

Animal remains of Alaybeyi Höyük

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Abstract: This paper presents the zooarchaeological observations on animal remains of Alaybeyi Höyük unearthed from 2016 and 2017 excavation sessions. Dated to 4721–4553 cal. BC, Alaybeyi stands so far as the oldest archaeological settlement discovered in northeast Anatolia. Therefore, the faunal assemblage at Alaybeyi offers great opportunity to study the status of animals and their relationships with humans in the largely unexplored Kars-Erzurum plateau covering a period from the Chalcolithic to Late Iron Age. Taxonomic and osteometric analyses show that, like the present day, cattle were dominant over caprines, revealing extensive cattle pastoralism in the region for at least about 7 millennia. While caprines too were significant in the subsistence strategy of local humans, there was not any sign of raising pigs. Significant numbers of wild species including carnivores, aquatic mammals, and rodents, as well as resident and migratory birds, were also hunted by Alaybeyi people. Additionally, horse burials, horse cult, dog burials, and a rich number of dog bones present animals as versatile actors in various ritual and symbolic practices at the site.

Key words: Zooarchaeology, Alaybeyi Höyük, animal remains, East Anatolia, Turkey

1. Introduction

Alaybeyi Höyük lies in the nearby agricultural land of a village called Alaybeyi, about 28 km west of present-day Erzurum. Located in the Aziziye district, and on the western part of the Erzurum Plain (Figure 1a), no significant topographic elevation of the settlement is noticeable from normal view. Therefore, the settlement remained unknown to archaeologists until 2016. It was discovered during the construction of the Trans-Anatolian Natural Gas Pipeline (TANAP) in the region. Following the discovery, the construction activities were stopped and rescue excavations started in 2016 under the directorate of the Erzurum Museum [1]. The rescue excavation was completed in October 2017.

The site is located in a region with a resourceful marshy environment and plenty of water. This particular wet and cold ecological setting made the Erzurum Plain and the nearest Pasinler Plain perfect pasture grounds for cattle pastoralism. People mainly grow potatoes, sugar beets, and a small amount of wheat on a seasonal basis. Wildlife is quite rich in the Alaybeyi region. Particularly noted as one of the greatest routes for migratory birds in Eurasia, the marshlands in the region currently host 239 resident and migratory bird species [2].

The stratigraphy of the settlement (Figures 1b and 1c) revealed occupational levels from the Chalcolithic to Late

Iron Age, and the C14 dating from the bone sample of the Chalcolithic layer showed the earliest occupation between 4721 and 4553 calibrated BC [1]. This makes Alaybeyi Höyük so far the oldest settlement found in northeastern Anatolia. The Early Bronze Age layer, on the other hand, revealed the well-known trans-Caucasian Kura–Araxes culture. However, some striking new evidence, such as the Mother Goddess figurines at Alaybeyi Höyük, have never been attributed to this culture from any other site. The burial chambers at Alaybeyi Höyük are also unique in their kind since architectural feature of the Kura–Araxes tomb was completely unknown before [3]. Remarkable cultural assemblages were also unearthed from the Early and Late Iron Age occupational levels. These include a round burial with horse cult, craft objects, workshop areas, necropolis, and very rich burial and cultural objects [1]. The actual pattern of the settlement is yet to be understood, since only 3–5% of the settlement has been brought under excavation so far. Yet, the radiocarbon dates, the richness of artifacts, and very significant obtained data indicate the potential of Alaybeyi Höyük for answering many questions about the archaeology of eastern Anatolia.

A rich assemblage of faunal remains were also recorded from Alaybeyi Höyük. Therefore, the faunal assemblage of this oldest archaeological settlement in northeast Anatolia [1,3] offers a first opportunity to examine the

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Figure 1. a) Location of Alaybeyi Höyük within Erzurum Plain and the neighboring Pasinler Plain; b) the western part of the site across TANAP pipe line project; c) the western part of the site after excavation.

status of domesticated and wild animals, as well as their interactions with humans in the largely unexplored Kars-Erzurum plateau throughout a period ranging from the Chalcolithic to Late Iron Age. This study presents the zooarchaeological analysis on the animal remains of Alaybeyi Höyük unearthed in 2016 and 2017 excavation sessions.

2. Materials and methods

A total of 4591 bones and bone fragments have been examined in this study (Table 1). During the 2016 excavation session, the bones were primarily collected, preserved, and cleaned at the site by the excavators. The bones unearthed

in the 2017 excavation session were cleaned, collected, and packed under the direct supervision of the author. Most of these bones were hand-collected, since it was a rescue excavation with a restricted timeline. However, some of them were also collected by dry sieving. In many trenches, the assemblage was found as a large composition of animal bones (Figure 2), but this did not outnumber the scattered records of bone and bone fragments all over the site.

After recording and packing, the samples were brought and examined throughout 2018 and early 2019, and are currently housed at the Palaeoanthropology laboratory of the Department of Anthropology, Mardin Artuklu University, Turkey. The faunal remains were weighed,

Table 1. Total identified species at Alaybeyi Höyük.

| Skeletal part | C30 | C31 | C32 | D23 | D33 | E21 | E23 | E24 | E27 | E28 | E29 | E30 | E31 | E32 | E33 | F23 | F24 | F27 | F28 | F28 (Pt-1) | F29 | F30 | F31 | F32 | F33 | E-F 27 | E-F 28 | E-F 29 | E-F 30 | NISP | NISP% |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------|-----|-----|-----|-----|-----|--------|--------|--------|--------|-------------|-------|
| Sheep (<i>Ovis aries</i>) | - | - | 1 | 5 | 4 | - | 10 | 8 | 4 | 15 | 32 | 31 | 5 | - | 1 | 12 | 2 | 12 | 21 | - | 18 | 3 | 11 | 2 | - | 5 | - | 12 | - | 214 | 8.33 |
| Goat (<i>Capra hisicus</i>) | - | 3 | 1 | - | - | - | 9 | - | 7 | 6 | 5 | 16 | 5 | - | - | - | 1 | 4 | 19 | 4 | 7 | 5 | 8 | - | - | - | 4 | 1 | 105 | 4.09 | |
| Sheep/Goat (<i>Ovicapra</i>) | - | 1 | - | 17 | - | - | 34 | 19 | 26 | 43 | 101 | 89 | 45 | 8 | - | 13 | 16 | 77 | 72 | 5 | 54 | 19 | 63 | - | 2 | 17 | - | 33 | 5 | 759 | 29.54 |
| Cattle (<i>Bos taurus</i>) | 2 | 13 | 20 | 4 | - | - | 28 | 24 | 29 | 104 | 136 | 116 | 35 | 13 | 4 | 31 | 17 | 65 | 76 | 1 | 138 | 17 | 28 | 8 | 14 | 22 | - | 29 | 1 | 975 | 37.95 |
| Boar (<i>Sus scrofa</i>) | - | - | - | - | - | - | 2 | 1 | 6 | 13 | 2 | 7 | - | - | - | - | - | 10 | 2 | 20 | 12 | - | 5 | 3 | - | - | 1 | 2 | 86 | 3.35 | |
| Horse (<i>Equus caballus</i>) | - | 2 | - | - | - | - | 1 | - | 2 | 8 | 11 | 7 | - | 1 | - | 1 | - | - | 3 | - | - | - | - | 1 | - | 3 | - | 1 | 41 | 1.60 | |
| Donkey (<i>Equus asinus</i>) | - | - | - | - | - | - | 1 | - | - | - | 2 | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | 1 | 5 | 0.19 | |
| Red deer (<i>Cervus elaphus</i>) | - | - | - | - | - | - | 1 | 1 | - | 3 | 1 | 2 | 1 | - | - | - | 1 | 2 | 2 | - | - | - | - | - | - | - | - | - | 14 | 0.54 | |
| Leopard (<i>Panthera pardus</i>) | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.04 | |
| Dog (<i>Canis familiaris</i>) | - | - | - | 47 | - | - | 16 | 3 | 3 | 1 | 7 | 5 | 1 | 2 | - | 12 | 3 | 4 | 4 | 4 | 4 | 1 | 2 | 2 | - | - | 1 | 1 | 228 | 8.87 | |
| Wolf (<i>Canis lupus</i>) | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 2 | 0.08 | |
| Fox (<i>Vulpes vulpes</i>) | - | - | - | - | - | - | - | - | - | - | 1 | 3 | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - | - | 1 | - | 7 | 0.27 | |
| Otter (<i>Lutra lutra</i>) | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.04 | |
| Hare (<i>Lepus europaeus</i>) | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 | - | - | - | - | - | 1 | - | 1 | - | - | - | - | - | - | - | 4 | 0.16 | |
| Beaver (<i>Castor fiber</i>) | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 0.08 | |
| Common vole (<i>Microtus</i> sp.) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | 1 | - | - | - | - | - | 3 | 0.11 | |
| Field mouse (<i>Apodemus</i> sp.) | - | - | - | 1 | - | 6 | - | - | 3 | - | - | - | - | - | - | - | - | 1 | - | 1 | 1 | 1 | 2 | - | - | - | 1 | - | 17 | 0.58 | |
| Rat (<i>Rattus</i> sp.) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.04 | |
| Unidentified rodent | - | - | 1 | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 | - | - | - | - | - | - | 5 | 0.27 | |
| Black-tailed Godwit (<i>Limosa limosa</i>) | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.04 | |
| Common crane (<i>Grus grus</i>) | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 2 | 0.08 | |
| Greylag goose (<i>Anser anser</i>) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 | - | - | 2 | 0.08 | |
| Chukar partridge (<i>Alectoris chukar</i>) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 | 0.04 | |
| Pheasant (<i>Phasianus</i> sp.) | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | 2 | 0.08 | |
| Teal (<i>Anas crecca</i>) | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 0.08 | |
| Little owl (<i>Athene noctua</i>) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | 1 | 0.04 | |
| Eurasian woodcock (<i>Scolopax rusticola</i>) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | 0.04 | |
| Freshwater oyster | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.04 | |
| Homo | - | 17 | 1 | - | - | - | - | - | 5 | 8 | 4 | 12 | 2 | 4 | 3 | 2 | - | 2 | 5 | - | 5 | 3 | 2 | 6 | - | 3 | 1 | 1 | 86 | 3.35 | |
| Total | 2 | 36 | 23 | 75 | 4 | 6 | 102 | 58 | 92 | 205 | 303 | 290 | 95 | 28 | 8 | 180 | 41 | 181 | 207 | 30 | 241 | 50 | 123 | 23 | 16 | 50 | 4 | 86 | 10 | 2569 | |
| Burnt bones | - | - | - | - | - | - | 14 | - | 3 | 21 | 14 | 9 | 2 | - | - | - | 2 | 22 | 13 | - | 26 | - | 6 | - | - | - | - | 4 | - | 136 | |
| Vertebrae, rib, unidentified and fragmented bones | - | 92 | - | 44 | - | - | 98 | 32 | 153 | 84 | 223 | 224 | 66 | 37 | 20 | 88 | 15 | 101 | 157 | - | 122 | 25 | 81 | 28 | 33 | 110 | - | 53 | - | 1886 | |
| Grand Total | 2 | 128 | 23 | 119 | 4 | 6 | 214 | 90 | 248 | 310 | 540 | 523 | 163 | 65 | 28 | 268 | 58 | 304 | 377 | 30 | 389 | 75 | 210 | 51 | 49 | 160 | 4 | 143 | 10 | 4591 | |



Figure 2. Bone assemblage unearthed at Trench F 29 of Alaybeyi Höyük.

sorted, and categorized according to their skeletal parts, then were identified as a possible genus or species. The bones of sheep and goats were carefully examined and differentiated according to Boessneck (1969) [4] and Salvagno and Albarella (2017) [5]. The indistinguishable bones were categorized as sheep/goat (*Ovicapra*). All bones and bone parts were chronologically categorized according to the archaeological layers of the site. Different sources of taphonomic evidence (i.e. weathering or gnawing by carnivores and rodents etc.) were examined in order to identify the possible effects on bone assemblage and interactions between different animal species and the settlement. The measurable specimens were isolated and measured according to Angela von den Driesch (1976) [6].

Since the bones were extremely fragmented and only a low percentage of them were found in their complete form, it was possible for a total of 2569 specimens to be identified to their genus or species level. Among the other bones and bone fragments, 136 bones were categorized as burnt bones and 1886 bones were categorized as vertebrae, ribs, fragments, and unidentified. Only the identified 2569 bones were used for the zooarchaeological analysis and interpretation in this study. This was because of 2 particular reasons: first, these bones were the selected sample which had been identified to a specific genus or species level, and second, most of the time it was not possible to identify any species by the vertebrae bones because the vertebra of sheep, goat, roe deer, fallow deer, and even some pig vertebrae can look alike. Because they are very confusing, vertebrate bones were commonly excluded in the zooarchaeological analysis. The same problem was also seen with the ribs. Although ribs can easily be identified and sometimes categorized to a species level, it was almost impossible to determine the minimum number of individuals (MNI) since their numbers were confusing and problematic while calculating the number

of identified specimens (NISP). On the other hand, the methods used to determine the species and the age at death were applied to all of the identified specimens regardless of the archaeological layers and chronological periods at the site.

3. Result

3.1. Mammals: Ungulata

3.1.1. Cattle

A total of 976 specimens (Table 2), consisting of about 38% of total fauna (Figure 3), were identified as the remains of cattle (*Bos taurus*). Mandibula comprised the highest ratio (12.71%) among the total identified cattle bones. Pelvis, followed by the mandibula, comprised 10.56% of total cattle remains. There were also very considerable numbers of skull bones. The number of long bones was also profound. Humerus, radius, femur, and tibia, respectively comprised 9.73%, 7.79%, 4.71%, and 5.43% of total identified cattle bones. Phalanx I, II, and III, along with metacarpus and metatarsus, were also noticeable. While over 8.09% of bones were identified to be the metatarsus, the metacarpus comprised about 5% of the total identified cattle bones. The majority of the cattle remains were unearthed from Trench E 28, E 29, E 30, F 27, F 28, and F 29. Approximately all skeletal parts were present. Only the nonmeat bearing bones (e.g., knee caps, carpals, or tarsals) were highly scarce. Overall, the body part representation indicated butchering activities near or in the very immediate vicinity of the site. Except a few metapodials and most of the phalanges, almost no long bone was observed in complete form. Most of these bones, along with vertebrae and ribs, were heavily fragmented. Extensive cut marks, caused by the use of metal cleavers and knives, were also present. On the other hand, most cattle bones were found fused, but their distribution overall showed the individuals of different age groups (Figure 4). Moreover, their sizes were very small compared to the wild cattle.

3.1.2. Caprine

A total of 1078 bones were identified as the remains of small ruminants. Among them, 214 specimens were identified as sheep (Table 3), 105 specimens were identified as goat (Table 4), and the remaining undistinguishable 759 specimens (Table 5) were categorized as sheep-goat (*Ovicapra*). Like the cattle remains, the majority of identified sheep bones were recorded from Trench E 28, E 29, E 30, F 27, F 28, and F 29. However, Trench E 30 and F 28 presented the highest number of identified goat bones. On the other hand, the majority of indistinguishable small ruminant bones were recorded from Trench E 28, E 29, E 30, E 31, F 27, F 28, F 29, and F 31.

Except for the lower jaw and hip bones, the majority of caprine remains was comprised mainly of long bones. Mandibula comprised a ratio of 14.23% of the sheep-goat

Table 2. Identified cattle remains at Alaybeyi Höyük.

| Skeletal part | C 30 | C 31 | C 32 | D 23 | E 23 | E 24 | E 27 | E 28 | E 29 | E 30 | E 31 | E 32 | E 33 | F 23 | F 24 | F 27 | F 28 | F 28 (Pit - I) | F 29 | F 30 | F 31 | F 32 | F 33 | E-F 27 | E-F 29 | E-F 30 | NISP | NISP% |
|------------------|----------|-----------|-----------|----------|-----------|-----------|-----------|------------|------------|------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|----------------|------------|-----------|-----------|----------|-----------|-----------|-----------|----------|------------|-------------|
| Horncore | - | - | - | - | - | - | - | 2 | 7 | - | - | - | - | - | 1 | 1 | 2 | - | 3 | - | - | 1 | - | 1 | 1 | - | 19 | 1.95% |
| Skull/Skull part | - | 1 | 5 | - | - | 3 | 2 | 9 | 13 | 11 | 3 | 2 | - | 2 | - | 16 | 5 | - | 10 | 2 | 1 | - | - | 2 | 2 | - | 89 | 9.12% |
| Maxilla | 1 | 2 | 3 | - | 1 | - | 3 | 3 | 3 | 3 | - | - | - | - | - | 3 | 1 | - | - | - | 2 | - | - | 2 | 1 | - | 28 | 2.87% |
| Mandibula | 1 | 1 | 1 | - | 4 | 3 | 4 | 15 | 13 | 22 | 4 | 1 | - | - | 1 | 5 | 9 | - | 23 | 3 | 4 | - | 1 | 3 | 6 | - | 124 | 12.71% |
| Tongue bone | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.10% |
| Atlas | - | - | - | - | 1 | - | - | 2 | 1 | - | - | - | - | - | - | - | 1 | - | 1 | - | - | - | - | - | - | - | 6 | 0.61% |
| Axis | - | - | - | 1 | 1 | - | - | - | 2 | 1 | - | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - | - | - | 7 | 0.72% |
| Sacrum | - | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | 4 | 0.41% |
| Scapula | - | 1 | - | - | - | - | 1 | 5 | 5 | 2 | 5 | - | - | 5 | - | 3 | 5 | - | 5 | - | 1 | - | - | 1 | 1 | - | 40 | 4.09% |
| Humerus | - | - | - | - | 7 | 2 | 3 | 15 | 14 | 6 | 4 | 1 | - | 1 | 2 | 6 | 9 | - | 11 | 3 | 3 | 1 | 3 | 3 | 1 | - | 95 | 9.73% |
| Radius | - | 1 | 1 | - | 1 | 4 | 5 | 11 | 14 | 14 | 1 | 1 | - | - | - | 4 | 4 | - | 10 | - | 1 | - | 2 | 1 | 1 | - | 76 | 7.79% |
| Ulna | - | - | - | - | 1 | 2 | 2 | 2 | 3 | 5 | - | - | - | 1 | 1 | 2 | 2 | - | 3 | - | 1 | - | 1 | 2 | 1 | - | 29 | 2.97% |
| Carpals | - | - | - | - | - | - | - | - | 2 | 1 | - | - | - | - | - | - | - | - | 4 | - | - | - | 2 | - | - | - | 9 | 0.92% |
| Metacarpus | - | - | 2 | - | - | 3 | - | 4 | 4 | 5 | 2 | 4 | - | - | 3 | - | 5 | - | 7 | - | 3 | - | - | - | 4 | - | 46 | 4.71% |
| Pelvis part | - | 6 | 2 | - | 3 | - | - | 10 | 12 | 12 | 3 | 1 | - | 4 | 1 | 9 | 10 | - | 17 | 2 | 2 | - | 2 | 3 | 4 | - | 103 | 10.56% |
| Femur | - | 1 | 1 | - | - | - | - | 2 | 11 | 5 | - | - | 1 | 5 | - | 4 | 7 | - | 2 | 2 | 1 | 1 | 1 | 1 | 1 | - | 46 | 4.71% |
| Patella | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 | - | - | - | - | - | - | 2 | 0.21% |
| Tibia | - | - | 1 | - | 1 | 1 | 1 | 3 | 11 | 6 | 2 | - | - | 5 | 2 | 3 | 2 | - | 7 | 2 | 1 | 1 | 1 | 1 | 2 | - | 53 | 5.43% |
| Fibula | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.10% |
| Calcaneous | - | - | - | - | - | 2 | - | 4 | 4 | 3 | - | - | - | 2 | - | 3 | 1 | - | 2 | - | - | 1 | - | - | - | - | 22 | 2.25% |
| Austragalus | - | - | 1 | - | - | 1 | - | 2 | 1 | 3 | 1 | - | 1 | 3 | - | - | 1 | - | 3 | - | - | 1 | - | - | - | - | 18 | 1.84% |
| Centratarsus | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 2 | 0.21% |
| Metatarsus | - | - | 1 | 2 | 3 | 3 | 4 | 6 | 10 | 8 | 4 | - | 1 | 2 | 4 | 2 | 4 | - | 11 | 1 | 7 | 2 | - | 2 | 2 | - | 79 | 8.09% |
| Phalanx -I | - | - | - | - | 5 | - | 3 | 4 | 3 | 2 | 4 | 3 | - | 1 | 2 | 1 | 4 | - | 8 | - | - | - | 1 | - | 1 | - | 42 | 4.31% |
| Phalanx -II | - | - | - | - | - | - | 1 | 3 | 3 | 1 | 1 | - | 1 | - | - | 2 | 2 | 1 | 5 | 1 | - | - | - | 1 | 2 | - | 24 | 2.46% |
| Phalanx -III | - | - | - | - | - | - | - | 2 | - | 4 | 1 | - | - | - | - | - | - | - | 3 | - | 1 | - | - | - | - | - | 11 | 1.13% |
| Total | 2 | 13 | 20 | 4 | 28 | 24 | 29 | 104 | 136 | 116 | 35 | 13 | 4 | 31 | 17 | 65 | 76 | 1 | 138 | 17 | 28 | 8 | 14 | 23 | 29 | 1 | 976 | 100% |

(*Ovicapra*), while comprising 17.29% and 8.57% of the total identified sheep (*Ovis aries*) and goat (*Capra hircus*), respectively. The long bones such as humerus comprised 10.14%, 8.41%, and 7.62%; radius comprised 10.67%, 9.35%, and 15.24%; tibia comprised 7.77%, 8.88%, and 5.71%; metacarpal comprised 8.43%, 4.67%, and 7.62%; and metatarsal comprised 16.07%, 9.35%, and 12.38% of total identified remains of sheep-goat (*ovicapra*), sheep, and goat, respectively. Like the cattle remains, most of the caprine bones, along with vertebrae and ribs, were heavily fragmented and showed extensive cut marks from metal tools. The nonmeat bearing bones (e.g., phalanxes or knee caps) were also very scarce. On the other hand, there was a special finding among the remains of small ruminants.

Except for the skull, vertebrae, and ribs, 31 complete bones comprised from a single young goat were recorded from the bottom of a garbage pit (well) of Trench E 27. All of these bones were unfused and probably belonged to a goat younger than 12 to 13 months old [7].

3.1.3. Equidae

There were at least 2 horse burials recorded from Alaybeyi Höyük. A complete horse skeleton was found alongside a young male human individual. Another human individual buried with a horse skull was recovered from Trench D 28 (Figure 5). In addition to the skeletal remains of these 2 ritual horses, considerable numbers of equidae specimens were also identified from Alaybeyi fauna. Among them, 41 were identified as the remains of horses and 5 specimens

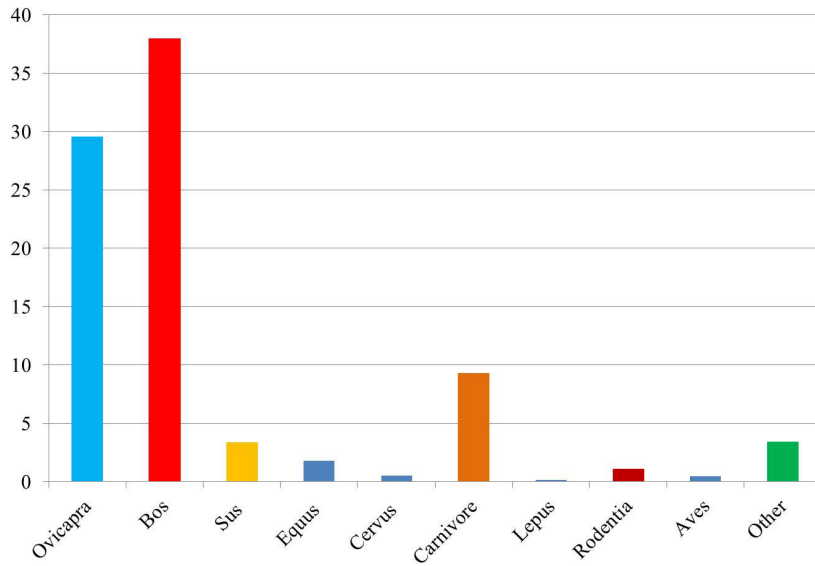


Figure 3. Ratio of the total identified species at Alaybeyi Höyük.



Figure 4. Phalanx I & II indicate the exploitation of cattle of different ages and sizes.

were identified as the remains of donkeys (Table 6). The highest ratios of equidae bones were comprised of the mandibula and the proximal phalanx, and the highest

numbers of equidae bones came from Trench E 28, E 29, and E 30, respectively. A talus and a calcaneus of a young horse that were broken and later healed and fused together

Table 3. Identified sheep (*Ovis aries*) remains at Alaybeyi Höyük.

| Skeletal part | C 32 | D 23 | D 33 (2016) | E 23 | E 24 | E 27 | E 28 | E 29 | E 30 | E 31 | E 33 | F 23 | F 24 | F 27 | F 28 | F 29 | F 30 | F 31 | F 32 | E-F 27 | E-F 29 | NISP | NISP% | |
|-------------------|----------|----------|-------------|-----------|----------|----------|-----------|-----------|-----------|----------|----------|-----------|----------|-----------|-----------|-----------|----------|-----------|----------|----------|-----------|------------|-------------|-------|
| Horn core | - | - | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 2 | - | - | - | - | - | 1 | 9 | 4.21% |
| Skull /Skull part | - | - | - | - | 2 | - | - | - | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 4 | 1.87% |
| Mandibulae | - | - | - | - | 1 | - | 3 | 7 | 7 | 2 | - | 3 | 2 | 2 | 2 | 3 | 1 | - | - | 2 | 2 | 37 | 17.29% | |
| Atlas | - | - | - | - | - | - | - | - | 1 | - | - | - | - | 1 | - | 2 | - | - | - | - | - | - | 4 | 1.87% |
| Axis | - | - | - | - | - | - | 1 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 1.40% |
| Scapula | 1 | - | - | - | - | - | 1 | 1 | 2 | 1 | - | 1 | - | - | 1 | - | - | - | 1 | - | 1 | 10 | 4.67% | |
| Humerus | - | - | - | 1 | - | - | 4 | 4 | 2 | - | - | 1 | - | - | 1 | - | - | 4 | - | 1 | - | 18 | 8.41% | |
| Radius | - | 1 | - | 1 | 1 | - | 2 | 3 | 2 | 1 | 1 | 2 | - | 2 | 1 | 2 | - | - | - | - | - | 1 | 20 | 9.35% |
| Ulna | - | - | - | 2 | - | - | - | - | 3 | 1 | - | - | - | 1 | 1 | - | - | - | - | - | - | 1 | 9 | 4.21% |
| Metacarpus | - | - | - | - | 1 | - | - | - | 2 | - | - | - | - | 4 | - | 1 | - | - | 1 | 1 | - | 10 | 4.67% | |
| Pelvis/part | - | - | - | - | - | - | 1 | 2 | 2 | - | - | 1 | - | - | 1 | 1 | - | - | - | - | - | 8 | 3.74% | |
| Femur | - | 1 | - | - | 1 | - | - | 1 | - | - | - | - | - | 1 | - | 1 | 1 | - | - | 1 | - | 7 | 3.27% | |
| Patella | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 0.93% | |
| Tibia | - | 1 | - | - | 1 | 1 | - | 6 | 3 | - | - | 2 | - | 1 | - | - | - | 2 | - | - | 2 | 19 | 8.88% | |
| Calcaneous | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 2 | 0.93% | |
| Austragalus | - | - | - | - | - | - | 1 | 3 | - | - | - | - | - | - | 2 | 3 | - | 1 | - | - | - | 10 | 4.67% | |
| Tarsals | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.46% | |
| Metatarsus | - | - | - | - | - | 2 | 1 | 3 | 3 | - | - | - | - | - | 4 | - | 1 | 3 | - | - | 3 | 20 | 9.35% | |
| Phalanx I | - | 2 | - | 6 | 1 | - | 1 | - | 1 | - | - | 1 | - | - | 2 | 3 | - | - | - | - | - | 17 | 7.94% | |
| Phalanx II | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 0.46% | |
| Phalanx III | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | - | - | - | - | - | - | 3 | 1.40% | |
| Total | 1 | 5 | 4 | 10 | 8 | 4 | 15 | 32 | 31 | 5 | 1 | 12 | 2 | 12 | 21 | 18 | 3 | 11 | 2 | 5 | 12 | 214 | 100% | |

as a single bone (Figure 6) were also found. Pathology of fracture and healing was also observed on some other equine phalanges. However, no cut marks or burn marks were seen on any of these identified equine bones.

3.1.4. Suidae

A total of 86 specimens were identified as the remains of *Sus scrofa* (Table 7). The highest number of *Sus* bones came from Trench E 28, F 27, F 29, and the pit of Trench F 28. The majority (over 75%) of *Sus* bones were comprised of skulls and skull fragments, canine teeth, and metapodial bones. Other body parts were also present, but very low in number. Most of the *Sus* bones were unfused. The size of canine teeth and the dental formula also indicated them to be young individuals.

3.1.5. Cervidae

Among the deer, only 14 specimens, comprised of skeletal and antler parts of red deer (*Cervus elaphus*), were identified. It appeared that the antlers were collected from natural habitat of red deer since they showed the sign of

natural shedding. All the antlers were used for making different types of household and weaving tools.

3.2. Mammals: Carnivora

3.2.1. Canidae

With a ratio of 8.87% of the total identified faunal remains, the dog (*Canis familiaris*) comprised the highest part of the total identified carnivorous species at Alaybeyi Höyük. Excluding the vertebrae and ribs, at least 228 bone specimens were identified as the remains of domestic dogs (Table 8). In particular, 2 dog skeletons had great significance for understanding the human-dog relationship at Alaybeyi Höyük. Among them, an almost complete dog skeleton was recorded from Trench F 23 (Figure 7). Along with the ribs and vertebrae bones, a total of 172 complete bones were identified from this single individual. Likewise, another 54 complete bones were identified from another dog burial recorded in Trench D 23. No cut, burn, or gnawing marks were seen on any of these dog bones.

Table 4. Identified goat (*Capra a. hircus*) remains at Alaybeyi Höyük.

| Skeletal part | C 31 | C 32 | E 23 | E 27 | E 28 | E 29 | E 30 | E 31 | F 24 | F 27 | F 28 | F 28 (Pit - 1) | F 29 | F 30 | F 31 | E-F 29 | E-F 30 | NISP | NISP% |
|---------------------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|-----------|----------------|----------|----------|----------|----------|----------|------------|-------------|
| Horncore | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 2 | 1.90% |
| Skull/Skull part | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | 1 | 0.95% |
| Mandibula | - | - | - | - | 1 | 2 | 2 | 2 | - | - | 1 | - | - | 1 | - | - | - | 9 | 8.57% |
| Axis | - | - | - | 1 | - | - | - | - | - | - | - | 1 | - | - | - | - | - | 2 | 1.90% |
| Scapula | - | - | 1 | 2 | 1 | - | 1 | - | - | - | - | - | - | - | - | - | - | 5 | 4.76% |
| Humerus | - | 1 | - | 1 | - | - | 1 | - | - | - | - | - | 1 | - | 3 | - | 1 | 8 | 7.62% |
| Radius | - | - | - | 2 | - | - | 4 | 1 | - | 1 | 2 | - | 1 | 1 | 3 | 1 | - | 16 | 15.24% |
| Ulna | - | - | - | - | - | 1 | 1 | - | - | 1 | 2 | - | - | - | - | - | - | 5 | 4.76% |
| Metacarpus | 1 | - | 1 | - | - | - | 1 | - | - | - | 3 | - | 1 | 1 | - | - | - | 8 | 7.62% |
| Pelvis /Pelvis part | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | 1 | 0.95% |
| Tibia | - | - | - | 1 | 1 | - | 1 | - | - | - | 2 | - | 1 | - | - | - | - | 6 | 5.71% |
| Calcaneous | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 | 0.95% |
| Austragalus | - | - | 1 | - | - | 2 | 1 | - | 1 | - | - | - | 1 | 1 | - | 1 | - | 8 | 7.62% |
| Metatarsus | 1 | - | 1 | - | 2 | - | 2 | 2 | - | 2 | 2 | - | 1 | - | - | - | - | 13 | 12.38% |
| Phalanx -I | 1 | - | 4 | - | 1 | - | - | - | - | - | 7 | 1 | - | 1 | 1 | 1 | - | 17 | 16.19% |
| Phalanx -II | - | - | - | - | - | - | 1 | - | - | - | - | - | 1 | - | 1 | - | - | 3 | 2.86% |
| Total | 3 | 1 | 9 | 7 | 6 | 5 | 16 | 5 | 1 | 4 | 19 | 4 | 7 | 5 | 8 | 4 | 1 | 105 | 100% |

3.2.2. Other carnivores

Besides the large numbers of dog bones, only 3 specimens were identified as the remains of wolves (*Canis lupus*), 7 specimens as the remains of foxes (*Vulpes vulpes*), and 1 mandible was identified as the remains of an otter (*Lutra lutra*). The left part of a maxilla probably of a leopard (*Panthera pardus*) was found unbroken.

3.3. Mammals: Lagomorpha

Four hare (*Lepus europaeus*) bones were identified from the faunal remains of Alaybeyi Höyük; however, no cut marks or burn marks were observed on them.

3.4. Mammals: Rodentia

A total of 23 bones were identified to be Rodentia of different species (Table 9). Among them, 3 specimens were identified as vole (*Microtus* sp.), 17 specimens were identified as field mouse (*Apodemus* sp.), 1 specimen was identified as rat (*Rattus* sp.), and 2 bones were identified as the remains of Eurasian beaver (*Castor fiber*). There were no cut, burn or any other cultural marks on these rodent bones (Figure 8).

3.5. Reptilia

Only a plastron (lower shell) and a carapace (upper shell) of the Eurasian tortoise (*Testudo graeca iberica*) represented the family reptilia at the site. Neither any cultural mark, nor

any associate artifacts were found with these specimens.

3.6. Gastropoda

A few freshwater snails and oyster shells were the representative of gastropoda in the faunal assemblage of Alaybeyi Höyük.

3.7. Aves

At least 8 species of bird were identified, albeit the numbers of avifaunal remains were not very high (Table 10). The identified species include black-tailed godwit (*Limosa limosa*), common crane (*Grus grus*), teal (*Anas crecca*), greylag goose (*Anser anser*), chukar partridge (*Alectoris chukar*), pheasant (*Phasianus* sp.), little owl (*Athene noctua*), and Eurasian woodcock (*Scolopax rusticola*) (Figure 9). An example of tool-making by using the ulna of a common crane was also noticeable.

3.8. Worked bones and bone tools

At least 53 worked bones and bone artifacts were recorded from the Alaybeyi faunal assemblage. Awls, points, weaving tools, knife butts, incised bones, perforated phalanges, beads, and burial objects were among the most significant bone tools and worked bones. Surprisingly, the bones of a variety of species, including cattle, horse, donkey, boar, goat, sheep, deer, and crane were used for the production of these bone tools (Figure 10).

Table 5. Identified sheep-goat (*Ovicapra*) remains at Alaybeyi Höyük.

| Skeletal part | C 31 | D 23 | E 23 | E 24 | E 27 | E 28 | E 29 | E 30 | E 31 | E 32 | F 23 | F 24 | F 27 | F 28 | F 28 (Pit -1) | F 29 | F 30 | F 31 | F 33 | E-F 27 | E-F 29 | E-F 30 | NISP | NISP% |
|----------------------|----------|-----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|---------------|-----------|-----------|-----------|----------|-----------|-----------|----------|------------|-------------|
| Horncore | - | - | - | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 0.40% |
| Skull / Skull part | - | 2 | 6 | - | 1 | 1 | 4 | 11 | 3 | 2 | - | - | 1 | 3 | 4 | 1 | - | 1 | - | 2 | 3 | - | 45 | 5.93% |
| Maxilla | - | - | - | 1 | - | - | 1 | 2 | 1 | - | - | - | 1 | - | - | - | - | 1 | - | - | - | - | 7 | 0.92% |
| Mandibula | 1 | 2 | 3 | 2 | 5 | 6 | 20 | 11 | 5 | - | 3 | 2 | 7 | 8 | - | 14 | 2 | 4 | 1 | 4 | 7 | 1 | 108 | 14.23% |
| Atlas | - | - | - | - | - | 1 | - | - | - | - | - | - | 1 | 4 | - | 1 | - | 1 | - | 2 | - | - | 10 | 1.32% |
| Axis | - | - | - | - | - | 1 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 0.40% |
| Sacrum | - | - | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - | - | - | 4 | 0.53% |
| Scapula | - | - | - | 1 | - | 3 | 3 | 9 | 2 | 1 | - | - | - | 2 | - | 1 | 1 | 2 | - | 1 | 2 | - | 28 | 3.69% |
| Humerus | - | 1 | 6 | 1 | 3 | 4 | 9 | 8 | 5 | - | 3 | 2 | 6 | 15 | - | 3 | - | 4 | - | 3 | 4 | - | 77 | 10.14% |
| Radius | - | - | 5 | 1 | 3 | 5 | 13 | 7 | 3 | 2 | 1 | 4 | 10 | 9 | - | 6 | 3 | 5 | - | 1 | 3 | - | 81 | 10.67% |
| Ulna | - | - | - | 1 | 1 | - | 1 | - | - | 1 | - | - | 1 | 4 | - | - | - | - | - | - | - | - | 9 | 1.19% |
| Metacarpus | - | - | 2 | 2 | 1 | 3 | 6 | 6 | 6 | 2 | 1 | 2 | 12 | 8 | - | 1 | 1 | 9 | - | - | 2 | - | 64 | 8.43% |
| Pelvis / Pelvis part | - | 2 | - | - | 1 | 2 | 5 | 3 | 3 | - | - | - | 4 | 1 | - | 7 | 1 | 1 | - | 2 | 1 | - | 33 | 4.34% |
| Femur | - | - | 2 | 2 | - | 5 | 4 | 10 | 4 | - | - | - | 7 | 3 | - | 3 | 3 | 12 | - | 2 | 2 | 1 | 60 | 7.91% |
| Patella | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.13% |
| Tibia | - | 1 | 9 | 5 | 1 | 3 | 5 | 8 | 5 | - | - | 2 | 4 | 1 | - | 3 | 2 | 8 | - | - | 2 | - | 59 | 7.77% |
| Austragalus | - | - | - | - | 2 | 2 | - | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - | - | - | 6 | 0.79% |
| Calcaneus | - | - | - | - | 1 | - | - | 1 | - | - | 3 | - | - | - | - | 1 | - | - | - | - | - | - | 6 | 0.79% |
| Centratarsus | - | 1 | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | 3 | 0.40% |
| Metatarsus | - | 7 | - | 3 | 5 | 6 | 22 | 8 | 4 | - | 1 | 2 | 21 | 11 | 1 | 11 | 2 | 9 | - | - | 6 | 3 | 122 | 16.07% |
| Phalanx -I | - | 1 | - | - | - | 4 | 2 | 3 | - | - | - | 1 | 1 | 3 | - | 2 | 1 | 2 | 1 | - | 1 | - | 22 | 2.90% |
| Phalanx -II | - | - | - | - | 2 | - | 1 | - | 1 | - | - | - | - | - | - | - | 1 | 3 | - | - | - | - | 8 | 1.05% |
| Total | 1 | 17 | 34 | 19 | 26 | 43 | 101 | 89 | 45 | 8 | 13 | 16 | 77 | 72 | 5 | 54 | 19 | 63 | 2 | 17 | 33 | 5 | 759 | 100% |

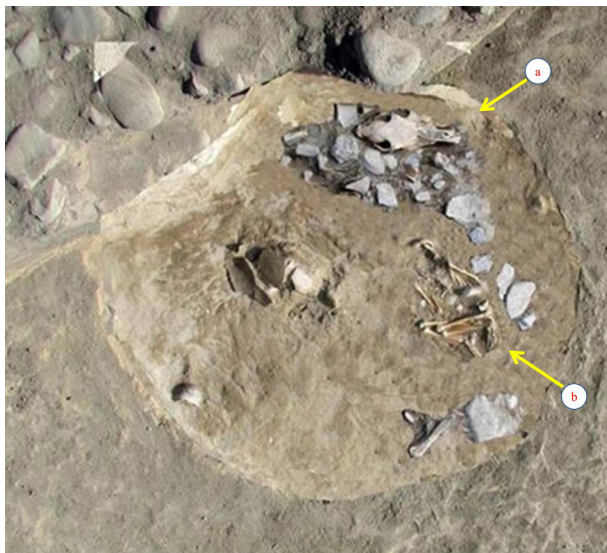


Figure 5. The round burial chamber at Alaybeyi Höyük: a) a horse skull was placed on an altar; b) a human individual was buried in the hocker position.

4. Discussion

The Erzurum-Kars Plateau is the most elevated and coldest region in Anatolia. The first frosts often start here in autumn and frozen conditions can sometimes last until the end of spring or early summer. With only 5% of land area brought under cultivation until the 1960s [8], the cold and marshy environmental condition has been so favorable for cattle pastoralism that the Plateau currently supports the highest level of cattle production in Anatolia [9]. It appears that Alaybeyi people too were much more dependent on cattle pastoralism than agricultural harvest. Zooarchaeological data shows the distribution of cattle remains to be all occupational areas of Alaybeyi Höyük and to be predominant over caprine remains. This signifies the supremacy of cattle pastoralism in the region for about 7 millennia.

However, although small in number, sheep and goats too were vital in subsistence. Considerable numbers of weaving tools also indicate wool processing and fabric production activities at the site. Providing that there was

Table 6. Identified horse and donkey remains at Alaybeyi Höyük.

| <i>Equus caballus</i> | C 31 | E 23 | E 27 | E 28 | E 29 | E 30 | E 32 | F 23 | F 28 | F 32 | E-F 27 | E-F 29 | E-F 30 | NISP |
|-----------------------|------|------|------|------|------|------|------|------|------|------|--------|--------|--------|------|
| Skull | - | - | - | - | 1 | - | - | - | - | - | - | - | - | 1 |
| Maxilla | - | - | - | - | 3 | - | - | - | - | - | - | - | - | 3 |
| Mandibula | 1 | - | - | - | 2 | 3 | - | - | 1 | - | - | - | - | 7 |
| Scapula | - | - | 1 | - | - | 1 | - | - | - | - | - | - | - | 2 |
| Humerus | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 |
| Carpals | - | - | - | 1 | - | 1 | - | - | - | - | - | - | - | 2 |
| Metacarpus | - | 1 | - | 2 | - | - | - | - | - | - | - | - | - | 3 |
| Metacarpus -II | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| Pelvis/Part | - | - | - | - | - | 1 | - | - | - | - | 1 | - | - | 2 |
| Femur | - | - | - | 1 | - | - | - | - | - | - | 1 | - | - | 2 |
| Patella | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 |
| Calcaneous | - | - | - | - | 2 | - | - | - | - | - | - | - | - | 2 |
| Austragalus | - | - | - | 1 | 2 | - | - | - | 1 | - | - | - | - | 4 |
| Metatarsus | - | - | - | - | 1 | - | - | 1 | - | - | - | - | - | 2 |
| Phalanx -I | - | - | - | 2 | - | - | 1 | - | 1 | 1 | 1 | - | - | 6 |
| Phalanx -II | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | 2 |
| Total | 2 | 1 | 2 | 8 | 11 | 7 | 1 | 1 | 3 | 1 | 3 | 1 | - | 41 |
| <i>Equus asinus</i> | | | | | | | | | | | | | | |
| Mandibula | - | 1 | - | - | 1 | - | - | - | - | - | - | - | 1 | 3 |
| Humerus | - | - | - | - | 1 | - | - | - | - | - | - | - | - | 1 |
| Metacarpus | - | - | - | - | - | - | - | - | 1 | - | - | - | - | 1 |
| Total | - | 1 | - | - | 2 | - | - | - | 1 | - | - | - | 1 | 5 |

no trace of carpus production from archaeobotanical study (personal communication with Gülşah Altunkaynak), it is likely that animals played a vital role for the production of cloths and comfort at Alaybeyi Höyük.

Different types of stress-related pathological marks indicate the large ungulates to be used for laboring and draft activities. Particularly the armory-related remains at the site [1] and the contemporary sociocultural pattern indicate that donkeys and horses were extensively used in laboring, battlefield, and defense activities [10]. The very small number of bones may raise question about the importance of equidae at the site. However, it was observed in ethnographic fieldwork (by the author) that pastoral groups in the region commonly throw their dead animals in a communal dumping place, often away of the settlement. Since no cut marks were observed on any horse or donkey bone, it was apparent that the people of Alaybeyi did not consume them. Therefore, it is obvious that the people of Alaybeyi Höyük too dumped their dead horses and donkeys far away of the settlement, which might have been the cause of the very few equidae bones in the faunal assemblage. Like the modern pastoral groups [11,12], as

well as Late Chalcolithic-Iron Age societies in west Asia [10], equidae and cattle were also probably used as draft animals, especially for carrying harvested crops, firewood, market goods, or collecting stone pebbles from the nearest natural source. It is worth mentioning that even 30 years ago, the rural societies in the Erzurum Plain were very much dependent on bullock carts.

While looking at the ratios, domestic species were dominant over the wild species. However, the varieties of identified wild species indicate that Alaybeyi people had deep interaction with their natural world. Among the wild mammals, boar comprised the higher ration. The size and shapes of the skulls indicate the majority of them to be of wild individuals. However, with the help of only a few measurable bones, it was not possible to come to a conclusion on whether Alaybeyi people raised pigs or hunted wild boar. The size of the canine teeth, dental formula, and unfused condition of most *Sus* bones, on the other hand, indicates that young and juvenile pigs/boars were preferred. The red deer bones too brought many questions since no deer species is currently extant in Erzurum region. However, the faunal assemblage of



Figure 6. Pathology on horse bone: anterior and posterior views of the unfused calcaneus and astragalus of a juvenile horse, which were broken and later fused together.

Table 7. Identified boar/pig (*Sus scrofa*) remains at Alaybeyi Höyük.

| Skeletal part | E 23 | E 24 | E 27 | E 28 | E 29 | E 30 | F 27 | F 28 (Pit -1) | F 28 | F 29 | F 31 | F 32 | E-F 29 | E-F 30 | NISP | NISP% |
|-----------------|----------|----------|----------|-----------|----------|----------|-----------|------------------|----------|-----------|----------|----------|----------|----------|-----------|-------------|
| Skull | - | - | 1 | - | - | 2 | 2 | 6 | - | 1 | - | - | - | - | 12 | 14% |
| Maxilla | - | - | - | 1 | 2 | 1 | 1 | - | - | 2 | 2 | 2 | - | - | 11 | 13% |
| Mandibula | - | - | 3 | 9 | - | 3 | - | 3 | - | 5 | 1 | 1 | 1 | - | 26 | 30% |
| Canaine tooth | - | - | 1 | 1 | - | - | 1 | 2 | - | - | - | - | - | - | 5 | 6% |
| Milk tooth | - | - | - | - | - | - | - | 1 | - | - | 1 | - | - | - | 2 | 2% |
| Atlas | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 1% |
| Scapula | - | 1 | - | - | - | 1 | 1 | - | - | 2 | - | - | - | - | 5 | 6% |
| Humerus | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 | 1% |
| Radius | - | - | - | 1 | - | - | - | - | - | 1 | - | - | - | - | 2 | 2% |
| Metacarpus -I | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | 1 | 1% |
| Metacarpus -IV | - | - | - | - | - | - | - | - | 1 | 1 | - | - | - | - | 2 | 2% |
| Tibia | - | - | - | - | - | - | 1 | 4 | - | - | - | - | - | - | 5 | 6% |
| Fibula | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 1% |
| Metatarsus -I | 1 | - | - | - | - | - | - | 2 | 1 | - | - | - | - | - | 4 | 5% |
| Metatarsus -II | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1% |
| Metatarsus -III | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | 1% |
| Metatarsus -IV | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | 1% |
| Metatarsus -V | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | 1% |
| Phalanx -I | - | - | - | 1 | - | - | 1 | - | - | - | - | - | - | - | 2 | 2% |
| Phalanx -II | - | - | 1 | - | - | - | - | 1 | - | - | - | - | - | - | 2 | 2% |
| Total | 2 | 1 | 6 | 13 | 2 | 7 | 10 | 20 | 2 | 12 | 5 | 3 | 1 | 2 | 86 | 100% |

Table 8. Identified dog (*Canis familiaris*) remains at Alaybeyi Höyük.

| Skeletal part | D 23 | E 23 | E 24 | E 27 | E 28 | E 29 | E 30 | E 31 | E 32 | F 23 | F 24 | F 27 | F 28 | F 29 | F 30 | F 31 | F 32 | E-F 28 | E-F 29 | NISP | NISP% |
|-----------------|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|------------|-------------|
| Skull | 1 | 1 | - | - | - | 3 | - | 1 | - | 1 | - | 1 | - | 1 | - | - | - | - | - | 9 | 4% |
| Maxilla | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | 1 | 0% |
| Mandibula | 1 | 1 | - | 2 | - | - | - | - | - | 2 | - | - | 1 | 1 | - | - | - | - | 1 | 9 | 4% |
| Canine tooth | 1 | - | - | - | - | 1 | - | - | - | 3 | - | - | - | - | - | - | - | 1 | - | 6 | 3% |
| Atlas | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 3 | 1% |
| Axis | 1 | - | - | - | - | - | 2 | - | 2 | 1 | - | - | 1 | - | - | - | - | - | - | 7 | 3% |
| Sacrum | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 1% |
| Scapula | 2 | - | - | - | - | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | 5 | 2% |
| Humerus | 2 | 4 | 1 | - | 1 | 1 | - | - | - | 2 | 1 | - | - | 1 | - | - | - | - | - | 13 | 6% |
| Radius | 2 | - | - | - | - | - | 1 | - | - | 2 | - | 2 | - | - | 1 | 1 | - | - | - | 9 | 4% |
| Ulna | 2 | - | - | 1 | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 5 | 2% |
| Carpus | 3 | - | - | - | - | - | - | - | - | 8 | - | - | - | - | - | - | - | - | - | 11 | 5% |
| Metacarpus -I | - | - | - | - | - | - | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | 2 | 1% |
| Metacarpus -II | 1 | - | - | - | - | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - | - | 3 | 1% |
| Metacarpus -III | 2 | 1 | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 5 | 2% |
| Metacarpus -IV | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 | - | - | - | - | - | - | 2 | 1% |
| Metacarpus -V | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 2 | 1% |
| Pelvis | 3 | 2 | - | - | - | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - | - | 7 | 3% |
| Baculum | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 | 0% |
| Femur | 2 | 1 | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 5 | 2% |
| Patella | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 2 | 1% |
| Tibia | 3 | 2 | 1 | - | - | 2 | - | - | - | 4 | - | 1 | 1 | - | - | - | 2 | - | - | 16 | 7% |
| Fibula | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 4 | 2% |
| Calcaneus | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 2 | 1% |
| Austragalus | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 2 | 1% |
| Tarsus | 3 | - | - | - | - | - | - | - | - | 10 | - | - | - | - | - | - | - | - | - | 13 | 6% |
| Metatarsus -I | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 | 0% |
| Metatarsus -II | - | - | 1 | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 3 | 1% |
| Metatarsus -III | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 2 | 1% |
| Metatarsus -IV | - | - | - | - | - | - | 1 | - | - | 2 | - | - | - | - | - | - | - | - | - | 3 | 1% |
| Metatarsus -V | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 2 | 1% |
| Phalanx -I | 4 | - | - | - | - | - | - | - | - | 15 | - | - | - | - | - | - | - | - | - | 19 | 8% |
| Phalanx -II | 2 | - | - | - | - | - | - | - | - | 15 | - | - | - | - | - | - | - | - | - | 17 | 7% |
| Phalanx -III | 1 | - | - | - | - | - | - | - | - | 14 | - | - | - | - | - | - | - | - | - | 15 | 7% |
| Tail bone | 4 | 1 | - | - | - | - | - | - | - | 5 | - | - | - | - | - | - | - | - | - | 10 | 4% |
| Starnum | 4 | - | - | - | - | - | - | - | - | 6 | - | - | - | - | - | - | - | - | - | 10 | 4% |
| Total | 47 | 16 | 3 | 3 | 1 | 7 | 5 | 1 | 2 | 121 | 3 | 4 | 4 | 4 | 1 | 2 | 2 | 1 | 1 | 228 | 100% |



Figure 7. Dog burial unearthed at Trench F 23 of Alaybeyi Höyük.

Table 9. Identified rodent species at Alaybeyi Höyük.

| Species | Skeletal part | D 23 | E 21 | E 24 | E 27 | F 27 | E-F 29 | F 29 | F 30 | F 31 | F 32 | NISP |
|---|---------------|------|------|------|------|------|--------|------|------|------|------|------|
| Eurasian beaver (<i>Castor fiber</i>) | Skull | - | - | 1 | - | - | - | - | - | - | - | 1 |
| | Mandible | - | - | 1 | - | - | - | - | - | - | - | 1 |
| Common vole (<i>Microtus sp.</i>) | Femur | - | - | - | - | 1 | - | - | - | - | - | 1 |
| | Skull | - | - | - | - | 1 | - | - | 1 | - | - | 2 |
| Field mouse (<i>Apodemus sp.</i>) | Skull | - | - | - | - | - | - | - | 1 | - | - | 1 |
| | Mandible | 1 | 1 | - | 1 | - | - | - | - | 1 | - | 4 |
| | Humerus | - | - | - | 1 | - | - | - | - | - | - | 1 |
| | Radius | - | 1 | - | - | - | - | - | - | - | - | 1 |
| | Pelvis | - | 1 | - | 1 | - | - | - | - | - | 1 | 3 |
| | Femur | - | - | - | - | - | 1 | 1 | - | - | - | 2 |
| | Tibia | - | 1 | - | - | 1 | - | - | - | - | 1 | 3 |
| | Vertebrae | - | 2 | - | - | - | - | - | - | - | - | 2 |
| Rat (<i>Rattus sp.</i>) | Femur | - | - | - | - | - | 1 | - | - | - | - | 1 |
| Total | | 1 | 6 | 2 | 3 | 3 | 2 | 1 | 2 | 1 | 2 | 23 |

Alaybeyi Höyük at least testifies to their presence in the past. A small amount of oak forest is still present in the region, which further supports favorable deer habitat in the past [13]. Among the small mammals, wild hares are common in Erzurum, and therefore the presence of only 4 hare bones in the Alaybeyi assemblage suggests that either hare was not common in the region throughout the occupational period, or people were not interested in hare hunting. The lack of hare bones could instead be a result of the research methods, since most of these bones were obtained by the hand-collection method. Among other

microfaunal remains, considerable numbers of rodent species at least indicate that voles and mice were present at Alaybeyi Höyük, and perhaps acted both as agricultural and house pests. On the other hand, the beavers were probably consumed by the Alaybeyi people or hunted for their valuable pelt. The beavers, along with the otters, further indicate the exploitation of a very resourceful marshy environment.

Almost all of the identified bird species at Alaybeyi Höyük are wild. Among them, the black-tailed godwit from the family Scolopacidae is a summer visitor, the

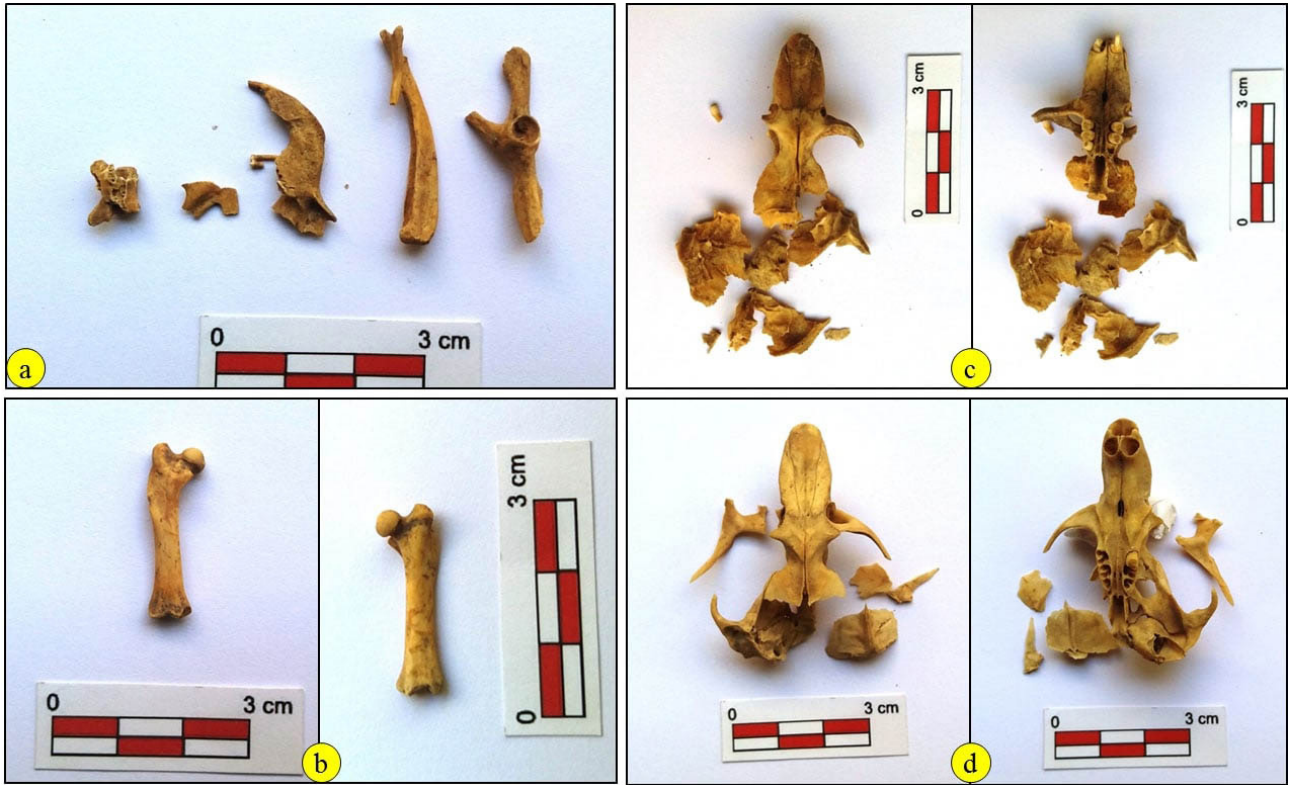


Figure 8. Rodents at Alaybeyi Höyük: a) a vertebrate bone, 2 mandibles, a tibia, and a pelvis of *Apodemus* sp.; b) a femur of *Apodemus* sp.; c-d) 2 distinct skulls of *Microtus* sp.

Table 10. Identified bird species at Alaybeyi Höyük.

| Species | Skeletal part | E 27 | E 28 | E 30 | F 27 | F 28 | F 29 | F 31 | E-F 28 | NISP |
|---|------------------|------|------|------|------|------|------|------|--------|------|
| Black-tailed godwit (<i>Limosa limosa</i>) | Tarso-metatarsus | 1 | - | - | - | - | - | - | - | 1 |
| Common crane (<i>Grus grus</i>) | Ulna | - | - | - | 1 | - | - | - | - | 1 |
| | Carpo-metacarpus | - | 1 | - | - | - | - | - | - | 1 |
| Teal (<i>Anas crecca</i>) | Caracoid | - | 1 | 1 | - | - | - | - | - | 2 |
| Greylag goose (<i>Anser anser</i>) | Humerus | - | - | - | - | - | - | 1 | - | 1 |
| | Femur | - | - | - | - | - | - | - | 1 | 1 |
| Chukar partridge (<i>Alectoris chukar</i>) | Scapula | - | - | - | - | 1 | - | - | - | 1 |
| Pheasant (<i>Phasianus sp.</i>) | Tibio-tarsus | 1 | - | - | - | - | 1 | - | - | 2 |
| Little owl (<i>Athene noctua</i>) | Tibio-tarsus | - | - | - | - | - | - | 1 | - | 1 |
| Eurasian woodcock (<i>Scolopax rusticola</i>) | Femur | - | - | - | - | - | - | - | 1 | 1 |
| Total | | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 12 |

Eurasian woodcock is a passage migrant, and the common crane is a resident species in the Erzurum Plain. Along with the greylag goose, species such as bean goose and white-fronted goose are the wintering migratory birds in the region. Among the ducks, wigeon and gadwall are summer migrants, and many other ducks such as teal, mallard,

garganey, and shoveler are the permanent residents in the marshlands of Erzurum [2]. Among the most common meat-providing terrestrial birds, particularly chukar partridge, grey partridge, and the great bustard are also the permanent resident birds in the region. Quails are common wintering birds here, and frequently hunted by



Figure 9. Bird bones from Alaybeyi Höyük: a–b) tarso-metatarsus of *Limosa limosa*; c–d) femur of *Scolopax rusticola*; e–f) tibio-tarsus of *Athene noctua*; g) carpo-metacarpus of *Grus grus*; h–i) tibio-tarsus of *Phasianus* sp.

the local people. Therefore, it is clearly evident that there was a rich number of avifauna in their environment that Alaybeyi people could involve in hunting activities all year round. At least 5 owl species are currently known as the permanent resident species in Erzurum [2]. Among them, the little owl (*Athene noctua*) was identified in Alaybeyi Höyük. These birds mainly depend on small rodent species and amphibians for their survival [13,14]. Therefore, wide varieties of permanently-residing owls strongly indicate the presence of rodents in the plain. The identified rodents of Alaybeyi Höyük also support this idea.

The use of animals in symbolic practices was also inevitable since archaeological evidence [1] and ethnographic accounts illustrate the importance of locally available animal species in traditional beliefs and symbolic practices [15,16]. In addition to zooarchaeological data, archaeological evidence also presents direct symbolic roles of the horse, dog, crane, and raptors at Alaybeyi Höyük [1]. Using crane bones to produce beads or

flutes; human burial with horse skulls; dog burials; using dog phalanxes as sacred funerary objects, or presence of a raptor cult in human burial [1] can be very strong examples of animal symbolism at Alaybeyi Höyük. The round tomb at Trench D 28 can be an especially major key for revealing animal-related sociocultural and ritual aspects at Alaybeyi Höyük throughout the 5th century BC. The tomb continues from the bottom to the ceiling, and cream, red, and brown ceramic pieces with floral decorations were found as burial objects [1]. A horse skull was placed on an altar made of a row of stones. Animal bone fragments were also present in the northwestern part of the tomb. The human skeleton was buried in the hocker position and it was surrounded by dense ceramic pieces. A dagger, which was broken and rusty, was also found on the northwest part of the tomb [1]. Overall, the animal remains and cultural objects in this tomb demonstrate funerary practice associated with a horse cult.



Figure 10. Bone tools and worked bones at Alaybeyi Höyük: a) weaving tool made of antler; b) polished spike of antler; c) small wheel made of cattle femur caput; d) spade made of cattle scapula; e) perforated cattle knucklebone; f) caprine phalanx I was perforated from 2 sides; g) caprine phalanx I was perforated from 3 sides; h) handle of a broken spatula, which was made of a caprine scapula; i) horse phalanx I was perforated from 2 ends.

There is no question that dogs were crucial at Alaybeyi Höyük. Besides their general roles, it appears that dogs had strong symbolic functions. Throughout the Bronze Age and Iron Age, dogs were widely considered as protectors and healers, as well as often depicted with gods and goddesses [17]. Being considered as a gift of the gods, dog saliva was considered an important medicinal substance in ancient Mesopotamia. Ethnographic accounts in contemporary agropastoral societies also show that no skeletal parts of the dogs are brought to the settlement unless they have any sacred use [12,15,16]. Without the symbolic use, like other dead animals, dead dogs are simply dumped away from the settlement to avoid the unpleasant smell and disease. It was further observed that the shepherds in present-day Alaybeyi do not prefer keeping dogs since they do not need them for cattle pastoralism. Therefore, the profound amount of dog remains, no trace of cut or burn marks on

any of the dog bones, and overall archaeological context of these dog burials strongly indicate that, unlike throwing the dead animals away, the dogs were intentionally buried by Alaybeyi people within the site. This signals a mystic relationship between humans and dogs at Alaybeyi Höyük.

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References

1. Erkmen M, Altunkaynak G. Alaybeyi Höyük excavation of 2016 session. In: 26. Müze Kurtarma Kazıları Sempozyumu. Ankara, Turkey: Kültür Varlıkları ve Müzeler Genel Müdürlüğü; 2017. pp. 237-262 (in Turkish).
2. Sari A, Arpacık A, Başkaya Ş. Bird species of Erzurum marshes in Northeastern Anatolia, Turkey. Pakistan Journal of Zoology 2018; 50 (2): 629-637. doi: 10.17582/journal.pjz/2018.50.2.629.637
3. Altunkaynak G, Işıklı M, Erkmen M. In the light of new evidence from the Erzurum plain: an overview of Kura-Araxes funerary practices in Eastern Anatolia. TÜBA-AR 2018; Special Issue: 73-91.
4. Boessneck J. Osteological differences between sheep (*Ovis aries* Linnè) and goat (*Capra hircus* Linnè). In: Brothwell D, Higgs E. (eds). Science in Archaeology. A Comprehensive Survey of Progress and Research. London, UK: Thames & Hudson; 1969, pp. 311-358.
5. Salvagno L, Albarella U. A morphometric system to distinguish sheep and goat postcranial bones. PLoS ONE 2017; 12 (6): e0178543. doi: 10.1371/journal.pone.0178543
6. von den Driesch A. A Guide to the Measurement of Animal Bones from Archaeological Sites. Peabody Museum Bulletin 1, Cambridge, MA, USA: The Peabody Museum of Archaeology and Ethnology; 1976.
7. Genccelep M, Karasu A, Alpdogan O. The determination of radius-ulna closure time of growth plates in mohair goat kids by radiography. Small Ruminant Research 2012; 103 (2-3): 182-186. doi: 10.1016/j.smallrumres.2011.09.049
8. Altınlı İE. Geology of East and Southeast Anatolia. Maden Tetkik ve Arama Dergisi 1966; 66 (66): 35-74 (in Turkish with an abstract in English).
9. Ünal Ç. Livestock potentiality of Erzurum. Doğu Coğrafya Dergisi 2004; 9 (12): 257-274 (in Turkish with an abstract in English).
10. Caroline G. Size matters – Donkeys and horses in the prehistory of the Southernmost Levant. Paléorient 2012; 38 (1-2): 185-201. doi: 10.3406/paleo.2012.5468
11. Siddiq AB. Pastoral societies of Mardin province in Southeast Anatolia – Some anthrozoological aspects. Mukaddime 2017; 8 (2): 253-265. doi: 10.19059/mukaddime.296314
12. Şanlı S, Siddiq AB. Anthrozoological study on the agro-pastoral societies of Kiziltepe, Southeast Anatolia. İnsan & İnsan 2018; 5 (16): 121-138. doi: 10.29224/insanveinsan.378568
13. Siddiq AB. The Aceramic Neolithic Fauna of the Central Anatolia - Environmental Effects, Or Cultural Preferences? PhD, İstanbul University, İstanbul, Turkey, 2018 (in Turkish with an abstract in English).
14. König C, Weick F, Becking J-H. Owls: A Guide to the Owls of the World. New Haven, CT, USA: A & C Black Publishers Ltd / Yale University Press; 2009.
15. Siddiq AB, Şanlı S. Animals and pastoral groups in mountainous Ömerli district of Southeast Anatolia. Anthrozoos 2020 (Accepted)
16. Siddiq AB. Human-Animal Relationships in Prehistoric Societies and Pre Pottery Neolithic Fauna of Central Anatolia. İstanbul, Turkey: Çizgi Kitabevi; 2019 (in Turkish).
17. Dirven L. A goddess with dogs from Hatra. In: Peruzzetto A, Metzger FD, Dirven L. (editors). Animals, Gods and Men from East to West: Papers on Archaeology and History in Honour of Roberta Venco Ricciardi. BAR international series; No. 2516. Oxford, UK: Archaeopress; 2013, pp. 147-159.