THE ROLE OF TEXTILE PRODUCTION AND FISHING IN THE EBA METALLURGICAL CENTRE OF ÇUKURIÇI HÖYÜK (TURKEY)

By Christopher Britsch and Barbara Horejs

Abstract

A large number of ovens combined with metallurgical equipment and slag from the Early Bronze Age settlement of Çukuriçi Höyük allows classifying the settlement as a metallurgical center. The wide range of other tools, however, show that a lot of different crafts where performed alongside the metal production. Two of these activities – textile production and fishing – are easily traceable via ceramic small finds and faunal remains. Both textile production and fishing are time consuming activities. This paper analyzes to which extent these crafts were performed and therefore how they were organized and embedded in the specialized society of Çukuriçi Höyük.

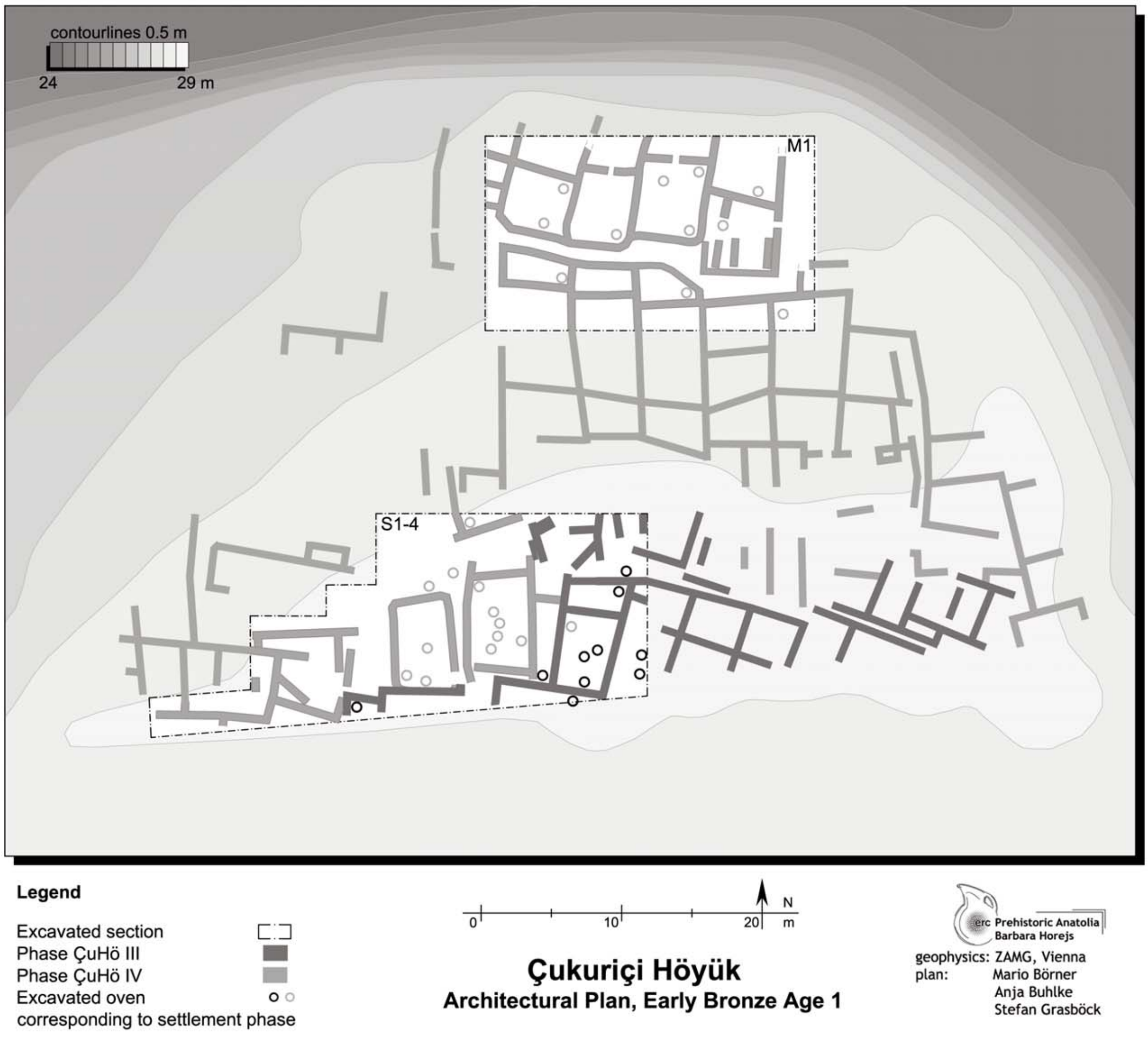

Fig. 1 Architectural Plan of EBA 1 Çukuriçi Höyük.

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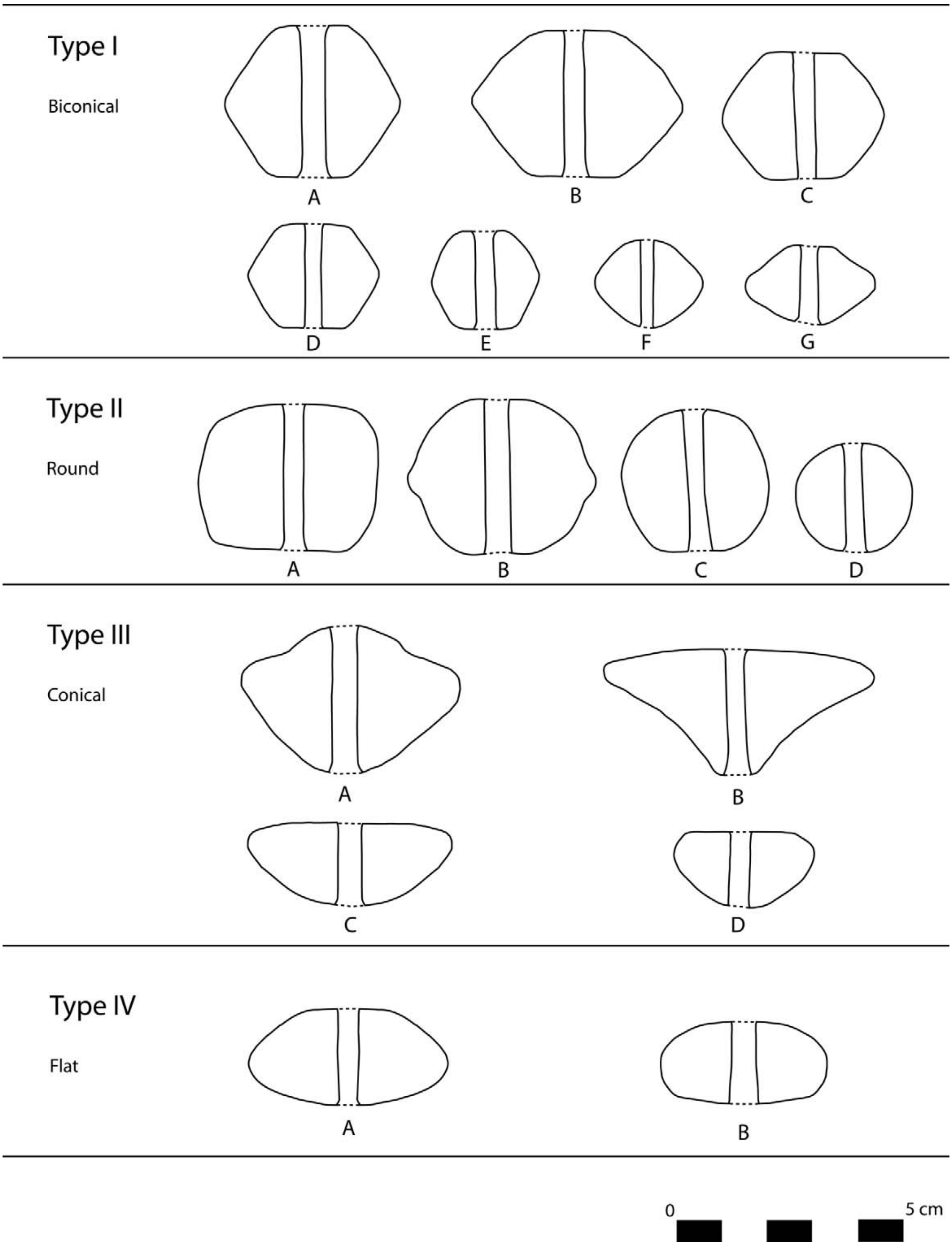

Fig. 2 Typology of spindle whorls of Çukuriçi Höyük phases ÇuHö IV-III (n = 56).

Introduction

This paper focuses on the role of textile production and fishing, two handicrafts typically referred to as normal household activities.[1] The aim is to gain knowledge about the social impact of these crafts and their scale of specialization within the metallurgical center and its specialized society at Çukuriçi Höyük. Moreover, by revealing the schemes and patterns of these household activities the question of local traditions and the meaning of these crafts for Early Bronze Age identities will be approached.

Çukuriçi Höyük is situated at the central Aegean coast in western Anatolia, in the immediate vicinity of the ancient city of Ephesos. Thorough excavations prove that Çukuriçi Höyük is a tell that consists of at least seven settlement phases dating to the Pottery Neolithic (7th millennium), the early Chalcolithic (6200–6000 calBC), the late Chalcolithic (4th millennium) and the Early Bronze Age 1 (2900–2750 BC). This paper focuses on the two youngest occupations ÇuHö IV and III dating to the Early Bronze Age 1. These phases were traced in two large trenches situated in the original center (trenches S1-S4 with 330 m²) and northern edge (trench M1 with 286 m²) of the tell (Fig. 1). In both trenches, buildings with multiple rooms were revealed. One of the most impressive features was the large quantity of ovens, with additional metallurgical equipment that were built inside living areas. Ovens could be identified in trenches S1-S4 (26) and M1 (13), all set up in rooms that also feature normal living activities. This clearly shows the close connection of the whole settlement to metallurgy as a part of daily life.[2]

This is also clearly visible through the artifact inventory of Early Bronze Age Çukuriçi Höyük, which includes more metallurgical tools than any other EBA 1 site in western Anatolia, even compared to far larger sites. Nevertheless, the production of metal and metal artifacts was by far not the only craft performed inside the settlement. The ceramic small finds alone make up a total of 147 pieces. Most of these were textile tools (48 %); including 56 spindle whorls and 14 loom weights, and fishing tools (22 %) comprising 32 pierced discs of different sizes and weights. This quite large quantity of tools led to this study about textile production and fishing technologies on the site. It should be noted that the study only includes ceramic tools and none of bone or stone.

Fig. 3 Selection of Spindle Whorls of Early Bronze Age Çukuriçi Höyük (Photographer: N. Gail).

The aim of this study is to analyze the way textile production and fishing were embedded as daily tasks in the metallurgical specialized society of Early Bronze Age Çukuriçi Höyük by a technical analysis of the different tools. It will be estimated how much could be produced and in what timeframe, or in the case of the fishing tools, which kinds of fish could be caught where and in what quantity. These details about labor expenditure will give an understanding of how strongly implemented these tasks were in daily life. It should thus be possible to determine what importance was ascribed to these crafts and what impact they had on society.

Textile Production

The analyzed ceramic textile tools of the Early Bronze Age settlements at Çukuriçi Höyük comprise 56 spindle whorls and 14 loom weights. The loom weights could be separated into two groups, *cylindrical* and *ovoid* weights. (see Fig. 4.1 and 4.2). All weights are made with the same kind of clay; rough, coarse-pored mineral tempered clay. The analysis of the EBA pottery ware groups, including recent petrographic studies, shows that the same clay was used for the pithos wares of Çukuriçi Höyük. The loom weights differ in weight: while the cylindrical ones weigh between

[1] See for example Schachner 1999.

[2] Horejs 2008, Horejs 2009, also Horejs 2010 and Horejs *et al*. 2011, Mehofer 2014.

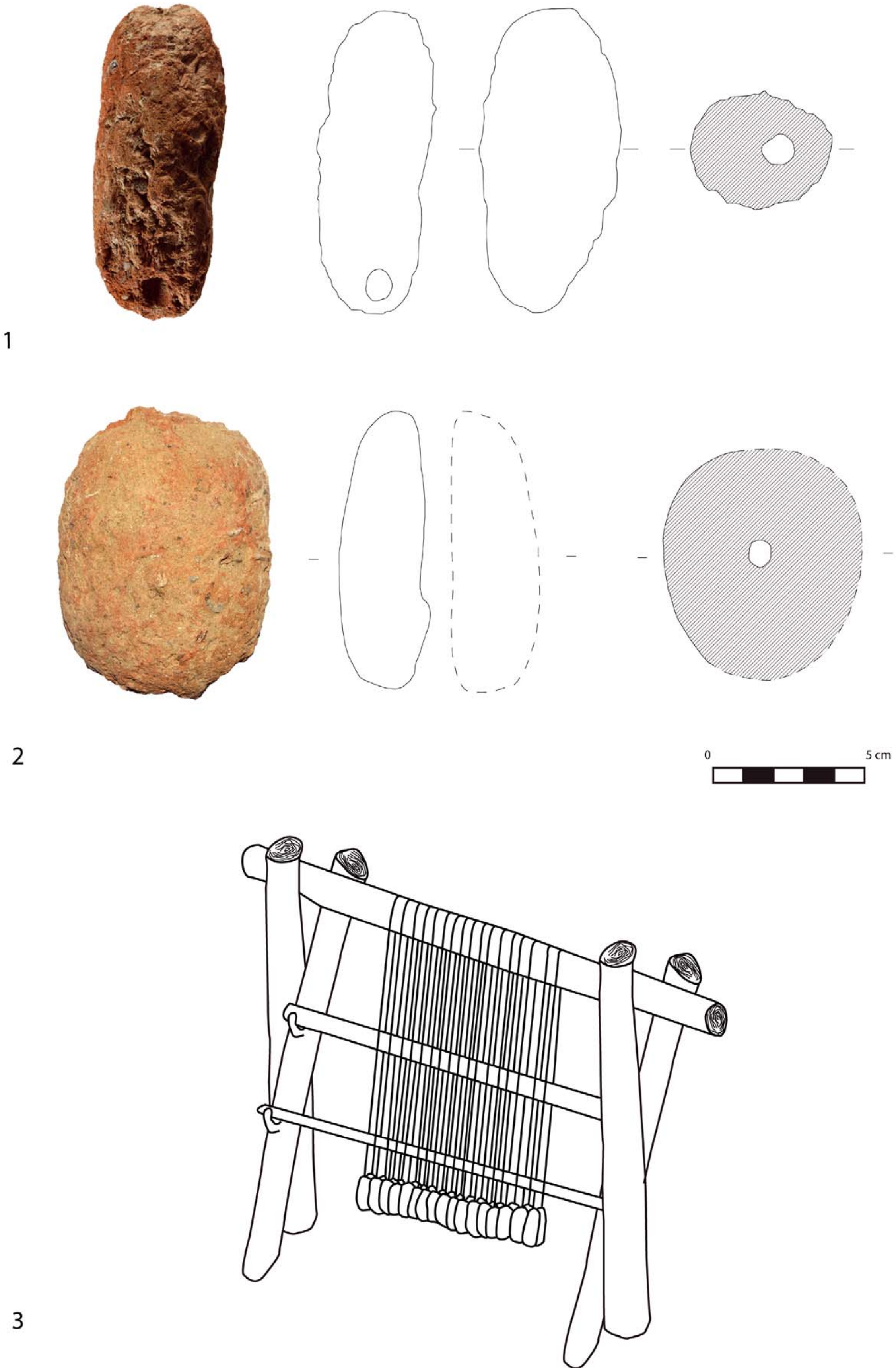

Fig. 4 (1) Cylindrical loom weight – Type I, (2) Ovoid loom weight – Type II, (3) Reconstruction of a set up loom.

200 and 250 g the ovoid weights weigh 400 to 480 g. The only comparable pieces to these loom weights come from Liman Tepe and can be seen in the *İzmir Arkeoloji Müzesi*, but are unpublished. All other Early Bronze Age 1 loom weights in western Anatolia differ in shape or way of making.

The spindle whorls vary in shape and size, but it was possible to separate four clear types (see Fig. 2). These types are biconical, spherical, conical and flat whorls. The biconical ones are greatest in number (32 pieces). The weight of all spindle whorls varies between c. 10 g and c. 80 g and there is no direct connection between weight and shape. Most whorl types appear in both phases ÇuHö III and IV; only the conical shapes seem to appear exclusively in Phase IV and stop being used in the later Early Bronze Age settlement. Most of the whorls are made out of fine, porous clay tempered with fine minerals; they are manufactured with care and sometimes decorated. These features perfectly fit into the framework of other Early Bronze Age sites in western Anatolia. To list a few comparisons: at Demircihüyük spindle whorls weigh between 2.5 and 60 g, in Troy I between 3 and 88 g and in Beycesultan between 10 and 50 g.[3] All three assemblages consist mainly of biconical whorls. Sites like Troy or Beycesultan in particular show that the preference for biconical spindle whorls becomes even more pronounced during the Early Bronze Age.[4] This indicates that the changes and developments investigated in this paper not only apply to Çukuriçi Höyük, but also to other Early Bronze Age sites. The developments outlined in the following are therefore to be seen as general indicators for the development in Early Bronze Age textile techniques in western Anatolia.

Different experiments – mostly conducted by the CTR[5] – have shown that the weight of spindle whorls and loom weights are most important for the different working processes. The size and type of clay materials seem to have no effect on the spinning process except for the impact they might have on the weight. The shape of the tools may further influence the product.[6] While for the loom weights the thickness is crucial, Schade-Lindig and Schmidt (2003) as well as Verhecken (2009) showed that it makes a difference for the spinning process if the whorl is conical, flat, round or biconical.[7]

For the Early Bronze Age in western Anatolia it is commonly assumed that only hand spindles were used for spinning;[8] and this seems to be the case at Çukuriçi Höyük. As already mentioned, the important attributes of spindle whorls for analyzing the spinning process are weight and shape. Through a series of tests, members of the CTR were able to show that there is a direct connection between the weight of the spindle whorl and the thickness of the yarn produced.[9] They could show, for example, that a 4 g whorl will produce a yarn of 0.3 mm thickness, a 8 g whorl a yarn of 0.3 to 0.4 mm thickness, a 18 g whorl a yarn of 0.4 to 0.6 mm thickness and a 44 g whorl a yarn of 0.8 to 1.0 mm thickness. Comparing these results to the weight of Çukuriçi Höyük spindle whorls, it must be assumed that mainly yarns with a thickness 0.6 to 1.2 mm were produced. The weight of the spindle whorls not only affects the yarn but also the productivity of spinning. In another series of tests, members of the CTR were able to demonstrate the link between the weight of spindle whorls and the operating speed.[10] In the tests it was possible to spin 35 m yarn per hour with a 4 g spindle whorl, 40 m per hour with an 8 g whorl and 50 m per hour with an 18 g whorl. This fact will be important when discussing the time expenditure of the whole textile production process. This is the technical framework for discussing the spinning process.

Another important aspect is the shape of the whorl. This does not influence the thickness of the yarn or the working speed in a noticeable way, but shape has an effect on the fibers themselves because the different shapes have different physical properties. Biconical shapes spin faster in smaller circles, while flat, round and conical

3 See Obladen-Kauder 1996, Korfmann (ed.) 1987, Schliemann 1874, Blegen et al. 1950 and Lloyd and Mellaart 1962.

4 Blegen *et al.* 1950, Völling 2008, Lloyd and Mellaart 1962.

5 The Danish National Research Foundation's Center of Textile Research.

6 Mârtensson *et al.* 2009.

7 Schade-Lindig and Schmidt 2003; Verhecken 2009, see also Verhecken 2013.

8 See for example Hoffmann 1974, Crowfoot 1937 and Balfanz 1995.

9 Mårtensson *et al.* 2009, 378.

10 Mårtensson 2007, 101, Andersson *et al.* 2008, 173 and Andersson *et al.* 2010, 164–165.

shapes spin slower and in larger circles. The faster spinning is an advantage when processing fine, short fibers, while longer, coarser fibers can also (sometimes even better) be processed with slower spinning whorls.[11] Biconical spindle whorls are therefore better suited to spinning wool and other shapes are more suitable for plant fibers. It has to be mentioned at this point that all forms *can* be used for both wool and plant fibers, but there are small advantages and disadvantages. As Hoffmann (1988) writes: "If there is one thing to be learnt from watching people work in old traditional crafts it is this: The tools and the working procedures are never clumsy, never impractical".[12] So it has to be assumed that if there is a noticeable advantage of a certain shape, a person who works with that tool will notice it and prefer the "better" tool. At Çukuriçi Höyük, the high number of biconical spindle whorls might indicate a preferred use of wool rather than plant fibers. This hypothesis seems to be supported by the archaeozoological and archaeobotanical record. The archaeozoological data[13] shows a high amount of sheep and goats that were slaughtered at an older age (20 %), which may indicate that they were being kept alive in order to harvest wool.[14] The archaeobotanical studies by U. Thanheiser show no remains of fiber plants at EBA Çukuriçi Höyük so far.[15] It has to be kept in mind, however, that if plants are only harvested for their fibers, it is quite possible that they leave no traces in the archaeological record.[16] Further and more detailed research into this specific issue will clarify the proportions of wool and plant fibers used.

With these insights it is possible to analyze the next step of textile production – weaving. As commonly assumed for the Early Bronze Age in western Anatolia, the warp-weighted loom was also used at Çukuriçi Höyük. Even though such a loom is a large device, only the loom weights are preserved in most cases; their weight and thickness reveal information about the kinds of textiles produced with them. Several yarns used as warp threads are each hung on one loom weight to be straightened by its weight. A series of tests by members of the CTR showed that it is possible to determine the optimal weight to the yarns by their thickness; this number is called the *warp-tension*.[17] For example a yarn of 0.3 to 0.4 mm thickness would need 15 to 20 g warp-tension, a yarn of 0.4 to 0.6 mm thickness a warp-tension of 25 to 30 g and a yarn of 0.8 to 1.0 mm thickness a 40 g warp-tension. Too little weight would not be able to straighten the particular thread and too much weight would simply rip it. One loom weight, however, always weighs down several threads. Experiments have shown that the ideal number of threads per loom weight is 10 to 30 warp threads.[18] That means that a yarn with 40 g warp-tension, for example, would need a loom weight of at least 400 g to a maximum of 1200 g for ideal weaving conditions. To calculate these prerequisites for Çukuriçi Höyük it is necessary to compare the most likely thickness of spun yarn with the different weights of the loom weights. Since most of the spindle whorls of Çukuriçi Höyük would produce a yarn of 0.6 to 1.2 mm thickness, the warp-tension would range between c. 25 and 45 g. The loom weights weigh between 200 and 250 g for cylindrical shapes or 400 and 480 g for ovoid shapes respectively. It is therefore obvious that the two types of loom weights were made for two different types of yarn. The cylindrical ones would be ideal for threads with 20 to 30 g warp-tension and the ovoid weights for threads with 20 to 45 or even 50 g warp-tension. In all cases the loom weights would carry around 10 warp threads, which also indicates a clear idea of how the loom had to be set up and how the textile had to be woven. The other factor that influences the set-up of the loom is the shape, or more precisely the thickness of the loom weight. The thickness determines how many weights can be hung next to each other on one loom and therefore the thread count of the textile, which has implications for both the quality of the textile and the efficiency of weaving per m² on the loom. The shapes of Çukuriçi Höyük EBA loom weights have a remarkable advantage through their shape. The elongated forms enable carrying a high weight without becoming too thick. Loom weights that are too thick would imply that only few weights could be

11 Schade-Lindig and Schmidt 2003.

12 Hoffmann 1988.

13 Galik 2010 and Horejs *et al*. 2011, 54–57.

14 See for example Payne 1973, Ryder 1971 and Ryder 1974, as well as Ryder 1992, and Ryder 1993.

15 Horejs *et al*. 2011, 50–54.

16 See for example Robkin 1979, Barber 1991, and Beugnier and Crombé (ed.) 2007.

17 Mårtensson *et al*. 2009, 378.

18 See Mårtensson *et al*. 2009.

	Cylindrical loom weights	Ovoid loom weights
	c. 250 g c. 4,0 cm thick	c. 450 g c. 5,0 cm thick
Warp threads / loom weight	10 (with 25 g *warp-tension*)	12 (with 40 g *warp-tension*)
Warp threads/ cm	5	5
Loom weights in total	50	40
Warp threads in total	500	480
Yarn for warp threads	500 m	480 m
Yarn for weft threads	500 m	480 m
Yarn/ m²	1020 m	979 m

Table 1 Examples of calculations based on the Çukuriçi Höyük loom weights and spindle whorls.

hung next to each other and that the threads would then be too far apart from each other, possibly producing a low quality textile. The thickness of the loom directly influences the woven textile, as Mårtensson *et al*. (2009) demonstrated: "The weaving tests described above have confirmed that if the weaver wants to produce a coarse, open fabric using thick yarn, (s)he would choose heavy, thick loom weights; if (s)he wants to weave a coarse, dense fabric using thick yarn, (s)he would choose heavy but thin loom weights. On the other hand, if (s)he wants to produce an open fabric or a weft-faced fabric using thin yarn, (s)he would choose light, thick loom weights. Finally, if (s)he would weave a dense fabric using fine yarn with many threads per cm, (s)he would prefer light, thin loom weights"[19]. At Çukuriçi Höyük it was possible to weave high quality textiles with fine yarn with the cylindrical loom weights and coarser, denser textiles with thicker yarn with the ovoid weights. If the ovoid loom weights would be put together on their thicker sides it would even be possible to weave a coarser and more open textile with the thicker yarn. Thus it was possible to weave fine and coarse, dense textiles for clothing, as well as coarser, rougher textiles for other usage.

The next step is to analyze the productivity of the whole process of textile production to determine the labor expenditure of this craft. This is possible by making calculations first introduced by Mårtensson *et al*. (2009)[20]. With this calculation it is possible to find out how much yarn would be needed for 1 m² of textile according to each particular set-up. Two examples of this calculation are shown in *Table 1*. In these examples the textile has a length and width of 1 m, to be able to calculate the amounts of yarn needed for 1 m². Also to simplify the demonstration a tabby weave technique was assumed, which means that an equal number of warp and weft threads were used. To get the numbers in *Table 1*, the following calculations have been made:

1. Warp threads per weight: weight of loom weights ÷ *warp-tension* of yarn
2. Warp threads per cm: (warp threads per loom weight × 2) ÷ weight thickness
3. Number of loom weights: width of set-up (here 1 m) ÷ weight thickness × 2
4. Warp threads in total: number of loom weights × warp threads per weight
5. Yarn for warp threads: number of yarn threads × length of set-up (here 1 m)
5. Yarn for weft threads: equal to number of yarn threads (only in tabby weave)
7. Yarn per m²: Yarn for warp threads + yarn for weft threads + 2 %

With these calculations it is possible to figure out the time needed for the textile production. Experiments by A. Batzer showed that a person trained in the warp-weighted loom can produce roughly 0.7 m² per day.[21] Considering smaller repairs and other incidences a demand of yarn for 1.5 m² every two days can be assumed to keep a weaver working. In the set-up with the cylindrical

19 Mårtensson *et al*. 2009, 390.

20 Mårtensson *et al*. 2009, 392–395.

21 See CTR General Introduction, 13.

loom weights this would add up to c. 1530 m yarn, with the ovoid weights to c. 1469 m. According to the above calculations of spinning speed, the production of yarn for the set-up with cylindrical loom weights would take up to c. 38 working hours and c. 29 working hours for the ovoid weights. Regardless of the loom weights or spindle whorls used, about 15 additional working hours have to be added for cleaning and preparing the fibers.[22] These calculations clearly show how time consuming and labor-intensive the textile production at Early Bronze Age Çukuriçi Höyük was.

Fishing

Several methods can be employed to catch fish, which can be separated into active and passive methods. Fishing with line and hook, spearfishing and fishing with cast-nets are active methods, while fishing with gillnets and traps are passive methods.[23] Nearly all those methods can be traced in Early Bronze Age sites of western Anatolia, either by the tools themselves or the remains of certain sea creatures.[24] These finds normally include a great amount of fish bones. At Çukuriçi Höyük a quite large quantity of fish bones and other remains of marine subsistence were found among the archaeozoological remains, including even larger fish such as small sharks (see Fig. 4).[25] It is thus astonishing that no spears, hooks or similar tools were found so far, like those found in Troy I, Aphrodisias or Beycesultan.[26] The only fishing tools are the pierced and rounded sherds, which could have been used as net weights for bottom gillnets. It has to be mentioned, however, that there are alternative interpretations as to the function of these discs, especially the smaller pierced pieces. They are sometimes referred to as a type of spindle whorl, as a pendant or as a token.[27] One can therefore only hypothesize that the fishers at EBA Çukuriçi Höyük specialized in fishing with bottom gillnets. A gillnet is made out of up to five different parts – the net itself, the swimmers, sometimes a buoy, net sinkers and sometimes an anchor. Since the net, the swimmers and the buoy, were usually made of plant materials, they are rarely preserved in the archaeological context.[28] The whole reconstruction must therefore be based on the net sinkers and, if available, on the anchor. The most common material for net sinkers in the Early Bronze Age was ceramic. Sometimes the pieces were specially made, but flat, rounded and pierced pot sherds were often simply recycled. While larger examples of these pierced discs are mostly referred to as net sinkers, the smaller ones are often seen as a kind of spindle whorl.[29] This interpretation does not seem to apply in the case of Çukuriçi Höyük, as the detailed analysis demonstrates. A lot of the smaller sherds weigh less than the smallest spindle whorls and would therefore produce a finer, thinner yarn. It seems highly unlikely that one would use recycled pot sherds rather than specialized tools to spin finer threads. Especially when considered that the spindle whorls at EBA Çukuriçi Höyük where produced with great care, in many cases smoothed and polished and often decorated. This clearly demonstrates the care and devotion to the household tasks. Hence it is very probable that these sherds were not used as spindle whorls at Çukuriçi Höyük. Since they were all made the same way, it is far more probable that all perforated discs were used for the same purpose – as net sinkers for bottom gillnets. The finds of 159 net weights made of lead in a shipwreck of the 7th century AD found at the coast of Dor, Israel, support this assumption. Out of these only six weighed 30 to 60 g, 78 pieces weighed c. 15 g, 39 pieces c. 9 g and 36 only 5 to 6 g. There is no doubt that all these finds are net sinkers.[30] This specific clustering of groups with distinct weights clearly shows the possibility to use net sinkers with very little weight.

The balancing of sinkers and swimmers is an important part in preparing a gillnet. All net sinkers need to be of about the same weight; otherwise the net will float unevenly in the water and could easily get tangled (see Fig. 6). The same applies to the swimmers: balancing swimmers and sinkers determines the position of the net. A net can be set floating directly under the surface, set on the bot-

22 Mårtensson 2007, 101.

23 Powell 1996, 77.

24 See Rosman 1980, Powell 1996, and Jawad 2006.

25 Galik 2011 and Horejs *et al.* 2011, 57–59.

26 Blegen *et al.* 1950, 42, and Sharp Joukowsky 1986, 584 and 594, as well as Lloyd and Mellaart 1962, 287–288.

27 See for example Blegen *et al.* 1950, Sharp Joukowsky 1986, Hochstetter 1987, Obladen-Kauder 1996, as well as Rahmstorf 2008 and Strommenger and Miglus 2010.

28 Salls 1989, 181 and Powell 1996, 104.

29 See for example Blegen *et al.* 1950, Obladen-Kauder 1996, and Strommenger and Miglus 2010.

30 Galili and Rosen 2008, 69–70.

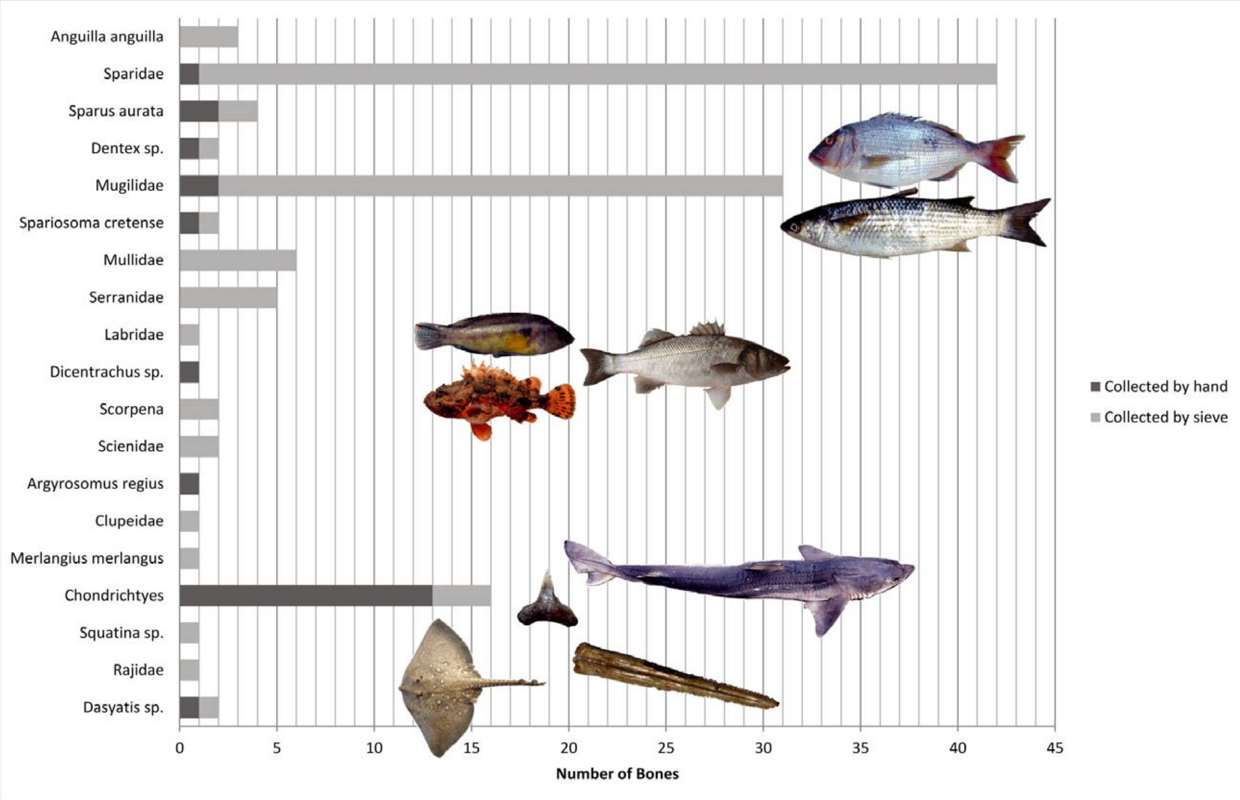

Fig. 5 Different Fish Species from EBA 1 Çukuriçi Höyük by Number of Bones (Graphic: A. Galik).

tom of the sea or floating between bottom and surface (see Fig. 5). While all these positions work with smaller and larger sinkers, the main reason for using different kinds of sinkers is an adaption to a certain sea floor.

The pierced discs of Early Bronze Age Çukuriçi Höyük weigh from 6 g up to 130 g. The discs cluster in four groups according to their weight and size (see Table 2). One very heavy piece (242 g) had to be excluded: it might have been used as an anchor. These groups are likely to represent different nets or net types that were used in different situations. Whether the sea floor is muddy, soft, sandy, pebbly or stony, the net – more specific the net sinkers – must be adjusted. On stony ground, for example, larger and heavier sinkers are advantageous. Smaller ones would easily get stuck between the stones, whereas larger pieces can lie on top. Furthermore, more small sinkers than larger ones are needed, which would increase the possibility of the net getting stuck between the stones.[31] On soft, muddy or sandy ground, on the other hand, net sinkers with smaller weights are the better choice. Large pieces will be bogged down into the ground and get covered. This could cause the net to rip apart when it is pulled out, not only losing the net sinkers, but possibly also destroying the whole net. Smaller and lighter net sinkers will not get buried too easily and even if they get stuck; it would be easier to pull them out without damaging the net.

It is better to use small and light net sinkers when floating the net between surface and bottom or directly under the surface, since the higher quantity makes it easier to balance sinkers and swimmers.[32] According to these considerations, the fishers of Early Bronze Age Çukuriçi Höyük seemed to have adapted their technique to different fishing spots.

The geoarchaeological and environmental studies by H. Brückner and F. Stock allow the identification of potential fishing activity zones. The closest shore and access to the sea – in the Early Bronze Age – was 1.5 to 2.0 km away from the tell (see Fig. 7).[33] The geological drillings showed that these areas had mainly silty and sandy under-

[31] Rosman 1980.

[32] Rosman 1980.

[33] Stock *et al*. 2013, 2.

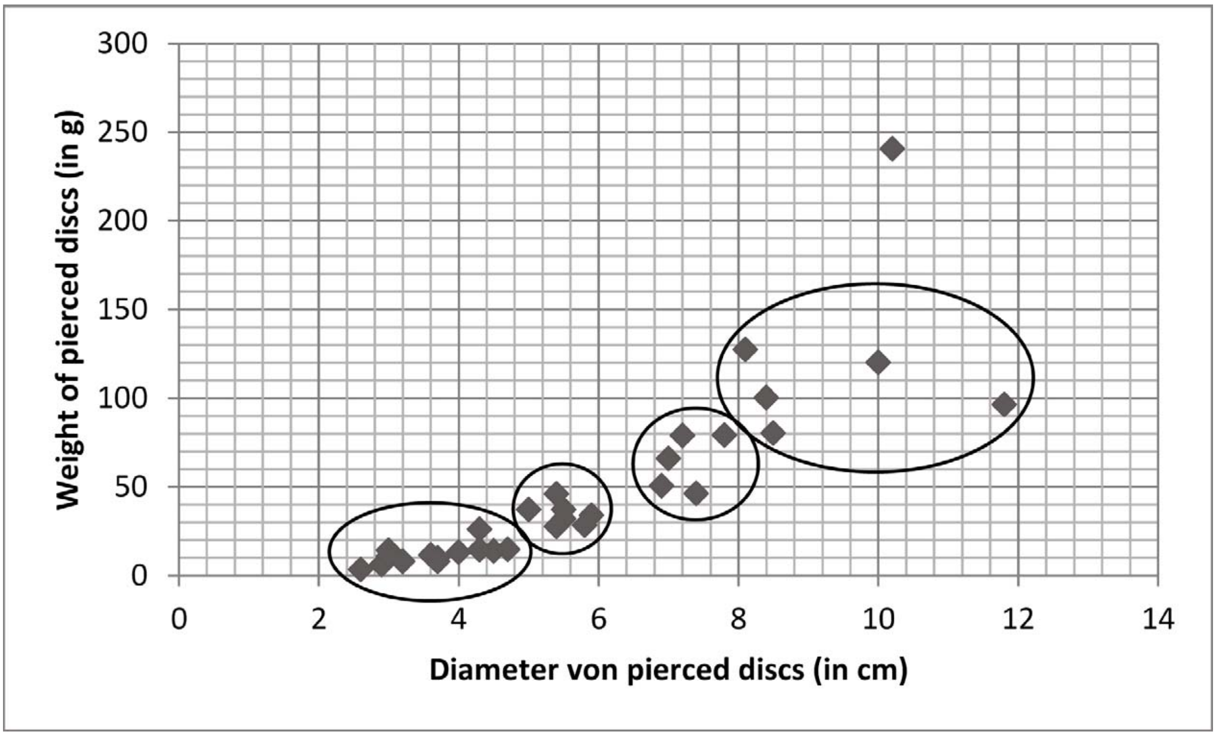

Table 2 Clustering of pierced discs – groups marked (n=32, n[g]=1491,6 g).

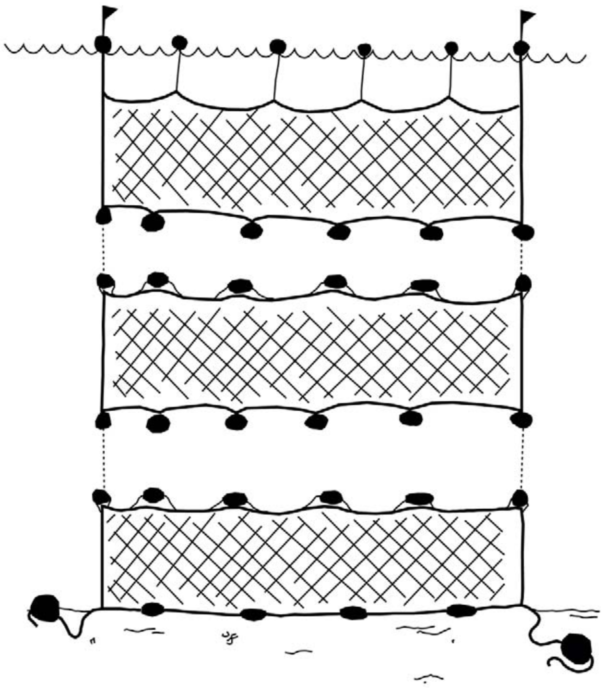

Fig. 6 Different possible Positions for Bottom Gillnets (Drawing: M. Röcklinger after Rosman 1980).

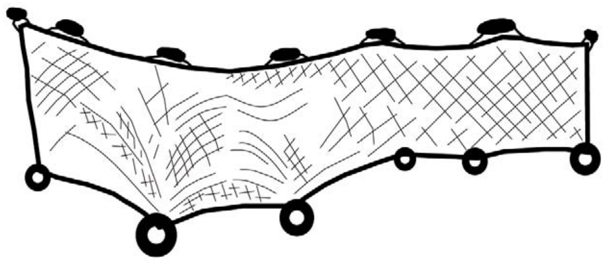

Fig. 7 Demonstration of the Consequences of uneven swimmers and sinkers (Drawing: M. Röcklinger after Rosman 1980).

ground and also featured remains of fish.[34] Additionally the studies of molluscs by A. Galik revealed a shift from stony to sandy habitat in the coastal area near Çukuriçi Höyük in the 4th and 3rd millennium BC.[35] Therefore, the shore of the lagoon represents the ideal fishing spot for bottom gillnets with light and medium heavy sinkers. Furthermore, an area with stony underground north of the neighboring Panayır Dağ could be found through the geological examinations.[36] This means that an ideal fishing spot for bottom gillnets with heavier net sinkers was available only 300 to 500 m further away during the Early Bronze Age.

[34] Friendly information from F. Stock.

[35] Horejs *et al*. 2012, 57–58.

[36] Friendly information from F. Stock.

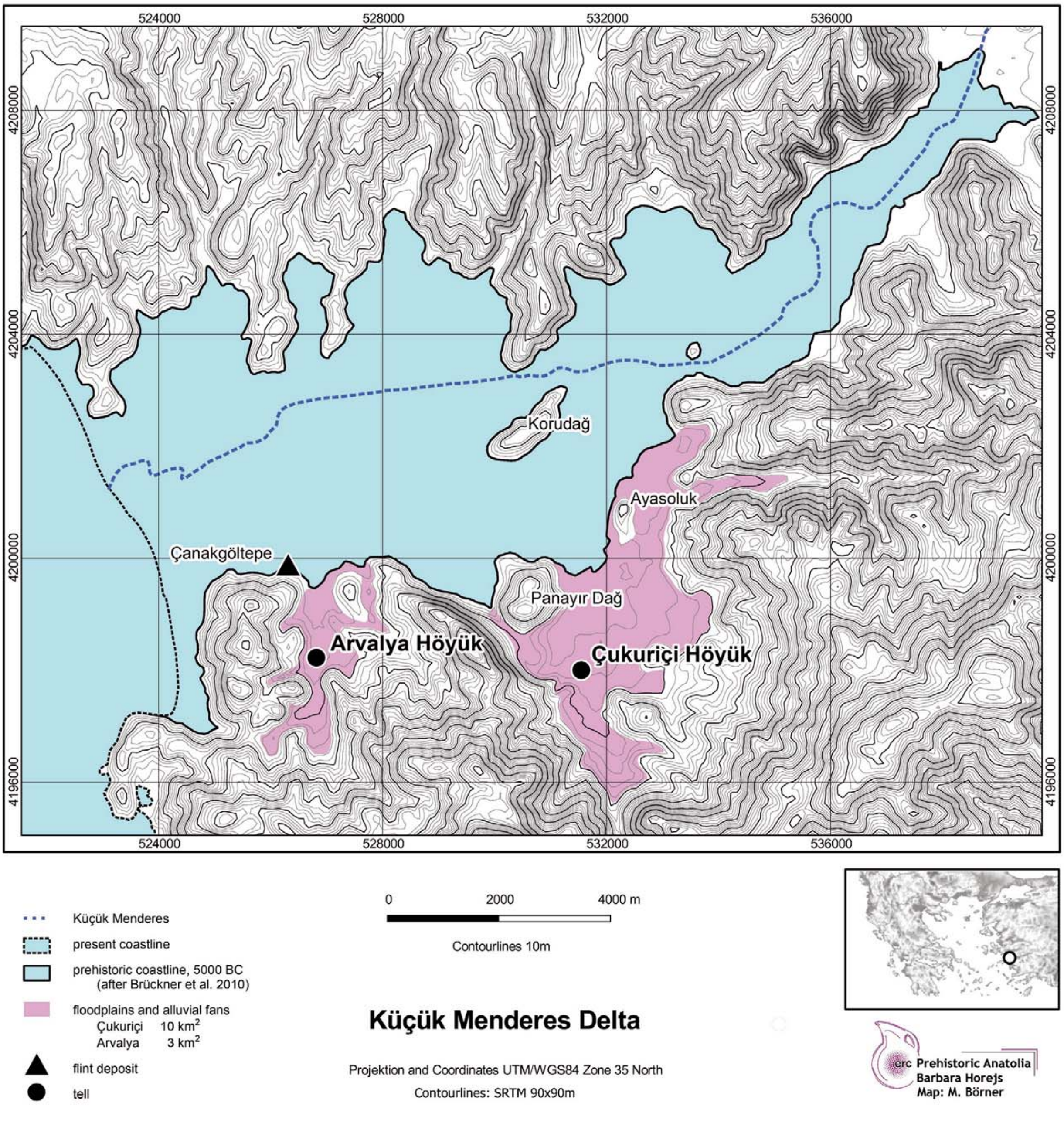

Fig. 8 Prehistoric coast line of the Küçük Menderes Delta (after Stock *et al*. 2013).

In addition to this adaption to geological conditions, a great knowledge of the hunted fish is necessary as well. A fisher has to know where and at what time to find which fish. A seasoned fisher will be able to get the ideal time frame for leaving a bottom gillnet in the water. If the net stays in the water for too long, predatory fish could track down the catch, eat it, or even worse: tear up the net.[37] The Archaeozoological research by A. Galik revealed that the fishers of Early Bronze Age Çukuriçi Höyük clearly had this kind of specialized knowledge. Two fish species – mullets and sparidae – were by far the most exploited species. The next largest group consists of chondrichthyes, such as sharks and rays. All these fish species had to be fished specifically using different tech-

[37] See Rosman 1980 and Powell 1996.

niques.[38] Mullets and sparidae mainly live near the coast and in brackish water. This perfectly fits with the estimated fishing spots in 1.5 to 2.0 km distance to the site. These facts clearly show a high level of knowledge and specialization within the fishing community at Early Bronze Age Çukuriçi Höyük.

Impact of Textile Production and Fishing

It has been demonstrated which techniques for textile production and fishing were used at Early Bronze Age Çukuriçi Höyük. The expertise necessary to conduct these crafts as well as the time and labor expenditure of textile production was explored. The study of the Early Bronze Age textile production clearly indicates that a high amount of working time and labor was needed, which suggests the involvement of many craftspeople. It could be demonstrated that it would take several people working several days to prepare the fibers, produce the yarn and weave it to a textile. Even only 1 m^2 of textile – far from being enough for any kind of clothing – would take up a lot of work time in the progress. Weavers would never be able to work effectively without multiple people spinning yarn, because otherwise the weaver would quickly run out of material. Such a relation between two (or even more) working partners needs to be organized. At the current state of research it cannot be definitely said how these procedures might have been organized, if certain social groups were committed to specific tasks, if work was freely organized or perhaps carried out according to a seasonal schedule. In any case, it is certain that the Early Bronze Age textile production at Çukuriçi Höyük was an organized craft. It could be shown that the textile production process was highly standardized. The weavers used only two different kinds of loom weights, with which they were able to produce two (or three) different kinds of textiles. In addition, the spindle whorls were perfectly fitted to produce (warp) threads for the weaving with these loom weights. To answer the question about the preferred use of either plant or animal fiber, it can be hypothesized via the shape of the spindle whorls that both plant and animal fibers could be spun, but that a preference for wool existed in the early 3rd millennium BC. All these specializations show a strong commitment to textile production as an important craft, even though the Early Bronze Age settlements of Çukuriçi Höyük feature an explicit specialization on metallurgy. Furthermore, the analyses revealed that both metallurgy and textile production were conducted on-site.

Similar insights could be made for fishing. While it was not possible to determine the time and labor expenditure for the prehistoric fishing technologies examined, it could be demonstrated that a high degree of expertise and knowledge was necessary. The fishers of Early Bronze Age Çukuriçi Höyük were specialized in net fishing, more specifically fishing with bottom gillnets. A specialization on certain fish species could be further noted, mainly on mullets and sparidae. These specializations show that the fishers had a great insight into the craft and could focus their efforts on specific targets.

This demonstrates that the people of Early Bronze Age Çukuriçi Höyük were not only magnificent metal workers but also skilled craftspeople in other fields of work. Both specializations in textile production and fishing technologies must be based on a long-term experience and therefore show a great devotion to these tasks and a potential preservation of local traditions. It implies that both these activities were carried out by the community that also specialized in metallurgical production. Furthermore, it seems very likely that these tasks were organized in some way. The question of how they were organized and which social groups carried out these tasks will be the focus of future studies. So far we pointed out the variety of different crafts carried out in a community of the early 3rd millennium BC. Different degrees of specialization are noticeable within the various crafts carried out at Early Bronze Age Çukuriçi Höyük. Nonetheless, both household-based crafts – fishing and textile production – feature a high grade of specialization and a potential preservation of local traditions.

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