‘Atiqot 112, 2023

Trash or Cache? The Textile Evidence from the Naḥal ‘Omer Middens as an Indicator of Early Islamic-Period Trade Networks along Israel’s Silk Road

Orit Shamir, Berit Hildebrandt, Roy Galili, Nofar Shamir and Guy Bar-Oz[1]

Middens provide an important source of data for exploring the history of ancient settlements. Excavations at the middens of Naḥal ‘Omer, an Early Islamic way-station in the ‘Arava desert, yielded a treasure-trove of textiles, such as silk and cotton, including ikats probably imported from India or South Arabia. The Early Islamic period witnessed a flourishing of artistic and cultural achievements, with textiles playing a central role in expressing creativity. The Silk Road, Mediterranean trade routes and connections with India and Central Asia facilitated the movement of textiles and inspired cross-cultural influences. This period probably witnessed a “textile revolution” that was characterized by the increase in cotton and silk cultivation. In this paper, we discuss how the treasures from the middens shed light on the production and trade of textiles along trade routes between east and west through three important textile groups: ikat, silk and zilu.

Keywords: Naḥal ‘Omer; middens; silk; cotton; ikat; zilu; connectivity; Early Islamic period; Bioarcheology; Textile analyses

Introduction

Following a lecture on the site of Naḥal ‘Omer, Hugh Kennedy, Professor of Arabic at the University of London, wrote (Shamir 2022a):

> If you have never heard of Naḥal ‘Omer you need not be dismayed by your ignorance. One thing does distinguish Naḥal ‘Omer from many hundreds of villages in the Fertile Crescent in that it offers a very good environment for the preservation of organic remains including

[1] Dr. Orit Shamir, Israel Antiquities Authority; Dr. habil. Berit Hildebrandt, Department for Prehistory and Early History, University of Göttingen; Dr. Roy Galili, Department of Archaeology, Ben-Gurion University of the Negev, Be’er Sheva‘; Nofar Shamir, School of Archaeology and Maritime Cultures, University of Haifa; Prof. Guy Bar-Oz, School of Archaeology and Maritime Cultures, University of Haifa.

textiles. So here in this small out-of-the-way village we have evidence that the inhabitants in the Early Islamic period possessed a wide range of woven and dyed textiles including local manufacture but also, in all probability, imports from India or south Arabia. Naḥal ‘Omer, in fact, presents evidence of the penetration of the market economy way beyond the confines of metropolitan and elite life.

Indeed, the silk textiles, and cotton and silk ikats, found at the site are excellent indications of textile trade (Shamir 2022a; for a discussion of silk trade in antiquity, see Hildebrandt 2017; Hansen 2017).

Naḥal ‘Omer is situated at the intersection of the ancient Incense Route from Petra to Gaza and the Mediterranean, and the road from the Red Sea to the Judean Hill Country, Jerusalem and northern Israel (Fig. 1). The Roman-period site of Orḥan-Mor (Arabic:

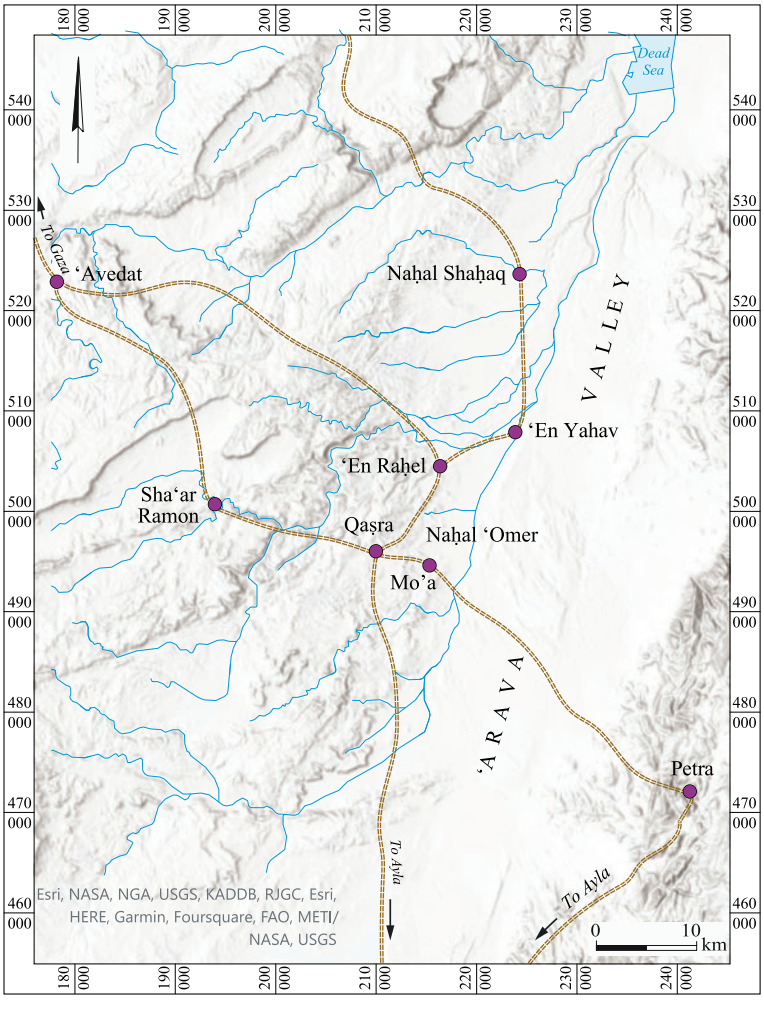

Fig. 1. Location of sites along the Incense Route (after Baginski and Shamir 1995:21).

Moyat-‘Awad) is located nearby, yet the route witnessed a major decline in the first half of the third century CE (Erickson-Gini and Israel 2013; Bar-Oz et al. 2022; Hildebrandt et al. 2023). Settlement processes in the region following the Arab conquest of 634–638 CE, which included the establishment of the main pilgrimage route between Egypt and central Arabia, and the foundation of Early Islamic Ayla, influenced local economies and opened new opportunities in southern Palestine (Whitcomb 1995; Avni 2014; Bar-Oz et al., forthcoming). A side effect of this process was the establishment of a new network of villages and farms along the ‘Arava Valley (Porat 2016; Avni 2018). The direct connections between Iran, Iraq, the Jazira and the Southern Levant were now promoted, as they were brought together under one political and religious entity—the Abbasid caliphate (Bar-Oz et al., forthcoming).

One such site was Naḥal ‘Omer, a small agricultural village consisting of 16 domestic structures, a mosque and seven middens.[2] Subsequent surveys in Naḥal ‘Omer’s vicinity have documented agricultural plots and a cemetery (Ben-Michael, Israel and Nahlieli 2017). The site, dated to the Early Islamic period (seventh–ninth centuries CE),[3] is preserved intact and contains dense concentrations of cultural and agricultural activities (Ben-Michael, Israel and Nahlieli 2017; see Carmi and Segal 1995).

The Naḥal ‘Omer Middens

The treasure-trove of the Naḥal ‘Omer textile finds somewhat stands in contrast with the extant settlement structures. The excellently preserved organic materials, the majority of which were found in middens near the settlement’s houses (Fig. 2), are an indication of the important source of data that middens can be for exploring everyday history of ancient settlements, acting as sort of a ‘social archive’ (e.g., Bar-Oz et al. 2007; 2019; 2022; Tal, Taxel and Jackson-Tal 2013; Tepper et al. 2018).

In the dry environment of the ‘Arava, the middens of Naḥal ‘Omer survived in an incredibly well-preserved state near the dwellings of the village, providing an ideal context for investigating the subsistence economy and trade activities at this site by means of innovative approaches of the archaeology of garbage. According to this approach, the depositional record of middens is an advantage, as the accumulation of material was

[2] Analysis of the textiles and other artifacts from the excavations at Naḥal ‘Omer has been undertaken since April 2022 and will continue throughout 2025 in the course of the project “Revealing the Israeli Silk Road: Exploring Networks of Trade and Exchange between East and West through Textile Finds from Naḥal ‘Omer, with a Focus on Silk and Cotton,” which operates on behalf of, and is financially supported by a research collaboration program between Lower Saxony/Germany and Israel by the State of Lower Saxony through the “Niedersächsisches Vorab.” Cleaning of a selection of textiles from the 2022 campaign and previous excavations was undertaken by Raisa Vinitsky, Ilan Naor and Olga Negnevitsky. We thank Naama Sukenik and an anonymous reviewer for their valuable comments.

[3] The dating of the settlement is supported by the radiocarbon dating of organic finds, analyzed in the Poznań Radiocarbon Laboratory (cf. Job No. 16657/20).

Fig. 2. *In situ* textile on the surface of the middens (photography: N. Shamir).

continuous, condensed and coherent over time (Rathje and Murphy 1992; Bar-Oz et al. 2019). The middens of Naḥal ‘Omer are characterized by an exceptionally high density of finds. Our research has therefore focused on them to obtain data on the organization of the site both on a local and regional level (Bar-Oz et al. 2022). Excavations in 1991, and more recently in 2020 and 2022, yielded an exceptionally diverse assemblage of organic remains. The early excavations yielded a great number of cotton textiles, along with linen, wool and goat-hair fabrics, and even some samples of silk (Baginski and Shamir 1995). More than 300 textile fragments of various sizes and shapes have been catalogued thus far (Table 1). During the 2022 campaign, half of a large waste dump, and a smaller portion of a second one, were excavated (Fig. 3). The finds consisted of c. 3900 textile fragments (Fig. 4). In addition, basketry and cordage, date-palm seeds, a scapula bearing an Arabic inscription, a bone game piece, animal bones, a wooden comb, leather objects, human and animal hair, bird feathers, several wood artifacts and some pieces of leather, including footwear, parchment and animal skins were found. Other important finds include about 20 small fragments of papyri with Arabic writing, further supporting the interpretation of these middens as ‘social archives’ (Bar-Oz et al. 2022; Bar-Oz et al., forthcoming; Hildebrandt et al. 2023).

The Naḥal ‘Omer textile finds are so far exceptional, compared to other Early Islamic sites, as they were found in middens, as opposed to other contemporaneous textile finds that come mainly from dwellings (see below). The variety of textile fragments also sheds

Table 1. Number of Textiles from Naḥal ‘Omer, according to Excavation Season[i]

Season	Linen	Wool	Goat hair	Cotton	Silk	Wool and Cotton	Total
1981, 1991	31	60	3	153	3	1	251
2020	12	18	2	45	2	1	80
Total	43	78	5	198	5	2	331

[i] Textile identification is primarily based on analyses aided by thread counter and dinolite microscope.

Fig. 3. Excavation section, Naḥal ‘Omer (photography: N. Shamir).

Fig. 4. Thousands of textiles unearthed in the 2022 excavation (photography: N. Shamir).

light on the household refuse that seems to have been mixed with the remains of long-distance trade (Bar-Oz et al., forthcoming). The finds from the Naḥal ‘Omer middens show that the inhabitants in the Early Islamic period possessed a wide range of woven and dyed textiles, partly locally manufactured in the Land of Israel/Palestine, but in all probability, also partly imported. We believe that some of the textile types discarded in the Naḥal ‘Omer middens reflect transregional and complex transportation networks, connecting between diverse economic agents and cultures in the late Byzantine–Early Islamic-period transition. In particular, ikat cottons, silks, zilu textiles and cotton fragments with supplementary weft can probably be identified as imported fabrics based on their material, decoration or production techniques. While in the previous excavation seasons only scarce examples were discovered, the 2022 season yielded many more textiles of these types, as well as fabrics produced through weaving techniques, such as twill cottons, previously unknown at Naḥal ‘Omer. Due to their uniqueness in this region, and in light of parallels from other regions along the Silk Road, such as India and south Arabia, all or most of these textiles may have been imported. The ikat cottons are currently the only examples of this sort, and the earliest to be discovered in Israel.

Other finds in the middens indicate that the inhabitants of Naḥal ‘Omer practiced farming to some degree and cultivated date palms. The botanical remains reveal the main components of the travelers’ and inhabitants’ diets. For example, a considerable amount of highly varied date kernels attests to the role of dates as Incense Road staples. The extraordinary amount of date kernels is supplemented by products made from date palms, including wooden posts for construction, mats, cords, ropes and baskets. These highlight the importance of date cultivation in the lives of the site’s residents, similar to the Arabian Peninsula. In contrast to the large number of organic finds, only a few pottery sherds of jars and cooking ware and glassware were discovered.[4]

In contrast to these commodities, which attest to everyday activities and were probably made of local materials, the textile assemblages illuminate various aspects of the organization of desert trade, reflecting on the subsistence and caravan-based trade economy known from other findspots. While written sources often mirror the desires of urban elites for exotic and expensive goods (e.g., for silk, see Hildebrandt 2017; 2021; 2022), Naḥal ‘Omer’s middens attest to the use of imported fabrics in everyday life in a rural village in the Negev. Moreover, these middens reflect the decisions made by the ancient inhabitants when they disposed of their trash.

Preliminary observations indicate that the Naḥal ‘Omer middens almost exclusively represent organic waste. It appears that the disposal of trash was governed by rules that shed light on the behavioral traits of those using the middens. This is based on the hypothesis that human patterns of trash disposal are a valuable tool in the study of the functioning of

[4] The pottery was examined by Tali Erikson-Gini and dated to the Early and Late Umayyad period, i.e., mid-seventh–late eighth centuries CE.

the village. From this perspective, the artifacts found in a refuse dump, and the way they are treated, reflect strategies of daily conduct, waste management and consumption, as well as particular activities, values, and social and economic behavior. Moreover, artifacts found in dumps often reflect the wealth, social status and occupation of their original owners (Hoffman 1974). In addition to the fragments of precious textiles, a gold ornament found its way to the middens: a truncated pyramid with four rings attached to its base from which precious gems would have dangled (Lester 2017). While it is probable that this gold find was not discarded intentionally in the trash mounds (e.g., instead of being melted down and reused), it shows that the inhabitants of Naḥal ʻOmer had access to expensive luxury items.

The Naḥal ʻOmer middens seem to reflect a cohesive strategy for waste and consumables management based on the organizational structure of the village's households, and an efficient, economical use of products and raw materials. Garbage collection was important to maintain hygiene standards in a settlement, which probably also served and hosted merchant caravans, to judge from the costly and presumably imported textiles. The location of the mosque in a prominent place in the center of the village, yet slightly distant from the rest of the houses, indicates that it probably also served travelers (Ben-Michael, Israel and Nahlieli 2017).

The Textiles

As noted above, some 3900 textiles were discovered in the 2022 excavation season. They were preliminarily sorted according to their weaving structures and colors: simple undyed, dyed and complex textiles. The textiles found so far are made of wool (Fig. 5), cotton (Fig. 6), linen (Fig. 7), silk (Fig. 8), goat hair (Fig. 9) and mixed wool and cotton (zilu). All the finds are fragmentary, mostly cut or torn, and show traces of multiple use prior to being discarded.

The first stage in the deterioration of a garment was its wearing and washing. The most common method of washing textiles is by using water and detergent (soap). Every time a textile is washed, it suffers a degree of loss, with broken or loose fibers rinsed away. The beating of textiles is particularly damaging, causing fibers to break.[5] Subsequent to its initial use, a textile may be reused in the same manner (conventional reuse) or for a different purpose;[6] alternatively, it may be recycled as raw material and used for the manufacture of new products.[7]

Much information can be inferred from the textiles concerning the social milieu in which they were reused, as well as the factors that led to their reuse and recycling (Morgan 2017:89).

---

[5] See http://www.vam.ac.uk/content/articles/c/cleaning-textiles (accessed August 8, 2023).

[6] See https://en.wikipedia.org/wiki/Upcycling for reuse, and https://en.wikipedia.org/wiki/Repurposing for repurposing (accessed August 13, 2023).

[7] See https://www.collinsdictionary.com/dictionary/english/reuse (accessed July 5, 2023).

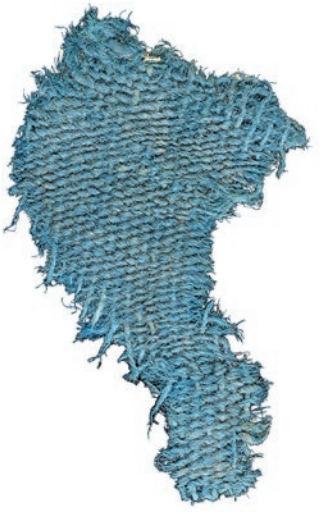

Fig. 5. Wool textile (photography: D.Gazit).

Fig. 7. Linen textile (photography: O. Negnevitsky).

Fig. 6. Cotton textile (photography: D. Gazit).

Fig. 8. Silk textile (photography: D. Gazit).

Fig. 9. Goat hair textile (photography: D. Gazit).

Due to the time-consuming and costly *châine opératoire* of their production, textiles were too valuable to just throw away when damaged or soiled. Even when a garment had reached the state where patching and mending were no longer possible, it was cut into pieces that were used as patches, repurposed or remade into another garment (Mannering 2000:15).

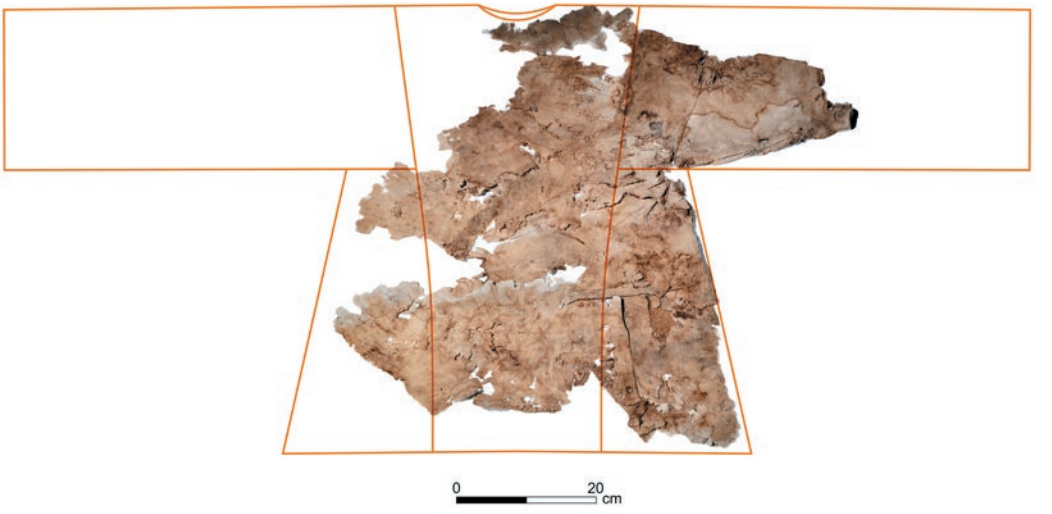

Fig. 10. Cut-to-shape tunic (photography: C. Amit).

The majority of the textile fragments from the Naḥal ‘Omer middens probably originated in garments: they are delicate (according to the number of woven threads per cm) and often colorful. In contrast, thick and coarse textiles were often chosen for heavy-duty uses, e.g., as floor coverings. The original use of textiles as garments is particularly clear in the case of linen fragments with stains and burn marks unearthed in previous excavations, which were once part of a cut-to-shape linen tunic (Fig. 10). Tunic fragments from the 2022 excavations can be attributed to a cut-to-shape tunic, representing a transition from the ‘woven-to-shape’ tunics of the Roman and Byzantine periods (Shamir 2017) to the ‘cut-to-shape’ tunics of the Early Islamic period and later (Shamir and Baginski 2017). Twenty-five cut-to-shape tunics are known from the eighth–ninth centuries CE at Qaṣr el-Yahud, situated along the Jordan River, near the Monastery of Saint John the Baptist. If these tunics had sleeves, they were made from separate pieces (Shamir 2015). Another cut-to-shape cotton tunic was found at Chehrābād, in a salt mine in northern Iran, and dated to the fourth–sixth centuries CE. Gussets were added on both sides of the tunic, making it wider around the knees (Grömer and Aali 2020; Livingstone 2023:99).

Ikat Textiles (Fig. 11)

Among the outstanding finds from Naḥal ‘Omer are cotton textiles with warp-ikat patterns.[8] The 1981 and 1991 excavations at Naḥal ‘Omer yielded eight ikats (Baginski and Shamir 1995); two more were found in the 2020 campaign. The 2022 excavations yielded more than 200 ikat fragments, some larger than those from the previous excavations. The warp ikat threads are colored blue, brown, reddish-brown, red, cream and tan, in different

[8] The term warp refers to the thread which runs lengthwise on the loom.

Fig. 11. Ikat textiles (photography: O. Negnevitsky).

combinations. They were probably dyed with madder (reddish brown and brown) and indigo (blue). Madder (*Rubia tinctorum*) and indigo could be produced in India or Israel. The patterns consist of 'feathers' and/or lozenges. The original fabrics were cut into pieces and reused, some as decorative patches. Almost all the Naḥal 'Omer ikat threads are Z-spun at 14–28 warp threads per cm and 9–14 weft threads per cm, but there are exceptions in the 2022 excavation season, where the number of threads reaches 44 in the warp and 23 in the weft (Baginski and Shamir 1995; Shamir and Baginski 2014; Shamir 2019).

The word ikat derives from the Malaysian word mengikat, meaning 'to tie,' which refers to the highly complex production process in which the design is created by repeatedly

binding the threads with a resist material and dyeing to only fix the color in the areas left exposed. The weaving of ikat textiles is carefully carried out at the end, after stretching the dyed warp threads on a loom in the correct order. As a result of the inevitable bleeding of the color under the resist material and of the slight movement of threads caused by the strains of the loom, these textiles are patterned with their signature 'blurry' effect. Weavers who need more precise patterning use warp ikats, where they can see the pattern on the loom. The greater the number and the closer the spacing of warp elements in relation to weft, the more the warp will tend to conceal the weft. If the warp elements hide the weft elements completely, the weft will only affect the fabric appearance, with it being warp-faced. As opposed to a simple weave, this intricate technique requires particular expertise in preparing the warp.

In this method, some parts of the warp are tied into a knot, stitched or compressed to make them less accessible to a dye solution of a certain color (tie-dyeing; see Gyul 2022). The precision of the wrapping determines the clarity of the design. After wrapping, the warp threads are dyed. When finished and unwrapped, the areas under the ties retain their original color. The ikat technique continues to be used, for example in India and Uzbekistan, and even inspires modern designers (Shamir and Baginski 2014). Beyond the beautiful visual effect of their patterns, ikat fabrics represent centuries of weaving technology, culture and artistry. A key characteristic of ikat fabrics is the 'blurriness' of the different colors in the finished fabric, creating an effect in which a thread seemingly displays different colors. By weaving a fabric in this technique, unique patterns are created, the design of which the weavers already had to have in mind prior to its dyeing.[9]

The origin of this technique is not known. It is possible that it appeared in different regions and countries independently. However, the early samples of ikats found in different parts of the world enable us to speculate on the contacts made between groups of different people, the migration of ideas and technologies, and the cultural exchanges that occurred between different countries and regions in the past (Gyul 2022). Potential origins and mutual influences are also indicated by the designs of the extant fabrics that consist of abstract and vibrating stripes, creating designs reminiscent of feathers and lozenges. The choice of abstract patterns displayed by both Chinese and early Indian ikats (the latter known from cave paintings of the Vakataka Period, late fifth–sixth centuries CE, and from Ajanta, which depict ikat-decorated garments—see Baginski and Shamir 1995; Shamir and Baginski 2014) was associated with the technology of resist-dyeing, which is not particularly suitable for creating figurative images (such as mythological plots found mainly on ikats from Indonesia—see Gyul 2022).[10] Abstract design was a deliberate choice, especially in the Muslim world, reflecting the aesthetic priorities of Islam, inspired by an inconceivable

[9] See https://www.matterprints.com/journal/making/ikat-fabric/ (accessed May 11, 2023).

[10] See https://thezay.org/ikat-in-the-arab-world/ (accessed May 11, 2023).

God. The fact that the abstract style of ikats was not just decorative, but carried symbolic meaning is evidenced by the Arab conception of textiles as message carriers.

Cotton ikats were discovered in Egypt (Bühler 1972:23), bearing inscriptions with their date (862–864 CE) and origin: the tiraz[11] workshops of San'a, Yemen (Balfour-Paul 1996:126; Bühler 1972; Golombek and Gervers 1977:92, 98, 99). The patterns, material (cotton) and spin direction (Z-spun yarns) of the Naḥal 'Omer fragments resemble the ikats found in Yemen, yet they differ in thickness and thread counts: the Yemenite products are much finer and crowded, with c. 30 warp and 14 weft threads per cm, versus the c. 14–28 warp and 9–14 weft threads in textiles found in Israel (Baginski and Shamir 1995; Shamir and Baginski 2014 and personal observation, Benaki Museum). In addition, the yellowish-brown dye obtained from *wars*—the dye plant *Flemingia Grahamiana*, a dye for which Yemen was famous (Balfour-Paul 1996:20, 126), was not observed in the Naḥal 'Omer textiles. The Arabs were the first to produce tirazes (Gyul 2022; Winnik 2022), which enable the identification of these fabrics as important religious symbols, conveying new religious rules and norms. In the first centuries of Islam, when the new religion sought to sway new followers, textiles acquired a social function and became one of the tools for introducing the new faith. In this context, ikat cotton fabrics were an expression of religious piety (Mackie 2015; Gyul 2022).

The ikats from Naḥal 'Omer are not only rare in this period, but represent one of the earliest archaeologically documented occurrences of this type of textile, together with a similar cotton textile find from the sanctuary of Lot in Jordan (Granger-Taylor 2012). The different spin directions of the cottons found at Naḥal 'Omer are of particular interest, as they are often considered a key factor in the identification of their provenance. S-spun, which is counter-clockwise, is predominant at sites in Israel from the Neolithic until the Medieval period, and particularly, in the Roman period (first–third centuries CE). Z-spun examples (with the yarn spun clockwise) are extremely rare and are interpreted as imports (Shamir 2016c).

S-spun cotton threads are typical of the Upper Nile in Nubia and Egypt's Western Desert (Yvanez 2016a; 2016b; Bouchaud, Yvanez and Wild 2019:16; Kelley 2023:141). Z-spun cotton threads are typical of textiles from India and Yemen (Golombeck and Gervers 1977:83; Mackie 1989:88; Barnes 1996). However, the spin direction is not the sole key to determine provenance (Wild 1997:291). In fact, recent research has questioned this identification method and called for a more thorough consideration of the wider context of textiles (Bouchaud, Yvanez and Wild 2019; Shamir 2019). Despite this, we believe that spinning direction is a meaningful indicator of origin when comparing contemporary spinning direction, but needs to be considered alongside weaving and decorating techniques and the general find contexts, as well as scientific analyses of the stains and dirt that adhere to the fragments.

[11] Ikats with inscriptions on them (Gyul 2022; Winnik 2022).

The discovery of cotton seeds and textiles in Qal‘at al-Bahrain (mid-sixth–late fourth centuries BCE) and in Madâ‘in Sâlih (first–seventh centuries CE) add to our knowledge of the history of cotton in the Middle East in antiquity and show that like India and northeastern Africa, the Arabian Peninsula was a center of cotton cultivation and textile production (Bouchaud, Tengberg and Dal Prà 2011). It is interesting to note that ikat textiles were not found in Egypt and Nubia, with the exception of one warp-ikat stripe from Gebel Adda, Nubia, dated to 300–500 CE. This ikat fragment was made of wild silk, similar to tussah silk, and has a pattern in maroon and yellow. The weft is maroon-colored and its count is 10–12 per cm, while the warp count varies between 34 and 42 per cm, which constitutes a very high density (Adams and Webb 2002). A drawstring bag made from a recycled strip of ikat cotton from Antinoupolis is unlikely to date earlier than the eighth century CE (Pritchard 2014:47).

Silk textiles with warp-ikat were discovered in China, e.g., in the excavations of Dulan (Qinghai), dating to the eighth century CE (Xu 2002:106; Zhao and Wang 2013:377). They are delicate and have a high count of threads per cm (Shamir and Baginski 2014). In China and west Turkestan, as well as in the Middle East (Yemen), only the warp threads were ornamented and dyed. The spread of ikat technology in Asia was linked to trade along the so-called Silk Roads, along which goods and ideas travelled. Through the trade between west and east Asia/China, the military expansion of the Arabs, and the new aesthetic ideals introduced with the new religion of Islam, ikat fabrics reached Mawarannahr in modern-day Uzbekistan, where their production is cultivated to the present day (Gyul 2022; this is also true for India and Iran, see Shamir and Baginski 2014).[12]

Later cotton ikats from the ninth–tenth centuries CE are known from Egypt and the tiraz workshops of San‘a, Yemen (Bier 2014). They are more delicate than the ikats of Naḥal ‘Omer, and some were used as shawls. One example is a Yemen ikat textile from the ninth–tenth century CE exhibited at the Metropolitan Museum. It consists of a plain weave tabby cotton in ikat technique that is flanked by wide borders with another design on both sides. These borders display three perpendicular stripes alternating with a medallion-like shape that are created by brocading with supplementary wefts (Fig. 12). Pieces of cotton with comparable supplementary wefts were also found at Naḥal ‘Omer (Figs. 13, 14).

Silk Textiles

Seventeen silk fragments were found at Naḥal ‘Omer. They are the only silks from this period discovered thus far in Israel. All are Z-spun, with 24–36 weft threads per cm. One silk has a coral-red main weft and yellow brocading weft threads, which create diagonal motifs (Fig. 15); another is red (Fig. 16) and yet another is green (Fig. 8).

[12] For India, see https://alesouk.com/ikat-as-a-modern-trend; for Iran, see https://ifpnews.com/ikat-800-year-old-art-yazd/ (accessed August 5, 2023).

Fig. 12. Yemen ikat textile, nineth–tenth century CE, exhibited at the Metropolitan Museum flanked with plain weave tabby cotton ikat technique decorated with brocading (supplementary wefts), creating patterns made of groups of three perpendicular stripes alternating with a medallion-like form that comprise the design (https://www.metmuseum.org/art/collection/search/443604).

Fig. 13. Naḥal ‘Omer cotton, ikat with supplementary wefts (photography: O. Negnevitsky).

Fig. 14. Naḥal ‘Omer cotton, ikat with supplementary wefts (photography: O. Negnevitsky).

Several Byzantine textiles from Niẓẓana (Nessana; Bellinger 1962; Baginski and Sheffer 2004) and ʻAvedat originated in Egypt (Baginski and Tidhar 1978; Shamir and Baginski 2018; Shamir 2022a; Hübner 2016:55–56). Niẓẓana yielded undyed linen textiles with silk bands in compound weave. The piece from ʻAvedat can be dated to the second half of the sixth or first half of the seventh century CE. Comparisons with findings from Aḫmīm and Antinoë in Egypt make it likely that it was imported. These silks indicate that in the sixth century CE, the local production of silk fabrics was spread over the entire Byzantine Empire (Hübner 2016:53). At the site of Pella in Jordan, which was probably destroyed in the earthquake of 749 CE, eight S-spun silk textiles woven in tabby and twill were found (Eastwood 1992:257–265; Walmsley and Smith 1992:183–185); their origin is unclear (Hübner 2016:58–59). Hübner (2016:61) states that: "Unfortunately neither historians of art nor textile experts have so far been able to define exactly the place of production for each of the findings." The origin of silk may have been Egypt, Syria or Asia Minor (Eastwood 1992:264–265; Shamir and Baginski 2018). Silk from China was usually more delicate, unspun and had a higher count of threads per cm. Examples can be found among the compound weaves of Palmyra, where fiber analyses identified it as cultivated silk (*bombyx silk*). However, the silk was not completely degummed, causing the untwisted warp threads to be more resistant to the high tension during the weaving process (Schmidt-Colinet, Stauffer and Al-As'ad 2000:12–13; Wild 2002:679; Hübner 2016:43–47). An exceptional

Fig. 15. Silk coral-red main weft and yellow brocading weft threads creating diagonal motifs (photography: C. Amit).

Fig. 16. Red silk textile (photography: O. Negnevitsky).

Fig. 17. Cotton textile decorated with red cotton bands alternating with shiny silk S-spun threads wrapped with metal strips, probably silver, discovered at ‘En Marzev (photography: C. Amit).

cotton textile decorated with red cotton bands alternating with shiny silken S-spun threads wrapped with metal strips, probably made of silver, was discovered at ‘En Marzev (Fig. 17) from the same period (Shamir 2016a; 2022a).[13]

Zilu Textiles (Fig. 18)

A very distinctive type of textile, a so-called zilu textile, was also found at Naḥal ‘Omer. These textiles are composed of colored wool and white cotton, and show a relatively simple geometric motif. Only one rather large fragment (14 × 23 cm) was found in previous excavations at the site (Baginski and Shamir 1995). The 2022 excavation yielded ten additional zilu fragments. The zilu fragments are compound weft-faced fabrics patterned by alternating floating wool wefts with cotton warps and wefts. In the case of Naḥal ‘Omer, they are pile-less textiles (Kawami 1991:99; Afshar 1992:31–32). Some scholars suggest that the material is exclusively cotton (e.g., Ittig 1992) as is seen in some regions today (Rahmani and Moghanipoor 2019:339; Saladrigas Cheng and Munakata 2015). The zilu-

[13] The study of the origin of the raw materials used in the silk and cotton fragments found at Naḥal ‘Omer will be undertaken in the future, using cutting-edge biogeochemistry methods, such as isotope analyses (Ryan et al. 2021), taxonomic identification using proteomic methodologies (for silk, see Lee et al. 2022) and analyses of dyestuffs (Hildebrandt et al. 2023).

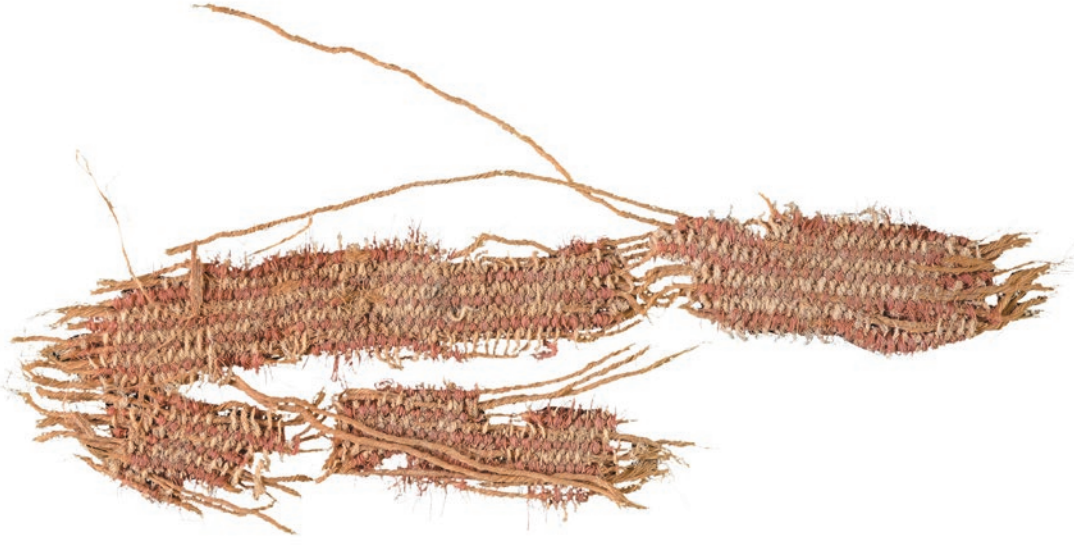

Fig. 18. Wool and cotton, compound weave (photography: N. Shamir).

loom is a wooden vertical loom with a draw harness, rather than the standard two-beam loom. The zilu loom is not a true draw-loom, though most zilu motifs are simple enough that the weaver can produce near-exact replicas from memory (Buckley 2022). Because of the zilu loom's size and the heavy weight of its parts, it was traditionally used by male weavers and not by women, since the weaver needed considerable upper body strength to move the heavy beams and pull the levers (Saladrigas Cheng and Munakata 2015).[14]

These looms were still in use in the 1980s, notably in the northeastern Iranian workshops of Meybod Yazd, Kashan and Ardakanfor, where they are still used for the production of bicolored carpets (Afshar 1992; Ittig 1992; Thompson and Granger-Taylor 1995–96; Saladrigas Cheng and Munakata 2015; Rahmani and Moghanipoor 2019). Even in ancient times, this type of patterned textile would only have been produced in specialized workshops (Ciszuk 2004:112). One of the important uses of zilu fabrics is as floor coverings in mosques in Iran, particularly in desert areas. This is one of the reasons why these fabrics have survived at all (Rahmani and Moghanipoor 2019:353; Wulff 1966:210–212). The zilu fabrics of Naḥal ʻOmer may have been used as floor coverings, e.g., in the mosque at Naḥal ʻOmer, in the same manner as the comparable Iranian zilu fabrics.

One example from Naḥal ʻOmer shows an unusual weaving technique and spin direction: It was Z-spun, different from the Levantine tradition, suggesting that this kind of compound weave was not locally produced, but may have originated in Iraq, Armenia or Iran. Weaves of a similar composition have been found at Fustât, where they are attributed to the eleventh

[14] See also http://www.turkotek.com/misc_00031/conversation.htm (accessed May 12, 2023).

century CE (Mackie 1985:35; 1989:87). Similar fabrics were found at Shahr-I-Qumis, an Iranian site dated to the late sixth century CE (Kawami 1991; Gasparini 2022:82, 86), indicating an early form of a zilu carpet according to Vogelsang-Eastwood (1988). However, according to Ittig (1992), its structure is described as weft-faced compound tabby weave, with two sets of wefts, one of which is supplementary, and only one warp set. Another example is a zilu textile from the eighth century CE with a pattern of roundels with a single bird, on display at the Cleveland Museum but probably originating from Iran, Iraq or Syria (Mackie 2015). A group of samite fabrics made of coarse red wool and decorated with white cotton that were used as floor coverings were found at Taq-I Bustan in modern-day Iran, from the fourth century CE, i.e., the era of the Sassanid Empire (Mackie 2015:51). This group of samites is traditionally attributed to a workshop from the seventh or eighth century CE in the regions of modern-day Iran or Iraq based on stylistic and technical grounds, particularly the Z-direction of their spun yarn (in contrast, an S-direction would have pointed to Syria; see Mackie 2015:51).

A cotton zilu textile in the Islamic Museum, Cairo (401.0 × 98.2 cm) probably represents a carpet from Islamic Iran. Its field design consists of five arched compartments outlined in white on a blue background; this type of field is often referred to as a multiple prayer rug. The Cairo zilu is one of three extant examples dated and ascribed to 963 CE (Ittig 1992). A second fragment was discovered in the Shah Vali Mosque in Taf (Afshar 1992; Ittig 1992). A third fragment appeared on the Tehran art market in 1954; its present location is unknown (Beattie 1981; Ittig 1992). Their structure is identical with nineteenth- and twentieth-century CE zilu looms in Iran, which have not only two sets of complementary wefts, but two warp sets as well. There are textual references to the manufacture and use of zilu fabrics from at least the fourth–tenth centuries CE. There is also literary evidence regarding the use of zilu fabrics in mosques. However, they were also commissioned for secular buildings (see Afshar 1992; Ittig 1992 and further references therein).

In summary, all these textiles seem to have been imported, or at least produced based on technologies that were exchanged along the Silk Roads. The expertise needed to produce them, alongside the cost of their raw materials made them more precious than other ancient textiles. The fragments from the Naḥal ʻOmer middens were probably deemed beyond reuse, or they would have not been discarded. The comparably low numbers of these particular textile types support the assumption that they were generally cherished possessions that were not easily parted with. Moreover, they show that even in a remote agricultural village like Naḥal ʻOmer, access to exotic and precious fabrics was possible.

Concluding Remarks

In this study, we highlighted the main characteristics of textiles retrieved in the 2022 excavation of the Naḥal ʻOmer middens. Although the analysis is ongoing, the excavation results enable us to draw several preliminary conclusions regarding the inhabitants of the

desert site of Naḥal ‘Omer, their habits, cultural background and sources of influence with regard to their material culture. The findings clearly indicate cultural connections with the seminomadic societies of the Arabian Peninsula, a source of cultural influence that emerged following the Islamic conquest. The exotic goods and rare textiles that passed through the small village of Naḥal ‘Omer shed light on the trade in textiles on the geographic fringes of the Silk Road network and on the cultural and trade relations between east and west in one of the fascinating and still largely unknown periods of late antiquity.

The textile finds from Naḥal ‘Omer contrast sharply with the textiles found at nearby contemporary sites, originating from different archaeological contexts: Naḥal Shaḥaq (Shamir 1995), ‘En Marzev (Shamir 2016a) and ‘En ‘Evrona (Shamir 2016b), which were not way-stations, and the textiles were discovered in buildings as opposed to in middens. It seems that the inhabitants left these sites in an orderly fashion and took their goods with them. At the site of Yoṭvata, the textiles were found in a layer of ash and brown soil with dung (thickness 0.15–0.20 m; see Ayalon 2022:233; Shamir 2022b). In Naḥal ‘Amram, they were found in copper mines (Baginski and Cottier-Angeli, unpublished). The location of Naḥal ‘Omer on a prime spot along a trade route is of great importance (Bar-Oz et al., forthcoming). Naḥal ‘Omer is so far unique, as wool was still the fiber of choice during the Early Islamic period (seventh–eighth centuries CE) at the other sites (Table 2). It is also interesting to note that very few goat-hair textiles were discovered at these sites, even though goats were bred there and coarse goat hair was used for sacks, saddles and floor coverings, although not for clothing. The high number of ikat textiles discovered at Naḥal ‘Omer stands in sharp contrast to contemporaneous sites in Egypt, Nubia and Jordan during this period where only four ikats in total have been found.

Cotton was not used during the Roman period in the Land of Israel. Even during the Byzantine period, from the fifth–seventh centuries CE, cotton remained rather rare in this region and was only found at the sites of ‘En Boqeq (Sheffer and Tidhar 1991:22, 37; Shamir 2019), Niẓẓana (Bellinger 1962:91, 98–99; Shamir 2019) and Rogem Ẓafir (Shamir 2019). Only 21 of 277 Byzantine textiles found in Israel were made of cotton (Shamir 2019). Cotton continued to be rare during the Islamic period, with the finds at Naḥal ‘Omer being the notable exception. The large quantities of cotton fabrics discovered at the site probably attest to the textile trade with faraway lands. Cotton textiles retained their distinct foreign character even during the Late Islamic period, an example being the S-spun cotton textiles found at Qaṣr el-Yahud, associated with Nubian and south Egyptian pilgrims. Nonetheless, a local cotton production slowly developed during the Medieval period, until the fiber became quite prevalent, eventually replacing linen (Shamir 2019).

There is no indication that weaving took place in the domestic structures of Naḥal ‘Omer, although three light spinning whorls discovered in the ruins of a building suggest the spinning of wool and goat hair (Baginski and Shamir 1995). The 2022 excavations yielded two examples of wool fibers that begun to be spun, but discontinued. Of further interest are the fabrics missing from the Naḥal ‘Omer assemblage, such as tapestry made of linen and wool, typical of Coptic textiles, found in Egypt and ‘En Boqeq, where they

Table 2. Distribution of Textiles from Early Islamic Sites

Site	Linen	Cotton	Wool	Goat Hair	Silk	Total
Khirbat Deiran (Reḥovot)		1				1
‘En ‘Evrona	6	2	14			22
‘En Marzev (Yahav)	5	2	46	4		57
Naḥal ‘Amram	13		2	2		17
Naḥal ‘Omer (1981, 1991)	31	153	60	3	3	251
Naḥal Shaḥaq	2		10	4		16
Yoṭvata			28			28
Total	*57*	*158*	*160*	*13*	*3*	*391*

date to the seventh century CE, at Qaṣr el-Yahud, where they date to the ninth century CE (Shamir 2005), and at the Makkukh-Qurunṭul Cliff, Cave 11, attributed to the Medieval period (Shamir and Schick 2019:214, 217).

The preliminary analysis of the finds from the Naḥal ‘Omer middens has also enlightened us on numerous aspects of the character of the site, including its role in the exchange of ideas and commodities in the Early Islamic period, as well as practices of waste management, emphasizing the separation of organic and inorganic materials. This is the first step in our research, which will continue to investigate this unique and diverse assemblage. We hope that a comparison with the results from the study of assemblages from different sites using advanced scientific methods will illuminate the kinds of textiles that were common in the region during specific periods, and therefore likely to be local, and those which were exceptional and can probably be associated with other regions. Through these comparisons, we aim to shed light on the trade along a hitherto unknown artery of the Silk Road and place the finds of Naḥal ‘Omer within the framework of global trade networks and connectivity.

References

Adams N.K. and Webb W.S. 2002. Silk in Ancient Nubia: One Road. Many Sources In *Silk Roads, Other Roads (Proceedings of the Textile Society of America 8th Biennal Symposium, Sept. 26–28, 2002, Smith College, Northampton, Mass.)* 497. https://digitalcommons.unl.edu/tsaconf/497 (accessed August 13, 2023).

Afshar I. 1992. Zilu. *Iranian Studies* 25:31136.

Amar Z. 2000. *Agricultural Products in the Land of Israel in the Middle Ages*. Jerusalem (Hebrew).

Avni G. 2014. *The Byzantine-Islamic Transition in Palestine: An Archaeological Approach*. Oxford.

Avni G. 2018. Early Islamic Irrigated Farmsteads and the Spread of Qanats in Eurasia. *Water History* 10:313–338.

Ayalon E. 2022. Architecture and Stratigraphy. In L. Singer-Avitz and E. Ayalon. *Yotvata. The Ze’ev Meshel Excavations, 1974–1980: The Iron I “Fortress” and the Early Islamic Settlement* (Tel Aviv University Institute of Archaeology Monograph Series 42). Tel Aviv. Pp. 187–240.

Baginski A. and Shamir O. 1995. Early Islamic Textiles, Basketry and Cordage from Naḥal ‘Omer, Israel. *‘Atiqot* 26:21–42.

Baginski A. and Shamir O. 1998. Textiles, Basketry and Cordage from Jeziret Fara‘un (Coral Island). *‘Atiqot* 36:39–92.

Baginski A. and Sheffer A. 2004. Textiles from Nessana. In D. Urman ed. *Nessana—Excavations and Studies* I (Beer-Sheva XVII). Be’er Sheva‘. Pp. 216*–221*.

Baginski A. and Tidhar A. 1978. Dated Silk Fragment from ‘Avdat (Eboda). *IEJ* 28:113–115.

Balfour-Paul J. 1996. *Indigo in the Arab World*. London.

Barnes R. 1996. Indian Textiles. *Hali* 87:80–85.

Bar-Oz G., Bouchnik R., Weiss E., Weissbrod L., Bar Yosef Mayer D.E. and Reich R. 2007. “Holy Garbage”: A Quantitative Study of the City-Dump of Early Roman Period Jerusalem. *Levant* 39:1–12.

Bar-Oz G., Galili R., Fuks D., Erickson-Gini T., Tepper Y., Shamir N. and Avni G. 2022. Caravanserai Middens on Desert Roads: A New Perspective on the Nabatean-Roman Trade Network across the Negev. *Antiquity* 96:592–610.

Bar-Oz G., Weissbrod L., Erickson-Gini T., Tepper Y., Malkinson D., Benzaquen M., Langgut D., Dunseth Z.C., Butler D.H., Shahack-Gross R., Roskin J., Fuks D., Weiss E., Marom N., Ktalav I., Blevis R., Zohar I., Farhi Y., Filatova A., Gorin-Rosen Y., Yan X. and Boaretto E. 2019. Ancient Trash Mounds Unravel Urban Collapse a Century Before the End of Byzantine Hegemony in the Southern Levant. *Proceedings of the National Academy of Sciences of the United States of America* 116:8239–8248.

Bar-Oz G., Galili R., Hildebrandt B., Shamir O., Shamir-Shafir N., Erickson-Gini T., Fuks D. and Avni G. Forthcoming. Treasures in the Trash Mounds of Naḥal ‘Omer: An Early Islamic Village in the Wadi Arabah. *Carmel*.

Beattie M.H. 1981. A Note on Zilu. In C. Cootner ed. *Flatwoven Textiles: The Arthur Jenkins Collection* I. Washington, D.C. Pp. 168–173.

Bellinger L. 1962. Textiles. In H.D. Colt. *Excavations at Nessana (Auja Hafir, Palestine)* 1. London. Pp. 91–105.

Ben-Michael J., Israel I. and Nahlieli D. 2017. Naḥal ‘Omer: A Village from the Early Islamic Period in the Arava. *HA–ESI* 129 (November 5). Pp. 1–23. http://www.hadashot-esi.org.il/report_detail_eng.aspx?id=25325&mag_id=125 (accessed August 13, 2023) (Hebrew).

Bier C. 2014. Compression Resist: Shibori, Clamp-Resist, and Ikat. Inscribed Cotton Ikat from Yemen in the Tenth Century CE. In A. Luximon ed. *Resist Dye on the Silk Road: Shibori, Clamp Resist and Ikat (Proceeding of the 9th International Shibori Symposium in Hangzhou, China).* Hangzhou. Pp. 32–40.

Bouchaud C., Tengberg M. and Dal Prà P. 2011. Cotton Cultivation and Textile Production in the Arabian Peninsula during Antiquity: The Evidence from Madâ‘in Sâlih (Saudi Arabia) and Qal‘at al-Bahrain (Bahrain). *Vegetation History and Archaeobotany* 20:405–417.

Bouchaud C., Yvanez E. and Wild J.-P. 2019. Tightening the Thread from Seed to Cloth. New Enquiries in the Archaeology of Old World Cotton. In C. Bouchaud and E. Yvanez eds. *Cotton in the Old World: Domestication, Cultivation, Uses and Exchange* (*Revue d'ethnoécologie* 15). Paris. Pp. 1–46. https://journals.openedition.org/ethnoecologie/4063 (accessed August 13, 2023).

Buckley C. 2022. Drawlooms along the Silk Roads. In F. Zhao and M.-L. Nosch eds. *Textiles and Clothing along the Silk Roads: Thematic Collection of the Cultural Exchanges along the Silk Roads* (Unesco Silk Roads Programme). Paris–Hangzhou. Pp. 95–115.

Bühler A. 1972. *Ikat Batik Plangi*. Basel.

Carmi I. and Segal D. 1995. Radiocarbon Dating of Early Islamic Textiles in the 'Arava Valley. *'Atiqot* 26:55–56.

Ciszuk M. 2004. Taqueté and Damask from Mons Claudianus: A Discussion of Roman Looms for Patterned Textiles. In C. Alfaro Giner, J.-P. Wild and B. Costa Ribas eds. *Purpureae vestes (Actas del I symposium internacional sobre textiles y tintes del Mediterráneo en época romana, Ibiza, 8 al 10 noviembre, 2002)*. Valencia. Pp. 107–113.

Eastwood G. 1992. The Pella Textiles. In A.W. McNicoll. *Pella in Jordan* 2: *The Second Interim Report of the Joint University of Sydney and the College of Wooster Excavations at Pella, 1982–1985* (*MA* Suppl. 2). Sydney. Pp. 257–265.

Ellis M. 2006. *Embroideries and Samplers from Islamic Egypt*. Oxford.

Erickson-Gini T. and Israel Y. 2013. Excavating the Nabataean Incense Road. *JEMAHS* 1:24–53.

Fuks D., Amichay O. and Weiss E. 2020. Innovation or Preservation? Abbasid Aubergines, Archaeobotany and the Islamic Green Revolution. *Archaeological and Anthropological Sciences* 12:50.

Gasparini M. 2022. Sasanian Textiles and the Tang Cosmopolitan Style. In S. Farridnejad and T. Daryaee eds. *Sasanian Studies: Late Antique Iranian World* 1:81–96.

Golombek L. and Gervers V. 1977. Tiraz Fabrics in the Royal Ontario Museum. In V. Gervers ed. *Studies in Textile History, in Memory of Harod B. Burnham*. Toronto. Pp. 82–125.

Granger-Taylor H. 2012. Textiles. In K.D. Politis ed. *Sanctuary of Lot at Deir 'Ain 'Abata in Jordan: Excavations 1988–2003* (ACOR 7). Amman. Pp. 378–392.

Grömer K. and Aali A. 2020. How to Make a Sassanian Tunic: Understanding Handcraft Skills Based on a Find from the Salt Mine in Chehrābād, Iran. In L. Quillien and K. Sarri eds. *Textile Workers: Skills, Labour and Status of Textile Craftspeople between the Prehistoric Aegean and the Ancient Near East Proceedings of the Workshop Held at 10th ICAANE in Vienna, April 2016* (Oriental and European Archaeology 13). Vienna. Pp. 57–74.

Gyul E. 2022. Ikat of Central and West Asia. In F. Zhao and M.-L. Nosch eds. *Textiles and Clothing along the Silk Roads: Thematic Collection of the Cultural Exchanges along the Silk Roads* (Unesco Silk Roads Programme). Paris–Hangzhou. Pp. 275–294.

Hansen V. 2017. *The Silk Road: A New History with Documents*. New York.

Hildebrandt B. 2017. Silk Production and Trade in the Roman Empire. In B. Hildebrandt and C. Gillis eds. *Silk: Trade and Exchange along the Silk Roads between Rome and China in Antiquity* (Ancient Textiles Series 29). Oxford. Pp. 34–50.

Hildebrandt B. 2021. The Terminology of Silks in Texts of the Roman Empire: Qualities, Origins, Products and Uses. *Acta Via Serica* 6/2:117–140.

Hildebrandt B. 2022. Roman Silk Trade and Markets. In X. Liu and P. Brancaccio eds. *The World of the Ancient Silk Road.* London. Pp. 497–510.

Hildebrandt B., Shamir O., Galili R., Shamir N. and Bar-Oz G. 2023. Networks of Trade and Exchange along the Israeli Silk Road: The Silk and Cotton Finds from Naḥal Omer, Negev Desert. *Antiquity* 97(393):1–8, 14.

Hoffman M.A. 1974. The Social Context of Trash Disposal in an Early Dynastic Egyptian Town. *American Antiquity* 39:35–50.

Hübner U. 2016. Palestine, Syria and the Silk Road. In S.N.C. Lieu and G.B. Mikkelsen eds. *Between Rome and China: History, Religions and Material Culture of the Silk Road* (Silk Road Studies 18). Turnhout. Pp. 19–74.

Ittig A. 1992. Notes on a Zilu Fragment Dated 963/1556 in the Islamic Museum, Cairo. In A. Ittig ed. *The Carpets and Textiles of Iran: New Perspectives in Research* (*Iranian Studies* 25). Cambridge. Pp. 37–42.

Kawami T. 1991. Ancient Textiles from Shahr-I Qu mis. *Hali* 59:95–99.

Kelley A.C. 2023. Movement and Mobility Cotton and the Visibility of Trade Networks across the Saharan Desert. In L. Brubaker, R. Darley and D. Reynolds eds. *Global Byzantium (Papers from the Fiftieth Spring Symposium of Byzantine Studies).* Abingdon–New York. Pp. 1–17.

Lee B., Pires E., Pollard A.M. and McCullagh J.S.O. 2022. Species Identification of Silks by Protein Mass Spectrometry Reveals Evidence of Wild Silk Use in Antiquity. *Scientific Reports* 12:1–16.

Lester A. 2017. Gold and Bronze Jewelry from an Early Islamic Village in Naḥal ʻOmer. *HA–ESI* 129 (November 5). Pp. 1–4. http://www.hadashot-esi.org.il/images//Nahal%20Omer-Jewelry.pdf (accessed August 13, 2023) (Hebrew).

Livingstone R.J. 2023. "When Sorted and Cleaned May Prove of Great Interest": The Textiles from Antinoopolis Held in the Collections of the Museum of New Zealand Te Papa Tongarewa (Te Papa). *Tuhinga* 34/3:87–104.

Mackie L.W. 1985. Covered with Flowers: Medieval Floor Coverings Excavated at Fustat in 1980. *Oriental Carpet and Textile Studies* 1:23–35.

Mackie L.W. 1989. Textiles. In W. Kubiak and G.T. Scanlon. *Fusṭāṭ Expedition Final Report* II: *Fusṭāṭ-C* (ARCE Reports 11). Winona Lake. Pp. 81–97.

Mackie L.W. 2015. *Symbols of Power: Luxury Textiles from Islamic Lands, 7th–21st Century*. New Haven–London.

Morgan F.P. 2017. *Dress and Personal Appearance in Late Antiquity: The Clothing of the Middle and Lower Classes* (Late Antique Archaeology 1). Leiden–Boston.

Mannering U. 2000. The Roman Tradition of Weaving and Sewing: A Guide to Function? *Archaeological Textiles Newsletter* 30:10–16.

Porat Y. 2016. Tunnel-Well (Qanat) Systems and Settlements from the Early Islamic Period in the ʻArava. *ʻAtiqot* 86:1–81 (Hebrew; English summary, pp. 113–116).

Pritchard F. 2014. Soft-Furnishing Textiles from the Egypt Exploration Fund Season at Antinoupolis, 1913–14. *British Museum Studies in Ancient Egypt and Sudan* 21:45–61.

Rahmani A. and Moghanipoor M.R. 2019. The Technique of Zilu Weaving in Anatolia, Caucasus and Iran. *Art-Sanat* 11:339–363.

Rathje W.L. and Murphy C. 1992. *Rubbish!: The Archaeology of Garbage*. Tucson.

Ryan S.E., Dabrowski V., Dapoigny A., Gauthier C., Douville E., Tengberg M., Kerfant C., Mouton M., Desormeau X., Zazzo A. and Bouchaud C. 2021. Strontium Isotope Evidence for a Trade Network between Southeastern Arabia and India during Antiquity. *Scientific Reports* 11 (303):1–10.

Saladrigas Cheng S. and Munakata K. 2015. Fabrics and Looms in Present-Day Iran: Beyond the Persian Carpets. *Datatèxtil* 32:1–20.

Schmidt-Colinet A., Stauffer A. and Al-As‘ad K. 2000. *Die Textilien aus Palmyra: Neue und alte Funde* (Damaszener Forschungen 8). Mainz.

Shamir O. 1995. Textiles from Naḥal Shaḥaq, Israel. *‘Atiqot* 26:43–48.

Shamir O. 2001. Byzantine and Early Islamic Textiles Excavated in Israel. *Textile History* 32:93–105.

Shamir O. 2015. Egyptian and Nubian Textiles from Qasr el-Yahud, 9th Century AD. In A. De Moor, C. Fluck and P. Linscheid eds. *Textiles, Tools and Techniques of the 1st Millenium AD from Egypt and Neighbouring Countries (Proceedings of the 8th Conference of the Research Group "Textiles from the Nile Valley," Antwerp, 4–6 October 2013).* Tielt. Pp. 48–59.

Shamir O. 2016a. Textiles and Fleece from ‘En Marzev. *‘Atiqot* 86:11–19.

Shamir O. 2016b. Textiles, Cordage and Fleece from ‘En ‘Avrona. *‘Atiqot* 86:3–9.

Shamir O. 2016c. Textile Trade to Palestine in the Roman Period according to the Talmudic Sources and the Textiles Finds. In K. Droß-Krüpe and M.-L Nosch eds. *Textiles, Trade and Theories: From the Ancient Near East to the Mediterranean* (Kārum-Emporion-Forum 2). Münster. Pp. 231–245.

Shamir O. 2019. Cotton Textiles from the Byzantine Period to the Medieval Period in Ancient Palestine. In C. Bouchaud and E. Yvanez eds. Cotton in the Old World: Domestication, Cultivation, Uses and Exchange (*Revue d'ethnoécologie* 15). Paris. https://journals.openedition.org/ethnoecologie/4176 (accessed August 8, 2023).

Shamir O. 2022a. Silk Textiles from the Byzantine Period until the Medieval period from Excavations in the Land of Israel (5th–13th Centuries CE): Origin, Transmission, and Exchange. *Acta Via Serica* 7:53–81.

Shamir O. 2022b. Textiles, Textile Impressions and a Plait. In L. Singer-Avitz and E. Ayalon eds. *Yotvata: The Ze'ev Meshel Excavations, 1974–1980: The Iron I "Fortress" and the Early Islamic Settlement* (Tel Aviv University Institute of Archaeology, Monograph Series 42). Tel Aviv. Pp. 315–326.

Shamir O. and Baginski A. 2014. The Earliest Cotton *Ikat* Textiles from Naḥal ‘Omer, Israel 650–810 CE. In M.-L. Nosch, Z. Feng and L. Varadarajan eds. *Global Textile Encounters* (Ancient Textiles Series 20). Oxford–Havertown, Pa. Pp. 65–73.

Shamir O. and Baginski A. 2016. Functions, Uses and Reuses of Silk Textiles in the Land of Israel and a Seventh Century CE Textile Decorated with Silk Threads Wrapped with Silver Strips. *International Symposium: A World of Silks Proceedings*. Hangzhou. Pp. 87–114.

Shamir O. and Baginski A. 2017. The Earliest Cut-to-Shape Tunic in Israel from the Early Islamic Period Site at Naḥal ‘Omer. *HA–ESI* 129 (November 5). Pp. 1–5. http://www.hadashot-esi.org.il/images//Nahal%20Omer-Tunic.pdf (accessed August 8, 2023) (Hebrew).

Shamir O. and Baginski A. 2018. Medieval Silk Textiles from Excavations in the Land of Israel. In S. Menache, B.Z. Kedar and M. Balard eds. *Crusading and Trading between West and East: Studies in Honour of David Jacoby* (Crusades-Subsidia 12). Abingdon–New York. Pp. 327–335.

Shamir O. and Baginski A. 2021. Trade and Transfer: Early Medieval Textiles from Excavations in Israel (9th–13th Centuries). In H. Nol ed. *Riches beyond the Horizon: Long-Distance Trade in Early Medieval Landscapes (ca. 6th–12th Centuries)* (Medieval and Post-Medieval Mediterranean Archaeology Series IV). Turnhout. Pp. 235–268.

Shamir O. and Schick T. 2019. Chalcolithic to Medieval Textiles from the Judean Desert Caves Survey. In O. Peleg-Barkat, J. Ashkenazi, U. Leibner, M. Aviam and R. Talgam eds. *Between Sea and Desert: On Kings, Nomads, Cities and Monks. Essays in Honor of Joseph Patrich* (Land of Galilee 5). Ẓemaḥ. Pp. 195–224.

Shamir O. and Sukenik N. 2016. 13th Century CE Textiles from Mezad Zohar. *Strata BAIAS* 34:155–164.

Sheffer A. and Tidhar A. 1991. The Textiles from the ‘En-Boqeq Excavation in Israel. *Textile History* 22:3–46.

Tal O., Taxel I. and Jackson-Tal R.E. 2013. Khirbet al-Ḥadra: More on Refuse Disposal Practices in Early Islamic Palestine and Their Socio-Economic Implications. *Strata BAIAS* 31:117–148.

Taragan H. 2019. Textiles in Cross-Cultural Encounters: The Case of the Umayyad Palace at Khirbat al-Mafjar. *Al-Masāq: Journal of the Medieval Mediterranean* 32:140–155.

Tepper Y., Erickson-Gini T., Farhi Y. and Bar-Oz G. 2018. Probing the Byzantine/Early Islamic Transition in the Negev: The Renewed Shivta Excavations 2015–2016. *Tel Aviv* 45:120–152.

Thompson J. and Granger-Taylor H. 1995–1996. The Persian Zilu Loom of Meybod. *Bulletin du CIETA* 73:27–53.

Vogelsang-Eastwood G.M. 1988. *Zilu* Carpets from Iran. *Studia Iranica* 17/2:225–240.

Walmsley A.G. and Smith R.H. 1992. The Islamic Period. In A.W. McNicoll. *Pella in Jordan* 2: *The Second Interim Report of the Joint University of Sydney and the College of Wooster Excavations at Pella, 1982–1985* (*MA* Suppl. 2). Sydney. Pp. 183–198.

Whitcomb D. 1995. Islam and the Socio-Cultural Transition of Palestine—Early Islamic Period (638–1099). In T.E. Levy ed. *The Archaeology of Society in the Holy Land*. London–Washington, D.C. Pp. 488–501.

Wild J.-P. 1997. Cotton in Roman Egypt: Some Problems of Origin. In *Special Volume in Commemoration of the 70th Birthday of Professor Hideo Fujii* (*Al-Rafidan* 28). Tokyo. Pp. 287–298.

Wild J.-P. 2002. Textiles of Eastern Promise. Review of A. Schmidt-Colinet, A. Stauffer and K. Al-As‘ad. Die Textilien aus Palmyra: Neue und alte Funde (Damaszener Forschungen 8). Mainz 2000. *JRA* 15:675–680.

Winnik A. 2022. The Creation and Spread of *Tiraz* Textiles across the Silk Road. In X. Liu and P. Brancaccio ed. *The World of the Ancient Silk Road*. London. Pp. 524–541.

Wulff H.E. 1966. *The Traditional Crafts of Persia: Their Development, Technology, and Influence on Eastern and Western Civilizations*. Cambridge, Mass.–London.

Xu X. 2002. Dulan Burial Ground. In F. Zhao ed. *Recent Excavations of Textiles in China*. Hangzhou. Pp. 72–109.

Yvanez E. 2016a.Textiles and Funerary Rituals: The Wrapping of Offerings at Meroe and el-Hobagi. *Sudan and Nubia* 20:75–81.

Yvanez E. 2016b. Spinning in Meroitic Sudan: Textile Production Implements from Abu Geili. *Dotawo: A Journal of Nubian Studies* 3:153–178.

Zhao F. and Wang L. 2013. Glossary of Textile Terminology (Based on the Documents from Dunhuang and Turfan). *JRAS* 23:349–387.

Zohary D. 1998. The Diffusion of South and East Asian and of African Crops into the Belt of Mediterranean Agriculture. In H.D.V. Prendergast, N.L. Etkin, D.R. Harris and P.J. Houghton eds. *Plants for Food and Medicine (Proceedings of the Joint Conference of the Society for Economic Botany and the International Society for Ethnopharmacology, London, 1–6 July 1996).* Kew. Pp. 123–134.