Preliminary report on the faunal remains from the Early Neolithic site (Starčevo-Criş IIIB-IVA) at Tăşnad-*Sere*, Satu Mare County

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Abstract: *Ca. 2,090 faunal remains were uncovered during the 2001 and 2017's excavations at Tăşnad-*Sere*. The assemblage comprised five domestic species (cattle, sheep, goat, pig and dog) and seven wild species (aurochs, red deer, boar, roe deer,* Equus hydruntinus*, wild horse and brown bear). A single fragment comes from a bird, possibly a wild duck. The bones were collected from houses and different types of pits: storage, waste or clay exploitation. Domesticates make up 58.28% of the remains, against 41.72% for the game. Cattle account for 43.87%, followed by small ruminants (11.15%), pig (2.94%) and dog (0.72%). Among the hunted species the aurochs dominates by 13.53%. Other species with similar biotope requirements are roe deer (4.62%),* Equus hydruntinus *(1.11%), and wild horse (0.48%). The grouping of species claiming larger forested biotopes includes red deer (11.78%), boar (9%), and brown bear (0.8%). Skeletal elements from all body parts of wild specimens were identified, suggesting that the complete carcasses were brought into site for processing after the hunting. Special attention was given to antlers (mostly shed antlers from red deer) for tool-making. The high rate of immature individuals (ca. 56%) suggests large-scale consumption of beef. An important number of adult (20%) and elderly specimens (4%) points towards the keeping of animals for working, dairying and breeding. Goat was of little importance among the small ruminants. Meat production was the primary aim of small ruminants rearing. Pork played a small part in the diet. Cervids were an important source of food, pelt and raw materials. Most of the red deer individuals were full-aged, while in the case of the roe deer they were mostly immature. Both the Tăşnad location (at a higher altitude in contrast to lowland settlements - 79.4 m average altitude - from the Hungarian Plain) and its dating to a late sequence of the early Neolithic are reasons to explain its economy focused on bovines and game.*

Rezumat: *Aproximativ 2090 de resturi de faună au fost descoperite în timpul săpăturilor dintre anii 2001 şi 2017 la Tăşnad-*Sere*. În cadrul eşantionului au fost identificate cinci specii domestice (bovine, ovine, caprine, porcine și câini) și șapte specii sălbatice (bour, cerb, mistreț, cerb,* Equus hydruntinus*, cal și urs brun). Un singur fragment aparţine raţei sălbatice. Oasele au fost recoltate din locuințe și diferite tipuri de gropi (de provizii, deșeuri menajere sau gropi din care s-a scos lutul). Segmentul domestic reprezintă 58,28%, față de 41,72% cel al speciilor sălbatice. Bovinele reprezintă 43,87%, urmate de rumegătoarele mici (11,15%), porc (2,94%) și câine (0,72%). Bourul este prevalent printre speciile sălbatice cu 13,53%. Alte specii cu cerințe similare de biotop sunt căpriorul (4,62%),* Equus hydruntinus *(1,11%) și calul sălbatic (0,48%). Grupa speciilor adaptate unui ambient împădurit include cerbul (11,78%), mistrețul (9%) și ursul brun (0,8%). Au fost identificate elementele scheletice din toate regiunile corporale ale specimenelor sălbatice, sugerând faptul că animalele vânate au fost aduse întregi în aşezare, pentru prelucrarea carcaselor. Trebuie menţionată cantitatea mare de coarne (mai ales de cerb, culese) utilizată pentru prelucrare. În cazul vitei amintim ponderea crescută a specimenelor imature, aproximativ 56%, sugerând consumul preponderant al cărnii. Păstrarea unui procent important de adulţi (20%) și maturi (4%) sugerează exploatarea animalelor pentru lapte, forță de muncă și reproducere. Capra avea o importanță redusă printre rumegătoarele mici. Producția de carne a fost scopul principal al creșterii ovicaprinelor. Carnea de porc a avut o pondere mică în dietă. Cervidele au reprezentat o sursă importantă de hrană, piei, os, corn. Majoritatea indivizilor de cerb au fost vânați la o vârstă matură spre deosebire de căprior, care este prezent prin indivizi juvenili şi subadulţi. Atât amplasarea sitului de la Tăşnad la o altitudine mai mare, comparativ cu așezările neolitice din câmpia maghiară (localizate în zone joase,*

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la o altitudine medie de 79,4 m), cât şi datarea sitului Tăşnad într-o fază târzie a neoliticului timpuriu ar reprezenta argumente pentru un tip de de economie bazată pe bovine şi vânat.

Keywords: *Tăşnad, Starčevo-Criş culture, faunal remains, wild horse, Equus hydruntinus.*

Cuvinte cheie: *Tăşnad, cultura Starčevo-Criş, resturi de faună, cal sălbatic, Equus hydruntinus.*

◈ Introduction

The town of Tăşnad is situated in north-west Romania, at the western end of the Tăşnad Hills, at an altitude of 230 m above sea level; the point *Sere* is located south-west of the town, near a thermal spa, on the banks of the Cehal River, a tributary of the Ier River. The Cehal valley opens to the Ier and Someş Plains, which represent the north-easternmost part of the Great Hungarian Plain and was a marshy area until the drainage works of the 19th and 20th centuries. Even today, the Cehal valley is quite swampy, especially at the confluence with the Ier River. The Austrian military maps show large-scale deforestation during the last three centuries; at the end of the 18th century, the surroundings of the site were still afforested (C. Astaloş *et alii* 2013, p. 47). Several prehistoric sites from different periods have been investigated on both terraces of the Cehal, at altitudes of about 140 m. The extension of the thermal resort of Tăşnad has required, since 2001, extensive excavations which led to the discovery of an early Neolithic settlement. Based on the pottery style, the site at Tăşnad can be attributed to phases IIIB and IVA of the Starčevo-Criş culture (C. Virag 2015, p. 3). According to researchers, this Neolithic settlement *is the most important site of its kind in the country, and perhaps from northwest Romania ... The large number of pieces of obsidian from the Hungarian Tokay area points up to a strong, thriving community with an intense trading activity with the neighbouring communities* (C. Virag 2015, p. 7).

The assemblage consisting of 2090 animal remains was collected during the 2001-2017's campaigns (tab. 1). Only 1,256 bones (60.85%) were securely assigned to species, reflecting the severe fragmentation of the bones (39.15%). Obviously, one of the causes is their splitting for marrow extraction. Other 808 fragments represent ribs and bone flakes from small and large sized-mammals. 25 remains are cervid shed antlers and debris resulted from the processing of this raw material. A single bone comes from birds, possibly a wild duck. A part of a human tibia was also collected from the pit no. 2/2001, from a depth of 1.7-1.8 m. The mammal sample was assigned to five domestic species (cattle, sheep, goat, pig, and dog) and seven wild species (aurochs, red deer, boar, roe deer, *Equus hydruntinus*, wild horse and brown bear). NISP-wise (number of fragments), the bones of domesticates make up 58.68%, with 41.32% from the wild mammals. Cattle account for 43.87%, compared to 11.15%, the rate of the small ruminants and 2.94%, the pig. Dog consumption is not excluded, dog bones being severely broken. Among the wildlife species, aurochs dominates with 13.53%, followed by red deer - 11.78, wild boar - 9, roe deer - 4.62%, equidae - 1.59% and brown bear - 0.8% (fig. 1). MNI-wise (number of individuals), the wild to domestic ratio is 27.88% to 72.12%. Consequently, wild boar dominates with 7.27%, followed by aurochs - 6.67%, red deer - 4.85%, roe deer - 3.64%, *Equus hydruntinus* - 2.42%, brown bear - 1.82% and wild horse - 1.21 % (tab. 2). The reduced number of wild specimens' jaw bones, useful in the MNI estimates, is the easiest explanation. Either the hunted animals (or at least some of them) were not brought complete to the settlement or the distribution of the body elements reflects the incomplete excavation of the site. As far as fishing is concerned, fish bones have not been found, but according to published archaeological information *large fishing net clay weights were found...only in 2009 were found over*

30 fragments, indicating an intense practice of fishing as an important source of food (C. Virag 2015, p. 7). Their bones were collected from houses and different types of pits: storage, waste or clay extraction pits (C. Virag 2015, p. 7). Feature cx. 7/2002 deserves special attention. According to archaeologists, this large pit contained pottery, and an aurochs neurocranium in its south-western part was found. Most likely, the animal was sacrificed in a religious ceremony, the head being then deposited in that location (J. Németi *et alii* 2003, p. 318). The cranium belongs to a large bull. About 150 bone fragments the site' sample have traces of fire, 100 of them being calcined; 17 bones have traces of use or incipient processing (?). They came from large specimens, bovines (fig. 3/a, b, f), horse (fig. 2/c), some of them from small animals. The range of worked bone is wide, including grinders, scrapers, handles, and percussion tools[1]. Only ten fragments were identified as having butchery marks. As a rule, there had only fine cuts, mainly to remove the hides and feet. Due to high bone fragmentation, the carcass processing marks were not visible. Fine traces were observed on astragals of red deer (fig. 3/c), goat and cattle, on metapodials (fig. 3/e) or phalanges. Some traces of meat removal exist on the ribs or vertebrae, usually from large species (fig. 3/g). They also appear on three distal bovine humeri (fig. 3/d).

◈ Bovines

Of the 832 bones assigned *grosso modo* to bovines, 551 belong to cattle, 170 to aurochs, and 111 to *Bos* sp. The bones in the *Bos* group are mostly ribs and vertebrae. The majority of cattle elements (ca. 31.2%) consist of distal parts of the legs (phalanges, metapodials). The loose teeth and skull fragments account for 25.7%, while 23% represent the proximal parts of the legs (meaty parts) and 19.9%, the spine. In fact, teeth are dense elements with greater chance of surviving over time (L. Binford, J.B. Bertram 1977, p. 109). The spine is less represented due to the large proportion of the unassigned ribs. On the whole, there are no major discrepancies between the proposed categories; the variations being rather determined by the sampling contexts, the different preservation state of bones (taphonomic aspects), the preferential use of certain parts for processing and, last but not least, the investigation stage of the site. The aurochs sample includes 16% skull elements, 30% feet, 32.35% spine, and only 21% represent the fleshy parts of the legs (fig. 9).

When estimating cattle age, both tooth-wear (E. Grant 1982) and fusion data (*apud* M. Udrescu *et alii* 1999) were used. Consistent with data on long bone sutures, only 9% of the elements were not fused before one year (tab. 3). They decrease at 8% between for the 1-2 year range. Specifically, there are few juvenile animals below two years old. The 2-3 year class (largely coincident with the middle fusion group) includes 42.5% of the subadulte bones; the late fusion group includes some subadulte and young adult elements. The proportion of still unfused bones is 43.68%, against 56.32% for the fused elements (referring to animals that reached the adult stage). The representation of the 4-5 year group is relative because there are many vertebrae not clearly assigned to either cattle (including aurochs) or red deer. Basically, most of the bones were provided by subadulte cattle. According to teeth, of the 75 specimens, five are under one year (6.5%), 18 between 1 and 2 years (24%), 28 between 2 and 4 years (37.33%), 13 between 4 and 6.5 years, eight between 6.5 and 9 years (10,67%) and three over 9 years (4%). In other words, the ratio infant/ juvenile/ subadulte/ adult/ mature-senile is 2.67/ 24/ 25.33/ 40/ 4% (V. Forest 1997, p. 955). On the whole, dentition is partially correlated with

[1] We do not insist on them, probably they will be published in another context.

post-cephalic remnants. However, the fusion data generally shows the same trends as those shown by dentition. It is clear from both tab. 3 and fig. 4, a small proportion of animals were slaughtered before reaching one year, a high proportion were killed while immature, and a sufficient number of specimens were exploited for longer. Aurochs bones come from eleven specimens. According to teeth, an animal was about 3.5-4 years old, two between 4-6.5 years, five between 6.5 to 9 years and three over 11 years (fig. 4). Generally, bones are fused at the ends and there are some with visible sutures indicating young adult specimens; for example, a proximal femur, a distal radius, a proximal tibia indicates possibly three young adult individuals, otherwise there were only mature individuals. It is clear there was preferential hunting of adults and mature-senile, and no juveniles. Age classes also suggest a lack of concerns about taming or possible domestication.

Only a few measurements were taken on the identified taxa due to the fragmentary nature of the sample. The cattle population from Tăşnad area included larger and robust individuals (domestic males and mix-breeds), and few medium or smaller-sized specimens (females). Based on a metacarpal of 208 mm length, a waist of 130 cm was estimated (J. Matolcsi 1970). The bone comes from a male. A value of 135.1 cm is mentioned in an earlier sample from the site (D. Bindea 2008, p. 138). Apparently cattle here were of similar size to those from early Neolithic sites in the Carpathian basin (fig. 5): Gura Baciului with a variation of 122 to 131.6 cm (M=127 cm) (G. El Susi, D. Bindea 1995, p. 183; D. Bindea 2008, p. 137), Zăuan with 132.6 cm (D. Bindea 2008, p. 137, tab. 35), Miercurea Sibiului (level Ic) with 128,4 cm (G. El Susi 2007, p. 76) and Endröd 119 with 121.1-134.5 cm (M=126.6 cm) (S. Bökönyi 1992, p. 203). The aurochs skull with attached horns (fig. 2/f), found inside pit no. 7 belongs to a large male. The horns are 820 mm in length on the outer curvature, 940 mm distance between the tips of the horns, the following diameters at the base: 130/118/390 mm[2]. The occipital height (B-A) is 215 mm and the breadth of occipital condyles is 131 mm. The horns are laterally oriented, and then twist forward and upward. They are long with thick walls. The cross-section at the base is almost circular. The frontal ridge is flat, relatively short, of 160 mm in length compared to the other dimensions. The item finds its correspondent among the very robust Mesolithic and early Holocene artefacts from Kecel-Rózsaberek, Hungary (I. Vörös 1987, p. 79-80), belonging to so-called *SE European type with widely apart and upwards horns... lowland type with longer horns* (*apud* I. Vörös 1987, p. 83).

◈ Caprovines

This grouping includes seven bones from goat, 29 from sheep and 104 not securely assigned to one or the other of the two species. The loose teeth and mandibles make up 27.8% of the sample, and the proximal parts of the limbs, 30.7%. The metapodials and astragals were certainly worked, their proportion being smaller (21.43%). They belong to three goats, eight sheep and 19 sheep/ goat. Based on dentition, 13.33% of the presumed individuals were killed before six months, the same number before one year, 36.67% between 1-2 years, 13.33% between 2-4 years, 20% between 4-6 years and 3.33% over (fig. 6). A dissimilar statistic resulted from the fusing stages. The early fusing class (8-12 months) contains 33.33% of unfused bones against the 66.67% fused bones. The middle fusing class (meaning 12-18 months) contains 45.45% not sutured bones. And 92.3% of the elements originate in animals slaughtered before three years, according the distributions of the unfused elements from the late fusing class. Nevertheless, the tooth-wear stage indicates an important rate of animals surviving over three

[2] The artefact is exposed in the Satu Mare County Museum.

years of age - ca. 30%. Moreover, in this case, the maxillary remains partially correspond to the long bones which are missing for animals over 3-4 years old. Maybe, to a limited extent, ageing information was affected by taphonomy. Sheep exploited in the area were slender, with heights less than 60 cm (fig. 7) (M. Teichert 1975 *apud* M. Udrescu *et alii* 1999). Withers height, shows that sheep from Tăşnad were similar in size to those from Gura Baciului – 58.9 cm (G. El Susi, D. Bindea 1995, p. 185), Zăuan – 54.2 cm (D. Bindea 2008, p. 151, tab. 37), Miercurea Sibiului – mean/ 60,4 cm (57.08 - 65.04 cm) (G. El Susi 2007, p. 73) and Endröd 119 – 57.19 cm (51.2 - 63.6 cm) (S. Bökönyi 1992, p. 216). Goats were of little importance in the settlement economy, but very few remains were positively identified, and even less measured.

◈ Suids

Pig is represented by 37 fragments, most of them from the meaty parts of the limbs (40.5%). Well preserved are the mandibles (35.13%) and feet bones (18.9%), with just a few ribs and vertebrae collected (5.5%). Wild boar produced a high rate of limb elements (83%) against the 7.1%, for the head and 9.7% for the spine. Possibly, only large pieces of the hunted animals were brought into the settlement, sometimes beheaded. Few words could be said about pig slaughtering due to its reduced sample. Maxillary remains account for eleven fragments (39.7%) of the 37 bones. The eleven identified individuals have the following ages at death: six specimens between 6-12 months (54.54%), four between 1-2 years (36.36%) and two between 2-4 years (18.18%). Practically, juveniles represent 58%, 25% were subadulte and 16.67% were adults (fig. 8). Dentition of the wild boar is few, so that, the NMI and the age classes are based on fusion data of the long bones. Therefore, out of the 12 individuals, five are under two years (41.67%), six between 3-4 years (50%) and only one is mature (8.33%). The high rate of young and subadulte is astonishing. Their somewhat irrational hunting could suggest an increased density in the area, leading to a herd reduction (predatory effect), or simply it was dictated by food needs. The pig was primitive, quite tall at the withers; there were possible mixes with the boar. Only 75.7 cm at the withers was calculated for one specimen and a variation of 91.8 - 104.41 cm (an average of 98.6 cm) was estimated in case of wild boar.

◈ Dog

An incomplete skeleton was gathered from feature no. 53/2006 (a refuse pit). The pit inventory consisted of two anthropomorphic idols, a small altar, weights and an impressive amount of ceramics and bones (C. Virag *et alii* 2007, p. 366). The skeleton is missing the skull (except the mandibles), spine and feet. All the bones of the basin and limbs are fragmented (during time) and not measurable. Perhaps the dead animal was thrown into the pit with other household waste. In total, about 200 animal bones were collected from that pit, half of them belonging to bovines). Other eight dog bones were collected from different contexts, of which four were skull elements and four long bones. Perhaps those animals were small in size and quite gracile. For the moment, there is no clear evidence of dog consumption.

◈ Equids

The faunal sample from Tăşnad-*Sere* is particularly interesting from the point of view of the bones of *Equus hydruntinus* (European wild ass) and wild horse. As a rule, the remains of *Equus hydruntinus* consist mainly of isolated dentition in a poor preservation state. As recently established, dental morphology may be less helpful if used alone. For the time being, their sample at Tăşnad was separated based only on dental features. In order to separate the

teeth of the two species (*E. hydrunt*inus and *E. ferus*), some traditional criteria such as the presence/ absence of the pli caballin, form of the protocone, value of the protocone index, form of lingual sulcus, degree of penetration of external sulcus were used (*apud* I. Baxter 1998, p. 7- 8). Feature 2/2001 provided an upper tooth, slightly worn, from an immature specimen. Two lower teeth (P2+P3) from a specimen more than 3.5-4 years old (M.A. Levine 1982, p. 244, appendix I) were collected from feature 1/2001. The ectoflexid is deep and penetrates the neck of the double knot; the lingual sulcus is V-shaped. A distal shoulder blade (measuring 40 mm across the cavity) was collected from the same context; it may come from the same individual. The house (cx. 2/2005) provided a pair of maxilla and a mandible splinter from an individual 5-7 years old, according to the cheek-tooth height-wear (M.A. Levine 1982, p. 247, appendix III). A third phalanx (with the proximal dimensions of 39/20.5 mm) and a distal metapodial were also collected from that context. Feature 34/2006 provided a proximal radius and two upper teeth (M2 + M3) of a young adult individual. A right mandible with complete dentition was found in feature 103/2006 (tab. 4). The external sulcus is V-shaped but the internal sulcus does not penetrate between the metaflexid and the ectoflexid in the case of the premolars, just in the case of the molars. Overall, the protocone length varies between 7.3-10 mm (mean 8.4 mm) and the protocone index, between 31.7-45.7 mm (mean 37.8 mm). The few measurements of the teeth and long bones fall within the range size variation of the European sites located more or less in the proximity of our site (Van Asperen *et alii* 2012, p. 21-27; I. Vörös 1981, p. 64-66). This specimen does not seem to have been very mature either. Overall, out of the six presumed individuals, at least two are young/ subadulte, the others reaching adulthood but not full maturity. Of course, they were hunted for a tender meat, pelt and fat. *Equus hydruntinus* inhabited Europe and the Middle East for more than 300,000 years. For a long time, paleontological data placed E*. hydruntinus* within the equids phylogenetic tree, because it shares primitive *Equus* features with both the zebras and the asses, and derived characters with the asses and the hemiones. The DNA analysis confirms the proximity of *E. hydruntinus* and *Equus hemionus* and rejects their proximity to either *Equus burchelli* or the asses, as suggested by tooth morphology. Moreover, the small genetic distance between *E.* cf. *hydruntinus* of Iran and the classical *E. hydruntinus* of Crimea suggests that both samples belong to the same species. Accordingly, the geographic range of *E. hydruntinus* - until now believed to be limited to Europe, Israel, and Turkey - can be extended towards the East as far as Iran (L. Orlando *et alii* 2016, p. 2083). Holocene finds of *E. hydruntinus* are known from 22 sites, all of them in the central part of the Carpathian Basin. Bones of *E. hydruntinus* also occur in the Carpathian Basin from the beginning of the Holocene until the Late Copper Age (*apud* A. Németh *et alii* 2016, p. 6). It seems that the taxon had survived up to the middle Holocene in the Northern Black Sea regions, SE Europe (Romania, N Bulgaria and the Central European steppe (Hungary) (N. Spassov, N. Iliev 2002, p. 317). Unfortunately, one cannot say much about its remains in the prehistory of Transylvania. *E. hydruntinus* is otherwise mentioned at Gura Baciului, but this information is doubtful (*apud* D. Bindea 2008, p. 200).

Three molars/ premolars, a metatarsal bone, a femur and an astragalus (fig. 2/c) belong to the wild horse. The astragalus shows some cuts, along with a worn-out trohlea. The height of medial trochlea is 64 mm. The sample comes from at least two animals. We assigned the teeth to the wild horse only based on their larger proportions and the presence of pli caballin; complete measurements were not taken if they were damaged. An individual is about 1-3.5 years old, based on two upper teeth: the former in eruption, the second not yet (M.A. Levine 1982, p. 246, appendix I). The other animal may have reached an adult stage. The wild horse was an element of the native fauna of the Carpathian Basin during the Early and Middle

Holocene, its remains being known from at least 37 sites. Most wild horse remains date back to the Neolithic. Until recently, Copper Age horses in Hungary have been identified as domestic. New data, however suggests that, *wild horses probably became extinct in the Carpathian Basin only around the Copper Age–Bronze Age transition or during the Bronze Age when large herds of domesticated horses first appeared in the region, when people of the Yamnaya culture settled in Europe* (*apud* A. Németh *et alii* 2016, p. 6). Its presence in Neolithic sites of Transylvania is scarce. A metatarsal of 258 mm length is mentioned in the early Neolithic settlement at Gura Baciului (O. Necrasov 1964, p. 171). The piece was assigned to *E. przewalskii* (?). Recent DNA analysis attested that Przewalski's horses are feral descendants of the horses herded at Botai and not truly wild horses (C. Gaunitz *et alii* 2017, p. 111).

◈ Cervids

Ca. 148 red deer bones were recorded, most from the upper (34.5%) or lower parts (40%) of the limbs (fig. 9). Few cephalic elements were identified (15.5%) and even lesser from the spine (10.13%). There is also the problem of separating cervid ribs and vertebrae from those of the cattle. Obviously, the whole animals were brought to the settlement, probably many cephalic remains being thrown elsewhere. It is worth mentioning the significant amount of antlers (many of them collected) found in a refuse pit - cx. 2/2001. Red deer sample indicates at least eight individuals, of which three were hunted before reaching 26-30 months (37.5%) and five between 3-5 years (62.5%). Dentition is poorly represented and do not provide sufficient elements for determining ages classes. Based on fusion data, no animals less than one year were found. The middle fusion group (12-29 months) includes only 8.33% unfused bones, against the 91.67% fused. The late fusing group (26-42 and >42 months) accounted for only 14.29% unfused bones against 85.71% fused bones. This confirms the hunt of animals reaching the adult stage. As for the roe deer, 42% of its material represents the distal parts of the limbs. About 30% of the bones originate in the upper parts of the limbs and 22.8% in the skull. They were also brought entirely at the site. The spine totals only 5.2%, its rate being heavily biased by the poor elements of separation from those of sheep. The roe deer sample came from at least six animals of which two of 2-5 months old (killed in summer), one of 15-16 months (killed maybe in summer), one of 18-30 months, and two of 3-4 years.

◈ Exploitation of animals at Tăşnad

When interpreting the statistics of Tăşnad one can assume that the husbandry focused on cattle raising (43.87%) with a reduced contributions of small ruminants (11.15%) and pig (2.94%), and an increased rate of game (41.32%). The animal husbandry focusing on Caprovines „*came over in this form from SW Asia... This fauna, in an unchanged type, reached northwards to the Carpathian Basin but never crossed the northern chain of the Carpathians* (S. Bökönyi 1992, p. 199). *The comparatively high cattle and low pig ratio distinguishes the animal husbandry from that of the early Neolithic of the Southern Balkans and put it into the northern type* (S. Bökönyi, 1992, p. 79). In our regions, the first Neolithic communities introduced an animal husbandry based by Caprovines, also comprising cattle, pig and dog. But the habitats will have been conducive to cattle rising on the northern regions of the Balkans and the aurochs was a common taxon with significant densities. Due to new environmental conditions, a switch towards cattle exploitation happened over time. Positively, towards the end of the final phases of the Starčevo-Criş culture the prevalence of cattle in husbandry becomes certitude. So, one can assume that animal economies based on cattle exploitation with an important

proportion of Caprovines however (G. El Susi 2014, p. 45-46), *under the pressure of a colder climate and moister soil* (S. Bökönyi 1992, p. 199) developed in Transylvanian sites.

It is probable that much of the cattle were primarily bred for meat. The high rate of immature specimens (about 56%) suggests large-scale consumption of beef. An important number of adult (20%) and elderly specimens (4%) recommends the keeping of animals for working, dairying and breeding. Goat was of little importance among small ruminants. The meat production was the primary aim of rearing small ruminants. A low rate of neonate mortality is present (only 13.33%). The majority of animals were killed as juveniles and subadulte (56.67%) against 30% for the adults. It is worth noting that the killing threshold is as late as the sixth year, a single specimen surviving over that limit. An elderly sheep may represent an old breeding specimen. Pork played a small part in the diet. It is to be noted the highest mortality rate observed amongst juvenile and subadulte specimens (about 83%), the kill-off peak being in the latter half of the first year. There are no signs of intensive killing of piglets. Cervids were an important source of food, pelt and raw materials. Most of the red deer individuals were the full-aged and the immature in the case of the roe deer. Evidence for skinning was found in case of cattle, small ruminants, red deer and equids. The placement of the site at the contact zone between the uplands (Tăşnad Hills) and the lowlands (the plain of Ier) is also confirmed by the distribution and frequencies of the wild taxa. Following the frequencies of wild taxa in relation to their specific biotopes, some interesting aspects are revealed by statistics. So, among the hunted species the aurochs dominates with 13.53%; the European aurochs was better adapted to an open but wet landscape, which should not exclude forests with swamps and slops (J. Connolly *et alii* 2012, p. 998). Other species with similar requirements are roe deer (4.62%), hydruntinus (1.11%), and wild horse (0.48%). On the whole, these species which adapted to the lowland open landscapes account for 19.74%. The cluster of species claiming a more forested biotope includes red deer (11.78%) and bears (0.8%). The boar (9%) has an intermediate position, surviving just as well both in the lowlands with soft tree vegetation, and in the uplands.

The early Neolithic habitation at Tăşnad is one of the fewest from Transylvania that produced a substantial sample, and excavations are underway. There are some contemporary sites, but unfortunately with insufficient assemblages, as follows: Zăuan (193 determined bones), Gura Baciului (St. Criş III-IV levels - 165 bones), Miercurea Sibiului-Pietriş (IIB-IIIA levels - 178 bones), Moldova-Veche-Rât (530 bones) (G. El Susi 2007, p. 71-92). Using scatter plots (fig. 10), we figured correlations between NISP and various sample components, based on Pearson's coefficient. Thus, the relationship between sample size (NISP) and rate of domesticates (*apud* Z.S. Kovács *et alii* 2010, p. 248, fig. 9) suggests a strong negative correlation[3], but statistically insignificant ($p = 0.14$). Tăşnad (1) distinguishes itself by the numerous samples and the large amount of game (some 41%). Gura Baciului (2), Zăuan (3) and Miercurea Sibiului (4) share the highest rates of the game (between 77-88%) despite their reduced samples (less than two hundred fragments). Although they are located in the uplands, we would expect much hunting. The results must be regarded with caution, because *in small samples, the odd random element plays a more pivotal role: a few wild animal bones may create the false impression of intensive hunting* (L. Bartosiewicz 2012, p. 200). Moldova Veche-Rât (5) seems closer to Tăşnad by its high rate of wild specimens (43.7%), despite its small amount of bones (530 pieces). Obviously, the location of the site in such a complex biotope as the Danube Valley would have had an impact on the exploitation of wild resources. The following graph shows a positive relationship between the

[3] If sample size increases, domestic specimens' rate reduces.

NISP and the number of taxa (*apud* L. Bartosiewicz 2012, p. 201, fig. 4), but it is weak enough and statistically insignificant (p=0.3). The sample size affects positively the number of species, although, according to our chart, the same number of taxa is seen at Tăşnad, Zăuan and Moldova Veche, despite their unequal assemblages. The correlation between cattle rate and NISP reveals a negative, statistically insignificant correlation (p=0.4). In this sense, increase of sample size does not necessarily mean increase of cattle percentage. The proportion of cattle is about 40% at Tăşnad, Moldova Veche-Rât and Gura Baciului but much higher at the following two, around 63-68%. The last scatter plot suggests a negative relationship between the NISP and the procentual contribution by sheep/goat (p=0.3). Apart from Gura Baciului and Zăuan showing a significant rate of small ruminants (22-30.6%), only 11-12% is recorded for the other sites (fig. 10). Pig was little exploited everywhere, its percentage not exceeding 6%, despite of being suitable for the local environment. Summerizing, it is likely that the increase of NISP stimulates the number of taxa than the percentages of bovines, caprids or domestic species.

In the recent years, more than 40,000 animal bones produced by Körös sites from Hungary, the sites were reviewed in an appropriate synthesis (L. Bartosiewicz 2012, p. 195-204). However, most of them are somewhat earlier than ours and they rely on wide variety of sample sizes. The composition of the samples conforms to the usual Early Neolithic pattern, showing the dominance of domesticates over wilds. Overall, the large game represented less than 10% of the NISP relative to the domestic species. Hunting and pig, despite of being more suitable for the habitats of the Great Hungarian Plain seemed to be of reduced interest to these communities. Sheep/goat bones dominated over those of cattle in all samples of large size. They accounted for 72.9%, followed by cattle with 25.1% and pig with 1.1% (L. Bartosiewicz 2012, p. 198-202). The remains of domestic pig and dog are ca. 1% in all samples. *The early inhabitants of the Great Hungarian Plain apparently clung to their traditional form of animal husbandry and tried to maintain their original way of life even after their arrival to the Carpathian Basin* (E. Gál 2005, p. 157). As visible in fig. 11, the economy of the early Neolithic communities of Tăşnad differs from those within the Hungarian Plain by cattle and game high rates. High percentage of game and a few small ruminants are typical of Ibrány-Nagyerdõ, one of the latest sites, but there aren't any other similarities with Tăşnad. Not even the relatively late Körös site of Szolnok-Szanda is similar to Tăşnad. Both Tăşnad's location at a higher altitude (140 m) in contrast to lowland settlements (79.4 m average altitude) from the Hungarian Plain (L. Bartosiewicz 2012, p. 197), and its dating to a late sequence of the early Neolithic are reasons to explain its economy focused on bovines and game. It follows that further research and new samples are needed to sheds light on these issues.

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Contexts	2001			2002					Layer 2001-2002
	Cx. 1	Cx. 2	Cx. 3	Cx. 3	Cx. 5a-5b	Cx. 6	Cx. 7	Cx. 2	
Bos taurus	35	192	2	18	17	1	1	2	27
Ovis/Capra	7	65		18	8		1		6
Sus domesticus	2	12		2	6				1
Canis familiaris		3		1					
Domestics	**44**	**272**	**4**	**39**	**29**	**1**	**2**	**2**	**34**
Cervus elaphus	13	57	1	3	12			2	7
Sus scrofa	18	35	2	5	10		2	1	4
Capreolus capreolus	4	27		6					1
Bos primigenius	1	15	2	4			15		1
Equus ferus		1							1
Equus hydruntinus	1	2							
Ursus arctos	2			2	1				
Wilds	**39**	**137**	**5**	**20**	**23**		**17**	**3**	**14**
Determined	**83**	**409**	**9**	**59**	**52**	**1**	**19**	**5**	**48**
Bos sp.	1	7			8				1
Bos/ Cervus	6	79	4	4	2				14
Sus sp.		4	1	1	1				
Small- sized ribs	2								
Large-sized ribs		1	2						1
Small fragments	2	59		7	20				
Large fragments	29	108	1	7	36		9		31
Total mammals	**123**	**667**	**17**	**78**	**119**	**1**	**28**	**5**	**95**
Antlers	1	21		1				2	
Aves									1
Total sample	**124**	**688**	**17**	**79**	**119**	**1**	**28**	**7**	**96**

Tab. 1. Distribution of animal bones in archaeological contexts; Cx. – Complex.
Distribuţia oaselor de animale în contextele arheologice; Cx. – Complex.

Contexts	2005				2006											2009											2013-2017
	Cx. 2	Cx. 3	Cx. 4	Cx. 22	Cx. 23	Cx. 34	Cx. 35	Cx. 37	Cx. 48	Cx. 53	Cx. 54	Cx. 56	Cx. 66	Cx. 70	Cx. 76	Cx. 95	Cx. 98	Cx. 101	Cx. 102	Cx. 103	Cx. 105	Cx. 106	Cx. 108	Cx. 112	Cx. 191	Cx. 200	
Bos taurus	50	13	6	11	13	16	6		4	40	1		6	9	14	3		2	10	17	2	20	3	8	1	1	
Ovis/Capra	1	2	1	6		8	1		1	2						1		2		3	1	1		5			
Sus domesticus	3									4				1	1				2					1		1	1
Canis familiaris	1					3				1*																	
Domestics	**55**	**15**	**7**	**17**	**13**	**27**	**7**		**5**	**47**	**1**		**6**	**10**	**15**	**4**		**4**	**12**	**20**	**3**	**21**	**3**	**14**	**1**	**2**	**1**
Cervus elaphus	15		2	2		1	1			7		1		2	16			1	2					2			1
Sus scrofa	7		3		1	2	3			6		1		3	1	1			4	2		2					
Capreolus capreolus	8	1		1		4				3				1							1			1			
Bos primigenius	12	18	6	3	9	9	6	3		56			1	2		2		1		1	1	1		1			
Equus ferus	1									1								1									1
Equus hydruntinus	7			1		2														1							
Ursus arctos	5																										
Wilds	**55**	**19**	**11**	**7**	**10**	**18**	**10**	**3**		**73**		**2**	**1**	**8**	**17**	**3**		**3**	**6**	**4**	**2**	**3**		**4**			**2**
Determined	**110**	**34**	**18**	**24**	**23**	**45**	**17**	**3**	**5**	**120**	**1**	**2**	**7**	**18**	**32**	**7**		**7**	**18**	**24**	**5**	**24**	**3**	**18**	**1**	**2**	**3**
Bos sp.	18		1	2	8	23	3	1	11	7						3	1	2	1	12				1			
Bos/Cervus	28			16			10			11			2	1										2			
Sus sp.														1													
Small- sized ribs																											8
Large-sized ribs	2					6				45																	
Small fragments		10														4		1						3			15
Large fragments		1	16			6		3		20	2			15		8	2		4	5				6		2	11
Total mammals	**158**	**45**	**35**	**42**	**31**	**80**	**30**	**7**	**16**	**203**	**3**	**2**	**9**	**35**	**32**	**22**	**3**	**10**	**23**	**41**	**5**	**24**	**3**	**30**	**1**	**4**	**37**
Antlers																											
Aves																											
Total sample	**158**	**45**	**35**	**42**	**31**	**80**	**30**	**7**	**16**	**203**	**3**	**2**	**9**	**35**	**32**	**22**	**3**	**10**	**23**	**41**	**5**	**24**	**3**	**30**	**1**	**4**	**37**

Tab. 1. continued/continuare; *skeleton/schelet.

Taxa	NISP	%	MNI	%
Bos taurus	551	43.87	75	45.45
Ovis/Capra	140	11.15	30	18.18
Sus domesticus	37	2.94	11	6.67
Canis familiaris	9	0.72	3	1.82
Domestics	**737**	**58.68**	**119**	**72.12**
Cervus elaphus	148	11.78	8	4.85
Sus scrofa	113	9	12	7.27
Capreolus capreolus	58	4.62	6	3.64
Bos primigenius	170	13.53	11	6.67
Equus ferus	6	0.48	2	1.21
Equus hydruntinus	14	1.11	4	2.42
Ursus arctos	10	0.8	3	1.82
Wilds	**519**	**41.32**	**46**	**27.88**
Determined	**1256**	**100**	**165**	**100**
Bos sp.	111			
Bos/ Cervus	179			
Sus sp.	8			
Small- sized ribs	10			
Large-sized ribs	57			
Small fragments	121			
Large fragments	322			
Total mammals	**2064**			
Antlers	1			
Aves	25			
Total sample	**2090**			

Tab. 2. Frequencies of species as fragments (NISP) and individuals (MNI).
Frecvenţele speciilor pe fragmente (NISP) şi indivizi (MNI).

Cattle	Age (months) cf. Udrescu *et alii* 1990	Unfused	Fused	Total
Early fusing	**0-12 m**	**2-9.1%**	**20-90.9%**	**22**
Scapula, distal	7-10 m	2	12	14
Acetabulum	7-10 m		8	8
Early fusing	**12-24 m**	**6-8%**	**69-92%**	**75**
Radius proximal	12-15 m	2	9	11
Ph. I, II	20-24 m	4	48	52
Humerus distal	15-20 m		12	12
Middle fusing	**24-36 m**	**17-42.5%**	**23-57.5%**	**40**
Tibia distal	24-30 m	2	9	11
Calcaneus	36 m	10	5	15
Metapodials distal	24-30 m	5	9	14
Late fusing	**36-60 m**	**38-43.68%**	**49-56.32%**	**87**
Humerus proximal	42-48 m	3	5	8
Radius distal	40-48 m	3	2	5
Ulna, prox., distal	36-42 m	1	2	3
Femur proximal	36 m	3	5	8
Femur distal	42 m	1	10	11
Tibia proximal	48 m	2	3	5
Vertebrae	54-60 m	25	22	47

Tab. 3. Available fusion date of the bones cattle.
Datele de sutură ale oaselor de bovine.

Context	Bone	L/R	OL	B	Lg. prot.	I. prot.	Lf	I. LF	Taxon
Cx. 1/2001	Mandibula- P2	R	27.8				12	43.2	E h
Cx. 1/2001	Mandibula- P3	R	23				8	34.8	E h
Cx. 2/2001	Upper P3/P4	L	23	22	7.3	31.7			E h
Cx. 2/2005	Mandibula-P/M	L	25.5				8,9	34.9	E h
Cx. 2/2005	Maxilla-P2	L	30.4						E h
Cx. 2/2005	Maxilla-P3	L	22.6	20.7	8.2	36.3			E h
Cx. 2/2005	Maxilla-P4	L	22	20.9					E h
Cx. 2/2005	Maxilla-M3	L+R	22.8	17.2	8.6	37.7			E h
Cx. 34/2006	Maxilla-M2	R			7.7				E h
Cx. 34/2006	Maxilla-M3	R	21.9	18.9	10	45.7			E h
Cx. 103/2006	Mandibula-M1	R	22	12.6			8	36.4	E h
Cx. 103/2006	Mandibula-P3	R	25.7	13.5			11.1	43.2	E h
Cx. 103/2006	Mandibula-P4	R	25.3	13.6			12	47.4	E h
Layer/2002	Upper Molars	L	26.7	21.7					E f
Cx. 101/2009	Upper Molar	L	27.7	22	~12	43.3			E f

Left/ right; OL-Occlusal length; B-Breath; Lg. protocone; Index protocone; Lf-Length postflexid; Index postflexid; E h - (hydruntinus); E f - (ferus).

Tab. 4. Measurements of Equids' dentition.
Măsurătorile dentiţiei de ecvidee.

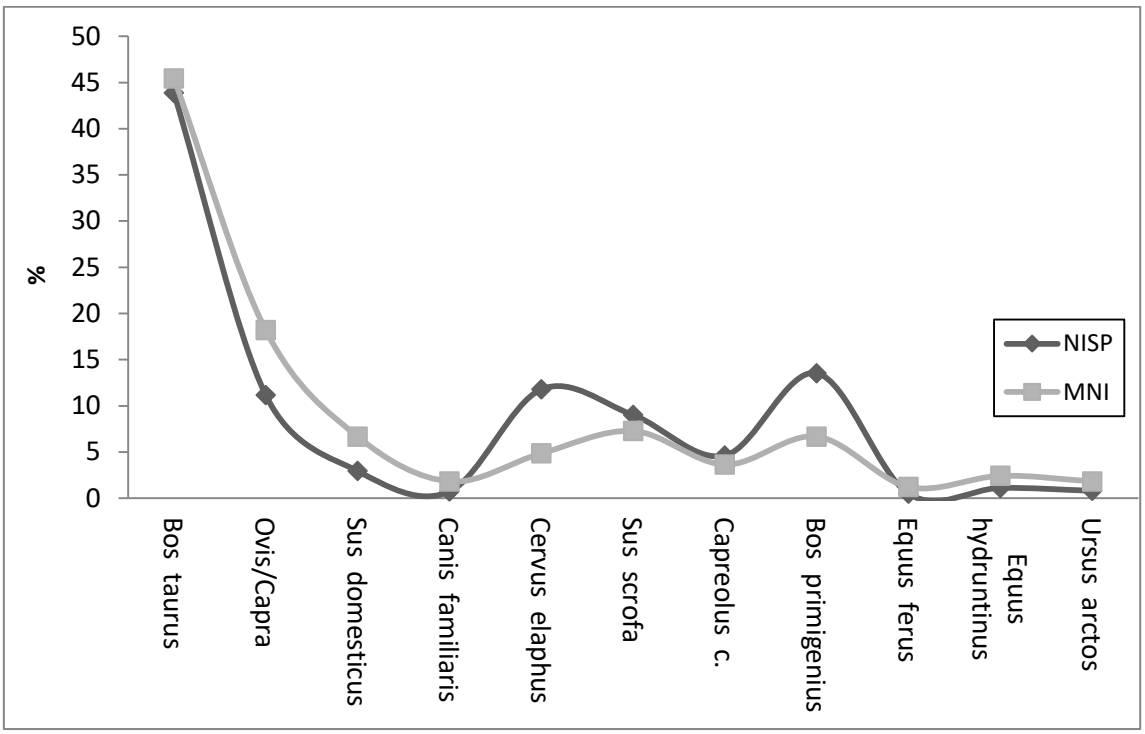


Fig. 1. Species distribution as NISP and MNI at Tăşnad.
Distribuția speciilor ca NISP și NMI la Tășnad.

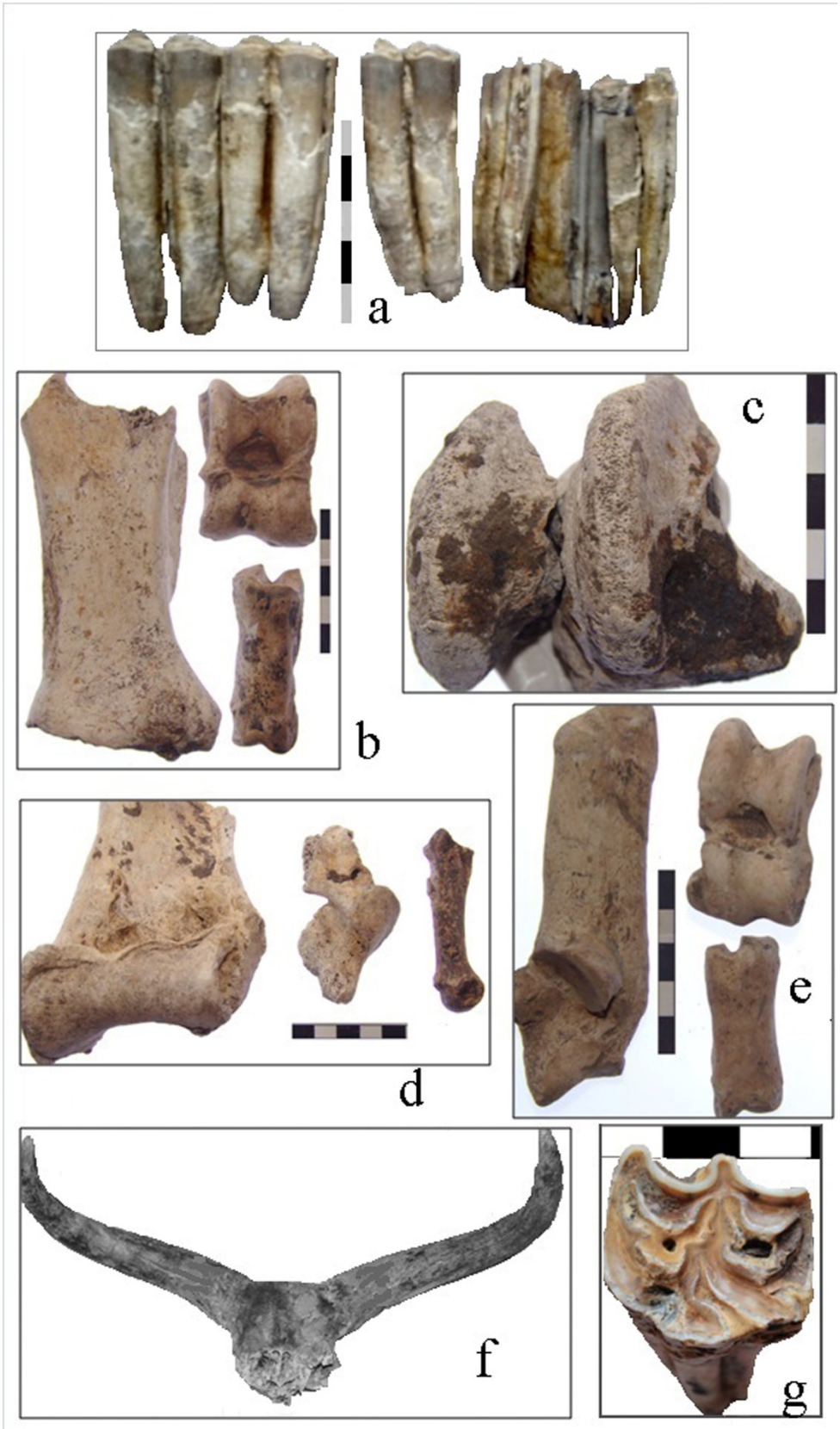


Fig. 2. Remains from wild taxa: a, g - teeth of *Equus hydruntinus*; b - bones of red deer; c - talus of wild horse; d - bones of bear, e - bones of wild boar.
Resturi de animale sălbatice: a, g - dinți de hidruntin; b - oase de cerb; c - astragal de cal sălbatic; d - oase de urs; e - oase de mistreț.

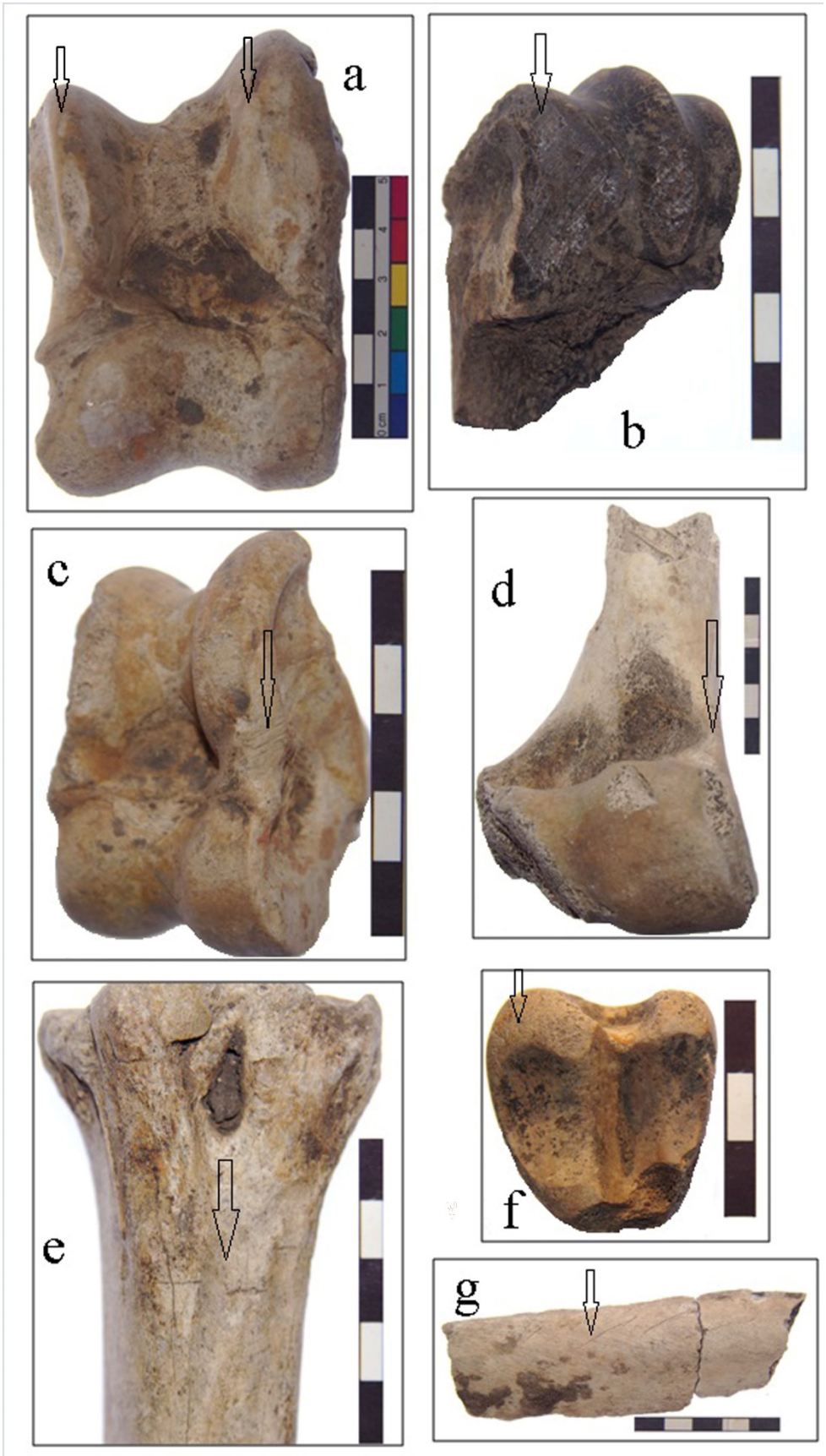


Fig. 3. Bones with cut-marks (cattle - a, d, e, g; red deer - c) and processing (cattle - b, f).
Oase cu urme de tăiere (vită - a, d, e, g; cerb - c) și prelucrare (vită - b, f).

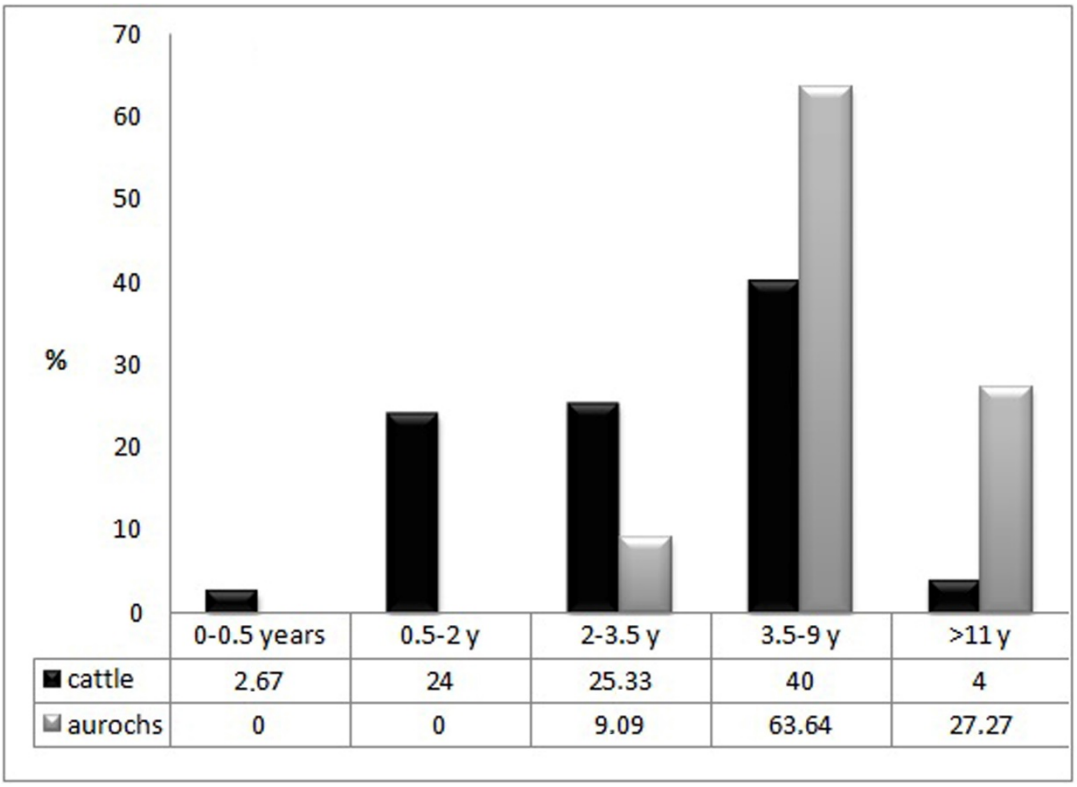


Fig. 4. Age profiles of the cattle and aurochs at Tăşnad.
Vârsta de sacrificare la vita și bourul de la Tăşnad.

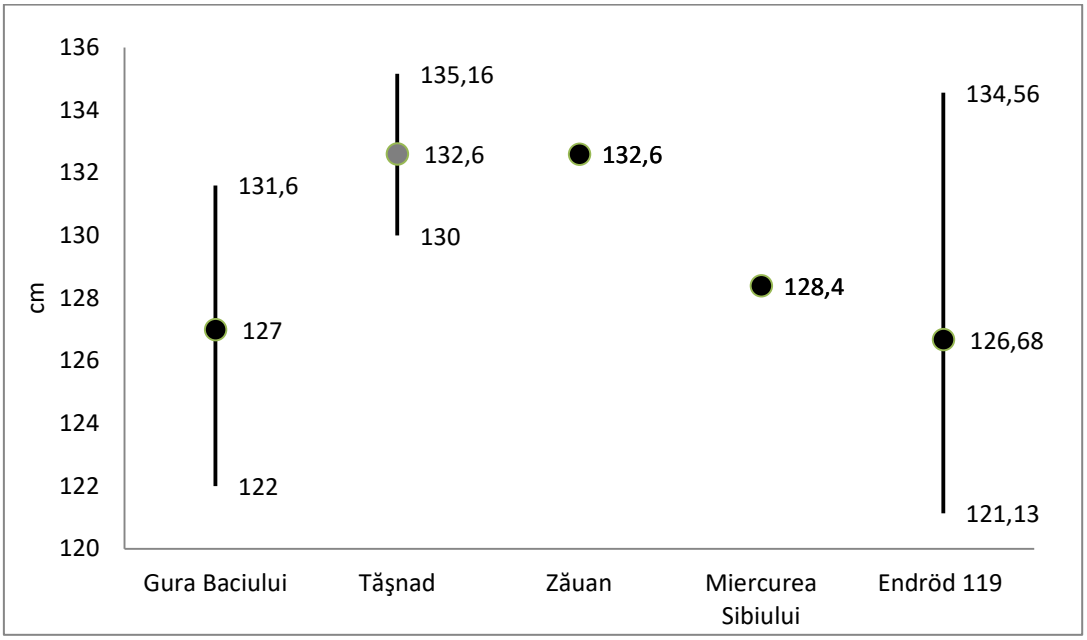


Fig. 5. Size of the cattle in some Körös sites (mean, minimum, and maximum values).
Talia la greabăn a vitelor din câteva așezări Criș (valorile medii, minime și maxime).

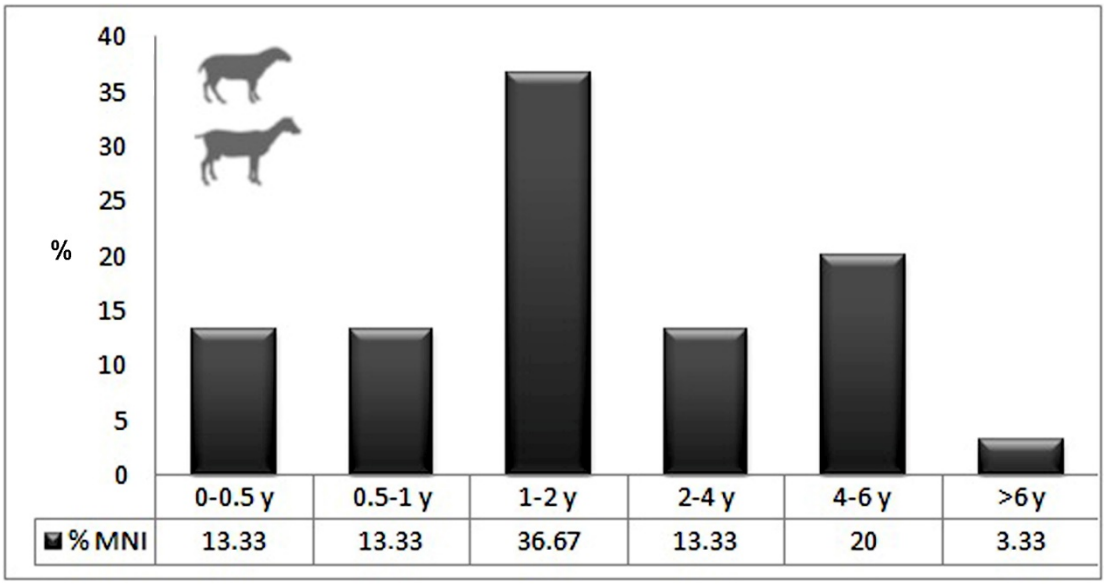


Fig. 6. Age profiles of the sheep/goat at Tăşnad.
Vârste de sacrificare ale ovicaprinelor de la Tăşnad.

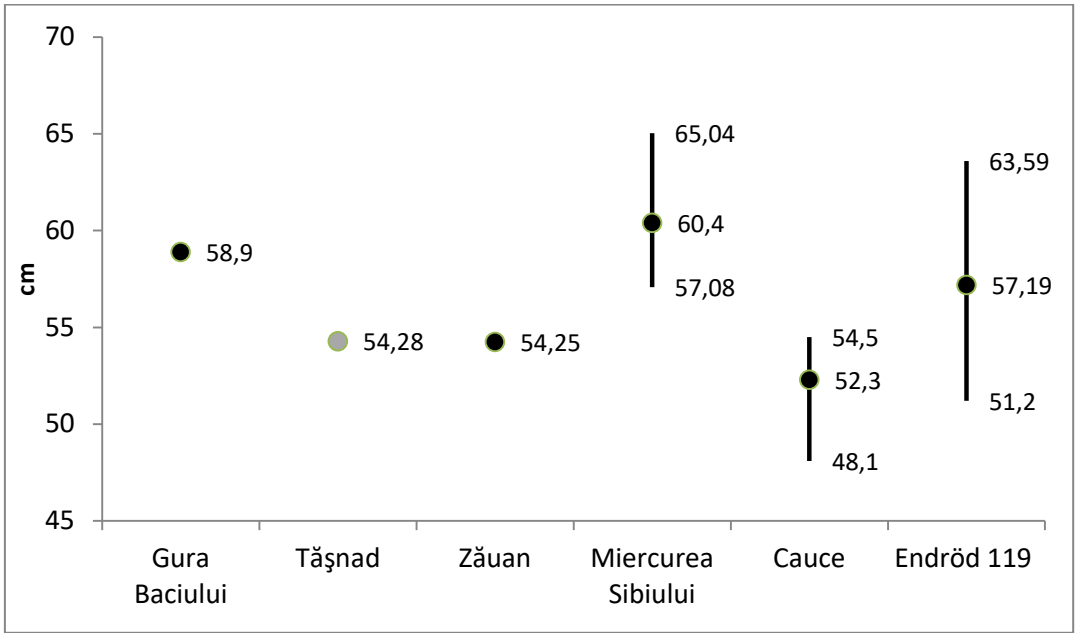


Fig. 7. Size of the sheep in some Körös sites (mean, minimum, and maximum values).
Talia oiilor din câteva așezări Criș (valorile medii, minime și maxime).

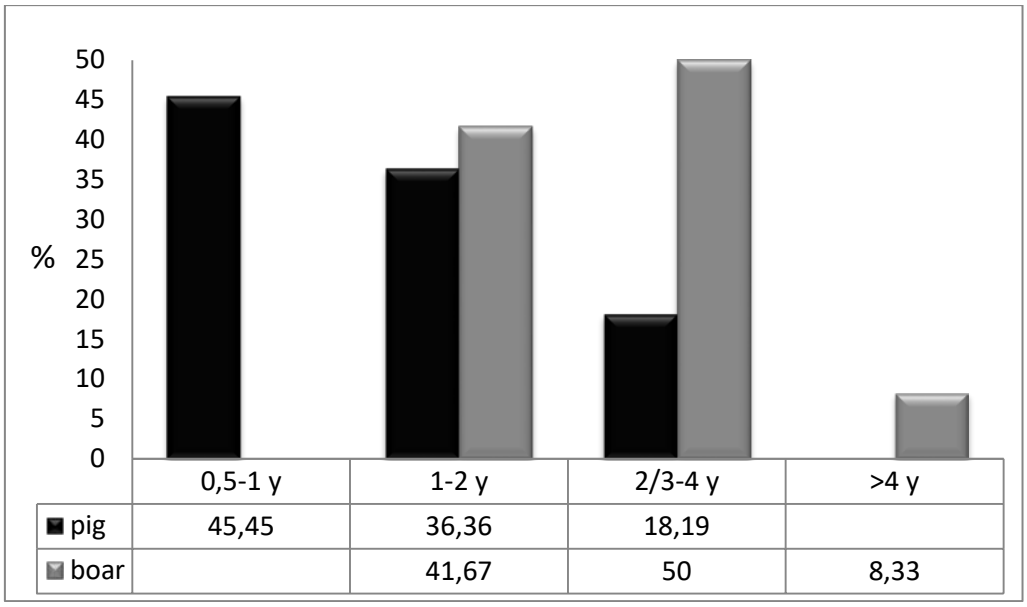


Fig. 8. Age profiles of the pig and wild boar at Tăşnad.
Vârste de sacrificare la porcul și mistrețul de la Tăşnad.

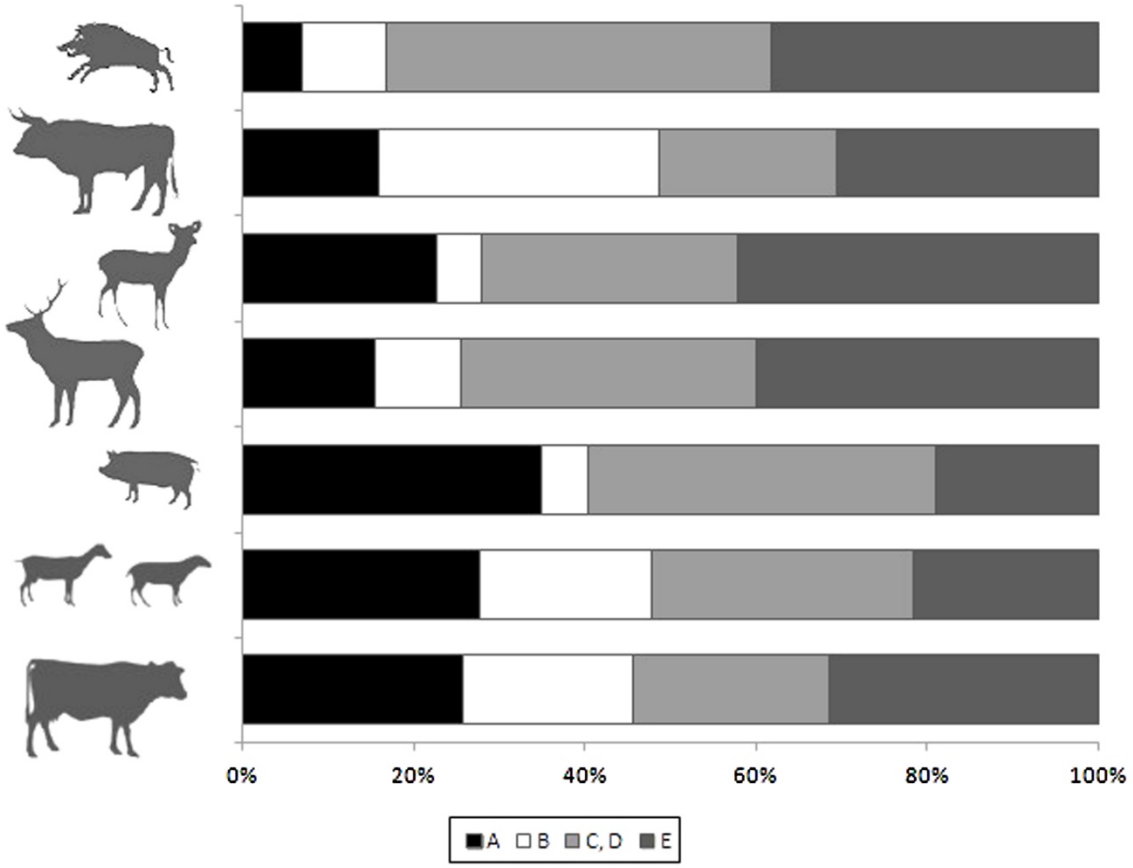
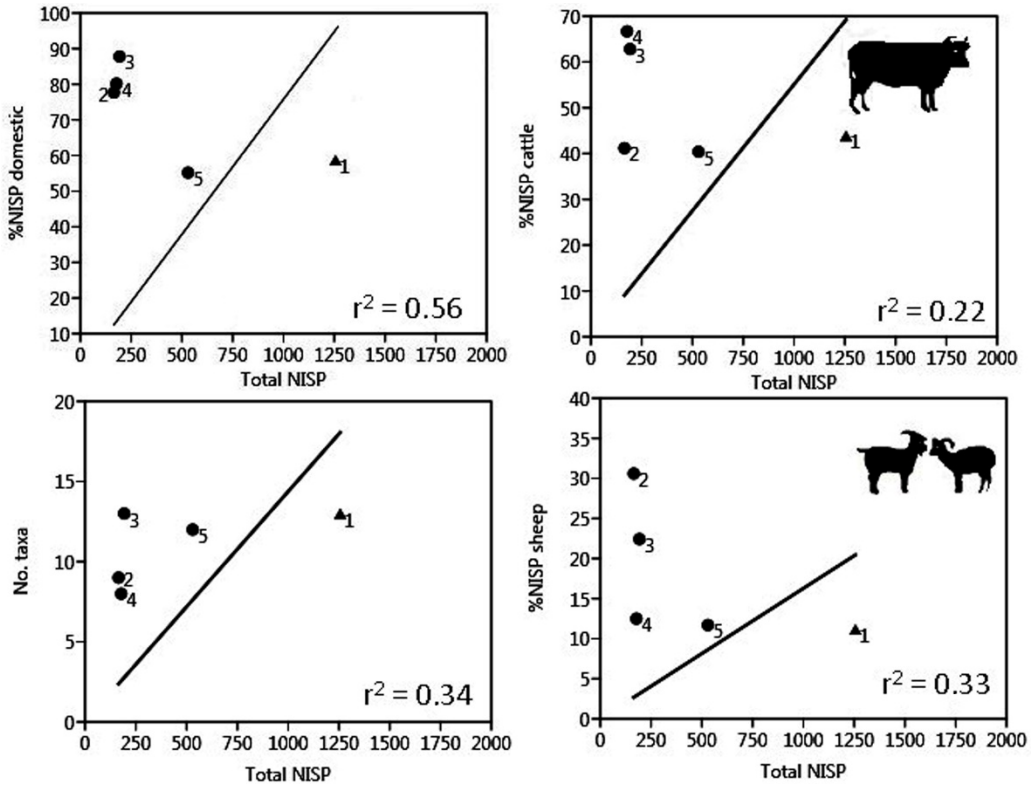


Fig. 9. Body parts distribution of main taxa at Tăşnad: A -skull; B -spine; C, D - belts and upper parts of the limbs; E - feet.
Distribuția părților corporale la principalele specii de la Tășnad: A -craniu; B - coloană; C, D - centuri și părți proximale ale memebrelor; E -labe.



Tăşnad (1), Gura Baciului (2), Zăuan (3), Miercurea Sibiului (4), Moldova Veche-Rât (5)

Fig. 10. Correlations between NISP and various components (domesticates, no. of taxa, bovines, small ruminants) based on Pearson's coefficient.
Corelații Pearson între NISP și diverse componente (domestice, nr. de taxoni, vite, ovicaprine).

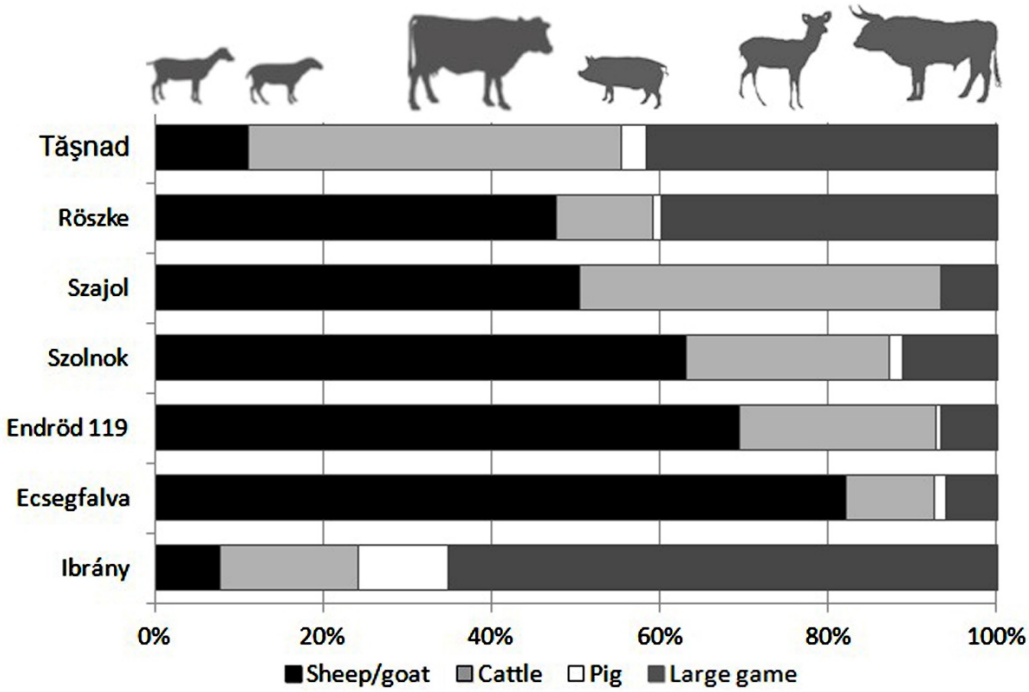


Fig. 11. The percentage composition of the animal samples in some Körös sites from the Carpathian Basin
Compoziția procentuală a unor loturi de animale în așezări Criș din bazinul Carpatic.