

Textile and Textile Tool Expressions in 2nd and 1st Millennium BCE Cyprus

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Introduction

The multifaceted society of ancient Cyprus, a crossroads of peoples, is likely to have influenced textile manufacture on the island. Cyprus is thus compelling as a location with regard to any technological ‘dialogues’ between West and East. Textile products were undoubtedly an important

¹ I thank Mary Harlow and Cécile Michel for inviting me to give a paper at the *Melammu* conference in Beirut. I also thank the *Finnish Institute of the Middle East* and its former director Raija Mattila and administrative assistant Manal Chatila for the excellent organisation of the conference. The study of the textile material in Cyprus was initiated during my Marie Curie Fellowship at the Centre for Textile Research at the university of Copenhagen (FP7 PIEF-GA-2011-298974 DIASPORA) with the project *West and East –textile technologies and identities in South Italy and Cyprus in the 1st millennium BC*.

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commodity for commerce and gift-exchange.² Coroplastic art attests to the flourishing textile production present on the island in the 2nd and 1st millennium BCE.³

Textiles require optimal microclimatic conditions to ensure their preservation. Consequently, they are relatively rare in archaeological contexts. They often survive as mineralised casts where the organic textile material has, in contact with the underlying support, created a chemical reaction in a substitution process which in turn generates a so-called pseudomorph.⁴ These pseudomorphs, often intermixed with intact fibers,⁵ can provide information on the spinning and weaving technology behind any given piece. Ancient textiles have also been preserved through impressions on pottery,⁶ soil,⁷ or as sealing impressions.⁸

Through the study of replicas of textile tools recovered in archaeological finds, experimental archaeology has perfected our knowledge of ancient textile manufacture. Based on the study of technical parameters such as weight and thickness/diameter of loom weights and spindle whorls respectively, it is possible to estimate within a range what type of cloth the tools from any given archaeological site were able to produce.⁹

Select Archaeological Textiles in Cyprus

Korovia-Palaeoskoutella

A textile sample (Fig. 1) discovered by the Swedish Cyprus Expedition in 1929,¹⁰ at the site of *Korovia-Palaeoskoutella* in the Karpas region,

² Only traces of disintegrated textile finds were made on the Bronze Age Ulu Burun ship (14th century BCE) (Ingram, 2006; Pulak, 2012) but finds of glass ingots possibly intended for the production of glass beads, perhaps for use in textile decoration, would underpin a developed craft.

³ Karageorghis, 1998.

⁴ Chen et al. 1998; Sibley 1982.

⁵ Good, 2001: 215.

⁶ Doumani / Frachetti, 2012.

⁷ Unruh 2008..

⁸ Oates, 2001: 298.

⁹ Mårtensson et al. 2005–2006; Andersson Strand / Frei / Gleba / Mannering / Nosch / Skal, 2010; Andersson Strand, 2012: 208; Andersson Strand et al. 2015; http://ctr.hum.ku.dk/tools/toolsreports/General__introduction.pdf [20/06/2017]; Andersson Strand, 2015.

¹⁰ Åström, 1972: 10. The fragments are part of the Cypriote Collections in the *Medelhavsmuseet* in Stockholm

consists of two small fragments probably from the same textile and possibly originally used to wrap an object or bones deposited in the burial.¹¹ The mineralised cloth is a balanced tabby, meaning that the vertical warp threads interconnect with the horizontal weft threads at right angles and at equal single intervals in both thread systems. The smaller of the two textile fragments measures 2.3 x 1.5 cm with a 1.1 cm thickness, and the larger piece measures 2.7 x 2.6 cm with a 0.7 cm thickness. Thread diameter varies between 0.36 mm and 0.57 mm. In the larger fragment some thicker threads are visible and may refer to an in-weave to create a decorative element, but may also refer to a darn.¹² Thread can be spun in a clockwise or a counter-clockwise direction; this is conventionally designated in the terms s and z- spun thread respectively. The letters refer to the middle twist angle of the letters S and Z. The thread in our sample is, as established by Geijer in 1965, s-spun, both in the warp and the weft.¹³ No selvedge is preserved. The thread count is roughly 10×10 per cm. Fibre testing points to the bast family, either flax or hemp.¹⁴ A reddish substance initially thought to be remains of a dye substance is due to contamination from the iron-rich soil, as the technical analysis revealed no traces of dye.¹⁵

Vounous-Bellapais

In 1931–1932 during the Cyprus Museum excavations of the necropolis at Vounous-Bellapais under the direction of Porfyrios Dikaïos, a spearhead (T 26. 79) was discovered on the northern coast of the island with cloth attached, which is now exhibited in the Cyprus Museum in Nicosia (Fig. 2).¹⁶ The spearhead measures 53 cm by 5 cm with a rivet thickness

¹¹ For the concept of wrapping in archaeological contexts see Harris / Douny, 2014.

¹² Landenius Enegren / Vanden Berghe, 2016.

¹³ Åström / Geijer, 1964.

¹⁴ Landenius Enegren / Vanden Berghe 2016: 187–194; Landenius Enegren / Vanden Berghe 2020: 451; Landenius Enegren, 2018: 30.

¹⁵ Landenius Enegren / Vanden Berghe 2016: 187–194, with thanks to Ella Young for providing us with information on the Karpas region.

¹⁶ Dikaïos, 1940: 54–57: “...dagger-blade with mid-riff tang – cloth adhere to it...”. Pieridou, 1967: 25. Possible pieces of the same textile are stored at the Victoria and Albert Museum in London. I thank Hero Granger-Taylor and Margarita Gleba for pointing this out.

of 1.2 cm. The spearhead, of a common type, dates to the Early Cypriote IIIB-Middle Cypriote I period (2100–1850 BCE).

The spearhead was most likely wrapped in the cloth and was thus deposited in the grave. The partially mineralised textile is well preserved. On the upper part of the spearhead the cloth has not entirely fused with the underlying support. The textile measures on one side roughly 17.9 cm in length and 2.4 cm in width, and on the opposite side 3.6 cm in length and 1.7 cm in width. The weave is, as seen in the Palaeoskoutella sample, a balanced tabby. The selvedge is preserved on a small part of it. Here the thread has a thread count of 9 warp threads and 12 weft threads. The thread diameter measures between 0.71 mm to 1.31 mm. The thread is spliced,¹⁷ s-twisted and in parts S-plied. The single threads have little twist. Splicing, commonly found on Egyptian textiles from the Middle Kingdom, can sometimes be very challenging to detect. The practice involves two or more lengths of fibre being joined together in such a way that their ends overlap in order to form one continuous string.¹⁸ These can subsequently be spun using a spindle.¹⁹ Splicing is most probably present on all the textile specimens discussed in the present article. Fibre analysis of the Vounous textile suggests flax or hemp.²⁰

Lapithos

Sir John Myres' excavations in 1913, at the site of Lapithos on the northern coast of Cyprus, yielded a knife and a pin with visible pseudomorphs.²¹

¹⁷ I thank Margarita Gleba for calling my attention to the probable splicing of the thread. As mentioned, splicing is difficult to detect but, in view of other Bronze Age textiles from Near Eastern contexts (Gleba / Griffiths, 2011-2012) which recall a similar structure, we can infer that the thread is spliced and in parts S-plied. The variation in thread diameter also suggests splicing (personal comm. M. Gleba 28.9.2017); see also Landenius Enegren, 2018: 31; Landenius Enegren / Vanden Berghe, 2020: 453.

¹⁸ Granger-Taylor, 1998: 102.

¹⁹ Barber, 1991: 48, with further references and Bellinger, 1959.

²⁰ The testing was performed at the *Royal Institute for Cultural Heritage* in Brussels, Belgium (KIK-IRPA) by Ina Vanden Berghe and Anne Coudray in October 2017 (Vanden Berghe / Coudray 2018). See Nosch 2014 and Zohary 2012 for general information on flax.

²¹ The pseudomorphs were noticed by Jennifer Webb, La Trobe University, Australia. See the publication on metal finds from Lapithos (Webb, 2020). I wish to thank her for kindly asking me to study these textile remains. I also thank the Dept. of Antiquities for their kind permission. See also Landenius Enegren, 2018; Landenius Enegren / Vanden Berghe, 2020.

The context is funerary and dates to the Middle Bronze Age. The knife (Lapithos Metal 894) from Tomb 16.3 is of a common type and measures 10.6 cm × 3.1 cm (Fig. 3). The mineralised textile remains measure 3.3 cm × 2.1 cm on one face. On the other face the textile is present in two spots. The larger of these measures 3.9 cm × 2.9 cm and the smaller, located at the tip of the knife, 0.8 cm × 0.6 cm. Examination with a digital microscope shows the thread count to be roughly 14 threads per cm in both systems with a thread diameter of c. 0.5 mm. Splices are visible and in parts the thread is also S-plied; the un-plied threads have very little twist.

The second textile sample from Lapithos is a pin (Lapithos Metal 1051) measuring 7.9 cm in length × 0.8 cm in diameter at the widest part (Fig. 4). The actual pseudomorph measures 4.1 cm in length and 1.1 cm, wrapped at the top with a 0.3 cm thickness. The way the cloth wraps around the pin with a visible fold suggests that it once covered the whole pin. Accordingly, it is tempting to posit that the pin was used as a fastening device. Magnification with a digital microscope shows that the cloth is tightly woven, with an average thread diameter of 0.8 mm. Technical analysis of the fibre in both Lapithos samples points to a bast fibre, either hemp or flax.²²

Select Near, Middle Eastern and Aegean comparative textile material-similarities and dissimilarities

The Near And Middle East provides the closest roughly contemporary evidence with which to compare the Cypriot samples.

Tell Abraq

Small pieces of woven fabric dated to the 3rd millennium BCE (2100–2000) were discovered at Tell Abraq, Umm al –Qawain, in the UAE: one piece on a spearhead, the other on a toe ring with the human toe bone still intact.²³ The textile is of a loose plain weave/tabby type with s-spun thread. A small area of the spearhead also disclosed a pseudomorph showing a weft or warp-faced fabric, meaning that one of the thread systems has more threads per cm with respect to the other. The fibre samples taken

²² The testing was performed at the *Royal Institute for Cultural Heritage* in Brussels, Belgium (KIK-IRPA) by Ina Vanden Berghe and A. Coudray in October 2017 (Vanden Berghe / Coudray 2018).

²³ Reade/ Potts, 1993: 99.

from the weave on both objects initially revealed a bast fibre, either jute or linen, which further tests disclosed to be linen.²⁴ This in turn would underpin an interpretation of a warp-faced fabric as linen seems to have been more often warp-faced as opposed to wool.²⁵

Tell Brak

A tabby weave was found on a third millennium BCE dagger blade (2400–2150 BCE) in a ritual deposit at Tell Brak in modern day Syria. The traces of mineralized cloth attached revealed a fine s-spun thread with 10 x 13 threads per 0.5 cm.²⁶ No information on fibre analysis is given.

Sidon

More than thirty small fragments likely belonging to the same mineralized textile were found in a female Middle Bronze Age burial at Sidon, 30 km south of Beirut.²⁷ Analysis of the fragments disclosed that the weave, a balanced tabby, has a thread count of 20 x 18 threads per cm. The yarn is S-plyed and measures 0.35–0.45 mm in diameter. Splices are visible.²⁸ No actual fibres were preserved due to high mineralisation, but the presence of splices in the fabric and the diameter of the spliced thread lead the authors to suggest flax, linen.²⁹

Terqa

A double jar burial of the Khana period (18th to 15th centuries BCE) at Terqa in modern-day Syria held the wrapped bones of a child in a well-preserved cloth.³⁰ To my knowledge, no specific fibre analysis has been undertaken. However, the image provided in the excavation publication shows what

²⁴ Reade/ Potts, 1993: 99.

²⁵ I thank Margarita Gleba for sharing her expertise and calling my attention to possible differences in fibre choice with regard to weft and warp-faced fabric. See also Gleba 2017: 1215.

²⁶ Oates et. al 2001: 234, 299, Fig. 323.

²⁷ Gleba / Griffiths, 2011–2012.

²⁸ Gleba / Griffiths, 2011–2012: 291.

²⁹ Gleba / Griffiths, 2011–2012: 291.

³⁰ Barber 1991, 68.

seems to be a weft-faced tabby with s-spun thread,³¹ which may indicate wool since linen, as mentioned, was more frequently warp-faced.

Tappeh Hesar

Small fragments of both s-spun and z-spun single thread “...coarse red-brown textile...” were found in a burial at Tappeh Hesar in north-eastern Iran in a 3rd millennium context.³² The fibre is not determined but is presumed by the authors to be wool. The use of the two spin directions S and Z was most likely applied for spin patterning purposes. The weave shows 8–10 threads per cm² in both thread systems. A smaller coloured part revealed a higher quality denser thread count³³

Thera

An example of Bronze Age (17th century BCE) carbonised textile remains, most likely pertaining to the same piece of cloth, were found in a pit at the site of Akrotiri on Thera and show a balanced tabby weave with 20–22 S-ply threads per cm in both directions. The fibre has been determined to be flax. The thread diameter variation amounts to 0.25–0.4mm. Magnification revealed an elaborately worked fabric with decorative elements such as embroidery and fringe work.³⁴

Mycenae

Another Greek Bronze Age textile find is on a spearhead at Mycenae from Tomb N of Circle B (16th century BCE). The textile in linen is a tabby weave with plyed S2z warp and weft threads with a count of 20/22 threads per cm, with a mean thread diameter of 0.3mm.³⁵ Both of these two Aegean textile remnants show a densely worked fabric with 20–22 threads per cm, one of which is also elaborately fashioned compared to the mean count of 9–14 threads per cm in the Cypriote textile samples, all of which are, moreover, in plain-weave.

³¹ Buccellati / Kelly-Buccellati, 1978: 14, Pl. VII.

³² Ellis, 1989: 287–289.

³³ Ellis, 1989: 287–289; Völling 2008: 203.

³⁴ Spantidaki / Moulherat, 2012: 187–188; Smith / Tzachili, 2012: 142, Fig. 9.1–9.3.

³⁵ Spantidaki / Moulherat, 2012: 192.

Textile Tools and Experimental Archaeology

Experimental archaeology has furthered our knowledge and interpretation of the technical aspects of ancient textiles. The testing applied to replicas of textile tools recovered in archaeological contexts, now known as the CTR method, was developed by archaeologists and craftspeople at the Centre for Textile Research (CTR) at the University of Copenhagen in collaboration with the Centre for Historical-Archaeological Research and Communication (CHARC) in Lejre, Denmark.³⁶ With regard to the technical analysis of spindle whorls, for instance, two parameters—weight and diameter of a whorl—influence the properties of the manufactured thread; the lighter the spindle whorl, the thinner the thread. Moreover, twist angle will influence the diameter of the thread.³⁷

In the same burial as the textile fragments discussed above in Tumulus 7 at *Korovia*–Palaeoskoutella, a few spindle whorls of fired clay were also found. These range in weight from 9 to 30 grams. Five are spherical and two are biconical in shape. From the technical parameters we can infer that the spindle whorls could have been used to produce thread within the diameter range present in the textile samples with which they were found. This fact lends itself to the suggestion that these same whorls might have been used in the production of the fabric, although, of course, this cannot be ascertained!³⁸

Kition-Bamboula

The French Excavations at the site of *Kition-Bamboula*, on the south coast of Cyprus, recovered loom weights in situ stored in an amphora in the context of a sanctuary of the archaic period. The loom weights are of unfired clay and weigh between 200 and 500 grams (Fig 5).³⁹ The donut/torus form suggests to some that these implements were perhaps fishnet sinkers.⁴⁰ However, this would seemingly only apply to those of fired clay,

³⁶ Mårtensson et al 2005–2006.

³⁷ Andersson Strand, 2012; Mårtensson et al. 2006.

³⁸ Landenius Enegren, 2018. I thank expert handspinner Kim Caulfield for her kind help in discussing distaffs, the intricacies of spinning technique and how the physical properties of spindle whorls influence the final thread product.

³⁹ Caubet, 2015: 261–262; 271–272.

⁴⁰ Chavane, 1975: 76; 113.

since for practical reasons any unfired material would quickly disintegrate in prolonged contact with water.

Applying the CTR method, a potential loom set-up with one of the donut/torus-shaped loom weights weighing 469g and with a 61mm thickness demonstrates that the loom weight would have been suitable for the manufacture of a textile with a thread requiring 40g tension, resulting in a thread diameter of 1 mm with a warp count of 3.6 threads per cm. Keeping in mind the optimal number of threads attached per loom weight (10–30), these would consequently produce a rather coarse textile.

In comparison, excavations at the Late Bronze Age–early Iron Age site of Episkopi-*Bamboula*—once an important trading centre also located in the south of the island not far from present-day Limassol⁴¹—have revealed the dominant loom weight shape to be the truncated pyramidal and the ‘sausage’ shape. The semi-discoid type with two holes also occurs. Some truncated pyramidal weights bear decoration on the top face (Fig 6). Their weight ranges from between 69–336 g based on a sample of 29 loom weights studied to date. This weight range would allow for the manufacture of a broad range of textile qualities.

At the ancient inland site of Idalion, reworked ceramic sherds have been found (Fig. 7). It is likely that these were used in textile manufacture.⁴² Simple truncated pyramidal loom weights also occur. The median weight for the total loom weights studied is 37g, which points to their use in the production of fine quality textile.

Spinning-Direction and Cultural Connotation

Thread can be spun with a spindle either clock-wise or anti clock-wise, in which the spin direction, as mentioned above, is conventionally designated as S or Z-spun. The placing of the spindle whorl on the spindle, which gives momentum to the spin, influences the spinning direction which, in turn, is culturally determined.⁴³ A low-whorl placement gives a z-spun thread and a high whorl an s-spun. However, in the later Hallstatt culture

⁴¹ <https://classics.uc.edu/index.php/research/bamboula>

⁴² Alberti et al 2012. For a discussion of the proposed uses of these implements including as spindle whorls, see Rahmstorf, 2008: 37–52. See also Laurito, 2013: 230–231. For the site of Idalion see Gaber, 2008 with further references.

⁴³ Barber, 1991: 65–66.

both s and z-spun thread was spun,⁴⁴ using a low-whorl spindle,⁴⁵ to create spin-patterns. In Egypt and the Near East high-whorl s-spun thread was the norm, whereas the Aegean world and Europe preferred low-whorl spinning, thus yielding z-spun thread. In Anatolia z-spun seems to have been the norm.⁴⁶ In the Bronze Age textiles from Cyprus the thread is s-spun which would rather point to an affinity with Egyptian and Near Eastern spinning traditions. However, to complicate matters, flax/linen has a natural tendency to 's-twist' in both dry and wet spinning tests.⁴⁷

Where do we place Cyprus with regard to spinning culture? Tradition is based on techniques handed down through generations. In modern-day Cyprus spinning has customarily been high-whorl. In ancient times the evidence is not clear-cut. By looking at the attrition marks on Cypriote spindle whorls, Lindy Crewe points us to a low-whorl spinning culture.⁴⁸ Use-wear detected on spindle whorls from the Late Early Bronze and Middle Bronze Age from *Marki Alonia* also suggests that the whorl was placed low on the spindle.⁴⁹ Jennifer Webb further reached this conclusion from her examination of a metal spindle with the ceramic whorl and a piece of organic fibre still attached to it, now in the Zintilis collection at the Cycladic Museum in Athens.⁵⁰ The truncated biconical whorl, here placed almost midway on the spindle, became popular in the Early Cypriote Bronze Age (c. 2100).⁵¹ However, if the Zintilis spindle functioned as a distaff, where the biconical truncated whorl would offer perfectly balanced support for the fingers and the hand, this fact would impact the discussion of low-whorl versus high-whorl spinning culture in Bronze Age Cyprus.⁵² Caroline Sauvage highlights some examples of Late Bronze Age Cypriote whorls that show "...notches on their domes, pointing

⁴⁴ Grömer, 2016: 171.

⁴⁵ Personal communication Margareta Gleba (4.9.2017)

⁴⁶ Barber, 1991: 65.

⁴⁷ Greiner, 2015: 36; Batigne / Bellinger, 1953: 671; Crowfoot, 1931.

⁴⁸ Crewe, 1998: 59.

⁴⁹ Frankel / Webb, 2006: 171.

⁵⁰ Webb, 2002: 365.

⁵¹ Webb, 2002: 365 with ref. to Crewe, 1998.

⁵² I thank Kim Caulfield for sharing her knowledge and informative assessments of spindles and distaffs (personal communication 26.02.2016). She leans toward the interpretation, as proposed by Jennifer Webb, that the Zintilis implement is a spindle. Physical examination by an expert spinner would perhaps throw more light on the optimal use for this implement, distaff or spindle.

towards the use of high-whorl spindles”.⁵³ Moreover, she discusses some models of terracotta spindles found at Vounous suggesting that perhaps both low-whorl and high-whorl spinning techniques were present, one for plying the yarn and the other for spinning.⁵⁴ The evidence at present remains inconclusive. A study of toolkits found in Early and Middle Bronze Age contexts, however, may support Anatolian influence pointing to a low-whorl spinning technology.⁵⁵ A bone spindle from Amathus in the Medelhavsmuseet in Stockholm with a biconical whorl attached (Fig. 8), unfortunately broken at both ends, does not thus provide information on the exact placing on the spindle, high or low.⁵⁶ It can be noted that in all of the Cypriote Bronze age textiles I have examined spin direction is s, pointing towards a high-whorl spinning tradition, albeit keeping in mind the caveats discussed above.

As a final consideration I would like to highlight the ‘archaeology of identities’ with loom weights as a point of reflection. Through these implements—although ubiquitous in archaeological contexts and although the general shapes recur through centuries—a certain site identity can, in my view, be gleaned. For every archaeological site studied the loom weights reveal an individual character, in part due to differences in clay composition, size, and sometimes shape. Nonetheless, when we have, for example, the same truncated pyramidal shape its expressions differ from site to site. It is when working with these tools that you sense their biography, to use Janet Hoskins’ approach, in which material objects possess an agency and this intangible but nevertheless strongly present agency also continues with the researcher. These textile tools are in their own identity sphere of sorts, where technological knowledge has been transmitted for generations and in which tacit and embodied knowledge play a big part. In a phenomenological sense this continues with the researcher’s hands. Swedish ethnologist Jonas Frykman uses phenomenological perspectives in his “quest to explore the cultural domains that have to do with experience, knowledge and feeling”.⁵⁷ As Frykman and Gilje express so well: “The scholar is thus no longer an objective observer that stands at the side of his or her object of study, instead he or she is participant and

⁵³ Sauvage, 2014: 221.

⁵⁴ Sauvage, 2014: 220–221.

⁵⁵ Smith and Tzachili, 2012: 148; Webb, 1996

⁵⁶ The spindle with whorl is in course of study by the present author.

⁵⁷ Frykman, 2012: 19 (translation by the present author).

should as such use imagination and intuition allowing themselves to be inspired and implicated by the specific situation”.⁵⁸

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⁵⁸ Frykman / Gilje, 2003.

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Abbreviations

EJA = European Journal of Archaeology

OJA = Oxford Journal of Archaeology

PAPS = Proceedings of the American Philosophical Society

SIMA = Studies in Mediterranean Archaeology



Fig. 1. Textile remains from Korovia-*Palaeoskoutella*. Photo. H. Landenius Enegren with kind permission from the Medelhavsmuseet, Stockholm.



Fig. 2. Textile remains on a spearhead from Vounous. Photo H. Landenius Enegren with kind permission from the Dept. of Antiquities of Cyprus.



Fig. 3. Textile remains on a knife from Lapithos. Photo H. Landenius Enegren with kind permission from the Dept. of Antiquities of Cyprus.



Fig. 4. Textile remains on a pin from Lapithos. Photo H. Landenius Enegren with kind permission from the Dept. of Antiquities of Cyprus.



Fig. 5. Torus-shaped loom weight from Kition-*Bamboula*. Photo H. Landenius Enegren with kind permission from the French Archaeological Mission at Kition-*Bamboula*.



Fig. 6. Loom weight of the semi-discoid type from Episkopi-*Bamboula*. Photo H. Landenius Enegren with kind permission from the University of Cincinnati Excavations at Episkopi-*Bamboula*.



Fig. 7. Re-worked sherd from Idalion. Photo H. Landenius Enegren with kind permission from the Lycoming College Expedition to Idalion.



Fig. 8. Spindle with spindle whorl from Amathus. Photo H. Landenius Enegren with kind permission from the Medelhavsmuseet, Stockholm.