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ARCHAEOLOGICAL AND ANALYTICAL INVESTIGATION OF A NEW NEOLITHIC SITE IN WESTERN ANATOLIA: EKŞİ HÖYÜK (DENİZLİ, TURKEY)

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ABSTRACT

Archaeological excavations in the western half of Anatolia in the Lake District and the Aegean coast had provided significant findings on how and when the Neolithic lifestyle emerged in these regions. However, until the beginning of archaeological excavations at Ekşi Höyük, our knowledge about the Neolithisation of the Upper Menderes Basin, which lies between these two regions, was limited to the Neolithic settlements identified during surface surveys. With the start of excavations at Ekşi Höyük, one of the oldest known settlements in Western Anatolia, it became clear how and when the Neolithic lifestyle emerged in the region. The excavations at Ekşi Höyük have also provided detailed information on the diet, raw material use, division of labour and specialisation of Neolithic communities in the Upper Menderes Basin. This paper presents the results of these excavations between 2015 and 2020. A combination of locus and code systems was adopted to record fieldwork, and vector drawing software was used for digitising finds and architectural remains. The distribution of finds and analyses of site use was carried out using GIS software. The ceramics' internal and external surface colours were measured with spectrophotometry equipment, and the additives were determined by macroscopic observations. Chipped stone finds were analysed typologically, and macroscopic observations were used to identify obsidian sources. Animal remains are presented statistically by species and age. The demographic distribution of the human remains and the identified diseases are presented.

KEYWORDS: Neolithic, Western Inland Anatolia, Ekşi Höyük, Lake District

1. INTRODUCTION

Over the past few decades, recent studies in western Anatolia have brought new perspectives to this region's Neolithisation process. While this process was previously described only with the data obtained from the Lake District, the excavations conducted at several Neolithic settlements in the Aegean coastal region, such as Ulucak, Ege Gübre, Yeşilova, and Çukuriçi have provided a new perspective on these debates. New data suggest that the Neolithic lifestyle in both the Lakes District and the Aegean coast emerged almost simultaneously in the first half of the 7th millennium BCE rather than spreading from the Lakes District to the Aegean coast as previously thought. Nevertheless, the absence of excavations in the basins between the Lakes District and the Aegean coast, fed by the Büyük Menderes River, resulted in a lack of understanding concerning the role of these areas in the Neolithization process of Western Anatolia until recently. So much so that this lack of research has caused the basins irrigated by the Büyük Menderes River in Southwest Central Anatolia to be defined as an intermediate cultural region of Hacilar Culture. Another reason the Upper Menderes

Basin is excluded from these debates stems from a more general paradigm. Within the context of these debates, the Upper Menderes Basin was often seen as lacking the environmental resources needed to support various means of livelihood, as a barrier separating Near Eastern cultures from European ones, or as a bridge transmitting these cultures into Europe for many years. Due to this approach, it came to be discussed that the lifestyle transposed to the Aegean coasts and Europe, especially in Southwest Anatolia, was shaped and spread after the river basins. (Özdoğan, 2014: 36) As a result, the role and importance of the Upper Menderes Basin in the Neolithic period have not been fully understood. However, archaeological surveys conducted in the region between 2003 and 2014 and recently commenced excavations at Ekşi Höyük show that the situation is quite different from what was previously considered. The fieldwork, which initially focused on the investigation of the plains of the basin and later extended to the mountain region, shows that there is a total of 18 settlements (Fig. 1) along with Ekşi Höyük. (Abay, 2011: 20; Dedeoğlu, 2014; Dedeoğlu *et al.*, 2016: 554)

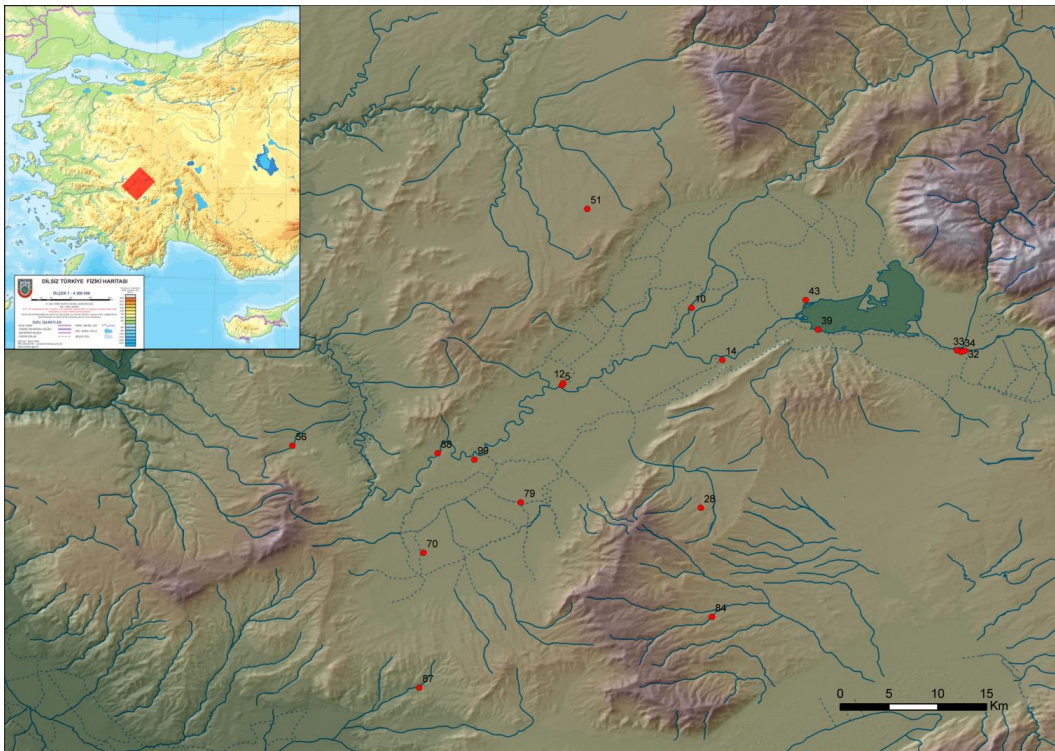


Figure 1. Neolithic settlements found in the Upper Menderes basin

The information obtained from the analyses of the surface finds supports the initial results obtained from the excavations at Ekşi Höyük. Monochrome and painted pottery discovered during the survey indicate that the region was mostly populated contemporaneously with Neolithic settlements in the

Lakes District. In addition, surveys conducted in the north/northeast of the region and the Neolithic settlements discovered in the south have also yielded similar results.

The Archaeological Excavation Project at Ekşi Höyük is a research initiated based on the results of

systematic archaeological surveys to reveal the settlement patterns in the Upper Menderes Basin during prehistoric times. In addition to collecting information about the Neolithization of the basin, the project aims to acquire data concerning the organisation of communities that established the settlements, their livelihood strategies and space use shaped by their organisational forms. As the more significant part of the cultural deposit of the settlements consists of layers dated to the Neolithic period, which can be followed in a nearly uninterrupted fashion, it becomes possible to evaluate the archaeological remains extensively and holistically, as well as to understand the changes and transformation processes peculiar to the Neolithic itself. This paper gives an overview of the archaeological finds uncovered during the excavation at Ekşi Höyük between 2015 and 2019, resulting from the interdisciplinary studies conducted on the assemblages. In the second section, information on

the settlement's location is presented. The third section discusses the stratigraphical data of Ekşi Höyük. Following this, the stratigraphy of the mound from the earliest to the latest levels is described until the eighth section. In the eighth section, demographic and pathological information about the individuals identified in the cemetery area above the mound is presented. In the ninth section, the Neolithic period data of Ekşi Höyük are evaluated in general and a comparison with the contemporary Neolithic settlements in the Lakes Region, Coastal Aegean and Greece is presented.

2. THE SITE

Ekşi Höyük is built on a natural hill (Fig. 2), corresponding to Neogene (Pliocene) lacustrine layers, following the east-west direction. (İlhan *et al.*, 2020: 662)

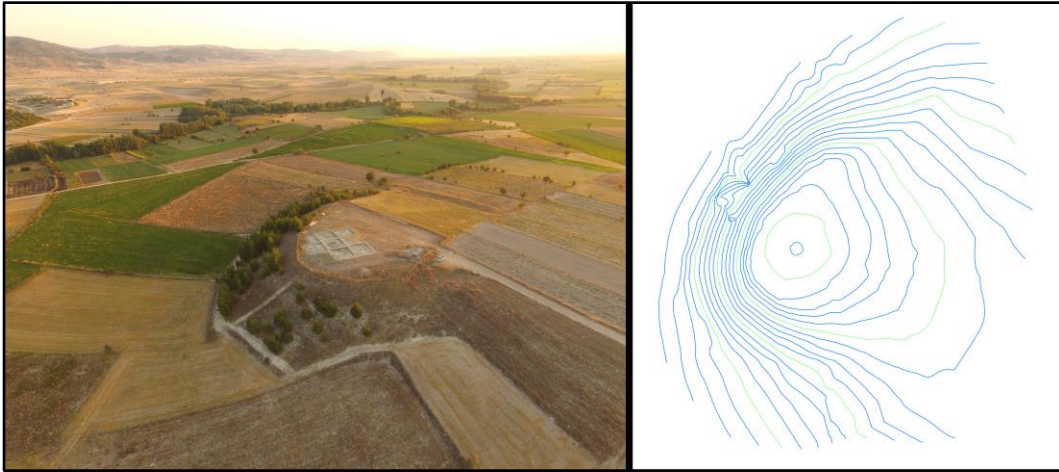


Figure 2. Ekşi Höyük and its topographic plan

It is situated in the Denizli Province, within the boundaries of the Çal district, at an altitude of approximately 819 metres above sea level. The settlement, spreading over an area of roughly 2 hectares, is located in the northern part of the Baklan Plain, around 500 m south of the Büyük Menderes River, a natural boundary between Çivril and Baklan Plains. (Dedeoğlu *et al.*, 2019: 2) The mound's location at the starting point of the natural route connecting the Çal Basin and Çivril-Baklan Basins (Ceylan, 1998:

236–239) made it possible for the communities residing in the settlement to communicate and, accordingly, interact with the surrounding regions. Another factor that makes the settlement suitable for inhabitation is its proximity to the Büyük Menderes River, the most crucial water source of the basin, and the wetland located in the southeast of the hill, which today is called Geren Lake. Geoarchaeological studies have revealed that this lake also existed in the Neolithic period. (İlhan *et al.*, 2020: 680)

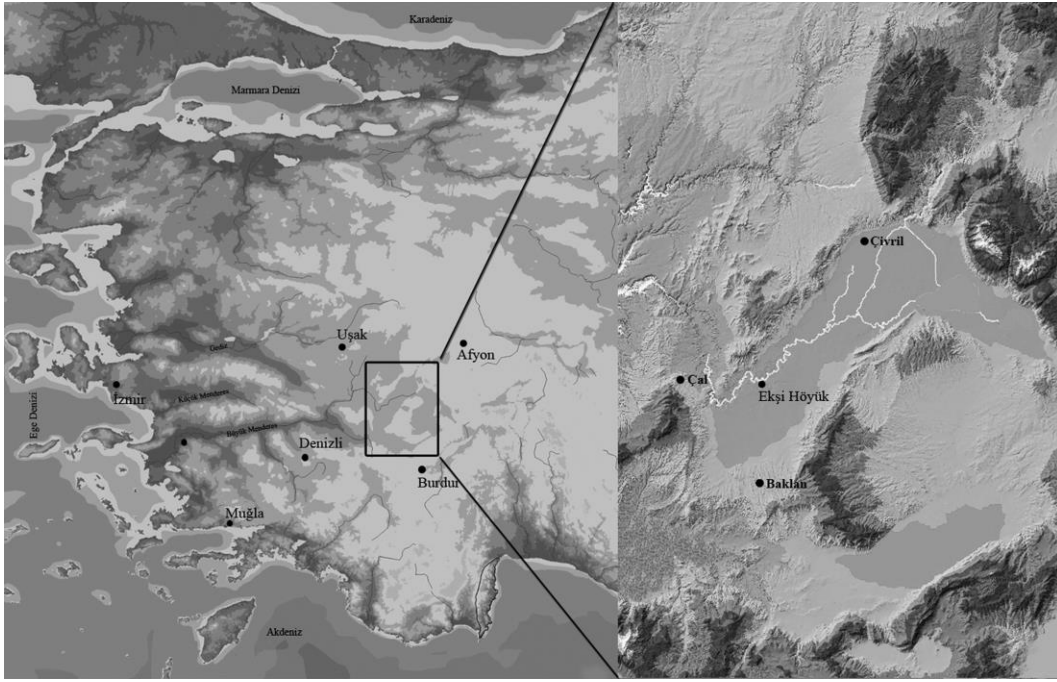


Figure 3. The location of Ekşi Höyük in Western Anatolia

3. STRATIGRAPHIC SEQUENCE AND ANALYSIS OF RADIOCARBON DATES

Geoarchaeological research on the mound indicates that the cultural fill is approximately 2 metres thick. (Öner *et al.*, 2019: 1068) During the archaeological excavations carried out between 2015-2019, seven settlement levels were identified; however, the initial settlement period of the mound has not yet been revealed.

The earliest strata detected during the excavations of the settlement conducted until 2019, belonging to phases 7 and 6, are defined by red, lime-plastered floored rectangular structures. Analysed sample from level 7 yields the calibrated dates of 6825-6587 BCE with a probability of 94,7%. Defined by the apsidal constructions, phases 5 and 4 lay over the previous layers. Limited data is available for phase 5. Carbon samples taken from the late stage of phase 4 indicate occupation between 6200 and 6000 BCE. The findings of phase 3, which continued uninterruptedly after phase 4, indicate occupation between 6000-5875 BCE, while the following phase 2 is defined only by burnt floors and ceramics dated relatively to 5500-4400 BCE. After Phase 2, the mound was not resettled. Finally, in phase 1, the hill was used as a burial site, carbon-dated to the 10-11th century (Fig. 4 and Table 1).

Stratigraphy of Ekşi Höyük	
Phases	Dates
1	10th – 11th c. CE
Hiatus	
2	
3	6000-5875 BCE
4	6400/6300-6000 BCE
5	
6	6750-6600/6500 BCE
7	

Figure 4. Stratigraphy of the mound

A total of 10 radiocarbon samples from the Neolithic phases of Ekşi Höyük were analysed. Four samples were selected from burnt wood and the rest from bones. One sample was analysed by Beta Analytic, and the rest were analysed by TÜBİTAK MAM using the AMS method. The results are presented below.

Table 1. Ekşi Höyük radiocarbon dates (Radiocarbon dates calculated using OxCal with calibration curve Reimer et al. 2020)

Ekşi Höyük Phase	Lab. / Sample No.	Sample Type	Pre-treatment	Sample Context	$\delta^{13}C$	Conventional Age BP	Calibrated Date BCE (2 σ range)
7	TÜBİTAK-0327	Charred Material	Acid-Base-Acid	Open Space	-26,6 ± 0,7	7838 ± 38	(%94,7) 6825-6587
7	TÜBİTAK-0325	Bone	Collagen Extraction - Ultrafiltration	Indoor-Hearth	-21,7 ± 0,9	7649 ± 38	(%95,4) 6589-6432
6	Beta-454516	Bone	Collagen Extraction - Ultrafiltration	Indoor	-19,9 o/oo	7800 ± 30	(%95,4) 6691-6516
4a	TÜBİTAK-0058	Charred Material	Acid	Courtyard-Hearth	-22,0 ± 0,8	7329 ± 34	(%95,4) 6241-6077
4a	TÜBİTAK-0059	Charred Material	Acid-Base-Acid	Courtyard	-22,5 ± 0,9	7250 ± 35	(%95,4) 6222-6030
4a	TÜBİTAK-702	Bone	Collagen Extraction - Ultrafiltration	Indoor	-18,3 ± 0,8	7238 ± 34	(%95,4) 6221-6022
4a	TÜBİTAK-2405	Bone	Collagen Extraction - Ultrafiltration	Indoor	-	7193 ± 34	(%95,4) 6212-5986
4a	TÜBİTAK-0429	Bone	Collagen Extraction - Ultrafiltration	Indoor	-19,8 ± 0,6	7131 ± 35	(%95,4) 6067-5920
4a	TÜBİTAK-2406	Bone	Collagen Extraction - Ultrafiltration	Indoor	-	7024 ± 34	(%95,4) 5990-5805
4a	TÜBİTAK-0427	Charred Material	Acid-Base-Acid	Courtyard-Platform	-21,9 ± 0,5	6865 ± 34	(%95,4) 5834-5668

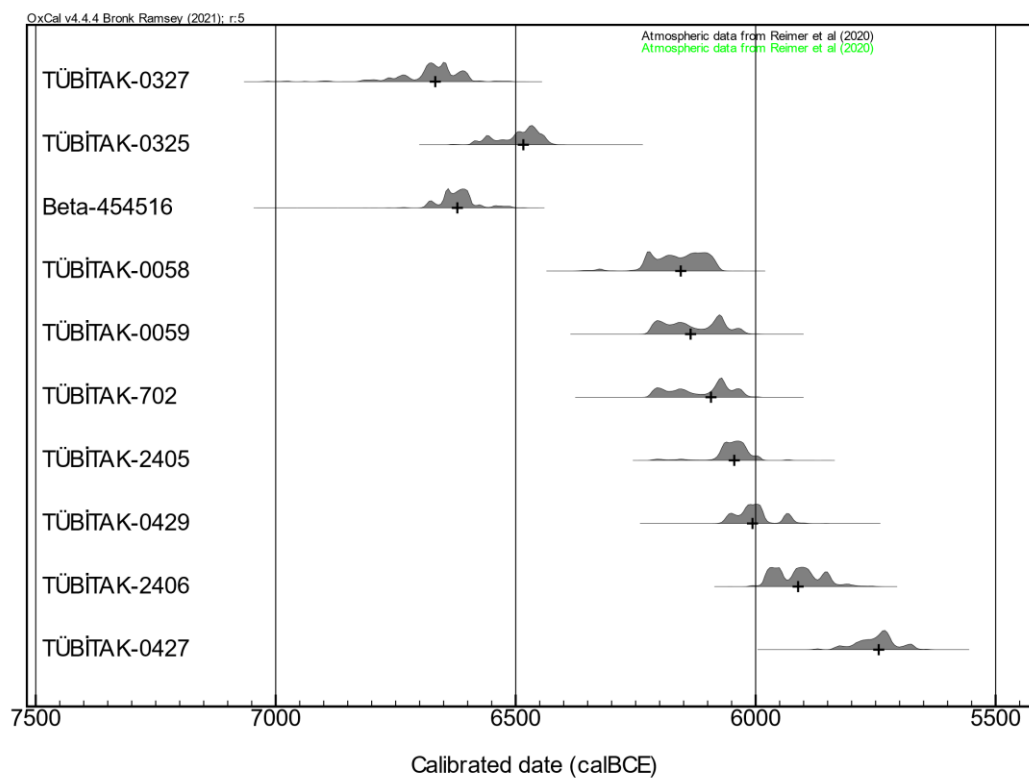


Figure 5. Calibrated radiocarbon dates of Ekşi Höyük

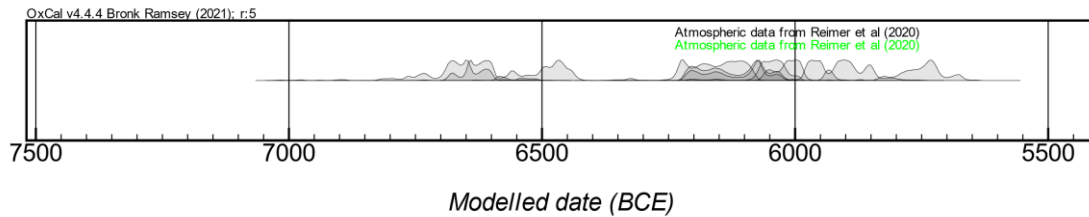


Figure 6. Stack view of Ekşi Höyük's Radiocarbon Results

Most samples belong to Phase 4a, except for two samples with median values of 5912 cal BCE and 5744 cal BCE. This phase is dated to approximately 6200-6000 cal BCE. The calibrated results of a bone found in Phase 6 lime-plastered structure yield a median value of 6622 BCE. One of the samples dated to Phase 7 is the burnt wooden remains recovered from the pit of a pole, which is thought to have carried the upper cover of the lime-plastered structure. The other sample was taken from the hearth inside the structure. The 7th and 6th phases are dated to 6750-6600 BCE when these samples were evaluated. No pottery shards from these phases were found during the current studies (Figs 4, 5, 6 and Table 1).

4. ARCHAEOLOGICAL FEATURES

Ekşi Höyük excavations were started in two trenches, each 100 square metres in size, located at the highest point of the hill. New excavation areas were created in the northeast, west and south of these areas

in the following years. The new trenches' location was determined to examine the Neolithic phases on a broader area to provide the spatial outline and understand construction techniques during the entire prehistoric occupation. The excavation areas to the west of the hill function as stepped trenches due to the natural slope and make it possible to investigate the phases dated to earlier periods.

5. THE EARLIEST OCCUPATION: PHASES 7 AND 6

The earliest settlement uncovered on the mound is represented by the lime-plastered floored rectangular structures, which were built throughout phases 7 and 6, dated 6780-6593 BCE. These structures, which continued uninterruptedly throughout both phases, show similar features in their directions, forms, and construction techniques, apart from a few differences that will be mentioned below (Fig. 7).

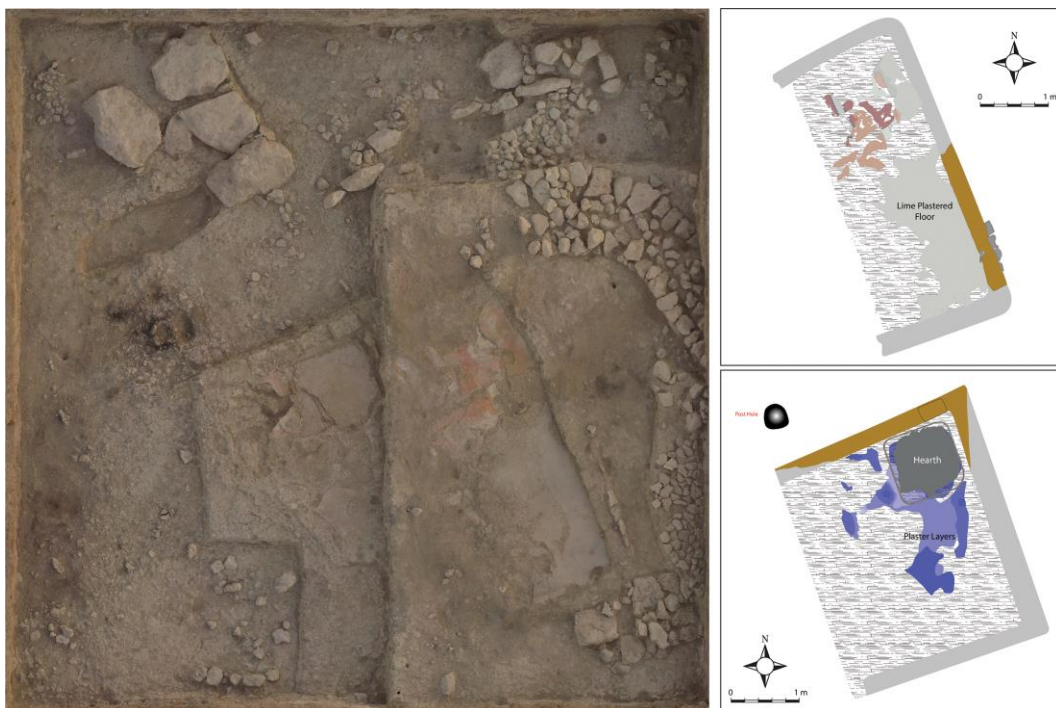


Figure 7. Aerial photograph of the lime-plastered floors (on the left), drawing of the lime-plastered structure of phase 6 (upper right), and drawing of the lime-plastered structure of phase 7 (bottom right)

The archaeological finds belonging to phase 7 consist of a building unearthed in an approximately

20 m² area, a posthole pit just outside this structure, and a fire pit with a diameter of 80 cm. The preserved

part of the rectangular structure measures 3 x 3,5 m and is northwest-southeast oriented. The building has a thin mudbrick wall with a thickness of 25 cm and a red lime floor with five separate plaster layers. It is understood that during the construction and renovation phases of the lime floors, a dense-textured base of about 2 cm thick, consisting of small-sized pebbles and sand, was plastered with a thick and hard-structured lime and painted using red colour. The most important architectural element that distinguishes the building from its successor is the large (90 x 90 cm) square hearth with rounded corners located northeast of the building. The hearth and the floor of the building were plastered simultaneously five times, and the same construction technique was used in both. An approximately 8-10 cm thick ash fill was removed from the uppermost plaster of the hearth, which is devoid of any finds except for a single chipped flake. The fact that the hearth was built in this structure, its relatively qualified construction style, and the lack of finds related to consumption detected in the upper fill suggest that this hearth may have been built for a different function than a simple cooking place. Just outside the northwest wall of the building, there is a posthole with a diameter of 35 cm, possibly associated with the roofing, in which a piece

of burnt wood is preserved. Another architectural element defined outside the space is a large 80 cm diameter fire pit. While its upper fill consists of burnt soil and ashes, the animal bones detected inside the fire pit may indicate that this area served the purpose of food preparations.

Maintaining the tradition of rectangular buildings with lime floors, another building was constructed within phase six. This building was constructed somewhat similarly to its predecessor, with a lime floor consisting of many plastering layers. All four plastering stages were painted with different decoration motifs. The decoration of the earliest phase was created by dividing the red paint into sections with cream-coloured bands. These bands are bordered on both sides by parallel black lines. The inward sides of the black lines are decorated in a saw-tooth pattern, facing each other. The decoration template used in the second plastering phase incorporates several differences. At this stage, the red paint is divided by a wider cream-coloured band, and straight grey lines delimit the band on both sides. In addition, two straight stripes, 2 cm thick, running parallel to the edges in the centre of the band, divide the cream-coloured band into three sections, wide on both sides and narrow in the middle.



Figure 8. Details of the first plaster layer of the lime-plastered floor of phase 6

Contrary to its predecessor in the previous phase, no other finds could be found inside or outside this building, apart from a fragment of animal bone and a round clay object (token). Although this makes it difficult to interpret the buildings' function, the lime-plastered floors in both phases were probably deliberately cleaned.

Similar structures are known from Aceramic Hacilar, Bademağacı 8, Ulucak VI, Çukuriçi XIII and Girmeler settlements in Western Anatolia. Except for the Girmeler example, dated to the 8th millennium BCE, all lime-plastered floors are dated to the first half of the 7th millennium BCE. (Mellaart, 1970: 3–8;

Takaoğlu *et al.*, 2014: 113–114; Horejs *et al.*, 2015: 297–298; Duru and Umurtak, 2019: 129; Çevik and Erdoğan, 2020: 78)

Chipped stone samples constitute the largest group of finds from the sixth and seventh phases. So far, no pottery has been found, but a limited number of bone tools were detected, including awls, spatulas, and other processed bones used for various purposes.

5.1. Chipped stones

Chipped stones from the Neolithic Ekşi Höyük give an insight into a rich assemblage of two main groups of finds – obsidian and non-obsidian. Within

the second group, various raw materials macroscopically correspond to various chert types, chalcedony, opal, jasper, radiolarite, silicified limestone and quartz, among others which vein, milky and clear quartz (rock crystal) were knapped in small portions. While the in-depth analyses will be presented elsewhere, the current study outlines the significant differences between the assemblages of the earlier phases 7 and 6 and the later occupation layers in phase 4. The methodology follows the study of lithics from the Neolithic sites in Western Anatolia by Milić (2018), and it involves detailed technological analyses and macroscopic raw material study. Further examination of lithics will focus more on a diachronic perspective while considering the latest prehistoric occupation in levels 3 and 2, spatial analyses and provenance studies of obsidian.

Altogether, slightly below 4000 chipped stones (more precisely 3705) were discovered during excavations between 2015-2020, while the material from excavations in 2021 was not counted in. Additionally, out of 3705, 1069 artefacts come from non-stratified layers, either presenting finds from the surface, trench opening, profile cleaning, or artefacts attributed to phase 1, which are taken as mixed material as well, bearing in mind the dating (10-11th century AD) and the excavation context. This paper offers the first results deriving from lithic technology, focusing on the primary production and secondary modification of blanks, and is based on a smaller sample size. Considering the entire material

associated with phases 7 to 4, obsidian takes 19,9% of the assemblages in contrast to other raw materials used for the production of chipped stone tools on the site. On the other hand, obsidian presence varies in phases, and diachronic changes concerning the use of non-local raw materials should be investigated further.

Currently, a small number of 213 chipped stone artefacts were documented in clear contexts in phases 7 and 6 from the areas excavated prior to the 2021 field season, which also brought more findings from the same dating. Obsidian in the earliest levels takes only 5%, and it is mainly available in transparent varieties, which could macroscopically be associated with Central Anatolian sources, apart from one matt piece. However, forthcoming publications will involve the results of pXRF provenance studies and demonstrate more precisely when the obsidian from Melos (recognised macroscopically in the slightly later and mixed context) started appearing in the assemblages, as well as what was the ratio between the use of obsidian originating from Cappadocian and Aegean outcrops. Besides, there is an area in the earliest phase disturbed by later Neolithic building activities, which could potentially enlarge the number of finds, including obsidian, available in more varieties as well. Therefore, future excavations might shed new light on the exact proportions of obsidians at the settlement foundation, particularly regarding long-distance cultural connexions with both east and west.

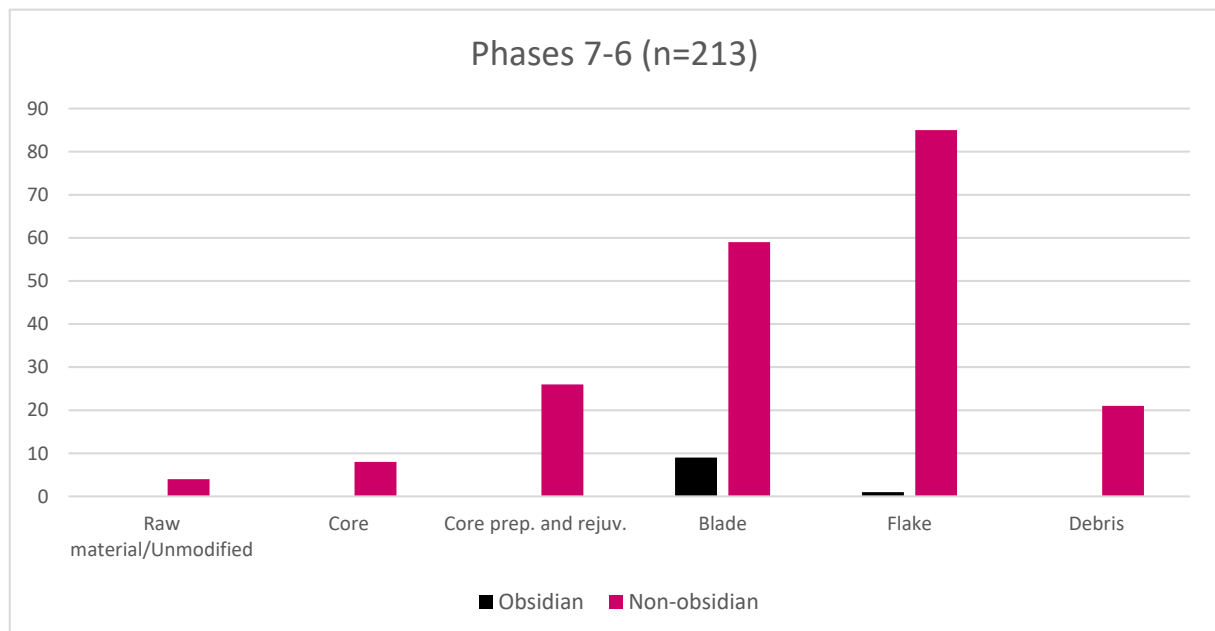


Figure 9. Categories related to the primary production of blanks in the earliest Neolithic phases 7-6

Technological analyses were employed to differentiate the main categories in the primary production of blanks, where the presence of raw or unmodified pieces, cores, core preparation, and rejuvenation elements, blades, flakes, and debris were recorded (Fig. 9). In the settlement's earliest phases, 7

and 6, obsidian artefacts belong to regular (mainly pressure) blades and a single flake, which are currently suggesting the involvement of obsidian in the site exclusively in the form of ready-made products. However, this should be taken as preliminary due to the existence of quite a few artefacts in the mentioned disturbed area attesting to obsidian production on-site (with finds belonging to core rejuvenation marked), which still needs to be clarified within the new excavations.

On the contrary, non-obsidian finds speak in favour of the presence of local production of blades and flakes. Two main raw material groups were encountered as noteworthy at the beginning of the settlement. The first corresponds to the vein and clear quartz (rock crystal), which do not commonly appear as significant in the later levels of occupation at Ekşi Höyük as here. All unworked raw pieces and 5 of the 8 cores documented in the non-obsidian group belong to rock crystal and vein quartz and are followed by an opening flake, ten thin flakes, one blade and debris in the same raw material. Despite still a low number of quartzes finds, direct percussion of cores set on an anvil and knapping of thin flakes and blades are attested at the earliest levels, suggesting an opportunistic or ad-hoc production of blanks by the use of the hard hammer.

The second group, belonging to different varieties of chert, opal, chalcedony, and jasper, points out the production of flakes and blades on potentially local raw materials, which through the presence of cores, core maintenance elements (preparation and rejuvenation) in association with debris clearly demonstrate the existence of a production on-site. Cores made on thick flakes are either exhausted or fragmented and bear uni- and multidirectional negative scars from the detachment of flakes and blade(let)s. A single core informs about knapping on an anvil, where opposite directional negatives were recorded. On-site knapping is best confirmed with the presence of preparation flakes (decortification and opening flakes) and rejuvenation elements, such as crested flakes, lateral blades, plunging and debitage surface correction specimens. Flake blanks are slightly more frequent than blade blanks and mainly correspond to thin non-cortical flakes with unidirectional and rarer multidirectional scars. Apart from thin flakes, a small number of thick and thin cortical flakes, some laminar, hinged and flakes smaller than 2 cm, exist in the assemblage of the non-obsidian raw material group. In the group of blades, available in lengths between 25 and 42 mm, unidirectional blades are dominant, attesting to the use of direct percussion and pressure technique, besides a single bladelet which is the product of knapping on an anvil. Pressure blades (currently

taking around 30% of blade blanks) were possibly produced locally (bearing in mind raw materials corresponding to cores and rejuvenation elements) and are currently speaking in favour of the use of hand, sitting and standing pressure (following blade widths from Pelegrin, 2012). Finally, three different blank production methods were employed in the earliest phases 7 and 6 at Ekşi Höyük in the non-obsidian raw material group – direct percussion (with a hard and soft hammer) for the production of flakes and blades, pressure blade making, and direct percussion of cores set on an anvil. Furthermore, few artefacts also show the recycling of old hammer stones, suggesting a wide use of direct hard percussion on site.

Amongst 213 chipped stone artefacts from phases 7-6, 33% of blanks show secondary modification bearing retouch or macroscopic edge scars. In the group of obsidian and quartz finds, only a few blanks have further modifications, belonging to retouched blades, flakes and a pièce esquillée. The largest group of modified blanks belongs to blades (31) and flakes (25) in non-obsidian. Besides laterally retouched blades and flakes, notched, denticulated pieces and pièces esquillées, sickle blades used with or without retouched are noteworthy. They make almost half of the tools made on blade blanks and are particularly interesting due to their sizes and morphology compared to those in the later Neolithic occupation levels. Sickle blades in the earliest phases are relatively small (14-30 mm in length), made on less regular blades, with the majority having the gloss oblique to the edge of the blades. It is interesting to observe the appearance of small denticulated (and sometimes backed) sickle blades, which are not commonly attested in other early Neolithic sites in western Anatolia (Milić, 2018), and can therefore be considered as a particular element at Ekşi Höyük at the moment, which should be investigated further in the site's sequence.

6. CHANGES IN SOCIAL ORGANISATION: PHASES 5 AND 4

At Ekşi Höyük, the rectangular structures with red lime floors are followed by phases 5 and 4, where buildings with apsidal plans were used. Although these phase structures have a completely different construction technique than the previous phases, it is understood that they were built in the same direction (northeast-southwest). Out of the apsidal buildings with 1 m thick walls, there is a single building belonging to phase 5, which has been unearthed in a 15 m² area. In this regard, the data from phase 4, which were detected within an approximately 300 m² area, enables us to better understand the general characteristics of the settlement (Fig. 10). Two

settlement phases are identified in this phase, which prominently differs from each other. The plan of the architectural structures belonging to the early phase named 4b consists of a 21 m² large apsidal building and the rectangular structures detected around this

building (Fig. 11). The apsidal building is located at a point close to the centre of the settlement. Small flat stones were paved under the floor of the 4 m² west-facing entrance of the building.



Figure 10. 4b-4a apsidal and rectangular buildings

Rectangular structures were built on both sides of the apsidal building; however, only the southwestern structure yielded detailed information. This rectangular structure has a 40 m² area of use. The north-western wall of this building was constructed adjacent to and parallel with the south-eastern wall of the apsidal building. A 1 m wide opening on the eastern wall of the building served as an entryway, and a furnace was designed adjacent to the wall right north of this entrance.

Evidence indicates that the apsidal building was sealed intentionally, and the floor of the next phase was built upon it. The sealing was accomplished by

first burning the building and then placing mudbricks on the floor in an orderly manner. The building was burnt excessively, with the fire also impacting the finds inside. The apsidal building underwent comprehensive changes during phase 4a, corresponding to the later usage stage. After the burning ritual, the front section of the building was cancelled, and the area of use was reduced to 11 m² from 21 m². Unlike in the previous phase, a square-shaped furnace exists on the southwestern corner of the building. It could be stated that there was a differentiation not only in the apsidal structure but also in the general architectural design in phase 4a.

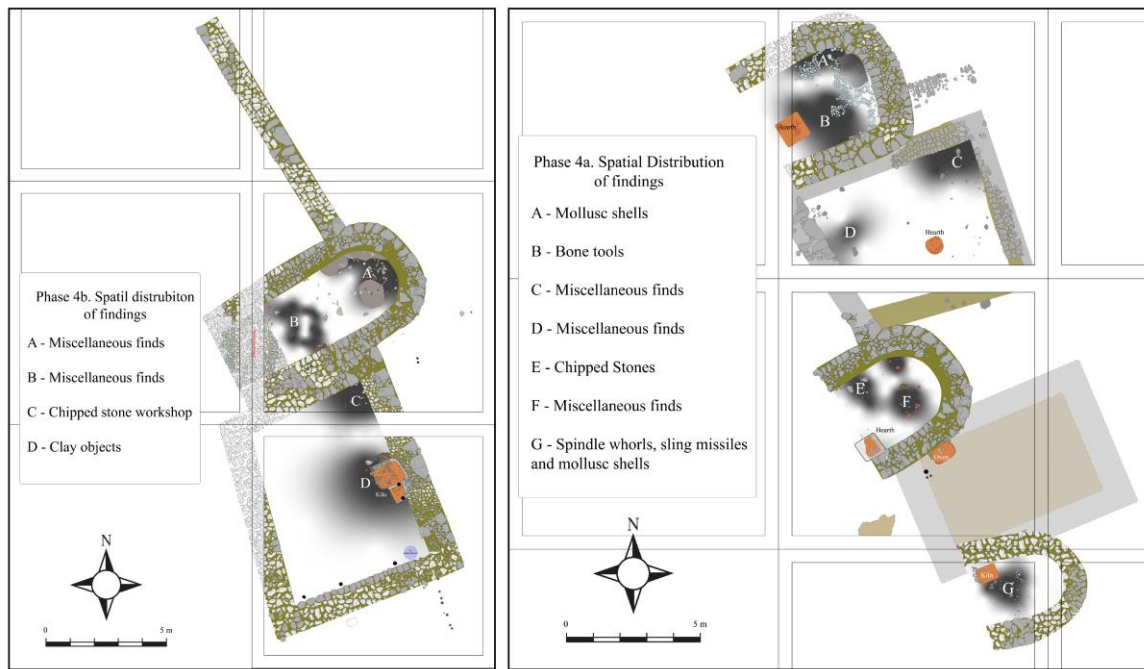


Figure 11. Phases 4b and 4a structures

Along with this phase, two more apsidal structures were identified apart from the existing apsidal structure. These two newly added apsidal buildings were built in the same orientation as the central one. One of the new apsidal buildings is located 4 metres from the central apsidal building while the other is 6 metres away from it, and there are rectangular courtyards between buildings.

The northern apsidal building has a 13,5 m² area of use. The entrance of the building is probably located in the southwest direction, and a square-shaped furnace was uncovered in the western part. The floor of the building was built by laying small stones with dimensions ranging between 5-15 cm and then covering them with a thin layer of plaster.

The area of use within the walls of the apsidal building in the south is approximately 8 m². There is a similar type of hearth adjacent to the room's northern wall, some of which remains in a section and another part of which was destroyed by the burial of the 10th-11th century, possibly similar to those found in other buildings.

It is considered that the spaces between the apsidal structures were used as courtyards. The northern courtyard has an area of 28 m², while the uncovered area of the southern courtyard is 20 m². There exists a platform on the north-eastern corner of the northern courtyard. Another architectural element in the courtyard is the hearth with a diameter of 35 cm, the floor of which is paved with pottery pieces. The only defined architectural element in the southern courtyard is an oven built adjacent to the north wall.

6.1. Use of Space: Production, Daily Life and Ritual Practises

The intensity and context of finds from phase 4, the most extensively studied phase at Ekşi Höyük so far, enable us to make certain implications about the daily life practises and production activities of the community which resided at the site.

A remarkable number of finds were detected inside the apsidal structure, which constitutes the focal point of the first stage of phase four. Bone awls, chipped stone tools, figurines and more than 300 sling missiles were uncovered at the entrance of the building. Abundant grinding stones found *in situ* in the inner section of the building suggest that this area was used intensively for food processing purposes.

The finds and architectural elements identified in the large rectangular structure located south of the apsidal building contain data regarding different areas of use corresponding to activities in separate sections of the building. For instance, the kiln adjacent to the room's eastern wall and its immediate surroundings were used to produce and fire clay objects. Clay objects found in this location, the great majority composed of sling missiles, provide evidence of the area's function. Another piece of evidence supporting this interpretation is the waste/unusable clay objects found in the ash in the "ash pits" created in front of the kiln to sweep the ashes. These "waste clays" were presumably swept to "ash pits" along with the ashes from the furnace. Eight opal cores found north of the area *in situ* and presumably associated bladelets show that this section was used to produce lithic tools. The

distribution of the finds found in the building shows that this area was used intensively in at least two activities, the production of clay objects and chipped stone.

The data obtained from phase 4b at Ekşi Höyük offers essential clues about rituals and symbolism. The deliberate burning of the apsidal structure, its closure with mud bricks, and its continued use in smaller sizes show that it is not just a living space but has a symbolic meaning and associated ritual activity. In fact, the continuity of the use of buildings and similar ritual practises can be defined in some contemporary settlements. Several interesting details associated with the ritual practice in the apsidal house

at Ekşi Höyük are noticed. It is noteworthy that in the burned section of the building, the finds are significantly less in number compared to the other part of the building and that there was a bovine scapula on the floor, in situ, that could be associated with the ritual.

On the other hand, it should be noted that many of the figures of this phase were also identified within this structure. Clay figurines were located in this area, including two human heads with paint and masks and a human head wearing a mask with added horns. It is presumed that these types of masks may have been used in ritual activities within the community and have specific importance.



Figure 12. Examples of phase 4b clay figurines

Another archaeological evidence for the rituals and symbolism in phase 4b comes from the rectangular structure where intensive production activities were carried out. In the southern part of this building, in front of the wall, 4 bull statues, produced in different sizes and buried below the floor level, were unearthed. The head, horn, and legs of the figurines, all of which were made by drying a white, fine textured clay, were found in the same area (Fig. 13).

This gives the impression that the limbs of the figurines were deliberately broken. Although it is not clear whether this action took place during the installation phase of the building or its use, it is important in terms of showing domestic ritual practises in phase 4b. Existing archaeological data indicate that clues to ritual and symbolism seen in phase 4b are not so intense in its successor phase 4a.



Figure 13. Deliberately broken bull figurines of phase 4b

For example, an area with baked/unbaked clay objects and a workshop with chipped stone flakes were unearthed on the floor of the apsidal structure dated to phase 4a. Numerous bone tools found in the other apsidal building located north of this structure indicate that this space may have had a function for the production and/or the intensive use of bone tools. Furthermore, the existence of another area with a concentration of mollusc shells provides evidence of the community's food consumption. It is understood that the apsidal building in the south, especially the oven and its surroundings, which was built adjacent to the northwest wall of the building, was used extensively to produce clay objects. Numerous baked and unbaked sling missiles, spindle whorls, weights and clay objects were unearthed in and around the oven. In addition, a lump of clay, which is likely to be used to produce clay objects, was also found in this kiln. Marks from a straw mat were found on the bottom of all the objects unearthed in the kiln and its surroundings. It can be thought that the mat, which appears to have been laid in this area, was perhaps used to disconnect unbaked or dried clay objects from the moist soil. There is also some data on the use of the two courtyards located between the apsidal structures in phase 4a. Although the exact boundaries of the southern courtyard cannot be clearly defined, it can be said that it is located between two apsidal structures. Various animal bones found inside and around the furnace designed adjacent to the apsidal building in the northern section of the courtyard

might suggest that it served the purpose of cooking food. Boundaries of the northern courtyard are more properly defined. A large number of obsidian and chert bladelets and a grinding stone that is fixed on the ground were found on a platform located on the northeastern corner of the courtyard. The flat-shaped figurine, which was found on this platform and without any gender characteristics, constitutes the only figurine that belongs to this phase.

In general, apparent differences between the two phases (4b and 4a) existed, particularly concerning the spatial organisation and the use of space, even though the formation of the latter phase was undoubtedly following a continuity in keeping the apsidal building tradition by the community.

6.2. Pottery and Small Finds

In the 4th phase of Ekşi Höyük, there are mostly monochrome ceramics with red or brown slips, and no paint decoration is encountered except for a few examples consisting of simple band motifs (Fig. 14). It can be remarked that the ceramics from 4a and 4b have similar characteristics in general. S-profile bowls and jars, which are characteristic of the Neolithic period, constitute the largest group, some of which have handles and animal head attachments unique to this period. In addition to the bowls and jars that were detected with ratios of 58% and 39% respectively, plates and miniature pots were also found with a ratio of 2% and 1% respectively. The majority of jars (42%) have short necks and semi-spherical bodies. Other jar

forms include those with everted rims, short necks and globular bodies, and those without necks. No carinated bowls were found. The most frequently attested bases are the flat ones (53%). Other base shapes detected in this period are disc (27%) and ring (20%) types. Vertically perforated lugs make up the majority (65%) Around 5% of the handles are made in the form of reliefs shaped like animal heads.

Mineral inclusions are abundant in the ceramic paste (gravel, lime, mica, etc.) Plant inclusions were detected in nearly 10% of the analysed samples. It was observed that shells have also been added to the ceramic paste in some cases.

Apart from the pottery, other finds include globular, biconical, and cylindrical loom weights and more than 250 sling missiles which were found deposited together in several areas in phase 4.

In addition to figurines depicting animals such as bulls and sheep and the female figurines frequently encountered in other settlements of the Neolithic period, some unique examples, such as the figurine with a horned head and a masked face were also detected in 4b. Another find produced in clay is a spoon with an animal depiction on the handle.

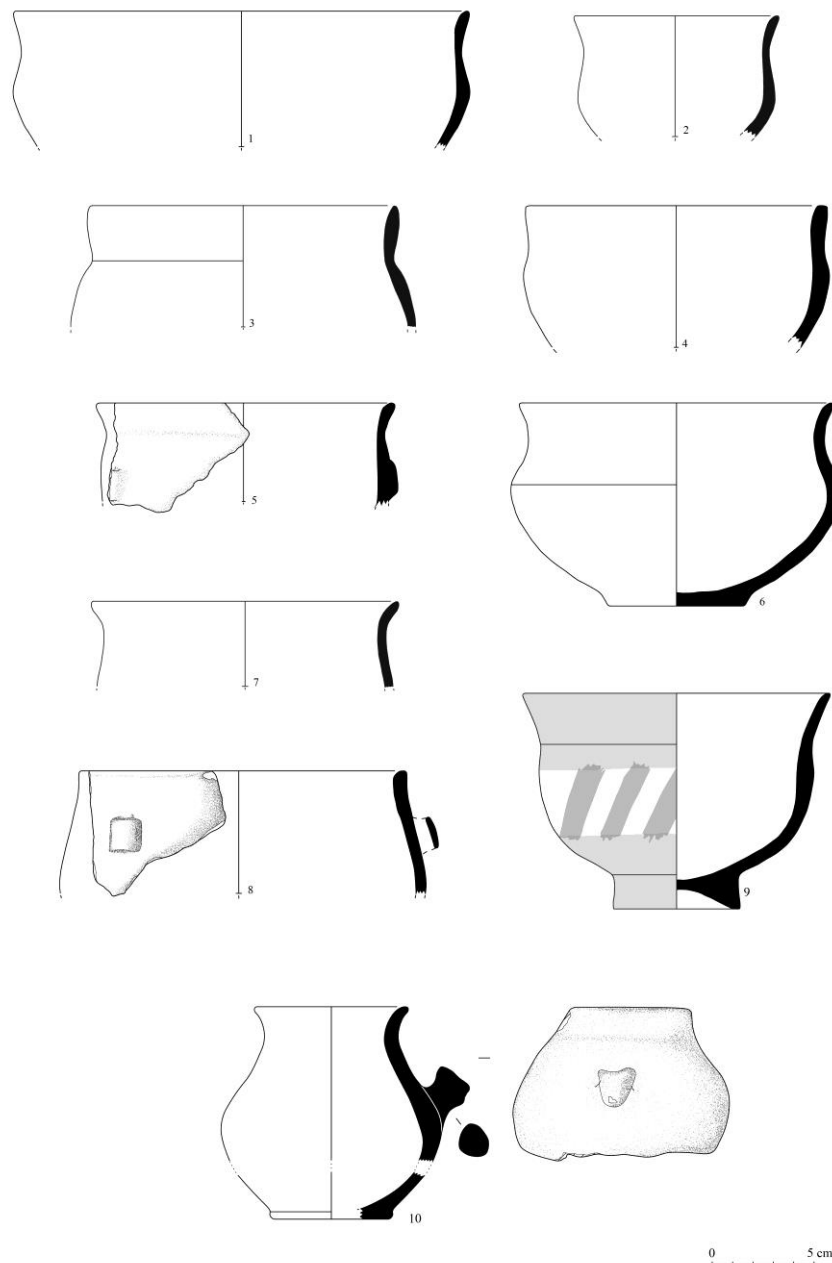


Figure 14. Examples of phase 4 pottery

6.3. Chipped stones

A sample size of 873 chipped stone artefacts from well-defined, undisturbed contexts in phase 4 (here considering 4a and 4b together) are investigated in detail. They are comprised of 157 obsidian and 716 non-obsidian finds. In phase 4 obsidian makes up 18% of the assemblage, however, the currently studied sample shows that the obsidian amounts between 4a and 4b differ, being 23% and 13% respectively while showing an increase from older to younger stratigraphical level.

Within the obsidian group, the most numerous are blades with 83% (n=130), which are followed by flakes (n=13) and core maintenance elements (n=10). Even though the assemblage contains a single core and lacks real knapping debris (n=2), platform rejuvenation flakes, crested and lateral blades (showing core preparation and rejuvenation) speak in favour of some obsidian knapping on-site during phases 4a and 4b (Fig. 15). In addition, several

obsidian cores were documented in mixed contexts and are not entirely absent in the Neolithic sequence, which excludes the possibility that obsidian was solely brought to the site in the form of blanks or tools. Only obsidian core from phase 4 is ascribed to a recycled blade blank, which was additionally knapped in an opportunistic way on an anvil by direct percussion. Obsidian blades were, aside from the use of percussion, largely produced by pressure technique (with ca. 75%) and knapped mainly by pressure from a sitting and standing position. In contrast to the early phases 7 and 6, obsidian in levels 4a and 4b can be related to both Melian and Cappadocian sources, according to the macroscopic observation of colours, texture, and banding. Obsidian flakes show different dorsal reduction negatives (mainly unidirectional and some multidirectional), while there also exist flakes which are the result of knapping on an anvil (with opposed directional negatives).

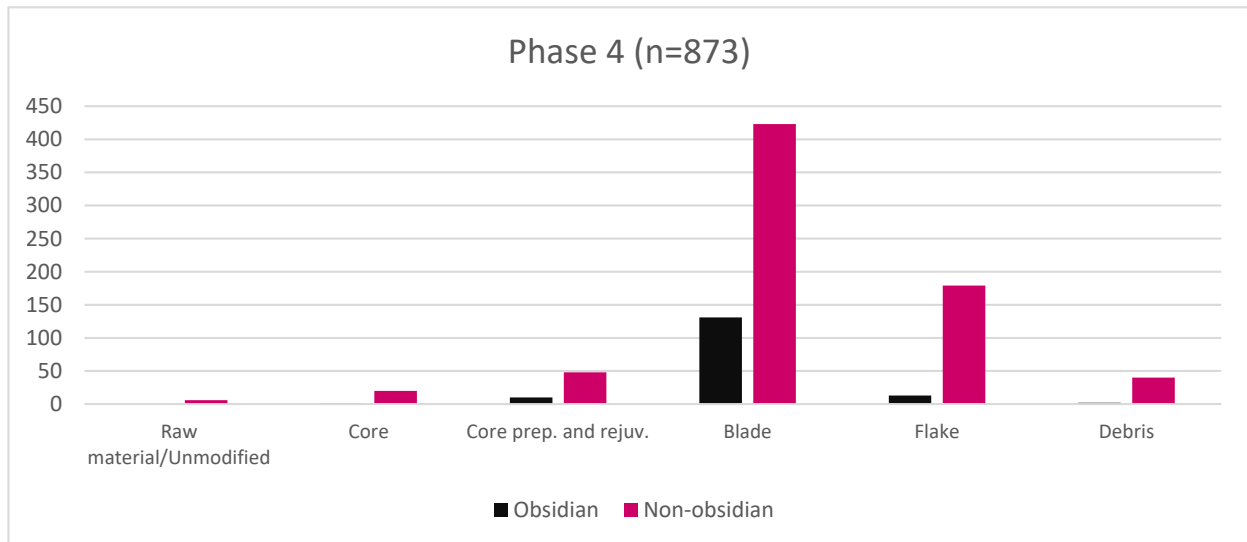


Figure 15: Categories related to primary production of blanks in Neolithic phase 4

Knapping of quartz is also attested here, although its role does not seem to be particularly outlined as was the case at the beginning of the settlement. Quartz was likely present and knapped occasionally by direct percussion, while small nodules have been also reduced after being set on an anvil, which is visible both from the presence of small core-like elements with several removals and blade and flake blanks. The largest group of non-obsidian finds belongs to chert, chalcedony, jasper, opal, silicified limestone, and radiolarite varieties. Local knapping of flakes and blades, which are highly frequent in the assemblage (with a ratio of 70% to 30% in favour of blades over flakes) can be related to the presence of cores (n=16), which bear mixed blade-flake unidirectional negatives. Several cores also attest to a

changed (turned) direction towards the end of the knapping sequence, visible through some opposite directional negatives, which speaks in favour of maximal exploitation of the raw material. Blade cores are mainly wedge-shaped or semi-conical, while no bullet cores have been recorded so far. This contrasts with the evidence from the Lakes District and goes rather in line with the sites of the Aegean coastal group (Baykal-Seeher, 1994; Balkan-Atlı, 2005; Milić, 2018).

The view on on-site knapping at levels 4a and 4b is additionally supported by recorded core maintenance elements, coming from knapping surface and platform opening and rejuvenation, creasing, decortification, and debitage surface correction. In contrast to the obsidian group, next to percussion,

slightly less (ca. 58%) of blade blanks can be related to pressure knapping, while the sizes of blades and detachment stigmata show the use of different pressure modes, employing hand, abdominal, shoulder and standing pressure undoubtedly, while several pieces are likely to have been produced by a lever. Cortical and non-cortical (thin and thick) flakes

appear regularly next to hinged, laminar, and flakes with sizes less than 2 cm. Finally, the debris mainly presents rests of knapping, waste of intentional blade sectioning and a portion of debris also could be associated with burning activities and fragmentation due to fire exposure.

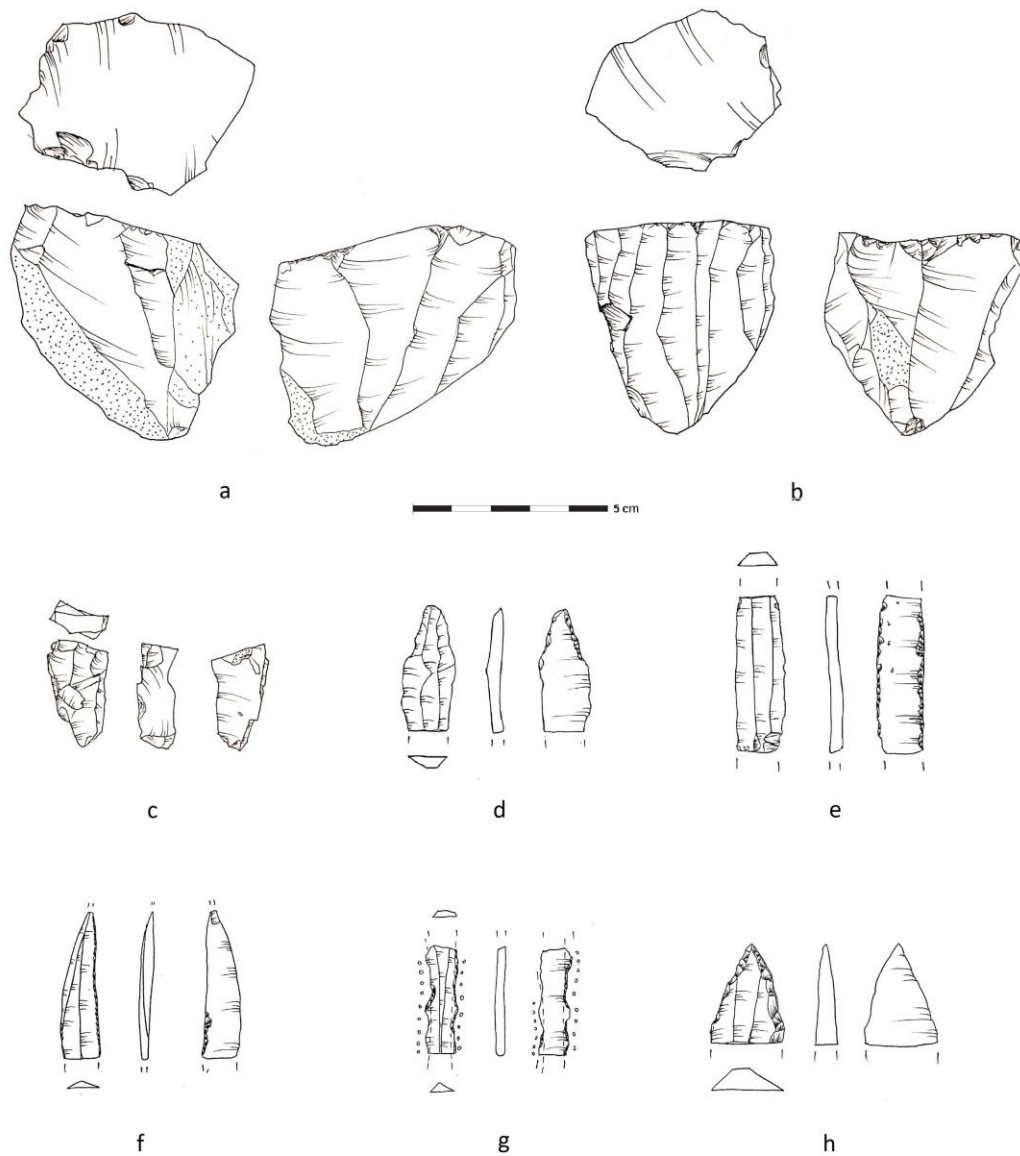


Figure 16. Cores (a-c) and retouched tools (on blade blanks, d-h) from levels 4 (a-e) and early phases 7-5 (f-h)/drawings: B. Milić

Typological analyses show that there is a significant development in phase 4, seen through a variety of tool types in contrast to early phases 7 and 6 (Fig. 16). Similarly, modification of blanks was recorded on 33% of obsidian artefacts, and 35% of non-obsidian finds. Within the obsidian group, retouched tools are however less frequent than those bearing edge scars likely to come from use. The most

prominent are tools made on blade blanks (81%), and tool typology informs about the use of retouched blades and flakes, notched, truncated tools and only a few end-scrapers or their fragments. Non-obsidian group of finds show that 72% of retouched or blanks with edge scars belonging to blades, which are followed by modified flakes (25%), and finally, other elements, such as rejuvenation flakes or cores turned

into pounders (used secondarily). A high diversity of tool types is present with laterally retouched blades and flakes, drills, notched, truncated and denticulated tools, scrapers (end-, circular and semi-circular), pointed tools, pièces esquillées, oblique truncations, and sickle blades. Harvesting tools are again available in a high number (making 20% of all tools in the assemblage) and exhibit in this phase both gloss, which was parallel and oblique to the working edge, while parallel being more common. In addition, more than half of the blades that were inserted in sickles belong to pressure thin blades, which majorly contrasts the evidence from phases 7 and 6, where less regular blades were used for harvesting.

6.4. Animal Exploitation and Bone Industry

A large number of bone fragments were uncovered from the Neolithic layers at Ekşi Höyük. However, while analyses of the material from other phases are currently ongoing, the assessment of zooarchaeological remains from phase 4 is presented below.

A total of 3187 bones from phase 4 have been studied and 1104 species identified. Determination of the exact species of the remaining 2080 animal bones

was not possible due to the lack of characteristic parts or high fragmentation. Instead, they were categorised and defined as belonging to small, medium-sized, and large animals by taking the bone wall thickness into consideration (Table 2 and 3).

Considering the two separate levels of phase 4, amongst the analysed material, sheep and goats appear to have been the animals consumed most frequently (86.1% in 4a and 89.1% in 4b). In phase 4a, pigs were the second most preferred species after sheep and goats, with 7.58% (Table 2, Fig. 17). Furthermore, cattle were more frequently consumed compared to sheep, with a slight ratio difference (4.05%) in phase 4b. However, there was no notable difference between pig and cattle ratios in either phase. Considering the bones of sheep and goats whose species had been determined with certainty, it was observed that the ratio of *Ovis* versus *Capra* was distinctly greater in phase 4 (Table 2). This study employed the criteria of Boessneck, Müller, and Teichert to distinguish sheep bones from those of goats. Bones with missing fragments or those with broken characteristic parts limited detailed characterisation as sheep or goat bones, and therefore, these were defined as sheep/goat.

Table 2. List and quantities of identified species

TAXA	STRATUM									
	3-4?		4a		4b		4b-7?		5-7?	
	N	N%	N	N%	N	N%	N	N%	N	N%
SHEEP, <i>OVIS</i>	4	26.67	103	21.68	132	24.30	7	31.82	9	17.31
GOAT, <i>CAPRA</i>			14	2.95	24	4.42	3	13.64	1	1.92
SHEEP/GOAT, <i>OVIS/CAPRA</i>	8	53.33	292	61.47	329	60.59	12	54.55	29	55.77
PIG, <i>SUS</i>	2	13.33	36	7.58	16	2.95	-	-	2	3.85
CATTLE, <i>BOS</i>	1	6.67	17	3.58	22	4.05	-	-	8	15.38
RED DEER, <i>Cervus elaphus</i>	-	-	-	-	2	0.37	-	-	-	-
FALLOW DEER, <i>Dama dama</i>	-	-	5	1.05	3	0.55	-	-	-	-
ROE DEER, <i>Capreolus capreolus</i>	-	-	8	1.68	11	2.03	-	-	-	-
FOX, <i>Vulpes vulpes</i>	-	-	-	-	4	0.74	-	-	-	-
TORTOISE, <i>TESTUDO</i>	-	-	-	-	-	-	-	-	3	5.77
Identified animal bones, TOTAL	15	100	475	100	543	100	22	100	52	100

The assemblage demonstrates the presence of domestic animals in the settlement, as well as that of several wild species. The most important wild animal subgroup comprised various deer species. Falling under the Cervidae family, red, roe, and fallow deer were defined amongst the animal bone remains at Ekşi Höyük. A limited number of fox and tortoise bones were also observed on the site.

It was noted that there were very few cutting marks on the animal bones. Due to the high number of bone fragments and the scarcity of cutting marks in the studied material, it was assumed that the bones had been smashed into pieces, possibly with an axe-like tool.

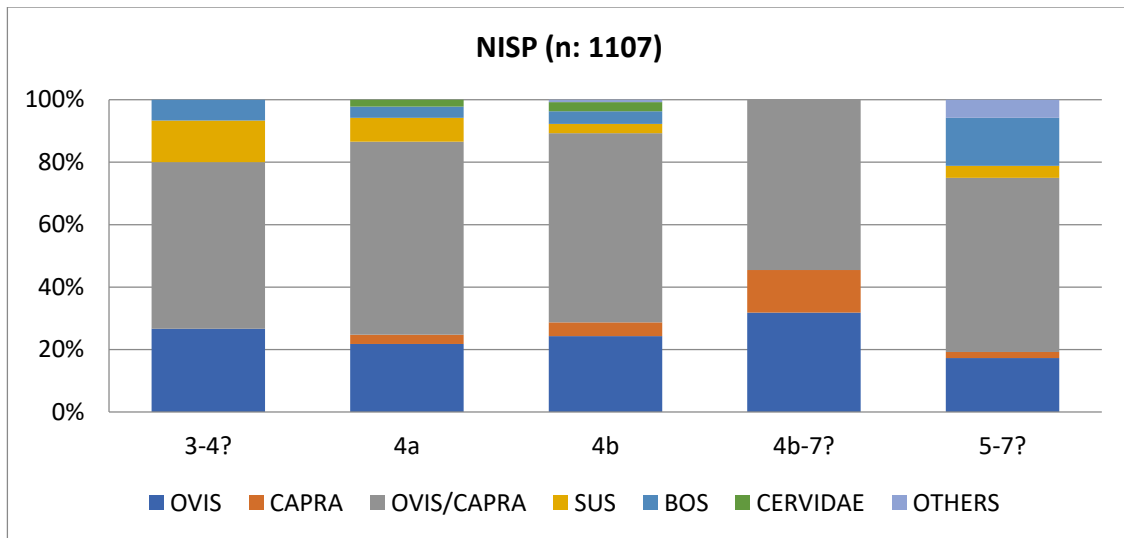


Figure 17. Proportion of the number of identified species

Table 3. Proportion of unidentified animal bones

TAXA	STRATUM									
	3-4?		4a		4b		4b-7?		5-7?	
	N	N%	N	N%	N	N%	N	N%	N	N%
Unidentified, small	-	-	7	0.84	9	0.79	-	-	-	-
Unidentified, small/medium	-	-	28	3.38	52	4.58	-	-	5	6.85
Unidentified, medium	23	74.19	696	83.96	943	83.08	12	100	54	73.97
Unidentified, medium/large	-	-	48	5.79	64	5.64	-	-	6	8.22
Unidentified, large	8	25.81	50	6.03	67	5.90	-	-	8	10.96
Identified animal bones, TOTAL	31	100	829	100	1135	100	12	100	73	100

The examination of bones made it possible to determine the purposes for which the animals were exploited in the settlement. When we evaluated the subsistence economy on the site during the Neolithic period, from Table 1 it was understood that the food economy was mainly built on domestic animals (more than 90%) and that hunting activities did not play an important role in the settlement in phase 4. Only 3% of the animal bones belonged to game

animals, although this ratio also includes the bones of fox and tortoise that were thought not to have been consumed as food.

Detailed research was carried out aimed at designating groups according to the age of the animals when they were butchered, based on the state of epiphyseal fusion of the long bones and tooth wear and eruption.

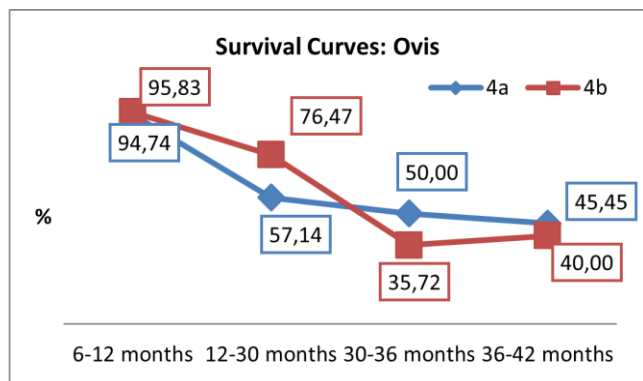
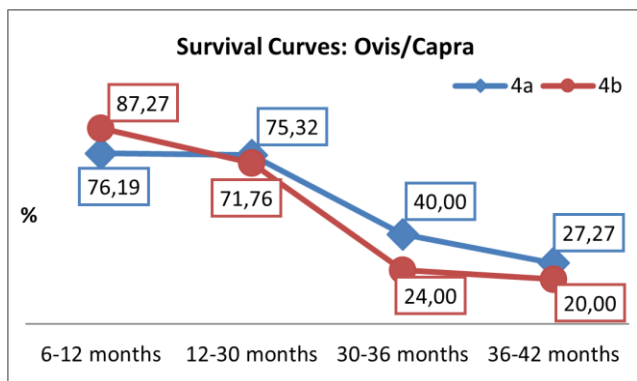


Figure 18. Survival curves for ovicaprids (on left), survival curves for sheep (on right)

Age determination according to bone knitting phases follows the criteria set by Habermehl and Silver. The sheep and sheep/goat kill-off patterns were calculated separately for levels 4a and 4b (Fig. 18). When we evaluated the survivorship curve of sheep together with that of goats, we saw that the majority of them had been butchered before the age of three. It was perceived that the greater part of the animals butchered before the age of three were male specimens consumed for their meat. Relatively fewer specimens survived the ages of 3 - 4. After surveying the life curve, we considered these specimens to be females, providing procreation with possibly a limited number of breeding males. When we examined the survivorship curve, it appeared that sheep and goats were kept mainly for their meat, although a few of them were probably exploited for their wool and milk by the Neolithic community. Moreover, when we looked solely at the life curves of the sheep, our attention was drawn to the existence of 2-4-year-old sheep, especially in phase 4b, with a specimen ratio varying between 57.14% and 45.45%. We believe that the high number of 3-4-year-old specimen points to the exploitation of sheep for their milk, and less frequently, for their wool. In view of the archaeological data in association with the probable use of wool, we can see that a good number of spindle whorls were obtained from the settlement. In the future, more detailed research will be conducted on the use of milk in the settlement.

Whereas pigs and cattle constituted the second most important group after sheep and goats at Ekşi Höyük, their rates were relatively low compared to sheep and goats. Using findings obtained from animal bones, Logarithmic Size Index (LSI) and gender distribution analyses are also being conducted in the settlement to further scrutinise sustenance and food economies. Thus, the research progresses, making it possible to better understand the dynamics of animal exploitation at Ekşi Höyük.

7. LATEST NEOLITHIC OCCUPATION: PHASE 3

Finds from phase 3 are extensively destroyed by factors such as modern agricultural activities since they were located close to the surface of the site. The limited number of architectural elements associated

with this phase suggests a continuation in the use of the rectangular courtyard of phase 4a. It is recognised that the area was restored and enclosed by new mudbrick walls built in the same direction also in phase 3. The only archaeological remains to be possibly associated with this phase are the ovens built adjacent to the northern wall of the area and the partly preserved floor. While the finds unearthed within the area are not sufficient for commenting on whether the area was used for purposes like in the previous phase, the potential use as an open space is likely. The area is connected to spaces where stone foundations and mudbrick superstructures can be identified via a doorway in the south.

7.1. Pottery and Small Finds

In addition to monochrome bowls and jars, examples decorated with paint were also detected in phase 3 (Fig. 19). It is noted that pottery forms are similar to those used in phase 4. Furthermore, slightly carinated bowls with everted rims from this phase were not known in phase 4. It is observed that the number of painted pottery (14%) increased in this phase. The main decorative motifs are simple and intricate bands. Painted examples were created by applying red-coloured bands diagonally or in the shape of concentric triangles upon the surface painted with a light-coloured (usually light brown). There are decorations involving arcs and curves which do not form any geometric patterns as well. Surface treatments on the bowls and jars show similar use of brown (48%) and red-brown/red colour (52%). Bullhead relief can be found on pottery in the form of handles or in low relief. It is noted that decorative painting was not generally applied on pottery with embossed surfaces. One can remark that the pottery forms that are similar to the previous phase are also seen in phase 3. Examples of small finds include a clay idol, rubbing stones, hammer stones, serpentine axes, tokens, sling missiles and a limited number of bone tools.

The Phase 3 bone tools (10 pieces) consist of two types, awl and spatula. The striking factor in both tool groups is that the head parts found in one example are perforated. Awls are made not only of metapodial but also of waste and rib bone.

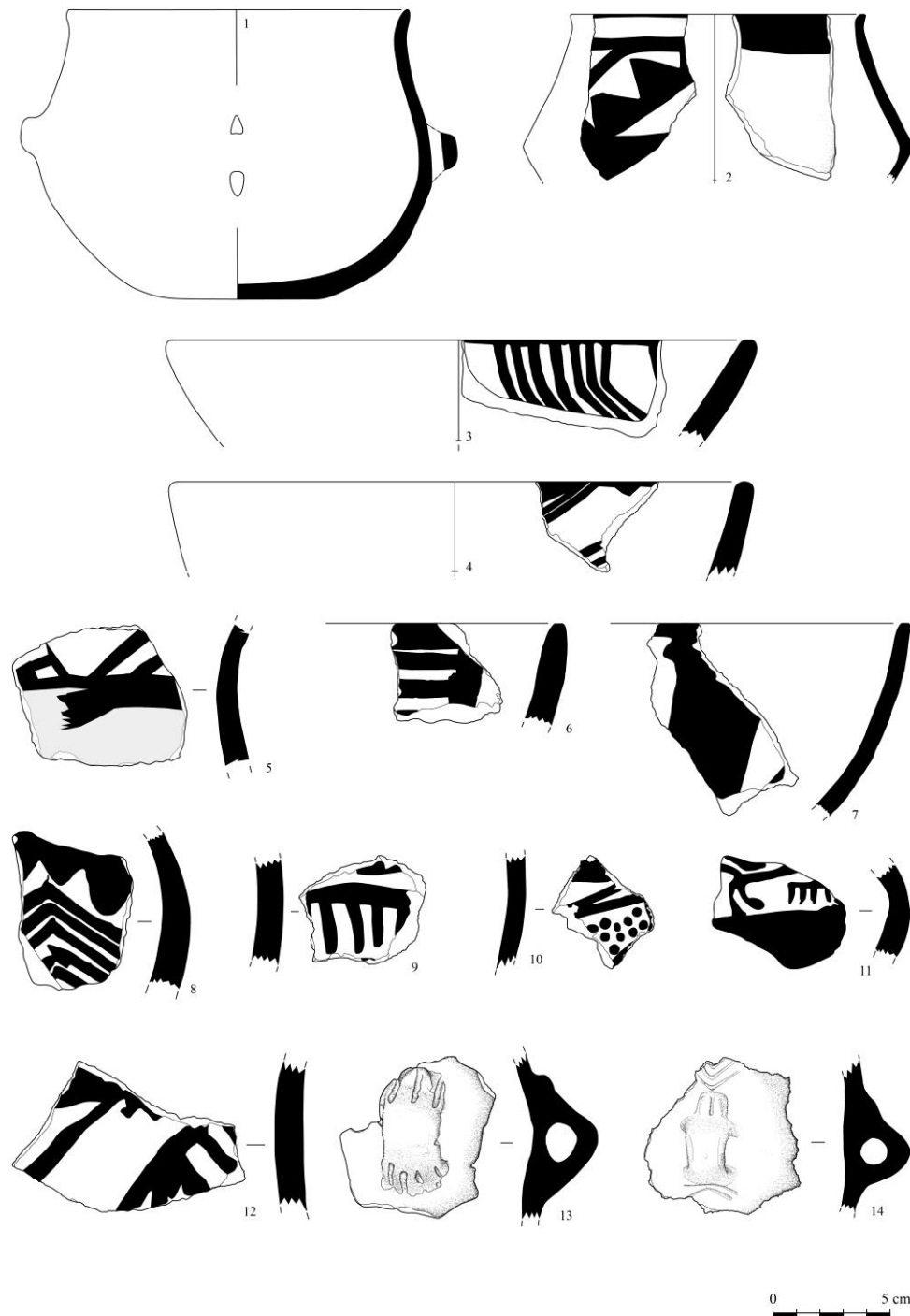


Figure 19. Examples of phase 3 pottery

8. HUMAN REMAINS AT EKŞİ HÖYÜK: 10TH AND 11TH C. CE CEMETERY

During the 2015-2019 campaign, 49 features containing human remains were found at the top first layer of the mound of Ekşi Höyük. A radiocarbon sample from human bones indicates that the cemetery is dated to 1077-1154 CE (48.5% probability) or 1012-1055 CE (46.4% probability). (Dedeoğlu *et al.*, 2019)

8.1. The Graves

The integrity of some tombs and their contents were damaged by intensive agricultural activities in modern times due to their proximity to the surface. Therefore, some piles of isolated bones were found scattered on the mound in the excavated areas. A total of 49 features including graves and isolated bone piles (13/49) were found. Of these 36 are simple earth pit

graves with 8 graves showing some structural variations including flat stone blocks covering the top of the graves (F39 and F112), stone blocks surrounding the graves (F25, F40, F87) and clay plastering of the inner walls of a grave (F54). In addition to these, 2 graves had some stone remnants indicating that there may have been more of the type with stone surrounding (Fig. 20). Those with a distinct grave structure constitute 22% of all graves at the site as of 2019. One of the graves with stone surrounding was empty, and another one had a secondary use, where a later deceased was interred in the grave by removing some bones and pushing the remaining bones of the earlier one to the side. No

burial gifts were found within these graves. The only finds were two corroded nails recorded in one of the burials (F103) which indicates the presence of a coffin. Six of the bodies were laid in the east-west direction with the head to the west, facing mostly south and southeast. One of these was on its right side and the others were lying on their back. The remaining 30 were laid NE to SW directions with some small variations. Within 30, seven bodies were laid on their right side and 23 were on their backs in the dorsal position. Only 21 skeletons' head positions can be observed, 6 of those looking up, and 15 are facing south, south-east with a few exceptions.



Figure 20. Different types of graves at Ekşi Höyük.

The positions of the arms varied. While there are skeletons where both hands are on the chest, abdomen, or hips, the more common positioning of right and left arms differs. The right arms were predominantly extended at the side of the body, the left arms were mostly located on the chest, abdomen, or hip. Rarely, there are skeletons in which the hand was placed on the shoulder (3 individuals), one under the head of an individual lying on its right, and in three individuals the left hand is extended over the body and placed near the right hand. In addition to these, there are skeletons in which the positions of the arms cannot be determined due to their dispersed nature or remaining in the cross-sections of the excavated areas. The legs are extended apart from one

individual interred in another grave which was already occupied (F 111). The legs of this individual are drawn up and placed vertically bent at the knees to fit the grave, as the lower part of the grave was occupied by the remains of the first individual.

8.2. Demography

Among 49 features, anthropological analyses of 23 skeletons were completed. The demographic distribution of these skeletons is shown in Table 4. Standard osteological methods are used for age and sex estimations (Brooks and Suchey, 1990; Buikstra and Ubelaker, 1994)

Table 4. Demographic details of Ekşi Höyük's skeletal sample. Overall age categories; young adult: 20-30; mature adult: 30-40s; old adult: approximately 50+

No	Feature No	Sex	Age
1	4	Male	Mature adult
2	5	Male	Young adult (18-20 yrs)
3	6	Indetermined	8 yrs
4	11	Female	MA/OA
5	15	Male	Mature adult
6	17	Male	Mature adult
7	28	Female?	Adult

8	36	Female	Young adult
9	39	Male	Mature adult
10	53	Indetermined	2-3 yrs
11	54	Female	Mature adult
12	67	Female	Mature adult
13	68	Indetermined	6-7 yrs
14	69	Female	Mature adult
15	83	Female	Mature adult/Old adult
16	90	Male	Young adult
17	99	Male	Old adult
18	111	Female	Mature adult
19	111	Male	Mature adult
20	119	Indetermined	Adolescent (15-16 yrs)
21	112	Female	Mature adult
22	123	Male	Old adult
23	127	Male?	Mature adult/Old adult

There is a great number of scattered and isolated human bones with no context. The minimum number of individuals has not yet been determined as anthropological analyses are to be carried out.

8.3. Pathology

Comprehensive anthropological and pathological analyses of skeletons are still ongoing, however, this report aims to inform about the current study.

Osteoarthritis is a joint disease triggered by several factors including age, sex, genetics, obesity, trauma and movement (Waldron, 2009). Nevertheless, movement is one of the main factors of osteoarthritis, therefore the disease occurs on the joints and is used widely to assess a person's lifestyle on archaeological skeletal populations. Osteoarthritis is found in varying degrees on Ekşi Höyük's post-Neolithic skeletal collection. However, the number of individuals is small, females display various stages of osteoarthritis, especially on the vertebrae towards the late stages of mid-adulthood (4/9). One should bear in mind that what is apparent on the bones is that even the slight changes are in fact the later stages of the disease. Four out of six men display severe arthritic changes, especially on the neck vertebrae. Both men and women who have osteoarthritic changes are in the middle to old age range, therefore it is difficult to correlate these with activities.

The young's (3), one female and one male do not show any bony changes. On the other hand, another young male (F90) in his twenties show excessive osteoarthritis on all vertebrae, deformations on the ligament insertion points at clavicalae, cranial malformation as the skull grew towards to right and made the skull elongated towards the right, this condition is due to perhaps immature suture closure. The same individual also suffered from a fracture on the distal shaft of the right femur. Complete new modelling of bone with misalignment from the femur

axis can be seen along with the extensive callus formation on the distal shaft. The severity of the fracture is also indicated by two cloacal openings (holes) in the posterior side of the bone where the pus is to discharge (Fig. 21). All this information together, this individual's young age, the presence of intense bone deformations and fracturing femur, which is the strongest bone of the body, may indicate that this individual was a heavy worker.



Figure 21. A fracture on the distal femur with extensive callus formation and cloacal openings (F90). Photo by Başak Boz

Another case of a middle adult male (F15) suffered from severe osteoarthritis (pseudoarthrosis) on the right elbow bones (humerus, ulna, and radius). A pseudo joint facet was formed on the distal humerus for ulna to contact, this perhaps was a result of using the arm before the healing was complete after traumatic events to the right arm (Fig. 22). The advanced remodelling of the elbow suggests that the individual lived years after the incidence.

Spondylolysis detaches the part called "lamina" from the vertebral body. There are 3 cases (one male and 2 females) of spondylolysis seen in this skeletal series. Although spondylosis has a genetic predisposition, it is a stress fracture, that is generally considered as repeated stress and trauma on the lower back during activities such as load bearing. However, it could also be a result of acute trauma. The most affected area is the lower back vertebrae.

A juvenile scoliosis case detected on a child skeleton (F68) of about 7 years old is a developmental disorder that causes a lateral abnormal curvature of the spine (Fig. 23).

23 skeletons from the 10th -11th century CE cemetery on the top layer of Ekşi Höyük have been studied. Although the analyses have not been completed, the small number of graves and skeletons revealed interesting results. As the studies progress, it will be possible to learn more about the population.



Figure 22. Severe osteoarthritis on the right elbow bones of a male (F15). Photo by Çisem Ergün



Figure 23. A juvenile scoliosis case detected on a child skeleton (F68)

9. DISCUSSION AND CONCLUSION

Although Ekşi Höyük is a relatively new excavation site, it has already begun to produce information on different topics related to the beginning of settled life and agriculture in the area extending from the Lakes Region to the Aegean Coastal Region. The results from reported field seasons provided significant data about material

culture and its diachronic transformations, architectural traditions employed by the community, and the inter-regional relationships involving the Lakes District, Upper Menderes Basin, and the Aegean coastal region.

The uncovered stratigraphical layers, pottery, and other finds, together with radiocarbon dates, show that the settlement was continuously occupied for more than 1000 years, i.e., from the first half of the 7th

millennium BCE to the middle-6th mill. BCE. Through this long and continuous sequence, it is possible to comprehend the emergence and development of the Neolithic lifestyle in the Upper Menderes Basin. The results obtained from Ekşi Höyük demonstrate three stages of the settlement's development. The first stage begins with the phase incorporating the rectangular structures with the red-painted floor. According to relative and absolute chronology, it seems suitable to place this phase between 6800-6600 BCE. The second stage is represented by the emergence of apsidal buildings, dated between 6400-6000 BCE, according to absolute and relative dates. The last stage is identified with the jars and bowls with painted decorations since its architectural elements are quite damaged due to their proximity to the surface. This stage corresponds to 6000-5500 BCE according to both relative and absolute dates. Overall, Ekşi Höyük forms a general framework for the emergence and development of the Neolithic lifestyle in the area stretching out from the Lake District to the Aegean Coastal Region.

The results from the archaeological excavations at Ekşi Höyük support the evidence obtained from surface surveys in the region, demonstrating that the Upper Menderes Basin was inhabited from the beginning of the first half of the 7th millennium BCE. Furthermore, the dating of the oldest settlement at Ekşi Höyük can be taken as a reference for the Neolithic in the Lakes District in general. Since the corrected results of a C14 analysis of the first stratum defined as Aceramic in Hacilar dates to 8000 BCE (Mellaart, 1970: 6), they are deemed inadmissible by some researchers. (Duru, 1989; Düring, 2011: 162) Considering the early Neolithic level dating at Bademağacı I/8 (Duru and Umurtak, 2019: 128), it emerges that the first settlements in the Lakes District and Upper Menderes Basin were founded in the first half of the 7th mill. BCE. This further goes in line with the establishment of settlements in the Aegean coastal region, such as Ulucak and Çukuriçi. Absolute dating of phase VI at Ulucak and phase XIII at Çukuriçi also point to the first half of the 7th millennium BCE (Horejs *et al.*, 2015: 296; Çevik and Erdoğan, 2020: 78). Another fact that confirms the dating of the beginning of the Neolithic period in the first half, if not in the first quarter of the 7th millennium BCE is that the earliest levels also bear a similarity in terms of architectural structures in the mentioned settlements, characterised by structures with red floors. They were uncovered in phases 7 and 6 at Ekşi Höyük. The floors of the rectangular structures found in the Aceramic phase of Hacilar were also painted red. The buildings are positioned around a courtyard harbouring a furnace, oval hearths, and storage pits (Mellaart, 1970: 3-7). Lime floors bearing black- and red-coloured

paint marks were located in the EN phase 8 at Bademağacı (Duru and Umurtak, 2019: 123-127). Neither intrinsic to the Upper Menderes Basin nor the Lakes District, structures with red floors are also seen in the rectangular buildings in phase VI at Ulucak (Çevik and Erdoğan, 2020: 78-81) and phase XIII at Çukuriçi (Horejs *et al.*, 2015: 297-298). Another common characteristic of these layers is that pottery is generally described as "non-existent or rare". Therefore, the earliest level of Hacilar was defined as Aceramic. Moreover, similar terms were also used for the evidence of Ulucak Höyük. No pottery was found in the phase with red-painted floors at Ekşi Höyük either. The first phase of the Neolithic began without pottery in the Aegean Island of Knossos, and Greece was also suggested (Perlès *et al.*, 2013; Karamitrou-Mentessidi *et al.*, 2015; Douka *et al.*, 2017) despite objections (Reingruber, 2005, 2008: 127). The claim that the first phase of the Neolithic in Greece began without pottery is based on data obtained from the sites of Gediki, Soufli Magoula, Sesklo, Argissa Magoula, Achilleion, Franchthi, and Dendra (Perlès, 2004: 64-97).

We can remark that pottery became widely used in the second phase with apsidal buildings at Ekşi Höyük. As is seen from Ulucak V and Hacilar IX (Mellaart, 1970: 9-10; Çevik and Erdoğan, 2020: 81-83), it seems that this is also the case for the Aegean coastal region and the Lakes District. In the second phase, the monochrome tradition prevails in pottery production in the mentioned regions. Furthermore, pottery forms have remarkably similar characteristics. It is discerned that the architectural tradition underwent a change in the phase of apsidal structures at Ekşi Höyük in the second half of the 7th millennium BCE. Settlements such as Ulucak, Yeşilova and Ege Gübre (Çilingiroğlu *et al.*, 2012; Derin, 2012; Sağlamtimur, 2012) indicate that the architectural tradition also changed in the Aegean coastal region. Wattle and daub rectangular structures started being used in phase V at Ulucak, while buildings with circular plans started appearing in settlements like Yeşilova and Ege Gübre. There are structures aligned around a courtyard or were separated by empty spaces in the Hacilar VI and Bademağacı EN/3 levels, while five adjacent or interconnected structures were unearthed at Höyücek TD (Duru and Umurtak, 2005: 6-18). Ekşi Höyük's apsidal structures bear similarities to the Lakes District amongst the mentioned regions and Kurucay amongst the settlements in the Lakes District (Duru, 1994: 9-10). The apsidal structures found in phase 12 and the subsequent strata at Kurucay in the Lakes District seem to represent different traditions simultaneously within the region. In this respect, it draws attention that Kurucay resembles Ekşi Höyük rather than Hacilar which is located in closer

proximity. Nevertheless, it is clear that the apsidal structures set the ground for the process, resulting in the prevalence of painted bowls and jars at Ekşi Höyük in the 6th millennium BCE. Indeed, it should not be a coincidence that the earliest apsidal structure (in phase 5) was placed on structures with red floors, and the apsidal structures were also repeated in the same place in the subsequent levels. Each stage of this architectural sequence should entirely represent the reorganisation of social structure, including differences in the Upper Menderes Basin and Western Anatolia. During this phase, the similarities between Greece and the Upper Meander Basin, where Ekşi Mound is located, are noteworthy. In Greece, this phase is called the Early Neolithic. As is known from the sites of Argissa, Sesklo, Franchthi, and Achilleion, among others, this phase is mainly characterised by pottery (Perlès, 2004: 98). The most distinctive feature of the pottery belonging to this phase is its monochrome character (Phelps, 2004: 29). This phase, which is divided into three phases, is understood to have started around 6400 BCE and ended around 6000 BCE, according to the absolute dates of Argissa, Sesklo and Achilleion (Perlès, 2004: 99, 109).

This new process corresponds to phase 3, where interregional relations and elements of material culture went through transformations. Perhaps, the increase in the number of painted potteries is one of the factors that best represent the reorganisation of social structure with the inclusion of differences. Subsequently developing with the fantastic and geometric styles at Hacılar in the Lakes District, the tradition of decorating pottery with paint can also be seen at Ekşi Höyük in the Upper Menderes Basin, as the mentioned pottery is important archaeological data showing that the Upper Menderes Basin falls within the same cultural environment as the Lakes District. It seems that “cultural borders” were redrawn in phase 3 with painted pottery. So much so that the western border of the decorative paint tradition went beyond the Upper Menderes Basin. Thus, the bowls and jars with painted decorations were found in the settlements of Tripolis, Akyaka Höyük, Laodikeia, Aphrodisias-Pekmeztepe, and Çine-Tepecik (Joukowsky, 1986: 47; Günel, 2007: 234–235; Oğuzhanoglu, 2014: 72; Konakçı, 2017) prove that the “Hacılar Culture” spread towards the Aegean coast through Büyük Menderes Valley. A large number of fragments with painted decorations of the same characteristics were found during fieldwork conducted at settlements such as Eyice Höyük, Uçın, and Dutluca Höyük (Koçak and Bilgin, 2010, 2013; Oy, 2021: 71–75) within the provincial borders of Afyon in addition to the Menderes Basin suggest that the “Hacılar Culture” is observed throughout extensive geography. As for the Aegean coastal

region of Western Anatolia, it fell outside the area defined by the painted pottery of Hacılar in this phase where “cultural borders” were redrawn. In contrast to the Lake District and the Upper Menderes Basin, pottery with painted decorations never became a significant cultural element in the Aegean coastal region. According to traditional classification, the monochrome tradition continues in Aegean coastal pottery without interruption in both the Late Neolithic and the Early Chalcolithic. Although the pottery indicates differentiation between the regions, the architecture provides data concerning the possibility that a social change occurred in the Aegean coastal region, just like the Upper Menderes Basin and the Lakes District, after the 6th millennium BCE. Structures with thick mudbrick walls placed adjacently around the two streets were found in phase IV at Ulucak Höyük. At Ege Gübre and Yeşilova, the transition from structures with circular plans to rectangular structures was complete. Rectangular structures with rubble foundations and mudbrick walls were also used at Çukuriçi (Horejs, 2012). A settlement that enclosed dwellings, pottery workshops, domestic areas, and sacred structures by a thick mudbrick wall was discovered in the Hacılar II in the Lakes District (Mellaart, 1970: 25–37). A building tradition involving structures erected around a large courtyard in the shape of a circle with second floors supported by a buttress appears in Hacılar I (Mellaart, 1970: 75–87). It is possible to see similar dwellings with buttresses in phase 7 of Kuruçay (Duru, 1994: 13). Considering the data from Ekşi Höyük together with the architecture of the regions and pottery; it is seen that differentiation occurred amongst the regions. On the other hand, the pottery found in the levels dated before the 6th millennium BCE in all of the regions above display close similarities in terms of material features and forms; however, as the data from Ekşi Höyük demonstrates, the threshold of transition to the 6th millennium BCE points to the beginning of a period when the similarities shared by the regions, which can be particularly traced through pottery, started decreasing. The Aegean coastal region, Upper Menderes, and the Lakes District became distinct in pottery tradition. On the other hand, a similar trend emerged in the pottery with painted decorations in the Upper Menderes Basin, the Lakes District, and the Konya Plain in phase 3. Finally, the tradition started resembling the architectural traditions of Catalhöyük and Can Hasan towards the middle of the 6th millennium BCE as seen at Hacılar I and Kuruçay 7. On the other hand, it is interesting to note that the Upper Meander Basin shows similarities in pottery tradition with Greece but not with the coastal Aegean part of Western Anatolia. At the beginning of the 6th

millennium BCE, the Early Neolithic ended in Greece, and the Middle Neolithic began. A rich painted-ware tradition with regional variations characterises this phase. As in the Upper Meander Basin, the proportion of painted wares began to increase in the early 6th millennium BCE, as seen at Franchthi FCP 2 (Vitelli, 1993: 117–118) and Achilleion (Winn and Shimabuku, 1989b: 95). As with the pottery; there was also a change in architecture. As known from Achilleion, the buildings in the Middle Neolithic are one-roomed and quadrangular as in the previous phase. However, there are also two-roomed buildings. In this phase, the thickness and height of the stone foundations increased, and more massive structures emerged (Gimbutas, 1989: 334; Winn and Shimabuku, 1989a: 46–66). At Sesklo, the settlement section called Acropolis was surrounded by a perimeter wall. It is thought that this perimeter wall consisted of at least two concentric rings, as at Dimini (Elia, 1982: 218).

Chipped stone production and use at Ekşi Höyük bring important information about the changes in the local economy and inter-regional connexions throughout the 7th mill. BCE. The beginning of the settlement occupation is particularly interesting regarding knapping methods and use of raw materials, where obsidian and quartz varieties can further bring new results to the character of the first farming community settling in the Upper Menderes Basin. While it is still early to build a detailed picture of the procurement of non-local and exotic raw materials, it seems that there is a significant rise in obsidian proportions from the beginning to the end of the Neolithic sequence (progressing from 5% in phases 7-6, over 13% in phase 4b, through 23% in phase 4a). Due to a limitation in the context related to phase 5, and currently, lacking detailed study for phases 3 and 2, it is still unclear whether the mentioned growth is entirely gradual through time and when is the exact time when the Aegean sources impacted the procurement of obsidian. On the other

hand, raw material use and its impact on technological advancement could have been similar to the situation from the sites inhabited in the first half of the 7th mill. BCE in the Aegean coastal region (Horejs *et al.*, 2015; Guilbeau *et al.*, 2019; Milić, 2019). A change in production and use of tools has also been attested between phases 7-6 and 4a and 4b at Ekşi Höyük, which certainly can be a result deriving from a number of available finds directly influencing variety in tool types, for instance, but also an outcome of different knapping strategies related to particularly chosen local raw materials in the later phases, where the production was concentrated on obtaining blade blanks with highly employed pressure technique, next to percussion and anvil-technology, which maintained in use for reduction of flakes and smaller nodules respectively. One of the major shifts, when tools are considered, comes in the use of sickle blades in phases 7-6 and later phase 4. Blank choice (regularity of blades, standardisation in sizes, retouching) and gloss orientation suggest a potential difference in harvesting practises and morphology of the sickles in the first and second half of the 7th mill. BCE, which should be investigated in correlation with archaeobotanical remains in future. Some of the remarks on the production and use of chipped stones can therefore be decisive in placing Ekşi Höyük in the Upper Menderes Basin between cultural traits of the Lakes District and the Aegean coastal region.

In conclusion, Ekşi Höyük produced considerable information for both identifying the relations with the neighbouring regions and specifying the region's material cultural elements and their chronological attribution. However, as is underlined in the introduction, the excavation work has been newly started. As the research at Ekşi Höyük progresses, it will enable us to better understand the emergence and development of the Neolithic lifestyle in Western Anatolia, and perhaps even in the area located west of the Aegean Sea.

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