OTTOMAN PERIOD (16TH–17TH CENTURIES) ANIMAL BONE REMAINS FROM THE CASTLE OF CSÓKAKŐ-ALSÓVÁR (VÉRTES HILLS, HUNGARY) – PRELIMINARY RESULTS

TÖRÖK KORI ÁLLATCSONTLELETEK CSÓKAKŐ-ALSÓVÁRBÓL – ELŐZETES EREDMÉNYEK•

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Abstract

This paper presents the first zooarchaeological results based on the assemblage (NISP = 1,565) of 16th–17th century materials studied to date, recovered from the castle of Csókakő-Alsóvár in the Vértes Hills. The castle, a medieval aristocratic residence, was converted into an Ottoman Turkish fortification in the 1540s. The analysis of the bone material indicated that the meat provision of inhabitants was based on cattle (49.4%) and caprines (23.7%). Pork (15.2%) and game (7–8%) were also occasionally consumed in the castle, suggesting the presence of Christian mercenaries besides Muslim warriors.

The identified hunted animals included rarely recorded wild species in archaeological assemblages, such as the red squirrel and the hazel grouse, alongside the commonly occurring remains of roe deer (3.8%) and red deer (2.4%). Besides exploiting the forested area around the castle, hunting also took place slightly further a field, in open areas near water sources, as indicated by the remains of hare (0.9%) and fish. The white-tailed eagle, whose wing bone in the assemblage suggests the use of feathers from this bird, may have been captured in the same area.

Alongside the butchery and food remains that formed the main part of the assemblage, several objects carved from the skeletal hard tissues of animals enriched the zooarchaeological material under study. The most valuable ones, such as ivory combs and a bone rosette, represented personal objects and their decorations, arriving to the castle of Csókakő-Alsóvár together with their owners. Nevertheless, the presence of some simple tools, blanks, and debris in the assemblage suggests that skilled persons in antler and bone manufacturing could have practised bone crafting at times.

Kivonat

A Vértes-hegységben található, a középkorban arisztokrata rezidenciaként működő csókakői vár az Oszmán Birodalom terjeszkedése nyomán az 1540-es években török erődítménnyé alakult. Tanulmányomban az Alsóvárból meghatározott 16–17. századi régészeti állattani leletanyag (NISP=1565) előzetes eredményeit mutatom be. Az elemzések azt valószínűsítik, hogy a lakosok húsellátása szarvasmarhán (49,4%), valamint juhon és kecskén (23,7%) alapult. A várban alkalmanként sertéshúst (15,2%) és vadhúst (7–8%) is fogyasztottak, ami a muszlim harcosok mellett keresztény katonák jelenlétére utal.

A vadállatok közül a régészeti leletanyagokban szokványosan előforduló őz- (3,8%) és gímszarvasmaradványok (2,4%) mellett néhány ritkább faj – mint például a mókus, a házi patkány és a császármadár – vázrészeit is azonosítottuk. A mezei nyúl (0,9%) és a halak maradványai azt is bizonyítják, hogy nemcsak a vár körüli erdőkben, hanem a kissé távolabb eső, vizes élőhelyekkel tarkított nyílt területeken is vadásztak. Ugyanitt ejthették el azt a rétisast is, amelynek egy szárnycsontja került elő, a nagytermetű ragadozó madár szárnyának vagy tollainak hasznosítását sejtetve.

• How to cite this paper: GÁL, E., (2026): Ottoman Period (16th–17th centuries) animal bone remains from the castle of Csókakő-Alsóvár (Vértes Hills, Hungary) – preliminary results, *Archeometriai Műhely* **XXIII/2** 139–154.
doi: 10.55023/issn.1786-271X.2026-013

A nagyrészt húsfeldolgozásból és étkezésből származó maradványok mellett több, az állatok kemény vázszöveteiből készült tárgy bővítette a vizsgált anyagot. A legértékesebbek – mint például egy elefántcsontfésű és a csontberakások – személyes használati tárgyak vagy azok díszei voltak, és tulajdonosaikkal együtt érkezhettek a csókakői Alsóvárba. Ugyanakkor néhány egyszerű csonteszköz, nyersanyag és műhelyhulladék jelenléte a leletanyagban azt valószínűsíti, hogy alkalomadtán agancs- és megmunkálással is foglalkoztak az erődítményen belül.

KEYWORDS: ZOOARCHAEOLOGY, ANIMAL BONES, IVORY COMB, TURKISH FORTIFICATION, OTTOMAN PERIOD, HUNGARY

KULCSSZAVAK: RÉGÉSZETI ÁLLATTAN, ÁLLATCSONTOK, ELEFÁNTCSONTFÉSŰ, TÖRÖK VÁR, TÖRÖK KOR, MAGYARORSZÁG

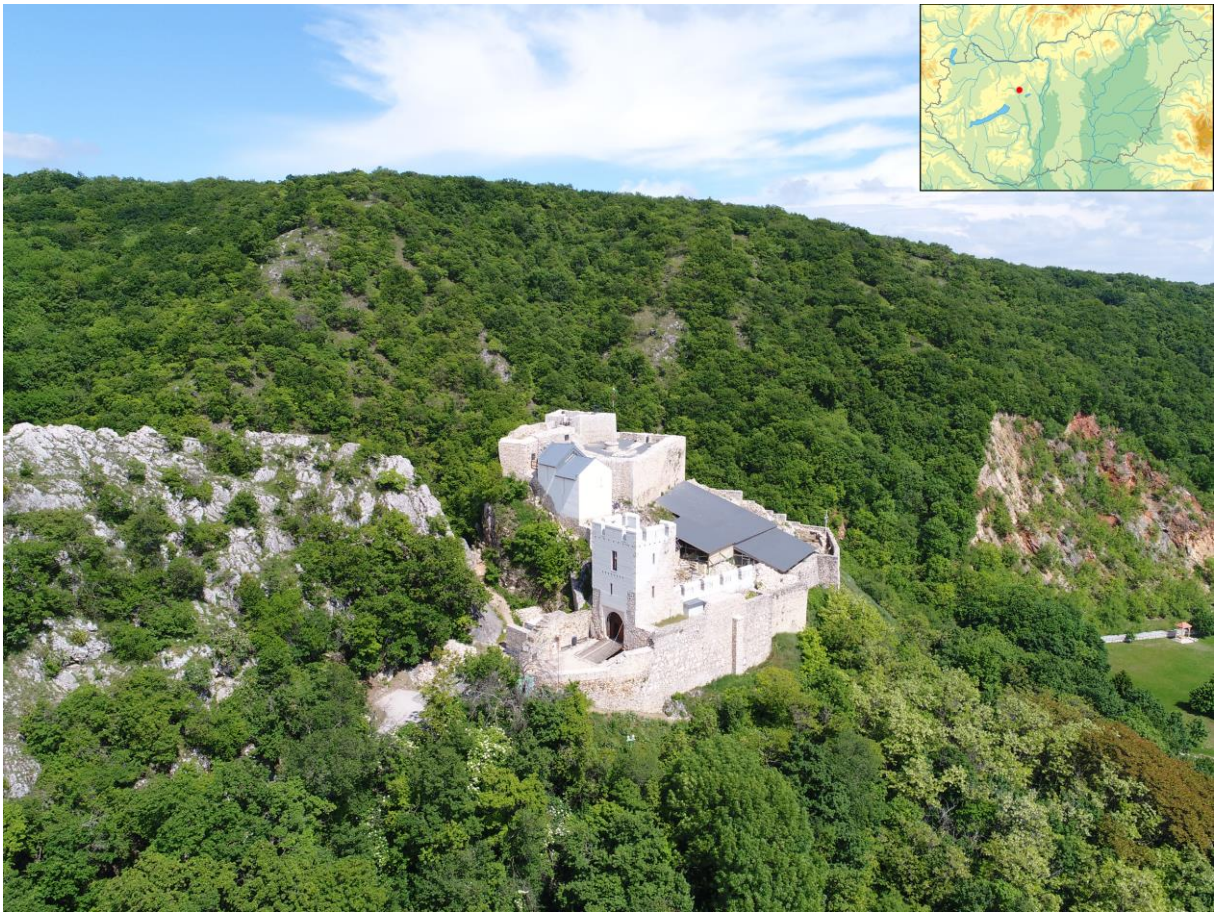

Fig. 1.: The location of Csókakő castle based on László Keserű's aerial photo and László Sebők's map (compilation by Erika Gál)

1. ábra: Csókakő várának elhelyezkedése Keserű László légifotójának és Sebők László térképének felhasználásával (Gál Erika összeállítása)

Introduction

The castle of Csókakő, erected by the Csák family in the second half of the 13th century, was built on a rocky plateau on the side of the 479 m high Csóka Hill on the edge of the Vértes Hills (**Fig. 1**). The oldest (13th–14th century) part of the fortress complex, known as the 'upper castle' (Felsővár in Hungarian), occupies a roughly 600 m^2 area on the cliff top at 359 m above sea level. Around it, at 7–17 m below, a castle chapel and a lower castle (Alsóvár) were built, covering an area of about 1400 m^2, during the 15th century (**Fig. 2**).

The fortification, owned by several noble families (after the king) during the 14th–16th centuries, came under Ottoman rule in 1543–1544 (Hatházi & Kovács 2019, 29). According to the payroll, the Ottoman guard numbered around 30–50 people in the castle of Csókakő (Hegyi 2007a, 1014-1022). By the 1720s and 1730s, the stronghold was already remembered as a ruin (Bél 1977, 109).

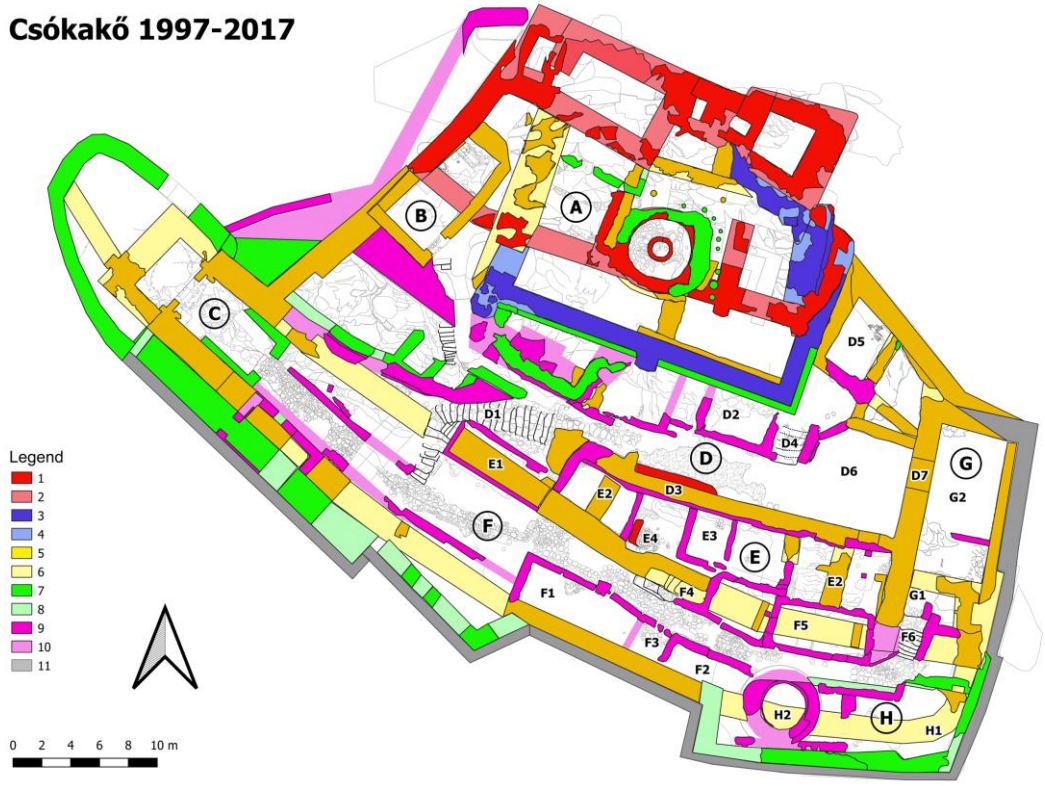

Fig. 2.: Survey map of the excavations (graphics by Balázs Holl; survey by Balázs Holl, Krisztián Pokrovenszki, and Tamás Belegrai), after Hatházi & Kovács 2019, Fig. 3. Legend: A: upper castle; B: chapel; C: gate tower; D: upper terrace; E: middle terrace; F: southern section of lower terrace; G: eastern section; H: south-eastern bulwark. 1: 13th century; 2: 13th century, addition; 3: 14th century; 4: 14th century, addition; 5: 15th century (1430–1496); 6: 15th century (1430–1496), addition; 7: first half of the 16th century (1530s); 8: addition from the first half of the 16th century (1530s); 9: Ottoman Period (1543/44–1687); 10: Ottoman Period (1543/44–1687), addition; 11: modern restoration

2. ábra: Ásatási térkép (Holl Balázs grafikája; Holl Balázs, Pokrovenszki Krisztián és Belegrai Tamás felmérése), Hatházi & Kovács 2019, 3. ábra alapján. Jelmagyarázat: A: felső vár; B: kápolna; C: kaputorony; D: felső terasz; E: középső terasz; F: az alsó terasz déli szakasza; G: keleti szakasz; H: délkeleti bástyák. 1: 13. század; 2: 13. századi hozzáépítés; 3: 14. század; 4: 14. századi hozzáépítés; 5: 15. század (1430–1496); 6: 15. századi (1430–1496) hozzáépítés; 7: a 16. század első fele (1530-as évek); 8: a 16. század első feléből származó hozzáépítés (1530-as évek); 9: Oszmán korszak (1543/44–1687); 10: Oszmán korszak (1543/44–1687), hozzáépítés; 11: modern restauráció

Systematic archaeological investigations of the castle began in the early 1960s, continued between 1996 and 2008, and ended in 2014–2017. Current zooarchaeological analyses focus on the most abundant animal bone assemblages found in the area of the fortification, i.e. the 13th–14th century, the 15th century, and Ottoman Period (16th–17th centuries) materials brought to light under the direction of archaeologists Gábor Hatházi and Gyöngyi Kovács during the 2000s.

Although it is not always possible to date the layers precisely, several layers can be dated well based on ceramic and coin finds. There were closed stratigraphic units from the Árpád Era, the Matthias Era, the middle of the 16th century, the second half of the 16th century, the second half of the 17th century, and even the end of the 17th century (Hatházi & Kovács 2016, 2019; Hatházi et al. 2017).

A more precise dating was also possible through some characteristic ceramic finds. Several units can be dated to the second half of the 16th century based on sgraffito-decorated bowls and Iznik vessel fragments. The material around the mosque is dated to the 17th century based on glazed Ottoman stove tiles. The clay layer excavated on the western side of the Ottoman Period staircase is dated even more precisely to the second half of the 17th century based on milk jugs and ‘freckled’ painted plates (Kovács et al. 2025).

Table 1.: Distribution of remains (NISP=Number of Identifiable Specimens)
1. táblázat: A leletek megoszlása (NISP=a pontosabban azonosítható leletek száma)

Species	Hungarian name	NISP	%
Cattle (*Bos taurus*)	Szarvasmarha	773	49.4
Sheep (*Ovis aries*)	Juh	106	
Goat (*Capra hircus*)	Kecske	14	23.7
Sheep or goat (Caprinae)	Juh vagy kecske	252	
Pig (*Sus domesticus*)	Sertés	238	15.2
Horse (*Equus caballus*)	Ló	3	0.2
Dog (*Canis familiaris*)	Kutya	5	0.3
Domestic goose (*Anser domesticus*)	Házi lúd	4	0.3
Domestic chicken (*Gallus domesticus*)	Házityúk	41	2.6
Domestic animals	**Háziállatok**	**1435**	**91.7**
Red deer (*Cervus elaphus*)	Gímszarvas	38	2.4
Roe deer (*Capreolus capreolus*)	Őz	60	3.8
Wild boar (*Sus scrofa*)	Vaddisznó	3	0.2
Hare (*Lepus europaeus*)	Mezei nyúl	14	0.9
Red squirrel (*Sciurus vulgaris*)	Európai mókus	2	0.1
Black rat (*Rattus rattus*)	Házi patkány	1	<0.1
White-tailed eagle (*Haliaeetus albicilla*)	Rétisas	1	<0.1
Hazel grouse (cf. *Tetrastes bonasia*)	Császármadár	1	<0.1
Eurasian jay (*Garrulus glandarius*)	Szajkó	5	0.3
Cyprinidae sp. indet.	Pontyféle	2	0.1
Pisces indet.	Meghatározhatatlan hal	3	0.2
Wild animals	**Vadállatok**	**130**	**8.3**
Total	**Összesen**	**1565**	**100.0**
Large ungulate	Nagypatás	44	
Small ungulate	Kispatás	166	
Mammalia indet.	Meghatározhatatlan emlős	23	
Grand total	**Mindösszesen**	**1798**	

This paper presents the initial results from the Ottoman Period assemblage and compares them with contemporaneous assemblages from fortifications in Hungary. The goal is to investigate livestock exploitation and the impact of the environmental conditions around the castle, which likely also influenced the inhabitants' meat supply and consumption. In addition, we offer a glimpse into the unique material culture of the inhabitants reflected in rare objects carved from hard skeletal tissues.

Material and methods

From the Ottoman Period assemblage found at the castle of Csókakő-Alsóvár, 1798 animal remains have been studied to date. The largest part of the examined finds was found in the demolition of the mosque (E1 on the floor plan, **Fig. 2**) on the southern wall of the medieval palace wing built on the central terrace of the Lower Castle (E on the floor plan) and in the immediate surroundings of the mosque. A smaller part of the identified bones was discovered during the excavation of the surroundings of the gate tower (forecourt, wall passage) and from the closed clay layer of the late Ottoman period observed on the western edge of the multi-period stone staircase. According to the ceramic finds found in these layers, the identified bones can be dated to the 17th century, and partly to the second half of the 17th century.

The larger quantity of glazed Ottoman stove tiles appearing in the material around the mosque may indicate the stove of the Ottoman Period building constructed on the territory of the medieval palace (Hatházi & Kovács 2024, 174-180), but the animal bone assemblages examined so far do not indicate any correlation between the concentration of finds and the functional spaces of the castle.

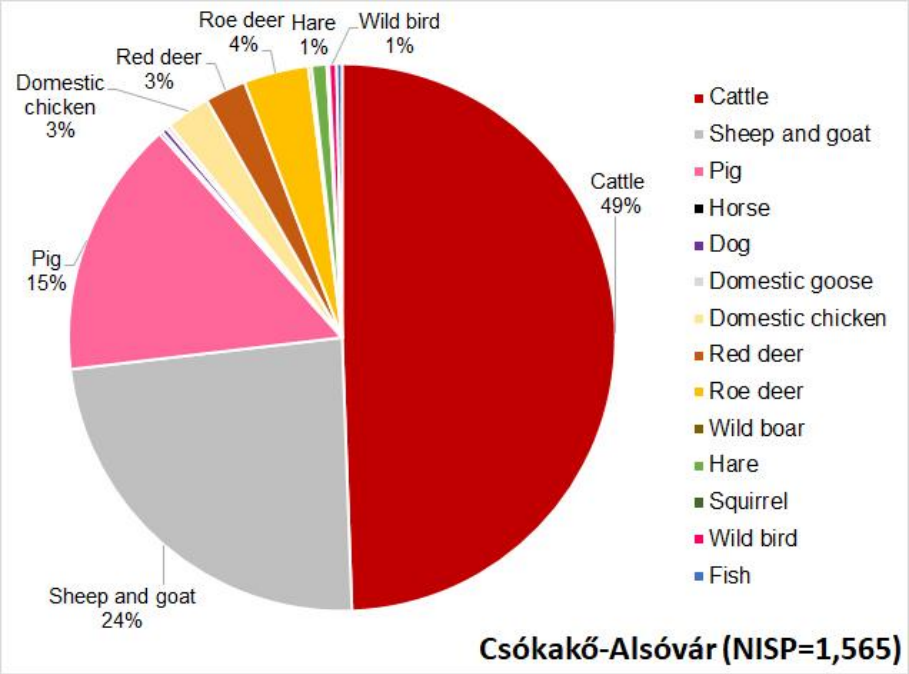

Fig. 3.: Diagram showing the distribution of remains by taxonomic groups

3. ábra: A leletek rendszertani csoportok szerinti megoszlását szemléltető diagram

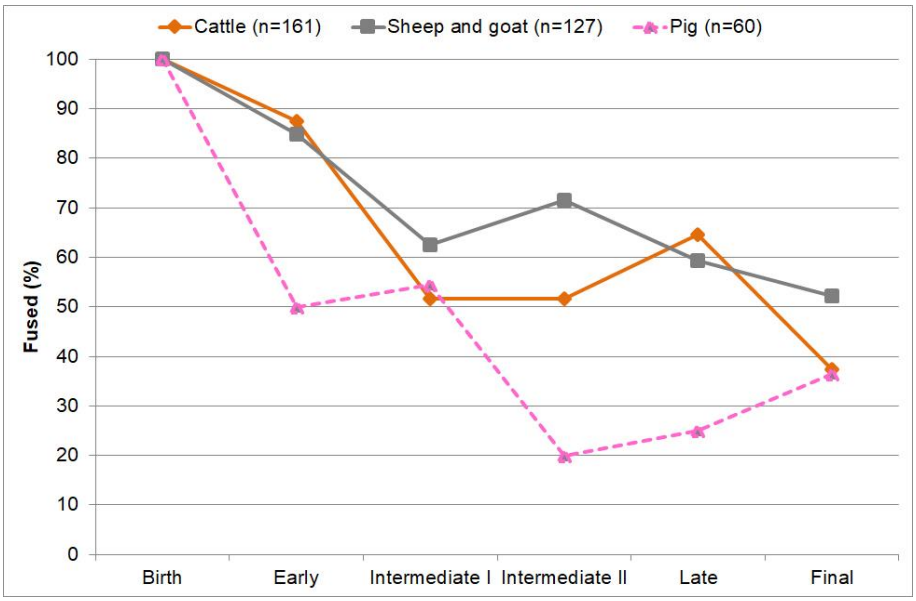

Fig. 4.: Epiphyseal fusion curves in cattle, caprines, and pig, showing percentages of fused elements at each fusion stage

4. ábra: Epifízis-csontosodási görbék szarvasmarhában, juhban és kecskében, valamint sertésben, amelyek az elcsontosodott vázrészek százalékos arányát mutatják az egyes fúziós szakaszokban

The animal remains were collected by hand during the excavation. They were generally studied with the naked eye. Microscopical examination was also performed when modifications, such as skinning marks, pathological change, traces of bone manufacturing and use wear, were detected on the remains.

The identification of animal bones included the use of comparative materials, handbooks, and atlases (e.g. Albéric et al. 2017; Boessneck 1969; Prummel 1988; Schmid 1972). The analysis of age at death followed the method developed by O'Connor (1989, 174; 1991, 248–254; 2003, 165–170), which focuses on the dental eruption and attrition in the mandible on the one hand, and the fusion of epiphyses on the other. The latter method is based on the sequence of fusion of long bone epiphyses in the skeleton of each species. The determination of the age of epiphyseal fusion relies on the work by Chaix & Méniel (2001).

The withers heights of sheep were calculated using the coefficients developed by Manfred Teichert (Teichert 1975). Bone measurements were taken using digital callipers (0.1 mm); following the standard by von den Driesch (1976).

Our results were compared with already published coeval bone materials from other military centres in Hungary. Some of these sites, such as Békés-Kastélyzug, Dombóvár-Gólyavár, and Nagykani-

zsa-Vár, also yielded medieval (from the 13th/14th to the early 16th century) animal remains in addition to the Ottoman Period (late 16th–17th century) assemblages, as was the case with Csókakő-Alsóvár. For this reason, we cannot rule out the possibility that some medieval finds were mixed in with the Ottoman Period bone accumulations at these sites. The relevant documentation and information on the excavation circumstances have been received from archaeologists Gábor Hatházi and Gyöngyi Kovács, who excavated the site in the last decades.

Results

The number of identifiable specimens (NISP) was 1565. Most bones could be identified to species level or assigned to a specific taxonomic group, e.g. caprines, fish, etc. (**Table 1**).

Species and age composition

Domestic animals

The great majority (91.7%) of the remains originated from domestic animals (**Fig. 3**). Cattle yielded almost half of the bone assemblage (NISP=773; 49.4%). Neither horn cores nor complete long bones were found from this species that could provide information on the type and size of cattle consumed in the castle. Nevertheless, the presence of numerous cranial remains as well as the terminal bones without economic value indicated that the slaughter of these animals probably took place on site. However, both the size and the structure of the castle make it unlikely that large animals were kept within the fortification.

The kill-off pattern in cattle shows that only a small proportion (12.5%) of the animals were slaughtered by the 'early' stage of bone fusion, which would correspond to the age of 1–1.5 years (**Fig. 4**). Then there is a considerable drop-off to the 'intermediate' stage, suggesting a higher consumption of beef from young cattle (beyond 2–2.5 years of age).

The upturn of the curve in the late-fusing bone groups involves several hypotheses. One of the explanations may be that cattle remains in this assemblage represent more than a local population of cattle. Additional beef might have originated from beasts slaughtered at other places. Such meat may have been either bought from the market or collected as tax in the broader area of the castle. Nevertheless, neither the slaughtering place, nor the time limits of bone accumulations are known at the site.

On the other hand, the mentioned pattern on the chart may also be due to random bias resulting from a small sample size (n=161).

Fig. 5.: Horn core of sheep (medial view)
5. ábra: Juhszarvcsap (mediális nézet)

Only about one-third of the cattle seem to have been kept alive beyond the 'Final' fusion stage (around 4–4.5 years), indicating the moderate secondary exploitation of this species. The development of teeth in three mandibles confirmed this kill-off rate for adult cattle compared to younger individuals.

Sheep and goat were the second most frequent group, yielding a total of 371 (23.7%) remains (**Table 1**). The first seems to have been much more common than the latter: 106 sheep bones versus 14 remains from the goat. A horn core fragment from sheep (Sample 24) indicated that at least some sheep had slightly twisted horns (**Fig. 5**). In addition, the withers height of 605.2 mm could be calculated from a complete sheep humerus found in Sample 113 (**Appendix Table 1**).

From a complete metatarsus (Sample 298), the withers height of 655.3 mm could be calculated for a goat (**Appendix Table 1**). The presence of complete metapodials from goat kids in the assemblage indicated that the distal legs of this species were not used for food (**Fig. 6**).

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Fig. 6.:
Metacarpi from goat kids (dorsal view)

6. ábra:
Kecskegida-kézközépcsontok (dorzális nézet)

The exploitation of caprines (sheep and goat) seems to have been similar to that of cattle regarding the youngest age group, with slaughtering only 15% of the lambs and goat kids by the 'Early' stage, i.e. younger than 6 months old. From this age onwards, however, fewer young sheep and goat seem to have been killed than cattle, pointing to the secondary exploitation of a small stock. A ca. 10% of additional meat, indicated by the slight upturn of the fusional curve, seems to have originated from animals slaughtered between stage 'Intermediate I' and 'Intermediate II', that is, individuals in their second year of life. More than half of the caprine remains originated from specimens kept until the stage 'Final', representing 4–5-year-old sheep and goat that may be interpreted as a sign of milk and wool production and animals retained for the maintenance of breeding stock (**Fig. 4**). Similarly to cattle, data regarding mandibular tooth eruption and wear support this result.

Pig yielded a total of 238 remains (15.2% of the assemblage), indicating that pork was at least occasionally consumed in the castle. According to the lack of secondary exploitation in this species, the kill-off pattern significantly differs from that of bovids. Half of the remains originated from pigs killed in their first year. Another massive drop (30%) in the fusional curve appeared at the level of stages 'Intermediate I' and 'Intermediate II', pointing to the slaughtering of 2–3-year-old individuals. The upturns of the curve in the epiphyseal fusion stages 'Late' and 'Final' may be owing to the small number of ageable pig remains in the assemblage (n=60). Nevertheless, if they mark the bringing of extra meat to the castle, the skeletal parts belonging to these two groups are attached to good-quality meat such as the rump, shank, and chop.

In addition, a humerus from a foetal or newborn piglet found in Sample 17 pointed to abortion or perinatal death. The proportion of slaughtered male individuals compared to the females – based on the sexable tooth rows that included the canines – was 6:4.

In addition to the main meat-providing domestic mammals, the horse and the dog were also identi-

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fied from three and five sporadic remains, respectively (**Table 1**).

Poultry was represented by the domestic goose (NISP=4; 0.3%) and the domestic chicken (NISP=41; 2.6%). Tarsometatarsi with and without cock spurs from the latter indicated that both hens and cocks were kept in the castle. Skeletal parts with medullary bone tissue, evidencing the consumption of egg-laying hens, were not identified from this assemblage. The low rate (24.4%) of remains from young individuals suggests that mainly the fully grown chickens were consumed. A similar dominance of adult birds was typical of goose.

Wild animals

Despite the small proportion (8.3%) of the remains from wild animals, this group included a rather large variety of vertebrates (**Table 1**). The red deer, the roe deer, the wild boar, and the hare represented game. Among these, the roe deer was the most frequent (60 remains; 3.8%). Bones from the head (skull and mandible remains) and terminal bones (such as carpals, tarsals, metapodia, and phalanges), in addition to skeletal parts rich in meat, indicated that complete carcasses were transported to the castle (**Fig. 7**). Except for five remains representing a partial skeleton of a roe fawn in Sample 141, all the roe deer bones originated from fully grown individuals.

The red deer (NISP=38; 2.4%) also yielded terminal bones although no skull fragments were found. The few antler remains from this species represented either blanks or beam segments, which did not provide information on whether they originated from gathered antlers or killed animals.

The third most frequent game was the hare by 14 remains (0.9%), while the wild boar yielded only three bones (0.2%). The red squirrel was identified from a radius (Sample 312) and a tibia (Sample 15).

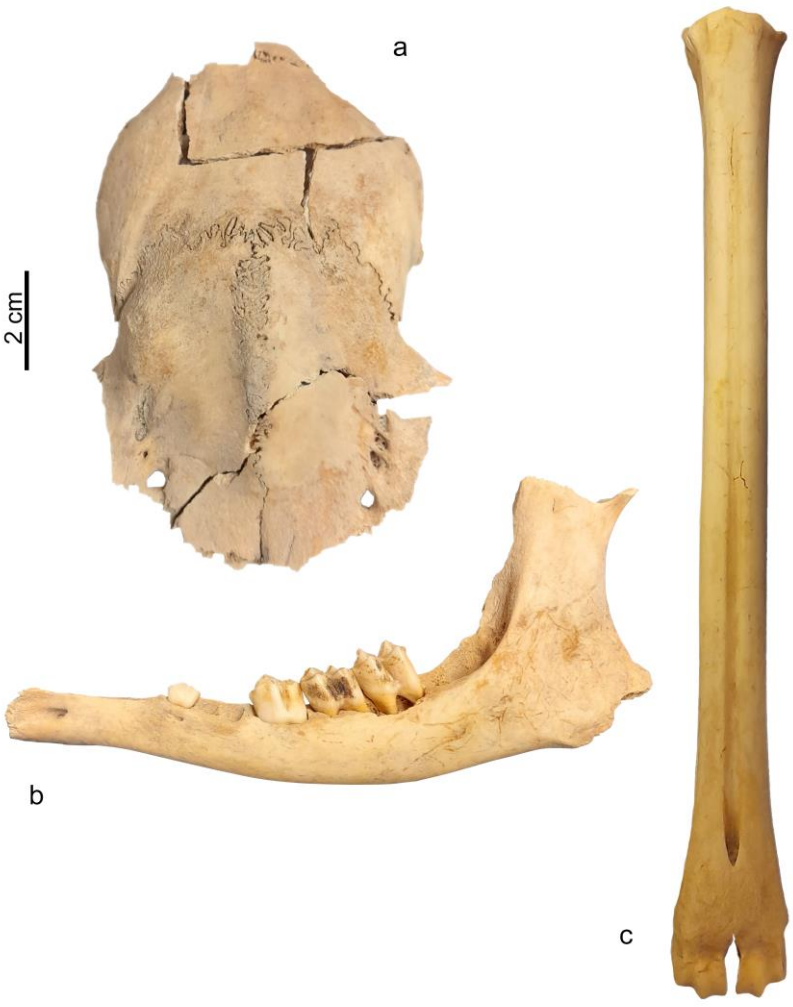

Fig. 7.:
Roe deer remains.
a – skull fragment (dorsal view);
b – mandible (buccal view);
c – metatarsus (dorsal view)

7. ábra:
Őzmaradványok.
a – koponyatöredék (dorzális nézet);
b – állkapocs (arc felőli nézet);
c –lábközépcsont (dorzális nézet)

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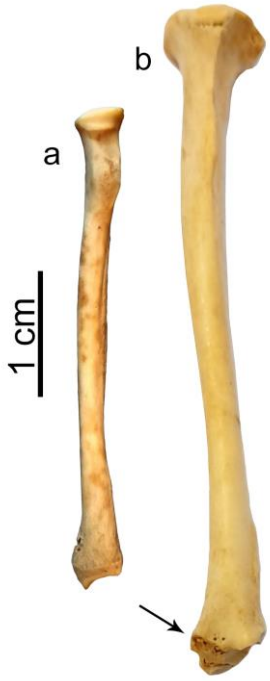

Fig. 8.:
Red squirrel remains.
a – radius (cranial view);
b – tibia (cranial view).
The arrow indicates the chop mark

8. ábra:
Mókusmaradványok.
a – orsócsont (kraniális nézet);
b – sípcsont (kraniális nézet).
A nyíl a vágásnyomra mutat

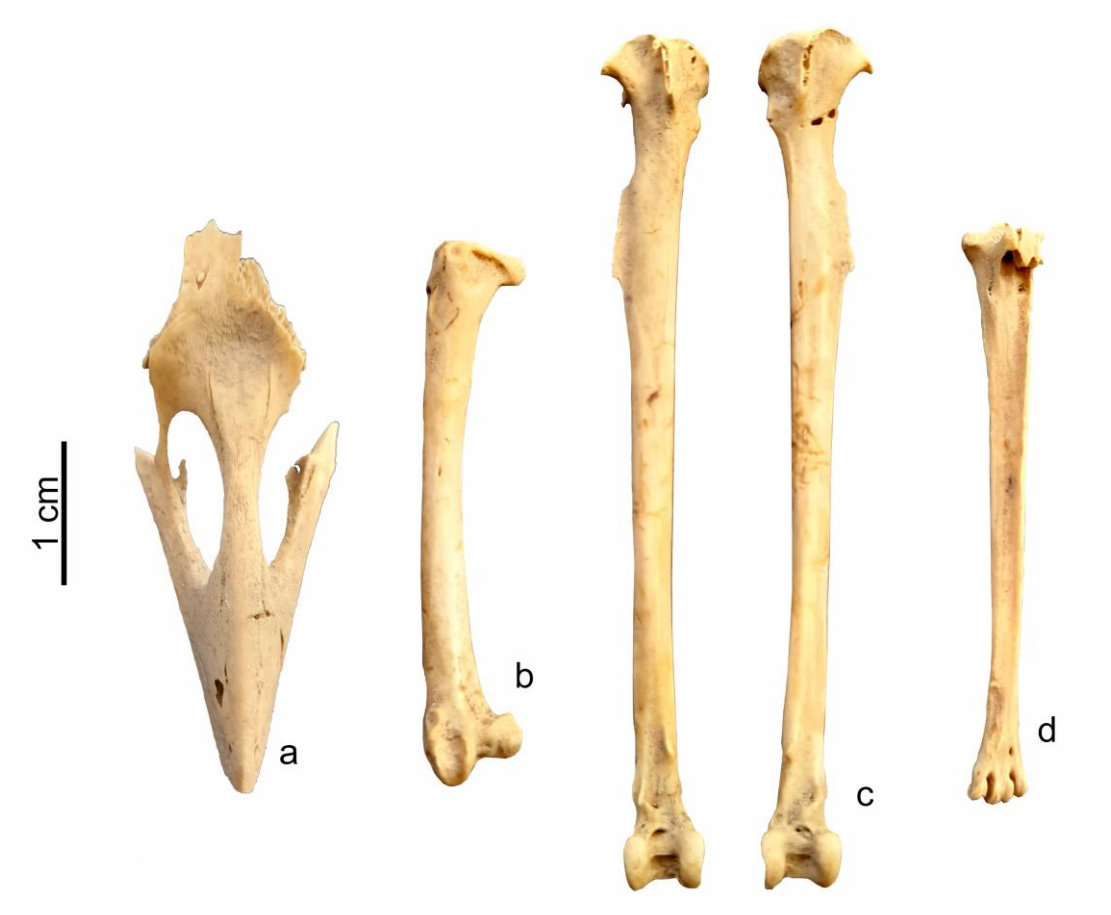

Fig. 9.: Partial skeleton of a Eurasian jay. **a** – skull fragment (frontal view); **b** – femur (caudo-lateral view); **c** – tibiotarsi (cranial view); **d** – tarsometatarsus (plantar view)

9. ábra: Szajkó részleges váza. **a** – koponyatöredék (felülnézet); **b** – combcsont (kaudo-laterális nézet); **c** – sípcsontok (kraniális nézet); **d** – csüdcsont (plantáris nézet)

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The latter bone displayed a chop mark through the distal epiphysis, most likely related to the skinning of this fur animal (**Fig. 8**).

The osteological features and sizes of a small femur found in Sample 16 suggested that this skeletal part either belonged to a European edible dormouse or a rat. Owing to the overlapping morphology and biometrics, ZooMS (zooarchaeology by mass spectrometry) method was used for the identification of this specimen. According to the recently completed examination, the bone belonged to the black rat (house rat).

Game birds were represented by the hazel grouse, which was identified from a tibiotarsus, the distal leg bone rich in meat. The group of wild birds also included the white-tailed eagle, which was recognised from a radius, one of the wing bones. The five bones from a jay represented the partial skeleton of this bird (**Fig. 9**). From the total of five fish remains, two could be assigned to the family of Cyprinidae (**Table 1**).

Taphonomic marks

Approximately one-third of the remains in the total assemblage displayed certain human or animal modification. Chop marks were the most frequently identified form of damage, appearing on a total of 338 remains. They were especially common on cattle bones (n=207), consistent with the number of remains and the size of skeletal parts in this species (**Fig. 10**).

Chop marks were associated with the dismemberment of large carcasses and the partitioning of body parts. Therefore, chopping was not characteristic of small-sized animals, such as poultry, except for a goose's carpometacarpus.

Cut marks were less frequent than chop marks, appearing on a total of 57 remains. They could be related to skinning (**Fig. 11**) and defleshing (**Fig. 12a**).

Marks of heat were also common (on a total of 113 remains), especially on cattle remains (n=65). These marks generally appeared as light to dark brown spots rather than fire marks and calcination, suggesting no direct contact with fire in most cases. Hot ash thrown over the kitchen midden may likely have caused the discolouration of some such bones.

The gnawing marks, identified on a total of 57 remains, were also the most frequent on cattle bones. The smaller the size of the bone, the more likely it was to be completely ingested (**Fig. 10**).

Pathological modifications

A total of 20 remains displayed pathological changes, representing 1.3% of the assemblage. Among these, pig remains were the most frequent, with 11 specimens. This species was followed by cattle in frequency, yielding eight remains with malformations. A single rib fragment from a small ungulate belonged either to caprines or pig.

Most of the pathological changes affected the ribs (**Fig. 12b**) and the vertebrae (**Fig. 13**), and indicated mechanical trauma, inflammatory reaction, and developmental disorder. In addition, articular disease (in a cattle proximal phalanx) as well as oral and dental anomalies (in pig maxilla, mandible, and teeth) were identified. The lack of pathological changes in sheep and goat bones is notable, despite the high rate of adult and mature individuals (**Fig. 4**). The detailed analysis and description of the disease-related bone modifications will be the subject of a separate paper.

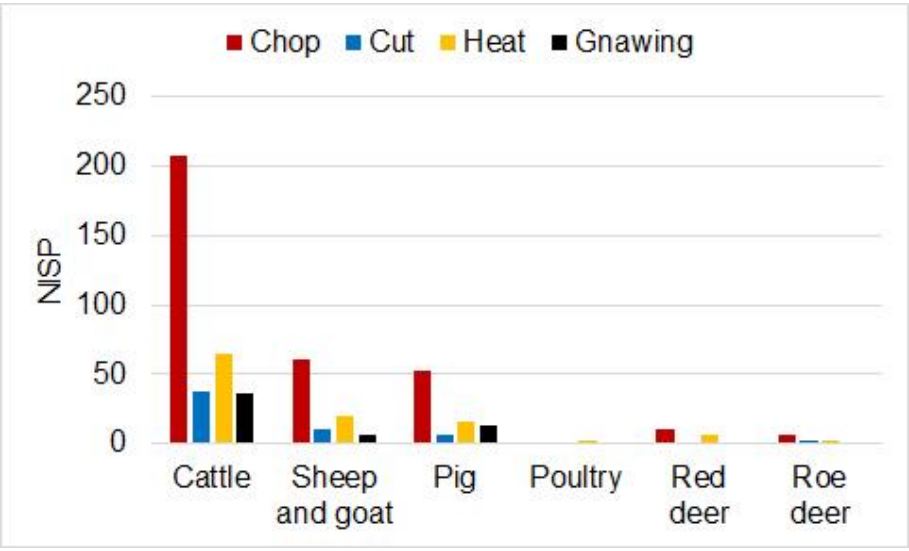

Fig. 10.: Taphonomic marks on the remains of the most frequent species

10. ábra: Tafonómiai nyomok a leggyakoribb fajok maradványain

Fig. 11.: Skinning marks on a proximal phalanx from cattle (palmar view)

11. ábra: Nyúzásnyomok egy szarvasmarha első ujjpercén (palmáris nézet)

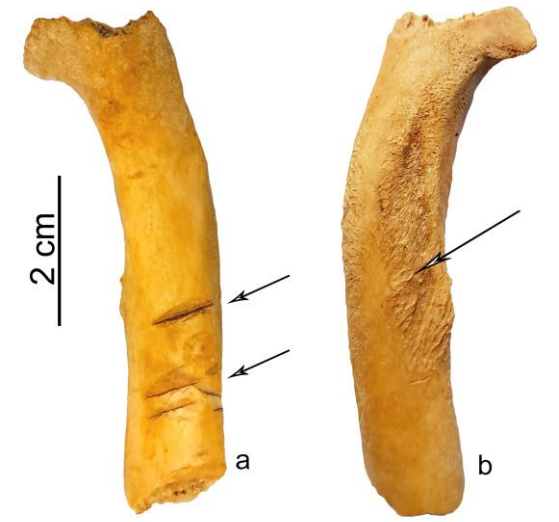

Fig. 12.: Cut marks (a) and pathological changes (b) on a cattle rib. **a** – medial view; **b** – caudal view

12. ábra: Késnyomok (a) és patológiás elváltozás (b) szarvasmarhabordán. **a** – mediális nézet; **b** – kaudális nézet

Fig. 13.: Bifurcated dorsal spine in a cattle thoracic vertebra (cranial view)

13. ábra: Villás elágazású tövisnyúlvány szarvasmarha-hátcsigolyán (kraniális nézet)

Bone, antler, and tusk objects

The studied assemblage also contained some objects made from hard skeletal tissues, as well as associated workshop debitage and raw material selected for manufacturing. The nicest and most valuable artifacts (or their decoration) were personal objects of self-representation, which arrived to the castle with their owners. They include a rather degraded comb made from elephant ivory (**Fig. 14**), a few common and uncommon decorative bone inlays, and four Haban knives with bone handles, among which one has a mother-of-pearl inlay. (Habans were a 16th–17th century anabaptist group originating in Central Europe, renowned for their crafts). The double-sided ivory combs represent rare finds outside the Buda Castle area in Hungary. They have so far been documented only from the Ottoman Period (16th century) village in the Lower Castle of Visegrád (Choyke & Kováts 2010, 123-124, Figures 11–12).

In addition, the assemblage also included a few simple and half-made bone objects. These items – together with some remains representing selected raw material, such as antler and bone sections displaying sawing marks, and debris – suggested that bone manufacturing was practised in the castle as well. Considering the small number and the low quality of these items, however, it seems likely that

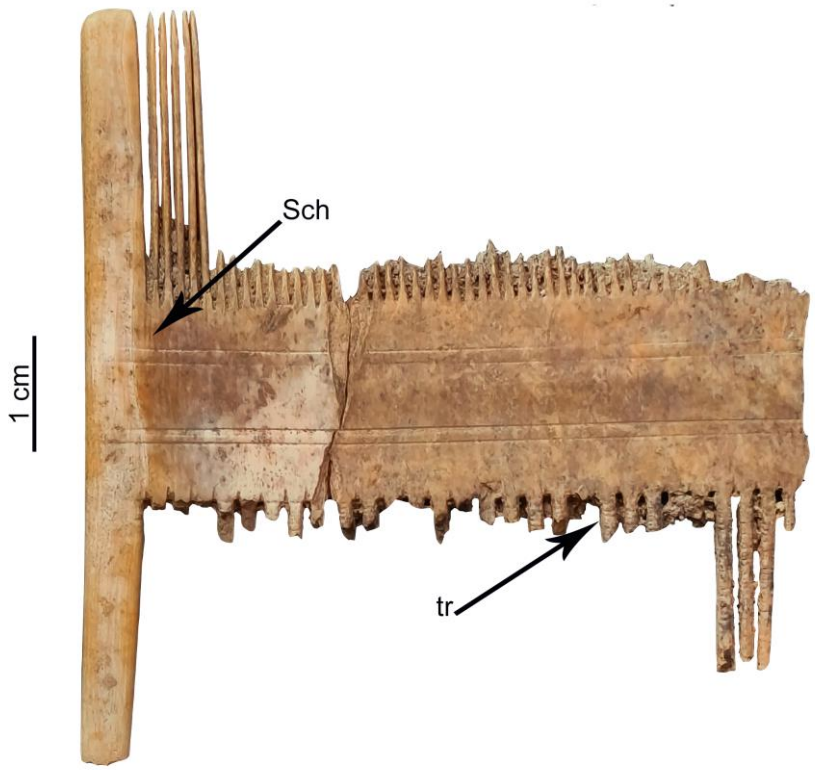

Fig. 14.:
Fragment of a double-sided comb made from elephant ivory.
Sch – parallel bright and dark bands of the Schreger pattern in longitudinal plane;
tr – transverse wear from hair

14. ábra:
Elefántagyarból faragott kétoldalas fésű töredéke.
Sch –a Schreger-minta párhuzamos világos és sötét sávjai hosszmetszetben;
tr – hajszálak által hagyott haránt irányú kopásnyomok

bone crafting was only opportunistically carried out by persons having little experience.

A thorough presentation of the bone objects will also be made when the examination of the entire Ottoman Period assemblage is completed.

Discussion

The composition of the assemblage from Csókakő-Alsóvár indicates that the greatest part of the bone material represented butchery waste and food refuse. In addition to these, a few remains of animals which were not consumed, such as the horse, the dog, and the European jay, as well as some bone objects and workshop debitage, formed the zooarchaeological material.

The dominance (from 60.5% to 78.0%) or high relative frequency (from 46.6% to 50.2%) of cattle remains seems to have been typical of the 16th–17th centuries castles located in the countryside, whether inhabited by Turkish (Nagykanizsa-Vár, Bökönyi 1974, 384; Barcs-Vár, Gál & Bartosiewicz 2016; Dombóvár-Gólyavár, Gál & Berta 2005; Békés-Kastélyzug, Vörös 1980) or Christian soldiers (Bajcsa-Vár, Bartosiewicz 2002).

This is in sharp contrast with the bone materials recovered from Turkish settlements located in the castle of Buda and its surroundings – a military centre during the Ottoman occupation of the Hungarian capital –, where mutton and poultry seem to have been the most favoured meat (Csippán 2007; Daróczi-Szabó 2004; Daróczi-Szabó 2011; Gál et al. 2010). The only exception was the bone material recovered at Szekszárd-Palánk, where caprines were the leading species by 38.3% of the NISP, followed by cattle (30.2%) in terms of relative frequency (Bartosiewicz 1995, 120, Table 1).

Sheep and goat remains were usually the second most commonly identified components of military castle assemblages in rural areas. Besides Csókakő-Alsóvár (23.7%), this was the case at Békés-Kastélyzug (35.3%), Dombóvár-Gólyavár (21.0%), and Nagykanizsa-Vár (14.9%). One of the exceptions was the castle at Barcs, where the domestic chicken (9.5%) seems to have been the second most often slaughtered animal. In the Styrian castle of Bajcsa, which never fell into Turkish hands, pig (16%) was the second most often killed species, well reflecting Christian influence on the diet. The ratio of caprine, pig, and poultry remains in the analysed assemblages was most likely affected by the ethnic composition and religious customs of the inhabitants, as well as the environmental conditions around the strongholds.

Herding pigs is obvious at places surrounded by forests and marshlands, where both food and stock improvement (by cross-breeding with the wild boar) are largely available for this species. This may be one of the explanations for the notable representation of pig remains at Dombóvár-Gólyavár (17.1%), Csókakő-Alsóvár (15.2%), Nagykanizsa-Vár (11.4%), and Szekszárd-Palánk

HU ISSN 1786-271X; urn: nbn: hu-4106

(7.4%). The significant contribution of pork to the meat supply of the castles suggests an ethnically and culturally mixed population. According to written sources, a few to several dozens of Christian soldiers of Balkan origin also served alongside Turkish warriors in the above-mentioned fortresses. Moreover, the Ottoman army also included several Hungarian soldiers in some strongholds (Hegyi 2007a, 2007b). On the other hand, serfs ordered to the construction of the castle may have also contributed to the consumption of pork in Csókakő.

Contrary to the sites mentioned above, the pig remains were extremely underrepresented in the bone materials of Barcs-Vár (0.6%) and Békés-Kastélyzug (2%), suggesting Islamic dietary restrictions, similar to those found in the elite Turkish settlements in Buda (Gál & Berta 2005, Table 3).

Among the Ottoman Period sites studied so far, poultry remains were outstandingly well represented (ca. 30–60%) only at some of the aforementioned high-status settlements in the area of the Buda Castle. On the one hand, this is likely due to the significant role of domestic birds in supplementing the mutton, when pork was avoided, and beef appears to have had a minor role in the meat supply of the inhabitants (Gál & Berta 2005, Table 3). On the other hand, the archaeological finds had accumulated in large pits both at the sites of Budapest 1–Szent György tér–Királyi istálló (Csippán 2007) and Budapest 1–Szent György tér–Teleki Palota (Daróczi-Szabó 2004), which probably favoured the preservation of small and fragile avian bones.

Among the fortifications located in the countryside, the greatest frequency of poultry remains was recorded in the assemblages from Dombóvár-Gólyavár (9.3% domestic hen, 2.8% domestic goose, and 0.2% domestic pigeon; Gál & Berta 2005, Table 1) and Barcs-Törökvár (9.5% domestic hen; Gál & Bartosiewicz 2016, 183, Table 1). Continuing with the afore-mentioned taphonomic and cultural characteristics as core features in shaping a bone collection, we must note that the excavation methods at the site of Dombóvár-Gólyavár included the flotation of excavated sediment. Furthermore, the lowest frequency of pig remains (0.6 %!) was documented in the bone material of Barcs-Törökvár among the coeval military centres (Gál 2021, 201, Fig. 10).

Csókakő-Alsóvár, yielding a small percentage of poultry remains (2.6% from the domestic hen and 0.3% from the domestic goose, respectively), belongs to the group of sites where the meat supply of the castle seems to have been based on domestic and wild mammals.

Csókakő's special geographical position is reflected in the relatively high contribution (ca. 7–8%) of hunted species to the bone assemblage, providing the greatest frequency of remains from wild species among the military fortresses during the Ottoman Period studied so far (Gál 2021, 201, Fig. 10; Gál & Berta 2005, Table 1). The unusually high proportion of game remains seconds our conclusion regarding the presence of non-Muslim inhabitants based on the consumption of pork, as hunting usually involves the killing of animals without ritually bleeding the carcass, thus the meat becomes *haram* (forbidden) food (Bartosiewicz et al. 2008, 133-134).

Dietary laws included in the Quran classify the carrion and blood (and the flesh of swine, among others) as *haram* food. Nevertheless, hunting was permissible following the rules. These involved the use of trained animals such as birds of prey and dogs ('black in colour') that would catch the prey without eating from it, not even injuring it with their teeth or claws. The hunt, caught alive, could be slaughtered in a *halal* manner (cutting the throat, draining the blood) in this way, similarly to other animals slaughtered in the name of Allah (Gul & Begum 2024).

Not only common game such as the roe deer (3.8%), red deer (2.4%), and hare (0.9%), but also rarely recorded fur animals and wild fowl such as the red squirrel and hazel grouse were identified in the material under study (**Table 1**). The red squirrel so far was documented only in the 14th–15th century assemblage of Visegrád-Palota (Bökönyi 1974, 426), a royal centre during the Hungarian Middle Ages. Previously, the bones of hazel grouse were identified only in the 16th century assemblage of Székelykeresztúr-Kriza János utca 23–27 (Gál 2008, 318-319), a noble residence located in Transylvania (today part of Romania).

Jay was most likely also caught in the forests surrounding the castle and kept as a pet bird. With its colourful plumage, this bird appears to be more attractive than other species in the Corvidae family. Its way of life as a woodland species also sets it apart from many other corvids that are commensal scavengers. This character and the ability to imitate sounds, including human speech, seem to result in the neutral attitude towards jays in comparison with other, less popular Corvids as reflected in Hungarian proverbs (Bartosiewicz 2004). Jay was identified from rural (the 10th–12th century assemblage from Visegrád-Várkert-dűlő), urban (Vác-Széchenyi utca 2–4, 15th century), aristocratic (Székelykeresztúr-Kriza János u. 23–27, 16th century), and ecclesiastical (Esztergom-Várhegy-Kőbánya, 14th–15th century) settlements alike (Gál 2021).

Venison seems to have been occasionally complemented by the meat of hare that could be hunted in the nearby valleys. Cyprinids may have been

provided either from the Gaja Creek or even fishponds in the vicinity of the castle. The white-tailed eagle also lives in wetlands where tall trees for nesting are available. The presence of the radius, to which, along with the ulna, the secondary remiges (flag feathers) are attached. This bone, therefore, suggests the possible exploitation of this bird for its plumage. Strong feathers with long shafts were used as quills in the past centuries, but they could also have been used as brushes, decoration, and in fletching arrows (Serjeantson 2009, 184-192). White-tailed eagle was also identified by its wing bones in the 11th–13th century rural assemblage of Tiszalök-Rázom and the 15th–17th century Gyula Castle (Jánossy 1985).

Remains from small vertebrates are rare in non-sieved archaeological assemblages (Gál & Bartosiewicz 2021). Therefore, the small femur from the black rat represents one of the most interesting finds in the bone material under study. The oldest remains of black or house rat came to light at the Roman Period site of Budapest III-Szentendrei út 139 within the territory of Aquincum, the provincial capital, today part of Budapest. A later find occurred in the 14th–15th century assemblage of Vác-Piac utca (Kovács 2014, 40-47). Since the brown rat arrived from Asia to Europe only in the early 18th century (Yu et al. 2022), our specimen indirectly confirms the age of the bone accumulation.

Conclusions

The preliminary zooarchaeological results of the 16th–17th century assemblage from Csókakő-Alsóvár indicate livestock exploitation similar to those of other coeval military fortresses in the countryside, where Christian soldiers, such as the Rascians (the way Serbs were called at the time), also served in the Turkish castle. The presence of cranial remains and terminal bones without economic value, both from the domestic and wild species, offers evidence that most of the livestock was slaughtered on site and the hunted animals were brought to the fortification as complete carcasses. On the other hand, the kill-off pattern in the main meat-providing domestic animals seems to suggest the bringing of additional cuts of meat into the castle.

In addition to the decreasing order of NISP for cattle, caprines, and pig, it is notable that the proportion of game animals is relatively high, among which the bones of rarely encountered species such as the red squirrel, the black rat, and the hazel grouse were also identified. The partial skeleton of a jay, a corvid well known for imitating human speech, most likely originated from a bird kept as a companion.

The dominance of forest species in the assemblage well reflects the environmental conditions around the castle. The presence of remains from the hare, white-tailed eagle, and fish points to the exploitation of more distant resources as well. Skinning marks and the evidence of antler and bone manufacturing indicate a wide use of animal resources beyond meat provision. Rare personal objects made from the hard tissue of animals, such as an ivory comb and several bone inlays, highlight the cultural significance of animal remains in this Ottoman Turkish Period assemblage and support the need to complete the ongoing zooarchaeological analyses.

Contribution of the author

Erika Gál Writing – original draft.

Acknowledgements

I am grateful to archaeologists Gyöngyi Kovács and Gábor Hatházi for inviting me to study the animal bone assemblages found at the castle of Csókakő-Alsóvár, and for sharing the documentation of the site. David Orton (University of York), Principal Investigator of the RATTUS project (Rats and the Archaeology of Trade, Urbanism, and Disease in Past European Societies, 2023–2027), provided the identification of our rat specimen. László Bartosiewicz and István Feld are thanked for the revision of the manuscript. Their helpful comments and suggestions improved the quality of the paper. László Bartosiewicz is further thanked for the linguistic corrections. This study has been granted by the NKFI Project K-143099 ‘Castles, settlement network, material culture, 1300–1700 – Complex microregional historical, landscape historical and archaeological research in Transdanubia’ (PI: Gyöngyi Kovács).

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