ROMAN PERIOD ANIMAL REMAINS FROM MOST NA SOČI

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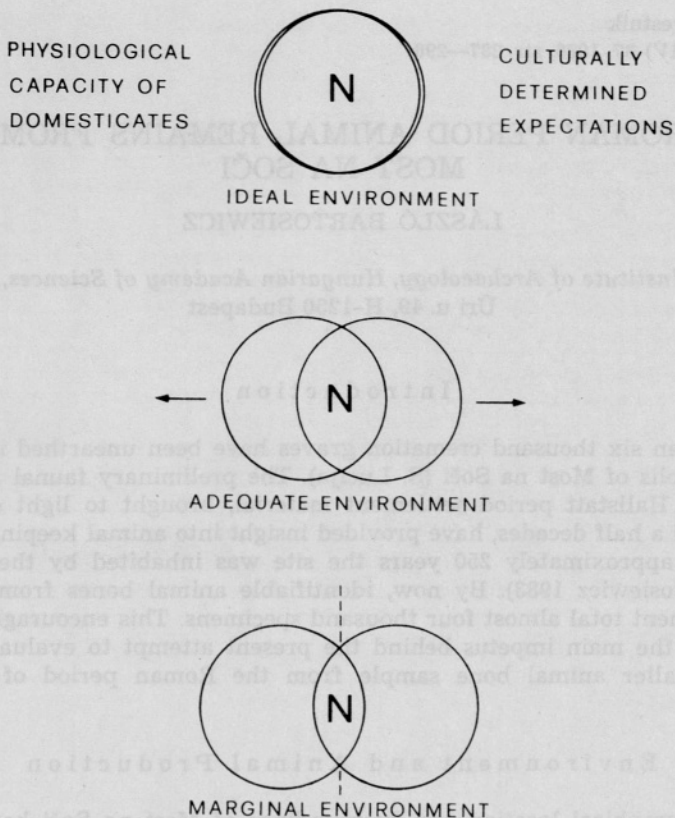*Institute of Archaeology, Hungarian Academy of Sciences,*
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Introduction

More than six thousand cremation graves have been unearthed in the Iron Age necropolis of Most na Soči (S. Lucija). The preliminary faunal analysis of the related Hallstatt period settlement material, brought to light during the last one and a half decades, have provided insight into animal keeping practices during the approximately 250 years the site was inhabited by the S. Lucija group (Bartosiewicz 1983). By now, identifiable animal bones from the Hallstatt settlement total almost four thousand specimens. This encouragingly large quantity is the main impetus behind the present attempt to evaluate a significantly smaller animal bone sample from the Roman period of the same settlement.

Environment and Animal Production

The geographical location and surroundings of Most na Soči have already been discussed in detail in a series published on the site (Gabrovec-Svoljšak 1983). As part of the natural environment the Soča and Idrijca rivers are particularly worth mentioning again since they form a natural defense system around the semi-arid slopes over which the settlement spread. Of additional interest here may be the economic environment which, by the early decades A. D. must have been affected by Roman occupation and the proximity of Emona (some 100 kms to the East) and Aquileia (some 100 kms to the southeast). These towns became major cultural and trading centers in the area. It was hoped that in spite of the order of magnitude difference between the sizes of the Hallstatt and Roman Period faunal assemblages they could be used to demonstrate cultural differences on the one hand, while would also serve as an example of environmentally determined continuity in animal keeping on the other.

The impact of environment on the physiological and anthropogenic factors of animal production was discussed by Choyke (1983). According to her model, net production output of any domestic animal species may be defined in terms of the interaction between the biological production capacity of that species and culturally determined human needs. Mayr (1970) says that *»marginal populations ... are under the severe handicap of having to remain co-adapted with*

PHYSIOLOGICAL
CAPACITY OF
DOMESTICATES

N

CULTURALLY
DETERMINED
EXPECTATIONS

IDEAL ENVIRONMENT

← N →

ADEQUATE ENVIRONMENT

N

MARGINAL ENVIRONMENT

Figure 1: Net production output (N) of domesticates as defined by the genotype-environment interaction in a cultural context. Dashed line indicates the minimum threshold mentioned in the text.

Sl. 1: Neto učinek prireje (N) domačih živali, opredeljen z medsebojnim vplivanjem genotipa in okolja v neki kulturi. Prekinjena črta označuje v tekstu omenjeno skrajno mejo.

the gene pool of the species as a whole while adapting to local conditions«. That is, in the case of human dependent domestic animals, the interaction between genotype and environment under marginal circumstances may result in phenotypes that are deemed unacceptable from a cultural viewpoint. When production output declines to a minimum threshold keeping of that species is sooner or later abandoned. These ideas are presented in **Figure 1.**

On the basis of modern analogies the Hallstatt period fauna of Most na Soči was identified as having been characterized by consumption of sheep products as opposed to the wide exploitation of pigs for meat (Bartosiewicz-Sáfár 1983). Subsequent investigations also showed that this basic type of animal husbandry is highly correlated with the consumption of energy in form

of plants that increases as the keeping of sheep and goat increasingly pre-
dominates (Bartosiewicz 1984). This general picture should be compared with
tendencies observed in the small Roman Period assemblage of animal bones
from Most na Soči.

Material

From the 2nd century A. D. time period discussed here, 667 bones were
available for study, of which almost three quarters could be identified to
species.

The distribution of these animal remains is shown in **Table 1.** The faunal
list has also been sub-divided into meat value categories that each of the bones
represent in one way or the other. According to Uerpmann (1972) best meat
bearing parts of the skeleton (including mandibles with the tongue and mas-
seter muscle) were classified into group A, B represents medium meat output,
while group C was allotted to the boniest regions of the body such as dry limb.

According to Table 1 breaking the material down this way shows that Ro-
man Period domestic garbage contained surprisingly many bones from the
low meat carrying capacity (C category) bones in the case of cattle which
is the most important domestic animal at this site.

It is worthy of note that relatively many A category bones are present
suggesting that while large pieces of beef may have been stripped off the
carcass within the habitation area, some of the less valuable cuts may have
been left behind during primary butchering off site.

The other interesting phenomenon is that when compared to tendencies
observed at the Hallstatt settlement, relatively few horn core and antler
fragments are present. The large number of these bones would have been
most indicative of related craft activities such as horn working.

The species composition of the bone material was reviewed against the
background of the considerable sample from the Hallstatt Period which by the
mere virtue of its size proved to reflect species proportions in statistically
significant terms. Although the nearly 500 identifiable bones from the time
of the late Roman occupation may well be representative of meat consumption
patterns at the settlement, with percentages from such a small sample one
should be aware of the possibility that species proportions may be distorted
(Choyke-Bartosiewicz 1983).

In order to avoid potential bias of this kind, the binomial standard error of
pairwise proportions for each species was calculated using McCullagh's for-
mula (1974):

$$SE = \left(\frac{p\,\% \; q\,\%}{n} \right)^{\frac{1}{2}}$$

where   SE = the binomal standard error

         p = the percentage of one species

         q = the percentage of the other species

         n = the sum of fragments from the two species

Table 1: The animal species — skeletal part distribution of bones from the Roman Period features of the Most na Soči settlement.

Tabela 1: Živalske vrste — zastopanost skeletnih delov iz rimske naselbine na Mostu na Soči.

	Cattle	Sheep	Goat	Caprine	Pig	Horse	Red deer	Wild pig
mandibula	27			18	5		1	
atlas	4				1			
vertebra								
cervicalis	1			1				
thoracalis	3							
lumbaris	3			1				
scapula	11			6	4			
humerus	19	4		12	3			
pelvis	6	1		3	1			
femur	6	2		6				
A category total	80	7		49	14			
neurocranium	4			3				
maxilla	7			3	1			
radius	42	1	1	12	5	1	1	
ulna	4				1			
tibia/fibula	12	10	1	17	4	1		
costa	7			8				
B category total	76	11	2	43	11	2	1	1
horn core/antler	1	1	2	1				
teeth	17			17	4	2		
metacarpus	23	9	7	8	3			
phalanx	15			4	2	1	1	
calcaneus	5	3			2			
astragalus	4	4		3	1			
metatarsus	9	10	1					
C category total	74	27	10	33	12	3	3	
long bone fragm.	5			16				
flat bone fragm.	1							
Total	236	45	12	141	37	5	7	1

Note: 118 bone fragments from large ungulates and 66 pieces from small ungulates could not be identified to species. The Caprine term refers to the Caprinae subfamily that includes both sheep and goat, two species of similar osteomorphological makeup.

Table 2: The matrix of binomial standard errors (SE) calculated between each pair of species in the Roman Period sample.

Tabela 2: Matrika binomnih standardnih napak (SE), izračunanih na osnovi dvojic živalskih vrst iz rimskodobnega vzorca.

	Sheep	Goat	Caprine	Pig	Horse	Red deer
cattle	**2.1878**	**1.3626**	**2.3908**	**2.0716**	**0.9181**	**1.0730**
sheep		5.3999	—	5.4950	4.2426	4.7331
goat			—	6.1432	11.0510	11.0665
caprine				**2.3759**	**1.5272**	**1.2684**
pig					**4.9970**	5.5142
horse						24.7249

Note: Wild pig with only one specimen was not included in the table. Bold face indicates that the proportion between the two species concerned (shown in Table 1) is statistically significant on the $P \leq 0.05$ level of probability.

(For the purpose of this calculation percentages are expressed relative to n, that is only in terms of two species.) Results of these investigations are presented in **Table 2.** Values exceeding 5 in this matrix belong to proportions which are not significant on the $P \leq 0.5$ level of probability. Smaller figures on the other hand, show that the proportion between the number of fragments of the two species concerned, as was summarized in the last line of **Table 1,** is statistically significant. Such relationships include the unambiguous dominance of cattle remains over bones from all the remaining species, and a value which shows that the proportion of Caprine remains is significantly higher than those of pig, horse and red deer. At the same time, while the pig bones outnumber those of horse in relative terms, the same phenomen between pig and red deer is not supported by this statistical test.

These preliminary observations should be considered as guidelines in the subsequent comparison with the Hallstatt Period faunal list from this settlement to be discussed in the following section of this study.

Comparative Analysis

The general traits described in the previous sections may be reviewed in detail by way of a diachronic comparison between the two relevant settlement periods. The Hallstatt and Roman Period faunal lists are presented in a parallel fashion in **Table 3.** As a result of smaller sample size species found sporadically in the Hallstatt layers (such as hare or brown bear) do not occur in the Roman Period assemblage. When percentages of the most characteristic animals (mostly domesticates) are compared, the remains of cattle and the two caprine species seem to dominate both samples. Visual appraisal of this tendency is enhanced in **Figure 2**. Here the percentages of comparable species from the Roman Period material are plotted against corresponding values of the Hallstatt sample. Identical bone deposition patterns should have occured on

Table 3: Comparative faunal lists based on the number (n) and percentage (⁰/₀) of fragments from animal species identified in the two chronological units of the settlement.

Tabela 3: Primerjalni favnistični seznami, izdelani na osnovi absolutnega števila (n) in odstotkov (⁰/₀) kostnih fragmentov določljivih živalskih vrst iz dveh časovnih faz naselbine.
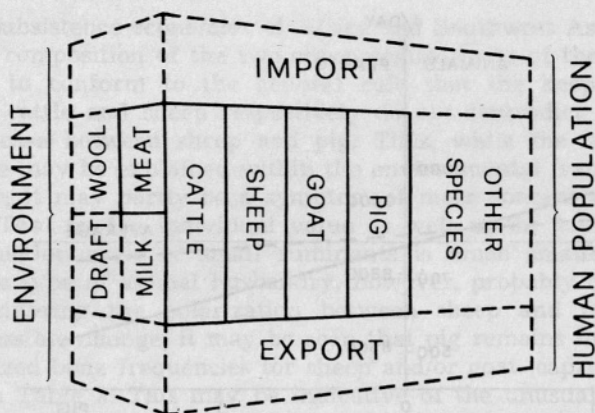
	Hallstatt Period		Roman Period	
	n	⁰/₀	n	⁰/₀
cattle (Bos taurus L.)	1470	39.71	236	48.76
sheep (Ovis aries L.)	483	13.04	45	9.30
goat (Capra hircus L.)	50	1.35	12	2.48
sheep/goat (Caprinae)	1226	33.12	141	29.13
pig (Sus domesticus L.)	237	6.40	37	7.64
horse (Equus caballus L.)	14	0.38	5	1.03
dog (Canis familiaris L.)	64	1.73		
hen (Gallus domesticus L.)	1	0.03		
red deer (Cervus elaphus L.)	38	1.02	7	1.45
roe (Capreolus capreolus L.)	4	0.11		
hare (Lepus europaeus Pall.)	1	0.03		
wild pig (Sus scrofa L.)	20	0.54	1	0.21
brown bear (Ursus arctos L.)	1	0.03		
wild or domestic pig (Sus sp.)	93	2.51		
Total	3702	100.00	484	100.00

the dashed isometry line in the diagram. While the positions of data points assigned to cattle (1) and caprines (4) respectively are remarkably different, a high r = 0.973 coefficient of correlation shows that the dispersion of all points along the y = — 0.903 + 1.088 × regression line is insignificant.
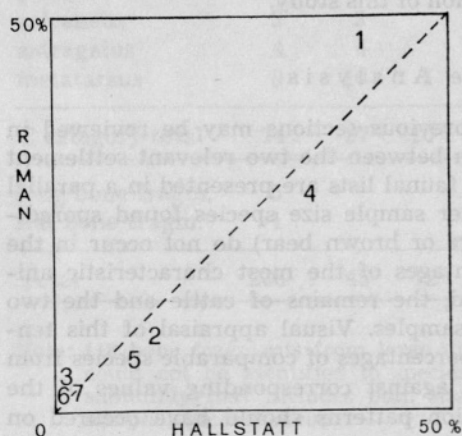
Figure 2: The graphic representation of differences between the percentage contribution of animals to the two samples. 1 = cattle, 2 = sheep, 3 = goat, 4 = caprine, 5 = pig, 6 = horse, 7 = red deer.

Sl. 2: Grafično prikazane razlike med odstotkovnimi vrednostmi posameznih živalskih vrst iz halštatske in rimske dobe. 1 = govedo, 2 = ovca, 3 = koza, 4 = drobnica, 5 = svinja, 6 = konj, 7 = jelen.

ENVIRONMENT

IMPORT

DRAFT WOOL MEAT

MILK

CATTLE SHEEP GOAT PIG OTHER SPECIES

EXPORT

HUMAN POPULATION

Figure 3: The schematic summary of the consumption of animal products at a settlement. Dashed lines indicate aspects to be reconstructed, however, largely intangible.

Sl. 3: Prikaz porabe živinorejskih proizvodov v naselbini. Črtkano je rekonstruirano in negotovo.

As has been previously mentioned, of the main domestic Artiodactyls pig makes no noteworthy contribution to the faunal list from either periods. The difference between the proportions of bone fragments from cattle and caprine species, however, may be indicative of a shift toward the meat exploitation of cattle at the expense of sheep and/or goat in the Roman Period: the tendency is almost the reverse of what occurs during Hallstatt times. Since binomial standard errors listed in Table 2 confirm the dominance of cattle bones over those of caprines one may reasonably speculate that cattle in fact had a slightly more important role in Roman Period meat exploitation than in the earlier Hallstatt time. Should this argument hold true, differences between meat oriented cattle and sheep consumption could be ascertained.

Figure 3 shows the relationship between animal product from domestic species, of which only meat amounts can be at least indirectly quantified using the bone material from archaeological sites. While rarely found representations or special artifacts (such as remains of wool or harness elements) may also cast light on the various other ways animals were exploited, many questions may only be hypothetically answered in the absence of external archaeological evidence (Neustupný 1978).

Conclusions

Just as during Hallstatt times, the keeping of domestic animals unambiguously determined the meat consumption profile of the Roman Period settlement at Most na Soči. It is also evident that the percentage contribution of cattle to the faunal assemblage increased between the two periods discussed here. Inter-
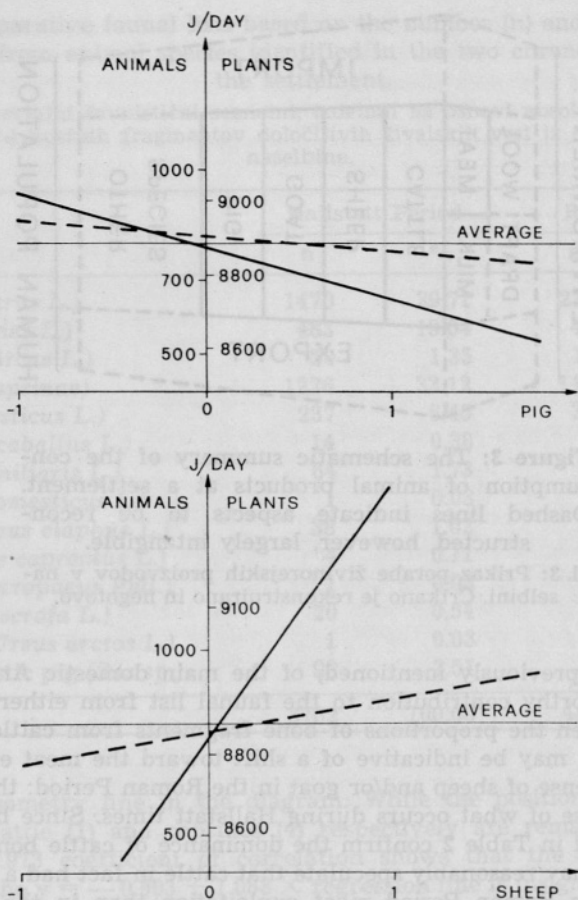
Figure 4: Daily per capita energy consumption as the function of factor scores characterizing »Pig« and »Sheep« type animal husbandry. (Bartosiewicz 1984.) According to the continuous lines indicating significant correlations, the consumption of energy in form of animal products declines as pig prevails (top graph), while the consumption of plant energy increases with the prevalence of sheep keeping.

Sl. 4: Dnevna poraba energije po glavi kot funkcija faktorske množice, ki jo označujeta prireji »svinje« in »ovce« (Bartosiewicz 1984). Glede na polni črti, ki označujeta močno povezanost (korelacijo), pada poraba energije iz živalskih proizvodov v primeru, ko prevladuje svinjereja (zgornji diagram), medtem ko poraba energije iz rastlin narašča v primeru, ko prevladuje ovčereja.

relationships between keeping and production of the four domestic Artiodactyls listed in Figure 3 have already been discussed in relation to the preliminary evaluation of the Hallstatt material (Bartosiewicz 1983) when a factor analysis was performed in order to reveal functional patterning between these four

species in the subsistence economies of Africa and Southwest Asia. Changes in the percentage composition of the two chronological units of the Most na Soči material seem to conform to the general rule that the keeping and meat exploitation of cattle and sheep respectively do not contradict each other, as would be the case between sheep and pig. Thus, while the increasing proportion of cattle may be explained within the environmental framework identified at this site, it may partly be a symptom of more concentrated wealth in Roman times. That is, the individual value as well as the biological and financial reproduction cycle of small ruminants is much smaller (Dahl-Hjort 1979). The basic type of animal husbandry, however, probably did not change radically. Considering the polarization between sheep and pig as a main criterion for possible change, it may be seen that pig remains make up 18.7 % of the summarized bone frequencies for sheep and/or goat (caprine remains) in both periods in Table 3. This may be indicative of the unusual stability of a »sheep keeping« economy which reflects, above all, environmental constraints.

In light of this rather clear expression of determination, the modern analogy may be worth citing again. Although data on the domestic flora are not available at this point the following observation may be of interest in generating hypotheses concerning the cultivation of crops in the surroundings of Most na Soči. Factor scores of 27 developing countries representing a wide range of natural and economic environments on Factor 2 (»Sheep«) in the preliminary analysis of the Hallstatt material from Most na Soči showed that energy consumption in the form of plants increases significantly with the prevalence of sheep breeding as expressed by factor scores (**Figure 4**). The trend concerning the energy content of animal products on the other hand, is not supported by significant correlations as a possible result of varying degrees of meat versus milk consumption. This is why domestic crops of high caloric value (grain in particular) may have been of great importance during the economic history of Most na Soči.

In this paper an attempt was made to outline the general faunal picture of Roman Period Most na Soči. Many of the observations and hypothetical statements are to be further tested during the comprehensive evaluation of the material by additional methods of archaeozoology such as the estimation of numbers of individuals and biometrical analysis of the osteometrical data.

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RIMSKODOBNI OSTANKI ŽIVALI Z MOSTA NA SOČI

Povzetek

Med značilnostmi rimskega obdobja na Mostu na Soči, kjer sicer prevladuje halštatska poselitev, je tudi razmeroma majhna količina živalskih ostankov. Na sestavo živalskih kosti je očitno vplivalo predvsem okolje naselbine, kajti med kostnim odpadnim gradivom svetolucijske kulture in kasnejšega keltskega in rimskega obdobja ni statistično pomembnih razlik. Prevladujejo prežvekovalci (tako govedo kot ovce, oz. koze), hkrati pa ni veliko ostankov divjih živali, kar potrjuje mnenje o kontinuirani izrabi živali ne glede na to, da je na tem področju prišlo do velikih kulturnih sprememb.