ESZTER ISTVÁNOVITS, VALÉRIA KULCSÁR

ANIMALS OF THE SARMATIANS IN THE CARPATHIAN BASIN (Archaeozoology through the eyes of archaeologists)[1]

On the present level of our knowledge on the Sarmatians migrating to the Carpathian Basin in the 1st century AD we can only guess where their original homeland exactly was, there are only presumptions. What is certain is that they departed from the European steppe. Taking this into consideration, animal farming obviously played an outstanding role in their way of life, at least at the beginning of their journey. Nevertheless, we have only few data on Sarmatian animals either in the steppe, or in the Carpathian Basin.

We have to emphasise that natural geographical conditions (mainly the average annual precipitation) of the Great Hungarian Plain tell against the presence of nomadism at this territory. At the same time these conditions were positively favourable for animal husbandry before the river regulation that took place in Hungary in the 19th century (Fig. 1). Beside animal farming, agriculture got a constantly growing role in the life of settling Sarmatian migrants. The Middle Danube Region is characterised by their dense settlement network. Typical features of these large settlements include beehive-shaped storage pits. Without going into the details of Sarmatian agriculture, we should note that one of the main export issue to Roman provinces, in all probability, was grain.

When examining the animal husbandry of Sarmatians we have three types of sources on our disposal. The first one includes the works of Antique authors. However, there is only rare substantive information in the literary evidence, either in the case of steppe or in the Carpathian Basin. On the first hand, we mostly read about horses, but mainly in general terms[2]. Sometimes we find relatively talkative sources, but their interpretation is problematic. Among the most detailed descriptions related to domestic animals Strabo should be mentioned: „The whole of the country has severe winters as far as the regions by the sea that are between the Borysthenes and the mouth of Lake Maeotis; but of the regions themselves that are by the sea the most northerly are the mouth of the Maeotis and, still more northerly, the mouth of the Borysthenes, and the recess of the Gulf of

[1] This study has been written in the framework of OTKA (Hungarian Scientific Research Fund) project N 104980.

[2] These sources were collected by István Vörös: e.g. Martialis 7,30, Cassius Dio LXXII,7, Tacitus. Hist. I.79 [55, p. 105].

Tamyraces, or Carcinites, which is the isthmus of the Great Chersonesus. The coldness of these regions, albeit the people live in plains, is evident, for they do not breed asses, an animal that is very sensitive to cold; and as for their cattle, some are born without horns, while the horns of others are filed off, for this part of the animal is sensitive to cold; and the horses are small, whereas the sheep are large; and bronze water-jars burst and their contents freeze solid" [45, 7.III.18].

According to a widely spread literary topos, cold climate influenced the animals' size and outlook. In Hippocrates' view that is why at the steppe „The wild beasts ... are not large, but such as can be sheltered underground; for the cold of winter and the barrenness of the country prevent their growth, and because they have no covert nor shelter", and „The wagons are drawn by yokes of oxen, some of two and others of three, and all without horns, for they have no horns, owing to the cold" [20, p. 18–19].

The situation is somewhat more favourable if we examine depictions. Apart from magic creatures and abstract images of the Sarmatian animal style we primarily know depictions of riding warriors or hunters. Beside these there are depictions of certain animals that deserve special attention. They appear mainly in the steppe finds, so in the present study they can be taken into consideration only as comparative material, in single cases. The number of depictions in the Sarmatian material of Hungary is very low[3]. Most of them are Roman products and there are only few pieces that can bring us closer to the determination of at least the species' markers[4].

The richest group of sources is represented by osteological material. At the steppe it comes primarily from burials that, in many respects, narrows the possibilities of examination, because we can not see the whole spectrum of the animal stock, certain species may be missing, thus, the study of farming and household is delimited. We do not get enough information e.g. on the nutrition habits, utilisation of bones, butchering of the animals etc.

The situation is different in the case of the Sarmatians living in the Carpathian Basin. The archaeozoological material coming basically from settlements represents a huge mass. However, its evaluation became accessible only decades after the first settlement publication [11; 55; 56;]. Though since that time a great number of animal bones was determined [e.g. 7; 28; 16; 52 etc.], most of such works are confined to determining the composition of the animal stock. At the same time, in our opinion, archaeozoological investigations have a serious perspective. It would be enough to mention that archaeogenetic examinations recently becoming more and more popular in anthropology, have not been even started yet in this field. Nevertheless, it is important to keep in mind, that all pastoral societies apply the means of artificial selection, that is to say, the changes and moves of animal stock are much more "disciplined" and traceable than that of the humans.

Beside settlements we also have to deal with cemeteries. These sites are more neglected in archaeozoology than settlements, that can, perhaps, be explained by the fact that archaeologists considered animal remains found at earlier excavations (e.g. a horse tooth or tibia) to be secondary and did not paid special attention to them. Also decades earlier, the phenomenon of ditches surrounding the graves was not recorded at all or was not carefully investigated, only profiles of the ditches were made and recorded. A characteristic example: in the recently published cemetery of Madaras in 54 graves 404 remains of 108 individuals coming from 11 species were unearthed [62, p. 445]. These data point to the importance of this question we should devote a special attention to in the future.

Because of the long history of Sarmatians in the Carpathian Basin it seems to be very probable

[3] Recently they were collected by Margit Nagy [38, p. 10–21].

[4] We'll return to these markers when discussing concrete species.

that most part of the stock included local regional species and only a small part of it could have come from booting and/or import [58, p. 42]. In the case of different migrant Sarmatian groups we always have to count with an earlier, local animal stock and the new one brought from the steppe. In order to separate these two – the "autochthonous" and "migrant" – components we obviously should examine archaeozoological material in terms of chronology. To make it clear: the regeneration of the stock can proceed in two ways, as it was assumed by István Vörös: "quick change = the stock (breed) is supplemented with a large mass of 'foreign' animals; slow change = a 'regional breed', characteristic for the area (environment) in question, is reached by improving the conditions of animal farming and by providing the expansion of herding knowledge" [58, p. 42]. Today we are far from at least presumptions on this question.

Considering the chronological changes in nutrition habits, it was László Bartosiewicz who made an attempt for drawing conclusions based on the material of the settlement excavated in Kompolt. In his opinion, comparing to the 2nd century the significance of cattle grew in the 3rd century; at the same time sheep keeping became less important. Between the 3rd–5th century this difference nivellated [7, p. 327].

Our knowledge on the character of animal farming is poor. As it has been already mentioned, in special literature there is a periodically and constantly returning idea, according to which Sarmatians of the Carpathian Basin were nomads. This can be excluded even without thorough examinations, taking into consideration the geographic conditions of the Danube Region. However, it is still a question how to imagine Sarmatian herds, their pasturage, whether stabling was used or not etc. There are no answers yet. All that we know is that researchers interpret part of ditches found in a number of settlements, as corrals [64, p. 74]. There are some large ones (40x40 m and 30x14 m, 20x20 m), but we also have data referring to smaller ones (15x20 m). There was a 8-shaped, 30x20 m large ditch excavated that could also serve as corral [64, p. 74, 77; 46, p. 63]. Gabriella Vörös drew attention to a special situation, namely, that up to now these constructions have been known only in the Danube-Tisza interfluve. She suggested that east of the Tisza the keeping of large animals was less characteristic because of soil and water conditions [57, p. 56]. However, the osteological material does not support this explanation. In connection with corrals we have a specific linguistic datum. Up to the 17th century so-called "gógány-castles" existed in Hungary. The word "gógány" is an Eastern Iranian loanword meaning cattle corral [19, p. 567]. Finally, we would like to note that pathology analyses will, probably, give new data for the conditions of animal farming.

Sarmatians of the Carpathian Basin from the very start, up to the 5th century when we lose them out of sight had four main breeds in the livestock: cattle, small ruminants, horses and pigs. Usually the first two dominate. Among the most frequent finds the dogs are to be mentioned. Cats, hens, geese and asses are rare, and from only a few excavations we know remains of camels. The ratio of species at different settlements depends on the natural conditions and regional division of labour. In the case of this or that Sarmatian village we have to keep in mind that it has a special significance which part of a settlement was excavated: osteological material of the "industrial district" or of the grain storage territories characterised by dozens of beehive-shaped pits can be basically different comparing to the material of "residential areas" or regions in the vicinity of corrals[5]. Large-scale preventive excavations today would be suitable for a such spatial analysis using the means of GIS.

Archaeozoological determinations in the majority of cases usually include only number of

[5] This is noteworthy at least because the accumulation of bone material in different archeological features shows a great variability. In Szegvár this number varied between 0 and 347 per feature [61, p. 116].

bones, without specifying on the number of individuals, which very strongly deforms the whole picture [e.g. 10, p. 255][6]. It can be a problem in the evaluation of the finds that we know only superficially the composition of livestock in different settlements despite of the huge number of finds. Only few exceptions can be cited, at the same time showing the problem's degree. To demonstrate it, we bring an example from the site of Orosháza–Községporta, Szűcs-tanya (Table 1) [53, p. 226 – adding the composition percentage of MNI = minimal number of individuals]:

Table 1. Osteological material from Orosháza–Községporta, Szűcs-tanya

Species	*Number of bones*	*%*	*MNI (minimal number of individuals)*	*%*
Cattle	140	37,3	25	56,8
Sheep	6	1,6	3	6,8
Goat	12	0,8	2	4,5
Sheep/Goat	12	3,2	3	6,8
Pig	11	2,9	3	6,8
Horse	40	10,7	2	4,5
Dog	142	37,9	3	6,8
Cat	18	4,8	1	2,3
Hen	2	0,5	1	2,3
Ground squirrel	1	0,3	1	2,3
Total	375		44	

Or, in the case of the Szegvár-Oromdűlő site (Table 2) [61, p. 121]:

Table 2. Osteological material from Szegvár-Oromdűlő

Species	*Number of bones*	*Number of individiuals*
Cattle	455	54
Sheep	865	54
Pig	198	30
Horse	54	11
Dog	5	5

Supplementing this picture we have to add that, from one hand, the bone material in many cases is strongly fragmented and not suitable for identification; and, from another hand, only a small percent of slaughtered animals' bones come to light at excavations. It is a question what happened with the "missing" many thousand pieces (cf. taphonomy). Part of them could have perished, another part was eaten by dogs or calcinated [e.g. 8, p. 300]. Even taking into consideration these explanations, we can assume that at settlements animal bones are found in a relatively low number comparing to the expected number. Mátyás Vremir, determining body regions of bones during the examination of an Avarian settlement – a usual practice in archaeozoological studies – wrote that "In a speculative way we can suggest the possibility of large-scale and practical utilisation of the bones

[6] At the same time, according to László Bartosiewicz [8, p. 301] the compositon percentage of the number of fragments and individuals do not differ in the case of large bone assemblages. If this is the case, then in the future it will make sense to compare the materials of certain settlements.

(e.g. making bone glue)”[7].

László Bartosiewicz made calculations considering the situation when the small number of an osteological assemblage sometimes distort the whole picture [7, p. 324–325]. Sándor Bökönyi conceived that the “security border” can be about 500 pieces [11, p. 42]. In the following tables we tried to represent as many published Sarmatian materials as possible to show also distortions.

Table 3. Domestic animal bone material of settlements[8]

Site	*Cattle*	*Sheep*	*Goat*	*Sheep/goat*	*Small ruminants (total)*	*Pig*	*Horse*	*Ass*	*Camel*	*Dog*	*Cat*	*Fowl*		*Total*
												Hen	*Goose*	
Alsónémedi	2515	1332	4		1336	683	280			1185	23	57		6079
Apagy	87	15	10	30	55	61	15			5				223
Ártánd–Kisf.	29	4		26	30	9	23	1 1 mule?		54				147
Ártánd–Nagyf.	114	9	1	58	68	48	47			233		1		511
Bánhalma	10	2			2		10			3				25
Doboz	88			19	19	35	12				26			180
Dunavecse	370			197		59	151		3	287		2		1069
Endrőd	388	78	6	239	323	73	97			6	1		1	889
Gyoma	4511			1937	1937	1011	1802			364	van	70		9695
Hajdúnánás	3084	74	7	988	1069	751	795			636	6	20	16	6377
Hódmezővásárhely	75	43		23	66	7	19			32				199
Kiskundorozsma	11327	6031	135		6166	1424	2081			2175	135	124	25	23457
Kompolt	384	46		272	318	37	58			12		6		815
Kunbaracs	9			1	1									10
Kunpeszér	11			4	4	1	2							18
Kunszállás	128			219	219	71	41			100		9		568
Kunszentmiklós	127			83	83	35	42			3				290
Nyírtura	21	8	1		9		9			220				259
Orgovány	6	1		7	8	7								21
Orosháza	140	6	12	12	30	11	40			142	18	2		383
Öregcsertő	13	1		1	2		2							17
Pócspetri	444	213			213	171	180	2		504	3			1517
Rákoscsaba	27	8			8	2	8							45
Sáp	59	22		40	62	7	7			3				138
Szabadszállás	125			117	117	10	7			233				492

[7] Vremir Mátyás: Nyíregyháza keleti elkerülő 36. lelőhely (Nyíregyháza–Oros, Nyulaska, Szék-dűlő) Népvándorlás kori telep és késő avar kori temető állatcsont-leletei. [Nyíregyháza Eastern by-pass road, site 36. (Nyíregyháza–Oros, Nyulaska, Szék-dűlő) (Animal bone finds of a Migration Period settlement and of an Avarian Age cemetery). Unpublished manuscript in the Jósa András Museum. E.g. in Újhartyán undefinable fragments make the 20–30% of the whole material [8, p. 301]. These fragments are usually small splinted bone parts in the case of which we can rightly think of purposive human activity.

[8] For references, see the Catalogue of sites at the end of the article.

Szegvár	455	865			865	198	54	1		5				1578
Tázlár	724			660	660	66	25	2						1477
Tiszaföldvár	2602			1151	1151	474	408	4		108	1			4748
Tiszafüred	153			41	41	25	24			14				257
Tiszavasvári	81			10	10	7	37			11				146
Újhartyán	273			143	143	22	36			74				548
Total	28455	8758	176	6378	15212	5305	6312	11	3	6409	213	219	42 +72	64464

The ratio of domestic animals (Table 3) found in cemeteries is different comparing to the ones found at settlements, probably, because representatives of species buried in human graves played mostly ritual and not practical role. The most preferred animals in burials are horses and not cattle or small ruminants. While we know cattle bones from three sites, horse bones occurred in 12 cemeteries. In the graves and ditches surrounding graves we find mostly non-edible parts of animals (skull, teeth) that served not as food offerings, but, more probably, as symbols of the complete animals (pars pro toto)[9]. Pigs and fowls are also relatively frequently met in the graves (four sites), while sheep and goats are exceptionally rare (two sites) (Table 4). Wild animals are also hardly met as well as at settlements (Table 5, 7). In the future a special attention should be paid to the difference between the archaeozoological material of the graves and ditches surrounding them. E.g. in the latter we frequently find complete horse skulls, while they are not characteristic for graves (Table 6)[10].

Table 4. Domestic animal bones in graves

Site	*Cattle*	*Sheep*	*Sheep/ goat*	*Pig*	*Horse*	*Dog*	*Fowl*	*Total*
Békéssámson					2 teeth			2
Debrecen-Máta	1							1
Dunaharaszti					1 skull, 1 tooth			2
Geszteréd					1 skull			1
Hortobágy-Poroshát	1			1	teeth, leg			4
Isaszeg	1			1	1 mandible			3
Nyíregyháza site 161	10		2		6			18
Kiskunfélegyháza					7 teeth, 2 skulls			9
Kisvárda							1 chicken	1
Kiszács					1 tooth			1
Lajosmizse					1 skull	1 skeleton		2
Madaras	22	11		12	46	3	5	99
Mátételke							1	1
Orosházi tanyák					1 tooth in a mug			1

[9] In details, see in the chapter dealing with horses.

[10] In this case we have to take into consideration, that graves are regularly found badly looted, while the ditches are obviously intact. At the same time the latter are usually more shallow than the burials, so agricultural activity frequently disturbs the finds here.

Szeged-Rivódűlő				1				1
Szentes-Sárgapart					1 skull			1
Tiszavasvári							1 hen	1
Total	35	11	2	15	73	4	8	148

Table 5. Wild animal bones in graves

Site	*Red deer*	*Hare*	*Fox*	*Bird / turtle*	*Total*
Madaras	2	2	2	1 black grouse 2 turtles	9
Üllő site 5	antler				1
Total	3	2	2	3	10

Table 6. Animal bones in ditches surrounding graves

Site	*Cattle*	*Pig*	*Horse*	*Other*	*Total*
Kiskundorozsma-Subasa			1 skull		1
Lajosmizse			1 skull		1
Nyíregyháza site 161	13	1	2		16
Subotica				2 eggs	2
Sződliget			1 skull		1
Total	13	1	5	2	21

At the start of archaeozoological research an attempt was made to compare livestock of different regions of the Great Hungarian Plain, focusing on the ethnically differing areas [58, p. 58; 59]. István Vörös compared primarily the region surrounded by the Csörsz (Devil's) Dyke and the parts situated beyond. His idea was based on the assumption that the earthwork – in tendency – follows the border between the chernozem soil of the Plain and the closed forest-forest steppe zone. Here we should note that according to a generally excepted opinion the construction of the Csörsz Dyke can be connected to Sarmatians. However, it is necessary to point out that the time of the construction is not clear. Even in case the Roman Age dating will be supported by convincing evidence, we cannot put it before the last quarter of the 3rd century. The whole picture is made more complicated by the fact that Sarmatian finds have been coming to light far beyond the line of the Csörsz Dyke. In the reality, the border between Sarmatians and other Barbarian peoples (Germans, Celts, Dacians) could have been a contact zone and not a sharp frontier similar to the Roman limes [25]. All these facts show that, on the present level of research, István Vörös's results should be approached cautiously. More than two decades ago he thought that the order of frequency of livestock at Sarmatian and Quadian settlements is the following (in order of prevalence): cattle–sheep–pig (Sarmatian territory), cattle–pig–sheep (Roman Age settlements of North and Northeast Hungary, that is to say, parts more influenced by Germanic and Dacian ethnic groups). Both horse and cattle-dog appear in the whole of the Hungarian Plain, but ass is known only at Sarmatians, similarly to hunting dogs [58, p. 58, Table 5–6]. Since his study, similar attempts have not been made; recent research only refers to Vörös's results discussed above.

An important question is that of slaughter and butchering of the animals, which sometimes – in principle – can provide a chance to make ethnical or chronological assumptions. We mean e.g. observations like the one according to which Avarians skinned their horses by cutting the extremities,

while ancient Hungarians disassembled the horse leg at the pivot / ankle joints[11].

At the settlements, traces of pole-axing sometimes can be recorded (crushed coronal bone) (Fig. 2) [61, p. 116]. However, on the basis of comparison of the bones by meat regions, it seems more probable that animals, at least most of them, were killed not in the village, that is to say, the butchery, where primary disassemblage took place, should be looked for somewhere at a separated place [56, p. 123; 61, p. 118].

Cattle

As we have already pointed out, the most frequent domestic animal of the Sarmatians in the Carpathian Basin was cattle. Up to now, examinations of around 28,500 bone finds (45.7% of total domestic animal material) have been published (cf. Table 3). In the special literature reviewed by us we found only two excavations where the number of small ruminants bones (sheep / goat) was higher than that of the cattle: Kunszállás [58, p. 59] and Szegvár [61, p. 116–118].

There are small, medium and large size individuals among cattle alike, the first two dominating [58, p. 39–44][12]. Withers heights of the cows mostly vary between 1002 and 1333 mm, while that of the bulls between 1088.8 and 1272 mm [58, p. 41; 16, p. 210]. Life weight of one such animal with withers height of 1052 mm was calculated (around 250 kg) [8, p. 302]. Among the cattle large number of oxen was found, their withers heights were be between 1171–1222 mm [e.g. 32, p. 90; 61, p. 116; 16, p. 210]. Beside body size and constitution, sizes and shapes of horncore bases show great variability [58, p. 42]. The short horned variant is common, in the case of the cattle from Hajdúnánás the horncores vary between 110–230 mm [11, p. 71; 16, p. 210]. They mostly have medium wall thickness, but there were also thin and thick pieces found. Larger diameter varies between 36 and 84 mm, the smaller one between 30 and 56 mm [53, p. 227 – with further reference]. Different size of the animals and different character of horns come from sexual dimorphysm and the character of the breed. Taking into consideration the latter, in principle, it will be possible to separate regional species in the future. Comparison of cattle finds from different regions of the Great Hungarian Plain took place only about 25 years ago [58, p. 40]. Since that, the revision of the mass material found at preventive large-scale excavations has not been done from this aspect. So, today we can refer only to isolated research results[13].

Sándor Bökönyi suggested that large size (withers height: 1300–1400 mm) cattle relatively rarely occurring among small and medium size, generally spread individuals, come from Roman import or booting. He also assumed, that these were oxen, that is to say, not breeding animals [11, p. 45–46; 12, p. 252]. This idea has been usually overtaken by the research [6, p. 370; 16, p. 226]. At the same time, according to István Vörös, the export-import was just the opposite, that is to say, it were the Sarmatians who drove their cattle en masse to Roman markets [58, p. 42]. This question will obviously be solved by the methodological comparison of Sarmatian and Roman (mainly from the neighbouring provinces of Pannonia and Dacia) find material.

[11] For the comparison with Avarian Age/Age of Hungarian Conquest material, see Gábor Lőrinczy's work [34, p. 132]. Data on Roman Age were published by Beáta Tugya [51, p. 92–93]. Recently, on the question of butchering in connection with Roman Age finds (but off the Sarmatian territory), see the study by István Vörös, though without comparison with Sarmatian customs [63, p. 161–164].

[12] According to Andrea Kőrösi „small size of body is characteristic" [28, p. 10], but e.g. in Kiskundorozsma and Kunszentmárton the medium size individuals dominate (of course, at these sites small and large bodied variants occur as well) [50, p. 136; 56, p. 123].

[13] Unfortunately, no attempts for chronological distinction were made either. That is to say, our knowledge on chronological changes in the livestock is even poorer, than on the regional differences.

Today we have a solid evidence, supported by large series, showing that in the case of the cattle, it were not the immature animals who were slaughtered and in some cases very old individuals are encountered in find materials [7, p. 326; 16, p. 211; 5, p. 520][14]. All these point to the varied utilisation: cattle were used as draught animals and also for producing milk. The former is made probable by the occurrence of oxen and large size individuals [11, p. 46; 61, p. 118]. Beside that we have data for the utilisation of horns [16, p. 210–211; 53, p. 227]. This is evidenced only by cutting traits on the base of horncore, because horns usually perish in the soil. In the sites of Hajdúnánás and Orosháza traces of cutting were observed possibly referring to the fact that soon after the slaughter of the animal, horn parts were cut off. In the case of the latter settlement such traces could be recorded at one third of the found horncores. Authors of the publication also suggested that horns were used more frequently than it could be observed, because it is not necessary to cut it: after drying for some months horn separates from its base itself [53, p. 227][15].

Judging from split long bones and skulls we know that brains and bone marrow was consumed.

Beside Sarmatian settlements of the Carpathian Basin, cattle bones are also known from burials, if not in a large number. They were mentioned from 14 graves of Madaras–Halmok [62, p. 445] and in Nyíregyháza–Felsősima cattle remains were met in five burials[16]. An especially interesting phenomenon was encountered in the latter site, feature 187 (looted grave surrounded with a ditch), where beside the remains of a female skeleton, in the SE corner of the grave-pit, that is to say, beyond the woman's head, the skull and extremities of a young cattle laid in a heap (Fig. 3). Beside, we can refer to the sites of Debrecen–Máta határ, Hortobágy–Poroshát grave I.1 and Isaszeg grave 2 [31, p. 71]. The speciality of the Nyíregyháza–Felsősima cemetery is that while in the ditches surrounding or accompanying the graves, horse bones dominated, the majority of animal bones found in graves (66.6%) belonged to cattle[17].

Small ruminants: sheep and goat

Another important species are sheep and goats. Comparing to cattle, we have less information on them[18]. This group includes a total of 15,000 archaeozoological finds having been published up to now (24.4% of all domestic animal bones), which is noteworthy at least because here we deal with much smaller bones than in the case of cattle or horses, so in the course of the excavation much more bone fragments belonging to sheep/goat must be lost. Almost 9000 pieces were identified as belonging to sheep and only in 150–200 cases remains were identified with goats. At one third of the finds we know only that they belonged to small ruminants.

Similarly to cattle, sheep are usually small [11, p. 46–47; 12, p. 252], but there are rather significant variances. Females' withers heights vary between 535 and 608 mm, while males heights are 623–726 mm. We know sizes of two female goats (535 and 702 mm) [58, p. 46; 61, p. 117; 16, p. 227]. In case of both sheep and goats several types of horns were met. Just to mention some

[14] In the case of e.g. Szegvár full-blown animals composed 57.4% of the identified livestock [61, p. 118]. According to László Bartosiewicz taking into consideration the relatively slow reproduction ability of the cattle (compared to the sheep/goats and pigs) it was neccessary to preserve young individuals [9, p. 292].

[15] The authors mention that in the site of Nagytarcsa–Urasági dűlő similar butchering traits were observed on the base of goat horncore.

[16] Unpublished excavation by Eszter Istvánovits.

[17] We thank Imola Kelemen for the examinations.

[18] Similarly to archaeozoologists we discuss goat and sheep together, because in most of cases their remains can not be separated.

examples, the horn of a goat from Ártánd belongs to the so-called Prisca type [12, p. 252][19], while the horncore of the individual from Apagy is small, the horn is straight and "sabre"-shaped [58, p. 46]. Among the sheep, individuals with corpulent, outwards twisted horns (triangular cross-section) were encountered [11, 46–47, fig. 3; 56, p. 124, t. XIII, 3; 12, p. 252; 16, p. 213]. A small "goat horn"-like horn characteristic for the so-called turbary sheep was also found, and also remains of a turbinal shaped horn with triangular cross-section referring to the so-called "Copper sheep". Its horn size fell between 80–285 mm [58, p. 46; 12, p. 252; 16, p. 213]. There are also individuals with rudimentary or no horns [11, p. 47–48, fig. 4–5; 12, p. 252; 16, p. 213].

There are settlements where, in all probability, inhabitants consumed mostly mature animals, but young individuals were encountered even on a larger degree than in the case of cattle; in other sites the ratio of young and old individuals is more balanced [16, p. 213, fig. 8; 7, p. 326; 11, p. 62]. In this aspect, the osteological material of Szegvár–Oromdűlő is very special. Here only one third of the sheep bones belonged to adults (16 individuals); among the 38 young animals 22 were lambs younger than one month. The same was the composition of pig bones. In the case of suckler lambs it were the extremities and skulls that got into archaeological features. In connection with the slaughter of these young animals, data were cited on Roman cuisine, namely the roast lamb unboned at its larynx described in Apicius' cookbook. We also learn from this literary source that gralloched, unboned pigs were prepared both cooked and roasted [61, p. 117, 119].

While in the settlement materials – as we could see – sheep bones appear in great quantities and goats are met also frequently, these animals are encountered relatively rarely in burials. In the cemetery of Nyíregyháza–Felsősima there were remains (coming not from the meat region) of sheep in one grave and that of a goat in another, but in the ditches surrounding the graves no small ruminants were discovered[20]. In Madaras, 11 cases were mentioned, all of them coming from grave-pits [62, p. 445–447].

Sacral role of the ram was analysed by Eszter Istvánovits [23]. László Szolnoki who published a feature of a settlement part recently excavated by him between Sáp, Bihartorda and Bihardancsháza also evaluated it as a sacral one. At the bottom of feature 13 (stratigraphic unit 20) they found three spindle whorls, a small hand-made mug and a skeleton of a young sheep [48, p. 10, 15, fig. 2, 1].

Pig

Pig was encountered in all of the published settlement materials, with the only exception of the Nyírtura–Várrét site [10, p. 259][21]. A total of more than 5000 bones were published, that make 8.5% of the domestic animal remains (see Table 3).

Similarly to cattle and sheep, among pigs small and medium (590–655 mm) body size dominated, but e.g. in Apagy an individual of 750–780 mm withers height was found [11, p. 48; 12, p. 253; 58, p. 48]. In Sándor Bökönyi's opinion short headed individuals must have been on low degree of domestication [11, p. 48; 12, p. 253].

The age distribution (number of young individuals) clearly refers to meat exploitation. As it has been already mentioned in the case of Szegvár–Oromdűlő [61, p. 117, 119], neonati and embryos are

[19] Prisca type horn having a triangular cross-section, is twisted, bending outwards in a regular way, its front part is arched, the back part is plain.

[20] We thank Imola Kelemen for the information.

[21] Such anomalies should be considered essential, because this is a kind of difference in nutrition that can mark either a religious, or ethnic difference. Of course, this can be taken into consideration only if we have sufficient amount of data at our disposal.

sometimes met [58, p. 55; 16, p. 218]; in Kompolt half of the pig bones belonged to this category [7, p. 326].

Horse

Up to now almost 6500 horse bones (10.1% of the domestic animal remains) have been published. In the archaeozoological material of the settlements sometimes great quantities are found, but usually they do not exceed the number of cattle and small ruminants, only that of the pigs [6, p. 372–373; 28, p. 10].

According to literary sources, the horses of Sarmatians were small[22]. Alanic horse of emperor Probus sacked in a battle with Barbarians had miraculous qualities[23] "though not handsome or especially large, was reputed, according to the talk of the captives, to be able to run one hundred miles in a day and to continue for eight or ten days..." [21, 8.3].

Actually, small horses dominate in the archaeological material. Their withers height varies between 1200–1280 mm, they are gracile and slim. Contrary to Sándor Bökönyi's theory, according to which sliminess was the result of castration[24], István Vörös was on the opinion that these are species-typical features [56, p. 124–125]. Beside small horses, several other species (1280–1460 mm) were recorded in the Great Hungarian Plain [56, p. 125; 16, p. 216], among them medium sized, like e.g. in Újhartyán, Pócspetri [8, p. 302; 5, p. 520] or Kiskundorozsma–Nagyszék. The withers height of individuals found at the latter site reached even 1477 mm [50, p. 136–137]. They were also of slim constitution. There were slim, thin and less thin legged variants met alike [12, p. 257; 16, p. 217]. According to István Vörös low-built and medium sized horses were saddlers [61, p. 118]. Judging from some pathological cases they were intensively exploited [16, p. 222].

Bökönyi published a 1520 mm high military horse from Kunszentmiklós–Bak ér suggesting the possibility of Roman import [11, p. 50, 52; 12, 257]. However, István Vörös showed that Bökönyi miscalculated by 1120 mm the height estimated from tibia, that is to say, the actual withers height could have been 1408 mm [58, p. 50]. The appearance of large and strong individuals draw our attention to the question of cataphractarius horses. Taking into consideration this characteristic Sarmatian heavy cavalry warfare, we have to keep in mind that part of war horses must have been suitable for carrying riders wearing heavy armour. Based on the analysis of Bosporan depictions, researchers of Crimean Greek antiquities long ago pointed out the possibility that such specimens must have belonged to special Central Asian breed (considered to be the ancestor of the Akhaltekin horses) with tall body, small head, thin legs and graceful stature [1, p. 74–76; 4, p. 99]. This is an aspect to be considered in further research of Sarmatian horses in the Carpathian Basin.

Judging from Strabo's description, Sarmatians consumed horse meat [45, VII,4,6]. This literary information was fully evidenced by horse bones found at settlements. It was observed in several cases that on the basis of crackings horses were indeed eaten [11, p. 62; 56, p. 124; 7, p. 325; 50, p.

[22] Strabo VII,4,8, Ammianus XVII.12.2-3, Plin. NH VIII.162, Ovid. Ep. ex Ponto I,2,77 ff. Data were collected by István Vörös and Andrea Vaday [55, p. 105; 56, p. 125, footnote 61]. A thorough study on literary sources and depictions of Sarmatian horses and dogs was published by A.K. Nefedkin [3, p. 196–220].

[23] Otherwise, Alanic horse seems to be a customary term: Hadrian made an epitaphy to his favourite Alanic horse named Borysthenes [36, p. 135].

[24] On castration, see Strabo: "It is a peculiarity of the whole Scythian and Sarmatian race that they castrate their horses to make them easy to manage; for although the horses are small, they are exceedingly quick and hard to manage" [45, VII.4.8].

137, 16, p. 217][25]. However, we have also assemblages missing any traces referring to that [48, p. 19]. In the site of Nyírtura–Várrét bones of large animals were rather used to obtain marrow from them, while traits of gnawing could be seen on the bones of smaller individuals. At the same site 12.17% of the bones were burned or glowed, but no traces of cooking were found that differs from the general experience [10, p. 259].

In the case of horses we have to emphasise finds connected with sacral sphere[26]. They appear both at settlements and cemeteries. In Szeged–Kiskundorozsma–Nagyszék II a horse skull was found in a dwelling [46, p. 73]. A unique find assemblage came to light in Hódmezővásárhely–Kakasszék feature 2. In a 143 cm long, 80 cm wide and 80 cm deep, S–N oriented pit widening towards its southern end, three horse skulls were found. The middle one was turned to the north lying a little higher than the two ones sidewards turned to the south. Mandibles missed in all the cases, but under the skulls there was a half mandible lying horizontally. The skulls were situated 50 cm above the bottom of the pit. Under and above them the fill was black and no finds came to light from here [17, p. 48]. At this site there were both settlement features and burials, so "ritual" phenomena can be connected to either of them. At Üllő site 5, in the central part of a shallow pit a skull and extremity bones of a horse laid – probably, remains of a skinned animal (Fig. 4)[27].

Horse must have been playing central role in the Sarmatian world of beliefs. So, it is not surprising that in several burials of the Carpathian Basin horse remains were recorded. In Dunaharaszti in graves 2 and 3 – both of them looted – a horse skull, in grave 7 a horse tooth were found [42, p. 155]. In Zenta-Mákos horse bones came to light from the vicinity of the grave, in Nagy-Korhány and Nagy-Bashalom they were recovered in the earth of the barrow [42, p. 169, 197–198][28]. While in the graves themselves we find only isolated fragments (teeth, vertebra, leg bones etc.), in the ditches surrounding the graves horse skulls are frequently met [e.g. 5, p. 521].

A clay horse protome discovered in Kiskőrös may also refer to horse's role in Sarmatian religion[29].

Ass

Asses, if not frequently, sometimes occur in Sarmatian archaeozoological material. A total of 11 bones were published. The first piece was mentioned from Ártánd by Sándor Bökönyi [12, p. 257]. Further examples are known from Tázlár, Tiszaföldvár, Derecske, Pócspetri and Szegvár [58, Table 5; 5; p. 519; 61, p. 116–118]. These are small bodied individuals. Mediterranean beasts of burden found on the territory of Pannonia are similarly small [60, p. 256; 61, p. 118][30].

In the case of tooth found in Ártánd–Kisfarkasdomb it was suggested that it belonged to a mule

[25] The latter author noted that in the Hajdúnánás material published by her, this phenomenon was observed but not generally. L. Bartosiewicz considered it to be characteristic in Újhartyán that all the consumed horse parts belonged to full-blown animals, while in the case of other livestock immature individuals had been also slaughtered [8, p. 302].

[26] This is not surprising at all keeping in mind the steppe background of the Sarmatians. On the cultic role of horse, primarily see E.E. Kuzmina's work [2].

[27] Unpublished excavation by Valéria Kulcsár.

[28] In these three cases the connection of the bones with the grave is dubious.

[29] Finding circumstances of the pieces are uncertain: it comes from an assemblage found during the excavation of an Avarian cemetery; the author of the publication determined it as coming from a cremation grave of Sarmatian Age [41, p. 117–118, T. XLIV–XLV; 26, p. 87, fig. 10].

[30] However, Sándor Bökönyi did not exclude the possibility of getting it to Sarmatians with Greek-Scythian mediation [12, p. 257].

[12, p. 257–258]. No similar finds have been discovered since.

Camel

At the moment camel is represented with a single reliable find in the Sarmatian material of the Carpathian basin. The three bones found in the site of Dunavecse–Ugordáció 1 belong to a bactrian. This animal is known from the Roman provinces, but missing from the material of the Barbaricum [52, p. 149]. It was also suggested in the case of Kompolt feature 69 (well) that a bone of a camel (a dromedary in this case) came to light [7, p. 327][31].

Fowls: hen and goose

Fowls do not belong to the frequent archaeozoological finds at Sarmatian settlements (somewhat more than 300 bones, 0.4% of the domestic animal remains), but they are not unique [28, p. 10; 8, p. 302]. Number of published hen bones exceeds 200, that of goose – 40, in further more than 70 cases we know only that these were bones belonging to fowls.

We have very few data considering their outlook. According to Sándor Bökönyi hens were small, smaller than their Roman relatives [11, p. 61], but large bodied goose was identified as Roman import [56, p. 125; 8, p. 302]. At the moment we miss identifications of eggs found at settlements, sometimes they could have had sacral function. To cite only one example, let's have a look at the find from Tiszaföldvár, a beehive-shaped pit 1982/26. Here on the debris, a skeleton of a 10 years old child thrown to the pit and found in a twisted position laid upon a body of a dog. There was also another dog skeleton in the pit, at the bottom of which four 12 cm (diameter) large and one 6 cm large eggs of a grallatory were discovered [54, p. 83, fig. 3]. Eggs were placed into burials very rarely, e.g. in two graves (71 and 149) of the Nyíregyháza–Felsősima cemetery[32], and in two cases from ditches surrounding graves from Subotica [47, p. 11, 15]. Despite of the relatively low number of finds, it is obvious that Sarmatians kept fowls for eggs and meat.

Dog

Dog bones are met with a prominent frequency. We have at our disposal more than 6400 examined bones (10.3% of domestic animals). However, in the case of these animals, data considering the number of bones is deceiving, because in a lot of cases we find complete skeletons in the (waste) pits. This, of course, is not surprising, because dog meat was not consumed, so the corpse of the perished animal was simply buried. So, the ratio of dog bones (individual skeletons) is much higher comparing to the number of individuals calculated from cattle, sheep, goat, pig and even horse bones coming from nutrition waste.

Researchers separate two types of dogs: a large sized shepherd dog with strong bones, essential for guarding and driving large animals[33] – its skull constitution reminds that of the wolf; and sighthound, the dog of hunting at open spaces. A transition type of the two is an evidence for interbreeding of the types[34]. In the site of Pócspetri, 13 individuals were separated into five groups according to the skull morphology and/or body constitution; it was also noted that there were also individuals with different body constitution as an impact of Pannonian trade. At the same time the

[31] There were both Roman and Avarian Age shards in the well, so the dating is dubious.

[32] Nyíregyháza, excavation by Eszter Istvánovits, unpublished.

[33] According to István Vörös [58, p. 51] this is a Canis familiaris matris-optimae. Such individual was found at Kiskundorozsma–Nagyszék [50, p. 137].

[34] The two types were separated by Sándor Bökönyi. Further research confirmed his observation [11, p. 52–61; 12, p. 259; 58, p. 51–53 etc.]. According to Bökönyi the first type was a variant of Celtic-Roman sighthound further bred locally, while the other type includes multi-functional average dogs [11, p. 56].

author of the publication pointed out that „Dogs found at the site neither by size, nor by variability differ from the Sarmatian Age trend" [5]. So, it is not clear how to interpret the five groups, among which beside the two "traditional" ones only one dog is characterised by "'heavy' front part and somewhat lighter, more drooping back side". The average height of the two customary Sarmatian dogs is around 460–589 mm, though one from Hódmezővásárhely was 612 mm, while a somewhat smaller individual with shorter head from Hajdúnánás could have been similar to puli with withers height around 475–495 mm. Beside these, the presence of a pointer like dog can be also suggested [16, p. 218–219; 53, p. 227; 51, p. 93].

Talking about hunter dogs we should refer to a passage from a 3rd century AD Syrian author, (Pseudo) Oppian's work devoted to hunting. According to him "These among all dogs are the most excellent and greatly possess the mind of hunters: Sauromatian". "In mating the tribes of dogs take heed that the breeds are fit and right suitable for another ... put a Sarmatian sire with an Iberian dam" [39, 1. 373, 397].

Sometimes very old and/or ill animals also continued to live in the villages, among them individuals whose wounds were consequences of human activity [28, p. 11; 16, p. 222]. Evidences for intensive dog keeping are traits of gnawing observed at other animal bones [48, p. 19; 51, p. 92–93].

In the case of dogs we have to pay a special attention to their sacral role. Of course, in this question we should be cautious, because the finding of a complete skeleton or a skull in itself do not refer to animal sacrifice at all. Sometimes, however, we have records on special and very careful burials of dogs, which can not be left out of consideration [57, p. 64]. Just to cite some examples, let us refer to the above mentioned (in connection with eggs) grave from Tiszaföldvár, where two dog skeletons came to light accompanied by a child's skeleton and eggs [54, p. 83, fig. 3]. A similar case can be cited from Dunakeszi–Alagi major feature 138 where a child's skeleton was uncovered with a dog above and another – puppy – dog beyond the child's head (Fig. 5)[35]. The other case is a "dog burial" reliably assumed to be sacral from Tiszadob–Sziget. Here a beehive-shaped cavity "started" from the bottom of a cylindrical pit. At the bottom of the beehive-shaped pit a large bodied dog laid on its side. The mouth of the pit was so narrow that it must have been a great difficulty to push the corpse through (Fig. 6) [24, p. 177–178, fig. 9 – with further data]. In feature 72 (dwelling) of Szeged–Kiskundorozsma, 2-3 cm above the floor a small sized dog skeleton was found in the corner. In another corner a horse skull laid. From the preliminary report we know that excavators observed traits referring to the "outstanding role of dogs", among others they recorded a dog skeleton buried in an oven [46, p. 62, 63–64, fig. 4,4]. In the site of Dunavecse-Ugordáció a dog's corpse was also mentioned. It laid accompanied with a vessel in a pit dug into the corner of a house [35, p. 120]. A characteristic phenomenon is that at settlements where we suspect sacral burial of dogs, pits with human corpses thrown into them are regularly found.

In Hajdúnánás a dog skull was discovered which, judging from the traits observed, was cut from the corpse. Its lower side became absolutely plain by polishing, that is to say, there are "traits of utilisation" on it [16, p. 220–221, 226, fig. 11].

Ritually buried dogs can be met not only at settlements[36]. We find them also in graves[37], pits

[35] Unpublished excavation by Valéria Kulcsár.

[36] Ritual role of dogs both at settlements and cemeteries was examined in details by Lavinia Grumeza referring to further literature [18].

[37] Lajosmizse [31, p. 130], Madaras [62, p. 447]. Dogs buried in coffins at the feet of human corpses were excavated in the cemetery with ditches surrounding graves at the site of Makó–Industrial park (kind oral information by Csilla Balogh).

situated on the territory of cemeteries[38] and also in ditches surrounding graves[39]. Burial of dogs is not the speciality of the Sarmatians of the Carpathian Basin.

Cat

Up to the present moment more than 200 cat bones were published from eight sites showing that among Sarmatian animals these were not frequent, but also not rare species. Usually remains of cats are evaluated as Roman import [56, p. 125].

According to László Bartosiewicz two cat skulls from Gyoma show great similarity with European wildcat [9, p. 295].

Wild animals

Apart from the four big games – red deer, roe deer, wild-boar and aurochs (274 bones = 0.4% of the total osteological material) – fur-bearers were hunted: primarily remains of hare remains, but also bones of fox, weasel, polecat, hamster and other rodents were found (Table 7). The use of fur is evidenced by a hamster skull with traits of skinning discovered in Kompolt [7, p. 328][40]. Remains of brown bear are known from Apagy [58, p. 33]. Red deers live in closed forests, while wild-boar in bush forests, aurochs in forest steppe. Except for hare, the rest of hunted fur-bearers come from forest milieu. A special hunting practice is demonstrated by the head (skull and pair of mandibles) of a hunting ferret coming from Tiszaeszlár–Szellőhalom barrow II, grave 7 [56, p. 125]. Remains of wild birds, fish and turtles are known in a small number. At the same time fish spinal found in Vrsac–Crvenka grave 4 is a warning sign showing that we have to expect further remains of these animals in the future [18, p. 418][41].

In general we can assume that the ratio of wild animals in the total number of osteological material of Sarmatian settlements is much lower than that of the domestic ones (98.3% of the bones belong to domestic animals). Beside the more than 60000 domestic animal remains published up to now, only 1000-1200 wild animal bones were listed[42]. The lack of the latter is usually explained by the lack of hunting. It is dubitable, whether this assumption can be accepted as fact. We have to consider this question at least because it was suggested about one of dog types that they were used for hare hunting [11, p. 62] – Bökönyi's data are generally overtaken by the later researchers. At the same time remains of hares – though they belong to the most frequently huntered animals – are found in a much less number than that of the dogs used for chasing them.

From literary sources we know that hunting played an important role in the life of steppe Iranian peoples. Talking about Scythians and Sarmatians Strabo notes that "As for game, there are deer and wild boars in the marshes, and wild asses and roe deer in the plains. Another peculiar thing is the fact

[38] Kaba–Tatárülések: under the barrow in a small pit a femur of the dead and a huddled dog skeleton were recorded [42, p. 199–200). In Debrecen–Máta határ in the vicinity of the barrow two dog skeletons were found [42, p. 201–202]. In the cemetery of Madaras–Halmok in the vicinity of grave 121 a dog was placed onto a thick level of ash into a regular grave pit. There were fowl bones near the dog's skull [27, p. 215]. A similar phenomenon – regular grave-pit with a dog – was met in the Sarmatian cemetery of Nyíregyháza, Oros–Mega Park (we thank Gábor Pintye for the information).

[39] In Pócspetri in six cases [5, p. 524 – with further data], in Üllő site 5 [49, p. 21] and Nyíregyháza–Felsősima (unpublished excavation by Eszter Istvánovits).

[40] In the case of hamster, ground squirrel and other underground animals usually it can not be decided whether their bones got into archaeological features as a result of human activity or not. Anyway, according to some opinions "their presence in relatively deep archaeological strata may refer to the contemporary relatively dry meadowy environment" [8, p. 300].

[41] Small remains of fish can be easily overlooked in the course of settlement excavations.

[42] A characteristic datum e.g.: out of 5737 bones examined by Andrea Kőrösi, 5684 belonged to livestock [28, p. 10].

that the eagle is not found in these regions. And among the quadrupeds there is what is called the "colos"; it is between the deer and ram in size, is white, is swifter than they, and drinks through its nostrils into its head, and then from this storage supplies itself for several days, so that it can easily live in the waterless country" [45, 7.IV.8]. It is difficult to imagine that inhabitants of the Great Hungarian Plain rich in wild animals and fish left the practice of hunting and fishing; of course, the composition of hunted animals must have changed.

In all probability, Sarmatians hunted on a high level. We have a Cassius Dio passage in connection with emperor Hadrian, talking about a Jazygian man named Mastor "who had become a captive and had been employed by Hadrian in his hunting because of his strength and daring..." [13, LXIX.22]

Hunting meant a good chance for warriors to show their strength and compete in bravery and manhood. At the same time, it was a good occasion to train and practise in harmonised troop movements that was necessary for the effective employment of their war tactics. Sarmatians of the Carpathian Basin, similarly to their steppe relatives, were famous for their mounted warriors, so they undoubtedly had to preserve this tradition. The lack of hunted animals' remains can be rather explained by the circumstance that they did not drag the hunt chase to the villages, but consumed it at the end of hunting. We may refer to numerous examples from the Caucasian Nart epic, where men taking part in common "adventure" ritually share the gotten game. Everybody had his share according to his merits and rank. After that they consume the meat in the course of a common feast at the spot of the hunting.

Beside the relative lack of hunted animals, the number of fish, shells and cochlea is strikingly low. As exceptions such assemblages can be mentioned as e.g. the great number of cochlea recorded among the shards of a bowl found in an around 1 sq.m large area between pits 7 and 8 in the site of Hódmezővásárhely–Kopáncs [41, p. 115] or 153 cochlea in a beehive-shaped pit in Szegvár [61, p. 115]. Of course, we do not know whether these cochlea were consumed or not.

We can supplement the above list with animal remains only rarely found, but deserving attention as possible evidences of agricultural activity. To these belong the findings of a little owl from Lajosmizse [32, p. 90] and that of rodents (Table 7). The great number of animal burrows recorded at most of settlement excavations also may refer to intensive agriculture (of course, this phenomenon in itself is not a reliable argument, because we do not know how the increase of rodents as a consequence of agriculture can be dated).

Table 7. Wild animal bones published from settlements

Site	*Red deer*	*Roe deer*	*Wildboar*	*Auroch*	*Hare*	*Bear*	*Fox*	*Badger / polecat*	*Rodent*	*Fish/bird / turtle/ frog*	*Total*
Apagy	12	1	6	10		3				4 turtles	36
Ártánd–Kisfar								1 badger			1
Ártánd–Nagyf.	1				4						5
Dunavecse		3?									3
Endrőd		2			1					cochlea	
Gyoma	2	3		3	1			badger	1 weasel-like animal	fish	10
Hajdúnánás	19	11	12		4				19 hamsters 1 mole-rat	10 storks 1 coot 2 cranes 4 birds 9 fish	121

Kiskundorozsma	48		1		54			7 badgers	22 mice 2 beech martens 66 ground squirrels 1 dormouse 214 hamsters 166 other	92 bird 80 bustards 2 frogs 14 fish 5 pike	774
Kunszentmiklós	1		2								3
Orosháza									1 ground squirrel		1
Öregcsertő				1							1
Pócspetri	19	8	3						1 rodent	4 birds	35
Szabadszállás	1				4						5
Szegvár	1									2 turtles 1 fish	4
Tázlár	2										2
Tiszaföldvár	55	3	16	22	7		4	1 polecat			108
Tiszafüred	6										6
Tiszavasvári	2			1							3
Total	169	28	40	37	75	3	4	9	494	230	1089

Some words about worked animal bone

While a huge amount of animal bones is discovered at Sarmatian settlements of the Carpathian Basin, it can be assumed that data referring to bone working is strikingly low. Among archaeological finds bone objects are also relatively rare. We know few combs appearing at sites [43], beside that there are some awls, abrasive bones or skates, spatulas, chisels and needles[43]. We have very few such objects also among the grave finds. According to László Bartosiewicz, in the case of Sarmatians we can speak only about occasional utilisation of bone waste. The only relatively frequent bone implement is the so-called bone skate [8, p. 306; 16, p. 225–226][44].

Low rate of bone processing is in sharp contradiction with the existence of a unique find assemblage: a hoard found in Jászkarajenő in 1986. From a Roman Age vessel, fragments of which were dispersed by ploughing, 326 complete and fragmented carved bone objects were collected. Excavation made at the spot of the finding recorded a Late Sarmatian settlement [15]. At the same time, it is still a question whether bones really belonged to the material of the settlement or the bone objects are counterfeits?

Traits referring to bone or antler processing have been found very sporadically and are unreliable. Workshops (Gyoma; Nyíregyháza–Rozsrétszőlő, a dwelling; Motorway M43, vicinity of Óföldeák site 9; Cegléd site 4/7; Üllő site 5) were collected and reviewed by Gábor Pintye [43, p. 183]. On the basis of cutting traits observed on bones, István Vörös suggested bone working at Kunszentmárton and Erika Gál at Hajdúnánás [56, p. 123; 16, p. 230]. Attempts were made to record traits referring to horn processing [16, p. 210; 53, p. 227].

[43] For more details, cf. Andrea Kőrösi's study [29].

[44] The function of the so-called bone skates is a contradictive issue in archaeozoological literature [14; 29, p. 104].

The only aim of this article was to make a comprehensive review of our data on disposal, on the basis of studies published so far. Summarising our ideas on the zoological knowledge, animal farming, hunting of the Sarmatians of the Carpathian Basin, we can assume that the quantity of the archaeozoological material provides great prospects for the future research, unexploited yet. There are a lot of untouched problems, like e.g. the comparison with the earlier (Late Iron Age) material, with that of the steppe; comparative research of certain regions of the Great Hungarian Plain; examination of possible ethnic (?) differences in the way of meat processing; demonstration of changes in the livestock that could have taken place in the period of 400-450 years' Sarmatian domination[45].

СПИСОК ИСПОЛЬЗОВАННОЙ ЛИТЕРАТУРЫ

1. Десятчиков Ю. М. Катафрактарий на надгробии Афения // СА. 1972. № 4. С. 68-77.
2. Кузьмина Е. Е. Конь в религии и искусстве саков и скифов // Скифы и сарматы / Ред. А. И. Тереножкин. Киев: Наукова думка, 1977. С. 96-119.
3. Нефёдкин А. К. Военное дело сарматов и аланов (по данным античных источников). СПб.: Филологический факультет СПбГУ; Нестор-История, 2011. 303 с.
4. Шургая И. Г. Изображения всадника и коня из Илурата // КСИА. 1983. Вып. 174. С. 96-100.
5. Bárány A. Szarmata kori kutyaleletek Pócspetri lelőhely állatcsontanyagából (Dog Remains from the Sarmatian Age in the Animal Bone Material of the Site Pócspetri) // Ante viam stratam: a Magyar Nemzeti Múzeum megelőző feltárásai Kántorjánosi és Pócspetri határában az M3 autópálya nyírségi nyomvonalán / Szabó Á., Masek Zs. (Ed.). Budapest: Magyar Nemzeti Múzeum, 2012. P. 519-544.
6. Bartosiewicz L. Animal exploitation at the Sarmatian site of Gyoma 133 // Vaday A., Bartosiewicz L., Berecz K., Choyke A. M., Medzihradszky Zs., Puszta S., Székely B., Vicze M., Vida T. Cultural and Landscape changes in South-East Hungary II. Prehistoric, Roman Barbarian and Late Avar Settlement at Gyoma 133 (Békés County Microregion). Budapest: Archaeolingua, 1996. P. 365-446.
7. Bartosiewicz L. A lelőhely állatcsontanyaga (archaeozoológia) // Vaday A., Bánffy E., Bartosiewicz L., Biró K., Gogâltan F., Horváth F., Nagy A. Kompolt-Kistér: Újkőkori, bronzkori, szarmata és avar lelőhely. Leletmentő ásatás az M3 nyomvonalán (A Neolithic, Bronze age, Sarmatian and Avar site. Rescue excavation at the M3 motorway). Eger: Dobó István Vármúzeum, 1999. P. 279-338.
8. Bartosiewicz L. A vándorlás és letelepedettség jellegzetességei az újhartyáni lelőhely állatcsontleleteinek tükrében (Migration and Sedentism in Light of the Animal Bones from Újhartyán (Central Hungary) // A Móra Ferenc Múzeum Évkönyve, Studia Archaeologica. 2001. T. VII. P. 299-317.
9. Bartosiewicz L., Choyke A. Sarmatian and Early Medieval animal exploitation at the site of Endrőd 170 // Vaday A. H., Jankovich B. D., Kovács L. Archaeological Investigations in County Békés 1986–1992. Budapest: Archaeolingua, 2011. P. 285-357.
10. Berendi E. A Nyírtura–Várrét közelében (Nyíregyháza, keleti elkerülő út 37. lelőhely) feltárt szarmata településrészlet állatcsont leletei (Animal bones from the Roman Imperial Period settlement part near Nyírtura–Várrét (Nyíregyháza, Eastern Bypass, Site 37) // A Nyíregyházi Jósa András Múzeum Évkönyve. 2006. T. XLVIII. P. 255-260.
11. Bökönyi S. Animal remains of Sarmatian sites from Bács-Kiskun county // Cumania. 1976. T. 4. P. 41-72.
12. Bökönyi S. Szarmata állatcsontleletek Biharkeresztes-Artánd-Nagyfarkasdombról (Animal remains from the Sarmatian settlement of Biharkeresztes-Artánd, Kis- és Nagyfarkasdomb) // A Debreceni Déri Múzeum Évkönyve. 1982 (1984). P. 251-265.
13. Cassius Dio: Roman History. Loeb Classical Library, 9 volumes, Greek texts and facing English translation: Harvard University Press, 1914 thru 1927. Translation by Earnest Cary. URL: http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Cassius_Dio/home.html

[45] We are grateful to István Vörös for reading and estimating our article before publishing.

14. Choyke A. M. Bone skates: raw material, manufacturing and use // Pannonia and beyond. Studies in Honour of László Barkóczi / A. Vaday (Ed.). Antaeus. 1997-1998 (1999). T. 24. P. 148-156.
15. Dinnyés I. A jászkarajenői késő szarmata csontfaragványok // Studia Comitatensia. 2011. T. 31. P. 285-409.
16. Gál E. Animal remains from the multi-period site of Hajdúnánás-Fürjhalom-dűlő. Part I. Sarmatian finds // Acta Archaeologica Academiae Scientiarum Hungaricae. 2010. T. 61. P. 207-260.
17. Gazdapusztai Gy. Dák-szarmatakori temető és telep Hódmezővásárhely–Kakasszéken // Archaeologiai Értesítő. 1960. T. 87. P. 47-50.
18. Grumeza L. Animal inhumations within settlements during the Sarmatian Period on the Western Plain (end of the 2nd century – first half of the 5th century AD) // Archeovest I. In memoriam Liviu Măruia. Interdisciplinaritate în arheologie şi istorie / A. Stăvila, D. Micle, A. Cîntar, Ch. Floca, S. Forţiu (Eds.). Szeged: Jatepress, 2013. P. 413–435.
19. Harmatta J. Nomadic and Sedentary Life in the Great Steppen-Belt of Eurasia // The archaeology of the steppes. Methods and strategies. Papers from the International Symposium held in Naples 9–12 November 1992 / Genito B. (Ed.). Series Minor. T. XLIV. Napoli: Instituto Universitario Orientale. Dipartimento di Studi Asiatici, 1994. P. 565-571.
20. Hippocrates: On Airs, Waters, and Places. Translated by Francis Adams. URL: http://classics.mit.edu//Hippocrates/airwatpl.html (дата обращения: 20.07.2015).
21. Historia Augusta, Life of Probus, published in the Loeb Classical Library, English translation is by David Magie, 1932. URL: http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Historia_Augusta/Probus*.html (дата обращения: 14.07.2015).
22. Istvánovits E. A Felső-Tisza-vidék legkorábbi szarmata leletei. 2-3. századi sírok Tiszavasváriból (The earliest Sarmatian finds of the Upper Tisza region – 2nd-3rd century burials in Tiszavasvári) // A Nyíregyházi Jósa András Múzeum Évkönyve. 1984/86 (1990). T. XXVII-XXIX. P. 83-133.
23. Istvánovits E. A szarmaták és a kos. Adatok a Kárpát-medence szarmatáinak hitvilágához (Die Sarmaten und der Widder. Beiträge zur Glaubenswelt der im Karpatenbecken lebenden Sarmaten) // A Nyíregyházi Jósa András Múzeum Évkönyve. 1997–1998 (1998). T. XXXIX–XL. P. 135-151.
24. Istvánovits E. Tiszavasvári–Városföldje, Jegyző-tag. A settlement of the 5th century (Hunkori település maradványai Tiszavasváriban, a Városföldjén) // A Nyíregyházi Jósa András Múzeum Évkönyve. 1999. T. XLI. P. 173-254.
25. Istvánovits E., Kulcsár V. Actual State of Research of the Csörsz- or Devil's Dyke // Identităţi culturale locale şi regionale în context european. Studii de arheologie şi antropologie istorică. Local and Regional Cultural Identities in European Context. Archaeology and historical anthropology / Pop H., Bejinariu I., Băcueţ-Crişan S., Băcueţ-Crişan D. (Eds.). Cluj Napoca: Editura Mega – Editura Porolissum, 2010. P. 311-321.
26. Istvánovits E., Pintye G. Az alföldi Barbaricum mécsesei (Lamps of the Barbaricum of the Great Hungarian Plain) // A Nyíregyházi Jósa András Múzeum Évkönyve. 2011. T. LIII. P. 83-111.
27. Kőhegyi M. Előzetes jelentés a Madaras-Halmok későszarmata-hunkori temetőjének ásatásáról (Vorläufige Mitteilung über die Freilegung des Spätsarmatisch-hunnenzeitlichen Gräberfeldes von Madaras-Halmok) // Archaeologiai Értesítő. 1971. T. 98. P. 210-215.
28. Kőrösi A. Előzetes jelentés az Alsónémedi – Ócsa összekötő út építését megelőző ásatások állatcsontanyagának vizsgálatáról // Kutatások Pest megyében. Tudományos konferencia III. 2000. Pest Megyei Múzeumi Füzetek Új Sorozat 6 / Korkes Zs. (Ed.). Szentendre: Pest Megyei Múzeumok Igazgatósága, 2001. P. 9-15.
29. Kőrösi A. Szarmata és avarkori csonteszközök Felgyő–Kettőshalmon (Typology of the Worked Bone Implements from Felgyő-Kettőshalmi dűlő) // Csont és bőr. Az állati eredetű nyersanyagok feldolgozásának története, régészete és néprajza. Bone and Leather. History, Archaeology and Ethnography of Crafts Utilizing Raw Materials from Animals / Gömöri J., Kőrösi A. (Eds.). Az anyagi kultúra a Kárpát-medencében 4. Budapest: MTA VEAB Iparrégészeti és Archaeometriai Munkabizottság – Kézművesipar-történeti Munkabizottság, 2011. P. 99-116.

30. Kulcsár V. Szarmata sírok Kiskunfélegyháza, Külsőgalamboson (Sarmatengräber in Kiskunfélegyháza, Külsőgalambos) // Cumania. 1986. T. 9. P. 9-23.
31. Kulcsár V. A kárpát-medencei szarmaták temetkezési szokásai. Aszód: Osváth Gedeon Múzeumi Alapítvány, 1998. 153 p.
32. Kulcsár V., Vörös I. Szarmata telep Lajosmizse határában. Leletmentés az M5 útnál (Adalék a római kori utakhoz) // Cumania. 1989. T. 11. P. 67-93.
33. Kürti B. Szarmata temetőrészlet Kiskundorozsma–Subasáról (M5–26=78. lelőhely, Csongrád megye 1998) // Szántó Kovács Múzeum Évkönyve. 2005. T. 7. P. 85-109.
34. Lőrinczy G. A Szegvár-oromdűlői kora-avarkori temető 1. sírja // A Móra Ferenc Múzeum Évkönyve. 1984–85. 2 (1991). P. 127-154.
35. Lukács J. Szarmata falu Dunavecse–Ugordáció-dűlőben (Előzetes jelentés) // A Barbaricum ösvényein / Á. Somogyvári, G. V. Székely (Eds.). Kecskemét: Bács-Kiskun Megyei Önkormányzat Katona József Múzeuma, 2011. P. 119–143.
36. Mócsy A. Pannonia and Upper Moesia. A History of the Middle Danube Provinces of the Roman Empire. London; Boston: Routledge & Kegan Paul, 1974. 453 p.
37. Nagy D. S. Az Orosházi-tanyák, MÁV-homokbánya szarmata temetője (Sarmatisches Gräberfeld aus der MÁV-Sandgrube von Orosházi-tanyák) // A Szántó Kovács Múzeum Évkönyve. 2005. T. 7. P. 11-48.
38. Nagy M. Állatábrázolások és az I. germán állatstílus a Közép-Duna-vidéken. Tierdarstellungen und der germanische Tierstil I im Gebiet der Mittleren Donau. Budapest: MNM, 2007. 208 p.
39. Oppianus. Oppian, Colluthus, Tryphiodorus. The Loeb Classical Library. English translation by A. W. Meir. London; New York, 1928. URL http://www.archive.org/stream/oppiancolluthust00oppiuoft#page/28/mode/2up (дата обращения: 21.07.2015).
40. Párducz M. Újabb adatok az Alföld római korának ismeretéhez (Neue Angaben zur römischen Zeit des Alföld) // Dolgozatok a M.Kir. Ferencz József-Tudományegyetem Archaeologiai Intézetéből. 1932. T. VIII. P. 112-121.
41. Párducz M. Őskori és szarmata telep Hódmezővásárhely határában (Siedlung der Urzeit und der Sarmatenzeit in der Umgebung von Hódmezővásárhely) // Dolgozatok a M.Kir. Ferencz József-Tudományegyetem Archaeologiai Intézetéből. 1942. T. XVIII. P. 113-122.
42. Párducz M. Denkmäler der Sarmatenzeit Ungarns, III // Archaeologia Hungarica. 1950. XXX. 260 p.
43. Pintye G. A Kárpát-medencei szarmata települések csontfésűi // Archaeologiai Értesítő. 2009. T. 134. P. 165-195.
44. Rózsa Z. Szarmata telep- és temetőrészlet Békéssámson, Erdőháti-halom lelőhelyen // Szántó Kovács Múzeum Évkönyve. 2005. T. 7. P. 49-84.
45. Strabo. The Geography. Loeb Classical Library, 8 volumes, Greek texts with facing English translation by H. L. Jones. Harvard University Press, 1917 thru 1932. URL: http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Strabo/home.html (дата обращения: 17.07.2015).
46. Szalontai Cs., Tóth K. Előzetes jelentés a Szeged–Kiskundorozsma határában végzett szarmata kori település- és temetőfeltárásról // Hadak útján. A népvándorlás kor fiatal kutatóinak konferenciája / Bende L., Lőrinczy G., Szalontai Cs. (Eds.). Szeged: Csongrád Megyei Múzeumok, 2000. P. 59-78.
47. Szekeres L., Szekeres Á. Szarmata és XI. századi temetők Verusicson (Subotica–Azotara). Szabadka, 1996. 65 p.
48. Szolnoki L. Régészeti feltárások Sáp, Bihardancsháza és Bihartorda között (2009) // A Bihari Múzeum Évkönyve. 2011. T. XV-XVI. P. 7-31.
49. Tari E. Az M0-s körgyűrű építését megelőző régészeti feltárások // Magyar Múzeumok. 2004. T. 10:3. P. 19-22.
50. Tóth A. Kiskundorozsma–Nagyszék (M5. Nr. 34. 26/72) szarmata település állatcsont leletei // A Móra Ferenc Múzeum Évkönyve. Új folyam. 2014. T. 1. P. 131-159.
51. Tugya B. Császárkori és Árpád-kori állatcsontleletek a Hódmezővásárhely–Barattyosi kerékpárút lelőhelyeiről // Hombár Múzeumi Műhely 6. Múzeumi Tanulmányok. 2011. P. 91-98.
52. Tugya B., Lichtenstein L. Dunavecse–Ugordáció I. lelőhely 2–5. századi objektumainak archeozoológiai

értékelése // A Barbaricum ösvényein... A 2005-ben Kecskeméten tartott tudományos konferencia előadásai. Archaeologia Cumanica 1 / Á. Somogyvári, Gy. V. Székely (Eds.). Kecskemét: Bács-Kiskun Megyei Önkormányzat Kecskeméti Katona József Múzeuma, 2011. P. 145-160.
53. Tugya B., Rózsa Z. A szaru, mint nyersanyag felhasználása Orosháza-Községporta –Szűcs-tanya szarmata lelőhelyen. Régészeti, archaeozoológiai, néprajzi vonatkozások // Környezet – Ember – Kultúra. A természettudományok és a régészet párbeszéde. A Magyar Nemzeti Múzeum Nemzeti Örökségvédelmi Központ 2010, október 6–8-án megrendezett konferenciájának tanulmánykötete / A. Kreiter, Á. Pető, B. Tugya (Eds.). Budapest: Magyar Nemzeti Múzeum Nemzeti Örökségvédelmi Központ, 2012. P. 225-230.
54. Vaday A. Atipikus szarmata telepjelenség Kompolt-Kistéri tanya 15. lelőhelyén // Agria. 1997. T. 33. P. 77-107.
55. Vaday A., Vörös I. Szarmata telep nyomai Bánhalma határában // Archaeologiai Értesítő. 1977. T. 104. P. 98-105.
56. Vaday A., Vörös I. Szarmata település Kunszentmártonban // Szolnok Megyei Múzeum Évkönyve. 1979/80 (1980). P. 117-139.
57. Vörös G. Településszerkezet és életmód az alföldi szarmaták falvaiban // Jazigok, roxolánok, alánok. Szarmaták az Alföldön / P. Havassy (Ed.). Gyulai katalógusok 5. Gyula, 1998. P. 49-66.
58. Vörös I. Apagy barbaricumi császárkori település állatcsontmaradványai (Animal Bones from the Roman Imperial Period Settlement at Apagy in Barbaricum) // A Nyíregyházi Jósa András Múzeum Évkönyve. 1990–1992 (1993). T. 33–35. P. 33-65.
59. Vörös I. A szirmabesenyői császárkori telep állatcsontmaradványai // A Herman Ottó Múzeum Évkönyve. 1999. T. 37. P. 223-236.
60. Vörös I. Hunkori település állatcsontleletei Tiszavasváriban // A Nyíregyházi Jósa András Múzeum Évkönyve. 1999. T. XLI. P. 255-266.
61. Vörös I. A szegvár-oromdűlői császárkori telep állatcsontleletei // A Móra Ferenc Múzeum Évkönyve, Studia Archaeologica. 2005. T. 11. P. 115–125.
62. Vörös I. Madaras-Halmok szarmata temető állatcsontleletei // Kőhegyi M., Vörös G. Madaras–Halmok. Kr. u. 2–5. századi szarmata temető. Szeged: Szegedi Tudományegyetem Régészeti Tanszéke, 2011. P. 445-455.
63. Vörös I., Soós E. Garadna-Kastély zug. A római császárkori germán teleprészlet újraértékelése // Communicationes Archaeologicae Hungariae. 2014. P. 121-152.
64. Wicker E. Egy szarmata falu külterülete (M5 125. Kiskunfélegyháza–Izsáki út). Feltárások 1995–1996. évben // Múzeumi kutatások Bács-Kiskun megyében 1995–1996 / Körösi I. (Ed.). Kecskemét: Bács-Kiskun Megye Önkormányzatának Múzeumi Szervezete, 1997. P. 73-80.

REFERENCES

1. Desiatchikov Iu. M. Katafraktarii na nadgrobii Afeniia. *Sovetskaia arkheologiia*, 1972, N 4, pp. 68-77.
2. Kuz'mina E. E. Kon' v religii i iskusstve sakov i skifov. *Terenozhkin A. I. (Ed.). Skify i sarmaty*, Kiev, Naukova dumka Publ., 1977, pp. 96-119.
3. Nefedkin A. K. *Voennoe delo sarmatov i alanov (po dannym antichnykh istochnikov).* St. Petersburg: Filologicheskii fakul'tet SpbGU, Nestor-Istoriia Publ., 2011. 303 p.
4. Shurgaia I. G. Izobrazheniia vsadnika i konia iz Ilurata. *Kratkie soobshcheniia Instituta arkheologii AN SSSR*, 1983, Vol. 174, pp. 96-100.
5. Bárány A. Szarmata kori kutyaleletek Pócspetri lelőhely állatcsontanyagából (Dog Remains from the Sarmatian Age in the Animal Bone Material of the Site Pócspetri). *Szabó Á., Masek Zs. (Eds.). Ante viam stratam: a Magyar Nemzeti Múzeum megelőző feltárásai Kántorjánosi és Pócspetri határában az M3 autópálya nyírségi nyomvonalán.* Budapest: Magyar Nemzeti Múzeum, 2012, pp. 519-544.
6. Bartosiewicz L. Animal exploitation at the Sarmatian site of Gyoma 133. *Vaday A., Bartosiewicz L., Berecz K., Choyke A. M., Medzihradszky Zs., Puszta S., Székely B., Vicze M., Vida T. Cultural and Landscape changes in South-East Hungary II. Prehistoric, Roman Barbarian and Late Avar Settlement at Gyoma 133*

(Békés County Microregion). Budapest: Archaeolingua, 1996, pp. 365-446.
7. Bartosiewicz L. A lelőhely állatcsontanyaga (archaeozoológia). *Vaday A., Bánffy E., Bartosiewicz L., Biró K., Gogâltan F., Horváth F., Nagy A. Kompolt-Kistér: Újkőkori, bronzkori, szarmata és avar lelőhely. Leletmentő ásatás az M3 nyomvonalán (A Neolithic, Bronze age, Sarmatian and Avar site. Rescue excavation at the M3 motorway).* Eger: Dobó István Vármúzeum, 1999, pp. 279-338.
8. Bartosiewicz L. A vándorlás és letelepedettség jellegzetességei az újhartyáni lelőhely állatcsontleleteinek tükrében (Migration and Sedentism in Light of the Animal Bones from Újhartyán (Central Hungary), *A Móra Ferenc Múzeum Évkönyve, Studia Archaeologica*, 2001, T. VII, pp. 299-317.
9. Bartosiewicz L., Choyke A. Sarmatian and Early Medieval animal exploitation at the site of Endrőd 170. *Vaday A. H., Jankovich B. D., Kovács L. Archaeological Investigations in County Békés 1986–1992*. Budapest: Archaeolingua, 2011, pp. 285-357.
10. Berendi E. A Nyírtura–Várrét közelében (Nyíregyháza, keleti elkerülő út 37. lelőhely) feltárt szarmata településrészlet állatcsont leletei (Animal bones from the Roman Imperial Period settlement part near Nyírtura–Várrét (Nyíregyháza, Eastern Bypass, Site 37), *A Nyíregyházi Jósa András Múzeum Évkönyve*, 2006, T. XLVIII, pp. 255-260.
11. Bökönyi S. Animal remains of Sarmatian sites from Bács-Kiskun county, *Cumania*, 1976, T. 4, pp. 41-72.
12. Bökönyi S. Szarmata állatcsontleletek Biharkeresztes-Artánd-Nagyfarkasdombról (Animal remains from the Sarmatian settlement of Biharkeresztes-Artánd, Kis- és Nagyfarkasdomb). *A Debreceni Déri Múzeum Évkönyve*. 1982 (1984), pp. 251-265.
13. Cassius Dio: Roman History. Loeb Classical Library, 9 volumes, Greek texts and facing English translation: Harvard University Press, 1914 thru 1927. Translation by Earnest Cary. URL: http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Cassius_Dio/home.html (Accessed on: 17.07.2015).
14. Choyke A. M. Bone skates: raw material, manufacturing and use. *Vaday A. (Ed.). Pannonia and beyond. Studies in Honour of László Barkóczi*, *Antaeus,* 1997-1998 (1999), T. 24, pp. 148-156.
15. Dinnyés I. A jászkarajenői késő szarmata csontfaragványok, *Studia Comitatensia*, 2011, T. 31, pp. 285-409.
16. Gál E. Animal remains from the multi-period site of Hajdúnánás-Fürjhalom-dűlő. Part I. Sarmatian finds, *Acta Archaeologica Academiae Scientiarum Hungaricae*, 2010, T. 61, pp. 207-260.
17. Gazdapusztai Gy. Dák-szarmatakori temető és telep Hódmezővásárhely–Kakasszéken, *Archaeologiai Értesítő*, 1960, T. 87, pp. 47-50.
18. Grumeza L. Animal inhumations within settlements during the Sarmatian Period on the Western Plain (end of the 2nd century – first half of the 5th century AD). *Stăvila A., Micle D., Cîntar A., Floca Ch., Forţiu S. (Eds.). Archeovest I. In memoriam Liviu Măruia. Interdisciplinaritate în arheologie şi istorie.* Szeged: Jatepress, 2013, pp. 413–435.
19. Harmatta J. Nomadic and Sedentary Life in the Great Steppen-Belt of Eurasia. *Genito B. (Ed.). The archaeology of the steppes. Methods and strategies. Papers from the International Symposium held in Naples 9–12 November 1992.* Series Minor. T. XLIV. Napoli: Instituto Universitario Orientale. Dipartimento di Studi Asiatici, 1994, pp. 565-571.
20. Hippocrates: On Airs, Waters, and Places. Translated by Francis Adams. URL: http://classics.mit.edu//Hippocrates/airwatpl.html (Accessed on: 20.07.2015).
21. Historia Augusta, Life of Probus, published in the Loeb Classical Library, English translation is by David Magie, 1932. URL: http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Historia_Augusta/Probus*.html (Accessed on: 14.07.2015).
22. Istvánovits E. A Felső-Tisza-vidék legkorábbi szarmata leletei. 2-3. századi sírok Tiszavasváriból (The earliest Sarmatian finds of the Upper Tisza region – 2nd-3rd century burials in Tiszavasvári), *A Nyíregyházi Jósa András Múzeum Évkönyve*, 1984/86 (1990), T. XXVII-XXIX, pp. 83-133.
23. Istvánovits E. A szarmaták és a kos. Adatok a Kárpát-medence szarmatáinak hitvilágához (Die Sarmaten und der Widder. Beiträge zur Glaubenswelt der im Karpatenbecken lebenden Sarmaten), *A Nyíregyházi Jósa András Múzeum Évkönyve*, 1997–1998 (1998), T. XXXIX–XL, pp. 135-151.
24. Istvánovits E. Tiszavasvári–Városföldje, Jegyző-tag. A settlement of the 5th century (Hunkori település

maradványai Tiszavasváriban, a Városföldjén), *A Nyíregyházi Jósa András Múzeum Évkönyve*, 1999, T. XLI, pp. 173-254.
25. Istvánovits E., Kulcsár V. Actual State of Research of the Csörsz- or Devil's Dyke. *Pop H., Bejinariu I., Băcueţ-Crişan S., Băcueţ-Crişan D. (Eds.). Identităţi culturale locale şi regionale în context european. Studii de arheologie şi antropologie istorică. Local and Regional Cultural Identities in European Context. Archaeology and historical anthropology*. Cluj Napoca: Editura Mega – Editura Porolissum, 2010, pp. 311-321.
26. Istvánovits E., Pintye G. Az alföldi Barbaricum mécsesei (Lamps of the Barbaricum of the Great Hungarian Plain), *A Nyíregyházi Jósa András Múzeum Évkönyve*, 2011, T. LIII, pp. 83-111.
27. Kőhegyi M. Előzetes jelentés a Madaras-Halmok későszarmata-hunkori temetőjének ásatásáról (Vorläufige Mitteilung über die Freilegung des Spätsarmatisch-hunnenzeitlichen Gräberfeldes von Madaras-Halmok), *Archaeologiai Értesítő*, 1971, T. 98, pp. 210-215.
28. Kőrösi A. Előzetes jelentés az Alsónémedi – Ócsa összekötő út építését megelőző ásatások állatcsontanyagának vizsgálatáról. *Korkes Zs. (Ed.). Kutatások Pest megyében. Tudományos konferencia III. 2000. Pest Megyei Múzeumi Füzetek Új Sorozat 6*. Szentendre: Pest Megyei Múzeumok Igazgatósága, 2001, pp. 9-15.
29. Kőrösi A. Szarmata és avarkori csonteszközök Felgyő–Kettőshalmon (Typology of the Worked Bone Implements from Felgyő-Kettőshalmi dűlő). *Gömöri J., Kőrösi A. (Eds.). Csont és bőr. Az állati eredetű nyersanyagok feldolgozásának története, régészete és néprajza. Bone and Leather. History, Archaeology and Ethnography of Crafts Utilizing Raw Materials from Animals. Az anyagi kultúra a Kárpát-medencében 4*. Budapest: MTA VEAB Iparrégészeti és Archaeometriai Munkabizottság – Kézművesipar-történeti Munkabizottság, 2011, pp. 99-116.
30. Kulcsár V. Szarmata sírok Kiskunfélegyháza, Külsőgalamboson (Sarmatengräber in Kiskunfélegyháza, Külsőgalambos), *Cumania*, 1986, T. 9, pp. 9-23.
31. Kulcsár V. *A kárpát-medencei szarmaták temetkezési szokásai*. Aszód: Osváth Gedeon Múzeumi Alapítvány, 1998, 153 p.
32. Kulcsár V., Vörös I. Szarmata telep Lajosmizse határában. Leletmentés az M5 útnál (Adalék a római kori utakhoz), *Cumania*, 1989, T. 11, pp. 67-93.
33. Kürti B. Szarmata temetőrészlet Kiskundorozsma–Subasáról (M5–26=78. lelőhely, Csongrád megye 1998), *Szántó Kovács Múzeum Évkönyve*, 2005, T. 7, pp. 85-109.
34. Lőrinczy G. A Szegvár-oromdűlői kora-avarkori temető 1. sírja, *A Móra Ferenc Múzeum Évkönyve*, 1984–85, 2 (1991), pp. 127-154.
35. Lukács J. Szarmata falu Dunavecse–Ugordáció-dűlőben (Előzetes jelentés). *Somogyvári Á., Székely G. V. (Eds.). A Barbaricum ösvényein*. Kecskemét: Bács-Kiskun Megyei Önkormányzat Katona József Múzeuma, 2011, pp. 119–143.
36. Mócsy A. *Pannonia and Upper Moesia. A History of the Middle Danube Provinces of the Roman Empire*. London; Boston: Routledge & Kegan Paul, 1974, 453 p.
37. Nagy D. S. Az Orosházi-tanyák, MÁV-homokbánya szarmata temetője (Sarmatisches Gräberfeld aus der MÁV-Sandgrube von Orosházi-tanyák), *A Szántó Kovács Múzeum Évkönyve*, 2005, T. 7, pp. 11-48.
38. Nagy M. *Állatábrázolások és az I. germán állatstílus a Közép-Duna-vidéken. Tierdarstellungen und der germanische Tierstil I im Gebiet der Mittleren Donau*. Budapest: MNM, 2007, 208 p.
39. Oppianus. Oppian, Colluthus, Tryphiodorus. The Loeb Classical Library. English translation by A. W. Meir. London; New York, 1928. URL http://www.archive.org/stream/oppiancolluthust00oppiuoft#page/28/mode/2up (Accessed on: 21.07.2015).
40. Párducz M. Újabb adatok az Alföld római korának ismeretéhez (Neue Angaben zur römischen Zeit des Alföld), *Dolgozatok a M.Kir. Ferencz József-Tudományegyetem Archaeologiai Intézetéből*, 1932, T. VIII, pp. 112-121.
41. Párducz M. Őskori és szarmata telep Hódmezővásárhely határában (Siedlung der Urzeit und der Sarmatenzeit in der Umgebung von Hódmezővásárhely), *Dolgozatok a M.Kir. Ferencz József-Tudományegyetem*

Archaeologiai Intézetéből, 1942, T. XVIII, pp. 113-122.
42. Párducz M. Denkmäler der Sarmatenzeit Ungarns, III, *Archaeologia Hungarica*, 1950, XXX, 260 p.
43. Pintye G. A Kárpát-medencei szarmata települések csontfésűi, *Archaeologiai Értesítő*, 2009, T. 134, pp. 165-195.
44. Rózsa Z. Szarmata telep- és temetőrészlet Békéssámson, Erdőháti-halom lelőhelyen, *Szántó Kovács Múzeum Évkönyve*, 2005, T. 7, pp. 49-84.
45. Strabo. The Geography. Loeb Classical Library, 8 volumes, Greek texts with facing English translation by H. L. Jones. Harvard University Press, 1917 thru 1932. URL: http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Strabo/home.html (Accessed on: 17.07.2015).
46. Szalontai Cs., Tóth K. Előzetes jelentés a Szeged–Kiskundorozsma határában végzett szarmata kori település- és temetőfeltárásról. *Bende L., Lőrinczy G., Szalontai Cs. (Eds.). Hadak útján. A népvándorlás kor fiatal kutatóinak konferenciája*. Szeged: Csongrád Megyei Múzeumok, 2000, pp. 59-78.
47. Szekeres L., Szekeres Á. *Szarmata és XI. századi temetők Verusicson (Subotica–Azotara)*. Szabadka, 1996. 65 p.
48. Szolnoki L. Régészeti feltárások Sáp, Bihardancsháza és Bihartorda között (2009), *A Bihari Múzeum Évkönyve*, 2011, T. XV-XVI, pp. 7-31.
49. Tari E. Az M0-s körgyűrű építését megelőző régészeti feltárások, *Magyar Múzeumok*, 2004, T. 10:3, pp. 19-22.
50. Tóth A. Kiskundorozsma–Nagyszék (M5. Nr. 34. 26/72) szarmata település állatcsont leletei, *A Móra Ferenc Múzeum Évkönyve. Új folyam*, 2014, T. 1, pp. 131-159.
51. Tugya B. Császárkori és Árpád-kori állatcsontleletek a Hódmezővásárhely–Barattyosi kerékpárút lelőhelyeiről. *Hombár Múzeumi Műhely 6*. Múzeumi Tanulmányok. 2011, pp. 91-98.
52. Tugya B., Lichtenstein L. Dunavecse–Ugordáció I. lelőhely 2–5. századi objektumainak archeozoológiai értékelése. *Somogyvári Á., Székely Gy. V. (Eds.). A Barbaricum ösvényein... A 2005-ben Kecskeméten tartott tudományos konferencia előadásai. Archaeologia Cumanica 1*. Kecskemét: Bács-Kiskun Megyei Önkormányzat Kecskeméti Katona József Múzeuma, 2011, pp. 145-160.
53. Tugya B., Rózsa Z. A szaru, mint nyersanyag felhasználása Orosháza-Községporta –Szűcs-tanya szarmata lelőhelyen. Régészeti, archaeozoológiai, néprajzi vonatkozások. *Kreiter A., Pető Á., Tugya B. (Eds.). Környezet – Ember – Kultúra. A természettudományok és a régészet párbeszéde. A Magyar Nemzeti Múzeum Nemzeti Örökségvédelmi Központ 2010, október 6–8-án megrendezett konferenciájának tanulmánykötete.* Budapest: Magyar Nemzeti Múzeum Nemzeti Örökségvédelmi Központ, 2012, pp. 225-230.
54. Vaday A. Atipikus szarmata telepjelenség Kompolt-Kistéri tanya 15. lelőhelyén, *Agria*, 1997, T. 33, pp. 77-107.
55. Vaday A., Vörös I. Szarmata telep nyomai Bánhalma határában, *Archaeologiai Értesítő*, 1977, T. 104, pp. 98-105.
56. Vaday A., Vörös I. Szarmata település Kunszentmártonban, *Szolnok Megyei Múzeum Évkönyve*, 1979/80 (1980), pp. 117-139.
57. Vörös G. Településszerkezet és életmód az alföldi szarmaták falvaiban. *Havassy P. (Ed.). Jazigok, roxolánok, alánok. Szarmaták az Alföldön. Gyulai katalógusok 5.* Gyula, 1998, pp. 49-66.
58. Vörös I. Apagy barbaricumi császárkori település állatcsontmaradványai (Animal Bones from the Roman Imperial Period Settlement at Apagy in Barbaricum), *A Nyíregyházi Jósa András Múzeum Évkönyve*, 1990–1992 (1993), T. 33–35, pp. 33-65.
59. Vörös I. A szirmabesenyői császárkori telep állatcsontmaradványai, *A Herman Ottó Múzeum Évkönyve*, 1999, T. 37, pp. 223-236.
60. Vörös I. Hunkori település állatcsontleletei Tiszavasváriban, *A Nyíregyházi Jósa András Múzeum Évkönyve*, 1999, T. XLI, pp. 255-266.
61. Vörös I. A szegvár-oromdűlői császárkori telep állatcsontleletei, *A Móra Ferenc Múzeum Évkönyve, Studia Archaeologica*, 2005, T. 11, pp. 115–125.
62. Vörös I. Madaras-Halmok szarmata temető állatcsontleletei. *Kőhegyi M., Vörös G. Madaras–Halmok. Kr. u.*

2–5. századi szarmata temető. Szeged: Szegedi Tudományegyetem Régészeti Tanszéke, 2011, pp. 445-455.
63. Vörös I., Soós E. Garadna-Kastély zug. A római császárkori germán teleprészlet újraértékelése, *Communicationes Archaeologicae Hungariae*, 2014, P. 121-152.
64. Wicker E. Egy szarmata falu külterülete (M5 125. Kiskunfélegyháza–Izsáki út). Feltárások 1995–1996. évben. *Körösi I. (Ed.). Múzeumi kutatások Bács-Kiskun megyében 1995–1996*. Kecskemét: Bács-Kiskun Megye Önkormányzatának Múzeumi Szervezete, 1997, pp. 73-80.

Appendix

Catalogue of mentioned sites

1. Alsónémedi – Ócsa [28, p. 14]
2. Apagy–Peckés rét [58, p. 34]
3. Ártánd–Kisfarkasdomb [12, p. 263]
4. Ártánd–Nagyfarkasdomb [12, p. 263]
5. Bánhalma [55, p. 105]
6. Békéssámson–Erdőháti-halom [44, p. 58]
7. Debrecen–Máta határ [42, p. 201]
8. Doboz–Hajdúirtás [58, p. 59]
9. Dunaharaszti [42, p. 155]
10. Dunavecse–Ugordáció [52, p. 146–148]
11. Endrőd site 170 [9, p. 287]
12. Geszteréd [42, p. 195–197]
13. Gyoma site 133 [6; 61, p. 125]
14. Hajdúnánás–Fürjhalom-dűlő [16, p. 209]
15. Hódmezővásárhely–Barattyos [51, p. 92]
16. Hortobágy–Poroshát [31, p. 71]
17. Isaszeg [31, p. 71]
18. Kiskundorozsma–Nagyszék [50, p. 133]
19. Kiskundorozsma–Subasa [33, p. 86]
20. Kiskunfélegyháza–Külsőgalambos [30, p. 13]
21. Kiszács (today: Kisač, Serbia) [42, p. 209]
22. Kisvárda–Nagyboldogasszony utca [31, p. 72]
23. Kompolt–Kistér [7, p. 324]
24. Kunbaracs–Beck-tanya [11, p. 42]
25. Kunpeszér [11, p. 42]
26. Kunszállás–Alkotmány tsz. [11, p. 42]
27. Kunszentmárton–Téglagyár [56, p. 124]
28. Kunszentmiklós–Bak ér [11, p. 42]
29. Lajosmizse–Kónya major [31, p. 73]
30. Madaras–Halmok [62]
31. Mátételke [31, p. 72]
32. Nyíregyháza, site 161 (Eszter Istvánovits's unpublished excavation)
33. Nyírtura–Várrét [10]
34. Orgovány [12, p. 263]
35. Orosháza–Községporta [53, p. 226]
36. Orosházi tanyák [37, p. 18]
37. Öregcsertő–Csorna [11, p. 42]
38. Pócspetri–Nyírjes felső [5, p. 519]
39. Sáp site 11, Halastó-hát [48, p. 19]

40. Subotica–Azotara [47, p. 11, 15]
41. Szabadszállás–Józan [11, p. 42]
42. Szeged–Rívódűlő [42, p. 174]
43. Szegvár–Oromdűlő [61, p. 116–118]
44. Szentes–Sárgapart [31, p. 73]
45. Sződliget–Csörög (Valéria Kulcsár's unpublished excavation)
46. Tázlár–Kriván-tanya [58, p. 59]
47. Tiszaföldvár–Téglagyár [58, p. 59]
48. Tiszafüred–Nagy Kenderföldek [58, p. 59]
49. Tiszavasvári–Paptelekhát [58, p. 59]
50. Tiszavasvári–Városföldje [22, p. 86–87]
51. Újhartyán [8, p. 305]
52. Üllő site 5 (unpublished excavation by Valéria Kulcsár and colleagues)

Э. Иштванович, В. Кульчар

Животные сарматов Карпатского бассейна (археозоология глазами археологов)

Резюме

Сарматское племя, переселившееся в Карпатский бассейн в I в. н. э., за несколько поколений оставило номадизм и осело. Животноводство продолжало играть важную роль в их хозяйстве. Однако, несмотря на то, что мы располагаем огромным остеологическим материалом (в частности, более 60000 опубликованных костей домашних животных), происходящим главным образом с поселений, наши познания о составе, внешнем виде и использовании скота достаточно ограничены. В данной работе мы попытаемся суммировать наши данные по отдельным животным и предложить некоторые аспекты, которыми смогут воспользоваться исследователи в будущем.

Ключевые слова: животноводство, Карпатский бассейн, сарматы, археозоология.

E. Istvánovits, V. Kulcsár

Animals of the Sarmatians in the Carpathian Basin (archaeozoology through the eyes of archaeologists)

Summary

Sarmatians arriving to the Carpathian Basin from the steppe in the 1st c. AD gave up their nomadic way of life in some generations and settled in villages. Animal husbandry continued to play an important role in their economy. However, despite of the huge osteological material on our disposal (e.g. more than 60000 published bones of domestic animals) coming from mostly settlements, our knowledge on the composition, outlook and exploitation of the animal stock is relatively poor. In the present study we made an attempt to summarise our data on certain animals and proposed some aspects that can be used in the further research.

Key words: animal husbandry, Carpathian Basin, Sarmatians, archaeozoology.

Fig. 1. Detail of the hydrological map of the Carpathian Basin before river regulation.

Fig. 2. Skull of a pole-axed horse found at Üllő site 5, feature1509 (unpublished excavation by V. Kulcsár).

Fig. 3. Remains of a young cattle found at Nyíregyháza site 161, feature (grave) 187 (unpublished excavation by E. Istvánovits).

Fig. 4. Remains of a horse found at Üllő site 5, feature 2123 (unpublished excavation by V. Kulcsár).

Fig. 5. Child skeleton accompanied by remains of two dogs at Dunakeszi–Alagi major, feature 138 (unpublished excavation by V. Kulcsár).

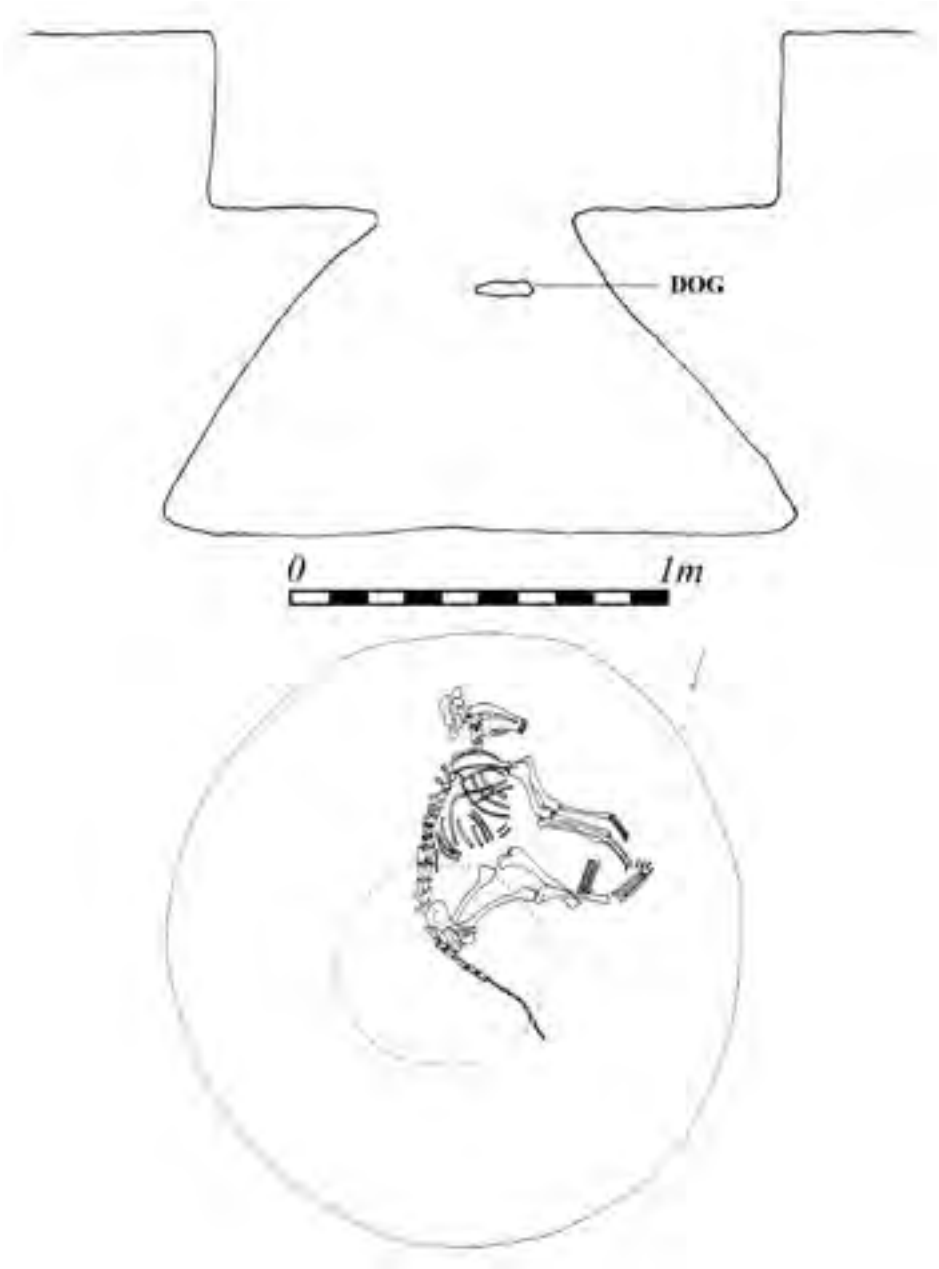

Fig. 6. "Dog burial" found at Tiszadob–Sziget, feature 118 [24, fig. 9].