

# Towards an Understanding the Role of Seals in the Subneolithic Communities of the South-East Coast of the Baltic Sea. The Bacula from Šventoji 3 Site

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**Abstract.** The article presents the results of traceological studies of two harp seal bacula, from the Šventoji 3 site (coastal Lithuania). As a result of the microscopic observations carried out, technological and functional microtraces were discovered on both artefacts. The analysis of the use-wear traces, which are better readable only on one of the artefacts, allowed for a hypothesis that they arose as a result of contact with well-tanned and dry hide. This made it possible to assign to the studied artefacts the function of objects of everyday use, having direct contact with this material. The findings were illustrated with the current knowledge on the use of bacula in prehistory, historical times and among archaic communities known from ethnographic observations.

**Keywords:** traceology, seal, penis bone, baculum, hide, Subneolithic, Lithuania.

## Siekiant suprasti ruonių vaidmenį pietryčių Baltijos subneolito bendruomenėse: varpos kaulų iš Šventosios 3 gyvenvietės tyrimai

**Anotacija.** Straipsnyje pateikiami pajūryje, Šventosios 3 gyvenvietėje, rastų dviejų grenlandinių ruonių varpos kaulų trasologinių tyrimų rezultatai. Atlikus mikroskopinius abiejų kaulų tyrimus, ant jų buvo aptikta gamybos ir naudojimo žymių. Naudojimo žymės buvo ryškesnės ant vieno iš tirtų radinių. Kaulų tyrimai leido iškelti hipotezę, kad šios žymės atsirado po sąlyčio su gerai išdirbta sausa oda. Todėl galima manyti, jog tirti dirbiniai buvo kasdienio naudojimo daiktai, turėję nuolatinį kontaktą su tokia oda. Pristatytų dirbinių naudojimas iliustruotas etnografinių tyrimų duomenimis ir šiuo metu turimomis žiniomis apie varpos kaulų naudojimą priešistoriniais ir istoriniais laikais.

**Reikšminiai žodžiai:** trasologija, ruoniai, varpos kaulas, kailis, subneolitas, Lietuva.

In the recently published article, a hypothesis was put forward claiming that the seal was of great importance to the symbolism and ritual life of hunter-gatherer-fishing communities inhabiting the southeastern coast of the Baltic Sea in the middle Holocene (Osipowicz et al., 2020a). Somewhat earlier it has been also proven that the raw material obtained from this animal constituted an important element of daily life for the Subneolithic peoples and were used for many purposes, such as production of ornaments (Osipowicz et al., 2020b), specialist tools (Osipowicz et al., 2019) or fat for lamp fuel (Heron et al., 2015). Actually, their meaning was probably even greater than findings of the mentioned analyses suggest; this can be concluded based on the fact that about 40% of all the bones from sites in Šventoji are seal remains (Stančikaitė et al., 2009: Table 3; Luik, Piličiauskienė,

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2016: 190). Studies reported in this article fall within the framework of the research on the addressed problem and provide new data for investigations conducted in this regard.

The primary objective of this paper is to present results of traceological analyses of selected seal penis bones obtained from site Šventoji 3 (coastal Lithuania), on which macroscopically readable surface modifications were observed that could indicate that the bones could have been used. The microscopic studies reported in this paper were conducted to verify a hypothesis about the anthropomorphic origin of this damage and to determine the possible function of the artefacts. This was intended to provide us with the answer regarding the position the analysed items used to hold in the everyday and ritual life of the community inhabiting Šventoji 3 site, and then confront thus obtained knowledge with recent findings on the meaning of the seal for Subneolithic communities in that region. The results of the conducted studies were discussed in the context of current knowledge on the use of such bones in prehistoric and historic times, as well as among archaic communities known from ethnographic reports.

## 1. Materials and methods

The subject of the studies reported in this article are two specimens of the baculum also called the penile bone (*os penis*) of the harp seal (*Phoca groenlandica*), discovered in the course of excavation studies conducted at Šventoji 3 site, coastal Lithuania (Fig. 1A, B)<sup>1</sup>.

The complex of sites in Šventoji (Fig. 1A) was discovered in 1966 during irrigation works carried out in the region. At the time, dozens of archaeological sites and loose finds were identified, dated now (including the sites discovered later) to the period between 6000–500 cal BC. They are located on a swampy littorina sea terrace, 16 km long and up to 2.5 km wide, stretching between the City of Palanga and the Lithuanian–Latvian state border (Piličiauskas et al., 2012; Piličiauskas, 2016). The sites were interpreted as habitation sites, refuse layers, fishing stations and possibly pile dwelling settlements. Human occupation at site Šventoji 3 was <sup>14</sup>C dated to 3500–2500 cal BC (Piličiauskas, 2016).

Initial traceological observations of the general state of preservation of artefacts and technological and use-wear traces were made using a Nikon SMZ–745T microscope fitted with a Delta PixInvenio 6EIII camera. Photomicrograph presented at Fig. 2A was taken with this equipment. Observations of the use polish were conducted using a Zeiss Axioscope 5 Vario microscope fitted with a AxioCam 208 camera. The photomicrographs visible at Figs. 2C–E, H–J; 3; 4 and 5A–C, G, J–O were also made with this equipment. The rest of the microphotographs included in the article (Fig. 2B, F, G; 5D–F, H, I; 6) were taken with the use of Zeiss–AxioTech microscope fitted with an AxioCam 105 camera.

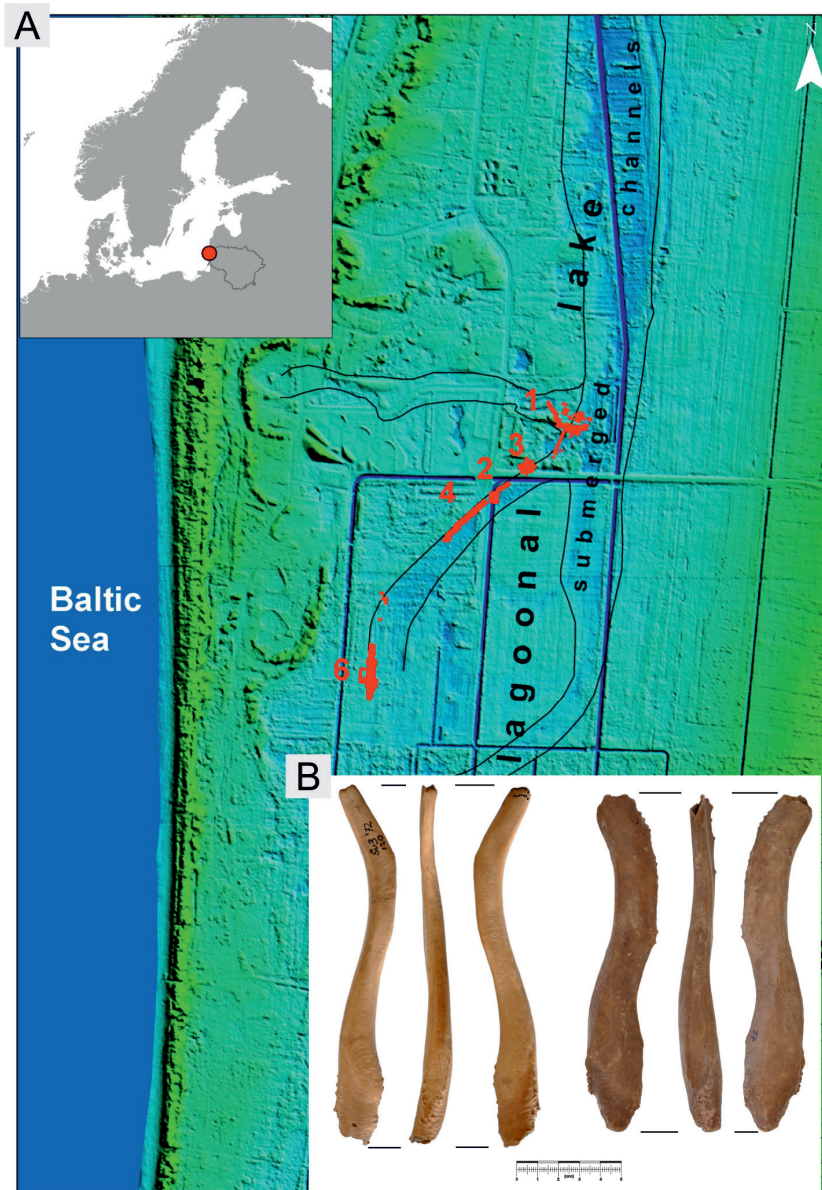
The adopted traceological terminology is based on a popular conceptual system (e.g. Legrand, 2007; Osipowicz, 2010; Buc, 2011; Orłowska, 2016), that was adjusted to the needs and requirements of the conducted analysis.

## 2. Results of traceological analysis

### 2.1. Results of technological studies

Technological traces observed on both of the analysed artefacts are limited to a narrow range of traces of scraping performed along the bone axis, visible on the left lateral side on both artefacts (Fig. 2A, 4A). Additionally, on one of the specimens traces of scraping were observed on the apex part, over the length of about 0.5–1 cm on the right lateral and dorsal sides (cf. Fig. 2). No other types of intentional surface transformations that could indicate use of tools for processing the described items were recorded.

<sup>1</sup> The archaeozoological studies of the bones were conducted by Giedrė Piličiauskienė of the Department of Archaeology, Vilnius University.



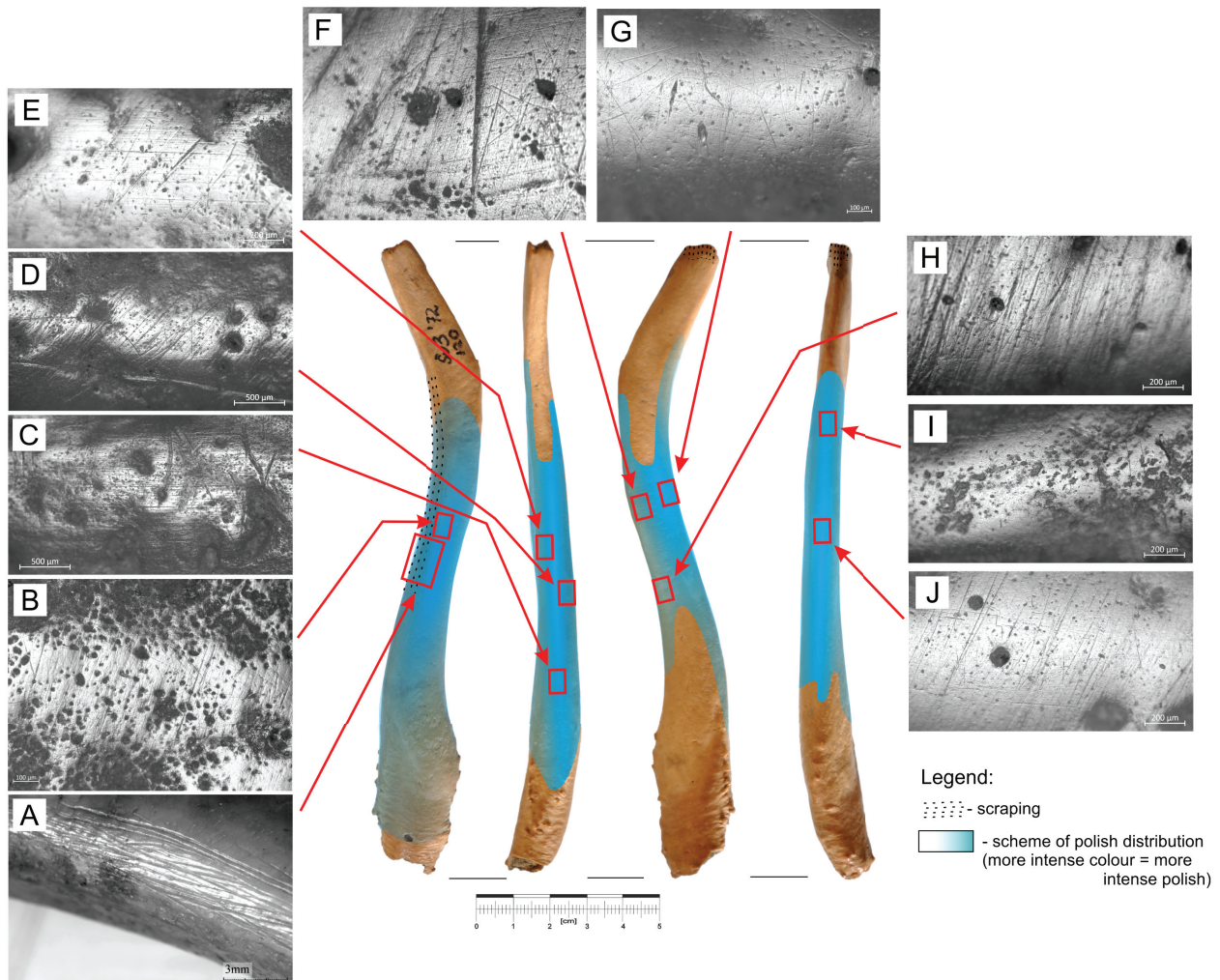
**Fig. 1.** A – location of the sites in Šventoji (by Gytis Piličiauskas); B – bacula from site Šventoji 3 studied in the article (photos by Justyna Orłowska).

*1 pav. A. Šventosios gyvenviečių situacijos planas (remiantis G. Piličiausku); B. Šventosios 3 gyvenvietėje rasti ruonių varpos kaulai (Justynos Orlovskos nuotrauka)*

## 2.2. Results of functional studies

The conducted microscopic analyses allowed to identify clear modifications of the natural relief of the raw material that indicate the described bacula were used. This include primarily a bright polish, which is particularly clear on the specimen 1, presented in Fig. 2. Here, it covers a large part of the item surface except for the apex part and its base on the right lateral side, while becoming more intense in the central part (cf. Fig. 2). The polish is accompanied by linear traces whose characteristics vary in different parts of the specimen, nonetheless (cf. Fig. 3), just as traits of the mentioned polish do.

On the left lateral side, a polish of heterogeneous microtopography was observed, with regular microrelief and rounded high points. It has a smooth texture and is linear, that is, it is oriented perpendicularly or slightly inclined to the bone axis. In the central part of the tool it is accompanied by similarly oriented very fine (hair-like) linear traces in the form of filled (which are prevalent) and black (less prevalent) striations with rounded edges. They are usually 400–600 micrometres long and generally less than 2–3  $\mu\text{m}$  wide (Fig. 2B). These traces were observed on the left lateral side of the analysed bone near both its ventral and dorsal sides.

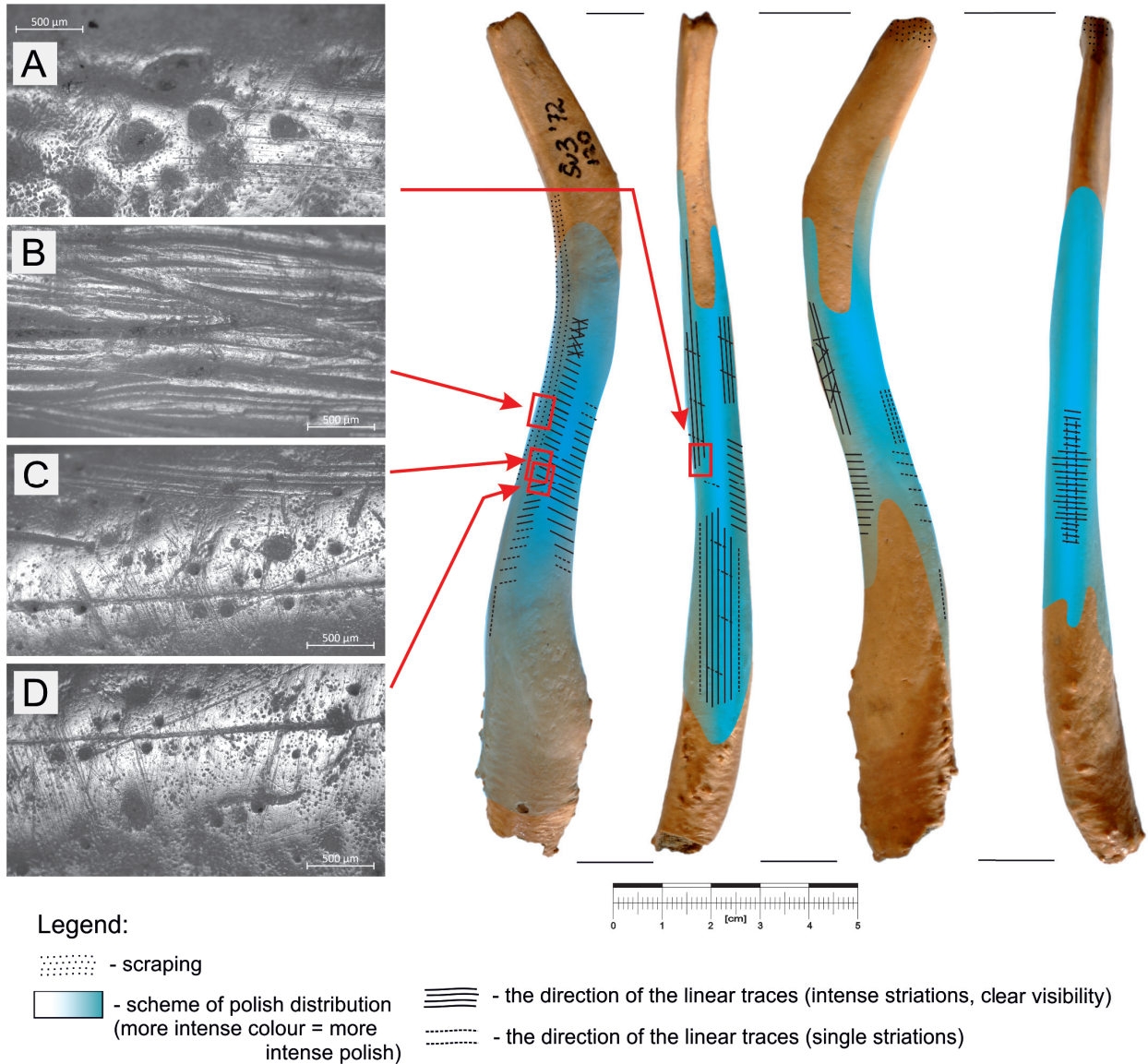


**Fig. 2.** Baculum 1 – scheme of polish distribution and examples of the technological and use-wear traces observed at its surface.

**2 pav.** Varpos kaulas Nr. 1: kaulo vietos su gludinimo žymėmis ir ant jo aptiktų gamybos bei naudojimo žymių pavyzdžiai

A polish of similar characteristics was also noted on the ventral side of the artefact. However, in this part, the structure of linear traces is significantly more diverse (cf. Fig. 3). Within the area of the polished surface near the base of the specimen, there are clear striations parallel to its axis that cover primarily the central part of the described edge. There are mainly black striations and filled striations with quite regular edges of varying length and width, usually estimated at about 2–3  $\mu\text{m}$  (Fig. 2C). Similar linear traces, though of somewhat lower intensity, occur over the length of about 3 cm on the apex side of the specimen. However, they were not observed there in the central parts of the edge but in two independent areas (on the dorsal side and the ventral side of the bone – cf. Fig. 3). Between this area of parallel traces and the surface bearing parallel traces by the base of the specimen, there is an area without any linear traces, about 1 cm long. On the described ventral side of the artefact in its apex part and its central part, traces inclined to its axis (mainly black striations) were also observed. However, these tend to occur individually (Fig. 2E) except for the central part of the specimen on the right lateral side, where over the length of about 2 cm they become more intense and regular, analogous to those described for the left lateral side (Fig. 2D).

The polish visible on the right lateral side of the described artefact has somewhat different characteristics and a more limited coverage. It does not occur on the base but in the central part on the apex side, over the length



**Fig. 3.** Baculum 1 – scheme of striations distribution and details of the microtraces observed at its surface.

**3 pav.** *Varpos kaulas Nr. 1: įraižų išsidėstymo schema ir ant kaulo paviršiaus matomos mikrojraižos*

of about 2 cm of the polished surface, and covers only the upper parts of the microrelief (where it seems to be inchoate). Its topography is heterogeneous, whereas the microrelief is regular with rounded high points. In the remaining part of the polished area, a polish of homogeneous microtopography, regular microrelief (basically flat, only slightly pitted) and slightly rough texture were observed.

The linear traces visible within the polished area on the described edge are also heterogeneous. In the part close to the apex, on the dorsal side, multidirectional striations of varying characteristics are visible (Fig. 2F). Towards the base, inclined and perpendicular striations become more prevalent (and from a certain point they are prevalent), whereas the texture of the polish becomes smoother. These striations are of different character than those described above, since aside from the above mentioned hair-like traces there are also much larger scratches over 1000 µm long and over 20 µm thick (Fig. 2H).

From the ventral side, in the right lateral area close to the apex, linear traces are virtually unclear (with the exception of typical post-depositional damage), while the bone surface is substantially smooth and virtually flat

(Fig. 2G). In the central part of the specimen over a short section hair-like striations parallel to the bone axis are visible, whereas in the area close to the base single inclined striations occur (cf. Fig. 3).

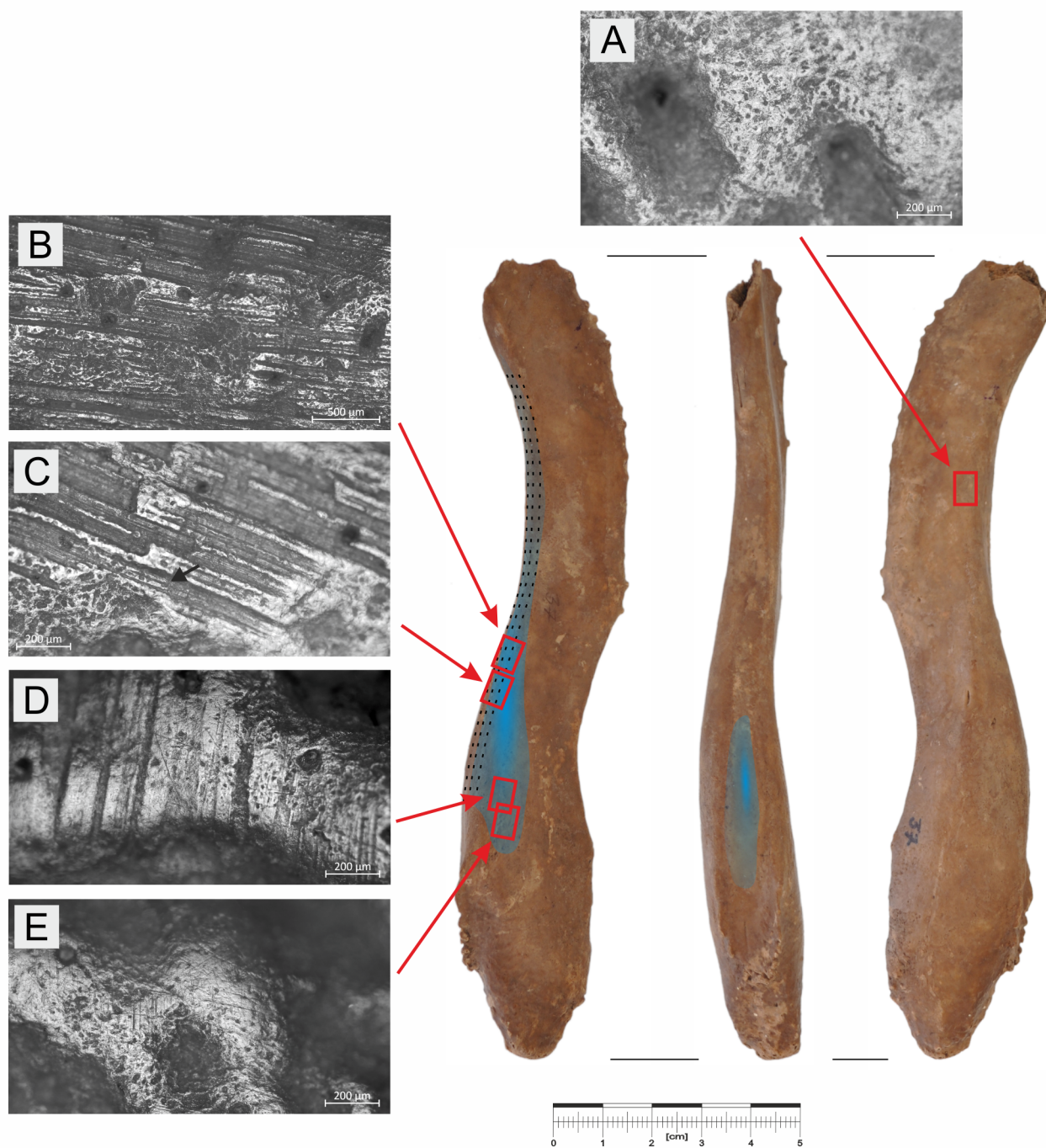
The polish visible on the dorsal side of the specimen has homogeneous microtopography, regular microrelief and a slightly rough texture. Near the apex, within the polish no linear traces occurred (Fig. 2I), while in the central part of the artefact over the length of about 3 cm numerous inclined and (less numerous) parallel very fine hair-like striations were observed. In this area, the topography of the polish is virtually flat, while the texture is smoother (Fig. 2J).

On the second analysed artefact (baculum 2 – Fig. 4), use-wear traces are definitely less developed. Identifying them is additionally hindered by a post-depositional polish, clear to varying degree in different parts of the object (Fot. 4A). The damage, which can be highly likely interpreted as resulting from the specimen being used, occur only on the left lateral and ventral sides. The polish observed near the base on the ventral side is an atypical generic weak polish that bears no traces that would allow it to be further characterised or functionally interpreted in more detail. However, it is already relatively consolidated and hence, distinguishable (as it seems) from a post-depositional one.


On the left lateral side of the artefact, use-wear traces were observed in the context of the area where scraping traces are also visible and in its vicinity (cf. Fig. 4). These are centred around the base. The polish that can be noted there has a generally heterogeneous microtopography and regular microrelief with rounded high points. Its texture is virtually smooth, accompanied by multidirectional linear traces, mainly filled striations (Fig. 4E). Only in one area a polish of a homogeneous microtopography was observed. In that area, linear traces are oriented perpendicularly to the product axis and are mainly black striations and very wide (up to 50  $\mu\text{m}$ ) and deep furrows with rounded edges, whose bottoms are either nonpolished or polished (Fig. 4D). In the described case it is difficult to definitely state whether the depicted use-wear polish is covering traces of scraping or is it damaged by them. In the major part of the area where it has been identified, it has a quite atypical character. It covers mainly upper parts of the microrelief and in many respects it is similar to the post-depositional polish, making interpretation problematic. However, in some areas, the edges of the linear streaks formed by scraping are evidently rounded, while the polish itself can be also observed on their bottom (Fig. 2C – marked with an arrow). This allows us to suggest that the polish is secondary to the scraping traces on the object.

### 3. Discussion

The bacula of marine and terrestrial mammals were used in various periods of Prehistory. Most likely, in many cases their purpose was more diverse than strictly utilitarian. The oldest finds of this kind are the penile bone of a cave bear bearing incisions, found at a Neanderthal site Vindija in northwestern Croatia. However, in this case, due to lack of detailed analyses, it is impossible to verify whether the striations observed on it are decorative, symbolic or whether they were formed accidentally when the bone was being cleaned or used as a tool (Giemsh 2017). Numerous finds of used bear penile bones are dated to the upper Palaeolithic, likewise. These include, among others, a needle made of this raw material, discovered in a Gravettian settlement stratum dated to 29–25 thousand years BP at Brillenhöhle site in the Ach Valley in the Swabian Alb. Another Gravettian find of this type comes from Hohle Fels cave. It is an intensely polished baculum whose function was supposedly that of a tool, probably related to hide processing (Scheer 1995). A bear penile bone occurred also at a Late Palaeolithic double burial site in Oberkassel, most likely serving as a burial gift (Szombathy 1920; Mollison 1928; Street 2002; Giemsch/Tinnes/Schmitz 2015, 248). Another one was identified in strata at a Late Magdalenian site Teufelsküche on the Upper Rhine in Baden–Württemberg, to which the function of a hunter equipment element was attributed (Pasda 1994, 166) or, more generally, that of a tool (Bosinski 2008, 343). Numerous bear bacula were also identified in Subneolithic inventories, an example of which are artefacts from Shamanka II site on Lake Baikal in Siberia, where in burials from that period (dated to c. 8 000–7 000 cal BP) 10 items of this type



Legend:

⋯ - scraping     - scheme of polish distribution (more intense colour = more intense polish)

**Fig. 4.** Baculum 2 – scheme of polish distribution and examples of the technological and use-wear traces observed at its surface.

*4 pav. Varpos kaulas Nr. 2: kaulo vietos su gludrinimo žymėmis ir ant jo aptiktų gamybos bei naudojimo žymių pavyzdžiai*

were found. One of them is sharpened, intensely polished and smoothed, whereas the other 9 bear subtle polishing/use-wear traces (and in some cases also traces of processing). These bones were discovered on skeletons or in clusters nearby. Most of them come from male burials and are interpreted as an attempt to transmit the bear's vital and breeding forces onto the owner of an amulet of this kind (Losey et al. 2013, 65; Giemsch 2017, 45–56).

The possible high ritual significance of bacula for Prehistoric communities can be also concluded based on ethnographic observations. In this regard, bear penile bones are also highly important, as they used to be considered by, e.g., the Udege people of Siberia to be a powerful amulet capable of treating infertility and facilitating labour (Giemsch 2017, 47). Among Tuva people (southern Siberia) they were regarded as a symbol of power and strength (Clottes 2016, 81), while Saami people of northern Scandinavia used to fix bear bacula to sacred drums to acquire their power in this way (Hultkrantz 1992, 141; Kroik 2006, 204). There are also stories that Inuit shamans used polar bear bacula during rituals as an object that would allow them to connect to the spiritual world and also during rituals of passage (Mithen 2003, 388; Giemsch 2017). However, it was not solely the bear baculum that were significant for the peoples of the North. Among traditional Alaskan tribes (aside from bear bones), a similar role was played by the same type of bone obtained from the harbour porpoise, the seal and the sea lion. They were referred to as *oosik* and symbolised strength and potency (Gates 2005, 168). Fossilised bacula were also often polished by representatives of these communities and used as hafts for knives and other tools (Long 2012, 200).

As can be concluded based on the above summary, the tradition of using bacula is very long and common among archaic communities. Undoubtedly, the most evidence in this regard is provided by bear bone finds; however, one should not rule out the possibility that prehistoric peoples found this type of bones of other species, including the seal, to be of similar significance, although they have not received yet the attention they deserve. It seems that the baculum served for various, often completely different purposes at the same time, playing an important part in both everyday life and, primarily, the ritual-oriented part of life of hunter-gatherer communities. Did the bacula described in this article discovered at Šventoji 3 site play a similar role? This question can be answered based on the results of analyses of the use-wear traces observed on these artefacts.

However, before proceeding to discussing them, it is worth shedding some light on two circumstances that may help interpret the purpose of the bones described in this article. First of all, in the case of these bones, attention is drawn to absence of the working edges in the form of functional blades, the presence of which is characteristic of most types of osseous or stone implements known from prehistoric sites (such as knives, scrapers, chisels, etc.). The nature of the surfaces on which possible use-wear traces were observed suggests that if we are really dealing here with tools, they are products that were used in a way similar to grinders or smoothers.

The other thing is the origin of the scraping traces observed on the products. It has been recently proven that traces of this type visible on beamer-type tools found at Šventoji sites, which used to be employed for hide processing and were made of the seal tibia, were formed as a result of ad hoc repairs of the working edges (Osipowicz et al. 2019). Are we dealing with a similar situation in the case of the analysed bacula? Most likely not, which is supported by several arguments.

First of all, the observed scraping traces probably resulted from a short-term one-time activity (instead of multiple ad hoc repair processes). This is evidenced by their characteristics, that is, superficiality, location in a single highly narrow area and a small extent in which individual linear streaks and striations are crossing each other. Moreover, given the vast coverage of use-wear damage recorded on the first of the analysed specimens (cf. Fig. 3), including the possibility to distinguish in this case several possible working edges,<sup>2</sup> it should be concluded that the theory considering the described scraping traces as a process intended to repair working edges

<sup>2</sup> Areas bearing clusters of homogeneous linear traces should be regarded as such. Other polished areas are most likely a result of the described objects being held or hafted, or possibly caused by an indirect contact with the raw material that was being 'processed'.



is not supported by the way they are distributed, for if this were true, they would be visible on a considerably larger area, including other possible working edges of that tool, yet there are none. Additionally, both types of traces (scraping traces and use-wear damage) are present in a considerable area completely independently of each other, in the meaning that the polish and the striations formed as a result of everyday use are located at a distance from linear bands formed by scraping (cf. Fig. 3C). This indicates lack of a 'functional connection' between both acts of interfering with a given tool surface. At the same time, in the contact areas of both categories of traces, scraping traces were altered (rounded and polished – Fig. 4C) by means of use to some degree, without modifications of this sort outside of the direct range of use-wear traces (Fig. 3B). This indicates that the scraping process was primary to the modifications caused by use.

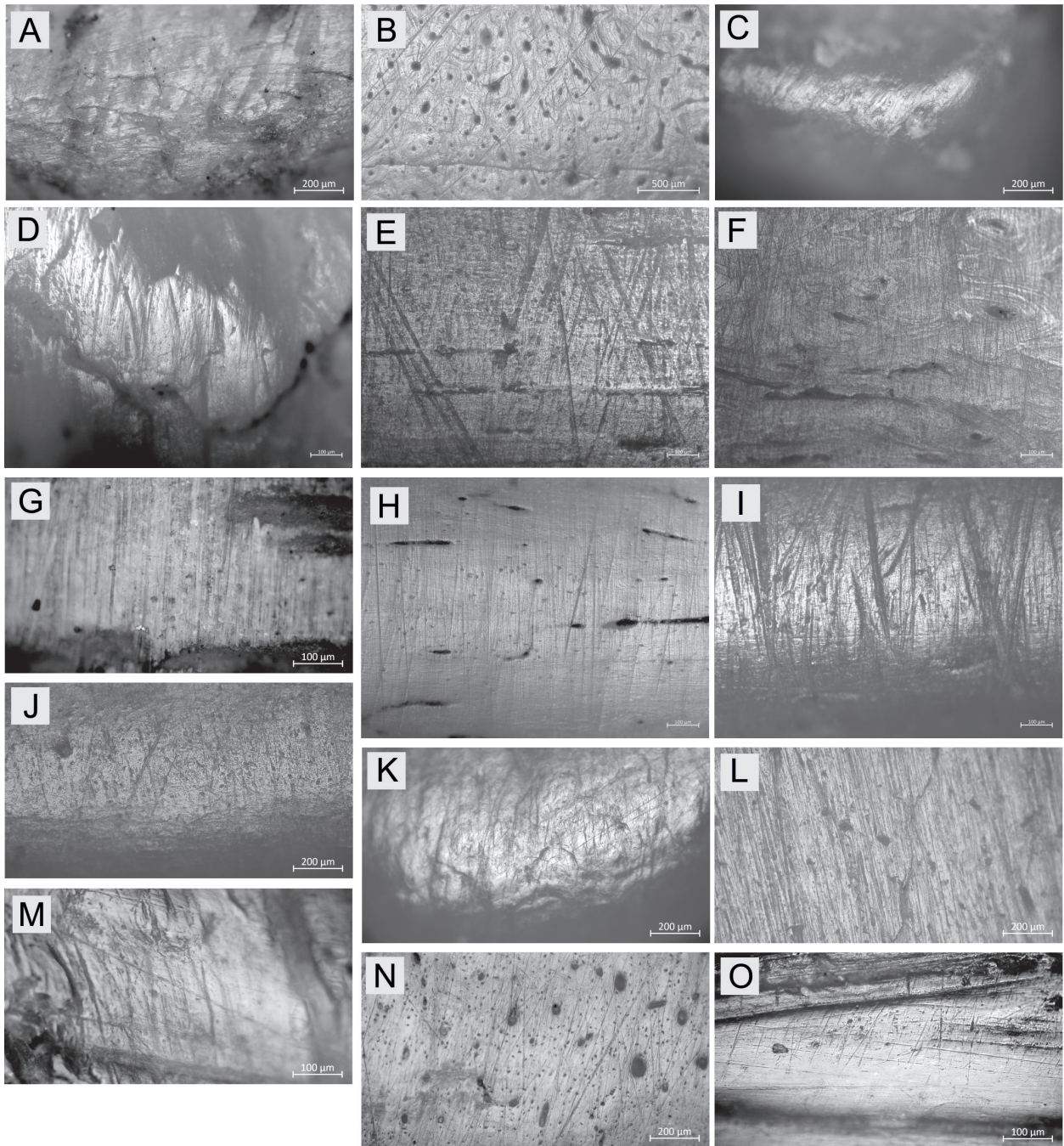
The final argument for the lack of correlation between the traces of scraping and an ad hoc repair process of the tools during work is the presence of only unquestionably inchoate damage after work on the second analysed baculum (cf. Fig. 4). However, the intensity and location of the traces of scraping observed there do not vary from those visible on the first of the described bones, which was certainly in use for a long time. The hypothesis that both these products underwent identical repair work (or even any 'repair' of the second baculum) is not supported by the degree of development of the use-wear damage visible on these objects. This indicates that there is no link between the act of scraping with the possible use of both these items as tools and its technological origin; therefore, these traces were most likely formed during cleaning of the bones of remains of flesh and cartilage present in this area.

What may the manner in which the use-wear traces observed on the analysed bacula are distributed and their characteristics say about the function of these artefacts? Again, in this regard the basic data is provided by the first of the examined products, which is more worn out (cf. Fig. 3). In the case of this implement, we may distinguish several possible working edges. The first one is the central part of the specimen. The manner in which the linear traces observed on it are located and oriented suggest an activity that was performed using a motion perpendicular to the bone axis, whereas the functional area covers the dorsal and the left and right lateral sides of the specimen (with the best-formed and most widely distributed traces on the left lateral side).<sup>3</sup> The second functional area can be determined on the ventral side of the baculum near its base. The characteristics of the well-formed use-wear traces that are very clear there indicate that they were created as a result of an axis-wise motion, i.e., a motion oriented differently to that in the central part. Most likely, edges on the meeting point of the ventral side and the left and right lateral sides of the specimen were used in a similar way, and hence can be classified as a third possible functional edge.

The attempt to interpret the material the contact with which had resulted in the formation of the described microtraces, gives rise to a number of problems. These issues stem from the heterogeneous nature of the recorded damage, i.e., differences in the characteristics of the clear polish and the linear traces depending on the area in which observations were made. However, in general, as these discrepancies are not grave enough, there is no reason for assuming they were caused by the multifunctional nature of the examined artefacts (the use of different edges for working different type of raw materials), not the motility of a performed action.

The traits of the observed polish allow us to rule out in the very beginning contact with materials such as bone, wood, herbaceous plants, soft stone or fish as the possible 'source' of the analysed microtraces (cf. Fig. 5A–G). Their general characteristics has the highest number of analogies in use-wear traces formed on the bones as a result of contact with hide. However, traces of this sort are highly diverse, allowing many potential interpretations in this regard to be eliminated. The hide curing process itself is a highly complicated and multiphase activity (compare Klokkernes T. 2007). This results in discrepancies in traces formed on tools used at different stages of this process. Considering the characteristics of the use-wear modification visible on the analysed bacula, on a

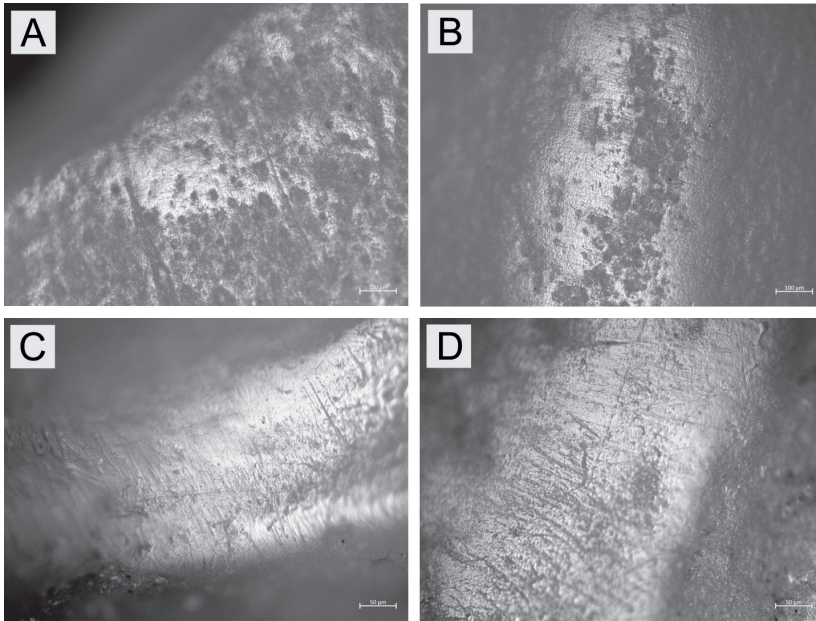
<sup>3</sup> Most likely, the absence of linear traces in the central part of the left lateral side is due to the concave character of the bone surface in that area exclusively.



**Fig. 5.** Examples of the microphotographs of use-wear traces resulting on bones from contact with various materials: A – chiselling the softened bone; B – chopping fresh wood; C – engraving the hardwood; D – processing of soft stone; E – fish scraping; F – splitting of fresh sedge fibres; G – polishing the bone surface with horsetail; H – cleansing the hide with an admixture of ash; I – cleansing the hide with an admixture of ochre; J – dehairing the hide after leaching; K – dehairing the hide without leaching; L – smoothing dry, cleansed leather; M – hide brain tanning; N – fleshing a hide; O – bone polishing with soft leather.

**5 pav.** *Apdirbant įvairias medžiagas ant kaulo atsiradusios darbinės žymės:*

*A – minkšto kaulo kalimas; B – žalio medžio kapojimas; C – kieto medžio raižymas; D – minkšto akmens apdirbimas; E – žuvies skutimas; F – šviežių viksvolinių augalų pluošto atskyrimas; G – kaulo paviršiaus poliravimas arklio uodegos ašutais; H – odos valymas naudojant pelenus; I – odos valymas naudojant ochrą; J – plaukų šalinimas nuo šarmu apdorotos odos; K – plaukų šalinimas nuo šarmu neapdorotos odos; L – sausos, jau nuvalytos odos lyginimas; M – odos impregnavimas smegenimis; N – mėsos likučių valymas nuo odos; O – kaulo poliravimas minkšta oda*



**Fig. 6.** Traces being the result of the contact with a soft, well-tanned leather observed at the surface of the experimental bone pendants.

**6 pav.** Žymės, atsiradusios ant eksperimentui naudotų kaulinių kabučių po sąlyčio su gerai išdirbta minkšta oda

list of potential activities they might have been employed in, one can cross out preliminary cleaning and securing the raw material against bacteria using additions such as ash or ochre (cf. Fig. 5H, I),<sup>4</sup> hair removal (with and without leaching – cf. Fig. 5J, K), smoothing of dry cleaned hide (cf. Fig. 5L) or hide brain tanning (cf. Fig. M). Traces similar to those observed on one of the edges of the first baculum (Fig. 2J) are generated by removal of the flesh side (Fig. 5N). Nonetheless, the absence of sharp working edges in the described artefacts makes it impossible that they were employed to this end. To summarise the presented list and with due consideration of the results of the conducted comparative studies, it can be safely assumed that the analysed bacula were not used in any technological stages of the hide curing process.

This suggestion is supported not only by the characteristics of the traces that can be observed on them but also (indirectly) by the way in which they are distributed. In light of the conducted experiments, a working edge limited to merely about 3 cm,<sup>5</sup> with the bone surface it is part of much longer, straight, and unlimited in any way, should be considered unlikely; it is also rather unreasonable in terms of effectiveness of any activity performed as a stage of a hide curing process. Such a process would also provide little explanation for the presence of two highly narrow areas with parallel linear traces discovered on the ventral side of the first baculum near its apex (Fig. 2, 3). Even if we consider the possibility that they might have constituted a single working edge (together with the currently damaged plane between them), their modest length (about 2 and 3 cm) and their concave shape render any effective processing of hide using a longitudinal motion limited to that area impossible.<sup>6</sup> Lastly, what should be considered atypical of household tools related to hide curing are the characteristics of some linear traces visible on the artefacts. Here, one may list primarily the presence of striation areas, made up of nonintersecting parallel striations of abrasive characteristics (cf. Fig. 3D), which are independent of one another and which are not overlapping. These areas are not a result of a single activity repeated multiple times (which is typical of household tools), but most likely they were formed as a result of short (and probably one-time) acts

<sup>4</sup> Traces of the addition of ash are only seemingly alike, since in this case, the polish has a very mat finish in contrast to the clearly visible polish on the artefacts.

<sup>5</sup> The area where striations are perpendicular to the axis of the first baculum occur.

<sup>6</sup> Its independence of the area with parallel striations near the base is clearly evidenced by a gap between the linear traces (cf. Fig. 3A).

performed independently of one another. Their correlation with the polish suggests that they are of a functional origin; however, these are most definitely not traces that were caused by use (i.e., hide processing).

Assuming that the analysed bacula are not tools related to curing of the discussed raw material, how can we interpret their original function? The characteristic of the polish observed on some surfaces of the first artefact (Fig. 2E) is highly similar to that typical of bone polishing using a soft and well-cured red deer chamois (cf. Fig. 50). Even closer analogies for all types of damage present on the described bacula were identified on experimental bone pendants fixed using a leather string (cf. Fig. 2 and Fig. 6).<sup>7</sup> As a result of the bone contacting cured and tanned hide, both types of polish were formed on the surface of the pendants, visible on the artefacts analysed in this article (cf. Fig. 2B, C and 6A, B, as well as Fig. 2E, J and 6C). The general profile of the produced linear traces with prevalent hair-like black and filled striations is similar, too, although in this case they are obviously shorter than in the case of those observed on the analysed bacula. This is undoubtedly due to the varying motility of the movement that generated these modifications on the bone surface in both cases.

The purpose of the analysed artefacts is probably impossible to be fully determined anymore or it would require multiple experiments. To summarise the conducted studies, it can be nonetheless stated with high probability that the use-wear traces observed on the bacula from Šventoji 3 site were formed as a result of contact with soft and well-cured hide. Naturally, it cannot be definitely ruled out that they might be some sort of specialist tools related to processing of this type of raw material. In the light of the remarks made regarding the morphology of the worn surfaces, a hypothesis that we are dealing here with objects of everyday use, probably elements of larger tools, objects or even 'structures', the real purpose of which we will not determine, sadly, seems more likely. Therefore, it is unfortunately impossible to obtain the answer to the question put forward early in the discussion about the role the analysed baculum played in the life of the hunter-gatherer-fishing communities from Šventoji. The data we can access do not allow us to determine whether they were used for strictly utilitarian activities or whether their purpose was rather ritual.

#### 4. Conclusions

To sum up the described studies it should be stressed that despite the fact that they did not allow us to fully identify functions of the analysed items, they undoubtedly provided further arguments for the hypothesis on the above-average meaning of the seal and raw materials obtained from it in the life of Subneolithic communities of the Baltic coast in the Middle Holocene. Importantly, we are not dealing here most likely with typical household tools or products that are a manifestation of a cult, but rather typically utilitarian objects. They constitute direct evidence of raw materials obtained from this animal being present also in the daily life of the mentioned community, which we used to conclude based on mainly indirect arguments up to this moment (e.g. Heron et al., 2015; Luik and Piličiauskienė, 2016; Osipowicz et al., 2019). Traceological studies of this type of artefacts should be considered one of the major research postulates in future microscopic studies on the use of osseous raw materials in Prehistory. Undoubtedly, we tend to attribute the function of a tool to analysed historical objects too soon and too automatically, forgetting that marks they bear might originate from nonhousehold usage. This has been recently showed in the article on craniums from Šventoji (Osipowicz et al., 2020a) referred to in the introduction, which seems to be also confirmed by the bacula analysed in this study.

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<sup>7</sup> The detailed description of the experimental work carried out using these pendants was published elsewhere (cf. Osipowicz et al., 2020b).

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## Siekiant suprasti ruonių vaidmenį pietryčių Baltijos subneolito bendruomenėse: varpos kaulų iš Šventosios 3 gyvenvietės tyrimai

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Santrauka

Pastarųjų metų tyrimai atskleidė, kad PR Baltijos pajūrio žvejų ir medžiotojų kasdieniame, ritualiniame ir religiniame gyvenime ruoniai buvo itin svarbūs gyvūnai, o naudojama buvo ne tik jų mėsa ar oda, bet ir kaulai (Osipowicz, 2020; Luik, Piličiauskienė, 2016). Svarbiausias šio straipsnio tikslas yra pristatyti dviejų grenlandinių ruonių (*Phoca groenlandica*) varpos kaulų (*os penis*), rastų Šventosios 3 gyvenvietėje, trasologinių tyrimų rezultatus. Naudojimo žymių ant šių kaulų buvo matyti ir plika akimi, o mikroskopiniai tyrimai patvirtino, kad kaulai neabejotinai buvo naudojami žmonių, ir leido nustatyti galimą tokių kaulų funkciją.

Tirti kaulai buvo rasti Šventosios 3 gyvenvietėje (1 pav., A, B), kuri, remiantis <sup>14</sup>C datomis, buvo naudojama 3500–2500 cal BC (Piličiauskas, 2016). Mikroskopiniai kaulų tyrimai atskleidė, kad didelis kaulų paviršiaus plotas yra nugludintas, ypač kaulo Nr. 1 (2 pav.), o gludrinimo žymės itin intensyvios ties kaulo viduriu. Kartu su gludrinimo žymėmis ant kaulo paviršiaus buvo aptinkama įvairių įraižų (3 pav.). Antrojo kaulo (Nr. 2) naudojimo žymės buvo kur kas silpniau matomos (4 pav.), jos pastebėtos tik ant kairiojo lateralinio ir ventralinio paviršiaus.

Jūrų ir sausumos žinduolių varpos kaulai naudoti įvairiais priešistoriniais laikais: vėlyvojo paleolito La Gravetės kultūros gyvenvietėse rasti iš varpos kaulų pagaminti yla ir odos apdirbimo įrankis (Scheer, 1995), varpos kaulų dėta į kapus (Szombathy, 1920; Mollison, 1928; Street, 2002; Giemsch, Tinnes, Schmitz, 2015, p. 248). Nemažai lokio varpos kaulų randama subneolito gyvenvietėse, pavyzdžiui, prie Baikalo ežero esančios Šamankos II gyvenvietės palaidojimuose (8 000–7 000 cal. BP) aptikta 10 varpos kaulų, kurie dėti daugiausia į vyrų kapus (Losey *et al.*, 2013, p. 65; Giemsch, 2017, p. 45–56). Kad varpos kaulai buvo svarbūs ritualiniame gyvenime, rodo ir etnografiniai duomenys – vienos Sibiro tautos tikėjo, kad jie gydo nevaisingumą, lengvina gimdymą, kitos manė, kad yra galios ir stiprumo simbolis (Giemsch, 2017, p. 47; Clottes, 2016, p. 81). Šiaurinėje Skandinavijoje samiai tvirtindavo meškų varpos kaulus prie šventųjų būgnų (Hultkrantz, 1992, p. 141; Kroik, 2006, p. 204), inuitų šamanams baltųjų lokių varpos kaulai esą leisdavę susisiekti su dvasių pasauliu (Mithen, 2003, p. 388; Giemsch, 2017). Aliaskoje gyvenusios gentys panašiems tikslams naudojo ne tik lokių, bet ir ruonių bei jūros liūtų varpos kaulus (Gates, 2005, p. 168). Iš fosilizuotų kaulų šios bendruomenės gaminosi peilių rankenas ir kitus dirbinius (Long, 2012, p. 200). Tad varpos kaulų naudojimo tradicijos labai senos ir plačiai paplitusios, o daugiausia žinoma apie lokių varpos kaulų naudojimą. Nors kitų rūšių gyvūnų kaulai taip pat naudoti, jie dar nesulaukė tinkamo tyrėjų dėmesio. Varpos kaulai medžiotojų ir rinkėjų bendruomenėse naudoti įvairiais, daugiausia ritualiniais, tikslais, nors jie buvo naudojami ir kasdieniame gyvenime. Kam galėjo būti naudojami Šventosios 3 gyvenvietėje rasti kaulai, buvo pabandyta nustatyti atlikus jų darbo žymių tyrimus.

Tirti artefaktai neturėjo darbinių ašmenų, kaip įprasta daugumai kaulo ar rago dirbinių. Ant jų paviršiaus matomos galbūt darbo žymės rodytų, kad jeigu šiais kaulais buvo dirbama, jie galėjo būti naudoti apdirbti, o būtent minkštinti, lyginti įvairias medžiagas. Ant kaulų matomos kirtimo žymės yra susijusios ne su kaulų naudojimu, o su ruonio dorojimu, t. y. su varpos kaulo atskyrimu nuo mėsos ir sausgyslių, kurios kaip tik ir tvirtinasi kirčio vietoje. Ant daugiau naudoto radinio buvo galima išskirti tris darbinius paviršius (3 pav.). Ant jų pastebėtos žymės – įraižos ir poliravimas – yra įvairios kilmės, o tai labai apsunkina bandymą nustatyti artefaktų funkciją. Vis dėlto įvairios žymės greičiausiai atsirado ne todėl, kad kaulai buvo daugiafunkcūs paskirties. Tokio pobūdžio gludinimas, koks fiksuotas ant abiejų kaulų, yra panašiausias į atsirandantį po kaulo ir odos kontakto. Tiesa, oda ant kaulo gali palikti labai įvairių žymių, kurios priklauso ir nuo odos apdirbimo būdo, ir nuo vykdytos veiklos (5 pav., A–G). Vis dėlto panašiausia, kad aptiktos žymės atsirado po kaulų ir gerai išdirbtos minkštos odos kontakto. Galbūt varpos kaulai galėjo būti naudojami kaip specializuoti įrankiai jau minkštai odai apdirbti. Deja, tiksliai nustatyti, kam juos naudojo medžiotojų, rinkėjų ir žvejų bendruomenės, ar jie naudoti utilitariniais, ar ritualiniais tikslais, neįmanoma.

Nepaisant to, šie iš ruonių kaulų pagaminti dirbiniai dar kartą patvirtino hipotezę, kad ruoniai ir iš jų gaunamos žaliavos buvo itin svarbios Baltijos subneolito bendruomenėms. Be to, šių radinių tyrimai, kaip ir ruonių kaukolių tyrimai (Osipowicz *et al.*, 2020a), dar kartą parodė, kad negalima skubėti dirbiniams priskirti vieną ar kitą funkciją, o žymės ant tiriamų objektų gali būti visai nesusijusios su kasdienėmis įprastomis ūkinėmis veiklomis.