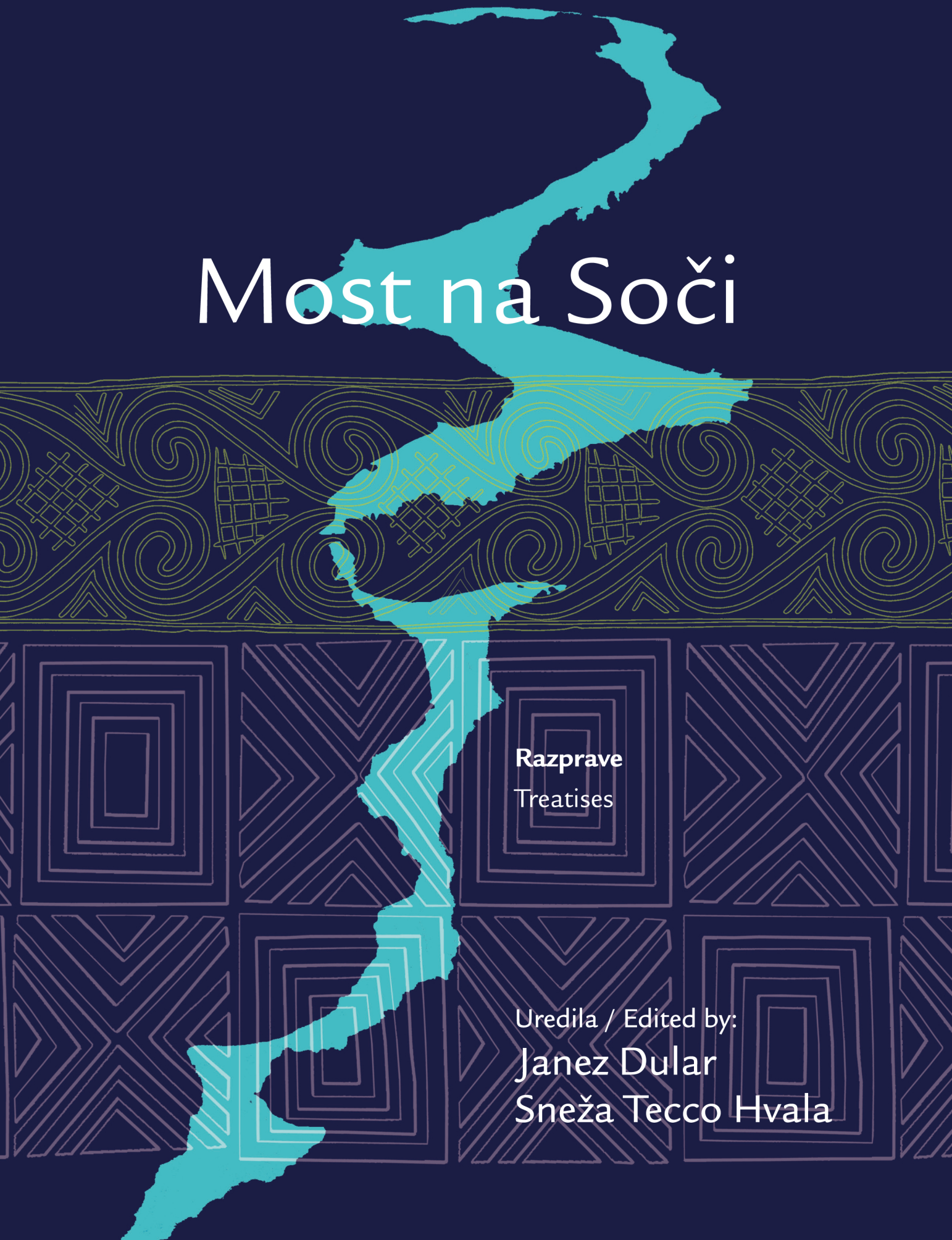
Opera Instituti Archaeologici Sloveniae 34

Most na Soči



Razprave
Treatises

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ŽELEZNODOBNO NASELJE MOST NA SOČI
Razprave

THE IRON AGE SETTLEMENT AT MOST NA SOČI
Treatises

Uredila / Editors:

Janez Dular, Sneža Tecco Hvala

ZALOŽBA ZRC

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VSEBINA

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TEXTILE FIND FROM THE IRON AGE SETTLEMENT AT MOST NA SOČI: CONSERVATION, ANALYSIS AND COMPARISONS

Karina GRÖMER, Klara KOSTAJNŠEK, Tjaša TOLAR, Gojka PAJAGIČ BREGAR

NAJDIŠČE IN KONTEKST

Goriški muzej iz Nove Gorice je v letih med 1971 in 1984 raziskal prostrano območje z ledinskim imenom Merišče, ki leži vzhodno od starega jedra vasi Most na Soči. Geološko osnovo pobočja sestavljata ledeniška morena in rečni prod, ki sta ga odložili reki Idrijca in Soča. Izkopavanja so razkrila ostanke 35 železnodobnih hiš, drenažni jarek in pot. Poleg tega so dokumentirali 32 lokacij z razpršenimi sledmi poselitve, o kateri pričajo ohranjene plasti ruševin in posamične najdbe (Svoljšak, Dular 2016). Posebej zanimive so organske najdbe iz hiše 6 (glej tu Tolar, 445–452).

HIŠA 6

Ostanki stavbe so ležali na pobočju, kjer je bil pozneje, v rimskem času, zgrajen obsežen stavbni kompleks in ta je uničil starejše ostanke. Od železnodobne hiše, ki je imela dve gradbeni fazi, so se ohranili skromni ostanki temeljev in obrisi gradbenih jam, zatrpanih z debelimi plastmi ruševin. Hiša je imela v prvi gradbeni fazi bolj ali manj kvadraten tloris in en sam prostor, merila je 3,5 m v dolžino in vsaj 2,6 m v širino, površina raziskanega dela znaša okoli 6 m^2 (Svoljšak, Dular 2016, 72). Sledi prežgane ilovice in oglja kažejo, da je pogorela.

Po požaru so postavili novo hišo (gradbena faza 2) okoli dva metra proti jugovzhodu. Nova gradbena jama je bila vkopana skozi ruševine v geološko osnovo, pri tem sta bili v precejšnem delu uničeni starejša zgradba in oprema. Hišo druge faze je pozneje v dobršni meri uničila rimska gradnja. Pravzaprav so ostanki omejeni z obrisom gradbene jame. Rob vkopa je bil dobro viden

SITE AND CONTEXT

Between 1971 and 1984, the Goriški muzej in Nova Gorica investigated an area covering the vast terrace known as Merišče, located to the east of the old centre of the village of Most na Soči. The natural deposits of the terrace are composed of moraine till and fluvioglacial gravel deposited by the Idrijca and Soča rivers. The excavations unearthed the remains of 35 Iron Age houses, a drainage ditch, and a path through the settlement. In addition, 32 locations of dispersed habitation traces were documented, where only layers of debris and individual finds indicative of human activities survived. House 6 is of particular interest concerning organic finds (see this volume Tolar, 445–452).

HOUSE 6

The remains of the building were situated on the part of the slope that was occupied later, in the Roman Period, by a vast building complex that largely destroyed the earlier remains. The Iron Age house had two construction phases, of which only some limited remains of the foundations survived along with the outlines of the construction pits filled with thick layers of debris. In the first phase, the house had a roughly square plan and a single room, which measured 3.50 m in length and at least 2.60 m in width. The interior surface of the area investigated measured roughly 6 m^2 (Svoljšak & Dular 2016, 72). Traces of burnt clay and charcoal indicate that the house burnt down.

After the fire, a new house was constructed two metres further to the southwest (second construction

zlasti na severozahodu, čeprav so ga na treh mestih presekali rimski zidovi. Gradbeno jamo so zapolnjevale ruševine, sestavljene pretežno iz prežgane gline, kamnitega drobirja s sledovi ognja in zoglenelega lesa. Pestra zastopanost drevesnih vrst kaže na prostor za žgalno daritev. Najdbe so ležale pod rimskimi zidovi, med njimi so fragmenti fibul, lončenina, bronasti gumbi in obeski ter jagode iz stekla, brona in koral. V prežgani zemlji so bili tudi živalske kosti, zrna žit, fragmenti zoglenele pogače in tkanine (glej tu Tolar; Laharnar; Toškan).

TEKSTILNI OSTANKI IZ HIŠE 6

STANJE OHRANJENOSTI TKANINE IN METODE ANALIZE

Pogoji za ohranitev organskih snovi so v klimatskih razmerah osrednje Evrope vse prej kot ugodni. Tovrsten material se na arheoloških najdiščih redko ohrani, le v izjemnih okoliščinah (glej npr. Grömer 2016, 20–31), kot so koliščarske neolitske in bronastodobne naselbine na mokrih tleh predalpskega prostora (npr. Pajagič Bregar et al. 2009), najdbe v rudnikih soli v Hallstattu in Dürrnbergu-Halleinu ali npr. v ledeniku ohranjena neolitska mumija, znana kot Ötzi. Te najdbe kažejo raznovrstne naravne materiale, ki so jih prazgodovinski ljudje poznali in uporabljali. Velika večina arheološkega tekstila je ohranjena v majhnih fragmentih, običajno na kovinskih predmetih, denimo iz brona, železa ali srebra (glej npr. Grömer et al. 2017).

Zoglenele tekstilne najdbe so poseben primer, po navadi so odkrite v grobovih ali v naselbinskih kontekstih, kot je v primeru obravnavanega tekstila z Mosta na Soči. Pri nepopolnem gorenju delujejo kemični procesi vzajemno s fizičnimi spremembami. Zoglenel tekstil se navadno ohrani v skrčenem stanju (glej Wild 1988, 11), kljub delnim transformacijam pa ostane mikrostruktura v precejšnji meri enaka. Rastlinska vlakna so v karbonizirani obliki običajno bolj stabilna, v nasprotju z vlakni živalskega izvora, ki se v ognju pogosto razkrojijo. Če je organski material (npr. tekstil) dlje časa izpostavljen visokim temperaturam brez prisotnosti kisika, zogleni. Pri tem se neobstojne sestavine tekstilnih vlaken zmanjšajo, naraste pa vsebnost ogljika. Mikrostruktura rastlinskih in živalskih vlaken se v veliki meri ohrani.

Pri analizi tkanine je treba preučiti različne konstrukcijske parametre *(sl. 1*; glej npr. Walton in Eastwood 1988). Mednje sodijo poleg vrste preje (enojna preja ali sukana preja, smer vitja (S ali Z), premer preje) še karakteristike tkanja (vrsta vezave, gostota niti, napake pri tkanju). Dokumentira se tudi morebitne ohranjene robove tkanine, šive ali druge strukture površine. Pri zoglenelem tekstilu je treba upoštevati, da se ta zaradi karbonizacije pogosto skrči, zato je treba konstrukcijske lastnosti takšnega tekstila zelo pazljivo obravnavati.

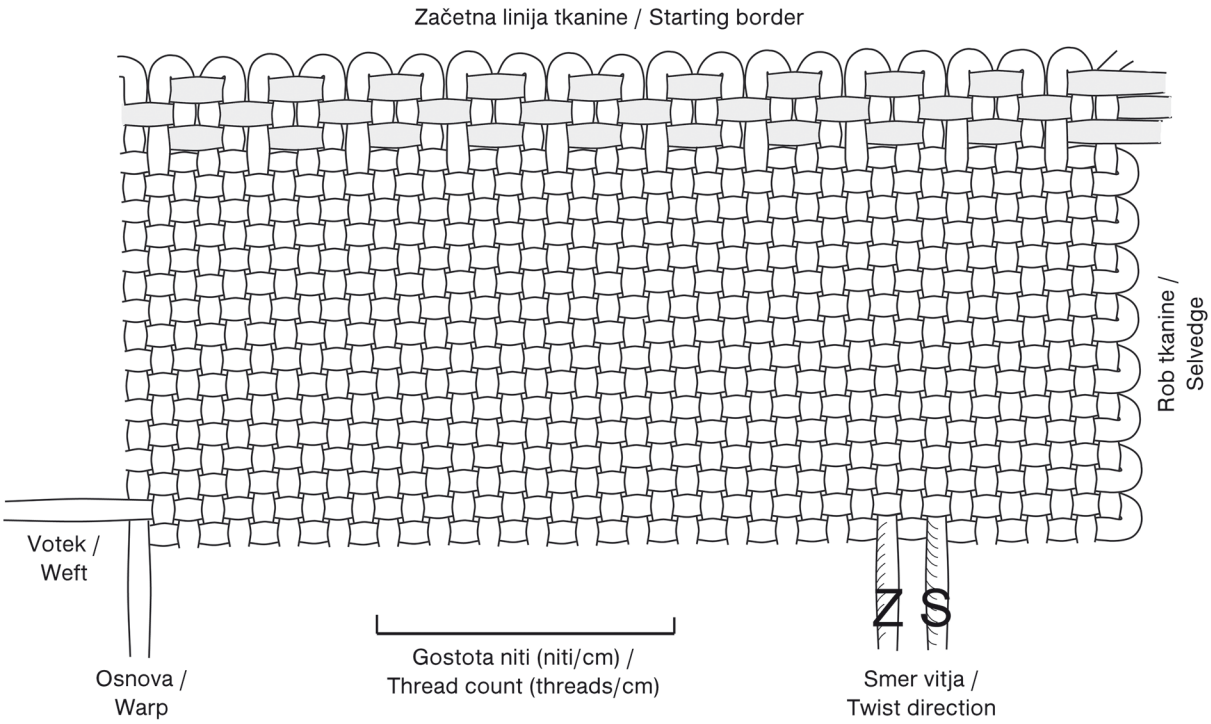
phase). The new construction pit cut through the debris and into the natural deposit. It destroyed a considerable part of the earlier house remains and inventory. In turn, the Romans later largely destroyed the second phase house. In fact, its remains are more or less limited to the outline of the construction pit. The edge of the construction pit was most clearly discernible in the northwest, though it was cut in three areas by Roman period walls. The construction pit was filled with debris, which mainly consisted of burnt earth, small pieces of rubble with traces of fire and numerous pieces of charred wood. The great variety of wood species suggests a burnt-offering place. The finds were lying under the Roman walls and include fragments of fibulae and ceramic vessels, bronze buttons and pendants, as well as beads of glass, bronze, and coral. The burnt earth also revealed animal bones, cereal grains, charred bread and fragments of a textile (see also this volume Tolar; Laharnar; Toškan).

THE TEXTILE REMAINS FROM HOUSE 6

PRESERVATION CONDITIONS OF TEXTILES AND METHODOLOGY OF TEXTILE ANALYSIS

The preservation conditions for organic materials under the climatic conditions of Central Europe are, especially for textiles, anything but suitable. Thus, the majority of the materials that were handled by prehistoric people are usually not preserved at archaeological sites. Only in serendipitous cases (see e.g. Grömer 2016, 20–31), such as the Neolithic and Bronze Age wetland settlements around the Alps (e.g. Pajagič Bregar et al. 2009), the findings from the salt mines in Hallstatt and Dürrnberg-Hallein or even the Iceman, a Neolithic mummy better known as 'Ötzi' show us the variety of raw materials in use. The great majority of archaeological textiles are tiny fragments, preserved in connection with metal artefacts such as bronze, iron or silver (see e.g. Grömer et al. 2017).

Charred textiles are a specific case; they can be found in graves as well as in settlement contexts, as in the case of Most na Soči. With incomplete combustion, chemical processes interact with physical alterations. After carbonization (see Wild 1988, 11), the charred and usually shrunken textiles preserve in carbonized form. Although there are partial transformations, the microstructure of the textile usually remains substantially intact. Plant fibres are often more stable in a carbonised state, animal fibres, on the other hand, often perish in fire. If the textiles are exposed to excessive heat in the absence of oxygen, the process is called coalification. The amount of volatile constituents of the textile fibres thereby decrease more and more in favour of the carbon content. Again, the microstructure of plant and animal fibres is largely maintained.



Sl. 1: Shematski prikaz tkanine in njenih konstrukcijskih parametrov.
Fig. 1: Technical details of a textile.
(© K. Grömer, after Banck-Burgess 1999, Fig. 5.1).

Analizo tkanine in njenih konstrukcijskih parametrov smo izvedli z digitalnim ročnim mikroskopom *DinoLite*, stereomikroskopom *LEICA LZ 40* in stereomikroskopom *65.560 NOVEX* (Euromex - Holland) ter z digitalno kamero (*CMEX5000*). Izmerili smo premer preje, določili vezavo tkanine ter podrobno preučili možne vzorce na površini, šive ipd.

Vrsto vezave smo določili po standardih *SIST EN 1049* in *ISO 7211-2:1984*. Vezavo smo določili neposredno na vzorcih, pri čemer smo uporabili lupo, preparirno iglo in ravnilo. Pomagali smo si tudi z vizualno analizo s programom *ImageJ*. Gostoto niti smo določali po enakih standardih, kot veljajo za vezavo, tj. sprva neposredno na vzorcih in nato z vizualno ali optično analizo. Določili smo smer zavojev preje (Z ali S) v skladu s standardom *SIST ISO 2:1995*, premer preje z monookularno lupo ter vizualno analizo (s programom *ImageJ*), premer vlaken pa s pomočjo SEM-posnetkov in programa *ImageJ*.

Identifikacija vlaken je bila izvedena na podlagi morfološke analize z vrstično elektronsko mikroskopijo (*SEM*) na aparatur*i JEOL JSM-6060 LV* (glej npr. Sreenivasa Murthy 2016). Za strukturno ali analitično opazovanje predmetov mikro in celo nano velikosti (0,000001 mm) se uporablja elektronski mikroskop. Kot komplementarno metodo smo uporabili Fourierjevo transformacijsko infrardečo spektroskopijo (FTIR)

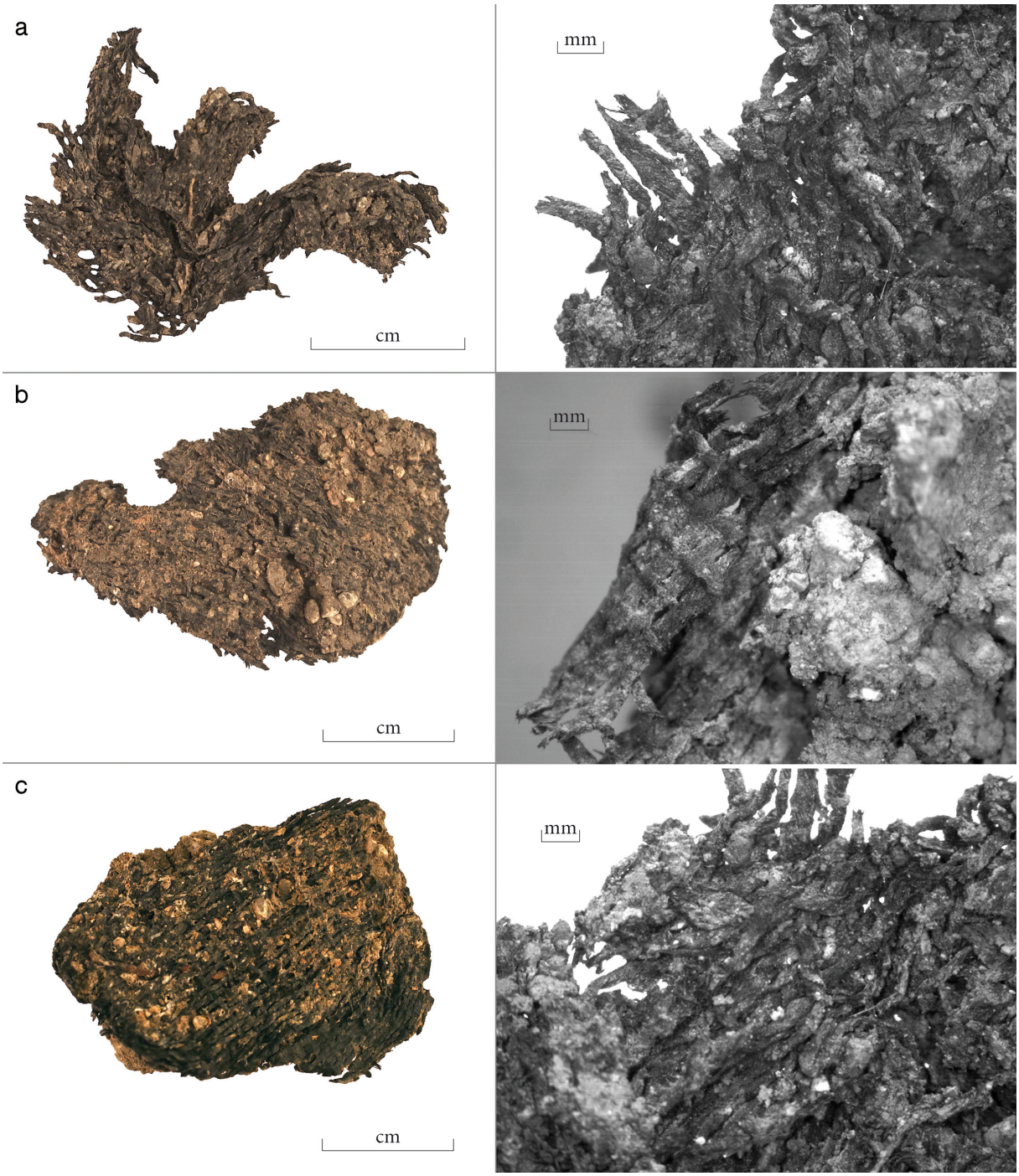
To analyse a textile, various technical details must be recorded (*Fig. 1*; see e.g. Walton & Eastwood 1988). Among them are the characteristics of the threads (use of plied or single yarn, twist direction (S or Z) and yarn diameter), as well as the characteristics of the weave (weave type, thread count, weaving errors). If possible, patterns, seams and hems and other surface structures must be documented as well. In the case of a charred textile, the fact that such textiles are often shrunken must be taken into account. Thus, the technical data is to be discussed with great care.

Measurements of the technical details of the textile from Most na Soči were carried out with a *DinoLite* Digital Microscope, a *LEICA LZ 40* stereomicroscope, and a *65.560 NOVEX* stereomicroscope (Euromex, Holland) with a digital camera (*CMEX5000*). Thread diameter, fine structures of the weave and details of patterns and seams were documented.

The type of weave was determined in accordance with the standards *ISO 3572:1976* and *ISO 9354:1989*. The weave was determined directly on the samples, using a magnifier, preparation needle, and a ruler. *ImageJ* software was used for visual analysis. The thread density was determined in accordance with the standards *SIST EN 1049* and *ISO 7211-2:1984*. The density was determined similarly as weave was, i.e. first on the samples

(glej npr. Garside in Wyeth 2006). Analiza FTIR je bila izvedena na aparaturi *Perkin Elmer*, UK. Namen uporabe spektroskopije je bil primerjati kemijsko sestavo vzorcev (funkcionalne skupine molekul, iz katerih so sestavljeni vzorci). Mikro- in spektroskopske analize so bile izvedene na Oddelku za tekstilstvo, grafiko in oblikovanje Naravoslovnotehniške fakultete Univerze v Ljubljani.

and then by means of visual analysis. The twist direction of yarn (Z or S) was performed by means of visual analysis and in accordance with the standard *SIST ISO 2:1995*. The yarn diameter analyses were conducted with a monocular magnifier and with the program *ImageJ*. The fibre diameter was determined using *SEM* images and *ImageJ* program.



Sl. 2: Tekstil z Mosta na Soči, očiščeni in analizirani vzorci. Od zgoraj navzdol: vzorec 1, vzorec 2 in vzorec 3.
Fig. 2: Fig. 2: Textile from Most na Soči, analysed samples after cleaning. From uppermost to the lowest: Sample no. 1, Sample no. 2 and Sample no. 3.
(Foto / Photo: M. Zaplatil (levo / left); M. Starešinič (desno / right).

POSTOPEK ČIŠČENJA IN KONSERVACIJE

Trije vzorci zoglenelega tekstila so se ohranili skupaj z grudicami zemljine (prst z manjšimi kamenčki iz kulturne plasti železnodobne naselbine). Zaradi starosti in pooglenitve so poškodovani, krhki, sploščeni, črne barve, umazani od prsti ter na dotik togi in krhki. Prvotna oblika vlaken je tako ohranjena samo na določenih delih. V prvi fazi smo vzorce nežno očistili s čopičem in fotografirali (*sl. 2).*

TEHNIČNE ZNAČILNOSTI IN PRIMERJAVE TEKSTILNE NAJDBE

Ker so si ostanki podobni in so bili najdeni dokaj blizu drug drugega, domnevamo, da pripadajo istemu kosu tekstila, zato jih opisujemo skupaj. Čeprav so ostanki relativno majhni (največji kos meri pribl. 3,5 x 2,4 cm), so pomembni, saj nimamo veliko informacij o tekstilu iz sočasnih naselbinskih kontekstov.

Identifikacija vezave tekstilnih niti je bil velik izziv, ker so vzorci izjemno krhki in nestabilni. Zasledovali smo ponovitve prepleta niti in raport vezave – še posebno na tistih mestih, kjer je bil vzorec manj poškodovan (npr. *sl. 3*). Takih delov je bilo samo nekaj, večina vzorca je imela nejasen ali neprepoznaven preplet niti. V ilovnati grudi je bilo mogoče identificirati tkanino v več plasteh (do 3 plasti, npr. pri vzorcu 3*; sl. 4)*. Vezavo smo lahko določili le na nekaj mestih, gre pa za vezavo platno. Robovi tkanine se niso ohranili, zato ni bilo mogoče določiti smeri osnove ali votka. Tkanina je bila izdelana iz enojne preje s S-vitjem in premerom 0,3–0,5 mm *(sl. 3, 4)*. Zaradi zoglenelosti je tkanina črna in sploščenega videza. Na določenih predelih je razpadla, vlakna so se skrčila, zato medsebojna povezava med nitnima sistemoma ni vidna. Podoben proces razkroja je opazen tudi pri sočasnih najdbah z nekaterih grobišč (glej npr. Banck-Burgess 1999, Taf. 1–2).

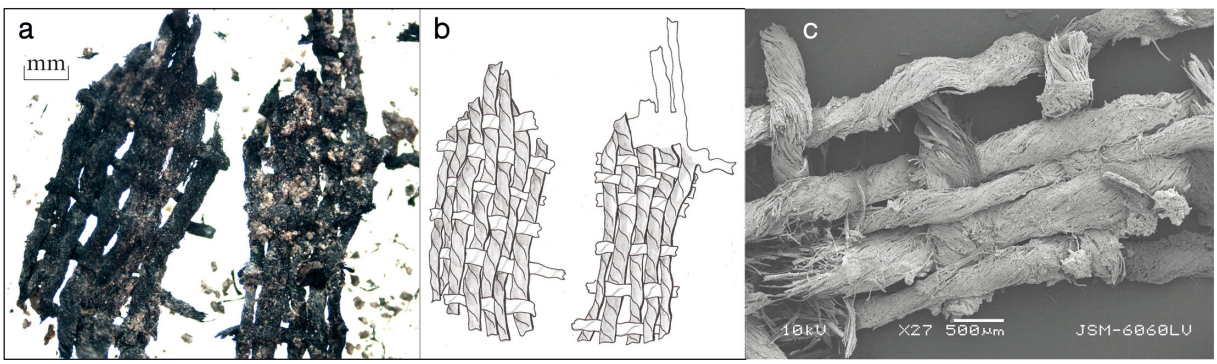
The identification of fibres was performed on the basis of the morphological analysis with a scanning electron microscope (*SEM*) on a *JEOL JSM-6060 LV* machine (see e.g. Sreenivasa Murthy 2016). Electron microscopy is applied to study objects down to the micro- and even nanometre scale (0.000001 mm) in a structural or analytical way. Moreover, the Fourier Transform Infrared Spectroscopy (FTIR) (see e.g. Garside & Wyeth 2006) was used as a complementary method and was conducted on a *Perkin Elmer* machine, UK. The purpose of using spectroscopy was to compare the chemical structure of the samples (functional groups of molecules composing samples). The micro- and spectroscopic analyses were performed at the Faculty of Natural Sciences and Engineering, Department of Textiles, Graphic Arts and Design in Ljubljana.

CONSERVATION TREATMENT

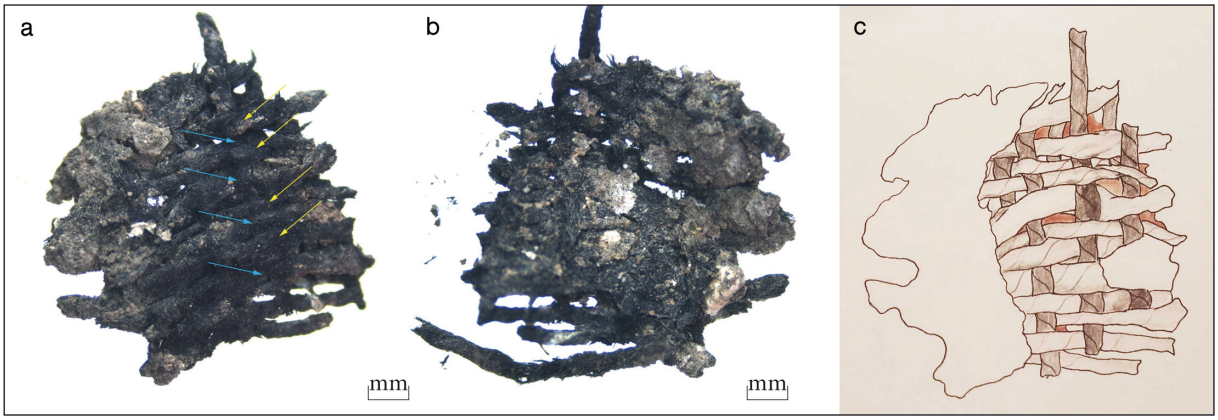
Three samples of charred textile remains were preserved with a lump of intact soil and small stones from a cultural layer of an Iron Age settlement. The remains of the textiles are charred, damaged, flattened, coloured black and, in most cases, surrounded by soil. Their original shape has only been preserved in certain places. The fibres are infused with soil and impurities, and they appear stiff. However, they are extremely fragile and decompose at low load. The samples were gently cleaned with a brush and photographed *(Fig. 2)*.

TECHNICAL DESCRIPTION OF THE TEXTILE FIND AND COMPARISONS

As the different fragments of textile are quite similar and were found close to each other, it was assumed that all of them formerly belonged to one textile and are, therefore, described together. The textile fragments are



Sl. 3: Vzorec 2. a) Detajl vzorca (foto: M. Starešinič); b, c) jasno viden del prepleta niti, ki kaže na vezavo platna
Fig. 3: Sample no. 2. a) Detailed view of the sample (photo: M. Starešinič);
b, c) clearly visible parts of the weave and the plain weave pattern
(Foto in risba / Photo and drawings: K. Kostajnšek).



Sl. 4: Vzorec 3. a) Sprednja stran, vidno prepletanje vzdolž ene niti (M. = 1:1); b) s hrbtne strani; c) shema prepleta osnovnih in votkovnih niti.
Fig. 4: Sample no. 3. a) Front side and apparent interweaving of one thread (Scale = 1:1); b) from the backside; c) scheme of the interlacing of the warp and weft thread.
(Foto / Photo: M. Starešinič; risba / drawing: K. Kostajnšek).

Na tistih mestih, kjer sta struktura tkanine in veza-va lepo vidni (npr. *sl. 3, 4)*, je bilo mogoče določiti število niti na enoto (tj. gostoto niti). Da bi pridobili čim bolj zanesljive rezultate, smo štetje na različnih mestih večkrat ponovili. Vidna struktura vezave platno je nenavadna, saj je gostota niti v eni smeri dvakrat večja kot v drugi. Kljub temu se vrsta vezave s tem ni spremenila, vendar je treba upoštevati tudi krčenje. Videti je, kot da je tkanina večplastna, morda zaradi nekakšne deformacije ali namembnosti oziroma uporabe. Tehnične lastnosti vlaken in tkanine, ki nam jih je uspelo analizirati, so navedene v *tabeli 1*.

Na enem od fragmentov (vzorec 3) je bila vidna nit v paru (ali dvojna nit; *sl. 4*). Ker je fragment premajhen za določitev smeri osnove in votka, lahko ta pojav pojasnimo z več razlagami. Če se nit v paru pojavi v

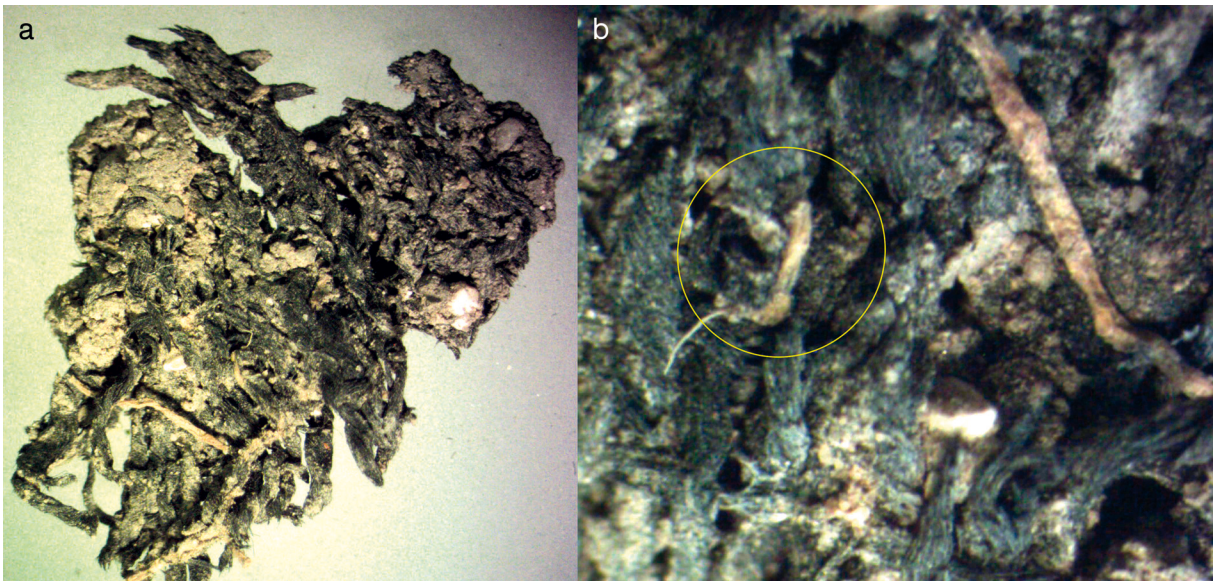
	Nitni sistem 1 **Thread system 1**	**Nitni sistem 2** **Thread system 2**
Vrsta preje Yarn/plied yarn	enojna preja single yarn	enojna preja single yarn
Smer vitja Twist direction	s	s
Kot vitja Twist angle	30-40°	30°
Premer preje Yarn diameter	0,3-0,5 mm	0,3-0,4 mm
Premer vlaken Fibre cross- section diameter	5-12 µm	
Gostota niti (število niti/cm) Thread count (threads per cm)	18-20	10-12

Tab. 1: Konstrukcijske lastnosti tekstila.
Tab. 1: Technical details of the textile.
(© K. Grömer, NHMW).

quite small (the biggest parts of them cover an area of 3.5 x 2.4 cm; c. 3.75 x 1 cm), but nonetheless important because there is little information about textiles from contemporary settlement contexts.

The identification of the weave-type was a challenge because of the highly brittle and unstable conditions of the samples. We looked for a repeat of yarn entanglement and repeat of weave, especially in places where the samples were less damaged (e.g. *Fig. 3*). There were few such sections; the majority of samples contained unclear or unrecognisable yarn entanglement. In the clay lumps up to three layers of the textile could be identified (e.g. in Sample 3; *Fig. 4*). There are some places, where the weave structure can be identified as plain weave (tabby). There was no selvedge or other hint to discern warp and weft. The fabric was made of S-twisted single yarns of 0.3–0.5 mm thread diameter (*Figs. 3, 4*). The colour is blackish due to the charred state, and the textile has a flattened appearance. The textile is disintegrated, the fibres have been shrunken; thus, the internal connection between the thread systems is declining. Similar mechanisms of disintegration have also been observed among contemporary grave finds (see e.g. Banck-Burgess 1999, Taf. 1–2).

We determined the number of threads per certain unit only in places where the fabric structure and weave were clearly visible (e.g. *Figs. 3, 4*). In order to obtain a result that would be as reliable as possible, the counting was repeated in different places as many times as possible. The visible structure of the plain weave is remarkable, because the thread count in one direction is twice as large as in the other direction. Nonetheless, the weave type did not change but shrinkage must be taken into account. It appears as if the fabric is placed, and several layers maybe perhaps because of some kind of deformation or merely because of different purpose or use. The technical measurements that can still be taken are listed in *Table 1*.



Sl. 5: Vzorec 1, ohranjen ostanek niti.
Fig. 5: Sample no. 1, preserved residue of the thread.
(Foto / Photo: K. Kostajnšek).

smeri osnove, gre lahko za napako pri snovanju, kar pomeni, da se je pri snovanju zaradi napake namesto ene niti pojavila nit v paru. Če pa se nit v paru pojavi v smeri votka, gre lahko za deformacijo pri izvleku votka (zgrešen votek) med tkanjem, kjer se je naslednji vneseni votek prekril s prejšnjim.

Nit, ki smo jo odkrili pri vzorcu 1 *(sl. 5b*, obkroženo*)*, se močno razlikuje od ostalih. Posnetki SEM ohranjenega ostanka niti kažejo podoben vzdolžni videz *(sl. 5)*, kot ga imajo ostale niti na vzorcu, zato predpostavljamo, da gre za lan ali konopljo. Na podlagi pojavljanja niti v vzorcu domnevamo, da gre za sukanec – kot prikazuje *sl. 5*, bi to lahko bil šiv v tkanini.

Če primerjamo najden tekstil z Mosta na Soči z drugimi sočasnimi tekstilnimi najdbami, lahko rečemo, da se sklada z njimi. Vezava platno je poleg vezave keper (glej Grömer et al. 2017) v halštatski kulturi običajna. Tudi uporaba enojne preje je značilna za tekstil vzhodnohalštatske kulture (glej Bender Jørgensen 2005; Grömer et al. 2013, sl. 18). Premeri zoglenelih in zato skrčenih niti se bolj ali manj uvrščajo v red velikosti doslej znanih kvalitetnih halštatskih tekstilij, npr. premeri niti iz Hallstatta v Avstriji so najpogosteje med 0,3 in 0,6 mm (Grömer et al. 2013, sl. 17). Tudi gostota niti med 10 in 20 niti/cm je precej običajna v tem času in prostoru.

Kakorkoli že, halštatske tkanine v vezavah platno in keper so navadno dokaj enakomerne, še posebno tkanine iz enojne preje, uporabljene v obeh sistemih oz. smereh. Na območju vzhodne halštatske kulture je bilo najdenih le nekaj primerov tkanin v vezavi platno s primerljivo gostoto niti, predvsem v Sloveniji in na Madžarskem: npr. grobna najdba z Vač, kjer je na železnem

On one of the fragments (Sample no. 3) once a paired thread is visible (*Fig. 4*). As the fragment is too small to distinguish warp and weft, that feature can be explained in different ways. Perhaps it was a fault in the warping of the loom, and a paired yarn was once used as warp instead of a single yarn. If the paired yarn is situated in weft direction, it might be explained that during weaving the weft thread ran out and a new one was added, overlapping the former one.

A thread was found at Sample no. 1 (*Fig. 5b*, circle) that substantially differs from the others. The SEM images showed a similar longitudinal appearance (*Fig. 5*) as in other threads; thus, it can be presumed that the raw material is flax or hemp. Based on the way the thread appears on the sample, this is probably a sewing thread, as demonstrated in *Fig. 5*, this could be a seam in the fabric.

To compare the item from Most na Soči with what we know about contemporary textiles, we can say that it fits in quite well. Plain weave or tabby is next to twill a common weave type in the Hallstatt Culture. Furthermore, the use of single yarn fits well in what we know about textile culture of the Eastern Hallstatt area (see Bender Jørgensen 2005; Grömer et al. 2013, Fig. 18). The diameters of the shrunken threads are in between the range of well-known textile qualities of the Hallstatt Culture, e.g. at Hallstatt in Austria thread diameters of 0.3–0.6 mm are the most common (Grömer et al. 2013, Fig. 17). Moreover, thread counts between 10 and 20 threads per cm are common in the region and period.

Nevertheless, Hallstatt Period tabbies and twills are usually balanced, especially textiles with single yarn in both thread directions. Only few examples of tabby

obroču ohranjena tkanina v platneni vezavi z gostoto 18 niti/cm v eni smeri in 10 niti/cm v drugi. Z madžarskega najdišča Csanytelek Ujhalasto je na železnem prstanu iz groba 44 ohranjena mineralizirana tkanina v platneni vezavi, ki je imela podobno gostoto niti in je v enem nitnem sistemu (v eni smeri) prav tako dvakrat večja kot v drugem, kar pomeni 8 osnovnih niti/cm in 16 votkovnih niti/cm. (glej Bender Jørgensen 2005, 142 in 145, inv. št. 48 in 123).

ANALIZA VLAKEN

Na podlagi posnetkov SEM ter opazovanja vzdolžnega videza vlaken pri vzorcu 1 z Mosta na Soči predpostavljamo, da gre za laneno ali konopljino vlakno; površinske karakteristike so namreč pri obeh zelo podobne.

Čeprav so vlakna zoglenela, polna nečistoč in obdana z zemljo (*sl. 2–5*), lahko opazimo (*sl. 6*), da so nekatera vlakna vzdolžno precej neenakomerno široka. Vidni so značilna odebeljena mesta in prečni pregibi, premaknitve, ki so posledica mehanske obdelave in so tipični za laneno ali konopljino vlakno. Tudi oblika vzdolžnega izgleda vlakna, ki je žlebasto in rahlo oglato, kaže značilnosti lanu ali konoplje *(sl. 6, 7)*.

Glede na rezultate analize FTIR lahko zaključimo, da med temi tremi vzorci ni bistvenih razlik *(sl. 8)*, zato lahko potrdimo domnevo, da gre za enako surovino. Namen uporabe Fourierjeve transformacijske infrardeče spektroskopije (FTIR) je bil primerjati kemijsko sestavo vzorcev (funkcionalne skupine molekul, iz katerih so vzorci sestavljeni). V našem primeru ne moremo potrditi razlike, ali gre za lan ali konopljo.

Glavne absorpcijske trakove spektrov FTIR, pridobljene z analizo vzorcev 1, 2 in 3, smo primerjali z odgovarjajočimi absorpcijskimi trakovi skupaj z viri v literaturi, ki opisujejo navedene trakove (Šutka et al. 2012; Dai in Fan 2010; Garside in Wyeth 2006). Glavni absorpcijski trakovi so se pokazali pri 3250 cm^{-1}, 1570 cm^{-1}, 1370 cm^{-1} in 1015 cm^{-1} in so povezani s funkcionalnimi skupinami ter posledično identifikacijo surovinske sestave preiskovanih vzorcev, kar je prikazano tudi v *tabeli 2*.

textiles with comparable thread count were found in the Eastern Hallstatt Culture, especially in Slovenia and Hungary: for example, a grave find from Vače with a tabby on an iron ring with 18 threads in one direction and 10 in the other; and from Csanytelek, Ujhalasto, there is a tabby textile encrusted on an iron ring from Grave 44, that also has a thread count in one system twice that of the other: i.e. 8 warps to 16 weft threads (see Bender Jørgensen 2005, 142 and 145, Cat. Nos. 48 and 123).

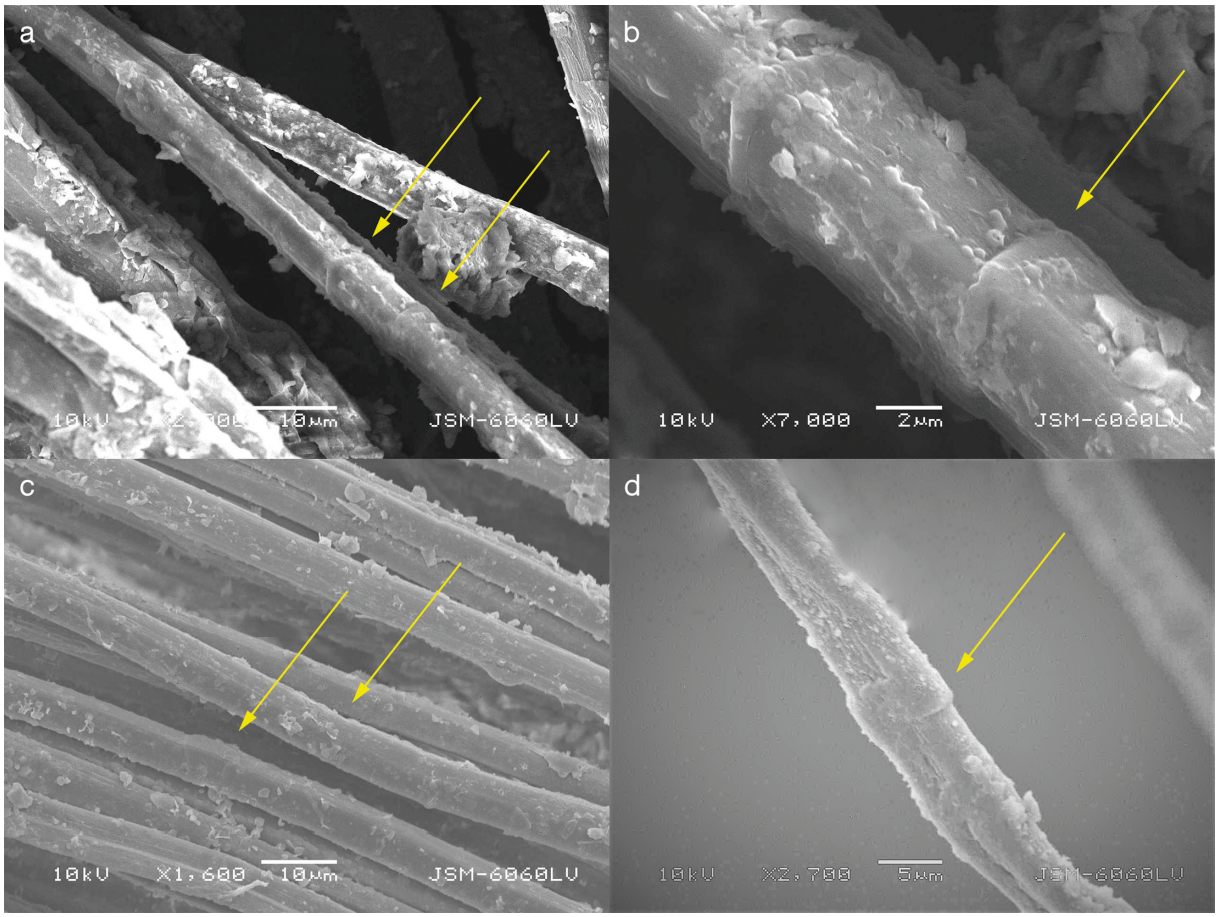
FIBRE ANALYSIS

Based on the SEM images and observation of longitudinal fibre appearance at Sample 1, it can be assumed that this is either a flax or hemp fibre, since the surface characteristics of the two are very similar.

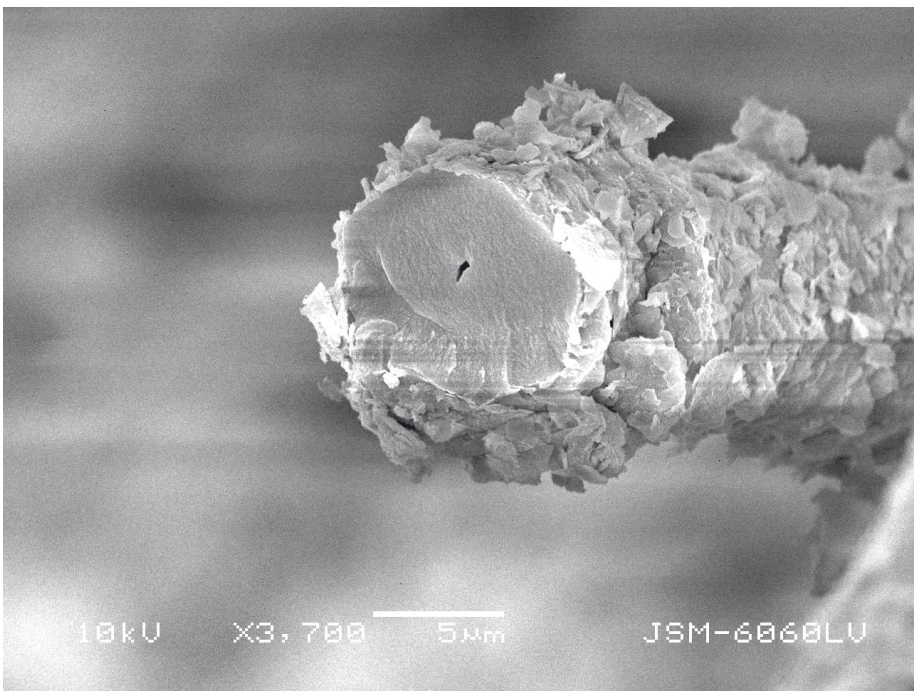
The fibres are charred, full of impurities and surrounded by soil (*Figs. 2–5*). The longitudinal view of the fibre (*Fig. 6*) shows the width to be quite irregular. Nevertheless, some characteristic nodes remain visible: the points at which the fibre width changes are marked with swellings and irregular joint formations. Also kink bands, folds and dislocation can be observed along the length of some fibres, which are a consequence of mechanical treatment, and are typical of flax and hemp fibres. Furthermore, the shape of the longitudinal fibre appearance indicates the characteristics of flax or hemp. The shape is fluted (irregular polygonal shapes, contributing to the coarse texture of the fabric) and slightly angular (*Figs. 6, 7*).

Regarding the results of FTIR analysis, it can be concluded that there are no significant differences among the three samples (*Fig. 8*). This fact further confirms the assumption that all the samples consist of the same (raw) material. The purpose of using the Fourier Transform Infrared Spectroscopy (FTIR) is to make a comparison between the chemical structure of samples (functional groups of molecules composing samples). In this case, the FTIR analysis results cannot confirm whether this is flax or hemp.

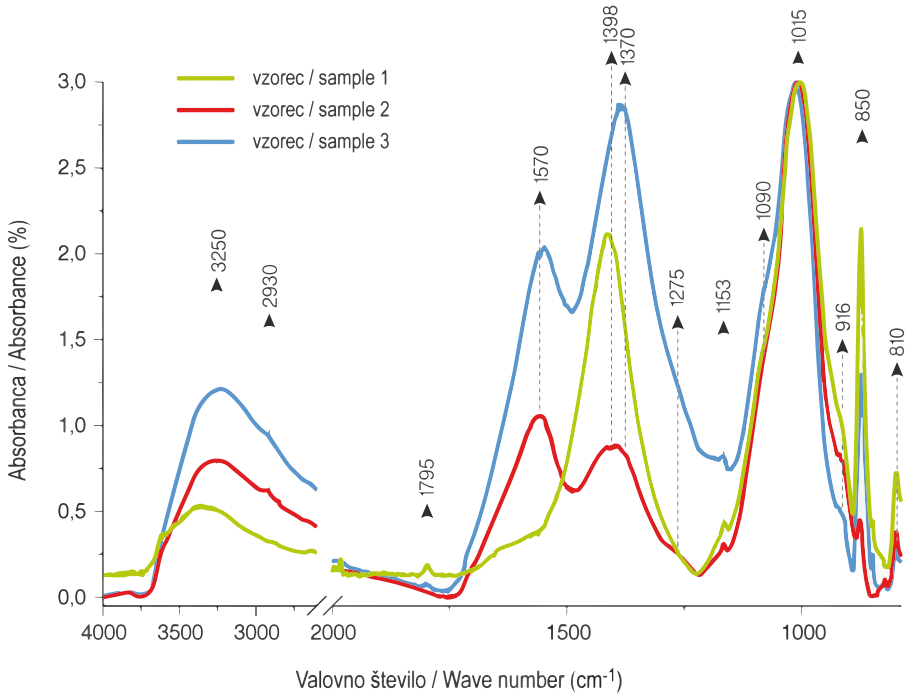
Main absorption bands in FTIR spectra obtained from the analysis of the Samples 1, 2 and 3 were compared with the corresponding assignments of these bands according to the literature review (Šutka et al. 2012; Dai & Fan 2010; Garside & Wyeth 2006). The main position of absorption bands is found at 3250, 1570, 1370 and 1015 wavenumber in cm^{-1}, associated with related functional groups and consequently identification of raw material, which are presented in *Table* 2.



Sl. 6: Vzorec 1, vzdolžni pogled in značilnosti vlaken.
Fig. 6: Sample no. 1, longitudinal appearance and characteristics of fibres.
(Foto / Photo: K. Kostajnšek).



Sl. 7: Vzorec 1, prečni prerez vlakna in dobro viden lumen vlakna.
Fig. 7: Sample no. 1, cross section of the fibre and a clearly visible lumen.
(Foto / Photo: K. Kostajnšek).



Sl. 8: Vzorci 1, 2 in 3, primerjava FTIR spektrov.
Fig. 8: Samples Nos. 1, 2 and 3, FTIR spectra.
(Graf / Graph: V. Zalar Serjun).

Pozicija absorpcijski trakov (valovno število cm^{-1}) Position of absorption bands (wavenumber in cm^{-1})		Funkcionalne skupine (vrsta vibracije) Functional group (vibration mode)	Surovina Materials
Izmerjene vrednosti Investigated samples	Podatki pridobljeni s pregledom literature Data obtained by literature review		
3250	2400–3600	O-H valenčno nihanje O-H stretching	lan, konoplja flax, hemp
1570	1500–1570	nitro NO_2	
1370	1365 1384 1372	C-H deformacijsko nihanje metoksilnih skupin in C1-O vibracije siringil derivatov symmetric C-H bending from methoxyl group and C1-O vibrations in syringyl derivatives	lan, konoplja flax, hemp
1015	1000–1162	C-O; C-O-C valenčno nihanje C-O; C-O-C stretching	celuloza, hemiceluloza, lan, konoplja cellulose and hemicellulose flax, hemp

Tab. 2: Glavni absorbcijski trakovi FTIR spektrov.
Tab. 2: Main absorption bands in FTIR spectra.

DISKUSIJA: KONTEKSTI TEKSTILNIH NAJDB

Tekstilne najdbe iz starejše železne dobe so bile odkrite v srednjeevropskem prostoru v različnih kontekstih. Večina jih izvira iz grobov, kjer je bil tekstil uporabljen kot oblačilo pokojnika oziroma kot mrtvaški prt ali pa za zavijanje grobnih pridatkov (darov) (glej npr. Banck-Burgess 1999; Bender Jørgensen 2005; Gleba 2008; Grömer 2014; Rast-Eicher 2008). Več sto ostankov tekstila, datiranih med letoma 800 in 400 pr. n. št., je bilo najdenih tudi v rudniku soli v Hallstattu (Grömer et al. 2013). Najdeni so bili skupaj z rudarskimi odpadki. Nekateri od njih so verjetno ostanki rudarske opreme, druge so morda rudarji uporabljali kot krpe za različne namene, npr. za čiščenje ali kot pomožen material za ovijanje, npr. platno, vrvi ipd. Tekstilne najdbe iz železnodobnih naselbin so redke. Z avstrijskih najdišč poznamo le en tak primer, tj. z najdišča Kalenderberg blizu Mödlinga, in sicer iz konteksta, datiranega v Ha C, kjer je bil na glinenem kosu diskaste oblike odkrit odtis tkanine v keprovi vezavi (Grömer 2014, catalogue, Hallstattzeit No, HaZ6–HaZ8). Na najdišču Smolenice – Molpír na Slovaškem so bili najdeni ostanki zoglenelega organskega materiala, med katerimi je bila prepoznana volnena vrv s S-vitjem (Furmanek in Pieta 1985, 137). Te najdbe so datirane v čas Ha D.

NAJDBE TEKSTILA V ŽELEZNODOBNIH HIŠAH IN KULTNIH PROSTORIH

Najdba z Mosta na Soči odpira razpravo o našem vedenju o uporabi tekstila v hišah ali kultnih objektih iz halštatske dobe. Kot je znano, je bila halštatska družba hierarhična. Iz tega časa so poznani različni naselja in hiše, centralne naselbine so bile v glavnem utrjene in umeščene na vzpetine ter obkrožene z manjšimi zaselki. Rezidence, v katerih je prebivala elita, so se po velikosti in zgradbi razlikovale od hiš revnejšega sloja. Manj vemo o kultnih objektih iz halštatske dobe in njihovi notranji opremi, z izjemo Býčí skále (Rast-Eicher 1995). Kar zadeva tekstilije, ki so se uporabljale v hišah, imamo v glavnem na voljo vire, ki se nanašajo na bogatejši družbeni sloj – denimo upodobitve situlske umetnosti ali celo najdbe iz bogatih grobov. Te vire gre upoštevati tudi v okviru razprav o naselbinskih kontekstih.

Situle mestoma zelo detajlno upodabljajo "hišni tekstil", kot npr. ležišča in vzglavnike (glej npr. Eibner 2016; Turk 2005). V tem smislu je zanimiva knežja grobnica iz Hochdorfa (Banck-Burgess 1999), ker so se v njej ohranili ostanki opreme, kot so pregrinjala, stenski zastori, vzglavniki in ležišča. Zelo verjetno se te stvari niso uporabljale zgolj v pogrebnem obredju, temveč tudi v vsakdanjem življenju, vsaj elite. Tekstilni dodatki za hišo so skupna značilnost premožnejših hiš v sočasnih

DISCUSSION: TEXTILE CONTEXTS

Early Iron Age textiles can be found from different contexts in Central Europe. Most of them are from grave finds. In the graves, textiles were used as garments for the deceased but also as shrouds or wrappings of grave goods (see e.g. Banck-Burgess 1999; Bender Jørgensen 2005; Gleba 2008; Grömer 2014; Rast-Eicher 2008). There are also hundreds of textiles dating between 800 and 400 BC which have been found in a salt-mine at Hallstatt in Austria (Grömer et al. 2013). They were left behind together with the mining waste. Some of those textiles might have been fragments of miner's gear, but rags were also brought into the mine to serve different purposes such as cleaning item or as makeshift binding material. Textiles from Iron Age settlements are scarce. From Austria, there is one example from the site Kalenderberg near Mödling in a HaC context: a twill imprint on a small discoid piece of clay (Grömer 2014, catalogue, Hallstattzeit No, HaZ6–HaZ8). From Smolenice–Molpír in Slovakia, the remains of charred organic material were identified, among that a woollen S-plied cord (Furmanek & Pieta 1985, 137). The find dates to HaD.

TEXTILES IN IRON AGE HOUSES AND CULT OBJECTS

The find from Most na Soči raises the issue of what is known about the use of textiles in houses and cult objects of the Hallstatt Culture. At first, we must state that Early Iron Age society is a hierarchical one and we know of various kinds of settlements and houses. Hallstatt Period centralised settlements were mostly fortified, situated on hilltops and surrounded by little villages. The residences of the elites differed from houses of the poorer part of society in their size and structure. Little is known about cult objects from the Hallstatt Period, except the Býčí skála (Rast-Eicher 1995). Regarding textiles used in houses, the most commonly available are sources from the wealthy strata of society, such as images on situla art or even grave finds from rich graves. That must be taken into account when discussing the settlement context.

The situlae (e.g. Eibner 2016; Turk 2005) sometimes illustrate in great detail household textiles such as mattresses and pillows. The princely tomb from Hochdorf (Banck-Burgess 1999) is also of interest for this case, because there the remains of soft furnishings like covers, wall hangings, pillows and mattresses have been found. It is likely that such items were not only used for funeral rites but that they also reflect textile items used in daily life, at least by the elites. Household textile accessories were common features of wealthy homes in contemporary cultures, for instance in the

kulturah, npr. v etruščanskih in grških domovanjih (glej npr. Massa 1989, 36–37). Še več, iz grško-rimskega sveta vemo, da je podobne tekstilne izdelke možno najti v templjih in drugih sakralnih objektih, zlasti kot stenske zastore ali kot "zastore vhodov", za ovijanje in podobno (Clarysse in Geens 2009, 39).

INTERPRETACIJA NAJDBE Z MOSTA NA SOČI

Vsi trije vzorci tekstila z Mosta na Soči so bili ohranjeni na enak način in v enakem kontekstu. Najdeni so bili v zoglenelem stanju v železnodobni hiši 6. Pripadali so drugi gradbeni fazi. Kot je že bilo omenjeno, je imelo območje hiše 6, ki je bila v prvi gradbeni fazi požgana, v drugi fazi poseben namen, verjetno je bilo tu kultno mesto (Svoljšak in Dular 2016).

Za interpretacijo tekstilne najdbe sta pomembna dva vidika: tehnične značilnosti izdelave tekstila in kontekst, tj. uporaba oz. namembnost.

Pri vzorcu 1 je bila ugotovljena nit, ki bi lahko bila ostanek šiva v tkanini. Iz tega bi lahko sklepali, da je šlo za oblačilo ali pa za kakšno drugo šivano tekstilijo, torej s šivi. V drugem primeru bi lahko pripadala hišni opremi, kot so zavese, stenske ali talne obloge, blazine, rjuhe, vreče, slikarsko platno ali kaj podobnega. Prav tako je možno, da gre za del oblačila, ki je bilo shranjeno na tem mestu. Iz sočasnih grških primerov je znano, da so tekstil in obleke hranili v lesenih zabojih (Pekridou - Gorecki 1989, 55, sl. 28), nameščenih ob stenah hiš.

Če vzamemo v obzir možnost, da tekstilni ostanki izvirajo iz kultnega mesta, je verjetnejša razlaga, da je tkanina spadala med votivne predmete oz. del žgalne daritve.

***

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homes of the Etruscans and Greeks (e.g. Massa 1989, 36–37). Additionally, from the Graeco-Roman world, it is known that in temples and other sacral buildings similar textiles can also be found, especially wall hangings, 'door curtains', wrappings and the like (Clarysse & Geens 2009, 39).

INTERPRETATION OF THE MOST NA SOČI FIND

All three samples from Most na Soči were preserved in the same manner and context. They were found charred in the Iron Age House 6. The textiles were found in a context with the second construction phase of the house. As mentioned, the area of the house, which ended in fire in the first construction phase, most probably had a special purpose in the second phase, most likely a cult place (Svoljšak & Dular 2016).

For the interpretation of the textile find, there are two items of importance: technical features of the textile itself and the context.

On Sample 1, a thread was found that was identified as the remain of a seam in the fabric. Therefore, it can be assumed that this is either a garment, or any other form of textile with a seam. If it was the latter, it could belong to the furnishing of the house (wall hanging, wallpaper/wall coverings, upholstery, support for oil painting, floor covers, sheets, sacks, etc.). It is also possible that it was a fragment of a garment that was stored at place. From contemporary Greece, it is known that textiles and clothing were stored in wooden boxes (Pekridou-Gorecki 1989, 55, Fig. 28), which were positioned near to the walls of the houses.

To take the context into account, which was possibly a cult place, there are more possibilities of interpreting the textile. The textile remains might also have belonged to one of the sacrificial goods that were thrown into the burnt offering place.

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