

THE DEPOSITION OF DOGS (*CANIS FAMILIARIS*) AT SATU NOU – VALEA LUI VOICU (BABADAG CULTURE)

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Keywords: archaeozoology, Early Iron Age, Babadag culture, ritual depositions, *Canis familiaris*, biometry

Abstract: The archaeozoological study carried out in Satu Nou – Valea lui Voicu (Oltina, Constanța County) provides new information on the relationship between humans and dogs in the early period of the Iron Age. Thus, numerous bones from several dogs (*Canis familiaris*) were identified in the feature called "ditch or gully" and in a pit (Pit 41). The authors of the research attributed this context, stratigraphically considered the oldest, to the Babadag culture (10th–9th centuries BC). The studied group includes the complete and partial skeletons of 14 individuals (12 identified in the ditch and two in Pit 41), unearthed in the 1991–1992 seasons. Some dogs (at least four individuals) were slaughtered by blows to the skull and / or were eaten (at least five individuals) as evidenced by the disarticulation and defleshing cut marks identified on the bones. Given the special archaeological situation at Satu Nou, the phenomenon of cynophagy must be viewed in a ritual and funerary context.

Of the 14 dogs, two are certainly males, two are possibly males and four are possibly females. The animals were predominantly slaughtered at a young age: nine are subadults (between 8 and 18 months) and five are adults. The average withers height of these animals is 50.2 cm (n = 5; limits 46–55.6 cm) after Koudelka and 51 cm (n = 5; limits 47.4–56.8 cm) after Harcourt; the gracility index average is 7.4 (n = 5; limits 6.6–8.3). These figures describe medium-sized and above-average dogs of medium robustness. It is very interesting that nine of these individuals have extremely varied pathologies affecting various anatomical parts, from the skull to the phalanges. Most of these pathologies healed in the individuals' lifetime, but they illustrate that these animals have gone through various accidents or traumas, some of them at relatively young ages.

In general, the dog had a wide range of attributes: psychopomp creature, companion of the warrior and hunter, and also guardian of the home, with a therapeutic and purifying role. In our case the dog was sacrificed (sometimes violently), deposited as an offering and sometimes probably ritually consumed. It should not be omitted that in the same ditch from Valea lui Voicu were identified human bones (from 26 individuals), pottery, but also numerous animals remains that could have been part of the funerary banquets that probably took place in this area. The association of all these archaeological, anthropological and archaeozoological materials may suggest the existence of dog sacrifices at the funerals of the deceased (as their companions) and the deposition of a part of the animal near the body, while the rest of the animal was consumed during the funerary ceremony.

Cuvinte-cheie: arheozoologie, perioada timpurie a epocii fierului, cultura Babadag, depuneri rituale, *Canis familiaris*, biometrie

Rezumat: Studiul arheozoologic realizat pentru situl de la Satu Nou – Valea lui Voicu (com. Oltina, jud. Constanța) ne aduce noi informații cu privire la relația dintre oameni și câini în perioada timpurie a epocii fierului. Astfel, în complexul denumit „șanț sau viroagă” și într-o groapă (Gr. 41), au fost identificate numeroase oase provenite de la mai mulți câini (*Canis familiaris*). Acest context, considerat din punct de vedere stratigrafic și cel mai vechi, a fost atribuit de autorii cercetării, culturii Babadag (sec. X–IX a. Chr.). Lotul studiat cuprinde osemintele, mai mult sau mai puțin complete, a 14 indivizi (12 identificați în șanț și doi în Gr. 41), descoperite în campaniile 1991–1992. Studiul acestora ne arată că unii câini au fost sacrificați prin lovituri la nivelul craniului (cel puțin patru indivizi) și/sau au fost consumați alimentară (cel puțin cinci indivizi) dovadă fiind identificarea de urme antropice de descărnare și dezarticulare. Acest fenomen al cynofagiei trebuie privit într-un context ritual și funerar dacă avem în vedere situația arheologică mai specială de la Satu Nou.

Din cele 14 depuneri de câini, două provin cu siguranță de la doi masculi, doi este posibil să fie masculi și patru este posibil să fie femele. Vârstele de sacrificare ale acestor câini ne arată că nouă indivizi sunt subadulți (între 8 și 18 luni) și cinci sunt adulți, deci observăm o predominare a animalelor tinere. Talia acestor animale prezintă o valoare medie de 50,2 cm (n = 5; limite 46–55,6 cm) după Koudelka și de 51 cm (n = 5; limite 47,4–56,8 cm) după Harcourt, iar indicele de gracilitate are o medie de 7,4 (n = 5; limite 6,6–8,3). Aceste cifre sugerează câini de talie medie și supramedie cu o robustețe mijlocie. Ceea ce este extrem de interesant este faptul că nouă dintre acești indivizi prezintă patologii extrem de variate care ating diferite elemente anatomice de la craniu până la falange. Majoritatea acestor patologii sunt vindecate în cursul vieții indivizilor, dar ele ne ilustrează că aceste animale sufereau diferite lovituri sau accidente, unele dintre animale fiind relativ tinere.

În general, câinele are o serie de atribute psihopompe, fiind considerat un însoțitor al războinicului și vânătorului, dar în același timp era și un paznic al căminului și avea și un rol terapeutic și de purificare. În cazul nostru câinele era sacrificat (uneori violent), deus ca ofrandă și uneori probabil consumat ritualic. Nu trebuie să omitem faptul că în același șanț de la Valea lui Voicu s-au mai identificat oase umane (de la 26 de indivizi), ceramică, dar și numeroase resturi de animale care este posibil să fi făcut parte din banchetele funerare care probabil aveau loc în această zonă. Asocierea tuturor acestor materiale arheologice, antropologice și arheozoologice poate să ne sugereze existența unor sacrificii de câini cu ocazia funeraliilor unor defuncți (ca însoțitori ai acestora), în care o parte din animal era deusă în apropierea acestora, iar o altă parte era consumată în cadrul ceremoniei funerare.

I. INTRODUCTION

Identified in 1980, the archaeological site from Satu Nou – Valea lui Voicu (Oltina, Constanța County) is situated in southeast Romania. It occupies a strongly eroded promontory in the immediate vicinity of the Danube (Fig. 1), consisting of two plateaus with a level difference of about 6 m. Archaeological research carried out between 1982–2002 proved the existence of an important fortified Getic settlement (3rd–1st century BC), which records archaeological layers of over 5 m on the northern plateau, arranged on nine levels of habitation¹. Below the inhabitation of the Second Iron Age, the remains of a possible place of worship from the Early Iron Age, attributed to the Babadag culture (10th–9th centuries BC), were partially researched². The feature consists of pits and a ditch, which follows the western

boundary of the promontory; here were deposited both human and animal complete skeletons or skeletal parts, together with domestic animal remains, stones and pottery³.

Although previously published in detail⁴, this special archaeological situation did not benefit from a well-deserved interdisciplinary approach. However, relatively recently, human and animal osteological material from the research conducted by M. Irimia and N. Conovici in 1991–1992 in the Hallstattian level (Babadag culture) was identified in the collections of the “Francisc I. Rainer” Institute of Anthropology in Bucharest. The materials come from S I, drawn on the northern promontory (Fig. 2). Part of the faunal material consists of kitchen waste, more precisely 1202 such items, weighing 9187 g, already published⁵; another part is a series of ritual depositions of whole or incomplete animals that are the subject of this study.



Figure 1. The position of the site from Satu Nou – Valea lui Voicu.

Numerous bones from several dogs (*Canis familiaris*) were identified in the complex called “ditch or gully” and in a pit (Pit. 41). The studied structure includes the complete and partial skeletons of 14 individuals (12 were discovered in the “ditch” and two in Pit 41), which are

clearly differentiated from finds in household contexts. One of the main differences is that the dog bones are relatively complete, many of the cracks (fragmentation) having occurred mainly during their sampling or due to faulty handling, as evidenced by the recent traces of

¹ Irimia, Conovici 1989; Conovici, Irimia 1990; 1991; 1999; Conovici *et alii* 2010–2011.

² Irimia, Conovici 1993; Morintz 1987; Ailincăi 2013.

³ Irimia, Conovici 1993; Conovici *et alii* 2002; 2003; Irimia 2003; Ailincăi 2008a.

⁴ Irimia, Conovici 1993.

⁵ Bălășescu *et alii* 2015.

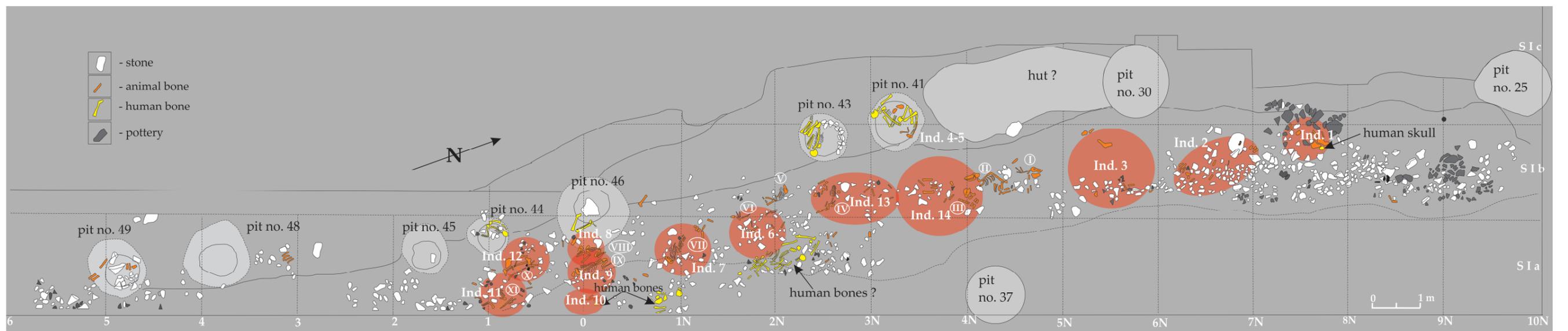


Figure 2. Satu Nou – Valea lui Voicu. Plan of Section S Ia–c (adapted from Irimia, Conovici 1993).

breakage (post-discovery *in situ*). Few of these faunal fragments show ancient anthropic traces, such as cut marks, and even fewer show teeth marks (carnivores). We note that no traces of burning were identified on any dog bone fragments, unlike the kitchen waste (7.4%)⁶.

Unfortunately, the data regarding the manner of deposition is extremely scarce. Although we have consulted the archives of the Museum of National History and Archaeology in Constanța, we were not able to find detailed drawings or photographs. The identification of the osteological material on the published archaeological plan is also problematic, as the dog skeletons are marked with Roman numerals, from I to XI (Fig. 2), but the analysed remains include bones from at least 14 individuals. Following the numbering on the bones, we marked in red, on the plan, the probable place the bones were unearthed. We used Arabic numerals (1–14), keeping the order from the previous publication⁷. As visible in Fig. 2, the studied osteological material is probably incomplete, as individuals I, II and V, noted on the original plan by Mihai Irimia and Nicolae Conovici⁸, are most likely missing.

Despite this impediment, multiple dog deposition is of great importance for the early period of the Romanian Iron Age, considering that for this historical interval⁹ there is very little information about this species (size, biometry, etc.). Moreover, in general, the data on the relationship between man and dog are extremely deficient.

II. METHODOLOGY

The description of the different anatomical parts was made after the Barone¹⁰. The age at death of the dogs was determined based on the tooth eruption and wear¹¹, as well as the degree of epiphyseal fusion of the bones¹². Dog skeletons will be presented briefly and schematically. Thus, the presence and absence of elements will be illustrated by colour codes using the scheme of the dog skeleton developed by Helmer¹³. Also, in the case of each skeleton or skeletal part, the possible anthropic marks will be specified (skinning and disarticulation – on the drawings the code is “a”), as well as the paleopathology of these animals (on the drawings the code is “p”).

In canids, the main criterion for identifying sex¹⁴ is the presence or absence of penile bone that exists only in males. Another criterion would be the biometric data, which in the case of smaller specimens could indicate females, and larger ones could suggest males, but, in this

case, we must keep in mind that for the early period of the Iron Age we know absolutely nothing about this species.

The biometric data (Annex 1) were taken according to von den Driesch's recommendations¹⁵, and the animal's size was estimated based on the Koudelka and Harcourt indices¹⁶.

In this study we kept the numbering from the 2016 article¹⁷, and added in parentheses the archaeological information identified on the animal bones, in order to have more control over the information in close correlation with the excavation documentation.

III. DESCRIPTION OF THE FAUNAL MATERIAL

Individual 1 (S Ib square 8N)

It is incomplete and is represented only by a few anatomical elements that come only from the left hind limb: coxal, femur, tibia, fibula, calcaneus, metatarsals II, III and IV (Fig. 3).

The femur, tibia and calcaneus show small recent damage to the proximal part, while only the proximal half is left from the metatarsals. The coxal, represented by the acetabulum, a part of the ilium and ischium and of the branch of the pubis that delimits the anterior half of the obturator foramen, shows cut marks at the level of the pubis. Probably, in this case, only a dog limb that was detached from the body was deposited.

The age was determined only based on the degree of epiphyseal fusion and is about 13–16 months¹⁸, as suggested by the fused distal tibia (the suture line is still visible on about a quarter of the circumference), while the proximal epiphysis is unfused (under 18 months).

No assessments can be made regarding the sex of this individual.

Individual 2 (S Ib square 6N–7N)

This is an incomplete skeleton (Fig. 4–5). Part of it has been partially restored, namely the skull, which shows recent and old damage. Thus, part of the calvaria was reassembled (parietals, occipital, left hemifrontal and temporals). The following elements remained isolated: a left maxillary fragment with the following dentition: (I¹), I², I³, C, (P¹, P²), P³, P⁴, M¹, M² and the left zygomatic – the rupture between them at the level of P³ is old, but it can be reconstituted (glued); the right maxillary and a fragment

⁶ Bălășescu *et alii* 2015, p. 231.

⁷ Ailincăi *et alii* 2016b.

⁸ Irimia, Conovici 1993.

⁹ Bălășescu *et alii* 2003.

¹⁰ Barone 1986.

¹¹ Schmid 1972; Horard-Herbin 1997.

¹² Silver 1969; Schmid 1972; Barone 1986.

¹³ Helmer 1987.

¹⁴ Chaix, Meniel 1996, p. 33.

¹⁵ von den Driesch 1976.

¹⁶ Udrescu *et alii* 1999.

¹⁷ Ailincăi *et alii* 2016b.

¹⁸ Silver 1969, p. 286; Schmid 1972, p. 75.

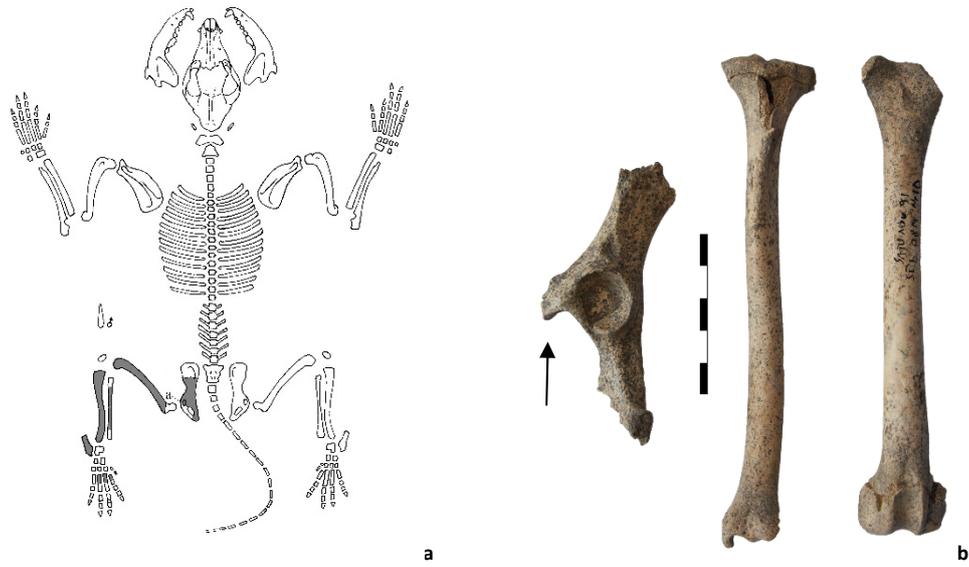


Figure 3. a. Graphic representation of the anatomical elements present in individual 1 (the elements discovered and analysed are illustrated in grey); b. Anatomical elements of individual 1: coxal with cut marks, tibia and femur (from left to right).



Figure 4. a. Graphic representation of the anatomical elements present in individual 2 (the elements discovered and analysed are illustrated in grey); b. The mandibles of individual 2: lower – left mandible; upper – right mandible (lateral view).

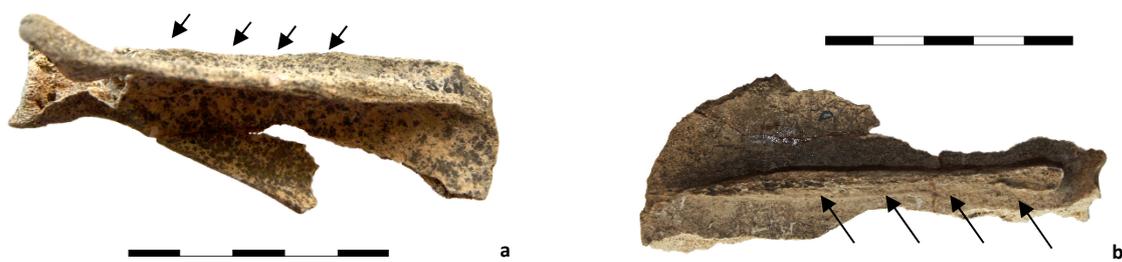


Figure 5. Scapulae of individual 2 showing cut marks: left scapula (a) and right scapula (b).

of ectorbital with fresh cracks. Thus, the calvaria generally has fresh cracks, while the facial skeleton has a series of old fractures, which would suggest a series of blows at this level, possibly causing death. Also, the zygomatic processes of the temporal bones were broken, from ancient times, at the base. The cranial sutures are open and the basioccipital is not fused. The basal length of the skull, according to the Brinkmann coefficient, is 151.8 mm and after Dahr is 147.1 mm (see Annex no. 1).

Recent breakage is visible at the level of the mandibles, especially in the anterior part. All teeth had erupted; the right mandible has the dental formula: P₃, P₄, M₁, M₂, (M₃), and the left one: C (P₁, P₂), P₃, P₄, M₁, M₂, M₃. Based on dental wear we can assess stage A¹⁹. We also note that the right mandibular M₂ is lingually broken.

Regarding the appendicular skeleton, we notice that most of the anatomical elements exhibit unfused epiphyses, except for the acetabulum and metacarpal II which is distally fused, suggesting that the deposited animal was young; it also shows numerous recent traces of breakage. Thus, the skeletal age, judging by the metacarpal epiphysis that fuses around 8 months (Silver, 1969), is also confirmed by the lack of the olecranon epiphysis of the ulna that fuses at 9–10 months. This estimation overlaps with the age indicated by the dentition.

The individual may be a female (?) if we consider the absence of the sagittal crest of the skull.

The taphonomic study allowed the observation of both fresh and ancient fractures at the level of both scapulae. These suggest a series of anthropic interventions with a sharp tool, which indicates disarticulation rather than defleshing. Thus, in the case of the left scapula, the acromial edge is broken along the spine, and in the right one, the spine is broken at the base (Fig. 5).

Individual 3 (S Ib, square 5N) ²⁰

It is also an incomplete dog skeleton (Fig. 6/a). The skull, which was probably crushed by the weight of the archaeological sediments, was relatively well reassembled. The upper dentition is: left - I¹, I², I³, C, (P¹), P², P³, P⁴, M¹, M²; right - I¹, I², I³, C, P¹, P², P³, P⁴, M¹, (M²). At the level of the upper jaw some cusps of the left P⁴ and the right M¹ are traumatically broken. Also, on the left parietal, in the postero-superior angle, there are traces of a healed blow that extends to the sagittal crest. The cranial sutures are: opened interfrontal, but closed interparietal (Fig. 7). The mandible shows damage in the region of the second right

incisor and the left angular process. The present dentition is: left - I₂, I₃, C, P₁, P₂, P₃, P₄, M₁, M₂, M₃; right - C, P₁, P₂, P₃, P₄, M₁, M₂, M₃. Dental wear suggests stage D²¹. The basal length of the skull according to the Brinkman coefficient²² is 161.2 mm (average), and after Dahr it is 154.1 mm.

All the epiphyses of the appendicular skeleton are completely fused, as are the vertebrae (over 2 years old). Traces of a sharp object (Fig. 6/b) were observed on the right femur, on the distal side of the shaft, which would suggest defleshing. The withers height was determined based on a complete tibia, at a value of 48.3 cm (Koudelka index) and 49.2 cm (Harcourt index). Gracility index is at 6.65. These values suggest a medium-sized dog of medium robustness²³.

Dental and skeletal age indicate that the individual is an adult, and the fact that the bone markings of the skull are the most developed in the all studied osteological materials would suggest a male.

From the same square (S Ib, square 5N) some isolated dog bones were also recovered: half an atlas (left side), a right femur with fused epiphyses (with carnivore teeth marks traces at the level of the proximal epiphysis), a left tibia with unfused epiphyses (Fig. 8) and a fibula diaphysis. These anatomical elements can be distributed to the other individuals identified in the studied sample.

Individual 4 (S Ib-c, square 4N, Pit 41)

It is also incomplete (Fig. 9/a, 10–11), showing numerous recent cracks, most likely due to faulty sampling. The skull, which we assume was whole at deposition, has been reconstituted. Thus, it was possible to complete the calvaria, but the zygomatic arches have gaps (Fig. 10). The cranial sutures are open. Thus, the basioccipital has not fused with the basisphenoid, which, in turn, has not fused with the presphenoid. The sagittal crest is poorly developed; the akrokranium is slightly prominent and the interparietal is missing. At the level of the parietals, there are traces of a blow healed during the dog's life. The dentition at the level of the maxillary is: left with complete dentition (I¹-M³); right - C, P¹, P², P³, P⁴, M¹, M². The left maxillary canine is broken (traumatic) at the exit of the alveolus (Fig. 10).

The mandible also exhibits a series of recent cracks and damage to the incisors and the vertical branch (Fig. 9/b). The dentition of the mandibles is as follows: left - I₃-M₂; right - I₃-M₃. Dental wear suggests stage C²⁴. The basal length of the skull is 155.8 mm (right) according to the Dahr coefficient.

¹⁹ Horard-Herbin 1997, p. 152, fig. 142.

²⁰ Even if it is inconsistent with the plan, it can be individual 1, according to Irimia, Conovici 1993.

²¹ Horard-Herbin 1997, p. 152, fig. 142.

²² Driesch 1976, p. 61.

²³ Udrescu *et alii* 1999, p. 108.

²⁴ Horard-Herbin 1997, p. 152, fig. 142.

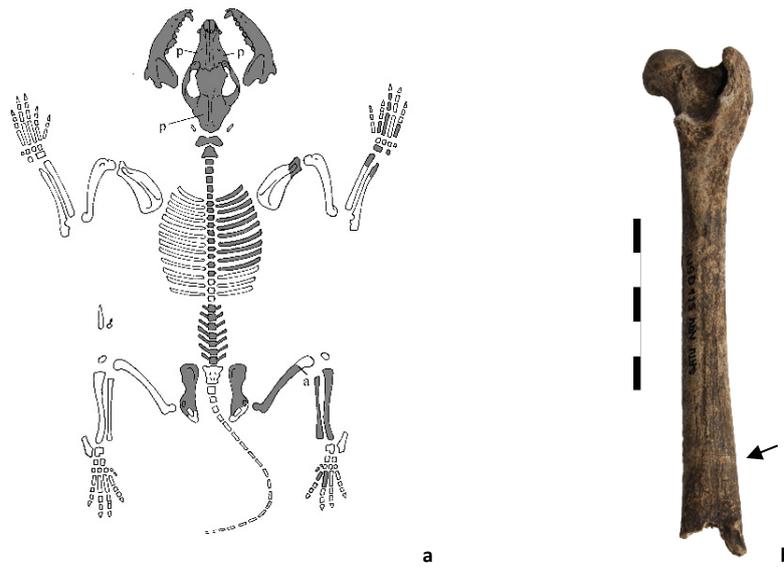


Figure 6. a. Graphic representation of the anatomical elements present in individual 3 (the elements discovered and analysed are illustrated in grey); b. Dog femur with cut marks (caudal view).



Figure 7. Skull of individual 3. a. Dorsal view; b. Basal view; c. Right side view; d. Left side view.



Figure 8. Right femur and left tibia of the dog discovered in S 1b, square 5 N.



Figure 9. a. Graphic representation of the anatomical elements of individual 4 (the elements discovered and analysed are illustrated in grey); b. The mandibles of individual 4; lower – left mandible, upper – right mandible (side view).



Figure 10. The skull of individual 4: a. Dorsal view; b. Basal view.



Figure 11. Pathologies of individual 4: a. Axis and cervical vertebra 3 (left side view); b. Axis and cervical vertebra 3 (dorsal view); c. Costal body (medial view); d. Phalanx I (dorsal view).

The vertebral column is almost complete (Fig. 9/a). The cervical vertebrae (C2 - axis and C3) are fused together, especially on the left side (Fig. 11/a-b). The ribs are present only through 10 vertebral and 10 sternal ends plus 15 body fragments. Among them, a healed rib fracture with well-consolidated callus was observed (Fig. 11/c).

The rest of the appendicular skeleton can be seen in Fig. 9/a. We specify only that the bicapital tuberosity of the scapula is fused; the humeri are fused distally, but not proximally; the radii are fused proximally and not distally; the ulnae are proximally fused; the femur is unfused; the tibiae are distally fused and proximally unfused; the epiphyses of the metacarpals and metatarsals are fused; the calcaneus is fused; the phalanges are fused. Also, at the level of a phalanx 1, there are traces of a healed infectious process (Fig. 11/d).

The age resulting from dental wear and especially the degree of epiphyseal fusion of the recovered bones (see above) suggests 12 to 15 months²⁵. The presence of a penile bone (2 cm fragments) indicates a young male.

From a taphonomic point of view, there are no traces of violence or other ancient anthropic interventions.

Individual 5 (S Ib-c, square 4N, Pit 41)

An isolated dog skull was also found in the same pit (Fig. 12). Its state of conservation and representation is very poor, with numerous recent breakages. The interfrontal suture is open, as is the interparietal one. The sagittal crest is very weak, the akrokranium is slightly

prominent. The basioccipital is not welded to the sphenoid and presphenoid. The upper dentition is: right - C, (P¹), fallen P², P³, P⁴; left - C, P³, P⁴, M¹, M². The vertical branches of the mandibles are recently broken. The observed lower dentition is: right - I₃, C, P₁, (P₂), P₃, P₄, M₁, (M₂); left - I₃, C, P₁-M₂ (Fig. 13). Mandibular tooth wear indicates stage A²⁶.

The age determined on the basis of dentition and cranial sutures indicates a young (subadult) animal, whose sex could be female (?).

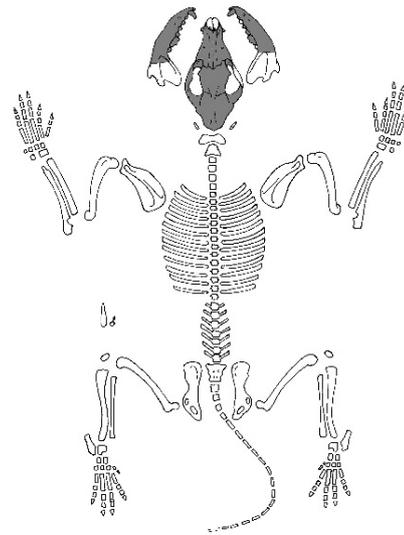


Figure 12. Graphic representation of the anatomical elements of individual 5 (the elements discovered and analysed are illustrated in grey).



Figure 13. The mandibles of individual 5: a. Lingual view, b. Lateral view.

²⁵ Silver 1969, p. 285–286.

²⁶ Horard-Herbin 1997, p. 152, fig. 142.

Individual 6 (S I a, square 2N–3N)

This dog skeleton is incomplete (Fig. 14). The skull is strongly fragmented. The basioccipital is not welded to the basisphenoid. At the level of the maxillary there is the following dentition: left - C, P¹, (P²), M¹; right - I¹, I³, P⁴.

The mandibles also have recent cracks and lack the vertical branches and the anterior part. The mandibular dentition presents the whole series, both on the left and on the right. Only P₁ left and P₄ right and M₃ right and left were lost post-mortem (Fig. 15). Tooth wear suggests stage A²⁷. The basal length of the skull is 150.6 mm (right) according to the Dahr coefficient²⁸.

In addition to the anatomical elements presented above, three cervical vertebrae (C3–C5) were also discovered, as well as a right metatarsal II with missing distal epiphysis.

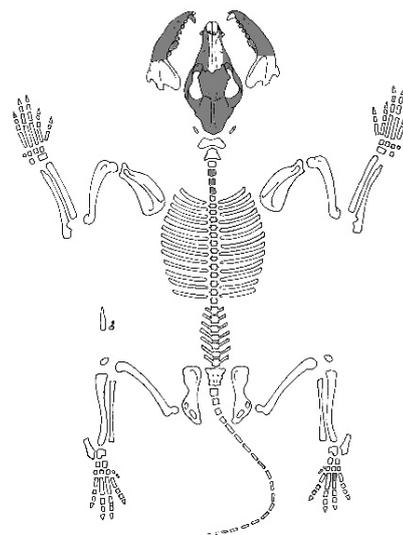


Figure 14. Graphic representation of the anatomical elements found in individual 6 (the elements discovered and analysed are illustrated in grey).



Figure 15. The mandibles of individual 6: a. Lingual view, b. Lateral view.

Individual 7 (S I a, square 1N–2N)

It is relatively well represented compared to the material described above (Fig. 16/a). The skull has been restored from numerous fragments with recent cracks. The right zygomatic arch is missing, as well as the paraoccipital process on the same side. The cranial bone markings are almost absent: the sagittal ridge is missing, and the akrokranium is undeveloped. The sutures are open and visible. The basioccipital is not welded to either the basisphenoid or the presphenoid. Almost all the upper teeth are present, except for I² and I³ on the right. Also,

the left canine crown is broken (trauma), as are the right P⁴ cusps (Fig. 17).

The mandibles are complete. The dental formula is normal and complete, only the M₃ on the right is missing. Dental wear indicates stage C²⁹. The calculation of the basal length of the skull according to Brinkmann is 141.4 mm, and according to Dahr 150.7 mm³⁰.

The spine is almost complete, except for two thoracic vertebrae and most of the caudal ones. The epiphyses of the vertebrae are not fused. As pathology, on the anterior face of the body of lumbar vertebra 3, a kind of "sleeve" was observed, not very prominent (Fig. 16/b).

²⁷ Horard-Herbin 1997, p. 152, fig. 142.

²⁸ Driesch 1976, p. 61.

²⁹ Horard-Herbin 1997, p. 152, fig. 142.

³⁰ Driesch 1976, p. 61.

The appendicular skeleton has many recent cracks. The long bones are proximally unfused and distally fused (humerus, tibia), proximal fused and distally unfused (ulna), fused (metapodials), or unfused at both ends (femur).

The skeletal age obtained from the degree of epiphyseal fusion suggests an animal over 12 months old (distal humerus - 8–9 months, but not proximal fused - 15 months, proximal ulna - olecranon 9–10 months, proximal radius 11–12 months), but no more than 15–16 months

(distal tibial epiphysis and calcaneal tuberosity fuse around 13–16 months). Due to the mismatch between the proximal humerus, which fuses at 15 months³¹, and the distal tibia, which fuses at 13–16 months, we selected the 12 to 15 months interval. The skeletal age agrees with the dental one.

According to the gracility of the skeleton and the cranial bone markings, the sex of this individual could be female (?).



Figure 16. a. Graphic representation of the anatomical elements present in individual 7 (the elements discovered and analysed are illustrated in grey); b. Lumbar vertebra 3 with pathology.



Figure 17. Skull of individual 7: a. Dorsal view; b. Basal view; c. Left side view; d. Right side view.

³¹ Silver 1969, p. 285–286; Schmid 1972, p. 72.

Individual 8 (S Ia-c, square 1–1N)

It is well represented (Fig. 18), however a number of elements are missing, and it shows many recent cracks. The restored skull is characterized by recent damages, especially to the right zygomatic and the tip of the left temporal zygomatic apophysis. Towards the left basal side there are a series of ancient ruptures and cracks. Thus, the base of the skull is broken at the tympanic bulla, in the connection area between the basioccipital and the basisphenoid, and the rupture continues next to the external carotid foramen, separates the left glenoid cavity in the anterior part and then slightly curves upwards to the coronary. Also, the zygomatic apophysis of the temporalis was broken right from its base (where the bone is the strongest) and the zygomatic was detached from the maxillary. The occipital condyles are intact. The cranial bone markings are quite rudimental, the sagittal ridge does not exist, the frontal ridges are very obliterated, the akrokranium is slightly prominent. Regarding the sutures, we have the interfrontal which is visible (the crestal part closed in the posterior third), and the interparietal is closed. The upper dentition is: left - I¹-C, P¹ (broken), P²-M¹, M² (broken); right - I¹-I³, (C), P¹-P⁴, (M¹), M² (Fig. 19).

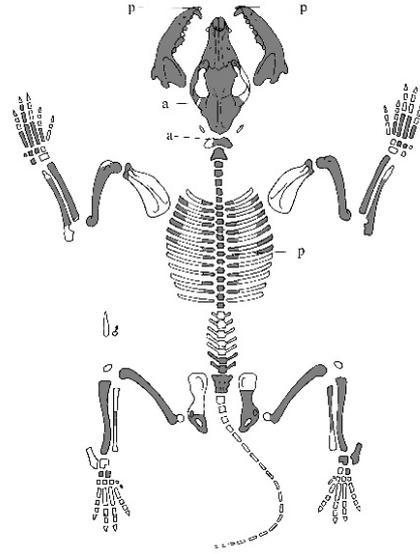


Figure 18. Graphic representation of the anatomical elements in individual 8 (the elements discovered and analysed are illustrated in grey).



Figure 19. Skull of individual 8: a. Dorsal view; b. Basal view; c. Left side view; d. Right side view.

The mandibles are relatively complete. The anterior part of the mandibles is pathologically destroyed (the alveoli are resorbed) (Fig. 21/a). The present dentition is: left - C-P₃, P₄ (fallen during life, resorbed alveolus), M₁-M₃; right - I₃-P₁, P₂ (fallen during life, resorbed alveolus), P₃-M₃.

The dentition of this dog shows the most accentuated dental wear (stage E³²) which suggests an old animal. The mandibular canines are very worn, up to the middle of the pulp canals, and the maxillary ones are only very little worn, on the anterior edge. The upper incisors

³² Horard-Herbin 1997, p. 152, fig. 142.

are worn by rounding, while the mandibular ones have destroyed alveoli. The premolars are also worn – the first right mandibular premolar is broken (lost), but the root (uniradicular) is still in the alveolus. Also, the right maxillary P⁴ has broken cusps, the same being observed in the right mandibular P₃. An accentuated wear is also present on the maxillary molars, where the left M¹ has lost the connection between the roots. The value of the basal length of the skull after Brinkmann is 155.7 mm, and after Dahr it is 154.4 mm³³.

The spine is relatively well represented. Only a few lumbar vertebrae (5) and all caudals are missing. Is interesting that the left wing of the atlas has been broken since ancient times. Also, at the level of the thoracic vertebrae, a series of deformations and exostoses were highlighted (Fig. 21/b).

The rest of the appendicular skeleton discovered and analysed has all the epiphyses fused (Fig. 18 and 20). The age of the animal is quite advanced considering the accentuated

dental wear, the condition of the epiphyses and cranial sutures (the interfrontal one closes around 3–4 years³⁴). The individual is probably a female (?). The pathologies of the mandible and spine are noticeable (Fig. 21/a-b).

The old breaks observed on this skeleton can be interpreted as signs of violence against the animal's head and neck. These lead to the hypothesis that this dog received one (or more) blows to the left side of the skull, which fractured his left zygomatic arch and the cracks spread both to the left side and to its base. The same blow broke the left wing of the atlas. The other skeletal elements do not show such stigmas.

The withers height was estimated based on the humeri, tibiae and right radius. Its average value is 49.6 cm after Koudelka (n = 5, limits 48.2–51.9 cm) and 49.5 cm (n = 5, limits 49.1–50.2 cm) according to Harcourt. The gracility index has an average value of 7.5 (n = 5, limits 7.1–8). These values indicate a dog of medium size and medium robustness³⁵.



Figure 20. The long bones of individual 8. a. Humeri; b. Radii; c. Tibiae.



Figure 21. Pathologies at the level of individual 8: a. Mandibles (occlusal view); b. Deformed thoracic vertebra at the level of the spinous process.

³³ Driesch 1976, p. 61.

³⁴ Barone 1986.

³⁵ Udrescu *et alii* 1999, p. 108.

Individual 9 (S I, square 1–1N)

This skeleton is almost complete (Fig. 22–24). Most of the facial mass has been restored, also showing many recent cracks (with a few missing pieces). Thus, the nasals do not articulate due to the absence of the tip. Other bones of the skull that were identified: the left occipital condyle, with a small portion of the squamous part of the occipital (to the left), a fragment of the posterior left temporal squama (the two fragments cannot be refitted because the left paraoccipital process is missing), a fragment of the basioccipital (to the right), a fragment of the basisphenoid (also to the right), the right paraoccipital process and two fragments of the tympanic bulla. All these fragments show ancient fractures. The basioccipital is not fused to the basisphenoid (the rest of the sutures are missing). The maxillary dentition is fully present on both sides (Fig. 23). The fact that some parts of the skull have ancient cracks would suggest that the animal was sacrificed (killed) by blows to the skull.

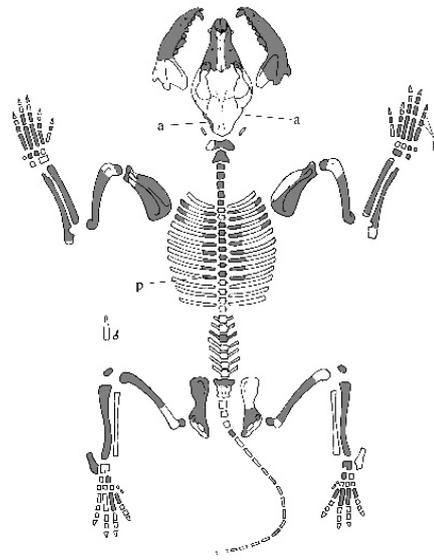


Figure 22. Graphic representation of the anatomical elements in individual 9 (the elements discovered and analysed are illustrated in grey).



Figure 23. Viscerocranium of individual 9: a. Dorsal view; b. Basal view.



Figure 24. Pathologies of individual 9: a. Rib; b. Phalanges 1 and 2.

The mandibles exhibit recent cracks that mainly affected the vertical branches. The lower dentition is almost complete, except for the left M₃. Dental wear indicates stage A³⁶. The basal length of the skull is 142.6 mm after Brinkmann, while after Dahr is 151.3 mm³⁷.

The spine is incomplete (Fig. 22), with unfused epiphyses. A series of thoracic (6), lumbar (6), sacral (2) and caudal (16) vertebrae are missing.

The appendicular skeleton has numerous recent cracks and numerous missing pieces (Fig. 22). The bicapital tuberosity of the scapulae is welded, the distal epiphysis of the humerus is recently fused (the line between the epiphysis and the diaphysis is visible in both elements) and, in the left metacarpus II, the distal extremity is fused, while it is unfused in the rest of the metapodials. The epiphyses of the rest of the long bones are unfused.

³⁶ Horard-Herbin 1997, p. 152, fig. 142.

³⁷ Driesch 1976, p. 61.

The age of this dog is about 8–9 months if we consider that the bicapital tuberosity of the scapula fuses at 6–7 months, the metacarpal around 8 months, and the freshly welded distal humerus indicates about 8–9 months³⁸. The skeletal age is in line with the dental age and indicates a young animal.

As pathologies, we have identified a fractured rib (with pseudarthrosis), 2 cm from the vertebral head, and two phalanges (first and second) welded together by a callus following a trauma (Fig. 24/a–b).

Individual 10 (S I, square 1–1N)

It consists only of the skull cap with the parietals and a part of the frontals plus a portion of the occipital where all the cracks are recent (Fig. 25). The skull was probably complete when it was deposited. The cranial sutures are closed, even the interfrontal one. The sagittal crest is not developed.

The appendicular skeleton comprises only of the hind limbs. Thus, the right femur is complete, with welded epiphyses (Fig. 26/a). Of both tibiae, only the proximal half is left, with fused epiphyses. The breakages caused by ancient blows to the diaphysis suggest they were applied violently on fresh bone (Fig. 26/b). The fibulae consist only of the proximal half and are broken at the same level as the tibiae.

The age of the dog is over 3–4 years, given that the

interfrontal suture is welded at this age³⁹.

The height of the animal was estimated based on the femur at 51.4 cm (Koudelka index) and 52.3 cm (Harcourt index). The gracility index is 8.3. These estimates indicate an animal of above-average size and medium robustness⁴⁰.

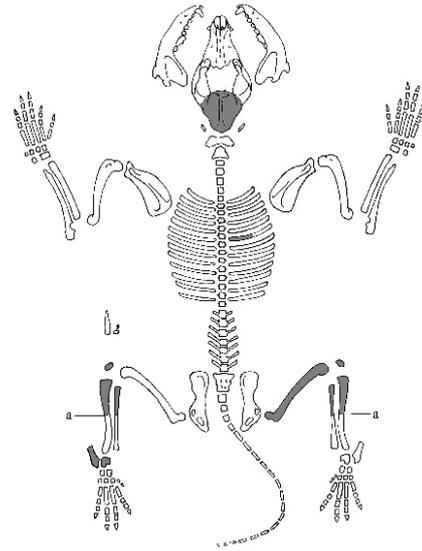


Figure 25. Graphic representation of the anatomical elements in individual 10 (the elements discovered and analysed are illustrated in grey).



Figure 26. Individual 10. a. Right femur with fused epiphyses (cranial view); b. Proximal tibiae with anthropic modifications at the level of the diaphysis (medial view).

Individual 11 (S I, square 1, central area)

This dog skeleton is relatively intact (Fig. 27). The skull is restored from several fragments, with some missing pieces, including the zygomatic apophyses of the temporals, the right nasal and the bone markings of the maxillary apophyses, the left occipital condyle and the basioccipital (Fig. 28). The sutures of the skull cap are open,

and the sagittal crest is absent. The upper dentition is well represented, as only the right P¹, and left P¹ and P² are missing. On the right frontal, along the frontal ridge, there is an old blow that had healed.

The mandibles show some minor damage to the angular processes. The dentition is well represented and indicates stage B wear⁴¹. Thus, on the right side I₁, P₂ and M₃ are missing, and on the left side only P₂ is missing. In

³⁸ Silver 1969, p. 285–286; Schmid 1972, p. 72.

³⁹ Barone 1986.

⁴⁰ Udrescu *et alii* 1999, p. 108.

⁴¹ Horard-Herbin 1997, p. 152, fig. 142.

this dog we also noticed the very large dimensions of the teeth (especially the carnassial - M₁ which have 23.1 / 9 mm - left and 23 / 8.9 mm - right). The basal length according to Brinkmann (average) is 157.5 mm, and after Dahr is 167.8 mm⁴².

The spine is quite complete, but poorly preserved, probably because the animal was relatively young. At the level of the ribs, healed fractures were observed on three fragments (Fig. 29).

The appendicular skeleton is relatively well represented. The bicipital tuberosities of the scapulae are welded; the distal epiphyses of the humeri are fused, but the proximal epiphyses are not fused; the distal epiphyses of the identified metapodials are welded, but the line between the epiphysis and the diaphysis is still visible; phalanges 1 and 2 show fused epiphyses; the rest of the long bones do not exhibit welded epiphyses.

The skeletal age indicates an animal up to 11–12 months, given that the proximal and distal radius, as well as the ulna would have been fused around this age, while the metapodials fuse at about 10 months⁴³. This age is in line with the dental one.

The sex is male, determined from a fragment of the penile bone.

No ancient anthropic modifications have been observed.

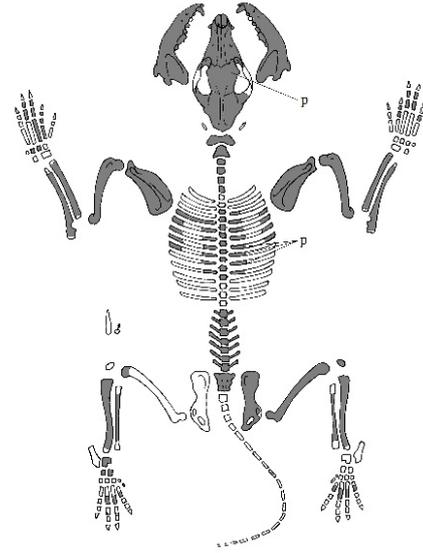


Figure 27. Graphic representation of the anatomical elements in individual 11 (the elements discovered and analysed are illustrated in grey).



Figure 28. Cranial elements of individual 11. a. Skull – dorsal view; b. Skull – basal view; c. Skull – left side view; d. Mandibles – lingual view.



Figure 29. Pathologies of individual 11's ribs.

⁴² Driesch 1976, p. 61.

⁴³ Silver 1969, p. 285–286; Schmid 1972, p. 72.

Individual 12 (S Ia, square 1, east area)

It lacks the skull, but the rest of the postcranial skeleton is relatively well represented, with numerous traces of recent breakage (Fig. 30). All the cervical vertebrae (7), two thoracic vertebrae, the sacrum and all the caudals are missing from the spine. Lumbar vertebra 4, on the back of the body, shows a massive exostosis of triangular shape and fringed appearance that fits perfectly in a hollow in the body of the lumbar vertebra 3. It has the appearance of a "sleeve" (Fig. 31/a).

The appendicular skeleton has many recent cracks (Fig. 32). All the epiphyses are fused⁴⁴, suggesting that the individual is an adult dog of over 1,5 years of age. In the proximal third of the IV^h left metatarsal shaft, a healed pathology is observed (Fig. 31/b).

The elements for sex identification are missing, but biometrically it is the most developed dog in the whole series, so it is possibly a male.

From several complete bones (left humerus, right radius, ulnae, femurs and tibiae) we estimated the size (Fig. 32). Thus, the average withers height after Koudelka is 55.6 cm (n = 8; limits 53.4–57.6 cm), and after Harcourt is 56.8 cm (n = 8; limits 54.4–59.1 cm). The average

gracility index is 7.45 (n = 6; limits 6.97–7.96). These values place this dog in the category of above-average-sized animals of medium robustness⁴⁵.

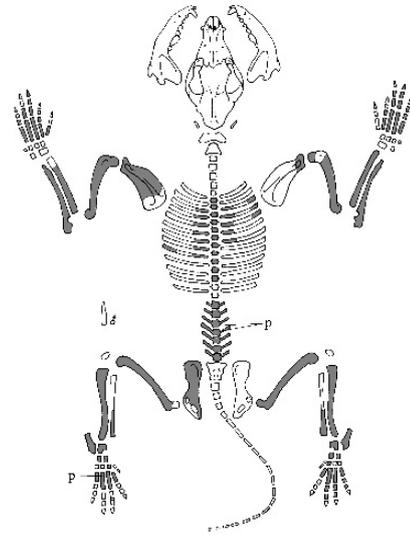


Figure 30. Graphic representation of the anatomical elements in individual 12 (the elements discovered and analysed are illustrated in grey).



Figure 31. Pathologies of individual 12. a. Lumbar vertebrae 3 and 4 (left side view); b. Metatarsals IV in which the left one (the left of the photo) has a pathology on the diaphysis (side view).



Figure 32. Long bones of individual 12. a. Humeri; b. Ulnae; c. Femurs; d. Tibiae.

⁴⁴ Silver 1969, p. 285–286; Schmid 1972, p. 72.

⁴⁵ Udrescu et alii 1999, p. 108.

Individual 13 (S 1b, witness area with S 1a, square 3–4N)

It is almost complete (Fig. 33). The skull is completely restored, only some parts of the palatine bones are missing. The right zygomatic arch has been broken since ancient times (Fig. 34). The interparietal suture is closed, the interfrontal is open, the basioccipital is welded with the basisphenoid and the presphenoid. In the region of the left parietal, in the postero-superior angle, the traces of a healed blow are visible. The dentition is almost complete, only the right P¹ is missing (Fig. 35).

The mandibles are complete, but show some minor damage due to relatively old age of the animal. The dentition is complete, except for I₂ and M₃ on the left side, and I₁, I₂ and P₁ on the right. The rest of the mandibular incisors were lost during the individual's lifetime and the alveoli have resorbed. Tooth wear indicates stage D⁴⁶. We mention the wear of the mandibular canines in the front and obliquely due to the antagonism with the three incisors on the jaw (Fig. 35 a). The basal length of the skull is 147.2 mm after Brinkmann and 147.8 mm according to Dahr⁴⁷.

The spine is relatively well represented. Thus, we identified seven cervical vertebrae, nine thoracic, one lumbar and two caudal. In the thoracic area we observed two vertebrae with laterally deformed spinous processes (Fig. 35 b). Also, two ribs with normal and healed callus were observed.

The epiphyses of the appendicular skeleton are completely fused, with numerous recent cracks (Fig. 33).

In continuation we will present only the identified pathologies. Thus, both humeri show old fractures of varying severity. The right humerus most probably suffered a greenstick fracture at the level of the link of the distal third

with the rest of the diaphysis. The bone is deformed and it forms an antero-posterior angle. The left humerus exhibits, approximately in the middle of the diaphysis, a complete unconsolidated fracture, as well as an angle of pseudarthrosis of exacerbated development (Fig. 36/a-b).

Both radius and ulna pairs are complete. In the left pair, a well healed fracture is observed at the level of the distal third; the axis of the radius makes a small antero-posterior and latero-median angle. A bridge unites both bones in the interosseous space, for a portion of 41 mm, (Fig. 36/c–d). No pathology is observed on the right side. This individual is the most polytraumatized in the entire studied series from Satu Nou – Valea lui Voicu.

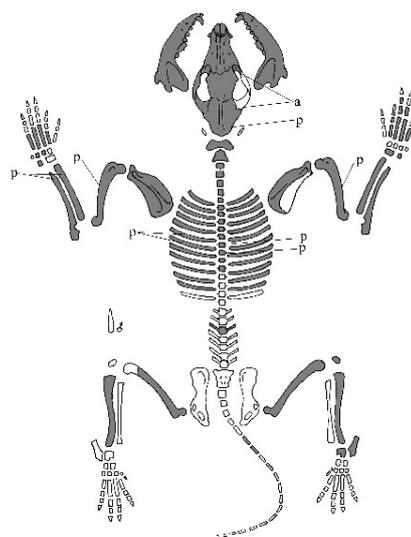


Figure 33. Graphic representation of the anatomical elements in individual 13 (the elements discovered and analysed are illustrated in grey).



Figure 34. Skull of individual 13. a. Dorsal view; b. Basal view; c. Left side view; d. Right side view.

⁴⁶ Horard-Herbin 1997, p. 152, fig. 142.

⁴⁷ Driesch 1976, p. 61.



Figure 35. Anatomical elements with pathology of individual 13. a. Mandibles (occlusal view); b. Thoracic vertebrae with laterally deformed spinous processes (cranial view).

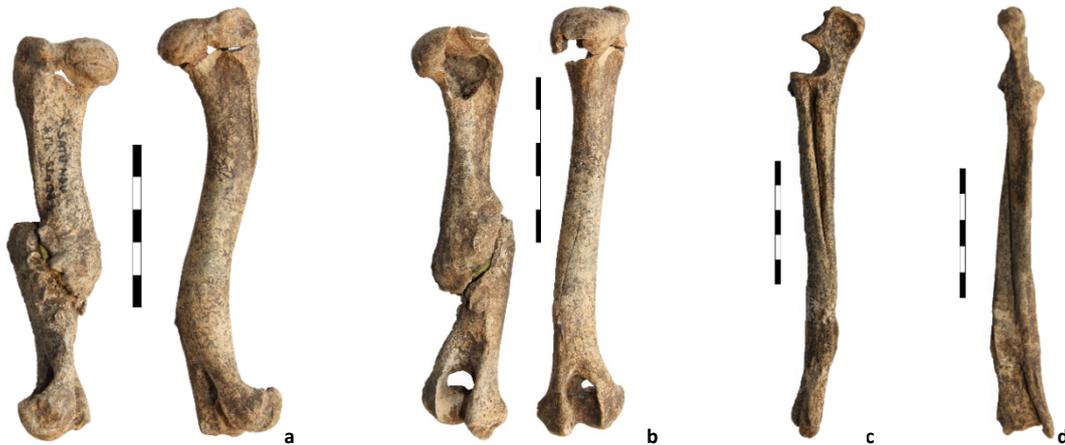


Figure 36. Anatomical elements with pathologies of individual 13. a. Humeri (side view); b. Humeri (dorsal view); c. Radius and left ulna (side view); d. Radius and left ulna (dorsal view).

The skeletal age suggests a dog around 2–3 years old, considering that the intraparietal suture is partially closed and the interfrontal suture is still open (it closes at about 3–4 years). This age is in line with the dental age, indicating an adult dog.

Based on the biometric study of four complete bones (a radius, an ulna and the paired tibias) from individual 13, we calculated the withers height of the animal. The average value after Koudelka is 46 cm ($n = 4$; limits 45.7–46.7 cm), and after Harcourt is 47.4 cm ($n = 4$; limits 46.6–48.2 cm). The average gracility index is 7.2 ($n = 3$; limits 6.8–7.7). These values place this dog in the category of medium size and medium robustness⁴⁸.

Individual 14 (S 1b, witness area with S 1a, square 3–4N)

It is incomplete, many bones are missing (Fig. 37–38). The skull has many recent cracks. Only a portion of the skull cap was reconstituted: the parietal, occipital, and temporal bones. The sagittal crest is slightly prominent. The cranial sutures appear to be open. Several small, isolated fragments were also identified, such as: fragments from both zygomatic bones, left maxillary (with I³, C, P¹–M¹) and

a small portion from the right maxillary (with I³). The skull cap shows traces of a healed old blow of lesser gravity, in the postero-superior angle of the right parietal.

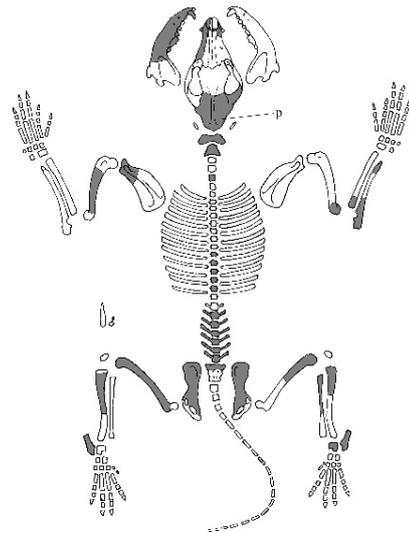


Figure 37. Graphic representation of the anatomical elements of individual 14 (the elements discovered and analysed are illustrated in grey).

⁴⁸ Udrescu et alii 1999, p. 108.



Figure 38. The left mandible of individual 14. a. Lateral view; b. Lingual view.

Only the left half of the mandible is present, with the vertical branch and anterior part destroyed (Fig. 38). It has an extra P₁ (monoradicular), while P₁, P₂ and M₃ were lost post-mortem. Dental wear is in stage B⁴⁹. The basal length of the skull after Dahr is 151.2 mm.

The spine is poorly represented. Only the atlas, the axis, a cervical vertebra, five thoracic, six lumbar and one sacral were identified. The vertebral epiphyses are not fused.

The appendicular skeleton is partially present (Fig. 37). The bicipital tuberosity of the scapula is welded; the humerus is distally fused; the radius is proximally unfused; the ulna is fused at both ends; the acetabulum is welded; the femur is unfused at both ends; the tibia is proximal unfused and the calcaneus is fused.

The skeletal age oscillates between the proximally fused ulna and the unfused proximal radius, which suggests about 11–12 months; at the same time, the tuberosity of the calcaneus fused at about 13–16 months⁵⁰. Therefore, we believe that this animal is around one year old, which corresponds to the dental age.

IV. DISCUSSIONS

IV.1. Considerations on the analysed osteological material

The dog (*Canis familiaris*) is the first animal that was domesticated by human communities before they practiced agriculture (cultivating plants and breeding animals). The species appeared as a result of the domestication of the wolf (*Canis lupus*) more than 16,000 years ago⁵¹ and is man's oldest friend.

The functions that dogs can perform in a human community are extremely varied, from the protection and guarding of property, herds of animals, as well as people, to aiding in hunting, battle, being used as a draft or pack animal, or for leisure (dog fights, company, etc.) or even for consumption. Some of these functions are extremely difficult to attest through archaeology, but quite a few

evidences can be brought by archaeozoology⁵², which deals with the study of faunal remains discovered in archaeological contexts.

We have studied from an archaeozoological point of view 14 partial / incomplete / complete dog remains from at least 14 different individuals unearthed at Satu Nou - Valea lui Voicu. Unfortunately, many of them have several recent cracks and missing elements, caused mainly by the inappropriate handling during archaeological research, as well as during the transportation from the site to various locations (archaeological storage).

Even in these difficult research conditions, after almost 28 years, the studied remains are extremely important, as they provide information on the relationship of human communities with their animals, respectively dogs. Below we describe some of the biometric characteristics of these dogs and make some considerations on these depositions.

Of the 14 depositions, two are males, two are possibly males and four possibly females. Since sexual dimorphism is extremely low in this species, it is difficult to identify their sex; the only viable certain criterion is the presence of the penile bone. It was identified in only two instances (individuals 4 and 11).

The basal length of the skull has an average value of 151 mm after Brinkmann (n = 7; limits 141.4–161.2 mm) and 153.1 mm after Dahr⁵³ (n = 10; limits 147.1–167.8 mm).

The height of these animals has an average value of 50.2 cm (n = 5; limits 46–55.6 cm) after Koudelka and 51 cm (n = 5; limits 47.4–56.8 cm) after Harcourt; as noticed, these values are relatively the same. The gracility index has an average of 7.4 (n = 5; limits 6.6–8.3). These figures indicate medium and above-medium sized dogs of medium robustness⁵⁴. The value is close to that calculated for the eponymous settlement of the Babadag culture⁵⁵ of 52.8 cm (Koudelka index) and 54.1 cm (Harcourt index) and Vânători⁵⁶ (12th–10th centuries BC) where, for a male dog, the height was estimated at 47.7 cm after Koudelka and 47.4 cm after Harcourt, with a gracility index of 7.1.

⁴⁹ Horard-Herbin 1997, p. 152, fig. 142.

⁵⁰ Silver 1969, p. 285–286.

⁵¹ Ollivier 2017.

⁵² Méniel 2006.

⁵³ Driesch 1976, p. 61.

⁵⁴ Udrescu *et alii* 1999, p. 108.

⁵⁵ Haimovici 2008, p 162, tab 10.

⁵⁶ Ailincăi, Bălășescu, unpublished.

At Celic Dere⁵⁷ (6th–4th centuries BC) two dogs were identified, partial or complete, with a relatively smaller height, about 42.2 cm and 43.7 cm, respectively (after Harcourt). At Beidaud, in a Hallstattan context (Pit 11), the remains of an incomplete dog⁵⁸, 51 cm tall⁵⁹, were discovered. The size of the dogs from the La Tène period (the settlements from Bordușani⁶⁰, Popești, Radovanu, Vlădiceasca, Piscul Crășani, Cârломănești, Grădiștea⁶¹ and Vadu Anei⁶²) is relatively larger than that of the animals from the Early Iron Age.

The slaughter age of these animals is extremely variable. To determine it, we used both dental wear and skeletal age criteria. In each case, we tried to confront the two age assessment systems. We specify that all animals are over 6 months old. Thus, of the 11 individuals whose dental age was estimated, most are young animals in stages A (4), B (2) and C (2), under 15 months. Only three individuals are adults, two in stage D, and one, very old, in stage E.

The skeletal age was determined for 12 individuals, out of which dental age criteria was available for nine individuals. Of the 12 individuals, seven are young, under 12–18 months, and the rest are over 18–24 months. There is a good correlation between dental and skeletal age. Thus, individuals up to stage C of dental wear are under 15 months, while the rest exceed this age.

The combination of the two criteria shows that nine individuals are subadults (between 8 and 18 months) and five are adults. There is a predominance of young animals, but not very young.

In half of the 14 depositions, human interventions were observed, some of them, involving the skull, death causing (four individuals – 2, 8, 9, 13). Traces of cutting at the postcranial skeleton were also highlighted: atlas (individual 8), scapula (individual 2), coxal (individual 1), femur (individual 3), tibia (individual 10). We can assume that these animals were sacrificed by blows, especially to the head. Regarding the cut marks on the postcranial skeleton, it is possible that they targeted both disarticulation (coxal) and defleshing / meat recovery (scapula, femur, tibia) for consumption (cynophagy) during ceremonies.

Cynophagy is a phenomenon encountered since the beginning of the domestication of the dog, from the Palaeolithic period. The phenomenon has been observed throughout history, with a greater or lesser intensity, depending on the geographical region, the historical period, the research stage, etc⁶³. This practice is currently part of the culinary culture of many countries, mainly from

Asia (Vietnam, Korea, China and Indonesia) and Africa. Cynophagy is often viewed with disgust by Europeans, especially since the end of the twentieth century, when it was explicitly forbidden.

Extremely interesting is the fact that nine of these individuals have varied pathologies, which affect different anatomical elements, from the skull to the phalanges. Most of these pathologies healed during the lifetime of these individuals, indicating that these animals suffered various blows or accidents, some of the animals at a relatively young age.

IV.2. Satu Nou finds in a broader context

Most of the archaeozoological studies regarding the Babadag culture have been carried out on the domestic waste of these communities. The presence of dog remains in the various faunal samples from this culture is quite discreet in most settlements, having a share of less than 2–3% (1.8% as NR in Satu Nou⁶⁴), except for the Niculițel site⁶⁵, where it reaches 7.5%, and Enisala⁶⁶, where the proportion is 7.3%. The rarity of dog remains is also closely linked to its poor documentation in various domestic contexts of this culture; it means that it was not part of the animals usually consumed by these communities (so far, we do not have such evidence).

The discovery of a relatively large number of dogs in Satu Nou in anatomical connection, with a more or less complete representation of the skeleton, in different special contexts (funeral and / or ritual), suggests the intention of the community to sacrifice this animal and, perhaps, to consume its flesh; this is an indirect indication of a strong symbolic relationship between dog and man in the Early Iron Age.

The interaction between dog and man reveals to us in Satu Nou the position of this animal within the community. So far, no such situation has been published / identified in the Romanian archaeology, in which several skeletons / skeleton parts of this animal are found in a “ritual” ditch and a pit (Pit 41), associated with human bones, kitchen waste, pottery and other artefacts, hence the difficulty of interpreting this unique and extremely interesting material for the early period of the Iron Age.

The rarity of this situation is also due to the special status that the site from Satu Nou – *Valea lui Voicu* probably had for the human communities from the beginning of the first millennium BC, on the Lower Danube. Not long ago, in a study dedicated mainly to human body depositions, we pointed out that the discoveries from

⁵⁷ Haimovici, Bodi 2003, p. 482.

⁵⁸ Haimovici, Chirilă 2004, p. 306.

⁵⁹ Haimovici, Chirilă 2004, p. 307 – unfortunately, the index used to calculate the withers height is not specified, and we do not have access to the original biometric data.

⁶⁰ Bălășescu 1997.

⁶¹ Udrescu 1985; 1990.

⁶² Moise 2000.

⁶³ Arbogast 2018; Horard-Herbin 2014; Horard-Herbin *et alii* 2014; Meniel 2006; Bălășescu *et alii* 2005, Bălășescu, Morintz 2018; Lazăr *et alii* 2016.

⁶⁴ Bălășescu *et alii* 2015.

⁶⁵ Stanc, Radu 2013.

⁶⁶ Stanc *et alii* 2019.

Satu Nou – Valea lui Voicu must be regarded in the context of the funerary discoveries identified in the Early Iron Age settlements in southeastern Europe⁶⁷, especially those attributed to the Babadag culture⁶⁸ on the Lower Danube. A complex burial practice has been documented here, based on specific practices of deposition, decomposition and manipulation of bodies, outlining a burial behaviour that ultimately resulted in the burial of the deceased in settlements or places other than cemeteries⁶⁹. In addition to the numerous animal bones⁷⁰ and dogs discovered in anatomical connection, human bones from no less than 26 individuals were also unearthed in Satu Nou, some of them also showing traces of violence. The state of connection and fragmentation of human osteological material indicates, as in other cases⁷¹, the existence of this unusual funerary ritual, which was accompanied in Satu Nou by animal sacrifices (dogs). Although the bones of the analysed dogs show evidence of violent episodes with bone fractures, some of them healed, in at least four cases, the animals died as a result of blows to the head. On the other hand, the faunal remains that can be considered kitchen waste are quite abundant and can be compared proportionally with analysed lots from other sites of the Babadag culture. Their association could suggest the organization of ceremonies with deposition of human bodies as their main purpose. These ceremonies, it seems, involved both the slaughter and consumption of animals (dogs).

Given the above, it is difficult to believe that this site was a settlement. As we have pointed out so far, it is very interesting that, on the analysed bones, both human and animal, there are very few signs of animal intervention (wild or domestic) on the bodies. This is probably due to the existence of some protection structures, as we suspect would have existed also in the case of other similar discoveries from sites of the Babadag culture⁷².

Another site with a special status is the one in Hlinjeni, Republic of Moldova. In the 570 sqm researched in 1988–1990, almost 150 archaeological structures were discovered (pits of different sizes, agglomerations of materials, etc.) that contained complete artefacts, animal

bones, but also human bones from at least 147 individuals, mostly subadults⁷³. Many of these depositions, dated to the first part of the first millennium BC, among other things, also contained dog bones⁷⁴.

Although dog osteological remains are present in many contemporary sites⁷⁵, depositions of dogs or other animals dating to the early 1st millennium BC in the Carpatho-Balkan area are very rare⁷⁶. In the 1988 excavation field notes from Niculițel, Florin Topoleanu noted the discovery of a dog skeleton in pit 7, information that we also quoted⁷⁷. There are published cases of whole pig and dog bodies or body parts depositions from the Babadag settlement in Bucu, on the Ialomița Valley⁷⁸, as well as in Dobrogea, in Celic Dere⁷⁹ (two dogs – no structures specified) and Beidau⁸⁰ (a dog in Pit 11). Also, on the Ialomița Valley, at Platonești, a feature is mentioned that contained a skeleton from a large mammal, probably cattle⁸¹. Relatively recently, at the site of Vânători⁸², Galați County (12th–10th centuries BC), the entire skeleton of a male dog deposited on the bottom of pit 1125 was discovered.

There is also pit 18, from sector Z, level Ha I2 from Popești, where, in addition to pottery, the corpses of two young pigs were deposited⁸³. Part of a horse skeleton was also documented in the settlement of Saharna – Țiglău (Republic of Moldova)⁸⁴. Other depositions of whole animals were discovered in clear funerary contexts, such as those from Meri (ovicaprines)⁸⁵, Prăjeni (ovicaprines)⁸⁶ or Trifești (two bovines)⁸⁷. Quite exceptional cases can be considered the two collective graves in Gomolava, Serbia. The first grave contained the bones of 32 people, along with red deer and dog bones, millet and barley grains, as well as ceramic containers and metal objects⁸⁸. The second mass grave contained the remains of 78 people, most of them subadults. Also, a part of the skeleton of a bovid in anatomical connection was discovered, as well as charred cereals, mill fragments and numerous ceramic fragments. Some skeletons had in their immediate vicinity several items of clothing and adornment (pendants, bracelets, a discoid appliqué and three fibulae)⁸⁹.

Another interesting situation is found at Svilengrad, Bulgaria. Here, during archaeological rescue researches, a

⁶⁷ Ailincăi 2015; Ailincăi *et alii* 2016b.

⁶⁸ Ailincăi *et alii* 2005–2006; Ailincăi 2008a.

⁶⁹ Ailincăi *et alii* 2016a.

⁷⁰ Bălășescu *et alii* 2015.

⁷¹ Ailincăi 2015.

⁷² Ailincăi 2008a; 2008b; Ailincăi, Constantinescu 2015; Ailincăi 2015, etc.

⁷³ Gol'ceva, Kašuba 1995.

⁷⁴ Čemyrtan 1995. Almost 10% of the pits attributed to the Saharna and Șoldănești cultures also contained dog bones.

⁷⁵ Stanc, Radu 2013; Stanc, Ailincăi 2013; Stanc *et alii* 2019.

⁷⁶ Vezi Sîrbu 1993a; Arnăut 2014, p. 104–116. The same situation is found in Central Europe, see in this regard the analysis made by Škvor Jernejčič, Toskan 2018.

⁷⁷ Topoleanu, Jugănar 1995, Fig. IV/2; Ailincăi *et alii* 2016a, p. 238.

⁷⁸ Rența 2008, p. 73–74.

⁷⁹ Haimovici, Bodi 2003, p. 482. The settlement of Celic Dere dates between the end of the 6th century and the beginning of the 4th century BC (Șimion 1997).

⁸⁰ Haimovici, Chirilă 2004, p. 307. Unfortunately, we do not have information about the position on the plan and the content of pit 11. The site has a level of habitation attributed to the Babadag culture (10th–9th centuries BC) and one dated to the 6th–5th centuries BC. (Șimion 2003).

⁸¹ Rența 2008, p. 75.

⁸² Ailincăi, Bălășescu, unpublished.

⁸³ Palincaș 2004–2005.

⁸⁴ Niculiță, Niciu 2014.

⁸⁵ Moscalu 1976; Bolomey 1976.

⁸⁶ Ursulescu, Șadurschi 2005.

⁸⁷ Ioniță 1962.

⁸⁸ Tasić 1972, p. 32.

⁸⁹ Tasić 1972; 1972–1973.

site considered to be a “pit sanctuary” was investigated. The depositions date to both the Early and Late Iron Age, which suggests continuity in the use of this space as a place for ritual practice. In addition to the depositions of human bodies, in 16 pits skeletons of animals in anatomical connection were discovered, especially dogs, but also pigs and ovicaprines. The analysis revealed that they were mainly new-born or very young animals. Although animal depositions date back to the Late Iron Age, this custom seems to have been practiced since the beginning of the first millennium BC (Pšeničevo culture), as most of the depositions of human bodies are dated⁹⁰.

In fact, as the Svilengrad discoveries indicate, the deposition of whole animals intensified in the Late Iron Age. This fact is illustrated throughout the Carpatho-Balkan area by numerous discoveries from necropolises, settlements or other places⁹¹. Although it was published almost 30 years ago, Valeriu Sîrbu's study on ritual animal sacrifices in the Carpatho-Danubian area between the 11th century BC and the 3rd century AD shows this change in behaviour regarding depositions of animals. The situation remains almost the same regarding dog depositions. The dogs held 19% of the total number of depositions and were dated only in the Late Iron Age and Roman times⁹². A series of discoveries from the current territory of Bulgaria should also be mentioned. In addition to the site at Svilengrad, dog depositions are also known at sites such as Koprivlen⁹³, Radnevo⁹⁴, Debel⁹⁵, etc.; dogs and horses are the most common animals that were sacrificed in the Thracian world⁹⁶.

Animal sacrifices and depositions, especially of dogs, occur in different contexts, eras and areas, with different ways of representation and, obviously, numerous ways of interpretation⁹⁷. In the case of the dog depositions from Satu Nou, as we have shown above, they may be related to a ritual context, probably associated with a complicated funeral process, difficult to reconstitute. Indications of blows identified on both dog and human bones may suggest the practice of animal sacrifices (dogs), probably also human. Until now, the discovery from Satu Nou can be considered unique in the Carpathian-Balkan area, the dog depositions in this area at the beginning of the first millennium BC being almost non-existent. The situation is somewhat different from that of Anatolia⁹⁸ and Greece⁹⁹,

where dogs often appear in funerary and ritual contexts, especially since the late Bronze Age. The deposition of dogs in the tombs of the Mycenaean period is a frequently documented custom. It gradually disappeared in mainland Greece, especially after the Geometric period¹⁰⁰.

In the Homeric account of the funeral of Patroclus, in addition to sheep, cows and horses, 12 young Trojans were sacrificed, together with two of the deceased's dogs¹⁰¹. The sacrifice of the two dogs clearly takes place in a funerary context, even if their role in the ritual can be interpreted differently. Ancient sources provide some details about the complexity of dog sacrifices in the prehistoric period, when, both in Greece and in Italy, they are associated with certain deities¹⁰². The dogs had a therapeutic and purifying role. The sacrifice of puppies was associated with the worship of the goddess Hecate. The daughter of Tartarus and Demeter, Hecate accompanied the souls of those who died prematurely or those who did not have a funeral. Although we cannot draw a proper comparison, it is interesting to mention that in Satu Nou slaughtered dogs appear together with numerous child bones and bizarre depositions of human remains.

V. CONCLUSIONS

The archaeozoological study carried out in Satu Nou – *Valea lui Voicu* brings new information on the relationship between humans and dogs in the early period of the Iron Age. The analysis of 14 more or less complete individuals, some of them in anatomical connection, indicates that some of them were sacrificed by blows to the head (at least 4 individuals) and were eaten (at least five individuals). This phenomenon of cynophagy must be seen in a ritual and funerary context, if we consider the special archaeological situation in Satu Nou.

Of the 14 dog depositions, two are males, two possibly males and four possibly females. By slaughter age, young animals are predominant: nine individuals are subadults (between 8 and 18 months) and five are adults.

The average height of the animals is 50.2 cm (n = 5; limits 46–55.6 cm) after Koudelka and 51 cm (n = 5; limits 47.4–56.8 cm) after Harcourt, and the average gracility index is 7.4 (n = 5; limits 6.6–8.3). These figures point to medium and above-medium-sized dogs of medium robustness¹⁰³.

⁹⁰ Nekhrizov 2006; Nekhrizov, Tzvetkova 2008; 2012; Ninov 2006; 2008.

⁹¹ Sîrbu 1993a; 1993b; 2001; 2004; 2006; Sîrbu, Dăvinca 2004; 2018; Ursachi 1995; Vulpe, Teodor 2003; Teleaga 2017.

⁹² Sîrbu 1993a, p. 96–108.

⁹³ Vulcheva 2002, p. 103, 112–113; Bozkova *et alii* 2002.

⁹⁴ Savatinov 1997.

⁹⁵ Balabanov 1999.

⁹⁶ Vulcheva 2002, p. 112; Teleaga 2017.

⁹⁷ See, for example, Gräslund 2004; Snyder, Moore 2006; Wilkins 2006; Aldhouse Green 2002, p. 37–52; Lacam 2008; Chadwick 2015; Vuković-

Bogdanović, Jovičić 2015; Costamagno *et alii* 2018; Dixon 2018; Lev-Tov *et alii* 2018; Thurston 1996 and others.

⁹⁸ Robertson 1982.

⁹⁹ Day 1984.

¹⁰⁰ Day 1984.

¹⁰¹ *Iliad* XXIII, 170–175.

¹⁰² See discussions at Day 1984; de Grossi Mazzorin, Minniti 2006; Trantalidou 2006; Lacam 2008.

¹⁰³ Udrescu *et alii* 1999, p. 108.

Nine of these individuals have extremely varied pathologies that affect different skeletal elements, from the skull to the phalanges. Most of these pathologies healed during the individuals' lifetime, but illustrate that the animals suffered various blows or accidents, some of them at a relatively young age.

In addition to the psychopomp attributes, the dog was considered a companion of the warrior and hunter, but at the same time he was also a guardian of the home¹⁰⁴, with a therapeutic and purifying role. In our case, the dogs were sacrificed (sometimes violently), deposited as an offering and sometimes probably ritually consumed.

It should be mentioned that, in the archaeological structures studied at *Valea lui Voicu*, human bones and pottery were also identified, together with numerous animal remains that may have come from the funeral banquets that probably took place in this area. The association of all these archaeological, anthropological and archaeozoological materials may suggest the existence of dog sacrifices at funerals (as companions of the deceased), when part of the animal was laid near the deceased and another part was consumed during the funeral ceremony.

ACKNOWLEDGEMENTS

Adrian Bălăşescu's zooarchaeological work was supported by a grant from the Romanian Ministry of Research and Innovation, CCCDI – UEFISCDI, project number PN-III-P1-1.2-PCCDI-2017-0686, within PNCDI III. We would like to thank our colleagues Mihai Constantinescu and regretted Nicolae Miriţoiu from the "Francisc I. Rainer" Institute of Anthropology of the Romanian Academy, who generously provided us with this faunistic material that would otherwise have been lost to the scientific world. We also thank Cătălin Nicolae for the photos of the dog bones.

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¹⁰⁴ Sîrbu 1993a, p. 110.

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Annex 1. Biometrics¹⁰⁵

CRANIUM	Ind 2	Ind 3	Ind 3	Ind 4	Ind 4	Ind 5	Ind 7	Ind 7	Ind 8	Ind 8	Ind 9	Ind 9	Ind 11	Ind 11	Ind 13	Ind 13	Ind 14	N	MIN	MAX	AVG
1		187.3	180.5				157	172.2					174.5	165				5	157	187.3	172.8
2		172.5	169				151.5	162					164.2	156.5				6	151.5	172.5	162.6
3		164.3	160.5				143	154					156.5	147.2				5	143	164.3	154.3
4								47.5						37				2	37	47.5	42.3
5								106										1	106	106	106.0
7		94.5	89.2					85.6					85.5	79.5				5	79.5	94.5	86.9
8			86					87						82				3	82	87	85.0
9		106.3	103					98					97.6	100				5	97.6	106.3	101.0
10								52.2										1	52.2	52.2	52.2
12			74.5					71.5						73				3	71.5	74.5	73.0
13			90					83.5										3	82.6	90	85.4
13a			87.5					83.1				82.6						2	83.1	87.5	85.3
14			35															1	35	35	35.0
14a			32.5															1	32.5	32.5	32.5
15		64	60.7				58.3											9	56.5	66	61.7
16	18.8	20	15				18	16.8										10	15	20	17.5
17		51	47.2				44.2	45									45	12	42	51	46.9
18L	19.6	20	19.6				18.3	18									18.2	13	17.3	20.2	18.8
18GB	10.2	9.5	10	8.8			10	10.2									10.2	13	8.8	10.3	9.8
18B	7.3	7	7.3	6.8			7.3	6.9									6.9	13	6.8	8.1	7.3
19		19	18.3					17.4									17.3	10	16.1	19.1	17.7
20L	13	13.4	13.5	12.2			13.1	13.7									14.2	13	12.2	20.5	13.9
20B	14.7	15.2	15.2	13			13.5	13.2									15.3	12	13	15.7	14.4
21L	6	6.4	6	6			6.6	6.6										11	5.6	7.4	6.6
21B	8.4	9	7.8	7.8			8.5	8.7										11	7.8	10	8.6
22																		2	21.2	21.3	21.3
23	60.2	66.1	65.1	65.1			60.4									21.3		6	60.2	66.1	62.7
24		61.3	63.6	63.6			61.5											6	59	63.6	61.0
25	35.7	36.4	35.4	35.4			37.7	36.5										8	35.3	50.6	38.0
26	53.9	52.3	64.8	64.8			60.4	62.9										7	50.1	64.8	57.8
27	16.8	18.1	19.4	19.4			18.4	19.1										7	16.8	19.6	18.6
28	14.6	12.6	13.1	13.1			13.2	14.2										7	12.6	17.1	14.3
29	52.7	52.8	54.6	54.6				53.3										6	52.7	56	54.2
30		98.2	100.9	100.9				98										5	88.5	100.9	96.1
31		35.5	39.7	39.7				34.4										5	34.4	39.7	37.1
32		49.8	50.8	50.8				43.1										5	43.1	50.8	47.3
33		37.6	38.9	38.9				32.4										5	32.2	38.9	35.0
34		65.9	59.9	59.9				62										5	57.9	65.9	61.6
35		34.2	36	36				34										6	32.7	36.1	34.6
36		36.1	36.6	36.6				35.7										6	33.9	36.8	35.7
37		28.1	28.1	28.6	27.3			26.5										7	26.5	29.4	27.8
38		52.1	54.4	54.4				51.6										5	51.6	55.5	53.4
39		49.3	53.1	53.1				49.6										4	49.3	53.5	51.4
40	43.4	42.3	45.4	45.4				43.1										6	41.7	45.6	43.6

¹⁰⁵ Biometric data are based after Angela von den Driesch (1976) and are expressed in millimetres; Legend: l – left part; r – right part.

MANDIBULA	Ind 2 I	Ind 2 r	Ind 3 I	Ind 3 r	Ind 4 I	Ind 4 r	Ind 5 I	Ind 5 r	Ind 6 I	Ind 6 r	Ind 7 I	Ind 7 r	Ind 8 I	Ind 8 r	Ind 9 I	Ind 9 r	Ind 11 I	Ind 11 r	Ind 13 I	Ind 13 r	Ind 14 I	N	MIN	MAX	AVG
1			136.5								118.4	118.3				120.2	130.6	130.7				6	118	137	125.8
2			131.1			135.7					118.9	119.4					129.5	128.7				6	119	136	127.2
3			128			129.4					113.9	114.4										7	114	129	122.2
4			117.5								101.1	100.7					113.3	113.5	106.4	107		8	101	118	107.7
5	104		112.3								96.9	97.3	107.2	106.1			110.6	109.7	102	101.1		11	96.9	112	104.2
6	107.2		115.2			116.8					102.9	103	112.5	111.3			112.2	111.5	106.5	106.7		11	103	117	109.6
7	73.7		75.5	76		73.2				68.8	70.1	71	74.3	73.9	73	72.5	78.3	77.8	70.8	71	72.7	16	68.8	78.3	73.3
8	65.9		68.1	68.5		68.9				67.1	67.4	66.9	68.3	68.5	67.2	67.5	72.8	73.3	66.2	66.1	67.3	16	65.9	73.3	68.1
9	62.2		63.7	63.5		64.6				60.6	61.8	61.4	63	64.2	62.3	62	68.9	68.4	62	62.1	63.4	16	60.6	68.9	63.4
10	35.7	35.9	33	33.5		31.6				31.7	32.7	32.5	34.3	34	21.7	31.6	36.2	35.8	31.8	31.6	34	17	21.7	36.2	32.8
11	30.7		35.3	35.4	38.2	37.3	35.2	35.6		34.5	35.7	35.8	35.6	35.6	36.7	36.7	38.2	38.1	34.8	35	34.4	18	30.7	38.2	35.7
12	26.5		31.3	30.6	32.5	32.6	30.4	31.2	28.2	28.7	30.2	30.3	30.8	30.8	32	32.2	33.6	33	30.7	30.8	30.1	19	26.5	33.6	30.8
13L	22.1	22.4	22.5	21.6	20.2	19.5	19.96	20	20.4	20.3	19.9	20.4	22.1	22.3	19.5	19.4	23.1	23	19.6	19.7	21.5	21	19.4	23.1	20.9
13B	8.7	8.65	8.4	8.6	7.9	7.8	8.1	7.9	7.7	7.4	7.7	7.7	8.8	8.9	8.5	8.4	9	8.9	7.8	7.7	8.5	21	7.4	9	8.2
14	21.9	21.7	20.4	20.7	18	18.1	19	18.9	19.7	20	19.1	19	21	20.8	18.4	18.1	24.2	21.7	18.5	18.8	20.6	21	18	24.2	19.9
15L	8.6	8.8	8.8	8.9	8.5	8.3			7.3	7.8	8.6	8.6	8.7	8.6	8	8.2	9.2	9.2	8	8		18	7.3	9.2	8.5
15B	5.9	4.8	5.9	6.3	6.1	6			6.1	5.9	6.2	6.2	6	6.1	6	6.1	6.5	6.5	6.1	6.2		17	5.9	6.5	6.1
16L	4.8		4	4		4.2					4.4	4.4	3.7	4		4.5			4.3	4.3		9	3.7	4.8	4.2
16B	4.3		3.8	3.9		3.8					3.7	3.7	3.3	3.8		4						9	3.3	4.3	3.8
18	46.2	47.5	50.6	51.1	54						48.2	48.4	51.7	50.7			47.4	47.5	44.3	45.5		13	44.3	54	48.7
19	18.2	18.3	19.1	19.1	17.5	18	22.2	18	18.7	18.6	17.7	18	18.7	17.5	18.8	18.2	18.8	18.8	16.9	17.5	19.3	20	16.9	22.2	18.5
20	24	23.2	21.7	21.9	24.2	24.1	18.4	18.2	19.1	18.7	20.9	20.9	22.2	23.2	22	21.5	21.3	21.3	20.8	21.5	24.6	21	18.2	24.6	21.6
22			158.6			164.2					143.9	144.5					156.7	155.7				6	144	164	154
Brinkman 2																									
23			161								138.5	138				140.3	155.2	155.5	145.8	146.6		8	138	161	148
24			164								141.5	142.1	156.5	154.9		145	161.5	160.2	148.9	147.6		11	141	164	152
Brinkman 5	151.8																								
25	151.8		161.2								141.3	141.5	156.5	154.9		142.6	157.8	157.1	147.3	147.1		11	141	161	151
26	147.1		153.5	154.7		155.8				150.6	151.5	150	154.1	154.7	150.9	151.8	167.1	168.6	148	147.7	151.2	16	147	169	154

SCAPULA	Ind 3 r	Ind 4 r	Ind 7 r	Ind 11 l	Ind 11 r	Ind 12 l	Ind 12 r	Ind 13 l	Ind 14 l	N	MIN	MAX	AVG
SLC		23.7	21.1	24.3			26	20.8	21.9	6	20.8	26	23.0
GLP	26	27.7	26.1	31	30		30.7		26.3	7	26	31	28.3
LG	23.8	23.9	23.2	27.2	27		26.6	25.5	23.2	8	23.2	27.2	25.1
BG	16.4	16.2	15.2	18.2	18.2	19	19.2	16.3	14.9	9	14.9	19.2	17.1

HUMERUS	Ind 4 l	Ind 4 r	Ind 8 l	Ind 8 r	Ind 11 l	Ind 11 r	Ind 12 l	Ind 12 r	Ind 14 r	N	MIN	MAX	AVG
GL			154	152.5			170.8			3	152.5	170.8	159.1
Bp				39.9			41.6			2	39.9	41.6	40.8
SD			12.3	12.2		11.8	13.6	14		5	11.8	14.0	12.8
DD			12.9	12.8			13.4	13.7		4	12.8	13.7	13.2
Bd	30.6	30.6	31.2	30.5	33.2	32.7	34.3	33.7	29.8	9	29.8	34.3	31.8
DAPd	24.4	23.8	24	24.4	26.5	26.1	26.9	26.8	22.4	9	22.4	26.9	25.0
gracility index			8.0	8.0			8.0			3	8.0	8.0	8.0
withers height (Koudelka)			519	513.9			575.6			3	513.9	575.6	536.2
withers height (Harcourt)			501.7	496.5			559.3			3	496.5	559.3	519.2

RADIUS	Ind 4 l	Ind 4 r	Ind 8 l	Ind 8 r	Ind 12 l	Ind 12 r	Ind 13 l	N	MIN	MAX	AVG
GL				149.8		169.5	145.2	3	145.2	169.5	154.8
Bp	16.3	16.3		17.2	18.8	19.1	16.1	6	16.1	19.1	17.3
DAPp	11.2	11.8		11.5	12.3	12	10.2	6	10.2	12.3	11.5
SD			11.8	11.1	13.3	13.3	11.2	5	11.1	13.3	12.1
DD			6.1	6.2	6.2	6.2	5.2	5	5.2	6.2	6.0
Bd			22.3	22		24.2	20.7	4	20.7	24.2	22.3
Dd			12.8	12.5		13.3	11.5	4	11.5	13.3	12.5
gracility index				7.4		7.8	7.7	3	7.4	7.8	7.7
withers height (Koudelka)				482.4		545.8	467.5	3	467.5	545.8	498.6
withers height (Harcourt)				495.9		558.5	481.2	3	481.2	558.5	511.9

ULNA	Ind 4 l	Ind 4 r	Ind 7 r	Ind 7 l	Ind 8 r	Ind 12 l	Ind 12 r	Ind 13 l	N	MIN	MAX	AVG
GL						210	210.7	171	3	171	210.7	197.2
LO	16	16.4	16.8	16.7	16.7	20	19.6	18.6	8	16	20	17.6
DPA	19.4	19.4	20.9	21	24.2	24.4	25.5	21.3	8	19.4	25.5	22.0
SDO	23.2	22.9	17.8	17.9	20.5	22.2	22.4	17.9	8	17.8	23.2	20.6
BPC	14.6	14.7	12.5	13	15.9	16.2	16.3	16	8	12.5	16.3	14.9
withers height (Koudelka)						560.7	562.6	456.6	3	456.6	562.6	526.6
withers height (Harcourt)						590	592	481.6	3	481.6	592	554.5

PELVIS	Ind 1 l	Ind 3 l	Ind 3 r	Ind 7 r	Ind 7 l	Ind 8 r	Ind 11 r	Ind 12 l	N	MIN	MAX	AVG
GL								141.6	1	141.6	141.6	141.6
LA	18.9	18.1	18.1	18.9	19	21	20.8	21.1	8	18.1	21.1	19.5

FEMUR	Ind 3 r	Ind 8 l	Ind 8 r	Ind 10 r	Ind 12 l	Ind 12 r	Ind 13 l	Ind 13 r	N	MIN	MAX	AVG
GL				170.8	186	188			3	170.8	188.0	181.6
GLC				166.2	183.6	184.3			3	166.2	184.3	178.0
Bp	31.6			37.2	36.8	37.6	32		5	31.6	37.6	35.0
DC	15.3			18.2	18.8	17.7	16.9		5	15.3	18.8	17.4
SD		13.4	13.2	14.1	13.7	13.7			5	13.2	14.1	13.6
DD		13.3	13.3	13	13.9	13.6			5	13.0	13.9	13.4
Bd		30.8	30.2	30.6	31.3	31.9		27.7	6	27.7	31.9	30.4
Dd		33.6	33.7	32.3	35.9	34		28.8	6	28.8	35.9	33.1
gracility index				8.3	7.4	7.3			3	7.3	8.3	7.6
withers height (Koudelka)				514.1	559.9	565.9			3	514.1	565.9	546.6
withers height (Harcourt)				523.4	571.1	577.4			3	523.4	577.4	557.3

TIBIA	Ind 3 r	Ind 4 l	Ind 4 r	Ind 7 l	Ind 8 l	Ind 8 r	Ind 10 l	Ind 10 r	Ind 12 l	Ind 12 r	Ind 13 l	Ind 13 r	N	MIN	MAX	AVG
GL	165.3				165	165.2			183	186.5	156.5	156.8	7	156.5	186.5	168.3
Bp	29.3				33.6	33	34.1	33.5	31.9		29.2	30	8	29.2	34.1	31.8
DAPp	31.2				34.5	34.2	34.8	35	37		29.4	30	8	29.4	37.0	33.3
SD	11				11.8	11.8			13.3	13	10.7	11	7	10.7	13.3	11.8
DD	10.8				10.8	11.2			12.4	12.9	10.8	10.5	7	10.5	12.9	11.3
Bd	18.9	21.5	21.4	20.4	21.3	20.6			22.5	22.7	19.3	19.1	10	18.9	22.7	20.8
DAPd	13.9	15.7	16	15.7	16.1	16.3			17.2	17.1	14.1	14.7	10	13.9	17.2	15.7
gracility index	6.65				7.15	7.14			7.27	6.97	6.84	7.02	7	6.7	7.3	7.0
withers height (Koudelka)	482.7				481.8	482.4			534.4	544.6	457	457.9	7	457.0	544.6	491.5
withers height (Harcourt)	492.1				491.2	491.8			543.8	554	466.4	467.3	7	466.4	554.0	500.9

CALCANEUS	Ind 10 l	Ind 14 l	Ind 14 r	N	MIN	MAX	AVG
GL	41.5	40.7	41.2	3	40.7	41.5	41.13
BG	18.5	15.1	15.3	3	15.1	18.5	16.3

ASTRAGALUS	Ind 10 r	Ind 14 r
GL	25.7	24.5
BG	18.5	16.3

ABREVIERI / ABRÉVIATIONS / ABBREVIATIONS

- AAC – Acta Archaeologica Carpatica, Kraków
ACMI – Anuarul Comisiunii Monumentelor Istorice, București
ACSS – Ancient Civilisations from Scythia to Siberia, Leiden
ActaArch – Acta Archaeologica. København
ActaArchHung – Acta Archaeologica Academiae Scientiarum Hungaricae, Budapest
AJA – American Journal of Archaeology, Boston
Alba Regia – Alba Regia. Annales Musei Stephani regis, Székesfehérvár
Altertum – Das Altertum, Deutsche Akademie der Wissenschaften zu Berlin Sektion für Altertumswissenschaft Akademie der Wissenschaften der DDR Zentralinstitut für Alte Geschichte und Archäologie, Berlin
Aluta – Aluta. Revista Muzeului Național Secuiesc Sfântu Gheorghe
AM – Mitteilungen des Deutschen Archäologischen Instituts, Athenische Abteilung, Berlin
AMI(T) – Archäologische Mitteilungen aus Iran (und Turan)
ANRW – *Aufstieg und Niedergang der römischen Welt. Geschichte und Kultur Roms im Spiegel der neueren Forschung*, Berlin – New York, 1972–1998
Antaeus – Antaeus. Communicationes ex Instituto Archaeologico Academiae Scientiarum Hungaricae, Budapest
Antiquity – Antiquity. A Review of World Archaeology, Durham, UK
Anuarul MJIAP – Anuarul Muzeului Județean de Istorie și Arheologie Prahova, Ploiești
AnUCraiova – Analele Universității din Craiova
AnUVT – Annales d'Université "Valahia" Târgoviște, Section d'Archéologie et d'Histoire
Apulum – Acta Musei Apulensis. Muzeul Național al Unirii, Alba Iulia
ARA – Annuaire Roumain d'Anthropologie
ArchBulg – Archaeologia Bulgarica, Sofia
ArchÉrt – Archaeologiai Értesítő. A Magyar Régészeti és Művészettörténeti Társulat tudományos folyóirata, Budapest
ArchHist – Archeologia Historica, Brno
ArchKorr – Archäologisches Korrespondenzblatt, Mainz
ArchRozhledy – Archeologické Rozhledy, Praha
Area – Area, Royal Geographical Society, London
ArheologijaSofia – Arheologija. Organ na Archeologičeskija Institut i Muzej, Sofia
ArhMold – Archeologia Moldovei, Iași
ArhVestLjubljana – Arheološki vestnik. Inštitut za arheologijo ZRC SAZU, Ljubljana
ASC – Archeologica Slovaca Catalogi, Bratislava
AVANS – Archeologické Vyskumy a Nálezy na Slovensku, Nitra
BARIntSer – British Archaeological Reports. International Series, Oxford
BARSupSer – British Archaeological Reports. Supplementum Series, Oxford
BASOR – Bulletin of the American Schools of Oriental Research, University of Chicago
BCH – Bulletin de Correspondance Hellénique, Athènes-Paris
BiblIstrPont-SA - Biblioteca Istro-Pontică. Seria Arheologie. Institutul de Cercetări Eco-Muzeale „Gavrilă Simion”, Tulcea
BiblMemAnt – Bibliotheca Memoriae Antiquitatis, Piatra-Neamț
BiblMusNap – Bibliotheca Musei Napocensis, Cluj-Napoca
BiblMuzNaț-SCP – Biblioteca Muzeului Național – Seria Cercetări Pluridisciplinare, București
BiblThrac – Bibliotheca Thracologica, București
BiEtud IFAO – Bibliothèque d'étude, Institut français d'archéologie orientale, Le Caire
BMJT – Buletinul Muzeului Județean Teleorman, Alexandria
Bonner Jahrbücher – Bonner Jahrbücher des Rheinischen Landesmuseums in Bonn, Bonn
BSA – British School at Athens, Athens
BSNR – Buletinul Societății Numismatice Române, București
CA – Cercetări arheologice, București
Caiete ARA – Caietele ARA, Revistă de Arhitectură, Restaurare și Arheologie, Asociația ARA, București
CAPH – Cemeteries of the Avar Period (567–829) in Hungary, Budapest
Carpica – Carpica. Complexul Muzeal „Iulian Antonescu” Bacău, Bacău

- CCA – Cronica Cercetărilor Arheologice din România, București
- CCDJ – Cultură și Civilizație la Dunărea de Jos, Călărași
- CIAnt – Classical Antiquity, University of California, Berkeley
- Collegium Antropologicum – Collegium Antropologicum. Journal of the Croatian Anthropological Society
- Crisia – Crisia. Muzeului Țării Crișurilor, Oradea
- Dacia – Dacia (Nouvelle Série). Revue d'archéologie et d'histoire ancienne. Académie Roumaine. Institut d'archéologie « V. Pârvan », Bucarest
- DMÉ – A Debreceni Déri Múzeum Évkönyve, Debrecen
- Documenta Praehistorica – Documenta Praehistorica, University of Ljubljana, Faculty of Arts, Department of Archaeology, Ljubljana
- Drobeta – Drobeta. Muzeul Regiunii Porțile de Fier, Drobeta-Turnu Severin
- EphemNap – Ephemeris Napocensis. Academia Română, Institutul de Arheologie și Istoria Artei, Cluj-Napoca
- ERAUL – Études et Recherches archéologiques de l'Université de Liège
- eTopoi – Journal for Ancient Studies, Berlin
- EurAnt – Eurasia Antiqua. Deutsche Archäologisches Institut, Berlin
- Expedition – Expedition. The Magazine of Archaeology, Anthropology
- FAH – Fontes archaeologici Hungariae, Budapest
- FolArch – Folia Archaeologica. A Magyar Nemzeti Múzeum Évkönyve. Annales Musei Nationalis Hungarici, Budapest
- Gallia – Gallia. Archéologie de la France antique
- Germania – Germania. Anzeiger der Römisch-Germanischen Kommission des Deutschen Archäologischen Instituts, Frankfurt
- Gladius – Gladius. Estudios sobre armas antiguas, armamento, arte militar y vida cultural en Oriente y Occidente, España
- GNMP – Glasnik Narodnog muzeja Pančevo, Pančevo
- GSAD – Glasnik Srpskog arheološkog društva, Beograd
- Gymnasium – Gymnasium. Zeitschrift für Kultur der Antike und humanistische Bildung
- Habis – Habis. Arqueología, filología clásica, Universidad de Sevilla
- Hesperia – Hesperia. Journal of the American School of Classical Studies at Athens, Cambridge
- Historia – Historia. Zeitschrift für Alte Geschichte, Franz Steiner Verlag, Stuttgart
- Histria archaeologica – Histria archaeologica. Časopis Arheološkog muzeja Istre, Pula, Croatia
- HMÉ – A Hajdúsági Múzeum Évkönyve, Hajdúböszörmény
- IAA Reports – Israel Antiquities Authority Publications, Israel
- Ialomița – Ialomița. Studii de cercetări de arheologie, istorie, etnografie și muzeologie, Slobozia
- IARPotHP – International Association for Research on Pottery of the Hellenistic Period e. V.
- IJA – International Journal of Archaeology
- IJO – International Journal of Osteoarchaeology, Journal online
- Iran – Journal of the British Institute of Persian Studies
- Istros – Istros, Muzeul Brăilei, Brăila
- IzvestijaSofia – Izvestija na Nacionalnija Arheologičeski Institut, Sofia
- JAMÉ – A nyíregyházi Jósa András Múzeum Évkönyve, Nyíregyháza
- JAS – Journal of Archaeological Science
- JDAI – Jahrbuch des Deutschen Archäologischen Instituts, Deutsches Archäologisches Institut, Berlin
- JEMAHS – Journal of Eastern Mediterranean Archaeology and Heritage Studies, Pennsylvania State University
- JFA – Journal of Field Archaeology
- JHRE – Journal of Housing and Rural Environment, Iran
- JNES – Journal of Near Eastern Studies
- JPMÉ – A Janus Pannonius Múzeum Évkönyve, Pécs
- JRGZM – Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz, Mainz
- Klio – Klio. Beiträge zur Alten Geschichte, Berlin
- Kühn-Archiv – Kuhn-Archiv. Arbeiten aus dem Landwirtschaftlichen Institut der Universität Halle
- MAIASK – Materialy po arheologii i istorii antichnogo i srednevekovogo Kryma, Moskva – Tyumen – Nizhnevartovsk
- MAInstUngAK – Mitteilungen des Archäologischen Instituts der Ungarischen Akademie der Wissenschaften, Budapest
- MAN – MAN. Journal of the Royal Anthropological Institut, London
- Marisia – Marisia. Studii și materiale. Arheologie – Istorie – Etnografie. Târgu Mureș
- MCA – Materiale și Cercetări Arheologice, București
- MEFRA – Mélanges de l'École française de Rome. Antiquité, Roma

- MFMÉ-SA – A Móra Ferenc Múzeum Évkönyve – *Studia Archaeologica*, Szeged
- MHÁS – Magyarország honfoglalás kori és kora Árpád-kori sírleletei, Miskolc–Budapest–Szeged–Szombathely
- Minerva – *Minerva. Revista de filología clásica*, Universidad de Valladolid
- Monographie du CRA – *Monographie du Centre de Recherches archéologiques*, Valbonne
- MÓTK – Magyar Őstörténeti Témacsoport Kiadványok. Magyar Tudományos Akadémia Bölcsészettudományi Kutatóközpont, Budapest
- Mousaios – *Mousaios. Buletinul Științific al Muzeului Județean Buzău*
- MR – *Magyar Régészet. Online Magazin (Archaeolingua)*
- NM – *Natura Montenegrina*, Podgorica
- Oltenia – *Oltenia. Studii și Comunicări*, Craiova
- Padusa – *Padusa. Bolletino del Centro polesano di studi storici, archeologici et etnografici*, Rovigo
- PamArch – *Památky Archeologické*, Praha
- Peuce – *Peuce, Studii și cercetări de istorie și arheologie*, Institutul de Cercetări Eco-Muzeale, Tulcea
- Phoenix – *Phoenix. The Journal of the Classical Association of Canada*
- Pontica – *Pontica. Studii și materiale de istorie, arheologie și muzeografie*, Muzeul de Istorie Națională și Arheologie Constanța
- PZ – *Prähistorische Zeitschrift*, Berlin-Mainz
- Quaternary International – *Quaternary International. The Journal of the International Union for Quaternary Research*
- RA – *Revue Archéologique*, Paris
- Radiocarbon – *An International Journal of Cosmogenic Isotope Research*, Cambridge
- RÉL – *Revue des études latines*
- RMM.MIA – *Revista Muzeelor și Monumentelor, seria Monumente Istorice și de Artă*, București
- RMV – *Rad muzeja Vojvodine*, Novi Sad
- RT – *Régészeti Tanulmányok. A Közép-Duna-medence honfoglalás- és kora Árpád-kori sírleletei*, Budapest
- RVM – *Rad vojvođanskih muzeja*, Novi Sad
- SAM – *Studia Archaeologica et Mediaevalia*, Bratislava
- Sargetia – *Sargetia. Acta Musei Devensis, Buletinul Muzeului județean Hunedoara*, Deva
- SAP – *Studia ad Archaeologiam Pazmaniensia. A PPKE BTK Régészeti Tanszékének kiadványai*, Budapest
- SCA – *Studii și Cercetări de Antropologie*, București
- SCIV(A) – *Studii și Cercetări de Istorie Veche (și Arheologie)*, București
- SCN – *Studii și Cercetări de Numismatică*, București
- SlovArch – *Slovenská Archeológia*, Nitra
- SP – *Studii de Preistorie*, București
- Starinar – *Starinar. Arheološki institut Beograd*
- StCl – *Studii Clasice*, București
- Studia Hercynia* – *Studia Hercynia*, Univerzita Karlova
- Studia praehistorica* – *Studia praehistorica*, National Institute of Archaeology with Museum, Sofia
- Študijné zvesti – *Študijné zvesti. Archeologického ústavu Slovenskej akadémie vied*, Nitra
- Syria – *Syria. Revue d'art oriental et d'archéologie*
- Th-D – *Thraco-Dacica*, București
- Tisicum – *A Jász – Nagykun – Szolnok Megyei Múzeumok Évkönyve*, Szolnok
- TNYSc – *Transactions of the New York Academy of Sciences*, New York
- Transilvania – *Transilvania. Centrul Cultural Interetnic Transilvania*, Sibiu
- TRW – *Transformation of the Roman World*, Leiden
- TYCHE – *TYCHE. Beiträge zur Alten Geschichte, Papyrologie und Epigraphik*
- Tyragetia – *Tyragetia. Anuarul Muzeului Național de Istorie a Moldovei*, Chișinău
- VAH – *Varia Archaeologica Hungarica V. Redigit Csanád Bálint. Publicationes Instituti Archaeologici Academiae Scientiarum Hungaricae*, Budapest
- Valachica – *Valachica. Studii și cercetări de istorie și istoria culturii*, Complexul Muzeal Național Curtea Domnească Târgoviște
- VAMZ – *Vjesnik Arheološkog muzeja u Zagrebu*, Zagreb
- ŽA – *Živa Antika / Antiquité Vivante. Društvo za antički studii na SRM, Seminar na klasična filologija, Filozofski fakultet*, Skopje
- ZAM – *Zeitschrift für Archäologie des Mittelalters*, Bonn
- ZfA – *Zeitschrift für Archäologie*, Berlin
- Ziridava – *Ziridava. Studia Archaeologica. Complexul Muzeal Arad*

ZMS – Zbornik muzeja Srema, Sremska Mitrovica

ZNM Beograd – Zbornik Narodnog Muzeja, Beograd