Zvezdana Modrijan, Tina Milavec (ur. / eds.), Poznoantična utrjena naselbina Tonovcov grad pri Kobaridu. Najdbe / Late Antique fortified settlement Tonovcov grad near Kobarid. Finds, Opera Instituti Archaeologici Sloveniae 24, 2011, 303–388

8. SESALSKA MAKROFAVNA

8. MAMMALIAN MACROFAUNA

Borut TOŠKAN, Janez DIRJEC

Tonovcov grad leži na naravno dobro zavarovanem, 412 m visokem hribu severno od Kobarida (*sl. 8.1*). Prva poselitev na tem mestu sega v prazgodovino in je dokumentirana s posameznimi najdbami artefaktov brez ostalin naselbinskih struktur (glej Tonovcov grad. Naselbinski ostanki in interpretacija, pogl. 2.2). Iz tega obdobja so maloštevilni tudi živalski ostanki, saj v prazgodovinski kontekst sodijo le po en fragment goveje koželjnice in golenice ter zgornji meljak drobnice. Naslednja z naselbinskimi ostanki izpričana poselitev Tonovcovega gradu je že poznoantična in obsega več faz.[1] V tem obdobju je spričo svoje strateške lege širše območje Kobarida igralo pomembno vlogo. Tod je namreč tekla rimska cesta, ki je čez prelaz Predil povezovala Čedad/*Forum Iulii* z naselbinami na Koroškem (Šašel 1975, 76; Bosio 1991, 193; Ciglenečki 1997a, 188). Še posebej pomembna je bila prav vloga naselbine na Tonovcovem gradu, ki je v tistem obdobju predstavljala središče območja, zamejenega z rekama Nadižo in Sočo (Ciglenečki 1997b; 2005). Več tisoč sesalskih kosti in zob iz poznoantičnih plasti Tonovcovega gradu tako ponuja izvrstno priložnost za poglobljen vpogled v ekonomijo in prehranske navade prebivalcev lokalnega središča na območju jugovzhodnih Alp v obdobju od druge polovice 4. do začetka 7. stoletja, v luči najdb iz zgodnjesrednjeveške faze (okvirno datirane med 7. in 9. stoletje; glej Tonovcov grad. Naselbinski ostanki in interpretacija, pogl. 2.2) pa tudi v morebitne spremembe, ki so jih v ta prostor vpeljali priseljenci z vzhoda.

8.1 MATERIAL IN METODE

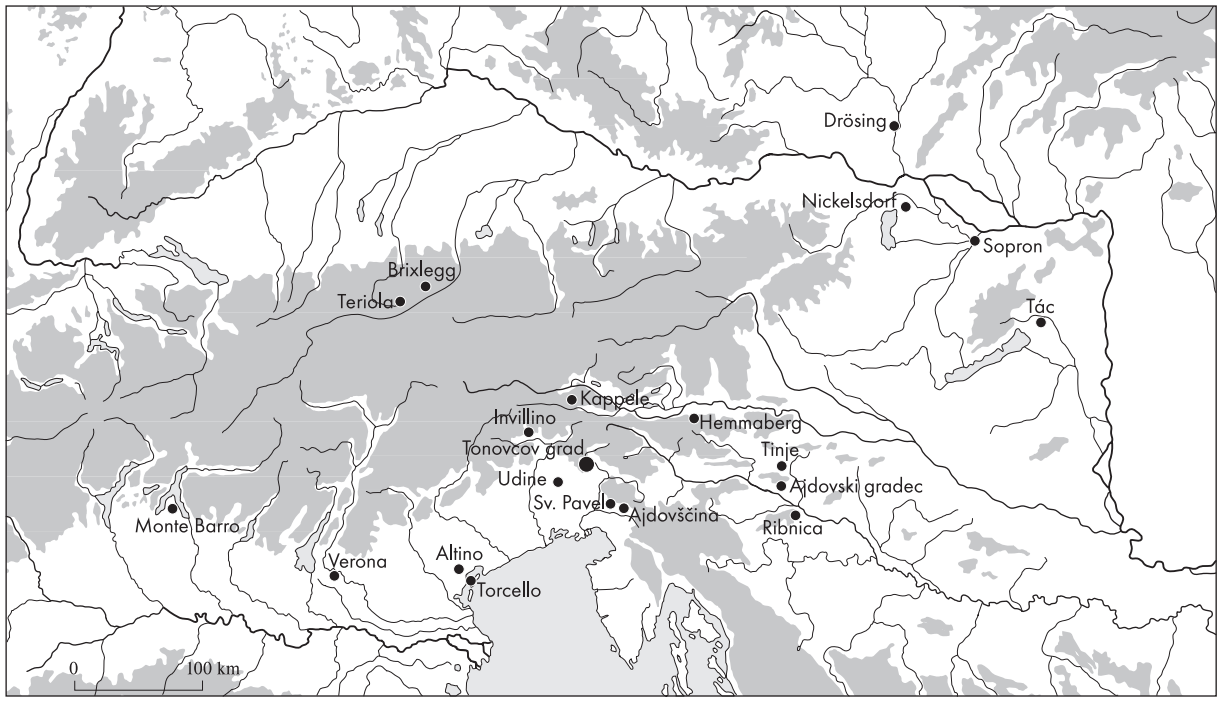
Izkopavanja na Tonovcovem gradu so potekala med letoma 1993 in 2005. Podrobne podatke o najdišču in metodologiji terenskega raziskovanja podajajo Ciglenečki, Modrijan in Milavec (Tonovcov grad. Naselbinski

[1] Časovni okvir posameznih faz (Tonovcov grad. Naselbinski ostanki in interpretacija, pogl. 2.2): prva poznoantična faza = PA 1 (2. polovica 4. in začetek 5. st.), druga poznoantična faza = PA 2 (od konca 5. do začetka 7. st.) in zgodnjesrednjeveška faza = ZSV (okvirno 7. do 9. st.).

Tonovcov grad lies on a naturally well protected, 412 m high hill north of Kobarid (*Fig. 8.1*). Individual finds indicate that a settlement was located at this location already in prehistoric times, however no settlement structure remnants were discovered from this period (see Tonovcov grad. Settlement remains and interpretation, chapter 2.2). Animal remains are also rare, for only one fragment of a cattle radius and tibia and the upper molar of a sheep or goat originate from the prehistoric context. Tonovcov grad was settled again in Late Antiquity and this settlement can be divided into two phases; in addition to this an Early Medieval phase has been also established.[1]

Due to its strategic location the broader Kobarid area played an important role during the aforementioned period. This territory was crossed by the Roman road leading across the Predil pass and connecting *Forum Iulii* with settlements in Carinthia (Šašel 1975, 76; Bosio 1991, 193; Ciglenečki 1997a, 188). The role of the settlement at Tonovcov grad was especially important, as it represented the centre of the area marked by the Nadiža and Soča rivers at the time (Ciglenečki 1997b; 2005). Several thousand mammalian bones and teeth from the Late Antique layers at Tonovcov grad offer an excellent opportunity for an insight into the economy and diet of the inhabitants of this local centre in the southeast Alps between the second half of the 4th century and the beginning of the 7th century. The finds from the Early Medieval phase (7th to 9th century; see Tonovcov grad. Settlement remains and interpretation, chapter 2.2) also offer an insight into the eventual changes that were introduced into the area by the "Barbarians" from the east.

[1] The time frames of the individual phases (Tonovcov grad. Settlement remains and interpretation, chapter 2.2): Late Antiquity phase 1 = LA 1 (2nd half of 4th century, beginning of 5th century), Late Antiquity phase 2 = LA 2 (end of 5th century to beginning of 7th century) and Early Medieval phase = EMA (approx. 7th to 9th century).



Sl. 8.1: Lega Tonovcovega gradu in ostalih v besedilu pogosteje omenjenih najdišč.
Fig. 8.1: The position of Tonovcov grad and other sites that are commonly mentioned in the text.

ostanki in interpretacija, pogl. 1.3, 2.1), zato se na tem mestu posvečava le predstavitvi arheozoološke analize. Favnistični ostanki so bili pobirani ročno, le deloma je bil izkopan sediment tudi (suho) presejan skozi sita.[2] Zaradi tega je delež manjših kosti in zob ter kostnih/zobnih drobcev v vzorcu nekoliko podcenjen (*tab. 8.19*). Kvantitativne primerjave med taksoni temeljijo na številu določenih primerkov (*Number of Identifiable Specimens*, NISP). Pri tem sva fragmente, ki nedvoumno pripadajo isti kosti (npr. drobci med arheološkimi izkopavanji razbitih kosti), združila in jih štela kot en primerek (tj. NISP = 1). Ob najmanjšem številu določenih primerkov sva v okviru nekaterih analiz uporabila tudi podatek o najmanjšem številu osebkov (*Minimum Number of Individuals*, MNI).[3] Pri izračunu MNI za posamezen skeletni element sva v primerih, ko se ta v skeletu pojavlja v paru, upoštevala podatek o abundanci elementa številčno bolje zastopane anatomske strani. K tej številki sva nato prištela še vse fragmente istega skeletnega elementa nasprotne anatomske strani, za katere je bilo ugotovljeno, da nedvoumno pripadajo drugim živalim (tj. živalim drugačne starosti ali nasprotnega spola).

Pri biometrični študiji sva sledila smernicam von den Driescheve (1976). Zaradi pogosto skromnega števila merljivih ostankov posameznega skeletnega ele-

[2] Dolžina stranice kvadratno oblikovanih luknjic na situ je merila 1 cm.

[3] Za diskusijo o prednostih in slabostih posameznih kazalnikov abundance najdb glej npr. Gautier (1984), Grayson (1984), Grayson, Frey (2004).

8.1 MATERIALS AND METHODS

The excavations at Tonovcov grad took place between 1993 and 2005. Detailed information as regards the site and the fieldwork research methodology were given by Ciglenečki and Modrijan (see Tonovcov grad. Settlement remains and interpretation, chapters 1.3, 2.1), thus we will merely focus on the presentation of the archeozoological analysis. Most of the faunal remains were manually gathered, for only a part of the excavated sediment was (dry) sifted through sieves.[2] Due to this the contribution of smaller bones, teeth and bone/tooth fragments is slightly underestimated (*Tab. 8.19*). Qualitative comparisons between the taxa are based on the number of identifiable specimens (NISP). In calculating NISP we joined the fragments that undoubtedly belong to the same bone (for example fragments of bones that were broken during the archaeological excavations), and counted them as a single example (i.e. NISP = 1). Within certain analyses we used the information as regards the minimum number of individuals (MNI) to complement the number of identifiable specimens.[3] In the examples in which a skeletal element appears in pairs we calculated the MNI for an individual element by taking into account the data from the numerically better represented anatomical side. All of the fragments of the same skeletal

[2] The sides of the square holes on the sieve measured 1 cm.

[3] For the discussion as regards the advantages and disadvantages of the individual indicators of abundance of finds see Gautier (1984), Grayson (1984), Grayson, Frey (2004).

menta sva v okviru nekaterih analiz metrične podatke standardizirala ter tako virtualno povečala razpoložljivi vzorec (*cf.* Albarella 2002). Standardiziranje sva izvedla v skladu s formulo:

$$\text{standardizirana vrednost} = (x - m) / s,$$

kjer x predstavlja dimenzijo primerka s Tonovcovega gradu, m in s pa povprečje in standardno deviacijo iste dimenzije pri referenčnem vzorcu. V okviru pričujočega prispevka sva kot referenčni vzorec uporabila gradivo iz rimskega mesta Tác/*Gorsium* (Madžarska; Bökönyi 1984), pri čemer sva upoštevala le skeletne elemente, zastopane z vsaj 30 primerki. Na ta način sva skušala zadovoljiti pogoju, da je za izračun povprečne vrednosti in standardne deviacije treba operirati z bolj ali manj normalno porazdeljenimi (metričnimi) podatki. Po drugi strani pa sva z izključitvijo pičlo zastopanih skeletnih elementov iz referenčnega vzorca zmanjšala (odpravila?) neželen vpliv[4] različnega deleža zastopanosti samcev, samic in kastratov med ostanki posameznih skeletnih elementov. Pričakujemo namreč lahko, da so med majhnimi vzorci razlike v deležu zastopanosti obeh spolov v splošnem večje kot med velikimi. To ne nazadnje potrjuje tudi podatek, da so razlike v deležu samcev, samic in kastratov med vzorcema govejih dlančnic (N = 168) in stopalnic (N = 162) iz rimskega mesta Tác/*Gorsium* praktično zanemarljive (Bökönyi 1984, Tab. 5), podobno pa velja tudi za favnistične vzorce s številnih drugih najdišč (npr. Riedel 1979, 99; 1993a, Tab. 6; 1994a, Tab. 3).

V primeru razlikovanja med tretjimi meljaki domačega prašiča (*Sus domesticus*) in njegovega divjega prednika (*S. scrofa*) sva uporabila zgornji sorodno metodo. Tu razmerje med posameznimi meritvami primerjamo z uporabo logaritma količnika med izbranimi metričnimi podatki v številcu in neko referenčno vrednostjo (tj. standardom) v imenovalcu (Payne, Bull 1988). V tem prispevku uporabljena standardna vrednost za širino tretjega zgornjega oz. spodnjega meljaka znaša 21,7 oz. 18,3 in temelji na vzorcu recentnih divjih prašičev (*Sus scrofa libycus*) iz Turčije (Payne, Bull 1988, 40 s).

[4] Predpostavimo, da želimo primerjati standardizirane metrične podatke za govedo z najdišč A in B ter da pri tem v postopku standardiziranja uporabimo referenčni vzorec, kjer med golenicami močno prevladujejo primerki samcev, med nadlahtnicami samic, pri ostalih skeletnih elementih pa je razmerje med spoloma približno enako. V kolikor bi med gradivom z najdišča A število izmerjenih golenic presegalo število nadlahtnic, v okviru najdišča B pa bi bilo obratno, potem bi zgoraj omenjene razlike v spolni strukturi med obema navedenima skeletnima elementoma v referenčnem vzorcu prispevale k višjim povprečnim vrednostim standardiziranih metričnih podatkov (≈ velikosti goved) za najdišče A nasproti najdišču B tudi v primeru, ko bi bila velikost govejih ostankov z obeh najdišč sicer primerljiva.

element from the opposite anatomical side for which it was ascertained that they undoubtedly belonged to other specimens (i.e. animals of a different age or the opposite sex) were added to this number.

Measurements were taken following the guidelines provided by von den Driesch (1976). Due to the often rather low numbers of measurable remains of individual skeletal elements the biometrical study has been performed on standardised metric data, which virtually increased the available sample (*cf.* Albarella 2002). The standardisation was performed in accordance to the following formula:

$$\text{Standardised value} = (x - m) / s,$$

in which x represents the dimension of the specimen from Tonovcov grad, while m and s represent the average and standard deviation of the same dimension from a reference sample. For this article we used the material from the Roman town of Tác/*Gorsium* (Hungary; Bökönyi 1984) as a reference sample, at which we took into account only skeletal elements represented by at least 30 specimens. In this way we tried to fulfil the condition that states that the average value and standard deviation needs to be calculated with more or less normally distributed (metric) data. Moreover, the exclusion of the poorly represented skeletal elements from the reference sample reduced (eliminated?) the undesired influence[4] of differential contributions of males, females and castrates to the remains of individual skeletal elements. Namely, we can expect that within small samples the inter-sample differences in the shares of the two sexes are generally greater than in large samples. This is also confirmed by the data that show that the differences in the contributions of males, females and castrates to the samples of bovine metacarpals (N = 168) and metatarsals (N = 162) from Tác/*Gorsium* are practically negligible (Bökönyi 1984, Tab. 5). Similar can be stated for the faunal assemblages from numerous other sites (e.g. Riedel 1979, 99; 1993a, Tab. 6; 1994a, Tab. 3).

In our attempt to differentiate between the third molars of domestic pig (*Sus domesticus*) and its wild ancestor (*S. scrofa*) we used a method similar to the

[4] Let's assume that we wish to compare the standardised measurements for cattle from sites A and B and that we in this standardisation process use a reference sample in which males dominate amongst the tibia remains, while females dominate with humerus remains; at the remaining skeletal elements the ratio between the sexes is roughly the same. In the event that the material from site A included a greater number of tibiae than humeri, and the picture would be the opposite in site B, then the above mentioned differences in the sex structure amongst the two skeletal elements within the reference sample would aid the higher average values of standardised measurements (≈ cattle size) for site A compared to site B even in the event that the size of bovine remains would be comparable at both sites.

Pri statistični obdelavi sva praviloma uporabljala neparametrične prijeme, saj vzorci pogosto niso izkazovali normalne porazdelitve. Med drugim sva proučevala tudi zastopanost posameznih anatomsklih delov živalskega trupa (izraženo z NISP), ki sva jih na podlagi kakovosti in količine pripadajočega mesa razdelila v tri kategorije: kategorija A (vključuje ostanke nosačev, okretačev ter drugih vratnih, prsnih in križnih vretenc, lopatic, nadlahtnic, medenic in stegnenic), kategorija B (obsega ostanke lobanj, spodnjih čeljustnic, koželjnic, golenic in piščali) ter kategorija C (vključuje ostanke zgornjih čeljustnic, zob, dlančnic, stopalnic, zapestnih kosti, skočnic, petnic in ostalih nartnih kosti ter prstnic).

Podatke o deležu zastopanosti vsake od treh kvalitetnih kategorij ter tiste o številu določenih primerkov posameznega taksona sva v nadaljevanju uporabila kot vstopne podatke za analizo večdimenzionalnega skaliranja (*Multidimensional scaling*, MDS), da bi ugotovila obstoj morebitnih razlik v favnistični sliki v prostoru in času. Obstoj različnih pasem govedi sva proučevala z uporabo analize glavnih komponent (*Principal Component Analysis*, PCA), ki so bile izračunane na podlagi matrike treh merjenih dimenzij skočnic omenjenega taksona. Statistična obdelava je bila narejena s programskim paketom StatSoft 2001, Statistica za Windows, verzija 6.0.

Favnistično gradivo s Tonovcovega gradu hrani Tolminski muzej.

8.2 TAKSONOMIJA

Skupno je bilo med izkopavanji poznoantičnih in zgodnjesrednjeveških plasti na Tonovcovem gradu pridobljenih 18.524 ostankov velikih sesalcev. Vsaj do nivoja rodu[5] jih je bilo mogoče določiti 5.621 (oz. 30,3 %). V razpoložljivem gradivu je zastopanih najmanj dvanajst vrst iz šestih družin (*tab. 8.1*), od katerih jih večino še danes najdemo na širšem območju Zgornje in Srednje Soške doline (Kryštufek 1991). Edino izjemo v tem smislu predstavlja globalno izumrlo pragovedo (*Bos primigenius*), čeprav je tudi današnja prisotnost kozoroga (Kryštufek 1991, 254) in morda divjega prašiča (Kryštufek 1991, 236) sicer le posledica ponovne naselitve po predhodnem lokalnem iztrebljenju.

Po številu določenih primerkov je najbolje zastopana vrsta v vzorcu najverjetneje ovca (*Ovis aries*). Z gotovostjo sva lahko slednji sicer pripisala zgolj 272 ostankov, kar predstavlja 63 odstotkov vseh specifično determiniranih kosti in zob drobnice.[6] Vendar pa lahko pričakujemo, da je s podobnim deležem ovca zastopana tudi v vzorcu vseh tistih ostankov poddružine Caprinae, ki jih do nivoja vrste sicer ni bilo mogoče določiti

[5] V primeru drobnice je bilo mogoče specifično determinirati le 15,5 odstotka ostankov; ostali so določeni le do nivoja poddružine (tj. subfam. Caprinae).

[6] Kozi (*Capra hircus*) sva pripisala 156 ostankov.

one described above. In this case the ratio between the individual measurements was compared with the use of a logarithm that calculated the quotient between the selected metric data in the numerator and a referential value (i.e. standard) in the denominator (Payne, Bull 1988). In this contribution we used the standard value for the breadth of the upper or lower molar at 21.7 and 18.3, respectively. The two standards are based on the sample of recent wild boars (*Sus scrofa libycus*) from Turkey (Payne, Bull 1988, 40 f).

As a rule we used non-parametric approaches in our statistical analyses, for the samples often failed to show a normal distribution. In studying the representation of individual anatomical regions of the animal body (expressed in terms of NISP), we divided the various skeletal elements into three categories regarding the quality and quantity of meat: category A (includes remains of vertebrae, scapulae, humeri, pelvises and femora), category B (includes skull fragments, as well as fragments of lower jawbones, radii and tibiae) and category C (includes fragments of upper jawbones, teeth, metacarpals, metatarsals, carpals, tarsals and phalanges).

In the following we used the data on the contributions by each of the three qualitative categories and the abundance (NISP) of individual taxa as the input data used in *Multidimensional scaling* (MDS). This helped ascertaining the existence of the eventual differences in the exploited fauna through space and time. The existence of the various cattle forms/breeds was studied with the use of the *Principal Component Analysis* (PCA), which was calculated on the basis of the greatest length of the medial sides, greatest depth of the lateral side and the distal breadth of the astragalus. The statistical calculations were performed with StatSoft 2001 software, Statistica for Windows, version 6.0.

The faunal material from Tonovcov grad is kept by the Tolmin Museum.

8.2 TAXONOMY

During the excavations of the Late Antique and Early Medieval layers at Tonovcov grad a total of 18,524 large mammalian remains were discovered. Of these, 5,621 (30.3 %) could be defined at least to the level of the genus[5]. The material revealed a minimum of twelve species from six families (*Tab.* 8.1), most of which can still be found in the area of the Upper and Central Soča valley (Kryštufek 1991). The sole exception in this sense is represented by the globally extinct aurochs (*Bos primigenius*), even though today the Alpine ibex (Kryštufek 1991,

[5] In the event of sheep and goats only 15.5 percent of the remains could be identified to the level of species; the remaining finds could only be identified as belonging to the Caprinae subfamily.

Takson / Taxon	NISP	% NISP
Caprinae	2748	48,9
Bos taurus	1620	28,8
Sus sp.	1095	19,5
Equus caballus	67	1,2
Cervus elaphus	29 (19)	0,5
Capra ibex	14	0,2
Capreolus capreolus	9 (1)	0,2
Bos cf. *primigenius*	9	0,2
Canis familiaris	5	0,1
Ursus arctos	4	0,1
Ostalo / Rest	21	0,4
SKUPAJ / TOTAL	5621	100,0

Tab. 8.1: Število določenih primerkov (NISP) za posamezne taksone velikih sesalcev s Tonovcovega gradu. Skupina 'Ostalo' vključuje: *Bos taurus* s. *Equus caballus* (N = 5), *Bos taurus* s. *Cervus elaphus* (N = 2) ter Caprinae s. *Capreolus capreolus* (N = 14). Pri cervidih je v oklepaju podano število ostankov rogovja.
Tab. 8.1: Number of identifiable specimens (NISP) for individual large mammalian taxa at Tonovcov grad. The group "Other" includes: *Bos taurus* s. *Equus caballus* (N = 5), *Bos taurus* s. *Cervus elaphus* (N = 2) and Caprinae s. *Capreolus capreolus* (N = 14). For cervids the number of antler remains is provided in brackets.

(tj. 2.320 primerkov). Po tej oceni bi se število ostankov ovce v obravnavanem vzorcu povzpelo na približno 1.730, s čimer bi preseglo[7] število govedu (*Bos taurus*) pripisanih najdb (NISP = 1620). Slika je seveda povsem drugačna, če razmerje med obema vrstama izrazimo v količini z zakolom pridobljenega mesa; ne gre namreč pozabiti, da masa goved tudi za osemkrat presega maso ovac (Luff 1982, 8; Baker 1991, Tab. 76a).

Ovci in govedu po številu najdb sledita koza (*Capra hircus*) in domači prašič (*Sus domesticus)*, katerih deleža zastopanosti sta bila ocenjena na slabih 20 odstotkov vseh določenih najdb. Natančnega števila kozjih ostankov, podobno kot v primeru ovac, ni mogoče podati. Enako velja za rod *Sus*, saj je zanesljivo razlikovanje med domačim in divjim prašičem (*Sus scrofa*) pogosto nemogoče. V primeru gradiva s Tonovcovega gradu sva delež zastopanosti vsake od obeh vrst prašičev ugotavljala s pomočjo podatkov o širini tretjih zgornjih in tretjih spodnjih meljakov; omenjeni dimenziji namreč izkazujeta le minimalno variabilnost v odvisnosti od starosti in spola živali (Payne, Bull 1988, 31). Rezultati nedvoumno dokazujejo prisotnost obeh vrst, v skladu s pričakovanji pa močno prevladujejo ostanki domačega prašiča (*sl. 8.2*). Skladni s tem so tudi podatki o dimenzijah kosti postkranialnega skeleta (*pril. 8.1*).

Od domačih živali so bile na Tonovcovem gradu najdene še kosti konja (*Equus caballus*) in psa[8] (*Canis familiaris*), ki pa skupaj predstavljajo le dober odstotek NISP. Podobno sliko kaže tudi večina sočasnih najdišč v

254) and possibly the wild boar (Kryštufek 1991, 236) are present in this area only because they were reintroduced after having been made extinct.

According to the number of taxonomically identified remains it seems that sheep (*Ovis aries*) is the best represented species in the assemblage. Such a presumption is based on the expectation that the share of sheep in the assemblage of all Caprinae remains (N = 2748) should not differ considerably from what has been observed in studying the (only) 428 Caprinae remains identifiable to the level of species. Of these, 272 were referable to sheep (i.e. 63 %), the remaining 156 being those of goat (*Capra hircus*). According to this estimate the number of sheep remains in the studied assemblage would rise to approximately 1,730, with which it would surpass[6] the number of finds identifiable as cattle (*Bos taurus,* NISP = 1,620). Of course we get a completely different picture if the ratio between the two species is expressed with the amount of meat obtained through culling; one should not forget that the weight of cattle can surpass the weight of a sheep or goat by eight fold (Luff 1982, 8; Baker 1991, Tab. 76a).

In terms of the number of finds sheep and cattle are followed by goat and domestic pig (*Sus domesticus)*, whose contributions were estimated at almost 20 percent of all the taxonomically identified mammal remains. Similarly to the case of sheep an exact number of goat remains cannot be provided.

The same holds true also for the two species of the genus *Sus*, for reliable differentiation between domestic pig and wild boar (*Sus scrofa*) is often impossible. In the case of the material from Tonovcov grad we assessed the contribution of both species by considering the breadth of the third upper and third lower molars, as the previously mentioned dimensions show merely a minimal variability in relation to the age and sex of the animal (Payne, Bull 1988, 31). While the results proved the presence of both *Sus* species, they emphasized the dominance of domestic pig (*Fig. 8.2*). The dimensions of the post-cranial skeletal elements also fit this pattern (*Appendix 8.1*).

[7] Razlika v abundanci obeh taksonov sicer ostaja pod mejo statistične značilnosti (χ^2 test: p = 0,204). Za podatke glede ostalih taksonov glej *tab. 8.2*.

[8] Kanidni okretač iz vzorca št. 277 se po vrednosti širine kranialne sklepne površine (BFcr *sensu* von den Driesch 1976, 69) umešča tako znotraj variacijske širine za velike rimskodobne pse iz mesta Tác/*Gorsium* (Bökönyi 1984, 212) kot tudi znotraj tiste za volkove (Riedel 1977, 167; lastni neobjavljeni podatki).

[6] The difference in the abundance of both taxa remains below the level of statistical significance (χ^2 test: p = 0.204). Data for othet taxa are shown in *table 8.2*.

Tab. 8.2: Rezultati statističnega testiranja razlik v zastopanosti posameznih taksonov velikih sesalcev v vzorcu s Tonovcovega gradu z uporabo χ^2 testa. V tabeli so p-vrednosti običajnega χ^2 testa zapisane pokončno, p-vrednosti χ^2 testa z yatesovimi popravki (*Yates corrected χ^2 test*; StatSoft, Inc. 2001) pa poševno. Statistično značilne razlike v zastopanosti posameznih taksonov (tj. $p < 0,05$) so označene z zvezdo (*). Legenda: Cap – Caprinae; B.T. – *Bos taurus*; E.C. – *Equus caballus*; C.E. – *Cervus elaphus*; C.I. – *Capra ibex*; C.C. – *Capreolus capreolus*; B.P. – *Bos primigenius*; C.F. – *canis familiaris*; U.A. – *Ursus arctos*.
Tab. 8.2: The results of the χ^2 statistical test of the differences in the representation of individual large mammalian taxa in the sample from Tonovcov grad. The table shows the p-values written in normal font, and the *Yates corrected* p-values (StatSoft, Inc. 2001) in italics. Statistically significant differences in the representation of the individual taxa (i.e. $p < 0.05$) are denoted with an asterisk (*). Abbreviations: Cap – Caprinae; B.T. – *Bos taurus*; E.C. – *Equus caballus*; C.E. – *Cervus elaphus*; C.I. – *Capra ibex*; C.C. – *Capreolus capreolus*; B.P. – *Bos primigenius*; C.F. – *canis familiaris*; U.A. – *Ursus arctos*.

	Cap.	**B.T.**	***Sus***	**E.C.**	**C.E.**	**C.I.**	**C.C.**	**B.P.**	**C.F.**	**U.A.**
Cap.		0,000*	0,000*	0,000*	0,000*	0,000*	0,000*	0,000*	0,000*	0,000*
B.T.	*0,000**		0,000*	0,000*	0,000*	0,000*	0,000*	0,000*	0,000*	0,000*
Sus	*0,000**	*0,000**		0,000*	0,000*	0,000*	0,000*	0,000*	0,000*	0,000*
E.C.	*0,000**	*0,000**	*0,000**		0,005*	0,000*	0,000*	0,000*	0,000*	0,000*
C.E.	*0,000**	*0,000**	*0,000**	0,005*		0,124	0,017*	0,017*	0,000*	0,000*
C.I.	*0,000**	*0,000**	*0,000**	*0,000**	*0,127*		0,374	0,374	0,178	0,082
C.C.	*0,000**	0,000*	0,000*	0,000*	0,018*	0,380		1,000	0,445	0,420
B.P.	*0,000**	*0,000**	*0,000**	*0,000**	*0,018**	*0,380*	*1,000*		0,445	0,420
C.F.	*0,000**	*0,000**	*0,000**	*0,000**	*0,000**	*0,184*	*0,453*	*0,453*		0,819
U.A.	*0,000**	*0,000**	*0,000**	*0,000**	*0,000**	*0,087*	*0,429*	*0,429*	*0,824*	

regiji (Stork, von den Driesch 1987, Tab. 2; Baker 1991, 154; Pucher 1993, Tab. 1; Turk 2000, 169; Forstenpointner *et al.* 2002, Tab 1; Bartosiewicz, Choyke 1985, Tab. 1). Gre za pričakovano posledico dejstva, da konji in psi v pozni antiki pač niso bili (več) vir mesa za prehrano. Trupla poginulih živali so bila tako praviloma zavržena v odpadne jarke oz. jame (*cf.* Stallibrass 2000), zaradi česar se njihove kosti med "kuhinjskimi odpadki" pojavljajo le po naključju. Eno takšnih (odpadnih?) odlagališč je morda bilo ob vzhodnem vogalu objekta 1 (*sl. 8.12*). Na vsega skupaj 15 m^2 površine (tj. južna polovica kv. 669 in severna polovica kv. 719) je bilo namreč najdenih kar 19 konjskih ostankov (MNI = 3), kar predstavlja dve tretjini vseh kosti in zob omenjene vrste med gradivom iz druge poznoantične faze s Tonovcovega gradu. Pri tem je zanimivo, da je bila na istem mestu najdena tudi ena izmed skupno sicer le štirih kosti psa.

V okviru obravnave konjskih kosti si poseben komentar zasluži možnost, da je med njimi zastopana tudi mula. V to smer kaže morfologija prve prstnice iz vzorca št. 2110 (kv. 717; mkv. C3), ki je v skladu z opažanji Petersove (1998, sl. 56) bliže muli kot konju (*sl. 8.3*). Ne glede na utemeljenost takšne determinacije pa velja dodati, da mule na Tonovcovem gradu zagotovo niso bile številčne. Poleg primerka s *slike 8.3* je namreč ekvidno gradivo vključevalo še tri prve prstnice, ki pa so vse morfološko bliže konju. Enako velja tudi za ostanke še drugih skeletnih elementov,[9] katerih morfologija naj bi omogočala (vsaj pogojno) razlikovanje med obema oblikama (*sl. 8.4*).

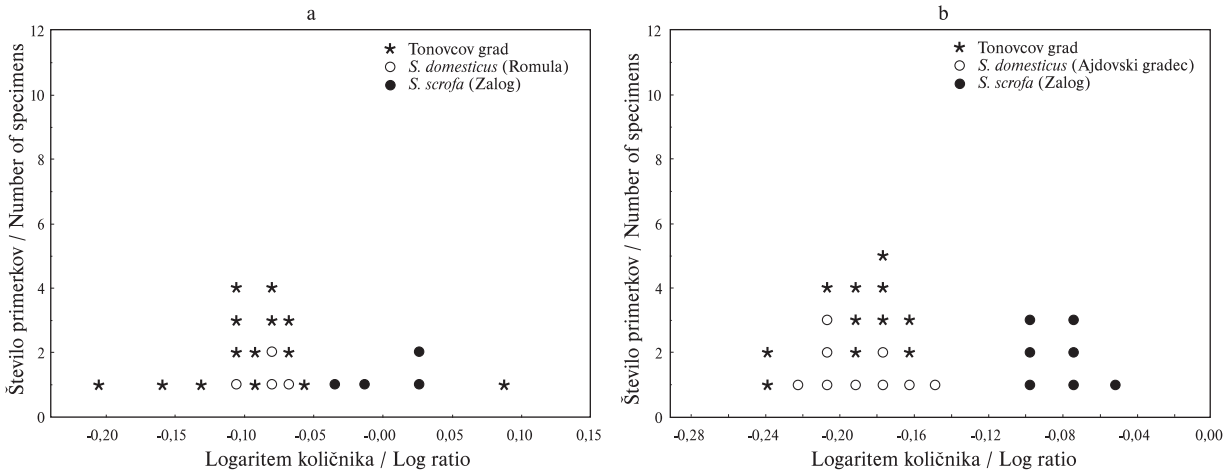
[9] V okviru favnističnega vzorca s Tonovcovega gradu so to: distalni del koželjnice (N = 3), distalni del golenice

Tonovcov grad also revealed bones of other domestic animals, such as horse (*Equus caballus*) and dog[7] (*Canis familiaris*); however they were discovered in small numbers as the two species together represent just above one percent of the NISP. A similar picture is shown also by other contemporaneous sites in the region (Stork, von den Driesch 1987, Tab. 2; Baker 1991, 154; Pucher 1993, Tab. 1; Turk 2000, 169; Forstenpointner *et al.* 2002, Tab 1; Bartosiewicz, Choyke 1985, Tab. 1). This is an expected consequence of the fact that in the studied region horse and dog meat was no longer considered to be a source of food in Late Antiquity.[8] Deceased animals were thus as a rule discarded and thrown into ditches or waste-holes (*cf.* Stallibrass 2000), which means that their bones appear amongst "kitchen waste" only by coincidence. One such (waste?) site might have existed at the east corner of building 1 (*Fig. 8.12*). As many as 19 horse finds (MNI= 3) were located within a total of 15 m^2 (i.e. the south half of sq. 669 and the north half of sq. 719).[9] These finds represent two thirds of all horse bones and teeth within the material dated to the Late Antiquity phase 2. At this

[7] The breadth of the cranial articular surface (BFcr *sensu* von den Driesch 1976, 69) of the canine epistopheus from sample No. 277 corresponds to both large Roman period dogs from the town of Tác/*Gorsium* (Bökönyi 1984, 212) and wolves (Riedel 1977, 167; own unpublished data).

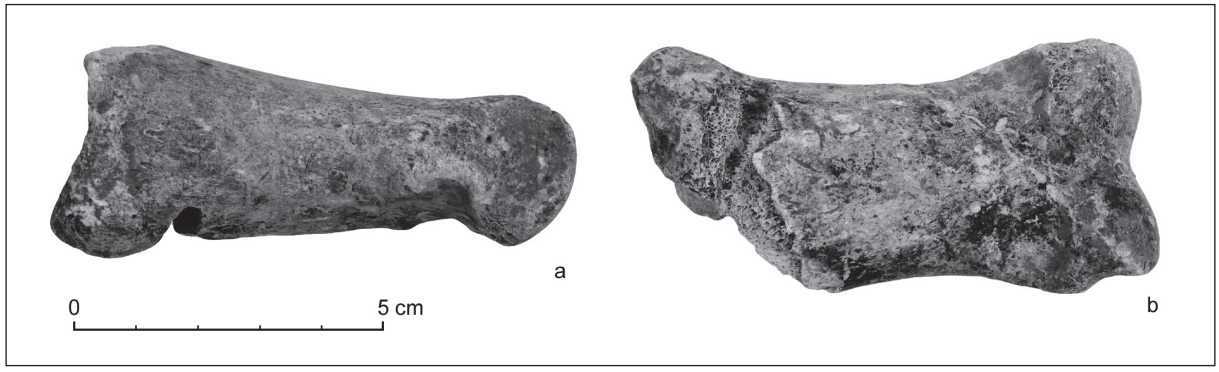
[8] However, two horse bones from the Late Antiquity phase 2 did show cut-marks.

[9] The total excavation area within the area of structure 1 surpassed 400 m^2.



Sl. 8.2: Variabilnost v širini tretjega zgornjega (**a**) in tretjega spodnjega (**b**) meljaka pri prašičih s Tonovcovega gradu, domačih prašičih iz Ribnice/Romule (rimska doba; lastni neobjavljeni podatki) oz. z Ajdovskega gradca nad Vranjem (pozna antika; Bartosiewicz, Choyke 1985) ter divjih prašičih z Zaloga (mezolitik; Toškan, Dirjec 2006, 187). Variabilnost je izražena kot logaritem količnika med posamezno izmerjeno vrednostjo širine zoba in pa standardno vrednostjo za navedeno dimenzijo. Postopek izračunavanja logaritemskega količnika je podan v pogl. 8.1.

Fig. 8.2: The variability in the breadth of the third upper (**a**) and third lower (**b**) molar in pigs/wild boars from Tonovcov grad, pigs from Ribnica/*Romula* (Roman period; unpublished data) and Ajdovski gradec above Vranje (Late Antiquity; Bartosiewicz, Choyke 1985) and wild boars from Zalog (Mesolithic; Toškan, Dirjec 2006, 187). The variability is expressed as a logarithm of the quotient between the individual measured value of the tooth breadth and the standard value for the stated dimension. The procedure for calculating the logarithm quotient is given in chapter 8.1.



Sl. 8.3: Ekvidna prva prstnica s Tonovcovega gradu (št. vzorca: 2110; kv. 717; mkv. C3) z morfološkimi značilnostmi mule (*cf.* Peters 1998, Sl. 56). Foto: M. Zaplatil.

Fig. 8.3: The equid first phalange from Tonovcov grad (sample No.: 2110; sq. 717; msq. C3) with morphological characteristics of a mule (*cf.* Peters 1998, Fig. 56). Photo: M. Zaplatil.

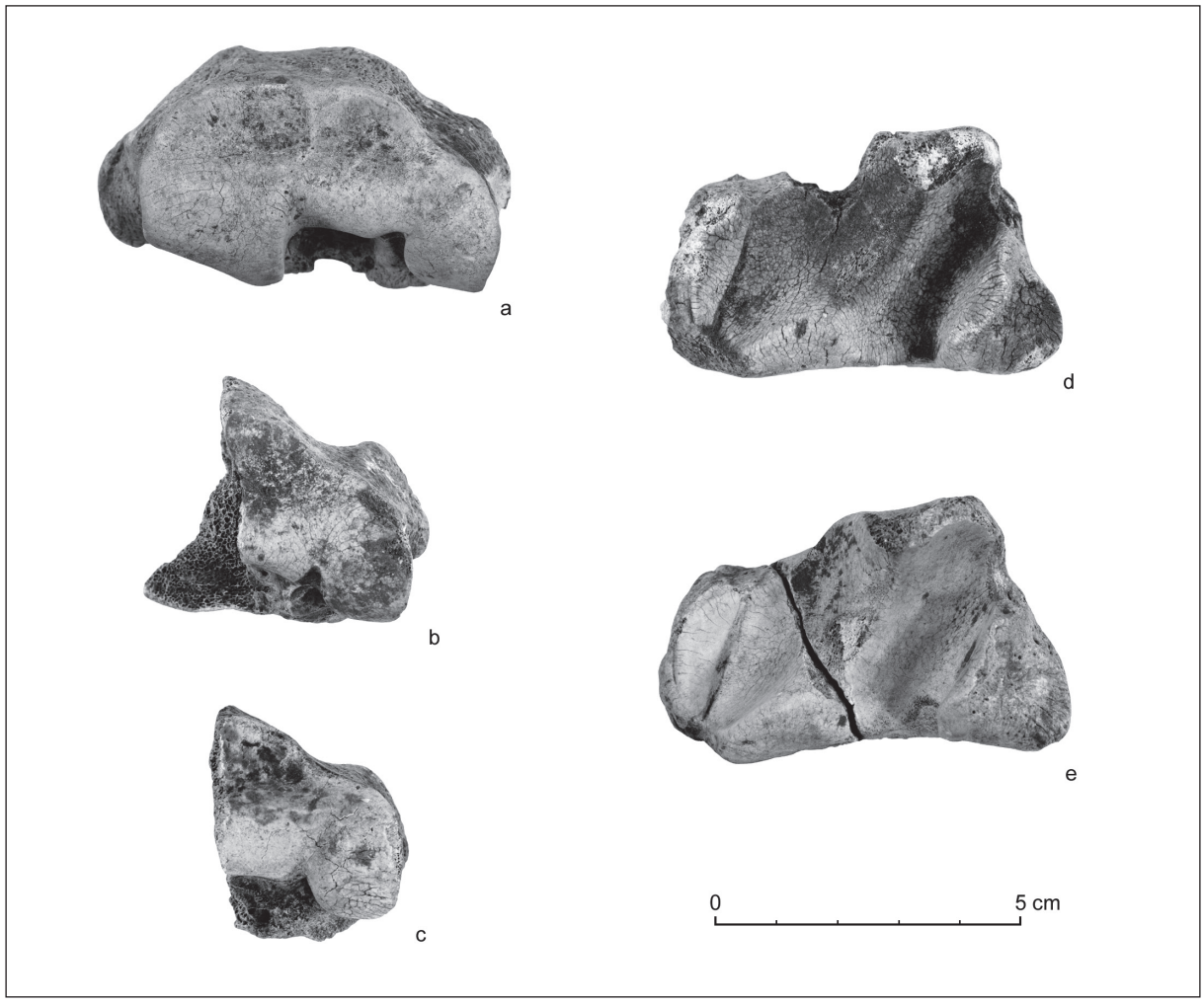
Delež kosti in zob lovnih živali med živalskimi ostanki s Tonovcovega gradu komaj presega odstotek NISP, čeprav je v gradivu sicer zastopanih najmanj[10] šest vrst divjadi. Ob zgoraj že omenjenem divjem prašiču so

(N = 2) ter dlančnica (N = 1); *cf.* Peters (1998, 411 ss).

[10] Upoštevaje lego Tonovcovega gradu in ekološke zahteve nekaterih v favnističnem vzorcu zastopanih lovnih vrst (npr. kozorog) ni mogoče z gotovostjo izključiti, da je med drobnici pripisanimi ostanki tudi kak primerek gamsa (*Rupicapra rupicapra*); zanesljivo razlikovanje med omenjeno vrsto na eni strani ter ovco oz. kozo na drugi je namreč razmeroma težavno (*cf.* Pucher, Engl 1997, 39 ss).

it might be interesting that one of the four (in total) dog bones was found at the same location.

While dealing with equid bones it should be mentioned that mules may be represented amongst them, too. This is indicated by the morphology of the first phalanx from sample No. 2110 (sq. 717; msq. C3), which is – according to the observations by Peters (1998, Fig. 56) – closer to a mule than a horse (*Fig. 8.3*). Regardless of the basis for such a speculation it should be added that mule remains were not to be found in larger quantities at Tonovcov grad. Namely, alongside the specimen from *figure 8.3* the equid material included another three first



Sl. 8.4: Ekvidni ostanki s Tonovcovega gradu z morfološkimi značilnostmi konja (*cf*. Peters 1998, Sl. 54 in 55): **a** – distalni del koželjnice (št. vzorca 778); **b** – distalni del koželjnice (št. vzorca 960); **c** – distalni del koželjnice (št. vzorca 1711); **d** – distalni del golenice (št. vzorca 747); **e** – distalni del golenice (št. vzorca 1666). Foto: M. Zaplatil.
Fig. 8.4: Equid remains from Tonovcov grad with the morphological characteristics of a horse (*cf*. Peters 1998, Figs. 54 and 55): **a** – distal part of the radius (sample No. 778); **b** – distal part of the radius (sample No. 960); **c** – distal part of the radius (sample No. 1711); **d** – distal part of the tibia (sample No. 747); **e** – distal part of the tibia (sample No. 1666). Photo: M. Zaplatil.

to še jelen (*Cervus elaphus*), srna (*Capreolus capreolus*), kozorog (*Capra ibex*), rjavi medved (*Ursus arctos*) in pragovedo (*Bos primigenius*). Iz navedenega izhaja, da je lov v ekonomiji prebivalcev Tonovcovega gradu igral zelo obrobno vlogo. Ugotovitev je sicer pričakovana, saj podobno sliko kažejo praktično vsa arheozoološko obdelana poznoantična najdišča na območju med Gardskim jezerom v Italiji in Kozjanskim v vzhodni Sloveniji: Monte Barro (Baker 1991, 154), Torcello (faza Ta; Riedel 1979, 84 s), Verona (faza VR-I; Riedel 1994a, 77 ss), Videm/Udine (Riedel 1993b, Tab. 12), Sv. Pavel nad Vrtovinom (Svoljšak 1985, 226 s), Invillino (Stork, von den Driesch 1987, Tab. 2), Kappele (Pucher 1993, Tab. 1), Teriola (Pucher 2003, Tab. 1), Sv. Hema/Hemmaberg (Forstenpointner *et al.* 2001, Tab. 1), Ajdovski gradec nad Vranjem (Bartosiewicz, Choyke 1985) in Tinje (Turk 2000, 169).

phalanges, all of which were morphologically closer to horse. The same holds true for the remains of other skeletal elements[10] showing morphological characteristics which allow for the (at least conditional) discrimination between the two forms (*Fig. 8.4*).

The relative abundance of bones and teeth of wild animals hardly surpasses one percent of the total NISP, even though this share consists of at least[11] six species.

[10] The following were discovered in the faunal assemblage from from Tonovcov grad: the distal part of the radius (N = 3), the distal part of the tibia (N = 2) and metacarpus (N = 1); *cf*. Peters (1998, 411 ff).

[11] Taking into account the geographic position of Tonovcov grad and the ecological demands of some of the wild species (for instance ibex) represented within the fauna sample, it cannot be ruled out that the remains ascribed to sheep and goat might

Pravzaprav med navedenimi najdišči ni bistvenih razlik niti v samem naboru lovnih vrst. V tem smislu gre izpostaviti predvsem divjega prašiča, srno, medveda in jelena. Slednji je navadno zastopan predvsem z (obdelanimi) ostanki rogovja in tako je tudi v primeru Tonovcovega gradu.[11] Zdi se torej, da je bil lov[12] na jelene motiviran predvsem s pridobivanjem rogovij kot surovine za izdelavo raznih orodij. Drugače je bilo z divjim prašičem in srno, ki sta takratnim lovcem najverjetneje predstavljala predvsem dodaten vir mesa. Med skupno devetimi najdbami vrste *C. capreolus*[13] je tudi primerek v celoti ohranjenega rogovja, ki pa ne kaže sledi obdelave. Najdbe medveda so redke in morda predstavljajo ostanke živali, ki so bile uplenjene z namenom obrambe ljudi in živine *(cf.* Riedel 1989, 319) ali kot trofeja (*cf.* Johnstone 2007, 288).

Ostanki kozoroga v okviru poznoantičnih najdišč v regiji so izjemno redki.[14] Po najini najboljši vednosti je tak primer znan le z Gradišča nad Pivko pri Naklem (Rakovec 1973, 260). Gradivo s Tonovcovega gradu vključuje do deset kostnih fragmentov kozoroga. Njihova determinacija temelji na metričnih podatkih, ki pa spričo delnega prekrivanja dimenzij posameznih skeletnih elementov včasih ne dopuščajo zanesljivega razlikovanja med kozorogom in drobnico (*sl. 8.5*). Čeprav torej natančnega števila ostankov vrste *C. ibex* v gradivu s Tonovcovega gradu ni mogoče podati, pa o njeni prisotnosti v obravnavanem vzorcu ne gre dvomiti. To poleg nekaterih ostankov, katerih dimenzije so prikazane na *sliki 8.5*, dokazujejo tudi metrični podatki petnice iz vzorca št. 110, nadlahtnice iz vzorca št. 1560, dveh fragmentov komolčnice iz vzorcev št. 1402 in 2090 ter morda tudi prva prstnica iz vzorca št. 1182 (*pril. 8.1*).

Posebno obravnavo zaslužijo bovidne najdbe, ki po svojih dimenzijah presegajo običajne vrednosti, ugotovljene pri domačem govedu (pozno)antične starosti v Srednji Evropi. V gradivu s Tonovcovega gradu je bilo takih najdb 14. Vsaj nekatere od njih se zdi utemeljeno pripisati pragovedu. Tak primer predstavlja fragment stegnenice s *slike 8.6*, pri čemer velja dodati, da se proces zraščanja epifize sklepne glave (*caput femoris*) z diafizo pri tem primerku sploh še ni končal. Prav tako se zdi za domače govedo s poznoantičnega Tonovcovega gradu prevelik vsaj kateri od treh distalnih delov golenice s *slike 8.7*. Ti sicer ne odstopajo od največjih predstavnikov omenjene vrste iz rimskega mesta Tác/*Gorsium*,[15] vendar

[11] Med skupno 29 najdbami jelena s Tonovcovega gradu je fragmentov rogovij kar 19, večina s sledmi obdelave.

[12] Do rogovij so sicer ljudje prihajali tudi s pobiranjem naravno odpadlih primerkov.

[13] Navedeno število najdb srne je morda nekoliko podcenjeno, saj sva 14 kostnih fragmentov determinirala le kot *Capreolus capreolus* s. Caprinae.

[14] Podobno sliko kažejo praktično vsa holocenska najdišča v SV Italiji (Riedel 1989, 317) in na Slovenskem (Rakovec 1973, 257 ss).

[15] Opisna statistika za dimenzijo 'najmanjša širina diafize golenice' z najdišča Tác/*Gorsium* (N = 51): razpon vredno-

Alongside wild boar, remains of the red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), Alpine ibex (*Capra ibex*), brown bear (*Ursus arctos*) and aurochs (*Bos primigenius*) can also be found in the studied assemblage. From the modest contribution of wild animals it is clear that hunting played a quantitatively insignificant role in the economy of the inhabitants of Tonovcov grad. This was to be expected, for a similar picture was portrayed by practically all archeozoologically analyzed Late Antique sites in the area between Lake Garda in Italy and Kozjansko in East Slovenia: Monte Barro (Baker 1991, 154), Torcello (phase Ta; Riedel 1979, 84 f), Verona (complex VR-I; Riedel 1994a, 77 ff), Udine (Riedel 1993b, Tab. 12), Sv. Pavel above Vrtovin (Svoljšak 1985, 226 f), Invillino (Stork, von den Driesch 1987, Tab. 2), Kappele (Pucher 1993, Tab. 1), Teriola (Pucher 2003, Tab. 1), Hemmaberg (Forstenpointner *et al.* 2001, Tab. 1), Ajdovski gradec above Vranje (Bartosiewicz, Choyke 1985) and Tinje (Turk 2000, 169). No great inter-site differences were observed in the wild species composition either. Red deer is usually well represented with remains of (worked) antler, which is also the case at Tonovcov grad.[12] It therefore seems that the main goal of red deer stalking[13] was obtaining antlers, later used as a raw material in producing tools. The situation was different with wild boar and roe deer, which most likely represented an additional meat source for the hunters. Amongst the total of nine finds of the species *C. capreolus*[14] a set of fully preserved antlers was also discovered; however this particular set did not show any traces of working. Bear finds are rare and possibly represent remains of animals that were killed in order to protect people and domestic animals *(cf.* Riedel 1989, 319) or in order to procure trophies (*cf.* Johnstone 2007, 288).

Alpine ibex remains are extremely rare at Late Antique sites in the region.[15] To our best knowledge such an example is known only from the hilltop settlement Gradišče nad Pivko near Naklo (Rakovec 1973, 260). The material from Tonovcov grad includes up to ten bone fragments that belonged to the Alpine ibex. Their taxonomic identification is based on metric data, which – however – does occasionally not allow for a reliable differentiation between the alpine ibex and sheep or goat (*Fig. 8.5*). Even though it is impossible to

also include chamois (*Rupicapra rupicapra*), for it is often impossible to clearly differentiate between the chamois on one side and sheep or goat on the other (*cf.* Pucher, Engl 1997, 39 ff).

[12] From the total of 29 red deer finds from Tonovcov grad 19 are antler fragments, most of which show traces of working.

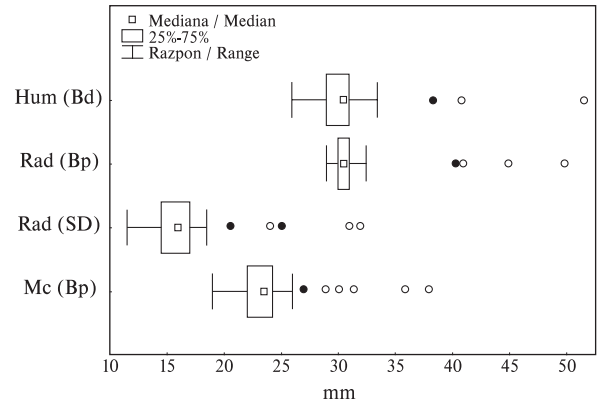
[13] Antlers were also obtained just by picking up specimens that were shed naturally.

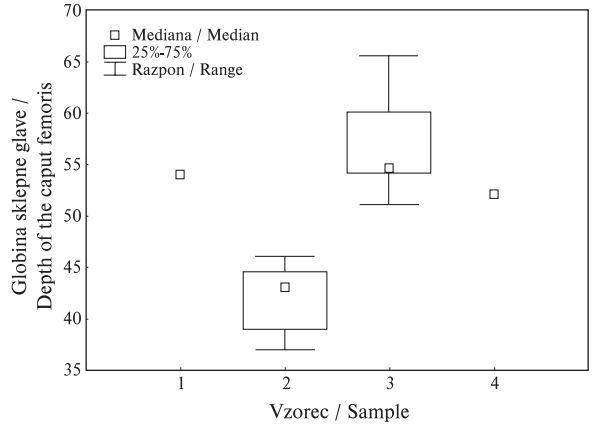
[14] The number of roe deer finds could be slightly underestimated, for we have defined 14 bone fragments merely as *Capreolus capreolus* s. Caprinae.

[15] Practically all Holocene sites in NE Italy (Riedel 1989, 317) and the territory of present day Slovenia (Rakovec 1973, 257 ff) show a similar trend.

Sl. 8.5: Dimenzije dolgih kosti kozoroga s Tonovcovega gradu (●). Za primerjavo so podane meritve fosilnih kozorogov iz več francoskih najdišč (○; Prat 1966, 289 s) ter drobnice s Tonovcovega gradu (diagram tipa okvirji z ročaji). Velikosti vzorcev drobnice za posamezno dimenzijo so sledeče: Hum (Bd): 21; Rad (Bp): 24; Rad (SD): 9; Mc (Bp): 8. Legenda: Hum – nadlahtnica; Rad – koželjnica; Mc – dlančnica. Dimenzije so povzete po von den Drieschevi (1976) in so predstavljene v *prilogi 8.1*.

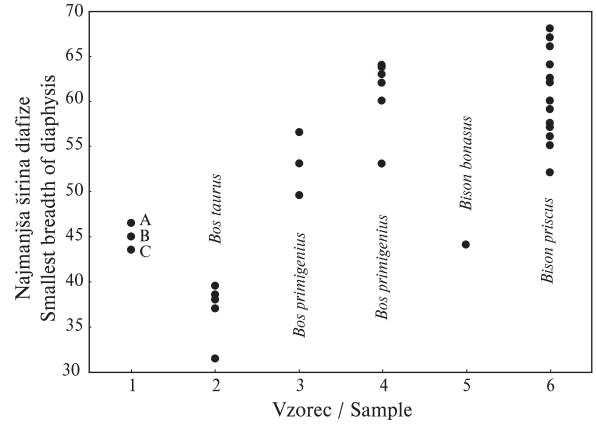
Fig. 8.5: Dimensions of ibex long bones from Tonovcov grad (●). As a comparison we have given the measurements of fossil ibex from a number of French sites (○; Prat 1966, 289 s) as well as sheep and goat from Tonovcov grad (*Box & whisker* diagram). The sample size of the sheep and goats for a specific dimension is as follows: Hum (Bd): 21; Rad (Bp): 24; Rad (SD): 9; Mc (Bp): 8. Legend: Hum – humerus; Rad – radius; Mc – metacarpal. The dimensions are taken from von den Drieschevi (1976). See *Appendix 8.1.*





Sl. 8.6: Največja globina sklepne glavice stegnenice (DC *sensu* von den Driesch 1976) s Tonovcovega gradu (vzorec št. 2084, kv. 766, mkv. D2). Podani so tudi primerjalni podatki za domače govedo, pragovedo in zobra. Seznam in velikost (N) vzorcev: **1** – *Bos primigenius* s. *Bison bonasus*, Tonovcov grad (4.–5. stoletje; N = 1); **2** – *Bos taurus*, Tonovcov grad (4.–8. stoletje; N = 12); **3** – *Bos primigenius*, več evropskih najdišč (holocen; N = 14; Boessneck *et al.* 1963, 185 s; Chaix, Arbogast 1999, 48); **4** – *Bison bonasus*, Seeberg (Švica, neolitik; N = 1; Boessneck *et al.* 1963, 185). Vse mere so v mm.

Fig. 8.6: The greatest depth of the *caput femoris* (DC *sensu* von den Driesch 1976) from Tonovcov grad (sample No. 2084, sq. 766, msq. D2). Given are also the comparative data for domestic cattle, aurochs and European bison. List and size (N) of samples: **1** – *Bos primigenius* s. *Bison bonasus*, Tonovcov grad (4^{th} –5^{th} century; N = 1); **2** – *Bos taurus*, Tonovcov grad (4^{th} –8^{th} century; N = 12); **3** – *Bos primigenius*, a number of European sites (Holocene; N = 14; Boessneck *et al.* 1963, 185 f; Chaix, Arbogast 1999, 48); **4** – *Bison bonasus*, Seeberg (Switzerland, Neolithic; N = 1; Boessneck *et al.* 1963, 185). All measurements are in mm.



Sl. 8.7: Najmanjša širina diafize (Bd *sensu* von den Driesch 1976) treh bovidnih golenic s Tonovcovega gradu (primerek **A:** vzorec št. 1335, kv. 769, mkv. A2; primerek **B:** vzorec št. 519, kv. 631, mkv. C4; primerek **C:** vzorec št. 279, kv. 769, mkv. A4). Podani so tudi primerjalni podatki za domače govedo, pragovedo, zobra in stepskega bizona. Seznam vzorcev: **1** – *Bos* s. *Bison*, Tonovcov grad (4.–7. stoletje); **2** – *Bos taurus*, Tonovcov grad (4.–7. stoletje); **3** – *Bos primigenius*, zahodna Evropa (holocen; Chaix, Arbogast 1999, 48); **4** – *Bos primigenius*, srednja Evropa (mlajši pleistocen; Martin 1987, 119); **5** – *Bison bonasus*, Seeberg (Švica, neolitik; Boessneck *et al.* 1963, 186 s); **6** – *Bison priscus*, Cava Filo (Italija, mlajši pleistocen; Sala 1986, 148). Vse mere so v mm.

Fig. 8.7: The smallest breadth of diaphysis (Bd *sensu* von den Driesch 1976) from the three bovine tibia at Tonovcov grad (specimen **A:** sample No. 1335, sq. 769, msq. A2; specimen **B:** sample No. 519, sq. 631, msq. C4; specimen **C:** sample No. 279, sq. 769, msq. A4). Provided is also the comparative data for domestic cattle, aurochs, European bison and steppe bison. List of samples: **1** – *Bos* s. *Bison*, Tonovcov grad (4^{th} –7^{th} century); **2** – *Bos taurus*, Tonovcov grad (4^{th} –7^{th} century); **3** – *Bos primigenius*, western Europe (Holocene; Chaix, Arbogast 1999, 48); **4** – *Bos primigenius*, Central Europe (early Pleistocene; Martin 1987, 119); **5** – *Bison bonasus*, Seeberg (Switzerland, Neolithic; Boessneck *et al.* 1963, 186 f); **6** – *Bison priscus*, Cava Filo (Italy, early Pleistocene; Sala 1986, 148). All measurements are given in mm.

pa pri tem ne gre pozabiti, da se je na območju jugovzhodnih Alp velikost goved v pozni antiki zmanjšala (Riedel 1994b, 54). V zvezi s *sliko 8.7* velja opozoriti tudi na to, da je fosilno pragovedo v povprečju presegalo velikost subfosilnega in da podobno velja tudi za ledenodobnega stepskega bizona (*Bison priscus*) nasproti recentnemu zobru (*B. bonasus*). Še zadnja bovidna najdba, ki je po svojih dimenzijah nedvomno bliže pragovedu kot domačemu govedu, je tretja prstnica iz vzorca št. 54 (kv. 666; mkv. D1). Diagonalna dolžina ventralnega dela[16] namreč pri omenjenem primerku meri 83,0 mm, medtem ko je razpon vrednosti za navedeno dimenzijo pri domačemu govedu s Tonovcovega gradu od 52,5 do 78,0 mm (N = 11), pri pragovedu/zobru s švicarskega mlajšekamenodobnega kolišča Seeberg pa med 73,0 in 93,0 mm (N = 78; Boessneck *et al*. 1963, 196).

Resnici na ljubo zgolj na podlagi dimenzij in morfoloških značilnosti zgoraj navedenih bovidnih najdb ni mogoče z gotovostjo zavrniti možnosti, da je med njimi zastopan tudi zober. Razlog, da se to vendarle ne zdi zelo verjetno, je odsotnost najdb omenjene vrste na Slovenskem in v Italiji v obdobju antike in srednjega veka (Rakovec 1973; Bon *et al*. 1991; Benecke 2005–2006, 426). Po drugi strani pa velja omeniti tudi poročilo langobardskega zgodovinarja Pavla Diakona, da so zobri živeli v pragozdovih med Vipavsko in Zgornjesavsko dolino še tudi takrat, ko se je langobardski kralj Alboin s svojo vojsko in prebivalstvom leta 568 selil čez današnjo Slovenijo v Italijo.[17]

Težave s kriteriji za razlikovanje med pragovedom in zobrom so manj moteče v primeru preostalih devetih od predhodno omenjenih 14 nadpovprečno velikih bovidnih kosti s Tonovcovega gradu. Ne le zato, ker nekatere od njih odstopajo od morfologije zobra (*cf*. Sala 1986; Martin 1987), temveč tudi zato, ker se po svojih dimenzijah prav vse umeščajo bliže domačemu govedu kot kateri od obeh divjih vrst. Slednje je morda še najmanj očitno v primeru fragmenta lopatice s *slike 8.8*, saj je prekrivanje med metričnimi podatki domačega goveda in pragoveda tu precejšnje. Bistveno manj problematična se zdi determinacija za domače govedo v primeru najdb, prikazanih v *tabeli 8.3*. Navedene kosti so bile najdene v istem kvadrantu (celo v istem mikrokvadrantu) in so tako verjetno pripadale istemu, za takratne razmere relativno velikemu domačemu govedu. Ta je po velikosti presegal celo dimenzije maljšekamenodobnih primerkov s švicarskega najdišča Seeberg, čeprav je takratno domače govedo po velikosti zaostajalo le za velikim rimskodobnim in je torej prekašalo poznoantične oz. zgodnjesrednjeveške primerke (Guintard 1999, 14 s).

sti = 28,5–47,0 mm; povprečna vrednost 38,3 mm; standardna deviacija = 4,74.

[16] DLS *sensu* von den Driesch 1976.

[17] *cf. Pavel Diakon (Paulus Diaconus): Zgodovina Langobardov (Historia Langobardorum)*, (prevedli: F. Bradač, B. Grafenauer in K. Gantar), Maribor, 1988, 66.

provide a precise number of *C. ibex* remains within the material from Tonovcov grad, its presence is not to be doubted. Alongside certain remains – the dimensions of which are shown in *figure 8.5* – this is also proven by the measurements of the calcaneus of sample No. 110, the humerus from sample No. 1560, two ulna fragments from samples Nos. 1402 and 2090 and possibly also the first phalanx from sample No. 1182 (*Appendix 8.1*).

Bovine finds – whose sizes exceed the usual values ascertained for (Late) Antique domestic cattle in Central Europe deserve special attention. The material from Tonovcov grad included 14 such specimens. It seems that at least some of them can be ascribed to the aurochs. One such specimen is represented by the femur fragment shown on *figure 8.6*, displaying an unfused *caput femoris*. At least one of the three tibia distal epiphyses from *figure 8.7* seems to surpass in size the Late Antique domestic cattle from Tonovcov grad, too. It is true that all three specimens correspond to the largest representatives of cattle from the Roman town of Tác/*Gorsium*,[16] however it is noteworthy that the size of cattle in the southeast Alpine area became smaller in Late Antiquity (Riedel 1994b, 54).

The last bovine find definitely closer to aurochs than domestic cattle, is the third phalanx from sample No. 54 (sq. 666; msq. D1). Its diagonal length on the ventral part[17] measures 83.0 mm, with the range of the same dimension observed in domestic cattle from Tonovcov grad (N = 11) and in aurochs/European bison from the Swiss Neolithic pile-dwelling site at Seeberg (N = 78; Boessneck *et al*. 1963, 196) being 52.5-78.0 mm and 73.0-93.0 mm, respectively.

Based on the dimensions and morphological characteristics of five of the aforementioned 14 large bovine finds, the possibility of some of them belonging to the European bison cannot be rejected. After all the Lombardian historian Pavel Diakon reported that the species was present in the forests between the Vipava and Upper Sava valleys even in 568, when the Lombardian king Alboin together with his army and citizens were moving across the territory of present-day Slovenia into Italy (Paulus Diaconus, Historia Langobardorum 2, 8).[18] Nevertheless, in view of the lack of Antique and medieval finds of the European bison in Slovenia and NE Italy (Rakovec 1973; Bon *et al*. 1991; Benecke 2005-2006, 426), the possibility of these bones belonging to aurochs seems to be much more likely.

The problems with the criteria for differentiating between *Bos primigenius* and *Bison bonasus* are not

[16] The descriptive statistics for 'the smallest breadth of the tibia diaphysis' from the site Tác/*Gorsium* (N = 51): range = 28.5-47.0 mm; average = 38.3 mm; standard deviation = 4.74.

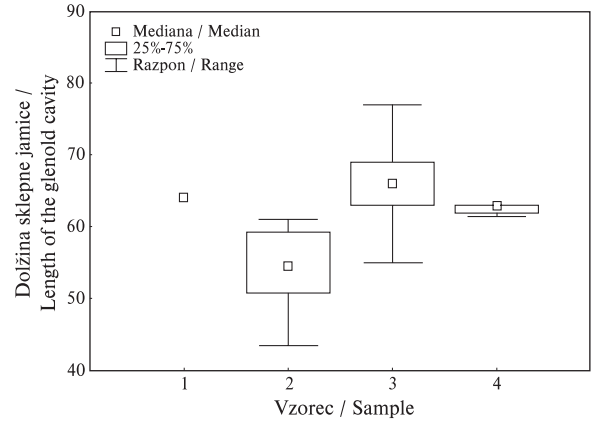
[17] DLS *sensu* von den Driesch (1976).

[18] *cf. Pavel Diakon (Paulus Diaconus): Zgodovina Langobardov (Historia Langobardorum)*, (slovenian translation by: Bradač, F, Grafenauer, B. and Gantar, K.), Maribor, 1988, 66.

Tab. 8.3: Dimenzije bovidnih kosti iz vzorca št. 2006 (kv. 719, mkv. D1) s Tonovcovega gradu, ki so domnevno pripadale isti živali. Podani so tudi primerjalni podatki za domače govedo s Tonovcovega gradu, Ajdovskega gradca (Slovenija; Bartosiewicz, Choyke 1985) in Seeberga (Švica; Boessneck *et al.* 1963, 176 ss) ter pragovedo iz več evropskih najdišč (Boessneck *et al.* 1963, 176 ss; Bökönyi 1984, 150; Chaix, Arbogast 1999, 47 s). Legenda: Me – mediana; N – velikost vzorca; Min.–Max. – razpon vrednosti. Dimenzije so povzete po von den Drieschevi (1976) in so predstavljene v *prilogi 8.1*. Za časovno umestitev najdišč glej besedilo. Vse mere so izražene v mm.
Tab. 8.3: The dimensions of the bovine bones from sample No. 2006 (sq. 719, msq. D1) from Tonovcov grad, assumed to belong to the same animal. Provided is also comparative data for cattle from Tonovcov grad, Ajdovski gradec (Slovenia; Bartosiewicz, Choyke 1985) and Seeberg (Switzerland; Boessneck *et al.* 1963, 176 ff) as well as for aurochs from numerous European sites (Boessneck *et al.* 1963, 176 ff; Bökönyi 1984, 150; Chaix, Arbogast 1999, 47 f). Abbreviations: Me – median; N – sample size; Min.–Max. – range. The dimensions are taken from von den Driesche (1976). For the placement of sites in time see text. All measurements are given in mm.

Dimenzija **Dimension**		***Bos* cf. *taurus***	***Bos taurus***			***B. primigenius***
		Tonovcov grad	**Tonovcov grad**	**Ajdovski gradec**	**Seeberg**	**Evropa / Europe**
		Mera Measurement	Me (N) Min.–Max.	Me (N) Min.–Max.	Me (N) Min.–Max.	Me (N) Min.–Max.
Humerus	Bp	88,0	–	–	79,0 (3) 73,0–86,0	140,0 (5) 136,0–146,0
Ulna	DPA	67,0	63,0 (1)	–	58,5 (6) 56,0–61,0	83,0 (5) 79,0–97,0
Femur	DC	45,0	42,75 (12) 37,0–46,0	–	40,0 (1)	54,5 (14) 51,0–65,5
Tibia	Dd	42,5	41,5 (13) 37,5–46,0	45,8 (5) 40,5–52,4	–	54,25 (18) 44,0–63,5
Phalanx 2	GL	44,0	37,5 (37) 26,0–43,5	–	37,0 (5) 35,0–38,5	48,0 (52) 42,0–53,0

Sl. 8.8: Največja širina sklepne jamice (BG *sensu* von den Driesch 1976) bovidne lopatice s Tonovcovega gradu (vzorec št. 1662, kv. 668, mkv. C2). Podani so tudi primerjalni podatki za domače govedo, pragovedo in zobra. Seznam in velikost (N) vzorcev: **1** – *Bos primigenius* s. *Bison bonasus*, Tonovcov grad (4.–7. stoletje; N = 1); **2** – *Bos taurus*, Tonovcov grad (4.–8. stoletje; N = 12); **3** – *Bos primigenius*, Seeberg (Švica, neolitik; N = 15; Boessneck *et al.* 1963, 176 s); **4** – *Bison bonasus*, Seeberg (Švica, neolitik; N = 6; Boessneck *et al.* 1963, 176 s). Vse mere so v mm.
Fig. 8.8: Breadth of the glenoid cavity (BG *sensu* von den Driesch 1976) of the bovine scapula from Tonovcov grad (sample No. 1662, sq. 668, msq. C2). Provided is also comparative data for domestic cattle, aurochs and European bison. The list and sizes (N) of samples: **1** – *Bos primigenius* s. *Bison bonasus*, Tonovcov grad (4^{th} –7^{th} century; N = 1); **2** – *Bos taurus*, Tonovcov grad (4^{th} –8^{th} century; N = 12); **3** – *Bos primigenius*, Seeberg (Switzerland, Neolithic; N = 15; Boessneck *et al.* 1963, 176 f); **4** – *Bison bonasus*, Seeberg (Switzerland, Neolithic; N = 6; Boessneck *et al.* 1963, 176 f). All measurements are given in mm.



K domačemu govedu sva na podlagi metričnih podatkov pripisala tudi fragment komolčnice iz vzorca št. 519, katerega globina na mestu komolčnega odrastka[18] meri 67,0 mm (primerjaj tudi s *tab. 8.3*), ter drobec distalne golenice iz vzorca št. 1825. Slednji sicer as great with the remaining nine large bovine bones studied from Tonovcov grad. This is the case not only because some of them differ from the morphology of the European bison (*cf.* Sala 1986; Martin 1987), but also because all of them are closer in their dimensions to cattle than to either of the wild species. The latter is not so obvious in the case of the scapula fragment shown in *figure 8.8*, for the measurements of cattle and those of aurochs are rather similar in this case. Ascribing the specimens referred to as *B. taurus* in *table 8.3* seems less problematic. These bones were found in the same square (even micro-square) and thus most likely belong to the

[18] DPA *sensu* von den Driesch 1976.

nekoliko izstopa zaradi razmeroma globoke distalne epifize[19] (tj. 46,5 mm; primerjaj tudi s *tab. 8.3*), ki dosega spodnji rob razpona vrednosti za pragovedo. Ker pa meri najmanjša širina diafize omenjene golenice zgolj 38 mm (primerjaj tudi s *sl. 8.7*), sva jo vendarle pogojno determinirala za domače govedo.

8.3 PORAZDELITEV NAJDB V ČASU

Na Tonovcovem gradu sta bili ugotovljeni dve fazi poznoantične poselitve in ena zgodnjesrednjeveška (za časovno opredelitev posamezne faze glej op. 1). Največ najdb (tj. 39,3 %) izvira iz druge poznoantične faze, medtem ko jih gre z zgodnjesrednjeveško poselitvijo – ta je bila sicer bistveno manjša od obeh poznoantičnih (glej Tonovcov grad. Naselbinski ostanki in interpretacija, pogl. 2.2.) – povezati komaj 7,7 odstotka. Primerjava deležev zastopanosti posameznih taksonov je pokazala na veliko podobnost med gradivoma iz druge poznoantične ter iz zgodnjesrednjeveške faze, medtem ko vzorec iz prve poznoantične faze odstopa po očitno večjem deležu zastopanosti domačega goveda (*tab. 8.4*). Relativna frekvenca pojavljanja lovnih vrst je v vseh treh primerih zanemarljiva (vrti se okrog odstotka NISP), nobenih omembe vrednih medfaznih razlik pa ni opaziti niti v pogledu vrstne pestrosti (*sl. 8.13*).

Del kosti in zob s Tonovcovega gradu ni bilo mogoče z zanesljivostjo pripisati nobeni od treh faz, čeprav gre zagotovo za gradivo iz obdobja med koncem 4. in 8. (morda 9.) stoletjem. Je pa bilo na podlagi arheoloških podatkov dobro polovico od navedenih ostankov mogoče umestiti v drugo poznoantično fazo vsaj z zelo veliko verjetnostjo (*tab. 8.5*), saj je bila mednje v okviru posamezne stratigrafske enote domnevno pomešana le peščica zgodnjesrednjeveških kosti in zob. Takšno tezo na neki način potrjuje tudi izrazita pozitivna korelacija v deležu zastopanosti posameznih taksonov med navedenim vzorcem in gradivom, katerega umestitev v drugo poznoantično fazo ni vprašljiva (Pearsonov koeficient korelacije: 0,996; p = 0,000). Posledično sva tako v okviru nadaljnjih analiz gradivu iz druge poznoantične faze prištela tudi vse tiste kosti in zobe iz premešanih plasti, katerih datiranje v omenjeno fazo sicer ni povsem zanesljivo, je pa zelo verjetno (glej *tab. 8.5*). Takšno postopanje nama je omogočilo operirati z večjimi vzorci, kar je prispevalo k boljši reprezentativnosti rezultatov. Pri tem naj domnevna prisotnost posameznih najdb iz zgodnjesrednjeveške faze ne bi bila moteča, saj je njihovo število v združenem vzorcu zanemarljivo.

V okviru tukaj predstavljene študije sesalske makrofavne s Tonovcovega gradu je abundanca posameznih taksonov in/ali (skupin) skeletnih elementov praviloma izražena s podatkom o najmanjšem številu določenih primerkov (NISP). Pri medfazni primerjavi deležev zasto-

[19] Dd *sensu* von den Driesch 1976.

same cattle, relatively large for the time. The size of this animal must have exceeded the specimens of Neolithic age from the Swiss site of Seeberg, even though the cattle of the time lagged in size only behind the large Roman period forms and was thus larger than the Late Antique and Early Medieval ones (Guintard 1999, 14 f).

On the basis of its size (i.e. the depth across the *processus anconaeus*[19] equals 67.0 mm; *Tab. 8.3*) the ulna fragment from sample No. 519 is referrable to cattle as was the fragment of the distal tibia from sample No. 1825. The latter stands out slightly due to the relatively deep distal epiphysis[20] (46.5 mm; *Tab. 8.3*) that is as deep as has been observed in small aurochs. Nevertheless, as the smallest breadth of the distal end measures a mere 38.0 mm (*Fig. 8.7*) we have opted for its conditional identification as cattle.

8.3 DIACHRONIC DISTRIBUTION OF FINDS

Two Late Antiquity and an Early Medieval settlement phases (for the dating of each phase see Note 1) were established at Tonovcov grad. Most finds originate from Late Antiquity phase 2 (i.e. 39.3 %), while a mere 7.7 % date to the Early Medieval phase, when the settlement was, however, much less intensive (see Tonovcov grad. Settlement remains and interpretation, chapter 2.2). The comparison between the contributions of individual taxa showed great similarity between Late Antiquity phase 2 and the Early Medieval phase, while the assemblage from the Late Antiquity phase 1 differs by its obviously greater share of cattle (*Tab. 8.4*). As they represent roughly 1 per cent of NISP the hunted species are negligible in all three samples, and no significant differences between the individual phases were observed as far as species richness is concerned (*Fig. 8.13*).

Some bones and teeth from Tonovcov grad could not be reliably attributed to any of the three settlement phases, although they certainly originate from the period encompassed between the end of the 4th and the 8th (maybe even 9th) century. Nevertheless, on the basis of the archaeological data the majority of these remains could be placed into Late Antiquity phase 2 with a high degree of probability (*Tab. 8.5*), for within each stratigraphic unit only a handful of early medieval finds were mixed amongst Late Antique material. This is further confirmed by the strong positive correlation in the shares of individual taxa observed in the aforementioned assemblage and the material that reliably belongs to Late Antiquity phase 2 (Pearson correlation coefficient: r = 0.996, p = 0.000). Consequently, all bones and teeth from the mixed layers that cannot be reliably dated to the aforementioned phase, but are highly likely to belong

[19] DPA *sensu* von den Driesch (1976).

[20] Dd *sensu* von den Driesch (1976).

Tab. 8.4: Število določenih primerkov (NISP) za posamezne taksone velikih sesalcev s Tonovcovega gradu po fazah. Skupina 'Ostalo' vključuje: *Bos taurus* s. *Equus caballus*, *Bos taurus* s. *Cervus elaphus* ter Caprinae s. *Capreolus capreolus*. Pri cervidih je v oklepaju podano število ostankov rogovja. Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.
Tab. 8.4: Number of identifiable specimens (NISP) for individual large mammalian taxa from Tonovcov grad per individual phase. The group "Other" includes: *Bos taurus* s. *Equus caballus*, *Bos taurus* s. *Cervus elaphus* and Caprinae s. *Capreolus capreolus*. For cervids the number of antler remains is provided in brackets. Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Takson **Taxon**	**PA 1 / LA 1**		**PA 2 / LA 2**		**ZSV / EMA**		**Mešano / Mixed**	
	NISP	**%**	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**
Caprinae	638	40,4	1124	52,4	230	58,7	756	50,4
Bos taurus	646	39,9	468	21,9	82	20,7	424	28,3
Sus sp.	251	15,9	496	23,0	70	17,9	278	18,5
Equus caballus	25	1,6	15	0,7	5	1,3	22	1,5
Cervus elaphus	4	0,3	18 (15)	0,8	1 (1)	0,3	6 (3)	0,4
Capra ibex	4	0,3	7	0,3	–	0,0	3	0,2
Capreolus capreolus	–	0,0	5	0,2	1	0,3	3 (1)	0,2
Bos cf. *primigenius*	5	0,3	2	< 0,1	–	0,0	2	0,1
Canis familiaris	–	0,0	3	0,1	1	0,3	1	0,1
Ursus arctos	1	0,1	1	< 0,1	2	0,5	–	0,0
Ostalo / Rest	2	0,2	14	0,6	–	0,0	5	0,3
Σ det. fragm.	1576	100,0	2153	100,0	392	100,0	1500	100,0
Σ indet. fragm.	3189 (= 67,0 %N)		5139 (= 70,5 %N)		1039 (= 72,5 %N)		3536 (= 70,2 %N)	
SKUPAJ / TOTAL	4765		7292		1431		5036	

panosti posameznih taksonov pa sva za domače govedo, drobnico in prašiča, ki skupaj predstavljajo več kot 95 odstotkov vseh določenih najdb, izračunala še najmanjše število osebkov (MNI; *tab. 8.6*). Dobljeni rezultati v celoti potrjujejo razmerja iz *tabele 8.4*, kjer je številčnost najdb izražena kot NISP. Oba kazalnika abundance tako izkazujeta pomembno zmanjšanje vloge goveda s pričetkom druge faze poznoantične poselitve Tonovcovega gradu, vzporedno s tem pa je pomen pridobila drobnica. Delež zastopanosti prašiča se skozi opazovano obdobje ni bistveno spreminjal; vrsta je bila za prebivalce Tonovcovega gradu sicer nedvomno pomembna, a njena vloga nikoli ni presegala vloge goveda in/ali drobnice. Podobno stalnost izkazuje tudi relativna frekvenca pojavljanja ostankov lovnih vrst. Ta v nobeni od faz ne presega poldrugega odstotka NISP, kar je nedvoumen dokaz za kvantitativno skromen ekonomski pomen lova.

O vlogi posameznih vrst domačih živali v ekonomiji proučevanih skupnosti priča tudi frekvenca zastopanosti posameznih skeletnih elementov (*tab. 8.18*). V primeru gradiva s Tonovcovega gradu večjih medfaznih razlik v tem pogledu ni zaznati pri nobenem od osrednjih taksonov (*tab. 8.7*). To se kaže tudi v razmeroma konstantnih deležih zastopanosti skeletnih elementov iz treh kvalitetnih kategorij[20] trupa goveda, drobnice in prašiča v času. Kot so pokazali rezultati testa χ^2, namreč

[20] Vzorec porazdelitve skeletnih elementov v omenjene kvalitetne kategorije (tj. kategorije A, B in C) je podan v pogl. 8.1.

into it (see *Tab. 8.5*) were added to the assemblage from the Late Antiquity phase 2 in the rest of the analyses. In this we were allowed to operate with larger and thus more representative assemblages. The hypothesized presence of individual Early Medieval finds was not considered to be obtrusive, since their number is thought to be insignificant in the total assemblage.

Within the framework of this study of the mammalian macro-fauna at Tonovcov grad the abundance of individual taxa and/or (groups) of skeletal elements is expressed by the number of identifiable specimens (NISP). When comparing the contributions of individual taxa between the phases we also calculated the minimum number of individuals (MNI; *Tab. 8.6*) for domestic cattle, sheep, goats and pigs, which together represent over 95 percent of all finds. The results fully confirm those shown in *table 8.4,* where NISP has been used. Both abundance indicators (i.e. NISP and MNI) thus show a significant reduction in the role of cattle starting from the beginning of the Late Antiquity phase 2; at the same time caprines began gaining on importance. The share of pigs has not changed significantly throughout the observation period; they were certainly important for the inhabitants of Tonovcov grad, but their role never exceeded that of cattle and sheep. A similar continuity is shown in the relative frequency of game remains, which does not exceed 1.5 per cent of taxonomically identifiable specimens in any of the phases. Such a result

Tab. 8.5: Število določenih primerkov (NISP) za posamezne taksone velikih sesalcev v gradivu s Tonovcovega gradu, ki večinoma izvirajo iz druge poznoantične faze. Skupina 'Ostalo' vključuje: *Bos taurus* s. *Equus caballus* (N = 1) ter *Bos taurus* s. *Cervus elaphus* (N = 1). Pri cervidih je v oklepaju podano število ostankov rogovja.
Tab. 8.5: Number of identified specimens (NISP) for individual large mammalian taxa from Tonovcov grad, mostly originating from Late Antiquity phase 2. The group "Other" includes: *Bos taurus* s. *Equus caballus* (N = 1) and *Bos taurus* s. *Cervus elaphus* (N = 1). For cervids the number of antler remains is provided in brackets.

Takson / Taxon	NISP	% NISP
Caprinae	424	50,2
Bos taurus	214	25,4
Sus sp.	177	21,0
Equus caballus	20	2,4
Cervus elaphus	3 (1)	0,4
Capra ibex	1	0,1
Capreolus capreolus	1 (1)	0,1
Bos cf. *primigenius*	1	0,1
Canis familiaris	1	0,1
Ostalo / Rest	2	0,2
SKUPAJ / TOTAL	844	100,0

medfazna odstopanja pri nobenem od treh taksonov ne presegajo meje statistične značilnosti (α = 0,05).

Medfazna primerjava velikosti živali nekaterih bolje zastopanih sesalskih vrst je predstavljena v nadaljevanju (glej pogl. 8.5), starostna struktura za domače govedo, drobnico in prašiča pa na *sliki 8.9* ter v *tabelah 8.8–11*. Navedeni podatki kažejo, da so nihanja v zastopanosti posameznih starostnih razredov v proučevanem obdobju pod mejo statistične značilnosti (test χ^2: p > 0,05). To pa samo po sebi še ne izključuje obstoja časovnih trendov, kar zadeva starost živine ob zakolu. Podrobnejša analiza podatkov o deležu kosti s še nezraščenima epi- in diafizo (*tab. 8.8–8.10*) namreč nakazuje dvig povprečne starosti ob zakolu/poginu v drugi poznoantični fazi nasproti stanju v prvi poznoantični fazi v primeru vseh treh taksonov.[21] Količnik med številom še ne v celoti osificiranih kosti in pa številom tistih z že zraščenima epi- in diafizo je v primeru prve poznoantične faze namreč statistično značilno večji od njegove vrednosti pri gradivu iz druge poznoantične faze tako v primeru drobnice (p = 0,005) kot tudi prašiča (p = 0,000).[22] Pri govedu podobno očitnih trendov sicer ni opaziti, se pa določene medfazne razlike kažejo tudi pri tej vrsti. Tako

[21] Podatki za zgodnjesrednjeveško fazo v tej primerjavi niso bili upoštevani, saj je razpoložljivo število najdb preskromno.

[22] Izračun p-vrednosti temelji na t-vrednosti za posamezno primerjavo dveh proporcev (StatSoft, Inc. 2001).

Tab. 8.6: Najmanjše število osebkov (MNI) za tri najbolje zastopane taksone velikih sesalcev s Tonovcovega gradu. Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.
Tab. 8.6: Minimum number of individuals (MNI) for the three best represented large mammalian taxa at Tonovcov grad. Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Takson / Taxon	PA 1 / LA 1	PA 2 / LA 2	ZSV / EMA
B. taurus	18	12	4
Caprinae	22	43	7
Sus sp.	8	14	3

Tab. 8.7: Obseg korelacije med deleži zastopanosti posameznih skeletnih elementov domačega goveda, drobnice in prašiča med tremi tukaj obravnavanimi poselitvenimi fazami Tonovcovega gradu. V tabeli so Spearmanovi r korelacijski koeficienti zapisani pokončno, Pearsonovi korelacijski koeficienti pa ležeče. Vsi korelacijski koeficienti so statistično značilni (α = 0,05). Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.
Tab. 8.7: Correlation between the shares of individual skeletal elements of cattle, sheep/goats and pigs originating from individual settlement phase at Tonovcov grad. The table shows the Spearman's r correlation coefficients written in normal font while the Pearson's correlation coefficients are written in italics. All correlation coefficients are statistically significant (α = 0.05). Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

PA 1 / LA 1			
	Bos	**Capr.**	***Sus***
Bos		0,92	0,77
Caprinae	*0,95*		0,79
Sus	*0,86*	*0,89*	
PA 2 / LA 2			
	Bos	**Capr.**	***Sus***
Bos		0,95	0,85
Caprinae	*0,99*		0,81
Sus	*0,91*	*0,93*	
ZSV / EMA			
	Bos	**Capr.**	***Sus***
Bos		0,86	0,79
Caprinae	*0,88*		0,79
Sus	*0,79*	*0,86*	

unambiguously indicates the (quantitatively) modest economic importance of hunting.

The economic role of animals of the studied community is also indicated by the frequency by which individual skeletal elements appear in the studied assemblage (*Tab. 8.18*). In the case of the material from Tonovcov grad no major inter-phase differences were noticed in any of the key taxa (*Tab. 8.7*). This is

Tab. 8.8: Število kosti domačega goveda s Tonovcovega gradu z nezraščenima epi- in diafizo po starostnih skupinah. Posamezno skupino sestavljajo skeletni elementi, ki popolnoma osificirajo pri isti ontogenetski starosti (tj. v prvem, drugem, tretjem ali po tretjem letu življenja). Razlika med obema poznoantičnima fazama v zastopanosti že popolnoma osificiranih kosti in pa tistih s še nezraščenima epi- in diafizo ni statistično značilna (χ^2 test: χ^2 = 0,54; p = 0,462). Podatke o časovnem poteku zraščanja epi- in diafiz podaja Silver (1972). Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.

Tab. 8.8: Number of unfused cattle bones at Tonovcov grad by age groups. An individual age group is composed from skeletal elements that completely ossify at the same ontogenetic age (i.e. in the first, second, third or after the third year of life). The differences between Late Antiquity phases 1 and 2 in the representation of fused *versus* unfused bones is not statistically significant (χ^2 test: χ^2 = 0.54; p = 0.462). Details on fusing phases of epi- and diaphysis are provided by Silver (1972). Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Faza Phase	Starost Age	Epifiza / Epiphysis	
		Zraščena Fused	Nezraščena Unfused
PA 1 LA 1	0–1	-	-
	1–2	22	2
	2–3	26	3
	3–	46	13
	Σ	94	18
PA 2 LA 2	0–1	-	-
	1–2	33	2
	2–3	8	5
	3–	35	12
	Σ	76	19
ZSV EMA	0–1	-	-
	1–2	1	1
	2–3	5	1
	3–	2	2
	Σ	8	4

je delež kosti s še nezraščenima epi- in diafizo v vzorcu ostankov, ki popolnoma osificirajo po koncu drugega leta starosti, v prvi poznoantični fazi statistično značilno manjši od tistega iz druge poznoantične faze (p = 0,027). Velja poudariti, da je navedeni trend ravno nasproten od ugotovljenega pri drobnici in prašiču.

Spričo številnih pasti, vezanih na oceno starostne strukture populacij na podlagi podatkov o frekvenci pojavljanja kosti s še nezraščenima epi- in diafizo (*cf*. Moran, O'Connor 1994), sva starost živali ob poginu/zakolu ocenila še na osnovi obrabe žvekalne površine kočnikov.

Tab. 8.9: Število kosti drobnice s Tonovcovega gradu z nezraščenima epi- in diafizo po starostnih skupinah. Posamezno skupino sestavljajo skeletni elementi, ki popolnoma osificirajo pri isti ontogenetski starosti (tj. v prvem, drugem, tretjem ali po tretjem letu življenja). Razlika med obema poznoantičnima fazama v zastopanosti že popolnoma osificiranih kosti in pa tistih s še nezraščenima epi- in diafizo ni statistično značilna (χ^2 test: χ^2 = 2,95; p = 0,085). Podatke o časovnem poteku zraščanja epi- in diafiz podaja Silver (1972). Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.

Tab. 8.9: The number of unfused sheep/goat bones from Tonovcov grad by age groups. An individual age group is composed from skeletal elements that completely ossify at the same ontogenetic age (i.e. in the first, second, third or after the third year of life). The differences between Late Antiquity phases 1 and 2 in the representation of fused *versus* unfused bones is not statistically significant (χ^2 test: χ^2 = 2.95; p = 0.085). Details on fusing phases of epi- and diaphysis are provided by Silver (1972). Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Faza Phase	Starost Age	Epifiza / Epiphysis	
		Zraščena Fused	Nezraščena Unfused
PA 1 LA 1	0–1	17	3
	1–2	4	1
	2–3	4	4
	3–	3	5
	Σ	28	13
PA 2 LA 2	0–1	59	4
	1–2	18	1
	2–3	22	8
	3–	27	17
	Σ	126	30
ZSV EMA	0–1	14	2
	1–2	6	2
	2–3	2	4
	3–	4	8
	Σ	26	16

also reflected in the relatively constant shares of individual skeletal elements within the three qualitative categories[21] through time. The results of the χ^2 test showed that the variations do not exceed the level of statistical significance (α = 0.05) in any of the three best represented taxa.

The inter-phase comparison between the sizes of some of the better represented mammalian species is presented below (see chapter 8.5), while the mortality

[21] The division of skeletal elements into qualitative categories (i.e. categories A, B and C) is given in chapter 8.1.

Tab. 8.10: Število kosti prašiča s Tonovcovega gradu z nezraščenima epi- in diafizo po starostnih skupinah. Posamezno skupino sestavljajo skeletni elementi, ki popolnoma osificirajo pri isti ontogenetski starosti (tj. v prvem, drugem, tretjem ali po tretjem letu življenja). Razlika med obema poznoantičnima fazama v zastopanosti že popolnoma osificiranih kosti in pa tistih s še nezraščenima epi- in diafizo ni statistično značilna (χ^2 test: χ^2 = 2,11; p = 0,147). Podatke o časovnem poteku zraščanja epi- in diafiz podaja Silver (1972). Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.
Tab. 8.10: The number of unfused pig bones from Tonovcov grad by age groups. An individual group is composed from skeletal elements that completely ossify at the same ontogenetic age (i.e. in the first, second, third or after the third year of life). The differences between Late Antiquity phases 1 and 2 in the representation of fused *versus* unfused bones is not statistically significant (χ^2 test: χ^2 = 2.11; p = 0.147). Details on fusing phases of epi- and diaphysis are provided by Silver (1972). Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Faza Phase	Starost Age	Epifiza / Epiphysis	
		Zraščena Fused	Nezraščena Unfused
PA 1 LA 1	0–1	-	-
	1–2	9	5
	2–3	8	6
	3–	3	5
	Σ	20	21
PA 2 LA 2	0–1	-	-
	1–2	22	8
	2–3	17	7
	3–	2	9
	Σ	41	24
ZSV EMA	0–1	-	-
	1–2	3	-
	2–3	6	4
	3–	-	3
	Σ	9	7

Žal je bilo v primeru goveda razpoložljivih podatkov za reprezentativno oceno starostne strukture premalo; uporabila sva namreč metodologijo Grantove (1982), ki ne omogoča analize posameznih izoliranih zob. Od le šestih zadovoljivo ohranjenih spodnjih čeljustnic jih pet izvira iz prve poznoantične faze, ena pa iz druge. Slednja je domnevno pripadala okrog tri leta stari živali (M.W.S. = 37),[23] medtem ko so v prvi poznoantični fazi s štirimi najdbami prevladovali primerki nad 3,5 leta

[23] M.W.S. – stopnja obrabe spodnje čeljustnice (*Mandibular Wear Stage*; Grant 1982)

profiles of cattle, caprines and pig are illustrated in *figure 8.9* and in *tables 8.8-8.11*. The data suggest that the variations in the representation of various age classes are below the level of statistical significance (χ^2 test: p > 0.05). This in itself does not exclude the existence of diachronic trends as regards the age of the domesticates at culling. Namely, a detailed analysis of the data on relative abundance of unfused bones (*Tabs. 8.9-8.10*) suggests that the average age at death might has been on the rise during the Late Antiquity phase 2 (compared to Late Antiquity phase 1) for both caprines and pig,[22] with the inter-phase differences being statistically highly significant (p = 0.005 and p = 0.000, respectively).[23] Contrary to this, in the case of cattle the contribution of unfused bones among the completely ossified remains after the completion of the second year of age is statistically significantly lower in the Late Antiquity phase 1 than in Late Antiquity phase 2 (p = 0.027).

Given the number of uncertainties related to the assessment of the population mortality profile based on the unfused bones (*cf.* Moran, O'Connor 1994), molar eruption and attrition sequences were also considered. In the case of cattle Grant's (1982) methodology was used, which unfortunately, does not allow for the analysis of individual isolated teeth. Consequently, no sufficient data were available from which a representative mortality profile could be constructed. Of the six sufficiently preserved mandibles five originate from the Late Antiquity phase 1 and one from the Late Antiquity phase 2. The latter possibly belonged to an approximately three years old animal (MWS = 37)[24], while Late Antiquity phase 1 finds consisted of four specimens belonging to over 3.5 years old cattle (MWS = 41-45) and a mandibula of a 10 to 12 weeks old calf (MWS = 10-11). These data thus fit well with the one from *table 8.8*, as in both cases Late Antiquity phase 1 shows the preferential culling of adult animals (i.e. over three years old). A similar comparison on the level of the remaining two settlement phases is rendered impossible by small assemblage sizes.

In the case of caprines and pigs we had more data available on the age at death, for the methodology used also allowed for the analysis of isolated teeth (*cf.* Payne 1973; Rolett, Chiu 1994). Nevertheless, in the inter-phase comparisons we have limited ourselves to the comparison between the two best represented i.e. Late Antiquity phases 1 and 2. Similarly to what has been observed while analyzing the relative abundance of unfused bones, the study of tooth wear showed an absence

[22] The data for the Early Medieval phase were not taken into account in this comparison due to the insufficient number of finds.

[23] The calculation of the p-value is based on the t-value for the individual comparison between the two ratios (StatSoft, Inc. 2001).

[24] MWS – *Mandibular Wear Stage* (Grant 1982)

Tab. 8.11: Starost domačih prašičev s Tonovcovega gradu, kot izhaja iz obrabe žvekalne površine kočnikov (*cf.* Rolett, Chiu 1994). Razlika v zastopanosti posameznih starostnih razredov med obema poznoantičnima fazama ni statistično značilna (χ^2 test: $\chi^2 = 2{,}56$; $p > 0{,}200$). Legenda: SA – subadulten (tj. 5/8 do 10/14 mesecev); YA – mlad adulten (tj. 10/14 do 18/26 mesecev); MA – adulten (tj. nad 18/26 mesecev); PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.

Tab. 8.11: The age at death for pigs from Tonovcov grad, as shown by molar wear (*cf.* Rolett, Chiu 1994). The difference in the representation of individual age groups between Late Antiquity phases 1 and 2 is not statistically significant (χ^2 test: $\chi^2 = 2.56$; $p > 0.200$). Abbreviations: SA – subadult (i.e. 5/8 to 10/14 months); YA – young adult (i.e. 10/14 to 18/26 months); MA – mature adult (i.e. above 18/26 months). Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Faza / Phase	Starost / Age	SA	YA	MA
PA 1 LA 1	M_1	3	3	2
	M_2	-	3	1
	M_3	-	2	2
	Σ	3	8	5
PA 2 LA 2	M_1	8	7	4
	M_2	6	1	3
	M_3	-	3	3
	Σ	14	11	10
ZSV EMA	M_1	2	-	-
	M_2	-	-	1
	M_3	-	-	-
	Σ	2	-	1

starih goved (M.W.S. = 41–45). V tem smislu je bila edina izjema čeljustnica 10 do 12 tednov starega teleta (M.W.S = 10–11). Navedeni podatki se tako ujemajo s tistimi iz *tabele 8.8*. Kar zadeva prvo fazo poznoantične poselitve Tonovcovega gradu, namreč oboji izkazujejo večinski zakol odraslih (tj. nad tri leta starih) živali; primerjava na nivoju preostalih dveh faz je zavoljo le enega razpoložljivega podatka nemogoča.

V primeru drobnice in prašiča je razpoložljivih podatkov o starosti živali ob poginu/zakolu več, saj je uporabljena metodologija omogočala tudi analizo izoliranih zob (*cf.* Payne 1973; Rolett, Chiu 1994). Kljub temu sva se pri medfaznih primerjavah omejila le na vzporedbo dveh bogateje zastopanih faz, tj. prve in druge poznoantične faze. Podobno kot že analiza zastopanosti še ne popolnoma osificiranih kosti je tudi študija obrabe žvekalne površine zob pokazala na odsotnost statistično značilnih razlik v starostni strukturi med obema fazama tako v primeru drobnice (*sl. 8.9*) kot tudi prašiča (*tab. 8.11*). Celo več. Na podlagi podatkov o obrabi zob ni mogoče govoriti niti o obstoju kakršnega koli trenda, ki bi kazal na dvig povprečne starosti ob zakolu. Količnik med številom meljakov juvenilnih, subadultnih in mladih adultnih živali na eni strani ter številom meljakov (starih) adultnih primerkov na drugi se v gradivu iz prve poznoantične faze namreč statistično ne razlikuje od vrednosti za drugo poznoantično fazo pri nobenem od treh meljakov pri nobenem od obeh taksonov. Iz tega je mogoče sklepati, da zgoraj navedeni povečan delež še ne popolnoma osificiranih kosti drobnice in prašiča v drugi poznoantični fazi (*tab. 8.9–8.10*) pravzaprav ne odraža dejanske spremembe v gospodarjenju z živino na začetku 6. stoletja, ampak da gre predvsem za posledice delovanja različnih pred- in poodložitvenih dejavnikov.

8.3.1 TAFONOMIJA

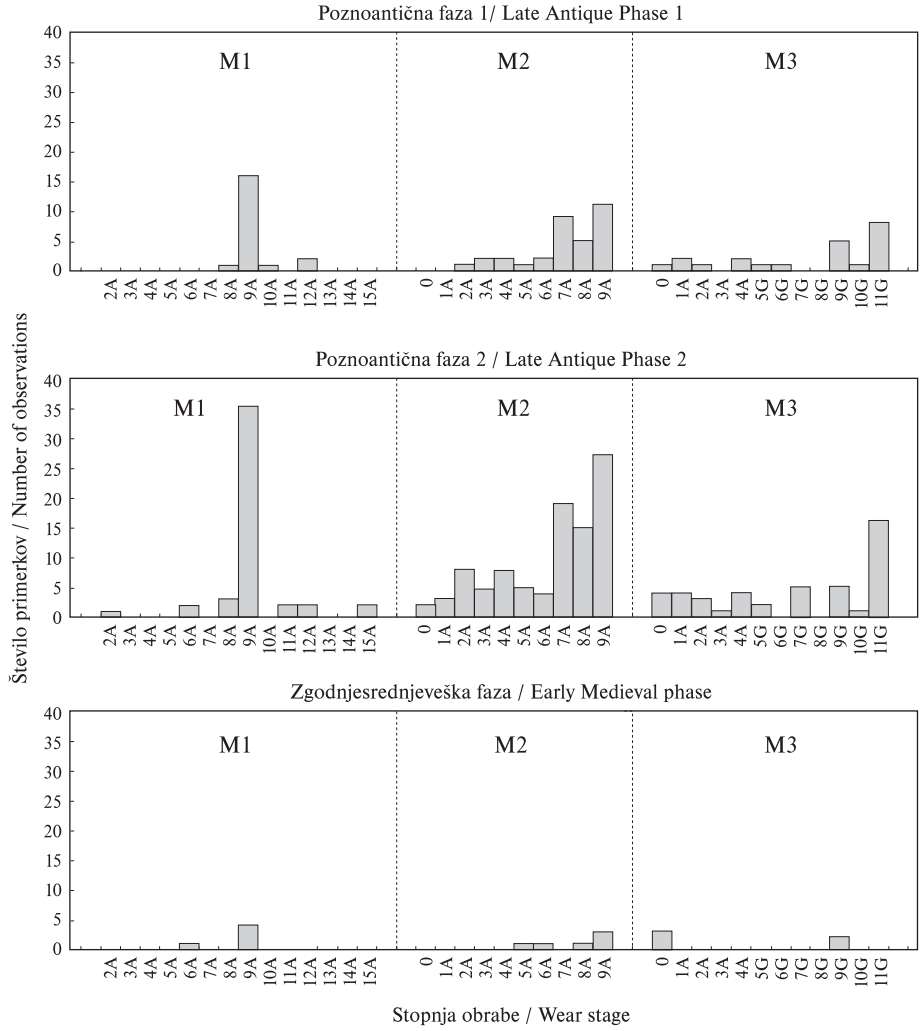
Arheozoološka informacija, zajeta v favnističnem vzorcu, je praviloma do neke mere zamegljena zavoljo

of statistically significant differences in the mortality profiles between the two Late Antiquity phases both in the case of caprines (*Fig. 8.9*) and for pig (*Tab. 8.11*). Based on the latter data it is not even possible to confirm the trend of a slight rise in the average age at culling. After all, in the material from the Late Antiquity phase 1 the quotient between the number of juvenile, subadult and young adult molars on the one hand and the number of (old) adult molars on the other is not statistically different from the values relevant to the Late Antiquity phase 2 at any of the three molars for neither of the two taxa. It follows that the increase in the share of unfused caprine and pig bones dated to the Late Antiquity phase 2 (*Tabs. 8.9-8.10*) most probably does not truly reflect the actual changes in livestock management in the early 6th century, but might rather be the result of various pre- and post-depositional factors.

8.3.1 TAPHONOMY

The arheozoological information obtained from the faunal assemblage is to a certain extent blurred by the various biotic and abiotic post-depositional factors, whose role is hard to define *a posteriori*. This should definitely be taken into account in the evaluation of the mortality profiles. It is a known fact that dogs can destroy most of the smaller bones, i.e. bones with a lower structural density[25] (e.g. Payne, Munson 1985; Marean, Spencer 1991, 656; Lyman 1999, 325 ff; Cleghorn, Marean 2004), and therefore significantly distort the original relationship

[25] The same holds true for pigs (Greenfield 1988). Moreover, the remains of lower structural density also show a more intensive/faster disintegration within the sediment (Outram 2004, 172 f).



Sl. 8.9: Stopnja obrabe kočnikov pri drobnici s Tonovcovega gradu (*cf.* Payne 1973). Simbole za označbo posameznih stopenj obrabe podaja Payne (1987, 610). Razlika med obema poznoantičnima fazama v zastopanosti drugih spodnjih meljakov z različno stopnjo obrabe žvekalne površine ni statistično značilna (χ^2 test: $\chi^2 = 4{,}239$; $p < 0{,}999$); M_2 je bil izbran zato, ker je v obravnavanem vzorcu zastopan z največjim številom primerkov.

Fig. 8.9: Level of molar wear at sheep and goats from Tonovcov grad (*cf.* Payne 1973). The symbols for marking individual levels of wear is provided by Payne (1987, 610). The difference between Late Antiquity phases 1 and 2 in the wear of second lower molars (M_2) is not statistically significant (χ^2 test: $\chi^2 = 4.239$; $p < 0.999$); M_2 was chosen because it is the best represented tooth in the analysed material.

delovanja različnih biotskih in abiotskih poodložitvenih dejavnikov, katerih vlogo je *a posteriori* zelo težko opredeliti. Tega se je treba zavedati tudi pri ocenjevanju starostne strukture živali ob zakolu. Znano je namreč, da psi lahko zgrizejo večino manjših kosti oz. kosti z manjšo strukturno gostoto[24] (npr. Payne, Munson 1985; Marean, Spencer 1991, 656; Lyman 1999, 325 ss; Cleghorn, Marean 2004) ter s tem pomembno popačijo izvirno razmerje med posameznimi starostnimi razredi. Vzorci z nesorazmerno velikim številom distalnih delov nadlahtnic nasproti proksimalnim tako zelo verjetno izkazujejo tudi

[24] Podobno velja za prašiče (Greenfield 1988), ostanki z manjšo strukturno gostoto pa izkazujejo tudi intenzivnejše/hitrejše razpadanje v sedimentu (Outram 2004, 172 s).

between the age classes. Samples with a disproportionately large number of humeral distal ends relative to proximal ones (the latter being characterized by a significantly lower structural density) are thus highly likely to show also an underestimation of the mandibles of young animals (when compared to the number attributed to mature specimens). As the experiment carried out by Payne and Munson (1985, 34 ff) showed, dogs are able to entirely destroy the lower jawbones of lambs (including numerous deciduous teeth), while (at least) parts of mandibles of adult sheep and goats with permanent molars are preserved.

The ratio between the number of caprine humerus distal and proximal ends amongst the material from

podcenjen delež spodnjih čeljustnic mladih živali glede na število tistih, ki jih gre pripisati že odraslim. Kot sta s poskusom pokazala Payne in Munson (1985, 34 ss), psi lahko v celoti uničijo spodnje čeljustnice jagenjčkov in kozličev (z mnogimi mlečnimi zobmi vred), medtem ko se posamezni deli mandibul odraslih ovac in koz z že stalnimi kočniki praviloma ohranijo.

Razmerje med številom distalnih in proksimalnih delov nadlahtnic drobnice v gradivu iz obeh poznoantičnih faz s Tonovcovega gradu znaša 4 : 1 v korist prvih, kar nakazuje zmerno destruktivno aktivnost psov (*cf.* Munson 2000, 400 s). Skromen (tj. < 1 %) delež ostankov z odtisi zob v tem smislu ni problematičen, saj zanemarljivo število obgrizenih kosti samo po sebi še ne gre vnaprej razumeti kot kazalnik manjše destruktivne aktivnosti psov ali celo njen izostanek (Kent 1981, 370; Payne, Munson 1985, 34). Podobno razmerje med številom distalnih in proksimalnih delov nadlahtnic drobnice je bilo ugotovljeno tudi v modernem sezonskem taboru plemena Navajo,[25] ki je bil predmet aktualistične študije posledic pasjega mrhovinarstva na ovčjih kosteh. Na podlagi rezultatov navedene raziskave in še nekaterih podobnih je Munson (2000, 400) izpeljal oceno obsega uničenja kosti in zob drobnice posameznih starostnih razredov s strani psov. Ta mu je služila kot izhodišče za izpeljavo novih, korigiranih frekvenc zastopanosti posameznih zob, ki naj bi omogočile izračun verodostojnejših ocen starostne strukture živali ob zakolu. Korigirane frekvence zastopanosti za posamezne zobe drobnice s Tonovcovega gradu podajava v *tabeli 8.12*.

Late Antiquity phases 1 and 2 at Tonovcov grad is 4:1 in favour of the former, which suggests that there was a moderate destructive activity by dogs (*cf.* Munson 2000, 400 f). This is not necessarily in contradiction with the observed modest (i.e. < 1 %) proportion of gnawed remains, for the negligible number of such bones in itself is not seen as an indicator of less destructive dog activities, or even its absence (Kent 1981, 370; Payne, Munson 1985, 34). A similar ratio of caprine humerus distal and proximal ends as in the case of Tonovcov grad was found also in a modern seasonal camp of the Navajo tribe,[26] which was the subject of a current study of the effects of dogs ravaging sheep bones. On the basis of these results and that of several similar studies, Munson (2000, 400) estimated the extent of sheep/goat teeth destruction caused by dogs by multiplying the observed numbers of teeth in individual age classes by the inverses of the survival rates from the aforementioned Navajo dog-ravaged assemblage. This allowed him to construct a corrected for ravaging mortality profile which was much more realistic. Analogously corrected mortality profile for caprines from Tonovcov grad is given in *table 8.12.*

It is known that the sheep/goat fourth lower deciduous premolars fall out roughly at the same time as the third lower molars start erupting (*cf.* Moran, O'Connor 1994, 277 f). The mortality profile that would be based on the wear of the dP_4 and M_3 specimens included in the studied assemblage would encompass all age classes and thus fulfil one of the key conditions for its credibility. Let us take a look at the corrected relative

Tab. 8.12: Podatki o dejanskih in korigiranih frekvencah pojavljanja mlečnih četrtih spodnjih predmeljakov in tretjih spodnjih meljakov drobnice po starostnih razredih za gradivo iz obeh poznoantičnih faz s Tonovcovega gradu. Postopek izračunavanja korigiranih frekvenc podaja Munson (2000, 400). Zvezda (⋆) označuje približne vrednosti.
Tab. 8.12: The data on the actual and corrected frequencies of deciduous fourth lower premolars and third lower molars of sheep and goats by age groups for the material from Late Antiquity phases 1 and 2 at Tonovcov grad. The process for calculating the corrected frequencies is provided by Munson (2000, 400). The asterisk (⋆) denotes approximate values.

Starost (v letih) Age (in years)	**Poznoantična faza 1 / Late Antiquity phase 1**				**Poznoantična faza 2 / Late Antiquity phase 2**			
	Dejanski podatki Actual data		**Korigirani podatki Corrected data**		**Dejanski podatki Actual data**		**Korigirani podatki Corrected data**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
0–1	4	7*	29,6	51,6	18	27*	133,3	74,3
1–2	3	93*	5,1	8,9	1	73*	1,7	1,0
2–3	5		5,5	9,5	12		13,1	7,3
3–4	9		9,1	15,9	15		15,3	8,5
4–	8		8,0	14,1	16		16	8,3
Σ	29	100,0	57,3	100,0	62	100,0	179,4	100,0

Znano je, da se pri drobnici obdobje izpada mlečnih četrtih spodnjih predmeljakov v grobem ujema z obdobjem izraščanja tretjih spodnjih meljakov (*cf.* Moran,

abundances of caprine deciduous P_4 and the M_3 teeth for each individual age class in the material from the two Late Antiquity phases at Tonovcov grad (*Table 8.12*). The

[25] Ugotovljeno razmerje med številom distalnih in proksimalnih koncev nadlahtnic je tu znašalo 4,7 : 1 (Munson 2000, 400 s).

[26] In this case the ratio established between the number of distal and proximal humerous parts was 4.7 : 1 (Munson 2000, 400 f).

O'Connor 1994, 277 s). Starostna struktura, ki bi temeljila na stopnji obrabe žvekalne površine razpoložljivih primerkov omenjenih dveh zob v proučevanem vzorcu, bi tako zajela vse starostne razrede ter s tem izpolnila enega ključnih pogojev za njeno verodostojnost. Poglejmo si korigirane frekvence pojavljanja mlečnih P_4 in M_3 ovac in koz posameznega starostnega razreda v gradivu iz prve in druge faze poznoantične poselitve Tonovcovega gradu (*tab. 8.12*). Razlika v deležu zastopanosti posameznega starostnega razreda med obema fazama je nad mejo statistične značilnosti (test χ^2: $\chi^2 = 16{,}11$; $p < 0{,}010$), kar sicer za analogno primerjavo, temelječo na dejanskih frekvencah pojavljanja obravnavanih zob, ne velja (test χ^2: $\chi^2 = 6{,}18$; $p > 0{,}200$). Ob upoštevanju korigiranih frekvenc pojavljanja najdb je razlika med fazama večja, tudi kar zadeva vrednost količnika med številom vseh zob do enega leta starih živali in številom tistih pripadajočih nad leto dni starim ovcam in kozam; medfazna razlika sicer v obeh primerih presega mejo statistične značilnosti.[26]

Predstavljeni rezultati postavljajo pod vprašaj ugotovitve, ki jih je bilo mogoče izpeljati iz podatkov o številčnosti še neosificiranih kosti drobnice nasproti tistim z že zraščenima epi- in diafizo. Ker je slednjih v gradivu iz prve poznoantične faze relativno manj kot med ostanki iz druge poznoantične faze (*tab. 8.9*), bi lahko to namreč nakazovalo časovni trend višanja povprečne starosti drobnice ob zakolu. Na drugi strani se zdi v luči podatkov iz *tabele 8.12* takšno domnevo smiselno ovreči, pri čemer pa ostajajo razlogi za obstoj razlike med obema starostnima krivuljama nepojasnjeni. Delno gre razliko med njima seveda pripisati dejstvu, da korigirani podatki iz *tabele 8.12* vsaj delno upoštevajo manko zob mladih živali, medtem ko v primeru podatkov iz *tabele 8.9* ni tako. Zanimivo pa bi bilo tudi raziskati, v kolikšni meri ugotovljena slika odraža delovanje človeka (*cf.* Maltby 1982; O'Connor 1991).

V ta namen sva za vsako od obeh faz število še ne popolnoma osificiranih distalnih koncev nadlahtnice in golenice ter proksimalnih koncev koželjnice primerjala s številom četrtih mlečnih spodnjih predmeljakov in tretjih spodnjih meljakov (*tab. 8.13*). Na istem mestu podajava tudi podatke o številu že v celoti osificiranih proksimalnih koncev nadlahtnice in golenice ter distalnih koncev stegnenice nasproti številu M_3 s stopnjo obrabe najmanj 5G (*sensu* Payne 1987, 610), prav tako ločeno za vsako od obeh poznoantičnih faz. Osifikacija distalnega konca nadlahtnice in golenice oz. proksimalnega konca koželjnice naj bi se pri ovci končala do konca drugega leta življenja (Silver 1972, Tab. A),[27] kar v

[26] Dejanske frekvence pojavljanja zob: $p = 0{,}021$; korigirane frekvence pojavljanja zob: $p = 0{,}000$. Izračun p-vrednosti temelji na t-vrednosti za posamezno primerjavo dveh proporcev (StatSoft, Inc. 2001).

[27] Gre le za približno oceno, ki ne upošteva znotrajvrstne variabilnosti na račun pasme, spola, življenjskih pogojev, na-

inter-phase difference in the representation of various age classes is above the level of statistical significance (χ^2 test: $\chi^2 = 16.11$, $p < 0.010$) and thus differs from the results of the analogous comparison based on the actual (i.e. observed) frequencies in which the studied teeth occurred (χ^2 test : $\chi^2 = 6.18$, $p > 0.200$). Taking into account the corrected abundances of deciduous P_4 and the M_3 the inter-phase difference is greater also with regard to the value of the quotient between the number of all teeth of up to one year old animals and the number of those belonging to sheep and goats over one year old.[27]

These results question the conclusions that could be derived from the data on the number of unfused caprine bones compared to their fused counterparts. Namely, Late Antiquity phase 1 material includes fewer of the latter (in comparison with material from Late Antiquity phase 2, *Tab. 8.9),* thus indicating a trend of increasing the average age of sheep/goat at culling which might be the reasons behind the observed difference between the two (i.e. bone- vs. teeth-based) mortality profiles. There are no doubts that to a certain degree it should be due to the fact that the corrected data in *table 8.12* at least partially take into account the lack of teeth of young animals, which is not the case for data in *table 8.9*. Other factors resulting in taphonomic loss should also be taken into account. But what about human influence? Is the observed discrepancy between the two profiles attributable also to the activities of the local population (*cf.* Maltby 1982; O'Connor 1991)?

To this effect we have compared the numbers of unfused humerus and tibia distal ends with the abundance of radius proximal ends on one side with the number of deciduous fourth lower premolars and third lower molars on the other betwen the two Late Antiquity phases (*Tab. 8.13*). Added to this is the information on the number of fused humerus and tibia proximal parts as well as femur distal ends versus the number of M_3 worn to at least stage 5G *(sensu* Payne 1987, 610) – separately for Late Antiquity phases 1 and 2. Within sheep the ossification of the humerus and tibia distal ends and of the radius proximal end should be completed by the conclusion of the second year of life (Silver 1972, Tab. A),[28] which roughly coincides with the loss of deciduous P_4 or the beginning of wear of M_3 (Payne 1973; Moran, O'Connor 2004, 277 ff). On the other hand, the proximal epiphysis of humerus and tibia or the distal epiphysis

[27] The actual abundance of tooth eruption: $p = 0.021$; corrected abundance of tooth eruption: $p = 0.000$. The calculation of the p-value is based on the t-value for each individual comparison between the two proportions (StatSoft, Inc. 2001).

[28] This is an approximate estimate which does not take into account the variability within species that occurs due to breed, sex, living conditions, way of breeding, etc. (Moran, O'Connor 2004, 272 ff). Similar also holds true for the comparison between the age at death on the basis of molar eruption and attrition sequences (Moran, O'Connor 2004, 268 ff).

grobem sovpada z izpadanjem mlečnih P_4 oz. začetkom obrabe stalnih M_3 (Payne 1973; Moran, O'Connor 2004, 277ss). Po drugi strani se zraščanje proksimalne epifize z diafizo pri nadlahtnici in golenici oz. distalne epifize z diafizo pri stegnenici konča po dopolnitvi tretjega leta starosti (Silver 1972, Tab. A), ko stopnja obrabe žvekalne površine tretjih spodnjih meljakov praviloma ustreza stopnji 5G (Payne 1973; Moran, O'Connor 2004, 277ss). Količnik med številom še ne osificiranih kostnih fragmentov ter skupnim številom vseh mlečnih P_4 in še neobrabljenih M_3 gre tako razumeti kot kazalnik abundance kranialnih in postkranialnih ostankov mladih živali v obravnavanem vzorcu. V nasprotju s tem količnik med številom že popolnoma osificiranih kosti in tretjimi spodnjimi meljaki s stopnjo obrabe najmanj 5G kaže na številčnost obeh skupin ostankov pri odraslih, nad tri leta starih ovcah in kozah.

Kot je razvidno iz *tabele 8.13*, je med ostanki mladih živali razmerje med številom kosti in zob v prvi poznoantični fazi zgolj 1 : 2 v korist slednjih, medtem ko znaša za gradivo iz druge poznoantične faze kar 1 : 6,75. Obratno sliko kaže primerjava obeh faz v vrednosti količnika med številom kosti in zob odraslih ovac in koz, saj je tu razmerje v prvi poznoantični fazi kar 1 : 5,7 v korist zob, medtem ko znaša v primeru druge poznoantične faze komaj 1 : 1,6. Iz navedenega izhaja, da gradivo iz druge faze poznoantične poselitve Tonovcovega gradu izkazuje manko[28] ostankov postkranialnega skeleta juvenilnih ovac in koz nasproti zobem primerljivo starih živali, ki ga ni mogoče razložiti zgolj z različno intenzivnim poodložitvenim razpadanjem ene in druge skupine ostankov. Čeprav je bilo gradivo iz prve poznoantične faze deponirano v enakem sedimentu kot tisto iz druge (in to celo za nekaj deset let daljše obdobje), je namreč manko juvenilnih kosti okončin drobnice nasproti zobem v omenjenem vzorcu vendarle manj izrazit.[29] Podatke iz *tabele 8.13* je tako mogoče razumeti kot indic za to, da so bile med drugo fazo poznoantične poselitve glave mladih ovac in koz deponirane (procesirane?) na drugih lokacijah, kot to velja za njihove trupe (*cf.* Maltby 1982, 86).[30] Na nekatera očitna nesorazmerja v deležu zastopanosti različnih delov trupa je ne nazadnje pokazalo tudi vzporejanje

čina reje ipd. (Moran, O'Connor 2004, 272 ss). Podobno velja tudi za vzporejanje starosti s stopnjo obrabe žvekalne površine kočnikov (Moran, O'Connor 2004, 268 ss).

[28] V gradivu iz druge poznoantične faze je delež kosti med vsemi (tj. kosti in zobje) ostanki mladih živali statistično značilno manjši od deleža kosti med vsemi ostanki odraslih, več kot tri leta starih ovac in koz (test χ^2: $\chi^2 = 5{,}93$; $p = 0{,}015$).

[29] V gradivu iz prve poznoantične faze se delež kosti med vsemi (tj. kosti in zobje) ostanki mladih živali statistično značilno ne razlikuje od deleža kosti med vsemi ostanki odraslih, več kot tri leta starih ovac in koz (test χ^2: $\chi^2 = 1{,}48$; $p = 0{,}232$).

[30] Žal specifično težo rezultatom in njihovim interpretacijam zmanjšuje pičlo število razpoložljivih najdb, kar velja predvsem za prvo poznoantično fazo.

Tab. 8.13: Frekvenca zastopanosti ostankov drobnice iz skupin A, B, C in D v obeh poznoantičnih fazah (= PA 1 in 2) s Tonovcovega gradu. Skupina A vključuje še ne v celoti osificirane primerke distalnih koncev nadlahtnice in golenice ter proksimalnih koncev koželjnice, skupina B vključuje mlečne četrte spodnje predmeljake in tretje spodnje meljake brez obrabe žvekalne površine, skupina C vključuje že v celoti osificirane primerke proksimalnih koncev nadlahtnice in golenice ter distalnih delov stegnenice, skupina D pa tretje spodnje meljake s stopnjo obrabe najmanj 5G (*sensu* Payne 1987, 610).
Tab. 8.13: The frequency of sheep/goat remains from groups A, B, C and D in the material from the Late Antiquity phases (= LA) 1 and 2 at Tonovcov grad. Group A includes not yet fused distal humeri and tibiae as well as fused proximal radii, group B includes deciduous fourth lower premolars and unworn third lower molars, group C includes fused proximal humeri and tibiae as well as distal femora, while group D includes third lower molars worn at least to the stage 5G (*sensu* Payne 1987, 610).

Skupina **Group**	**PA 1** **LA 1**	**PA 2** **LA 2**
A	4	4
B	8	27
C	3	19
D	17	31

of femur fuse by the end of the third year of life (Silver 1972, Tab. A), i.e. when the third lower molar is usually worn to stage 5G (Payne 1973; Moran, O'Connor 2004, 277 ff). The quotient between the number of unfused bone fragments of the aforementioned skeletal elements and the total number of deciduous P_4 and unworn M_3 teeth indicates the abundance of cranial *vs*. postcranial skeletal element remains from juveniles. In contrast, the quotient between the number of fused bones and the third lower molars worn to at least stage 5G reflects the abundance of both groups of remains belonging to adult (roughly three years old or more) sheep and goats.

Among the remains of juvenile animals from Late Antiquity phase 1 the ratio between the number of aforemntioned bones and teeth is a mere 1:2 in favour of the latter, while in Late Antiquity phase 2 this ratio rises to 1:6.75 (*Tab. 8.13*). A different picture emerged from the analysis of the remains of adults. Here the ratio between the number of bones from the postcranial skeleton and teeth dated to the Late Antiquity phase 1 shows a value as high as 1:5.7 in favour of teeth, whereas in Late Antiquity phase 2 the same quotient amounts to a mere 1:1.6. It follows that the material from the Late Antiquity phase 2 shows a lack[29] of juvenile sheep and

[29] In the material from Late Antiquity phase 2 the share of bones amongst all (i.e. bones and teeth) young animal remains is statistically significantly lower than the share of bones amongst all adult remains (three years or more). The data is for sheep and goat remains (χ^2 test: $\chi^2 = 5.93$; $p = 0.015$).

števila najdb posameznih elementov apendikularnega skeleta (*sl. 8.27–8.28*).

Podatek o "primanjkljaju" ostankov postkranialnih skeletnih elementov mladih ovac in koz v gradivu iz druge poznoantične faze pa ima implikacije, tudi kar zadeva zgoraj omenjeno razliko med obema razpoložljivima starostnima strukturama za omenjeni vrsti: tisto, ki temelji na deležu še ne popolnoma osificiranih kosti (*tab. 8.9*), in ono, ki izhaja iz stopnje obrabe žvekalne površine kočnikov (*tab. 8.13*). Ker je bil v drugi poznoantični fazi namreč pomemben del kosti postkranialnega skeleta domnevno deponiran zunaj meja izkopnega polja, je ugotovljeni delež še ne popolnoma osificiranih kosti med ostanki drobnice iz te faze (močno?) podcenjen. Posledično lahko označimo za neutemeljena tudi vsa iz *tabele 8.9* izhajajoča razmišljanja o povišanju povprečne starosti ovac in koz ob zakolu/poginu s pričetkom druge faze poznoantične poselitve Tonovcovega gradu. Obenem pa bistveno večjo težo pridobijo rezultati analize stopnje obrabe žvekalne površine kočnikov (*tab. 8.13*), ki kažejo na večinski zakol/pogin do enega leta starih ovac in koz tako v prvi kot tudi v drugi poznoantični poselitveni fazi, pri čemer je ta delež v okviru slednje celo statistično značilno večji.

8.4 PORAZDELITEV NAJDB V PROSTORU

Daleč največ favnističnih najdb s Tonovcovega gradu[31] je bilo pobranih na območju okrog stavbe 1 (tj. 17.282 oz. 95,9 % vseh izkopanih ostankov), medtem ko jih je raziskovanje vodnega zbiralnika navrglo le 21.[32] Podatki o številu najdb posameznih taksonov po območjih so podani v *prilogi 8.2*. Zaradi pičlega števila ostankov znotraj večine vzorcev podrobnejša analiza porazdelitve najdb v prostoru ni mogoča, preliminarna primerjava deležev zastopanosti posameznih taksonov med vzorci pa, vsaj kar zadeva gradivo iz prve poznoantične in pa zgodnjesrednjeveške faze, ne kaže opaznejših razlik. Nekoliko večjo heterogenost izkazuje porazdelitev najdb goveda, drobnice in prašiča v prostoru med drugo fazo poznoantične porazdelitve, ko so tudi razpoložljivi favnistični vzorci največji (*sl. 8.10*). Izstopa predvsem vzorec s prostora med cerkvami, ki je edini izmed petih z večinskim deležem najdb goveda (*pril. 8.2: tab. D*). V tem smislu tako omenjeni vzorec izkazuje podobnost predvsem z gradivom iz prve poznoantične faze, kjer je bilo govedo prav tako najbolje

[31] Med večletnimi izkopavanji so bili raziskani ostanki cerkvenega kompleksa ter še treh stavb in vodnega zbiralnika (Modrijan 2007).

[32] Ob 16 nedoločljivih fragmentih je vzorec vključeval tudi odlomek goveje rožnice, kozje lopatice ter zgornje čeljustnice, zoba (M_2) in distalnega konca koželjnice drobnice. Vsi ostanki so datirani v drugo poznoantično fazo.

goat finds of postcranial skeletal elements compared to the teeth of animals of the same age group, which cannot be explained solely by the differential taphonomic loss. Although the material from Late Antiquity phase 1 was deposited within the same sediment as that from the Late Antiquity phase 2 (even for a period lasting a few decades longer), the lack of juvenile sheep/goat bones from the postcranial skeleton compared to teeth remains of animals of the same age is much less pronounced in this assemblage.[30] The data from *table 8.13* can thus be understood as an indication that during the Late Antiquity phase 2 the heads of young sheep and goats were deposited (processed?) at other locations than their carcasses (*cf.* Maltby 1982, 86).[31] After all, certain obvious imbalances in the relative abundances were also indicated by the comparison between the number of finds of individual elements of the *appendicular* skeleton (*Figs. 8.27-8.28*).

The data on the "deficit" of young sheep and goat bones in the material from Late Antiquity phase 2 also has implications with regard to the difference between the two mortality profiles: the one based on the share of unfused bones (*Tab. 8.9*) and the one derived from the attrition sequences (*Tab. 8.13*). Since an important part of bones from the postcranial skeleton dated to Late Antiquity phase 2 are supposed to have been deposited outside the excavated area, the observed low contribution of unfused bones amongst the sheep/goat remains might be (heavily?) underestimated. If this is indeed so, then we may consider all thoughts unfounded as regards the increase in the average age of sheep and goats at culling with the beginning of the Late Antiquity phase 2. At the same time the analysis of tooth wear (*Tab. 8.13*) shows that in both Late Antiquity phases (i.e. 1 and 2) the majority of animals were culled/died before the age of one. The contribution of such young animals to the Late Antiquity phase 2 is statistically even more significant.

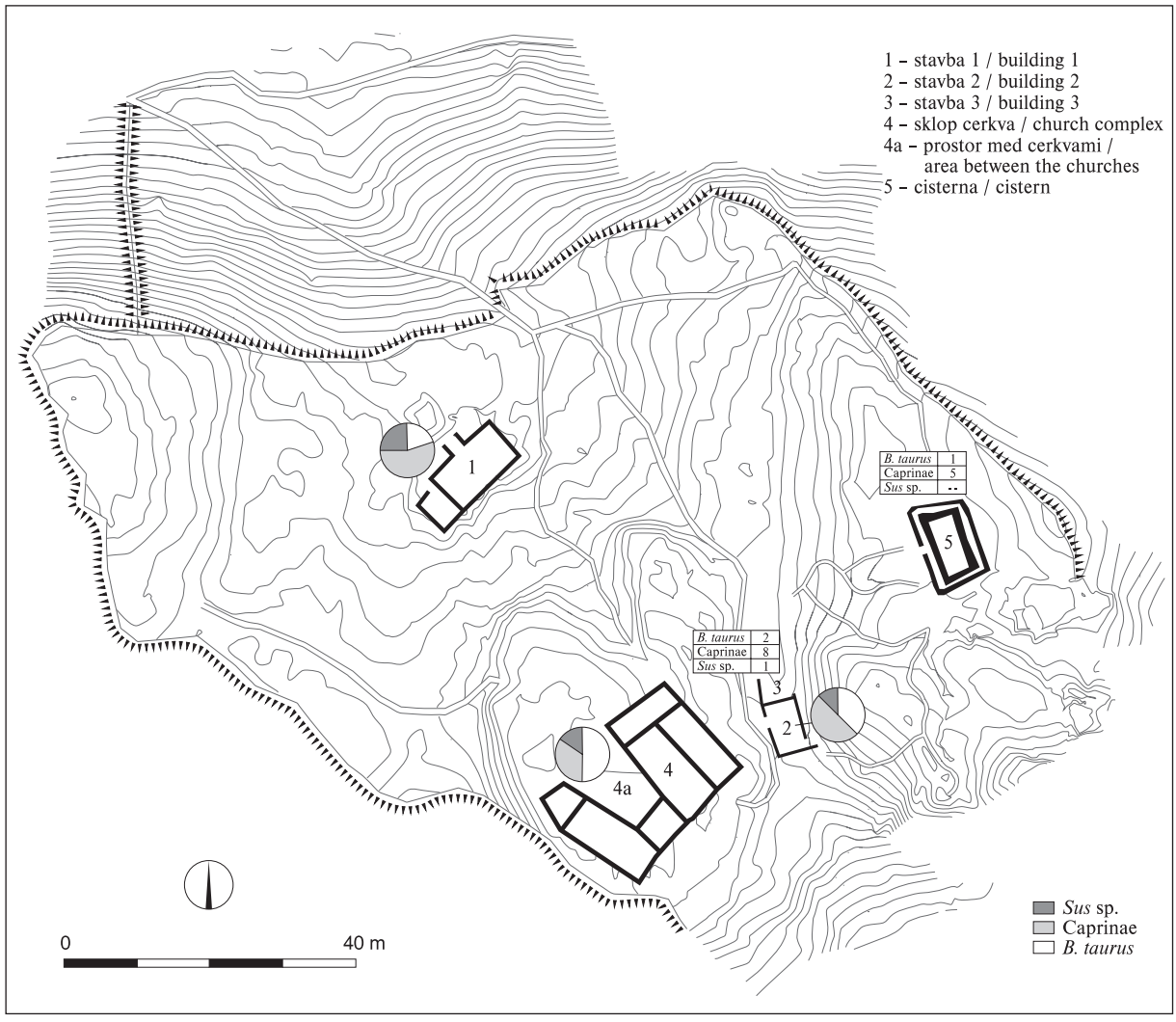
8.4 THE SPATIAL DISTRIBUTION OF FINDS

At Tonovcov grad[32] by far the most archaeozoological finds originate from the area surrounding building 1 (i.e. 17,282 or 95.9 % of all excavated remains), while only 21 were discovered in the excavation of the water

[30] The material from Late Antiquity phase 1 does not show any statistically significant difference in the share of bones among all (i.e. bone and teeth) young animal finds when compared to the share of bones within all adult (three years or more) sheep and goat remains (χ^2 test: $\chi^2 = 1.48$; $p = 0.232$).

[31] Unfortunately, the weight of these results and their interpretations are reduced by the small numbers of finds. This holds true especially for the Late Antiquity phase 1.

[32] The several-year excavations at the site concerned a ecclesiastical complex, three additional buildings and a water cistern (Modrijan 2007).



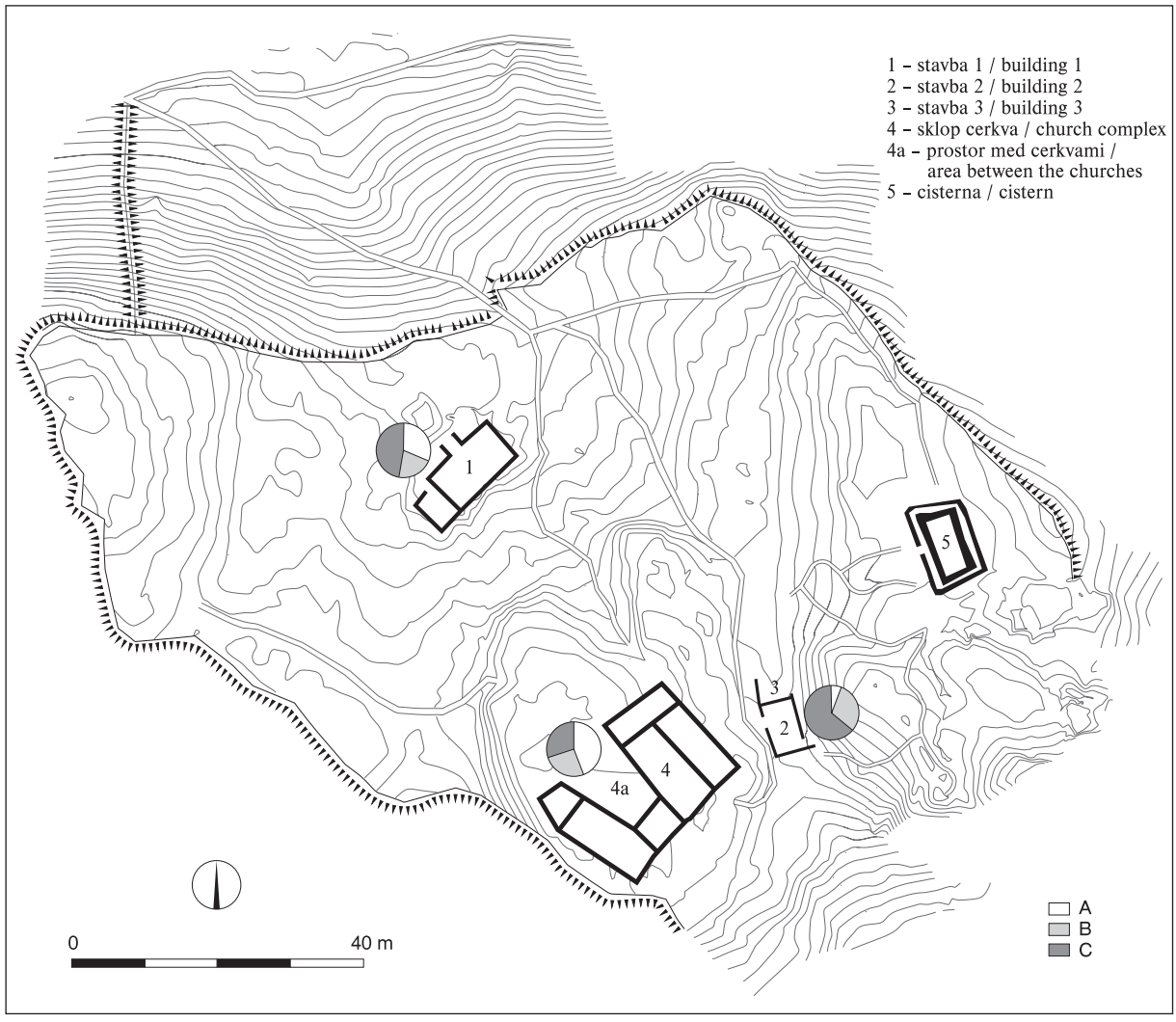
Sl. 8.10: Delež zastopanosti domačega goveda, drobnice in prašiča iz druge poznoantične poselitvene faze Tonovcovega gradu na prostoru med srednjo in južno cerkvijo, stavb 1–3 ter vodnega zbiralnika. Podatki o velikosti vzorcev so podani v *prilogi 8.2*.
Fig. 8.10: The share of cattle, sheep, goats and pigs from the Late Antiquity phase 2 at Tonovcov grad for the area between the central and the south churches, buildings 1–3 and the cisterne. The data on the size of the samples is given in *Appendix 8.2.*

zastopan takson (območje stavbe 3; *pril. 8.2: tab.C*) oz. si je vodilno mesto delilo z drobnico (območje stavbe 1; *pril. 8.2: tab. A*).

V okviru interpretacije zgornjih rezultatov velja seveda opozoriti na skromnost vzorca s prostora med cerkvami (NISP = 121), čeprav so razlike med deležem zastopanosti goveda in drobnice med omenjenim vzorcem in ostalimi vzorci iz druge poznoantične faze sicer v vseh primerih nad mejo statistične značilnosti (test χ^2: $p < 0{,}05$). Arheološki podatki žal ne omogočajo nedvoumnega vpogleda v odnos med najdbami s prostora med cerkvami in samim cerkvenim kompleksom, saj je bila stratigrafska situacija na tem delu najdišča zelo kompleksna (glej Tonovcov grad. Naselbinski ostanki in interpretacija, pogl. 2.5.5). Je pa ugotovljen visok delež ostankov goveda vseeno omembe vreden. Lahko bi namreč kazal na specifičen status objekta, ki je v 6. stoletju cistern.[33] Data on the number of finds of individual taxa in specific areas are given in *Appendix 8.2.* Due to the modest number of remains it is impossible to come up with a detailed analysis of the pattern of horizontal distribution of finds for most of the assemblages,[34] however the preliminary comparison between the shares of individual taxa within the assemblages – at least as far as the material from Late Antiquity phase 1 and the Early Medieval phase are concerned – revealed no significant

[33] Alongside the 16 taxonomicaly non-identified fragments the sample included a fragment of cattle horn core, a goat's scapula as well as a maxilla, a tooth (M_2) and a distal part of a radius referable to caprines. All finds were dated into the Late Antiquity phase 2.

[34] Each assemblage includes animal remains found within the area of individual buildings (i.e. ecclesiastical complex, buildings 1-3, water cistern).



Sl. 8.11: Delež zastopanosti ostankov iz posamezne od treh kvalitetnih kategorij (tj. kategorija A, B in C) trupa domačega goveda za drugo poznoantično poselitveno fazo Tonovcovega gradu na prostoru med srednjo in južno cerkvijo ter stavb 1 in 2. Vzorec porazdelitve skeletnih elementov v omenjene kvalitetne kategorije je podan v pogl. 8.1.
Fig. 8.11: The share of the remains of each of the three qualitative categories (i.e. category A, B and C) of cattle carcass for the Late Antiquity phase 2 at Tonovcov grad for the area between the central and the south churches as well as buildings 1 and 2. The definition of individual qualitative categories is given in chapter 8.1.

stal na prostoru med cerkvama[33] (*cf*. Kobryń *et al*. 1984; Bartosiewicz 1998; Ervynck 2004; MacKinnon 2004, 225). V tem smislu je še bolj poveden podatek o zastopanosti kosti in zob iz posamezne kvalitetne kategorije trupa goveda v treh favnističnih vzorcih iz druge poznoantične faze (*sl. 8.11*). Med ostanki s prostora med cerkvami namreč prevladujejo prav kosti najbolj mesnatih delov goveda (tj. kvalitetne kategorije A), česar ne izkazujeta ne

[33] Na prostoru med osrednjo in južno cerkvijo je bil odkrit v skalo vklesan izdolben prostor, ki je bil kasneje delno zasut in prekrit z več plastmi malte. Namen prostora ni popolnoma jasen, verjetno pa je bil izklesan kot vodni zbiralnik hkrati z izgradnjo prvih dveh cerkva konec 5. stoletja. Domnevno sredi 6. stoletja (tj. v poznoantični fazi 2) je bil objekt preurejen, s čimer se je spremenila tudi njegova namembnost (Modrijan 2007, 175 ss).

differences. A somewhat higher degree of heterogeneity is indicated by the spatial distribution of much more numerous cattle, caprine and pig finds originating from the Late Antiquity phase 2 (*Fig. 8.10*). The assemblage from the area between the central and the south churches stands out, for it is the only one (out of the five) in which cattle prevails (*Appendix 8.2: Tab. D*). In this sense the aforementioned sample reflects a similarity to the material from the Late Antiquity phase 1, in which cattle was either the best represented taxon (area of building 3; *Appendix 8.2: Tab.C*) or it shared the lead with caprines (area of building 1; *Appendix 8.2: Tab. A*).

During the interpretation of these results the paucity of the assemblage from the area between the central and the south churches (NISP = 121) should be noted, even though the differences between the contribution of cattle

sočasna vzorca z območja stavbe 1 oz. 2[34], niti nobeden od vzorcev iz prve poznoantične oz. zgodnjesrednjeveške faze poselitve Tonovcovega gradu.

Sicer praviloma skromni podatki o deležu še ne popolnoma osificiranih kosti ter o stopnji obrabe žvekalne površine kočnikov najpomembnejših domačih živali za posamezne dele izkopnega polja ne izkazujejo omembe vredne heterogenosti v prostoru. To velja tudi za gradivo s prostora med cerkvami iz druge poznoantične faze, kjer skladno s splošno sliko najdišča prevladujejo ostanki več kot dve leti (marsikdaj tudi več kot tri leta) starih goved. Med desetimi izoliranimi kočniki drobnice sva tri pripisala enoletnim živalim, preostale pa praviloma nad dve leti starim ovcam oz. kozam. V kolikor gre omenjene najdbe dejansko povezovati s specifičnim statusom tega prostora (glej opombo št. 33), potem dajejo sicer pičli podatki o starosti živali ob zakolu/poginu zanimivo sliko o prehrani nekega segmenta prebivalcev, morda pa le obiskovalcev (romarjev?) Tonovcovega gradu. Ti naj bi tako uživali meso (predvsem govedino) istih živali kot (ostali) prebivalci naselbine in domnevno tudi nič pogosteje od stanovalcev stavb 1 in 2 posegali po mehkejšem ter zato verjetno tudi bolj cenjenem mesu telet, jagenj in/ali kozličev. Posebnost favnističnega gradiva s prostora med cerkvami je tako zgolj nadpovprečno dobra zastopanost skeletnih elementov iz najbolj kakovostnih anatomskih delov trupa goveda (tj. kategorije A; *sl. 8.11*), zaradi česar bi lahko sklepali na višji status nekaterih prebivalcev naselbine. Podobno razliko je na primeru rimskega vojaškega tabora pokazala primerjava jedilnikov poveljnika in njegovega moštva (Stokes 2000, 149), povedni pa so tudi podatki o jedilniku urbane elite na Apeninskem polotoku (MacKinnon 2004, 225).

8.4.1 STAVBA 1

Med terenskim raziskovanjem je bila velika večina favnističnih najdb pobrana na območju stavbe 1. Gre za bivanjsko stavbo, ki je bila zgrajena in uporabljana v drugi fazi poznoantične poselitve.[35] Poleg površine same stavbe je bilo med izkopavanji na tem delu najdišča raziskanih še približno 400 m^2 njene okolice, kar omogoča analizo porazdelitve najdb v mikroprostoru. Rezultati kažejo koncentracijo ostankov pred vhodom v objekt ter vzdolž zunanje strani zidov 1, 4 in 5,[36] medtem ko se drugje pojavljajo le izjemoma (*sl. 8.12*). Pri tem

[34] Podatki za stavbo 3 in vodni zbiralnik v tej primerjavi niso bili upoštevani, saj je razpoložljivo število najdb preskromno.

[35] Do ponovne naselitve dela stavbe, ki je bila takrat že nekoliko porušena, je prišlo tudi v zgodnjesrednjeveški fazi. Na širšem območju stavbe 1 so bili ohranjeni tudi ostanki starejše poselitve, datirane v prvo poznoantično fazo (glej Tonovcov grad. Naselbinski ostanki in interpretacija, pogl. 2.2, 2.3).

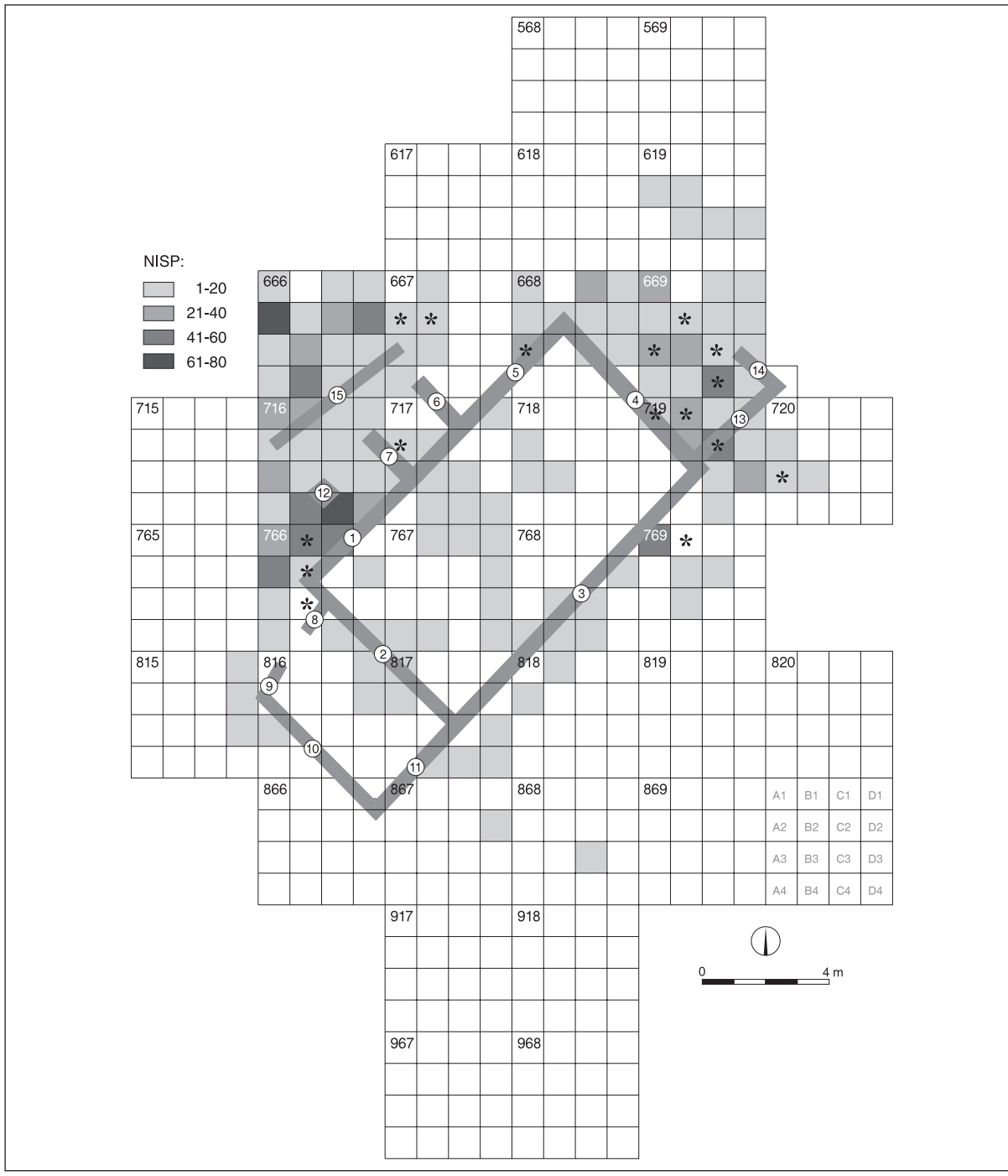
[36] Za identifikacijo posameznih zidov glej *sliko 8.12*.

as well as sheep/goat to the above assemblage and any of the remaining four assemblages from Late Antiquity phase 2 are all above the level of statistical significance (χ^2 test: $p < 0.05$). Unfortunately, the archaeological data do not offer an unequivocal picture of the relationship between the finds from the area between the churches and the ecclesiastical complex itself, as the stratigraphic situation in this part of the site was extremely complex (see Tonovcov grad. Settlement remains and interpretation, chapter 2.5.5). However, the high proportion of cattle remains is worth mentioning, as this could point towards the specific status of the area between the central and south churches in the 6th century[35] (*cf.* Kobryń *et al.* 1984; Bartosiewicz 1998; Ervynck 2004; MacKinnon 2004, 225). In this context the data are even more informative as regards the representation of individual qualitative categories of the cattle carcass within each of the three samples dated to the Late Antiquity phase 2 (*Fig. 8.11*). Animal remains from the area between the churches are dominated by the bones from the cattle carcass richest in meat (i.e. qualitative category A), which appear neither in the samples from the same phase excavated in the area of buildings 1 and 2,[36] nor in the samples from the Late Antiquity phase 1 or the Early Medieval phase.

The generally poor data on molar wear as well as those regarding the relative abundance of unfused bones per location within the excavated area do not show a notable heterogeneity in space. This also applies to the material from the Late Antiquity phase 2 originating from the area between the central and the south churches, which is – in accordance with the general picture – dominated by the remains of cattle over two years (often well over 3 years) old. Amongst the ten isolated caprine molars, three were attributed to one year old animals, while the rest generally belonged to sheep and goats aged two years or more. In the event that the actual finds are to be associated with the specific status of this area (see footnote No. 35), then the (unfortunately scarce) data as regards the age of the animals at death offers an interesting outline of the diet of a segment of the population of (or perhaps visitors /pilgrims to) Tonovcov grad. Despite supposedly consuming the meat (especially in the case of beef) of the virtually very same animals as the residents in buildings 1 and 2, without showing a more pronounced preference for the more tender and therefore presumably also higher value meat

[35] In the area between the central and south church a space carved into stone and later partially covered with gravel and multiple layers of mortar was discovered. The function of the structure is unclear, however the most likely explanation is that it was carved as a water cistern at the time the first two churches were built (5th century). It is assumed that the structure was rebuilt in the middle of the 6th century (i.e. Late Antiquity phase 2), and at the time it also changed its function (Modrijan 2007, 175 ff).

[36] Due to the lack of finds the data for structure 3 and the water cistern were not taken into account in this comparison.

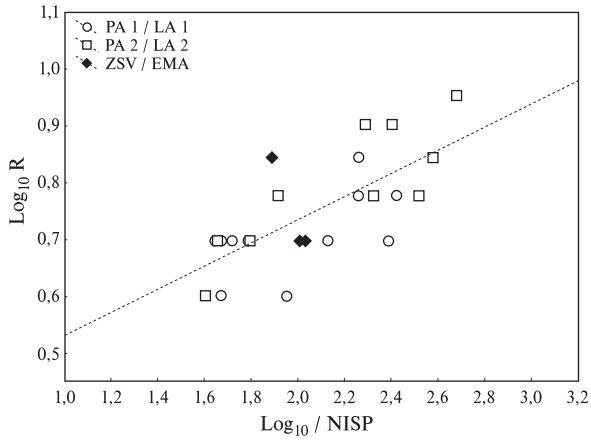


Sl. 8.12: Vzorec porazdelitve najdb domačega goveda, drobnice in prašiča iz druge poznoantične poselitvene faze Tonovcovega gradu na območju stavbe 1. Zvezda (*) označuje mikrokvadrante, v katerih so bili najdeni ostanki zarodkov. Obkrožene številke predstavljajo oštevilčenje posameznih zidov.
Fig. 8.12: The distribution of finds of cattle, sheep, goats and pigs from the Late Antiquity phase 2 at Tonovcov grad for the area of building 1. The asterisk (*) denotes the microquadrants in which embryonal remains were found. Encircled numbers represent numbering of the walls.

omembe vrednih razlik med posameznimi taksoni ni opaziti, prav tako tudi ne med obema poznoantičnima fazama.[37] Homogenost v prostoru (in času) izkazujejo

[37] Gradivo iz zgodnjesrednjeveške faze v tej primerjavi ni bilo upoštevano, saj se najdbe pojavljajo le znotraj takrat sicer

of calves, lamb or kids, the food waste from the area between the central and the south churches does stand out with its above average representation of skeletal elements from the highest quality body parts (i.e. qualitative category A; *Fig. 8.11*), which could reflect the higher status



Sl. 8.13: Odnos med velikostjo vzorcev in njihovo vrstno pestrostjo za posamezne kvadrante s širšega območja stavbe 1 na Tonovcovem gradu. Upoštevani so bili le vzorci iz "bogatih" kvarantov, ki so vključevali vsaj 40 določljivih kosti in zob datiranih v eno od treh tukaj obravnavanih poselitvenih faz. Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.

Fig. 8.13: The relation between the sample size and the species diversity for individual quadrants from the broader area of building 1 at Tonovcov grad. Only samples from "rich" quadrants that included at least 40 taxonomically determined bones and teeth dated into one of the three settlement phases were taken into account. Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

tudi podatki o številu vrst med ostanki iz posameznega kvadranta, obteženi z velikostjo vzorcev (*sl. 8.13*).

V opisanem vzorcu porazdelitve se bolj od človekovih aktivnosti odraža izrazito razgiban teren. Kjer (je) hodno površino predstavlja(la) kar sama geološka osnova (npr. kv. 617, 618, 765, 815, 819, 866, 868), kulturne plasti niso ohranjene, zato so tu tudi najdbe izjemno maloštevilne. Severno in zahodno od objekta ter v ozkem pasu vzdolž njegovega vzhodnega zidu pa se je v skalni osnovi oblikovala depresija, ki so jo zapolnili mestoma tudi do 2 metra debeli sedimenti; tu (npr. kv. 666, 669, 716 ter deloma kv. 719, 769, 818 in 817) je bila izkopana večina vseh najdb.

Na zelo neravno osnovo je bila postavljena tudi sama stavba 1, kar je še posebej izrazito pri zidu 3. Ta namreč leži v osrednjem delu na skalni osnovi, ki se v notranjosti dviguje nad spodnji nivo temeljnih kamnov kar za 1,2 m (glej Tonovcov grad. Naselbinski ostanki in interpretacija, pogl. 2.3). Skala zavzema velik del osrednjega prostora stavbe 1, kar je zagotovo pomembno prispevalo k razmeroma skromnemu številu tam najdenih favnističnih najdb (N = 42 oz 2,2 %). To dodatno podkrepljuje podatek o šestkrat večji številčnosti zgodnjesrednjeveških najdb na istem območju (N = 251), čeprav je vseh živalskih ostankov iz te faze štiriinpolkrat

že delno porušene stavbe 1 (glej Tonovcov grad. Naselbinski ostanki in interpretacija, pogl. 2.2, 2.3).

of that segment of the population within the settlement (*cf.* Stokes 2000, 149; MacKinnon 2004, 225).

8.4.1 BUILDING 1

During the field research, the vast majority of the faunal finds were collected in the area of building 1. This was a dwelling that was built and used during the Late Antiquity phase 2.[37] In addition to the area of the building approximately 400 m^2 of its surroundings were investigated during the excavations of this part of the site, which allows for an analysis of the distribution of finds within a microspace. The results show a high concentration of remains in front of the building entrance and along the outer side of the walls 1, 4 and 5,[38] while elsewhere they are rather rare (*Fig. 8.12*). No noteworthy differences between the various taxa were observed, nor were there any major differences between Late Antiquity phases 1 and 2.[39] The homogeneity in space (and time) is also shown by the data on species richness of the mammal remains originating from individual squares, weighed by the sample size (*Fig. 8.13*).

This pattern of distribution is by all means a reflection of human activities; nevertheless, the major factor defining it must have been the highly varied terrain. In places where the walking surface was represented by the geological basis itself (e.g. sq. 617, 618, 765, 815, 819, 866, 868) the cultural layers were not preserved, therefore, finds were rare. To the north and west of the building and within a narrow strip along its east wall a depression formed in the rock basis, which was filled by a sediment up to 2 meters thick at some points; most of the excavated finds were discovered within this sediment (e.g. sq. 666, 669, 716, and partly sq. 719, 769, 818 and 817).

Building 1 was positioned on an extremely uneven base, which is best seen in the wall 3. Its central part is located on live rock that rises as much as 1.2 m above the lower level of the interior cornerstones (see Tonovcov grad. Settlement remains and interpretation, chapter 2.3). The rock takes up a large part of the central area within building 1, which certainly contributed to the relatively small number of animal remains discovered there (N = 42 or 2.2 %). This is further emphasized by the data on the

[37] Part of the building that was already slightly ruined at the time was repopulated during the Early Medieval phase. Remains of the older settlement phase (i.e. Late Antiquity phase 1) were also discovered in the broader area of structure 1 (see Tonovcov grad. Settlement remains and interpretation, chapters 2.2, 2.3).

[38] For the identification of individual walls see *figure 8.13*.

[39] In this comparison the material from Early Medieval phase was not taken into account, for the finds only appear within the (at the time) already partially ruined structure 1 (see Tonovcov grad. Settlement remains and interpretation, chapters 2.2, 2.3).

Tab. 8.14: Številčnost ostankov iz posamezne od treh kvalitetnih kategorij (tj. kategorije A, B in C) trupa domačega goveda, drobnice in prašiča v okviru gradiva iz druge poznoantične poselitvene faze Tonovcovega gradu na območjih glavnega prostora stavbe 1 in njenega prizidka. Vzorec porazdelitve skeletnih elementov v omenjene kvalitetne kategorije je podan v pogl. 8.1.
Tab. 8.14: The numbers of finds of each of the three qualitative categories (i.e. categories A, B and C) of cattle, sheep/goat and pig carcasses, within the frame of the material from the Late Antiquity phase 2 of Tonovcov grad, originating from the areas of the main room of building 1 and its extension. The definition of individual qualitative categories is given in chapter 8.1.

Kategorija / Category	***B. taurus***	**Caprinae**	***Sus* sp.**	**Σ**
Glavni prostor / Main room:				
A	4	8	3	15
B	3	7	–	10
C	6	21	3	30
Σ	13	36	6	55
Prizidek / Extention:				
A	–	2	–	2
B	–	2	–	2
C	5	10	2	17
Σ	5	14	2	21

manj od tistih iz druge poznoantične faze (*pril. 8.2: tab. A*). Najdbe iz najmlajše od treh tukaj obravnavanih faz so namreč ležale v plasti mehke, kulturne zemlje, ki je ostanek ponovne uporabe delno že porušenega objekta. Pri tem se navedena plast ni deponirala neposredno na skalno osnovo kot pri najdbah iz druge poznoantične faze, marveč na do 60 cm debelo plast žganine oz. ostankov s sten odpadlega ometa (glej Tonovcov grad. Naselbinski ostanki in interpretacija, pogl. 2.2).

V okviru analize vzorca porazdelitve živalskih ostankov na širšem območju stavbe 1 velja opozoriti še na rezultate primerjave med gradivom iz glavnega prostora in tistim iz prizidka.[38] Omembe vrednih razlik v deležu zastopanosti posameznih taksonov omenjena primerjava ni pokazala (*tab. 8.14*), kar je potrdilo tudi statistično testiranje (test χ^2: $\chi^2 = 0{,}683$; $p > 0{,}05$). Zanimivo pa je, da vzorec iz prizidka odstopa po večinskem deležu zastopanosti kosti iz najmanj mesnatih delov trupa (tj. kvalitetne kategorije C). Res je, da je število najdb pičlo, a podobno izrazita prevlada zob, prstnic, dlančnic/stopalnic ter zapestnih/nartnih kosti ni bila ugotovljena pri nobenem od ostalih kvadrantov s podobno majhnim številom najdb (tj. $20 < NISP < 60$; *sl. 8.14*).[39] Celo več. Verjetnost, da bi lahko naleteli na vzorec s tako izrazito

six times greater numbers of early medieval finds in the same area (N = 251), even though there are four and a half times fewer animal remains from the Early Medieval phase altogether, when compared to those from Late Antiquity phase 2 (*Appendix 8.2: Tab. A*). This is because the finds dated to the latest of the three settlement phases collected within the area of building 1 lay in stacked layer of soft, strong cultural soil, which formed when the then already partially demolished building was being reused. This layer was not deposited directly on the rock base, as was the case with the finds from the Late Antiquity phase 2, but on an up to 60 cm thick layer of burnt plaster remains (see Tonovcov grad. Settlement remains and interpretation, chapter 2.2).

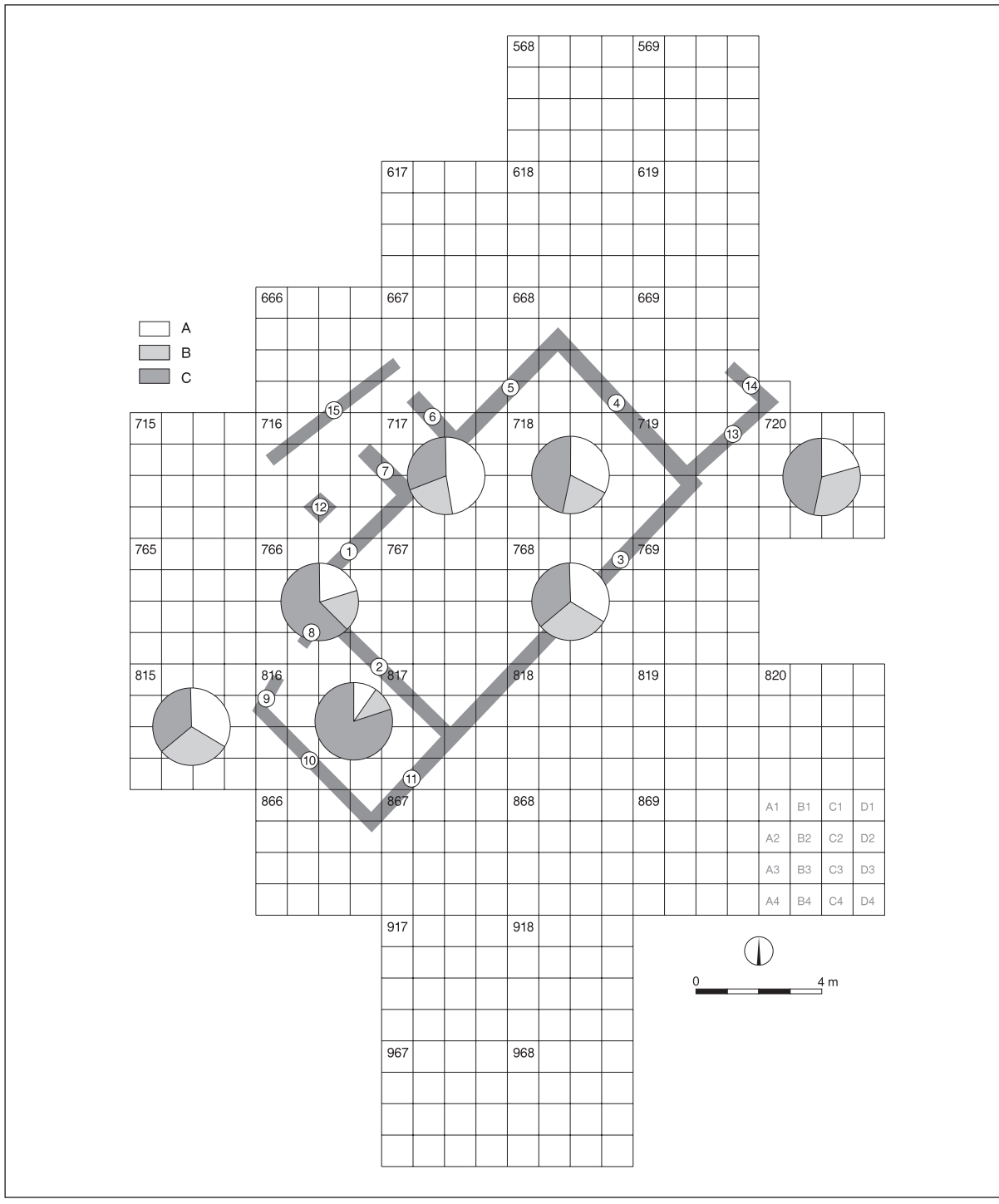
In the analysis of the spatial distribution of animal remains in the broader area of building 1 attention should be drawn to the results from the comparison between the material from the main room and that from the extension.[40] No noteworthy differences in the representation of individual taxa were observed in this comparison (*Tab. 8.14*) which was additionally confirmed by the statistical testing ($\chi^2 = 0.683$, $p > 0.05$). It is interesting, though, that the assemblage from the extension displayed a much greater share of bones from the least meaty parts of cattle, sheep/goat and pig carcasses (i.e. qualitative category C). It is true that the number of finds is scarce, but a similar strong dominance of teeth, phalanges, metacarpals, metatarsals, carpals and tarsals has not been found in any of the other squares with a similarily low number of finds (i.e. $20 < NISP < 60$; *Fig. 8.14*).[41] Moreover, in the event that

[38] Upoštevala sva le najdbe iz druge poznoantične faze, ko sta bila edinkrat v uporabi oba dela stavbe 1.

[39] V tem smislu predstavlja edino izjemo gradivo iz kvadranta 766, kjer prav tako močno prevladujejo ostanki najmanj mesnatih delov trupa. Vendar pa je v zvezi s tem treba dodati, da gre visok delež najdb iz kvalitetne kategorije C v tem primeru predvsem na račun ostankov drobnice. Med kostnimi najdbami večjega goveda je namreč tretjina primerkov iz najbolj kakovostnih delov živali, kar pa vsekakor odstopa od vzorca iz prizidka (*tab. 8.14*).

[40] We only took into account the finds from Late Antiquity phase 2, when both parts of the building were in use.

[41] In this sense the only exception is represented by the



Sl. 8.14: Delež zastopanosti ostankov iz posamezne od treh kvalitetnih kategorij (tj. kategorija A, B in C) trupa domačega goveda, drobnice in prašiča za drugo poznoantično poselitveno fazo Tonovcovega gradu za stavbo 1, njegov prizidek in bližnjo okolico; podatki so prikazani le za kvadrante, znotraj katerih je bilo najdenih med 20 in 60 določljivih kosti in zob. Vzorec porazdelitve skeletnih elementov v kvalitetne kategorije A, B in C je podan v pogl. 8.1.

Fig. 8.14: The share of the remains of each of the three qualitative categories (i.e. category A, B and C) of the carcass of cattle, sheep, goats and pigs for the Late Antiquity phase 2 at Tonovcov grad for building 1, its extention and its near vicinity. The data is shown only for quadrants within which at least 20 taxonomically determined bones and teeth were found ($NISP_{max} = 60$). The division of skeletal elements into qualitative categories A, B and C is shown in chapter 8.1.

prevlado ostankov iz najmanj mesnatih delov trupa tudi v primeru, ko tovrstnih razlik med izhodiščnim naborom najdb v prizidku in njegovi bližnji okolici sploh ni bilo, je manjša od petih odstotkov (test χ^2: $p < 0,05$). Da bi bilo odstopanje vzorca iz prizidka zgolj naključno, se torej ne zdi verjetno.

Pri poskusu interpretacije zgornjih ugotovitev sva upoštevala dejstvo, da je bila kvaliteta gradnje prizidka razmeroma slaba. Njegovi zidovi namreč niso bili temeljeni tako globoko kot zidovi glavnega prostora, prav tako pa tudi niso bili ometani. Poleg tega je večino že tako skromno odmerjenega uporabnega prostora zavzemala skala, tako da je bilo nekaj za bivanje primernega ravnega prostora le ob zidovih 8 in 9; v vogal zidov 9 in 10 je bilo postavljeno tudi ognjišče (glej Tonovcov grad. Naselbinski ostanki in interpretacija, pogl. 2.3). Navedeni podatki kažejo, da je prizidek sicer lahko bil uporabljen kot bivalni prostor (prisotnost ognjišča!), da pa je v njem najverjetneje prebivala oseba nižjega statusa, hlapec. Skoraj izključna prisotnost ostankov iz najmanj kvalitetnih delov trupa v sicer skromnem vzorcu se zdi tako razumljiva in na neki način predstavlja antitezo slike, ki jo kažejo favnistične najdbe z območja domnevne shrambe duhovščine na območju med srednjo in južno cerkvijo (*sl. 8.11*).

8.5 ANALIZA VELIKOSTI

Mere kolikor toliko ohranjenih sesalskih ostankov s Tonovcovega gradu so podane v *prilogi 8.1*. Žal je razpoložljivih podatkov pri večini vrst le peščica, tako da poglobljenih metričnih analiz ni bilo mogoče izvesti. Izjemo predstavljajo domače govedo, drobnica (predvsem ovca), prašič ter deloma konj, kjer sva ugotovila obstoj morebitnih trendov spreminjanja velikosti skozi čas in med regijami. Analize temeljijo na primerjavi standardiziranih metričnih podatkov dolgih kosti, čeprav sva upoštevala tudi mere petnic in/ali skočnic (glej pogl. 8.1). Vsaka kost je bila zastopana s po eno meritvijo, ki je bila vedno nedolžinska; pri kopitarjih so namreč slednje primernejše za oceno mase živali od dolžinskih mer (Scott 1990).

8.5.1 DOMAČE GOVEDO

Metrične študije ostankov domačega goveda v Srednji Evropi so pokazale, da se je z začetkom obdobja preseljevanja ljudstev velika "rimska" oblika (pasma?) goveda na tem prostoru postopoma izgubila. Govedoreja je, podobno kot že pred prihodom Rimljanov, v pozni antiki in ponovno zgodnjem srednjem veku temeljila predvsem na primitivnih lokalnih formah (Bökönyi 1974, 134). Navedeni proces, ki je imel seveda za posledico tudi upad povprečne velikosti živali v takratnih

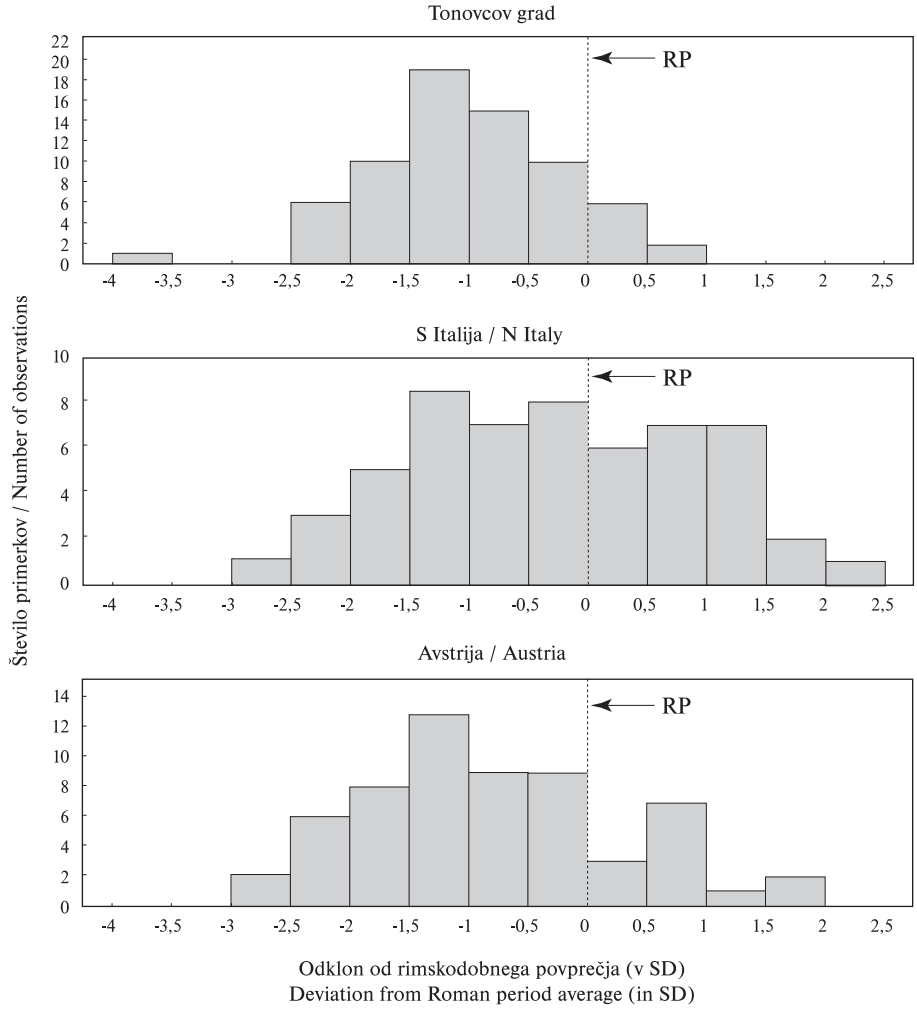
originally no differences in the carcass parts consumed by the inhabitants of the main room and those dwelling in its extention existed, the chances that we would observe such a pronounced differences in food waste composition between the two areas as those shown in *table 8.14* and *figure 8.14* are less than five percent (χ^2 test: $p < 0.05$).

In an attempt to interpret these considerations we took into account the fact that the quality of construction the extension was relatively poor. Its walls were not founded as deeply as the walls of the main room, and they were not plastered either. In addition, the majority of the already modest usable space was occupied by a rock, thus the only levelled area suitable for habitation could be found along the walls 8 and 9, where the fireplace was located (in the corner of walls 9 and 10; see Tonovcov grad. Settlement remains and interpretation, chapter 2.3). These data suggest that the extension could have been used as a living quarters (note the presence of the fireplace), but that it was most probably inhabited by a person of a lower status, a servant. The almost exclusive presence of poorest quality meat remains in the (unfortunately modest) sample seems thus understandable and in a way represents an antithesis to the image shown by the faunal remains found in the area of the assumed clergy larder in the area between the central and the south churches (*Fig. 8.11*).

8.5 SIZE ANALYSIS

The measurements of the sufficiently preserved mammalian remains from Tonovcov grad are shown in *Appendix 8.1*. Unfortunately, there is only a smidgen of available data for most species, so no in-depth metric analysis could be performed. An exception is represented by cattle, caprines (mainly sheep), pigs and to a certain extent horses in which cases we tried to check for the existence of any trends of diachronic size changes between regions. The analysis is based on the comparison between standardized measurements of long bones, even though measurements of calcaneus and/or talus bones were also taken into consideration (see chapter 8.1). In the analysis each bone was represented by a single measurement. This was always a breadth measurement (e.g. smallest breadth of the diaphysis, breadth of the proximal/distal epiphysis), as in ungulates they are more suitable for assessing the weight of the animal than lengths (Scott 1990).

material from square 766, in which the remains from the least meat-rich parts of the carcass dominate. However, it has to be said that the high share of finds from the qualitative category C is mainly due to a large number of caprine feet bones. Among cattle finds one third is represented by bones from the meatiest parts of the carcass, which certainly differs from the picture observed in the case of the sample collected within the extension (*Tab. 8.14*).



Sl. 8.15: Porazdelitev standardiziranih dimenzij dolgih kosti (nadlahtnica, koželjnica, dlančnica, golenica, stopalnica) ter petnic in skočnic domačega goveda s Tonovcovega gradu ter z več sočasnih najdišč severne Italije in Avstrije. Vsak skeletni element je zastopan le s po eno dimenzijo. Postopek standardiziranja dimenzij je podan v pogl. 8.1. Legenda: RP – rimskodobno povprečje, izračunano na osnovi govejih ostankov iz rimskega mesta Tác/*Gorsium* (Madžarska; Bökönyi 1984). Seznam najdišč S Italije: Invillino (Stork, von den Driesch 1987); Monte Barro (Baker 1991); Videm/Udine: grad (Riedel 1993b); Verona: skupek VR-I (Riedel 1994a). Seznam najdišč Avstrije: Kappele (Pucher 1993); Teriola (Pucher 2003); Sveta Hema/Hemmaberg (Forstenpointner *et al*. 2002); Drösing (Riedel 2007).

Fig. 8.15: Distribution of standardised metric datas of cattle long bones (humerus, radius, metacarpals, tibiae, metatarsals) as well as calcanei and astragali from Tonovcov grad and from a number of contemporary sites in North Italy and Austria. Each skeletal element is represented by a single dimension. The procedure for standardising the metric data is given in cahp. 7.1. Legend: RP – Roman Period average, calculated on the basis of cattle remains from the Roman town Tác/*Gorsium* (Hungary; Bökönyi 1984). The list of sites in N Italy: Invillino (Stork, von den Driesch 1987); Monte Barro (Baker 1991); Udine: castle (Riedel 1993b); Verona: complex VR-I (Riedel 1994a). List of sites in Austria: Kappele (Pucher 1993); Teriola (Pucher 2003); Hemmaberg (Forstenpointner *et al*. 2002); Drösing (Riedel 2007).

čredah, je najprej zajel bolj oddaljene province cesarstva (Bökönyi 1974, 134), medtem ko ga je na nižinskih območjih severne Italije zaznati šele z nastopom zgodnjega srednjega veka (Riedel 1979, 138 s; 1986, 85).

Primerjava standardiziranih metričnih podatkov (≈ velikosti) za kosti domačega goveda s Tonovcovega gradu ter z več sočasnih najdišč severne Italije in Avstrije je dala rezultate, ki zgornjo ugotovitev v celoti podpirajo (*sl. 8.15*). Navedeni trije vzorci se namreč med seboj dejansko razlikujejo, pri čemer razlika presega mejo

8.5.1 CATTLE

Metric analyses of cattle remains from Central European sites have shown that with the beginning of the Migration period the large "Roman" form (breed?) of cattle gradually disappeared from this region. Similarly to the period before the arrival of the Romans, cattle husbandry in Late Antiquity and the Early Middle Ages was once again based primarily on the primitive local forms (Bökönyi 1974, 134). This process, which of course

statistične značilnosti (Kruskal-Wallisov ANOVA-test: H [2; N = 185)] = 11,18; p = 0,004). Izstopa predvsem veliko severnoitalijansko govedo,[40] medtem ko statistično značilnih razlik med razpoložljivimi podatki za vzorec s Tonovcovega gradu ter tistimi z avstrijskih najdišč ni (Mann-Whitneyjev U-test: U = 1944,5; Z = -0,75; p = 0,455). Pri tem je povedno, da se povprečna vrednost standardiziranih metričnih podatkov za severnoitalijansko poznoantično govedo v splošnem ujema s povprečno vrednostjo rimskodobnih živali iz mesta Tác/*Gorsium*[41] (Bökönyi 1984), kar izpričuje pomembno zastopanost velikega "rimskega" goveda na območju ravninske severne Italije še globoko v obdobju pozne antike *(cf.* Riedel 1993b, 101; 1994a, 18), morda celo do začetnih faz zgodnjega srednjega veka (*cf.* Riedel 1979, 108).

Standardizirani metrični podatki za govedo s Tonovcovega gradu in Avstrije so, nasprotno, večinoma porazdeljeni levo od navpičnice, ki označuje povprečno vrednost za referenčni vzorec iz mesta Tác/*Gorsium* (*sl. 8.15*). Govedo s Tonovcovega gradu je bilo v povprečju statistično značilno manjše tudi od goveda iz z živalskimi ostanki bogatega rimskodobnega najdišča Ribnica na Dolenjskem/*Romula* (Mann-Whitneyjev U-test: U = 3772,0; Z = -5,05; p = 0,000), kar le še dodatno potrjuje progresivno povečevanje vloge primitivnega lokalnega goveda na Slovenskem v obdobju po koncu 4. stoletja. Višino ob vihru sva za gradivo s Tonovcovega gradu lahko izračunala le v primeru dlančnice[42] iz vzorca št. 414 (kv: 816; mkv: B4; druga poznoantična faza) in stopalnice[43] iz vzorca št. 2038 (kv./mkv. 668/D3, 669/D4; prva poznoantična faza). Sicer izolirana podatka sta skladna z zgornjimi ugotovitvami, saj sta oba mnogo bliže povprečnim vrednostim železnodobnih primerkov goveda iz Stične kot pa rimskodobnim iz Ribnice na Dolenjskem/Romule (*tab. 8.15*).

V nadaljevanju sva vzporejala velikost primerkov s Tonovcovega gradu in tistih s poznoantičnih najdišč Ajdovski Gradec nad Vranjem (Bartosiewicz, Choyke 1985) in Tinje nad Loko pri Žusmu (Turk 2000, Tab. 1) ter ugotovila odsotnost statistično značilnih razlik (Mann-Whitneyjev U-test: U = 279,0; Z = -1,40; p = 0,160 oz. U = 323,0; Z = 0,32; p = 0,745). Podobnost med navedenimi vzorci izpričujejo tudi sicer maloštevilne ocene višine živali ob vihru (*tab. 8.15*). Izginotje velikega"rimskega" goveda je bilo, kot kaže, na celotnem območju današnje Slovenije bolj ali manj sočasno.

[40] Razlika v razpoložljivih standardiziranih metričnih podatkih domačega goveda med Tonovcovim gradom in severnoitalijanskimi najdišči je statistično značilna (Mann-Whitneyjev U-test: U = 1229,0; Z = -3,36; p = 0,001).

[41] Navedeno gradivo sva sicer uporabila kot referenčni vzorec pri postopku standardiziranja metričnih podatkov goved s posameznih poznoantičnih najdišč (glej pogl. 8.1).

[42] Na osnovi vrednosti indeksa vitkosti (tj. 19,83) in Nobisovega indeksa (tj. 33,06) sva primerek pripisala samici.

[43] Na osnovi vrednosti indeksa vitkosti (tj. 12,33) in Nobisovega indeksa (tj. 20,71) sva primerek pripisala samcu.

also resulted in the decline in the average withers height of animals, first occurred in the more remote provinces of the Empire (Bökönyi 1974, 134), while it took until the Early Medieval period to hit the lowland areas of northern Italy (Riedel 1979, 138 f; 1986, 85).

The comparison between the standardized measurements (≈ size) for cattle bones from Tonovcov grad and a number of contemporary sites in northern Italy and Austria offered results that fully support these findings (*Fig. 8.15*). The three samples actually differ from each other, at which the difference exceeds the level of statistical significance (Kruskal-Wallis ANOVA test: H [2, N = 185)] = 11.18; p = 0.004). The large north Italian cattle stand out,[42] while there are no statistically significant differences to be observed between the available data for the sample from Tonovcov grad and those from the Austrian sites (Mann-Whitney U test: U = 1944.5; Z = -0.75; p = 0.455). The average value of the standardized measurements for Late Antique cattle from north Italy in general falls within the range of the average value of animals from the Roman town of Tác/*Gorsium*[43] (Bökönyi 1984), testifying the significant representation of large "Roman" cattle in the North Italian plains deep into the Late Antique period *(cf.* Riedel 1993b, 101; 1994, 18), perhaps even as late as the initial stages of the Early Middle Ages (*cf.* Riedel 1979, 108).

Contrary to what has been observed in north Italian material the standardized measurements for cattle from Tonovcov grad and Austria are mainly distributed to the left of the vertical that indicates the average value for the reference assemblage collected at Tác/*Gorsium* (*Fig. 8.15*). As a matter of fact, the cattle from Tonovcov grad was statistically significantly smaller also relative to conspecific animals from Roman period sites in present-day Slovenia (Mann-Whitney U test: U = 3772.0; Z = -5.05; p = 0.000; own unpublished data), which further corroborates the progressive increase in the role of primitive local cattle of small stature in the area of Southeastern Alps in the post 4th century period. As far as the material from Tonovcov grad is concerned, the withers height could be calculated only for the metacarpal[44] from sample No. 414 (sq./msq.: 816/B4; Late Antiquity phase 2) and the metatarsal[45] from sample No. 2038 (sq./msq.: 668/D3,

[42] The difference in the standardized measurements of cattle originating from Tonovcov grad relative to those from north Italian sites is statistically significant (Mann-Whitney U test: U = 1229.0; Z = -3.36; p = 0.001).

[43] The material from this site has already been used as the reference sample at the procedure of standardizing measurements for cattle from individual Late Antique sites (see chapter 8.1).

[44] On the basis of the estimate of the slenderness index (19.83) and the Nobis' index (33.06) the specimen was attributed to a female.

[45] On the basis of the estimate of the slenderness index (12.33) and the Nobis' index (20.71) the specimen was attributed to a male.

Tab. 8.15: Ocene višine ob vihru za domače govedo s Tonovcovega gradu, Stične (železna doba; Bökönyi 1994, Tab. 6), Ribnice na Dolenjskem/*Romule* (rimsko obdobje; neobjavljeni lastni podatki), Ajdovskega Gradca nad Vranjem (Bartosiewicz, Choyke 1985, Tab. 6) in Pristave na Bledu (Toškan, Dirjec 2008, 141). Višina ob vihru je izračunana na osnovi dimenzij dlančnic oz. stopalnic s pomočjo Matolcsijevih koeficientov (Matolcsi 1970). Legenda: Me – mediana; N – velikost vzorca; Min.–Max. – razpon vrednosti. Vse vrednosti so v cm.
Tab. 8.15: The estimate of the withers height for cattle from Tonovcov grad, Stična (Iron Age; Bökönyi 1994, Tab. 6), Ribnica na Dolenjskem/*Romula* (Roman period; unpublished personal data), Ajdovski Gradec above Vranje (Bartosiewicz, Choyke 1985, Tab. 6) and Pristava at Bled (Toškan, Dirjec 2008, 141). The withers height is calculated on the basis of the dimensions of the metacarpals or metatarsals with the aid of Matolcsi's coefficients (Matolcsi 1970). Abbreviations: Me – median; N – sample size; Min.–Max. – range. All values are in cm.

Najdišče **Site**	**Metacarpus**	**Metatarsus**
	Me (N) **Min.–Max.**	**Me (N)** **Min.–Max.**
Tonovcov grad	112,1	116,3
Stična	108,1 (4) 98,9–113,7	111,3 (4) 102,3–116,0
Romula	122,4 (35) 108,8–134,1	124,25 (20) 112,2–131,9
Ajdovski gradec	110,6 & 116,1	–
Pristava	–	108,2

Trend povečevanja povprečne velikosti domačega goveda s prihodom Rimljanov ter naknaden upad v pozni antiki in zgodnjem srednjem veku je še očitneje izpričan na *sliki 8.16*. Ta prikazuje vrednosti prve glavne komponente (*PC1 scores*), izračunane na podlagi korelacijske matrike metričnih podatkov treh dimenzij[44] skočnic iz več prazgodovinskih, rimskodobnih, poznoantičnih in zgodnjesrednjeveških najdišč v širši regiji. Ker prva glavna komponenta v okviru analize glavnih komponent (PCA) po definiciji opiše najvišji delež variance[45] osnovne množice podatkov, jo je mogoče razumeti kot vektor velikosti oz. nosilko velikostne informacije[46] (Lemen 1983). Drugače povedano: razlike v vrednostih prve glavne komponente med posameznimi najdišči/obdobji je, glede na navedeno zgoraj, utemeljeno interpretirati kot razlike v velikosti živali. Toliko bolj, ker so pri govedu dimenzije skočnic v veliki korelaciji z maso samih živali (*cf*. Bartosiewicz 1984).

Testiranje razlik v vrednostih PC1 med posameznimi vzorci s *slike 8.16* je pokazalo, da te presegajo mejo statistične značilnosti (Kruskal-Wallis ANOVA-test: H [3, 109] = 22,51; p = 0,000). Seveda gre navedeno heterogenost pripisati predvsem izrazito višjemu povprečju rimskodobnih goved, k čemur je prispevala prisotnost ostankov velikih "rimskih" form. Po drugi strani razlik med gradivom s Tonovcovega gradu in tistim z drugih poznoantičnih in zgodnjesrednjeveških najdišč v širši regiji ni, tako kot tudi ne med podatki

669/D4; Late Antiquity phase 1). The two data, though isolated, are consistent with the above findings, since both are much closer to the average values of Iron Age animals from Stična than to their Roman period counterparts (e.g. Ribnica/*Romula*; *Tab. 8.15*).

Next we compared the sizes of the specimens from Tonovcov grad and those from the Late Antique sites at Ajdovski Gradec above Vranje (Choyke and Bartosiewicz 1985) and Tinje above Loka pri Žusmu (Turk 2000, Tab. 1) and noted the absence of statistically significant differences (Mann-Whitney U test : U = 279.0; Z = -1.40; p = 0.160 and U = 323.0; Z = 0.32; p = 0.745, respectively). The similarity between these samples is also testified by the few calculable withers height estimates (*Tab. 8.15*). It thus seems that the large "Roman" cattle disappeared throughout the territory of present-day Slovenia more or less simultaneously.

The trend of increasing average cattle size with the arrival of the Romans and the subsequent decline observed in Late Antiquity and the Early Medieval period is even more evidently shown by the results of the Principal Component Analysis (PCA; *Fig. 8.16*). The latter was calculated on the correlation matrix of three measurements of cattle astragali[46] from numerous prehistoric, Roman period, Late Antique and Early Medieval sites in the broader region. Since the first principal component by definition accounts for the highest share of the total variance[47] of the initial data set, it can be understood as a size vector or a carrier of size information[48] (Lemen 1983). In other words, the differences in the first principal component scores between the individual sites/periods can be reasonably interpreted as differences in animal sizes. This is all the more so as it is known for the

[44] Gre za največjo dolžino na medialni strani (GLm *sensu* von den Driesch 1976), širino na lateralni strani (Dl) ter širino distalnega dela (Bd). Pri vseh treh dimenzijah so bili metrični podatki porazdeljeni normalno (Shapiro-Wilkov W-test: p > 0,05).

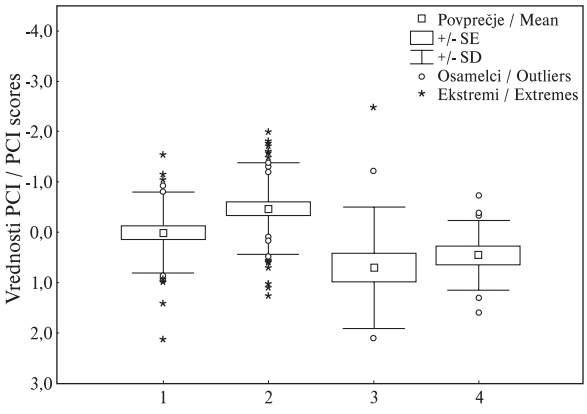
[45] Delež variance, ki ga v obravnavanem primeru opiše posamezna od prvih dveh glavnih komponent: PC 1 (88,7 %), PC 2 (7,4 %) in PC 3 (3,9 %).

[46] Znano namreč je, da nam v morfometriji največji delež variance praviloma razloži prav velikost.

[46] This includes the greatest length on the medial side (GLm *sensu* von den Driesch 1976), the depth on the lateral side (Dl) and the greatest breadth of the distal part (Bd). The measurements conformed to the normal distribution in all three the dimensions (Shapiro-Wilk W test: p > 0.05).

[47] The shares of the total variance accounted for by the first three principal components equal 88.7 % (PC 1), 7.4 % (PC 2) and 3.9 % (PC 3).

[48] In morphometry the highest share of variance is as a rule linkable to size.



Sl. 8.16: Diagram vrednosti prve glavne komponente (*PC 1 scores*), izračunane na osnovi korelacijske matrike metričnih podatkov treh dimenzij skočnic s Tonovcovega gradu (vzorec 3) ter z več prazgodovinskih (vzorec 1), rimskodobnih (vzorec 2) in poznoantičnih oz. zgodnjesrednjeveških (vzorec 4) najdišč v širši regiji. Zaradi negativnega predznaka vseh treh faktorskih uteži (*factor loadings*) izkazujejo večje skočnice nižje vrednosti prve glavne komponente napram tistim manjšim. Seznam in velikost (N) vzorcev za najdišča na območju Slovenije: Tonovcov grad (N = 13); Maharski prekop (bakrena doba; N = 3); Stare gmajne (bakrena doba; N = 2); Založnica (bakrena doba; N = 1); Gornja Radgona (pozna bronasta doba; N = 1); Gradec pri Mirni (starejša železna doba; N = 1); Kučar (starejša železna doba; N = 1); Ljubljana/*Emona* (rimska doba; N = 3); Sermin (rimska doba; N = 2); Školarice (rimska doba; N = 6); Ribnica na Dolenjskem/*Romula* (rimska doba; N = 28); Col (rimska doba; N = 5); Hrušica/*Ad Pirum* (rimska doba; N = 4); Pristava (zgodnji srednji vek; N = 2). Seznam in velikost (N) vzorcev za najdišča na območju Avstrije: Brixlegg (zgodnja bronasta doba; N = 25; Riedel 2003); Drösing (pozna antika; N = 12; 2007).

Fig. 8.16: Diagram of PC 1 scores, calculated on the basis of the correlation matrix of metric data referable to three astragalus dimensions in the material from Tonovcov grad (sample 3) and a number of prehistoric (sample 1), Roman (sample 2) and Late Antiquity or Early Medieval (sample 4) sites in the broader region. Due to the negative sign of all four factor loadings the larger specimens show lower PC 1 scores compared to the smaller ones. The list and size (N) of the samples for the sites in the territory of Slovenia: Tonovcov grad (N = 13); Maharski prekop (Copper Age; N = 3); Stare gmajne (Copper Age; N = 2); Založnica (Copper age; N = 1); Gornja Radgona (Late Bronze Age; N = 1); Gradec pri Mirni (Early Iron Age; N = 1); Kučar (Early Iron Age; N = 1); Ljubljana/*Emona* (Roman period ; N = 3); Sermin (Roman period; N = 2); Školarice (Roman period; N = 6); Ribnica na Dolenjskem/*Romula* (Roman period; N = 28); Col (Roman period; N = 5); Hrušica/*Ad Pirum* (Roman period; N = 4); Pristava (Early Middle Ages; N = 2). List and size (N) of the samples for the sites in Austria: Brixlegg (Early Bronze Age; N = 25; Riedel 2003); Drösing (Late antiquity; N = 12; 2007).

dimensions of the cattle astragali to greatly correlate to the weight of the animals (*cf.* Bartosiewicz 1984).

Testing the differences in PC1 scores between the individual samples included in *figure 8.16* has shown that they exceed the limit of statistical significance (Kruskal-Wallis ANOVA test: H [3, 109] = 22.51; p = 0.000). Of course, this heterogeneity can be mainly attributed to the significantly higher average of the Roman period cattle, which is mostly attributable to the presence of the large "Roman" form/breed. On the other hand, there are no substantial differences between the materials from Tonovcov grad and those from other Late Antique and Early Medieval sites in the broader region, nor are there any differences between the data from Tonovcov grad and those relative to Iron Age sites (Mann-Whitney U test: U = 144.0; Z = -1.83; p = 0.067). This ascertainment was to be expected and is perfectly in line with the thesis of the relatively rapid loss of knowledge associated with the breeding of large "Roman" cattle once the Empire collapsed and the resulting shift of cattle husbandry towards the smaller local primitive cattle forms as they were known in these territories already in the Iron Age. Minor differences between the prehistoric assemblage on one side and that from Tonovcov grad (as well as from other Late Antique sites) on the other can most likely be explained by the presence of individual Copper and/or Bronze Age specimens within the prehistoric assemblage. As is known the largest prehistoric domestic cattle are to be found in Neolithic contexts; later on they gradually became smaller (Bökönyi 1974, Fig. 7.9).

If the first principal component (PC 1) represents the size vector, then the second and the third (i.e. PC 2 and PC 3) can be understood as carriers of the shape information. In the aforementioned principal component analysis the second and third principal components account for an abundant ten percent of the total variance within the initial data set (see footnote No. 47). Similar as with PC 1, statistically significant differences in the distribution of scores along the second principal component has been observed, while only minor discrepancies emerged from the comparison of PC 3 scores. As seen in *figure 8.17*, Roman period finds show higher PC 2 scores relative to prehistoric[49] or Late Antique/Early Medieval[50] specimens, with the astragali from Tonovcov grad occupying an intermediate position between the two extremes. The values of factor loadings (*Tab. 8.16*) indicate that the specimens showing higher PC2 scores (i.e. Roman period finds) are relatively narrower than those with lower PC2 scores (i.e. prehistoric specimens). At this it is interesting that the greatest depth of the astragalus medial side (GLm)[51] increases faster than the greatest breadth of the distal part (Bd) of the same

[49] Mann-Whitney U test: U = 532.0; Z = -2.18; p = 0.029.

[50] Mann-Whitney U test: U = 252.0; Z = 2.23; p = 0.026.

[51] The same holds true also for the greatest length on the lateral side (i.e. GLl *sensu* von den Driesch 1976).

za Tonovcov grad in tistimi z železnodobnih najdišč (Mann-Whitneyjev U-test: U = 144,0; Z = -1,83; p = 0,067). Ugotovitev potrjuje tezo o razmeroma hitri izgubi znanj povezanih z vzrejo velikih goved po razpadu imperija ter posledičen premik težišča govedoreje na majhne primitivne forme lokalnega izvora, kakršne so v teh krajih poznali že v železni dobi. Določene razlike med prazgodovinskim vzorcem na eni strani ter tistim s Tonovcovega gradu (pa tudi ostalih poznoantičnih najdišč) na drugi gre najverjetneje pripisati prisotnosti bakrenodobnih in bronastodobnih primerkov v prazgodovinskem vzorcu; velikost goved je bila v prazgodovini na območju srednje Evrope namreč največja v mlajši kameni dobi, nato pa je vseskozi postopoma upadala (Bökönyi 1974, sl. 9).

Če je prva glavna komponenta vektor velikosti, potem lahko drugi dve (PC 2 in PC 3) razumemo kot nosilki oblikovne informacije. V primeru zgoraj predstavljene analize glavnih komponent slednji opisujeta dobrih deset odstotkov variance osnovnega nabora podatkov (glej opombo 44). Za razliko od vrednosti PC3, kjer razlik med posameznimi vzorci nisva ugotovila, pa te pri porazdelitvi vrednosti vzdolž druge glavne komponente obstajajo (*sl. 8.17*). Rimskodobni primerki namreč izkazujejo statistično značilno višje vrednosti PC2 od prazgodovinskih[47] ter tudi poznoantičnih/zgodnjesrednjeveških[48] skočnic; pri tem primerki s Tonovcovega gradu zasedajo vmesno lego med obema skrajnostma. Iz vrednosti faktorskih uteži (*Factor loadings*; *tab. 8.16*) izhaja, da so skočnice z višjimi vrednostmi PC2 (tj. rimskodobne skočnice) relativno ožje od tistih z nižjimi vrednostmi PC2 (tj. prazgodovinski primerki). Pri tem je zanimivo, da se pri govedu največja širina medialnega dela (GLm)[49] skočnice z naraščanjem mase živali domnevno povečuje hitreje od največje širine distalnega dela (Bd) istega skeletnega elementa (linearna[50] regresijska enačba: Bd = 6,798 + 0,579*GLm; Pearsonov koeficient korelacije: r = 0,67; p = 0,000). Takšen je vsaj trend, ki ga je mogoče razbrati iz metričnih podatkov za vzorec bronastodobnih govejih skočnic z Madžarskega (Bartosiewicz 1984, Tab. 1), ki sicer vključuje tako odrasle primerke obeh spolov kot tudi teleta. Pri tem velja poudariti, da je zgornja regresijska enačba bolj ali manj neodvisna od spreminjanja razmerij med starostnimi kategorijami oz. med spoloma v izhodiščnem vzorcu. Podobno velja tudi za Pearsonove koeficiente korelacije med dimenzijama GLm oz. Bd na eni strani ter ocenjeno

[47] Mann-Whitneyjev U-test: U = 532,0; Z = -2,18; p = 0,029.

[48] Mann-Whitneyjev U-test: U = 252,0; Z = 2,23; p = 0,026.

[49] Enako velja tudi za največjo dolžino lateralnega dela skočnice (tj. GLl).

[50] Primernost uporabe linearne regresije dokazuje porazdelitev ostankov (*Residuals*), saj ti ne izkazujejo statistično značilnih odstopanj od normalne porazdelitve (Shapiro-Wilkov W-test: p > 0,05).

Tab. 8.16: Faktorske uteži (*Factor loadings*) za posamezno od prvih treh glavnih komponent (PC), izračunanih na osnovi korelacijske matrike metričnih podatkov treh dimenzij skočnic s Tonovcovega gradu ter z več prazgodovinskih, rimskodobnih in poznoantičnih najdišč v širši regiji.
Tab. 8.16: Factor loadings for first three principal components (PC), calculated on the basis of the correlation matrix of metric data referable to three astragalus dimensions in the material from Tonovcov grad and from numerous prehistoric, Roman period and Late Antique sites in the broader region.

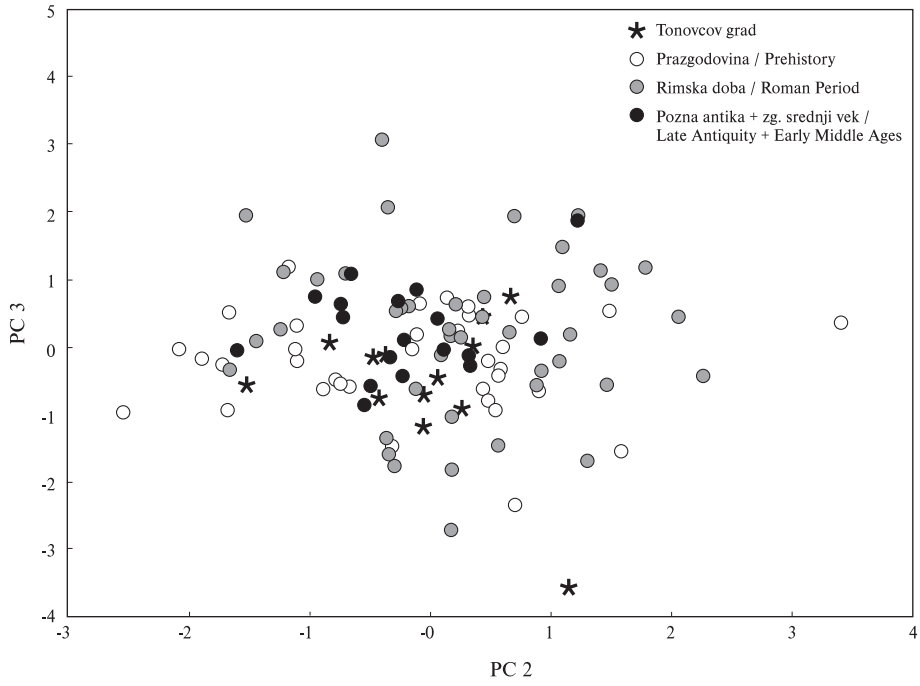
Dimenzija Dimension	**PC 1**	**PC 2**	**PC 3**
GLm	-0,95	0,22	0,23
Dl	-0,95	0,14	-0,26
Bd	-0,92	-0,38	0,03

skeletal element (linear[52] regression equation: Bd = 6.798 + 0.579 * GLm; Pearson correlation coefficient: r = 0.67; p = 0.000), as it was observed in the measurements obtained from Bronze Age specimens from Hungary (Bartosiewicz 1984, Tab. 1), which includes adult specimens of both sexes as well as calves. In relation to this it is worth noting, that the regression equation is more or less independent from the fluctuating share of individual age groups or sexes in the assemblage. Similar holds true for the Pearson correlation coefficients between the dimensions GLm (or Bd) on one hand and the estimated cattle weight on the other (*cf.* Bartosiewicz 1984, Tab. 1), as they never fall below 0.80.

The existence of two groups of astragali, differing in shapes (and not merely size), could be associated with the presence of two cattle forms (breeds?) in the studied area, i.e. the advanced "Roman" and the traditional local form. The existence of statistically significant differences between the material from prehistoric or Late Antique/Early Medieval sites on the one hand, and those from the Roman period on the other, may – in this case – reflect the lack (scarcity) of large cattle prior to the Romanisation of this area or following the fall of the Empire. Of course, as "Roman" cattle did not establish itself at once, it did not suddenly disappear either. The somewhat intermediate position of the sample from Tonovcov grad in *figure 8.17* could thus be due to the slightly higher representation of the large cattle form(s)/breed(s) as opposed to the situation at some other sites from the mid or second half of the first millennium. After all, the bulk[53] of the specimens included in the Late Antique/Early Medieval assemblage shown on *figure 8.17* is

[52] The appropriateness of using linear regression is proven by the distribution of residuals, for it does not show statistically significant deviation from the normal distribution (Shapiro-Wilk W test: p > 0.05).

[53] The sample also includes two specimens from the Early Medieval site of Pristava at Bled (Toškan, Dirjec 2008).



Sl. 8.17: Grafični prikaz odnosa med vrednostmi druge in tretje glavne komponente (*PC 2 & PC 3 scores*), izračunane na osnovi korelacijske matrike metričnih podatkov treh dimenzij skočnic s Tonovcovega gradu ter z več prazgodovinskih, rimskodobnih in poznoantičnih najdišč v širši regiji. Za seznam in velikost vzorcev glej pripis k *sliki 8.16*.
Fig. 8.17: Graphic representation of the relation between PC 2 and PC 3 scores, calculated on the basis of the correlation matrix of the metric data referable to three astragalus dimensions in the material from Tonovcov grad and a number of prehistoric, Roman and Late Antiquity sites in the broader region. For a list and samples and their size see text under *figure 8.16*.

maso goved na drugi (*cf*. Bartosiewicz 1984, Tab. 1), saj ti nikoli ne padejo pod vrednost 0,80.

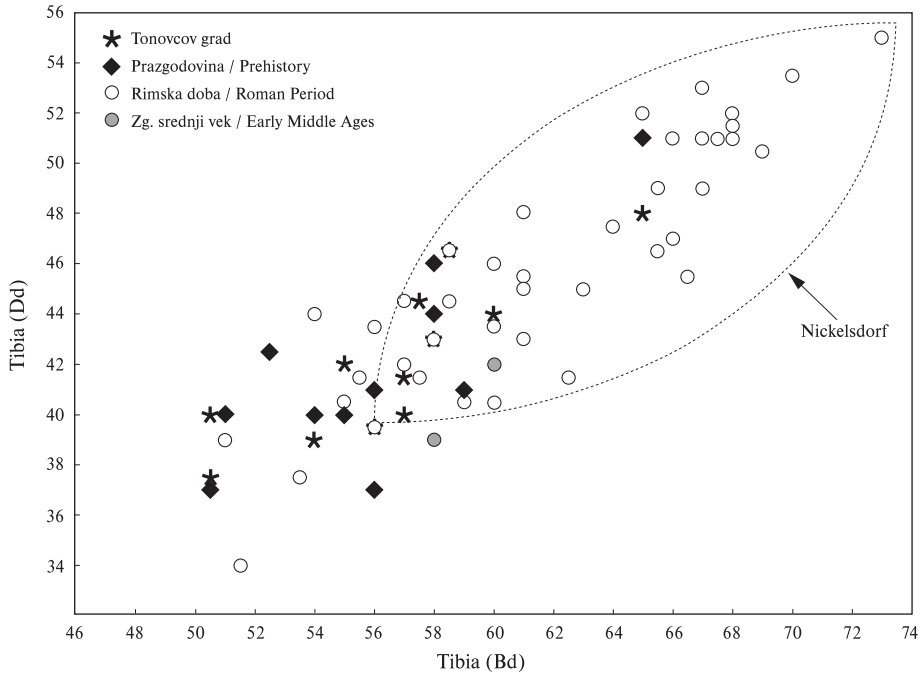
Obstoj dveh skupin govejih skočnic, ki se med seboj razlikujejo po obliki (in ne le velikosti), bi lahko povezovali s prisotnostjo dveh oblik (pasem?) goveda v tem prostoru, tj. napredne "rimske" in tradicionalne lokalne. V statistično značilnih razlikah med gradivom s prazgodovinskih oz. poznoantičnih/zgodnjesrednjeveških najdišč na eni strani ter rimskodobnih na drugi bi se v tem primeru lahko odražala prav odsotnost (maloštevilnost) velikih goved pred romanizacijo obravnavanega prostora oz. po razpadu cesarstva. Seveda se "rimsko" govedo v našem prostoru ni uveljavilo naenkrat, tako kot tudi ni naenkrat izginilo. Skočnice s Tonovcovega gradu se tako morda na *sliki 8.17* umeščajo med skočnice z rimskodobnih in tiste s poznoantičnih/zgodnjesrednjeveških najdišč prav zaradi še vedno nekoliko večje zastopanosti napredne oblike goveda nasproti stanju na nekaterih drugih najdiščih s sredine oz. druge polovice prvega tisočletja. Pretežni del[51] skočnic v poznoantičnem/zgodnjesrednjeveškem vzorcu s *slike 8.17* namreč predstavljajo najdbe z najdišča Drösing, ki leži severno od Donave, torej onkraj meja rimskega cesarstva (Riedel 2007). Tu pa je do zmanjševanja prisotnosti velikih

[51] Vzorec sicer vključuje še dva primerka z zgodnjesrednjeveške Pristave na Bledu (Toškan, Dirjec 2008).

represented by finds from the site of Drösing north of the Danube, and thus beyond the borders of the Roman Empire (Riedel 2007). As already stated above, in such peripheral areas the large "Roman" cattle disappeared significantly sooner than in the Southeastern Alps.

The presence of individual specimens from advanced "Roman" cattle within the assemblage from Tonovcov grad is evident also from *figure 8.18*, which shows the relationship between the breadth and depth of the distal tibia epiphysis in specimens originating from several prehistoric and Roman period as well as one Early Medieval site in the territory of present-day Slovenia. As can be seen the largest finds are those of Roman period animals; nevertheless, a single distal tibia does come also from Tonovcov grad.[54] Given that in *figure 8.18* we did not distinguish between males and females, an important part of the observed variability can of course be attributed to sexual dimorphism and not to the presence of two (or more?) different cattle forms/breeds. However, the overlap between the measurements of local and "Roman" cattle is to be expected in the central part of the "cloud" where males and castrates of the former as well as females of the latter are to be found. This can be clearly seen from the range of

[54] The find originates from the oldest Roman period settlement phase (i.e. the Late Antiquity phase 1), which may well not be a coincidence.



Sl. 8.18: Grafični prikaz razmerja med največjo širino (Bd) in največjo globino (Dd) distalne epifize golenice domačega goveda z več različnih najdišč z območja današnje Slovenije. Označeno polje ponazarja razpon vrednosti obeh dimenzij za domače govedo z rimskodobnega najdišča Nickelsdorf (Riedel 2004, Tab. 42). Seznam in velikost (N) vzorcev: Tonovcov grad (N = 12); Maharski prekop (bakrena doba, N = 4); Gornja Radgona (bronasta doba, N = 2); Cvinger (železna doba, N = 1); Vače (železna doba, N = 1); Veliki Vinji vrh (železna doba, N = 4); Bela Cerkev (železna doba, N = 1); Ribnica na Dolenjskem/*Romula* (rimska doba, N = 32); Vipava: telovadnica (rimska doba, N = 2); Gorenje Skopice (rimska doba, N = 2); Ljubljana/*Emona* (rimska doba, N = 5); Školarice (rimska doba, N = 2); Hrušica/*Ad Pirum* (rimska doba, N = 3); Pristava (zgodnji srednji vek, N = 2). Metrične podatke za najdišče Pristava podajata Toškan in Dirjec (2008, 150), preostanek pa predstavljajo lastni neobjavljeni podatki. Vse mere so v mm.
Fig. 8.18: Graphic representation of the relation between the greatest breadth (Bd) and the greatest depth (Dd) of tibial distal epiphyses of cattle from a number of different sites in the territory of present day Slovenia. The marked field denotes the range of values for both dimensions observed in cattle from the Roman period site of Nickelsdorf (Riedel 2004, Tab. 42). The list and size (N) of samples: Tonovcov grad (N = 12); Maharski prekop (Copper Age, N = 4); Gornja Radgona (Bronze Age, N = 2); Cvinger (Iron Age, N = 1); Vače (Iron Age, N = 1); Veliki Vinji vrh (Iron Age, N = 4); Bela Cerkev (Iron Age, N = 1); Ribnica na Dolenjskem/*Romula* (Roman period, N = 32); Vipava: gym (Roman period, N = 2); Gorenje Skopice (Roman period, N = 2); Ljubljana/*Emona* (Roman period, N = 5); Školarice (Roman period, N = 2); Hrušica/*Ad Pirum* (Roman period, N = 3); Pristava (Early Middle Ages, N = 2). The metric data for the site of Pristava was provided by Toškan and Dirjec (2008, 150), while the rest is represented by personal unpublished data. All measurements are in mm.

"rimskih" goved prišlo vendarle prej kot na območju jugovzhodnih Alp.

Prisotnost naprednih "rimskih" goved v vzorcu s Tonovcovega gradu dokazuje tudi *slika 8.18*, kjer je prikazano razmerje med širino in globino distalnega dela golenice za posamezna prazgodovinska in rimskodobna ter eno zgodnjesrednjeveško najdišče na Slovenskem. Med največjimi primerki, ki jih skoraj izključno predstavljajo rimskodobne golenice, je namreč tudi ena s Tonovcovega gradu.[52] Glede na to, da na *sliki 8.18* nisva razlikovala med golenicami samcev in samic, je seveda pomemben del izkazane variabilnosti utemeljeno pripisati prav spolnemu dimorfizmu in ne prisotnosti dveh (več?) različnih oblik goveda. Vendar pa lahko prekrivanje metričnih podatkov o

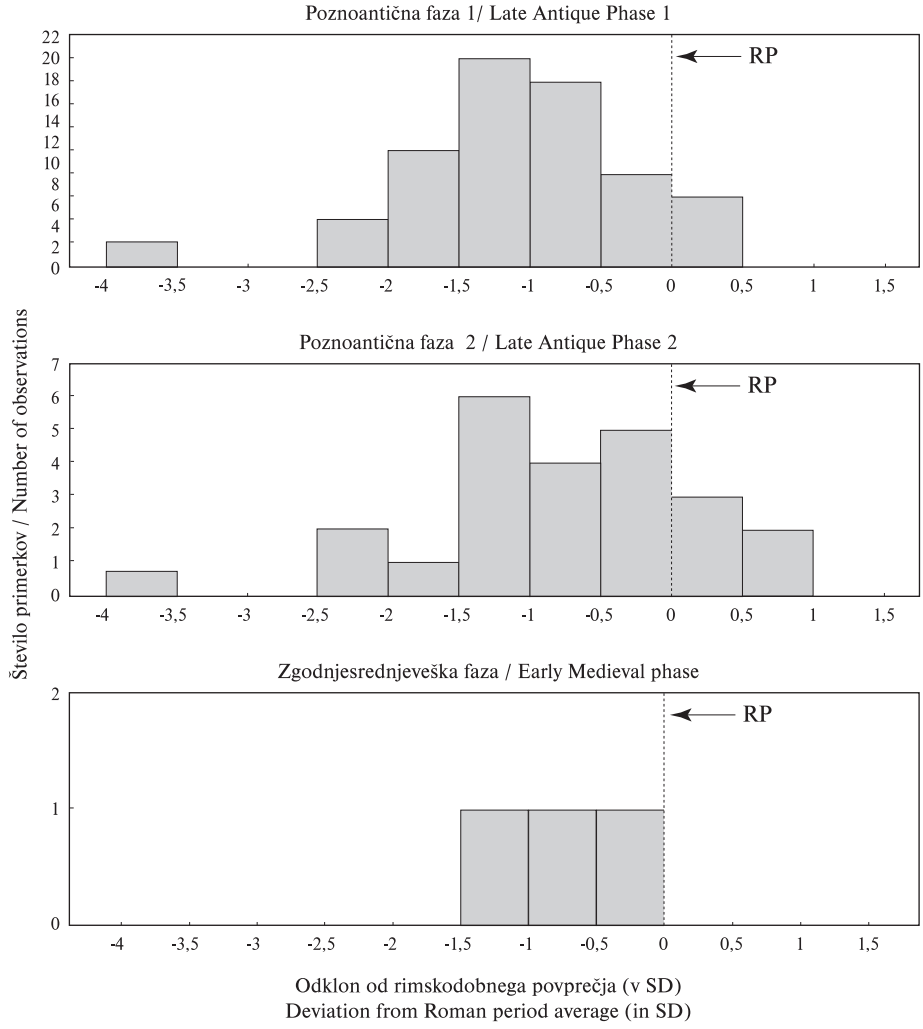
[52] Najdba (morda ne po naključju) izvira iz starejše, tj. prve faze poznoantične poselitve najdišča.

cattle tibia measurements from the Roman period site of Nickelsdorf in Eastern Austria, where the remains of only the large "Roman" cattle were found (Riedel 2004, 465 ff).[55] It should thus not be considered speculative to conclude that the largest specimens from *figure 8.18* (including at least one from Tonovcov grad)[56] are to be reliably related to the advanced "Roman" form/breed, despite the heterogeneous composition of the assemblage in terms of sex.

The analysis of the size of cattle from Tonovcov grad will be concluded with the comparison between the materials from both Late Antiquity settlement phases

[55] The estimate of the sex profile for the material from Nickelsdorf shows an equal share of both sexes (N = 36). In the case of Tonovcov grad we have sexed 15 sufficiently preserved pelvis fragments, ascribing 13 specimens to cows and two to oxen.

[56] See also *table 8.3*.



Sl. 8.19: Porazdelitev standardiziranih dimenzij dolgih kosti (nadlahtnica, koželjnica, dlančnica, golenica, stopalnica) ter petnic in skočnic domačega goveda s Tonovcovega gradu po posameznih fazah. Vsak skeletni element je zastopan le s po eno dimenzijo. Postopek standardiziranja dimenzij je podan v pogl. 8.1. Legenda: RP – rimskodobno povprečje, izračunano na osnovi govejih ostankov iz rimskega mesta Tác/*Gorsium* (Madžarska; Bökönyi 1984).
Fig. 8.19: Distribution of standardised metric data of cattle long bones (humerus, radius, metacarpus, tibia, metatarsus) as well as calcanei and astragali from Tonovcov grad, by settlement phases. Every skeletal element is represented by a single measure. The procedure for standardising the metric data is given in chapter 8.1. Legend: RP – Roman Period average, calculated on the basis of cattle remains from the Roman town of Tác/*Gorsium* (Hungary; Bökönyi 1984).

lokalnem in "rimskem" govedu pričakujemo predvsem na osrednjem delu "oblaka", kjer se umeščajo tako samci in kastrati prvih kot tudi samice drugih. To je lepo razvidno iz razpona vrednosti obeh merjenih dimenzij za domače govedo z rimskodobnega najdišča Nickelsdorf v vzhodni Avstriji, kjer so sicer naleteli izključno na ostanke velikega "rimskega" goveda (Riedel 2004, 465 ss).[53] Iz navedenega izhaja, da je največje primerke s *slike 8.18* (vključno z vsaj enim s Tonovcovega gradu) (*Fig. 8.19*). The results showed no substantial differences, thus contradicting the possibility of the existence of any noticeable change in the (average) size of these animals between the end of the 4th century all the way to the beginning of the 7th century. The same holds true also if the small Early Medieval assemblage is also considered.[57] Such a conclusion is in line with what has been described above (*Figs. 8.15-8.18*) and was thus to be expected. It indicates that in the broader area of Tonovcov grad the process of substituting the advanced "Roman" breed of cattle with the small local form had most likely ended before the first Late Antiquity settlement phase of the site

[53] Ocenjena spolna struktura za gradivo iz Nickelsdorfa kaže primerljiv delež obeh spolov (N = 36). V primeru Tonovcovega gradu sva spol ugotavljala pri 15 ustrezno ohranjenih fragmentih medenice, od katerih sva jih 13 pripisala kravam, preostala dva pa volom.

[57] Kruskal-Wallis ANOVA: H (2, N = 58) = 2.81; p = 0.245.

vega gradu)[54] navkljub spolno heterogenemu vzorcu vendarle utemeljeno pripisati napredni "rimski" obliki.

Analizo velikosti domačega goveda s Tonovcovega gradu končujeva s primerjavo med gradivom iz obeh faz poznoantične poselitve (*sl. 8.19*). Omembe vrednih razlik nisva ugotovila, tako da o opaznejšem trendu spreminjanja velikosti živali v obdobju od konca 4. pa tja do začetka 7. stoletja na podlagi razpoložljivih podatkov ne moreva govoriti. Kot so pokazali rezultati statističnega testiranja, takšnih trendov ni zaznati niti ob hkratnem upoštevanju gradiva zgodnjesrednjeveške starosti (tj. zgodnjesrednjeveške faze),[55] ki sicer izstopa po razmeroma skromnem številu najdb. Ugotovitev je po svoje pričakovana, saj se je na obravnavanem območju proces prenosa težišča govedoreje z napredne "rimske" oblike na majhno lokalno govedo v pretežnem delu domnevno končal še pred prvo fazo poznoantične poselitve Tonovcovega gradu (*sl. 8.15–8.19*). Morebitni nadaljnji upad povprečne velikosti goved v 8. in morda 9. stoletju (*cf.* Toškan, Dirjec 2008, Tab. 6A) pa bi bilo spričo skromnosti razpoložljivega vzorca iz zgodnjesrednjeveške faze tako ali tako zelo težko zaznati.

8.5.2 OVCA

Podobno kot pri domačem govedu se je z začetkom rimskega obdobja povečala tudi povprečna velikost ovac, k čemur je prispeval predvsem uvoz naprednih "rimskih" oblik (Bökönyi 1974, sl. 49). Njihovo število se je v nemirnem obdobju preseljevanja ljudstev nato postopoma manjšalo, kar se v arheozoološkem zapisu kaže predvsem kot upad povprečne velikosti posameznih skeletnih elementov. Podobno kot pri govedu je tudi do usihanja števila naprednih "rimskih" ovac najprej prišlo v bolj oddaljenih provincah, medtem ko so se te v nižinskem in predalpskem delu severne Italije obdržale vse tja do zgodnjega srednjega veka (Riedel 1994b, 54).

Glede na zgoraj navedeno je primerjava standardiziranih metričnih podatkov ovčjih kosti s Tonovcovega gradu in pa tistih z več sočasnih najdišč severne Italije, Avstrije in zahodne Madžarske dala pričakovane rezultate (*sl. 8.20*). Ovce z italijanskih naselbin Invillino, Videm/Udine in Verona (skupek VR-1) so bile namreč v povprečju statistično značilno večje od ovac s Tonovcovega gradu[56] oz. sočasnih avstrijskih najdišč. Po drugi strani primerjava Tonovcovega gradu z najdišči proti vzhodu ni izpostavila omembe vrednih razlik.[57]

[54] Glej tudi *tabelo 8.3*.

[55] Kruskal-Wallisova ANOVA: H (2, N = 58) = 2,81; p = 0,245.

[56] Mann-Whitneyjev U-test: U = 337,5; Z = -2,34; p = 0,019.

[57] Primerjava med ovcami s Tonovcovega gradu in tistimi s sočasnih najdišč v Avstriji oz. na Madžarskem: Mann-Whitneyjev U-test: U = 179,0; Z = -0,73; p = 0,468. Primer-

studied here even begun. Given the modest assemblage size dated to the Early Medieval phase any further decline in the average size of cattle in the 8th and possibly 9th century, although expected (*cf.* Toškan, Dirjec 2008, Tab. 6A), would be rather hard to detect.

8.5.2 SHEEP

As was the case with cattle, the beginning of the Roman period in Central Europe also saw an increase in the average size of sheep, which was presumably a result of the imports of the advanced "Roman" form/breed (Bökönyi 1974, Fig. 49). During the turbulent Migration period the presence of the latter breed gradually declined, which is reflected in the arheozoological record in the drop of the average size of individual skeletal elements. Similar to cattle the number of advanced "Roman" sheep first dwindled in the more remote provinces, while those in the north Italian lowlands and Pre-Alpine hills remained rather numerous until the Early Medieval period (Riedel 1994b, 54).

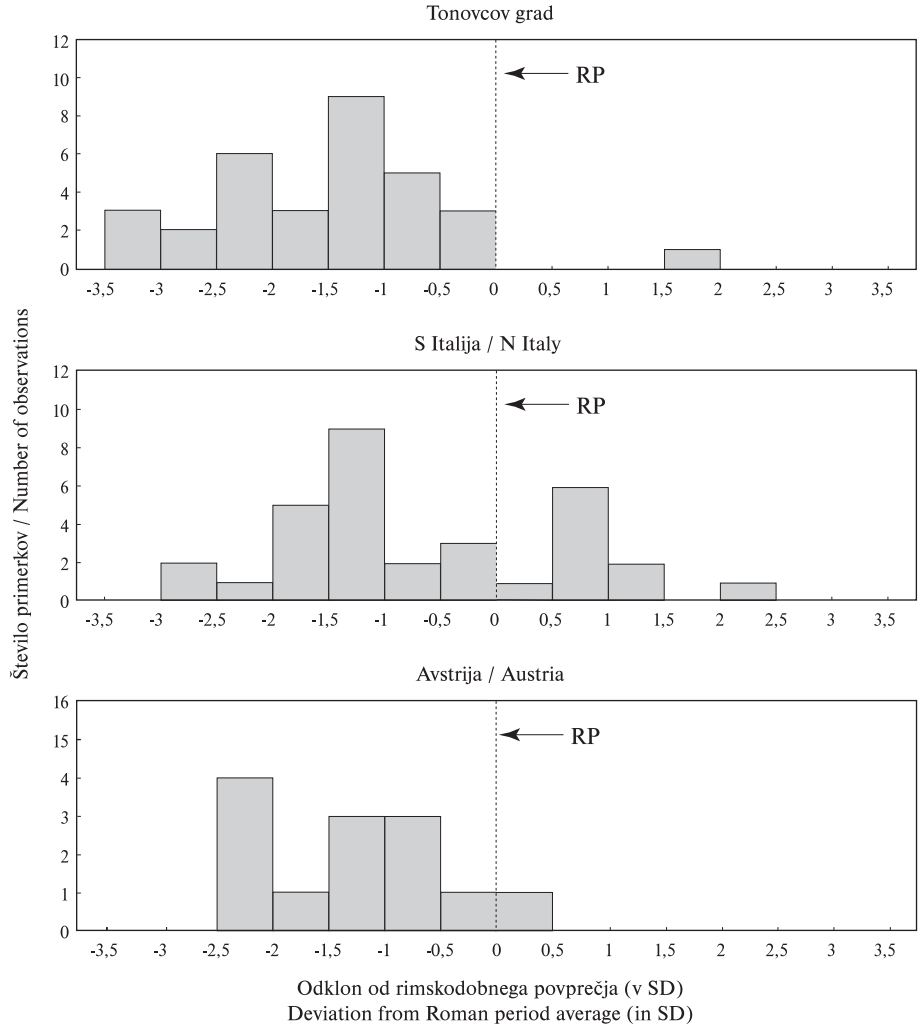
With the above in mind the results of the comparison between the standardized measurements of sheep bones from Tonovcov grad with those from several contemporary sites in north Italy, Austria and west Hungary are all but surprising (*Fig. 8.20*). Sheep from settlements of Invillino, Udine and Verona (complex VR-1) in Italy were on average statistically significantly larger than those from Tonovcov grad[58] or Austrian sites from the same period. On the other hand, comparing Tonovcov grad with sites in the east did not show any substantial difference.[59]

Figure 8.20 shows that Late Antique sheep from the territory of present-day Slovenia formed a metrically rather homogeneous population. In contrast to this the comparison between the standardized measurements of Late Antique sheep long bones and the material dated to the period between the 1st and 4th centuries AD demonstrates considerable metric heterogeneity. On average the sheep from Tonovcov grad were statistically significantly smaller than those from the e.g. Roman period site of Ribnica/*Romula*.[60] This was allegedly due to the higher numbers of advanced "Roman" sheep in the latter assemblage.

[58] Mann-Whitney U test: U = 337.5; Z = -2.34; p = 0.019.

[59] The comparison between the sheep from Tonovcov grad and those from the contemporary sites in Austria and Hungary: Mann-Whitney U test: U = 179.0; Z = -0.73; p = 0.468. The comparison between the material from Tonovcov grad and Ajdovski Gradec above Vranje: Mann-Whitney U test: U = 378.0; Z = 0.02; p = 0.980. The remains from Tonovcov grad and Ajdovski Gradec did not show any statistically significant differences amongst goat remains (Man-Whitney U test: U = 17.0; Z = -1.27; p = 0.203).

[60] Mann-Whitney U test: U = 47.0; Z = -3.11; p = 0.002. Standardized measurements for long bones were used as a size indicator.



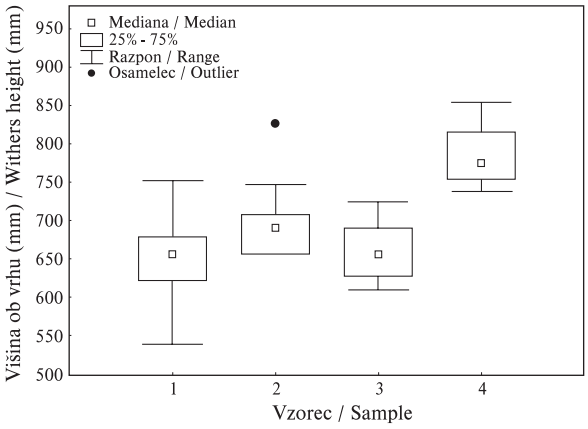
Sl. 8.20: Porazdelitev standardiziranih dimenzij dolgih kosti (nadlahtnica, dlančnica, stopalnica) ovce s Tonovcovega gradu ter z več sočasnih najdišč severne Italije, Avstrije in zahodne Madžarske. Vsak skeletni element je zastopan le s po eno dimenzijo. Postopek standardiziranja dimenzij je podan v pogl. 8.1. Legenda: RP – rimskodobno povprečje, izračunano na osnovi ovčjih ostankov iz rimskega mesta Tác/*Gorsium* (Madžarska; Bökönyi 1984). Seznam najdišč S Italije: Invillino (Stork, von den Driesch 1987); Videm/Udine, grad (Riedel 1993b); Verona: skupek VR-I (Riedel 1994a). Seznam najdišč Avstrije: Kappele (Pucher 1993); Sveta Hema/Hemmaberg (Forstenpointner *et al*. 2002); Drösing (Riedel 2007). Najdišče z zahodne Madžarske: Sopron/*Scarbantia* (Bökönyi 1986).

Fig. 8.20: Distribution of standardised metric data of sheep long bones (humerus, metacarpus, metatarsus) as well as calcanei and astragali from Tonovcov grad and from a number of contemporary sites in Northern Italy, Austria and Western Hungary. Each skeletal element is represented by a single measure. The procedure for standardising the metric data is given in chapter 8.1. Legend : RP – Roman Period average, calculated on the basis of sheep remains from the Roman town of Tác/*Gorsium* (Hungary; Bökönyi 1984). The list of sites in N Italy: Invillino (Stork, von den Driesch 1987); Udine, castle (Riedel 1993b); Verona: complex VR-I (Riedel 1994a). List of sites in Austria: Kappele (Pucher 1993); Hemmaberg (Forstenpointner *et al*. 2002); Drösing (Riedel 2007). Site in Western Hungary: Sopron/*Scarbantia* (Bökönyi 1986).

Sodeč po *sliki 8.20* so torej ovce na Slovenskem v pozni antiki tvorile metrično razmeroma homogeno populacijo. V nasprotju s tem kaže primerjava standardi-

java med gradivom s Tonovcovega gradu in z Ajdovskega Gradca nad Vranjem: Mann-Whitneyjev U-test: U = 378,0; Z = 0,02; p = 0,980. Med ostanki s Tonovcovega gradu in tistimi z Ajdovskega Gradca statistično značilnih razlik nisva ugotovila niti v primeru koz (Man-Whitneyjev U-test: U = 17,0; Z = -1,27; p = 0,203).

Contrary to the above, the comparison between the withers heights of prehistoric, Roman and Late Antique sheep has not shown any significant differences (Kruskal-Wallis test: p > 0.05; *Fig. 8.21*). Is the observed discrepancy between the outcomes of the two comparisions (i.e. *Fig. 8.20 vs. Fig. 8.21*) explainable with the latter assemblages being much smaller than was the case with the comparison between the standardized measurements of long bones (*Fig. 8.20*)? At least in



ziranih metričnih podatkov ovčjih dolgih kosti poznoantične starosti z gradivom iz obdobja med 1. in 4. stoletjem precejšnjo metrično heterogenost. Ovce s Tonovcovega gradu so bile tako npr. v povprečju celo visoko statistično značilno manjše od tistih z rimskodobnega najdišča Ribnica na Dolenjskem,[58] domnevno zaradi večje številčnosti naprednih "rimskih" ovac v starejšem od obeh vzorcev. Velja pa v zvezi z zgoraj navedenim opozoriti, da primerjava plečne višine ovac prazgodovinske, rimskodobne in poznoantične starosti ni izpostavila podobno očitnih razlik med obdobji (test Kruskal-Wallis: $p > 0,05$; *sl. 8.21*). Res je sicer, da so bili vzorci v slednjem primeru manjši kot ob primerjavi standardiziranih metričnih podatkov dolgih kosti (*sl. 8.20*), kar gotovo zmanjšuje njihovo reprezentativnost. Po drugi strani pa je tudi res, da vključuje poznoantično gradivo s *slike 8.21* najdbe iz petih rimskodobnih najdišč, medtem ko sva standardizirane metrične podatke primerjala le med vzorcema s Tonovcovega gradu in Ribnice na Dolenjskem. Vprašanje številčnosti velikih "rimskih" ovac na Slovenskem v rimskem obdobju ostaja torej za zdaj brez dokončnega odgovora. Je pa tako na podlagi razlik v standardiziranih metričnih podatkih med gradivom s Tonovcovega gradu in z rimskodobnega mesta Tác/*Gorsium* (*sl. 8.20*) kot tudi iz razlike med višino ob vihru ovac s tukaj obravnavanega najdišča in iz rimskodobne vile rustike v avstrijskem Nickelsdorfu[59] (*sl. 8.21*) nedvoumno razvidno, da je bilo na Tonovcovem gradu velikih "rimskih" ovac razmeroma malo, tako da je ovčereja temeljila predvsem na primitivni lokalni obliki pasme te vrste.

Primerjava standardiziranih metričnih podatkov ovčjih ostankov iz obeh faz poznoantične poselitve Tonovcovega gradu ne kaže na obstoj statistično značilnih trendov spreminjanja velikosti v času (Mann-Whitneyjev U-test: $U = 28,5$; $Z = -1,35$; $p = 0,177$; *sl. 8.22*). Skladni s tem so rezultati medfazne primerjave višine ob

[58] Mann-Whitneyjev U-test: $U = 47,0$; $Z = -3,11$; $p = 0,002$. Kot kazalnik velikosti sva uporabila standardizirane metrične podatke dolgih kosti.

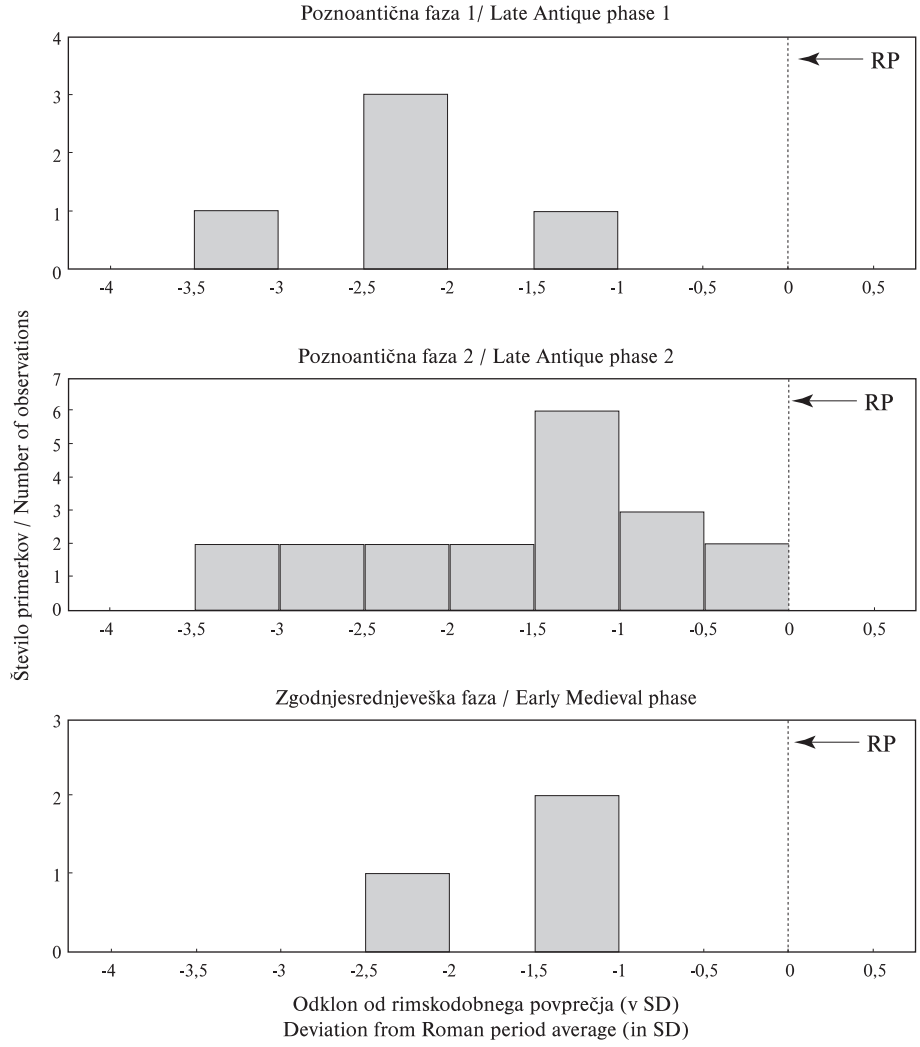
[59] V okviru vile rustike v Nickelsdorfu so bili najdeni le ostanki velikih "rimskih" ovac (Riedel 2004, 478 s).

Sl. 8.21: Višina ob vihru za ovce s prazgodovinskih (vzorec 1), rimskodobnih (vzorec 2) in poznoantičnih (vzorec 3) najdišč ter iz vile rustike v avstrijskem Nickelsdorfu (vzorec 4; Riedel 2004). Višina ob vihru je bila ocenjena na osnovi največje dolžine lateralnega dela skočnice (GLl *sensu* von den Driesch 1976) z aplikacijo Teichertovih koeficientov (*cf.* Riedel 1986, 125). Seznam in velikost (N) vzorcev: Pupićina peć, Istra (mlajša kamena doba; N = 5; Miracle, Pugsley 2006); Maharski prekop, Slovenija (bakrena doba; N = 1); Brixlegg, Avstrija (zgodnja bronasta doba; N = 23; Riedel 2003); Cvinger, Slovenija (starejša železna doba; N = 1); Jama I na Prevali, Slovenija (starejša železna doba; N = 1; Riedel 1977); Vrhnika/*Nauportus*, Slovenija (rimska doba; N = 1); Ljubljana/*Emona*, Slovenija (rimska doba; N = 2); Školarice, Slovenija (rimska doba; N = 2); Ribnica na Dolenjskem/*Romula*, Slovenija (rimska doba; N = 5); Hrušica/*Ad Pirum*, Slovenija (rimska doba; N = 1); Tonovcov grad (pozna antika; N = 12); Videm/Udine: grad, Italija (pozna antika; N = 3; Riedel 1993b).
Fig. 8.21: The withers height of sheep from prehistoric (sample 1), Roman period (sample 2) and Late Antique (sample 3) sites as well as from the *villa rustica* at Nickelsdorf (sample 4, Austria; Riedel 2004). The withers height was estimated on the basis of the greatest length of the lateral part of astragali (GLl *sensu* von den Driesch 1976) and the application of Teichert's coefficient (*cf.* Riedel 1986, 125). List and size (N) of samples: Pupićina peć, Istria-Croatia (Early Stone Age; N = 5; Miracle, Pugsley 2006); Maharski prekop, Slovenia (Copper Age; N = 1); Brixlegg, Austria (Early Bronze Age; N = 23; Riedel 2003); Cvinger, Slovenia (Late Iron Age; N = 1); Jama I na Prevali, Slovenia (Late Iron Age; N = 1; Riedel 1977); Vrhnika/*Nauportus*, Slovenia (Roman period; N = 1); Ljubljana/*Emona*, Slovenia (Roman period; N = 2); Školarice, Slovenia (Roman period; N = 2); Ribnica na Dolenjskem/*Romula*, Slovenia (Roman period; N = 5); Hrušica/*Ad Pirum*, Slovenia (Roman period; N = 1); Tonovcov grad (Late Antiquity; N = 12); Udine: castle, Italy (Late Antiquity; N = 3; Riedel 1993b).

part the answer could be positive, as small assemblages are often far from being representative. On the other hand, it is also true that the Late Antique material from *figure 8.21* includes finds from five Roman period sites, while for the standardized measurements comparison only the assemblages from Tonovcov grad and Ribnica/*Romula* were used. Despite all, the discrepancies in the standardized measurements between the material from Tonovcov grad and the Roman town of Tác/*Gorsium* (*Fig. 8.20*), as well as the difference between the withers height of sheep from Tonovcov grad and those from the Roman villa rustica in Nickelsdorf, Austria,[61] (*Fig. 8.21*) clearly show that there were relatively few large "Roman" sheep at Tonovcov grad. It may thus be concluded that sheep exploitation appears to have been mainly based on the local primitive form(s).

The comparison between the standardized measurements of sheep remains from the two Late Antiquity settlement phases at Tonovcov grad is not indicative

[61] Only remains of the large "Roman" sheep were discovered in the *villa rustica* in Nickelsdorf (Riedel 2004, 478 f).



Sl. 8.22: Porazdelitev standardiziranih dimenzij dolgih kosti (nadlahtnica, dlančnica, stopalnica) ovce s Tonovcovega gradu po posameznih fazah. Vsak skeletni element je zastopan le s po eno dimenzijo. Postopek standardiziranja dimenzij je podan v pogl. 8.1. Legenda: RP – rimskodobno povprečje, izračunano na osnovi ovčjih ostankov iz rimskega mesta Tác/*Gorsium* (Madžarska; Bökönyi 1984).
Fig. 8.22: Distribution of standardised metric data of sheep long bones (humerus, metacarpus, metatarsus) from Tonovcov grad, by individual settlement phase. Each skeletal element is represented by a single measure. The procedure for standardising the metric data is given in chapter 8.1. Legend: RP – Roman Period average, calculated on the basis of sheep remains from the Roman town of Tác/*Gorsium* (Hungary; Bökönyi 1984).

vihru, ocenjene na podlagi dimenzij skočnic in petnic; tudi v tem primeru namreč razlika med obema poznoantičnima fazama ne dosega meje statistične značilnosti (Mann-Whitneyjev U-test: U = 15,5; Z = 0,38; p = 0,700; N = 13). Podatkov za zgodnjesrednjeveško fazo je sicer malo, a tudi ti ne odstopajo od razpona vrednosti za ovce poznoantične starosti (Kruskal-Wallisov ANOVA-test: H [2, N = 27] = 2,06; p = 0,356).

8.5.3 DOMAČI PRAŠIČ

Časovna nihanja v velikosti domačega prašiča so bila bistveno bolj omejena kot pri domačem govedu in

of any statistically significant diachronic variation in sheep body-size (Mann-Whitney U test: U = 28.5; Z = -1.35; p = 0.177; *Fig. 8.22*). This is further corroborated by the results of the inter-phase comparison in withers heights, estimated from the dimensions of astragali and calcanei. Even in this case the difference between Late Antiquity phases 1 and 2 are not statistically significant (Mann-Whitney U test: U = 15.5; Z = 0.38; p = 0.700; N = 13). There are only a few data available for the Early Medieval phase, but the existing material falls within the range seen in Late Antique sheep from the same site (Kruskal-Wallis ANOVA test: H [2, N = 27] = 2.06; p = 0.356).

drobnici (Riedel 1994, sl. 6d). Romanizacija jugovzhodnoalpskega prostora je sicer prispevala k izboljšanim pogojem reje tudi v primeru prašičev, kar je rezultiralo v dvigu povprečne višine ob vihru nasproti stanju v železni dobi. Drugače kot pri govedu in drobnici pa domači prašiči z rimskodobnih, poznoantičnih in zgodnjesrednjeveških najdišč Srednje Evrope po velikosti niso nujno presegali prazgodovinskih, predvsem ne tistih bronastodobnih (Bökönyi 1974, 212 ss).

Ne glede na manj izrazita velikostna nihanja domačih prašičev v času pa primerjava standardiziranih dimenzij dolgih kosti omenjene vrste s Tonovcovega gradu, sočasnih najdišč iz severne Italije ter z Avstrijskega kaže razlike, ki presegajo mejo statistične značilnosti (test Kruskal-Wallis: H [2, N = 81] = 20,79; p = 0,000; *sl. 8.23*). Izstopajo predvsem očitno manjši primerki s Tonovcovega gradu, medtem ko med gradivom iz severne Italije in z Avstrijskega statistično značilnih razlik nisva ugotovila.[60] V zvezi s slednjima dvema vzorcema velja pri tem dodati tudi to, da večjih odstopanj ne kažeta niti v primerjavi z rimskodobnimi primerki (*sl. 8.23*), kar potrjuje naše vedenje o relativno majhnih časovnih nihanjih v velikosti omenjene vrste. Drugače je pri prašičih s Tonovcovega gradu, ki so statistično značilno manjši od rimskodobnih primerkov iste vrste tako z Madžarskega (*sl. 8.23*) kot tudi s Slovenskega (Mann-Whitneyjev U-test: U = 333,5; Z = -3,36; p = 0,001). Višina ob vihru za domačega prašiča s Tonovcovega gradu, ocenjena na podlagi dimenzij skočnic, niha med 60,8 in 74,2 cm (Me = 69,8; razpon: 60,8–74,2; N = 7; *cf.* Teichert 1969) oz. med 60,8 in 64,8 cm (Me = 63,5; razpon: 60,8–64,8; N = 7; *cf.* May *et al.* 1996).

Sodeč po *sliki 8.23* torej domači prašiči na jugovzhodnoalpskem območju v pozni antiki niso tvorili metrično homogene populacije. Skladen s tem je podatek, da primerjava prašičjih ostankov s Tonovcovega gradu in s sočasnega najdišča Ajdovski Gradec nad Vranjem (Bartosiewicz, Choyke 1985) ni pokazala omembe vrednih razlik v njihovih dimenzijah, so pa zato eni in drugi statistično značilno manjši od ostankov iste vrste s prav tako poznoantične naselbine Tinje nad Loko pri Žusmu (Turk 2000).[61] V ugotovljeni heterogenosti se najverjetneje kaže različno razmerje med večjimi "rimskimi" in manjšimi lokalnimi prašiči v okviru razpoložljivih vzorcev (*cf.* Bökönyi 1974, 216), morda pa tudi različne

[60] Primerjava med prašiči s Tonovcovega gradu in s sočasnih najdišč v S Italiji: Mann-Whitneyjev U-test: U = 163,0; Z = -3,23; p = 0,001. Primerjava med gradivom s Tonovcovega gradu in s sočasnih najdišč iz Avstrije: Mann-Whitneyjev U-test: U = 171,0; Z = -3,97; p = 0,000. Med ostanki poznoantične starosti iz S Italije in z Avstrijskega statistično značilnih razlik nisva ugotovila (Man-Whitneyjev U-test: U = 136,0; Z = -0,76; p = 0,445).

[61] Primerjava med gradivom s Tonovcovega gradu in z Ajdovskega Gradca nad Vranjem: Mann-Whitneyjev U-test: U = 136,0; Z = 1,09; p = 0,274. Primerjava med gradivom s Tonovcovega gradu in s Tinja nad Loko pri Žusmu: Mann-Whitneyjev U-test: U = 102,5; Z = -2,67; p = 0,007.

8.5.3 PIG

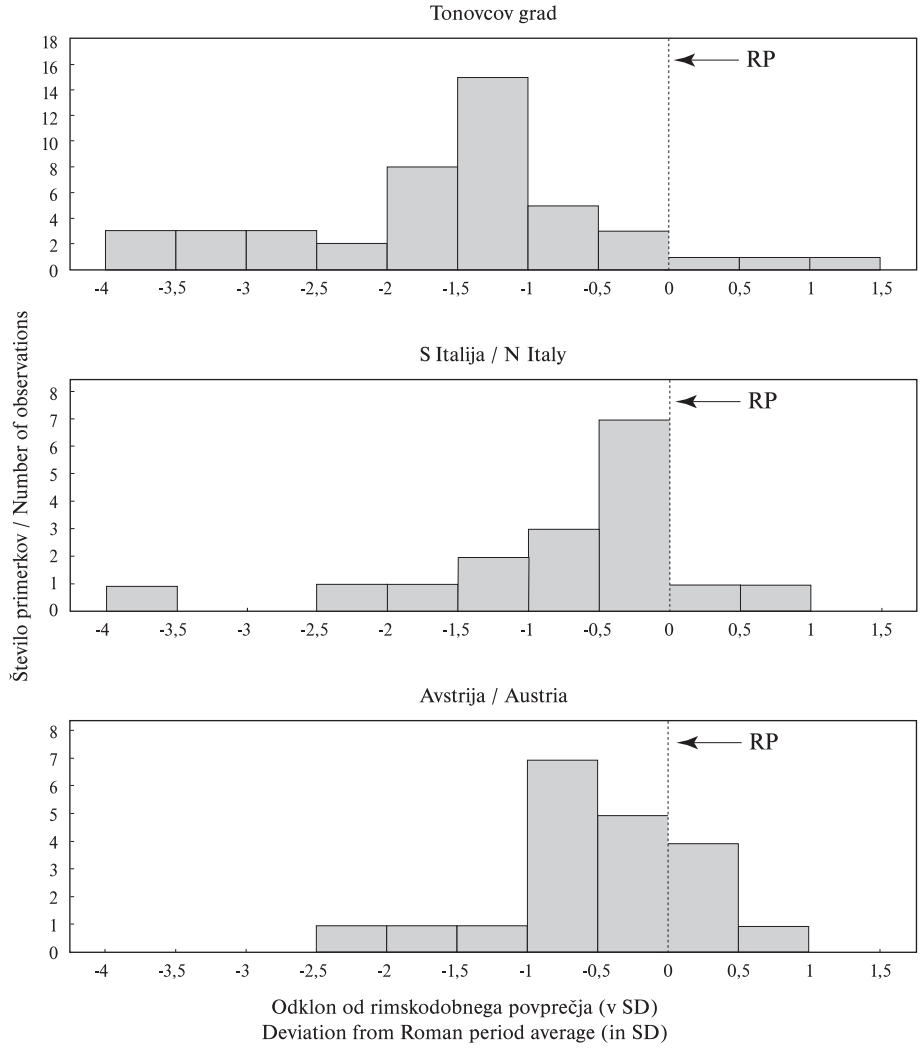
Diachronic variation in pig body-size was not as great as observed in cattle and caprines (Riedel 1994, Fig. 6d). The improved conditions for pig husbandry brought to the region by the Romans did result in the rise of the average withers height when compared to the Iron Age. Nevertheless, the pigs from Roman period, Late Antique and Early Medieval sites in Central Europe were not necessarily superior in size to the prehistoric ones, especially not to those from the Bronze Age (Bökönyi 1974, 212 ff).

Regardless of the less pronounced diachronic variations in pig body-size, the comparison between the standardized measurements of suine long bones from Tonovcov grad and several contemporary sites in northern Italy and Austria show statistically significant differences (Kruskal-Wallis test: H [2, N = 81] = 20.79; p = 0.000; *Fig. 8.23*). The markedly smaller specimens from Tonovcov grad clearly stand out, while the material from northern Italy and Austria show no statistically significant differences.[62] In relation to the latter two assemblages we should add that they do not show any major discrepancies relative to Roman period specimens (*Fig. 8.23*), thus confirming the thesis of relatively limited fluctuations in the size of the studied species through time. The pigs from Tonovcov grad show a different picture, for they are significantly smaller than those originating from Roman period sites (Tác/*Gorsium*: *Fig. 8.23*; Ribnica/*Romula*: Mann-Whitney U test: U = 333.5; Z = -3.36; p = 0.001). The withers height of pigs from Tonovcov grad, estimated on the basis of the size of astragali, varies between either 60.8 and 74.2 cm (Me = 69.8, range: 60.8-74.2; N = 7; *cf.* Teichert 1969) or between 60.8 and 64.8 cm (Me = 63.5, range: 60.8-64.8; N = 7; *cf.* May *et al.* 1996), depending of the methodology used.

What follows from *figure 8.23* is that pigs in the area of Southeastern Alps did not form a metrically homogeneous population during Late Antiquity. This is consistent with the fact that the comparison between pig remains from Tonovcov grad and from the contemporary settlement of Ajdovski Gradec above Vranje (Bartosiewicz, Choyke 1985) did not show any noteworthy differences in their sizes, however both are statistically significantly smaller than the remains from another Late Antique site in the broader region – Tinje above Loka pri Žusmu (Turk 2000).[63] The ob-

[62] The comparison between the pigs from Tonovcov grad and from sites in Northern Italy: Mann-Whitney U test: U = 163.0; Z = -3.23; p = 0.001. The comparison between the pigs from Tonovcov grad and from sites in Austria: Mann-Whitney U test: U = 171.0; Z = -3.97; p = 0.000. We have not found statistically significant differences between the Late Antique assemblages from Northern Italy and Austria (Man-Whitney U test: U = 136.0; Z = -0.76; p = 0.445).

[63] The comparison between the material from Tonovcov



Sl. 8.23: Porazdelitev standardiziranih dimenzij dolgih kosti (nadlahtnica, koželjnica, golenica) ter skočnic domačega prašiča s Tonovcovega gradu ter z več sočasnih najdišč severne Italije in Avstrije. Vsak skeletni element je zastopan le s po eno dimenzijo. Postopek standardiziranja dimenzij je podan v pogl. 8.1. Legenda: RP – rimskodobno povprečje, izračunano na osnovi prašičjih ostankov iz rimskega mesta Tác/*Gorsium* (Madžarska; Bökönyi 1984). Seznam najdišč S Italije: Invillino (Stork, von den Driesch 1987); Monte Barro (Baker 1991); Videm/Udine: grad (Riedel 1993b); Verona: skupek VR-I (Riedel 1994a). Seznam najdišč Avstrije: Kappele (Pucher 1993); Teriola (Pucher 2003); Sveta Hema/Hemmaberg (Forstenpointner *et al*. 2002); Drösing (Riedel 2007).
Fig. 8.23: Distribution of standardised metric data of pig long bones (humerus, radius, tibia) as well as astragali from Tonovcov grad and from a number of contemporary sites in Northern Italy and Austria. Each skeletal element is represented by a single measure. The procedure for standardising the metric data is given in chapter 8.1. Legend : RP – Roman Period average, calculated on the basis of pig remains from the Roman town of Tác/*Gorsium* (Hungary; Bökönyi 1984). The list of sites in N Italy: Invillino (Stork, von den Driesch 1987); Monte Barro (Baker 1991); Udine, castle (Riedel 1993b); Verona: complex VR-I (Riedel 1994a). List of sites in Austria: Kappele (Pucher 1993); Teriola (Pucher 2003); Hemmaberg (Forstenpointner *et al*. 2002); Drösing (Riedel 2007).

ekološke danosti posameznih okolij. Ker so razpoložljivi vzorci pogosto majhni (npr. Ajdovski gradec: N = 9; Tinje: N = 12), je ugotovljene razlike težko interpretirati. V primeru gradiva s Tonovcovega gradu pa se kljub vsemu zdi, da skromno število ostankov večjih "rimskih" prašičev (*sl. 8.24*) kaže na vsesplošno poslabšanje življenjskih razmer v obdobju pozne antike. Po drugi strani pa je tudi res, da so se na območjih zunaj Apeninskega polotoka celo v mirnejših časih od 1. do 4. stoletja večji prašiči množično pojavljali le v okviru gospodarskih posestev rimske poli-

served heterogeneity most likely reflects differential contributions by larger "Roman" and smaller local pigs to individual assemblages (*cf.* Bökönyi 1974, 216) and possibly also differing ecological characteristics of individual habitats. As these assemblages are often small (e.g. Ajdovski gradec: N = 9; Tinje: N = 12), the

grad and Ajdovski Gradec above Vranje: Mann-Whitney U test: U = 136.0; Z = 1.09; p = 0.274. The comparison between the material from Tonovcov grad and Tinje above Loka pri Žusmu (Mann-Whitney U test: U = 102.5; Z = -2.67; p = 0.007).

Sl. 8.24: Grafični prikaz razmerja med največjo širino (Bd) in največjo globino (Dd) distalne epifize golenice domačega prašiča iz več različnih najdišč z območja današnje Slovenije. Seznam in velikost (N) vzorcev: Tonovcov grad (N = 13); Gornja Radgona (bronasta doba, N = 3); Veliki Vinji vrh (železna doba, N = 2); Cvinger (železna doba, N = 1); Grgar (železna doba, N = 1); Ig (železna doba, N = 1); Stična (železna doba, N = 10); Ribnica (rimska doba, N = 5); Školarice (rimska doba, N = 1); Pristava (zgodnji srednji vek, N = 1). Metrične podatke za najdišče Stična podaja Bökönyi (1994, 212), za Pristavo Toškan in Dirjec (2008, 150), preostanek pa predstavljajo lastni neobjavljeni podatki. Vse mere so v mm.

Fig. 8.24: Graphic representation of the relationship between the greatest breadth (Bd) and the greatest depth (Dd) of the tibial distal end in pigs from a number of sites in present-day Slovenia. List and size (N) of the samples: Tonovcov grad (N = 13); Gornja Radgona (Bronze Age, N = 3); Veliki Vinji vrh (Iron Age, N = 2); Cvinger (Iron Age, N = 1); Grgar (Iron Age, N = 1); Ig (Iron Age, N = 1); Stična (Iron Age, N = 10); Ribnica (Roman period, N = 5); Školarice (Roman period, N = 1); Pristava (Early Middle Ages, N = 1). The metric data for the site of Stična was provided by Bökönyi (1994, 212), for Pristava by Toškan and Dirjec (2008, 150), while the rest is represented by personal unpublished data. All measurements are in mm.

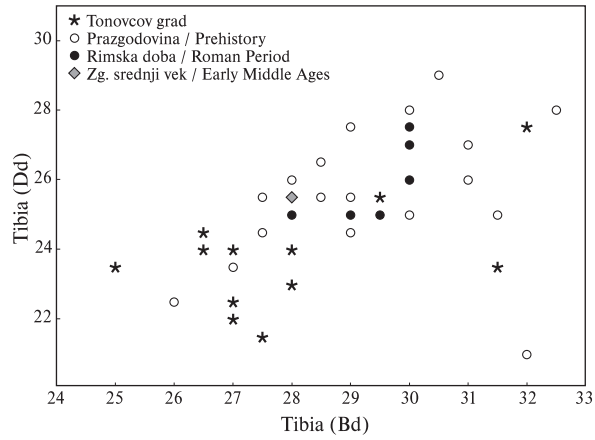
tične izbrane družbe (vila rustika), večjih mest in morda vojaških taborov (Bökönyi 1974, 216 s). Pri tem relativno velike dimenzije prazgodovinskih prašičev s *slike 8.24* ne gre interpretirati kot dokaz za nadpovprečno dobre pogoje reje v navedenem obdobju, temveč kot rezultat bolj ali manj sistematičnega križanja z divjim prašičem. Ta praksa naj bi bila v času železne dobe v Srednji Evropi postopoma opuščena (Bökönyi 1974, 211 ss).

Analizo velikosti domačega prašiča s Tonovcovega gradu končujeva s primerjavo med gradivom iz obeh faz poznoantične poselitve (*sl. 8.25*). Omembe vrednih razlik nisva ugotovila, tako da o opaznejšem trendu spreminjanja velikosti živali v obdobju od konca 4. pa tja do začetka 7. stoletja na podlagi razpoložljivih podatkov ne moreva govoriti. Kot so pokazali rezultati statističnega testiranja, ni takšnih trendov zaznati niti ob hkratnem upoštevanju gradiva zgodnjesrednjeveške starosti (Kruskal-Wallisova ANOVA: H [2, N = 42] = 5,25; p = 0,072), za katero je značilno razmeroma skromno število najdb.

8.5.4 KONJ

V primeru konja je razpoložljivih metričnih podatkov malo, zato poglobljene analize niso smiselne. Višino ob vihru je bilo mogoče oceniti le v primeru dveh metapodijev, ki pa sta verjetno pripadala isti živali. Obe kosti sta bili namreč najdeni neposredno druga poleg druge (kv./mkv. 719/D1; druga poznoantična faza), navrgli pa sta tudi zelo podobni oceni višine ob vihru, tj. med 133 in 139 cm (*tab. 8.17*). Navedeni konj[62] torej

[62] Da ne gre za mulo, je razvidno tako iz morfologije

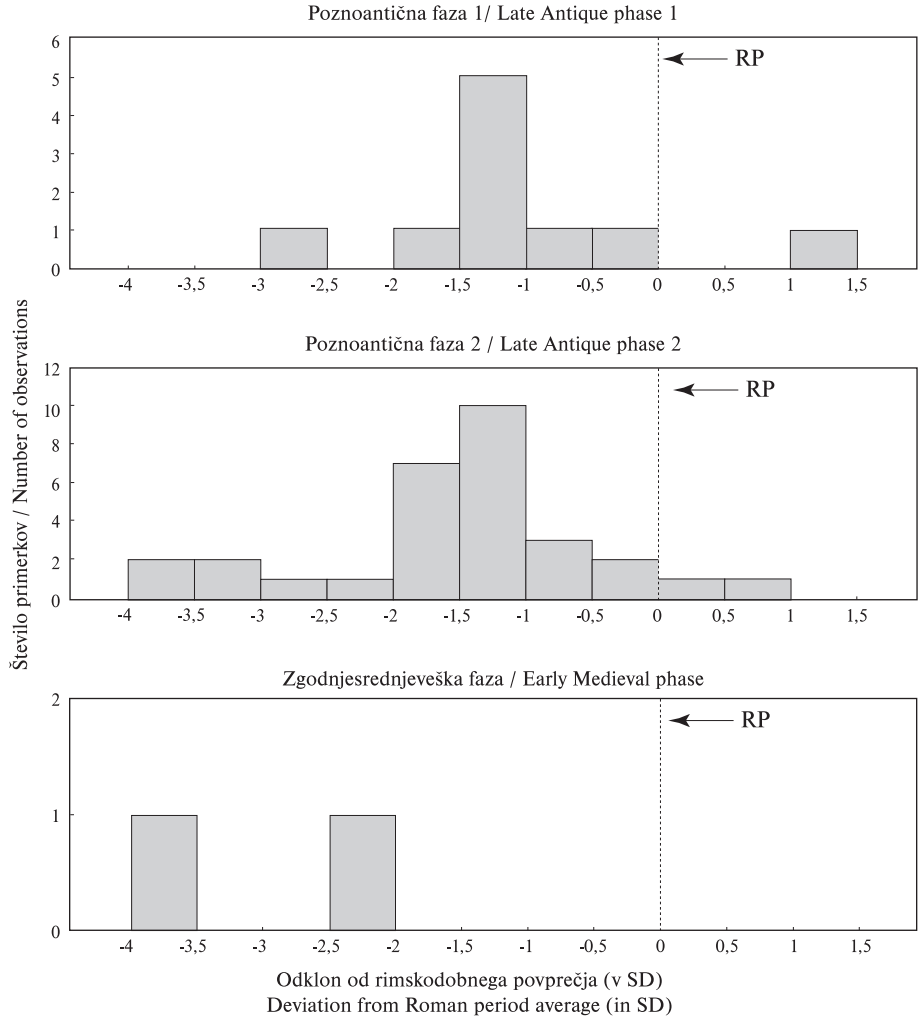


differences are not easy to interpret. Nevertheless, the modest numbers of the larger "Roman" pig remains in the much richer material from Tonovcov grad (N = 45) can be seen as being indicative of an overall deterioration in the living conditions in the Late Antique period (*Fig. 8.24*). On the other hand, it is also true that in the areas outside of the Apennine Peninsula – even in calmer times between the 1st and 4th century – larger pigs occurred in greater numbers only on larger estates owned by the Roman political elite (i.e. *villae rusticae*), main cities and possibly military camps (Bökönyi 1974, 216 f). At this the relatively large dimensions of the prehistoric pigs from *figure 8.24* should not be interpreted as a reflection of above average husbandry conditions, but as a result of a more or less systematic crossbreeding with the wild boar. This practice was supposedly abandoned in Central Europe only during the Iron Age (Bökönyi 1974, 211 ff).

We conclude the study of the variations in pig body-size at Tonovcov grad with a comparison between the material from both Late Antiquity phases (*Fig. 8.25*). No substantial differences were discovered, thus the available data does not indicate any trend of changes in the animal size between the end of the 4th and the beginning of the 7th century. As shown by the results of the statistical testing no trends could be detected even when the Early Medieval material (with a relatively modest assemblage) was taken into account (Kruskal-Wallis ANOVA: H [2, N = 42] = 5.25; p = 0.072).

8.5.4 HORSE

In view of the limited number of measurements on horses at our disposal, no in-depth analysis was possible. Withers heights could be estimated only in the case of two metapodials, which most likely belonged to the same animal. Namely, the two bones were found next to each other (sq. 719; msq. D1, Late Antiquity phase 2), and they also yielded very similar estimates of withers height (i.e.



Sl. 8.25: Porazdelitev standardiziranih dimenzij dolgih kosti (nadlahtnica, koželjnica, golenica) ter skočnic domačega prašiča s Tonovcovega gradu po posameznih fazah. Vsak skeletni element je zastopan le s po eno dimenzijo. Postopek standardiziranja dimenzij je podan v pogl. 8.1. Legenda: RP – rimskodobno povprečje, izračunano na osnovi prašičjih ostankov iz rimskega mesta Tác/*Gorsium* (Madžarska; Bökönyi 1984).

Fig. 8.25: Distribution of standardised metric data of pig long bones (humerus, radius, tibia) as well as astragali from Tonovcov grad, by individual settlement phase. Each skeletal element is represented by a single measure. The procedure for standardising the metric data is given in chapter 8.1. Legend: RP – Roman Period average, calculated on the basis of pig remains from the Roman town of Tác/*Gorsium* (Hungary; Bökönyi 1984).

ni dosegal velikosti naprednih "rimskih" živali, katerih višina ob vihru se je gibala med 145 in 155 cm in ki so bile pogoste predvsem v vojaških utrdbah in na farmah tipa vila rustika (Bökönyi 1974, 263).

Zgornje rezultate potrjuje tudi neposredna primerjava dimenzij posameznih konjskih kosti med tukaj obravnavanim najdiščem in rimskodobnim mestom Tác/*Gorsium* (*sl. 8.26*). Čeprav so bili veliki "rimski" konji morda prisotni tudi na Tonovcovem gradu,[63] je moralo biti namreč njihovo število vseskozi zanemarlji-

between 133 and 139 cm; *Tab. 8.17*). This horse[64] therefore did not reach the size of the improved "Roman" form/breed whose withers heights varied between 145 and 155 cm, and whose bones were more commonly found within military forts and estates of the *villa rustica* type (Bökönyi 1974, 263).

These results were also confirmed by the direct comparison between the dimensions of individual horse bones from Tononcov grad and those from the Ro-

obeh kosti (*cf.* Peters 1998, 411) kot tudi iz vrednosti indeksa vitkosti (*cf.* Bökönyi 1984, 63 s); slednji v primeru dlančnice znaša 14,9, v primeru stopalnice pa 11,8.

[63] Glej npr. večjo od obeh skočnic na *sliki 8.26*.

[64] The morphology (*cf.* Peters 1998, 411) and the slenderness index (*cf.* Bökönyi 1984, 63 f) of the two bones clearly indicate that we are not dealing with a mule; the slenderness indices for the metacarpus/metatarsus were found to be 14.9/11.8.

Tab. 8.17: Višina ob vihru za konja s Tonovcovega gradu, ocenjena na osnovi velikosti dlančnice (Mc) oz. stopalnice (Mt) iz kvadranta 719 (mkv. D1; druga poznoantična faza). Višina ob vihru je bila izpeljana iz največje dolžine lateralne strani (GLl *sensu* von den Driesch 1976) s pomočjo Kiesewalterjevih koeficientov (ocena 1; *cf*. Riedel 1986, 137) ter iz največje dolžine (GL *sensu* von den Driesch 1976) dlančnice/stopalnice s pomočjo Vittovih koeficientov (ocena 2; *cf*. Vitt 1952). Vse mere so v mm.
Tab. 8.17: The estimate of the withers height for horse from Tonovcov grad, calculated on the basis of the greatest length of the lateral side (GLl *sensu* von den Driesch 1976) of the metacarpus (Mc)/metatarsus (Mt) from square 719 (msq. D1; Late Antiquity phase 2), using the Kiesewalter's coefficients (estimate 1; *cf*. Riedel 1986, 137) and the greatest length (GL *sensu* von den Driesch 1976) of the metacarpus /metatarsus using Vitt's coefficients (estimate 2; *cf*. Vitt 1952). All measurements are in mm.

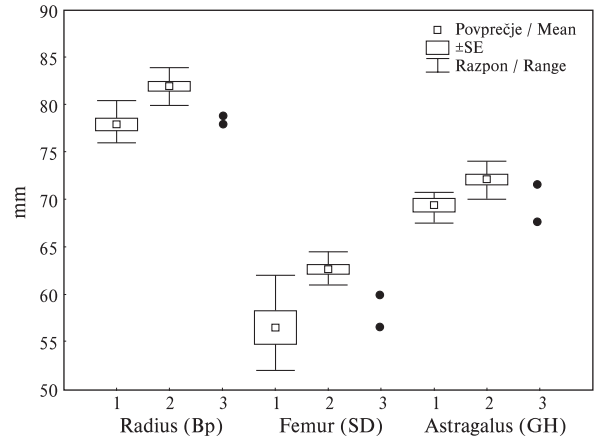
Dimenzija / Dimension	**Mc**	**Mt**
GLl	217,0	253,0
Ocena 1 / Estimation 1	1391	1348
GL	218,0	257,0
Ocena 2 / Estimation 2	1330	1346

vo. To je razvidno iz dejstva, da se večina razpoložljivih ostankov umešča znotraj variacijske širine ustreznih dimenzij za velike (t. i. vzhodnoevropske *sensu* Bökönyi 1974, 250 ss) železnodobne konje z območja Srednje Evrope, katerih višina ob vihru je nihala med 120 in 150 cm (povprečna vrednost ≈137 cm; Bökönyi 1974, 252).

8.6 PALEOEKONOMIJA

Analiza deležev zastopanosti kosti iz bolj ali manj kvalitetnih kosov goveda, drobnice in prašiča je pokazala na določene razlike med posameznimi deli najdišča (*sl. 8.11* in *8.14*), ki jih je mogoče interpretirati kot dokaz socialne razslojenosti prebivalstva. Dodaten vpogled v to tematiko ter v paleoekonomsko sliko Tonovcovega gradu nasploh ponujajo podatki o frekvenci pojavljanja posameznih skeletnih elementov treh najbolje zastopanih taksonov po fazah (*tab. 8.18*).

Že bežen pogled na podatke iz *tabele 8.18* pokaže razmeroma skromno število drobnih kosti (npr. prstnice, zapestne in nartne kosti) nasproti večjim, kar lahko v veliki meri pripišemo pomanjkljivostim izbranega načina vzorčenja najdb (*cf*. Toškan, Dirjec 2004, 158 ss). Dejstvo namreč je, da je bil skozi sita presejan le manjši del izkopanega sedimenta, tako da je bila večina obravnavanih ostankov pobrana ročno med samim izkopavanjem. Tezo o vzročno-posledični povezavi med načinom vzorčenja in primanjkljajem



Sl. 8.26: Vrednosti nekaterih dimenzij ostankov konja s Tonovcovega gradu(vzorec 3). Za primerjavo so podani razponi vrednosti posamezne dimenzije pri železnodobnih konjih z najdišča Le Brustolade (vzorec 1; Riedel 1984) in rimskodobnih primerkov z najdišča Tác/*Gorsium* (vzorec 2; Bökönyi 1984). Legenda (*cf*. von den Driesch 1976): Bp – širina proksimalnega konca; Bd – širina distalnega konca, GH – največja višina.
Fig. 8.26: The value of certain dimensions of horse remains from Tonovcov grad (sample 3). For the sake of comparison we provided also the individual dimensions from Iron Age horses from the site of Le Brustolade (sample 1; Riedel 1984) and the Roman period specimens from the site of Tác/*Gorsium* (sample 2; Bökönyi 1984). Legend (*cf*. von den Driesch 1976): Bp – breadth of the proximal end; Bd – breadth of the distal end, GH – greatest height.

man site of Tác/*Gorsium* (*Fig. 8.26*). Even though large "Roman" horses might have been present at Tonovcov grad,[65] their numbers had to be negligible throughout the studied period. This can clearly be seen from the fact that most remains can be placed within the range for large (i.e. eastern group *sensu* Bökönyi 1974, 250 ff) Iron Age Central European horses, whose withers heights varied between 120 and 150 cm (average value ≈137 cm; Bökönyi 1974, 252).

8.6 PALEOECONOMY

The analysis of the abundance of bones from higher and lower quality carcass parts of cattle, sheep/goat and pig indicated certain differences between the individual locations within the studied site (*Figs. 8.11* and *8.14*). These differences may be seen as a reflection of the social diversity of the population. An additional insight into this issue and into the paleoeconomy of Tonovcov grad is offered by the frequencies of skeletal elements of the three best represented taxa per phase (*Tab. 8.18*).

A brief glance at the data from *table 8.18* shows a relatively low number of small bones (e.g. phalanges, carpals, tarsals) compared to larger ones. To a certain extent

[65] See for instance the larger of the two astragali in *Fig. 8.26*.

drobnih kosti podkrepljuje ugotovitev, da v gradivu s Tonovcovega gradu število prvih prstnic drobnice očitno presega število drugih (*tab. 8.19*). Ker ni verjetno, da bi bila oba skeletna elementa med raztelešenjem živali ločena, spričo razmeroma podobne strukturne gostote (*cf.* Lyman 1999, Tab. 7.6) pa tudi ne gre pričakovati razlik v njuni obstojnosti, se zdi primanjkljaj drugih prstnic utemeljeno razložiti z razliko v njuni velikosti (druga prstnica je manjša). V zvezi s tem je povedno, da podobne razlike v številu nekajkrat večjih prvih in drugih prstnic pri govedu ni opaziti (*tab. 8.19*).

Navkljub ugotovljenemu primanjkljaju prstnic, zapestnih in nartnih ter drugih razmeroma majhnih kosti (npr. pogačic), kar je še posebej očitno v primeru telesno relativno majhne drobnice (*tab. 8.18–8.19*), pa v gradivu s Tonovcovega gradu podobnega primanjkljaja še celo nekoliko manjših zob ni zaznati (*tab. 8.18*). Celo več. V okviru ostankov iz prve poznoantične poselitvene faze predstavljajo (pretežno izolirani) zobje ovac in koz

this can be explained with the shortcomings of the chosen sampling method (*cf.* Toškan, Dirjec 2004, 157 ff); as only a minor part of the excavated sediment was sieved most of the analyzed remains were picked up manually during the excavation. Consequently, isolated teeth and small bones as well as smaller bone fragments were often overlooked and thus not collected. This is in a way corroborated by the greater number of first than second caprine phalanges in the material from Tonovcov grad (*Tab. 8.19*). As it is unlikely that these two skeletal elements were separated when the animal was butchered, and as – taking into account the relatively similar structural density (*cf.* Lyman 1999, Tab. 7.6) – both are expected to preserve in the sediment equally well, the lack of second phalanges can be explained by their much smaller size. Unsurprisingly, no substantial differences in the numbers of much larger first and second cattle phalanges were observed (*Tab. 8.19*).

Contrary to the paucity of phalanges, carpals, tarsals and other relatively small bones (e.g. kneecaps), which is

Tab. 8.18: Zastopanost posameznih skeletnih elementov domačega goveda, drobnice in prašiča s Tonovcovega gradu po fazah. Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.
Tab. 8.18: Representation of individual skeletal elements of cattle, sheep/goats and pigs from Tonovcov grad per phase. Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Skelet. element	**PA 1 / LA 1**			**PA 2 / LA 2**			**ZSV / EMA**		
	Bos	**Capr.**	***Sus***	***Bos***	**Capr.**	***Sus***	***Bos***	**Capr.**	***Sus***
Proc. corn.	12	15	–	14	21	–	–	16	–
Cranium	7	3	3	6	8	27	–	2	1
Maxilla	2	1	14	3	4	24	–	1	5
Mandibula	48	35	39	19	88	65	3	11	6
Dentes	106	293	50	83	428	84	22	54	17
Vertebrae	60	21	4	57	39	33	9	10	7
Scapula	19	17	14	15	40	56	1	12	7
Humerus	28	27	23	22	70	36	6	22	3
Radius	37	53	12	31	116	18	2	22	3
Ulna	27	8	20	16	21	29	1	5	4
Carpalia	17	1	–	9	4	–	3	2	–
Metacarp.	18	25	4	22	35	14	2	12	1
Phalanx 1	28	7	3	21	19	8	4	9	–
Phalanx 2	25	1	2	17	7	7	2	2	1
Phalanx 3	16	1	1	7	5	1	–	5	2
Pelvis	35	26	15	27	28	29	10	12	2
Sacrum	3	–	1	–	1	3	–	2	–
Femur	36	15	7	24	38	7	3	8	4
Patella	8	–	2	1	1	1	1	–	–
Tibia	31	47	25	25	80	26	5	16	3
Fibula	–	–	–	–	–	2	–	–	–
Tarsalia	49	19	5	25	29	17	1	5	2
Metatars.	30	23	3	22	41	9	7	2	2
Σ	642	638	251	468	1124	496	80	230	70

Tab. 8.19: Število prvih in drugih prstnic drobnice in domačega goveda s Tonovcovega gradu po fazah. Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.
Tab. 8.19: Number of first and second phalanges of sheep/goats and cattle from Tonovcov grad per phase. Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Takson Taxon	Skelet. element	PA 1 LA 1	PA 2 LA 2	ZSV EMA
Caprinae	Phalanx 1	7	19	9
	Phalanx 2	1	7	2
Bos	Phalanx 1	28	21	4
	Phalanx 2	25	17	2

slabo polovico (tj. 45,9 %) vseh najdb omenjenih dveh vrst.[64] Med gradivom, datiranim v drugo poznoantično oz. zgodnjesrednjeveško fazo, je delež zob med ostanki drobnice sicer nekoliko manjši (tj. 38,1 % oz. 23,5 %), vendar pa ta še vedno (bistveneje) ne zaostaja za deležem zob med ostanki goveda (17,7 % oz. 27,3 %) oz. prašiča (17,9 % oz. 24,3 %). Če ob tem upoštevamo, da je bilo med ročnim pobiranjem najdb najverjetneje spregledanih več razmeroma majhnih izoliranih zob ovac in koz nasproti bistveno večjim primerkom goveda in prašiča, je zgornja ugotovitev še toliko bolj zanimiva. Navedeni podatki nedvoumno kažejo na to, da ugotovljene razlike v zastopanosti posameznih skeletnih elementov med gradivom s Tonovcovega gradu ni utemeljeno pripisati zgolj dejanskim razlikam v številu posameznih skeletnih elementov v okviru okostij posameznih kopitarjev ali pa napakam zavoljo izbranega načina vzorčenja najdb. Ustrezno pozornost si namreč zasluži tudi cel spekter biotskih in abiotskih poodložitvenih dejavnikov.

Z vidika vpogleda v ekonomijo skupnosti je seveda zanimiv predvsem podatek, v kolikšni meri so v frekvenci zastopanosti posameznih skeletnih elementov kopitarjev izražene aktivnosti človeka. V zvezi s tem je tako treba poudariti, da je zgoraj izpostavljen podatek o skoraj polovičnem deležu zastopanosti zob (in torej posredno obeh[65] čeljustnic) med vsemi ostanki drobnice iz prve poznoantične faze razviden le v primeru, da abundanco izrazimo kot število določenih primerkov (NISP; *sl. 8.27*). Če namreč kot kazalnik številčnosti skeletnih elementov drobnice uporabimo podatek o najmanjšem številu osebkov (MNI) in s tem do neke mere upoštevamo očitno razliko v številu zob v okviru skeleta ovac/koz nasproti številu drugih elementov, potem delež zastopanosti čeljustnic ni več izstopajoč (*sl. 8.28*). Nasprotno. Upoštevaje podatke s *slike 8.28* se

[64] Med najdbami domačega goveda iz prve poznoantične faze je zob le 16,5 odstotka, med prašičjimi pa 19,9 odstotka.

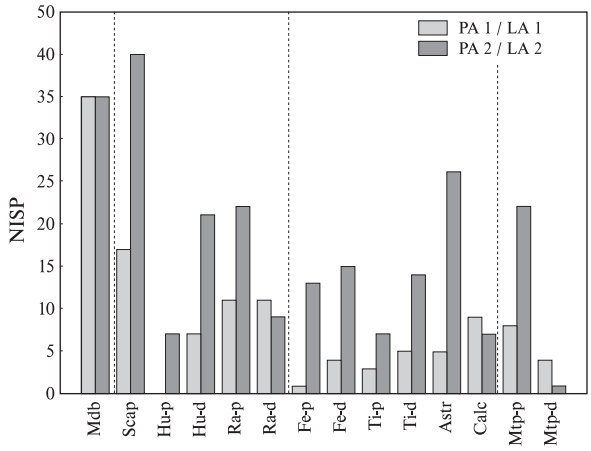
[65] Število zgornjih zob ne odstopa bistveno od števila spodnjih v nobeni od treh tukaj obravnavanih faz (poznoantična faza 1: 97 nasproti 104; poznoantična faza 2: 180 nasproti 208; zgodnjesrednjeveška faza: 14 nasproti 16).

especially evident in the case of the physically relatively small caprines (*Tabs. 8.18-8.19*), no such shortage has been seen in the case of teeth (*Tab. 8.18*). Moreover, in the material from the Late Antiquity phase the (mostly isolated) sheep and goat teeth represent almost half (i.e. 45.9 %) of all finds ascribed to these two species *vs.* a mere16.5 % in cattle and 19.9 % in pigs. In the material from Late Antiquity phases 2 and the Early Medieval phase the contribution of teeth to all caprine remains is somewhat smaller (i.e. 38.1 % and 23.5 %, respectively), however it still stays at least at the level of cattle (17.7 % and 27.3 %, respectively) or pig finds (17.9 % and 24.3 %, respectively). If we take into account the fact that during the hand picking of the finds it was highly likely that many relatively small isolated sheep and goat teeth were overlooked, this observation is even more intriguing. This undoubtedly indicates that the detected discrepancies in the frequencies of individual skeletal elements in the material from Tonovcov grad cannot be ascribed merely to the actual differences in the numbers of these skeletal elements within the ungulate skeleton or the errors that occurred due to the size-selective sampling methodology. The entire spectrum of biotic and abiotic post-depositional factors also played their role.

The almost 50 % share of teeth (and thus indirectly of both jawbones)[66] among all caprine remains from Late Antiquity phase 1 is observable only when abundance is expressed in terms of the Number of Identifiable specimens (NISP; *Fig. 8.27*). If we use the Minimum Number of Individuals (MNI) instead, thus taking into account the obvious difference in the number of teeth in the sheep/goat skeleton compared to the numbers of most of the other elements, then the contribution of mandibles and maxillae no longer stands out (*Fig. 8.28*). On the contrary! Taking into account the data from *figure 8.28* it seems that in the caprine material from the Late Antiquity phase 1 of Tonovcov grad cranial skeletal elements are not as common as e.g. radii or tibiae. Although the difference is not statistically significant ($\chi^2 = 0.95$; $p = 0.327$).

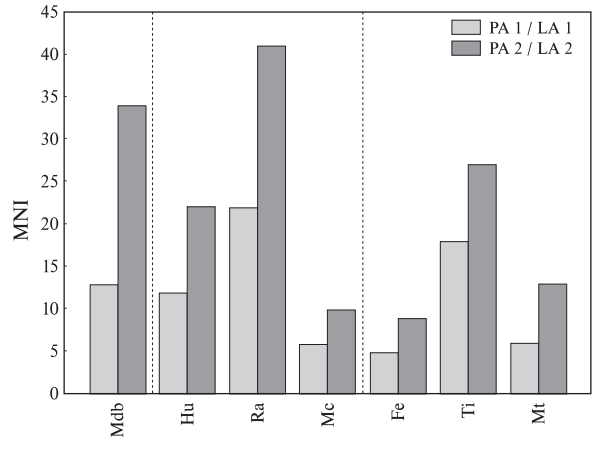
It can be concluded that individual sheep/goat skeletal elements from Tonovcov grad reflect human activities (see for instance chapter 8.3.1), for otherwise the larger structural density of teeth would have to result in their numbers being greater relative to most bones irrespective of the indicator chosen (i.e. either NISP or MNI). A similar conclusion can be derived from the differences observed in the number of fused epiphyses of sheep/goat bones linked by similar structural density (≈ similar preservability in the sediments; *Tab. 8.20*). Finally, the data from *table 8.20* indicate another interesting detail: the ratio between the number

[66] The number of upper teeth does not differ greatly from the number of lower teeth in any of the three phases (Late Antiquity phase 1: 97 *vs.* 104; Late Antiquity phase 2: 180 *vs.* 208; Early Medieval phase 3: 14 *vs.* 16).



Sl. 8.27: Zastopanost ostankov posameznih (delov) skeletnih elementov drobnice med gradivom iz prve in druge poznoantične poselitvene faze (= PA) Tonovcovega gradu. Abundanca najdb je izražena kot število določenih primerkov (NISP). Legenda: p – proksimalni del; d – distalni del. Med ostanke spodnje čeljustnice so prišteti tudi vsi izolirani spodnji sekalci, ličniki in kočniki.

Fig. 8.27: Representation of individual sheep and goat skeletal elements within the material from the Late Antiquity phases (= LA) 1 and 2 at Tonovcov grad. The abundance of finds is expressed as the number of identifiable specimens (NISP). Legend: p – proximal part; d – distal part. Isolated lower incisors and (pre)molars are included among the remains of mandibles.



Sl. 8.28: Zastopanost ostankov posameznih skeletnih elementov drobnice med gradivom iz prve in druge poznoantične poselitvene faze (= PA) Tonovcovega gradu. Abundanca najdb je izražena kot najmanjše število osebkov (MNI). Legenda: p – proksimalni del; d – distalni del. Med ostanke spodnje čeljustnice so prišteti tudi vsi izolirani spodnji sekalci, ličniki in kočniki.

Fig. 8.28: Representation of individual sheep and goat skeletal remains within the material from the Late Antiquity phases (= LA) 1 and 2 at Tonovcov grad. The abundance of finds is expressed as the minimum number of individuals (MNI). Legend: p – proximal part; d – distal part. Isolated lower incisors and (pre)molars are included among the remains of mandibles.

celo zdi, da so kosti glave ovac in koz v gradivu iz prve faze poznoantične poselitve Tonovcovega gradu slabše zastopane od npr. koželjnic ali golenic, čeprav razlika sicer ni statistično značilna (test χ^2: $\chi^2 = 0{,}95$; $p = 0{,}327$).

Iz zgornjega izhaja, da se v zastopanosti posameznih skeletnih elementov (drobnice) s Tonovcovega gradu do neke mere zagotovo odražajo tudi človekove aktivnosti (glej npr. pogl. 8.3.1), saj bi morali biti zobje spričo njihove večje strukturne gostote sicer številčnejše zastopani od kosti tudi, če bi bila abundanca najdb izražena kot MNI. Enak sklep je mogoče izpeljati iz razlik v frekvenci zastopanosti epifiz posameznih ovčjih/kozjih kosti s podobno strukturno gostoto, katerih obstojnost v sedimentu je torej načeloma primerljiva (*tab. 8.20*). Ne nazadnje pa podatki iz *tabele 8.20* kažejo na še eno prav tako zelo povedno zanimivost: razmerje med številom epifiz dolgih kosti prednjih[66] in zadnjih nog v gradivu iz prve poznoantične faze namreč statistično značilno odstopa od dejanskega razmerja med abundanco obeh skupin kosti v okviru skeleta drobnice (test χ^2: $\chi^2 = 10{,}12$; $p < 0{,}01$), kar nakazuje razlike v človekovem procesiranju posameznih delov trupa. Podobno nesorazmerje obstaja tudi med številom kosti iz najbolj (tj. nadlahtnice, stegnenice) in najmanj (tj. dlančnice, stopalnice) mesnatih

of caprine long bone epiphyses from front[67] and hind limbs found in the material from Late Antiquity phase 1 is significantly different from the one dated to the Late Antiquity phase 2 ($\chi^2 = 10.12$; $p < 0.01$). This is indicative of the differential processing of individual body parts. A similar disproportion also exists amongst the numbers of bones from the most (i.e. humerus, femur) and least (i.e. metacarpus, metatarsus) meaty parts of both pairs of extremities within the finds dated to Late Antiquity phase 2 (χ^2 test: $\chi^2 = 28.44$; $p < 0.001$).

If *figure 8.28* is indeed indicative of the influence of human activities on the representation of individual skeletal elements, then differences between the abundance of teeth and the abundance of jawbone fragments indicates a no less important role of various post-depositional factors. Regardless of the abundance indicator (i.e. NISP or MNI) the number of sheep/goat teeth by far surpasses the abundance of jawbones within the material from both Late Antiquity phases (*Tab. 8.18*). In view of the very similar horizontal distribution of skeletal elements the discrepancy observed in the quantity of teeth relative to maxillae/mandibles might be explained by the poorer resistence of the latter to dog (pig?) ravaging and/or disintegration in the sediment. As it can be seen in *table 8.21*, several local concentrations of teeth have been observed.

[66] Abundanca epifiz koželjnice je izražena kot povprečje med številom ostankov proksimalne in distalne epifize omenjenega skeletnega elementa.

[67] The abundance of radius epiphyses is expressed as the average between the number of remains of the proximal and distal epiphyses.

Tab. 8.20: Število ostankov epifiz posameznih skeletnih elementov drobnice s Tonovcovega gradu, ki izkazujejo primerljivo (tj. med 0,500 in 0,700 g/cm^3) strukturno gostoto. Abundanca najdb je izražena kot število določenih primerkov (NISP). Podatke o strukturni gostoti podajajo Lam *et al.* (1998, Tab. 1). Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.
Tab. 8.20: Number of sheep/goat epiphysis remains from individual skeletal elements, which show a comparable (i.e. between 0.500 and 0.700 g/cm^3) structural density. The abundance of finds is expressed as the number of identifiable specimens (NISP). The data on structural density is provided by Lam *et al.* (1998, Tab. 1). Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Skelet. element	**PA 1 LA 1**	**PA 2 LA 2**	**ZSV EMA**
Humerus (dist.)	7	21	10
Radius (prox.)	11	22	5
Radius (dist.)	11	9	3
Metacarpus (dist.)	7	1	2
Femur (prox.)	1	13	2
Tibia (dist.)	5	14	7
Metatarsus (dist.)	1	1	1

delov obeh parov okončin za najdbe drobnice iz druge poznoantične faze (test χ^2: $\chi^2 = 28{,}44$; $p < 0{,}001$).

Če je mogoče razliko med abundanco zob in nekaterih dolgih kosti na *sliki 8.28* razumeti kot argument v prid tezi o pomembnem vplivu človekovih aktivnosti na ugotovljeno zastopanost posameznih skeletnih delov drobnice s Tonovcovega gradu, pa razlika med abundanco zob in abundanco fragmentov čeljustnic priča o prav tako pomembni vlogi različnih poodložitvenih dejavnikov. Ne glede na izbrani način izražanja številčnosti najdb (tj. NISP ali MNI) namreč abundanca zob drobnice močno presega abundanco čeljustnic tako v okviru gradiva iz prve kot tudi iz druge faze poznoantične poselitve obravnavanega najdišča (*tab. 8.18*). Da gre navedeno razliko domnevno res pripisati slabšemu kljubovanju čeljustnic destruktivni aktivnosti psov (prašičev?) in/ali razpadanju v sedimentu, je pokazala podobnost med vzorcema porazdelitve najdb obeh obravnavanih skeletnih elementov v prostoru. Kot je razvidno iz *tabele 8.21*, izkazujejo zobje nekaj očitnih koncentracij najdb. Tako je bila v primeru gradiva iz prve poznoantične faze kar dobra petina zob pobrana iz le štirih mikrokvadrantov skupne površine zgolj 4 m^2, v gradivu iz druge poznoantične faze pa je bil ta delež le malenkost nižji. Pri tem je povedno, da je na istih mestih tudi podobna relativna koncentracija ostankov spodnjih in zgornjih čeljustnic; na območju kvadrantov z izrazito številčno prisotnostjo zob ter v njihovi neposredni okolici[67] je bila namreč pobrana kar tretjina vseh najdb čeljustnic (*tab. 8.21*). V manjši absolutni abundanci najdb čeljustnic nasproti zobem je tako najverjetneje izražena prav njihova večja tafonomska izguba v poodložitvenem obdobju (glej tudi pogl 8.3.1).

Ne glede na težavno razlikovanje med posledicami človekove aktivnosti in rezultati delovanja posameznih poodložitvenih dejavnikov na ugotovljene frekvence zastopanosti posameznih skeletnih elementov kopitarjev sva v okviru študije ekonomije poznoantične skupnosti s Tonovcovega gradu analizirala tudi delež zastopanosti ostankov različnih kvalitetnih delov trupa goveda

[67] Neposredno okolico posameznega mikrokvadranta predstavlja osem nanj meječih mikrokvadrantov.

For instance, in the case of Late Antiquity phase 1 the over one fifth of the sheep/goat teeth were collected from four microsquares measuring a mere 4 m^2 in total, and with Late Antiquity phase 2 this share was only slightly lower. At this point it is important that in the same areas a relatively similar concentration of the remains of lower and upper jawbones has been observed; as much as one third of all mandibles and maxillas were discovered in the area of the squares with a numerically strong presence of teeth and in their immediate surroundings[68] (*Tab. 8.21*). The smaller absolute abundances of jawbone finds (compared to tooth finds) thus most likely reflect their greater taphonomic loss (see also chapter 8.3.1).

Regardless of the difficulty in distinguishing between the consequences of human activity and the results of various other post-depositional factors upon the observed frequencies of individual ungulate skeletal elements we have – within the framework of the economy of the Late Antiquity community at Tononcov grad – also analysed the frequency of carcass parts of different qualities for cattle (*Fig. 8.29*) and sheep/goat (*Fig. 8.30*) within the individual squares in the broader area of building 1. In the event that the results showed groupings of individual squares based on settlement phases this could be understood as a reflection of the existence of actual differences between the phases in the shares of the skeletal elements from individual qualitative carcass categories. With the intent of reducing the disruptive influence of the small samples upon reliability, only squares including at least 40 taxonomically identified mammalian bones and teeth per any of the three phases were included in the analysis.

As far as the results for cattle, the heterogeneity in the group of samples[69] with relatively small numbers of finds is significantly larger than the one found in richer samples (*Fig. 8.29*). Consequently, the conclusions based on small samples is at least in this case unreliable. However, it is interesting that a certain gap between the material from Late Antiquity phases 1 and 2 is shown even

[68] The immediate surroundings of an individual microsquare are represented by the eight microsquares that border it.

[69] A *sample* is defined as the remains from an individual settlement phase originating from an individual square.

Tab. 8.21: Abundanca zob drobnice v okviru štirih z omenjenimi najdbami najbolj bogatih mikrokvadrantov za vsako od obeh poznoantičnih poselitvenih faz (= PA) Tonovcovega gradu. Podana je tudi abundanca ostankov spodnjih in zgornjih čeljustnic v istih mikrokvadrantih ter v njihovi neposredni okolici; neposredno okolico posameznega mikrokvadranta predstavlja osem nanj meječih mikrokvadrantov.
Tab. 8.21: The abundance of sheep/goat teeth within the frame of the four richest micro-quadrants for each of the two Late Antiquity phases (= LA) at Tononcov grad. Given is also the abundance of the remains of the upper and lower jawbones in the same micro-squares and in their vicinity; the vicinity of an individual micro-square is represented by the eight bordering micro-squares.

Faza Phase	**Kv. (Mkv.) Sq. (Msq.)**	**Št. zob v mkv. N of teeth in msq.**	**Št. čeljustnic v mkv. in njegovi okolici N of maxillas & mandibles in msq. and its surroundings**
PA 1 LA 1	666 (A2)	14	3
	769 (A2)	18	7
	817 (D3)	16	3
	818 (A3)	15	–
	Σ	63 (=21,5 % Tot.)	13 (=36,2 % Tot.)
PA 2 LA 2	666 (A2)	14	6
	669 (C3)	26	8
	716 (A3)	12	6
	769 (A1)	24	11
	Σ	79 (=17,8 % Tot.)	31 (=33,6 % Tot.)

(*sl. 8.29*) in drobnice (*sl. 8.30*) po posameznih kvadrantih na območju stavbe 1. V kolikor bi rezultati izpostavili grupacije posameznih kvadrantov na osnovi poselitvenih faz, bi to lahko razumeli kot potrditev teze o obstoju dejanskih medfaznih razlik v deležu zastopanosti skeletnih elementov posamezne kvalitetne kategorije trupa. Z namenom zmanjšati moteč vpliv (pre)majhnih vzorcev na zanesljivost rezultatov sva v analizo vključila le tiste kvadrante, v katerih je bilo med gradivom katere od treh faz pobranih najmanj 40 določljivih sesalskih kosti in zob.

V zvezi z rezultati za domače govedo velja v prvi vrsti izpostaviti, da je heterogenost v skupini vzorcev z razmeroma majhnim številom najdb bistveno večja od stanja v bogatejših vzorcih (*sl. 8.29*). Iz tega izhaja, da je ocena deležev zastopanosti skeletnih elementov različnih kvalitetnih kategorij trupa, utemeljena na majhnih vzorcih, vsaj v tem primeru pač nezanesljiva. Je pa zato toliko bolj zanimiva ugotovitev, da se določena razlika med gradivom iz obeh poznoantičnih faz kaže tudi ob upoštevanju le najbogatejših vzorcev (tj. tistih z NISP > 30). Prekrivanje med obema skupinama je sicer veliko, a vzorci z gradivom iz druge poselitvene faze vendarle kažejo na v povprečju nekoliko večji delež ostankov najbolj kvalitetnih delov goveda.[68]

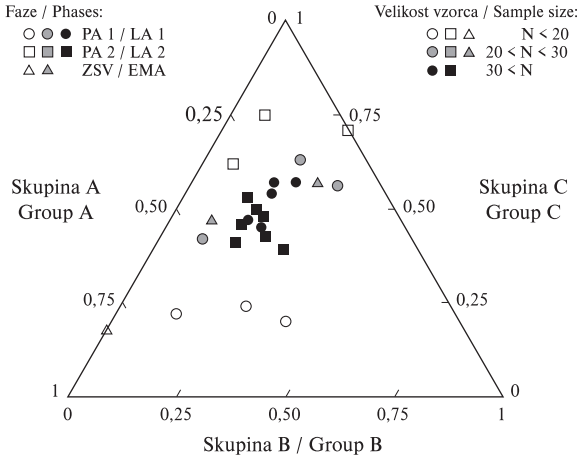
V tem smislu podobno sliko ponujajo tudi rezultati za drobnico (*sl. 8.30*). Tudi ob pogledu na *sliko 8.30* namreč lega vzorcev z najdbami iz druge poznoantične faze nakazuje v povprečju nekoliko večji delež zastopanosti ostankov lopatic, nadlahtnic, vretenc, medenic in stegnenic v omenjenem gradivu, kot je bilo to when only the richest samples are taken into account (i.e. those with N > 30). Although the overlap between the two groups is large, the assemblages from the Late Antiquity phase 2 show a slightly higher contribution of remains from the meatiest parts.[70]

A similar picture is offered by the results for caprines (*Fig. 8.30*), as the finds from the Late Antiquity phase 2 show a slightly higher share of scapula, humerus, vertebrae, pelvis and femur remains relative to the material from the Late Antiquity phase 1. As opposed to cattle, in the case of sheep and goats the results do not change significantly even when smaller samples (less than 25 remains) are taken into account.

In order to expand upon these results we compared the 13 richest faunal assemblages (NISP > 90) using the Multidimensional Scaling (StatSoft, Inc. 2001). The input matrix used in the estimation of assemblage-assemblage similarities included data on the number of all taxonomically identified mammalian remains, the number of cattle, caprine, pig, horse and game remains, as well as the abundance of bones from the three meat quality categories of the cattle and caprine carcass. A satisfactoriliy high proportion of variance of the initial data set was accounted for by the first three multidimensional scaling dimensions (stress = 0.07). Nevertheless, statistically significant inter-phase differences were observed only in dimension 1 (Mann-Whitney U test: U = 0.00; Z = 2.88; p = 0.004). Namely, the assemblages from the Late Antiquity phase 2 are placed in the left side of the diagram, while assemblages from the Late Antiquity

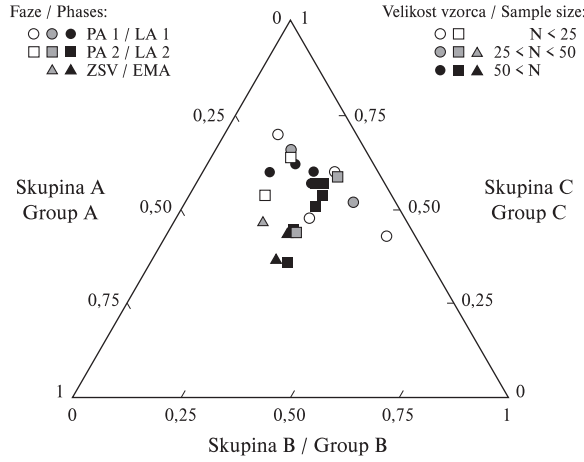
[68] Podatki za zgodnjesrednjeveško fazo v tej primerjavi niso bili upoštevani, saj je razpoložljivo število vzorcev preskromno.

[70] In this comparison data for the Early Medieval phase was not taken into account, for the number of sufficiently large samples was too small.



Sl. 8.29: Delež zastopanosti ostankov iz posamezne od treh kvalitetnih kategorij (tj. kategorija A, B in C) trupa domačega goveda po kvadrantih na Tonovcovem gradu: območje stavbe 1. Upoštevani so le kvadranti, v okviru katerih je bilo med gradivom katere od poselitvenih faz najdenih najmanj 40 določljivih sesalskih kosti in zob. Vzorec porazdelitve skeletnih elementov v omenjene kvalitetne kategorije je podan v pogl. 8.1. Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.

Fig. 8.29: The share of the remains of each of the three qualitative categories (i.e. category A, B and C) of the carcass of cattle, by squeres in the area of building 1. Only squares providing at least 40 taxonomically determined mammalian bones and teeth per any of the three settlement phases were taken into account. The division of skeletal elements into qualitative categories A, B and C is shown in chapter 8.1. Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.



Sl. 8.30: Delež zastopanosti ostankov iz posamezne od treh kvalitetnih kategorij (tj. kategorija A, B in C) trupa drobnice po kvadrantih na Tonovcovem gradu: območje stavbe 1. Upoštevani so le kvadranti, v okviru katerih je bilo med gradivom katere od poselitvenih faz najdenih najmanj 40 določljivih sesalskih kosti in zob. Vzorec porazdelitve skeletnih elementov v omenjene kvalitetne kategorije je podan v pogl. 8.1. Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.

Fig. 8.30: The share of the remains of each of the three qualitative categories (i.e. category A, B and C) of the carcass of sheep/goats, by squares in the area of building 1. Only squares providing at least 40 taxonomically determined mammalian bones and teeth per any of the three settlement phases were taken into account. The division of skeletal elements into qualitative categories A, B and C is shown in chapter 8.1. Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

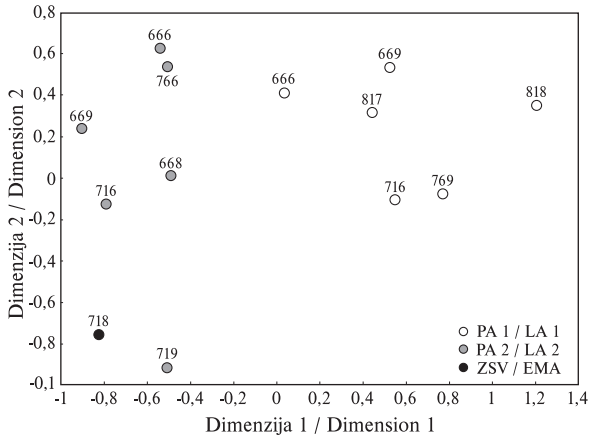
ugotovljeno za vzorce z najdbami iz prve poznoantične poselitvene faze. Za razliko od domačega goveda pa se v primeru drobnice rezultati bistveno ne spremenijo niti ob upoštevanju manjših vzorcev s skupnim številom determiniranih ostankov pod 25.

Zgornje rezultate sva nadgradila z uporabo metode večdimenzionalnega skaliranja (*Multidimensional Scaling*). Pri tem sva vzporejala 13 s favnističnimi najdbami najbogatejših vzorcev (NISP > 90), in sicer s hkratnim upoštevanjem podatkov o številu vseh določenih sesalskih ostankov, številom ostankov domačega goveda, drobnice, prašiča, konja in vseh lovnih vrst ter številom kosti iz treh kvalitetnih kategorij trupa goveda in drobnice. Matriko različnosti, sestavljeno na podlagi navedenih podatkov, sva razložila s pomočjo treh dimenzij (stres = 0,07), pri čemer so medfazne razlike v vrednostih posameznih dimenzij mejo statistične značilnosti presegale le v primeru dimenzije 1 (Mann-Whitneyjev U-test: U = 0,00; Z = 2,88; p = 0,004). Kot je razvidno s *slike 8.31*, se namreč vzorci z gradivom iz druge poznoantične poselitvene faze Tonovcovega gradu umeščajo v levo polovico diagrama, tisti z ostanki iz prve pa v desno. Takšno porazdelitev je mogoče razložiti prav z razliko v deležu zastopanosti kosti iz najbolj kvalitetnih delov

phase 1 can be found on the right (*Fig. 8.31*). Such a distribution might reflect the difference in the share of bones from the parts of the carcass richest in meat, as it indicates a gradual decline in the value along the abscise axis (= dimension 1) both in the case of cattle and caprines. The sheep and goat remains show a similar trend also along the ordinate axis (= dimension 2), but here the differences between Late Antiquity phases 1 and 2 are not as noticeable (Mann-Whitney U test: U = 16.00; Z = 0.32; p = 0.749; see also *figure 8.30*).

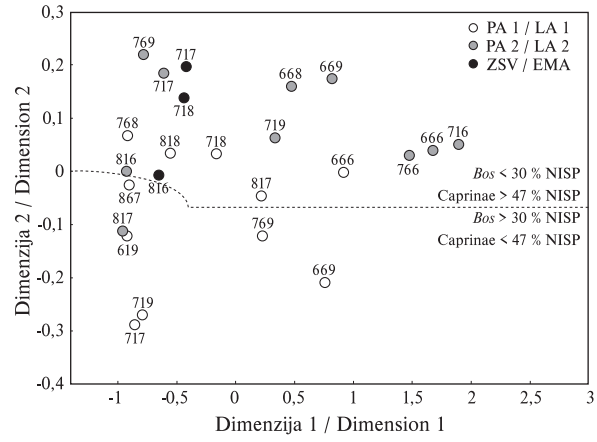
The data from *figures* 8.*29-8.31* are not easy to interpret, for the differences between the phases are limited, and the studied remains originate from a relatively small part of the settlement. At this point we should indicate the possibility that the above results could reflect a somewhat higher status of the inhabitants from building 1 during the Late Antiquity phase 2 compared to those who inhabited a different structure that stood on roughly the same area in Late Antiquity phase 1 (see Tonovcov grad. Settlement remains and interpretation, chapter 2.3).

The results from *figure 8.31* show that the first three multidimensional scaling dimensions mostly summarise the degree to which samples resemble each other in the frequencies of more or less meat rich body parts, at the



Sl. 8.31: Končna razporeditev matrike, pridobljene z večdimenzionalnim skaliranjem evklidskih razdalj med 13 vzorci (NISP > 90) sesalskih ostankov s Tonovcovega gradu: območje stavbe 1. Matrika različnosti je bila pridobljena na osnovi podatkov o številu vseh določenih sesalskih ostankov, številom ostankov domačega goveda, drobnice, prašiča, konja in vseh lovnih vrst ter številom kosti iz treh kvalitetnih kategorij trupa goveda in drobnice. Označbe vzorcev na diagramu ponazarjajo kvadrante izkopnega polja, iz katerih ostanki posameznih vzorcev izvirajo. Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.

Fig. 8.31: The final distribution of the matrix derived from multidimensional scaling of the Euclidic distances among 13 samples (NISP > 90) of mammalian remains at Tonovcov grad: area of building 1. The matrix contains data on the number of all taxonomically determined mammalian remains, number of remains of cattle, sheep/goats, pigs, horses and game as well as the number of remains of each of the three qualitative categories of the carcass of cattle and sheep/goats. The marks on the diagram depict the quadrants in the excavation field in which the remains of the individual samples were discovered. Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.



Sl. 8.32: Končna razporeditev matrike, pridobljene z večdimenzionalnim skaliranjem evklidskih razdalj med 24 vzorci (NISP > 40) sesalskih ostankov s Tonovcovega gradu: območje stavbe 1. Matrika različnosti je bila pridobljena na osnovi podatkov o številu ostankov domačega goveda, drobnice, prašiča, konja in vseh lovnih vrst ter številu vseh določenih sesalskih ostankov. Označbe vzorcev na diagramu ponazarjajo kvadrante izkopnega polja, iz katerih ostanki posameznih vzorcev izvirajo. Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.

Fig. 8.32: The final distribution of the matrix derived from multidimensional scaling of the Euclidic distances among 24 samples (NISP > 40) of mammalian remains at Tonovcov grad: area of building 1. The matrix contains data on the number of all taxonomically determined mammalian remains, number of remains of cattle, sheep/goats, pigs, horses and game. The marks on the diagram depict the quadrants in the excavation field in which the remains of the individual samples were discovered. Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

trupa, saj ta kaže trend postopnega upadanja vrednosti vzdolž abscisne osi (= dimenzija 1) tako v primeru goveda kot tudi ovce/koze. Ostanki drobnice sicer izkazujejo podoben trend tudi vzdolž ordinatne osi (= dimenzija 2), vendar pa tukaj razlike med obema poznoantičnima fazama niso tako izrazite (Mann-Whitneyjev U-test: U = 16,00; Z = 0,32; p = 0,749; glej tudi *sliko 8.30*).

Interpretacija podatkov s *slik 8.29–8.31* je težavna, saj so razlike med fazami majhne, obdelani ostanki pa izvirajo iz razmeroma skromnega dela celotne površine obravnavane naselbine. Na tem mestu bi tako le previdno nakazala možnost, da bi lahko zgornji rezultati kazali na nekoliko višji status stanovalcev stavbe 1 v obdobju druge poznoantične poselitvene faze Tonovcovega gradu nasproti tistim, ki so naseljevali neko drugo, na približno istem mestu stoječo stavbo (glej Tonovcov grad. Naselbinski ostanki in interpretacija, pogl. 2.3) v prvi poznoantični fazi.

Rezultati s *slike 8.31* med drugim kažejo, da izbrane tri dimenzije večdimenzionalnega skaliranja v same time accounting for only a small part (dimension 3?) of the variance connected to the abundance of finds of an individual taxon or the total number of all mammalian finds. For this purpose we rearranged the input matrix to include only data on the abundance of cattle, sheep, goat, pig, horse, game as well as all mammalian remains within an individual assemblage (*Fig. 8.32*).[71] The multidimensional scaling was rerun (stress = 0.002) and three dimensions were created. Of these, statistically siginificant inter-phase differences were observed only in the case of the dimension 2 (Kruskal-Wallis test: H [2, N = 24] = 7.09; p = 0.030). The analysis has shown a decrease in the relative frequency of cattle remains along the ordinate axis (= dimension 2), while the contributions of caprines and pigs show an inversely proportional trend. At this the assemblages from the Late Antiquity phase 2 are grouped in the upper half of *figure 8.32*, and those from the Late Antiquity phase 1 in the lower half. Such a

[71] The analysis included samples with at least 40 taxonomically identifiable mammalian remains (i.e. NISP ≥ 40).

tem primeru povzemajo predvsem varianco, povezano z deležem zastopanosti ostankov posameznih kvalitetnih kategorij plena, le v manjši meri (dimenzija 3?) pa tudi tisto, ki je povezana s številom vseh sesalskih najdb oz. najdb posameznega taksona. V ta namen sva večdimenzionalno skaliranje aplicirala tudi na matriko različnosti, sestavljeno na podlagi podatkov o abundanci ostankov goveda, drobnice, prašiča, konja, vseh lovnih vrst ter vseh sesalcev znotraj posameznega vzorca (*sl. 8.32*).[69] Tudi tokrat sva specificirala tri dimenzije (stres = 0,002), pri čemer sva statistično značilne medfazne razlike ugotovila le v primeru vrednosti dimenzije 2 (test Kruskal-Wallis: H [2, N = 24] = 7,09; p = 0,030). Analiza podatkov je pokazala padanje relativne frekvence pojavljanja ostankov goveda vzdolž ordinatne osi (= dimenzija 2), medtem ko kažeta deleža drobnice in prašiča obratno sorazmeren trend. Pri tem se vzorci iz druge poznoantične poselitvene faze grupirajo v zgornji polovici *slike 8.32*, tisti iz prve pa v spodnji. Takšen vzorec porazdelitve je skladen s podatki o zastopanosti domačega goveda, drobnice in prašiča v gradivu vsake od treh poselitvenih faz v celotnem vzorcu favnističnih najdb s Tonovcovega gradu, ki prav tako kaže na upad deleža goveda na račun drobnice na prehodu iz prve v drugo poznoantično fazo (*tab. 8.4–8.5*). Je pa v zvezi s tem pomembno opozoriti na bistveno bolj izraženo heterogenost v deležih zastopanosti posameznih taksonov med vzorci z najdbami iz prve poselitvene faze (*sl. 8.32*). Medtem ko leži kar devet od skupno desetih vzorcev z gradivom iz druge poznoantične faze na isti strani "sredinske črte",[70] je ta namreč enajst vzorcev z ostanki iz prve poznoantične faze praktično razdelila na dve polovici: pet jih leži nad omenjeno ločnico, šest pa pod njo. Pri poskusu interpretacije navedenih rezultatov se je treba zavedati, da so bili ti pridobljeni z analizo gradiva iz le dela izkopnega polja in tako morda niso reprezentativni za naselbino v celoti. Kljub temu pa večje heterogenosti obdelanega gradiva iz prve faze poznoantične poselitve Tonovcovega gradu v smislu deležev zastopanosti goveda in drobnice ne gre zanemariti. Lahko bi jo namreč razumeli tudi kot argument v prid tezi, da je bila razlika v pomenu obeh navedenih taksonov znotraj ekonomije prve in druge poznoantične poselitvene faze dejansko manjša od tiste, ki jo nakazuje zgolj število njunih ostankov v celotnem gradivu vsake od obeh obravnavanih faz (*tab. 8.4–8.5*).

[69] V analizo so bili vključeni le vzorci z najmanj 40 določljivimi sesalskimi ostanki.

[70] "Sredinska črta" je opredeljena kot ločnica med vzorci, pri katerih je bil ugotovljen nadpovprečno visok delež goveda ob nadpovprečno nizki vrednosti drobnice, ter vzorci, ki kažejo obratno sliko. Pri tem je bil povprečen delež zastopanosti navedenih taksonov izračunan na podlagi podatkov o njuni relativni frekvenci pojavljanja med sesalskimi ostanki iz obeh poznoantičnih faz.

pattern of distribution is in accordance to the data on the shares of cattle, caprines and pigs within the entire faunal assemblage collected at Tonovcov grad, which also shows a decline in the relative abundance of cattle due to an increase in the share of caprines at the transition between Late Antiquity phases 1 and 2 (*Tabs. 8.4-8.5*). Moreover, it is interesting to note the significantly greater heterogeneity in the contributions of individual taxa amongst the assemblages from the Late Antiquity phase 1 (*Fig. 8.32*). While nine out of the total of ten assemblages with Late Antiquity phase 2 material lie on the same side of the "central line",[72] the same line divided the eleven assemblages dated to the Late Antiquity phase 1 practically into two halves (i.e. five of them lie above the division and six below it). In the attempt of interpreting the results it had to be remembered that they were obtained through an analysis of the material from only a part of the excavated area and thus might not be representative for the settlement as a whole. However, the greater heterogeneity of the material from the Late Antiquity phase 1 should not be neglected as it could argue in favour of the thesis that inter-phase differences in the economic importance of cattle and caprines at Tonovcov grad were smaller than indicated by the number of the remains from the two Late Antiquity phases (*Tabs. 8.4-8.5*).

8.6.1 THE ROLE OF THE MAIN DOMESTICATES IN THE ECONOMY OF TONOVCOV GRAD

In Europe the importance of cattle, caprines and pigs in the economy of individual communities changed quite a bit in time and space between the mid 1st millennium BC to around 600 AD (King 1984; Forstenpointner *et al.* 2002, 58 f; MacKinnon 2004, 61 ff). Notable differences were observed between settlements from the same period and area, but which differed in their size and function (King 1984; Bartosiewicz 1990-1991; MacKinnon 2004, 61 ff). Data in *table 8.1* indicate that the central role in the economy of the Late Antique/Early Medieval Tonovcov grad was played by cattle, even though caprines were represented by a larger number of finds. Taking into account the much greater body mass of cattle and its importance as a working animal, its role certainly surpassed what is suggested by the number of remains.

The data on the share of unfused bones indicate that the preferred culling age of cattle during each of the three settlement phases was of three years and older

[72] The "central line" is defined as the line dividing samples at which an above average share of cattle and a below average percentage of caprine remains have been found from those showing a reverse image. At this the average representation share of the stated taxa was calculated from the data on their abundances amongst the mammalian remains from Late Antiquity phases 1 and 2.

8.6.1 VLOGA OSREDNJIH VRST DOMESTIKATOV V EKONOMIJI TONOVCOVEGA GRADU

V evropskem prostoru je bil pomen domačega goveda, drobnice in prašiča v ekonomiji posameznih skupnosti iz obdobja od sredine 1. tisočletja pr. n. št. do okoli leta 600 n. št. v času in prostoru precej spremenljiv (King 1984; Forstenpointner *et al.* 2002, 58 s; MacKinnon 2004, 61 ss). Opazne razlike so bile ugotovljene tudi v primerjavi favnistične slike naselij iz istega obdobja in območja, ki pa so se razlikovale v velikosti in funkciji (King 1984; Bartosiewicz 1990–1991; MacKinnon 2004, 61 ss). Sodeč po podatkih iz *tabele 8.1* je osrednje mesto v ekonomiji poznoantičnega/zgodnjesrednjeveškega Tonovcovega gradu zasedalo domače govedo, čeprav po številu najdb sicer prednjači drobnica. Spričo očitno večje mase goveda in pa njegovega pomena kot delovne živine je njegova vloga namreč zagotovo presegala tisto, na katero bi lahko sklepali zgolj iz ugotovljenega razmerja v številu ostankov.

Podatki o deležu zastopanosti kosti s še ne popolnoma zraščenima epi- in diafizo kažejo na to, da so na Tonovcovem gradu v vseh treh tukaj obravnavanih poselitvenih fazah preferenčno klali nad tri leta stara govedа (*tab. 8.8*). Vsaj kar zadeva prvo poznoantično fazo,[71] takšno sliko potrjujejo tudi podatki o stopnji obrabe žvekalne površine kočnikov (glej pogl. 8.3), pri čemer najdba spodnje čeljustnice domnevno deset do dvanajst tednov starega teleta morda kaže na lokalno rejo goveda (*cf.* MacKinnon 2004, Tab. 19). V večinskem zakolu odraslih živali bi se lahko odražala razmeroma intenzivna prireja mleka; pri govedoreji usmerjeni v proizvodnjo mesa, bi namreč med izkopanimi ostanki pričakovali večji delež kosti in zob telet. Po mnenju MacKinnona (2004, 205 s) naj v (pozni) antiki v okviru rimskega cesarstva kravje mleko ne bi igralo pomembnejše vloge, kar pa seveda ne izključuje lokalnih specifik. V politično in varnostno nestabilnem obdobju pozne antike bi namreč v ekonomsko avtarkičnih naselbinah tipa Tonovcov grad kravje mleko vsekakor predstavljalo dobrodošlo obogatitev dnevnega jedilnika. Po drugi strani pa lahko ugotovljeno starostno strukturo utemeljeno povezujemo tudi s pomenom goveda kot delovne živine. Spričo zahtevnosti govedoreje, o čemer poročajo tudi antični viri (*cf.* MacKinnon 2004, 89; a glej tudi MacKinnon 2004, 94), bi bil v nemirnem obdobju pozne antike množičen zakol mladih goved tako vse prej kot ekonomsko upravičen. Odvisnost takratnih skupnosti od produktov lastne poljedelske in živinorejske dejavnosti je namreč narekovala maksimiranje izkoriščanja teh za rejo relativno zahtevnih živali kot delovne živine na poljih oz. v transportu. Zaradi navedenega se je na

[71] Druga poznoantična ter zgodnjesrednjeveška faza v tej primerjavi nista bili upoštevani, saj je razpoložljivo število vzorcev preskromno (tj. N = 1).

at Tonovcov grad (*Tab. 8.8*). At least as regards the Late Antiquity phase 1[73] this picture is also confirmed by the tooth wear data (see chapter 8.3), with the find of a mandible of a ten to twelve weeks old calf possibly indicating that cattle was reared locally (*cf.* MacKinnon 2004, Tab. 19). In principle, the preferential culling of adults could be a reflection of a relatively intensive milk production. Namely, with a more meat-oriented cattle exploitation a higher contribution of calf remains would be expected. According to MacKinnon (2004, 205 f) cow's milk did not play an important role in the Roman empire in (Late) Antiquity, however this does of course not exclude local variation. Namely, in a politically unstable period as the Late Antiquity certainly was, cow's milk may have represented a welcome enrichment of the everyday menu to inhabitants of economically autarctic settlements such as Tonovcov grad. On the other hand the age profile indicated by the data in *table 8.8* can also be linked to the importance of cattle as working animals. Taking into account the demands of cattle husbandry, also emphasized by several Roman authors (*cf.* MacKinnon 2004, 89; but see also MacKinnon 2004, 94), the mass culling of young cattle would not be economically sound in the unstable Late Antique period. The dependence of communities on the products obtained from their own farming and stock rearing called for maximising the use of the relatively demanding cattle to rear as beasts of burden. Consequently, mainly the meat of animals unfit to work (i.e. old, injured specimens) found its way onto plates. Other Late Antique sites in the region show a similar age profile of the cattle at death (Riedel 1985, Tab. 2; Stork, von den Driesch 1987, Tab. 6; Riedel, Scarpa 1988, Tab. 1; Wilkens 1990, 308 ff; Riedel 1993b, Tab. 9; Turk 2000, 169; Bartosiewicz, Choyke 1985).

Further insights into the role of cattle in the economy of Tonovcov grad were obtained by analyzing the sex profile. Of the three metapodials and the 14 sufficiently preserved pelvis fragments those of cows prevail (N = 14), while only the metatarsal from sample No. 2038 (sq. 668, 669; mqu: D3, D4) was assigned to a bull. In this sample ox was represented by a mere two finds, even though it – as a rule – represents an ideal choice for work in the fields. If the estimated ratio between the sexes is at least roughly representative and if it is not to be ascribed to the less likely orientation toward a more intensive milk production, the observed sex ratio could be interpreted as a reflection of the farmer's compromise between the need to ensure a sufficient amount of fodder for the cattle on one hand and field crops for himself and his family on the other. Feeding a single pair of oxen would demand between 10 and 12 ha of pasture, which represented a great challenge for the mostly small Late Antique farming communities. As stated already by Roman authors

[73] Due to the small number of specimens (i.e. N = 1) the Late Antiquity phase 2 and the Early Medieval phase were not taken into account for this comparison.

krožnikih večinoma znašlo le meso za delo odsluženih (tj. starih, poškodovanih ipd.) primerkov. Skladni s tem so podatki o starostni strukturi goved ob zakolu/poginu tudi v okviru drugih poznoantičnih najdišč v regiji (Riedel 1985, Tab. 2; Stork, von den Driesch 1987, Tab. 6; Riedel, Scarpa 1988, Tab. 1; Wilkens 1990, 308 ss; Riedel 1993b, Tab. 9; Turk 2000, 169; Bartosiewicz, Choyke 1985).

V kontekstu ugotavljanja osrednjih produktov govedoreje je povedna tudi spolna struktura populacije omenjene vrste s Tonovcovega gradu. Med sicer le tremi metapodiji in 14 zadovoljivo ohranjenimi fragmenti medenice namreč močno prednjačijo ostanki krav (N = 14), medtem ko sva biku pripisala le stopalnico iz vzorca št. 2038 (kv. 668, 669; mkv: D3, D4).Vol je bil v navedenem vzorcu zastopan z zgolj dvema najdbama, čeprav je načeloma zagotovo predstavljal idealno izbiro za delo na polju. Če je ocenjeno razmerje med spoloma vsaj v grobem reprezentativno in v kolikor ga ne gre pripisati sicer manj verjetni želji po intenzivnejši prireji mleka, bi dobljeno sliko lahko interpretirali kot odraz kmetovega kompromisa med potrebo po zagotavljanju zadostnih količin krme za živino na eni strani ter poljščin zase in družino na drugi. Reja le enega para volov naj bi namreč zahtevala kar 10 do 12 ha veliko pašniško površino, kar je nedvomno pomenilo velik pritisk na po večini domnevno majhne poznoantične kmetijske skupnosti. Kot so navajali že antični pisci, je v takih primerih izhod v sili lahko predstavljalo zmanjšanje števila volov v čredah na račun krav (MacKinnon 2004, 95 s). Te so namreč z vidika reje bistveno manj zahtevne, še vedno pa lahko služijo kot delovna živina na poljih.

Ugotavljanje vloge mesa ter posameznih sekundarnih produktov reje je bilo v primeru drobnice še nekoliko bolj zapleteno, saj je bilo do vrste mogoče določiti zgolj 15,5 odstotka najdb. Tradicionalen pristop k problematiki je temeljil na ocenah starostne strukture drobnice, a brez upoštevanja razlik v obstojnosti med ostanki juvenilnih in že odraslih živali. Iz takšnih ocen izhajajoče ugotovitve so bile zato z vidika ovčereje/kozjereje pogosto neutemeljene (Cribb 1984), zato je Munson (2000) ponudil alternativen pristop. Ugotovljene frekvence pojavljanja zob ovac /koz posameznih starostnih razredov v arheološkem vzorcu naj bi se tako najprej utežile glede na njihovo sposobnost kljubovanja poodložitvenim destruktivnim dejavnikom, nato pa tako korigirane frekvence primerjale z bogato zbirko arheoloških in etnoarheoloških mortalitetnih statistik za omenjeni dve vrsti (*cf*. Munson 2000, 401 ss).

Korigirana starostna struktura za drobnico iz prve faze[72] poznoantične poselitve Tonovcovega gradu izkazuje polovični delež do enega leta starih ovac/koz. Ob tem relativna frekvenca pojavljanja zob živali, ki so bile

[72] Zgodnjesrednjeveška faza v to analizo ni bila vključena, saj je razpoložljivo število zob preskromno. Podatki za drugo poznoantično fazo so podani v nadaljevanju.

a solution to this was the reduction of the numbers of oxen relative to cows (MacKinnon 2004, 95 f), for they are much less demanding as regards maintenance and yet they can be used as working animals in the field.

Appraising the role of meat *vs.* individual secondary products was slightly more complicated in the case of caprines, for only 15.5 percent of the finds could be identified to the level of species. The traditional approach to the issue is based on the estimates of the age profile of sheep/goat, but without taking into account the differences in the preservation of juvenile and adult animal remains on and in the sediment. Conclusions drawn from such estimations were thus often unfounded from the aspect of sheep or goat breeding (Cribb 1984), thus Munson (2000) offered an alternative approach: the frequencies of caprine teeth from individual age classes within an archaeological assemblage should be corrected in order to (at least partially) take into consideration differential taphonomic loss. Such corrected frequencies are then to be compared to the rich collection of archaeological and ethno-archaeological mortality statistics for these two species (*cf*. Munson 2000, 401 ff).

The corrected mortality profile for caprines from the Late Antiquity phase 1[74] of Tonovcov grad indicates a 50 % share of teeth indicating animals up to one year of age. At this the relative frequency of sheep/goats that were culled or have died in their second year of life, does not reach even one tenth of all the ageable specimens (*Tab. 8.12*). The modern-ethnographic-historic mortality profiles for caprines allows various interpretations for such an age structure (subgroup 2b *sensu* Munson 2000, 401 f). Thus it is for instance possible that the farmers have opted to enlarge their herds by retaining a higher proportion of female young. A slightly more likely option seems to be the possibility that the data from *table 8.12* reflects a relatively low fertility rate (which is often associated with extreme wool emphasis). Finally, the described mortality profile could, in principle, also reflect the sale ("export") of a large number of lambs and kids for culling. Nevertheless, in view of the importance of the Late Antique settlement of Tonovcov grad, which was *de facto* the local (religious) centre, such a rearing policy is not likely. On the contrary: if a military unit was stationed at this location during Late Antiquity phase 1 – as indicated by certain archaeological finds (see chapter 2.1) – army meat provisioning may have even been imported (*cf*. MacKinnon 2004, 226), as is known to have occured with olive oil and possibly wine (see chapter 4.1). At this it should be mentioned, that the possible imports of caprines from the countryside, where the farmers would keep most lambs/kids for themselves,[75]

[74] Due to the insufficient number of teeth, the Early Medieval phase was not included into this analysis. Data for Late Antiquity phase 2 are provided below.

[75] Such action could be lead by the desire to increase their herds or a low fertility rate (which could be a consequence of intensive wool production).

zaklane oz. so poginile v svojem drugem letu življenja, ne dosega niti desetine vseh analiziranih primerkov (*tab. 8.12*). Izhajajoč iz modernih etnografsko-historičnih mortalitetnih profilov za drobnico dopušča takšna starostna struktura (podskupina 2b *sensu* Munson 2000, 401 s) različne interpretacije. Tako je npr. mogoče, da so se kmetje odločili za povečanje svojih čred in zato pri življenju ohranjali razmeroma visok delež samic. Še nekoliko verjetnejša se zdi možnost, da podatki iz *tabele 8.12* govorijo o relativno nizki stopnji rodnosti (kar pogosto povezujemo z izrazitim naporom, usmerjenim v pridobivanje volne). Ne nazadnje pa bi navedeno starostno strukturo lahko razložili tudi kot dokaz prodaje ("izvoza") velikega števila jagenj in kozličev za zakol, kar pa je v primeru lokalnega središča, kot je bil Tonovcov grad, vendarle manj verjetno. Celo nasprotno. Če se je med prvo fazo poznoantične poselitve obravnavanega najdišča tu res zadrževala vojaška posadka, na kar kažejo nekatere arheološke najdbe (glej pogl. 2.1), potem so morda takrat na Tonovcov grad meso (za vojsko) celo "uvažali" (*cf.* MacKinnon 2004, 226); nenazadnje je tak uvoz izpričan za oljčno olje in morda vino (glej pogl. 4.1). Pri tem velja omeniti, da bi morebiten uvoz drobnice s podeželja, kjer bi kmetje večino jagenj/kozličev zadržali zase,[73] prav tako rezultiral v prevladi do enega leta starih živali (pričakovan razpon: 40–60 %) in zanemarljivem deležu (tj. 7–10 %) dvoletnih (podskupina 2b *sensu* Munsel 2000, 403).

Sodeč po podatkih iz *tabele 8.12* je reja drobnice na območju Tonovcovega gradu v 6. stoletju (tj. drugi poznoantični fazi) doživela določene modifikacije. Na podlagi korigirane starostne strukture se namreč zdi, da je bila reja ovac/koz v tem obdobju usmerjena predvsem v prirejo mesa oz. mesa in mleka, medtem ko naj bi imela volna nekoliko manjši pomen (podskupina 1a *sensu* Munson 2000, 401). Podobno visoke (tj. > 70 %) deleže zastopanosti do enega leta starih živali med zaklanimi/poginulimi ovcami/kozami, ob sočasni zanemarljivi zastopanosti dvoletnih (< 15 %), izkazujejo agrarne skupnosti, ki drobnico vzrejajo (skoraj) izključno za lastne potrebe in ki vzdržujejo konstantno velikost čred. Pri tem naj bi razlikovanje med rejo, ki je usmerjena predvsem v izkoriščanje mesa, in tisto, ki daje prednost prireji mleka, izkazovalo razmerje v številu do šest mesecev starih ovac/koz nasproti številu med šest in dvanajst mesecev starih živali (Munson 2000, 401). Za poznoantični Tonovcov grad bi tako lahko sklepali, da je bilo pri kozjereji nekoliko bolj v ospredju pridobivanje mleka (prevladujejo mlečni četrti predmeljaki do šest mesecev starih živali; *tab. 8.22*), pri ovčereji pa mesa (zobje do šest mesecev starih primerkov manjkajo; *tab. 8.23*). Pičlo število podatkov sicer specifično težo navedenih ugotovitev nedvomno precej

[73] K takšnemu postopanju bi jih lahko vodila želja po povečanju lastnih čred ali nizka stopnja rodnosti (ki pa bi bila, kot že navedeno, lahko posledica intenzivnega izkoriščanja volne).

would also result in the dominance of up to one year old animals (expected range: 40-60 %) and a negligible (i.e. 7-10 %) share of those in the second year of life (subgroup 2b *sensu* Munsel 2000, 403).

Data from *table 8.12* shows that in the 6th century (i.e. Late Antiquity phase 2) sheep and goat exploitation at Tonovcov grad experienced a certain modification. On the basis of the corrected mortality profile it appears that caprine husbandry in this period was oriented primarily toward the production of meat or meat and milk, while wool supposedly had slightly less importance (subgroup 1a *sensu* Munson 2000, 401). Similarly high representation (i.e. > 70 %) of remains from up to one year old caprines, and a negligible proportion of those in their second year of life (< 15 %) are shown in agricultural communities that keep sheep/goat (almost) exclusively for their own needs and that preserve a constant herd size. At this profiles with more that two-thirds of young in the 2-6 months old class might be indicative of milk emphasis, whereas those with more than two-thirds of the young in the 6-12 months old class might reflect meat emphasis (Munson 2000, 401). For Late Antique Tonovcov grad we could conclude that in goat exploitation milk production was slightly more important than meat (note the prevailence of fourth deciduous premolars of up to six months old animals; *Tab. 8.22*), while in sheep it has been the oposite (note the lack of teeth of up to six months old animals; *Tab. 8.23*). The poor data undoubtedly greatly reduce the weight of these conclusions, but two points should be mentioned. According to Antique sources goat's milk was the most popular milk in Italy during the Roman period (*cf.* MacKinnon 2004, 205). The second derives from the study of the ratios between the size of the animal stocks and the culling frequency in 27 African and Southeast Asian countries in which animal husbandry is sufficiently well developed to suffice for the needs of the local population (Bartosiewicz 1985, 177 ff). These results have shown that (independent of the actual natural and cultural factors) sheep and pig may complement each other in meat production. The relatively modest number of pig remains compared to the numerous finds of young caprine individuals (supposedly mainly sheep) might indicate that the inhabitants of the Late Antique Tonovcov grad substituted for the lack in the pig production with a greater emphasis on sheep meat.

Pig was not as important as cattle and caprines at Tonovcov grad (*Tabs. 8.1*, *8.4-8.5*). This seems to contradict the assumption that pork was more appreciated than beef/veal, sheep and goat meat in Roman period Italy (MacKinnon 2004, 217). However, sites with higher contributions of pig remains can be found predominantly in the south and central part of the Apennine Peninsula, while in the north (especially in towns) cattle was always in the forefront (MacKinnon 2004, 68 ff). Antique sources include *Galia cisalpina* amongst the regions with more intensive pig breeding

Tab. 8.22: Starost (v mesecih) koz s Tonovcovega gradu, kot izhaja iz obrabe žvekalne površine četrtih mlečnih predmeljakov (*cf*. Payne 1985, 142). Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.

Stopnja obrabe Wear stage	Starost Age	PA 1 LA 1	PA 2 LA 2	ZSV EMA
1	0–2	1	2	-
2–3	2–6	1	-	-
4–5	2–12	-	-	1
6	6–12	-	-	-
7	6–24	-	1	-
8–10	12–24	-	-	-

Tab. 8.22: Age (in months) at death of goats from Tonovcov grad, based on data on the wear of forth deciduous premolars (*cf*. Payne 1985, 142). Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Tab. 8.23: Starost (v mesecih) ovc s Tonovcovega gradu, kot izhaja iz obrabe žvekalne površine četrtih mlečnih predmeljakov (*cf*. Payne 1985, 142). Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.

Stopnja obrabe Wear stage	Starost Age	PA 1 LA 1	PA 2 LA 2	ZSV EMA
1	0–2	-	-	-
2–3	2–6	-	-	-
4–5	2–12	2	11	-
6	6–12	-	5	-
7	6–24	1	3	2
8–10	12–24	2	1	-

Tab. 8.23: Age (in months) at death of sheep from Tonovcov grad, based on data on the wear of forth deciduous premolars (*cf*. Payne 1985, 142). Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

zmanjšuje, vseeno pa velja omeniti dve, z njim povezani zanimivosti. Prva se nanaša na dejstvo, da je bilo v rimskodobni Italiji najbolj priljubljeno mleko prav kozje, o čemer poročajo tudi antični viri (*cf*. MacKinnon 2004, 205). Druga pa izhaja iz študije razmerij med velikostjo živali in klavno frekvenco v 27 afriških in jugovzhodnoazijskih deželah z dovolj razvito živinorejo, da ta zadošča potrebam tam živečega prebivalstva (Bartosiewicz 1985, 177 ss). Njeni rezultati so namreč pokazali, da se lahko v smislu prireje mesa (neodvisno od dejanskih naravnih in kulturnih danosti) prašič uspešno dopolnjuje prav z ovco. Razmeroma skromno število prašičjih ostankov nasproti številnim najdbam ostankov mladih živali drobnice (domnevno predvsem ovce) tako morda nakazuje, da so prebivalci poznoantičnega Tonovcovega gradu "primanjkljaj" v prireji prašičjega mesa dejansko nadomestili z večjim zakolom mladih ovac.

Domači prašič je bil v okviru poznoantičnega (na podlagi razpoložljivih najdb pa domnevno tudi zgodnjesrednjeveškega) Tonovcovega gradu manj pomemben od goveda in drobnice (*tab. 8.1*; 8.*4*–*8.5*). Ugotovitev je v navideznem nasprotju z dejstvom, da je bila svinjina v rimskodobni Italiji sicer bolj cenjena od govejega/telečjega, ovčjega in kozjega mesa (MacKinnon 2004, 217). Vendar pa najdišča z izstopajočimi deleži zastopanosti prašiča najdemo predvsem na južnem in osrednjem delu Apeninskega polotoka, medtem ko je bilo na severu (sploh v mestih) ves čas v ospredju govedo (MacKinnon 2004, 68 ss). Antični viri sicer med regije z intenzivno prašičerejo in predelavo svinjine prištevajo tudi Predalpsko Galijo (*Galia cisalpina*), predvsem območje okrog današnjega Milana (MacKinnon 2004, 152 s). Resnici na ljubo predstavljajo prašičji ostanki v okviru najdišča Monte Barro skoraj 60 odstotkov vseh določenih favnističnih najdb (Baker 1991, 156). Nižja, a še vedno razmeroma visoka relativna številčnost

and pork production, especially the area surrounding today's Milan (MacKinnon 2004, 152 f). At Monte Barro pig remains indeed represent almost 60 percent of all taxonomically identified faunal finds (Baker 1991, 156), with little less than 40 percent observed in the area of Altino near Venice as well (Riedel 1985, 134). Nevertheless, at most sites in *Galia cisalpina* pig did not exceed a one third contribution (Riedel 1983, 4; Stork, von den Driesch 1987, Tab 1; Boschin, Weissteiner 2007, Tab. 3), which also holds true for Tonovcov grad (*Tab. 8.1*).

Archaeological data undoubtedly indicate that the popularity of domestic pig varied between Roman communities in various parts of the empire (*cf.* King 1984; Forstenpointner *et al.* 2002, 58 f; MacKinnon 2004, 61 ff). It seems that in the modest contribution of this species to the material from Tonovcov grad factors beyond human preference are also reflected. To our knowledge the relatively small number of pig remains is also shown in all other archeozoologically analysed sites in the Soča valley, regardless of the period: Iron Age and Roman period assemblages from Most na Soči (Bartosiewicz 1985, Tab. 1; 1986, Tab. 1), Roman period remains from Gradič near Kobarid (NISP = 7479; own unpublished data), material from the Iron age site of Grgar-Grašišče (NISP = 130; own unpublished data) as well as the small assemblage from the prehistoric burial site in Tolmin (Bartosiewicz 2002; Di Martino 2002).

It is known that keeping pigs in covered shelters is a relatively new trend that dates back to the beginning of the 19th century (Kryštufek 1991, 238). Prior to this pigs wandered around foraging freely (*cf*. Baker, Clark 1993, 52), thus their numbers were significantly influenced by the forest grazing at their disposal (Krže 1982, 24). The map depicting the potential natural vegetation in Slovenia (Zupančič, Wraber 1989, 119) shows that the forests in the area of the Upper and Central Soča Valley

ostankov omenjene vrste (tj. 38 %) je bila ugotovljena tudi na območju Altina pri Benetkah (Riedel 1985, 134). V okviru večine najdišč iz Predalpske Galije pa prašič vendarle ne presega tretjinski delež zastopanosti (Riedel 1983, 4; Stork, von den Driesch 1987, Tab 1; Boschin, Weissteiner 2007, Tab. 3), kar velja tudi za Tonovcov grad (*tab. 8.1*).

Arheološki podatki nedvoumno kažejo, da je bila priljubljenost domačega prašiča med rimskodobnimi skupnostmi iz različnih delov cesarstva različna (*cf.* King 1984; Forstenpointner *et al.* 2002, 58 s; MacKinnon 2004, 61 ss). Navkljub temu se zdi, da se v skromnem deležu zastopanosti omenjene vrste med gradivom s Tonovcovega gradu najverjetneje kažejo tudi nekateri drugi, od človekovih siceršnjih preferenc neodvisni dejavniki. Po najini najboljši vednosti namreč relativno pičlo število prašičjih ostankov izkazuje tudi sesalska makrofavna z vseh ostalih arheozoološko obdelanih najdišč v Posočju, in to ne glede na obdobje: železnodobni in rimskodobni vzorec z Mosta na Soči (Bartosiewicz 1985, Tab. 1; 1986, Tab. 1), rimskodobni ostanki z Gradiča pri Kobaridu (NISP = 7479; lastni neobjavljeni podatki), gradivo iz železnodobnega najdišča Grgar - Grašišče (NISP = 130; lastni neobjavljeni podatki) ter tudi sicer skromen vzorec iz prazgodovinskega grobišča v Tolminu (Bartosiewicz 2002; Di Martino 2002).

Znano je, da je hlevska reja prašičev mlada in sega v začetek 19. stoletja (Kryštufek 1991, 238). V obdobjih pred tem so se tako prašiči večinoma prosto pasli (*cf.* Baker, Clark 1993, 52), zato je na njihovo številčnost močno vplivala količina gozdne paše (Krže 1982, 24). Iz karte potencialne naravne vegetacije Slovenije (Zupančič, Wraber 1989, 119) izhaja, da predstavljajo na območju Zgornjega in Srednjega Posočja klimaksni gozd predvsem združbe *Anemono-Fagetum s. lat*., *Ostryo-Fagetum s. lat*. ter *Seslerio-Fagetum*. Njihova floristična sestava nedvomno ustreza prehranskim navadam prašičev (*cf.* Krže 1982, 47 ss), saj poleg plodonosne bukve vključujejo tudi druge zanje prehransko pomembne rastline (*cf.* Dakskobler 1996; 2004). Razmeroma nizek delež prašiča v favnističnem gradivu s Tonovcovega gradu torej domnevno ne gre povezovati z neustrezno vegetacijsko sliko. Prav tako tudi ne s prizadetostjo naravne gozdne vegetacije zaradi oblikovanja pašnikov in polj, do česar je okrog dalj časa trajajočih naselbin sicer prihajalo vse od mlajše kamene dobe dalje (*cf.* Culiberg 1995, 205; Andrič, Willis 2003, 817). Obsežno trebljenje gozdov je bilo tako npr. dokazano tudi za okolico železnodobnih naselij v rečnih dolinah vzhodne Slovenije (*cf.* Culiberg, Šercelj 1995, 199 s), pa je tam delež domačega prašiča v okviru favnističnih vzorcev kljub temu vsaj primerljiv z deležem drobnice (Bartosiewicz 1996, 33). Iz navedenega tako izhaja, da je treba skromen delež prašiča med sesalskimi ostanki z najdišč v Posočju (vključno s Tonovcovim gradom) najverjetneje pripisati reliefu območja. Zaradi tipa habitata so se morali sicer razmeroma neizbirčni prašiči (*cf.* Kryštufek 1991,

consists of mainly *Anemono-Fagetum s. lat*., *Ostryo-Fagetum s. lat*. and *Seslerio-Fagetum*. Such a vegetation undoubtedly suits the pigs' eating habits (*cf.* Krže 1982, 47 ff), for apart from beech they also include other important nutritional plants (*cf.* Dakskobler 1996; 2004). The relatively low incidence of pig bones in the faunal material from Tonovcov grad is therefore not to be linked with the inadequate type of vegetation. It cannot be explained by deforestation either, eventhough it is well known that man created pastures and fields around permanent settlements from the Middle Stone Age onwards (*cf.* Culiberg 1995, 205; Andrič, Willis 2003, 817). After all, evidence of vast deforestation was also found in the surroundings of the Iron Age settlements in the river valleys of Eastern Slovenia (*cf* . Culiberg, Šercelj 1995, 199 f), however the contribution of pig remains to the faunal assemblages from that region is still at least comparable to the percentage of caprine bones (Bartosiewicz 1996, 33). It thus follows that the low relative abundance of pigs within the sites in the Soča valley area (including Tonovcov grad) should most likely be attributed to the topography of the area. On local steep slopes the otherwise undemanding pigs (*cf.* Kryštufek 1991, 237; MacKinnon 2004, 153) had to give way to the better adapted sheep and goats, while the dry terrain in the relatively narrow Soča Valley would also have been an unfavourable pig habitat.

At Tonovcov grad pigs were the only domesticated animals that were reared exclusively for meat and fat. This can clearly be seen from the mortality profile (*Tabs. 8.10-8.11*), which indicates a preferential culling of young and subadult animals. At this the individual finds of specimens that were over three years old are most probably to be understood as a reflection of their use for reproduction purposes (*cf.* MacKinnon 2004, 152).

8.6.2 TONOVCOV GRAD AS A MILITARY POST

Certain archaeological data indicate that during the Late Antiquity phase 1 the settlement of Tonovcov grad might have housed a military unit (see chapter 2.1). Meat played an universally important part in the military menu (King 1984, 188; Riedel 1993a; MacKinnon 2004, 210); however, both the consumption pattern and the preference for meat types varied greatly in space and time (King 1984, 197 ff; Bartosiewicz 1990-1991). Interregional deviations are most noticeable in the role of pork *versus* mutton/goat meat, at which the former meat type were preferred in Germany and the latter in Britain. Otherwise, in both areas – as well as in Northern France, Benelux, Switzerland, Austria (King 1984, 197 ff), Bulgaria (Johnstone 2007) and Hungary (Bartosiewicz 1990-1991, Tab. 2) – cattle was by far best represented in military camps.

237; MacKinnon 2004, 153) na tamkajšnjih strmih pobočjih povečini umakniti drobnici, neugodne prehranske razmere pa so bile zanje tudi na suhih tleh razmeroma ozke Soške doline.

Sicer pa je bil na Tonovcovem gradu prašič edina domača žival, katere reja je bila usmerjena izključno v pridobivanje mesa in maščob. To dokazuje tudi starostna struktura (*tab. 8.10–8.11)*, ki izkazuje preferenčen zakol mladih in subadultnih živali. Pri tem gre posamezne najdbe več kot tri leta starih primerkov najverjetneje razumeti kot dokaz njihove uporabe za reprodukcijo (*cf.* MacKinnon 2004, 152).

8.6.2 TONOVCOV GRAD KOT VOJAŠKA POSTOJANKA

Nekateri arheološki podatki kažejo, da je bila med prvo poznoantično poselitveno fazo Tonovcovega gradu v naselbini morda nastanjena vojaška posadka (glej pogl. 2.1). Znano je, da je bilo meso pomembna komponenta vojaškega jedilnika (King 1984, 188; Riedel 1993a; MacKinnon 2004, 210), pri čemer izbor vrste mesa izkazuje precejšnjo variabilnost v prostoru in času (King 1984, 197 ss; Bartosiewicz 1990–1991). Odstopanja so opazna predvsem, kar zadeva vlogo drobnice in prašiča, pri čemer prva večje deleže zastopanosti izkazuje na območju Britanije, prašič pa v Nemčiji. Na obeh območjih, tako kot tudi v severni Franciji, Beneluksu, Švici, Avstriji (King 1984, 197 ss), Bolgariji (Johnstone 2007) in na Madžarskem (Bartosiewicz 1990–1991, Tab. 2) pa po številu ostankov v vojaških taborih praviloma prednjači govedo.

O prehrani rimske vojske na območju jugovzhodnih Alp je težko govoriti, saj močno primanjkuje verodostojnih podatkov (*cf.* MacKinnon 2004, 226). Po najini najboljši vednosti lahko tako na vlogo posameznih vrst domestikatov v vojaški prehrani na širšem območju Tonovcovega gradu sodiva le na primeru Ajdovščine/*Castra*.[74] Ta je bila namreč v četrtem stoletju pomembna vojaška postojanka, ki je varovala enega osrednjih dostopov v Italijo z vzhoda. Čeprav je razpoložljivi vzorec skromen (NISP = 414), je vseeno poveden: tudi tu so namreč prevladujoči ostanki domačega goveda (*tab. 8.24*). Ugotovitev je po svoje pričakovana in skladna s trendi, ki so bili ugotovljeni drugje po Evropi (*cf.* King 1984, 189 ss, 198). Ker je bilo govedo v jugovzhodnoalpskem prostoru osrednja domača žival že pred prihodom Rimljanov (*sl. 8.33*), romanizacija večjih sprememb na jedilniku staroselcev ni povzročila, zato tudi ni prihajalo

[74] Morda je bila vojaška enota v pozni antiki locirana tudi v naselbini Sv. Pavel nad Vrtovinom (8 km zahodno od Ajdovščine), kjer med nekaj ducati sesalskih ostankov po številu najdb prednjači govedo pred prašičem (Svoljšak 1985, 226 s), relativno pogosti pa so tudi ostanki lovnih vrst (*cf.* Bartosiewicz 1990–1991, 108).

Due to the lack of reliable data it is not easy to define the diet of the Roman army in the Southeastern Alps (*cf.* MacKinnon 2004, 226). To our best knowledge for the broader area of Tonovcov grad such data are known only in the case of Ajdovščina/*Castra*.[76] It the 4th century this was an important military post that protected one of the main gates into Italy from the East. Even though the assemblage is small (NISP = 414) it is still meaningful as cattle remains also prevail (*Tab. 8.24*). This observation was to be expected and is in accordance with trends shown elsewhere in Europe (*cf.* King 1984, 189 ff, 198). As cattle was the main domesticate in the southeastern Alpine area already prior to the arrival of the Romans (*Fig. 8.33*), the Romanisation itself apparently did not bring any greater changes to the diet of the indigenous people, thus there was no need to adjust the military menus to the local customs or vice versa (*cf.* King 1984, 198).

With the above in mind one could argue, that the relatively higher share of cattle in the material from the Late Antiquity phase 1 of Tonovcov grad may reflect the import of meat into the settlement in order to supply the soldiers. Even though it is known that the military often reared their own cattle (MacKinnon 2004, 210), the Roman state established an organised military food provisioning system, including the delivery of meat to its army (MacKinnon 2004, 226). The unstable conditions in Late Antiquity disturbed the efficient operation of this system that forced the military to search alternative sources of meat and fat (hunting, fishing; Bartosiewicz 1990-1991). However, in the case of Tonovcov grad no greater inter-phase differences were noticed in the species richness (*Tabs. 8.4-8.5*; *Fig. 8.13*), as finds of game and fish remained negligible throughout. We should also mention a practically identical contribution of cattle cranial remains in relation to postcranial bone found in the material from Late Antiquity phases 1 and 2 (i.e. 27.2 % and 26.7 %), which also opposes the thesis on the import of greater numbers of cattle for the needs of the army.[77] As indicated by the analysis of cattle finds from urban centres from Roman Period Italy, the heads were usually removed at the place of slaughter (as a part of the primary butchering of the animal) and thus did not reach the market together with the rest of the carcass. The consequences of such actions can of course also be seen in the faunal mate-

[76] It is possible that in Late Antiquity a military unit was stationed in the vicinity of the settlement of Sv. Pavel above Vrtovin (8 km west of Ajdovščina), where – among the several dozen mammalian remains – cattle was the most commonly represented species (Svoljšak 1985, 226 f). Notably (*cf.* Bartosiewicz 1990-1991, 108) pigs and game were also relatively common.

[77] As the finds mainly originate from the area of structure 1, these results should be understood as a reflection of the preferences of the occupants of this structure (area) and not necessarily the site as a whole.

do prilagajanja jedilnika vojske lokalnim običajem in obratno (*cf*. King 1984, 198).

V relativno višjem deležu zastopanosti domačega goveda v gradivu iz prve poznoantične poselitve Tonovcovega gradu bi se lahko, glede na zgoraj navedeno, odražal prav uvoz mesa v naselbino za oskrbo tam nameščenih vojakov. Čeprav je znano, da se je vojska pogosto ukvarjala z rejo lastnih čred živine (MacKinnon 2004, 210), pa je rimska država v obdobju cesarstva vzpostavila tudi organiziran sistem dobavljanja hrane (vključno z mesom) svojim vojakom (MacKinnon 2004, 226). Nestabilne razmere v pozni antiki so učinkovito delovanje omenjenega sistema ovirale, kar je vojsko sililo v iskanje alternativnih virov mesa in maščob (lov, ribolov; Bartosiewicz 1990–1991). Vendar pa v primeru Tonovcovega gradu omembe vrednih medfaznih razlik v vrstnem bogastvu vzorcev ni opaziti (*tab. 8.4–8.5*; *sl. 8.13*), število najdb lovnih vrst pa ostaja ves čas zanemarljivo. Omeniti velja tudi praktično identičen delež zastopanosti kranialnih ostankov goveda nasproti elementom postkranialnega skeleta v okviru gradiva iz obeh poznoantičnih faz (tj. 27,2 % in 26,7 %), kar prav tako nasprotuje tezi o uvozu večjih količin govedine za potrebe vojske.[75] Kot so pokazale analize govejih najdb iz urbanih središč rimskodobne Italije, so namreč glave praviloma odstranili na kraju zakola v okviru osnovnega raztelešenja živali in tako večinoma niso prišle na trg skupaj s trupom. Posledice takšnega postopanja se seveda kažejo tudi v favnističnem gradivu, predvsem v slabši zastopanosti zob, čeljustnic in lobanj (MacKinnon 2004, 219). Prav takšno sliko kažejo goveji ostanki iz vojaške postojanke Dichin/*Nicopolis* v Bolgariji (Johnstone 2007, 292), medtem ko v primeru Tonovcovega gradu, kot že navedeno, ni bilo tako.

K zgornjemu velja dodati še nekaj besed v zvezi s postopkom raztelešanja goved. Detajlna študija frekvenc in pa mest pojavljanja usekov in urezov na posameznih skeletnih elementih sicer presega namen pričujočega prispevka. Se pa zdi na tem mestu vendarle smiselno omeniti, da so epifize dolgih kosti okončin goveda v vzorcu s Tonovcovega gradu večinoma nepoškodovane. Ugotovitev je pomembna, saj kažejo goveji ostanki, izkopani v vojaških taborih, praviloma precej drugačno sliko. Postopek raztelešanja goved je bil tam namreč bistveno bolj "avtomatiziran" in je težil predvsem k produciranju enakomerno velikih porcij (*cf*. Riedel 1993b, 226 ss; Stokes 2000, 147). Spričo manjše pozornosti, namenjene dejanski mikrolokaciji udarca s sekiro oz. zareza z nožem na posameznih kosteh, čemur je do neke mere zagotovo botrovala tudi (pre)zaposlenost vojaških mesarjev, goveji ostanki iz vojaških taborov izkazujejo tudi večji delež dolgih kosti s poškodovano epifizo (*cf*. Maltby 1989, 90; Riedel 1993b, 227). Maloštevilnost tako poškodovanih

[75] Ker najdbe pretežno izvirajo z območja stavbe 1, je tudi dobljene rezultate treba razumeti kot odraz specifičnih preferenc stanovalcev omenjene stavbe (območja) in ne najdišča v celoti.

Tab. 8.24: Število določenih primerkov (NISP) za posamezne taksone velikih sesalcev iz Ajdovščine/*Castra*. Vir: lastni neobjavljeni podatki.
Tab. 8.24: Number of identifiable specimens (NISP) for individual large mammalian taxa from Ajdovščina/*Castra*. Source: personal unpublished data.

Takson / Taxon	**NISP**	**% NISP**
Bos taurus	156	37,7
Sus sp.	102	24,6
Caprinae	84	20,2
Equus caballus	62	15,0
Cervus elaphus	7	1,7
Camelus dromedarius	3	0,8
SKUPAJ / TOTAL	414	100,0

rial, especially in the modest representation of teeth, jawbones and skulls (MacKinnon 2004, 219). Such a picture is shown by cattle remains from the military post Dichin/*Nicopolis* in Bulgaria (Johnstone 2007, 292), however, as previously stated, this was not the case in Tonovcov grad.

A few additional words should be said in relation to the cattle butchering process. A detailed study of the frequencies and positions of the cut- and chop-marks on individual skeletal elements would be beyond the focus of this study. It is, however, worth noting that the epiphyses of cattle long bones are mainly undamaged. This is important, since cattle remains excavated at military camps tend to show a different picture reflecting a specific, much more patterned butchering procedure primarily aimed at producing equal portions (*cf*. Maltby 1989, 90; Riedel 1993b, 226 ff; Stokes 2000, 147). Due to the relatively little attention paid to the precise location of the chop or cut by the overworked military cooking personnel, the butchery waste often includes a large proportion of long bones with damaged epiphyses (*cf*. Riedel 1993b, 227).

The small numbers of bones damaged in such a way in the material from the Late Antiquity phase 1 of Tonovcov grad does not in itself exclude the possible presence of a military unit within the settlement. Similar holds true for the above presented data on the standardly low species richness and the lack of diachronic (i.e. inter-phase) variations in the share of cranial skeletal elements. Nevertheless, the data do give us at least an idea as regards the size of the (plausible) military unit, which apparently could not be very large. As such a small unit could perfectly satisfy their needs for food already with the local products (stock rearing and field crops), there would be no real need for a vast import of food, nor for routinized mass butchering (of cattle carcasses) or broadening of the diet by augmenting the role of game and/or fish (*cf*. Bartosiewicz 1990-1991).

kosti med gradivom iz prve faze poznoantične poselitve Tonovcovega gradu sicer sama po sebi še ne zanika morebitne prisotnosti vojaške posadke v naselbini. Enako velja tudi za zgoraj predstavljene podatke o zastopanosti zob in kosti glave ter o vrstnem bogastvu vzorca. Je pa iz navedenega mogoče sklepati vsaj na obseg (morebitne) vojaške posadke, ki ni mogla biti prav velika. Maloštevilno moštvo bi namreč svojim potrebam po hrani lahko brez večjih težav zadostilo že s produkti lokalne reje živine (in poljedelstva), izostala pa bi tudi potreba po množičnem, "avtomatiziranem" raztelešanju goved (zato manj poškodb epifiz dolgih kosti).

8.6.3 PRIMERJAVE V PROSTORU IN ČASU

Bistveno razliko med favnističnimi vzorci iz obeh poznoantičnih in zgodnjesrednjeveške poselitvene faze Tonovcovega gradu predstavlja očiten upad deleža domačega goveda na račun drobnice po zatonu prve poznoantične faze (*tab. 8.4–8.5*). Kaj tiči v ozadju navedenega procesa, je težko oceniti, skoraj gotovo pa to ne dokazuje obsežnejšega uvoza teletine/govedine v naselbino v času prve poznoantične poselitvene faze (glej zgoraj). V kolikor gre favnistično sliko z izkopanega dela najdišča posplošiti na celotno naselbino, bi bilo večji delež goveda med gradivom iz prve poznoantične faze bolj utemeljeno pripisati večji vlogi govedoreje v lokalni ekonomiji v navedenem obdobju. Pri tem velja poudariti, da izkazujejo starejša rimskodobna najdišča v regiji še višjo relativno frekvenco pojavljanja najdb domačega goveda, kot je bilo to ugotovljeno za prvo poznoantično fazo s Tonovcovega gradu (*sl. 8.33*). Iz tega bi lahko sklepali, da je postalo vzdrževanje velikih čred uniparnih in razmeroma počasi rastočih goved z namenom prireje mesa v nemirnem obdobju pozne antike očitno ekonomsko premalo učinkovito, zato sta pomen pridobivala drobnica in prašič. Trend upadanja obsega govedoreje se je spričo naraščajoče politične in varnostne nestabilnosti v obdobju pozne antike nadaljeval tudi še v šestem in deloma sedmem stoletju, tj. za časa druge poznoantične poselitvene faze Tonovcovega gradu. Analogije lahko najdemo na praktično vseh sočasnih najdiščih v regiji (*sl. 8.33*), kar izpričuje podoben odziv posameznih lokalnih skupnosti jugovzhodnoalpskega prostora na "barbarsko" pretnjo z vzhoda.

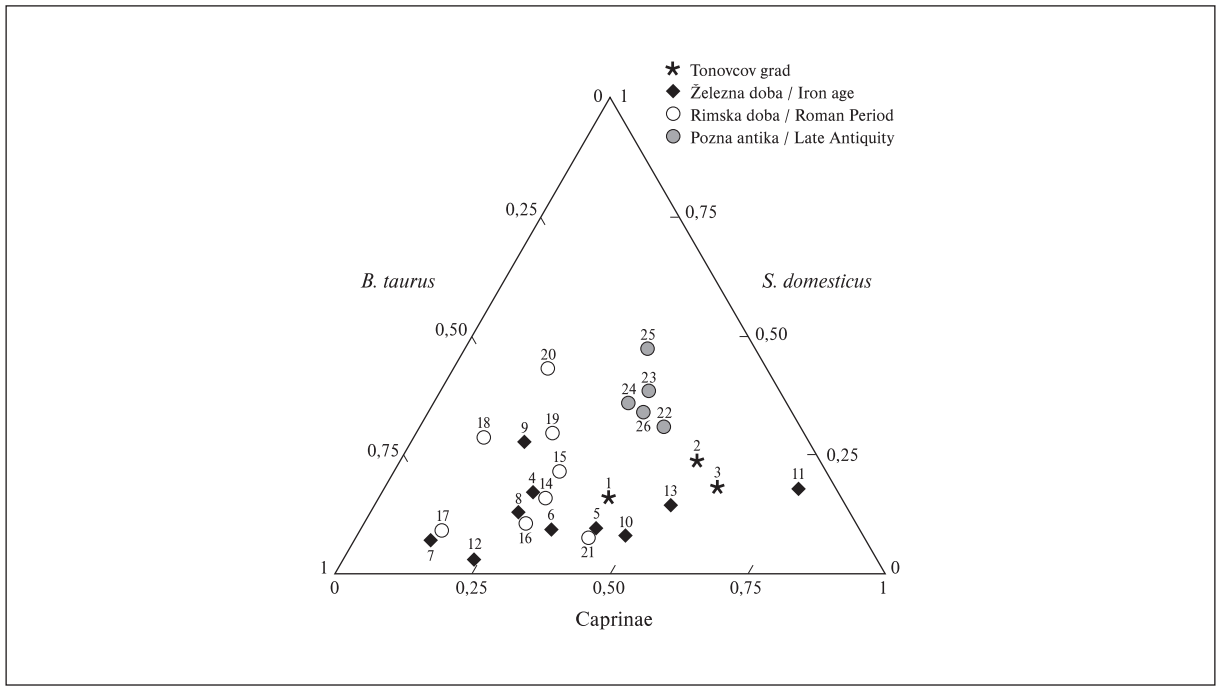
Da je upad deleža goveda na prehodu iz prve faze poznoantične poselitve Tonovcovega gradu v drugo verjetno res v precejšnji meri odsev slabših varnostnih razmer, kažejo tudi podatki o frekvenci pojavljanja najdb osrednjih domestikatov na železnodobnih najdiščih v regiji. Ti namreč praviloma izkazujejo vsaj polovični delež zastopanosti goveda, po čemer se umeščajo znotraj variacijske širine za rimskodobna najdišča v jugovzhodnoalpskem prostoru (*sl. 8.33*), in to navkljub sicer še

8.6.3 COMPARISONS IN SPACE AND TIME

The main difference between the faunal assemblages from both Late Antiquity and the Early Medieval phase at Tonovcov grad is represented by the noticable decline of cattle and the contemporaneous increase of caprines following the end of Late Antiquity phase 1 (*Tabs. 8.4-8.5*). It is hard to assess what stands behind this process, but it is almost certain that it does not reflect a considerable import of veal/beef during the Late Antiquity phase 1 (see above). In the event that the picture emerging from the analyses of animal remains from the excavated area is applicable to the entire settlement, the larger cattle share in the Late Antiquity phase 1 material would have rather to be attributed to the greater role played by cattle in the local economy of the time. It should be emphasised that earlier Roman period sites in the region show an even greater relative abundance of cattle finds than the Late Antiquity phase 1 at Tonovcov grad (*Fig. 8.33*). This could lead to the conclusion that during an unstable period of Late Antiquity maintaining large herds of uniparous and relatively slow growing cattle for meat production was obviously not economically efficient, thus sheep, goats and pigs were gaining in importance. Along with increasing political instability in Late Antiquity the declining trend in cattle exploitation continued also throughout the 6th and 7th century, i.e. during the time of Late Antiquity phase 2. Analogies can be found in practically all sites from that period in the region (*Fig. 8.33*), indicated by the similar response of individual local communities to the "barbarian" threat from the east.

The thesis of the decreased contribution of cattle during the transition between Late Antiquity phases 1 and 2 at Tonovcov grad being largely a reflection of the poorer safety conditions is corroborated by the data on the abundance of main domesticates at Iron Age sites in the Southeastern Alps. These tend to show an at least a 50 % share of cattle and thus fall within the range seen at Roman period sites in the same area (*Fig. 8.33*). This is noteworthy since Iron Age animal exploitation was based on the relatively archaic herding practices that differed greatly from Roman animal breeding (*cf.* Bökönyi 1974). At this it is important to state that amongst the Iron Age sites shown on *figure 8.33* significant settlements (i.e. "centres") prevail (Dular, Tecco Hvala 2007, 191 ff). These were (together with the accompanying territories) politically and economically autarctic units, whose existence was based on a subsistence economy,[78] however the communication network enabled close contacts and a dynamic exchange between neighbouring settlements as well as with more distant places (Dular, Tecco Hvala

[78] Members of the local community (i.e. inhabitants of a centre with the accompanying territory) produced their own food, reared their own cattle and manufactured tools and vessels.



Sl. 8.33: Delež zastopanosti domačega goveda, drobnice in prašiča v treh tukaj obravnavanih poselitvenih fazah Tonovcovega gradu in še 23 drugih najdiščih s prostora jugovzhodnih Alp. Seznam vzorcev, njihova velikost (NISP) in časovna opredelitev:
1 – Tonovcov grad (prva poznoantična faza); **2** – Tonovcov grad (druga poznoantična faza); **3** – Tonovcov grad (zgodnjesrednjeveška faza); **4** – Stična, Slovenija (železna doba; NISP = 4487; Bökönyi 1994); **5** – Kunkel, Slovenija (starejša železna doba; NISP = 282; Bartosiewicz 1996); **6** – Bled: pod Gradom, Slovenija (starejša železna doba; NISP = 347; Bartosiewicz 1996); **7** – Cvinger, Slovenija (starejša železna doba; NISP = 206; Bartosiewicz 1996); **8** – Gradec pri Vinkovem vrhu, Slovenija (starejša železna doba; NISP = 511; Bartosiewicz 1996); **9** – Libna, Slovenija (starejša železna doba; NISP = 130; Bartosiewicz 1996); **10** – Most na Soči, Slovenija (starejša železna doba; NISP = 2956; Bartosiewicz 1985); **11** – Nivize, Italija (železna doba; NISP = 158; Riedel 1968); **12** – Jama I na Prevali, Slovenija (železna doba; NISP = 947; Riedel 1977); **13** – Grgar-Grašišče, Slovenija (starejša železna doba; NISP = 130; neobjavljeno); **14** – Vrhnika/*Nauportus*, Slovenija (rimska doba; NISP = 189; neobjavljeno); **15** – Ribnica na Dolenjskem/*Romula*, Slovenija (rimska doba; NISP = 5876; neobjavljeno); **16** – Gorenje Skopice, Slovenija (rimska doba; NISP = 251; neobjavljeno); **17** – Col: telovadnica, Slovenija (rimska doba; NISP = 434; neobjavljeno); **18** – Draga, Slovenija (rimska doba; NISP = 142; neobjavljeno); **19** – Ajdovščina/*Castra*, Slovenija (rimska doba; NISP = 414; neobjavljeno); **20** – Altino, Italija (rimska doba; NISP = 732; Riedel 1985); **21** – Most na Soči, Slovenija (rimska doba; NISP = 484; Bartosiewicz 1986); **22** – Invillino, Italija (pozna antika; NISP = 3522; Stork, von den Driesch 1987); **23** – Ajdovski Gradec nad Vranjem, Slovenija (pozna antika; NISP = 2735; Bartosiewicz, Choyke 1985); **24** – Sv. Hema/Hammaberg, Avstrija (pozna antika; NISP = 704; Forstenpointner *et al.* 2002); **25** – Teriola, Avstrija (pozna antika; NISP = 356; Pucher 2003); **26** – Videm/Udine: grad, Italija (pozna antika; NISP = 1076; Riedel 1993b).

Fig. 8.33: The share of cattle, sheep/goats and pigs in three settlement phases at Tonovcov grad and 23 other sites in the Southeastern Alps. The list of samples, their size (NISP) and placement in time:
1 – Tonovcov grad (Late Antiquity phase 1); **2** – Tonovcov grad (Late Antiquity phase 2); **3** – Tonovcov grad (Early Medieval phase); **4** – Stična, Slovenia (Iron Age; NISP = 4487; Bökönyi 1994); **5** – Kunkel, Slovenia (Early Iron Age; NISP = 282; Bartosiewicz 1996); **6** – Bled: below the castle, Slovenia (Early Iron Age; NISP = 347; Bartosiewicz 1996); **7** – Cvinger, Slovenia (Early Iron Age; NISP = 206; Bartosiewicz 1996); **8** – Gradec pri Vinkovem vrhu, Slovenia (Early Iron Age; NISP = 511; Bartosiewicz 1996); **9** – Libna, Slovenia (Early Iron Age; NISP = 130; Bartosiewicz 1996); **10** – Most na Soči, Slovenia (Early Iron Age; NISP = 2956; Bartosiewicz 1985); **11** – Nivize, Italy (Iron Age; NISP = 158; Riedel 1968); **12** – Jama I on Preval, Slovenia (Iron Age; NISP = 947; Riedel 1977); **13** – Grgar-Grašišče, Slovenia (Early Iron Age; NISP = 130; unpublished); **14** – Vrhnika/*Nauportus*, Slovenia (Roman period; NISP = 189; unpublished); **15** – Ribnica na Dolenjskem/*Romula*, Slovenia (Roman period; NISP = 5876; unpublished); **16** – Gorenje Skopice, Slovenia (Roman period; NISP = 251; unpublished); **17** – Col: gym, Slovenia (Roman period; NISP = 434; unpublished); **18** – Draga, Slovenia (Roman period; NISP = 142; unpublished); **19** – Ajdovščina/*Castra*, Slovenia (Roman period; NISP = 414; unpublished); **20** – Altino, Italy (Roman period; NISP = 732; Riedel 1985); **21** – Most na Soči, Slovenia (Roman period; NISP = 484; Bartosiewicz 1986); **22** – Invillino, Italy (Late Antiquity; NISP = 3522; Stork, von den Driesch 1987); **23** – Ajdovski Gradec above Vranje, Slovenia (Late Antiquity; NISP = 2735; Bartosiewicz, Choyke 1985); **24** –Hammaberg, Austria (Late Antiquity; NISP = 704; Forstenpointner *et al.* 2002); **25** – Teriola, Austria (Late Antiquity; NISP = 356; Pucher 2003); **26** – Udine: castle, Italy (Late Antiquity; NISP = 1076; Riedel 1993b).

razmeroma primitivnim vzrejnim prijemom, ki so močno odstopali od napredne rimske prakse (*cf.* Bökönyi 1974). Pri tem je pomembno povedati, da med železnodobnimi najdišči s *slike 8.33* prevladujejo pomembnejša naselja (Dular, Tecco Hvala 2007, 191 ss). Ta so bila (skupaj s pripadajočim teritorijem) politično in ekonomsko sicer avtarkične enote, katerih obstoj je temeljil na subsistenčnem gospodarstvu,[76] je pa komunikacijska mreža omogočala tesne stike in živahno menjavo med sosednjimi naselji pa tudi bolj oddaljenimi kraji (Dular, Tecco Hvala 2007, 229 ss). Drugače povedano: spričo pretežno[77] stabilnih političnih in varnostnih razmer je železnodobnim skupnostim na območju jugovzhodnih Alp (v nasprotju s poznoantičnimi) domnevno uspelo vzpostaviti centralizirano oskrbo s teletino/govedino, kar se med drugim kaže tudi v prevladi govejih najdb znotraj tamkajšnjih favnističnih vzorcev.

8.7 SKLEP

V tem poglavju predstavljeno gradivo s Tonovcovega gradu sodi med najbogatejše arheozoološke vzorce s Slovenskega in ob žal še neobjavljeni študiji živalskih ostankov z Ajdovskega gradca nad Vranjem (Bartosiewicz, Choyke 1985) tudi daleč najobsežnejši favnistični vzorec poznoantične starosti. Kot tak je izvrstna priložnost za poglobljen vpogled v ekonomijo in prehranske navade prebivalcev lokalnega centra v obdobju med koncem 4. in 8. (morda tudi 9.) stoletjem.

Sodeč po tukaj predstavljenih rezultatih je bil Tonovcov grad ekonomsko avtarkična enota, katere obstoj je v veliki meri temeljil na subsistenčnem gospodarstvu. Med domačimi živalmi je osrednja vloga pripadala domačemu govedu, ki pa so ga primarno izkoriščali za delo na poljih oz. v transportu. Starostna struktura za omenjeno vrsto namreč kaže na preferenčen zakol več kot tri leta starih živali. Pomen domačega goveda se je na prehodu iz prve poznoantične poselitvene faze v drugo nekoliko zmanjšal na račun drobnice (domnevno predvsem ovce), kar razlagava z naraščajočo politično in varnostno nestabilnostjo na območju jugovzhodnoalpskega prostora.

Govedu je kot drugi ekonomsko najpomembnejši takson sledila drobnica, sicer prevladujoča po skupnem številu določenih najdb. Sodeč po razmerju med specifično določenimi primerki poddružine Caprinae so bile ovce številčnejše od koz. V obdobju druge poznoantične faze je drobnica predstavljala predvsem vir

[76] Člani srenje (tj. središča s pripadajočim teritorijem) so si sami pridelovali hrano, redili živino ter izdelovali orodje in posodje.

[77] Domnevno edini res krizni epizodi v obdobju železne dobe na Slovenskem so bili roparski vpadi tolp skitskega porekla v prvi polovici 6. stoletja pr. n. št. ter prihod keltskih Tavriskov ob koncu 4. stoletja pr. n. št. (Dular, Tecco Hvala 2007, 251 s).

2007, 229 ff). Due to the predominantly[79] stable political conditions and security, Iron Age communities living southeast of the Alps (in opposition to the Late Antique ones) presumably established a centralised provisioning system of veal/beef, which is among others reflected in the dominance of cattle finds in the faunal assemblages from the area.

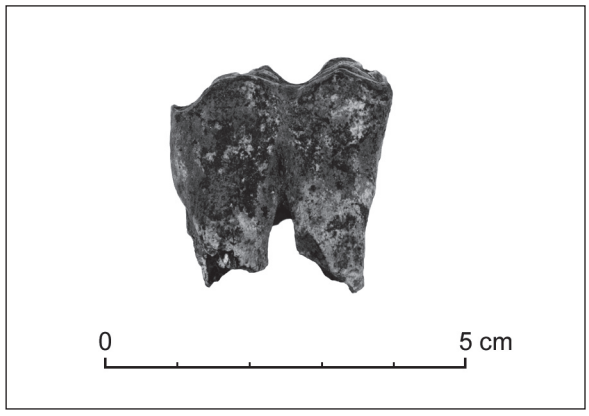
As far as the rest of the animal products are concerned, the question of wether they were produced/consumed locally (as a form of subsistence) remains without a definitive answer. As discussed in chapter 8.6.1, the mortality profile for caprines seems to be indicative of a local production of meat, milk and (as far as the Late Antiquity phase 1 is concerned) wool. Similar holds true for pigs, which were reared exclusively for meat (and fat). It is thus interesting to note, that no statistically significant differences in skeletal representation of individual carcass parts between Late Antiquity phase 1 and 2 were observed (Mann-Whitney U test: $p > 0.05$), even though the latter shows a much higher number of skull fragments (*Tab. 8.18*). Of course, at a different location within the same settlement the results might be (even very) different ...

8.7 CONCLUSIONS

The material from Tonovcov grad is among the richest faunal assemblages revealed by archaeological excavations in Slovenia and alongside the unfortunately still unpublished study of animal remains from Ajdovski gradec above Vranje (Bartosiewicz, Choyke 1985) also the most abundant faunal assemblage from the Late Antique period. As such it offers an excellent opportunity for a detailed insight into the local economy and the diet of the inhabitants of a local centre between the end of the 4th to the 8th (and maybe even the 9th) century.

From the results presented in this chapter it seems that Tonovcov grad was an economically autarctic unit, whose existence was to a great extent based on subsistence economy. Amongst domesticates the central role belonged to cattle, which was primarily used as beast of burden. The mortality profile shows that cattle were mainly culled once they were over three years old. The importance of cattle was slightly reduced due to an increase in the exploitation of caprines (hypothetically mainly sheep) at the transition from the Late Antiquity phases 1 and 2. This can be explained by the increased political and security instability in the southeastern Alpine area at that time.

[79] The only presumed crises in the territory of present-day Slovenia in the Iron Age is represented by the pillaging of the Skiit tribes in the first half of the 6th century BC and the arrival of the Celtic Tavrisks at the end of the 4th century BC (Dular, Tecco Hvala 2007, 251 f).



Sl. 8.34: Drugi spodnji predmeljak konja iz vzorca št. 547 (kv. 619; mkv. C2) s Tonovcovega gradu. Na zobu je vidna značilna obraba grizalne površine zaradi grizenja žvale (*cf*. Brown, Anthony 1998). Slika: M. Zaplatil.

Fig. 8.34: The second lower horse premolar from sample No. 547 (sq. 619; msq. C2) from Tonovcov grad. The tooth surface shows typical ware pattern as a result of chewing the bit (*cf*. Brown, Anthony 1998). Photo: M. Zaplatil.

mesa[78] in mleka;[79] prireja volne naj bi bila nekoliko bolj v ozadju. Slika, ki jo kaže prva poznoantična poselitev obravnavanega najdišča, je nekoliko bolj zamegljena. V korigirani starostni strukturi bi se namreč lahko odražal bodisi nekoliko večji poudarek na prireji volne bodisi uvoz mesa odraslih ovac/koz za prehrano.

Domači prašič po številu najdb (in pomenu) zaostaja tako za govedom kot tudi drobnico. Temu je verjetno v precejšnji meri botroval relief območja, saj so za rejo prašičev manj primerna tako suha tla na obravnavanem delu razmeroma ozke Soške doline kot tudi strma pobočja okoliških vzpetin. Prašičereja je bila sicer v skladu s pričakovanji usmerjena izključno v prirejo mesa in maščob. Nasprotno sliko kažejo konj in pes, katerih mesa prebivalci Tonovcovega gradu najverjetneje niso uživali. Prvi je bil pomemben predvsem kot tovorna žival in za jezdenje (*sl. 8.34*), drugi kot čuvaj čred, ljudi in imetja. Prebivalci Tonovcovega gradu so se ukvarjali tudi z lovom, čeprav iz skromnega deleža zastopanosti jelenjadi, srnjadi in drugih lovnih vrst sicer izhaja, da ta ni predstavljal omembe vrednega segmenta takratne ekonomije.

Ob najdbah sesalcev so bili med živalskimi ostanki s Tonovcovega gradu zastopane tudi kosti ptic, skoraj izključno domačih kokoši (glej pogl. 9, *tab. 9.1*). Podatek se lepo sklada s tezo o Tonovcovem gradu kot ekonomsko avtarkični naselbini, temelječi na subsistenčnem gospodarstvu, saj je kokoš (perutnina) v očeh takratnega prebivalstva nedvomno predstavljala vzrejno nezahteven vir razmeroma kvalitetnega mesa (*cf*. MacKinnon 2004, 210). Pomenljive so tudi najdbe trnkov (glej pogl. 2.1). V tej luči lahko kot pričakovane razumemo tudi rezultate analize velikosti osrednjih taksonov domestikatov: čeprav obdelano gradivo vključuje tudi posamezne primerke velikih "rimskih" oblik (pasem?), večino najdb namreč vendarle predstavljajo kosti in zobje tradicionalnega lokalnega goveda oz. drobnice.

Nekateri arheološki podatki kažejo, da je bila med prvo poznoantično poselitveno fazo Tonovcovega gradu v naselbini morda nastanjena vojaška posadka (glej pogl.

[78] To naj bi veljalo še posebej za ovce.

[79] V tem pogledu naj bi bile pomembnejše koze.

The second economically most important taxa (following cattle) were sheep and goats, which dominated by the total number of indentifiable finds. In Late Antiquity phase 2 caprines were reared predominantly as a source of meat[80] and milk,[81] while wool production may not have been as important. The situation during the Late Antiquity phase 1 is less clear: the corrected mortality profile could indicate either a slightly higher emphasis on wool production or imports of adult sheep/goat meat for food.

According to the number of finds (and thus supposed importance) pig lagged behind cattle and caprines. This is to a great extent a reflection of the relief of the terrain, as pig rearing is less suitable on the dry grounds of the relatively narrow Soča Valley, or the steep slopes of the surrounding hills. In accordance to our expectations pig exploitation was oriented exclusively into meat and fat production. An opposite picture is shown by small number of horse and dog remains, as it is highly unlikely that the inhabitants of Tonovcov grad (regularly) enjoyed their meat. Horse was important mainly as a beast of burden (*Fig. 8.34*), while dog was useful in guarding herds, people and property. The inhabitants of Tonovcov grad also hunted, even though the modest shares of deer and other game indicate that hunting did not represent a quantitatively important segment in their economy.

Animal remains at Tonovcov grad also included bird bones, almost exclusively belonging to domestic hen (see chapter 9, *Tab. 9.1*). This seems to confirm the thesis that Tonovcov grad was an economically autarctic settlement, based on a subsistence economy, for hen (poultry) undoubtedly represented an undemanding source of relatively high quality meat for the inhabitants (*cf*. MacKinnon 2004, 210). Finds of fish hooks also offer important evidence of angling (see chapter 2.1).

Certain archaeological data indicate that during the Late Antiquity phase 1 Tonovcov grad may have housed a military unit (see chapters 2.1, 4.1).

[80] Supposedly this holds especially true for sheep.

[81] In this sense goats were more important.

2.1, 4.1). Žal na podlagi zgoraj predstavljenih rezultatov analize favnističnega gradiva navedene teze ni mogoče niti potrditi niti zanikati. Se pa na podlagi podatkov o vrstnem bogastvu vzorcev vsake od treh tukaj obravnavanih poselitvenih faz, predvsem pa iz deležev zastopanosti skeletnih elementov in njihove ohranjenosti dozdeva, da je vojaška posadka (v kolikor je bila v naselbini dejansko nastanjena) obsegala razmeroma skromno število vojakov. Z začetkom druge poznoantične faze je Tonovcov grad postopoma pridobival pomen kot osrednja naselbina na območju med Nadižo in Sočo ter lokalno cerkveno središče, kar bi lahko prispevalo k izrazitejšemu socialnemu razslojevanju prebivalstva. Določene razlike med jedilnikom stanovalcev osrednjega prostora stavbe 1 in prehrano tistih iz njegovega prizidka je ne nazadnje izpostavila tudi favnistična analiza. Razpoložljivi podatki sicer resda kažejo na to, da so prebivalci Tonovcovega gradu v veliki meri uživali meso istih vrst živali, ne da bi posamezniki/skupine z višjim statusom pogosteje posegali po okusnejšem in bolj cenjenem (*cf.* MacKinnon 2004, 205 s) mesu mladih živali. Se je pa zato na krožniku slednjih (glej npr. stavbo 1; *sl. 8.14*) relativno pogosto znašlo meso najkvalitetnejših delov trupa, medtem ko med ostanki hrane njihovih služabnikov močno prevladujejo kosti iz bistveno manj cenjenih spodnjih delov okončin in glave. Še bolj kot v stavbi 1 pa so bili ostanki najbolj mesnatih delov trupa zastopani v prostoru med cerkvami. Žal razpoložljivi arheološki podatki namembnosti tega prostora za časa druge poznoantične poselitvene faze Tonovcovega gradu ne izkazujejo, "prestižen" nabor najdenih kostnih ostankov pa vendar še dodatno nakazuje obstoj določene socialne razslojenosti v obravnavani naselbini.

Unfortunately, the analysis of the faunal material does not lead to a confirmation or rejection of this thesis. Nevertheless, on the basis of taxonomic richness in all three settlement phases, and especially the frequencies of individual skeletal elements and their preservation it seems that the military unit (in the event that it really was stationed within the settlement) consisted of a relatively few soldiers. With the beginning of the Late Antiquity phase 2 Tonovcov grad gradually started gaining on importance as the central settlement in the area between the Nadiža and Soča rivers. It was also a local religious centre, which may also have contributed to a more expressed social diversification of its inhabitants. As a matter of fact, certain differences in the diet of the inhabitants from Tonovcov grad were indeed observed, which may be a result of social stratification (*Figs. 8.10-8.12, 8.14*). Namely, the diet of the higher standing social strata (see for instance building 1; *Fig. 8.14*) were more likely to include the meat of the highest quality carcass parts, leaving their servants to cope with the much less meaty lower parts of extremities and the head. The highest concentration of the remains from the carcass parts richest in meat was detected in the area between the central and the south churches. Unfortunately, the archaeological data available do not allow for an unambiguous interpretation of the purpose of the structure standing at this spot during the Late Antiquity phase 2, however such a rich assemblage of animal bones offers yet another indication of social stratification within the settlement.

8.8 LITERATURA / BIBLIOGRAPHY

Tonovcov grad. Naselbinski ostanki in interpretacija / Tonovcov grad. Settlement remains and interpretation = Ciglenečki, Modrijan, Milavec 2011.

ALBARELLA, U. 2002, 'Size matters': how and why biometry is still important in zooarchaeology. – V / In: K. Dobney, T. O'Connor (ur. / eds.), *Bones and the man*, 51–62, Oxford.

ANDRIČ, M. in / and K.J. WILLIS 2003, The phytogeographical regions of Slovenia: a consequence of natural environmental variation or prehistoric human activity? – *Journal of Ecology* 91, 807–821.

BAKER, P. 1991, Fauna. – V / In: G.P. Broglio, L. Castelletti (ur. / eds.), *Archeologia a Monte Barro I. Il grande edificio e le torri*, 153–258, Lecco.

BAKER, P. in / and G. CLARK 1993, Archaeozoological evidence for medieval Italy: a critical review of the present state of research. – *Archeologia Medievale* 20, 45–78.

BARTOSIEWICZ, L. 1984, Reconstruction of prehistoric cattle represented by astragali in a Bronze age "sacrificial pit". – C. Grigson, J. Clutton-Brock (ur. / eds.), *Animals and archaeology. Part IV: Husbandry in Europe*, BAR. International series 227, 64–80, Oxford.

BARTOSIEWICZ, L. 1985, Most na Soči: a preliminary faunal analysis of the Hallstatt Period settlement. – *Arheološki vestnik* 36, 107–131.

BARTOSIEWICZ, L. 1986, Roman Period animal remains from Most na Soči. – *Arheološki vestnik* 37, 287–296.

BARTOSIEWICZ, L. 1990–1991, Animal bones as indicators of continuity at Roman provincial sites. – *Antaeus* 19–20, 103–124.

BARTOSIEWICZ, L. 1996, Continuity in the animal keeping of Hallstatt Period communities in

Slovenia. – V / In: E. Jerem, A. Lippert (ur. / eds.), *Die Osthallstattkultur*, Archaeolingua 7, 29–35, Budapest.

BARTOSIEWICZ, L. 1998, Medieval animal bones from the castle of Váralja-Várfő (Western Hungary). – *A Wosinsky Mór Múzeum Évkönyve* 20, 157–172.

BARTOSIEWICZ, L. 2002, Unburned animal remains in the cremation graves from Tolmin. – V / In: D. Svoljšak, A. Pogačnik (ur. / eds.), *Tolmin, prazgodovinsko grobišče II. Razprave* (*Tolmin, the prehistoric cemetery II. Treatises.*), Catalogi et Monographiae 35, 133–135, Ljubljana.

BARTOSIEWICZ, L. in / and A.M. CHOYKE, 1985, Animal bones from the 5th–6th century settlement at Ajdovski gradec. – Neobjavljeno poročilo / Unpublished report. Hrani / capt at: Iza ZRC SAZU, Ljubljana.

BENECKE, N. 2005/2006, The Holocene distribution of European bison – the archaeozoological record. – *Munibe* 57, 421–428.

BOESSNECK, J., J.-P. JÉQUIER in / and H.R. STAMPFLI 1963, Seeberg, Burgäschisee-Süd. Die Tierreste. – *Acta Bernensia* 2, Bern.

BÖKÖNYI, S. 1974, *History of domestic mammals in Central and Eastern Europe*. – Budapest.

BÖKÖNYI, S. 1984, *Animal husbandry and hunting in Tác-Gorsium. The vertebrate fauna of a Roman town in Pannonia*. – Budapest.

BÖKÖNYI, S. 1986, Animal remains from the Roman Forum of Sopron-Scarbantia. – *Acta Archaeologica Academiae Scientiarum Hungaricae* 38, 397–422.

BÖKÖNYI, S. 1994, Analiza živalskih kosti. (Die Tierknochenfunde). – V / In: S. Gabrovec, *Stična I. Naselbinska izkopavanja* (*Stična I. Siedlungsausgrabungen*), Katalogi in monografije 28, 190–213, Ljubljana.

BON, M., G. PICCOLI in / and B. SALA 1991, I giacimenti Quaternari di vertebrati fossili nell'Italia nordorientale. – *Memorie di Scienze Geologiche* 43, 185–231.

BOSCHIN, F. in / and M. WEISSTEINER 2007, Una casa datata alla prima età Romana imperiale scavata a Elvas presso Bressanone. Lo studio della Fauna. – *Annali del Museo civico di Rovereto, Sezioni Archeologia, Storia, Scienze naturali* 23, 3–34.

BOSIO, L. 1991, *Le strade romane della* Venetia *e dell'*Histria. – Padova.

BRADAČ, F, B. GRAFENAUER in / and K. GANTAR (prevajalci / translators) 1988, *Pavel Diakon (Paulus Diaconus): Zgodovina Langobardov (Historia Langobardorum)*. – Maribor.

BROWN, D. in / and D. ANTHONY 1998, Bit wear, horseback riding and the Botai site in Kazakstan. – *Journal of Archaeological Science* 25, 331–347.

CAHIX, L. in / and R.-M. ARBOGAST 1999, Holocene aurochs from Western Europe: osteometric data. – V / In: G.C. Weniger (ur. / ed.), *Archäologie und Biologie des Auerochsen*, Wissenschaftliche Schriften des Neanderthal Museums 1, 35–48, Mettmann.

CIGLENEČKI, S. 1997a, Die wichtigsten Völkerwanderungszeitlichen Einfallstrassen von Osten nach Italien im Licht der neuesten Forschungen. – *Peregrinatio Gothica (Supplementum ad Acta Musei Moraviae)*, 179–191.

CIGLENČKI, S. 1997b, Poznoantični in slovanski sledovi na Kobariškem. – *Kobarid*, 17–28.

CIGLENEČKI, S. 2005, L'insediamento fortificato su altura di Tonovcov grad presso Caporetto e i suoi dintorni in età romana e paleo-slava. – V / In: A. Tilati (ur. / ed.), *La christianizzazione degli Slavi nell'arco Alpino orientale (secoli VI-IX)*, 93–108, Gorizia.

CIGLENEČKI, S., Z. MODRIJAN in /and T. MILAVEC 2011, *Poznoantična utrjena naselbina Tonovcov grad pri Kobaridu. Naselbinski ostanki in interpretacija / Late Antique fortified settlement Tonovcov grad near Kobarid. Settlement remains and interpretation.* – Opera Instituti Archaeologici Sloveniae 23.

CLEGHORN, N. in / and C.W. MAREAN 2004, Distinguishing selective transport and *in situ* attrition: a critical review of analytical approaches. – *Journal of Taphonomy* 2(2), 43–67.

CRIBB, R. 1984, Computer simulation of herding systems as an interpretative heuristic device in the study of kill-off strategies. – V / In: J. Clutton-Brock, C. Grigson (ur. / eds.), *Animals and archaeology. Part III: Early herders and their flocks*, BAR. International series 202, 161–170, Oxford.

CULIBERG, M. 1995, Dezertifikacija in reforestacija slovenskega Krasa. – *Poročilo o raziskovanju paleolitika, neolitika in eneolitika v Sloveniji* 12, 201–215.

CULIBERG, M. in / and A. ŠERCELJ 1995, Antrakotomske in karpološke raziskave rastlinskih ostankov s Kučarja. (Anthrakotomische und karpologische Untersuchungen der Pflanzenreste vom Kučar.) – V / In: J. Dular, S. Ciglenečki, A. Dular, *Kučar. Železnodobno naselje in zgodnjekrščanski stavbni kompleks na kučarju pri Podzemlju / Kučar. Eisenzeitliche Siedlung und frühchristlicher Gebäudekomplex auf dem Kučar bei Podzemelj*, Opera Instituti Archaeologici Sloveniae 1, 195–200, Ljubljana.

DAKSKOBLER, I. 1996, Združba Seslerio autumnalis-Fagetum (Ht.) M. Wraber ex Borhidi 1963 v Koprskem gričevju. – *Annales* 9, *Series historia naturalis* 3, 181–200.

DAKSKOBLER, I. 2004, Združbe črnega gabra (*Ostrya carpinifolia*) v Srednjem Posočju (Zahodna Slovenija). – *Razprave IV. razreda SAZU* 45(2), 37–146.

DI MARTINO, S. 2002, Resti ossei animali bruciati. – V / In: D. Svoljšak, A. Pogačnik (ur. / eds.), *Tolmin, prazgodovinsko grobišče II. Razprave* (*Tolmin, the prehistoric cemetery II. Treatises.*), Catalogi et Monographiae 35, 131, Ljubljana.

DRIESCH, A. von den 1976, A guide to the measurement of animal bones from archaeological sites. – *Peabody Museum Bulletin* 1, 1–136.

DULAR, J. in / and S. TECCO HVALA 2007, *Jugovzhodna Slovenija v starejši železni dobi. Poselitev, gospodarstvo, družba / South-Eastern Slovenia in the Early Iron Age. Settlement, economy, society*. – Opera Instituti Archaeologici Slovenia 12, Ljubljana.

ERVYNCK, A. 2004, The diet of the three orders in the feudal society of medieval north-western Europe. – V / In: S.J. O'Day, W. Van Neer, A. Ervynck (ur. / eds.), *Behaviour behind bones. The zooarchaeology of ritual, religion, status and identity*, 215–223, Oxford.

FORSTENPOINTNER, G., K. BAUER, G. GAGGL in / and G. WEIβENGRUBER 2002, Die Tierreste. – V / In: G. Forstenpointner, S. Ladstätter, R. Sauer in U. Thanheiser, Fernab der Pilger. Zum Alltagsleben in der spätantiken Siedlung auf dem Hemmaberg, *Jahreshefte des Österreichischen Archäologischen Institutes in Wien* 71, 39–78.

GAUTIER, A. 1984, How do I count you, let me count the ways? Problems of archaeozoological quantifications. – V / In: C. Grigson, J. Clutton-Brock (ur. / eds.), *Animals and archaeology. Part IV: Husbandry in Europe*, BAR. International Series 227, 237–251, Oxford.

GRANT, A. 1982, The use of tooth wear as a guide to the age of domestic ungulates. – V / In: B. Wilson, C. Grigson, S. Payne (ur. / eds.), *Ageing and sexing animal bones from archaeological sites*, BAR. British series 109, 91–108, Oxford.

GRAYSON, D.K. 1984, *Quantitative zooarchaeology*. – Orlando etc.

GRAYSON, D.K. in / and C.J. FREY 2004, Measuring skeletal part representation in archaeological faunas. – *Journal of Taphonomy* 2(1), 27–42.

GREENFIELD, H.J. 1988, Bone consumption by pigs in a contemporary Serbian village: implications for the interpretation of prehistoric faunal assemblages. – *Journal of Field Archeology* 15, 473–479.

GUINTARD, C. 1999, On the size of the ure-ox or the aurochs (*Bos primigenius* Bojanus, 1827). – V / In: G.-C. Weniger (ur. / ed.), *Archaeology and biology of the aurochs*, Wissenschaftliche Schriften des Neanderthal Museum 1, 7–21, Köln.

JOHNSTONE, C. 2007, A short report on the preliminary results from the study of the mammal and bird bone assemblages from Dichin. – *Proceedings of the British Academy* 141, 287–294.

KENT, S. 1981, The dog: an archaeologist's best friend or worst enemy – the spatial distribution of faunal remains. – *Journal of Field Archaeology* 8(3), 367–381.

KING, A. 1984, Animal bones and the dietary identity of military and civilian groups in Roman Britain, Germany and Gaul. – *Military and civilian in Roman Britain. Cultural relationships in a frontier province*, BAR. British Series 136, 187–217, Oxford.

KOBRYŃ, H., S. SERWATKA in / and K. ŚWIEŻYŃSKI 1984, Charakterystyka morfologiczna szczątków bydła z Wykopalisk archeologicznych na terenie średniowiecznego grodu w Kaliszu-Zawodziu. – *Archeologia polski* 29, 399–413.

KRYŠTUFEK, B. 1991, *Sesalci Slovenije*. – Ljubljana.

KRŽE, B. 1982, *Divji prašič. Biologija in gospodarjenje*. – Zlatorogova knjižnica 13, Ljubljana.

LAM, Y.M., X. CHEN, C.W. MAREAN in / and C.J. FREY 1998, Bone density and long bone representation in archaeological faunas: comparing results from CT and photon densiometry. – *Journal of Archaeological Science* 25, 559–570.

LEMEN, C.A. 1983, The effectiveness of the methods of shape analysis. – *Fieldiana Zoology* 15, 1–17.

LUFF, R.-M. 1982, *A zooarchaeological study of the Roman North-western Provinces*. – BAR. International Series 137, Oxford.

LYMAN, R.L. 1999, *Vertebrate taphonomy*. – Cambridge.

MACKINNON, M. 2004, Production and consumption of animals in Roman Italy: integrating the zooarchaeological and textual evidence. – *Journal of Roman Archaeology, Supplementary Series* 54, 1–264.

MALTBY, J.M. 1982, The variability of faunal samples and their effects on ageing data. – V / In: B. Wilson, C. Grigson, S. Payne (ur. / eds.), *Ageing and sexing animal bones from archaeological sites*, BAR. British series 109, 81–90, Oxford.

MALTBY, M. 1989, Urban rural variations in the butchering of cattle in Romano-British Hampshire. – V / In: D. Serjeantson, T. Waldron (ur. / eds.), *Diet and Crafts in Towns, The evidence of animal remains from the Roman to the Post-Medieval periods*, BAR. British Series 199, 75–106, Oxford.

MAREAN, C.W. in / and L.M. SPENCER 1991, Impact of carnivore ravaging on zooarchaeological measures of element abundance. – *American Antiquity* 56(4), 654–658.

MARTIN, T. 1987, Artunterschiede an den Langknochen groβer Artiodactyla des Jungpleistozäns Mitteleuropas. – *Courier Forschungsinstitut Senckenberg* 96, 1–124.

MATOLCSI, J. 1970, Historische Erforschung der Körpergrösse des Rindes auf Grund von ungarischem Knochenmaterial. – *Zeitschrift für Tierzüchtung und Züchtungsbiologie* 87(2), 89–137.

MAY, E., M. TEICHERT in / and K. HANNEMANN 1996, Allometric aspects to the determination of the withers height in pigs on the basis of the data of M. Teichert. – *Archaeozoologia* 8(1, 2), 125–137.

MIRACLE, P. in / and L. PUGSLEY 2006, Vertebrate faunal remains from Pupićina Cave. – V / In: P.T. Miracle, S. Forenbaher (ur. / eds.), *Prehistoric herders of Northern Istria*, Monografije i katalozi 14, 259–399, Pula.

MODRIJAN, Z. 2007, The Late Antique settlement Tonovcov grad near Kobarid: excavations 2002–2005. – V / In: M. Chiabà, P. Maggi, C. Magrini (ur. / eds.),

Le Valli del Natisone e dell'Isonzo tra Centroeuropa e Adriatico. Atti del convegno internazionale di studi, San Pietro al Natisone (UD), 15-16 september 2006, Studi e ricerche sulla Gallia Cisalpina 20, 175–180, Trieste, Roma.

MORAN, N.C. in / and T.P.O'CONNOR 1994, Age attribution in domestic sheep by skeletal and dental maturation: a pilot study of available sources. – *International Journal of Osteoarchaeology* 4, 267–285.

MUNSON, P.J. 2000, Age-correlated differential destruction of bones and its effect on archaeological mortality profiles of domestic sheep and goats.– *Journal of Archaeological Science* 27, 391–407.

O'CONNOR, T.P. 1991, *Bones from 46-54 Fishergate*. – Archaeology of York 15(4), London.

OUTRAM, A.K. 2004, Applied models and indices vs. high-resolution, observed data: detailed fracture and fragmentation analyses for the investigation of skeletal part abundance patterns. – *Journal of Taphonomy* 2(3), 167–184.

PAYNE, S. 1973, Kill-off patterns in sheep and goats: the mandibles from Aşvan Kale. – *Anatolian studies* 23, 281–303.

PAYNE, S. 1987, Reference codes for wear stages in the mandibular cheeck teeth of sheep and goats. – *Journal of Archaeological Science* 14, 609–614.

PAYNE, S. in / and P. MUNSON 1985, Ruby and how many squirrels? The destruction of bones by dogs. – V / In: N.R.J. Fieller, D.D. Gilbertson, N.G.A. Ralph (ur. / eds.), *Palaeobiological investigations*, BAR. International Series 266, 31–40, Oxford.

PAYNE, S. in / and G. BULL 1988, Components of variation in measurements of pig bones and teeth, and the use of measurements to distinguish wild from domestic pig remains. – *Archaeozoologia* 2(1,2), 27–65.

PETERS, J. 1998, *Römische Tierhaltung und Tierzucht*. – Passauer Universitätsschriften zur Archäologie 5, Rahden.

PRAT, F. 1966, Les capridés. – V / In: R. Lavocat (ur. / ed.), *Atlas de Préhistoire, Tome III: Faunes et flores Préhistoriques de l'Europe occidentale*, 279–300, Paris.

PUCHER, E. 1993, Ein kleiner, spätantiker Knochenfundkomplex vom Kappele ob Jadersdorf, Gemeinde Gitschtal, Kärnten. – V / In: S. Felgenhauer-Schmiedt (ur. / ed.), *Das Kappele ('die Kåpile') ob Jadersdorf. Eine spätantik-frühmittelalterliche Höhensiedlung in Oberkärnten*, 51–55, Klagenfurt.

PUCHER, E. 2003, Ein kleiner Tierknochenfundkomplex aus dem spätrömischen Kastell Teriola auf dem Martinsbühel bei Zirl in Tirol. – V / In: A. Höck (ur. / ed.), *Archäologische forschungen in Teriola 1*, 91–99, Wien.

PUCHER, E. in / and K. ENGL 1997, *Studien zur Pfahlbauforschung in Österreich. Materialen I. Die Pfahlbaustationen des Mondsees. Tierknochenfunde*. – Mitteilungen der Prähistorischen Kommission 33, Wien.

RAKOVEC, I. 1973, Razvoj kvartarne sesalske favne v Sloveniji. (Über quartäre Säugetierfaunen Sloweniens [NW Jugoslawien].) – *Arheološki vestnik* 24, 217–270.

RIEDEL, A. 1968, I mammiferi domestici del castelliere di Nivize nel Carso Triestino. – *Atti e memorie della Commissione grotte "Eugenio Boegan"* 8, 125–144.

RIEDEL, A. 1977, I resti animali della Grotta delle Ossa (Škocjan). – *Atti del Museo civico di Storia naturale, Trieste* 30(2), 125–208.

RIEDEL, A. 1979, La fauna degli scavi di Torcello (1961-62). – *Atti del Museo Civico di Storia Naturale di Trieste* 31(2), 75–154.

RIEDEL, A. 1983, Tierfunde einer römischen Fundstäte von Innichen. – *Padusa* 19(1–4), 3–18.

RIEDEL, A. 1984, The Paleovenetian horse of Le Brustolade (Altino) – *Studi Etruschi* 50, ser. III, 227–256.

RIEDEL, A. 1985, Die Fauna von Altino (Venetien) im Verhältnis zu den Faunen Nordostitaliens und der Alpenländer. – *Razprave IV. razreda SAZU* 26, 131–146.

RIEDEL, A. 1986, Risultati di ricerche archeozoologiche eseguite nella regione fra la costa adriatica ed il crinale alpino (dal Neolitico recente al Medio Evo). – *Padusa* 22 (1–4), 1–220.

RIEDEL, A. 1989, The wild animals of Northeastern Italy from Neolithic to Medieval times: an archaeozoological comment. – *Natura Bresciana, Annali del Museo Civico di Storia Naturale Brescia* 26, 311–330.

RIEDEL, A. 1993a, Die Tierknochenfunde des römerzeitlichen Lagervicus von Traismauer/Augustiana in Niederösterreich. – *Annalen des Naturhistorischen Museums in Wien, Serie A* 95, 179–294.

RIEDEL, A. 1993b, Tierknochenfunde aus den Ausgrabungen im Bereich des Schlosses von Udine (Friaul). – *Aquileia Nostra* 64, 70–106.

RIEDEL, A. 1994a, The animal remains of Medieval Verona: an archaeozoological and palaeoeconomical study. – *Memorie del Museo Civico di Storia Naturale di Verona (II^a serie), Sezione scienze dell'uomo* 3, 1–141.

RIEDEL, A. 1994b, Archaeozoological investigations in North-eastern Italy: the exploitation of animals since the Neolithic. – *Preistoria Alpina* 30, 43–94.

RIEDEL, A. 2003, Die frühbronzezeitliche fauna von Brixlegg in Tirol. – *Atti dell'Accademia Roveretiana degli Agiati, Contributi della Classe di Scienze Matematiche, Fisiche e Naturali*, ser. 8, vol. 3, B: 197–281.

RIEDEL, A. 2004, Tierknochen aus der römischen Villa rustica von Nickelsdorf im Burgenland (Österreich). – *Annalen des Naturhistorischen Museums in Wien 106A, 449–539.*

RIEDEL, A. 2007, Ein spätantiker Tierknochenfundkomplex aus Drösing an der March (Niederösterreich). – *Annalen des Naturhistorischen Museums in Wien 109A, 29–72.*

RIEDEL, A. in / and G. SCARPA 1988, Resti animali di un complesso produttivo di età tardoromana a

Volano. – *Annali del Museo civico di Rovereto, Sezioni Archeologia, Storia, Scienze naturali* 4, 37–54.

ROLETT, B.V. in / and M.-Y. CHIU 1994, Age estimation of prehistoric pigs (*Sus scrofa*) by molar eruption and attrition. – *Journal of Archaeological Science* 21, 377–386.

SALA, B. 1986, *Bison schoetensacki* Freud. from Isernia la Pineta (early Mid-Pleistocene – Italy) and revision of the european species of bison. – *Palaeontographia Italica* 74, 113–170.

SCOTT, K.M. 1990, Postcranial dimensions of ungulates as predictors of body mass. – V / In: J. Damuth, B.J. Macfadden (ur. / eds.), *Body size in mammalian paleobiology*, 301–336, Cambridge.

SILVER, A. 1972, The aging of domestic animals. – V / In: D. Brothwell in E. Higgs (ur. / eds.), *Science in archaeology. A survey of progress and research*, 293–302, London.

STALLIBRASS, S. 2000, Dead dogs, dead horses: site formation processes at Ribchester Roman fort. – V / In: P. Rowley-Conwy (ur. / ed.), *Animal bones, human societies*, 158–165, Oxford.

StatSoft, Inc. 2001, *STATISTICA (Data Analysis Software System), version 6.* – www.statsoft.com

STOKES, P. 2000, A cut above the rest? Officers and man at South Shields Roman fort. – V / In: P. Rowley-Conwy (ur. / ed.), *Animal bones, human societies*, 145–151, Oxford, Oakville.

STORK, M. in / and A. von den DRIESCH 1987, Tierknochenfunde aus Invillino-Ibligo in Friaul/Italien. – V / In: V. Bierbrauer (ur. / ed.), *Invillino-Ibligo in Friaul. Text*, Münchener Beiträge zur Vor- und Frühgeschichte 33, 453–484, München.

SVOLJŠAK, D. 1985, Sv. Pavel nad Vrtovinom. Rezultati sondiranj leta 1966. – *Arheološki vestnik* 36, 195–236.

ŠAŠEL J. 1975, "Rimske ceste v Sloveniji". – V / In: S. Gabrovec, S. Jesse, P. Petru, J. Šašel, F. Truhlar (ur. / eds.), *Arheološka najdišča Slovenije*, 74–99, Ljubljana.

TEICHERT, M. 1969, Osteometrische Untersuchungen zur Berechnung der Widerristhöhe bei vor- und frühgeschichtlichen Schweinen. – *Ethnographisch-Archäologische Zeitschrift* 10, 517–525.

TOŠKAN, B. in / and J. DIRJEC 2004, Ostanki velikih sesalcev v Viktorjevem spodmolu. (Remains of large mammals in Viktorjev spodmol.) – V / In: I. Turk (ur. / ed.), *Viktorjev spodmol in Mala Triglavca. Prispevki k poznavanju mezolitskega obdobja v Sloveniji / Viktorjev spodmol and Mala Triglavca. Contributions to understanding the Mesolithic period in Slovenia*, Opera Instituti Archaeologici Sloveniae 9, 135–167, Ljubljana.

TOŠKAN, B. in / and J. DIRJEC 2006, Veliki sesalci. (Large mammals.) – V / In: A. Gaspari (ur. / ed.), *Zalog pri Verdu. Tabor kamenodobnih lovcev na zahodnem robu Ljubljanskega barja / Zalog near Verd. Stone Age hunters' camp at the western edge of the Ljubljansko barje*, Opera Instituti Archaeologici Sloveniae 11, 165–188, Ljubljana.

TOŠKAN, B. in / and J. DIRJEC 2008, Ostanki velikih sesalcev z zgodnjesrednjeveške Pristave. (Large mammal remains from Early Mediaeval Pristava.) – V / In: A. Pleterski, *Zgodnjesrednjeveška naselbina na Blejski Pristav. Najdbe / Frühmittelalterliche Siedlung Pristava in Bled. Funde*, Opera Instituti Archaeologici Sloveniae 14, 139–151, Ljubljana.

TURK, I. 2000, Favna. – V / In: S. Ciglenečki, *Tinje nad Loko pri Žusmu. Poznoantična in zgodnjesrednjeveška naselbina / Tinje oberhalb von Loka pri Žusmu. Spätantike und frühmittelalterliche Siedlung*, Opera Instituti Archaeologici Sloveniae 4, 167–171, Ljubljana.

VITT, V.O. 1952, Loshadi Pezyryksich kuganov. – *Sovetskaja Archeologija* 16, 163–205.

WILKENS, B. 1990, I resti faunistici. – V / In: G. Sena Chiesa, B. Wilkens, I resti faunistici di Calvatone (CR), *Archeologia Medievale* 17, 307–322.

ZUPANČIČ, M. in / and T. WRABER 1989, Fitocenologija. – V / In: M. Javornik (ur. / ed.), *Enciklopedija Slovenije. 3. zvezek: Eg – Hab*, 118–120, Ljubljana.

8.9 PRILOGI / APPENDICES

PRILOGA / APPENDIX 8.1

Tab. A: Dimenzije izmerjenih ostankov domačega goveda (*Bos taurus*) s Tonovcovega gradu, datiranih v prvo poznoantično fazo (zapisano običajno), drugo poznoantično fazo (zapisano s krepkimi črkami) oz. zgodnjesrednjeveško fazo (zapisano poševno). Mere so izražene v mm. Okrajšave: OnB – obseg na bazi; za ostale okrajšave glej von den Driesch 1976.
Tab. A: Dimensions of the measured cattle remains (*Bos taurus*) from Tonovcov grad, dated into Late Antiquity phase 1 (written normally), Late Antiquity phase 2 (written in bold letters) and Early Medieval phase (written in italics). Measurements are given in mm. Abbreviations: OnB – basal circumference; for other abbreviations see von den Driesch 1976.

B. taurus	**Dimenzija Dimension**	**Meritve Measures**										
Proc. corn.	OnB	121,0	134,0									
Mandibula	M7	140,5										
	M8	86,0										
	M9	55,5										
	M15a	68,5										
	M15b	43,0										
	M_3L	38,0										
	M_3B	14,0										
Dens (M_3)	L	34,0	34,5	35,0	37,0	38,0	39,0	35,0	36,0	31,0	36,0	**33,0**
	B	14,0	14,0	13,0	13,5	16,0	16,5	15,0	14,0	15,0	15,0	**12,5**
	L	**33,0**	**36,0**	**36,5**	**37,0**	**34,0**	**37,0**	**36,5**	**38,0**	**38,5**	**39,5**	**35,0**
	B	**14,0**	**15,0**	**15,0**	**14,0**	**12,0**	**14,0**	**12,5**	**16,0**	**16,5**	**15,0**	**14,0**
	L	**36,0**	**36,5**	**38,0**	*40,0*							
	B	**15,0**	**16,0**	**13,0**	*14,0*							
Epistropheus	BFcr	90,5	91,0	120,0								
	SBV	47,0	-	-								
Scapula	LG	-	60,5	55,0	**58,0**	**47,0**	**52,0**	**54,0**	**55,5**	61,0		
	BG	48,0	54,0	42,0	**50,0**	**41,0**	-	**48,0**	-	-		
	GLP	-	71,0	-	**71,0**	-	**62,5**	-	66,0	-		
	SLC	50,5	59,0	-	-	-	-	-	-	-		
Humerus	Bp	-	-	-	88,0	-						
	SD	-	27,0	-	-	**36,0**	-					
	Bd	77,5	-	74,0	-	**84,0**	**84,0**					
	BT	71,0	-	70,0	-	**80,5**	-					
Radius	Bp	-	70,0	74,0	75,0	76,0	82,0	-	-	-	**72,0**	**74,0**
	BFp	-	66,0	68,5	68,0	69,5	72,5	-	-	-	**77,0**	**67,0**
	SD	35,5	-	38,0	-	-	-	38,0	**31,5**	-	-	-
	BFd	-	-	-	-	-	-	-	-	**53,0**	-	-
	Bd	-	-	-	-	-	-	-	-	-	-	-
	Bp	**78,0**	**83,5**	**84,0**	-	-	**79,0**	-				
	BFp	**70,0**	**77,5**	**76,5**	-	**67,5**	**74,0**	-				
	SD	-	-	-	**43,0**	-	-	-				
	BFd	-	-	-	-	-	-	*56,0*				
	Bd	-	-	-	-	-	-	-				
Ulna	BPC	47,0	**39,0**									
	DPA	67,0	**63,0**									
	SDO	50,5	-									

B. taurus	**Dimenzija Dimension**	**Meritve Measures**										
Mc	Bp	57,0	-	-	-	36,0	49,0	55,0	-	-	53,0	-
	Dp	33,5	-	-	-	-	28,5	32,0	-	-	35,5	-
	SD	30,0	19,0	29,5	-	-	25,0	30,0	21,0	32,0	-	29,0
	DD	20,0	-	23,5	-	-	18,5	21,0	-	-	-	-
	Bd	-	-	-	63,5	-	-	-	-	-	-	-
	Dd	30,5	-	-	32,0	-	-	-	-	-	-	-
	GL	-	-	-	-	-	-	-	-	-	-	-
	Bp	**48,5**	**49,0**	**56,5**	**60,0**	**-**	**-**	**-**	**45,0**	-		
	Dp	**28,0**	**28,5**	**31,0**	**37,0**	**-**	**40,0**	**-**	**42,5**	-		
	SD	**-**	**-**	**-**	**36,0**	**33,5**	**-**	**18,0**	**-**	*31,0*		
	DD	**-**	**-**	**-**	**22,0**	**21,5**	**-**	**-**	**-**	*20,0*		
	Bd	**-**	**-**	**-**	**63,5**	**61,0**	**-**	**-**	**-**	*59,5*		
	Dd	**-**	**-**	**-**	**32,0**	**-**	**-**	**-**	**-**	*29,0*		
	GL	**-**	**-**	**-**	**181,5**	**-**	**-**	**-**	**-**	-		
Pelvis	LA	**63,0**	**63,0**	*68,0*								
	LAR	**57,0**	**57,0**	*62,0*								
Sacrum	BFcr	64,0										
	HFcr	24,0										
Femur	Bp	-	-	-	-	122,0	-	-	-	**-**	**-**	**-**
	DC	-	39,0	42,5	44,5	44,5	45,5	46,0	46,5	**-**	**-**	**38,0**
	SD	31,5	-	-	-	-	-	-	-	**35,0**	**29,0**	**-**
	Bp	**-**	**-**	**-**	**-**	-						
	DC	**43,5**	**47,0**	**39,0**	**39,0**	*44,0*						
	SD	**-**	**-**	**-**	**-**	-						
Patella	GB	49,5	56,0	*52,0*								
Tibia	Bp	-	-	-	-	-	-	-	-	-	-	**87,0**
	SD	38,5	31,5	-	-	-	-	-	-	-	-	**-**
	Bd	-	50,5	54,0	55,0	57,5	58,0	60,0	60,0	65,0	-	**56,0**
	Dd	-	37,5	39,0	-	44,5	43,0	-	44,0	48,0	42,5	**42,0**
	Bp	**-**	-	-	-	-						
	SD	**39,5**	**-**	**-**	**-**	**-**						
	Bd	**-**	**57,0**	**56,0**	**55,0**	**57,0**						
	Dd	-	41,5	-	-	40,0						
Mt	Bp	50,0	43,5	46,0	46,5	44,0	-	-	-	-	44,0	46,0
	Dp	45,5	42,5	45,5	-	39,5	-	-	-	-	-	-
	SD	31,0	25,0	27,5	23,5	26,0	27,0	-	-	36,0	26,0	-
	DD	26,0	25,5	24,0	24,5	24,0	-	25,0	21,5	23,0	-	-
	Bd	-	49,0	54,5	-	51,0	-	51,5	-	51,5	-	-
	Dd	-	30,0	31,0	-	28,5	-	31,0	30,0	26,5	-	-
	GL	-	-	-	-	212,5	-	-	-	-	-	-
	Bp	47,5	48,0	-	**-**	**-**	**-**	**41,5**	**42,0**	**45,0**	**47,0**	**50,5**
	Dp	46,5	-	-	**-**	**-**	**-**	**40,5**	**41,0**	**-**	**43,0**	**48,0**
	SD	29,0	29,5	25,0	**25,0**	**25,5**	**-**	**-**	**-**	**24,0**	**-**	**-**
	DD	-	-	-	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Bd	-	-	-	**-**	**-**	**54,5**	**-**	**-**	**-**	**-**	**-**
	Dd	-	-	-	**-**	**-**	**24,0**	**-**	**-**	**-**	**-**	**-**
	GL	-	-	-	**-**	**-**	**31,0**	**-**	**-**	**-**	**-**	**-**
	Bp	-	-	-								
	Dp	-	-	-								
	SD	22,0	-	-								
	DD	-	24,5	-								
	Bd	-	51,0	*53,0*								
	Dd	-	31,0	*29,5*								
	GL	-	-	-								

B. taurus	**Dimenzija Dimension**	**Meritve Measures**										
Calcaneus	GL	137,0	131,0	**130,0**								
	GB	40,5	40,0	**42,5**								
Astragalus	GLl	58,0	60,0	61,0	61,0	62,0	62,5	62,5	-	64,0	64,5	68,0
	GLm	-	56,0	56,5	56,5	58,0	56,5	58,0	-	-	-	63,0
	Dl	-	33,0	33,0	35,0	35,0	35,0	35,0	-	36,0	36,0	39,0
	Dm	-	32,0	-	-	33,0	36,0	33,0	-	-	36,0	36,0
	Bd	-	39,0	38,0	37,5	39,0	41,0	43,0	36,0	-	-	43,0
	GLl	69,5	-	-	-	-	**58,0**	**58,5**	**62,0**	-	**68,0**	-
	GLm	-	49,0	62,5	57,0	-	**54,0**	**32,0**	**58,0**	-	**64,0**	*47,5*
	Dl	-	-	37,0	-	-	**32,5**	-	**34,5**	-	**34,0**	*29,5*
	Dm	-	-	35,0	-	-	**32,0**	-	**33,0**	-	**35,0**	*28,0*
	Bd	-	31,0	-	39,0	**44,5**	**37,5**	**35,5**	**39,5**	**42,0**	**41,0**	*31,5*
Centrotarsale	GB	51,0	56,0	56,0	58,0	61,0	**52,0**	**57,5**	**54,5**			
Phalanx 1	Bp	-	-	-	24,0	24,5	25,0	25,0	28,0	29,0	30,0	31,0
	SD	-	-	-	20,5	20,5	22,0	22,5	-	25,5	-	-
	DD	-	-	-	17,0	15,0	14,5	16,0	-	18,0	-	-
	Bd	28,0	31,0	31,5	22,0	23,5	23,0	25,5	-	26,0	-	-
	GL	-	-	-	51,5	47,0	55,0	58,0	-	55,5	-	-
	Bp	31,5	33,0	-	-	-	-	**25,0**	**30,5**	**31,0**	**31,5**	**35,5**
	SD	24,5	-	**24,5**	-	-	-	**22,0**	-	**28,0**	**29,0**	**29,5**
	DD	18,0	-	**18,0**	-	-	-	**18,0**	-	**21,0**	**21,0**	**21,0**
	Bd	29,0	-	**27,0**	**28,0**	**29,0**	**35,0**	**23,0**	-	**29,0**	**31,0**	**31,5**
	GL	56,0	-	-	-	-	**59,0**	**56,0**	-	**55,5**	-	**59,5**
	Bp	-	-	-	**26,5**	**29,0**	**29,5**	**32,0**	-	-	-	-
	SD	**25,0**	**26,0**	-	**22,5**	**24,0**	**27,5**	**27,0**	-	-	-	*26,0*
	DD	**20,0**	**21,5**	-	**16,5**	**18,5**	-	**18,5**	-	-	-	*18,5*
	Bd	**30,0**	**31,5**	**36,0**	**22,5**	**26,5**	**29,0**	**31,0**	-	**24,5**	**23,0**	*30,0*
	GL	**56,5**	-	-	**56,0**	**56,0**	**53,0**	**58,0**	**58,0**	-	-	*58,0*
	Bp	*28,0*	*32,0*									
	SD	-	-									
	DD	-	-									
	Bd	*25,5*	*29,0*									
	GL	*36,0*	*38,0*									
Phalanx 2	Bp	-	24,0	25,0	25,5	26,5	27,0	28,5	28,5	30,5	31,0	31,5
	Bd	27,0	20,5	20,0	21,0	-	22,5	24,5	23,0	25,0	23,5	29,5
	GL	44,0	33,0	35,5	36,0	-	37,5	39,0	43,0	40,5	42,0	35,0
	Bp	-	**23,5**	**25,0**	**25,5**	**26,0**	**26,0**	**26,5**	**27,0**	**28,5**	**32,5**	**33,5**
	Bd	-	-	**22,0**	**19,0**	**21,0**	**24,5**	-	**23,0**	**25,0**	**26,5**	**27,0**
	GL	43,0	**30,5**	**32,5**	**35,0**	**36,0**	**40,0**	**35,0**	**39,0**	**36,0**	**41,0**	**39,0**
	Bp	**28,5**	**30,0**	**30,5**	**33,0**							
	Bd	**24,0**	**25,0**	25,5	28,0							
	GL	**26,0**	**37,0**	**39,0**	**39,0**							
Phalanx 3	Ld	41,5	44,0	47,5	52,0	53,0	54,0	-	-	-	-	-
	MBS	15,5	15,5	20,0	25,5	22,5	24,0	17,0	18,0	19,0	22,0	23,0
	DLS	52,5	54,0	54,5	-	66,0	-	-	-	-	-	-
	Ld	-	**32,0**	**46,0**	**54,0**	**55,0**	**60,5**	-	**45,5**			
	MBS	23,0	**15,0**	**16,5**	**24,0**	**23,5**	**24,5**	**23,5**	**18,5**			
	DLS	-	-	**54,0**	**74,0**	**75,0**	**78,0**	**67,0**	**60,5**			

Tab. B: Dimenzije izmerjenih specifično nedeterminiranih ostankov drobnice (Caprinae) s Tonovcovega gradu, datiranih v prvo poznoantično fazo (običajno zapisane številke), drugo poznoantično fazo (krepko zapisane številke) oz. zgodnjesrednjeveško fazo (poševno zapisane številke). Mere so izražene v mm. Okrajšave: glej von den Driesch 1976.
Tab. B: Dimensions of the measured specifically undetermined remains of sheep/goats (Caprinae) from Tonovcov grad, dated into Late Antiquity phase 1 (written normally), Late Antiquity phase 2 (written in bold letters) and Early Medieval phase (written in italics). Measurements are given in mm. Abbreviations: see von den Driesch 1976.

Caprinae	**Dimenzija Dimension**	**Meritve Measures**										
Mandibula	M8	**51,0**										
Dens (M_3)	L	22,5	21,5	21,5	21,0	21,0	21,0	21,0	21,5	21,5	22,0	22,0
	B	8,1	8,0	8,0	7,9	8,0	8,1	8,5	8,2	8,8	8,1	8,6
	L	22,0	22,0	22,5	23,0	23,0	23,5	24,0	24,5	23,5	**20,0**	**20,0**
	B	8,0	8,4	8,1	8,8	9,0	8,5	8,7	8,5	8,4	**7,5**	**7,6**
	L	**21,0**	**19,0**	**21,0**	**21,0**	**21,0**	**21,0**	**21,0**	**21,0**	**21,5**	**21,5**	**21,5**
	B	**7,8**	**7,2**	**8,3**	**7,0**	**8,0**	**8,0**	**8,2**	**8,5**	**7,9**	**8,9**	**8,0**
	L	**22,0**	**22,0**	**22,0**	**22,5**	**23,0**	**22,5**	**22,5**	**22,5**	**22,5**	**23,0**	**23,0**
	B	**8,2**	**8,3**	**7,7**	**7,8**	**7,7**	**8,3**	**8,2**	**8,4**	**9,0**	**8,3**	**8,4**
	L	**23,0**	**23,0**	**23,0**	**23,5**	**24,0**	**20,0**	**21,0**	**21,0**	**21,5**	**21,5**	**21,5**
	B	**8,6**	**8,9**	**9,8**	**7,9**	**8,2**	**8,5**	**7,9**	**8,0**	**7,9**	**8,6**	**8,9**
	B	**21,5**	**22,0**	**22,0**	**22,0**	**23,0**	**25,0**	**23,0**	*22,5*			
	L	**8,0**	**8,0**	**8,0**	**8,4**	**8,6**	**9,4**	**8,1**	8,9			
Atlas	BFcr	*44,0*										
	BFcd	*44,0*										
Epistropheus	BFcr	43,0										
Scapula	LG	28,0	**24,0**	**26,0**	**26,0**	**24,5**	**25,0**	-	*28,0*			
	GLP	35,0	**30,0**	-	**32,0**	-	**32,0**	-	*34,0*			
	BG	26,0	**20,5**	**23,0**	-	**20,5**	**18,5**	-	*20,5*			
	SLC	22,0	**16,5**	**21,5**	**20,5**	-	-	**23,5**	-			
Humerus	Bp	-	-	-	-	-	-	**46,0**	-	-		
	SD	13,0	-	-	**14,0**	-	-	-	-	-		
	Bd	-	27,0	-	-	**30,0**	**31,0**	-	-	-		
	BT	-	26,0	32,0	-	-	**31,0**	-	**31,0**	*37,0*		
Radius	SD	16,0	11,5	**14,0**	14,5	18,5	15,5	16,0	16,5	17,5	17,0	**13,5**
		12,0	**12,5**	**14,0**	**14,5**	**15,5**	**16,0**	**16,5**	**16,0**	**17,0**	**17,5**	**18,0**
		18,5	**11,5**	**17,0**	**15,5**	**15,5**	**16,0**	**16,0**	**17,0**	**18,0**	15,5	16,0
		16,0	*16,5*	*17,0*	18,5							
Ulna	BPC	16,5										
Metacarpus	Bp	20,0	24,5	-	**21,5**	**22,5**	**24,0**	**26,0**	-	-	-	
	Dp	14,0	17,0	-	**16,0**	-	**17,0**	**18,0**	-	-	-	
	SD	-	16,0	13,0	-	-	**15,5**	**16,0**	**14,0**	**12,0**	*18,5*	
Pelvis	LA	26,0	29,0	**27,0**								
	LAR	23,0	27,0	**24,5**								
Femur	DC	-	-	**18,5**	**19,0**	**19,5**	**23,0**	**24,0**	**21,0**	-	-	
	SD	**11,5**	**13,5**	-	-	-	-	-	-	*10,5*	*15,0*	

Caprinae	Dimenzija Dimension	Meritve Measures										
Tibia	SD	11,0	11,0	12,0	12,0	13,0	13,5	14,5	14,5	14,5	16,0	16,0
	Bd	-	-	-	-	-	-	-	-	-	-	-
	Dd	-	-	-	-	-	-	-	-	-	-	-
	SD	16,0	16,5	9,5	12,0	14,0	12,5	-	-	-	17,0	-
	Bd	-	-	-	-	-	23,0	24,0	27,0	28,0	29,0	28,0
	Dd	-	-	-	-	-	17,5	21,0	20,0	14,5	-	20,5
	SD	**11,0**	**11,0**	**11,0**	**11,5**	**12,5**	**13,0**	**13,0**	**14,0**	**14,0**	**14,0**	**14,0**
	Bd	-	-	-	-	-	-	-	-	-	-	-
	Dd	-	-	-	-	-	-	-	-	-	-	-
	SD	**14,0**	**12,0**	**14,5**	**15,0**	**15,5**	**16,0**	**16,5**	**16,5**	-	**13,0**	-
	Bd	-	-	-	-	-	-	-	-	**26,0**	**21,5**	**24,0**
	Dd	-	-	-	-	-	-	-	-	**22,0**	**17,0**	**19,5**
	SD	-	-	**14,5**	-	-	-	-	-	**10,5**	**11,5**	**15,0**
	Bd	**26,0**	**26,0**	**26,5**	**26,5**	**26,5**	**28,0**	**28,0**	**27,5**	-	-	-
	Dd	**20,0**	**21,0**	**19,5**	**20,5**	**20,5**	**21,0**	**21,5**	**21,5**	-	-	-
	SD	**15,0**	**15,5**	**16,0**	**16,0**	**16,0**	**17,0**	**14,5**	-	-	-	*12,0*
	Bd	-	-	-	-	-	-	**23,5**	**24,0**	**25,5**	**30,0**	-
	Dd	-	-	-	-	-	-	**18,0**	**20,0**	**19,5**	**21,0**	-
	SD	15,0	-	-	14,5	-						
	Bd	-	24,0	25,0	25,0	25,0						
	Dd	-	18,5	19,0	19,0	20,5						
Metatarsus	Bp	-	-	-	-	-	-	-	-	-	**20,5**	**21,5**
	Dp	-	-	-	-	-	-	-	-	-	**20,5**	-
	SD	10,5	10,5	11,0	12,0	13,0	8,5	**10,0**	**11,0**	**11,0**	**11,5**	**13,0**
	Bp	**23,0**	-	-	-	-	-					
	Dp	-	-	-	-	-	-					
	SD	**13,5**	**10,0**	**11,5**	**10,5**	**12,0**	**12,5**					
Astragalus	GLl	30,0	**28,0**	**28,0**	**28,0**	**35,0**	**30,0**	**30,5**	**31,0**			
	GLm	28,0	**25,5**	-	-	**32,5**	**29,0**	**28,5**	**28,5**			
	Dl	16,0	**15,0**	**14,0**	**14,5**	**18,0**	**16,0**	**17,0**	**17,5**			
	Dm	16,0	**14,0**	-	-	**19,5**	**17,0**	**16,5**	**17,0**			
	Bd	19,0	**17,5**	**18,0**	-	**21,5**	**17,5**	**21,0**	**20,0**			
Phalanx 1	Bp	**11,5**	**12,5**	**13,0**	**13,5**	-	-	**12,0**	**12,5**	11,5	12,0	
	SD	**9,5**	**9,5**	**31,0**	-	-	**9,5**	**9,5**	**10,0**	*8,5*	*11,0*	
	DD	**13,5**	**8,0**	**9,0**	-	-	**7,5**	**8,0**	**8,0**	*7,0*	*8,0*	
	Bd	**10,5**	**11,0**	**12,5**	-	**12,5**	**10,5**	**11,0**	**11,5**	*10,5*	*11,5*	
	GL	**35,5**	**35,5**	**39,0**	-	-	-	**34,0**	**37,5**	*33,0*	*38,0*	
Phalanx 2	Bp	**11,0**	**13,5**	**16,0**								
	Bd	**8,5**	**11,5**	**12,5**								
	GL	**22,5**	**21,0**	**29,0**								
Phalanx 3	Ld	**26,5**										
	DLS	**26,0**										
	MBS	**11,0**										

Tab. C: Dimenzije izmerjenih ostankov ovce (*O. aries*) s Tonovcovega gradu, datiranih v prvo poznoantično fazo (običajno zapisane številke), drugo poznoantično fazo (krepko zapisane številke) oz. zgodnjesrednjeveško fazo (poševno zapisane številke). Mere so izražene v mm. Okrajšave: glej von den Driesch 1976.
Tab. C: Dimensions of the measured sheep remains (*O. aries)* from Tonovcov grad, dated into Late Antiquity phase 1 (written normally), Late Antiquity phase 2 (written in bold letters) and Early Medieval phase (written in italics). Measurements are given in mm. Abbreviations: see von den Driesch 1976.

O. aries	**Dimenzija Dimension**	**Meritve Measures**										
Mandibula	M7	**67,0**	-	-								
	M8	**46,5**	-	-								
	M9	**21,0**	22,5	20,0								
	M15b	**18,0**	**21,0**	**17,0**								
	M15c	**15,0**	**20,0**	**13,5**								
Dens (M_3)	L	**24,5**	**22,0**	**22,0**								
	B	8,6	8,2	8,3								
Atlas	BFcd	**46,0**										
Epistropheus	BFcr	**38,5**	**43,0**	**49,0**								
	SBV	-	**23,5**	-								
Scapula	LG	-	-	-	**26,0**							
	BG	20,5	23,0	**18,0**	**21,5**							
	SLC	-	-	**17,0**	**20,0**							
Humerus	SD	-	**14,5**	-	-	-	-	-	-	-	-	-
	Bd	28,0	**27,0**	**28,0**	**29,0**	**29,5**	**30,0**	**31,0**	**32,0**	**32,0**	**33,0**	-
	BT	-	**26,5**	**27,5**	**28,5**	**28,0**	**29,0**	**31,0**	**30,0**	-	**31,0**	**28,0**
	SD	-	-	-	-	-	-					
	Bd	-	**31,0**	**26,0**	**31,0**	*30,5*	*31,0*					
	BT	**30,0**	**30,0**	-	**30,5**	*30,0*	30,0					
Radius	Bp	28,0	30,5	-	-	-	-	-	-	-	**29,5**	**30,0**
	BFp	27,0	28,0	-	-	-	-	-	-	**25,0**	**28,5**	**28,0**
	SD	-	18,5	**15,0**	-	-	-	-	-	-	-	-
	Bd	-	-	-	-	**25,0**	**27,5**	**30,5**	-	-	-	-
	BFd	-	-	-	**24,0**	**23,0**	-	**26,5**	**24,0**	-	-	-
	Bp	**30,0**	**30,0**	**30,0**	**30,5**	**31,0**	**31,0**	**32,5**	-	**27,0**	**29,5**	**30,0**
	BFp	**26,5**	**27,5**	**28,0**	**28,0**	**28,0**	**29,0**	**29,5**	-	**25,0**	**26,0**	**26,5**
	SD	-	-	-	-	-	**16,5**	**16,5**	-	-	-	-
	Bd	-	-	-	-	-	-	-	**27,0**	-	-	-
	BFd	-	-	-	-	-	-	-	**22,0**	-	-	-
	Bp	**31,0**	**33,5**	-	*31,0*	*31,0*						
	BFp	**28,0**	**30,5**	-	*29,0*	*29,0*						
	SD	-	-	-	-	-						
	Bd	-	-	*30,0*	-	-						
	BFd	-	-	*27,0*	-	-						
Ulna	BPC	-	**17,0**	**18,5**	*16,5*							
	DPA	27,0	-	**26,0**	-							
	SDO	24,0	-	**24,5**	-							
Mc	Bp	24,0	-	-	22,0	**19,0**	**24,0**	**26,0**	-	**24,0**	-	*21,5*
	Dp	18,5	-	-	16,0	**18,0**	**18,0**	**17,5**	-	**16,5**	-	*16,0*
	SD	14,5	-	-	-	-	**14,5**	**14,5**	**15,5**	-	-	*13,0*
	DD	13,0	11,0	-	-	-	-	-	**11,0**	-	-	-
	Bd	-	25,5	30,5	-	-	-	-	**26,0**	-	*24,5*	-
	Dd	-	15,0	17,0	-	-	-	-	**17,5**	-	*16,0*	-
	GL	131,5	-	-	-	-	-	-	-	-	-	-
Femur	Bp	-	-	-	-	-	47,0	-	-			
	DC	-	-	-	-	-	**21,5**	**20,0**	-			
	Bd	32,0	33,5	36,0	38,0	37,0	-	-	36,5			

O. aries	**Dimenzija Dimension**	**Meritve Measures**										
Tibia	Bp	**42,5**										
	Dp	**37,5**										
Mt	Bp	17,0	19,0	19,0	-	**19,0**	**21,0**	**22,5**	**18,0**			
	Dp	16,5	19,5	19,0	-	**19,5**	**19,0**	**22,0**	**18,0**			
	SD	10,0	12,0	12,0	10,5	-	**13,5**	-	**10,5**			
	DD	-	-	-	-	-	-	-	-			
	Bd	-	-	-	-	-	-	-	-			
	Dd	-	-	-	-	-	-	-	-			
	GL	-	-	-	-	-	-	-	-			
Calcaneus	GL	54,0	**57,0**	-	*53,5*							
	GB	17,5	**19,0**	*17,0*	*18,5*							
Astragalus	GLl	29,0	30,5	-	**27,0**	**27,0**	**27,5**	**29,5**	**30,5**	**27,5**	**29,0**	**28,5**
	GLm	27,5	29,0	25,0	**25,5**	**26,0**	**24,5**	**27,5**	**27,5**	**25,5**	**25,5**	**26,5**
	Dl	16,0	17,0	15,0	**15,0**	**15,5**	-	**16,5**	**10,5**	-	**16,0**	**15,0**
	Dm	16,5	18,0	24,0	**14,5**	**16,0**	**13,0**	**16,0**	**16,5**	**15,5**	**16,0**	**16,0**
	Bd	19,0	19,5	18,0	**16,5**	**18,0**	**15,5**	**19,0**	**18,0**	**16,0**	**19,0**	**18,0**
Centrotarsale	GB	22,0										
Phalanx 1	Bp	11,0	**11,0**	**12,0**	**12,0**	**12,0**	**13,0**	**13,0**	**13,5**	*10,0*	*11,5*	*11,5*
	SD	9,0	**9,0**	**9,5**	**10,0**	**9,5**	**10,5**	**11,0**	**10,5**	*8,5*	*10,5*	*8,5*
	DD	7,5	**7,0**	**7,5**	**8,0**	**8,0**	**8,0**	**8,5**	**8,5**	*7,0*	*8,5*	*7,0*
	Bd	9,5	**10,0**	**10,0**	**11,0**	-	**12,0**	**12,0**	**12,5**	*9,5*	*10,0*	*10,0*
	GL	34,0	**35,5**	**33,0**	**31,0**	**36,5**	**34,0**	**36,0**	**38,0**	*30,5*	*33,5*	*34,0*
	Bp	*12,0*	*13,0*									
	SD	9,0	11,0									
	DD	*7,5*	*9,0*									
	Bd	*11,0*	*12,5*									
	GL	*32,5*	*36,5*									
Phalanx 2	Bp	*11,0*										
	Bd	*9,5*										
	GL	*21,0*										
Phalanx 3	MBS	**5,0**										

Tab. D: Dimenzije izmerjenih ostankov koze (*C. hircus*) s Tonovcovega gradu, datiranih v prvo poznoantično fazo (običajno zapisane številke), drugo poznoantično fazo (krepko zapisane številke) oz. zgodnjesrednjeveško fazo (poševno zapisane številke). Mere so izražene v mm. Okrajšave: OnB – obseg na bazi; za ostale okrajšave glej von den Driesch 1976.
Tab. D: Dimensions of the measured goat remains (*C. hircus*) from Tonovcov grad, dated into Late Antiquity phase 1 (written normally), Late Antiquity phase 2 (written in bold letters) and Early Medieval phase (written in italics). Measurements are given in mm. Abbreviations: OnB – basal circumference; for other abbreviations see von den Driesch 1976.

C. hircus	**Dimenzija Dimension**	**Meritve Measures**										
Proc. corn.	L (anter.)	158,0	-									
	L (post.)	135,0	-									
	OnB	78,0	96,0									
Mandibula	M9	**25,5**	**27,5**	**26,0**	-	**25,0**	**25,5**					
	M15a	-	-	-	-	-	**20,0**					
	M15b	**23,5**	**20,0**	-	-	-	-					
	M15c	**17,0**	**13,0**	**14,5**	**16,0**	**16,0**	**15,5**					
Epistropheus	BFcr	44,0										
Scapula	LG	**25,5**	27,5									
	BG	**22,5**	**23,5**									
	GLP	**33,0**	**33,0**									
	SLC	**21,0**	-									
Humerus	Bd	27,0	32,0	**28,5**	**33,0**	-	*31,0*					
	BT	26,0	31,0	**27,0**	**32,0**	**33,0**	*29,0*					
Radius	Bp	32,0	**28,0**	**31,0**	**32,0**	*30,5*	*31,5*					
	BFp	31,0	**27,0**	**29,0**	**31,0**	*29,0*	-					
Mc	Bp	-	**22,0**	-	**23,0**	*24,5*	-					
	Dp	-	**16,5**	-	**17,5**	*18,0*	-					
	SD	14,5	-	-	**13,5**	*16,0*	-					
	DD	9,5	-	**10,0**	-	-	*10,0*					
	Bd	24,0	-	**27,0**	-	-	*24,5*					
	Dd	15,5	-	-	-	-	*15,5*					
Femur	DC	**20,5**	21,5									
Mt	Bp	-	23,5	21,0	-	**19,5**	-	*19,5*				
	Dp	-	23,0	20,0	-	-	-	*18,0*				
	SD	-	-	-	-	**12,0**	-	-				
	DD	11,0	-	-	-	-	-	-				
	Bd	27,0	-	-	**14,0**	-	*26,0*	-				
	Dd	18,0	-	-	-	-	*16,0*	-				
Astragalus	GLl	28,0	28,5	32,0	-	**29,0**	**30,0**	**31,0**	**27,0**	**32,0**	*28,0*	
	GLm	27,0	26,0	30,0	26,5	**26,5**	**28,0**	**28,5**	**26,0**	**30,5**	26,5	
	Dl	16,5	16,0	27,5	-	**15,0**	**15,5**	**16,0**	**14,0**	**16,5**	*14,5*	
	Dm	17,0	16,0	28,0	17,0	**15,0**	**16,0**	**17,0**	**15,0**	**17,0**	*14,5*	
	Bd	19,0	18,0	20,5	18,5	-	**19,0**	**19,5**	**16,5**	**21,0**	*18,0*	
Centrotars.	GB	**22,5**	*23,5*									
Phalanx 1	Bp	14,0	**12,5**	**12,0**	**12,0**	**12,5**	**13,0**	**13,0**	**14,0**	*14,0*		
	SD	11,5	**10,0**	**9,5**	**10,0**	**10,5**	**9,5**	**11,5**	-	*12,0*		
	DD	9,0	**8,0**	**8,5**	**7,5**	**7,1**	**7,5**	**9,5**	-	*9,5*		
	Bd	12,5	-	**11,5**	**10,5**	**11,5**	**11,5**	**14,0**	**10,0**	*14,5*		
	GL	42,5	-	**34,0**	**36,5**	**39,5**	**35,0**	**37,0**	**26,0**	*40,0*		
Phalanx 2	Bp	**11,0**	**15,5**									
	Bd	**9,0**	**12,0**									
	GL	**24,5**	**28,0**									
Phalanx 3	Ld	**19,0**	-									
	DLS	**25,0**	**32,5**									
	MBS	**4,0**	**5,5**									

Tab. E: Dimenzije izmerjenih ostankov prašiča (*Sus* sp.) s Tonovcovega gradu, datiranih v prvo poznoantično fazo (običajno zapisane številke), drugo poznoantično fazo (krepko zapisane številke) oz. zgodnjesrednjeveško fazo (poševno zapisane številke). Mere so izražene v mm. Okrajšave: glej von den Driesch 1976.
Tab. E: Dimensions of the measured pig/wild boar remains (*Sus* sp.) from Tonovcov grad, dated into Late Antiquity phase 1 (written normally), Late Antiquity phase 2 (written in bold letters) and Early Medieval phase (written in italics). Measurements are given in mm. Abbreviations: see von den Driesch 1976.

***Sus* sp.**	**Dimenzija Dimension**	**Meritve Measures**										
Maxilla	M28	**60,0**	**54,5**									
Mandibula	M8	69,0										
	M9a	**35,5**										
Dens (M^3)	L	-	31,5	31,5	31,0	27,5	**27,5**	**27,5**	**28,5**	**25,0**	**26,0**	**31,5**
	B	13,5	18,0	17,5	19,0	15,0	**17,0**	**17,0**	**18,5**	**16,5**	**17,0**	**18,0**
	L	**32,0**	*27,0*									
	B	**27,5**	*16,0*									
Dens (M_3)	L	-	34,5	32,0	-	29,0	**33,0**	-	**27,0**	-	**25,0**	-
	B	15,0	15,5	15,5	14,5	13,0	**14,5**	**14,0**	**13,0**	**13,0**	**16,5**	**14,5**
	L	**-**	**31,5**	**32,0**	-							
	B	**15,0**	**15,0**	**15,0**	*18,5*							
Atlas	BFcr	78,0										
Epistropheus	BFcr	**45,0**	46,0									
Scapula	LG	-	26,0	-	-	-	**26,0**	**26,0**	-	**24,5**	**25,0**	**25,5**
	BG	25,5	22,5	-	-	-	**19,5**	-	-	**18,5**	**22,5**	-
	GLP	-	31,0	-	-	-	**30,5**	**31,0**	**33,0**	**29,0**	-	-
	SLC	24,5	20,5	19,5	21,0	23,5	**23,5**	-	-	**18,5**	-	-
	LG	**25,5**	**26,5**	**27,0**	**29,0**	**30,0**	**31,5**	**29,5**	**27,5**	**27,0**	-	**25,5**
	BG	**-**	**23,5**	**-**	**23,0**	**25,0**	**27,0**	-	-	-	**22,0**	**22,5**
	GLP	**31,0**	**-**	**34,0**	**32,5**	**36,0**	**37,0**	**36,0**	**32,0**	-	-	-
	SLC	**21,0**	**-**	**21,5**	**23,0**	**-**	**22,5**	**24,0**	**21,0**	**22,0**	**21,0**	**-**
	LG	**27,0**	**-**	**-**	*22,0*	*30,5*	-					
	BG	**23,0**	**-**	**-**	*17,5*	21,5	-					
	GLP	**32,0**	**-**	**-**	*25,5*	-	-					
	SLC	**-**	**21,5**	**19,5**	*16,0*	*18,5*	*22,5*					
Humerus	SD	11,5	13,0	16,5	17,5	-	-	16,5	**14,5**	**15,5**	**17,0**	**12,5**
	Bd	-	-	-	-	35,5	35,5	39,0	-	-	-	**34,0**
	BT	-	-	-	-	30,0	30,0	36,0	-	-	-	**30,0**
	SD	**-**	**-**	**-**	**-**	**-**	**-**	**-**	13,0	-	-	-
	Bd	**35,5**	**36,0**	**38,0**	**33,0**	**-**	**35,0**	**-**	**-**	**34,0**	**-**	**36,0**
	BT	**30,5**	**32,0**	**32,0**	**27,0**	**28,5**	**28,5**	**31,0**	**-**	**29,5**	**31,5**	**30,5**
	SD	*11,5*										
	Bd	-										
	BT	-										
Ulna	BPC	14,0	16,0	20,0	**17,0**	**17,0**	**20,0**	**20,0**	**20,5**	**21,0**	**17,5**	**17,0**
	DPA	-	-	33,0	-	**-**	-	**32,0**	-	-		
Radius	Bp	-	26,0	27,5	29,0	-	**28,0**	-	**25,5**	**26,0**	**27,0**	**28,0**
	BFp	26,0	-	-	-	-	-	-	-	-	-	-
	SD	-	17,0	-	-	14,5	-	**17,0**	-	-	-	-
	Bd	28,5	-	-	-	-	-	-	-	-	-	-
	Bp	**24,0**	**28,0**	-	*22,5*	*25,5*						
	BFp	-	-	-	-	-						
	SD	-	-	*13,0*	-	-						
	Bd											
Mc 3	Bp	14,5	**16,0**	**15,0**								
Mc 4	Bp	12,5	**14,5**									

***Sus* sp.**	**Dimenzija Dimension**	**Meritve Measures**										
Mc 5	Bd	**10,0**	**10,0**									
	GL	**61,0**	**53,0**									
Pelvis	LA	30,5	**28,0**	-	**33,0**							
	LAR	28,5	**25,5**	**29,0**	**30,5**							
Femur	Bp	-	-	57,0	-	-	-	-				
	DC	-	-	24,0	-	-	-	-				
	SD	18,5	18,5	-	**18,0**	*15,5*	*17,0*	*19,0*				
Patella	GB	18,0	**17,5**									
Tibia	SD	16,5	-	-	-	-	-	**18,0**	**18,5**	-	-	-
	Bd	-	27,0	25,0	27,0	27,5	32,0	-	-	**26,5**	**27,0**	**28,0**
	Dd	-	22,0	23,5	24,0	21,5	27,5	-	-	**24,5**	**24,0**	**24,0**
	SD	-	-	**14,0**	-	-	-	-	*18,0*			
	Bd	**29,0**	**31,5**	-	**31,0**	**27,0**	**28,0**	**26,5**	-			
	Dd	**25,5**	**23,5**	-	**18,0**	**22,5**	**23,0**	**24,0**	-			
Calcaneus	GL	-	-									
	GB	18,0	**20,5**									
Astragalus	GLl	36,0	**34,0**	**38,5**	**41,5**	**31,5**	37,0	39,0	41,0	39,0		
	GLm	34,5	**32,0**	-	**37,0**	**27,5**	-	**35,5**	**38,0**	**36,5**		
	Dl	19,0	-	-	22,5	16,0	-	19,5	21,0	20,0		
	Bd	22,0	**18,5**	-	**25,0**	**18,0**	-	**22,0**	**24,0**	**21,0**		
Mt 2	Bp	13,5	4,0									
	GL	-	**57,0**									
Mt 3	Bp	**12,0**	*14,0*	*15,0*								
Mt 4	Bp	15,0	**13,5**									
Mt 5	Bp	4,5	5,0									
Phalanx 1	Bp	13,0	**17,5**	**13,5**	**14,5**	**15,5**	**15,5**	**14,5**	**15,0,**			
	SD	11,5	**13,5**	**11,0**	**12,5**	**12,0**	12,5	12,5	11,5			
	DD	8,0	**9,5**	**8,5**	**8,0**	**9,0**	**9,5**	**9,0**	**9,0**			
	Bd	12,5	**16,0**	**12,0**	**14,0**	**14,0**	15,0	14,5	14,5			
	GL	31,0	**39,0**	**34,0**	**34,0**	**33,5**	**31,5**	**33,0**	**33,0**			
Phalanx 2	Bp	14,0	14,0	**13,0**	**13,5**	**14,0**	**14,5**	**16,5**	*16,0*	*14,0*		
	Bd	12,0	12,0	**11,5**	**11,5**	**13,0**	**12,0**	**14,0**	*13,0*	*13,0*		
	GL	23,0	26,5	**18,0**	**21,0**	**22,0**	**21,5**	**21,5**	*21,5*	*19,5*		
Phalanx 3	Ld	**21,5**	**25,5**	*27,5*								
	DLS	**21,0**	**25,5**	*27,5*								
	MBS	**9,5**	**10,0**	*11,0*								

Tab. F: Dimenzije izmerjenih ostankov konja (*E. caballus*) s Tonovcovega gradu, datiranih v prvo poznoantično fazo (običajno zapisane številke), drugo poznoantično fazo (krepko zapisane številke) oz. zgodnjesrednjeveško fazo (poševno zapisane številke). Mere so izražene v mm. Okrajšave: glej von den Driesch 1976.
Tab. F: Dimensions of the measured horse remains (*E. caballus*) from Tonovcov grad, dated into Late Antiquity phase 1 (written normally), Late Antiquity phase 2 (written in bold letters) and Early Medieval phase (written in italics). Measurements are given in mm. Abbreviations: see von den Driesch 1976.

E. caballus	**Dimenzija Dimension**	**Meritve Measures**			
Humerus	Bd	**78,0**	-		
	BT	**75,0**	**73,0**		
Radius	Bp	-	-	**78,0**	**78,5**
	BFp	-	-	**73,0**	**72,5**
	SD	-	**37,0**	-	-
	Bd	**68,0**	**71,0**	-	-
	BFd	**58,5**	**59,0**	-	-
Mc	Bp	**50,0**			
	Dp	**32,0**			
	SD	**32,5**			
	DD	**22,5**			
	GLl	217,0			
	Ll	**209,0**			
	GL	**218,5**			
Femur	DC	45,5			
	SD	40,0			
Tibia	Bd	**67,5**	**71,5**		
	Dd	**45,0**	**43,0**		
Calcaneus	GB	**51,0**			
Astragalus	GH	60,0	-	**56,5**	
	GB	-	-	**63,5**	
	BFd	-	-	**53,5**	
	LmT	59,0	51,5	**57,0**	
Mt	Bp	**45,5**			
	Dp	**36,5**			
	SD	**30,5**			
	DD	23,5			
	Bd	**46,5**			
	Dd	**34,5**			
	GLl	**253,0**			
	Ll	**252,0**			
	GL	**257,0**			

E. caballus	**Dimenzija Dimension**	**Meritve Measures**			
Phalanx 1	Bp	-	52,0	52,5	
	BFp	-	**48,5**	**47,5**	
	Dp	-	**33,5**	**36,5**	
	SD	32,5	**34,5**	**33,5**	
	DD	20,0	-	-	
	Bd	43,5	**41,0**	-	
	BFd	40,0	**41,0**	-	
	GL	84,5	**81,5**	-	
Phalanx 2	Bp	45,0	**51,5**	*52,0*	
	Dp	-	**29,5**	-	
	BFp	-	**44,5**	-	
	SD	-	**44,5**	-	
	DD	-	**22,5**	-	
	Bd	43,5	**48,0**	*47,0*	
	GL	47,0	-	*43,5*	
Phalanx 3	Ld	**49,0**			
	HP	**37,0**			
	LF	**24,0**			
	BF	**47,5**			
	GB	**69,0**			
	GL	**68,0**			

Tab. G: Dimenzije izmerjenih ostankov kozoroga (*C. ibex*) s Tonovcovega gradu, datiranih v prvo poznoantično fazo (običajno zapisane številke) oz. drugo poznoantično fazo (krepko zapisane številke). Podatki za najdbe, ki so bile vrsti *C. ibex* pripisane pogojno, so osenčeni. Mere so izražene v mm. Okrajšave: glej von den Driesch 1976.
Tab. G: Dimensions of the measured ibex remains (*C. ibex*) from Tonovcov grad, dated into Late Antiquity phase 1 (written normally), Late Antiquity phase 2 (written in bold letters) and Early medieval phase (written in italics). The data for finds that were conditionally ascribed to the species *C. ibex* are shaded. Measurements are given in mm. Abbreviations see von den Driesch 1976.

C. ibex	**Dimenzija Dimension**	**Meritve Measures**		
Humerus	SD	-	**19,0**	
	Bd	38,0	-	
Radius	Bp	**40,5**	-	-
	BFp	**39,0**	-	-
	SD	-	**25,0**	**20,5**
Ulna	DPA	37,5	-	
	BPC	-	23,0	
Mc	Bp	27,0		
	SD	18,5		
	Bd	19,0		
Calcaneus	GL	**72,5**		
	GB	**25,5**		
Phalanx 1	SD	**14,0**		
	DD	**10,5**		
	Bd	**16,5**		
	GL	**44,5**		

Tab. H: Dimenzije izmerjenih ostankov pragoveda (*B. primigenius*) s Tonovcovega gradu, datiranih v prvo poznoantično fazo (običajno zapisane številke) oz. drugo poznoantično fazo (krepko zapisane številke). Podatki za najdbe, ki so bile vrsti *B. primigenius* pripisane pogojno, so osenčeni. Mere so izražene v mm. Okrajšave: glej von den Driesch 1976.
Tab. H: Dimensions of the measured aurochs remains (*Bos primigenius*) from Tonovcov grad, dated into Late Antiquity phase 1 (written normally), Late Antiquity phase 2 (written in bold letters) and Early Medieval phase (written in italics). The data from finds that were conditionally ascribed to the species *B. primigenius* are shaded. Measurements are given in mm. Abbreviations see von den Driesch 1976.

B. primigenius	**Dimenzija Dimension**	**Meritve Measures**		
Scapula	LG	**64,0**		
Femur	Bp	136,5		
	DC	54,0		
Tibia	Bp	>90,0	-	-
	Dp	83,0	-	-
	SD	46,5	**43,5**	**45,0**
Phalanx 3	Ld	61,0		
	MBS	28,0		
	DLS	83,0		

Tab. I: Dimenzije izmerjenih ostankov psa (*C. familiaris*), srne (*C. capreolus*) in jelena (*C. elaphus*) s Tonovcovega gradu. Vsi podatki se nanašajo na najdbe iz druge poznoantične faze. Mere so izražene v mm. Okrajšave: OnB – obseg na bazi; za ostale okrajšave glej von den Driesch 1976.
Tab. I : Dimensions of the measured dog (*C. familiaris*), roe deer (*C. capreolus*) and red deer (*C. elaphus*) remains from Tonovcov grad. All data is for finds from Late Antiquity phase 2. Measurements are given in mm. Abbreviations: OnB – basal circumference; for other abbreviations see von den Driesch 1976.

Takson Taxon	**Skelet. element**	**Dimenzija Dimension**	**Meritev Measure**
C. familiaris	Epistropheus	BFcr	**40,5**
C. capreolus	Proc. corn.	OnR	**56,0**
		OR	**110,0**
	Mandibula	M15a	**24,0**
C. elaphus	Proc. corn.	OnR	**188,0**
	Scapula	LG	**44,0**
		BG	**41,5**
	Mt	Bp	**40,0**

PRILOGA / APPENDIX 8.2

Tab. A: Število določenih primerkov (NISP) za posamezne taksone velikih sesalcev na območju stavbe 1 na Tonovcovem gradu. Skupina 'Ostalo' vključuje: *Bos taurus* s. *Equus caballus* (N = 1) in Caprinae s. *Capreolus capreolus* (N = 1) za gradivo iz prve poznoantične faze, *Bos taurus* s. *Equus caballus* (N = 1) in Caprinae s. *Capreolus capreolus* (N = 1) za ostanke iz druge poznoantične faze ter *Bos taurus* s. *Equus caballus* (N = 1) in *Bos taurus* s. *Cervus elaphus* (N = 1) za gradivo iz premešanega sedimenta. Pri cervidih je v oklepaju podano število ostankov rogovja. Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.
Tab. A: Number of identified specimens (NISP) for individual taxa of large mammals in the area of building 1 at Tonovcov grad. The group "Other" includes: *Bos taurus* s. *Equus caballus* (N = 1) and Caprinae s. *Capreolus capreolus* (N = 1) for the material from Late Antiquity phase 1, *Bos taurus* s. *Equus caballus* (N = 1) and Caprinae s. *Capreolus capreolus* (N = 1) for the remains from Late Antiquity phase 2 and *Bos taurus* s. *Equus caballus* (N = 1) and *Bos taurus* s. *Cervus elaphus* (N = 1) for the material from the mixed sediment. For cervids the number of antler remains is given in the brackets. Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Takson **Taxon**	**PA 1 / LA 1**		**PA 2 / LA 2**		**ZSV / EMA**		**Mešano / Mixed**	
	NISP	**%**	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**
Bos taurus	620	40,6	376	19,5	81	20,9	282	22,4
Caprinae	619	40,5	1030	53,5	228	58,8	681	54,0
Sus sp.	247	16,2	467	24,3	69	17,8	260	20,6
Canis familiaris	–	0,0	2	0,1	1	0,3	1	0,1
Capreolus capreolus	–	0,0	4	0,2	1	0,3	1 (1)	0,1
Equus caballus	25	1,6	15	0,8	5	1,3	22	1,7
Cervus elaphus	4	0,3	18 (15)	0,9	1 (1)	0,3	6 (3)	0,5
Capra ibex	4	0,3	7	0,4	–	0,0	3	0,2
Bos cf. *primigenius*	5	0,3	2	0,1	–	0,0	2	0,2
Ursus arctos	1	0,1	1	0,1	2	0,5	–	0,0
Ostalo / Other	2	0,1	2	0,1	–	0,0	2	0,2
Σ det. fragm.	1527	100,0	1924	100,0	388	100,0	1260	100,0
Σ indet. fragm.	3122 (= 67,1 %N)		4767 (= 71,2 %N)		1033 (= 72,5 %N)		3260 (= 72,1 %N)	
SKUPAJ / TOTAL	4649		6691		1421		4521	

Tab. B: Število določenih primerkov (NISP) za posamezne taksone velikih sesalcev na območju stavbe 2 na Tonovcovem gradu. Skupina 'Ostalo' vključuje: Caprinae s. *Capreolus capreolus* (N = 3). Legenda: PA – poznoantična faza.
Tab. B: Number of identified specimens (NISP) for individual taxa of large mammals in the area of building 2 at Tonovcov grad. The group "Other" includes: Caprinae s. *Capreolus capreolus* (N = 3). Legend: LA – Late Antiquity phase.

Takson **Taxon**	**PA 2 / LA 2**	
	NISP	**% NISP**
Bos taurus	33	35,9
Caprinae	44	47,8
Sus sp.	11	12,0
Capreolus capreolus	1	1,1
Ostalo / Other	3	3,3
Σ det. fragment.	92	100,0
Σ indet. fragment.	125 (= 57,6 %N)	
SKUPAJ / TOTAL	217	

Tab. C: Število določenih primerkov (NISP) za posamezne taksone velikih sesalcev na območju stavbe 3 na Tonovcovem gradu. Legenda: PA – poznoantična faza.
Tab. C: Number of identified specimens (NISP) for individual taxa of large mammals in the area of building 3 at Tonovcov grad. Legend: LA – Late Antiquity phase.

Takson **Taxon**	**PA 1** **LA 1**	**PA 2** **LA 2**
	NISP	**NISP**
Bos taurus	26	2
Caprinae	19	8
Sus sp.	4	1
Σ det. fragment.	49	11
Σ indet. fragment.	67	20
SKUPAJ / TOTAL	116	31

Tab. D: Število določenih primerkov (NISP) za posamezne taksone velikih sesalcev na prostoru med srednjo in južno cerkvijo na Tonovcovem gradu. Skupina 'Ostalo' vključuje: *Bos taurus* s. *Equus caballus* (N = 3) in Caprinae s. *Capreolus capreolus* (N = 6) za gradivo iz druge poznoantične faze, *Bos taurus* s. *Cervus elaphus* (N = 1) za ostanke iz zgodnjesrednjeveške faze ter Caprinae s. *Capreolus capreolus* (N = 2) za gradivo iz premešanega sedimenta. Legenda: PA – poznoantična faza; ZSV – zgodnjesrednjeveška faza.
Tab. D: Number of identified specimens (NISP) for individual taxa of large mammals in the courtyard area between the two churches at Tonovcov grad. The group "Other" includes: *Bos taurus* s. *Equus caballus* (N = 3) and Caprinae s. *Capreolus capreolus* (N = 6) for the material from Late Antiquity phase 2, *Bos taurus* s. *Cervus elaphus* (N = 1) for the remains from Early Medieval phase and Caprinae s. *Capreolus capreolus* (N = 2) for the material from the mixed sediment. Legend: LA – Late Antiquity phase; EMA – Early Medieval phase.

Takson **Taxon**	**PA 2 / LA 2**		**ZSV / EMA**		**Mešano / Mixed**	
	NISP	**% NISP**	**NISP**	**% NISP**	**NISP**	**% NISP**
Bos taurus	56	46,3	1	–	42	30,2
Caprinae	38	31,4	2	–	75	54,0
Sus sp.	17	14,0	1	–	18	12,9
Canis familiaris	1	0,8	–	–	–	0,0
Capreolus capreolus	–	0,0	–	–	2	1,4
Ostalo / Other	9	7,5	1	–	2	1,4
Σ det. fragment.	121	100,0	5	–	139	100,0
Σ indet. fragment.	227 (= 65,2 %N)		6		275 (= 66,4 %N)	
SKUPAJ / TOTAL	348		11		414	