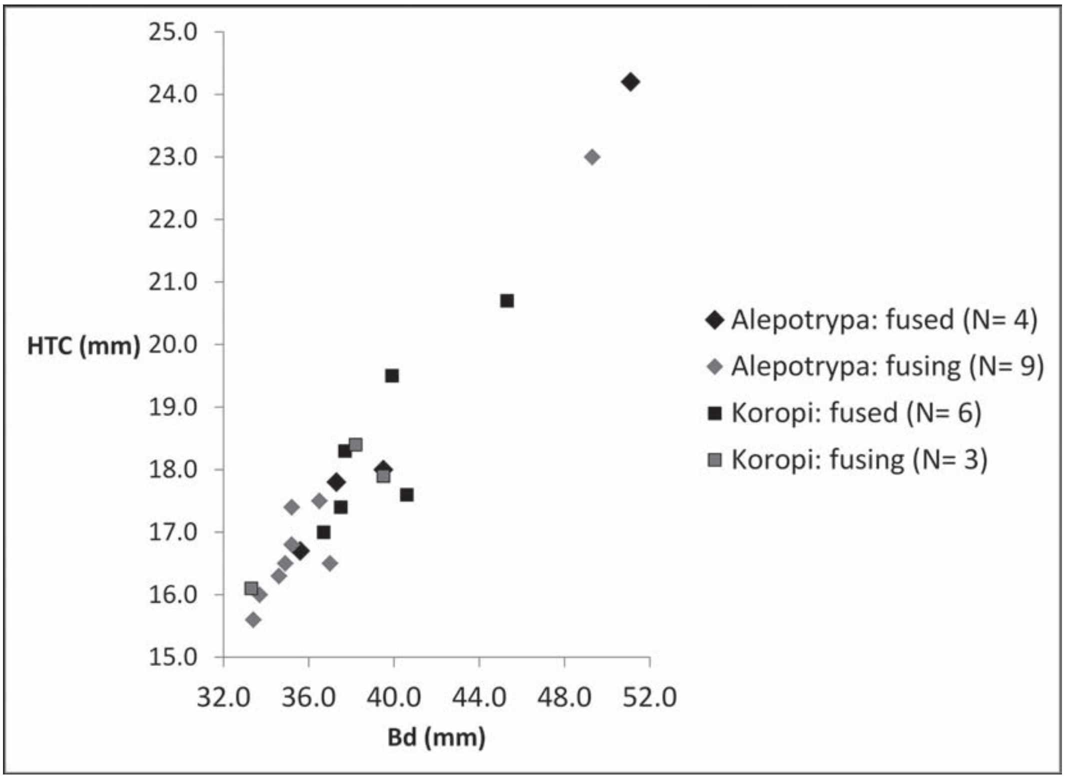

Figure 14.17. Scatterplot with measurements of pig distal humeri from Alepotrypa and Early Helladic Koropi Medical Center.

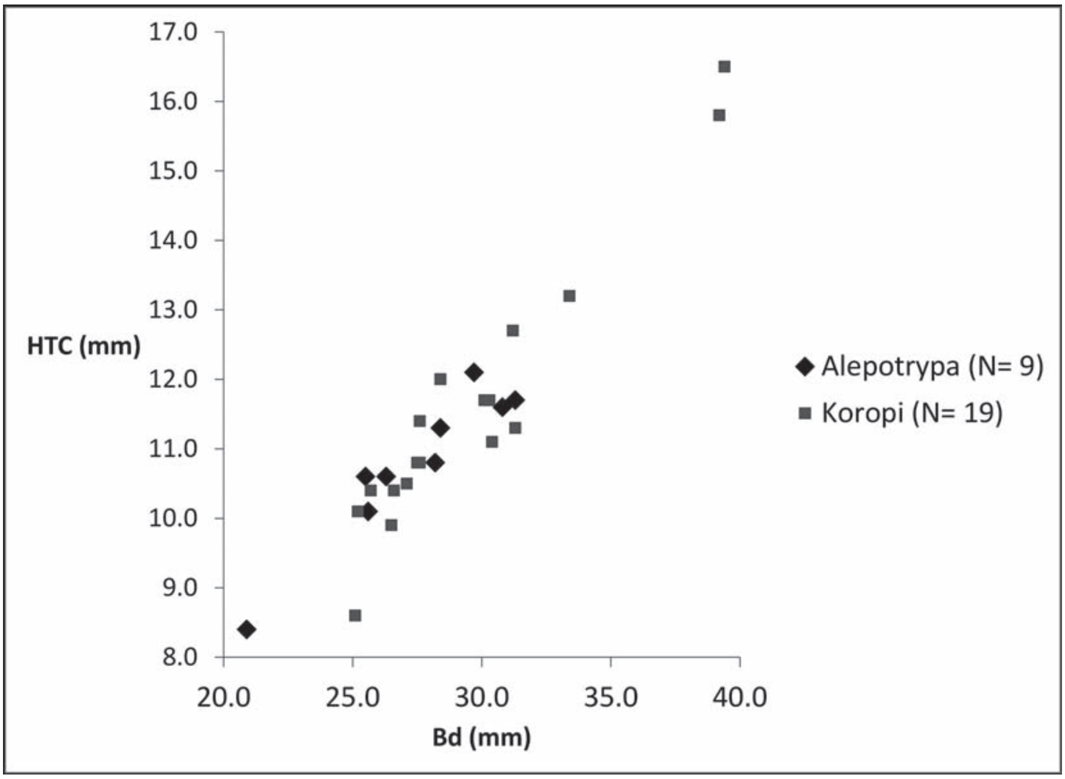

Figure 14.18. Scatterplot with measurements of dog distal humeri from Alepotrypa and Early Helladic Koropi Medical Centre. All plotted specimens are fully fused.

recorded as 'dog' or 'canid' were analysed and compared with those from Early Helladic Koropi (Figure 14.18). The pattern produced shows a large group in the middle of the plot, which most likely represents both male and female domestic dogs, as sexual dimorphism is not strong in this species. Moreover, the two particularly large specimens from Koropi represent wolves. The absence of specimens approaching that size from Alepotrypa indicates that wolves are either not present in the assemblage or that they were so rare in the wild that the possibility of their being represented in the assemblage is low. Furthermore, at the lower left of the scatterplot, there are two particularly small specimens, one from Alepotrypa and one from Koropi that could represent either a smaller species of canid such as the golden jackal (*Canis aureus*) or a smaller breed of dog. Fox is excluded as the size difference between foxes and dogs/jackals is significantly larger than the one observed in the scatterplot.

Discussion

Economy

Alepotrypa's faunal assemblage provides valuable insights into the economic activities undertaken by the cave's inhabitants from the Early to the Final Neolithic periods. The analyses show that the two main economic activities involving animals were animal husbandry and hunting. Animal husbandry was, by far, the more important of the two as the overwhelming majority of domestic animals shows (Figures 14.1–7). Hunting was undoubtedly undertaken at Alepotrypa but played, at least economically, a marginal role as the low percentages of wild species suggest. In order to obtain a more complete picture of the economic activities of Alepotrypa's inhabitants involving wild animals, fishing should also be considered (Theodoropoulou, this volume). Moreover, there might have been other, non-economic, interactions taking place at Alepotrypa between humans and some taxa such as birds (Tables 14.2–3), chelonians (Table 14.4), micromammals (Papayiannis, this volume) and molluscs (Theodoropoulou, this volume). For the bird and chelonian remains, which concern this chapter, the small samples hinder detailed interpretation. It is entirely possible that some bird species (*e.g.,* partridge), as well as marine turtle and land tortoise species, played an economic role, but their few remains and lack of evidence of butchery or consumption in general render this interpretation speculative. Nevertheless, their presence in the cave's deposits also leaves open other possibilities, such as the use of turtle/tortoise shells as vessels, the use of tortoiseshell for the production of utilitarian objects (*e.g.,* combs) or ornaments and the use of birds in ritual practices.

Animal husbandry at Alepotrypa accounted for 90–95% of the faunal assemblage. Undoubtedly the most important species, economically, were sheep and goat.

Throughout the sequence (Early-Final Neolithic), sheep and goat were by far the most abundant taxon (accounting for 60–80% of mammal remains, depending on chamber/period) and clearly formed the basis of the domestic animal economy. Other relevant zooarchaeological studies show that this was the case for most Neolithic assemblages in central and southern Greece (*e.g.,* Halstead 1996, table 1, 28). Moreover, the analyses suggest a gradual increase in the importance of sheep and goat from the Early to the Late and Final Neolithic periods. Sheep versus goat percentages show that the former species was diachronically more abundant (Figures 14.1–7). As far as the management of sheep and goat herds is concerned, their age and sex structures provide some insights. Mortality in animals younger than one year old was particularly high, normally above 30% and exceeding 50% in some samples. Within the first year, significant mortality in animals younger than 6 months (including many neonatal) suggests that sheep and goat were milked. The presence of butchery marks on most neonatal remains provides further support to the scenario of deliberate slaughtering of neonatal and young animals, rather than natural deaths. Traditional cheese-making requires the slaughter of some animals before they are weaned to secure rennet for cheese production (Hadjikoumis 2017). Moreover, it is attractive to combine the evidence for the potential of milk production with the suitability of cave environments for the production, maturation and preservation of dairy products such as cheese. The heavy predominance of females in both adult sheep and goat is also compatible with a scenario of milk exploitation, although it should be borne in mind that mortality profiles also show additional peaks in older age intervals that reveal a concern with meat production too.

The production of wool and/or hair should also be considered, especially if we take into account additional lines of evidence in the form of bone tools (*e.g.,* CPII 37 and 38), some of which could have been used in processing wool or hair. Mortality and sex data do not support a particular focus on wool/hair, but it is possible that the older age-at-death of sheep and the presence of adult males in the Final, compared to the Early, Neolithic can be considered as tentative evidence for sheep wool/hair exploitation. Even without a particular focus on wool, the potential for the production of respectable quantities is there (Halstead and Isaakidou 2011a). It is particularly difficult to detect wool and hair exploitation based on the study of faunal remains alone but it is possible that woolly sheep, long-haired goats or both were present at Alepotrypa, at least in its Final Neolithic phase (*c.* 4,500–3,200 cal BC). Besides the potential for animal fibre exploitation, the use of sheep fleece and sheep/goat skins in general should also be added to the list of available raw materials of animal origin.

Despite their remains being frequently combined due to methodological and sample size constraints, sheep and goat have different requirements and can be managed in different ways. Good knowledge of sheep and goat biology and behaviour by the herders of Alepotrypa would optimise their returns through fine-tuned adaptations of animal husbandry practices to local environments and socioeconomic needs. The analyses on sheep and goat remains provide indications for some differences between their respective management at Alepotrypa. To begin with, despite the overall stability of sheep to goat ratios throughout Alepotrypa's sequence, minor differences in their percentages in different contexts might indicate differences in management and eventually consumption and deposition. Moreover, the mortality profiles of sheep and goat reveal differences that may reflect management strategies that in turn are, at least partly, attributable to biological particularities of each species. For example, during the Late/Final Neolithic goat mortality peaked in the first year as well as at 2–3 years, while sheep mortality did so at 1–2 and 4–6 years. This pattern can be explained by differences in husbandry strategies and desired products from each species, but also as an effort to diversify and optimise returns. The higher mortality of goats in the first year can be explained by the tendency of this species to produce more offspring than sheep (*e.g.,* Payne 1973), to which the herders might have responded by slaughtering more kids than lambs to boost milk yields and/or improve the survival rate of remaining (predominately female) kids. The peaks at 1–2 years (and some at 2–3 years) for sheep and 2–3 years for goats could represent the age intervals during which most animals would reach optimum size for meat production, with sheep slaughtered at a younger average age due to faster growth rate. In addition to differences in growth rate, age-at-death might have also been influenced by possible differences in herding strategies. For example, it is possible that goat herds, if herded separately, were more mobile and had a diet of poorer quality, which would delay them from reaching the desired slaughter weight. Moreover, the documented practice in traditional Mediterranean animal husbandry of slaughtering bucks at 2–3 years, in contrast to keeping rams until older ages (Hadjikoumis 2017) could have also been practised at Alepotrypa, thus showing up in the data as increased mortality for goats compared to sheep. In turn, the higher survival of sheep to older age intervals (*e.g.,* 4–6 years) can be partly attributed to the same practice, but also to the possibility of wool exploitation, under the assumption that woolly sheep were present in Greece at least from the 4th millennium cal BC (Halstead and Isaakidou 2011a). Male and female numbers provide additional evidence for differences in the management of sheep and goat. A tendency for slaughtering almost all male goats at younger ages than sheep may have contributed to the absence of any positively identified adult male goat pelvis in the assemblage. To sum up, the analysis of caprine remains yielded evidence for the exploitation of both sheep and goat for milk but also meat production, with tentative evidence for wool/hair exploitation. The particularly high percentages of sheep and goat combined paint a picture of a Neolithic animal economy, which revolved around the management of these two species. With the data at hand, it is suggested that Neolithic sheep and goat herders possessed a high level of expertise that enabled them to successfully manage animals for a variety of products over almost three millennia.

Economically, the second most important species at Alepotrypa was the pig, which constituted a secondary (to sheep/goat) source of meat for the cave's occupants with percentages consistently in the 15–20% range. Although wild pigs are probably present in the assemblage, the vast majority of suid remains belong to domestic pigs. Age-at-death data suggest that many pigs were slaughtered at optimal size (*i.e.,* 1–2 years), but even more, at ages younger than 12 months, including neonatal piglets. As in the case of kids and lambs, most neonatal remains had signs of butchery thus excluding natural death as the main cause of neonatal mortality. This pattern in pig mortality deviates from the optimal strategy for meat production but, nevertheless, constituted a sustainable pig husbandry system that remained fairly stable from *c.* 6,000 to 3,000 cal BC. The swine herders of Alepotrypa may have been slaughtering animals below optimal weight due to a seasonal concentration of large litters in combination with limited resources, such as labour and possibly space within the cave, all of which would be necessary to rear all piglets to higher weights. Another interpretation of the particularly high mortality in pigs younger than 6 months would be a seasonal occupation of the site, but other evidence (*e.g.,* sheep/goat mortality patterns and material culture) point towards constant use of the cave by humans, at least during most of the Neolithic. Alternatively, or concurrently, pig herders may have been responding to other stimuli such as social politics (Halstead 2012) and culinary preferences. Pig husbandry, though of lesser importance than sheep and goat husbandry, undoubtedly formed an integral part of Alepotrypa's animal economy throughout its Neolithic occupation.

Cattle numbers are consistently low in all chambers and periods. Given the limited availability of environments in the vicinity of the cave suitable for large cattle herds, their scarcity is not surprising. Overall, cattle played a marginal role in economic terms, although it should not be dismissed as insignificant. Their presence, albeit in small numbers, shows that cattle husbandry was part of the economic system of the site and provided beef and possibly milk, as the presence of neonatal and immature remains suggests. Moreover, the possibility of their use in agricultural work remains open. Assuming that the small cattle samples are reliable, they indicate some decrease in the importance of cattle from the Early and Late to the Final Neolithic, which corresponds with the increase of sheep and goat numbers.

Dog was also consistently present in all chambers and periods. The high percentage in Early Neolithic Chamber A might be related to ritual activity involving dogs, as increased numbers of dog remains were recovered in relation to an ossuary. Moreover, the presence of butchery marks on dog remains raises the possibility of occasional consumption. The meaning of this practice or whether it was widespread in the Early Neolithic cannot be clarified with the data at hand, but it would not be surprising (Hadjikoumis 2016). In the rest of the chambers, dog percentages are around 1% and the most parsimonious interpretation is that the domestic dog's main role was to assist humans in herding and guarding the livestock, especially sheep and goat. Moreover, the presence of wild species raises the possibility of dogs participating in hunting activities. The presence of remains of dogs younger than 4 months, both in Early and Final Neolithic samples (Table 14.8), suggests that dogs were bred at the site. Biometric analysis (Figure 14.18) suggests that wolves were absent or rare, but a smaller-sized canid was present in small numbers. Those remains more likely belong to the golden jackal, although a smaller type of domestic dog cannot be excluded. Wild canids such as wolves and jackals, if present, would be hunted or kept at bay by the herders and their dogs.

Wild animals were scarce overall, with combined percentages consistently below 8% and, in most samples, around 5% (*cf.* Halstead and Isaakidou 2013). Red deer was, both in absolute numbers and in meat weight, the most important wild species throughout the sequence. Its overall low numbers suggest that red deer was only occasionally and opportunistically hunted, perhaps involving only those animals tempted by cultivation near the site or herders coming across red deer while supervising their animals away from the site. The scarce age-at-death data suggest that both adult and immature red deer were hunted. The scarcity of remains of young animals, if not a product of the small sample sizes, might indicate their deliberate avoidance by hunters to ensure sustainability of the population, or alternatively consumption of such animals away from the site. Beyond meat, the inhabitants of Alepotrypa also used red deer antlers and bone for the manufacture of a wide range of tools.

Besides red deer, several other mammal species were hunted and consumed. The hare apart, all the rest were carnivores (fox, cat, marten, badger, and possibly jackal and another small carnivore or mustelid). The presence of the hedgehog in Final Neolithic contexts is confirmed, but there is no means to determine whether this species was consumed by humans at Alepotrypa. Fox, hare and badger are present in samples of all periods and the presence of butchery marks on their remains confirms that humans hunted and processed these animals for the double purpose of consuming their meat and utilising their pelts. The same can be said about the marten, which was present only in Final Neolithic samples. Hare bone appears to have been a preferred raw material for bone tools, possibly because of its suitability in terms of size and density depending on the purpose for which it would be used. Concerning the fox, and possibly also the jackal, the protection of lambs, kids and piglets is another reason for humans to hunt them and discourage their approach to the cave.

The case of cat remains is intriguing because it is unknown whether they belonged to a wild or tamed/domestic animal. Butchery marks on some of its bones can be viewed, especially from a modern mindset, as evidence for cat being yet another hunted wild carnivore, as mustelids and canids were. With the available knowledge on cat domestication in the eastern Mediterranean (*e.g.,* Faure and Kitchener 2009), a wild status for the cat remains at Final Neolithic Alepotrypa is the most likely scenario; but the issue of when exactly domestic cats appeared in Greece remains open and should be addressed in future studies.

Beyond mammals, the presence of several species of bird (Tables 14.2–3) is noteworthy. Some of the bird species possibly lived in or around the cave (*e.g.,* corvids, owls, pigeons and birds of prey), while others may have been captured and consumed by humans (*e.g.,* crane and partridge). It is also possible that during the entire Neolithic period, land tortoises and/or marine turtles were also consumed, although unambiguous evidence for the practice is absent. It is also plausible that humans simply collected empty shells for other uses (*e.g.,* as vessels or 'boxes'), judging from the exclusive presence of carapace and plastron parts in the assemblage (Table 14.4).

Seasonality

The large numbers of neonatal (some possibly foetal) and immature sheep and goats illustrate a seasonal intensification of animal-related activities at Alepotrypa. Age-at-death data do not support an exclusively seasonal occupation of the cave, as animals of all ages are present. Nevertheless, a seasonal increase in people (and animals) and in the intensity of the cave's use during and following the birth season is plausible. Assuming a broad similarity between Neolithic and ethnographically documented husbandry practices from relevant environmental settings (*e.g.,* Hadjikoumis 2017; Halstead 1998; Halstead and Isaakidou 2011b), it is reasonable to suggest that the busiest period, in terms of pastoral activities, was between early winter and late summer. Besides sheep, goat, pig and cattle births, that busy part of the year most probably included the selection of neonatal and immature animals (predominately males) to be slaughtered, the selection of females and males for herd replacement, the milking and production of dairy products and possibly the harvest of wool and/or hair from sheep/goat.

Spring and summer in Greece is warm. Milk or dairy products left exposed to temperature fluctuations quickly spoil. It is, thus, reasonable to assume that the availability of a cool and stable cave environment would have promoted milking and dairying, in contrast to open-air Neolithic sites in Greece, which typically lack any evidence for milking (*e.g.,* Halstead 1998). Besides dairy products, the accumulation of animal and plant fibres during the summer would be followed by their processing and the manufacture of fabrics during autumn and winter. In order to envisage a complete picture of the activities undertaken by the cave's occupants on a seasonal basis, as well as the interplay between them in terms of labour and mutually beneficial practices (*e.g.,* stubble available for grazing sheep), the integration of zooarchaeological with archaeobotanical data is necessary.

Chamber Z

Chamber Z failed to yield any precise radiocarbon dates, a fact which has forced the site's excavators to consider it as chronologically belonging anywhere between the Early and Final Neolithic. In addition, Chamber Z presented a number of particularities when compared to any other chamber. These include the presence of whole but intentionally broken ceramic vessels, a fill with a black matrix reminiscent of manure and the absence of substantial architectural remains. The contextual particularity of Chamber Z is also reflected in its faunal sample, although no striking differences have been noted in terms of species composition and age-at-death. It differs from other chambers in its near-absence of cattle, stronger predominance of sheep/goat (and sheep within this taxon), the lower overall species diversity (also attributable to the small size of the sample) and little evidence of gnawing and burning. Its faunal composition is more reminiscent of other samples of the Final Neolithic (*e.g.,* Chambers B and D). This similarity can be viewed as evidence for a Final rather than an Early Neolithic chronology of the faunal sample from Chamber Z. The position of Chamber Z deeper in the cave and near a precipitous drop before the innermost chamber containing the lake may have played a role in the human choice of using that chamber in a different way.

Environment

The study of macromammals can only provide general insights into the environments exploited by the cave's inhabitants during the Neolithic. Nevertheless, in a previously little studied environmental setting, any information on the subject is valuable. The main characteristic of the assemblage is the strong majority of sheep and goat through time, which is a constant all over Greece during the Neolithic. The extent of this majority, however, might be indicative of the capacity of local environments to support either sheep and goat, or other species (such as pig and cattle) with different requirements. In the case of Alepotrypa, sheep and goat account for 60–80% of each sample, which is not unique but is among the highest for mainland Greece (*e.g.,* Halstead 1996, table 1, 28). Usually only island assemblages exhibit percentages above 70–80%, although in contrast to them, Alepotrypa shows a clear majority of sheep, thus being in accordance with most mainland assemblages in that respect. Moreover, at Alepotrypa there is an increase in sheep/goat numbers through time, culminating in percentages around 75% in the Late and Final Neolithic phases. The central role of sheep/goat and the particularly low cattle and wild animal percentages are compatible with shrub and low grassy vegetation rather than dense forest. Indeed the environment around the cave today is rocky with but a few precious pockets of thicker soil. It cannot support any extensive forest or extensive cultivations close by, although there are some exceptions at a greater distance from the site. If the Neolithic environmental setting was even broadly similar to that of today, then the particularly high sheep/goat percentages could be, at least partly, attributed to the rocky and largely barren landscape. Such high percentages have only been documented at cave or island environments, or both (Halstead 1996, table 1, 28–29), perhaps due to similarities in the landscape and vegetation at those sites. The increase in sheep/goat percentages at Alepotrypa from the Early to the Late and Final Neolithic might indicate a gradual further reduction of forested areas through time, either due to human interference or naturally occurring aridification.

Some species present in the assemblage such as cattle, red deer, marten, tortoise and woodpigeon (if present, instead of rock pigeon) thrive, to varying degrees, in or around reasonably forested habitats. Their presence indicates some availability of such habitats in the area, although their small numbers suggest forested environments either a long distance away or of a limited extent. Another type of habitat around the cave is the abrupt and rocky coastline with the exception of a few beaches. The nearest beach to Alepotrypa is only a few meters below the cave's entrance and although it currently consists mainly of large pebbles, in the recent, and possibly the distant, past it was sandy. In terms of fauna, rocky cliffs are ideal habitats for birds (*e.g.,* gulls, crows, rock pigeons) and sandy beaches are suitable for turtle nesting. Some of these resources may have been exploited directly by humans or indirectly through the hunting of predators (*e.g.,* fox, cat, marten) attracted to them.

Consumption

Sheep, goat and cattle provided the inhabitants of Alepotrypa with meat, as well as their milk or dairy products from *c.* 6000 to 3000 cal BC. Pork was also regularly consumed and possibly pig fat was also used in the diet or to preserve meat. A lot of the meat consumed from the four main domestic species was tender as the high percentages of immature animals suggest. It is unknown whether milk was consumed raw or processed into dairy products, or both. Whatever the case, it is almost certain that milk, one way or another, featured in the diet of the cave's inhabitants. The large numbers of immature animals slaughtered indicate that there would have been periods of increased availability of meat and dairy products during the year. This raises questions concerning the mechanisms developed to absorb increased availability (Halstead 2004), but the data at hand cannot point definitively in any specific direction. The most likely explanations are: (i) temporarily increased meat consumption through feasting, possibly undertaken by a seasonally increased population assembling for economic and/or sociocultural reasons, and (ii) the exchange of dairy products with other human groups in the area specialising in other economic activities (*e.g.,* agricultural produce).

Occasionally, dog, red deer, hare, badger, marten, cat and possibly wild boar and jackal meat was also consumed. No butchery was noted on bird and chelonian remains, but some of the identified taxa might have been consumed. Overall, a broad diversity of species was consumed but, in terms of absolute quantities and frequency, the bulk of animal protein consumed derived almost exclusively from sheep, goat, pig and cattle. Significant numbers of fish were also captured and should be added to the Neolithic 'menu' at Alepotrypa (Theodoropoulou, this volume).

The anatomical representation (Appendix 14.1) and types of butchery marks recorded on the remains of the most common species (Figure 14.16) show that entire carcasses were processed at the site. All stages of carcass dressing are present and in relatively balanced proportions. The inhabitants of Alepotrypa divided animal carcasses into smaller portions (including filleting), which is more compatible with cooking in pots and ovens or pits than with roasting entire animals on open fire. Dismembering and filleting marks were common also on neonatal remains and suggest that even small-sized carcasses were further divided prior to cooking. Another indication for culinary practices involving cooking in pots and ovens or pits, rather than open fires, is the low occurrence of burning (Figure 14.14). Fragmentation patterns (Table 14.10) suggest that access to marrow was facilitated through fracturing long bone shafts whilst fresh, although not to an intensive degree. This can be read as an indication of stability in availability of animal protein, which reduced the need for intensive fragmentation to make the most out of the calories available.

Conclusions

The size and preservation condition of the macrofaunal assemblage of Alepotrypa has allowed a wide range of analyses, the interpretation of which sheds new light onto several aspects of the human–animal relationship in Neolithic Greece. The overall picture of Alepotrypa is that of a distinctive site that contributes new knowledge on Neolithic animal husbandry and human–animal interactions in general. Although not to a degree that would make it quite out of the ordinary, the site does present several particular characteristics.

In the chronological periods covered by the samples under study (Early-Final Neolithic), there was no dramatic change in either the nature or the intensity of human–animal interactions. The faunal composition of the assemblage is typical of Neolithic Greece, although species frequencies are more characteristic of cave and island sites in containing high sheep/goat percentages, especially by Late and Final Neolithic standards. This is attributable to the site's type (*i.e.,* a cave) and the surrounding environment. The analyses paint a picture of diversity concerning the animal husbandry strategies. In contrast to most open-air sites, Alepotrypa yielded, besides meat production, strong evidence of milk as well as reasonable evidence of wool/hair exploitation, even from the earliest phases (*i.e., c.* 6,000 cal BC). Besides sheep and goat, evidence of milking also exists for cattle. Pig played a secondary role, compared to sheep/goat, but was important nevertheless in providing significant quantities of meat. Cattle, perhaps due to the largely unsuitable dry and rocky environment, played a largely marginal economic role in comparison to sheep/goat and pig, but their presence added further diversity and security to Alepotrypa's economic system. Although the Early Neolithic samples are small, their comparison with those of Late/Final Neolithic chronology suggests an increase in the importance of sheep and goat at the expense of cattle, pig and wild animals. This evidence supports a scenario of some intensification and specialisation towards sheep/goat husbandry, especially if combined with clearer evidence of milking and wool/hair exploitation in the later phases. Wild animals played additional and largely unknown roles in the sociocultural sphere, but the hard evidence indicates that their contribution in terms of meat was modest. Nevertheless, many of the hunted species also contributed their pelts/skins (*e.g.,* red deer, fox, hare, marten and cat) or raw material for bone tools (*e.g.,* red deer bone/antler and hare bone). Interactions with bird and chelonian species were also quite limited and the possibility of their consumption, as well as the use of their body parts in other activities, remains open.

The analysis of the assemblage indicates that the yearly cycle of pastoral activities was uneven, with a period of intense activity, roughly from early winter until late summer that included births, slaughter of young males and unwanted females, milking, production of dairy products and possibly the harvesting of wool/hair. This seasonally increased demand for labour, combined with the concomitant increased availability of meat and milk, constitute strong incentives for a seasonal congregation of more people at Alepotrypa. The exact reasons and context of such seasonal activities cannot be clarified only based on faunal remains. Nevertheless, it can be speculated that this potential for seasonal consumption of animal protein by relatively larger human groups was fulfilled, independently of the specific context in which it took place (*e.g.,* religious, social, economic, or a combination of those).

The environmental setting around Alepotrypa during its Neolithic occupation must have been almost as rocky and barren as that of today, although there are indications through the faunal composition for some differences, such as more forest coverage and sandier coves. There is also tentative evidence for either increased aridity or reduced forest coverage, or both, towards the end of the Neolithic period, reflected in a decrease in forest-loving species in favour of sheep and goat.

Chamber Z, in terms of its faunal sample, is more compatible with a Final Neolithic chronology. In general, almost all types of data indicate differences between Chamber Z and the rest of the chambers, although the small sample involved cannot provide any further details as to the causes.

Entire animal carcasses were processed and consumed at Alepotrypa throughout its occupation sequence. There is evidence for skinning, dismembering and filleting for almost all identified species, except for the hedgehog, birds and chelonians, which could have also been consumed. The Neolithic animal 'menu' was dominated by sheep, goat and pig with a marginal presence of cattle, as well as the occasional consumption of hunted species such as red deer, wild pig, hare and wild carnivores (fox, badger, marten, cat and possibly jackal). Cooking of meat was primarily done in pots, ovens or pits and less so on an open fire.

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Appendix 14.1. Raw data of Minimum number of Anatomical Units (MinAU) per chamber. Maximum number of Anatomical Units (MaxAU) is indicated in parenthesis if different from MinAU. P = proximal half, D = distal half

Chamber A (Early Neolithic)

Anat. unit Taxon	*Cattle*	*Pig*	*Sheep/ Goat*	*Sheep*	*Goat*	*Dog*	*Red deer*	*Fox*	*Hare*	*Badger*	*Small carnivore*	*Total*
Horncore/Antler	1 (2)	N/A	0	1	3 (4)	N/A	1	N/A	N/A	N/A	N/A	6 (8)
Mandible/loose teeth	5	9 (13)	2 (3)	1	6	3	0	1	0	1	0	28 (33)
Atlas	0	0	5 (7)	0	0	2	0	0	0	0	0	7 (9)
Axis	0	0	2	0	0	0	0	0	0	0	0	2
Scapula	2	4	11 (12)	1	5	2	0	0	0	0	0	25 (26)
Humerus P	0	4	5 (6)	0	0	3	0	0	0	0	0	12 (13)
Humerus D	0	3	6	0	1	4	1	0	0	0	0	15
Radius P	0	1	6	2	2	1	1	0	0	0	1	14
Ulna	1	0	6	0	1	2	0	0	0	0	0	10
Radius D	0	1	6	1	0	2	1	0	0	0	1	12
Metacarpus P	0	1	4	5	1	3	1	0	0	0	0	15
Metacarpus D	0	0	4	5	3 (4)	3	0	0	0	0	0	15 (16)
Pelvis	0	4 (6)	7 (10)	1	4	0	0	0	1	0	0	17 (22)
Femur P	1	5	7 (9)	1	0	1	0	0	0	0	0	15 (17)
Femur D	2	5	3 (5)	0	1	1	0	0	0	0	0	12 (14)
Tibia P	1	4	8 (10)	1 (2)	0	0	0	0	0	0	0	14 (17)
Tibia D	0	3	2 (7)	5	0	0	0	0	0	0	0	10 (15)
Astragalus	0	0	0	0	1	0	0	0	0	0	0	1
Calcaneus	0	0	1	1	0	1	0	0	0	0	0	3
Metatarsus P	0	1	3 (6)	5	2	3	0	3	0	0	0	17 (20)
Metatarsus D	0	1	5 (6)	3	2	3	0	3	0	0	0	17 (18)
1st Phalanx	1	3	1	3	1	1	0	0	0	0	0	10
2nd Phalanx	0	0	0	2	0	0	0	0	0	0	0	2
3rd Phalanx	0	0	0	1	1	0	0	0	0	0	0	2
Total	14 (15)	49 (55)	94 (117)	39 (40)	34 (36)	35	5	7	1	1	2	281 (314)

Chamber B (Early Neolithic)

Anat. unit Taxon	*Cattle*	*Pig*	*Sheep/Goat*	*Sheep*	*Goat*	*Dog*	*Red deer*	*Total*
Horncore/Antler	0	N/A	0	0	0	N/A	0	0
Mandible/loose teeth	0	5 (7)	1 (5)	6	1	1 (2)	1	15 (22)
Atlas	0	0	0	0	0	0	0	0
Axis	0	0	0	0	0	0	0	0
Scapula	0	0	0	0	0	0	0	0
Humerus P	0	1	1	0	0	0	0	2
Humerus D	0	1	1	0	0	0	0	2
Radius P	0	1	1	1	1	0	0	4
Ulna	0	0	1	0	0	0	0	1
Radius D	0	1	1	1	0	0	0	3
Metacarpus P	0	1	0	0	0	0	0	1
Metacarpus D	0	1	0	0	0	0	0	1
Pelvis	0	1 (2)	0 (1)	0	0	0	0	1 (3)
Femur P	0	1	1	0	0	0	0	2
Femur D	0	0	2	0	0	0	0	2
Tibia P	0	0	1	0	0	0	0	1
Tibia D	0	1	0	0	0	0	0	1
Astragalus	0	0	1	1	0	0	0	2
Calcaneus	0	0	0	0	0	0	0	0
Metatarsus P	0	0	0	0	0	0	0	0
Metatarsus D	1	0	0	0	0	0	0	1
1st Phalanx	0	0	2	0	0	0	0	2
2nd Phalanx	0	0	0	1	0	0	0	1
3rd Phalanx	0	0	0	0	0	0	0	0
Total	1	14 (17)	13	10	2	1	1	42 (51)

Chamber B (Final Neolithic)

Anat. unit Taxon	*Cattle*	*Pig*	*Sheep/Goat*	*Sheep*	*Goat*	*Dog*	*Red deer*	*Fox*	*Hare*	*Badger*	*Cat*	*Marten*	*Hedgehog*	*Canid*	*Mustelid*	*Total*
Horncore/Antler	1	N/A	0	5 (13)	10 (17)	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17 (32)
Mandible/loose teeth	4	4 (6)	6 (15)	24 (30)	25 (30)	0	2	1	1	0	1	0	1	1	0	70 (92)
Atlas	1	4	13	0	0	0	0	0	0	1	0	0	0	0	0	19
Axis	1	1	7	0	0	0	0	1	0	0	0	0	0	0	0	10
Scapula	0	19 (25)	13 (40)	25	23 (24)	2	4 (5)	1	0	0	0	0	0	0	1	88 (123)
Humerus P	0	23 (25)	18 (33)	12 (15)	18 (20)	1	0	0	0	0	1	0	1	0	0	74 (96)
Humerus D	1	30 (32)	19 (34)	20	26	1 (2)	0	0	0	0	1	0	1	1	0	100 (118)
Radius P	3	17	37 (56)	31	14	2	4 (6)	0	1	0	0	1	0	0	1	111 (132)
Ulna	3	14 (16)	33	0	4	0	1	1	2	1	1	0	0	0	0	60 (62)
Radius D	3	17	32 (47)	28 (29)	8	1	0	1	0	0	0	1	0	0	1	92 (108)
Metacarpus P	1	15	5 (7)	34 (35)	20	0	1	0	2	0	0	0	0	0	0	77 (81)
Metacarpus D	6	12 (15)	5 (9)	36 (39)	17 (20)	0	0	0	2	0	0	0	0	0	0	77 (91)
Pelvis	1 (2)	13 (14)	34 (71)	23	11 (12)	0	2 (4)	0	2	0	0	0	0	0	0	86 (128)
Femur P	1	30	70 (100)	5 (6)	3	0	1 (2)	1	1	0	0	0	0	0	0	112 (144)
Femur D	2	28 (29)	75 (126)	2 (3)	2 (3)	2	1	0	1	0	0	0	0	0	0	113 (167)
Tibia P	2	22 (30)	55 (81)	6	2	0	0	1	2	1	0	0	1	1	0	93 (127)
Tibia D	0	29 (37)	56 (74)	9	5	0	3	0	1	1	0	0	1	1	0	106 (133)
Astragalus	4	6	0	16	13	0	0	0	0	0	0	0	0	0	0	39
Calcaneus	2	9	8	19	11	1	1	0	2	0	0	0	0	0	0	53
Metatarsus P	0	14	22 (26)	14 (18)	23	1	3 (4)	3	1	0	0	0	0	0	0	81 (90)
Metatarsus D	4	13 (14)	11 (16)	20 (22)	20 (23)	1	1 (3)	3	1	0	0	0	0	0	0	74 (87)
1st Phalanx	6	9	21 (24)	20	13	0	6	1	0	0	0	0	0	0	0	76 (79)
2nd Phalanx	3	3	1	5	2	0	4	0	0	0	0	0	0	0	0	18
3rd Phalanx	2	2	2	3	2	0	2	0	0	0	0	0	0	0	0	13
Total	51 (52)	334 (370)	543 (823)	357 (387)	272 (295)	12 (13)	37 (46)	14	20	4	4	2	5	4	3	1661 (2042)

Chamber D (Final Neolithic)

Anat. unit Taxon	*Cattle*	*Pig*	*Sheep/ Goat*	*Sheep*	*Goat*	*Dog*	*Red deer*	*Fox*	*Hare*	*Cat*	*Marten*	*Hedgehog*	*Total*
Horncore/Antler	0	N/A	1	0	8	N/A	0	N/A	N/A	N/A	N/A	N/A	9
Mandible/loose teeth	0	2 (3)	1 (2)	3 (6)	5	0	0	2	0	0	1	0	14 (19)
Atlas	0	1	4	0	0	0	0	0	0	0	0	0	5
Axis	1	0	2	0	0	0	0	0	0	0	0	0	3
Scapula	3	10	6	13	7	0	1	0	0	0	0	0	40
Humerus P	2	2	7 (8)	8	2	0	0	0	0	0	0	0	21 (22)
Humerus D	2	2	8	8	6	1	0	0	0	0	0	0	27
Radius P	1 (2)	3	12 (14)	15	1 (2)	2	1	0	0	1	0	0	36 (40)
Ulna	0	4	12	0	0	0	1	0	0	0	0	0	17
Radius D	1	2	13 (14)	14	3	1	2	0	0	1	0	0	37 (38)
Metacarpus P	0	4	3	9	3	0	0	0	0	0	0	0	19
Metacarpus D	0	4	3	10 (11)	3	0	0	0	0	0	0	0	20 (21)
Pelvis	1	5	8 (9)	9	4	0	1	0	0	0	0	0	28 (29)
Femur P	1	2 (3)	19 (21)	5	0	0	2 (3)	0	0	0	0	0	29 (33)
Femur D	0	7	18 (23)	1	0	0	0	0	0	0	0	0	26 (32)
Tibia P	1	6	23 (26)	0	1 (2)	0	1	1	1	0	0	2	36 (40)
Tibia D	1	4	14 (16)	5	8	0	1	1	1	0	0	2	37 (39)
Astragalus	0	1	0	0	0	0	0	0	0	0	0	0	1
Calcaneus	3	3	1	2	0	0	0	0	0	0	0	0	9
Metatarsus P	0	3	7 (9)	6	6	0	0	0	1	0	0	0	24 (25)
Metatarsus D	1	3	4 (5)	6	6	0	0	0	1	0	0	0	21 (22)
1st Phalanx	0	2	6	0	1	0	1	0	0	0	0	0	10
2nd Phalanx	0	0	0	1	0	0	0	0	0	0	0	0	1
3rd Phalanx	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	18 (19)	70 (72)	172 (193)	115 (119)	64 (66)	4	12 (13)	4	4	2	1	4	470 (501)

Chamber B (Early–Final Neolithic)

Anat. unit Taxon	*Cattle*	*Pig*	*Sheep/Goat*	*Sheep*	*Goat*	*Dog*	*Red deer*	*Fox*	*Hare*	*Hedgehog*	*Total*
Horncore/Antler	0	N/A	0	0	0	N/A	0	N/A	N/A	N/A	0
Mandible/loose teeth	2	0	1	3	3	0	0	0	0	1	10
Atlas	0	1	0	0	0	0	0	0	0	0	1
Axis	0	0	1	0	0	0	0	0	0	0	1
Scapula	2 (3)	3	2 (5)	0	1	0	0	0	1	0	9 (13)
Humerus P	0	0	5	4	5	0	0	0	1	0	15
Humerus D	1	3	6	5	6	0	1	0	1	0	23
Radius P	0	3	3	6	0	0	0	0	0	0	12
Ulna	0	3	2	0	0	0	0	0	0	0	5
Radius D	1	2 (4)	4	5	0	0	0	0	0	0	12 (14)
Metacarpus P	0	0	3 (5)	1	1	0	0	0	0	0	5 (7)
Metacarpus D	0	0	2 (4)	1	1	0	0	0	0	0	4 (6)
Pelvis	0	2	6 (7)	1	0	1	1	0	0	0	11 (12)
Femur P	0	2	3 (6)	0	0	0	1	0	0	0	6 (9)
Femur D	0	2	5 (9)	0	0	0	0	0	0	0	7 (11)
Tibia P	1	2	12 (16)	0	1	0	1 (2)	0	0	0	17 (22)
Tibia D	0	2	12 (20)	1	1	0	0	0	0	0	16 (24)
Astragalus	0	0	0	0	1	0	0	0	0	0	1
Calcaneus	1	0	0	1	0	0	0	0	0	0	2
Metatarsus P	0	0	2 (3)	5 (7)	0	0	0	1	0	0	8 (11)
Metatarsus D	0	0	2	4	0	0	0	1	0	0	7 (9)
1st Phalanx	0	0	4	2	1	0	1	0	0	0	8
2nd Phalanx	0	0	0	0	0	0	0	0	0	0	0
3rd Phalanx	0	1	0	0	0	0	1	1	0	0	3
Total	8	26	75	39	21	1	6	3	3	1	183 (219)

Chamber Z (Early–Final Neolithic)

Anat. unit Taxon	*Cattle*	*Pig*	*Sheep/Goat*	*Sheep*	*Goat*	*Dog*	*Red deer*	*Hare*	*Total*
Horncore/Antler	0	N/A	0	0	1	N/A	0	N/A	1
Mandible/loose teeth	0	1 (2)	1 (2)	1	0	1	2	0	6 (8)
Atlas	0	0	1	0	0	0	0	0	1
Axis	0	1	1	0	0	0	0	0	2
Scapula	0	2 (3)	1 (3)	1	0	0	0	0	4 (7)
Humerus P	0	0	4 (5)	2	1	0	0	0	7 (8)
Humerus D	0	2	3	2	1	0	0	0	8
Radius P	0	0	7 (9)	1	1	0	0	0	9 (11)
Ulna	0	1	4 (5)	0	0	0	0	0	5 (6)
Radius D	0	0	8	1	0	0	0	0	9
Metacarpus P	0	1	0	4	1	0	0	0	6
Metacarpus D	0	1 (2)	1 (4)	5	1	0	0	0	8 (12)
Pelvis	0	4 (5)	8 (14)	4	1	0	0	0	17 (24)
Femur P	0	2 (4)	4 (6)	1	0	0	0	0	7 (11)
Femur D	0	0	5 (7)	0	0	0	0	0	5 (7)
Tibia P	0	1	8 (10)	1	0	0	0	0	10 (12)
Tibia D	0	1	7	2	0	0	0	1	11
Astragalus	0	0	1	2	1	0	0	0	4
Calcaneus	0	0	0	1 (2)	0	0	0	0	1 (2)
Metatarsus P	0	1 (2)	1	1	0	0	0	0	3 (4)
Metatarsus D	0	1 (2)	3 (4)	3	1	0	0	0	8 (10)
1st Phalanx	0	2	7 (8)	1	0	0	0	0	10 (11)
2nd Phalanx	0	2	2	3	0	0	0	0	7
3rd Phalanx	1	1	1	0	0	0	0	0	3
Total	1	24 (32)	78 (102)	36 (37)	9	1	2	1	152 (185)

Chamber B (Late/Final Neolithic)

Anat. unit Taxon	*Cattle*	*Pig*	*Sheep/Goat*	*Sheep*	*Goat*	*Dog*	*Red deer*	*Fox*	*Hare*	*Badger*	*Total*
Horncore/Antler	0	N/A	0	1	1	N/A	1	N/A	N/A	N/A	3
Mandible/loose teeth	0	4 (6)	2 (6)	3	3	0	1	0	0	0	13 (19)
Atlas	0	2	1	0	0	0	0	1	0	0	4
Axis	0	0	4	0	0	0	0	0	0	0	4
Scapula	3 (4)	4 (7)	3 (12)	7	5	1	0	0	0	0	23 (36)
Humerus P	0	3	4 (9)	7	5 (7)	0	0	0	0	0	19 (26)
Humerus D	0	4	2 (4)	13	11	1	0	0	0	0	31 (33)
Radius P	0	2	17 (20)	11	1	1	0	0	0	0	32 (35)
Ulna	0	5 (6)	14	0	1	0	0	0	1	0	21 (22)
Radius D	0	3	14 (17)	8 (10)	2 (3)	1	0	0	0	0	28 (34)
Metacarpus P	0	6	1	12	7 (8)	0	0	0	0	0	26 (27)
Metacarpus D	0	6	1	12 (13)	7 (8)	0	0	0	0	0	26 (28)
Pelvis	0	4 (5)	11 (18)	5	3	1	0	0	0	0	24 (32)
Femur P	1	4	21 (30)	2	0	0	0 (1)	0	0	0	28 (38)
Femur D	0	4	23 (32)	0	0	0	1	0	0	1	29 (38)
Tibia P	1 (2)	4 (5)	23 (34)	2	0	0	0	0	0	0	30 (43)
Tibia D	0	3	28 (36)	6	4	0	0	0	0	0	41 (49)
Astragalus	0	1	0	0	1	0	0	0	0	0	2
Calcaneus	2	3	1	1	2	0	0	0	0	0	9
Metatarsus P	2	6	2 (5)	14 (16)	6	0	0	1	0	0	31 (36)
Metatarsus D	1 (2)	6 (7)	1 (3)	15 (16)	5	0	0	1	0	0	29 (34)
1st Phalanx	4	0	2	2	6	0	2	0	0	0	16
2nd Phalanx	2	0	0	0	0	0	2	0	0	0	4
3rd Phalanx	1	0	0	0	1	0	0	0	0	0	2
Total	17 (20)	74 (83)	175 (250)	121 (127)	71 (76)	5	7 (8)	3	1	1	475 (574)

Chamber B (Late/Final Neolithic)

Anat. unit Taxon	*Cattle*	*Pig*	*Sheep/ Goat*	*Sheep*	*Goat*	*Dog*	*Red deer*	*Fox*	*Hare*	*Cat*	*Marten*	*Hedgehog*	*Total*
Horncore/Antler	1	N/A	0	1	0 (1)	N/A	0	N/A	N/A	N/A	N/A	N/A	2 (3)
Mandible/loose teeth	0	5 (7)	1 (3)	8 (12)	8 (10)	0	1	1	0	0	0	1 (2)	25 (36)
Atlas	1	1	2	0	0	0	0	0	0	0	0	0	4
Axis	0	0	6	0	0	0	0	0	0	0	0	0	6
Scapula	2 (4)	10 (11)	6 (17)	8 (9)	7	0	4	0	0	0	0	0	37 (52)
Humerus P	2	5	5 (10)	4 (5)	6	1	0	0	0	1	0	0	24 (30)
Humerus D	1 (3)	12 (13)	5 (7)	9 (10)	6	1	1	0	0	1	0	1	37 (43)
Radius P	3	4	15 (22)	12	4	1	1	0	0	0	1	0	41 (48)
Ulna	3	3	13	0	2	2	0	0	0	0	0	0	23
Radius D	2	4	10 (14)	9 (10)	2	0	1	0	0	0	1	0	29 (34)
Metacarpus P	2	5	0 (1)	10	3	0	1	1	0	0	0	0	22 (24)
Metacarpus D	0	4	0 (1)	7 (8)	3 (4)	0	0	1	0	0	0	0	15 (18)
Pelvis	0	5 (6)	8 (20)	11	5 (6)	0	0	0	0	0	0	0	29 (43)
Femur P	0	2	10 (21)	1	0	0	0	0	0	0	0	0	13 (24)
Femur D	0	3	14 (30)	0	0	0	0	0	0	0	0	0	17 (33)
Tibia P	4 (6)	5	23 (35)	1	0	0	0	0	0	0	0	0	33 (47)
Tibia D	2	5 (7)	20 (30)	5	2	0	2	0	1	0	0	0	37 (49)
Astragalus	2	2	1	4	0	0	1	0	0	0	0	0	10
Calcaneus	2 (3)	6	1	1	3	0	0	0	0	0	0	0	13 (14)
Metatarsus P	2 (3)	2	0 (3)	8	1	0	0 (1)	1	1	0	0	0	14 (19)
Metatarsus D	0	2	1 (4)	10	3	0	1	1	0	0	0	0	18 (21)
1st Phalanx	1	0	2	5	1	0	1	0	0	0	1	0	11
2nd Phalanx	2	1	0	1	0	0	1	0	0	0	0	0	5
3rd Phalanx	0	0	1	3	0	0	1	0	0	0	0	0	5
Total	32 (40)	86 (93)	144 (244)	118 (127)	56 (61)	5	16 (17)	5	2	2	3	2 (3)	471 (602)

Lake Chamber (Final Neolithic?)

Anat. unit Taxon	*Pig*	*Sheep/ Goat*	*Sheep*	*Goat*	*Total*
Horncore/Antler	N/A	0	0	0	0
Mandible/loose teeth	0	1	3	0	4
Atlas	0	0	0	0	0
Axis	0	1	0	0	1
Scapula	0	0	0	0	0
Humerus P	0	0	1	0	1
Humerus D	0	0	2	1	3
Radius P	0	1	1	1	3
Ulna	0	1	0	0	1
Radius D	0	1	1	1	3
Metacarpus P	0	0	1	0	1
Metacarpus D	0	0	1	0	1
Pelvis	0	0	1	0	1
Femur P	2	2	0	0	4
Femur D	1	4 (5)	0	0	5 (6)
Tibia P	0	1	2	0	3
Tibia D	0	0	3	0	3
Astragalus	0	0	0	0	0
Calcaneus	0	0	0	0	0
Metatarsus P	0	0	0	0	0
Metatarsus D	0	0	0	0	0
1st Phalanx	0	0	0	0	0
2nd Phalanx	0	0	0	0	0
3rd Phalanx	0	0	0	0	0
Total	3	12 (13)	16	3	34 (35)

Neolithic 'staircase' (Final Neolithic?)

Anat. unit Taxon	*Pig*	*Sheep/ Goat*	*Sheep*	*Goat*	*Red deer*	*Total*
Horncore/Antler	N/A	0	0	0	0	0
Mandible/loose teeth	1 (2)	1	1	0	0	3 (4)
Atlas	0	0	0	0	0	0
Axis	0	2	0	0	0	2
Scapula	2	0	0	0	0	2
Humerus P	0	0	0	0	0	0
Humerus D	0	0	0	0	0	0
Radius P	0	0	0	1	0	1
Ulna	0	0	0	0	1	1
Radius D	0	0	0	0	0	0
Metacarpus P	1	0	0	1	0	2
Metacarpus D	1 (2)	0	0	0	0	1
Pelvis	0	0	0	0	0	0
Femur P	0	1 (2)	0	0	0	1 (2)
Femur D	0	1	0	0	0	1
Tibia P	0	2	0	0	0	2
Tibia D	0	0	0	0	0	0
Astragalus	0	0	1	0	0	1
Calcaneus	0	0	0	0	0	0
Metatarsus P	0	0	0	0	0	0
Metatarsus D	0	1	0	0	0	1
1st Phalanx	0	1	1	0	0	2
2nd Phalanx	0	0	0	0	0	0
3rd Phalanx	0	0	0	1	0	1
Total	5 (7)	9 (10)	3	3	1	21 (24)

Loci 15–19 (Chamber E?) (Final Neolithic?)

Anat. unit Taxon	*Pig*	*Sheep/Goat*	*Sheep*	*Total*
Horncore/Antler	N/A	0	0	0
Mandible/loose teeth	0	0	0	0
Atlas	0	0	0	0
Axis	0	0	0	0
Scapula	0	1	0	1
Humerus P	0	0	0	0
Humerus D	0	0	0	0
Radius P	0	1	1	2
Ulna	0	0	0	0
Radius D	1	1	1	3
Metacarpus P	1	0	0	1
Metacarpus D	1	0	0	1
Pelvis	0	0	0	0
Femur P	1	0	0	1
Femur D	1	0	0	1
Tibia P	0	0	0	0
Tibia D	0	0	0	0
Astragalus	0	0	1	1
Calcaneus	0	0	0	0
Metatarsus P	0	1	1	2
Metatarsus D	0	0 (1)	1	1 (2)
1st Phalanx	0	0	0	0
2nd Phalanx	0	0	0	0
3rd Phalanx	0	0	0	0
Total	5	4 (5)	5	14 (15)

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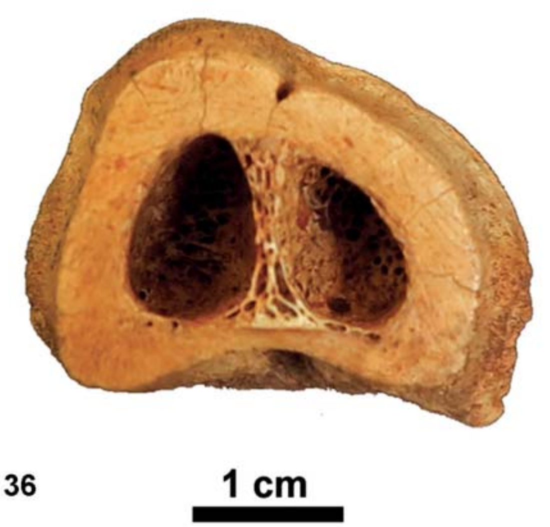

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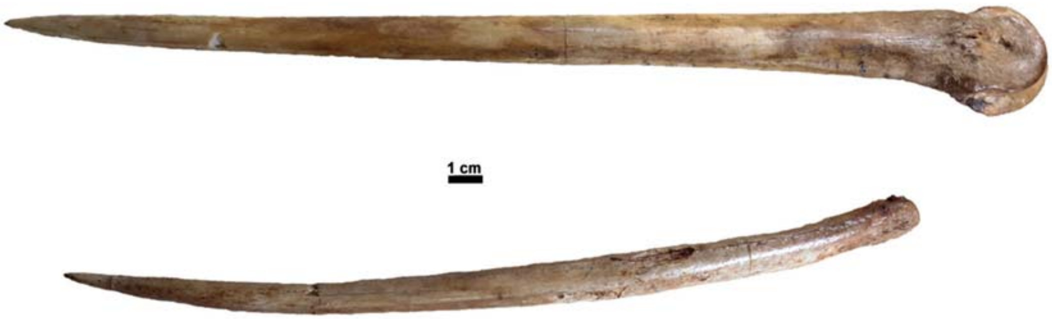

CPII 36. Red deer proximal metacarpus sawn off from its shaft from Chamber A (Early Neolithic) (by Angelos Hadjikoumis).
CPII 37. Pointed tools made of sheep/goat distal tibia (left) and distal metapodium (right), unknown context (by Angelos Hadjikoumis).
CPII 38. Large pointed tools made of red deer metapodia, unknown context (by Angelos Hadjikoumis).
CPII 39. Fox canine pendant from Chamber Z (Early-Final Neolithic) (by Angelos Hadjikoumis).