

The Starčevo culture horizon at the site of Kneževi Vinogradi (eastern Croatia): lithic and osseous industries

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ABSTRACT – *The region of Slavonia in eastern Croatia represents the westernmost area inhabited by the communities of the Starčevo culture, part of the Starčevo-Körös-Criș cultural complex. This region was intensively inhabited during the period between 6200 and 5500 cal BC, and numerous sites were excavated. Some of the aspects of the lives of these communities, however, are still insufficiently explored, in particular the economy and craft production. In this paper we will focus on lithic and osseous tool assemblages from the site of Kneževi Vinogradi-Osnovna Škola. The Starčevo cultural horizon has only yielded small assemblages of lithic and osseous tools, but they show some interesting technological and typological traits.*

KEY WORDS – *Starčevo-Körös-Criș culture; eastern Croatia; ground stone industry; osseous industry; Neolithic technology*

Kulturni horizont Starčevo na najdišću Kneževi Vinogradi (vzhodna Hrvatska): kamnite in kostne najdbe

IZVLEČEK – *Slavonija v vzhodni Hrvatski predstavlja najbolj zahodno območje, ki so ga poseljevale skupnosti kulture Starčevo, ki je del kulturnega kompleksa Starčevo-Körös-Çris. Območje je bilo intenzivno poseljeno v času med 6200 in 5500 pr. n. št., izkopane pa so bila tudi številna najdišča iz tega obdobja. Nekateri vidiki življenja teh skupnosti so še vedno premalo raziskani, zlasti gospodarstvo in obrtna proizvodnja. V članku se osredotočamo na zbirke kamnitih in kostnih orodij iz najdišča Kneževi Vinogradi-Osnovna škola. Iz kulturnega horizonta Starčevo je ohranjen sicer le manjši zbir kamnitih in kostnih orodij, kljub temu pa kažejo na nekaj zanimivih tehnoloških in tipoloških lastnosti.*

KLJUČNE BESEDE – *kultura Starčevo-Körös-Çris; vzhodna Hrvatska; tehnologija glajenih orodij; tehnologija kostnih izdelkov; neolitska tehnologija*

Introduction

The region of Slavonia in eastern Croatia represents the westernmost area inhabited by communities of the Starčevo culture, part of the Starčevo-Körös-Criș cultural complex. Absolute dates place the Starčevo culture in the period between 6200 and 5500 cal BCE (Whittle et al. 2002). During this period this region was intensively inhabited, and numerous sites have been excavated, including Zadubravlje, Galovo,

Sarvaš, Pepelane, and Stari Perkovci, among others (Dimitrijević 1979; Minichreiter 1992; 2007; Šošić Klindžić, Hršak 2014).

On a wide territory occupied by Starčevo culture communities, regional differences may be observed in the material culture and related settlement patterns, subsistence practices, economic organization,

and other aspect of life. The attention of researchers has mainly focused on the style of pottery and other clay objects (figurines, altars), while diverse aspects of subsistence and the economy have been less explored. In order to study raw material procurement, the organization of craft production and other aspects of the economy, lithic and osseous industries are particularly important. The assemblages of ground and chipped stone tools have been analysed and published in detail from a only limited number of sites (e.g., Šošić 2007; Težak Gregl 2007; Rajković 2019), while bone tools are virtually unknown, except for a few artefacts briefly mentioned or published in catalogues. The organization of production within settlements and possible locations of activity/working areas have, however, seldom been the focus of research. Among rare exceptions can be mentioned the site of Galovo, where an interpretation has been offered for one of the excavated features being a working pit (Minichreiter 2008). However, detailed analyses of the lithic and stone assemblages were not included in this study. Further research needs to be done to better understand the organisation of production and other aspects of the economy and everyday activities among the Starčevo culture communities.

This paper will present the results of the analyses of ground stone and bone assemblages from the site of Kneževi Vinogradi, and the data they provide on the craft production in this settlement.

The site of Kneževi Vinogradi – Osnovna Škola

The prehistoric site of Kneževi Vinogradi – Osnovna Škola is situated within the present-day village of Kneževi Vinogradi, 11 km from Beli Manastir, in Osijek-Baranja county, in eastern Croatia (Fig. 1). The site is located on the slopes of Bansko brdo, on the edges of the marsh which spread up to an ancient course of the Danube River (Minichreiter 1992.15; Rajković 2014).

The site was first noted in 1979, when the Museum of Slavonia in Osijek obtained a chance find of a Neolithic figurine. The research on the site was carried out in several small-scale rescue excavation campaigns on the location

of the local primary school (hence the label of the site Kneževi Vinogradi – Osnovna Škola) (Minichreiter 1992.15; Šimić 1983; 1986a; 1986b; 1986c; 1987).

The first excavation campaigns were carried out in the 1980s. Several trenches, covering a total surface of 136m², were excavated, positioned to the south-east from the primary school. These excavations encompassed the north-western part of the settlement. Some layers contained no features, but portable finds only, and just one semi dug-out dwelling was discovered, of irregular shape, approx. 4 x 4.5m. In 2003, rescue excavations were carried out on the area of the sport hall of the school and the total excavated area was approx. 140m² (Šimić 1983; 1986a; 1986b; 1986c; 1987).

Excavations revealed a multi-layered Neolithic site, and the traits of the pottery finds, as well as absolute dates obtained for this site, suggest that it was occupied by communities belonging to the Early Neolithic Starčevo culture, Late Neolithic Sopot and Vinča cultures. Some of the features, unfortunately, were not completely excavated, since the excavated area was dictated by their rescue character, and also the overall interpretation is complicated by the presence of some layers with mixed material (Minichreiter 1992.15; Rajković 2014).

The Starčevo cultural horizon at Kneževi Vinogradi

Several excavation layers and features were interpreted as remains of the Early Neolithic Starčevo cul-

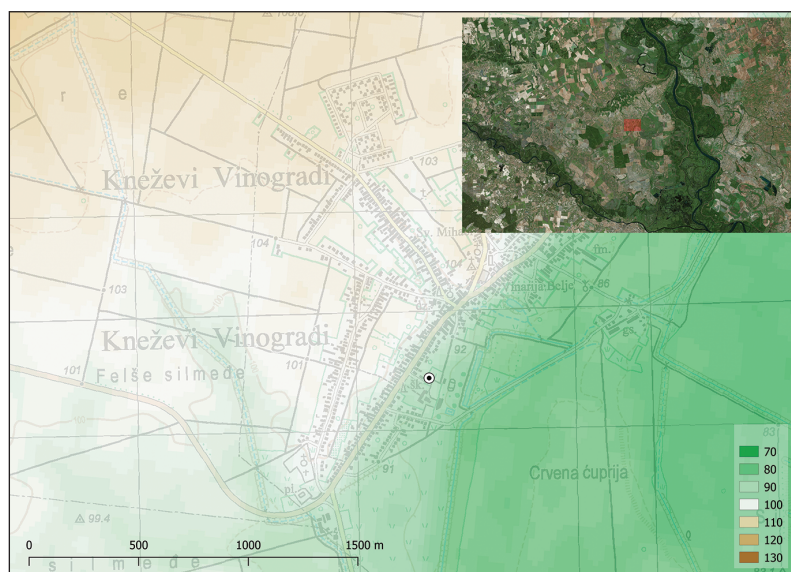


Fig. 1. The location of the site of Kneževi Vinogradi – Osnovna Škola.

ture settlement, some of them only partially examined, due to the rescue nature of excavations. The following features were attributed to the Starčevo culture¹:

- Unit 21, sq. 7 and its extension represent a cultural layer with Starčevo culture portable finds, widespread on almost the entire surface of the trench, except for the south-eastern extension.
- Unit 35, sq. 9 represents a cultural layer with rich findings of Starčevo culture portable material, and into this layer was dug one large pit, also with Starčevo material.
- Unit 45/46, sq. 9 represents a part of a larger pit-dwelling; its edges were noted on the north and west, while it continued further on other sides. The most interesting finds of the Starčevo horizon were discovered in this unit, including decorated ceramic findings, a zoomorphic figurine and a fragmented altar.
- Unit 47/49, sq. 8 represents a pit with Starčevo culture pottery.
- Unit 50/51, sq. 7 represents a pit-dwelling with several rooms and postholes, but with limited amount of portable finds.
- Unit 56/57, sq. 12 represents a refuse pit with Starčevo culture pottery.

Portable finds from these units include pottery, figurines and other clay objects, as well as lithic and osseous artefacts. Pottery finds include globular pots and bowls, as well as footed bowls. They were decorated with barbotine, ornaments made by impression and by plastic modelling. Some of the vessels have painted decoration, mainly linear motifs such as vertical and horizontal lines made by black paint on a reddish-brownish surface, but also spiral motifs, made after firing. The colour of vessels ranges from red-brownish to dark-brownish nuances. Other clay finds include weights and spindle whorls, discs, altars, zoomorphic and anthropomorphic figurines, as well as bucranion-shaped artefacts (Figs. 2, 3). Altars are rectangular or circular in shape and often have incised decoration (Rajković 2014).

The analysis of faunal remains shows that domestic animals prevailed, and the species represented are cattle, sheep, goats, and pigs. The remains of wild species were found in small quantities and they include red deer, roe deer, and just a few bones of

other species.² Other finds include lithic and osseous artefacts, as analysed in this text.

The absolute dates obtained for the site of Kneževi Vinogradi fall among the earliest obtained for the Starčevo culture in its entire distribution area (for other Starčevo culture dates, see Whittle et al. 2002). Three bones of *Bos taurus* from two different contexts were analysed, and they provided the following results:

- ❶ sample U 21 – SUERC-73546 (GU43988)/unit 56/57 is dated into 7077±31 BP (6015–5897 cal BC);
- ❷ sample U 22 – SUERC-73547 (GU43989)/unit 45/46 is dated into 7029±31 BP (5989–5846 cal BC); and
- ❸ sample U 23 – SUERC-73551 (GU43990)/unit 45/46, is dated into 7043±31 BP (6001–5873 cal BC)³.

Pottery finds were previously interpreted as belonging to the Spiraloid A phase according to the chronological classification of Stojan Dimitrijević (Dimitrijević, 1979.247; Minichreiter 1992.15). However, AMS dates obtained for the site suggest the Starčevo culture lasted for a longer period in this area, and future analyses will probably offer a revised chronological framework for the Starčevo culture in the region.

Ground stone industry

The amount of ground stone artefacts is rather small, only seven items can be securely placed into the Starčevo cultural horizon (Rajković 2019). Artefacts



Fig. 2. Fragmented altar, unit 45/46.

¹ The preliminary analysis of the material was done by the first excavator, J. Šimić, and further continued by authors of this text (see also Rajković 2019; Vitezović, Rajković 2017).

² The analysis of faunal remains was done by Jane Sanford Gaastra, publication pending.

³ The dates were obtained at the Scottish Universities Environmental Research Centre as part of the project Transmission of Innovations comparison and modelling of early farming and associated technologies in Europe (EUROFARM).



Fig. 3. Bucranion-shaped ceramic artefact (dim. 36 x 14mm), unit 56/57.

were classified and analysed following the typological classification and methodological framework defined by Dragana Antonović (1992; 2003; 2014). Raw material determination and observation of manufacturing and use-wear traces were carried out with a hand lens, with up to 60x magnification, and raw materials were also analysed on an Axioscope Zeiss microscope, with a magnification of up to 500x (Rajković 2019).

Artefacts include one adze, made from calcarenite, one chisel, made from calcite, one mallet from quartzite, one fragmented tool for which it was not possible to determine the type, and three pieces of debris (Tab. 1).

The adze was found in unit 35, and it is only partially preserved, *i.e.* only its dorsal side. Typologically, this object falls into the group of adzes that have a distal end wider than the proximal one. On its surface there is a considerable amount of concretions.

The mallet was discovered within unit 45/46 (Fig. 4). It was made from quartzite and was executed on a natural pebble. Typologically, it belongs to the type of mallets with parallel side edges.

Particularly interesting is the chisel, found in unit 56/57, that can be classified into the type of chisels with parallel side edges (Fig. 5). The cross section of its side is rectangular and its dimensions are quite small (12.13 x 39 x 13mm). It was made from calcite of whitish-yellowish colour and with a transparent structure. Items made from this raw material are known from Starčevo cultural layers at the site of Divostin in central Ser-

bia (Antonović 2003:49) and Donja Branjevina in the region of Bačka, also situated in the Pannonian plain (Antonović 2003; 2005). This raw material is usually associated with serpentinite and white limestones as one of the main raw materials for the production of decorative objects (Antonović 2003:49, 90).⁴ Calcite was used for decorative items in the Late Neolithic Vinča culture as well, notably on the site of Vinča – Belo Brdo, where it was used for production of figurines and pendants (Antonović 2003: 127). The chisel from Kneževi Vinogradi bears no traces of use nor hafting, and we may assume its purpose was not functional.

The pieces of debris are in fact fragments from once complete artefacts, formed as a result of their use, and were recovered from every unit.

Osseous industry

Approximately 90 artefacts were singled out either during excavations or subsequent examination of faunal remains, and forty of them can be securely placed into stratigraphic units ascribed to the settlement of the Starčevo culture (Vitezović, Rajković 2017). Artefacts were classified and analysed following the typological classification and methodological framework outlined by Selena Vitezović (2016a and references therein). Analytical criteria for the technological and functional interpretation of manufacture and use-wear traces were established based upon the work of numerous authors (Campana

Unit no.	Lithic tools	Osseous tools
Unit 35	Adze (calcarenite) (n = 1) Debris from use (unidentified raw material) (n = 1)	Awl (n = 2) Needle (n = 1) Spatula (n = 3) Small punching tool (n = 1) Bracelet (n = 1)
Unit 45/46	Mallet (quartzite) (n = 1) Unidentified tool (unidentified raw material) (n = 1) Debris from use (quartzite) (n = 1)	Awl (n = 5) Heavy point (n = 2) Needle (n = 4) Knife (n = 2) Chisel (n = 1) Burnishing tools (n = 2) Small punching tool (n = 1) Decorative item (n = 1) Non-utilitarian item (n = 1) Manufacturing debris (n = 2)
Unit 56/57	Chisel (calcite) (n = 1) Debris from use (unidentified raw material) (n = 1)	Awl (n = 5) Needle (n = 2) Manufacturing debris (n = 4)

Tab. 1. Lithic and osseous artefacts discovered within Starčevo culture units.

⁴ Despite the white colour, this is not to be confused with so-called 'light white rocks', frequently used by Vinča culture craftspeople (cf. Antonović 2003).

1989; Christidou 1999; Christidou, Legrand 2005; Legrand, Sidéra 2006; Legrand 2007; Maigrot 2003; Newcomer 1974; Peltier 1986; Semenov 1976). Identification of manufacturing and use-wear traces were carried out with a hand lens, with up to 30x magnification.

Stratigraphic unit 35

Eight osseous artefacts were recovered in this unit (Tab. 1).

Pointed tools include two medium-sized points (awls) and one fine-pointed tool or needle. One awl was made out an irregular splinter from a long bone of a medium or large mammal. It has traces of burnishing and polishing with a fine-grained abrasive tool in its distal portion, and its distal end is a sharp, pointed tip. The other awl was made from sheep/goat metapodial bone; the bone was longitudinally split and it has small portion of proximal epiphysis preserved on the base. The entire artefact is slender, fine and has a very fine pointed tip at the distal end. The needle was made from a long bone segment, probably of a medium-sized mammal; the basal part is damaged and it has fine, sharp point at the distal end. Traces of manufacture – scraping with a fine chipped stone tool and traces of polishing with abrasive tool – may be noted on its surfaces.

Burnishing tools include three spatulae, all made from ribs of large mammals, most likely all from *Bos* (Fig. 6). Two were made from split ribs, from one bone plate; one has a rounded working edge, the other a straighter one. The third spatula was made from an unsplit rib, with a rounded working edge. All these tools show very intensive traces of use, a very high level of polish and shine and worn surfaces with very few or no striations at all, suggesting they were used on soft, organic materials, most like-



Fig. 4. Mallet from quartzite, unit 45/46.

ly leather (cf. Christidou, Legrand 2005; Legrand 2007; Maigrot 2003; Peltier 1986).

One small percussion tool was recovered, a small punch or perhaps a retouching tool, made from red deer antler tine, badly preserved, with surfaces covered in concretions. On the tip, slightly modified, can be noted traces of intensive use – a blunted tip, horizontal short incisions and grooves.

The most attractive find is a fragmented bracelet, made from a marine mollusc shell *Glycymeris* (Fig. 7). The bracelet was made by cutting the valve of the shell, and the outer segment was transformed into a circular object, either in the shape of a closed or open bracelet. Both ends are broken. Due to concretions on its surface, it was not possible to examine if there are any traces of manufacture or use. Mollusc shells are not frequent in the Starčevo culture assemblages, although similar bracelets were found at Starčevo-Grad (Vitezović 2013a).

Stratigraphic unit 45/46

The richest and at the same time most interesting assemblage comes from this unit, with a total of 19 items. In addition to these 19 artefacts, two more tools can be attributed to this unit; the documentation from excavations shows they were discovered within the same square, no. 9 (extension) and at the same depth.⁵

Pointed tools include medium-sized points (awls), heavy points and fine-pointed tools (needles). Five awls were discovered, produced from sheep/goat metapodial bones; the bones were longitudinally split and then modified by cutting and scraping with a chipped stone tool and by burnishing and polishing with an abrasive tool into a pointed artefact (Fig. 8). Some of them have epiphysis preserved at the basal part. On two of them this epiphysis was also smoothed and abraded, *i.e.* the abrasion is not limited to the modification of side edges and distal parts, but extends on the entire length of the artefact. This suggests two techniques for obtaining blanks were used: one manufacture by first sawing the metapodia in half and then abrading it, and the other the technique when bone is first abraded and then sawing is applied (cf. Sidéra 2005; Vitezović 2011; 2016b.128). The third technique characteristic of the Starčevo culture assemblages, manufacture using abrasion only, was not noted within this assem-

⁵ For these two artefacts either the unit number was omitted on the label by mistake, or the excavators were not sure whether the location where they were recovered should also be attributed to this unit. They have technological and typological traits characteristic of the Starčevo culture bone industry (cf. Vitezović 2011; 2013a; 2016b), and this is why they were included here.



Fig. 5. Chisel made from calcite, unit 56/57.

blage, although this may be due to the rather small sample size.

Traces of use observed on all these awls include polish, shine and occasionally fine striations, suggesting they were used for work on soft, organic materials, such as plant fibres, leathers and hides (cf. Christidou, Legrand 2005; Legrand 2007; Maigrot 2003; Peltier 1986). On some of the awls additional traces of abrasion on the distal ends were noted, partially covering use-wear traces, and providing evidence of sharpening or repair.

Two heavy points were recovered, both made of large mammal metapodial bones, probably both from *Bos*. The first one is completely preserved; it was made from the proximal segment of a longitudinally split long bone by cutting with a chipped stone tool and by abrasion. The entire artefact is polished from use, and traces of burnishing in the distal portion reveal episode(s) of repair. The other heavy point is similar, only its distal end is fragmented.

Four needles were noted, made from medium-sized mammal long bones, probably the metapodial bones or sheep/goats. They have large portions of their surfaces burnished with some fine-grained abrasive tool, and fine, slender, sharp tips at the distal ends. Use-wear traces consist of polish and shine.

Two small cutting tools (knives) were found, both made from segments of boar tusks, and both fragmented. Tusks were split and segments shaped by scraping with chipped stone tools and by abrasion.

They are more or less crescent-shaped, with one of the edges heavily used, chipped and with striations from use.

One small chisel was discovered, with very unusual characteristics (Fig. 9). The artefact is completely preserved, made of the diaphysis segment of some large mammal's long bone, perhaps the metapodial or tibia. Its dimensions are 50 x 20mm. The tool is almost completely regularly rectangular, and only the mesial part is slightly widened. The basal part is straight, as is the working edge, which is 15mm wide; the bone is thinned on the outer side and the edge itself is slightly chipped, worn from use, but still sharp. The object is also carefully burnished, with traces from some fine-grained abrasive means on all of its surfaces (side edges, outer and inner surface). The most surprising detail is the negative of a partially executed large perforation on the inner (dorsal) surface, showing that it was, in fact, produced from manufacturing debris from the production of decorative items. This unfinished perforation had a diameter of 12mm and falls into the group of large perforations made by a hollow tool, characteristic for the Starčevo-Körös-Criş osseous industries, used in the production of decorative plates and applications (Vitezović 2013b and references therein).

One fragmented tool made from *Bos* tibia was discovered, most likely used as a spatula-chisel. The bone was longitudinally split; it has a small portion of epiphysis preserved at the basal part and the distal end is damaged. It has preserved traces of manu-



Fig. 6. Burnishing tools made from ribs, unit 35.

facture – grooving and cutting with a chipped stone tool and traces of burnishing – and traces of use – high polish and shine, as well as fine striations on almost the entire surface.

One particularly large scraping tool was also discovered, 170mm long and 36mm wide, made out of a large segment of *Bos* rib. The artefact is almost completely preserved, only the base is slightly damaged. The rib was not split, but on the lower surface the second bone plate is abraded up to 40mm of its length. The working edge is rounded, around 28mm wide, and very intensively worn, chipped and damaged from use. Similar scrapers, made from very large rib segments, were discovered at a few other Starčevo culture sites, including the site of Donja Branjevina in the Bačka region (Serbia), situated relatively close to Kneževi Vinogradi (bone artefacts from Donja Branjevina were first published in *Karmanški 2005*; subsequently analysed in detail and revised in *Vitezović 2011*).

Within this unit there was also one artefact made of red deer antler tine, heavily damaged from concretions on its surface. The basal part bears traces of transversal cutting by grooving and sawing. The natural tip of the antler was modified and the working tip is actually a small circular surface approx. 15mm in diameter. Traces of use can be observed – the working end is worn, battered and with damage from use. This item was a small punching tool.

The most unusual bone object was made from a segment of long bone from a large mammal, most likely from a *Bos* metapodial bone (Fig. 10). Its shape resembles the letter T, and such an object is



Fig. 8. Awls made from sheep/goat metapodial bones, unit 45/46.



Fig. 7. Fragmented bracelet made from *Glycymeris* shell, unit 35.

also called a bucrania amulet, otherwise made out of clay and widespread on other Starčevo culture sites across the Balkans (such as Donja Branjevina – *Karmanški 2005*; Grivac – *Bogdanović 2008.t. 6.8*; Blagotin – *Vuković 2005*; see also *Stanković 1992* and references therein), and also found at Kneževi Vinogradi (*Rajković 2014*) (Fig. 3). In fact, this bone bucranium can be considered as unique with regard to being made from this raw material – and although there are occasional mentions of these items being made from bones, this must be taken with caution, since they are not published in detail (without adequate photographs), and some bones may have a natural T-shape (for example, some fish bones).

This artefact's dimensions are 78 x 19mm and it is almost complete; only the ends of the upper part (the – on the T) are slightly damaged. The lower part narrows slightly, its maximum width is 12mm, but it is not pointed at the distal end. The blank was extracted by grooving from two sides (inner and outer) until the grooves met. The side edges were subsequently burnished by some fine-grained abrasive tool. Traces in negative from scraping with a chipped stone tool are visible on the outer surface of the object, while the inner surface (the side of the medullary cavity) has traces of fine burnishing. Polish and shine may be observed on this artefact; they are more or less evenly spread, which suggests they are the result of handling and manipulation (*cf. d'Errico 1993*). There are no traces of this item being used as tool (it does not have a part that might have been active, such as a working edge or tip), and there are no traces of it being, for example, suspended or attached by string in any way. However, while this artefact was not utilitarian, it also seems that it was not used as an ornament on an everyday basis or it was in use for only a short period of time before it entered the archaeological record. It most likely served as a decorative and/or as an object of status, prestige and/or it may have had apotropaic or other ritual purposes.

One fragmented decorative plaque or application was also discovered in this unit (Fig. 11). It was made out of a segment of a large mammal long bone. It is fragmented, but we may assume its original shape was more or less rectangular. On it we may notice one complete and three fragmented perforations, positioned very close to one another and roughly aligned. The entire artefact has very fine manufacturing traces; its edges were very carefully cut by transversal grooving and sawing, and both edges and surfaces were subsequently burnished and polished with an abrasive tool. Perforations were made by drilling from both sides, and their diameter is 5–6mm. Perforations do not have visible traces of wear, but the entire object does have polish, shine and fine striations from use.

Pieces of manufacturing debris were also recovered – a long bone segment with traces of transversal cutting and one elongated long bone splinter with traces of cutting with a chipped stone tool, probably a blank from some pointed tool.

Stratigraphic unit 56/57

Eleven artefacts were discovered within this unit, belonging to two typological groups – pointed tools (Fig. 12) and manufacturing debris.

Three awls were found, with technological and typological characteristics close to those recovered in unit 45/46 (Fig. 12.left). They were produced from longitudinally split sheep/goat metapodials with distal epiphysis preserved at the base, produced by a combination of sawing and abrasion, and with fine, sharp tips, polished from use. One unusual awl was



Fig. 9. Bone chisel, unit 45/46.

made from a segment of a larger long bone; it has both ends pointed but only one has traces of use (polished, worn surfaces). The entire artefact is carefully burnished and polished. The unusual shape of the basal part was perhaps to enable hafting or make it easier.

Two needles were discovered (Fig. 12.right); both made from splinters of medium-sized mammal long bones and fine traces of polishing and burnishing are visible on them. The tips are very fine, slender points, polished from use.

Four pieces of manufacturing debris were recovered – different long bone segments with traces of transversal and longitudinal cutting, burnishing, and polishing. Some of them are in fact semi-finished items, intended for pointed tools and one probably for an ornamental piece.

Techno-typological traits of osseous artefacts

The technological and typological characteristics of these osseous artefacts correspond well with the traits observed within other osseous assemblages of the Starčevo culture (*cf. Vitezović 2011; 2013a; 2016b*), and also have analogies within Körös and Criş industries (*Beldiman 2007; Beldiman, Sztancs 2011; Makkay 1990; Tóth 2012*).

The raw materials used at Kneževi Vinogradi – Osnovna Škola were predominantly bones – long bones (mainly metapodial bones) and ribs from sheep/goats and cattle (all the unidentified medium-sized and large mammals were probably sheep/goats and cattle, judging by the faunal record), followed by small quantities of boar tusks and red deer antler tines. Only one artefact was made from an exotic raw material, an ornament made from *Glycymeris* shell.

The technology of manufacture shows the same traits as other Starčevo culture osseous industries. Particular attention should be paid to the presence of manufacturing techniques such as the transversal division of bones by grooving and sawing, the making of large perforations with a hollow tool, the production of awls from metapodial bones by the combined technique of cutting with a chipped stone tool and abrasion, and modifications of antlers by transversal grooving and sawing (see also *Vitezović 2013a; 2016b*).

Typologically, the artefacts recovered at the site of Kneževi Vinogradi – Osnovna Škola have parallels

in other Starčevo-Körös-Criş assemblages – awls made from metapodial bones, spatulae made from rib segments (in particular the large spatula from an unsplit rib), small punching tools made from antler tines, etc. (Beldiman 2007; Vitezović 2011; 2013a). The absence of some of the characteristic techno-types (cf. Vitezović 2016b), namely spatula-spoons made from *Bos* metapodials, and awls made from small ruminant metapodials by use of abrasion, may be a regional trait, but also the result of the small size of the assemblage.

The small chisel made from bone is quite remarkable, both because of its small dimensions and fine production (albeit made from debris segment). The specific characteristics of the Kneževi Vinogradi assemblage are visible among non-utilitarian and ornamental items. Quite remarkable is the presence of the unusual, even unique T-shaped, bucranion-resembling non-utilitarian item, otherwise widespread when made of a different raw material (clay). Moreover, the fragmented application with several perforations does not have exact parallels among Starčevo-Körös-Criş osseous items.

It is interesting to note the limited typological repertoire – predominantly awls and needles (with only a few heavy points), small cutting tools and diverse burnishing tools, probably all of them used on the same material (soft organic materials of plant or animal origin), just for different stages of production. Furthermore, there are only two small percussion tools – there are no heavy duty cutting nor percussion tools (such as hammers or axes, for example). Hunting and fishing gear is also absent. There are only a few ornaments, and these are fragmented, and just one non-utilitarian item. On the other hand, there are several examples of not only manufacturing debris, but also of almost finished, non-used items.

Discussion

Ground stone artefacts were discovered in small quantities, and therefore little can be said on their typological and technological traits. Typologically and technologically, they do not show any drastic differences in comparison with other ground stone industries of the Starčevo culture (Antonović 2003; Rajković 2019). It is interesting, however, to note the use of whitish calcite for the production of a small item; furthermore, this item was most probably not a tool used in everyday activities, but had some other function – decorative, prestigious, and/or ritual.



Fig. 10. Bucranion or T-shaped bone object, unit 45/46.

Osseous artefacts also show typological and technological characteristics common to other osseous assemblages of the Starčevo culture (Vitezović 2011; 2013a; 2016b). However, there are few interesting, novel traits they display. A small bone chisel, unique in terms of its size and careful manufacture, raises interesting questions on the production, reuse and recycling of debris. The bucranion or T-shaped non-utilitarian item is thus far unique in the entire Starčevo-Körös-Criş cultural complex, and does not have parallels in other osseous industries in the south-eastern Europe nor Anatolia. The fragmented application

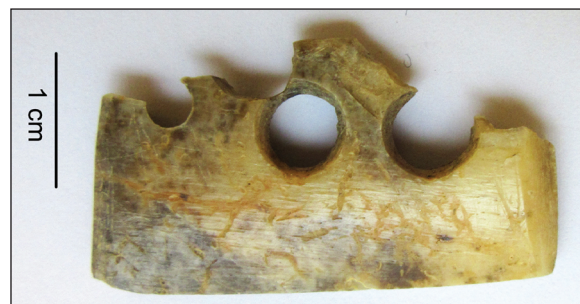


Fig. 11. Fragmented decorative application, unit 45/46.



Fig. 12. Awls made from sheep/goat metapodial bones and needles made from long bone segments, unit 56/57.

with several perforations is also a unique find. The presence of a bracelet made from a marine mollusc shell is important, since mollusc shell ornaments are very rare in the Starčevo culture (cf. Vitezović 2011; 2013a), and this confirms that these raw materials were already in use for decorative purposes among the Early Neolithic communities in the regions distant from the sea.

These artefacts also provide some data for the interpretation of the function of some of the features, of the site's organisation and use of space, in particular regarding units 35, 45/46 and 56/57 and regarding the possible location of activity/working areas (Tab. 1).

Within unit 35 were found one stone adze and one piece of lithic debris, as well as eight bone artefacts, all heavily used and worn, suggesting this was probably an activity area. Both pointed and burnishing tools were used for working on soft, organic materials, probably leather, while the punching tool was probably used as a retouching tool, perhaps to repair chipped stone artefacts during work. The broken bracelet may simply represent a lost item, but there is also a possibility that it was intended for repair and that is why it was in the activity area.

Unit 45/46, interpreted as a pit-dwelling, which yielded the most interesting ceramic artefacts, also pro-

vided interesting lithic and osseous items. Lithic tools from this unit include three items, one mallet, one tool of unidentified type and one debris segment. Bone artefacts include pointed and burnishing tools, all with traces of use on soft, organic materials, and the presence of a somewhat more diverse typological repertoire suggests they were used in different stages of production. All these artefacts indicate that within this feature was at least one, and perhaps several, activity areas. However, at this stage of research it is not possible to determine whether this feature was used only as some sort of workshop or working area, or if it also served for habitation (for cooking, eating, sleeping ...); further analyses of the remaining finds associated with this unit are thus needed.

It is interesting to note that the other Starčevo culture feature interpreted as a pit-dwelling, namely unit 50/51, contained no ground stone nor osseous artefacts, thus suggesting differences in the mode of use and function of these two structures.

Unit 56/57 was interpreted as a refuse pit. Only a few osseous artefacts were recovered in this unit and they are of a limited typological repertoire – only pointed tools and manufacturing debris. One piece of debris of a stone artefact was also found here, as well as a unique calcite chisel, suggesting it was discarded after it was no longer needed or used.

Conclusion

Assemblages of ground stone and lithic artefacts recovered from the site of Kneževi Vinogradi – Osnovna Škola are rather small, but interesting in terms of the raw materials and typological repertoire used. They share common techno-typological traits with assemblages from other Starčevo culture sites, but also have some locally specific traits, including a unique calcite chisel and T-shaped bone non-utilitarian object, among other items. Their analyses showed that the Starčevo culture communities that inhabited the settlement of Kneževi Vinogradi – Osnovna Škola

practiced diverse daily activities, which included the manufacture of osseous artefacts and diverse goods from plant materials, leathers and hides.

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