

Črnelnik in Devce, novoodkriti najdišči iz bakrene dobe na Ljubljanskem barju

Črnelnik and Devce, Newly discovered Copper Age sites at Ljubljansko barje

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Izveček

V članku obravnavamo rezultate arheoloških raziskav na najdiščih Črnelnik in Devce na Ljubljanskem barju v letu 2014. Gre za dve novoodkriti najdišči iz obdobja, ko so na Ljubljanskem barju živeli koliščarji.

Na podlagi interdisciplinarnih analiz uvrščamo kolišče na Črnelniku na začetek 4. tisočletja pr. Kr. Manj podatkov je pridobljenih z najdišča Devce, zato njegov značaj še ni ugotovljen. Postavljamo ga v čas med 4. in 2. tisočletjem pr. Kr.

Ključne besede: Slovenija, Ljubljansko barje, kolišča, kultura keramike z brazdastim vrezom, interdisciplinarno raziskovanje

Abstract

The article discusses the results of archaeological research at the sites of Črnelnik and Devce at Ljubljansko barje in 2014. These are two newly-discovered sites from the period when Ljubljansko barje was inhabited by pile-dwellers.

Based on interdisciplinary analyses, the pile-dwelling at Črnelnik is assigned to the beginning of the 4th millennium BC. Less data was gathered from the site of Devce, therefore its character cannot yet be determined. It is set in the time between the 4th and 2nd millennia BC.

Key words: Slovenia, Ljubljansko barje, pile-dwellings, Furchenstich pottery culture, interdisciplinary research

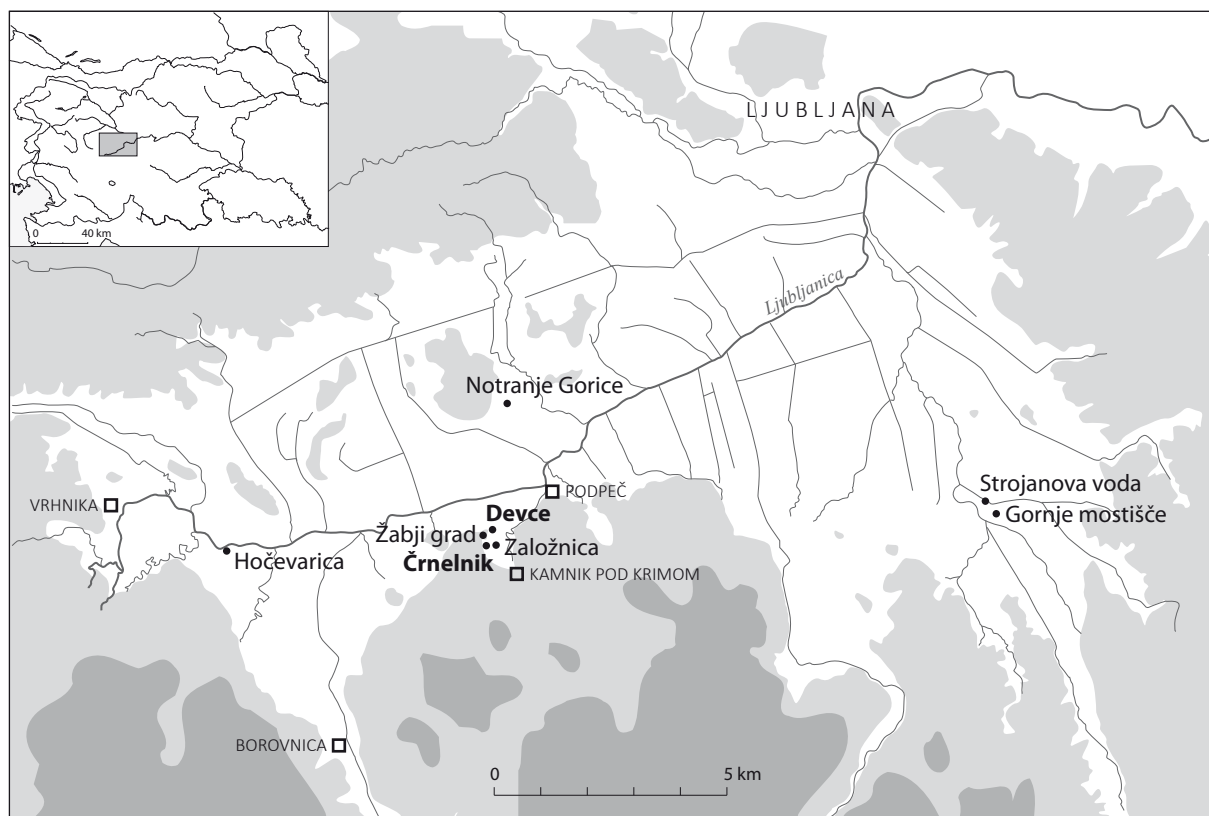
Članek posvečamo prijatelju, sodelavcu, arheologu in dolgoletnemu raziskovalcu kolišč na Ljubljanskem barju Janezu Dirjecu ob okroglem življenjskem jubileju!

UVOD

Leta 2014 je skupina arheologov pod strokovnim vodstvom Blaža Podpečana, ki deluje pod okriljem podjetja MAGELAN Skupina, d. o. o., iz Kranja, opravila arheološki nadzor na trasi nastajajočega kanalizacijskega sistema na Ljubljanskem barju, za vasi Kamnik pod Krimom in Preserje z zaselki.

Pri tem so naleteli na arheološke najdbe iz prazgodovine, rimskega obdobja, srednjega in novega veka.¹ V prispevku se bomo osredotočili na najdbe s prazgodovinskih najdišč, ki jih lahko povežemo s poselitvijo v obdobjih, ko so na Ljubljanskem barju živeli koliščarji.

¹ Podpečan 2015, 35.



Sl. 1: Ljubljansko barje.
Fig. 1: Ljubljansko barje.

Na prve ostanke iz domnevno bakrene dobe so naleteli na območju najdišča Devce – vakuumska postaja 2,² ob glavni cesti Podpeč–Borovnica pri križišču za Kamnik pod Krimom. Kasneje so naleteli še na ostanke koliščarske poselitve na Črnelniku,³ na zahodnem robu zaliva pod zaselkom Lazi (sl. 1 in 2).

Analiza je pokazala, da je Črnelnik najverjetneje kronološko starejše najdišče. Tako je utemeljena odločitev najprej predstaviti rezultate raziskav s Črnelnika, sledi predstavitev najdišča Devce – vakuumska postaja 2.

ČRNELNIK

Na ostanke koliščarske poselitve so arheologi naleteli avgusta 2014, ko se je začel strojni izkop jarka za kanalizacijski vod na t. i. Trasi 09, in sicer

² EŠD 9368 (= evidenčna št. dediščine) Ljubljana – arheološko najdišče Ljubljansko barje [http://rkd.situla.org/].

³ EŠD 9368 Ljubljana – arheološko najdišče Ljubljansko barje.

na njenem odseku pod vasjo Kamnik pod Krimom oz. zaselkom Lazi. V okviru nadzora in poznejših arheoloških raziskav je bilo tako skupaj zastavljeno kar 36 testnih sond (TS) oz. testnih jarkov (TJ) v izmeri od 2 × 2 m do 3 × 3,3 m (sl. 2).

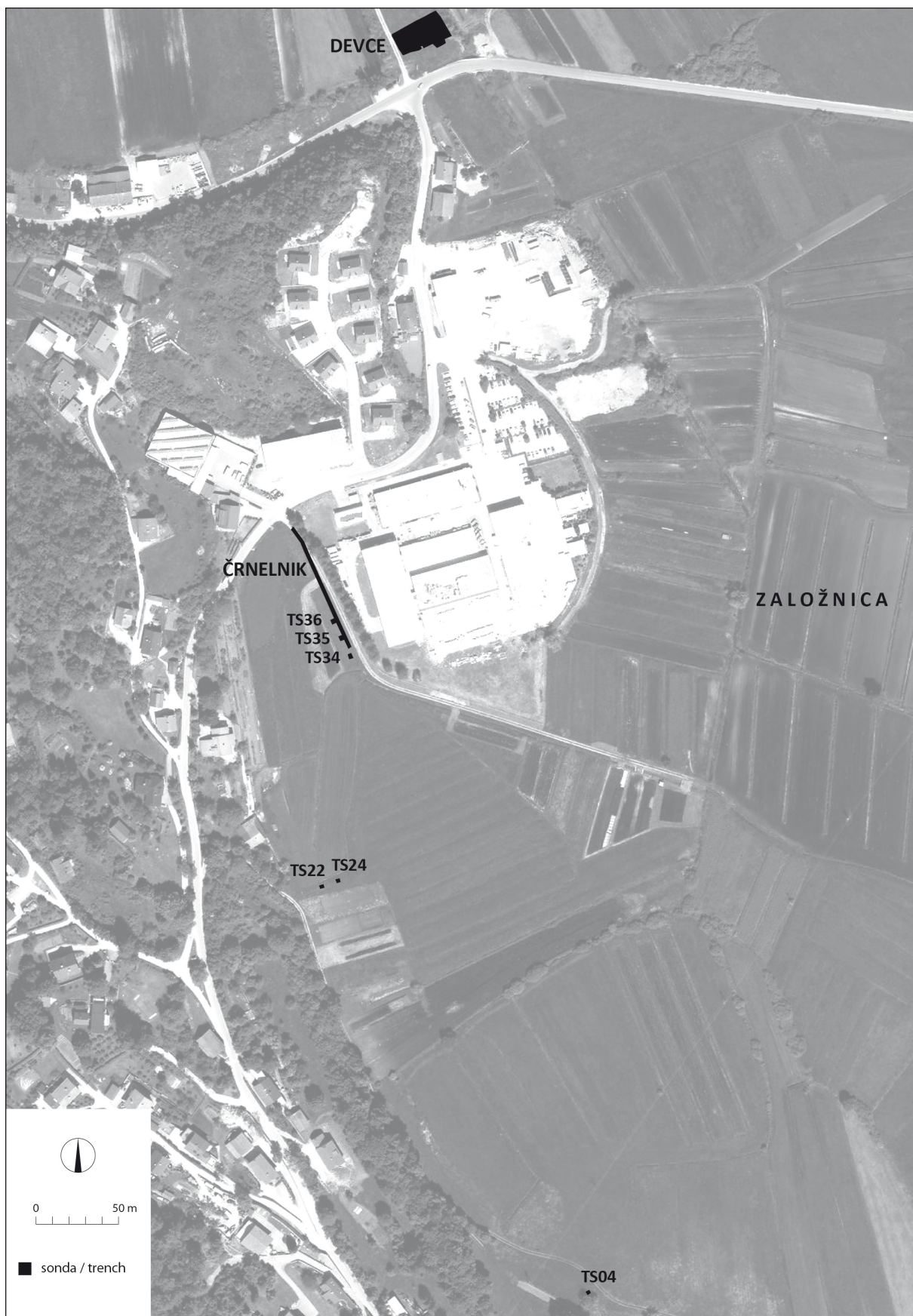
Na največjo koncentracijo najdb so naleteli v testni sondi TS35 in na območju t. i. makadamske ceste, locirano vzdolž in večinoma severno od omenjene testne sonde (sl. 2). Še 19 fragmentov domnevno prazgodovinske keramike je bilo odkritih v testni sondi TS07, ki zaradi bližine vodnega požiralnika tam verjetno niso ležale *in situ*.

Najbolj izpovedne so najdbe, keramika, živalske kosti, leseni koli itd. z novoodkritega najdišča Črnelnik, ki so se pojavljali na delu t. i. Trase 09 od pribl. 50 m od glavne ceste v Kamnik pod Krimom do skoraj južnega roba nasute zemljine, na kateri



Sl. 2: Ljubljansko barje. Zračni posnetek trase kanalizacijskih vodov leta 2014 z najdiščema Črnelnik in Devce – vakuumska postaja 2. (Načrt D. Češarek).

Fig. 2: Ljubljansko barje. Aerial shot of the route of sewerage lines in 2014 with marker sites of Črnelnik and Devce – vakuumska postaja 2.





Sl. 3: Črnelnik. Pogled z juga na območje, kjer je bila zastavljena testna sonda TS35. Desno oz. vzhodno od makadamske ceste so za žičnato ograjo industrijski objekti. V ozadju, pred prvo stanovanjsko hišo, je vidna trasa glavne ceste v Kamnik pod Krimom.

Fig. 3: Črnelnik. A view from the south towards the area of Test Trench TS35. There are industrial facilities right or east of the gravel road (location: Makadamska cesta), behind the barbed wire fence. In the background, in front of the first house, the route of the main road to Kamnik pod Krimom can be seen.

stojijo industrijski objekti (sl. 2 in 3). Kot omenjeno, jih del izvira iz nadzora pri strojnem izkopu na trasi makadamske ceste (na meji med parc. št. 3340/7 in 3342 k. o. Kamnik), del iz testne sonde TS35.

Testni sonde TS35 in TS36

Z namenom, da se pridobi čim več podatkov o najdišču Črnelnik, sta bili na območju najdišča zastavljeni dve testni sondi. Testna sonda TS35 je bila zastavljena na parceli 3340/7 k. o. Kamnik. Merila je pribl. $2,6 \times 3,2$ m (sl. 2 in 5). Pribl. 8 m rahlo severozahodno od nje je bila na isti parceli zastavljena še testna sonda TS36 v izmeri pribl. $2,8 \times 3$ m, ki se je po pogodbi z investitorjem kopala do šotne plasti SE 04 oz. do prvih sledi o kolišču (sl. 2 in 4).

Stratigrafija

O stratigrafiji prazgodovinskega najdišča je bilo veliko podatkov pridobljenih predvsem pri izkopu testne sonde TS35. Navajamo jih v nadaljevanju (sl. 6).⁴

– SE 09 (*geološka plast*):

do dna izkopa 13–18 cm debela plast gline bledoolivne barve, t. i. jezerska kreda oz. polžarica, v kateri so bili posamezni ostanki lupin mehkužcev. Praviloma so v plast segale tudi konice vertikalnih kolov.

– SE 08 (*t. i. kulturna plast*):

meljasta glina olivno-sive barve, s številnimi ostanki lesnega drobirja in večjih kosov lesa dolžine tudi nad 2 m ter kamni vel. do 15×25 cm. Db. = 43–66 cm. V njej je bilo veliko fragmentov prazgodovinske keramike, živalskih kosti itd.

– SE 07 (*krovnina t. i. kulturne plasti*):

plast meljaste gline temnosive barve, v kateri je bilo najti manjše drobce lesa in drugih organskih ostankov. Db. = 11–15 cm. Brez artefaktov.

– SE 06 (*geološka plast*):

plast gline bledoolivne barve, t. i. jezerska kreda oz. polžarica. Db. = 5–6 cm.

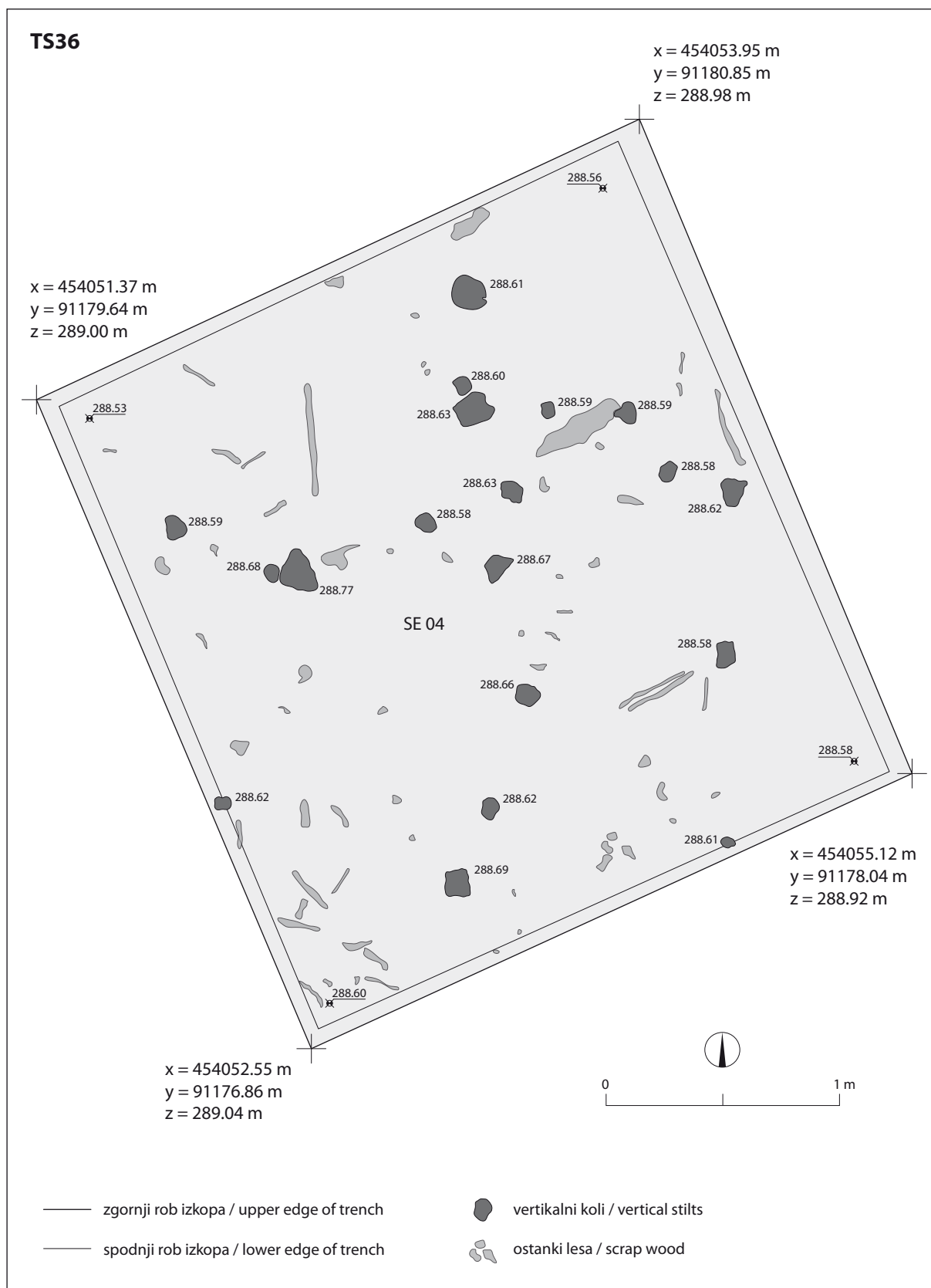
– SE 05 (*krovnina SE 06*):

plast meljaste gline temnosive barve, s številnimi drobci preperelega lesa (dolžine do 15 cm). Db. = 9–14 cm.

– SE 04 (*geološka plast*):

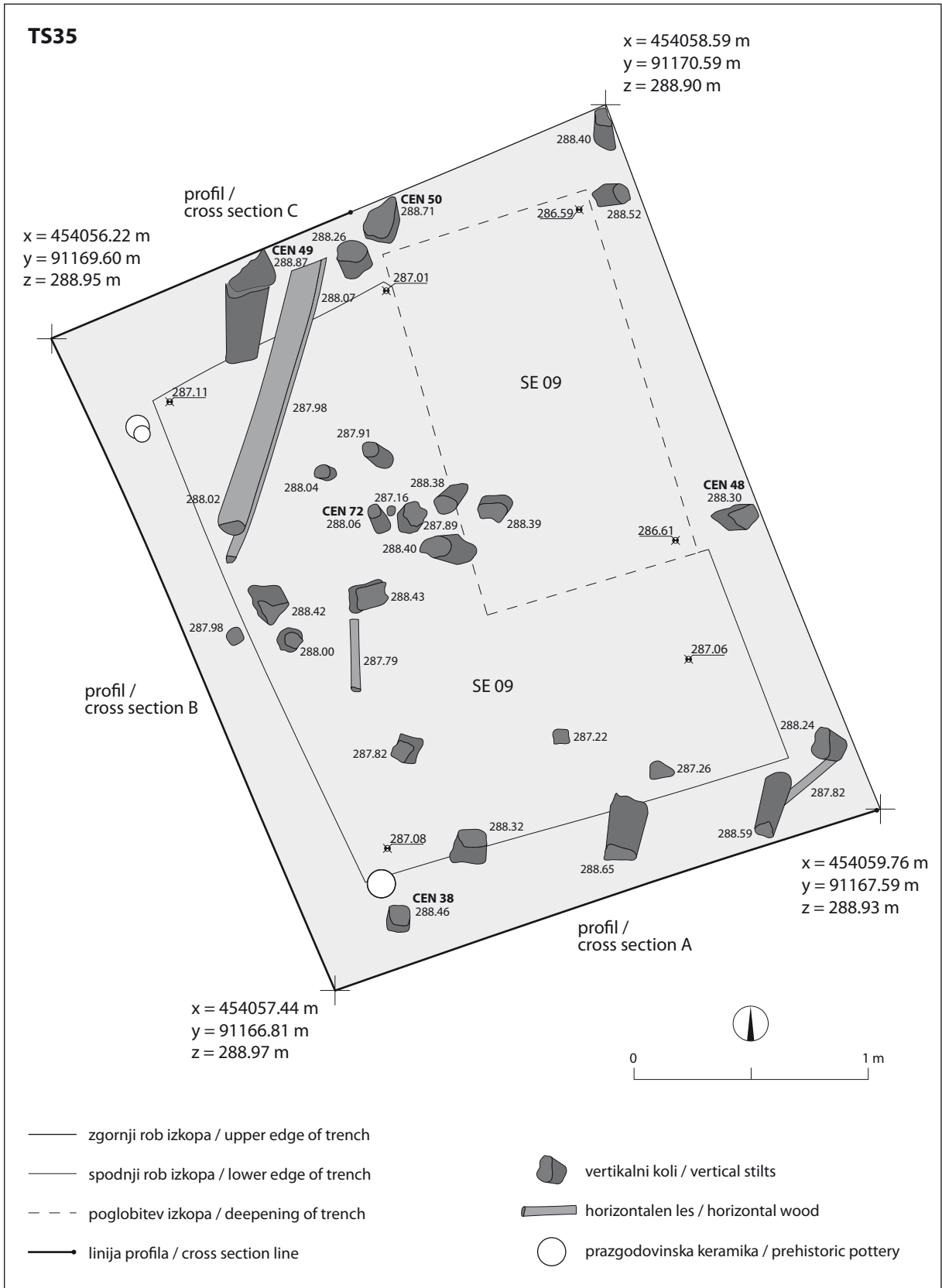
plast iz ostankov šotnih mahov temnordečkasto-rjave barve, s številnimi drobci preperelega lesa (dolžine do 30 cm). Db. = 47–48 cm.

⁴ Glej še Podpečan 2015, 35.

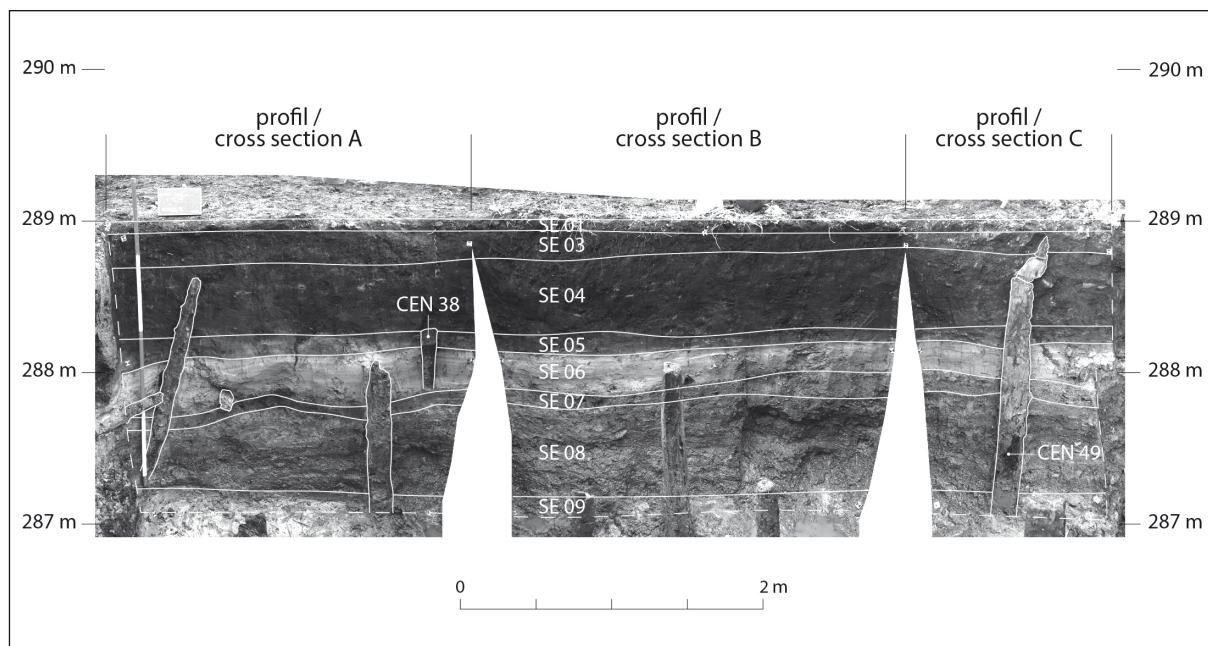


Sl. 4: Črnelnik. Načrt testne sonde TS36. (Risba D. Češarek)

Fig. 4: Črnelnik. Plan of Test Trench TS36.



Sl. 5: Črtnik. Načrt testne sonde TS35. (Risba D. Češarek)
 Fig. 5: Črtnik. Plan of Test Trench TS35.



Sl. 6: Črnelnik. Delno razgrnjeni profil testne sonde TS35. (Foto D. Češarek)
 Fig. 6: Črnelnik. Partly aligned Test Trench TS35, cross sections A, B, and C.

– SE 03 (plast pod travnato rušo, domnevno paleornica):

plast meljaste gline črne barve, z redkimi kamni velikosti do 7×9 cm. Db. = 9–15 cm. V njej se že pojavljajo vertikalni koli (sl. 6). V drugih testnih sondah, npr. v testni sondi TS27 (glej sl. 2), so bili odkriti vojaški naboj, deske in druge novodobne najdbe.

– SE 01 (krovnina):

travnata ruša. Db. = 7 cm.

Arheološke najdbe

Z območja najdišča izvira več sto arheoloških najdb. Izrazito prevladujejo fragmenti ostenj prazgodovinske keramike, nekaj je tudi izdelkov oz. najdb iz kosti, kamna in drugih materialov.

Keramika

V obravnavo smo vzeli prepoznavne in večinoma kronološko pomembne arheološke najdbe iz testne sonde TS35 oz. z območja najdišča na trasi makadamske ceste. Ker med kronološko najbolj izpovednimi najdbami keramike ni opaznih razlik v kvaliteti izdelave in videzu, menimo, da vse

pripadajo prazgodovinski koliščarski poselitvi. Stratigrafsko so sicer najzanesljivejše iz testne sonde TS35, iz plasti SE 08, ki je ležala na arheološko sterilni plasti jezerske krede SE 09. Prekrivala jo je plast SE 07, v kateri ni bilo artefaktov.

Med rekonstruiranimi keramičnimi oblikami smo prepoznali lonce (npr. t. 3; 4: 1–8; 5), skleda različnih oblik in velikosti. Med njimi so velike (t. 1: 13; 2: 1,4; 6: 11), srednje (npr. t. 1: 2,3,5; 2: 2) in majhne (t. 1: 4).

Zastopane so tudi majhne, skledam podobne skodelice z držaji (t. 1: 1; 2: 7). Podobna jim je nekoliko bolj zaprta posoda, ki je na ostenju ornamentirana v motivu šrafiranega traku in visečih, prav tako šrafiranih trikotnikov (t. 2: 6). Po obliki odstopa izjemno nizka, zaprta in kvalitetno izdelana posoda, na vratu ornamentirana z vzporednima vrezanima linijama, v katerih se je ohranilo prvotno polnilo rastlinskega izvora, narejeno iz nazobčanih trakov (t. 2: 8; sl. 7).

Med posodami z ročaji je treba omeniti lonce z ročaji (t. 6: 5) in vrče (t. 4: 9). Dva predstavljeni ročaja sta trakasta, eden je bil postavljen na trebuh lonca (t. 6: 5), drugi je t. i. presegaajoči ročaj in povezuje ustje vrča z ramenom (t. 4: 9).

Več je držajev. Dva sta trakasta (t. 1: 1; 2: 7). Drugi so jezičasti, bodisi razčlenjeni (t. 1: 4; 3: 2; 5: 1; 7: 7) bodisi nerazčlenjeni (t. 5: 3,6), ali

z ušescem oz. dvema (*t.* 5: 2,5; 7: 7). V funkciji držaja so bile oblikovane tudi bradavice in druge plastične aplikacije (*t.* 4: 4; 5: 4,7).

V enem primeru je ohranjen fragment nizke noge posode na nogi (*t.* 2: 5).

Posebna keramična oblika so enostavna predilna vretenca konične oblike (*t.* 7: 1–4). Nekoliko izstopa ploščato vretence (*t.* 7: 1).

S Črnelnika poznamo tudi ornamentirano keramiko. Prevladuje ornament odtisov prsta ali nekega topega predmeta, ki se pojavlja na ustju (*t.* 1: 6,12; 4: 1–3), pod ustjem (*t.* 3: 5; 4: 1,4), na držaju (*t.* 3: 2; 5: 1) in v kombinaciji z odtisom nohta (*t.* 3: 2,5; 4: 1,4), ki je lahko tudi samostojni ornament (*t.* 3: 3,4).

Kronološko pomembnejši je ornament, narejen v tehniki vrezovanja. Prevladuje navadni vrez (npr. *t.* 6: 3). Motivi so viseči trikotniki (*t.* 2: 6), stoječi trikotniki (*t.* 6: 9) in trakovi (*t.* 2: 6; 6: 4). Večkrat gre za kombinacijo več motivov in ornamentalnih tehnik, med katerimi je treba navesti tudi vbadanje (*t.* 2: 6; 6: 4,8,9). Na ostenju keramike (*t.* 6: 4) je videti, da je bila uporabljena tehnika vbadanja, ki je značilna za tehniko brazdastega vrezovanja. V enem primeru je vrezan motiv zapolnjen z brez reda vrezanimi linijami (*t.* 6: 2). V dveh primerih je opaziti tudi tehniko žlebljenja. Enkrat so posevni žlebovi na ramenu posode (*t.* 6: 1), drugič sta na vratu s tehniko žlebljenja narejeni ležeči vzporedni liniji (*t.* 2: 8). Na fragmentih posod, ornamentiranih z vrezi ali v kombinaciji z vbodi, so ohranjeni sledovi bele inkrustacije (*t.* 6: 2,9). Inkrustacija, kot vezivo, se pojavlja tudi na skodeli (*t.* 2: 8; *sl.* 7) z žlebljenima linijama, ki sta prekriti z nazobčanima trakovima zelo verjetno rastlinskega izvora.⁵ Glajenje je opaziti na štirih fragmentih (*t.* 2: 8; 6: 2,8,9). Vsi so tudi sicer ornamentirani s pomočjo drugih tehnik krašenja.

Najdbe iz kosti in kamna

Artefaktov iz kosti in kamna je malo. Iz SE 08 testne sonde TS35 izvira šest šil (štiri so poškodovana), na koncih zbrusen obroček iz ptičje kosti, ki je 1 cm dolg in 0,5 cm širok (*sl.* 25), ter retuširan odbitek iz rjavo-sivega roženca (*t.* 7: 6).

Fragmenti hišnega lepa

Iz kulturne plasti na Črnelniku izvirajo tudi fragmenti hišnega lepa. Na enem sta delno ohranjena odtisa pribl. 6 cm debelih oblic s skorjo (*t.* 7: 5; *sl.* 8). Razvidno je tudi, da je bil izpostavljen ognju.

Petrološka analiza kamnov in kamnitih artefaktov

Kamniti kosi na najdišču pripadajo sivim apnenecem in peščenjakom, med slednjimi prevladujejo drobnozrnati, svetlosive barve. Posamezni peščenjaki so tudi debelozrnati, z zrni velikosti do pribl. 1 mm. Nekaj kamnitih kosov pripada drugim kamninam, in sicer 1 kos oranžnemu meljevcu, 1 kos tufu in 3 kosi rožencu (npr. retuširan odbitek, *t.* 7: 6).

Drobnozrnati peščenjaki so večinoma srednje zaobljeni, kar je posledica preperevanja robov. Podobno velja tudi za apnenec, robovi so običajno zaobljeni kot posledica selektivnega kemičnega preperevanja.⁶ Nekateri kosi imajo na površini značilne korozijske oblike (*sl.* 9a). Gre za t. i. reliefno korodiranost, ki nastane pri dolgotrajnem kapljanju vode na določeno točko na površini kamna, kar je značilno predvsem za jamska okolja.⁷ Več takšnih kamnov je bilo ožganih (npr. *sl.* 9).

Živalski ostanki

Zbir živalskih ostankov, povezljivih s koliščarsko naselbino Črnelnik, vključuje 178 kosti in zob. Pretežni del (N = 133 oz. 74 %) jih pripada sesalcem, s posameznimi najdbami sta zastopana tudi razreda ptičev (Aves) in rib (Pisces). Taksonomsko je bilo mogoče ožje opredeliti 92 ostankov (*sl.* 10). Najdeni so bili blizu skupaj, tj. bodisi znotraj testne sonde TS35 (SE 08) bodisi na trasi makadamske ceste (*sl.* 2 in 3). Z izjemo ribjih lusk, kosti in zob, ki so bili pridobljeni s sejanjem vzorcev sedimenta v okviru arheobotaničnih raziskav, so bili analizirani živalski ostanki pobrani ročno med izkopavanji. Zato kaže pričakovati, da je zastopanost manjših živali in manjših skeletnih elementov večjih živali do neke mere podcenjena.⁸

⁶ Zupan-Hajna 2003.

⁷ Turk et al. 2007.

⁸ Glej npr. pičlost izoliranih zob, zapestnih in gleženjskih kosti ter prstnic v tabeli (*sl.* 11) (glej še Toškan 2015).

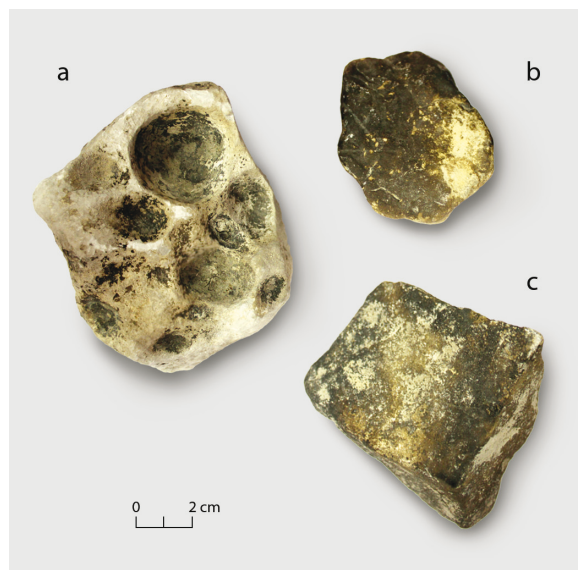
⁵ Glej še Podpečan 2015, 35.



Sl. 7: Črnelnik. Fragment skodele (t. 2: 8) kmalu po odkritju. (Foto E. Leghissa)
 Fig. 7: Črnelnik. A bowl fragment (Pl. 2: 8) soon after its discovery.



Sl. 8: Črnelnik. Različni pogledi na fragment ožganega hišnega lepa z odtisoma oblic. (Foto D. Valoh)
 Fig. 8: Črnelnik. Different views of the fragment of burned house plaster with the imprints of logs.



Sl. 9: Črnelnik. Korodiran (a) in ožgani kamni (a–c) s koliščarske naselbine. (Foto D. Valoh)
 Fig. 9: Črnelnik. Corroded (a) and burned (a–c) stones from the pile-dwelling settlement.

Zbir vključuje ostanke najmanj 13 vrst sesalcev, med katerimi je s 40-odstotnim deležem daleč najbolj zastopan jelen. Delež divjadi presega delež domačih živali tako po številu vrst (9 nasproti 4), kot po številu taksonomsko opredeljenih ostankov ($NISP_{divjad} = 60$; $NISP_{domestikati} = 29$). Pomembno je

poudariti, da med lovnimi vrstami niso zastopane le običajne prehransko zanimive živali (npr. jelen, srna, divji prašič, tur oz. zober), pač pa tudi številni kožuharji (volk, lisica, jazbec, rjavi medved, bober). To dokazuje širši gospodarski pomen lova, ki je nedvomno ponujal več od le mesa in maščob.

Takson / Taxon	Testna sonda Test Trench - TS35	Lokacija Location Makadamska cesta	Skupaj / Total
<i>Bos taurus</i> (domače govedo / cattle)	7	8	15
Caprinae (drobnica / ovicaprids)	1	5	6
<i>Sus cf. domesticus</i> (domači prašič / pig)	-	2	2
<i>Canis familiaris</i> (pes / dog)	3	3	6
<i>Cervus elaphus</i> (jelen / red deer)	9	27	36
<i>Bos taurus</i> / <i>Cervus elaphus</i> (govedo ali jelen / cattle or red deer)	1	-	1
<i>Capreolus capreolus</i> (srna / red deer)	1	7	8
<i>Bos primigenius</i> / <i>Bison bonasus</i> (tur ali zober / aurochs or wisent)	1	1	2
<i>Sus cf. scrofa</i> (divji prašič / wild boar)	5	3	8
<i>Castor fiber</i> (bober / beaver)	1	-	1
<i>Canis lupus</i> (volk / wolf)	-	1	1
<i>Vulpes vulpes</i> (lisica / fox)	1	-	1
<i>Meles meles</i> (jazbec / badger)	-	2	2
<i>Ursus arctos</i> (rjavi medved / brown bear)	-	1	1
Gen. et. spec. indet.	17	24	41
Σ Mammalia	47	84	131
Aves	5	-	5
Pisces	42	-	42

Sl. 10: Črnelnik. Živalski ostanki s koliščarske naselbine. Količina najdb je podana kot število določenih primerkov (NISP) (Grayson 1984, 17–26).

Fig. 10: Črnelnik. Animal remains from the pile-dwelling settlement. The number of finds is given as the number of identified specimens (NISP) (Grayson 1984, 17–26).

Nabor domačih živali vključuje govedo, prašiča, drobnico in psa. Med ostanki drobnice je bilo mogoče na podlagi njihove morfologije⁹ z gotovostjo potrditi zgolj prisotnost koze (*Capra hircus*). Pripisani so ji bili odlomek lobanje z rožnico, dve razbiti nadlahtnici in proksimalni del dlančnice. V

primeru prašiča je bilo razlikovanje med domačo in divjo vrsto opravljeno na podlagi razlik v velikosti posameznih kosti in zob.¹⁰ Podobno je bilo mogoče eno izmed kanidnih spodnjih čeljustnic pripisati volku (dolžina M_1 : 29,0 mm¹¹), odlomka bovidne lopatice in zgornje čeljustnice pa bodisi zobru bodisi turu. Na podlagi izmerkov zgornjih kočnikov (dolžina M^2 : 35,5 mm; širina M^2 : 25,0 mm) je v slednjem primeru nekoliko verjetnejša druga od obeh možnosti.¹²

Prevlada lovnih vrst nad domačimi je bila ugotovljena na obeh raziskanih mikrolokacijah, tj. v gradivu iz testne sonde TS35 in z območja trase makadamske ceste (sl. 10). Se pa med obema omenjenima podvzorcema kažejo nekatere razlike. Med gradivom s trase makadamske ceste je tako, denimo, govejih najdb trikrat manj kot jelenjih, pri čemer slednjemu bržčas pripada tudi dvanajst odlomkov reber, ki so v tabeli (sl. 10) sicer zavedeni med 24 taksonomsko ožje neopredeljenimi najdbami. V nasprotju s tem je razlika v zastopanosti obeh omenjenih vrst med najdbami iz testne sonde TS35 takorekoč nična. Z območja na trasi makadamske ceste izvira tudi relativno več ostankov srne in različnih divjih zveri (volk, jazbec, medved). V testni sondi TS35 je bila srnjad namreč zastopana zgolj s primerkom še priraslega rogovja mladega samca, pa še ta je zaradi nekoliko obrušenega terminalnega dela utegnil biti uporabljan kot orodje in ga torej ni utemeljeno obravnavati kot običajen prehranski odpadke.

Iz podatka o deležih zastopanosti posameznih vrst je mogoče sklepati, da je bil za koliščarje s Črnelnika glavni vir mesne hrane lov. Pri tem je vodilno vlogo skoraj zagotovo igral jelen, saj bistveno izstopa po številu najdb. Nekaj dvomov v takšno tezo je vneslo odkritje že omenjenih dvanajstih domnevno jelenjih reber s trase makadamske ceste, kakor tudi prav tam najden skupek petih jelenjih vretenc s še nezraščeni epifizami. Postavilo se je vprašanje, ali pretežni del zbranih jelenjih ostankov nemara ne pripada le enemu ali kvečjemu dvema, trem živalim. To bi seveda močno zmanjšalo ocenjen gospodarski pomen jelenjadi in lova nasploh.¹³ Vendar pa razmeroma visoke vrednosti indeksa "najmanjše število osebkov" oz. MNI¹⁴ za obe najbolj zastopani vrsti takšno možnost zavračajo (sl. 11). Tako je vsega

¹⁰ Bökönyi 1995.

¹¹ Prim. Davis 1987, sl. 6.13b. Glej tudi podatke za dolžino M_1 psov v tabeli 1.

¹² Boesseneck, Jéquier, Stampfli 1963, 174.

¹³ Andrič, Tolar, Toškan 2016, 115–118.

¹⁴ Grayson 1984, 27–48.

⁹ Glej Boessneck, Müller, Teichert 1964.

Skelt. element	<i>Cervus elaphus</i>						<i>Bos taurus</i>					
	Testna sonda / Test Trench TS35			Lokacija / Location: Makadamska cesta			Testna sonda / Test Trench TS35			Lokacija / Location: Makadamska cesta		
	sin.	dex.	MNI	sin.	dex.	MNI	sin.	dex.	MNI	sin.	dex.	MNI
Maxilla	1	-	1	-	-	-	2	1	2	-	1	1
Mandibula	-	-	-	1	2	3	-	-	-	-	1	1
Vertebrae cerv.	-	-	-	2	2	2	-	-	-	1	1	1
Vertebrae thor.	-	-	-	1	1	1	-	-	-	-	-	-
Vertebrae lumb.	-	-	-	2	1	1	3	2	2	1	1	1
Sacrum	-	-	-	1	1	1	-	-	-	-	-	-
Pelvis	1	3	3	-	-	-	-	-	-	1	1	1
Scapula	-	-	-	2	-	2	-	-	-	-	-	-
Humerus	2	1	2	-	-	-	-	-	-	-	-	-
Radius	-	-	-	-	-	-	-	1	1	1	1	2
Metacarpalia	-	-	-	1	2	2	-	-	-	-	-	-
Femur	1	1	2	-	-	-	1	1	2	-	-	-
Tibia	3	3	4	-	-	-	-	-	-	-	1	1
Calcaneus	1	-	1	-	-	-	-	-	-	-	-	-
Metatarsalia	-	2	2	-	-	-	-	-	-	-	-	-

Sl. 11: Črnelnik. Zastopanost posameznih skeletnih elementov jelena in domačega goveda med živalskimi ostanki s koliščarske naselbine. Količina najdb je podana kot število določenih primerkov, posebej za levo (sin.) in desno (dex.) stran okostja. Tabela vključuje tudi vrednosti indeksa "najmanjše število osebkov" oz. MNI. Pri izračunu MNI so bile ob anatomske orientiranosti upoštevane še ugotovitve, povezane z velikostjo posameznih kosti in stopnjo zraščeniosti epifiz (Bökönyi 1970).

Fig. 11: Črnelnik. Representation of individual skeletal elements of red deer and cattle among animal remains from the pile-dwelling settlement. The number of finds is given as the number of identified specimens, separately for the left (sin.) and right (dex.) parts of the skeleton. The table includes values of the MNI or minimum number of individuals index. The MNI calculation took into account, in addition to the anatomic orientation, findings connected to the size of individual bones and the presence of (un)fused epiphyses (Bökönyi 1970).

šest odlomkov jelenjih golenic pripadalo najmanj štirim različnim osebkom, štirje odlomki medenice trem, v primeru odkritja po enega levega in enega desnega primerka istega skeletnega elementa bodisi jelena bodisi goveda pa tak par najdb prav v nobenem od šestih primerov ni pripadal isti živali.¹⁵ Analizirano arheozoološko gradivo torej po vsej verjetnosti vendarle predstavlja povsem običajen zbir prehranskih odpadkov prebivalcev tega dela naselbine. Takšno interpretacijo podkrepljuje tudi razmeroma veliko število kosti s sledmi urezov in zasekanin (N = 19).

Analiza velikosti najdb (tab. 1) je pokazala, da se zbrani ostanki praktično brez izjeme umeščajo znotraj variacijske širine za primerke istih vrst z drugih okvirno sočasnih srednjeevropskih kolišč.¹⁶ Najširši razpon vrednosti je bil priča-

kovano ugotovljen pri jelenu, pri katerem je bil zbir razpoložljivih metričnih podatkov pač daleč najbogatejši. Posebej kaže izpostaviti predvsem visoko vrednost izmerkov širine distalnega dela ene izmed stegnenic (83,0 mm) in proksimalnega dela ene izmed golenic (Bp = 84,5 mm), a obe še vedno zaostajata za dimenzijami istih skeletnih elementov pri losu (*Alces alces*).¹⁷ V nasprotju s tem je bilo prav na podlagi izstopajoče velikosti del bovidne zgornje čeljustnice in odlomek lopatic mogoče pripisati divjemu govedu, tj. turu ali zobru.¹⁸ Obe omenjeni vrsti sta s prazgodovinskih kolišč Ljubljanskega barja že poznani.¹⁹ Enako velja tudi za losa,²⁰ za katerega je bilo tamkajšnje vodnato okolje z gozdnatim zaledjem vsekakor zelo primeren življenjski prostor.²¹

¹⁵ Glej podatke za jelenji in goveji stegnenici iz testne sonde TS35 ali za jelenji spodnji čeljustnici ter goveji koželjnici in medenici z območja na trasi makadamske ceste (sl. 11).

¹⁶ Boesseneck, Jéquier, Stampfli 1963; Pucher, Engl 1997; Toškan, Dirjec 2004.

¹⁷ Prim. Chaix, Desse 1981, 181–182.

¹⁸ Bökönyi 1995.

¹⁹ Drobne 1973.

²⁰ Drobne 1973; Toškan, Dirjec 2006; 58; Velušček, Toškan, Čufar 2011, 58.

²¹ Bauer, Nygrén 1999, 394.

Takson Taxon	Skelet. element	Zraščenaost epifize Stage of epiphyseal fusion	Metodologija Methodology	Starost ob smrti Age at death
<i>B. taurus</i>	Radius (dist.)	nezraščena / unfused	Silver 1969	< 36–42
		zraščena / fused	Silver 1969	> 36–42
	Vertebra cerv.	zraščena / fused	Habermehl 1961	≥ 96
	Vertebra lumb.	nezraščena / unfused	Habermehl 1961	< 30–48
		nezraščena / unfused	Habermehl 1961	< 30–48
		zraščena / fused	Habermehl 1961	< 30–48
		zraščena / fused	Habermehl 1961	< 30–48
Femur (prox.)	v zraščanju / fusing	Silver 1969	≈ 42	
	zraščena / fused	Silver 1969	> 42	
<i>C. hircus</i>	Humerus (prox.)	zraščena / fused	Popkin et al. 2012	> 16–40
	Humerus (dist.)	zraščena / fused	Popkin et al. 2012	> 7
	Metacarpus (d.)	nezraščena / unfused	Popkin et al. 2012	< 7–28
<i>S. domesticus</i>	Vertebra cerv.	nezraščena / unfused	Silver 1969	< 3–6
	Tibia (prox.)	nezraščena / unfused	Zeder et al. 2015	< 48–60
<i>C. elaphus</i>	Scapula	nezraščena / unfused	Mariezkurrena 1983	< 20
	Humerus (dist.)	nezraščena / unfused	Mariezkurrena 1983	< 8
	Humerus (dist.)	zraščena / fused	Mariezkurrena 1983	> 8
	Femur (dist.)	nezraščena / unfused	Habermehl 1985	< 30–36
	Femur (dist.)	zraščena / fused	Habermehl 1985	> 30–36
	Tibia (prox.)	nezraščena / unfused	Habermehl 1985	< 30–36
	Tibia (prox.)	zraščena / fused	Habermehl 1985	> 30–36
	Tibia (dist.)	nezraščena / unfused	Mariezkurrena 1983	< 20
<i>C. capreolus</i>	Cornua	Ø rože / burr = 21 mm	Habermehl 1961	24–36
	Cornua	Ø rože / burr = 29 mm	Habermehl 1961	≈ 60
	Femur (prox.)	zraščena / fused	Tomé, Vigne 2003	> 11–15
	Femur (dist.)	nezraščena / unfused	Tomé, Vigne 2003	< 14–15
<i>S. scrofa</i>	Ulna (prox.)	nezraščena / unfused	Zeder et al. 2015	< 48–60
	Femur (dist.)	nezraščena / unfused	Zeder et al. 2015	< 48–60

Sl. 12: Črnelnik. Seznam najdb med živalskimi ostanki s koliščarske naselbine, ki omogočajo vsaj okvirno opredelitev starosti živali ob poginu. Prevedba ugotovitev o (ne)zraščenaosti posamezne epifize oziroma stopnji obrabe zoba v starost živali ob uplenitvi/zakolu je povzeta po avtorjih, navedenih v rubriki "Metodologija". V primeru kozjih najdb so bili uporabljeni podatki za nekastrirane ovce, saj so razlike med omenjenima vrstama zanemarljive (Zeder 2006). Starost ob smrti je podana v mesecih.

Fig. 12: Črnelnik. The list of finds among animal remains from the pile-dwelling settlement, which enable at least approximate delimitation of animals' age-at-death. The translation of findings about the (non)fusion of individual epiphyses or the degree of tooth wear in the age-at-death is taken after the authors stated under "Methodology". With goat finds, the data for the uncastrated sheep was used since the differences between the mentioned two species are negligible (Zeder 2006). The age-at-death is given in months.

Pregled nad starostjo živali ob zakolu oziroma uplenitvi je zelo približen, saj je podatkov malo (sl. 12). Kljub temu je pomenljivo, da so v gradivu ostanki mladih in odraslih živali zastopani približno enako pogosto, kar velja tako za divjad (jelen, srna, divji prašič) kot za domestikate (govedo, drobnica). Med najdbami jelena takšno ugotovitev še podkrepljuje prisotnost spodnjih čeljustnic z različnimi stopnjami razvoja zobovja. Tako je primerek z mlečnimi ličniki in komaj izraščajočim prvim kočnikom pripadal šele dobre pol leta stari živali, medtem ko je treba čeljustnico s stalnimi in že sorazmerno zbrusenimi ličniki in kočniki pripisati nad osem let staremu osebk. ²² Pri vrstah,

kjer tako širokega razpona v starosti ob zakolu/uplenitvi ni zaznati, gre to bržčas razumeti kot posledico skromnega števila razpoložljivih podatkov in ne kot dejansko preferenčno poseganje po mesu živali iz zgolj določenega starostnega razreda. ²³

²³ Glej denimo primer domačega prašiča v tabeli (sl. 12).

→
Tab. 1: Črnelnik, arheološki nadzor leta 2014. Velikost živalskih ostankov s koliščarske naselbine. Vsi izmerki so v mm. Dimenzije so povzete po von den Driesch (1976).
Tab. 1: Črnelnik, rescue archaeological survey in 2014. The size of animal remains from the pile-dwelling settlement. All measurements are given in mm. Dimensions are taken after von den Driesch (1976).

²² Habermehl 1961, 155–160.

Takson / Taxon	Skelt. element	Mera / Dimension	Izmerek (v mm) Measurement (in mm)		
<i>Bos s. Bison</i>	Maxilla	M ¹ -M ³ (dolžina / length)	96,5		
<i>B. taurus</i>	Radius	SD	31,0	39,0	
		Bd	-	65,5	
		BFd	-	69,0	
	Pelvis	LA	60,5		
		LAR	53,5		
Femur	DC	40,5	43,5		
<i>C. hircus</i>	Proc. cornualis	Obseg baze / Circumference at the base	95,0		
	Humerus	Bp	39,0	-	
		SD	-	17,0	
		Bd	-	31,0	
	Metacarpus	Bp	24,5		
		Dp	17,0		
		SD	16,5		
DD		10,0			
<i>C. familiaris</i>	Mandibula	P ₁ -P ₄ (dolžina / length)	32,5	34,0	-
		P ₂ -P ₄ (dolžina / length)	28,0	29,0	-
		M ₁ -M ₃ (dolžina / length)	-	31,5	32,0
		M ₁ (dolžina / length)	-	19,5	-
		M ₁ alveolus (dolžina / length)	17,5	-	19,5
<i>C. elaphus</i>	Maxilla	P ² -P ⁴ (dolžina / length)	47,0		
	Mandibula	P ₂ -P ₄ (dolžina / length)	52,5		
		M ₁ -M ₃ (dolžina / length)	84,5		
		M ₃ (dolžina / length)	32,0		
		M ₃ (širina / breadth)	14,0		
		Pelvis	LA	55,5	
	Scapula	BG	42,5		
		LG	46,0		
		GLP	59,5		
		SLC	36,5		
	Humerus	SD	23,0	27,5	
	Metacarpus	SD	19,5		
	Femur	Bd	61,5	83,0	
	Tibia	Bp	84,5		
	Metatarsus	Bp	39,0		
Dp		40,0			
SD		21,5			
<i>C. capreolus</i>	Cornua	Obseg nad rožo / Circumference above the burr	44,0	62,0	
		Obseg rože / Circumference at the burr	66,0	91,0	
		Obseg pod rožo / Circumference below the burr	45,0	56,0	
	Scapula	LG	21,5		
		BG	23,0		
		GLP	28,0		
		SLC	16,5		
	Radius	SD	16,5		
	Femur	Bp	46,5	-	
		DC	20,5	-	
		Bd	-	29,5	
Metatarsus	SD	16,5			
<i>S. scrofa</i>	Ulna	BPC	25,5		
		DPA	41,0		
		SDO	31,5		
	Femur	Bd	50,5		
<i>C. fiber</i>	P ₄	Dolžina / length	10,5		
		Širina / breadth	9,0		
<i>M. meles</i>	Mandibula	P ₂ -M ₂ (dolžina / length)	40,0		
		M ₁ (dolžina / length)	16,0		
		M ₁ (širina / breadth)	7,5		
<i>C. lupus</i>	Mandibula	M ₁ alveolus (dolžina / length)	32,0		
<i>V. vulpes</i>	Ulna	BPC	9,0		

Arheobotanična analiza

Arheobotanični vzorci so bili odvzeti iz kulturne plasti najdišča Črnelnik in iz plasti v testnih sondah v bližnji oz. bolj oddaljeni okolici južno od prazgodovinskega najdišča.

Metode dela

Vzorci sedimenta so bili sprani prek dveh sit z najmanjšim premerom por 1 mm. Po spiranju

so bili na zraku posušeni²⁴ in v celoti pregledani pod stereomikroskopom.

Analizirani so bili tudi po presoji odvzeti vzorci, ki so bili namensko vzorčeni med izkopavanjem. V to skupino uvrščamo fosilizirani večji živalski iztrebek oz. koproilit, z vodo prepojeno lesno gobo in manjši vzorec mahu. Takoj po odvzemu na terenu pa do arheobotanične obdelave so bili ti vzorci hranjeni v hladilniku. Med pripravo so bili obdelani z nežnim spiranjem na situ s premerom por 0,056 mm in vseskozi hranjeni v vodnem mediju.

²⁴ O neustreznosti metode (glej Tolar et al. 2010).

SKUPINA GROUP	Takson / Taxa	Ohranjenost Preservation	Makroostanek / Macroremain	Količina ostankov v vzorcu Amount of remains in sample			
				VZ 34	VZ 35	VZ 75	VZ 76
Kulturne rastline Cultivated plants	<i>Hordeum vulgare</i> (nav. ječmen)	C	zrno / grain	-	6	14	4
	<i>Hordeum vulgare</i> (nav. ječmen)	C	fragm. rahisa / rachis fragm.	-	19	41	41
	<i>Brassica rapa</i> (oljna repica)	C	seme / seed	-	3	8	9
	<i>Triticum dicoccum</i> (dvozna pšenica)	C	fragm. rahisa z ogrinjalnimi plevami / spikelet fork	-	-	-	1
Plevelne, ruder- alne rastline / Weeds, Ruderals	<i>Chenopodium album</i> (bela metlika)	NC	seme/plod / seed/fruit	15	145	464	86
	<i>Polygonum</i> sp. (dresen)	NC	seme/plod / seed/fruit	-	-	2	1
	<i>Bromus</i> cf. <i>secalinus</i> / <i>Festuca</i> sp. (žitna stoklasa/bilnica)	C	zrno / grain	-	2	2	-
Nabiralne rastline Gathered plants	<i>Rubus fruticosus</i> agg. (robida)	NC	seme / seed	5	77	847	2460
	<i>Rubus</i> cf. <i>idaeus</i> (malina)	NC	seme / seed	8	28	1035	1882
	<i>Physalis alkekengi</i> (nav. volčje jabolko)	NC	seme / seed	-	13	100	90
	<i>Vitis vinifera sylvestris</i> (divja vinska trta)	NC	seme / seed	1	-	-	-
	<i>Vitis vinifera sylvestris</i> (divja vinska trta)	NC/C	seme/plod / seed/fruit	-	-	37	176
Vodne rastline Water plants	<i>Potamogeton</i> sp. (dristavec)	NC	seme/plod / seed/fruit	13	26	5	1
	<i>Myriophyllum spicatum</i> (klasasti rmanec)	NC	seme/plod / seed/fruit	2	1	2	-
	<i>Nuphar luteum</i> (rumeni blatnik)	NC	seme/plod / seed/fruit	14	6	1	-
	<i>Nymphaea alba</i> (beli lokvanj)	NC	seme/plod / seed/fruit	2	2	-	-
	<i>Najas marina</i> (velika podvodnica)	NC	seme/plod / seed/fruit	2	2	2	2
	<i>Trapa natans</i> (vodni orešek)	NC/C	fragm. plodu / fruit fragm.	1	-	0,26 (g)	0,25 (g)

SKUPINA GROUP	Takson / Taxa	Ohranjenost Preservation	Makroostanek / Macroremain	Količina ostankov v vzorcu Amount of remains in sample			
				VZ 34	VZ 35	VZ 75	VZ 76
Obrežne, močvirne rastline Lakeshore, wetland plants	<i>Cladium mariscus</i> (navadna rezika)	C	seme/plod / seed/fruit	6	7	-	-
	<i>Schoenoplectus lacustris</i> (jezerski biček)	NC	seme/plod / seed/fruit	227	95	28	7
	<i>Sparganium</i> sp. (ježek)	NC	seme/plod / seed/fruit	-	1	-	-
	<i>Carex type muricata</i> (pairajev šaš)	NC	seme/plod / seed/fruit	-	-	-	1
	<i>Carex</i> sp. – tricarpelate (trikarpelatni šaš)	NC	seme/plod / seed/fruit	2	1	7	5
	<i>Fallopia dumetorum</i> (hostni slakovec)	NC	seme/plod / seed/fruit	-	-	2	5
	Cyperaceae (ostričevke)	NC	seme/plod / seed/fruit	2	-	2	-
	<i>Ajuga reptans</i> (plazeči skrečnik)	NC	seme/plod / seed/fruit	-	5	6	13
Rastline vlažnih travnikov / Wet grassland pl.	<i>Ranunculus repens</i> (plazeča zlatica)	NC	seme/plod / seed/fruit	-	-	2	-
	<i>Viola</i> sp. (vijolica)	NC	seme/plod / seed/fruit	-	1	1	-
	Apiaceae (kobulnice)	NC	seme/plod / seed/fruit	-	2	3	-
	<i>Daucus carota</i> (korenje)	NC	seme/plod / seed/fruit	-	-	-	5
Drevesa, grmi / Wood plants	<i>Carpinus betulus</i> (beli gaber)	NC	seme/plod / seed/fruit	6	-	-	1
	<i>Alnus glutinosa</i> (črna jelša)	NC	seme/plod / seed/fruit	7	-	-	-
	Betulaceae (brezovke)	NC	fragm. socvetja/soplodja inflorescences fragm.	1	-	-	-
	<i>Sambucus nigra / racemosa</i> (bezeg)	NC	seme / seed	-	36	59	15
	<i>Corylus avellana</i> (leska)	NC/C	fragm. plodu / fruit fragm.	-	0,32 (g)	3,67 (g)	0,58 (g)
	<i>Cornus mas</i> (rumeni dren)	NC	seme/plod / seed/fruit	-	-	27	86
	<i>Cornus sanguinea</i> (rdeči dren)	NC	seme/plod / seed/fruit	-	-	-	1
	<i>Quercus</i> sp. (hrast)	NC/C	baza plodu / fruit base	-	-	12	-
	<i>Fragaria vesca</i> (jagodnjak)	NC	seme / seed	-	-	3	5
	neidentificiran les notidentified wood	C	fragmenti oglja charcoal fragments
Glive Fungi	neidentificirano notidentified	NC/C	spore / spores	-	6	12	20

Lokacija vzorcev / Location of samples: **VZ 34** (TS34; SE 7), **VZ 35** (TS35; SE 8/7), **VZ 75** (TS35; SE 8), **VZ 76** (TS35; SE 8)

Sl. 13: Črnelnik. Rezultati arheobotanične analize vzorcev: **VZ 34**, **-35**, **-75** in **-76**. Količina najdb je podana kot absolutno število rastlinskih makroostankov ali kot teža rastlinskih makroostankov v gramih (g).

C = zoglenelo; NC = nezoglenelo; TS = testna sonda.

Fig. 13: Črnelnik. Results of the archaeobotanical analysis of Samples: **VZ 34**, **-35**, **-75** and **-76**. The amount of plant macroremains is given in absolute numbers or as weight of plant macroremains in grams (g).

C = Carbonised; NC = Non-carbonised; SE = Stratigraphic unit (SU); TS = Test Trench.

Rezultati

Vzorci 75, 76, 35 iz TS35 z najdišča Črnelnik in vzorec 34 iz testne sonde TS34 iz neposredne bližine, južno od najdišča:

– Vzorca 75 in 76 sta bila odvzeta iz kulturne plasti (SE 08) koliščarskega naselja Črnelnik. Tik nad vzorcem 76 je ležala nekaj centimetrov debela plast (SE 07), iz katere izhaja vzorec 35. Ti trije vzorci najverjetneje pripadajo istemu kulturnemu sklopu.

– Vzorec 34 izhaja iz plasti, označene kot SE 07 v testni sondi TS34, ki je bila zastavljena zunaj območja najdišča, južno, nedaleč proč od testne sonde TS35 (glej sl. 2).

V vzorcih 75 in 76 so daleč najbolj prevladovali ostanki prehranskih, tj. gojenih in nabiranih rastlinskih taksonov (sl. 13).

Med gojenimi (kulturnimi) rastlinami je bilo največ ostankov ječmena (*Hordeum vulgare*). Dvozrne pšenice (*Triticum dicocum*) je bilo le za vzorec, nekaj več je bilo ohranjenih semen oljne ogrščice (*Brassica rapa*), za katero se še ne ve, ali je bila plevelna, nabirana ali celo gojena rastlinska vrsta.²⁵ Ostanki vseh treh omenjenih taksonov so bili v nasprotju z drugimi prehranskimi taksoni z odpornejšimi (lignificiranimi) semeni ali plodovi ohranjeni le v zoglenelem stanju.

Spekter nabiranih rastlin je podoben spektru s kolišč iz 4. tisočletja pr. Kr. na Ljubljanskem barju.²⁶ Prevladujeta malina (*Rubus idaeus*) in robida (*Rubus fruticosus* agg.), sledijo volčje jabolko (*Physalis alkekengi*), divja vinska trta (*Vitis vinifera sylvestris*), vodni orešek (*Trapa natans*), bezeg (*Sambucus nigra / racemosa*), lešnik (*Corylus avellana*), rumeni dren (*Cornus mas*), želod (*Quercus* sp.) in jagode (*Fragaria vesca*).

Dobro so bili zastopani tudi semena oz. plodovi vlagoljubnih taksonov, npr. plazeče zlatice, plazečega skrečnika, korenja, šaša, črne jelše, breze, nav. rezike, jezerskega bička, ježka, velike podvodnice, lokvanja, blatnika, klasastega rmanca in dristavca.

Poleg tega smo iz vzorcev odbrali oglje, ostanke rib, spore gliv in koprofite malih sesalcev.

Glede na lego in po pričakovanjih vzorec 34 (sl. 2 in 13) izstopa od ostalih vzorcev po najmanjšem številu antropogenih ostankov. V njem ni bilo nobene sledi kulturnih rastlin. Zelo malo, z enim samim taksonom, je bilo plevelno-ruderalnih taksonov. Tudi nabiranih sadnih drevesno-grmovnih

vrst in vrst z užitnimi oreški je bilo le za vzorec. Nekoliko več je bilo ostankov vodnih in obrežnih rastlin, torej naravnega rastijsa.

Vzorci 20, 25 in 6 iz različnih plasti v testnih sondah južno od najdišča Črnelnik:

Vsi trije vzorci so bili odvzeti iz testnih sond južno od prazgodovinskega najdišča Črnelnik (sl. 2 in 14).

– Vzorec 20 je bil odvzet v testni sondi TS22, v plasti temnosivkasto-rjave meljaste gline (SE 28), v katerem so bili številni koščki oglja in živalske kosti. Plast je ležala tik nad geološko osnovo. Presekana je bila z vkopom za telefonski kabel.

– Vzorec 25 je bil odvzet v testni sondi TS24, v plasti meljaste gline temnosive barve (2,5Y 4/2), (SE 07). V njej so bili posamezni manjši drobci lesa, oglja in drugih organskih ostankov.

– Vzorec 6 je bil odvzet v testni sondi TS04, zastavljeni na obrobju, v plasti meljaste gline temnosive barve (2,5Y 4/2), (SE 13). V njej so bili številni drobni lomljenci velikosti do 7 × 5 cm, drobci oglja in fragmenti domnevno poznoantične keramike z valovnico.

Vzorca 20 in 25 sta ležala razmeroma blizu drug drugega, medtem ko je mesto vzorčenja za vzorec 6 nekoliko bolj odmaknjeno (glej sl. 2).

V nobenem od obravnavanih vzorcev ni bilo najti ostankov kulturnih rastlin, plevelno-ruderalnih taksonov, kot sta bela metlika in dresnik, je bilo le za vzorec. Nekaj več, pa še vedno občutno manj kot v vzorcih z najdišča Črnelnik, je nabiranih taksonov, kot so robida, malina, volčje jabolko, vinska trta. Še največ, kar velja predvsem za vzorec 25, je ostankov, semen ali plodov naravno rastoče vegetacije vodnih in obrežnih rastlin, kot so rumeni blatnik, velika podvodnica, jezerski biček. V vzorcu 20 jih je občutno manj, v vzorcu 6 jih sploh ni. V vseh treh je bilo sicer tudi nekaj oglja.

Po presoji odvzeti vzorci:

– Lesna goba: Z najdišča Črnelnik izvira tudi dobro ohranjen kos lesne gobe z delno ohranjeno skorjo in tramo (sl. 15a). Gre najverjetneje za kresilno gobo, natančneje bukovo kresilko (*Fomes fomentarius*), (prim. s sl. 15b).²⁷

– Mah: Na najdišču Črnelnik je bil najden preplet mahu (sl. 16), in sicer dveh vrst: *Neckera crispa* in *Anomodon viticulosus*.²⁸ Pod povečavo stereomikroskopa je bilo v njem mogoče najti še

²⁵ Tolar 2011, 73–74.

²⁶ Tolar et al. 2011

²⁷ Osebna komunikacija F. Pohleven.

²⁸ Opredelitev A. Martinčič.

SKUPINA GROUP	Takson Taxa	Ohranjenost Preservation	Makroostanek Macroremain	Količina ostankov v vzorcu Amount of remains in sample		
				VZ 6	VZ 20	VZ 25
Plevelne, ruderalne rastline / Weeds, ruderals	<i>Chenopodium album</i> (bela metlika)	NC	seme/plod / seed/fruit	3	-	3
	<i>Fallopia</i> sp. (dresnik, slakovec)	NC	seme/plod / seed/fruit	-	1	-
Nabirane rastline Gathered plants	<i>Rubus fruticosus</i> agg. (robida)	NC	seme / seed	21	3	4
	<i>Rubus</i> cf. <i>idaeus</i> (malina)	NC	seme / seed	8	2	1
	<i>Physalis alkekengi</i> (nav. volčje jabolko)	NC	seme / seed	1	-	1
	<i>Vitis vinifera sylvestris</i> (divja vinska trta)	NC/C	seme / seed	1	-	-
Vodne rastline Water plants	<i>Potamogeton</i> sp. (dristavec)	NC	seme/plod / seed/fruit	-	-	1
	<i>Myriophyllum spicatum</i> (klasasti rmanec)	NC	seme/plod / seed/fruit	-	-	2
	<i>Nuphar luteum</i> (rumeni blatnik)	NC	seme/plod / seed/fruit	-	-	21
	<i>Najas marina</i> (velika podvodnica)	NC	seme/plod / seed/fruit	-	-	7
	<i>Trapa natans</i> (vodni orešek)	NC	frag. plodu / fruit frag.	-	-	1
	<i>Oenanthe aquatica</i> (vodni sovec)	NC	seme/plod / seed/fruit	-	-	1
Obrežne, močvirne rastline Lakeshore wetland pl.	<i>Cladium mariscus</i> (navadna rezika)	C	seme/plod / seed/fruit	-	2	2
	<i>Schoenoplectus lacustris</i> (jezerski biček)	NC	seme/plod / seed/fruit	-	1	62
Drevesa, grmi Wood plants	<i>Carpinus betulus</i> (beli gaber)	NC	seme/plod / seed/fruit	-	-	5
	neident. les / notident. wood	C	frag. oglja / charcoal frag.	-	-	-

Lokacija vzorcev / Location of samples: VZ 6 (TS 4; SE 13), VZ 20 (TS 22; SE 28), VZ 25 (TS 24; SE 7)

Sl. 14: Črnelnik. Rezultati arheobotanične analize vzorcev VZ 6, -20 in -25.

C = zoglenelo; NC = nezoglenelo.

Fig. 14: Črnelnik. Archaeobotanical results of Samples: VZ 6, -20 and -25.

C = Carbonised; NC = Non-carbonised; SE = Stratigraphic unit (SU); TS = Test Trench.

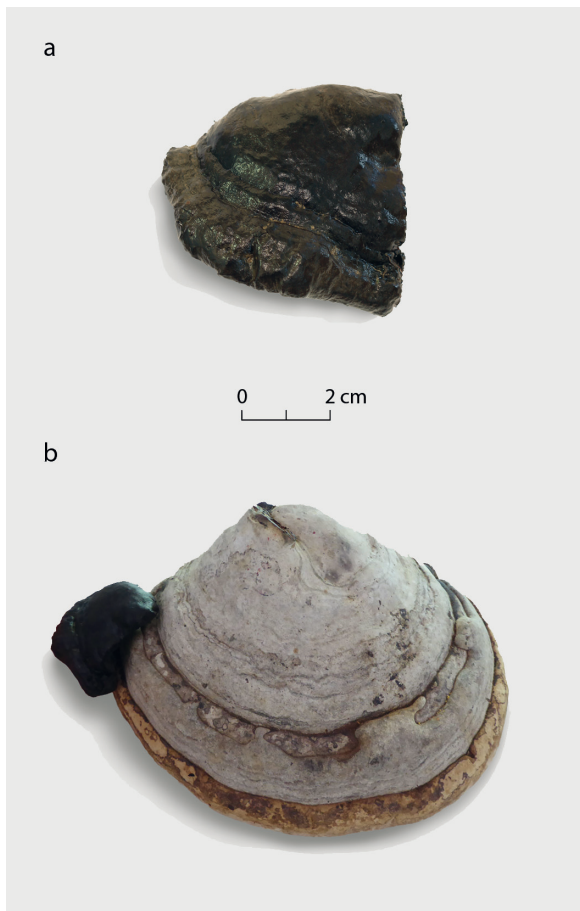
nekaj arheobotaničnih najdb, kot so štirje ostanki plodnih glavic lanu (*Linum usitatissimum*), sedem semen/plodov bele metlike (*Chenopodium album*), en listič orlove praproti (*Pteridium aquilinum*), dve iglici jelke (*Abies alba*), en fragment plodu bele omele (*Viscum album*), en fragment plodu vodnega oreška (*Trapa natans*), en fragment želoda (*Quercus* sp.), en koproilit malega sesalca, velikosti redu miši, ter nekaj fragmentov oglja in lesnega drobirja oz. skorje dreves.

– Večji živalski iztrebek (koprolit): Zanimiva najdba je tudi rahlo stisnjenemu valjčku podoben predmet, katerega struktura, velikost in oblika so nakazovale, da gre za iztrebek (koprolit) psa ali človeka.

Predmet je bil pred strokovno obdelavo najprej večkrat fotografiran (npr. sl. 17). Nato je bil v arheobotaničnem laboratoriju mokro sejan, kjer se je na 0,056 mm situ ujelo 20 ml rastlinskih in živalskih makroostankov. Vsi so ohranjeni v nezoglenem stanju (sl. 18).

Med živalskimi ostanki so prevladovali luske in zobje rib ter nekaj ploščatih, najverjetneje lobanjskih kosti rib (sl. 18a,b).

Med ohranjenimi rastlinskimi ostanki so bili štiri semena robide (*Rubus fruticosus*), seme lanu (*Linum usitatissimum*), seme oljne ogrščice (*Brassica rapa*), tri semena bele metlike (*Chenopodium album*), list in fragment ploda vodnega oreška (*Trapa natans*) ter seme breze (*Betula* sp.), (sl. 18c).



Sl. 15: Črnelnik. Fragment lesne gobe z najdišča (a); primerjava z recentno bukovo kresilko *Fomes fomentarius* (b).
 Fig. 15: Črnelnik. A fragment of a wood-decay fungus (a); and the comparison with recent tinder fungus (*Fomes fomentarius*) (b).
 (a – Foto D. Valoh)



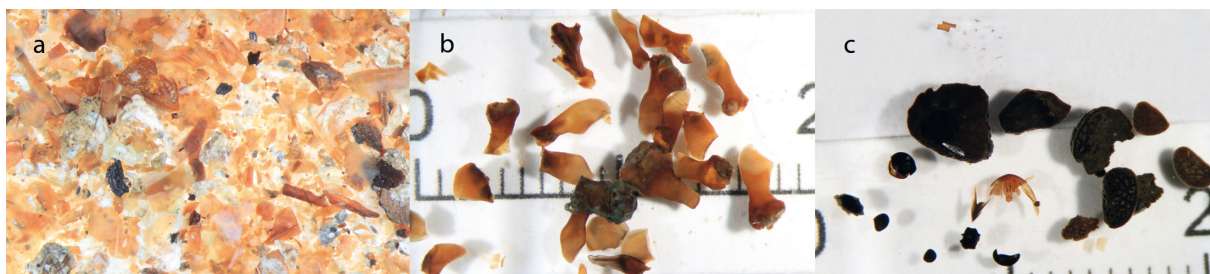
Sl. 16: Črnelnik. Ostanke prepleta mahov z najdišča (a); in detajl (b).
 Fig. 16: Črnelnik. Moss remains from the site (a); and a detail (b).
 (Foto D. Valoh)



Sl. 17: Črnelnik. Živalski iztrebek (koprolit; dolž. pribl. 7 cm) z makroostanki rastlin in živali. (Foto D. Valoh)
 Fig. 17: Črnelnik. Animal faeces (coprolite; length ca. 7cm) with macroremains of plants and animals.

Sl. 18: Črnelnik. Makroostanki iz živalskega iztrebka, po obdelavi v arheobotaničnem laboratoriju. Ostanke rib (a,b); ostanke rastlin (c). (Foto D. Valoh)

Fig. 18: Črnelnik. Macroremains from animal faeces, after processing in the archaeobotanical laboratory. Fish remains (a,b); and plant remains (c).



Dendrokronološke raziskave

Pregledano in identificirano je bilo 50 vzorcev lesa z območja trase kanalizacijskega voda na območju barjanskega zaliva, kjer leži arheološko najdišče Črnelnik (sl. 2).

Zap. št. Succ. No.	Drevesna vrsta Tree species	Ident.	%	D	%
1	<i>Quercus</i> sp. (hrast)	28	56	20	40
2	<i>Fraxinus</i> sp. (jesen)	10	20	4	8
3	<i>Fagus sylvatica</i> (bukev)	1	2	-	-
4	<i>Carpinus betulus</i> (beli gaber)	2	4	-	-
5	<i>Corylus avellana</i> (leska)	3	6	-	-
6	<i>Alnus glutinosa</i> (jelša)	4	8	-	-
7	<i>Abies alba</i> (jelka)	1	2	-	-
8	difuzno porozni listavci / diffuse-porous trees	1	2	-	-
Skupaj / Total		50	100	24	48

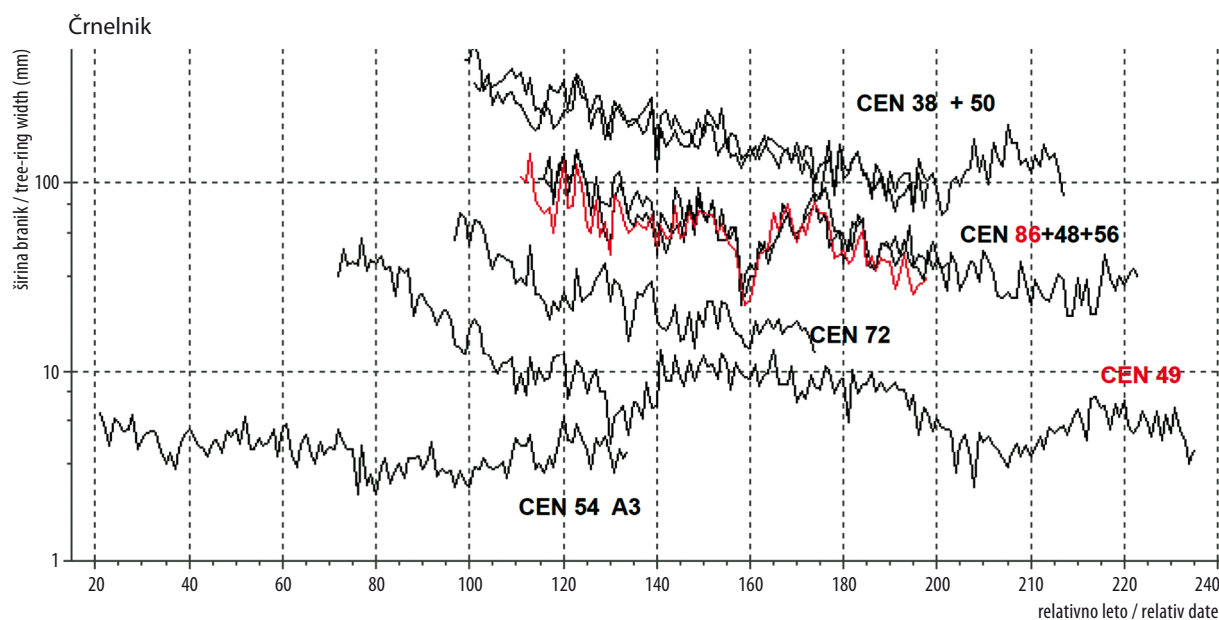
Sl. 19: Črnelnik. Vzorci lesa z območja, kjer so potekale arheološke raziskave. D = število dendrokronološko raziskanih vzorcev; Ident. = število identificiranih vzorcev. Fig. 19: Črnelnik. Wood samples from the archaeological site. D = the number of dendrochronologically researched samples; Ident. = the number of identified samples.

Določeno je bilo 7 lesnih vrst oz. rodov (sl. 19). Določitev rodu je bila opravljena v primerih, kjer razlikovanje vrst znotraj rodu na osnovi lesne anatomije ni bilo možno. Ugotovljene lesne vrste so hrast, jesen, bukev, beli gaber, leska, jelša in jelka. Največ je hrasta (56 %), sledi jesen (20 %), ostalih vrst lesa je manj.

V dendrokronološko obravnavo so bili sprejeti vsi v tabeli navedeni vzorci (sl. 19). Od ugotovljenih lesnih vrst so imeli dendrokronološki potencial hrastovi in jesenovi vzorci s 45 branikami ali več. Glede na ta kriterij je bilo za dendrokronološko analizo primernih 20 vzorcev hrasta in 4 vzorci jesena. Med njimi jih velika večina, vsi hrastovi in dva jesenova, izvira z območja arheološkega najdišča Črnelnik. Izvirajo iz testne sonde TS35 ali pa so bili pridobljeni pri arheološkem nadzoru na območju najdišča.

Dobljenih zaporedij širin branik izbranih vzorcev ni bilo mogoče medsebojno sinhronizirati, kar nakazuje na različen čas rasti in poseka lesa. Proučena jesenova kola, najdena v testnih sondah južno od najdišča Črnelnik, pa sta lahko iz drugega časovnega obdobja (glej sl. 2). Verjetno sta mlajša.

Za našo raziskavo so vsekakor najpomembnejši vzorci, ki jih lahko povežemo s koliščarsko poselitvijo. Pri večini primerov gre za nosilne kole, uporabljene pri gradnji koliščarskih kolib. Tako je bilo med njimi mogoče medsebojno sinhronizirati zaporedja 8 vzorcev nosilnih kolov, ki izvirajo z



Sl. 20: Črnelnik. Sinhronizirana zaporedja širin branik vzorcev lesa v relativnem času. Fig. 20: Črnelnik. Synchronised sequences of tree-ring widths in relative time.

Zap. št. Succ. No.	Oznaka Mark	Lega Position	Premer Diameter (cm)	Število branik Number of TR	Drevesna vrsta Tree species	Beljava Sapwood	Št. branik beljave / No. of TR in sapwood	Rd
1	CEN54 A3	TS35	22,0	114	QUSP	●	11	14
2	CEN72	TS35	30,0	78	QUSP	●	15	54
3	CEN38	TS35	34,0	98	QUSP	●	7	78
4	CEN86	TS35	19,0	88	QUSP	●	-	78
5	CEN56	TS35	22,0	88	QUSP	●	-	83
6	CEN50	TS35	28,0	129	QUSP	●	15	107
7	CEN48	TS35	24,0	129	QUSP	●	16	123
8	CEN49	TS35	38,0	184	QUSP	●	26	135

Sl. 21: Črnelnik. Osnovni podatki o sinhroniziranih vzorcih lesa. Noben vzorec nima ohranjene zadnje branike pod skorjo. QUSP = *Quercus* sp. (hrast); Rd = relativna datacija zadnje ohranjene branike izražena v koledarskih letih.

Fig. 21: Črnelnik. Basic data of synchronised wood samples. The last tree ring under the bark is not preserved in any of the researched samples. QUSP = *Quercus* sp. (Oak); Rd = Relative dating of the last preserved annual ring (in calendar years); TR = Tree Rings.

območja najdišča Črnelnik. Relativno datiranje zaporedij širin branik potrjuje, da tudi ta les večinoma ni bil posekan sočasno (sl. 20 in 21).

Z namenom, da se najdišče umesti v absolutni časovni okvir, je bilo sestavljenih več verzij kronologij najdišča. Vsa izmerjena zaporedja širin branik in vse verzije kronologij smo primerjali z datiranimi kronologijami z drugih najdišč v okviru koliščarske poselitve Ljubljanskega barja. Absolutno datiranje raziskanega lesa ni bilo možno. Datiranje s kronologijo BAR-3330, ki pokriva obdobje med 3771 in 3330 pr. Kr. in je absolutno datirana,²⁹ ni bilo mogoče.

DEVCE

Izkopno polje Vakuumska postaja 2 je bilo večidel zastavljeno na južnem robu parcele št. 211/6, k. o. Kamnik (pod Krimom) na ledini z imenom Devce. Obsegalo je površino pribl. 550 m² (sl. 2 in 22).³⁰

Stratigrafija

– SE 05 (geološka plast):

glina oz. jezerska kreda bledoolivne barve, v kateri so bili lupine vodnih mehkužcev in posamezni kamni (lomljenci). Db. = 50–60 cm. Leži

pod SE 04 in SE 15. Skoznjo prodrle korenine s površja, med njimi tudi železen obroček (SE 06).

– SE 04 (t. i. kulturna plast):

meljasta glina temnosive barve s posameznimi kamni (lomljenci; vel. največ 15 × 20 cm). Db. = 3–15 cm. Leži pod SE 03. V njej arheološke najdbe, kot so fragmenti prazgodovinske keramike, koščena ost in druge živalske kosti, ostanki drobcev oglja, lesa in vertikalno zabiti leseni koli, med njimi trije večji s priostreno konico.

– SE 03 (geološka plast):

šota temnordečkasto-rjave barve s številnimi drobcji preperelega lesa (do 5 × 5 cm). Db. = 12–30 cm. Leži pod SE 02. Plast je presekana z novodobnimi vkopi: SE 12, SE 10 in SE 08.

– SE 02 (plast pod travnato rušo, domnevno paleoornica):

meljasta glina črne barve z redkimi kamni (lomljenci; vel. do 5 × 7 cm). Db. = 15–34 cm. Leži pod SE 01. Plast je presekana z novodobnimi vkopi, kot so: SE 08, SE 10, SE 12 in SE 14. Debelina: 15–34 cm. V njej malo najdb, med njimi novodobni gumb za spenjanje.

– SE 01 (krovnina):

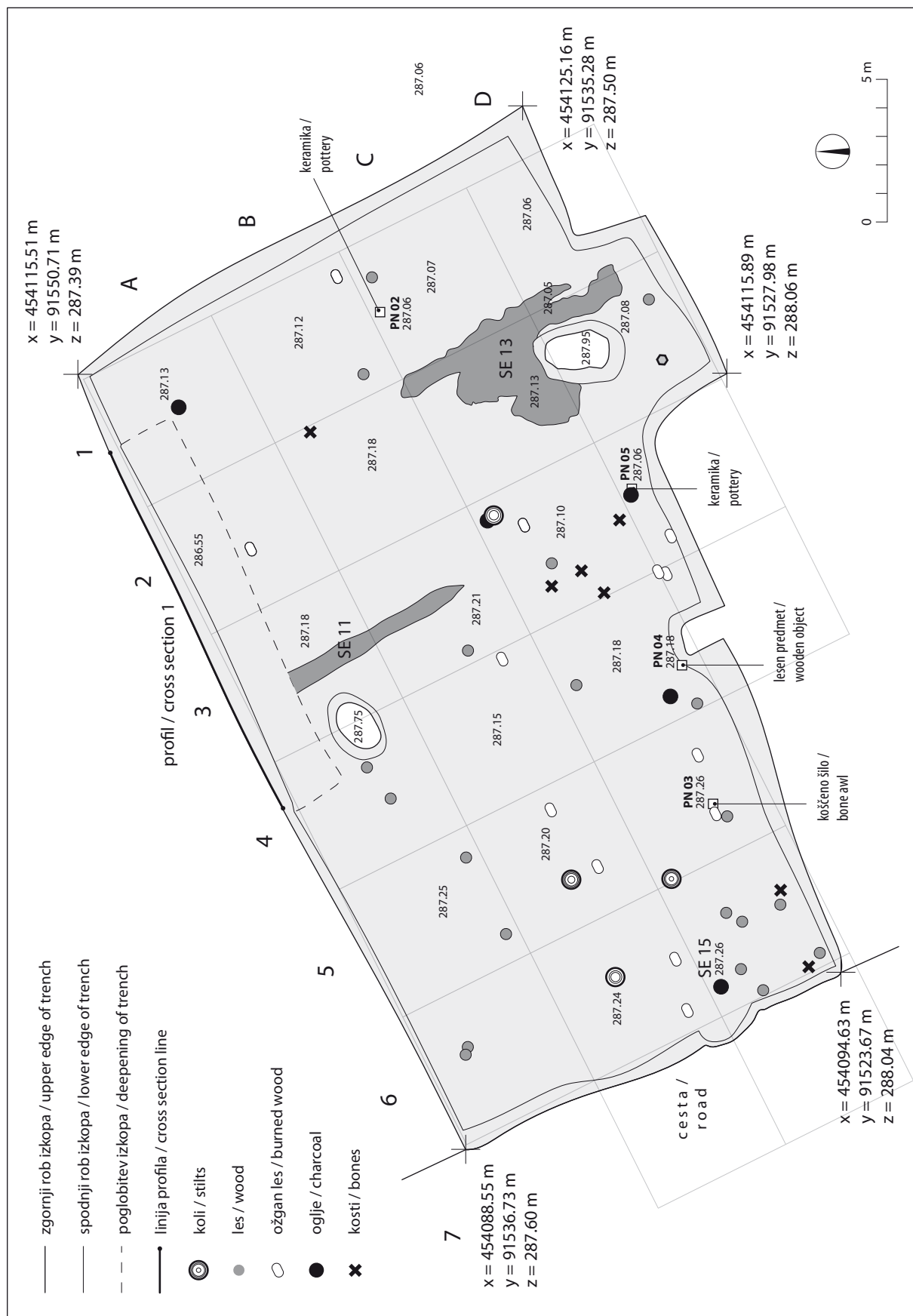
travnata ruša. Db. = 3–9 cm.

Sl. 22: Devce – vakuumska postaja 2. Arheološki nadzor leta 2014. Načrt izkopnega polja. (Risba D. Češarek)

Sl. 22: Devce – vakuumska postaja 2. Rescue archaeological survey in 2014. A plan of excavation.

²⁹ Glej Čufar et al. 2015.

³⁰ Glej še Podpečan 2015, 35.



Skelet. element	NISP		MNI	Metrični podatki (v mm) / Metric data (in mm)
	Sin.	Dex.		
Cranium	1	-	1	
Maxilla	1	2	1	P ₂ -M ₃ = 112,0; M ₁ -M ₃ = 47; M ₃ : 23,0 × 22,5
Mandibula	2	1	1	P ₂ -M ₃ = 119,5; M ₁ -M ₃ = 74,5; M ₃ : 31,0 × 14,0
Dens (P ²)	1	-	1	
Dens (P ₂)	1	-	1	
Vertebrae cerv.	1		1	
Vertebrae thor.	1		1	
Costae	2		1	
Scapula	1	-	1	BG = 44,5; LG = 49,0; GLP = 67,0; SLC = 39,0
Radius	-	1	1	SD = 38,5
Femur	1	-	1	Bp = 88,0; SD = 33,0; Bd = 75,0; GL = 363,0
Patella	1	-	1	
Tibia	1	-	1	Bp = 81,0; SD = 32,5; Bd = 55,0
Astragalus	1	-	1	GLl = 58,0; GLm = 54,5; Dl = 31,5; Dm = 33,0; Bd = 37,5
Calcaneus	1	-	1	GL = 123,0; GB = 39,0
Os centrotarsale	1	-	1	GB = 46,5
Metatarsus	1	-	1	Bp = 40,5; SD = 26,0; Bd = 44,0; GL = 307
Phalanges 1	4		1	GL = 61
Phalanges 2	2		1	GL = 47
Phalanges 3	5		1	DLS = 54,0; MBS = 19,0; Ld = 38,5

Sl. 23: Devce. Zastopanost posameznih skeletnih elementov jelena med živalskimi ostanki z najdišča. Količina najdb je podana kot število določenih primerkov (NISP), tabela pa vključuje tudi vrednosti indeksa "najmanjše število osebkov" oz. MNI in zbrane metrične podatke. Drugi zgornji oz. spodnji predmeljak (P², P₂) v levih zgornji oz. spodnji čeljustnici manjkata. Za opredelitev posameznih merjenih dimenzij in njihovih okrajšav glej von den Driesch (1976).

Fig. 23: Devce. Representation of individual skeletal elements of red deer among animal remains from the site. The number of finds is given as the number of identified specimens (NISP). Also shown are the MNI or minimum number of individuals index and the gathered metric data. The second upper premolar (P²) in the left maxilla and the second lower premolar (P₂) in the left mandible are missing. For the definition of individual measured dimensions and their abbreviations see von den Driesch (1976).

Arheološke najdbe

Na najdišču Devce – vakuumška postaja 2 je bilo arheoloških najdb zelo malo. Arheološko najpomembnejša je plast SE 04, v kateri so bili odkriti odlomki prazgodovinske keramike (t. 7: 8,9), koščena ost (t. 7: 11) in druge živalske kosti. Poleg tega je bilo v plasti na območju kv. C6 najti tri domnevno namensko postavljene kamne lomljence (SE 15), med katerimi je bil največji na spodnji strani ožgan, v bližini je bila večja koncentracija oglja.

V plasti SE 04 so bili najdeni tudi sicer razpršeni drobcji oglja, kosi lesa ter nekaj vertikalno zabitih kolov, katerih konice so segale v plast SE 05. Med njimi so bili trije večji koli s priostreno oz. obsekano konico.

Živalski ostanki

Med terenskim raziskovanjem na lokaciji Devce – vakuumška postaja 2 je bilo pridobljenih 50 živalskih ostankov, od katerih jih je bilo mogoče ožje taksonomsko opredeliti 42. Z izjemo treh odlomkov oklepa močvirske sklednice (*Emys orbicularis*), v orodje preoblikovane golenice drobnice ter ožje neopredeljenega ribjega zoba in vretenca, so bile vse najdbe pripisane jelenu. Kljub horizontalni razpršenosti teh kosti znotraj plasti SE 04 je pregled podatkov o zastopanosti posameznih skeletnih elementov pokazal, da gre zelo verjetno za ostanke zgolj ene živali. Drugače od Črnelnika,³¹ kjer so bile za zbir jelenjih najdb ugotovljene razmeroma visoke vrednosti indeksa "najmanjše število osebkov" oz. MNI, pri gradivu z Devc te vrednosti pri nobenem od skeletnih elementov ne odstopajo od ena (sl. 23). Poleg tega je mogoče zbrane najdbe na podlagi njihovih dimenzij uvrstiti v enoten

³¹ Glej sl. 11.

velikostni razred (*sl.* 23), medsebojna skladnost pa je izkazana tudi pri domnevni starosti osebka ob poginu, ocenjeni na podlagi stopnje obrabe zob in odsotnosti najdb s še nezraščeno epifizo. Skelet je pripadal razmeroma veliki, med osem in deset let stari živali, po vsej verjetnosti samcu. Od lobanjskih kosti je v analiziranem gradivu zastopan zgolj odlomek leve ličnice (*os zygomaticum*), zato ostaja spolna opredelitev pogojna.

Skladna s takšno oceno starosti je prisotnost eksostoz na več različnih skeletnih elementih, ki vsi pripadajo zadnji levi nogi in se jih zdi smiselno interpretirati kot obliko degenerativne spremembe kostnine. V bolj ali manj izraženi obliki jih je najti na pogačici, osrednji nartnici, petnici, skočnici, ob proksimalni epifizi stopalnice ter na dveh od štirih najdenih prvih prstnicah, obeh razpoložljivih drugih prstnicah ter dveh od skupno petih v gradivu prisotnih tretjih prstnicah. Očitno je, da gre pri patološko spremenjenih primerkih večinoma za kosti iste, že omenjene zadnje leve noge.

Pozoren pregled jelenjih najdb (N = 33) ni pokazal nikakršnih sledi človekovega delovanja, kot so urezi in zasekanine. Z izjemo lobanje in obeh čeljustnic večina kosti tudi ni razbitih, kar velja celó za mozgovne cevaste dolge kosti okončin. Izjema je primerek koželjnice, ki ima poškodovani zgolj obe epifizi, medtem ko je njen prehransko vsekakor bolj zanimiv diafizni del še cel. Za primerjavo: med 133 ostanki sesalcev s Črnelnika nepoškodovanih dolgih kosti ni najti, primerkov s sledmi urezov ali zasekanin pa je najmanj 19. Glede na navedeno se zdi, da obravnavanega jelena ni uplenil človek. Prav tako naj ta ne bi posegal v truplo, razen morda z odstranitvijo rogovja, če je bilo to ob poginu sploh razvito.³² Malo verjetna je tudi odstranitev kože, ker bi v tem primeru skupaj z njo bržčas odstranili tudi kosti skrajnega spodnjega dela nog,³³ na obeh spodnjih čeljustnicah pa bi pričakovali značilne sledi urezov.³⁴ Čeprav so bile obravnavane jelenje kosti najdene znotraj kulturne plasti SE 04, je torej njihova navezava na samo naselbino nezanesljiva.

Dodatno previdnost narekujejo podobni najdbi, na kateri so izkopavalci naleteli pribl. 500 m južneje na območju testnih sond TS22 in TS24 (*sl.* 2). Gre za skoraj popolni okostji telet, ki ju

sestavljajo večinoma nepoškodovane kosti brez kakršnih koli sledi urezov in zasekanin. Pri tem je pomenljivo, da je bil v testni sondi TS24 ob kosteh odkrit srebrn novc (6 Kreuzer) iz leta 1849, tako da gre vsaj v tem primeru bržčas za zakop novodobne obolele živali.³⁵

Arheobotanična analiza

Z najdišča Devce – vakuumska postaja 2 sta bila odvzeta dva vzorca sedimenta št. 80 in 81 iz SE 04 (*sl.* 24).

Bogatejši je bil vzorec 81, v katerem je bilo zaznati plevelne oz. ruderalne rastline, kot je bela metlika, in nabirane rastline, kot so robida, malina in volčje jabolko.

Glede na druge taksone je vsebina iz vzorcev dokaj primerljiva. Zastopane so tako vodne (dristavec, klasasti rmanec, rumeni blatnik, beli lokvanj, velika podvodnica) kot tudi obrežne oz. močvirne rastline (navadna rezika, jezerski biček, trikarpelatni šaš ...).

Na vlažne travnike kažeta plazeča zlatica in nokota iz vzorca 80. Najverjetneje ob vodi, v vlažnem okolju, je rasla tudi črna jelša.

RAZPRAVA

Črnelnik

Stratigrafija najdišča Črnelnik je za Ljubljansko barje zelo zanimiva. Zgornja plast jezerske krede SE 06, ki prekriva t. i. kulturno plast (glej *sl.* 6), kaže, da se je poselitev, zaradi ponovne ojezeritve območja, ki so ga v razmeroma kratkem obdobju prazgodovinski ljudje verjetno večkrat izbrali za naselitev, očitno prekinila oz. se ni več obnavljala.

Z območja le nekaj kvadratnih metrov velike sonde TS35 je bilo najti več dolgih, tudi zelo debelih (*sl.* 5, 21), povečini hrastovih in nekoliko manj jesenovih kolov, ki so jih koliščarji uporabili za gradnjo kolib. Seveda je bila testna sonda premajhna, da bi na tej podlagi lahko obširneje govorili o arhitekturi.

Kljub temu ugotavljamo, da so koli pripadali več gradbenim fazam, morda več koliščarskim vasicam. Za časa poselitve je vsaj del naselja večkrat uničil požar, kar pričajo npr. ostanek ožganega hišnega lepa z odtisoma oblic (*t.* 7: 5; *sl.* 8), morda pa tudi

³² Današnjim jelenom na Slovenskem staro rogovje odpade marca ali aprila, čiščenje novega pa se razvleče v čas od julija do decembra (Kryštufek 1991, 243).

³³ Prim. Serjeantson 1989.

³⁴ Binford 1981; Zeiler 1987.

³⁵ Prim. Porenta et al. 2015, 358–360.

SKUPINA GROUP	Takson / Taxa	Ohranjenost Preservation	Makroostanek Macroremain	Količina ostankov v vzorcju / Amount of remains in sample	
				VZ 80	VZ 81
Plevelne, ruderalne rastline Weeds, ruderals	<i>Chenopodium album</i> (bela metlika)	NC	seme/plod / seed/fruit	-	6
Nabirane rastline Gathered plants	<i>Rubus fruticosus</i> agg. (robida)	NC	seme / seed	-	21
	<i>Rubus cf. idaeus</i> (malina)	NC	seme / seed	-	13
	<i>Physalis alkekengi</i> (nav. volčje jabolko)	NC	seme / seed	-	2
Vodne rastline Water plants	<i>Potamogeton</i> sp. (dristavec)	NC	seme/plod / seed/fruit	4	2
	<i>Myriophyllum spicatum</i> (klasasti rmanec)	NC	seme/plod / seed/fruit	-	1
	<i>Nuphar luteum</i> (rumeni blatnik)	NC	seme/plod / seed/fruit	7	-
	<i>Nymphaea alba</i> (beli lokvanj)	NC	seme/plod / seed/fruit	1	-
	<i>Najas marina</i> (velika podvodnica)	NC	seme/plod / seed/fruit	1	6
Obrežne, močvirne rastline Lakeshore, wetland plants	<i>Cladium mariscus</i> (navadna rezika)	C	seme/plod / seed/fruit	2	2
	<i>Schoenoplectus lacustris</i> (jezerski biček)	NC	seme/plod / seed/fruit	218	87
	<i>Carex</i> sp. – tricarpetate (trikarpelatni šaš)	NC	seme/plod / seed/fruit	2	-
	<i>Ajuga reptans</i> (plazeči skrečnik)	NC	seme/plod / seed/fruit	-	1
Rastline na vlažnih travnikih Wet grassland	<i>Ranunculus repens</i> (plazeča zlatica)	NC	seme/plod / seed/fruit	2	-
	cf. <i>Lotus</i> sp. (nokota)	NC	seme/plod / seed/fruit	2	-
Drevesa, grmi Wood	<i>Alnus glutinosa</i> (črna jelša)	NC	seme/plod / seed/fruit	1	-
	neidentificiran les / unidentified wood	C	fragment oglja charcoal fragment	.	.

Lokacija vzorcev / Location of samples: VZ 80 (SE 4; kv. / Qu. C5), VZ 81 (SE 4; kv. / Qu. C6)

Sl. 24: Devce. Arheobotanična analiza vzorcev z najdišča. C = zogleleno; NC = nezogleleno.

Fig. 24: Devce. Archaeobotanical analysis samples from the site. C = Carbonised; NC = Non-carbonised; Qu. = Quadrant; SE = Stratigraphic unit (SU).

nekateri ožgani kamni (sl. 9) in oglje iz vzorcev za arheobotanične raziskave.

Dendrokronološka analiza je pokazala, da se nobena izmed kronologij ni prekrivala s kronologijo BAR-3330, ki pokriva obdobje med 3771 in 3330 pr. Kr. in je sinhronizirana z južnonemško-švicarsko standardno kronologijo.³⁶ Glede na najdbe se zdi najverjetnejša razlaga, da se je na Črnelniku poselitve zgodila pred omenjenim časovnim intervalom ali na njegovem samem začetku, kar bodo potrdile ali ovrgle šele raziskave lesa s Črnelnika ali kakšnega drugega najdišča pričakovano iste starosti z Ljubljanskega barja, kot je npr. Gornje mostišče (sl. 1).³⁷

Po drugi strani in kot že omenjeno, relativni odnosi med koli potrujejo, da les večinoma ni bil posekan sočasno. Kaže se več gradbenih faz, predvsem pa večdesetletni, morda stoletni časovni razpon od poseka prvega do poseka zadnjega drevesa na najdišču (sl. 20, 21). Natančnejšega zaključka trenutno ni možno dati.

Kulturna opredelitev najdb z najdišča Črnelnik se zdi enostavnejša in bolj povedna. Tako je najznačilnejši fragment ostenja posode, ki je bil ornamentiran z vrezanim motivom, zapolnjenim z brez reda vrezanimi linijami in s sledovi bele inkrustacije (t. 6: 2). Analogije zanj najdemo na Gornjem mostišču,³⁸ v Kevdercu nad Škofjo Loko,³⁹

³⁶ Glej Čufar et al. 2015.

³⁷ Glej Velušček, Čufar 2008; Mlekuž, Mušič, Medarič 2014, 38.

³⁸ Velušček, Čufar 2008, sl. 4: 1.

³⁹ Leben 1963, npr. t. 2: 1.

Gradišču nad Dešnom,⁴⁰ Gradcu pri Mirni,⁴¹ med najmlajšimi eneolitскими najdbami s Spahe,⁴² v 9. naselbinski fazi Moverne vasi⁴³ itd. V vseh primerih v sklopu z najdbami, ki se jih uvršča v kulturo keramike z brazdastim vrezom.⁴⁴

V kulturno enakih sklopih najdemo tudi analogije za fragment skodele (*t.* 2: 6), in sicer v Kevdercu⁴⁵ ter na bolj oddaljenem najdišču Kalinovnjek v Prekmurju.⁴⁶ Plitvejšo skodelo podobnega profila in iz istega kulturnega kroga pozna tudi Malečnik pri Mariboru.⁴⁷

Kronološko izpoveden je tudi fragment ostenja, na katerem je upodobljen motiv členjenega traku, narejen s tehniko plitvega navadnega vreza, vbodi pa so izdelani tako, kot je to običajno za tehniko brazdastega vrezovanja (*t.* 6: 4). Analogije zanj najdemo na posodju kulture keramike z brazdastim vrezom, npr. na Hočevarici,⁴⁸ v Kevdercu,⁴⁹ Levakovi jami na jugovzhodu Dolenjske⁵⁰ in v jami z oznako PO 165 na Novi tabli v Prekmurju.⁵¹ Še bolj členjeni so trakovi na skodeli iste kulture z Bukovnice⁵² in s Kalinovnjeka.⁵³

Za plitvo skodelo z ornamentiranim vratom in nizkim težiščem trebuha (*t.* 2: 8) nismo našli neposrednih analogij. Kroglasto ostenje spominja na precej globlji posodi z Malečnika⁵⁴ in skodelico s Kalinovnjeka.⁵⁵ Na eni takšnih posod z Malečnika je ohranjena tudi noga,⁵⁶ ki je primerljiva fragmentu noge s Črnelnika (*t.* 2: 5). Podobno, le z nekoliko nižje postavljenim težiščem, poznamo iz Kevderca.⁵⁷ Noga je ohranjena tudi na fragmentu lonca s Hočevarice.⁵⁸

Zanimiv je še ornament, ohranjen na vratu skodele (glej *sl.* 7), ki je primerljiv izrezljanemu

ovoju iz brezovega lubja na toporišču dvojne sekire z najdišča Cham-Eslen. Predmet je bil verjetno namenjen kultu.⁵⁹ Enako surovino se je uporabljalo tudi za praktični namen, kot kaže npr. ovitek tulca za lok s Schnidejocha.⁶⁰

Zanimivi sta tudi posodi, od katerih je ohranjeno dno in del ostenja (*t.* 6: 8,9). Sta ornamentirani na podoben način, tj. z vrezi in vbodi. Površini obeh posod sta glajeni. Na obeh je najti tudi motiv trakov, zapolnjenih s krožci. Zdi se, kakor da jih je naredila ista roka.

Na posodje lasinjske kulture na prvi pogled⁶¹ spominja ostenje manjšega lonca, ki je na rame-nu ornamentiran s poševnimi linijami v tehniki žlebljenja (*t.* 6: 1).

Uvrstitev drugih fragmentov keramike, ki jih doslej še nismo omenili, v kulturo keramike z brazdastim vrezom tudi ni vprašljiva (npr. *t.* 1: 1–5; 2: 1,2; 3: 2; 4: 2,4,5; 5: 4). Analogije zanje najdemo na najdiščih te kulture, tako v Sloveniji kot drugod.⁶² Marsikatera oblika se seveda lahko pojavlja še v kasnejših obdobjih prazgodovine.⁶³

Lesna goba (*sl.* 15) je pripisana pogosto determinirani vrsti bukova kresilka (*Fomes fomentarius*).⁶⁴ Raste na stoječih poškodovanih drevesih ali na posekani hlodovini, predvsem na bukvah.⁶⁵ Uporabljala se je za različne namene. Trosnjake (*t.* i. trama) so uporabljali zlasti za netenje ognja, oskrboran, izdelovanje tkanin in kajenje.⁶⁶

Za vse analizirane kamne in kamnite artefakte lahko najdemo surovino v bližini arheološkega najdišča Črnelnik. Apnenec ter tudi dolomit gradi hribovito okolico, ki na jugu omejuje Ljubljansko barje. V zaledju arheološkega najdišča so okoliški hribi zgrajeni iz jurskih apnencev ter triasnih in jurskih dolomitov.⁶⁷ Od tam, natančneje iz jamskega okolja, so bili na najdišče prineseni *t.* i. reliefno

⁴⁰ Pavlin, Dular 2007, t. 13: 1,2,5,15,16,18; 14: 5,7, itd.

⁴¹ Dular et al. 1991, t. 26: 10a,b.

⁴² Velušček 2011a, t. 4.16: 11.

⁴³ Budja 1992, sl. 4: faza 9.

⁴⁴ Glej npr. Velušček 2004d, 231–250; Velušček 2011b, 223–224.

⁴⁵ Leben 1963, t. 2: 4; 3: 2.

⁴⁶ Kerman 2013, najdbi št. 463 in 591.

⁴⁷ Strmčnik-Gulič 2006, najdba št. 2.

⁴⁸ Velušček 2004b, t. 4.1.12: 1.

⁴⁹ Leben 1963, t. 1: 4; 2: 2; 3: 2.

⁵⁰ Guštin 1976, sl. 7 in 8; t. 1: 4.

⁵¹ Šavel, Guštin 2006, najdbi št. 43 in 44.

⁵² Šavel, Guštin 2006, sl. 1, najdba št. 3.

⁵³ Kerman 2013, najdbi št. 631 in 648.

⁵⁴ Strmčnik-Gulič 2006, najdbi št. 3 in 8.

⁵⁵ Kerman 2013, najdba št. 566.

⁵⁶ Strmčnik-Gulič 2006, najdba št. 3.

⁵⁷ Glej Leben 1963, t. 3: 6.

⁵⁸ Velušček 2004b, t. 4.1.7: 3.

⁵⁹ Gross, Huber 2016, 175.

⁶⁰ Hafner 2016, 428–429, sl. 650.

⁶¹ Prim. npr. s Kramberger 2014.

⁶² Glej npr. Kalicz 1991, sl. 16: 2; Budja 1992, sl. 4: naselbinski fazi 8 in 9; Velušček 2004b, t. 4.1.2: 7,9; 4.1.3: 2,4; 4.1.5: 4; 4.1.7: 1,6; 4.1.8: 5; 4.1.9: 4,5; 4.1.10: 1,9,10; 4.1.11: 1, itd.; Šavel, Guštin 2006, najdbe št. 20–24, 37 in 39; Artner et al. 2012, t. 5: R0-2; 6: R35-1,73-1.

⁶³ Glej npr. Bregant 1975, t. 15: 5; 17: 2,10; 22: 10,13; 26: 1,2; 32: 14; 34: 10, itd.; Kalicz 1991, sl. 19, 20 in 21.

⁶⁴ Weiner 2016, 315.

⁶⁵ Pohleven 2008.

⁶⁶ Pohleven, Korošec, Gregori 2015, 12; glej še Weiner 2012, 62–63; Weiner 2016, 315.

⁶⁷ Pleničar 1970.

korodirani apnenci (*sl. 9a*).⁶⁸ Več kosov različno velikih kamnov (*sl. 9*), ki so na eni strani ožgani, morda kaže, da so bili uporabljeni za ograditev ognjišča.⁶⁹

Nasprotno so nahajališča peščenjaka nekoliko bolj oddaljena od arheološkega najdišča. Gre za karbonski drobnozrnat sivi sljudnati kremenov peščenjak. Uporabljali so ga lahko tudi za izdelavo žrmelj.⁷⁰ Najbližje nahajališče tovrstnih kamnin je na osamelcih pri Notranjih Goricah, od Črnelnika je oddaljeno le nekaj kilometrov,⁷¹ vendar je tedaj ležalo na nasprotni strani jezera.

Lokalnega izvora je verjetno tudi roženec. Najdemo ga v podobni smeri, predvsem v okolici Ligojne, na severnem robu Ljubljanskega barja, kjer se v dolomitu pojavljajo pole in plasti roženca.⁷²

Dodaten gospodarski pomen temu območju je dajal lov. Na najdišču dokumentirana divjad je namreč pri izbiri habitata skoraj brez izjeme vezana prav na gozdove.⁷³ Ti so bili idealna rešitev tudi za prosto pašo domačih prašičev in vsaj deloma koz, medtem ko so bili za govedo in predvsem ovco primernejše jase ter bolj ali manj obsežni izseki.⁷⁴ Da so koliščarji v tedanjem času že redčili gozdne površine za kmetijske namene, ni vprašljivo.⁷⁵ Kot dokazujejo številne najdbe kulturnih in plevelnih rastlin⁷⁶ pa izkrčena območja niso bila nujno namenjena pašništvu, ampak mnogokdaj predvsem poljedelstvu. Vsaj deloma so se torej ovce in govedo morali zadovoljiti s prehranjevanjem v manj ugodnih, gozdnatih in celo vlažnih obrežnih predelih,⁷⁷ saj je vsakršno urejanje ustrežnejših pašniških površin terjalo velik dodaten delovni trud.

Manjša zahtevnost kozjereje napram ovčereji je bržčas predstavljala enega pglavitnih razlogov za prevlado kozjih ostankov nad ovčjimi,⁷⁸ ne pa tudi edinega. Pomembno vlogo je moral odigrati tudi tedaj še razmeroma ozek nabor izkoriščanih sekundarnih proizvodov reje teh živali, ki je vključeval

predvsem kožo, kosti⁷⁹ in mleko⁸⁰ (pri slednjem je bila zaradi večje mlečnosti tako ali tako v prednosti koza).⁸¹ Dobro tisočletje kasneje, ko je bilo izkoriščanje ovčjega runa v jugovzhodnoalpskem prosotru že povsem uveljavljeno, se je razmerje na koliščih Ljubljanskega barja bistveno spremenilo in se močno nagnilo v prid ovce.⁸² Tako je bilo kljub dejstvu, da je lokalno okolje ovčereji še vedno ostajalo razmeroma nenaklonjeno.⁸³

Številčnost ostankov divjadi priča o tem, da je bil za prazgodovinske prebivalce Črnelnika lov zelo verjetno količinsko pomembnejši vir mesa in maščob od živinoreje. Nekaj previdnosti za takšno trditev je potrebne predvsem zaradi skromne površine izkopnega polja, ki je zajel le manjši del celotnega območja prazgodovinske vasi. Porazdelitev živalskih ostankov znotraj koliščarskih naselbin namreč praviloma ni homogena, kar kaže v pomembni meri pripisati prav različnemu spektru aktivnosti stanovalcev posameznih kolib.⁸⁴ Znatna heterogenost v horizontalni razpršenosti kosti in zob je bila ugotovljena tudi na Črnelniku. Spomnimo: znotraj testne sonde TS35 je bilo najdenih sedem govejih in devet jelenjih ostankov, na raziskanem delu makadamske ceste pa je bilo govejih ostankov osem, jelenjih pa najmanj 27. Z upoštevanjem taksonomsko ne povsem zanesljivo opredeljenih odlomkov reber število jelenjih najdb naraste celó na 41! Ker pa prevlado ostankov lovnih vrst nad domačimi izkazuje tudi večina drugih koliščarskih naselbin z Ljubljanskega barja iz 4. tisočletja pr. Kr.,⁸⁵ se jo zdi vendarle utemeljeno domnevati tudi za Črnelnik.

Kaj pa živinoreja? V prvi polovici 4. tisočletja je bil njen osnovni namen zagotavljanje čim večjih količin mesa in maščob. Kot že omenjeno, se je intenzivno izkoriščanje sekundarnih proizvodov reje pojavilo šele pozneje (vlečne sile goveda, denimo, v drugi polovici 4. tisočletja, ovčjega runa nemara še nekoliko kasneje⁸⁶). Velika skrb za povečanje iztržka prireje mesa in zagotavljanje kar se da stalnega dostopa do te vrste hrane, je ključno določala politiko zakola. Polčetrto leto staro govedo, ki je v analiziranem gradivu zastopano z distalnim delom

⁶⁸ Podobne poznamo že s kolišča Stare gmajne (glej Turk J. 2009, 284).

⁶⁹ Prim. z Dieckmann, Harwath, Hoffstadt 2006, 221–222.

⁷⁰ Turk J. 2009, 283.

⁷¹ Pleničar 1970.

⁷² Pleničar 1970.

⁷³ Kryštufek 1991.

⁷⁴ Glej npr. Higham 1968; Kühn et al. 2013, 53–55.

⁷⁵ Jeraj 2004, 63–64; Andrič 2009.

⁷⁶ Glej zgoraj in Jeraj 2004, 61.

⁷⁷ Prim. Kühn et al. 2013, 54.

⁷⁸ Glej str. 18 in tudi še Toškan, Dirjec 2004, 83–84.

⁷⁹ Glej str. 35.

⁸⁰ Ogrinc et al. 2014, 190–191.

⁸¹ Higham 1968, 94.

⁸² Toškan 2009a, 55; Velušček, Toškan, Čufar 2011, 58.

⁸³ Bartosiewicz, Choyke, Gál 2009a, 56.

⁸⁴ Prim. Marti-Grädel et al. 2003; Toškan 2009c, 301–302.

⁸⁵ Toškan, Dirjec 2004, 78–83; Toškan, Dirjec 2006, tab. 1; Velušček et al. 2004, tab. 3; Toškan 2009c, tab. 14.3.

⁸⁶ Velušček, Čufar, Zupančič 2009; Greenfield 2010.

Takson / Taxon	Skeletni element Skeletal element	Največja dolžina (v mm) Greatest length (in mm)	Opis / Description
<i>C. elaphus</i>	metacarpus	97,0	poškodovano šilo / fragmented awl
<i>C. elaphus</i>	metatarsus	113,5	poškodovano šilo / fragmented awl
<i>B. taurus</i>	ulna	103,5	celo šilo / unfragmented awl
Caprinae	tibia	58,0	celo šilo / unfragmented awl
Aves	dolga kost / long bone	152,0	poškodovano šilo / fragmented awl
Aves	dolga kost / long bone	10,0	na koncih obrušen obroček / ringlet
Indeterminatus	dolga kost / long bone	102,0	poškodovano šilo / fragmented awl

Sl. 25: Črnelnik. Koščeni artefakti med živalskimi ostanki s koliščarske naselbine.

Fig. 25: Črnelnik. Osseous artefacts among animal remains from the pile-dwelling settlement.

stegenice v fazi zraščanja epifize z diafizo, je bilo denimo zaklano tik pred začetkom zime.⁸⁷ Tako je bilo mogoče izkoristiti visoko stopnjo hranilnosti mesa po zaključeni obilni pašni sezoni ter obenem zmanjšati potrebo po zagotavljanju zimske krme. Podobno časovno naravnano zakol lahko domnevamo tudi pri drobnici in prašiču.⁸⁸ Del pri tem pridobljenega svežega mesa so koliščarji seveda konzervirali in ga zaužili šele v naslednjih tednih in mesecih. Ker so ob koncu zime jesenske zaloge večinoma že pošle, pomladna regeneracija čred pa se je komaj začela, je kot ključni vir svežega rdečega mesa vse tja do pozne pomladi domnevno obveljal lov. Podatki s Črnelnika so s takšno tezo skladni, saj lahko kar nekaj jelenjih kosti⁸⁹ in najmanj večjega od obeh rogovij srnjaka povežemo s pomladi uplenjeno divjadjo.

Oblike neprehranskega izkoriščanja domačih in divjih živali, ki jih lahko na podlagi razpoložljivih najdb potrdimo tudi za koliščarje s Črnelnika, vključujejo izdelovanje koščenega orodja in predelavo kožuhov v krzno. Zbir odkritih koščenih artefaktov obsega šest šil, od katerih sta bili dve povsem nepoškodovani, in krajši obroček (sl. 25). V skladu s pričakovanji so bili ti predmeti – večinoma gre za orodja – izdelani iz kosti divjih živali, tako sesalcev kot ptičev.⁹⁰ O uporabi kožuhov posredno priča zastopanost več vrst zveri in bobra. Čeprav je utegnita biti uplenitev rjavega medveda in morda volka predvsem obrambno dejanje, bi lahko bila namreč v ozadju lova na jazbeca, lisico in bobra prav želja po pridobivanju krzna. V ta namen naj

bi koliščarji s Črnelnika odirali celo pse, o čemer pričajo sledi urezov na spodnječeljustničnem telesu ene od čeljustnic.⁹¹

Pri divjih zvereh je odiranju bržčas rutinsko sledilo zaužitje mesa, o čemer pričajo urezi nad distalno epifizo jazbeče stegenice. Vsaj včasih je enaka usoda doletela tudi pse.⁹² Med najdbami s Črnelnika je to razvidno iz sledi urezov na anteriornem robu spodnječeljustnične veje, ki so domnevno nastali med odstranjevanjem spodnje čeljustnice v procesu primarnega kosaanja kadavra (sl. 26).⁹³

Odkritje treh razmeroma dobro ohranjenih spodnjih čeljustnic psa je zanimivo tudi zato, ker nam v kombinaciji z rezultati analize pasjega koprolita⁹⁴ (sl. 17 in 18) ponuja vpogled v njegov odnos s tedanjim človekom. Po dimenzijah spodnjega derača (M_1), ki velja za verodostojni kazalec velikosti celotne živali, so vse tri čeljustnice pripadale razmeroma majhnim osebkom s plečno višino med 30 in 40 cm.⁹⁵ Znano je, da podoben telesni ustroj kaže pretežni del psov s prazgodovinskih kolišč na Ljubljanskem barju in širše,⁹⁶ kar naj bi bilo po mnenju Bartosiewiczza povezano z njihovo obrobno vlogo v življenju tedanjih ljudi. Ti naj namreč nad psi ne bi izvajali nikakršnega resnejšega nadzora, prav tako naj ne bi izrecno skrbeli za njihovo razplojevanje in prehrano. S slednjim se lepo ujema ugotovitev, da so bili med ribjimi ostanki v že omenjenem koprolitu domnevno zastopani zgolj zobje in kosti glave, ki človeku bržčas niso bili zanimivi. Odsotnost nadzora nad parjenjem in precejšnja

⁸⁷ Takšna ocena temelji na predpostavki, da je bila kotitev v poznopomladanskem do zgodnjepoletnem času, tako kot to danes opažamo pri divje živečem domačem govedu (glej npr. Ball, Peters 2004).

⁸⁸ Glej npr. Toškan, Dirjec 2004, 121–122.

⁸⁹ Npr. spodnja čeljustnica z mlečnimi ličniki, lopatica, proksimalni del nadlahtnice, distalni del golenice.

⁹⁰ Toškan 2009c; 2010.

⁹¹ Prim. Zeiler 1987.

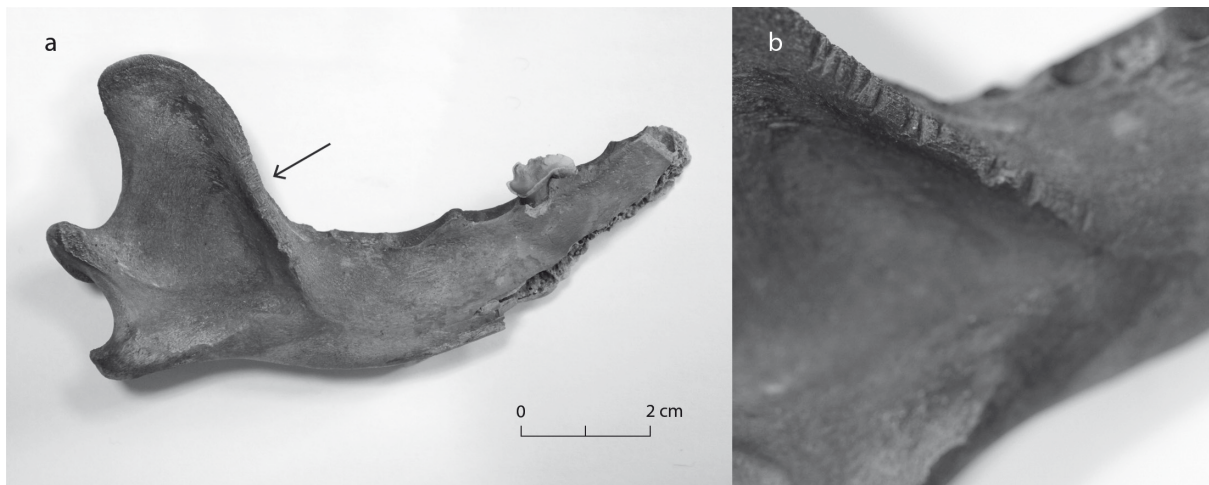
⁹² Prim. Bartosiewicz 1999, 314.

⁹³ Prim. Zeiler 1987.

⁹⁴ Glej str. 25–26.

⁹⁵ Prim. Bartosiewicz 2002, 79–83.

⁹⁶ Bartosiewicz 2002, 83–85.



Sl. 26: Črnelnik. Spodnja čeljustnica psa z urezi na anteriornem robu spodnječeljustnične veje. (Foto D. Valoh)
 Fig. 26: Črnelnik. A dog's mandible with cuts on the anterior edge of the ramus.

prepuščenost samim sebi pri iskanju hrane naj bi ključno prispevali k majhnosti koliščarskih psov. V prehranskem smislu so te živali tako domnevno zasedale nišo mrhovinarja.⁹⁷

Bolj kot psi so človekove zaloge hrane ogrožali gladavci.⁹⁸ Ob odsotnosti hišne miši in podgane so koliščarjem s Črnelnika v tem smislu največ težav bržčas povzročale belonoge miši (*Apodemus*), ki v stavbe zahajajo še danes.⁹⁹ Rod je zastopan tudi med najdbami z nekaterih prazgodovinskih koliščarskih naselbin Ljubljanskega barja.¹⁰⁰ Izkopavanja na Črnelniku kostnih ostankov gladavcev sicer niso dala, so pa bili v vzorcih sedimenta za arheobotanične raziskave odkriti njihovi koproliiti.

Arheobotanična analiza je pokazala, da so bili daleč najbogatejši vzorci, še zlasti vzorca 75 in 76, odvzeti iz kulturne plasti najdišča Črnelnik (sl. 13). Odkrili smo 2–3 taksone kulturnih rastlin in 11–12 nabiranih rastlinskih taksonov. Presenetila je odsotnost nekaterih taksonov, kot so semena in plodne glavice lanu (*Linum usitatissimum*) in maka (*Papaver somniferum*), pa tudi nežne nezoglenele pleve pšenice, kot sta enozrnica (*Triticum monococcum*) in dvoznica (*Triticum dicoccum*). Ker jih najdemo v metodološko primerljivo pobranih vzorcih z npr. koliščarskega najdišča Stare gmajne,¹⁰¹ njihovo odsotnost lahko pripišemo

uporabi neustrezne metode mokrega sejanja in shranjevanja vzorcev¹⁰² ali poizkopavalnemu delu v laboratoriju, tj. grobemu spiranju in naknadnemu sušenju rastlinskih makroostankov.¹⁰³ Na slednje opozarjajo arheobotanične raziskave mahu in domnevno pasjega koproliita, v katerih se pojavlja lan, ki je občutljiv rastlinski takson na neustrezno ravnanje z vodo prepojenimi vzorci.

V vzorcih iz kulturne plasti smo vseeno našli nekaj ostankov kulturnih rastlin, predvsem tistih z odpornejšo ali zoglenelo površino, kot so žitna zrna ter odlomki rahisa navadnega ječmena in dvoznice, semena oljne ogrščice ter tudi ostanke nekaterih plevelnih rastlin z odpornejšimi tkivi, ki vsi pričajo o obstoju obdelovalnih površin.

Po drugi strani semena oz. plodovi vlagoljubnih ter prehransko nepomembnih rastlin, kot so plazeča zlatica, plazeči skrečnik, korenje, šaš, črna jelša, breza, nav. rezika, jezerski biček, ježek, velika podvodnica, lokvanj, blatnik, klasasti rmanec in dristavec, pričajo o močvirnem oz. obrežnem in vodnem okolju počasi tekoče oz. stoječe vode. Ti taksoni predstavljajo naravno rastje v bližnji okolici prazgodovinskega naselja.

Na podobne taksone smo naleteli tudi iz verjetno kronološko sočasne plasti v testni sondi TS34, ki je bila zastavljena južno od najdišča, kjer je prav tako zaznati primerljivo obrežno in vodno vegetacijo (sl. 13).

⁹⁷ Bartosiewicz 2002, 85–88.

⁹⁸ Dark, Gent 2001.

⁹⁹ Kryštufek 1991, 155, 157; glej tudi npr. Cucchi, Vigne 2006, 103.

¹⁰⁰ Toškan 2012.

¹⁰¹ Tolar et al. 2011.

¹⁰² Tolar et al. 2010.

¹⁰³ Tolar et al. 2010.

Ostanke oglja, rib, spor gliv¹⁰⁴ (glej *sl. 13*) in koproлите malih sesalcev¹⁰⁵ lahko razumemo kot indikator prisotnosti človeka oz. ti ostanki kažejo na območje, kjer je živel človek.

V pribl. 7 cm dolgem iztrebku s Črnelnika so prevladovali ostanki rib (*sl. 18a,b*). Menimo, da gre za pasji iztrebek, saj naj bi v človeških prevladovali rastlinski ostanki.¹⁰⁶ Še več, v iztrebku s Črnelnika so bili odkriti ostanki posameznih delov ribjih glav, ne pa tudi vretenc. Tako je še verjetneje, da je iztrebek dejansko pripadal psu in ne človeku, kot se je na začetku raziskave, zaradi podobnosti v obliki in strukturi,¹⁰⁷ predpostavljalo kot druga možnost.

Za popestritev jedilnika je žival posegla tudi po rastlinski hrani (*sl. 18c*). Med rastlinskimi taksoni prevladujejo taksoni nekulturnih rastlin, ki tezo, da ne gre za človeški iztrebek,¹⁰⁸ dodatno potrjujejo.

Ostanki mahu (*sl. 16*), ki izvirajo z najdišča Črnelnik, so dveh vrst. Mah (*Neckera crispa*) iz rodu zavešček, ki z jelko (*Abies alba*) sestavlja posebno združbo *Neckero-Abietum*. Zanj je značilno, da uspeva na skalnatih površinah na območju dinarskega jelovo-bukovega gozda, na nadmorski višini od 450 (600) do 1200 m. Danes ga najdemo predvsem na Kočevskem, v Snežniškem pogorju, tudi v vzhodnem delu Trnovskega gozda in na Nanosu, kjer raste na skalnih blokih, ki jih skoraj v celoti pokrivajo mahovi, med katerimi je najpogostejši prav mah zavešček (zavesar).¹⁰⁹

Zaradi pogostnosti pojavljanja mahu, predvsem zaveščka, na arheoloških najdiščih se postavlja vprašanje, ali je bil tako zelo pogost v nekdanjih gozdovih ali pa je bil namerno iskana vrsta, zaradi svojih vsestransko uporabnih lastnosti.¹¹⁰ Te so zelo raznolike, denimo kot surovina za mašenje razpok v lesenih čolnih, kolibah,¹¹¹ za izdelavo podplatov,¹¹² razmaščevanje posod¹¹³ in zavijanje hrane¹¹⁴ do uporabe kot higienski pripomoček.¹¹⁵

Tako prva kot druga determinirana vrsta mahu (*Anomodon viticulosus*) ne veljata za močvirni ali

vodni vrsti, zato sta bili najverjetneje nabrani v jelovo-bukovem gozdu,¹¹⁶ ki je obdajal območje tedanjega jezera na Ljubljanskem barju, torej tam, od koder izvirajo tudi korodirani kamni (*sl. 9a*) in lesna goba (*sl. 15*).

Ker torej ti vrsti na Ljubljanskem barju ne uspevata, je na dlani, da so ga koliščarji s Črnelnika na kolišče prinašali in zaradi koristnosti najverjetneje tudi namenoma nabirali v gozdu.¹¹⁷ Kljub odsotnosti podatkov o dejanski rabi vseeno lahko trdimo, da se je slednje dogajalo v času obstoja kolišča. V mahu so bili namreč odkriti ostanki kulturnih rastlin, kot je lan, in živali, kot so koproлите malih sesalcev, ki so vsi antropogeni indikator.¹¹⁸

Devce

Z najdišča Devce – vakuumska postaja 2 (*sl. 2* in 22) je pridobljenih malo podatkov za relevantno razlago o arheološkem značaju najdišča. Trije priostreni debelejši koli v ničemer ne odstopajo od kolov s kolišč iz vseh obdobij na Ljubljanskem barju.

Malo je bilo tudi arheoloških najdb. Pojavljala se je enostavna keramika, časovno razširjenih oblik. Za plitvo skledico temno sive in mestoma oranžne barve (*t. 7: 9*) najdemo analogije predvsem na eneolitskih najdiščih. Na Ljubljanskem barju so prisotne že v 4.¹¹⁹ in nato vsaj še v 3. tisočletju pr. Kr.¹²⁰

Drugi fragment je del ustja z ostenjem lonca (*t. 7: 8*). Bližnje analogije najdemo na najdiščih 4. tisočletja.¹²¹ Enostavna oblika se pojavlja tudi kasneje v mlajših obdobjih prazgodovine.¹²²

Tretji predmet z najdišča Devce je ost iz živalske kosti – golenice, ki je na distalnem delu ošiljena (*t. 7: 11*).¹²³ V njej je bila najdena bodica rastlinskega izvora (*t. 7: 10*). V dolžino meri 2,8 cm in na talonu do 0,5 cm. Vprašanje, ali sta ta predmeta v kakšni medsebojni povezavi, razen tega, da sta bila najdena skupaj, ostaja brez odgovora.

¹⁰⁴ Prim. Jacomet, Brombacher, Dick 1989; Moskal-del Hoyo, Wachowiak, Blanchette 2010.

¹⁰⁵ Glej zgoraj.

¹⁰⁶ Glej Byrne 1973.

¹⁰⁷ Prim. Le Bailly, Leuzinger, Schlichtherle 2016, 146.

¹⁰⁸ Boenke 2007; Britton, Huntley 2011.

¹⁰⁹ Drakskobler, Marinšek 2009.

¹¹⁰ Dickson 2000.

¹¹¹ Arnold 1977; Monnier et al. 1991; Saatkamp, Guyon, Philippe 2011.

¹¹² Hochuli 2002.

¹¹³ Constantin, Kuijper 2002.

¹¹⁴ Dickson 2000; Dickson et al. 2009.

¹¹⁵ Rybniček, Dickson, Rybničekova 1998; Vadam 2003.

¹¹⁶ Dickson 2000; Drakskobler, Marinšek 2009.

¹¹⁷ Rösch 1988; Rybniček, Dickson, Rybničekova 1998; Dickson 2000.

¹¹⁸ Glej zgoraj.

¹¹⁹ Npr. Bregant 1975, t. 28: 3,4; 34: 10.

¹²⁰ Npr. Korošec, Korošec 1969, t. 50: 6,11; Velušček, Čufar 2003, t. 2: 4.

¹²¹ Npr. Korošec 1963, t. 23: 3; 27: 2,9; Bregant 1975, t. 33: 13,14; Velušček 2009, t. 3.17: 1; 3.20: 6, itd.

¹²² Npr. Dular et al. 1991, t. 3: 3,4.

¹²³ Gál 2011, 140, sl. 5.

Skromen je tudi nabor živalskih najdb. Poleg dveh ostankov rib in predvsem treh močvirske sklednice, ki potrjujejo bližino stoječih oz. počasi tekočih voda, je bilo namreč najdeno le še delno ohranjeno okostje zelo verjetno enega jelena. Zaradi odsotnosti kakršnih koli znakov človekovih aktivnosti na teh kosteh je treba opozoriti na možnost, da jelenje okostje z naselbino morda sploh ni povezano.

Tudi v arheobotaničnih vzorcih z najdišča Devce je bilo odkritih malo rastlinskih makroostankov (*sl. 24*). Kulturnih (gojenih) in plevelnih taksonov ni bilo ohranjenih. Na antropogeni vpliv, resda zelo šibek, morda kažejo ostanki treh domnevno nabiranih taksonov: robida, malina in volčje jabolko.¹²⁴

Pomembnejši so ostali neantropogeni rastlinski ostanki, ki kažejo vegetacijsko sliko bližnje okolice. Na najdišču Devce prevladujejo močvirni oz. obrežni in vodni taksoni, kar na mestu odvzema vzorcev 80 in 81 kaže na bližino plitvega vodnega in obvodnega okolja.

Na podlagi zbranih podatkov o značaju najdišča Devce še ni mogoče podati z argumenti podprte razlage. Tako ni jasno, ali gre za ostanke neke doslej še neznane glavne naselbine ali ostanke objektov oz. naprav, ki so jih zaradi ekonomskega interesa, bodisi ribolova bodisi česa drugega, postavili prebivalci glavnega naselja, ki je bilo nekje v bližini.¹²⁵ V tem primeru so najbližja najdišču kot glavna naselja lahko kolišče Črnelnik iz prvih stoletij 4. tisočletja, kolišče Založnica, ki je svoj vrh doživelo v 25. stoletju pr. Kr.,¹²⁶ in morda tudi bronastodobno naselje na Žabjem gradu (*sl. 1*).¹²⁷

O stvarnih povezavah med temi različnimi arheološkimi enotami na južnem obrobju Ljubljanskega barja trenutno ni mogoče argumentirano razpravljati. Najdišče Devce, kljub analizi, ostaja kronološko nenatančno umeščeno. Zagotovo je le, da sodi v prazgodovino. Kot kaže arheobotanična analiza, v obdobje, ko je na Ljubljanskem barju še bilo jezero. To pomeni, da najdišče Devce na podlagi zbranih podatkov lahko postavimo v eneolitik, morda celo v bronasto dobo. V absolutnih številkah to pomeni v obdobje od 4. do 2. tisočletja pr. Kr.

SKLEP

V članku so predstavljeni rezultati arheoloških izkopavanj, ki so potekala ob gradnji kanalizacijskega omrežja na južnem robu osrednjega dela Ljubljanskega barja pod vasjo Kamnik pod Krimom. Interdisciplinarno so obravnavani podatki z novoodkritih prazgodovinskih najdišč Črnelnik in Devce – vakuumska postaja 2 (*sl. 1* in 2).

Več podatkov je bilo pridobljenih za najdišče Črnelnik, kjer so bili odkriti ostanki koliščarske poselitve iz obdobja kulture keramike z brazdastim vrezom. Je četrto¹²⁸ oz. morda že peto¹²⁹ najdišče te kulture na Ljubljanskem barju.¹³⁰

Analiza keramike in dendrokronološke raziskave kažejo, da se je na Črnelniku poselitev najverjetneje začela v prvih stoletjih 4. tisočletja. Koliščarska vas, ali celo več zaporednih vasi, je bila obljudena najverjetneje v 39. in morda tudi še v prvi polovici 38. stoletja pr. Kr., kar jo uvršča na sam začetek prisotnosti najdišč omenjene kulture na Ljubljanskem barju. Postavljamo jo pred poselitvijo na Strojjanovi vodi in Hočevarici,¹³¹ morda ob bok poselitvi na Gornjem mostišču (*sl. 1*).¹³²

O arhitekturi s Črnelnika je bilo zbranih malo podatkov. Ugotovljeno je, da so za nosilne kole pri gradnji kolib uporabljali predvsem hrastov in jesenov les in da so na kolišče prinašali korodirane kamne iz jam in mah, ki se jih najde v bližnjih gozdovih na pobočjih 1107 metrov visokega Krima in drugih vršacev južno od Ljubljanskega barja. Uporabljali so tudi surovino, za katero najdemo nahajališča severno od najdišča, na takratni drugi strani jezera pri Notranjih Goricah ali severneje od tam.

Nekaj podatkov govori tudi o koncu poselitve na najdišču Črnelnik, ki se je morda končala zaradi dviga gladine jezera (*sl. 6*). Dejstvo je, da se potem na istem mestu poselitev ni nikoli več obnovila. Morda pa je bil vzrok prekinitve življenja ene izmed vasi tudi požar, ki je dokumentiran z ostanki prežganega hišnega lepa (*sl. 8*), nekaterimi ožganimi kamni (*sl. 9*) in drobcu oglja.

¹²⁸ Poleg Hočevarice (Velušček 2004a), Gornjega mostišča in Strojjanove vode (Velušček, Čufar 2008).

¹²⁹ Če v kulturo keramike z brazdastim vrezom uvrstimo tudi del najdb s kolišča Notranje Gorice (glej Velušček 2004c, 218–230).

¹³⁰ Glej najdišča kulture keramike z brazdastim vrezom na Ljubljanskem barju (*sl. 1*).

¹³¹ Glej Čufar et al. 2015.

¹³² Glej Velušček, Čufar 2008; Mlekuž, Mušič, Medarič 2014.

¹²⁴ Tolar et al. 2011.

¹²⁵ Prim. s Podpečan 2015, 35; Hafner, Pétrequin, Schlichtherle 2016, 64; Köninger 2016, 247–249.

¹²⁶ Velušček, Čufar 2003; Velušček 2014.

¹²⁷ Nadbath et al. 2008.

Rezultati arheozooloških raziskav kažejo, da sta imela za koliščarje s Črnelnika pomembno vlogo tako živinoreja kot lov, da pa je bil slednji v količinskem smislu vendarle pomembnejši. Pri tem je pomembno poudariti, da podobno sliko kažejo praktično vsa arheozoološko obdelana kolišča 4. tisočletja z Ljubljanskega barja,¹³³ kar predstavljeni ugotovitvi dviguje verodostojnost. Med izkopavanji odkriti ostanki divjadi so pripadali vrstam, ki so pri izbiri habitata skoraj brez izjeme vezane na gozdove (glej *sl.* 10).¹³⁴ Ti so predstavljali idealno rešitev tudi za prosto pašo domačih prašičev in do neke mere koz, medtem ko so bili za govedo in predvsem ovco bržčas primernejše jase ter bolj ali manj obsežni izseki.¹³⁵ Da so koliščarji v tedanjem času že redčili gozdne površine za kmetijske namene ni vprašljivo.¹³⁶ Kot dokazujejo številne najdbe kulturnih in plevelnih rastlin,¹³⁷ pa izkrcena območja niso bila nujno namenjena pašništvu, temveč tudi poljedelstvu.

Lov in živinoreja nista predstavljala le vir hrane. Koliščarji so iz kosti izdelovali orodja. Nekatere zveri in bobre so lovili tudi za krzno. V ta namen naj bi odirali celo pse. Tem koliščarji domnevno niso namenjali večje skrbi, zaradi česar so bili nizke rasti s plečno višino med 30 in 40 cm. V prehranskem smislu naj bi zasedali nišo mrhovinarja.

¹³³ Toškan, Dirjec 2004, 78–83; Toškan, Dirjec 2006, tab. 1; Velušček et al. 2004, tab. 3; Toškan 2009c, tab. 14.3.

¹³⁴ Kryštufek 1991.

¹³⁵ Glej npr. Higham 1968; Kühn et al. 2013, 53–55.

¹³⁶ Jeraj 2004, 63–64.

¹³⁷ Glej str. 36 in Jeraj 2004, 61.

Bolj kot psi so človekove zaloge hrane ogrožali glodavci: morda rumenogrla miš (*Apodemus flavicollis*) in navadna belonoga miš (*A. sylvaticus*), ki sta zastopani med najdbami z nekaterih drugih prazgodovinskih kolišč Ljubljanskega barja.¹³⁸ Izkopavanja na Črnelniku kostnih ostankov glodavcev sicer niso dala, so pa bili v vzorcih sedimenta za arheobotanične raziskave odkriti njihovi koproliiti.

Kljub neustrezni metodi zajemanja in obdelave vzorcev je arheobotanična analiza v vzorcih s kolišča potrdila obstoj taksonov 2–3 kulturnih in 11–12 nabiranih rastlin. Lan (*Linum usitatissimum*) je bil odkrit v mahu in pasjem iztrebku.

Kulturne in plevelne rastline kažejo na obdelovalne površine, najverjetneje v zaledju kolišča. Semena oz. plodovi vlagoljubnih rastlin, ki prehransko niso pomembni, pa pričajo o močvirnem oz. obrežnem in vodnem okolju počasi tekoče ali stoječe vode. Zelo verjetno gre za naravno rastje v bližnji okolici prazgodovinskega najdišča.

Drugo najdišče, ki smo ga obravnavali, so Devce – vakuumska postaja 2. Podatkov je bilo premalo, da bi o njem lahko zapisali kaj določnejšega. Pomembna se zdi arheobotanična analiza, ki je opozorila na okoljske razmere v neposredni okolici najdišča. Še vedno kaže na obstoj jezera. To pa je bilo poleg prazgodovinske keramike (*t.* 7: 8,9) tudi najpomembnejše izhodišče za datacijo najdišča, ki ga tako uvrščamo v eneolitik, v 4. ali 3. tisočletje, in/ali celo v bronasto dobo.

¹³⁸ Toškan 2012.

KATALOG NAJDB*

Črnelnik (t. 1–6; 7: 1–7)

Tabla 1

1. Frag. ustja z ostenjem, dnom in trakastim držajem; keramika; temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 56.
2. Frag. ustja z ostenjem; keramika; temnosiva; drobnoprznata. Makadamska cesta; datum: avgust 2014; evid. št. 23.
3. Frag. ustja z ostenjem; keramika; temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 77.
4. Skledica z delno poškodovanim razčlenjenim držajem; keramika; temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 57.
5. Frag. ustja z ostenjem; keramika; zunaj: temnosiva; znotraj: siva; drobnoprznata. Makadamska cesta; datum: avgust 2014; evid. št. 24.
6. Frag. razčlenjenega ustja z ostenjem; keramika; temnosiva; drobnoprznata. Makadamska cesta; datum: avgust 2014; evid. št. 10.
7. Frag. ustja z ostenjem; keramika; temnosivo-siva; drobnoprznata. Makadamska cesta; datum: 3. 11. 2014; evid. št. 20.
8. Frag. ustja z ostenjem; keramika; temnosiva; drobnoprznata. Makadamska cesta; datum: avgust 2014; evid. št. 27.
9. Frag. ustja z ostenjem; keramika; temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 71.
10. Frag. ustja z ostenjem; keramika; temnosiva; drobnoprznata. Makadamska cesta; datum: avgust 2014; evid. št. 17.
11. Frag. ustja z ostenjem; keramika; temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 76.
12. Frag. razčlenjenega ustja z ostenjem; keramika; sivo-temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 66.
13. Frag. ustja z ostenjem; keramika; sivo-temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 65.

Tabla 2

1. Frag. ustja z ostenjem; keramika; temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 62.
2. Frag. ustja z ostenjem; keramika; siva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 61.
3. Frag. ustja z ostenjem; keramika; zunaj: sivo-temnosiva; znotraj: temnosivo-siva; drobnoprznata. Makadamska cesta; datum: 15. 10. 2014; evid. št. 21.
4. Frag. ustja z ostenjem; keramika; zunaj: temnosivo-siva; znotraj: temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 64.
5. Frag. noge; keramika; temnosivo-siva; drobnoprznata. Makadamska cesta; datum: 3. 11. 2014; evid. št. 18.
6. Frag. ustja z ostenjem; vrezi in vbodi; keramika; temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 60.

7. Frag. ustja z ostenjem in trakastim držajem/ročajem; keramika; temnosiva-siva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 95.

8. Frag. ustja z ostenjem; žlebova in inkrustacija; inkrustacija prekriva nazobčan trak rastlinskega izvora; površina je glajena; keramika; temnosiva; drobnoprznata. Makadamska cesta; datum: avgust–september oz. september 2014; evid. št. 3.

Tabla 3

1. Frag. ustja z ostenjem; keramika; temnosiva; drobnoprznata. Makadamska cesta; datum: september 2014; evid. št. 15.
2. Frag. ustja z ostenjem in razčlenjenim držajem; pod ustjem odtisi; keramika; zunaj: sivo-temnosiva; znotraj: temnosivo-siva; drobnoprznata. Makadamska cesta; datum: september 2014; evid. št. 5.
3. Frag. ustja z ostenjem; pod ustjem odtisi; keramika; zunaj: siva; znotraj: temnosiva; drobnoprznata. Makadamska cesta; datum: avgust 2014; evid. št. 9.
4. Frag. ustja z ostenjem; pod ustjem odtisi; keramika; temnosivo-siva; drobnoprznata. Makadamska cesta; datum: 3. 11. 2014; evid. št. 14.
5. Frag. ustja z ostenjem; pod ustjem odtisi; keramika; temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 68.

Tabla 4

1. Frag. razčlenjenega in odebeljenega ustja z ostenjem; pod ustjem odtisi; keramika; temnosivo-siva; drobnoprznata. Makadamska cesta; datum: avgust 2014; evid. št. 12.
2. Frag. razčlenjenega ustja z ostenjem; keramika; temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 86.
3. Frag. razčlenjenega in odebeljenega ustja z ostenjem; keramika; siva-temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 85.
4. Frag. poudarjenega ustja z ostenjem in elipsastim držajem/bradavico; pod ustjem odtisi; keramika; zunaj: temnosivo-siva; znotraj: temnosiva; drobnoprznata. Makadamska cesta; datum: 27. 10. 2014; evid. št. 6.
5. Frag. ustja z ostenjem; keramika; zunaj: temnosivo-siva; znotraj: temnosiva; drobnoprznata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 63.
6. Frag. ustja z ostenjem; keramika; temnosiva; drobnoprznata. Makadamska cesta; datum: avgust 2014; evid. št. 29.
7. Frag. ustja z ostenjem; keramika; temnosivo-siva; drobnoprznata. Makadamska cesta; datum: avgust 2014; evid. št. 16.
8. Frag. ustja z ostenjem; keramika; sivo-temnosiva; drobnoprznata. Makadamska cesta; datum: september 2014; evid. št. 19.
9. Frag. ustja z ostenjem in trakastim ročajem; keramika; sivo-temnosiva; drobnoprznata. Makadamska cesta; datum: september 2014; evid. št. 4.
10. Frag. ustja z ostenjem; keramika; zunaj: siva; znotraj: temnosivo-siva; drobnoprznata. Makadamska cesta; datum: avgust 2014; evid. št. 25.

* Vsa kermika je izdelana prostoročno.

11. Frag. ustja z ostenjem; keramika; zunaj: temnosivo-siva; znotraj: temnosivo; drobnozrnata. Makadamska cesta; datum: 15. 10. 2014; evid. št. 22.

12. Frag. ustja z ostenjem; temnosiva; drobnozrnata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 78.

Tabla 5

1. Frag. ostenja z razčlenjenim držajem/dvema bradavica; keramika; temnosiva-siva; drobnozrnata. Makadamska cesta; datum: september 2014; evid. št. 8.

2. Frag. ostenja z vertikalno prevratnim držajem; keramika; zunaj: temnosivo-siva; znotraj: temnosiva; drobnozrnata. Makadamska cesta; datum: september 2014; evid. št. 7.

3. Frag. ostenja z jezičastim držajem; keramika; temnosiva; drobnozrnata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 94.

4. Frag. ostenja z bradavico/bradavicami – ohranjeno ležišče še dveh bradavic; keramika; zunaj: sivo-temnosiva; znotraj: temnosiva; drobnozrnata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 99.

5. Frag. ostenja z vertikalno prevratnim držajem; zunaj: temnosivo-siva; znotraj: temnosiva; drobnozrnata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 92.

6. Frag. ostenja z jezičastim držajem; keramika; temnosiva; drobnozrnata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 93.

7. Frag. ostenja z vertikalnim držajem / rebrom; keramika; temnosiva; drobnozrnata. TS35: SE 08; datum: 5. 11. 2014; evid. št. 98.

Tabla 6

1. Frag. ostenja; plitvi žlebovi; keramika; zunaj: temnorjava; znotraj: rjava; drobnozrnata. Makadamska cesta; datum: avgust 2014; evid. št. 43.

2. Frag. ostenja; vrezi s sledovi bele inkrustacije; površina je glajena; keramika; zunaj: temnosiva; znotraj: temnosivo-siva; drobnozrnata. Makadamska cesta; datum: avgust 2014; evid. št. 41.

3. Frag. ostenja; vrezi; keramika; temnosiva; drobnozrnata. Makadamska cesta; datum: 27. 10. 2014; evid. št. 42.

4. Frag. ostenja; vrezi in vbodi; keramika; temnosiva; drobnozrnata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 87.

5. Frag. ostenja s frag. trakastim ročajem; keramika; zunaj: temnosiva; znotraj: siva; drobnozrnata. TS35: SE 08; datum: 5. 11. 2014; evid. št. 97.

6. Frag. dna z ostenjem; keramika; zunaj: siva; znotraj: temnosiva; drobnozrnata. Makadamska cesta; datum: avgust 2014; evid. št. 34.

7. Frag. dna z ostenjem; keramika; zunaj: temnosiva; znotraj: temnosivo-siva; drobnozrnata. Makadamska cesta; datum: avgust 2014; evid. št. 36.

8. Frag. dna z ostenjem; vrezi in vbodi; površina je glajena; keramika; temnosiva; drobnozrnata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 89, 90.

9. Frag. dna z ostenjem; vrezi in vbodi s sledovi bele inkrustacije; površina je glajena; keramika; zunaj: temnosiva; znotraj: temnosivo-siva; drobnozrnata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 88.

10. Frag. dna z ostenjem; keramika; zunaj: temnosiva-siva; znotraj: rjava-temnosiva; drobnozrnata. Makadamska cesta; datum: september 2014; evid. št. 30.

11. Frag. dna z ostenjem; keramika; temnosiva; drobnozrnata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 100.

Tabla 7

1. Frag. predilno vretenca; keramika; temnosiva; drobnozrnata. TS35: SE 08; datum: 4. 11. 2014; evid. št. 59.

2. Frag. predilnega vretenca; keramika; temnosiva; drobnozrnata. Makadamska cesta; datum: 27. 10. 2014; evid. št. 1.

3. Frag. predilnega vretenca; keramika; temnosivo-siva; drobnozrnata. Makadamska cesta; datum: 3. 11. 2014; evid. št. 2.

4. Frag. predilno vretenca; keramika; temnosivo-siva; drobnozrnata. TS35: SE 08 / SE 04; datum: 4. 11. 2014; evid. št. 58.

5. Prežgan frag. hišnega lepa z odtisi brun; glina; keramika; temnosiva do črna. Makadamska cesta – med koloma; datum: september 2014; evid. št. 49.

6. Retuširani odbitek; roženec; rjava-siva. TS35: SE 08; datum: 4. 11. 2014; evid. št. 55.

7. Frag. dvakratno vertikalno prevrtanega razčlenjenega držaja; keramika; sivo-temnosiva; drobnozrnata. Datum: nadzor avgusta 2014; evid. št. 110.

Devce – vakuumška postaja 2 (t. 7: 8–11)

Tabla 7

8. Frag. ustja z ostenjem; keramika; zunaj: sivo-temnosiva; znotraj: temnosivo-rjava; grobozrnata. Kv. D3: SE 04; datum: 12. 8. 2014; evid. št. PN 005.

9. Frag. manjše sklede; keramika; zunaj: temnosivo-oranžna; znotraj: temnosivo-siva; drobnozrnata. Kv. C2: SE 04; datum: 21. 7. 2014; evid. št. PN 002.

10. Bodica rastlinskega izvora; siva. Kv. C5: SE 04; datum: 11. 8. 2014; evid. št. PN 003. Mesto najdbe: v ošiljeni živalski kosti (t. 7: 11).

11. Ošiljena živalska kost; golenica; v njej bodica (t. 7: 10). Kv. C5: SE 04; datum: 11. 8. 2014; evid. št. PN 003.

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Črnelnik and Devce, Newly discovered Copper Age sites at Ljubljansko barje

Translation

This article is dedicated to a friend, colleague, archaeologist, and a long-time researcher of pile-dwellings at Ljubljansko barje, Janez Dirjec, upon the occasion of his birthday.

INTRODUCTION

In 2014, under the expert supervision of Blaž Podpečan, a group of archaeologists who work within the company MAGELAN Skupina, d. o. o., from Kranj, carried out rescue archaeological survey at the route of the emerging sewerage system at the Ljubljansko barje, in the villages of Kamnik pod Krimom and Preserje with their respective hamlets.

During survey, they discovered archaeological finds from prehistory, the Roman period, Middle Ages, and New Age.¹ This article focuses on the finds from the prehistoric sites which can be connected to the population during the periods when the Ljubljansko barje was settled by pile-dwellers.

The first remains from, supposedly, the Copper Age were found in the area of the site Devce – vakuumska postaja 2 (vacuum station 2),² along the main road Podpeč–Borovnica, at the crossroads leading towards Kamnik pod Krimom. Later on, remains of pile-dwelling settlement at Črnelnik³ were discovered, at the western edge of the bay below the hamlet of Lazi (Figs. 1 and 2).

The analysis has shown that Črnelnik is most probably the chronologically older site. On this we based our decision to first present the results of the research at Črnelnik, which are followed by the presentation of the site Devce – vakuumska postaja 2.

ČRNELNIK

Archaeologists found the remains of the pile-dwelling settlement in August 2014, when the mechanical excavation of the ditch for the sewerage at the so-called Trasa 09 began, more precisely at its section below the village of Kamnik pod Krimom or the hamlet of Lazi. Within the surveillance and later archaeological research a total of 36 test trenches (TS) or test ditches (TJ) were made, measuring from 2 × 2m to 3 × 3.3m (Fig. 2).

The biggest concentration of finds was unearthed in Test Trench TS35 and in the area of the so-called gravel road (Makadamska cesta), located along and mostly north of the mentioned test trench (Fig. 2). Another 19 fragments of supposedly prehistoric pottery were found in Test Trench TS07, which due to the proximity of a sinkhole were not probably there *in situ*.

The most expressive finds are those of pottery, animal bones, wooden stilts etc. from the newly-discovered Črnelnik site which appeared at one part of the so-called Trasa 09, from approx. 50 m from the main road to Kamnik pod Krimom to almost the southern edge of the piled soil on which industrial facilities are built (Figs. 2 and 3). As mentioned above, one part originates from the surveillance of the mechanical excavation on the route of the gravel road (on the border between plot numbers 3340/7 and 3342 of cadastral community Kamnik) and another one from test trench TS35.

¹ Podpečan 2015, 35.

² EŠD 9368 Ljubljana – archaeological site of Ljubljansko barje (EŠD = Heritage Register Number; Cultural Heritage Register [<http://rkd.situla.org/>]; Ministrstvo za kulturo RS / Ministry of Culture, Republic of Slovenia).

³ EŠD 9368 Ljubljana – archaeological site of Ljubljansko barje.

Test Trenches TS35 and TS36

Two test trenches were set at the area of the Črnelnik site with the intention to acquire as many data about the site as possible. Test Trench TS35 was set at plot 3340/7 of cadastral community Kamnik. It measured approx. 2.6×3.2 m (Figs. 2 and 5). About 8m slightly to the north-west another test trench was set on the same plot, TS36, which measured approx. 2.8×3 m, and was, according to the contract with the investor, dug to peat layer SU (= SE) 04 or the first traces of a pile-dwelling (Figs. 2 and 4).

Stratigraphy

Much data about the stratigraphy of the prehistoric site was acquired primarily during the excavation of test trench TS35. The data is presented hereafter (Fig. 6).⁴

SU 09 (geological layer):

To the bottom, a 13–18cm thick layer of clay of pale olive colour, the so-called lake marl or snail-clay soil, in which individual remains of mollusc shells were present. Generally, tips of vertical stilts reached into this layer.

SU 08 (the so-called cultural layer):

Silty clay of olive grey colour with numerous remains of wood chips and bigger pieces of wood in the length of more than 2m, and rocks with the size up to 15×25 cm. Thickness = 43–66cm. It included many fragments of prehistoric pottery, animal bones etc.

SU 07 (the top of the so-called cultural layer):

The layer of silty clay of dark grey colour, in which smaller pieces of wood and other organic remains were found. Thickness = 11–15cm. No artefacts.

SU 06 (geological layer):

The layer of clay of pale olive colour, the so-called lake marl or snail-clay soil. Thickness = 5–6cm.

SU 05 (the top of SU 06):

The layer of silty clay of dark grey colour with numerous fragments of decayed wood in the length up to 15cm. Thickness = 9–14cm.

SU 04 (geological layer):

The layer made of peat moss remains of dark reddish-brown colour including numerous frag-

ments of decayed wood in the length of up to 30cm. Thickness = 47–48cm.

SU 03 (the layer under the turf, presumably former plough layer):

The layer of silty clay of black colour with rare stones in the size of up to 7×9 cm. Thickness = 9–15cm. This layer starts to include vertical stilts (Fig. 6). Other test trenches, such as e.g. test trench TS27 (see Fig. 2), revealed a military bullet, planks, and other new age finds.

SU 01 (the top layer):

Turf. Thickness = 7cm.

Archaeological finds

Several hundred archaeological finds originate from the area of the site. Distinctly prevalent are fragments of walls of prehistoric pottery, there are several items or finds made of bone, stone and other materials.

Pottery

The discussion included identifiable and mostly chronologically significant archaeological finds from test trench TS35 or the area of the site at the route of the gravel road. Since there are no noticeable differences in the quality of manufacture and appearance between chronologically the most expressive finds, we believe that they all belong to the prehistoric pile-dwelling settlement. Stratigraphically the most interesting come from test trench TS35, from layer SU 08, which was on top of the archaeologically sterile layer of lake marl SU 09. It was covered by layer SU 07, which did not include any artefacts.

Among the reconstructed pottery forms, pots (e.g. *Pls.* 3; 4: 1–8; 5), and dishes of various forms and sizes were identified. They include big (*Pls.* 1: 13; 2: 1,4; 6: 11), medium-sized (e.g. *Pls.* 1: 2,3,5; 2: 2), and small (*Pl.* 1: 4).

There are also small, dish-like cups with lugs (*Pls.* 1: 1; 2: 7). Similar to these is a slightly more closed dish the wall of which is ornamented in the motif of hatched-band and hanging, also hatched triangles (*Pl.* 2: 6). Considering the shape, the exception is a low, closed, and quality-made dish, ornamented on the neck with two parallel incised lines, in which the original filling of plant origin made of serrated bands was preserved (*Pl.* 2: 8; Fig. 7).

⁴ See also Podpečan 2015, 35.

Vessels with handles include pots (*Pl. 6: 5*) and pitchers (*Pl. 4: 9*). Two of the presented handles are band-shaped, one was set on the body of the pot (*Pl. 6: 5*), while the other one is vertical and high, and connects the rim with the shoulder (*Pl. 4: 9*).

Lugs are more numerous. Two are band-shaped (*Pls. 1: 1; 2: 7*). Others are tongue-like lugs, either with fingertip impressions (*Pls. 1: 4; 3: 2; 5: 1; 7: 7*) or without (*Pl. 5: 3,6*), or with a vertical ear or two (*Pls. 5: 2,5; 7: 7*). Knobs and other appliquéd ornamentation were also shaped for the function of a handle (*Pls. 4: 4; 5: 4,7*).

One fragment of a low foot of the footed vessel is preserved (*Pl. 2: 5*).

A special pottery form are simple spindle whorls of conical shape (*Pl. 7: 1–4*), among which a disc-shaped spindle whorl is somewhat outstanding (*Pl. 7: 1*).

Ornamented pottery is also known from Črnelnik. The ornament of finger or some blunt object imprints prevails and appears on the rim (*Pls. 1: 6,12; 4: 1–3*), under the rim (*Pls. 3: 5; 4: 1,4*), on the lug (*Pls. 3: 2; 5: 1*), and in combination with the fingernail impressions (*Pls. 3: 2,5; 4: 1,4*), which can also be an independent ornament (*Pls. 3: 3,4*).

Chronologically more significant is the ornament made with the technique of incising. The simple incision prevails (e.g. *Pl. 6: 3*). Motifs are hanging triangles (*Pl. 2: 6*), standing triangles (*Pl. 6: 9*) and bands (*Pls. 2: 6; 6: 4*). Frequently, there is a combination of motifs and ornamentation techniques, among which stabbing needs to be mentioned (*Pls. 2: 6; 6: 4,8,9*). The walls of the pottery (*Pls. 6: 4*) reveal that the technique of stabbing was used which is characteristic for a stab and drag style technique. In one example, the incised motif is filled with randomly incised lines (*Pl. 6: 2*). The technique of grooving can be noticed in two examples. In one, inclined grooves are made on the vessel shoulder (*Pl. 6: 1*), while in the other two parallel lines are made on the neck with the technique of grooving (*Pl. 2: 8*). Fragments of vessels ornamented with incisions or in combination with stabs traces of white encrustation are preserved (*Pl. 6: 2,9*). Encrustation as a binder appears also on a bowl (*Pl. 2: 8; Fig. 7*) with grooved lines covered with serrated bands of, very probably, plant origin.⁵ Polishing can be noticed on four fragments (*Pls. 2: 8; 6: 2,8,9*), of which all are generally ornamented with the help of other ornamentation techniques.

⁵ See also Podpečan 2015, 35.

Bone and stone artefacts

Bone and stone artefacts are scarce. From SU 08 of test trench TS35 six awls originate, four of which are damaged; a ring made of bird bone which is corroded at the ends, 1cm long and 0.5cm wide (*Fig. 25*); and a retouched flake made of brown-grey chert (*Pl. 7: 6*).

Fragments of house plaster

Fragments of house plaster originate also from the cultural layer at Črnelnik. One of them partly preserved the imprints of approx. 6cm thick logs (*Pl. 7: 5; Fig. 8*). It is also apparent that it was exposed to fire.

Petrological analysis of stones and stone artefacts

Stone pieces at the site belong to grey limestones and sandstones, among the latter fine-grained ones of light grey colour prevail. Individual sandstones are also coarse-grained, their grains being the size of up to approx. 1mm. A few stone pieces belong to other rocks, namely 1 to orange siltstone, 1 to tuff, and 3 pieces to chert (e.g. *Pl. 7: 6*).

Fine-grained sandstones are mostly medium rounded which is due to the selective weathering of edges. Similar is true for limestone, the edges here are usually rounded as the consequence of selective chemical weathering.⁶ The surface of some pieces has typical corrosive features (*Fig. 9a*). This is the so-called cavernous corrosion which occurs when water drips on a certain point on the surface of a stone for an extensive period of time, which is primarily typical of cave environments.⁷ Several of such stones were burned (*Fig. 9*).

Animal remains

The assemblage of animal remains, which can be connected to the pile-dwelling settlement of Črnelnik, includes 178 bones and teeth. The majority (N = 133 or 74%) belong to mammals, with birds (*Aves*) and fish (*Pisces*) being represented with only a few finds each. It was pos-

⁶ Zupan-Hajna 2003.

⁷ Turk et al. 2007.

sible to taxonomically identify 92 of the remains (Fig. 10). They were found close together, i. e. either within test trench TS35 (SU 08) or on the route of the gravel road (Figs. 2 and 3). With the exception of fish scales, bones, and teeth which were acquired by sieving sediment samples within the framework of archaeobotanical research, the analysed animal remains were hand-picked during the excavations. Therefore, it can be expected that the representation of smaller animals and smaller skeletal elements of larger animals is to a certain extent underestimated.⁸

The assemblage includes the remains of at least 13 species of mammals, among which red deer prevails with a 40-percent share. The share of game exceeds the share of domestic animals in both the number of species (9 versus 4) and the number of taxonomically defined remains ($NISP_{game} = 60$; $NISP_{domesticates} = 29$). It is important to emphasise that hunted species do not include only the usual meat-bearing animals (e.g. red deer, roe deer, wild boar, aurochs, wisent), but also several pelt animals (wolf, fox, badger, brown bear, beaver). This is the proof of a wider economic significance of hunting which undoubtedly offered more than just meat and fat.

The list of domestic animals includes cattle, pig, ovicaprids, and dog. Among the latter, only the presence of goat (*Capra hircus*) could have been confirmed with certainty.⁹ It was attributed a fragment of the skull with the corneal process, two fragmented humeri and the proximal part of a metacarpal. The differentiation between domestic pig and wild boar was made on the basis of differences in the size of individual better preserved bones and teeth.¹⁰ Likewise, it was possible to ascribe one of the canid mandibles to a wolf (M_1 length: 29.0mm¹¹), and a fragmented bovine scapula and a maxilla to either a wisent or an aurochs. Based on the size of the teeth still preserved in the maxilla fragment (M^2 length: 35.5mm; M^2 width: 25.0mm), the second of the two options is slightly more probable in the latter case.¹²

The supremacy of hunted species over domesticated ones was discovered on both researched

microlocations, i.e. in the material from test trench TS35 and from the area of the gravel road (Fig. 10). Nevertheless, there are certain differences apparent between both mentioned sub-samples. In the material from the gravel road, for instance, there are three times less bovine finds than red deer. This is without considering the twelve rib fragments, which are listed in Fig. 10 among 24 taxonomically unidentified finds, but most probably belong to red deer as well. Among the finds from test trench TS35, on the other hand, the difference in representation of the two mentioned species is practically zero. The excavations in the area of the gravel road yielded also relatively more remains of roe deer and various carnivores (wolf, badger, bear). In test trench TS35, for instance, roe deer was represented solely by the still-attached antlers of a young buck, and even this could have been, due to slightly sharpened terminal part, used as a tool and may not thus be justifiably discussed as ordinary food waste.

From the above data it can be deduced that hunting was the main source of meat for pile-dwellers from Črnelnik. The leading role almost certainly belonged to red deer since it significantly stands out considering the number of finds. Initially, the discovery of the afore-mentioned twelve presumably red deer ribs in the area of the gravel road, as well as of a set of five vertebrae of the same species with not yet fused epiphyses found at the same spot, brought some doubt about such a thesis. It namely raised the question of whether the majority of red deer remains gathered could belong to just a single (or at least not more than two, maximum three) animals, which would of course significantly decrease the economic importance of deer and hunting in general.¹³ However, such a thesis was proved wrong by the relatively high values of the minimum number of individuals index (MNI)¹⁴ for both best represented species (Fig. 11). Indeed, the total of six recovered red deer tibia fragments belonged to at least four different specimens and four pelvis fragments to no less than three animals. Moreover, whenever one left and one right specimen respectively of the same skeletal element of either a red deer or a bovid have been excavated, such pair of finds never belonged to the same animal.¹⁵ The analysed animal bones thus most probably do

⁸ See e.g. the sparsity of isolated teeth, carpal and tarsal bones, as well as phalanges in Fig. 11 (see also Toškan 2015).

⁹ See Boessneck, Müller, Teichert 1964.

¹⁰ Bökönyi 1995.

¹¹ Cf. Davis 1987, Fig. 6.13b. See also the data for the length of M_1 of dogs in Tab. 1.

¹² Boessneck, Jéquier, Stampfli 1963, 174.

¹³ Andrič, Tolar, Toškan 2016, 115–118.

¹⁴ Grayson 1984, 27–48.

¹⁵ See data for red deer and cattle femora from the test trench TS35 or for the red deer mandibles as well as cattle radii and pelvises from the area of the gravel road (Fig. 11).

represent quite ordinary food waste discarded by inhabitants of this part of the settlement, which is confirmed also by the relatively numerous traces of observed cut and chop marks ($N = 19$).

As far as the size of the bones is concerned (*Tab. 1*), the great majority of the gathered remains fit well within the range for specimens of the same species from other approximately contemporary middle-European pile-dwelling settlements.¹⁶ The greatest variability was, as expected, observed in red deer, which offered by far the richest set of available metrical data. The presence of a large distal part of a femur ($Bd = 83.0\text{mm}$) together with a proximal part of a tibia ($Bp = 84.5\text{mm}$) should be emphasised, however both still fall behind the dimensions of the same skeletal elements in moose (*Alces alces*).¹⁷ Contrary to this, it was on the basis of the outstanding size that a partially preserved part of a bovine maxilla and a scapula fragment were attributed to either aurochs or wisent.¹⁸ Both mentioned species are already known from the prehistoric pile-dwelling settlements of the Ljubljansko barje.¹⁹ The same is true for moose,²⁰ for which the watery environment with forests in the background was certainly appropriate living environment.²¹

The assessment of the age-at-death is very approximate since data are scarce (*Fig. 12*). Despite this, it is interesting that the remains of young and adult animals appear in the material in about the same frequency, which is true for game (red deer, roe deer, wild boar) as well as for domesticates (cattle, ovicaprids). Among the red deer remains, this finding is additionally substantiated by the presence of mandibles with various degrees of teeth development. Namely, a specimen with milk premolars and a barely erupted first molar belonged to a six months old animal, while a mandible with permanent and fairly worn premolars and molars needs to be ascribed to a specimen of over eight years of age.²² With the species where a similarly wide range of age upon culling/hunting cannot be observed, this should probably be understood as the consequence of a modest number of available

data and not of the actual preferential use of meat of those animals from only a certain age class.²³

Archaeobotanical analysis

Archaeobotanical samples were taken from the cultural layer of the Črnelnik site and from the layers in test trenches in the near or far surroundings, south of the prehistoric site.

Methods

Sediment samples were wet-sieved through two sieves with a 1mm mesh-sized as the smallest. After this, samples were air-dried²⁴ and sorted under the stereomicroscope.

Intentionally gathered samples (i.e. judgement samples) were also analysed, including bigger fossilised animal excrement or coprolite, a remain of wood-decay fungus soaked with water, and a sample of moss. Because of waterlogged non-carbonised preservation the samples were kept in a refrigerator. They were gently wet-sieved through a 0.056mm mesh and constantly kept in a water medium.

Results

Samples 75, 76, 35 from TS35 from the Črnelnik site and Sample 34 from test trench TS34 from the immediate vicinity, south of the site:

– *Samples 75 and 76* were collected from the cultural layer (SU 08) of the pile-dwelling settlement Črnelnik. Just above the sample 76, a few centimetres thick layer (SU 07) was located, from which *sample 35* originates. These three samples most probably belong to the same cultural context.

– *Sample 34* originates from the layer marked as SU 07 in test trench TS34, which was established outside the area of the site, to the south, not far from test trench TS35 (see *Fig. 2*).

Remains of cultivated and gathered plant taxa were by far the most abundant in samples 75 and 76 (*Fig. 13*).

Among cultivated plants, remains of barley (*Hordeum vulgare*) prevail. The remains of emmer wheat (*Triticum diccicum*) were found in rather

¹⁶ Boesseneck, Jéquier, Stampfli 1963; Pucher, Engl 1997; Toškan, Dirjec 2004.

¹⁷ Cf. Chaix, Desse 1981, 181–182.

¹⁸ Bökönyi 1995.

¹⁹ Drobne 1973.

²⁰ Drobne 1973; Toškan, Dirjec 2006, 58; Velušček, Toškan, Čufar 2011, 58.

²¹ Bauer, Nygrén 1999, 394.

²² Habermehl 1961, 155–160.

²³ See e.g. the example of pig in *Fig. 12*.

²⁴ For the inappropriate method used, see Tolar et al. 2010.

small amount, while of turnip (*Brassica rapa*) in a little bit greater. For the latter it is not known yet whether it was a weed, a collected, or even a cultivated plant species.²⁵ Remains of all the three mentioned cultivated taxa were, in contrast to other nutritious taxa with lignified seeds/fruits walls, preserved only in a carbonised state.

The spectrum of collected plants is similar to the spectrum from other Ljubljansko barje pile-dwellings from the 4th millennium BC.²⁶ At Črnelnik site raspberry (*Rubus idaeus*) and blackberry (*Rubus fruticosus* agg.) seeds prevail, followed by bladder cherry (*Physalis alkekengi*), wild grape (*Vitis vinifera sylvestris*), water chestnut (*Trapa natans*), elder (*Sambucus nigra / racemosa*), hazel (*Corylus avellana*), cornel (*Cornus mas*), acorn (*Quercus* sp.) and strawberry (*Fragaria vesca*).

Seeds/fruits of other, not nutritive taxa are also preserved, for example: creeping buttercup (*Ranunculus repens*), blue bugle (*Ajuga reptans*), carrots (*Daucus carota*), sedge (*Carex* sp.), black alder (*Alnus glutinosa*), birch (*Betula* sp.), saw-sedge (*Cladium mariscus*), lakeshore bulrush (*Scheuchzeria palustris*), bur-reed (*Sparganium* sp.), spiny water nymph (*Najas marina*), white water lily (*Nymphaea alba*), yellow water lily (*Nuphar luteum*), spiked water milfoil (*Myriophyllum spicatum*) and pondweed (*Potamogeton* sp.).

From the samples also charcoal, fish remains, fungi spores and coprolites of small mammals were collected.

Considering the position and according to the expectations, sample 34 (Figs. 2 and 13) stands out from other samples due to the smallest number of anthropogenic residues. It contained no traces of cultural plants. There were very few, only one taxa, of ruderal plants and weeds. Gathered plant macroremains of edible plant species were also scarce. Somewhat more numerous were remains of water and lakeshore plants, therefore of natural vegetation.

Samples 20, 25, and 6 from various layers in test trenches south of the Črnelnik site:

All three samples were collected from test trenches south of the prehistoric site of Črnelnik (Figs. 2 and 14).

– *Sample 20* was collected from test trench TS22, in the layer of dark greyish-brown silty clay (SU 28), which included numerous pieces of charcoal

and animal bones. It was cut with the entrenchment for the telephone line.

– *Sample 25* was collected in Test Trench TS24, in the layer of silty clay of dark grey colour (2.5Y 4/2), (SU 07). It included individual smaller pieces of wood, charcoal, and other organic remains.

– *Sample 6* was collected in Test Trench TS04, set at the margin, in the layer of silty clay of dark grey colour (2.5Y 4/2), (SU 13). It included numerous small quarry stones in size up to 7 × 5 cm, tiny pieces of charcoal, and fragments of presumably Late Roman pottery with a wavy line.

Samples 20 and 25 were located relatively close to each other, while the sampling location of sample 6 is somewhat more distant (see Fig. 2).

None of the discussed samples included remains of cultural plants. The remains of ruderal plants and weeds, such as goosefoot (*Chenopodium album*) and bindweed (*Fallopia* sp.), were scarce as well. There was slightly more (but still significantly less than in the samples from the Črnelnik site) gathered taxa, such as blackberry, raspberry, bladder cherry, wild grapes. Much more plant macroremains is preserved of naturally growing vegetation (water and lakeshore plants), especially in sample 25. Sample 20 contains less of them, while sample 6 none. All the three contained some charcoal.

Judgement samples:

– *Wood-decay fungus:* A well-preserved part of a fruit body of wood-decay fungus with partly preserved upper surface and the flesh was found at Črnelnik site (Fig. 15a). It is most probably the tinder fungus (*Fomes fomentarius*) (cf. Fig. 15b).²⁷

– *Moss:* A tangle of moss was found at the site of Črnelnik (Fig. 16), and that of two species: *Neckera crispa* and *Anomodon viticulosus*.²⁸ Under the stereomicroscope it was possible to find some plant macroremains as well, such as four remains of capsule fragments of flax (*Linum usitatissimum*), seven seeds/fruit of white goosefoot (*Chenopodium album*), one leaflet of eagle fern (*Pteridium aquilinum*), two needles of silver fir (*Abies alba*), one fragment of mistletoe fruit (*Viscum album*), one fragment of water chestnut fruit (*Trapa natans*), one fragment of acorn (*Quercus* sp.), one coprolite of a small mammal (the size of the mice), and some fragments of charcoal, wood chips and tree bark.

– *A larger animal faeces (coprolite):* Very interesting find is an organic object, similar to a slightly

²⁵ Tolar 2011, 73–74.

²⁶ Tolar et al. 2011.

²⁷ Pers. comm. F. Pohleven.

²⁸ Identification by A. Martinčič.

flattened cylinder. The structure, size and shape indicate that it is the faeces (coprolite) of a dog or a human.

First the object was photographed several times (e.g. *Fig. 17*), then it was gently wet sieved in the archaeobotanical laboratory. 20ml of non-carbonised plant and animal macroremains were caught on the 0.056mm mesh-sized sieve (*Fig. 18*).

Among animal remains, fish scales and teeth as well as a few flat, most probably skull fish bones prevailed (*Figs. 18a,b*).

Among plant macroremains six plant taxa were identified: four blackberry seeds (*Rubus fruticosus*), one flax seed (*Linum usitatissimum*), one turnip seed (*Brassica rapa*), three seeds of white goosefoot (*Chenopodium album*), a leaf and a fragment of water chestnut fruit (*Trapa natans*), and one birch seed (*Betula* sp.), (*Fig. 18c*).

Dendrochronological research

A total of 50 wood samples from the area of the sewerage line in the territory of the Ljubljansko barje's bay where the archaeological site of Črnelnik is situated were examined and identified (*Fig. 2*).

All together 7 wood taxa (*Fig. 19*) were determined. It was identified to a genus level when differentiation between species of one genus based on wood anatomy was not possible. Most frequent identifications were: oak, ash, beech, common hornbeam, hazel, alder, and fir. Oak prevails (56%), followed by ash (20%), while other types of wood were present in minor percent.

All samples listed in *Fig. 19* were dendrochronological researched. Oak and ash samples with more than 45 tree rings had dendrochronological potential (i.e. 20 samples of oak and 4 samples of ash). All oak and two ash samples originate from the area of the Črnelnik archaeological site. They either come from the test trench TS35 or were acquired during monitoring in the area of the site.

The resulting sequences of tree-ring widths in the selected samples were not possible to synchronise, which indicate various times of growth and wood felling. The analysed ash stilts, found in test trenches south of the Črnelnik site, could originate from a different time period (see *Fig. 2*). They are probably younger.

The samples that are connected to the pile-dwelling population are certainly the most important for our research. In majority they are remains of vertical stilts used for the construction of pile-dwelling houses.

Therefore, it was possible to synchronise dendrochronological sequences of 8 samples, originating from the area of the Črnelnik site. Relative dating of the sequences confirms that this wood was not cut down at the same time (*Figs. 20* and *21*).

With the purpose of assigning the site in the absolute time frame, several versions of site chronologies were assembled. All measured tree-ring width sequences and all versions of chronologies were compared to dated chronologies from other pile-dwelling sites of the Ljubljansko barje. Dating with BAR-3330 chronology, which covers the period between 3771 and 3330 BC and is absolutely dated,²⁹ was not possible, therefore the researched wood was not absolute dated.

DEVCE

The research area at Vakuumska postaja 2 was mostly set at the southern edge of plot no. 211/6, cadastral unit Kamnik (pod Krimom), at the fallow called Devce. It included an area of about 550m² (*Figs. 2* and *22*).³⁰

Stratigraphy

SU 05 (the bottom layer):

Clay or lake marl of pale olive colour, which included shells of water molluscs and individual stones (quarry stones). Th. = 50–60cm. It is located under SU 04 and SU 15. It was penetrated by roots from the surface, among them was also an iron ringlet (SU 06).

SU 04 (cultural layer):

Silty clay of dark grey colour with individual stones (quarry stones) 15 × 20cm big at the most. Th. = 3–15cm. It is situated under SU 03. It includes archaeological finds, such as prehistoric pottery fragments, osseous point and other animal bones, remains of charcoal pieces, wood, and a few vertically driven in wooden stilts, among them three larger with a sharpened point.

SU 03 (geological layer):

Peat of dark reddish-brown colour with numerous pieces of decayed wood up to 5 × 5cm in size. Th. = 12–30cm. It is situated under SU 02. The layer is cut with contemporary entrenchments: SU 12, SU 10, and SU 08.

²⁹ See Čufar et al. 2015.

³⁰ See also Podpečan 2015, 35.

SU 02 (the layer under the turf, presumably former plough layer):

Silty clay of black colour with rare stones (quarry stones) up to 5 × 7cm in size. Th. = 15–34cm. It is located under SU 01. The layer is cut with contemporary entrenchments, such as SU 08, SU 10, SU 12, and SU 14. Thickness: 15–34cm. It includes very few finds, among them a contemporary button for binding.

SU 01 (the top layer):

Turf. Th. = 3–9cm.

Archaeological finds

There were very few archaeological finds at the site of Devce – vakuumska postaja 2. Archaeologically most significant is layer SU 04, in which fragments of prehistoric pottery (*Pl.* 7: 8,9), an osseous point (*Pl.* 7: 11), and other animal bones were discovered. In addition to these, in square C6 the layer contained three presumably intentionally lined quarry stones (SU 15), the biggest of which was burned at the bottom, while a bigger concentration of charcoal was found nearby.

Layer SU 04 included generally dispersed pieces of charcoal, pieces of wood, and a few vertically driven in stilts, the points of which reached into layer SU 05. The stilts included three bigger ones with sharpened or cut points.

Animal remains

During the field excavations at the location Devce – vakuumska postaja 2, 50 animal remains were acquired, 42 of which allowed for the taxonomical identification. With the exception of three fragments of European pond turtle shell (*Emys orbicularis*), an artefact made of an ovicaprid tibia, and two unidentified fish remains, all finds were ascribed to red deer. Despite the horizontal dispersion of these bones within layer SU 04, the overview of data about the representation of individual skeletal elements showed that these are very probably remains of a single animal. Contrary to what has been observed at Črnelnik,³¹ where relatively high values of the MNI index per skeletal element were established for red deer, at Devce these values always equal one (*Fig.* 23). Moreover, on the basis of their dimensions, the collected finds

can be classified into a single size class (*Fig.* 23), with the mutual coherence also being exhibited by the assessment of the age-at-death, estimated on the basis of the degree of teeth wear and the absence of finds with not yet fused epiphysis. The recovered skeleton must thus have belonged to a relatively large, between eight and ten years old animal, most probably a male. A reliable sex determination is rendered impossible by the mere absence of neurocranial bones.

The presence of exostoses on several skeletal elements, which all belong to the hind left leg and which seem sensible to interpret as a form of degenerative change in bone tissue, is in accordance with such an estimate of ontogenetic age. They can be found, more or less vividly, on the patella, medial cuneiform bone, calcaneus and astragalus, along the proximal epiphysis of a metatarsal bone, on two out of four recovered first phalanges, both available second phalanges, and on two out of five available third phalanges. It is more than probable that these pathologically changed bones all belong to the same hind left leg.

A careful inspection of red deer finds (N = 33) did not reveal any traces of human activities, such as cuts and chop-marks. Moreover, most of the recovered bones are not fragmented, which is true even for the long bones of extremities rich in marrow. Of the latter, the only exception is represented by one of the two radii. Even here, however, the damage is limited to the two epiphyses, while its diaphyseal part – which is much more interesting from the dietary perspective – was found intact. To give a comparison: among 133 mammal remains from Črnelnik there are no undamaged limb bones and at least 19 specimens bear either gnawing or cut/chop-marks. It thus seems evident that the red deer from Devce was not hunted by man, nor did humans have tampered with the carcass, except possibly with the removal of antlers (if attached at the time of death³²). The removal of its hide is also very unlikely because together with it the bones of the utmost bottom part of the legs would probably also have been removed,³³ and typical cutting marks would be expected on the mandible.³⁴ Even though the discussed red deer bones were found within cultural layer SU

³¹ See *Fig.* 11.

³² At present, antlers in local red deer shed in March or April, while the velvet is lost between July and December (*Kryštufek* 1991, 243).

³³ Cf. *Serjeantson* 1989.

³⁴ *Binford* 1981; *Zeiler* 1987.

04, their connection to the settlement itself is thus to be considered unreliable.

Additional caution is called upon by two similar finds, which were recovered about 500m south, in the area of test trenches TS22 and TS24 (*Fig. 2*). These are almost complete skeletons of calves assembled mostly of undamaged bones without any cuts or chop-marks. What is interesting is that in test trench TS24 a silver coin (6 Kreuzer) from 1849 was discovered alongside the bones, which indicates that – at least in this case – we are most likely dealing with a modern burial of a possibly sick animal.³⁵

Archaeobotanical analysis

Two sediment samples nos. **80** and **81** from SU 04 (*Fig. 24*) were collected at the site of Devce – vakuumska postaja 2.

Sample no. 81 was the richer one. It contained weeds and ruderal plants, such as white goosefoot, as well as gathered plants, such as blackberry, raspberry, and bladder cherry.

As regards other taxa, the content of both samples is fairly comparable. They contain water plants (pondweed, spiked water-milfoil, white water lily, yellow water lily, spiny water nymph) as well as lakeshore/wetland plants (swamp sawgrass, lakeshore bulrush, sedges, etc.).

In sample no. 80, the remains of creeping buttercup and birdsfoot trefoil point to wet meadows. The black alder most probably also grew along water, in a wet environment.

DISCUSSION

Črnelnik

The stratigraphy of the Črnelnik site is very interesting for the Ljubljansko barje. The upper layer of lake marl SU 06, which covers the so-called cultural layer (see *Fig. 6*), indicates that the settlement, due to transgression of the lake which was chosen in a relatively short period of time by prehistoric people for their settlement, was obviously discontinued or was not renewed.

The area of the only a few square metres big trench TS35 uncovered several long, also very thick (*Figs. 5, 21*), mostly oak and slightly less ash

stilts used by pile-dwellers to build their houses. The test trench was, naturally, too small for us to be able to discuss on its basis the architecture in more detail.

Nevertheless, it can be determined that the stilts belonged to several building phases, possibly to several pile-dwelling hamlets. While it was settled, at least part of the settlement was destroyed by fire several times, which is testified to by e.g. remains of burned house plaster with imprints of logs (*Pl. 7: 5; Fig. 8*), possibly also some burned stones (*Fig. 9*), and charcoal from the samples for archaeobotanical research.

The dendrochronological analysis has shown that none of the chronologies overlapped with the BAR-3330 chronology, which covers the period between 3771 and 3330 BC and is synchronised with South German-Swiss standard chronology.³⁶ Considering the finds, the explanation that at Črnelnik settlement happened before the mentioned time interval or at its very beginning seems the most probable, which will be confirmed or rejected only by the study of the wood from Črnelnik or some other site of supposedly the same age from the Ljubljansko barje, such as e.g. Gornje mostišče (*Fig. 1*).³⁷

On the other hand, as mentioned before, chronological relationships between stilts confirm that wood was mostly not felled simultaneously. It points to several different building phases, especially to several decades, possibly even a century-long time span reaching from the felling of the first to the last tree at the site (*Figs. 20, 21*). This is the most precise conclusion that can be presented at the moment.

The cultural determination of the finds from the site of Črnelnik seems simpler and more expressive. Thus, the most typical fragment of a vessel's wall, which was ornamented with an incised motif filled with randomly incised lines and traces of white incrustation (*Pl. 6: 2*). Its analogies are found at Gornje mostišče,³⁸ in Kevderc above Škofja Loka,³⁹ Gradišče nad Dešnom,⁴⁰ Gradec near Mirna,⁴¹ among the youngest Eneolithic finds from Spaha,⁴²

³⁶ See Čufar et al. 2015.

³⁷ See Velušček, Čufar 2008; Mlekuž, Mušič, Medarič 2014, 38.

³⁸ Velušček, Čufar 2008, Fig. 4: 1.

³⁹ Leben 1963, e.g. Pl. 2: 1.

⁴⁰ Pavlin, Dular 2007, Pls. 13: 1,2,5,15,16,18; 14: 5,7, etc.

⁴¹ Dular et al. 1991, Pl. 26: 10a,b.

⁴² Velušček 2011a, Pl. 4.16: 11.

³⁵ Cf. Porenta et al. 2015, 358–360.

in the 9th settlement phase of Moverna vas⁴³ etc.; in all cases within the finds which are assigned to the Furchenstich pottery culture.⁴⁴

In culturally identical contexts analogies for a bowl fragment can also be found (*Pl. 2: 6*) in Kevderc,⁴⁵ as well as at the more distant site of Kalinovnjek in the Prekmurje region.⁴⁶ A shallower bowl of similar profile and from the same cultural circle is known also from Malečnik near Maribor.⁴⁷

Chronologically expressive is also a wall fragment, on which the motif of the band with impressions is depicted, made with the technique of shallow plain incision, while stabs are made in the way usual for the stab and drag style technique (*Pl. 6: 4*). Analogies for it can be found on vessels of the Furchenstich pottery culture, e.g. at Hočevarica,⁴⁸ Kevderc,⁴⁹ Levakova jama in the south-east of the Dolenjska region,⁵⁰ and in the pit marked PO 165 in Nova tabla in the Prekmurje region.⁵¹ Even more richly decorated are bands on the bowl of the same culture from Bukovnica⁵² and Kalinovnjek.⁵³

We could not find any direct analogies for the shallow bowl with the ornamented neck and low centre of the belly (*Pl. 2: 8*). The globular wall is reminiscent of two considerably deeper vessels from Malečnik⁵⁴ and a cup from Kalinovnjek.⁵⁵ One of these vessels from Malečnik has a preserved foot,⁵⁶ which is comparable to the foot fragment from Črnelnik (*Pl. 2: 5*). A similar one but with a slightly lower centre is known from Kevderc.⁵⁷ A foot is preserved also on a pot fragment from Hočevarica.⁵⁸

Also interesting is the ornament preserved on the neck of a bowl (see *Fig. 7*), which is comparable to the carved out wrapping made of birch bark on the handle of a double axe from the Cham-Eslen

site. The object probably had a cult purpose.⁵⁹ The same raw material was used for practical purposes, as is evident from e.g. the wrapper of a bow sleeve from Schnidejoch.⁶⁰

Also interesting are two vessels from which the bottom and part of the wall are preserved (*Pl. 6: 8,9*). They are ornamented in a similar way, therefore with incisions and stabs. The surface of both vessels is burnished. Both display a motif of bands filled with circles. It seems as if they were made by the same hand.

The wall of a smaller pot which is ornamented on the shoulder with diagonal lines in the grooving technique (*Pl. 6: 1*) at first glance⁶¹ resembles pottery of the Lasinja culture.

The classification of other pottery fragments, which have so far not been mentioned, into the Furchenstich pottery culture is also not questionable (e.g. *Pls. 1: 1–5; 2: 1,2; 3: 2; 4: 2,4,5; 5: 4*). Its analogies can be found at the sites of this culture, both in Slovenia and elsewhere.⁶² Many of these forms can, clearly, also appear in later periods of prehistory.⁶³

Wood-decay fungus (*Fig. 15*) is ascribed to tinder fungus (*Fomes fomentarius*), the frequently determined species.⁶⁴ It grows on standing damaged trees or on felled timber, especially beech trees.⁶⁵ It was used for various purposes. The sporocarps (the so-called flesh) were used primarily for igniting fire, attending to wounds, making fabric, and smoking.⁶⁶

The raw material for all analysed stones and stone artefacts can be found in the vicinity of the archaeological site of Črnelnik. The limestone as well as the dolomite constructs the hilly surroundings which in the south delimits the Ljubljansko barje. In the hinterland of the archaeological site, the hills are made of Jurassic limestones and Triassic and

⁴³ Budja 1992, Fig. 4: phase 9.

⁴⁴ See e.g. Velušček 2004d, 231–250; Velušček 2011b, 223–224.

⁴⁵ Leben 1963, Pls. 2: 4; 3: 2.

⁴⁶ Kerman 2013, finds nos. 463 and 591.

⁴⁷ Strmčnik-Gulič 2006, find no. 2.

⁴⁸ Velušček 2004b, Pl. 4.1.12: 1.

⁴⁹ Leben 1963, Pls. 1: 4; 2: 2; 3: 2.

⁵⁰ Guštin 1976, Figs. 7 and 8; Pl. 1: 4.

⁵¹ Šavel, Guštin 2006, finds nos. 43 and 44.

⁵² Šavel, Guštin 2006, Fig. 1, find no. 3.

⁵³ Kerman 2013, finds nos. 631 and 648.

⁵⁴ Strmčnik-Gulič 2006, finds nos. 3 and 8.

⁵⁵ Kerman 2013, find no. 566.

⁵⁶ Strmčnik-Gulič 2006, find no. 3.

⁵⁷ See Leben 1963, Pl. 3: 6.

⁵⁸ Velušček 2004b, Pl. 4.1.7: 3.

⁵⁹ Gross, Huber 2016, 175.

⁶⁰ Hafner 2016, 428–429, Fig. 650.

⁶¹ Cf. e.g. Kramberger 2014.

⁶² See e.g. Kalicz 1991, Fig. 16: 2; Budja 1992, Fig. 4: settlement phases 8 and 9; Velušček 2004b, Pls. 4.1.2: 7,9; 4.1.3: 2,4; 4.1.5: 4; 4.1.7: 1,6; 4.1.8: 5; 4.1.9: 4,5; 4.1.10: 1,9,10; 4.1.11: 1, etc.; Šavel, Guštin 2006, finds nos. 20–24, 37, and 39; Artner et al. 2012, Pls. 5: R0-2; 6: R35-1,73-1.

⁶³ See e.g. Bregant 1975, Pls. 15: 5; 17: 2,10; 22: 10,13; 26: 1,2; 32: 14; 34: 10, etc.; Kalicz 1991, Figs. 19, 20, and 21.

⁶⁴ Weiner 2016, 315.

⁶⁵ Pohleven 2008.

⁶⁶ Pohleven, Korošec, Gregori 2015, 12; see also Weiner 2012, 62–63; 2016, 315.

Jurassic dolomites.⁶⁷ From there, more precisely from the caves, the so-called cavernously corroded clasts of limestones (*Fig. 9a*) were brought to the site.⁶⁸ Several pieces of stones of various sizes, which are burned on one side (*Fig. 9*), could indicate that they were used to enclose a hearth.⁶⁹

Unlike the above, deposits of sandstone are somewhat more distant from the archaeological site. This is a carboniferous fine-grained grey quartz-mica sandstone. It could also have been used for the making of querns.⁷⁰ The closest deposits of such rock are at the solitary hills near Notranje Gorice, only a few kilometres from Črnelnik,⁷¹ but was at the time located on the opposite side of the lake.

The chert is probably also of local origin. It is found near Ligojna, at the northern edge of the Ljubljansko barje, where sheets and layers of chert appear in the dolomite.⁷²

Hunting gave this area an additional economic value. Game documented at the site is, namely, in its choice of habitat in great majority linked to forests.⁷³ The latter were also the ideal solution for free grazing of pigs and at least partly goats, while clearings and more or less extensive cuttings were more appropriate for cattle and especially sheep.⁷⁴ It is not questionable whether pile-dwellers in their time thinned forest surfaces for farming.⁷⁵ As is proven by numerous finds of cultural plants and weeds,⁷⁶ the grubbed areas were not necessarily intended for grazing, but frequently for agriculture. At least to some extent, sheep and cattle thus had to settle for grazing in less favourable, woody and even wet lakeshore parts,⁷⁷ since any acquisition of more appropriate grazing land demanded significant additional labour input.

The fact that goat-rearing was less demanding than sheep-rearing probably explains why goat remains prevail over sheep remains,⁷⁸ but this was not the only reason. An important role must have also been played by the then relatively nar-

row set of used secondary products of keeping these animals. Apart from skin and bones⁷⁹ it also included milk,⁸⁰ in which – due to goat's higher lactation capacity – the latter species had the advantage in any case.⁸¹ A good millennium later, when the use of sheep fleece was fully established in the south-eastern Alps, the proportion between these two species at the pile-dwelling settlements of the Ljubljansko barje significantly changed and leaned heavily in favour of sheep.⁸² This was the case despite the fact that the local environment remained fairly non-favourably disposed towards sheep-rearing.⁸³

The number of game remains testifies to the fact that hunting was quantitatively very probably a more important source of meat and fat for the prehistoric inhabitants of Črnelnik than animal keeping. Some caution with this statement is due primarily because of the modest size of the excavation field, which encompassed only a smaller part of the entire area of the prehistoric village. The distribution of animal remains within pile-dwelling settlements is, generally, not homogenous, which can to a great extent be contributed to the various spectre of activities of inhabitants of individual houses.⁸⁴ Not surprisingly, significant heterogeneity in the horizontal dispersion of bones and teeth was discovered also at Črnelnik. If we remember: within test trench TS35, seven bovine and nine red deer remains were found, while in the researched part of the gravel road there were eight bovine remains and at least twenty-seven remains of red deer. If the latter number is summed with several rib fragments conditionally ascribed to red deer (see p. 49), it increases to no less 41! Moreover, since the supremacy of hunted species remains over the domesticated is exhibited also at the majority of other pile-dwelling settlements at the Ljubljansko barje from the 4th millennium BC,⁸⁵ it seems valid to presume it also for Črnelnik.

What about animal keeping? In the first half of the 4th millennium, its primary purpose was to ensure the greatest possible amount of meat and fat. As mentioned above, the intensive use of secondary products started later (see e.g. the

⁶⁷ Pleničar 1970.

⁶⁸ Similar are known from the pile-dwelling settlement of Stare gmajne (see Turk 2009, 284).

⁶⁹ Cf. Dieckmann, Harwath, Hoffstadt 2006, 221–222.

⁷⁰ Turk 2009, 283.

⁷¹ Pleničar 1970.

⁷² Pleničar 1970.

⁷³ Kryštufek 1991.

⁷⁴ See e.g. Higham 1968; Kühn et al. 2013, 53–55.

⁷⁵ Jeraj 2004, 63–64; Andrič 2009.

⁷⁶ See above and Jeraj 2004, 61.

⁷⁷ Cf. Kühn et al. 2013, 54.

⁷⁸ See p. 49 and also Toškan, Dirjec 2004, 83–84.

⁷⁹ See p. 57.

⁸⁰ Ogrinc et al. 2014, 190–191.

⁸¹ Higham 1968, 94.

⁸² Toškan 2009b, 58; Velušček, Toškan, Čufar 2011, 58.

⁸³ Bartosiewicz, Choyke, Gál 2009b, 59.

⁸⁴ Cf. Marti-Grädel et al. 2003; Toškan 2009c, 301–302.

⁸⁵ Toškan, Dirjec 2004, 78–83; Toškan, Dirjec 2006, Tab. 1; Velušček et al. 2004, Tab. 3; Toškan 2009c, Tab. 14.3.

utilisation of the draught power of cattle in the second half of the 4th millennium and the use of sheep fleece possibly even later⁸⁶). The culling policy was greatly determined by the necessity to maximize the meat output of individual animals. A three and a half years old cattle, for example, which is represented in the analysed material by the distal part of the femur with fusing epiphyses, was culled right before the beginning of winter.⁸⁷ Thus, the increase in body mass due to the plentiful grazing season could have been benefited from and at the same time the need for winter fodder was decreased. A similar time frame of the culling can also be assumed for ovicaprids and pig.⁸⁸ A part of fresh meat acquired in this manner was, most certainly, conserved by the pile-dwellers and consumed in the following weeks and months. Since towards the end of winter, their autumn supplies must have nevertheless run out, and the spring regeneration of the herds has barely begun, hunting and fowling supposedly remained the key source of fresh meat all through to the end of spring. Data from Črnelnik are in line with such a thesis since several of the red deer bones⁸⁹ and at least the largest of the two recovered roe deer antlers can be connected to game killed in the spring.

Forms of non-dietary exploitation of domesticated and wild animals that can be inferred from the available finds include the making of osseous tools and fur production. The collection of recovered artefacts includes six awls, of which two were totally undamaged, and a shorter ringlet (*Fig. 25*). In accordance with the expectations, these objects (=mostly tools) were made of wild animals' bones, both mammals and birds.⁹⁰ The use of fur is also indirectly testified to by the representation of several carnivores and beaver. Even though the kill of a brown bear or possibly a wolf was primarily a defensive act, an important motivation for the hunt of badger, fox, and beaver could have been the desire for their coats. For this purpose, pile-dwellers from Črnelnik supposedly even skinned

dogs, which is testified to by the presence of cut-marks on a body of mandible.⁹¹

When discussing wild carnivores, the skinning was probably routinely followed by the consumption of meat, the evidence to which can be found in the cuts made above the distal epiphysis of a badger's femur. At least occasionally, the same destiny befell dogs.⁹² Among finds from Črnelnik, this is evident from the cut marks on the anterior edge of a mandibular ramus, which were presumably made during the removal of the mandible in the process of primary butchering of the carcass (*Fig. 26*).⁹³

The discovery of three relatively well-preserved dog mandibles is especially interesting because in combination with the dog's coprolite analysis results⁹⁴ (*Figs. 17 and 18*) an insight into its relationship with people of the time is offered. According to the dimensions of the lower carnassial (M_1), which is considered a reliable indicator of the animal's body size, all three mandibles belonged to relatively small specimens with height at the withers between 30 and 40cm.⁹⁵ A similar body structure is revealed by the majority of dogs from the prehistoric pile-dwelling settlements at the Ljubljansko barje and wider,⁹⁶ which is often believed to be connected to their specific role in the life of people of the time. Namely, people supposedly did not consciously control dog's breeding, neither did they take care of regularly providing food for these animals. Indeed, at major prehistoric settlements dogs must have been tolerated as scavengers. The latter is nicely matched by the finding that fish remains in the above-mentioned coprolite supposedly only included teeth and head bones which were of no interest to the humans. The absence of any mating control and the fact that they were supposedly mostly left to themselves to find food might have crucially contributed to the smallness of pile-dwelling dogs. In the dietary sense, these animals supposedly occupied the place of scavengers.⁹⁷

Pile-dwellers' food supplies were likely more endangered by rodents than by dogs.⁹⁸ Since there were yet no house mice or rats present in

⁸⁶ Velušček, Čufar, Zupančič 2009; Greenfield 2010.

⁸⁷ This estimate is based on the supposition that the animals were born in late spring or early summer, as can today be noticed with the cattle living in the wild (see e.g. Ball, Peters 2004).

⁸⁸ See e.g. Toškan, Dirjec 2004, 121–122.

⁸⁹ E.g. the mandible with deciduous premolars, a scapula, the proximal part of a humerus, and the distal part of a tibia.

⁹⁰ Toškan 2009c; 2010.

⁹¹ Cf. Zeiler 1987.

⁹² Cf. Bartosiewicz 1999, 314.

⁹³ Cf. Zeiler 1987.

⁹⁴ See p. 52.

⁹⁵ Cf. Bartosiewicz 2002, 79–83.

⁹⁶ Bartosiewicz 2002, 83–85.

⁹⁷ Bartosiewicz 2002, 85–88.

⁹⁸ Dark, Gent 2001.

the area during that period, the biggest problems were probably caused by field mice (*Apodemus*), which still enter buildings today.⁹⁹ These rodents are indeed present among the finds from some of the prehistoric pile-dwelling settlements of the Ljubljansko barje,¹⁰⁰ even though not at Črnelnik. Here, however, taxonomically unidentified rodent coprolites were discovered in the sediment samples taken for archaeobotanical research.

The archaeobotanical analysis showed that by far the richest samples, especially samples 75 and 76, were collected from the cultural layer of the Črnelnik site (Fig. 13). 2–3 taxa of cultural plants and 11–12 gathered plant taxa were discovered. The absence of the remains of certain taxa such as seeds and capsule fragments of flax (*Linum usitatissimum*) and poppy (*Papaver somniferum*) was surprising, as well as of fragile non-carbonised cereal chaff, such as of einkorn (*Triticum monococcum*) and emmer (*Triticum dicoccum*). Since they are usually found in the methodologically comparably collected samples from, for example, the pile-dwelling site Stare gmajne,¹⁰¹ it seems that their absence at Črnelnik site can be attributed to inappropriate methods and storing of samples (rough washing and subsequent drying of plant macroremains).¹⁰² Archaeobotanical analyses of moss and supposedly dog coprolite, that were both gently washed over and the remains kept in wet condition, confirm that suspicion while flax remains appear in both cases.

Nevertheless, samples from the cultural layers still gave us some cultural plant macroremains, especially those with more lignified or charred surface, such as cereal grains and rahis fragments of barley and emmer wheat, rapeseed seeds, and the remains of certain weeds with more resilient tissue, which all testify the existence of cultivated areas.

On the other hand, the remains of water and wetland plant taxa and those which are not nutritious such as the creeping buttercup, blue bugle, carrots, sedge, black alder, birch, swamp sawgrass, lakeshore bulrush, bur-reed, spiny water nymph, white water lily, yellow water lily, spiked water-milfoil, and pondweed, testify to the marshy or lakeshore and water environment of slowly running or standing water (i.e. lake). These taxa

present the natural vegetation in the vicinity of the prehistoric site.

We ran into similar taxa from the probably chronologically simultaneous layer in test trench TS34, which was set south of the site, where comparable remains of lakeshore and water plants can also be found (Fig. 13).

Remains of charcoal, fish, fungus spores,¹⁰³ and coprolites of small mammals¹⁰⁴ (see Fig. 13) can be understood as the indicator of human presence or these remains point to the area where humans actually lived.

Remains of fish (Figs. 18a,b) prevailed in the approx. 7cm long coprolite from Črnelnik. We believe it to be a dog's faeces since in human excrements plant remains are supposed to prevail.¹⁰⁵ Furthermore, in the faeces from Črnelnik remains of individual parts of fish heads were discovered but not also of vertebra, what also confirms the opinion that the excrement actually belonged to a dog and not a human, as it was supposed as the alternative option at the beginning of the study.¹⁰⁶

For the diversification of its menu, the animal consumed also plants (Fig. 18c), among which not cultivated taxa prevail which additionally confirm the thesis that this is not a human excrement.¹⁰⁷

Remains of moss (Fig. 16), which originate from the site of Črnelnik, are of two species. The moss (*Neckera crispa*) composes a special ecological group with the silver fir (*Abies alba*) and it calls *Neckero-Abietum* group, which typical thrive locations are rocks in the area of Dinaric fir-beech forest, at the altitude from 450 (600) to 1200 m. Today, it is found primarily in the Kočevska region, in the mountain chain of Snežnik, in the eastern part of Trnovski gozd, and on Nanos mountain, where it grows on rock blocks almost completely covered by various mosses, among which *Neckera crispa* is the most common.¹⁰⁸

Due to the frequency of moss, especially *Neckera crispa*, on archaeological sites two questions arise; was it such a frequent plant in forests of the time or was it a purposely sought species, due to its versatile use?¹⁰⁹ Namely, it can be used as a raw material for filling cracks in wooden boats,

⁹⁹ Kryštufek 1991, 155, 157; see also e.g. Cucchi, Vigne 2006, 103.

¹⁰⁰ Toškan 2012.

¹⁰¹ Tolar et al. 2011.

¹⁰² Tolar et al. 2010.

¹⁰³ Cf. Jacomet, Brombacher, Dick 1989; Moskal-del Hoyo, Wachowiak, Blanchette 2010.

¹⁰⁴ See above.

¹⁰⁵ See Byrne 1973.

¹⁰⁶ Cf. Le Bailly, Leuzinger, Schlichtherle 2016, 146.

¹⁰⁷ Boenke 2007; Britton, Huntley 2011.

¹⁰⁸ Draskobler, Marinšek 2009.

¹⁰⁹ Dickson 2000.

houses,¹¹⁰ it was used to make soles,¹¹¹ to degrease dishes,¹¹² wrap food in,¹¹³ and also as a hygiene accessory.¹¹⁴

Both the first and the second determined moss species (*Anomodon viticulosus*) are not considered marsh or water species, therefore they must have been gathered in the fir-beech forest¹¹⁵ that surrounded the area of the former lake in the Ljubljansko barje, most probably from the place where the corroded limestones (Fig. 9a) and wood-decaying fungus (Fig. 15) also originate.

Since these two species do not grow at the lowland of Ljubljansko barje, it is clear that the pile-dwellers from Črnelnik brought them to their homes and due to its usefulness probably gathered it intentionally in the nearest forest.¹¹⁶ Despite the absence of data about its actual use, it can still be said that all this happened while the pile-dwelling settlement was inhabited. Namely, remains of cultural plants, such as flax, and of animals, such as coprolites of small mammals, were discovered in the moss, which are all anthropogenic indicators.¹¹⁷

Devce

Not much data for the relevant definition about the archaeological character of the site has been acquired from the site of Devce – vakuumska postaja 2 (Figs. 2 and 22). Three sharpened thicker stilts in no way differ from the stilts from all periods at the Ljubljansko barje.

Archaeological finds were also few. Simple pottery of forms widespread in time appeared. For the shallow bowl of dark grey and partly orange colour (Pl. 7: 9) analogies can be found primarily at the Eneolithic sites. At the Ljubljansko barje, such bowls are present as early as in the 4th¹¹⁸ and then also at least in the 3rd millennium BC.¹¹⁹

The second fragment is a part of the rim with the wall of a pot (Pl. 7: 8). Its analogies are found at the sites of the 4th millennium.¹²⁰ The simple form appears also later, in younger periods of prehistory.¹²¹

The third object from the Devce site is a point made of animal bone – a tibia, which is sharpened at the distal part (Pl. 7: 11).¹²² A spine of a plant was found within it. It is 2.8cm long and at a head up to 0.5cm wide (Pl. 7: 10). The question of whether these two objects share a certain connection apart from being found together, remains unanswered.

The collection of animal remains is also modest. In addition to two remains of fish and three of the European pond turtle, which confirm the vicinity of standing or slowly flowing waters, only a partly preserved red deer skeleton was found. Due to the absence of any kind of signs of human activity on these bones we need to emphasise the possibility that they could actually have no connection to the settlement.

The archaeobotanical samples from the Devce site also revealed some plant macroremains (Fig. 24). No remains of cultivated plant taxa or weeds were preserved. Remains of three supposedly gathered taxa could possibly indicate the anthropogenic influence, however slight: blackberry, raspberry, and bladder cherry.¹²³

More important are other, non-anthropogenic plant remains which indicate the ecological conditions at the site. Marsh or lakeshore and water plant taxa prevail in the samples 80 and 81, which indicate shallow water and waterside environment.

Based on the gathered data about the character of the Devce site, it is not yet possible to give a definition supported by arguments. Thus it is not clear whether these are the remains of some, until now unknown main settlement or the remains of structures or equipment which were due to economic interest, either fishing or something else, set up by the inhabitants of the main settlement located somewhere nearby.¹²⁴ In the latter case, the closest to the site as the main settlement can be the pile-dwelling settlement of Črnelnik from the first centuries of the 4th millennium and the

¹¹⁰ Arnold 1977; Monnier et al. 1991; Saatkamp, Guyon, Philippe 2011.

¹¹¹ Hochuli 2002.

¹¹² Constantin, Kuijper 2002.

¹¹³ Dickson 2000; Dickson et al. 2009.

¹¹⁴ Rybniček, Dickson, Rybničekova 1998; Vadam 2003.

¹¹⁵ Dickson 2000; Draskobler, Marinšek 2009.

¹¹⁶ Rösch 1988; Rybniček, Dickson, Rybničekova 1998; Dickson 2000.

¹¹⁷ See above.

¹¹⁸ E.g. Bregant 1975, Pls. 28: 3,4; 34: 10.

¹¹⁹ E.g. Korošec, Korošec 1969, Pl. 50: 6,11; Velušček, Čufar 2003, Pl. 2: 4.

¹²⁰ E.g. Korošec 1963, Pls. 23: 3; 27: 2,9; Bregant 1975, Pl. 33: 13,14; Velušček 2009, Pls. 3.17: 1; 3.20: 6, etc.

¹²¹ E.g. Dular et al. 1991, Pl. 3: 3,4.

¹²² Gál 2011, 140, Fig. 5.

¹²³ Tolar et al. 2011.

¹²⁴ Cf. Podpečan 2015, 35; Hafner, Pétrequin, Schlichtherle 2016, 64; Köninger 2016, 247–249.

pile-dwelling settlement of Založnica, which peaked in the 25th century BC,¹²⁵ and possibly also the Bronze Age settlement at Žabji grad (*Fig. 1*).¹²⁶

Real connections between these different archaeological units at the southern outskirts of the Ljubljansko barje cannot be discussed authoritatively at the moment. The site of Devce, regardless of the analysis, remains chronologically imprecisely defined. The only certain thing is that it belongs to prehistory. As indicated by the archaeobotanical analysis, to the period when there was still a lake at the Ljubljansko barje. This means that the site of Devce, based on the gathered data, can be set to the Eneolithic, possibly even to the Bronze Age. In absolute numbers this means the period from the 4th to the 2nd millennium BC.

CONCLUSION

The article presents the results of archaeological excavations which were carried out upon the construction of the sewerage network at the southern edge of the central part of the Ljubljansko barje, beneath the village of Kamnik pod Krimom. The data from newly-discovered prehistoric sites of Črnelnik and Devce – vakuumska postaja 2 are discussed in an interdisciplinary manner (*Figs. 1 and 2*).

More data was acquired for the site of Črnelnik, where remains of a pile-dwelling settlement from the period of the Furchenstich pottery culture were discovered. This is the fourth¹²⁷ or possibly even the fifth¹²⁸ site of this culture at the Ljubljansko barje.¹²⁹

The pottery analysis and dendrochronological research show that at Črnelnik the settlement most probably started in the first centuries of the 4th millennium BC. The pile-dwelling village or even a series of villages was most probably populated in the 39th and perhaps also in the first half of the 38th century BC, which assigns it into the very beginning of the presence of the sites from the mentioned culture in the Ljubljansko barje. It is set prior to the settlement of Strojanova voda and

Hočevarica,¹³⁰ possibly at the same time as the settlement at Gornje mostišče (*Fig. 1*).¹³¹

Not much data was gathered about the architecture from Črnelnik. It was discovered that primarily oak and ash wood were used for carrier stilts for the construction of houses and that corroded stones from caves and moss were brought to the pile-dwelling which can be found in the nearby forests on the slopes of the 1107 metres high Krim and other mountains south of the Ljubljansko barje. They also used raw material, deposits of which are found north of the site, at the time on the other side of the lake near Notranje Gorice or further to the north from there.

Some of the data speaks also about the end of the settlement at the site of Črnelnik, which could have ended due to the rise of the lake surface (*Fig. 6*). The fact is that the settlement was later never renewed at the same place. Another reason that life stopped in one of the villages could have been a fire, which is documented with the remains of burned house plaster (*Fig. 8*), a few burned stones (*Fig. 9*), and pieces of charcoal.

The results of archaeozoological research show that animal keeping and hunting had an important role for the pile-dwellers from Črnelnik, but the latter was nevertheless quantitatively more important. It is important to emphasise that a similar picture is revealed by practically all archaeozoologically researched pile-dwellings of the 4th millennium BC from the Ljubljansko barje,¹³² which increases the credibility of the presented finding. Remains of game discovered during the excavations belong to animals which are in their choice of habitat almost exclusively linked to forests (*see Fig. 10*).¹³³ The latter were also the ideal solution for the free grazing of pigs and to some extent also goats, while meadows and more or less extensive forest clearings were probably more appropriate for cattle and especially sheep.¹³⁴ It is not questionable whether pile-dwellers at the time cleared forested areas for agricultural purposes.¹³⁵ As is proven by numerous finds of cultural plants and weeds,¹³⁶

¹²⁵ Velušček, Čufar 2003; Velušček 2014.

¹²⁶ Nadbath et al. 2008.

¹²⁷ In addition to Hočevarica (Velušček 2004a), Gornje mostišče, and Strojanova voda (Velušček, Čufar 2008).

¹²⁸ If we assign part of the finds from the pile-dwelling settlement of Notranje Gorice to the Furchenstich pottery culture (*see Velušček 2004c, 218–230*).

¹²⁹ *See sites of the Furchenstich pottery culture at the Ljubljansko barje (Fig. 1).*

¹³⁰ *See Čufar et al. 2015.*

¹³¹ *See Velušček, Čufar 2008; Mlekuž, Mušič, Medarič 2014.*

¹³² Toškan, Dirjec 2004, 78–83; Toškan, Dirjec 2006, Tab. 1; Velušček et al. 2004, Tab. 3; Toškan 2009c, Tab. 14.3.

¹³³ Kryštufek 1991.

¹³⁴ *See e.g. Higham 1968; Kühn et al. 2013, 53–55.*

¹³⁵ Jeraj 2004, 63–64.

¹³⁶ *See above and Jeraj 2004, 61.*

the cleared areas were not necessarily intended for grazing but also for agriculture.

Hunting and animal husbandry were not just a source of food. Pile-dwellers used animal bones to make tools. Some small carnivores and beaver were hunted also for their skins. Even dogs were supposedly skinned for this purpose. Dogs were supposedly not devoted much care by the pile-dwellers, that is why they were short with the height at the withers between 30 and 40cm. They were supposedly scavengers as far as food goes.

More than by dogs, humans' food supplies were likely threatened by rodents, possibly the yellow-necked mouse (*Apodemus flavicollis*) and wood mouse (*A. sylvaticus*), which are known from some other prehistoric pile-dwellings at the Ljubljansko barje.¹³⁷ Excavations at Črnelnik did not unearth any bone remains of rodents, but their coprolites were discovered in the sediment samples for archaeobotanical research.

Despite the inappropriate method of sampling and sample processing, the archaeobotanical analysis confirmed the existence of 2–3 cultural and 11–12 gathered plant taxa in the samples taken from the pile-dwelling settlement. Flax (*Linum usitatissimum*) remains were discovered in moss and a dog's faeces.

Cultural plants and weeds indicate that there were cultivated areas, most probably in the hinterland of the pile-dwelling settlement. Seeds/fruits remains of wetland plants which are not edible or nutritious testify to the marsh or lakeshore and water environment of slowly-flowing or standing water and indicate natural vegetation in the near vicinity of the prehistoric site.

The second discussed site is Devce – vakuumska postaja 2. There was too little data which would enable us to write something more definite about it. The archaeobotanical analysis seems to be important as it brought attention to environmental circumstances in the immediate vicinity of the site. It still indicates the existence of a lake. This was, in addition to prehistoric pottery (*Pl.* 7: 8,9), also the most important starting point for the dating of the site which is thus assigned to the Eneolithic, to the 4th or 3rd millennium, and/or even to the Bronze Age.

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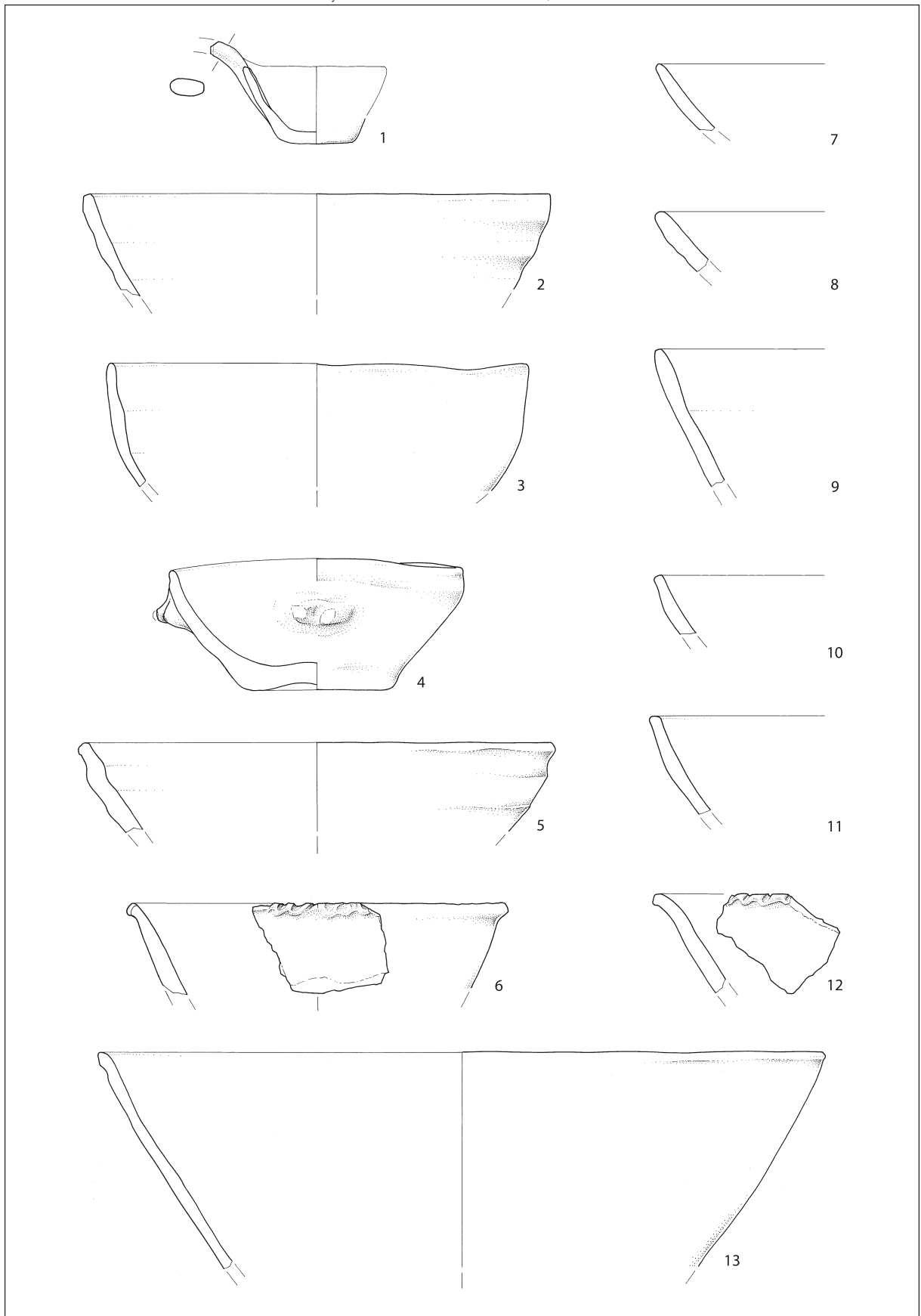
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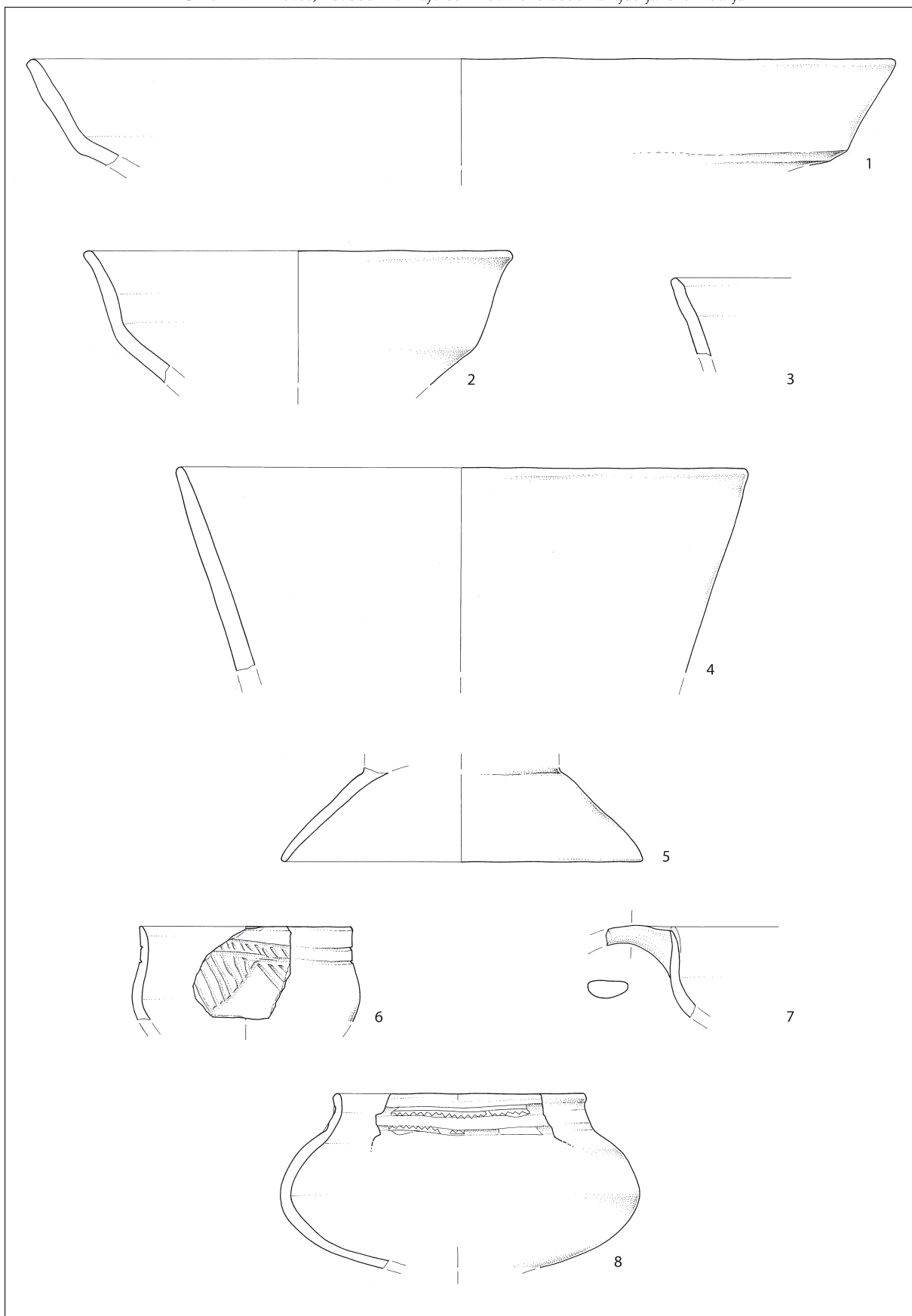
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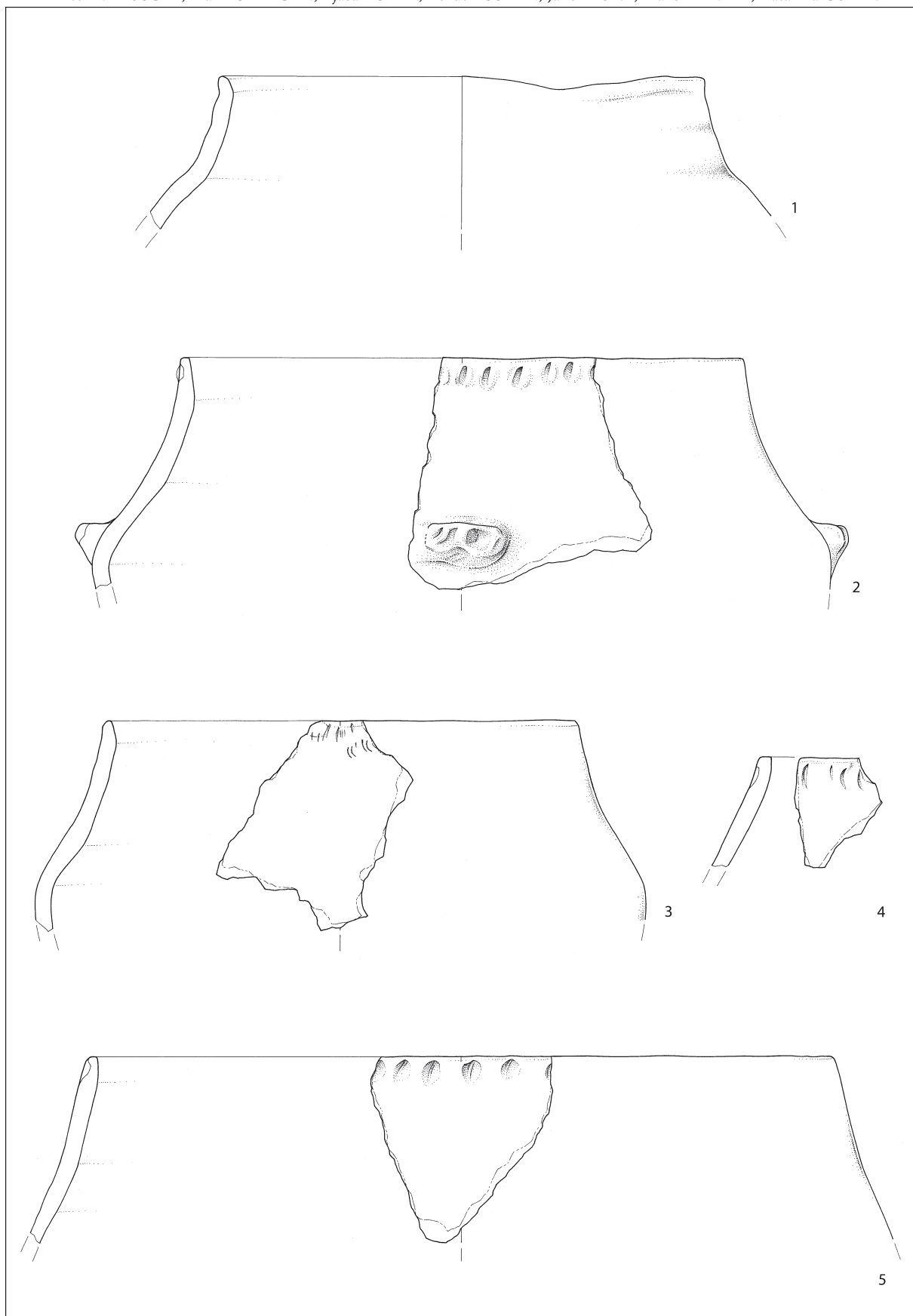
¹³⁷ Toškan 2012.



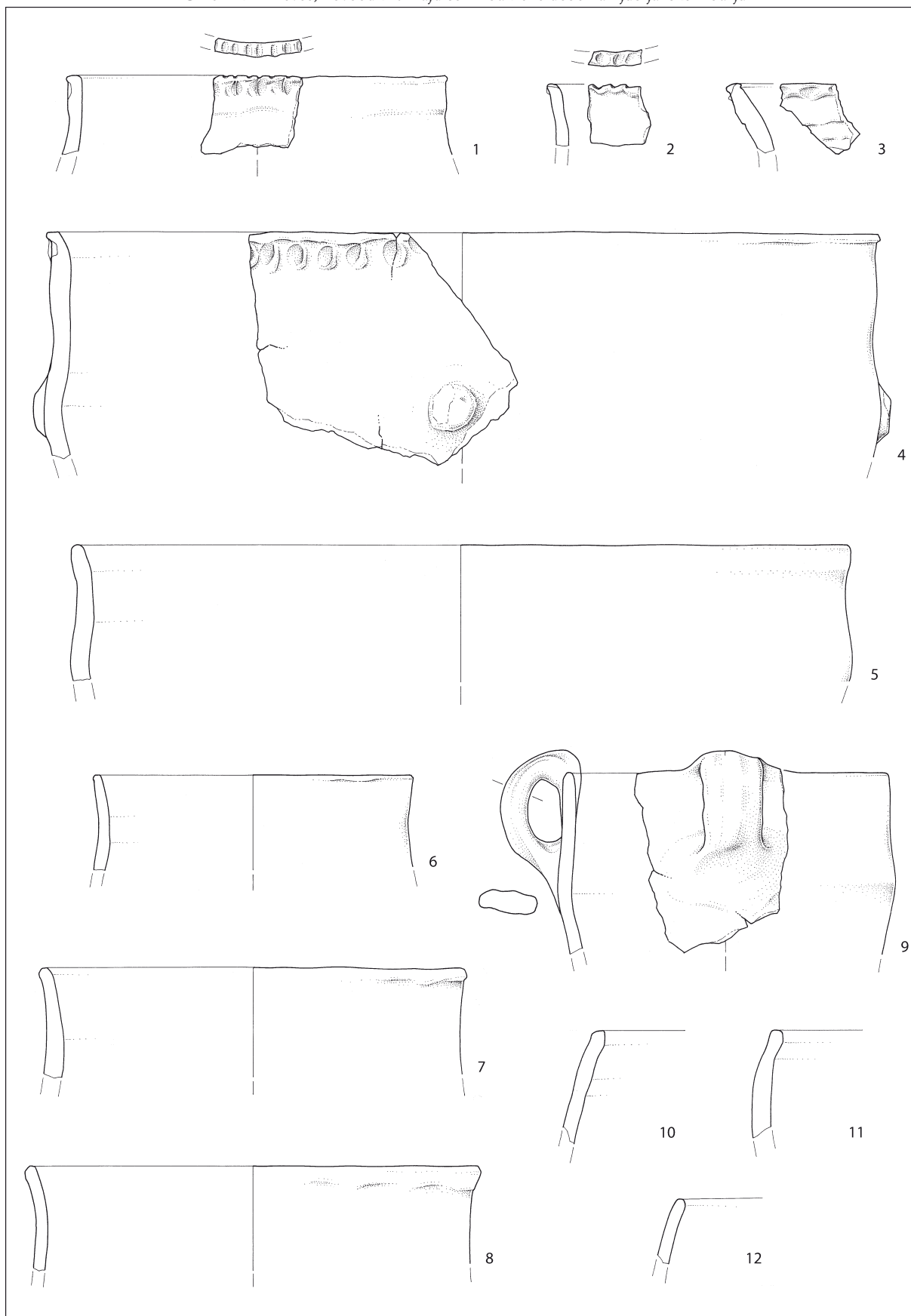
T. 1: Črnelnik. Keramika. M. = 1:3.
Pl. 1: Črnelnik. Pottery. Scale = 1:3.



T. 2: Črnelnik. Keramika. M. = 1:3.
 Pl. 2: Črnelnik. Pottery. Scale = 1:3.

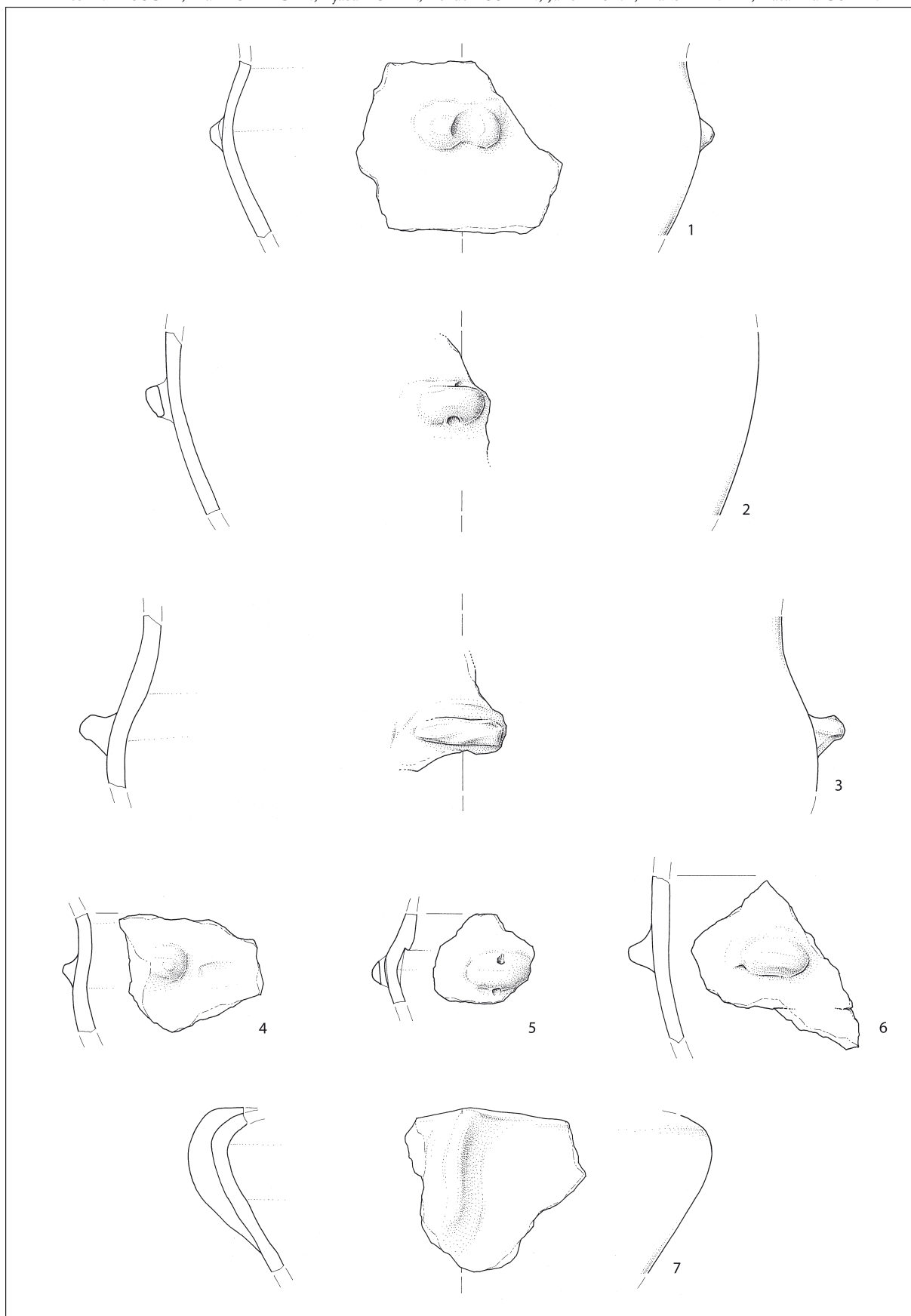


T. 3: Črnelnik. Keramika. M. = 1:3.
Pl. 3: Črnelnik. Pottery. Scale = 1:3.

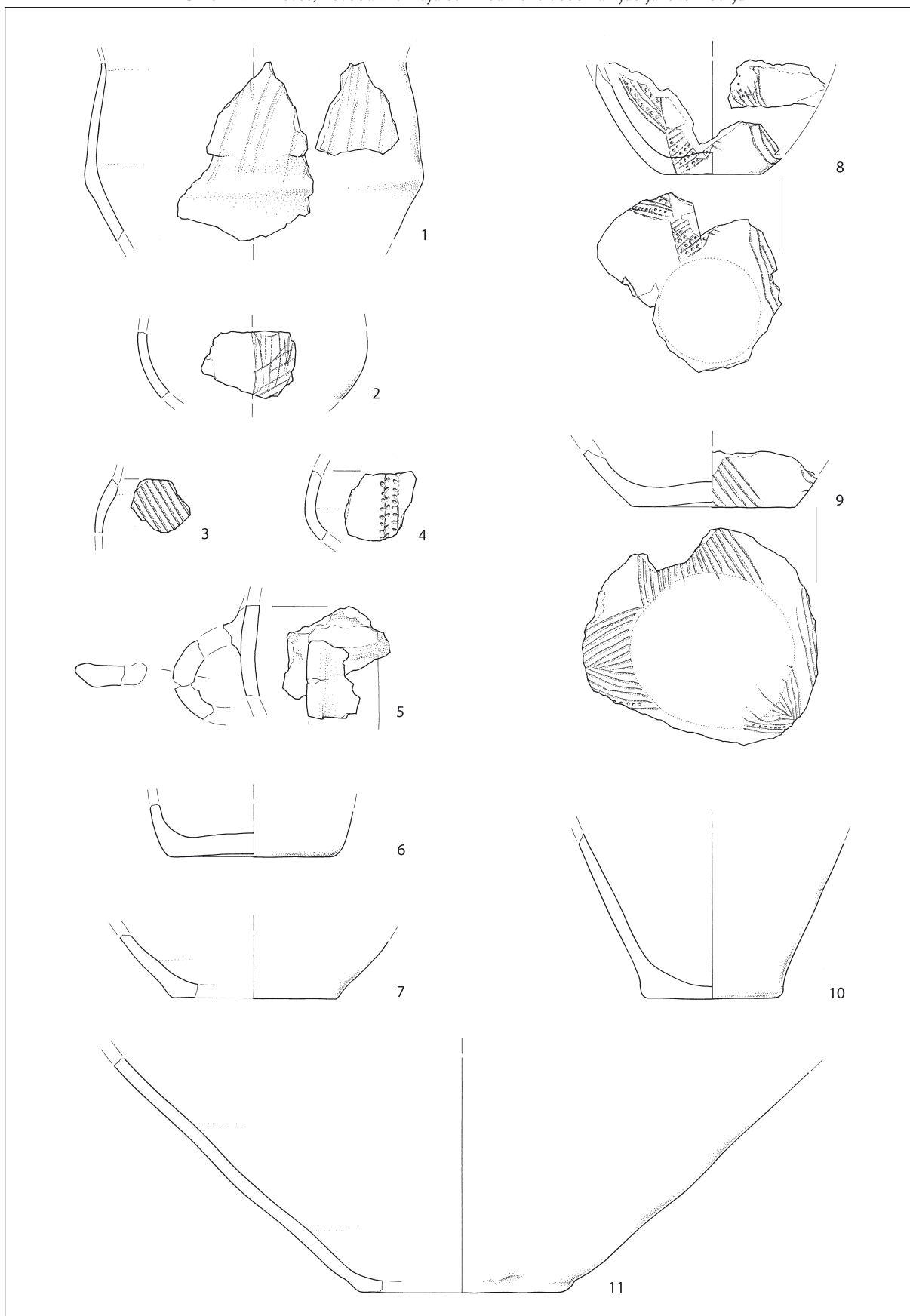


T. 4: Črnelnik. Keramika. M. = 1:3.

Pl. 4: Črnelnik. Pottery. Scale = 1:3.

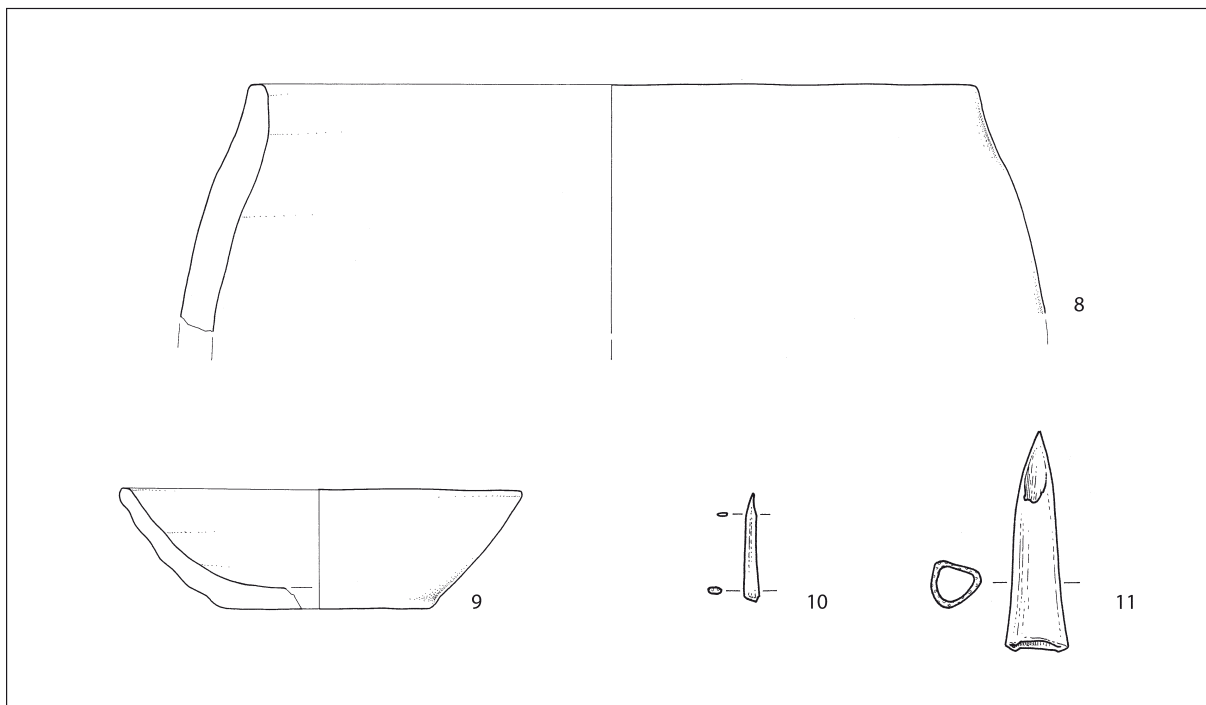
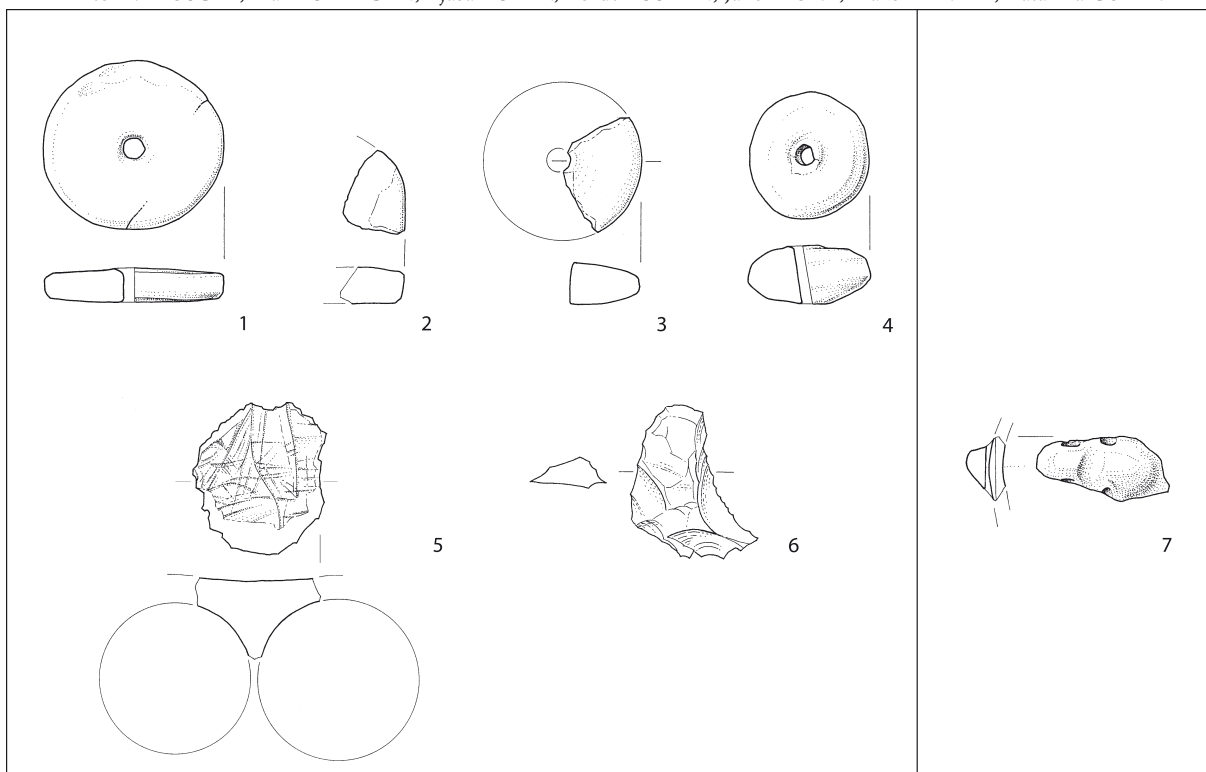


T. 5: Črnelnik. Keramika. M. = 1:3.
Pl. 5: Črnelnik. Pottery. Scale = 1:3.



T. 6: Črnelnik. Keramika. M. = 1:3.

Pl. 6: Črnelnik. Pottery. Scale = 1:3.



T. 7: Črnelnik (1-7); Devce - vakuumška postaja 2 (8-11). 1-4,7-9 keramika; 5 glina; 6 kamen; 11 kost; 10 organska snov (neidentificirana rastlina). M. 1-5,7-9 = 1:3; 6,10,11 = 1:2.

Pl. 7: Črnelnik (1-7); Devce - vakuumška postaja 2 (8-11). 1-4,7-9 pottery; 5 clay; 6 stone; 11 bone; 10 organic material (non-identified plant). M. 1-5,7-9 = 1:3; 6,10,11 = 1:2.