8
VELIKI SESALCI

LARGE MAMMALS

Borut TOŠKAN in Janez DIRJEC

Izvleček
Analiza favne z mezolitskega najdišča Zalog pri Verdu je izpostavila prevladujoč delež ostankov jelena in divjega prašiča. Upoštevajoč zastopanost posameznih (delov) skeletnih elementov obeh navedenih vrst je najdišče mogoče opredeliti kot lovsko postojanko. Verodostojnost interpretacije zmanjšujejo vprašljiva reprezentativnost vzorca in veliko število rogovinastih ostankov z očitnimi sledmi obdelave.

Ključne besede: Slovenija, Ljubljansko barje, mezolitik, živalski ostanki, lovska postojanka, rogovinasta orodja

Abstract
The faunal analysis of the Mesolithic site of Zalog near Verd revealed the predominance of skeletal elements of red deer and wild boar. Considering the representation of individual (parts of) skeletal elements of the two cited species, the site may be defined as a hunters' camp. The credibility of this interpretation, however, is undermined by the questionable representation of the sample as well as a high number of antler remains with obvious traces of working.

Key words: Slovenia, the Ljubljansko barje, Mesolithic, animal remains, hunters' camp, antler tools

1 UVOD

V Sloveniji je iz obdobja med 8.000 in 5.000 leti pr. n. št. poznanih kar nekaj mezolitskih najdišč, ki pa zaradi neustrezne metodike in/ali omejenega obsega njihovega raziskovanja niso bistveno prispevali k poznavanju staroholocenskega živalstva (za izjeme glej Pohar 1984; 1986; 1990; Toškan, Dirjec 2004a; Toškan, Kryštufek 2004; Turk, Toškan, Dirjec 2004). Izmed več predneolitskih planih najdišč z območja Ljubljanskega barja (npr. Vuga 1977; 1986; Turk, Vuga 1982; Josipovič 1983; Culiberg, Turk, Vuga 1984; Frelih 1986) je bila tako živalskim ostankom nekoliko večja pozornost namenjena le v primeru Brega pri Škofljici (Pohar 1984). Zaradi navedenega se zdi analiza favne s kamenodobnega[1] najdišča Zalog pri Verdu (286,31 m nm. v.) vsekakor smiselna, pa čeprav so bile najdbe pobrane iz struge potoka Ljubije, kar zagotovo zmanjšuje njihovo izpovedno vrednost.

1 INTRODUCTION

There are quite a few Mesolithic sites, dated to the period from 8000 to 5000 BC, known in Slovenia. However, due to inadequate methods and/or limited extent of research they did not substantially add to the knowledge of the Early Holocene animal life (for exceptions see Pohar 1984; 1986; 1990; Toškan, Dirjec 2004a; Toškan, Kryštufek 2004; Turk, Toškan, Dirjec 2004). Of the several plain pre-Neolithic sites from the area of the Ljubljansko barje (for example: Vuga 1977, 1986; Turk, Vuga 1982; Josipovič 1983; Culiberg, Turk, Vuga 1984; Frelih 1986), at least some attention to animal remains was only paid at Breg near Škofljica (Pohar 1984). Having said the above, the faunal analysis of the Stone Age[1] site of Zalog near Verd (286,31 metres above sea-level) is undoubtedly reasonable, even despite the fact that the finds were taken from the bed of the Ljubija Stream which surely reduces the interpretative value of the sample.

[1] Na osnovi radiokarbonskih datacij je bilo najdišče umeščeno v 8. tisočletje pr. n. št. (Gaspari, Erič, v tem zborniku).

[1] The site has been dated to the 8th millennium BC on the basis of radiocarbon dating (Gaspari, Erič, in this publication).

2 MATERIAL IN METODE

Podrobne podatke o najdišču in metodologiji terenskega raziskovanja podajata Gaspari in Erič (v tem zborniku), zato se na tem mestu posvečava le predstavitvi arheozoološke analize. Živalski ostanki so bili pobrani ročno iz poglobitev v rečnem dnu, kjer so bile zapažene koncentracije najdb. Posamezna koncentracija predstavlja osnovno zbiralno enoto, katere mikrolokacija je definirana z njenim centroidom. V celoti je bilo na približno 80 m dolgem odseku struge odkritih več kot 120 takšnih koncentracij, od katerih jih je 86 vsebovalo tudi kosti velikih sesalcev.

Določevala sva vse skeletne elemente z izjemo reber in pretežnega dela vretenc (od slednjih sva determinirala le nosač in okretač). Pri biometrični analizi sva sledila smernicam von den Driescheve (1976), starost živali ob poginu pa sva ocenjevala na osnovi obrabe žvekalne površine kočnikov. Kvantitativne primerjave med taksoni temeljijo na številu določenih primerkov (*Number of Identified Specimens*, NISP; Grayson 1984), medtem ko sva zastopanost posameznih skeletnih elementov izrazila z najmanjšim številom živalskih enot (*Minimal Animal Unit*, MAU; Lyman 1999). Statistična obdelava je bila narejena s programskim paketom StatSoft 2001, STATISTICA za Windows, verzija 6.0.

2 MATERIAL AND METHODS

Detailed data on the site and the methodology of field research used is given by Gaspari and Erič (in this publication). This part therefore concentrates only on presenting the archaeozoological analysis. Animal remains were hand-collected from the deepened parts in the bed of the stream where concentrations of finds were noticed. One concentration represents one basic collection unit, its microlocation being defined by its centroid. In total, more than 120 such concentrations were uncovered along the approximately 80 m long section of the bed, 86 of them containing also bones of large mammals.

All skeletal elements, with the exception of ribs and most vertebrae, have been identified (of the latter, only the atlas and axis were systematically identified). The biometric analysis was carried out according to the guidelines of von den Driesch (1976). The age of the animals at death was determined on the basis of the wear of the cheek teeth. The quantitative comparisons among the taxons are based on the number of identified specimens (NISP; Grayson 1984), while the representation of individual skeletal elements is expressed by the minimal animal unit (MAU; Lyman 1999). The statistical processing was conducted using the StatSoft 2001, STATISTICS for Windows program package, version 6.0.

Takson / ***Taxon***	Rogovje / ***Antlers***	Cranium	Os maxillare	Mandibula	Dens	Atlas / **Axis**	Scapula	Humerus	Radius	Ulna	Carpalia	Metacarpalia	Phalanges	Os coxae	Femur	Patella	Tibia	Fibula	Calcaneus	Astragalus	Ostale / ***Other tars.***	Metatarsalia	Indet. metapod.	NISP	% NISP
Cervus elaphus	148		2	7	28	2	7	8	14	2	1	6		4	3	1	5		1	3	1	11	6	260	61,6
Sus cf. ***scrofa***		3	8	13	37	2	7	6	5	5	1	3	1	5	1	1	6	2	2	5	2	1	6	122	28,9
Bos sp.					4		1					1	1				1					4	1	13	3,1
Meles meles				4					1	3														8	1,9
C. capreolus					1							2					2						1	6	1,4
Castor fiber					2		1			1					1									5	1,2
Felis sp.				1	1	1																		3	0,7
Ursus arctos													1				1							2	0,4
Bos s. ***Bison***												1												1	0,2
Capra hircus																			1					1	0,2
Equus caballus					1																			1	0,2
Martes martes				1																				1	0,2
SKUPAJ / ***TOTAL***	148	3	10	26	74	5	16	14	20	11	2	13	3	9	5	2	15	2	4	8	3	16	14	423	100

Tab. 8.1: Zastopanost posameznih taksonov velikih sesalcev in njihovih skeletnih elementov v gradivu z Zaloga.
Tab. 8.1: Representation of individual taxons of large mammals and their skeletal elements within the Zalog assemblage.

3 REZULTATI IN RAZPRAVA

Pridobljeno gradivo vsebuje 863 ostankov velikih sesalcev, od katerih jih je bilo vsaj do nivoja rodu mogoče določiti 429 (tj. 49,7 %). Visok odstotek določljivih najdb je pričakovana posledica načina vzorčenja, saj z ročnim pobiranjem ostankov ni bilo mogoče reprezentativno zaobjeti manjših (pod 1,5 cm velikih) fragmentov (Gaspari, ustno). Sicer pa je v zbranem gradivu zastopanih najmanj 11 vrst velikih sesalcev iz osmih družin (*tab. 8.1*). Kot posledica izpostavljenosti tekoči vodi s premikajočimi se peščenimi drobci je mnogo kosti obrušenih; ugotovljeno število primerkov z vidnimi sledmi urezov (16 oz. 1,8 %) in zasekanin (34 oz. 3,9 %) je zato zelo verjetno podcenjeno. Obgrizenih kosti v pregledanem materialu nisva zasledila.

3.1 Taksonomija

Red: Glodalci (Rodentia)

Družina: Bobri (Castoridae)

Castor fiber Linnaeus, 1758

Bober je bil v obravnavanem vzorcu zastopan s petimi najdbami. Komolčnica, katere proksimalna epifiza še ni bila zraščena z diafizo, je domnevno pripadala do okrog enega leta staremu osebku, že v celoti osificirana stegnenica pa več kot tri leta stari živali (Iregren, Stenflo 1982). Pomen bobra za takratno skupnost najverjetneje ni upravičeno omejiti le na pridobivanje kožuhov, ampak tudi mesa. Prav to morda nakazujejo sledi urezov ob proksimalni sklepni

3 RESULTS AND DISCUSSION

The collected material includes 863 fragments of large mammals, 429 of which (i.e. 49.7%) could be identified at least as far as their genus. This high percentage of identifiable remains is an expected consequence of the manner of sampling, since it was not possible to collect a representative number of smaller (less than 1.5 cm in size) fragments by hand-collection (pers. comm. by A. Gaspari). Whatever the case, the collected material includes at least 11 species of large mammals belonging to eight families (*Tab. 8.1*). The material was exposed to flowing water with moving sand particles which caused many bones to suffer abrasion; the number of fragments with identified cut marks (16 or 1.8%) and chop marks (34 or 3.9%) is therefore most probably underestimated. Gnawed bones have not been identified within the analysed material.

3.1 Taxonomy

Order: Rodents (Rodentia)

Family: Beavers (Castoridae)

Castor fiber Linnaeus, 1758

Within the sample under investigation, beaver remains have been identified in five fragments. The ulna, of which the proximal epiphysis has not yet been fused with the diaphysis, presumably belonged to an individual aged up to a year. The completely fused femur, on the other hand, belonged to an animal of over three years (Iregren, Stenflo 1982). The significance of beavers for the contemporary community is most probably unjustly limited only to their fur, while meat

Skelet. element	Dimenzija / ***Dimension***	Zalog	Ig
			Me (n) min–max
Ulna	Višina velike sigmoidne vdolbine / ***Height of large sigmoid cavity***	13,5	14,0 (4) 12,5–14,1
Femur	Največja dolžina / ***Greatest length***	120,5	116,2 (7) 111,5–119,0
	Dolžina od kondila navzdol / ***Length from condyle downwards***	112,0	110,4 (5) 107,3–112,6
	Transferzalna širina distalne epifize / ***Transverse breadth of the distal epiphysis***	38,0	38,7 (7) 37,5–42,0
	Dorzo-ventralna širina distalne epifize / ***Antero-posterior diameter of the distal epiphysis***	28,0	28,5 (6) 27,8–30,7
	Transferzalna širina proksimalne epifize / ***Transverse breath of the proximal epiphysis***	43,0	42,6 (4) 41,4–43,2

Tab. 8.2: Dimenzije izkopanih ostankov bobra (*Castor fiber*) z Zaloga in z Dežmanovih kolišč pri Igu (eneolitik; Rakovec 1958). Podani so mediana (Me), razpon vrednosti (min–max) in velikost vzorca (N). Vse mere so v mm.
Tab. 8.2: Dimensions of measured beaver (*Castor fiber*) remains from Zalog and from Dežman's pile-dwellings near Ig (Eneolithic; Rakovec 1958), with given median (Me), range (min–max) and sample size (N). All measurements are in mm.

površini komolčnice, ki so verjetno nastali pri kosanju plena (prim. Zeiler 1987).

Komolčnica in stegnenica iz Zaloga se po svojih dimenzijah ne razlikujeta od primerkov z Dežmanovih kolišč pri Igu (*tab. 8.2*) ter tako v velikosti nekoliko presegata recentne bobre (Rakovec 1958). Vrsta je sicer poznana še z več drugih prazgodovinskih najdišč Ljubljanskega barja (Drobne 1973; Pohar 1984; Toškan, Dirjec 2004b; 2006).

Red: Zveri (Carnivora)

Družina: Medvedi (Ursidae)

Ursus arctos Linnaeus, 1758

Na holocenskih najdiščih z Ljubljanskega barja splošno prisoten rjavi medved (čeprav vedno le s skromnim številom ostankov) je z dvema najdbama zastopan tudi v gradivu z Zaloga. Ugotovitev potrjuje tezo, da je bil lov na omenjeno zver v prazgodovini razmeroma redek dogodek (Riedel 1989; Bartosiewicz 1999).

Družina: Kune (Mustelidae)

Meles meles (Linnaeus, 1758)

Jazbec je z osmimi najdbami najbolje zastopana zver v obravnavanem vzorcu. Med navedenimi ostanki so kar štiri spodnje čeljustnice (*tab. 8.1*), ki se po dimenzijah umeščajo znotraj variacijske širine mezolitskih primerkov s Krasa (*tab. 8.3*). Vrsta je sicer zastopana v favni številnih mezolitskih najdišč Slovenije in sosednjih regij.

Hüster-Plogmann in sodelavci (1999) nihanje deleža jazbeca v favni švicarskih (e)neolitskih najdišč povezujejo s spreminjanjem obsega gozdnih sestojev v takratni krajini. V nasprotju s tem vidi Miracle (1997) v postopnem večanju števila jazbečevih (in zajčjih) ostankov v mezolitskih plasteh hrvaškega najdišča Pupićina peć pod Učko dokaze za povečevanje prehrambne pestrosti takratnih ljudi; v tem bi se lahko odražala porast števila prebivalstva in/ali postopen prehod od razmeroma mobilnega k bolj sedentarnemu načinu življenja (npr. Broughton, Grayson 1993; Stiner, Munro 2002). Nihanju deleža ekonomsko manj zanimivih vrst v času mezolitika žal na območju Ljubljanskega barja ni mogoče slediti, saj ustrezni podatki manjkajo. Omeniti pa velja, da je jazbec prisoten v favni večine postneolitskih najdišč z navedenega območja (Drobne 1973; 1974; 1975; Toškan, Dirjec 2004b; 2004c), ko ga v Pupićini peći več ni. Lov nanj očitno ni bil motiviran le s pridobivanjem mesa in maščob, temveč tudi (predvsem?) kožuhov (Zeiler 1987).

production should also be considered. The cut marks on the proximal articular surface of the ulna, probably made while butchering the prey, might indicate just that (cf. Zeiler 1987).

The ulna and the femur from Zalog do not differ in size from the specimens taken at Dežman's piledwellings near Ig (*Tab. 8.2*) and are slightly larger than the recent beavers (Rakovec 1985). The species is known also from other prehistoric sites at the Ljubljansko barje (Drobne 1973; Pohar 1984; Toškan, Dirjec 2004b; 2006).

Order: Carnivores (Carnivora)

Family: Bears (Ursidae)

Ursus arctos Linnaeus, 1758

Remains of the brown bear are common (although not numerous) on the Holocene sites of the Ljubljansko barje and have been identified in two fragments also at the Zalog site. This finding confirms the thesis that hunting the brown bear occurred relatively rarely in prehistory (Riedel 1989; Bartosiewicz 1999).

Family: Mustelids (Mustelidae)

Meles meles (Linnaeus, 1758)

The badger, with eight identified finds, is the best represented carnivore within the sample. Four of the fragments are mandibles (*Tab. 8.1*) and fall, in size, within the range of the Mesolithic specimens known from the Kras region (*Tab. 8.3*). The species is also represented in the fauna of numerous Mesolithic sites from Slovenia and surrounding regions.

Hüster-Plogmann and associates link the oscillation of the share of badger remains in the fauna of the Swiss (E)Neolithic sites to the change in the extent of the forest in the contemporary landscape. Contrary to that, the gradual increase in the number of badger (and hare) remains in the Mesolithic layers of the Croatian site of Pupićina peć under Učka led Miracle (1997) to see it as proof of an expanding diet breadth of the contemporary people. Such an increase in the nutritional variety could, furthermore, reflect population growth and/or gradual transition from a relatively mobile to a more sedentary mode of life (for example: Broughton, Grayson 1993; Stiner, Munro 2002). Unfortunately, the oscillation in the share of economically less interesting species throughout the Mesolithic cannot be observed in the Ljubljansko barje area due to a lack of pertinent data. It is worth mentioning, though, that the badger is present in the fauna of most of the post-Neolithic sites from the mentioned area (Drobne 1973; 1974; 1975; Toškan, Dirjec 2004b; 2004c), when

Tab. 8.3: Dimenzije spodnjih čeljustnic jazbeca (*Meles meles*) z Zaloga; podani so velikost vzorca (n), mediana (Me) in razpon vrednosti (min-max). Za primerjavo so prikazane dimenzije spodnjih čeljustnic z mezolitskega najdišča Jama na Sedlu pri Šempolaju (*grotta Benussi*; Riedel 1975). Višina ramusa je definirana kot razdalja med kotnim podaljškom (*processus angularis*) in vrhom kavljastega podaljška (*processus coronoideus*). Vse mere so v mm.
Tab. 8.3: Dimensions of measured badger (*Meles meles*) remains from Zalog, with given sample size (n), median (Me) and range (min-max). Measurements from the Mesolithic site of Jama na Sedlu near Šempolaj are presented for comparison (*grotta Benussi*; Riedel 1975). The ramus height is defined as the distance between the *processus angularis* and the *processus coronoideus*. All measurements are in mm.

Dimenzija / ***Dimension***	Zalog	Benussi
	Me (n) min–max	Me (n) min–max
Dolžina P_2–M_3 / ***Length of P_2– M_3***	-- (2) 39,5–41,0	-- (2) 39,7–42,2
Dolžina P_2–P_4 / ***Length of P_2–P_4***	-- (2) 17,0–18,0	20,2 (3) 19,0–20,4
Dolžina M_1– M_3 / ***Length of M_1–M_3***	22,0 (4) 21,0–23,5	22,7 (8) 21,2–23,6
Dolžina M_1 / ***Length of M_1***	16,0 (3) 15,0–17,5	16,4 (11) 15,1–18,7
Višina ramusa / ***Ramus height***	36,0	-- (2) 36,7–37,2

Martes martes (Linnaeus, 1758)

Spodnja čeljustnica kune zlatice je edini ostanek omenjene vrste v analiziranem gradivu. Specifično determinacijo omogoča razdalja med bradnima odprtinama (*foramen mentale*), ki pri obravnavanem primerku presega 4 mm (prim. Kryštufek 1991). V okviru mezolitskih najdišč Slovenije je vrsta poznana le še z Brega pri Škofljici (Pohar 1984) ter morda z Viktorjevega spodmola pri Famljah (Toškan, Dirjec 2004a).

Družina: Mačke (Felidae)

Felis cf. *silvestris* Schreber, 1777

Mački sva pripisala nosač, spodnjo čeljustnico ter izoliran zob. Slednja dva izvirata iz iste zbiralne enote (koncentracije), tako da sta morda pripadala istemu osebku. V kolikor so najdbe sočasne z najdiščem, jih lahko z gotovostjo pripiševa divji mački, saj se prvi domestikati na območju srednje Evrope pojavijo šele bistveno kasneje (Clutton-Brock 1999). V to smer kažejo tudi dimenzije spodnje čeljustnice, po katerih se primerek z Zaloga umešča znotraj variacijske širine holocenskih divjih mačk iz Evrope (*tab. 8.4*).

it no longer appears in the Pupućina peć. Hunting the badger was thus evidently not motivated solely by the exploitation of meat and fat but also (predominantly?) of fur (Zeiler 1987).

Martes martes (Linnaeus, 1758)

The mandible of a pine marten is the only find of this species within the analyzed material. The specific identification is based on the distance between the mental foramina (*foramen mentale*) of the mandible that exceeds 4 mm (cf. Kryštufek 1991). Among other Mesolithic sites in Slovenia the species is only known from Breg near Škofljica (Pohar 1984) and possibly from Viktorjev spodmol near Famlje (Toškan, Dirjec 2004a).

Family: Cats (Felidae)

Felis cf. *silvestris* Schreber, 1777

Cat remains were identified in an atlas, mandible and an isolated tooth. The two latter originate from the same collection unit (concentration) and might, therefore, even belong to the same individual. If accepted as contemporaneous with the site, these remains can, undoubtedly, be ascribed to a wild cat, since first domesticates do not appear in the Central European area until considerably later (Clutton-Brock 1999). The size of the mandible that places the specimen from Zalog within the variational width of the

Tab. 8.4: Dimenziji spodnje čeljustnice mačke (*Felis* sp.) z Zaloga. Primerjalno so prikazane dimenzije subfosilnih (neolitskih) mačk z Danske ter recentnih primerkov s kontinentalne Evrope (Kurtén 1965). Podani so velikost vzorca (n), mediana (Me) in razpon vrednosti (min-max). Legenda: VzM1 - višina spodnječeljustniškega telesa (*corpus mandibulae*) za M_1. Vse mere so v mm.
Tab. 8.4: Dimensions of measured cat (*Felis* sp.) mandible from Zalog. Measurements of subfossil (Neolithic) cats from Denmark and recent specimens from continental Europe are presented for comparison (Kurtén 1965), with given sample size (n), median (Me) and range (min-max). Explanation of abbreviation: VzM1 - height of the *corpus mandibulae* behind M_1. All measurements are in mm.

Dimenzija / ***Dimension***	Zalog	Subfos.	Recent.
		Me (n) min–max	Me (n) min–max
Dolžina M_1 / ***M_1 length***	9,5	8,8 (33) 7,5–10,0	8,3 (23) 7,4–9,0
VzM_1	12,0	11,8 (24) 9,7–14,0	11,1 (23) 9,2–13,2

V okviru mezolitskih najdišč Slovenije je vrsta poznana le še z Male Triglavce pri Divači (Turk, Toškan, Dirjec 2004).

Red: Lihoprsti kopitarji (Perissodactyla)

Družina: Konji, osli in zebre (Equidae)

Equus caballus Linnaeus, 1758

Konj je bil v obravnavanem gradivu zastopan z izoliranim spodnjim sekalcem (*sl. 8.1*), ki pa ne sodi v časovni kontekst naselbine Zalog. Najstarejše poznane najdbe domačega konja iz Slovenije so namreč arheološko datirane v končni del bronaste dobe[2] (npr. Rakovec 1973; Riedel 1977a; Bartosiewicz 1987), podobno pa velja tudi za SV Italijo (Riedel 1986) in Istro (Mihovilić *et al*. 2002). Kam časovno umestiti zob z Zaloga zaenkrat ni mogoče reči, skoraj zagotovo pa gre za kontaminacijo. Izključiti ne gre niti njegove povezave z nekoliko više ob Ljubiji ležečim bronastodobnim najdiščem (Gaspari, v tem zborniku). Zaradi paličaste oblike naj bi bil namreč konjski sekalec zelo izpostavljen transportu z vodnim tokom (Frostick, Reid 1983). V tem smislu je pomenljivo tudi dejstvo, da je bila najdba pobrana na samem začetku transekta, kjer struga seka najdišče Zalog (tj. zbiralna enota LZ-118).

Sl. 8.1: Sekalec konja (*Equus caballus*) z Zaloga (zbiralna enota LZ-118)-distalno. M. = 1 : 1 (Foto: R. Erjavec).
Fig. 8.1: Horse (*Equus caballus*) incisive from Zalog (collection unit LZ-118)-distal aspect. Scale = 1 : 1 (Photo: R. Erjavec).

Red: Sodoprsti kopitarji (Artiodactyla)

Družina: Prašiči ali svinje (Suidae)

Sus scrofa Linnaeus, 1758

Prašič je drugi najbolje zastopan takson v obravnavanem gradivu, saj po številu najdb zaostaja le za jelenom. Kosti z Zaloga se po svojih dimenzijah umeščajo znotraj variacijske širine za prazgodovinske div-

[2] V Partih sta bila sicer med ostanki kolov in pretežno eneolitske keramike najdena tudi konjska prstnica in zob, vendar obe najdbi izvirata iz struge Išce, kar prav tako dopušča možnost kontaminacije (Harej 1977).

Holocene wild cats from Europe (*Tab. 8.4*), leads to the same conclusion.

Among the Mesolithic sites of Slovenia beside Zalog, the species is known only from Mala Triglavca near Divača (Turk, Toškan, Dirjec 2004).

Order: Odd-toed ungulates (Perissodactyla)

Family: Horses, asses and zebras (Equidae)

Equus caballus Linnaeus, 1758

Horse remains are represented by an isolated lower incisor (*Fig. 8.1*). It does not, however, belong to the chronological context of the Zalog site, since the earliest known finds of a domestic horse from Slovenia are archaeologically dated to the final part of the Bronze Age[2] (for example Rakovec 1973; Riedel 1977a; Bartosiewicz 1987). Similar observations were made for NE Italy (Riedel 1986) and Istria (Mihovilić *et al.* 2002). The chronological determination of the tooth cannot be given as yet, though we are almost surely dealing with contamination. Moreover, the connection of this find to the Bronze Age site, lying slightly further up the Ljubija, cannot be excluded (Gaspari, in this publication). In support of the latter is the stick-like form of the tooth suggesting a potentially heavy exposition to transport by water current (Frostick, Reid 1983), as well as the fact that the find was taken at the very beginning of the transect where the bed crosses the site (i.e. collection unit LZ-118).

Order: Even-toed ungulates (Artiodactyla)

Family: Pigs (Suidae)

Sus scrofa Linnaues, 1758

The wild boar is the second best represented taxon in the researched material, only falling behind the red deer in number. In size, the bones from the Zalog site fall within the variational width for the prehistoric wild boar from various Central European sites (*Tab. 8.5*), which makes their identification as *Sus scrofa* seem entirely justified. On the other hand, the measurable specimens exceed the average size of the Roman Age pigs (*Fig. 8.2*).

Considering the chronological determination of the site, the identification of the material from Zalog as including that of wild boar is expected. In the context of the entire archaeozoological analysis, however,

[2] A horse phalanx and a tooth were found at Parte, among the remains of piles and predominantly Eneolithic pottery. Both finds, however, originate from the bed of the Iščica Stream, which allows for the possibility of contamination (Harej 1977).

Tab. 8.5: Dimenzije prašičjih ostankov z Zaloga. Za primerjavo so prikazani ustrezni podatki za subfosilne divje (*Sus scrofa*) in domače (*S. domesticus*) prašiče z več srednjeevropskih najdišč. Podani so mera centralne tendence (X – povprečje oz. Me – mediana), razpon vrednosti (min–max) ter velikost vzorca (N). Predstavitev najdišč: Barche di Solferino (starejša bronasta doba; Riedel 1977b), Mondsee (eneolitik; Pucher, Engl 1997), Madžarska – več najdišč (= M. / H.; prazgodovina; Bökönyi 1995), Seeberg (neolitik; Boessneck, Jéquier, Stampfli 1963) ter Ledro (starejša in srednja bronasta doba; Riedel 1977b). Za opredelitev dimenzij glej prilogo. Vse mere so v mm.
Tab. 8.5: Dimensions of wild boar (*Sus* cf. *scrofa*) remains from Zalog. Data for subfossil wild boar (*Sus scrofa*) and domestic pig (*S. domesticus*) from several Central European sites are presented for comparison, with given measure of central tendency (X – average or Me – median), range (min–max) and sample size (N). Sites presented: Barche di Solferino (Early Bronze Age; Riedel 1977b), Mondsee (Eneolithic; Pucher, Engl 1997), Hungary – various sites (= M. / H.; prehistory; Bökönyi 1995), Seeberg (Neolithic; Boessneck, Jéquier, Stampfli 1963) and Ledro (Early and Middle Bronze Age; Riedel 1977b). Dimensions are explained in the supplement. All measurements are in mm.

Dimenz. / ***Dimens.***	Zalog	***Sus scrofa***				***Sus domesticus***			
		Barche	Mondsee	M. / H.	Seeberg	Ledro	Mondsee	M. / H.	Seeberg
	Me (N) min–max	X (N) min–max	X (N) min–max	X (N) min–max	Me (N) min–max	X (N) min–max	X (N) min–max	X (N) min–max	Me (N) min–max
M^3 (D)	36,0 (4) 34,0–40,0	38,9 (4) --	42,5 (4) 39,5–44,0	-- 36,0–49,0	41,0 (5) 36,0–43,0	32,9 (12) --	34,3 (59) 29,0–38,5	-- 23,0–38,0	32,5 (4) 31,0–34,5
M^3 (Š)	22,0 (4) 20,0–23,0	--	22,0 (4) 21,5–22,5	--	22,5 (7) 21,5–25,0	--	18,5 (13) 17,5–21,5	--	18,5 (4) 16,5–19,5
M_3 (D)	40,5 (8) 38,0–47,0	41,7 (7) --	41,5 (3) 39,5–43,5	-- 40,0–55,0	44,0 (20) 40,0–49,0	33,3 (34) --	35,8 (51) 31,5–40,0	-- 20,0–42,0	--
M_3 (Š)	18,5 (7) 19,0–20,0	--	18,5 (3) 18,0–19,0	--	19,0 (21) 17,5–21,0	--	15,5 (13) 14,0–17,0	--	15,0 (1) --
Humerus (Bd)	49,0 (4) 47,0–52,0	52,3 (3) 47,2–58,0	47,7 (2) 46,5–49,0	-- 47,0–60,0	--	36,8 (47) 32,5–40,5	38,5 (3) 38,0–40,0	-- 33,0–45,5	--
Radius (Bp)	37,5 (1) --	38,7 (2) 38,3–39,2	--	-- 35,0–43,0	32,0 (3) 31,5–37,5	27,0 (53) 21,5–32,5	29,5 (3) 29,0–33,5	-- 25,5–36,0	24,0 (1) --
Scapula (SLC)	30,0 (6) 25,0–31,5	32,6 (2) 32,0–32,6	--	-- 26,0–40,0	31,5 (27) 25,0–37,0	22,1 (35) --	21,3 (20) 19,0–24,0	-- 18,5–28,5	21,5 (5) 20,0–22,0
Tibia (Bd)	37,0 (3) 31,5–40,0	38,5 (2) 36,0–41,0	40,0 (3) 40,0–40,5	-- 35,5–42,0	--	28,2 (21) 25,6–29,6	28,1 (5) 26,5–30,1	-- 25,5–35,0	--
Talus (GLl)	51,5 (4) 50,0–52,0	51,8 (2) --	--	-- 49,0–57,0	50,5 (29) 46,0–55,5	37,3 (1) --	40,5 (3) 39,0–42,0	-- 37,5–46,5	39,0 (2) 39,0–39,0
Talus (Dl)	27,5 (4) 26,0–29,0	--	--	-- 29,0–36,0	--	--	22,5 (3) 21,5–22,5	-- 23,0–30,0	--

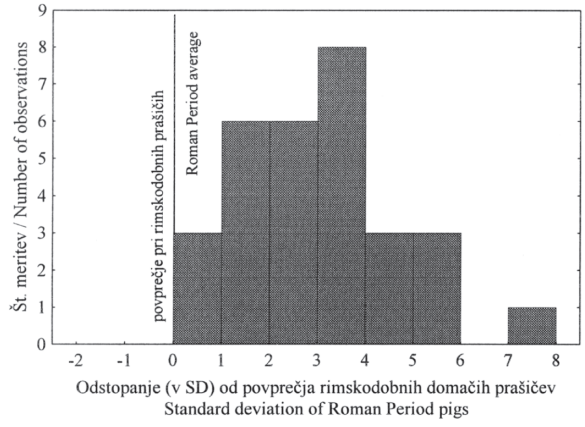
je prašiče z različnih srednjeevropskih najdišč (*tab. 8.5*), zato se zdi njihova determinacija za *Sus scrofa* povsem upravičena. Nenazadnje merljivi primerki z Zaloga presegajo tudi povprečne dimenzije rimskodobnih domačih prašičev (*sl. 8.2*).

Ugotovitev, da so v gradivu z Zaloga zastopani prav divji prašiči, je sicer *vis à vis* časovne umestitve najdišča pričakovana. Ker pa so bile najdbe pobrane z dna struge, kar dopušča možnost transporta posameznih kosti z vodnim tokom in posledično kontaminacijo gradiva, je v kontekstu celotne arheozoološke analize zgoraj navedeno spoznanje zelo pomembno. Navkljub posameznim primerkom, ki sicer očitno ne sodijo v kontekst predneolitskega najdišča (npr. konjski sekalec), se zdi torej pomemben del živalskih ostankov vendarle smiselno obravnavati kot avtohtonega.

Analiza obrabe žvekalne površine spodnjih meljakov prašičev z Zaloga kaže, da so takratni lovci plenili predvsem mlade adultne (tj. 10/14 do 18/26

there is a very important fact to consider. The finds were taken off the floor of the stream bed which allows for the possibility of individual bones being carried by water current and thus contaminated. In view of the supposed absence of pig remains it nevertheless seems reasonable to consider the majority of the animal remains as autochthonous, despite individual specimens evidently do not belong to the context of the pre-Neolithic site (horse incisor, for example).

The tooth wear analysis of the lower molars of pigs from Zalog shows that the contemporary man hunted mostly young adult (i.e. 10/14 to 18/26 months) and adult (i.e. above 18/26 months) animals (*Tab. 8.6*). In this regard, the only exceptions are a heavily worn third lower molar (ascribed to an individual senile at death), a fourth lower deciduous premolar and a barely erupted second upper molar. The paucity of the remains of juvenile wild boars is confirmed by the rare specimens of bones with the still unfused epi- and diaphysis (3x distal radius, distal ulna), and even



Sl. 8.2: Porazdelitev standardiziranih dimenzij merljivih ostankov divjega prašiča z Zaloga. Povprečje rimskodobnih prašičev se nanaša na obsežen vzorec z madžarskega najdišča Tác-Gorsium (Bökönyi 1984). Izmerjene vrednosti so bile standardizirane po formuli: stand. vrednost = (X – M) / SD, kjer X predstavlja posamezno meritev z Zaloga, M in SD pa povprečje oz. standardno deviacijo ustrezne dimenzije pri referenčnem vzorcu.
Fig. 8.2: Distribution of standardized measurements of wild boar remains from Zalog. Average value of Roman Age pigs relates to the extensive sample from the Hungarian site of Tác-Gorsium (Bökönyi 1984). Measurable values were standardized according to the formula: stand. value = (X – M) / SD, where X represents an individual measurement from Zalog, while M and SD represent the average value and standard deviation of the appropriate dimension in the referential sample.

mesecev) in adultne (tj. nad 18/26 mesecev) živali (*tab.* 8.6). V tem pogledu predstavljajo edine izjeme močno obrabljen tretji spodnji meljak (pripisala sva ga ob poginu senilnemu osebku), mlečni četrti spodnji predmeljak ter komaj izraščajoči drugi zgornji meljak.

Tab. 8.8: Ocenjena višina ob vihru za štiri prašiče z Zaloga. Ocena je bila izpeljana iz dimenzij ustrezno ohranjenih skočnic, pri čemer so bili uporabljeni klasični Teichertovi koeficienti (Teichert 1969) ter njihova modificirana oblika (May, Teichert, Hannemann 1996). Vse mere so v mm.
Tab. 8.8: The estimated withers height for four wild boar (*Sus* cf. *scrofa*) from Zalog. The estimate was made on the basis of sufficiently preserved astragali by using the classic Teichert's coefficients (Teichert 1969) and their modified form (May, Teichert, Hannemann 1996). All measurements are in mm.

Vzorec / ***Sample***	Teichert	May ***et al.***	
		Subadult.	Adult.
LZ-035	922	696	896
LZ-080	895	690	886
LZ-088	922	696	896
LZ-108	930	699	900

Tab. 8.6: Ocena starosti prašičev (*Sus* cf. *scrofa*) ob uplenitvi na osnovi stopnje obrabe grizalne površine spodnjih meljakov. Analiza temelji na navodilih, ki sta jih objavila Rolett in Chiu (1994).
Tab. 8.6: Estimate of the age of wild boars (*Sus* cf. *scrofa*) at death based on the degree of tooth wear of lower molars. The analysis is based on guidelines published by Rolett and Chiu (1994).

Zob / ***Tooth***	Obraba / ***Wear***	Starostna skupina / ***Age group***
M_1	E	Mlad adulten / ***Young adult***
M_1	E	Mlad adulten / ***Young adult***
M_2	E	Adulten / ***Adult***
M_3	0	Mlad adulten / ***Young adult***
M_3	0	Mlad adulten / ***Young adult***
M_3	0-A	Mlad adulten / ***Young adult***
M_3	0-A	Mlad adulten / ***Young adult***
M_3	B	Adulten / ***Adult***
M_3	B	Adulten / ***Adult***
M_3	C	Adulten / ***Adult***
M_3	C	Adulten / ***Adult***
M_3	D	Senilen / ***Senile***

Tab. 8.7: Število ostankov prašiča (*Sus* cf. *scrofa*) z nezraščenima ter število tistih z zraščenima 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). Podatke o obdobju zraščanja epi- in diafiz podaja Silver (1972).
Tab. 8.7: Number of wild boar (*Sus* cf. *scrofa*) remains with unfused and those with fused epi- and diaphysis according to age group. Individual group is composed of skeletal elements that fuse at the same ontogenetic age (i.e. in first, second, third or after third year). Data on the period of epi- and diaphysis fusing is given by Silver (1972).

Starost / ***Age***	Epifiza zraščena / ***Fused***	Epifiza ni zraščena / ***Unfused***
0–1	--	9
1–2	--	5
2–3	--	--
3–	4	10
SKUPAJ / ***TOTAL***	4	24

these fuse only after the completed third year of age (*Tab. 8.7*). It is not as yet possible to say whether the observed age structure is a reflection of age-selective hunting or it is, in fact, more reasonable to link it to taphonomic loss.

Allopatric and allochronic comparisons of the size of wild boar demand more extensive samples than the one taken from Zalog. The results written below are

Maloštevilnost ostankov juvenilnih prašičev potrjujejo tudi redki primerki kosti s še nezraščenima epi- in diafizo (3x distalna koželjnica, distalna komolčnica), pa še ti popolnoma osificirajo šele po zaključku tretjega leta starosti (*tab. 8.7*). Ali se v ugotovljeni starostni strukturi odraža starostno-selektiven lov ali pa jo je dejansko bolj upravičeno povezovati s tafonomskimi izgubami, zaenkrat ni mogoče reči.

Alopatrične in alohrone primerjave velikosti divjih prašičev zahtevajo obsežnejše vzorce od tistega z Zaloga, zato so v nadaljevanju navedeni rezultati le informativni. Višino živali ob vihru sva ocenila na osnovi dimenzij štirih ustrezno ohranjenih skočnic, pri čemer sva uporabila klasične Teichertove koeficiente (Teichert 1969) ter njihovo modificirano obliko (May, Teichert, Hannemann 1996). Ocenjene vrednosti se umeščajo znotraj variacijske širine recentnih divjih prašičev ter bistveno presegajo dimenzije prazgodovinskih domačih prašičev s SV Italije (Riedel 1986; 1996; *tab. 8.8*).

Družina: Jeleni (Cervidae)

Capreolus capreolus (Linnaeus, 1758)

Srna je v analiziranem gradivu zastopana z le šestimi najdbami, pretežno ostanki spodnjih delov okončin. Tako pičlo število najdb je vsaj v določeni meri verjetno smiselno povezovati z etologijo obravnavane vrste, katere osebki so bistveno manj družabni od jelenov in divjih svinj (Kryštufek 1991).

Cervus elaphus Linnaeus, 1758

Jelen je z 260 ostanki daleč najbolje zastopana vrsta v gradivu z Zaloga. Dobro polovico vseh najdb (148 oz 56,9 %) predstavljajo različno veliki odlomki rogovja,[3] med katerimi jih je 15 še priraslih na lobanjo. Na mnogih primerkih so opazne sledi obdelovanja, najdenih pa je bilo tudi nekaj (pol)izdelkov. Odsotnost še ne v celoti osificiranih kosti kaže, da v vzorcu prevladujejo ostanki odraslih osebkov. To potrjuje tudi stopnja obrabe žvekalne površine treh tretjih spodnjih meljakov, ki so pripadali med 5 in 6 let starim živalim. Še četrti ohranjen M_3 sva pripisala med dva in tri leta staremu osebku, saj je bil zob ob uplenitvi ravno v fazi izraščanja. V vzorcu je bil prisoten tudi mlečni četrti spodnji predmeljak, ki je pripadal do 2 leti staremu jelenu (prim. Habermehl 1961). Merljive kosti z Zaloga se v velikosti ne razlikujejo od objavljenih dimenzij mezolitskih jelenov s Slovenije in SV Italije (Riedel 1976; Boschin, Riedel 2000; Toškan, Dirjec 2004a).

[3] Med njimi je s posameznimi najdbami morda zastopan tudi los (*Alces alces*), ki je bil v takratnih gozdovih v zaledju Ljubljanskega barja razmeroma pogosten (prim. Pohar 1984; Turk, Vuga 1984; Toškan, Dirjec 2006).

therefore only informative. The withers height of the animals was estimated on the basis of the size of four sufficiently preserved astragali by using the classic Teichert coefficients (Teichert 1969) as well as their modified form (May, Teichert, Hannemann 1996). The estimated values fall within the range of recent wild boar and substantially exceed the size of prehistoric pigs from north-eastern Italy (Riedel 1986; 1996; *Tab. 8.8*).

Family: Deer (Cervidae)

Capreolus capreolus (Linnaues, 1758)

Within the analysed material, roe deer is represented by only six fragments, predominantly of lower limbs. It is reasonable to link such a small number, at least to a certain degree, to the ethology of the species, the individuals of which are substantially less sociable than those of red deer and wild boar (Kryštufek 1991).

Cervus elaphus Linnaeus, 1758

Red deer, with 260 fragments, is by far the best represented species at Zalog. A good half (148 or 56.9%) of these represent antler fragments of various sizes,[3] fifteen of which were still attached to the skull. The remains include many specimens with traces of working as well as some (semi)products. The absence of incompletely fused bones indicates that the remains of adult individuals predominate in the sample. This is confirmed by the level of tooth wear of three lower third molars, belonging to animals aged 5 to 6 years. The fourth preserved M_3 was attributed to an individual aged 2 to 3 years, since the tooth was just in the phase of eruption at the time of the kill. The sample included a deciduous fourth lower premolar of a red deer of up to 2 years of age (cf. Habermehl 1961). Measurable bones from Zalog do not differ in size from the published sizes of Mesolithic red deer from Slovenia and north-eastern Italy (Riedel 1976; Boschin, Riedel 2000; Toškan, Dirjec 2004a).

Family: Bovids (Bovidae)

Capra hircus Linnaeus, 1758

Beside the above-mentioned horse incisor, the calcaneus of a goat is the only other fragment attributed to domestic animals. The specific identification, often problematic for sheep and goats, does not appear

[3] With individual fragments, the remains may include also those of elk (*Alces alces*). This species was relatively common in the contemporary forests in the hinterland of the Ljubljansko barje (cf. Pohar 1984; Turk, Vuga 1984; Toškan, Dirjec 2006).

Družina: Votlorogi (Bovidae)

Capra hircus Linnaeus, 1758

Poleg zgoraj že omenjenega konjskega sekalca je fragment kozje petnice edini ostanek, ki sva ga pripisala domačim živalim. Pri drobnici sicer pogosto problematična specifična determinacija se tokrat ne zdi vprašljiva. Petnično telo *(corpus calcanei*) je namreč pri obravnavanem primerku oblikovano rahlo konveksno in ne konkavno, kot je to značilno za ovce (Prummel, Frisch 1986). Nekoliko težje se je opredeliti do vprašanja, ali kozja petnica sploh sodi v kontekst predneolitske naselbine? Res je, da se posameznim avtorjem prisotnost ostankov drobnice v mezolitskih plasteh kar nekaj najdišč vzdolž mediteranske obale ne zdi problematična (npr. Geddes 1985; Mlekuž 2003), vendar pa drugi opozarjajo na veliko nevarnost kontaminacije, neprimerno metodologijo izkopavanj in/ali problematično determinacijo (npr. Velušček 1995; Binder 2000; Zilhão 2001). Če ob tem upoštevamo še z eksperimenti podprte dokaze o nadpovprečni mobilnosti petnice v tekoči vodi (Lyman 1999), se zdi obravnavani primerek morda vendarle bolj smiselno obravnavati kot alohtonega.

Bos sp.

Rodu goved sva pripisala 14 najdb, predvsem zob in metapodijev. Z izjemo treh zob so vsi ostanki fragmentirani. Sledi urezov ali zasekanin sicer nisva opazila, sta pa bila dva fragmenta očitno obdelana in uporabljena kot orodje (Gaspari, v tem zborniku, *t. 30:* 15,16).

Razlikovanje med ostanki domačega goveda (*Bos* questionable here. The body of the calcaneus (*corpus calcanei*) in question has a slightly convex form rather than a concave one characteristic of sheep (Prummel, Frisch 1986). A more difficult question is whether the goat's calcaneus in fact belongs to the context of the pre-Neolithic settlement at all. Individual authors do not consider the presence of sheep/goat remains in Mesolithic layers of a number of sites along the Mediterranean coast as problematic (for example Geddes 1985; Mlekuž 2003), while others warn against the considerable danger of contamination, inappropriate excavation methodology and/or problematic identification (for example Velušček 1995; Binder 2000; Zilhão 2001). In fact, if considering the experiment-confirmed proofs of the above-average mobility of calcanei in flowing water (Lyman 1999), it would perhaps seem all the more reasonable to treat the specimen in question as an alluvial deposit.

Bos sp.

The *Bos* genus was ascribed 14 finds, mostly teeth and metapodii. With the exception of three teeth, all finds are fragmented. Cut marks or chop marks were not noticed though two fragments were apparently worked and used as tools (Gaspari, in this publication, *Pl. 30:* 15,16).

Distinguishing between cattle (*Bos taurus* Linnaeus, 1758) and aurochs remains (*Bos primigenius* Bojanus, 1827) is relatively problematic. The specific identification is rendered even more difficult by the high fragmentation of the available material. The findings of the biometric analyses have to be taken with reserve as well, since the size of aurochs females and

Tab. 8.9: Dimenzije bovidnih ostankov z Zaloga. Za primerjavo so prikazani ustrezni podatki za zobra (*Bison bonasus*), tura (*Bos primigenius*) in domače govedo (*Bos taurus*) iz antičnega in več prazgodovinskih najdišč srednje Evrope. Podani so mera centralne tendence (X – povprečje oz. Me – mediana), razpon vrednosti (min–max) ter velikost vzorca (n). Predstavitev najdišč: Seeberg (neolitik; Boessneck, Jéquier, Stampfli 1963), Madžarska – več najdišč (prazgodovina; Bökönyi 1995) ter Tác-Gorsium (antika; Bökönyi 1984). Razlaga kratic: Bp – širina proksimalne epifize, D – dolžina, Š – širina. Vse mere so v mm.

Tab. 8.9: Dimensions of *Bos* sp. remains from Zalog. Pertinent data for the European bison (*Bison bonasus*), aurochs (*Bos primigenius*) and domestic cattle (*Bos taurus*) from a Roman and several prehistoric sites in Central Europe are presented for comparison, with given measure of central tendency (X – average or Me – median), range (min–max) and sample size (n). Sites presented: Seeberg (Neolithic; Boessneck, Jéquier, Stampfli 1963), Hungary – various sites (prehistory; Bökönyi 1995) and Tác-Gorsium (Roman period; Bökönyi 1984). Dimensions are explained in the supplement. All measurements are in mm.

Skelet. el.	Dimenzija / ***Dimension***	Zalog	Seeberg			Madžarska / Hungary		Tác-Gors.
			Bison	***B. primig.***	***B. taurus***	***B. primig.***	***B. taurus***	***B. taurus***
			Me (n) min–max	Me (n) min–max	Me (n) min–max	min–max	min–max	X (n) min–max
Metatarsus	Bp	61,5	52,0 (5) 51,0–61,0	41,0 (7) 39,0–42,0	53,0 (11) 48,0–59,0	55,0–71,0	37,5–59,0	48,8 (328) 38,0–61,0
Phalanx I	Bp	25,0	33,5 (48) 29,0–46,0		26,1 (19) 23,5–29,0	--	--	--
P_3	D	24,0	--	--	--	--	--	--
	Š	14,5	--	--	--	--	--	--

taurus Linnaeus, 1758) in tura (*Bos primigenius* Bojanus, 1827) je dokaj problematično, velika fragmentiranost razpoložljivega gradiva pa specifično determinacijo le še otežuje. Z rezervo je treba jemati tudi izsledke biometričnih analiz, saj se dimenzije turovih samic in govejih samcev delno prekrivajo (Rowley-Conwy 1995). Upoštevajoč metrične podatke iz *tabele 8.9* pa bi bilo fragment stopalnice vendarle smiselno pripisati vrsti *Bos primigenius*. V največji širini proksimalne epifize namreč naveden primerek ne presega le stopalnic domačega goveda iz švicarskega neolitskega najdišča Seeberg Burgäschisee-süd, temveč tudi tiste iz antičnega Tác-Gorsiuma, kjer so našli predvsem ostanke velikih rimskih pasem (Bökönyi 1984). Ker se determinacija obravnavanega primerka za zobra ne zdi verjetna (prim. Boessneck, Jéquier, Stampfli 1963), lahko na favnistični seznam najdb z Zaloga upravičeno dodava tudi vsaj en ostanek tura.

Bos seu *Bison*

Distalni primerek bovidne dlančnice iz zbiralne enote LZ-085 v velikosti presega prazgodovinske in celo antične primerke domačega goveda (*tab. 8.10*), vendar pa zanesljiva determinacija do nivoja vrste vseeno ni mogoča. Sala (1986) sicer navaja, da postaja dlančnica pri rodu *Bos* distalno z dorzalne in volarne strani postopoma vse širša, medtem ko dosega pri rodu *Bison* največjo širino na prehodu iz diafize v epi-

cattle males partially overlap (Rowley-Conwy 1995). Considering the metric data from *Table 8.9*, however, it would be reasonable to attribute the metatarsus to the *Bos primigenius*. The maximum width of its proximal epiphysis does not only exceed that of the cattle metatarsii from the Swiss Neolithic site of Seeberg Burgäschisee-süd, but also those from the Roman period site of Tác-Gorsium, where mostly large Roman forms were found (Bökönyi 1984). Since the identification of the metatarsus as belonging to the European bison does not seem probable (cf. Boessneck, Jéquier, Stampfli 1963), an aurochs find can justifiably be added to the faunistic list of finds from Zalog.

Bos s. Bison

The distal fragment of a bovine metacarpus from the LZ-085 collection unit exceeds in size the prehistoric and even Roman period specimens of cattle (*Tab. 8.10*). In spite of that, a reliable identification to the level of species is still not possible. Sala (1986) does state that the metacarpus of the *Bos* genus gradually widens distally from both the dorsal and the volar sides, while with the *Bison* genus it reaches maximum width at the transition from the diaphysis to the epiphysis. The fragment from Zalog, though, is unfortunately so water-worn (*Fig. 8.3*) that a reliable distinction between the *Bos primigenius* and *Bison bonasus* (Linnaeus, 1758), species based on the above-stated criterion, is not possible.

Tab. 8.10: Širina proksimalne epifize bovidne dlančnice z Zaloga. Za primerjavo so prikazani ustrezni podatki za zobra (*Bison bonasus*), tura (*Bos primigenius*) in domače govedo (*Bos taurus*) iz antičnega in več prazgodovinskih najdišč srednje Evrope. Podani so mediana (Me), razpon vrednosti (min–max) ter velikost vzorca (n). Predstavitev najdišč: Seeberg (neolitik; Boessneck, Jéquier, Stampfli 1963), Madžarska – več najdišč (= Mad/Hun; prazgodovina; Bökönyi 1995) ter Tác-Gorsium (antika; Bökönyi 1984). Vse mere so v mm.

Tab. 8.10: Breadth of proximal end of a bovid metacarpus from Zalog. Pertinent data for the European bison (*Bison bonasus*), aurochs (*Bos primigenius*) and domestic cattle (*Bos taurus*) from a Roman and several prehistoric sites from Central Europe are presented for comparison, with given median (Me), range (min–max) and sample size (n). Sites presented: Seeberg (Neolithic; Boessneck, Jéquier, Stampfli 1963), Hungary – various sites (= Mad/Hun; prehistory; Bökönyi 1995) and Tác-Gorsium (Roman period; Bökönyi 1984). All measurements are in mm.

Dimenzija / ***Dimension***	Zalog	***B. bonasus***	***Bos primigenius***		***Bos taurus***		
		Seeberg	Seeberg	Mad / ***Hun***	Seeberg	Mad / ***Hun***	Tác
		Me (N) min–max	Me (N) min–max	Me (N) min–max	Me (N) min–max	Me (N) min–max	Me (N) min–max
Mc (Bd)	77,5	63,7 (4) 62,0–74,0	66,0 (6) 62,0–74,0	– 68,5–88,0	53,0 (6) 52,0–56,0	– 35,0–74,0	61,1 (352) 45,5–77,0

Sl. 8.3: Bovidna dlančnica z Zaloga (zbiralna enota LZ-085)-volarno. M. = 1 : 2 (Foto: R. Erjavec).
Fig. 8.3: Bovid metacarpus from Zalog (collection unit LZ-085)-volar aspect. Scale = 1 : 2 (Photo: R. Erjavec).

fizo. Žal pa je primerek z Zaloga toliko obrušen (*sl. 8.3*), da zanesljivo razločevanje med vrstama *Bos primigenius* in *Bison bonasus* (Linnaeus, 1758) na osnovi navedenega kriterija ni mogoče.

Med mezolitskimi najdišči na Slovenskem je tur poznan še iz Male Triglavce pri Divači (Pohar 1990) in Viktorjevega spodmola pri Famljah (Toškan, Dirjec 2004a), zober iz Male Triglavce (Pohar 1990) in Brega pri Škofljici (Pohar 1984), vsaj ena od obeh vrst pa tudi iz spodmola Pod Črmukljo pri Šembijah (Pohar 1986). Tako tur kot zober sta zastopana tudi v favni nekaterih mlajših prazgodovinskih najdišč z območja Ljubljanskega barja (npr. Rakovec 1952; Drobne 1973; ead. 1974).

Nedoločljivi ostanki

Približno polovico (434 oz. 50,3 %) vseh pridobljenih živalskih ostankov nisva uspela določiti niti do nivoja rodu. V skladu s pričakovanji prevladujejo ostanki vretenc (n = 47) in reber (n = 43), saj navedene skeletne elemente sploh nisva določevala (izjemi sta le nosač in okretač). Pretežni del nedoločljivih najdb (304 oz. 70,0 %) pa je vendarle tako fragmentiran, da se ni bilo mogoče opredeliti niti do tega, za kateri skeletni element pravzaprav gre. Sledi urezov sva zasledila na osmih primerkih, usekov na dveh, med nedoločljivim gradivom pa so prisotne tudi tri koščene konice (Gaspari, v tem zborniku, *t. 31:* 19-21).

3.2 **Tafonomija**

Arheozoološki vzorci, pri katerih bi razmerje v številu posameznih skeletnih elementov vsaj približno ustrezalo anatomskim pričakovanjem, so izjemno redki. Ugotovljene odklone lahko običajno pripišemo kateremu od naslednjih štirih vzrokov: 1. neustrezno vzorčenje, 2. različna stopnja ohranitve kostne substance posameznih skeletnih elementov zaradi delovanja specifičnih abiotskih dejavnikov in/ali zveri, 3. selektivni transport posameznih anatomskih regij plena s strani človeka ter 4. človekovo selektivno razbijanje različnih skeletnih elementov. V primeru živalskih ostankov z Zaloga se je potrebno ustaviti že pri prvem od njih: vzorčenju. Kosti so bile namreč pobrane ročno iz poglobitev v dnu rečne struge, kjer so bile zapažene koncentracije najdb. To pa pomeni, da je delež zastopanosti manjših živali (ter tudi manjših kosti večjih živali) v razpoložljivem gradivu zagotovo podcenjen (prim. Turk, Toškan, Dirjec 2004; Toškan, Dirjec 2004a).

Manj problematičen se zdi vpliv, ki so ga na sestavo vzorca imeli posamezni abiotski dejavniki. Odsotnost statistično značilne korelacije med deležem zastopanosti posameznih skeletnih elementov jelena in njihovo strukturno gostoto[4] (Spearman R = 0,399;

[4] Podatke o strukturni gostoti jelenjih kosti podaja Lyman (1999).

Of the Mesolithic sites in Slovenia besides Zalog, the aurochs is known also from Mala Triglavca near Divača (Pohar 1990) and Viktorjev spodmol near Famlje (Toškan, Dirjec 2004a), while the European bison is known also from Mala Triglavca (Pohar 1990) and Breg near Škofljica (Pohar 1984). At least one of these species is also known from the Pod Črmukljo rock shelter near Šembije (Pohar 1986). Aurochs and European bison are represented also in the fauna of some of the later prehistoric sites from the Ljubljansko barje area (for example Rakovec 1952; Drobne 1973; 1974).

Unidentifiable remains

Approximately half (434 or 50.3%) of all the uncovered animal remains could not be identified as to their genus. As expected, remains of vertebrae (n = 47) and ribs (n = 43) predominate among the latter, since these skeletal elements were not systematically identified (with the exception of the atlas and axis). A large part of the unidentifiable finds (304 or 70.0%) is so fragmented that not even their skeletal element could be identified. Cut marks were observed on eight specimens, chop marks on two. The unidentifiable material includes also three bone points (Gaspari, in this publication, *Pl. 31:* 19-21).

3.2 **Taphonomy**

Archaeozoological remains, where the relationship in the number of individual skeletal elements would at least approximately correspond to anatomical expectations, are extremely rare. The observed deviations may normally be attributed to one of these four causes: 1. inappropriate sampling, 2. different preservation levels of bone substance of individual skeletal elements due to the effects of specific abiotic factors and/or carnivores, 3. selective transport of individual anatomic regions of prey by humans and 4. human selective breaking of various skeletal elements. For the animal remains from Zalog, already the first cause needs to be looked at: sampling. The bones were hand-collected from the deepened areas at the bottom of the river bed wherever concentrations of finds were observed. This signifies that the share of representation for the small animals (as well as small bones of larger animals) within the available material is undoubtedly underestimated (cf. Turk, Toškan, Dirjec 2004; Toškan, Dirjec 2004a).

The influence of various abiotic factors on sample composition seems less problematic. The absence of a statistically significant correlation between the number of individual skeletal elements of red deer and their structural density[4] (Spearman R = 0,399; p = 0,100) shows that the differences in durability of

[4] Data on the structural density of red deer bones is given by Lyman (1999).

p = 0,100) kaže, da v primeru gradiva z Zaloga razlike v obstojnosti ostankov niso bistveno vplivale na frekvenco njihovega pojavljanja. Teže je oceniti, do kolikšne mere se v sestavi vzorca odraža vodni transport najdb (npr. konjski sekalec, verjetno tudi kozja petnica). Da moteč vpliv navedenega dejavnika morda vendarle ni bil zelo očiten, med drugim nakazuje domnevna odsotnost ostankov (samic) domačega prašiča, ki bi jih sicer naplavilo z nekoliko više ob toku Ljubije ležeče bronastodobne naselbine. Omeniti pa velja še ugotovitev, da številčnost v tekoči vodi nadpovprečno mobilnih skeletnih elementov (npr. vretenca, skočnica, medenica, lopatica) bistveno ne zaostaja za frekvenco pojavljanja tistih (npr. nosač, okretač, rebra, prstnice), ki naj bi jih odplavil šele bistveno močnejši tok[5] (*tab. 8.1;* Coard 1999).

Zanimivi so z eksperimenti (Payne, Munson 1985) in z etnološkimi študijami (Brian 1981) pridobljeni podatki o selektivni destrukciji kosti s strani psov. Na prvi pogled se namreč zdi, da so imeli na zastopanost posameznih skeletnih elementov v gradivu z Zaloga odločilen vpliv prav psi in/ali volkovi. Vendar pa popolna odsotnost njihovih ostankov in celo kakršnih koli obgrizenih kosti naveden podatek močno relativizira. Res je, da so najdbe kanidov v mezolitskih najdiščih tudi sicer praviloma pičle (Pohar 1990; Toškan, Dirjec 2004a) ter da se iz deleža obgrizenih ostankov ne da vedno sklepati na obseg pasjega/volčjega prerazporejanja kosti v prostoru (npr. Kent 1981). Glede na velikost vzorca pa bi v primeru tesnejše povezave med zastopanostjo posameznih skeletnih elementov in pa aktivnostjo kanidov vendarle pričakovali tudi kak primerek z vidnimi odtiski zob (prim. Pohar 1984; Toškan, Dirjec 2004b; Toškan 2005).

3.3 **Ekonomska vloga najdišča**

Prepoznati vlogo zgoraj obravnavanih poodložitvenih dejavnikov je pomemben sestavni del vsakršne arheozoološke raziskave, pri oceni ekonomske vloge najdišča pa igrajo ključno vlogo vendarle sledi človekove aktivnosti. V tem smislu se veliko pozornosti namenja vzorcu zastopanosti posameznih skeletnih elementov *vis à vis* domnevnemu pomenu različnih anatomskih regij uplenjene živali za obravnavano skupnost (npr. Straus 1987; Rowley-Conwy 1994-95; Legge 2000; Gidney 2000; Miracle 2002). Ker lahko nereprezentativen vzorec močno popači končne sklepe (prim. Turner 1989), sva v najinem primeru obravnavala le ostanke jelena in divjega prašiča. Navedeni vrsti namreč skupaj predstavljata dobrih 90 odstotkov vseh določljivih najdb, upoštevajoč dimenzije njunih kosti

[5] Ne gre pa pozabiti, da na številčnost posameznih skeletnih elementov vplivajo še mnogi drugi dejavniki.

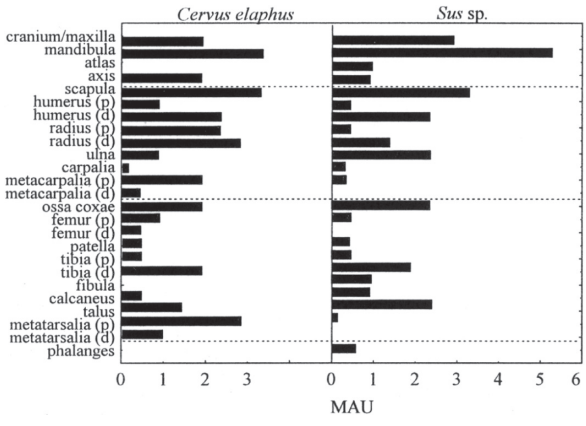
the Zalog remains did not significantly influence the frequency of their appearance. What is more difficult to assess is the degree to which water transport of the finds (for example horse incisor, probably also goat calcaneus) is reflected in sample composition. That the disturbing influence of this factor is not evident, might be, among other things, shown also by the supposed absence of the remains of (female) domestic pigs that would otherwise be transported to the Zalog site from the Bronze Age site, lying further upstream. An observation worth mentioning at this point is the number of the skeletal elements with an above-average mobility in flowing water (for example vertebrae, astragali, pelvis, scapula), which does not substantially lag behind the frequency of appearance of those (for example atlas, axis, ribs, phalanges) that are supposedly carried only by a strong water current[5] (*Tab. 8.1;* Coard 1999).

The data on the selective destruction of bones by dogs, obtained by experiments (Payne, Munson 1985) and ethnologic studies (Brian 1981), proved interesting. At first sight it seems that, of all the above enumerated factors, the most important influence on the representation of individual skeletal elements in the Zalog material are none other than dogs/wolves. However, the complete absence of their remains or even any gnawed bones strongly relativizes the above stated information. It is true that, on Mesolithic sites, dog / wolf finds are usually scarce (Pohar 1990; Toškan, Dirjec 2004a) and that the share of gnawed remains is not conclusive as to the extent of spatial redistribution of bones on the part of dogs (for example, Kent 1981). Considering the size of the sample, one would nevertheless expect some material evidence indicating a closer connection between the representation of individual skeletal elements and canide activity (cf. Pohar 1984; Toškan, Dirjec 2004b; Toškan 2005).

3.3 **Economic role of the site**

Recognizing the role of the above enumerated post-depositional factors is an important constituent part of any archaeozoological research. In estimating the economic role of a site, however, the key role is still played by traces of human activity. In that regard, a great deal of attention is paid to the representation pattern of individual groups of skeletal elements *vis à vis* the supposed significance that different anatomic regions of the killed animal had for the community under research (for example Straus 1987; Rowley-Conwy 1994-95; Legge 2000; Gidney 2000; Miracle 2002). Since an unrepresentative sample can strongly distort the final conclusions (cf. Turner 1989), it was decided,

[5] We should keep in mind that the number of individual skeletal elements is influenced by many other factors.



Sl. 8.4: Frekvenca zastopanosti posameznih skeletnih elementov jelena (*Cervus elaphus*) in divjega prašiča (*Sus scrofa*) z Zaloga, izražena z indeksom najmanjšega števila živalskih enot (MAU). Za opredelitev navedenega indeksa glej besedilo.

Fig. 8.4: Number of individual skeletal remains of red deer (*Cervus elaphus*) and wild boar (*Sus scrofa*) from Zalog, expressed with the index of minimal animal unit (MAU). For index definition see the text.

pa lahko pričakujemo tudi manjšo napako zaradi načina vzorčenja.

Zastopanost posameznih (delov) skeletnih elementov je pri obeh vrstah podobna (*sl. 8.4*), nekaj manjših odklonov (npr. večje število jelenjih metapodijev) pa gre verjetno pripisati razlikam v velikosti in vsebnosti kostnega mozga. Sicer pa v obeh primerih prevladujejo ostanki spodnjih čeljustnic, lopatic ter distalnih delov nadlahtnic, koželjnic in golenic, medtem ko so nosač, stegnenica, proksimalni del nadlahtnice in koželjnice, distalni del metapodijev, zapestnice in prstnice zastopane z bistveno nižjimi MAU vrednostmi. Glede na odsotnost statistično značilne soodvisnosti med frekvenco pojavljanja posameznih skeletnih elementov in njihovo strukturno gostoto se skromno število ostankov manjših skeletnih elementov ne zdi upravičeno razlagati z njihovo slabšo obstojnostjo v sedimentu (Lyman 1985). Verjetneje je, da se v navedeni ugotovitvi odraža kombinacija metodološke napake pri vzorčenju (prim. Toškan, Dirjec 2004a) in ekonomske vloge najdišča. Večje vrednosti MAU indeksa prstnic, zapestnic, dlančnic, nartnic in stopalnic namreč praviloma najdemo le na konkretnih mestih uplenitve živali, saj jih kot ekonomsko nezanimive ni smiselno prenašati drugam (npr. Binford 1978a; Prummel *et al.* 2002). Upoštevajoč celoten spekter in količino najdb pa se takšne vloge najdišču Zalog ne zdi upravičeno pripisati.

Poleg slabe zastopanosti ostankov ekonomsko nezanimivih skeletnih elementov je mogoče s *slike* 8.4 razbrati tudi skorajšnjo odsotnost kosti z najbolj mesnatih anatomskih regij plena. Znano je, da odločitev o transportu določenega skeletnega elementa pogosto ni odvisna le od njegovega neposrednega ekonomskega pomena.[6] Da bi upoštevala tudi to dejstvo, sva si v nadaljevanju ogledala odnos med frekvenco pojavljanja posameznih kosti in ustreznimi vrednostmi indeksa hranljive uporabnosti (*Food Utility Index* oz.

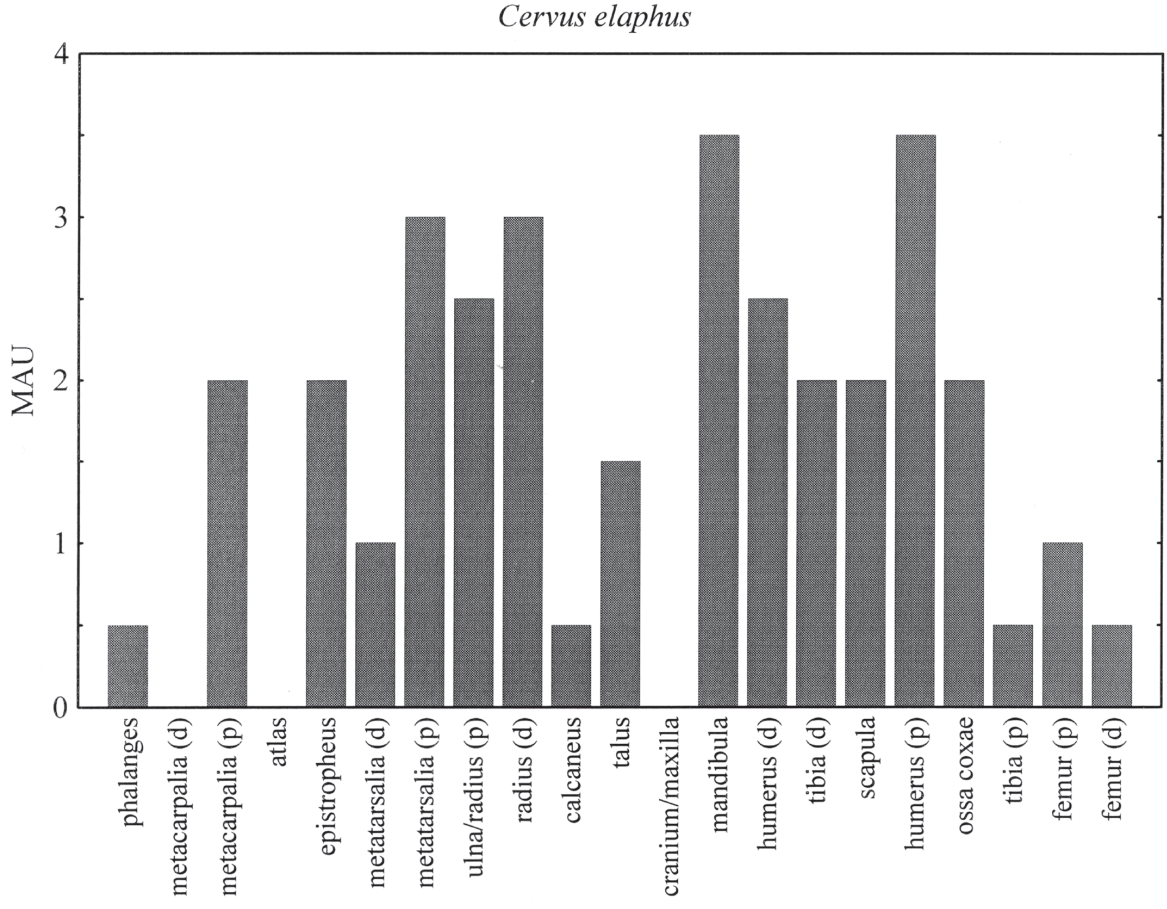
[6] Anatomska bližina energetsko bolj in tistih manj zanimivih skeletnih elementov lahko botruje odločitvi o transportu tudi ekonomsko sicer manj pomembnih kosti (t.i. »jezdeci«).

in this particular case, to treat only red deer and wild boar remains. These two species together represent over 90% of all identifiable finds. Furthermore: Considering the size of their bones, only a slight error due to sampling method can be expected.

The representation of individual (parts of) skeletal elements is similar for the two species (*Fig. 8.4*), with the few small deviations (for example the higher number of red deer metapodia) probably ascribable to the differences in size and content of bone marrow. In both cases, the remains of mandibles, scapulas and distal parts of humeri, radii and tibiae predominate. The atlas vertebrae, femuri, proximal parts of humeri and radii, distal parts of metapodia, carpal bones and phalanges, on the other hand, are represented by a substantially lower MAU values. Considering the absence of statistically significant interdependence between the number of individual skeletal elements and their structural density, we are not justified in explaining the paucity of the remains of small skeletal elements with their poorer durability in the sediment (Lyman 1985). It is more probably a reflection of a combination of methodological error in sampling (cf. Toškan, Dirjec 2004a) and economic role of the site. Higher MAU values for the index of phalanges, carpal, metacarpal, tarsal and metatarsal bones can, as a rule, be found only on the actual killing sites of the animals, since it is not viable to transport them elsewhere as economically uninteresting (for example Binford 1978a; Prummel *et al.* 2002). Taking into account the entire spectre and quantity of bone finds, it does not seem justified to ascribe such a role of a killing site to Zalog.

Figure 8.4 shows a poor representation of the economically uninteresting skeletal remains as well as an almost complete absence of bones from the most meat-bearing anatomical regions of the prey. It is known that the decision to transport a particular skeletal element is often independent of its direct economic significance.[6] To take into account this fact as well,

[6] The anatomical vicinity of those energetically more and those less interesting skeletal elements may be responsible for the decision to transport the economically less important bones as well (the so-called riders).



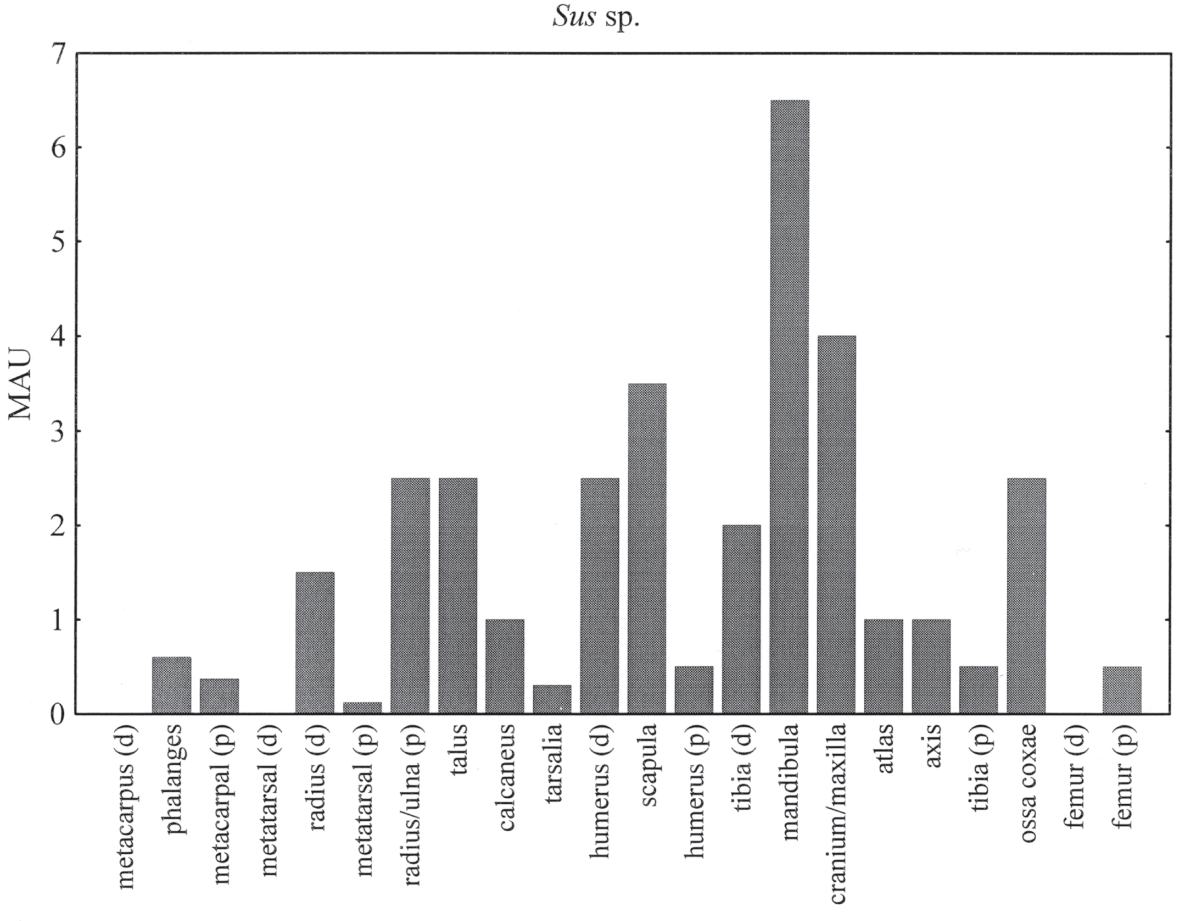
Sl. 8.5: Zastopanost posameznih skeletnih elementov gozdnega jelena (*Cervus elaphus*) z Zaloga glede na ustrezne vrednosti indeksa hranljive uporabnosti (FUI) pri severnem jelenu (Lyman 1999). Za opredelitev navedenega indeksa glej besedilo. Skeletni elementi so nanizani v skladu z lastnimi FUI vrednostmi: manj uporabni na levi in bolj uporabni na desni.

Fig. 8.5: Relationship between the MAU values of individual skeletal remains of red deer (*Cervus elaphus*) from Zalog and pertinent values of the food utility index (FUI) for reindeer (Lyman 1999). For index definition see the text. Skeletal elements are arranged according to own FUI values: less useful on the left and more useful on the right.

FUI; Lyman 1992). Rezultati za jelenje (*sl. 8.5*) in prašičje (*sl. 8.6*) ostanke nedvoumno kažejo na prevlado kosti z vmesnimi FUI vrednostmi. Upoštevajoč etnološke (Binford 1978) in arheološke (npr. Legge, Rowley-Conwy 1988; Rowley-Conwy, Halstead, Collins 2002) primerjalne podatke bi bilo ob predstavljenih rezultatih Zalog tako še najbolj smiselno obravnavati kot lovski tabor. Med daljšimi lovskimi pohodi naj bi namreč mezolitski ljudje oblikovali začasne postojanke (Rowley-Conwy 2001), kjer so najbolj mesnate dele plena (npr. zgornje dele prednjih in zadnjih okončin) pripravljali za končni transport do matične naselbine. Med bivanjem v takšnih taborih naj bi se skupinice lovcev prehranjevale z nekoliko manj mesnatimi deli uplenjenih živali ter tako oblikovale akumulacije kostnih odpadkov, kakršna je tista z Zaloga.

Kot opozarja Rowley-Conwy (1996), je sicer pičlost ostankov skeletnih elementov iz ekonomsko najzanimivejših anatomskih regij mogoče razložiti tudi z

we looked at the relationship between the frequency of appearance of individual bones and pertinent values of the food utility index (FUI; Lyman 1992). The results for the red deer (*Fig. 8.5*) and pig remains (*Fig. 8.6*) undoubtedly indicate a predominance of bones with intermediary FUI values. In view of comparable ethnologic (Binford 1978) and archaeological (for example Legge, Rowley-Conwy 1988; Rowley-Conwy, Halstead, Collins 2002) data, it would be all the more reasonable to treat the Zalog site as a hunting camp. During the long hunting expeditions, the Mesolithic people set up temporary camps (Rowley Conwy 2001), where they prepared the most meat-bearing parts of the prey (for example upper parts of front and hind limbs) for final transport to the base settlement. During their stay in such camps the small groups of hunters would feed on the less meat-bearing parts of the killed animals and thereby formed accumulations of bone waste, such as the one at Zalog.



Sl. 8.6: Zastopanost posameznih skeletnih elementov divjega prašiča (*Sus scrofa*) z Zaloga glede na ustrezne vrednosti indeksa hranljive uporabnosti (FUI) pri isti vrsti (Rowley-Conwy, Halstead, Collins 2002). Za opredelitev navedenega indeksa glej besedilo. Skeletni elementi so nanizani v skladu z lastnimi FUI vrednostmi: manj uporabni na levi in bolj uporabni na desni.
Fig. 8.6: Relationship between the MAU values of individual skeletal remains of wild boar (*Sus scrofa*) from Zalog and pertinent values of the food utility index (FUI) for the same species (Rowley-Conwy, Halstead, Collins 2002). For index definition see the text. Skeletal elements are arranged according to own FUI values: less useful on the left and more useful on the right.

večjo intenzivnostjo njihovega razbijanja, do katerega bi lahko prihajalo v okviru baznih taborov.[7] Namen takšnega početja tiči v večjem izkoristku kostne maščobe, njegov stranski učinek pa je seveda tudi slabša določljivost ostankov. V primeru gradiva z Zaloga se intenzivnosti razbijanja posameznih kosti ne da oceniti z ugotavljanjem deleža zastopanosti ostankov različnih velikostnih razredov, saj so razmerja med njimi porušena zaradi metodologije vzorčenja najdb. Vendar pa primerjava razpoložljivega gradiva z vzorci iz

As warned by Rowley-Conwy (1996), the paucity of remains of skeletal elements from the economically most interesting anatomical regions may be explained also by more intense breaking of bones that occurred at base camps.[7] The purpose of such behaviour is in the higher yield of bone fat, its side effect of course being a poorer identification of the remains. For the Zalog material, the intensity of breakage of individual bones cannot be estimated by observing the representation share of the remains of various size classes,

[7] Kot kažejo etnološke študije, je potrebno upoštevati tudi možnost prenašanja hrane med baznimi tabori (Binford 1978a), neenoten vzorec procesiranja trupel uplenjenih živali med različnimi človeškimi skupnostmi (Domínguez-Rodrigo 1999) ter število lovcev in količino časa, ki ga ti lahko prebijejo na mestu uplenitve (Monahan 1998).

[7] Ethnological studies show that we need to take into consideration also the food transport among base camps (Binford 1978a), differences in pray processing techniques between different human societies (Domínguez-Rodrigo 1999) as well as the number of hunters and amount of time they can spend (or could have spent) at a killing site (Monahan 1998).

Tab. 8.11: Obseg korelacije med zastopanostjo posameznih skeletnih elementov jelena (*Cervus elaphus*) oz. divjega prašiča (*Sus scrofa*) v vzorcu iz Zaloga ter njihovo frekvenco pojavljanja v mezolitskih najdiščih Star Carr (Legge, Rowley-Conwy 1988), Ringkloster (Rowley-Conwy, Halstead, Collins 2002) in Pečina pri Bjarču (Riparo di Biarzo; Rowley-Conwy 1996). Za razlago glej besedilo.
Tab. 8.11: Extent of correlation between the number of individual skeletal elements of red deer (*Cervus elaphus*) or wild boar (*Sus scrofa*) in the Zalog sample and their number in the Mesolithic sites of Star Carr (Legge, Rowley-Conwy 1988), Ringkloster (Rowley-Conwy, Halstead, Collins 2002) and Pečina near Bjarč (*Riparo di Biarzo*; Rowley-Conwy 1996). For explanation see text.

Najdišče / Site	Zalog	
	Spearman R	p
Cervus elaphus:		
Star Carr	R = 0,52	p = 0,019
Ringkloster	R = 0,26	p = 0,282
Pečina pri Bjarču	R = – 0,11	p = 0,625
Sus scrofa:		
Ringkloster	R = 0,76	p = 0,000
Pečina pri Bjarču	R = 0,37	p = 0,093

nekaterih drugih mezolitskih najdišč kaže, da je zastopanost posameznih skeletnih elementov v Zalogu bliže tistim z domnevnih lovskih postojank (npr. Star Carr, Ringkloster), kot onim z baznih taborov (npr. Pečina pri Bjarču, Faraday Road; *tab. 8.11*). V tem smislu pa je vsekakor pomenljiva tudi odsotnost statistično značilne soodvisnosti med fragmentiranostjo skeletnih elementov z Zaloga (ocenjeno z indeksom $^{NISP}/_{MNE}$) in njihovo vsebnostjo kostnega mozga (Spearman R = –0,069; p = 0,788; podatke o vsebnosti kostnega mozga podajata Jones in Metcalfe (1988)). Res pa je, da je zaradi metodologije vzorčenja najdb (npr. odsotnost sejanja sedimenta) zelo verjetno do neke mere popačeno tudi razmerje med vrednostma NISP in MNE.

3.4 **Rogovinasta in koščena orodja**

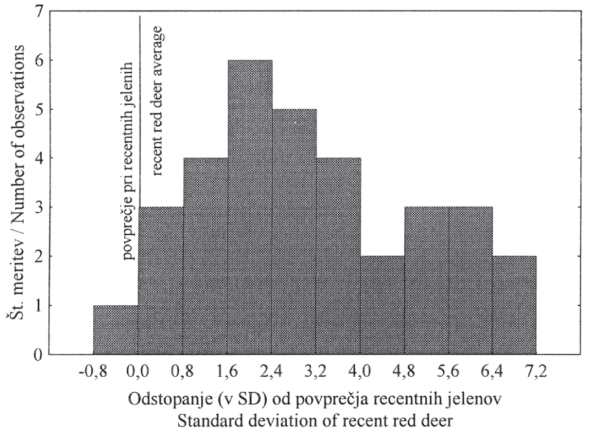
Med ostanki z Zaloga je veliko takih, ki kažejo očitne sledi obdelave. Izstopajo predvsem fragmenti jelenjega rogovja, med katerimi je tudi nekaj poškodovanih ali še ne v celoti izdelanih sekir (Gaspari, v tem zborniku, *t. 25-29*). Čeprav so posamezni primerki obdelanih koščenih in/ali rogovinastih ostankov poznani z več mezolitskih najdišč na Slovenskem (npr. Culiberg, Turk, Vuga 1984; Pohar 1984; Leben 1988; Toškan, Dirjec 2004a), pa je bilo njihovo množično pojavljanje doslej ugotovljeno le v spodmolu Mala Triglavca pri Divači (Turk, Toškan, Dirjec 2004). Da so bile v navedenem spodmolu obrtne delavnice za izdelke iz jelenjega rogovja, dokazuje tudi veliko število majhnih fragmentov rogovine (tj. odpadkov), ki predstavljajo kar 82 odstotkov vseh favnističnih najdb (Turk, Toškan, Dirjec 2004).

Čeprav različni metodologiji terenskega dela onemogočata neposredno primerjavo številčnosti rožnih fragmentov med Malo Triglavco in Zalogom, pa podatek, da ostanki rogovja v tukaj obravnavanem najdišču predstavljajo dobro polovico (tj. 52 %) vseh jelenjih najdb, vendarle kaže na izvajanje določenih since the relationships among these are destroyed due to the methodology of find sampling. A comparison of the available material with samples from some other Mesolithic sites nevertheless shows that the representation of individual skeletal remains at Zalog is closer to those of the supposed hunting camps (for example Star Carr, Ringkloster) than to those of base camps (for example Riparo di Biarzo, Faraday Road; *Tab. 8.11*). In that respect the absence of statistically significant interdependence between the fragmentation of skeletal elements represented at Zalog (marked with the $^{NISP}/_{MNE}$ index), and their content of bone marrow, is quite telling (Spearman R = –0,069; p = 0,788; data on bone marrow content was taken from Jones, Metcalfe (1988)).

3.4 **Antler and bone tools**

The remains from Zalog include many finds that show apparent signs of working. Of these, antler fragments are particularly prominent, including also some damaged or incompletely finished axes (Gaspari, in this publication, *Pl. 25-29*). Though individual specimens of worked bone and/or antler remains are known from several Mesolithic sites in Slovenia (for example Culiberg, Turk, Vuga 1984; Pohar 1984; Leben 1988; Toškan, Dirjec 2004a), their mass appearance has so far only been observed at the Mala Triglavca rock shelter near Divača (Turk, Toškan, Dirjec 2004). A workshop of antler products at the above mentioned site is proven also by a large number of small antler fragments (i.e. scrap), which represent an amazing 82% of all the faunistic finds (Turk, Toškan, Dirjec 2004).

Different methodologies of field work prevent a direct comparison of the number of antler fragments between Mala Triglavca and Zalog. Nevertheless, the information of antler remains representing a good half (i.e. 52%) of all red deer finds at Zalog indicates certain workshop activities there as well. A similar conclusion could be drawn from the relatively numerous fragments of antler burrs (NISP = 20) that probably represent waste material (cf. Clason 1983). Five of these could be treated as remains of already shed antler which undoubtedly signifies intentional collection



Sl. 8.7: Porazdelitev standardiziranih dimenzij merljivih ostankov jelena (*Cervus elaphus*) z Zaloga. Povprečje recentnih jelenov se nanaša na obsežen vzorec iz Španije (Mariezkurrena, Altuna 1983). Izmerjene vrednosti so bile standardizirane po formuli: stand. vrednost = (X – M) / SD, kjer X predstavlja posamezno meritev z Zaloga, M in SD pa povprečje oz. standardno deviacijo ustrezne dimenzije pri referenčnem vzorcu. V analizo so bili vključeni le popolnoma osificirani primerki, od katerih je vsak zastopan s po eno meritvijo.

Fig. 8.7: Distribution of standardized measurements of red deer remains (*Cervus elaphus*) from Zalog. The average value of recent red deer relates to the extensive sample from Spain (Mariezkurrena, Altuna 1983). Measured values were standardized according to the formula: stand. value = (X – M) / SD, where X represents an individual measurement from Zalog, while M and SD represent the average value or standard deviation of the appropriate measurement in the referential sample. The analysis includes only fused specimens, of which each is represented by a single measurement.

obrtnih dejavnosti tudi v Zalogu. Podobno bi lahko sklepali na osnovi razmeroma številnih odlomkov rogovjih rož (NISP = 20), ki verjetno predstavljajo odpadni material (prim. Clason 1983). Pet izmed njih lahko obravnavava kot ostanke že odpadlega rogovja, to pa nedvomno dokazuje namerno zbiranje te surovine. V to smer kaže tudi skupna številčnost vseh odpadlih in neodpadlih ostankov rogovja (MAU = 10), ki močno presega MAU vrednosti za katerega koli od ostalih jelenu pripisanih skeletnih elementov v vzorcu (MAU_{max} = 3,5).

Da pomemben del na najdišču prisotnih fragmentov rogovja dejansko ne gre povezovati z ostanki uplenjenih živali, je lepo razvidno tudi s *slike 8.7.* Na njej prikazana porazdelitev standardiziranih dimenzij[8] jelenjih skeletnih elementov je namreč izrazito bimodalna. Ker so bili v analizo vključeni le popolnoma osificirani primerki, je bipolarnost smiselno interpretirati kot odraz spolnega dimorfizma (prim. Mariezkurrena, Altuna 1983), ki med uplenjenimi živalmi dokazuje rahlo prevlado košut. Takšno razmerje med spoloma pa le še bolj očitno izpostavlja razkorak med številom samcem pripisanih kosti ($MAU_{♂max}$ = 3,5)[9] in številom še neodpadlih (!) rogovij (MAU = 7,5). Res je, da gre pri tem lahko predvsem za odraz neenakomerne prostorske porazdelitve ostankov. Po drugi strani pa na osnovi razpoložljivih podatkov ne moreva izključiti niti možnosti, da so v okviru najdišča Zalog obdelovali (skladiščili?) odpadla rogovja ter rogovja drugod uplenjenih in razkosanih samcev.

of this raw material. Additional proof is provided by the number of all (i.e. shed and unshed) antler remains (MAU = 10) that strongly exceeds the MAU values of any other skeletal element in the sample attributed to red deer (MAU_{max} = 3.5).

An important part of burr fragments at the site can actually not be connected with the remains of killed animals. This is clearly visible from *Figure 8.7.* The distribution of standardized measurements[8] of skeletal elements of red deer, showed on the cited figure, is distinctly bimodal. The analysis included only fused specimens. It is therefore reasonable to interpret the bipolarity as an expression of sexual dimorphism (cf. Mariezkurrena, Altuna 1983), thus indicating a slight prevalence of hind among the killed animals. Such a relationship between the sexes emphasized even further the discrepancy between the number of bones ascribed to males ($MAU_{♂max}$ < 3,5)[9] and the number of unshed (!) antlers (MAU = 7,5). It is true that such a discrepancy could be foremost a reflection of unequal spatial distribution of the remains. On the basis

[8] Dimenzije sva standardizirala po formuli: *standardizirana vrednost = (x-m)/s*, kjer *x* predstavlja dimenzijo primerka z Zaloga, *m* in *s* pa povprečje in standardno deviacijo iste dimenzije pri referenčnem vzorcu iz Španije (Mariezkurrena, Altuna 1983).

[9] Najvišja MAU vrednost za kosti (brez rogovja) jelenov in košut znaša 3,5 (spodnje čeljustnice, lopatice; *slika* 8.4). Tudi če bi vse spodnje čeljustnice/lopatice pripadale le samcem (kar pa je glede na *sliko 8.7* malo verjetno), bi torej največja možna MAU vrednost za samce (le kosti) ne presegala MAU vrednosti za rogovje.

[8] Standardised measurements were obtained according to the formula: *standardized value = (x-m)/s*, where *x* stands for the dimension of a specimen from Zalog, while *m* and *s* stand for the mean value and standard deviation of the same dimension in the referential sample from Spain (Mariezkurrena, Altuna 1983).

[9] The highest MAU value for red deer male and female remains (not counting antlers) equals 3,5 (*Fig. 8.4*). Thus, even if all the mandibulae and scapulae fragments belong to males, which is highly improbable (*Fig. 8.7*), the MAU value of red deer males in the Zalog sample would not exceed the MAU value for antlers.

3.5 **Sezona bivanja**

Obdobje leta, v katerem so se mezolitski ljudje zadrževali na območju Zaloga, je zelo težko oceniti. Sicer številni fragmenti rogovja so v pričujočem primeru neuporabni, saj jih zaradi že predstavljenih dokazov o namernem zbiranju odpadlih primerkov ni mogoče neposredno povezovati s sezono človekovega zadrževanja na najdišču. Na osnovi stopnje izraščanja in/ali obrabe grizalne površine sedmih prašičjih in enega jelenjega meljaka bi sicer obdobje zasedbe domnevnega lovskega tabora lahko omejili na le nekaj jesensko-zimskih mesecev (*sl. 8.8*), vendar pa pičlost najdb ter variabilnost v mesecu kotitve pri recentnih populacijah divjih prašičev nikakor ne izključuje drugačnih vzorcev aktivnosti. Še najbolj verodostojen kazalec obdobja bivanja v Zalogu tako zaenkrat ostajajo ptičje kosti (Janžekovič, Malez, v tem zborniku). Med njimi prevladujejo ostanki vrst, ki se na Slovenskem pojavljajo v migracijskem obdobju (pomlad ali jesen). Ker v gradivu sesalske makrofavne nisva prepoznala ostankov pomladi uplenjenih živali, bi torej predstavljeni podatki lahko kazali na (vsaj) jesensko prisotnost človeka na najdišču.

Sl. 8.8: Ocena sezone aktivnosti mezolitskih ljudi v Zalogu na osnovi izraščanja zob in/ali stopnje obrabe njihovih grizalnih površin pri divjem prašiču (polna črta) in jelenu (prekinjena črta). Vsak za oceno starosti primeren meljak je predstavljen s črto, ki označuje najverjetnejšo sezono uplenitve. Vsaka čeljustnica je zastopana le s po enim zobom. Pri oceni starosti sva se naslonila na smernice, ki sta jih objavila Higham (1967) in Habermehl (1961). Jesenski in zimski meseci so osenčeni.
Fig. 8.8: Estimate of the season of occupation of the Zalog site on the basis of teeth eruption and/or degree of tooth wear for wild boar (unbroken line) and red deer (broken line). Every molar suitable for the age estimate is presented with a line that marks the most likely season of kill. Every mandible is represented by one tooth only. In estimating the age, we leaned onto guidelines published by Higham (1967) and Habermehl (1961). Autumn and winter months are shaded.

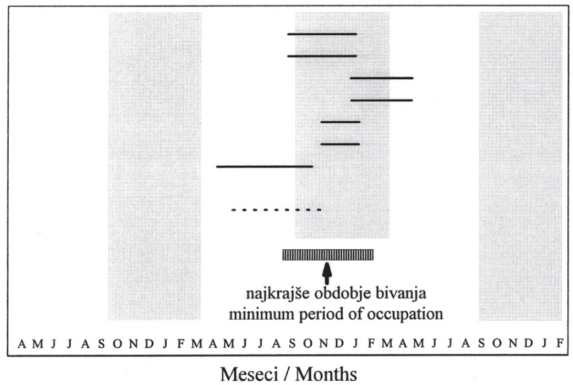
4 **ZAKLJUČEK**

Zastopanost posameznih skeletnih elementov jelena in divjega prašiča z Zaloga se ujema s sliko, ki jo kažejo nekatere domnevne postojanke mezolitskih lovcev po Evropi (npr. Star Carr, Ringkloster). Ob opredelitvi Zaloga za lovski tabor pa vendarle naletiva na dve težavi: 1. z metodologijo terenskega dela in potencialnim vodnim transportom najdb povezana vprašljiva reprezentativnost vzorca ter 2. veliko število ostankov

of the available data, however, not even the possibility of working (storing?) of antlers of males killed and dismembered at another place can be excluded.

3.5 **Habitation season**

It is very difficult to determine the time of year in which the Mesolithic hunters occupied the Zalog area. The numerous antler fragments are of no use for this purpose, since the data on the intentional collection of shed specimens, presented above, cannot be directly connected to the season of human presence at the site. Based on the degree of eruption and/or wear of the molars of seven pigs and one red deer, the period of occupation of the supposed hunting camp could be limited to only a few autumn and winter months (*Fig. 8.8*). The paucity of finds and the variability in the month of birth for the recent population of wild boar in no way excludes different activity patterns. At this point, the most credible indicator of the occupation period at Zalog are bird remains (Janžekovič, Malez, in this publication). Predominant among these are the remains of species that appear in Slovenia during the migration period (autumn or spring). Since animals killed in spring could not be identified within the material of mammal macrofauna, the above presented results may indicate an (at least) autumnal human presence at the site.



4 **CONCLUSION**

The representation of individual skeletal elements of red deer and wild boar from Zalog corresponds to that observed in certain supposed camps of Mesolithic hunters across Europe (for example Star Carr, Ringkloster). The determination of Zalog as a hunting camp, however, presents two problems: 1. questionable representation of the sample due to the field work methodology and the potential water transport of

rogovja z neizpodbitnimi sledmi obdelave. Kljub do neke mere nedvomno podcenjenemu deležu manjših kosti in kostnih fragmentov meniva, da neustrezno vzorčenje ni odločilno prispevalo k ugotovljenim razlikam v MAU vrednostih npr. distalnih delov nadlahtnic, koželjnic in golenic na eni strani in njihovimi proksimalnimi deli (kot ostanki najbolj mesnatih delov plena) na drugi. Nenazadnje soodvisnost med intenzivnostjo razbijanja posameznih (delov) skeletnih elementov in njihovo vsebnostjo maščob ni statistično značilna, enako pa velja tudi za korelacijo med številčnostjo ostankov in njihovo strukturno gostoto. Morda se v zastopanosti posameznih skeletnih elementov bistveno ne odraža niti vodni transport najdb, o katerem sicer pričata konjski zob in (verjetno tudi) kozja petnica. Številčnost relativno mobilnih kosti namreč ne zaostaja za frekvenco pojavljanja tistih, ki jih domnevno odplavi šele razmeroma močan tok (Coard 1999; Lyman 1999), pomenljiva pa je tudi odsotnost (samic) domačega prašiča.

V kontekstu opredelitve najdišča Zalog za lovsko postojanko se zdi tako bolj moteča množična prisotnost ostankov rogovja s sledmi obdelave, med katerimi so tudi nekateri (pol)izdelki. Veliko število (obdelanih) fragmentov jelenjega rogovja je bilo najdenih tudi v zgoraj omenjenih Star Carru in Ringklostru. Avtorja analiz živalskih ostankov (Legge, Rowley-Conwy 1988; Rowley-Conwy 1994-95; 1998) najdišči kljub temu obravnavata kot domnevni lovski postojanki, saj etnološke (npr. Binford 1978b) in arheološke (npr. Straus 1987) študije ne izključujejo povezave lova in izdelovanja (ne le lovu namenjenih) orodij v okviru istega tabora. Nenazadnje so tako Zalog kot tudi Star Carr in Ringkloster v mezolitiku ležali v neposredni bližini jezera, kjer bi ljudje lahko namakali rogovje in s tem olajšali njegovo naknadno obdelavo (prim. Semenov 1973).

Večjo previdnost pri opredelitvi funkcije navedenih najdišč priporočajo Mellars (1998) ter Conneller in Schadla-Hall (2003). Navedeni avtorji pri tem v ospredje postavljajo za lovsko postojanko preveč bogato zbirko kamenih artefaktov, od katerih številni (npr. vbadala, orodja za obdelavo kož ipd.) domnevno bolje ustrezajo kontekstu baznega tabora. Podobno naj bi mnogi z lovom povezani kameni artefakti v okviru mezolitskega najdišča Faraday Road (Ellis *et al.* 2003) dokazovali njegovo uporabo kot lovsko postojanko, čeprav med živalskimi ostanki prevladujejo kosti najbolj mesnatih anatomskih regij plena. Dvome o upravičenosti takšnih zaključkov vzbuja Mala Triglavca, ki v mezolitskih plasteh združuje številna lovna kamena orodja (predvsem trapezi, a tudi trikotniki in klinice s hrbtom in prečno retušo; Turk, M., I. Turk 2004) in prek 2.200 fragmentov jelenjega rogovja (tj. 82 % vseh favnističnih ostankov; Turk, Toškan, Dirjec 2004), ob katerih je bilo izkopanih tudi nekaj z

finds and 2. a large number of antler remains with irrefutable traces of working. Despite the share of small bones and bone fragments undoubtedly being partly underestimated, we nevertheless believe that the inappropriate sampling did not significantly contribute to the discovered differences in MAU values of, for example, distal parts of humeri, radii and tibiae, on the one hand, and their proximal parts (as remains of most meat-bearing parts of the prey), on the other. Furthermore, the interdependence between the intensity of breakage of individual (parts of) skeletal elements and their fat content is not statistically significant. A similar observation could also be made for the correlation between the number of the remains and their structural density. The representation of individual skeletal elements probably wasn't significantly distorted by the water transport of finds neither, otherwise proved by the horse tooth and (probably also) goat calcaneus; the number of the relatively mobile bones does not, in fact, lag behind the number of those that are supposedly washed away only by a relatively strong current (Coard 1999; Lyman 1999). The absence of (female) domestic pigs is also telling.

In the context of defining the Zalog site as a hunting camp, the presence of worked antler remains including also some (semi)products is more disturbing. A high number of (worked) antler fragments was found also at the above-mentioned sites of Star Carr and Ringkloster. Despite this, Legge and Rowley-Conwy treat the sites as supposed hunting camps (Legge, Rowley-Conwy 1988; Rowley-Conwy 1994-95; 1998). Namely, both ethnological (for example Binford 1978b) and archaeological (for example Straus 1987) studies do not exclude a connection between hunting and (not exclusively hunting) tool production within a single camp. Moreover, the Zalog, Star Carr as well as Ringkloster sites were all located in the immediate vicinity of a lake where the people could soak the antler and thereby facilitate its further processing (cf. Semenov 1973).

Mellars (1998) as well as Conneller and Schadla-Hall (2003) recommend a more careful definition of the cited sites, pointing to a collection of stone artefacts too rich for a hunting camp. Of the artefacts, numerous ones (for example burins, hide processing tools and others) supposedly better suit the context of a base camp. Similarly, numerous hunting-related stone artefacts within the Mesolithic site of Faraday Road (Ellis *et al.* 2003) supposedly proved its use as a hunting camp despite the fact that bones from the most meat-bearing anatomical regions of prey predominate. Doubts as to the justification of such conclusions is raised by the Mala Triglavca site that combines numerous stone hunting tools (mostly trapezes but also triangles as well as backed and truncated bladelets; Turk, Turk 2004) and over 2,200 fragments of antler

okraševanjem in razvedrilom povezanih najdb (Turk, M., I. Turk 2004; Mikuž, Turk 2004). Nenazadnje pa moramo v zvezi z obravnavano problematiko dopustiti tudi možnost, da se je namembnost posameznega najdišča v nekem obdobju pač spreminjala ter s tem prispevala k večji pestrosti najdb (Miracle *et al.* 2000; Conneller, Schadla-Hall 2003).

V primeru Zaloga je analiza kamenih artefaktov izpostavila prevladovanje enostavnih primerkov, katerih produkcija ni zahtevala večjega časovnega vložka, medtem ko kompleksni izdelki manjkajo (Kavur, v tem zborniku). Paleta arheoloških najdb torej načeloma ne nasprotuje opredelitvi najdišča kot lovske postojanke. Vsekakor pa lahko zanesljivejši in podrobnejši vpogled v vlogo posameznih mezolitskih taborov, obdobjem leta, v katerem so bili ti naseljeni, ter spekter aktivnosti, ki so jih lovsko-nabiralniške skupnosti tam izvajale, ponudijo šele sistematične arheološke in arheozoološke raziskave regije v celoti (npr. Rowley-Conwy 1993; Miracle 1994-95; Conneller, Schadla-Hall 2003).

(i.e. 82% of all faunistic remains; Turk, Toškan, Dirjec 2004). The material from this site includes also some finds related to decoration and pass-time (Turk, Turk 2004; Mikuž, Turk 2004). Finally, for this particular problem we should also allow for the possibility of the changing nature of a camp during a certain period of time which contributed to the greater variety of finds (Miracle *et al.* 2000; Conneller, Schadla-Hall 2003).

The analysis of stone artefacts from Zalog revealed the predominance of simple objects, the production of which did not demand a higher input of time, while the more complex specimens are missing (Kavur, in this publication). The array of archaeological finds therefore does not, in principle, contradict the definition of the site as a hunting camp. It is the systematic archaeological and archaeozoological research in the region as a whole that can provide a more reliable and detailed insight into the role of Mesolithic camps, the season of their occupation and the spectre of activities that the hunter-gatherer communities undertook there (for example Rowley-Conwy 1993; Miracle 1994-95; Conneller, Schadla-Hall 2003).

Zahvala

Zahvaljujeva se Andreju Gaspariju, ki nama je omogočil študij favnističnega gradiva. Alfredu Riedlu in Francescu Boschinu sva hvaležna za kritično komentiranje prve verzije rokopisa.

Acknowledgements

We would like to thank Andrej Gaspari for the opportunity to study this faunistic material. We are also thankful to Alfredo Riedel and Francesco Boschin, who provided critical comments on an earlier draft.

Priloge

Tab. 8.A: Dimenzije izmerljivih ostankov jelena (*Cervus elaphus*) z Zaloga. Meritve so bile izvedene po navodilih von den Driesch (1976) in so razložene na koncu priloge. Vse mere so v mm.
Tab. 8.A: Dimensions of measured remains of red deer (*Cervus elaphus*) from Zalog. Measurements were taken according to the guidelines of von den Driesch (1976) and are explained at the end of the supplement. All measurements are in mm.

Skelet. el.	Dimen.	Mere / ***Measurements***															
Rogovje / ***Antlers***	ONR	190	189	178	146	191	172	196	142	210	195	180	172	167	165	140	145
	OR.	218	222	210	194	226	220	236	--	245	--	240	--	207	185	--	--
	OPR	145	98	145	127	158	146	157	120	142	175	156	--	--	--	--	--
M_3	D	32	34	34,5	31,5	29,5	38										
	Š	12,5	14,5	14	14,5	13	17										
Scapula	GB	37,5	46	41	42,5	45											
	GL	42	51	43	49,5	48											
	SLC	34,5	41	37	37	37											
	GLP	--	62	58	62	64											
Humerus	Bd	61	--	63	62	54											
	BT	58	56,5	58,5	57	52											
Radius	Bp	51	47	46	53												
	Bd	60,5	50	61	--												
Ulna	BPC	30,5	29,5														
Metacarpus	Bp	--	33	43	38												
	Bd	44	--	--	--												
Femur	DC	35															
Patella	GB	41															
Tibia	Bd	51,5	46	46	43												
	Dd	40	36	36	36												
Calcaneus	GL	115															
	GB	35															
Talus	GLl	52,5	54	58,5													
	Glm	49	49,5	52													
	Dl	28	28,5	31													
	Dm	27,5	29	31													
	Bd	31	33	35,5													
Centrotars.	GB	44,5															
Metatarsus	Bp	--	--	34	33												
	Bd	40,5	41	--	--												

Tab. 8.B: Dimenzije izmerljivih ostankov divjega prašiča (*Sus* cf. *scrofa*) z Zaloga. Meritve so bile izvedene po navodilih von den Driesch (1976) in so razložene na koncu priloge. Vse mere so v mm.
Tab. 8.B: Dimensions of measured remains of wild boar pig (*Sus* cf. *scrofa*) from Zalog. Measurements were taken according to the guidelines of von den Driesch (1976) and are explained at the end of the supplement. All measurements are in mm.

Skelet. el.	Dimen.	Mere / ***Measurements***							
Maxilla	M28	47	--						
	M29	--	83,5						
M^3	D	36	34	40	36				
	Š	20	23	23	21				
M_3	D	47	38	40	38,5	45	44	40,5	41
	Š	19	18	--	18	20	18	19	19
Axis	LCDe	51							
	BFcr	55,5							
Scapula	BG	25	34	30	29	--	32		
	LG	29,5	--	--	35	31	35,5		
	GLP	36	--	--	42,5	--	46		
	SLC	26	30	30	30	25	31,5		
Humerus	Bd	52	47	51	47				
	BT	42,5	38	42,5	38				
Radius	Bp	--	33,5						
	Bd	37,5	--						
Ulna	DPA	50							
	SDO	37							
Mc II	GL	72,5							
	Bd	13							
Phalanx II	Bp	19							
	Bd	16							
Tibia	Bd	40	31,5	37					
	Dd	34	--	31					
Talus	GLl	51,5	50	51,5	52				
	Glm	47	44,5	44	--				
	Dl	27	28	26	29				
	Dm	--	--	28	--				
	Bd	29	27	32	30				
Mt III	Bp	19							

Tab. 8.C: Dimenzije izmerljivih ostankov srne (*Capreolus capreolus*) z Zaloga. Meritve so bile izvedene po navodilih von den Driesch (1976) in so razložene na koncu priloge. Vse mere so v mm.
Tab. 8.C: Dimensions of measured remains of roe deer (*Capreolus capreolus*) from Zalog. Measurements were taken according to the guidelines of von den Driesch (1976) and are explained at the end of the supplement. All measurements are in mm.

Skelet. el.	Dimen.	Mere / ***Measurements***	
Metacarpus	Bd	22	
Tibia	Bd	28	27,5
	Dd	--	21

Tab. 8.D: Dimenzije izmerljivih ostankov divje mačke (*Felis* cf. *silvestris*) z Zaloga. Meritve so bile izvedene po navodilih von den Driesch (1976) in so razložene na koncu priloge. Vse mere so v mm.
Tab. 8.D: Dimensions of measured remains of wild cat (*Felis* cf. *silvestris*) from Zalog. Measurements were taken according to the guidelines of von den Driesch (1976) and are explained at the end of the supplement. All measurements are in mm.

Skelet. el.	Dimenzija / Dimensions	Mere / Measurements
Mandibula	M7	9,5
	M9	12

Tab. 8.E: Dimenzije izmerljivih ostankov kune zlatice (*Martes martes*) z Zaloga. Meritve so bile izvedene po navodilih von den Driesch (1976) in so razložene na koncu priloge. Vse mere so v mm.
Tab. 8.E: Dimensions of measured remains of pine marten (*Martes martes*) from Zalog. Measurements were taken according to the guidelines of von den Driesch (1976) and are explained at the end of the supplement. All measurements are in mm.

Skelet. el.	Dimenzija / ***Dimension***	Mere / ***Measurements***
Mandibula	M10	15,5
	M18	26
	M19	9
M_1	D	11,5
	Š	4