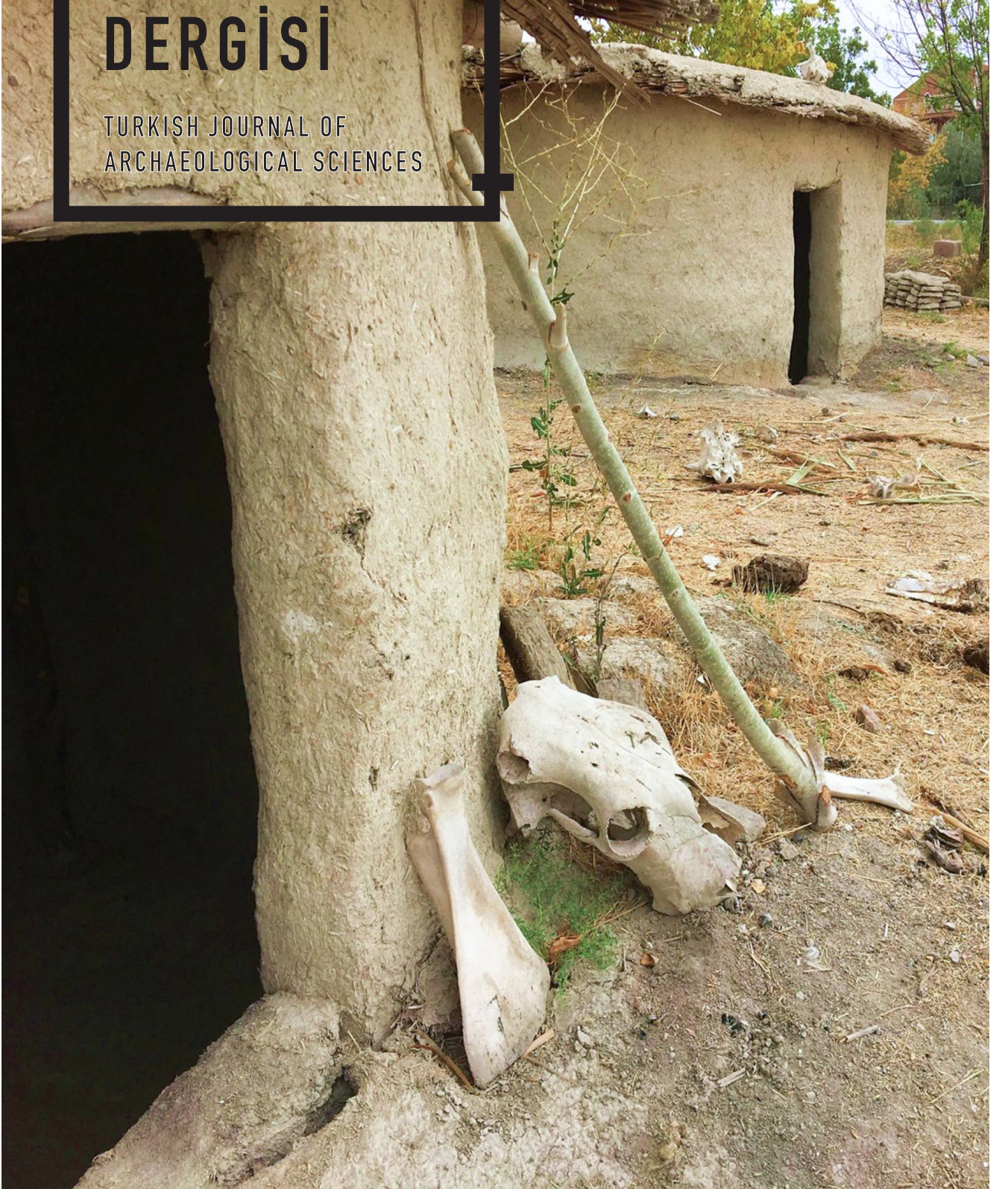


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Editörlerden

Bir yıl sonra yine bir Şubat ayı, beşinci sayımızla herkese merhaba diyoruz. Bu kez birbirinden çok farklı altı yazı ile karşınızdayız. Her biri gerek arkeolojik düşünce yelpazemizin sınırlarını genişleten, alternatif düşünmeye yönlendiren gerek disiplinin kendi içindeki yöntemsel gelişimini gösteren araştırma sonuçları.

Günümüzde var olan ve mücadele içinde olduğumuz çevresel, ekonomik, sosyal pek çok sorunun geçmişte hangi koşullarda nasıl yaşandığı, küçük gruplardan büyük örgütlü toplumlara kadar değişen ve dönüşen yaşama o dönem koşulları içinde nasıl baş edildiği, toplumların verdikleri tepkileri, geliştirdikleri çözümleri geçmişin derinliklerinde araştıran arkeoloji disiplinine bu sayımızdaki yöntemsel, etnografik, deneysel, yorumlamacı yaklaşımlara sahip yazılarla katkı vermeyi sürdürmenin mutluluğu içindeyiz. İyi okumalar.

Güneş Duru & Mihriban Özbaşaran



Note from the editors

A year has passed, and as February returns, we are pleased to present the fifth issue of the Turkish Journal of Archaeological Sciences. This issue brings you six different articles, each offering a unique perspective. Some push the boundaries of archaeological thought, others invite alternative ways of thinking, and some highlight methodological advancements within the field.

Archaeology, as a discipline, seeks to understand how past societies navigated environmental, economic, and social challenges under different conditions. From small-scale communities to large, complex societies, it explores how people adapted to change, responded to crises, and created innovative solutions. In this issue, we are excited to share new research that embraces methodological advances, and ethnographic, experimental, and interpretative approaches, all of them further enriching our understanding of the past.

We hope you enjoy reading!

Güneş Duru & Mihriban Özbaşaran

First *Pekmez* and Later Wine

Udo Hirsch^a

Abstract

When it comes to the origin of wine, two distinct narratives can be identified. The first pertains to wine and grapes (from the cultivated vine known as *Vitis vinifera* ssp. *vinifera*), as described in general terms by botanists, archaeologists, and other scientists. This narrative begins between the 5th and 4th millennium BCE with the rise of urbanism. Large settlements, organized by elites who could afford to cultivate vines on temple grounds or in royal gardens, along with the emergence of trade centers in the Southeast Asia and Mediterranean, provide evidence for the widespread use of grapes. Wine was consecrated to rulers in heaven, sacrificed by both religious and secular powers, and used in important funerary rituals. Until around 1200 BCE, wine remained the alcoholic beverage of the elite.

The second narrative originates from Georgia. During excavations of an early Neolithic settlement of the Shulaveri-Shomu culture (6000-5400 BCE) in the southern Caucasus, about 60 years ago, Georgian archaeologists identified grape seeds from what appeared to be cultivated grapes in the earliest strata. Another significant find was a large clay pot with a pattern resembling grapes. This pot (a *kvevri*, a traditional Georgian clay wine container) is considered to be the first and oldest of its kind in the world. Some grape seeds, as well as residues of tartaric acid found on pot sherds, are thought by some scholars to serve as markers for grape wine. Based on these discoveries, the narrative shifted to a widely accepted belief that the invention of viticulture, or the production of wine, originated in Georgia and spread through the Southeast Asia to Europe. However, recent research and discussions suggest a need to reconsider these assumptions. It is argued in this paper that the first product derived from grapes may have been *pekmez* (grape molasses) rather than wine.

Keywords: *Vitis vinifera* ssp. *silvestris*, *pekmez*, grapevine, prehistory, southern Caucasus

Özet

Şarabın kökeni söz konusu olduğunda, karşımıza iki anlatı çıkar. İlki, botanikçiler, arkeologlar ve diğer bilim insanları tarafından genel hatlarıyla tanımlanan şarap ve üzümle (*Vitis vinifera vinifera* adlı kültür asmasından) ilgilidir. Bu anlatı MÖ 5. ve 4. binler arasında şehirciliğin

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ortaya çıkışıyla görülür. Tapınak arazilerinde ya da kraliyet bahçelerinde asma yetiştirmeyi göze alabilen elitler tarafından organize edilen büyük yerleşimlerin yanı sıra Orta Doğu ve Akdeniz ülkelerindeki ticaret merkezlerinin ortaya çıkışı, üzümün yaygın şekilde kullanıldığına dair kanıtlar sunmaktadır. Şarap, cennetteki hükümdarlar için kutsandır, dini ve seküler güçler tarafından önemli cenaze törenlerinde kullanılırdı. Yaklaşık MÖ 1200'lere kadar üzüm şarabı seçkinlerin alkollü içkisiydi.

İkinci anlatı ise günümüz Gürcistan topraklarından gelmektedir. Güney Kafkasya'daki erken Neolitik Shulaveri-Shomu kültürüne ait yerleşmede (MÖ yak. 6000-5400) yapılan kazılarda, arkeologlar, erken tabakalarda yetiştirildiği anlaşılan üzüm çekirdekleri bulmuşlardır. Bir diğer önemli buluntu ise üzerinde üzüme benzeyen bir desen bulunan büyük bir kil kaptır. Bu kap (*kveveri*, geleneksel bir Gürcü kil şarap kabı), dünyada türünün ilk ve en eskisi olarak kabul edilir. Kap parçalarında bazı üzüm çekirdeklerinin yanı sıra tartarik asit kalıntıları da bulunmuştur ve bunlar bazı araştırmacılar tarafından üzüm şarabının göstergeleri olarak kabul edilmektedir. Bu buluntulara dayanan anlatı, şarap üretiminin icadının (dünyadaki ilk bağıcılık) Gürcistan'dan Orta Doğu'ya ve oradan da Avrupa'ya yayıldığına dair yaygın bir inanca dönüşmüştür. Ancak son zamanlarda yapılan araştırma ve tartışmalar bu varsayımların yeniden gözden geçirilmesini gerektirmektedir. Bu makalede, üzümde elde edilen ilk ürünün şarap değil *pekmez* olabileceği önerilmektedir.

Anahtar kelimeler: *Vitis vinifera* ssp. *silvestris*, pekmez, üzüm bağı/asma, tarih öncesi, güney Kafkasya

Introduction

The Grapevine in the Neolithic Period of the Southwest Asia

For a long time, the Fertile Crescent was known as the region in which hunters and gatherers settled down after pioneering the cultivation of plants and domestication of animals. Today we know that hunters and gatherers settled down first, turning into harvesting peoples living off the rich natural resources. Changes in climate, demography and culture triggered the economy of hunters and gatherers to transform into arable farming and animal husbandry over a long process of thousands of years.

A brief look at the chronological development in the Southwest Asia starts with foraging groups of the Levant up to the Taurus-Zagros region and the south Anatolian coast during the Late Epipaleolithic, (12.000-10.000 BCE). Following this, from 9700–8700 BCE, the Pre-Pottery Neolithic A (PPNA) period in the Levant and the northeastern Fertile Crescent reveals both hunting and gathering as well as indicating the first appearance of domesticated forms of crops in the Fertile Crescent (Van Zeist & Bottema, 1991; Colledge, 1998, 2001; Willcox et al., 2012; Weiss, 2015). From 10.000 to 7000 BCE the size of populations and the number of settlements increased significantly. During the Pre-Pottery Neolithic B (PPNB) period (8700-7000 BCE) mixed forms of agriculture emerged, based on cereals and pulses as well as sheep/

goat husbandry. The cultivation of plants becomes dominant and widespread (Asouti & Fuller, 2013). The changes mentioned above in the Southwest Asia are reflected in archaeobotanical findings in various publications (Colledge, 1998, 2001; Willcox et al., 2012; Asouti & Fuller, 2013; Fuller & Stevens, 2019; Weide et al., 2022).

Wild Grapevines in Early Settlements

To find hints about the existence of the early grapevine, it was researched by the author in 63 excavation reports of some of the earliest Neolithic settlements in the Southwest Asia, from 12.000 BCE in the southern Levant up to about 6000 BCE in the southern Caucasus. In the selection of the 63 settlements, preference was given to reports that provided the most comprehensive information about climate, environment, and typical habitats. For a better understanding, several publications have been used for some of the 63 settlements.

Some of the 63 researched early settlements existed in grass steppes and forest steppes and, to a much lesser extent, near gallery forests. Characteristic of the grass steppe are large varieties of wild grass, wild cereals and pulses. On the open forest steppe, the grapevine would have had little chance. The abundance of large herbivores in this zone, like gazelle, sheep, goats, aurochs and donkeys, would mean that a grapevine with its large, soft leaves would have been grazed well before it could have found its way to safety by climbing up the occasional tree. The wild grape could survive much better in gallery forests, which were found mainly in small side-valleys such as those of the tributaries to the Euphrates and Tigris. On the northern slopes and especially where steep slopes made access difficult for larger animals, the wild grapevine could grow tall on trees.

The excavation reports studied provide ample information on the grasses, plants, trees and fruits found. However, *Vitis* benchmarks are rare: at most 2-4 grape seeds and a few charred pieces of wood and often located in or about gallery forests. Charred seeds and carbonized pieces of wood were found in only 12 out of the 63 settlements studied (Figure 1). The other settlements were probably not located in landscapes suitable for the wild grapevine (Fuller, 2018).

The late Natufian period (9300-8500 BCE) coincides with the substantially cooler and drier conditions of the Younger Dryas epoch. This period may have experienced a retraction of the park and steppe woodland belt and its rich food resources (Garrard, 1999; Asouti, 2017). In the meantime, structural arrangements in housebuilding and the use of tools changed in the sites of the southern Levant (Valla, 1995). Until recently, the central area of the Fertile Crescent was the core center for the cultivation of grains and pulses and the domestication of goats, sheep and cattle (Figure 2). But Southwest Asia is now considered a zone where multiple centers developed for plant cultivation and animal husbandry (Fuller et al., 2011; Arranz-Otaegui et al., 2016; Bar-Yosef, 2017; Ergun et al., 2018; Stiner et al., 2018). Skills and experience spread

across the Mediterranean first to the west very early on and later to the north and east. In summary, the available archaeological archives do not provide clues to indicate an extensive cultivation or even use of the grapevine despite the apparent success in the cultivation of other plants.

Archaeological Background of the Southern Caucasus

It is assumed that the climatic changes taking place between 8200 and 6200 cal. BCE contributed to migration. It was becoming warmer and more humid. The tree line shifted north (Wick et al., 2003) and the first settlements in the southern Caucasus emerge at the end of the 7th millennium cal. BCE (Japaridze & Javachischwili, 1971).

The villages which emerged in the southern Caucasus, included settlements in today's Georgia, Azerbaijan, and Armenia. These are referred to as the Aratashen-Shulaveri-Shomu culture. The settlers probably came from the south or the southwest and brought with them their domesticated animals as well as cultivated food plants, mostly cereals and pulses. In the 1960s, excavations began at some of these Neolithic settlements in Georgia, Armenia and Azerbaijan which have continued, with major interruptions, to this day (Japaridze & Javachischwili, 1971; Ramischvili, 1997; Lordkipanidz, 2002; Badalyan et al., 2007; Bastert-Lambrichts, 2010; Lyonnet et al., 2012; Hovsepian, 2015; Nishiaki et al., 2015a; Hansen & Ullrich, 2017; Lyonnet, 2018; Nishiaki et al., 2018; Marro et al., 2019; Nishiaki, 2021; Palumbi et al., 2021).

The houses of the Shulaveri-Shomu settlements in Georgia are circular with a maximum diameter of between 3 and 5 m. The houses had no fireplaces for cooking or heating in the winter. They were also very sparsely equipped. The daily activities were carried out in the courtyard. The small depots, built in the courtyard, were probably used for food storage. This construction method is surprising because at this time of the southern Caucasus Neolithic period rectangular rooms with fireplaces and rich equipment inside the rooms had existed already for more than 2000 years in other places in the Southwest Asia (Bastert-Lambrichts, 2010). It might be possible that some of the Shulaveri-Shomu settlements were only used seasonally.

During the excavations of the settlements of the Shulaveri-Shomu culture (5800-5400 BCE), indications were found of the use of grapes. The most relevant evidence points to seeds of grapes; the presence of tartaric acid; a large, decorated clay vessel (called a *kvevri* in Georgian); the highest number of grape varieties in the world; and pollen from grape vines. This cluster of findings from archaeological and biomolecular investigations permitted Georgian scientists (Ramishvili, 1997) to claim that people in Georgia already grew vines in Neolithic times and stood at the inception of a continuous 8000-year-old wine culture and indicated that Georgia was the cradle of wine in the world (McGovern, 1999, 2003; This et al., 2006; Terral et al., 2010; Forni, 2012; Lyonnet et al., 2012; Hovsepian, 2015; Maghradze et al., 2016; Rova, 2024). Ramishvili (1997) noted that 10 grape seeds were found in 1965 during excavations

at Dangreuli Gora, one of the settlements of the Shulaveri-Shomu culture, in various places on a tamped clay floor. These seeds, having characteristics of cultivated grapevines, were dated at that time to 5000-3000 BCE and were estimated to be the oldest grape pips not only in Georgia, but on the entire Euro-Asian continent.

The biomolecular archaeologist McGovern (1999) stated that this earliest Neolithic evidence for the beginning of a true wine culture, in which wine dominated social and economic life, originates from Georgia. The Shulaveri Gora site south of Tbilisi yielded what could well be the oldest cultivated grape seeds dating from 6000 BCE. The botanist Rusishvili (2010) examined and determined the morphological properties of grape seeds found during the excavations of several other Neolithic and later settlements in Georgia. These included seeds which they referred to as the seeds of cultivated grapes. These uncarbonized seeds came from the Neolithic settlement Shulaveri Gora (Ramishvili, 2001).

Later, almost all of the grape seeds found during the excavations of the Shulaveri-Shuma settlements in Georgia (Bouby et al., 2021) were ¹⁴C dated for the first time. But instead of the expected Neolithic date, the seeds from the Neolithic level of Gadachili Gora, central Georgia, along the Kura River proved to be modern. McGovern and their colleagues (2017) stated that two uncarbonized grape seeds at Gadachili Gora does not confirm that a seed from a Neolithic layer is Neolithic in date. Examination of the context showed the seeds were in an animal burrow or tunnel extending into Neolithic levels, about 1.5 m below the surface, and were found with various other seeds, including carbonized and uncarbonized wheat and barley. The two uncarbonized grape seeds from the 2012-2013 excavation of the site proved to be modern. Uncarbonized grape seeds from the other sites were also dated recently, including one of the eight specimens from Dangreuli Gora, south of Tbilisi. and two from the Gudau River deposit from the northwestern part of Georgia believed to be of Neolithic date. These uncarbonized seeds were also modern, one uncarbonized seed from Anaklia, west Georgia and another carbonized specimen from Pichori, also west Georgia, proved to be truly ancient, having consistent archaeological and radiocarbon dating in the Middle Bronze Age (Bouby et al., 2021). The only other carbonized seed in the corpus that was ancient was from Arukhlo (one of the settlements of the Shulaveri-Shomu culture near Tbilisi), but rather than belonging to the Neolithic period, as its archaeological context suggested, it was dated to the Iron Age (McGovern et al., 2017). After this dramatic incursion into Georgia's assumed wine history – probably by a mouse – it is now certain that no Neolithic grape seeds, either wild or cultivated, have been found so far in Georgia. The oldest grape pips in Georgia come from the settlements Anaklia and Pichori, dated to the Middle Bronze Age (McGovern et al., 2017; Bouby et al., 2021).

A few more dates came to light at the Azerbaijan Neolithic-Chalcolithic site of Mentesh. Just one grape pip from the Neolithic period and six seeds together with one piece of charred

grapevine wood from the Middle Chalcolithic period are known. They are the earliest finds of *Vitis vinifera* ssp. *silvestris* from the southern Caucasus (Decaix, et al., 2016; Bouby et al., 2021). From other sites like Aratashen in Armenia, Badalyan et al. (2007) report two pips of *Vitis silvestris* were found in level 1, ca. 5600 BCE. There were a few more seeds found at Göytepe, Middle Kura Valley (uncertain morphology), (Nishiaki, 2021) and Hacı Elamxanlı Tepe (uncertain morphology, but supposed to be from wild grapes) in Azerbaijan (Nishiaki, 2015a).

Sporadic finds of wild grapevine pits (*Vitis vinifera* ssp. *silvestris*) have been known in the Southwest Asia since at least 12.000 BCE (Figure 1). With the colonization of the southern Caucasus from about 6000 BCE and the emergence of the Shulaveri-Shomu culture, sporadic seeds of the wild vine were also found there, thus proving the existence of the wild vine in the Caucasus. However, the re-dating of seeds from Neolithic excavation horizons found during excavations of the Shulaveri-Shomu culture show that there are no findings of *Vitis* seeds from the Neolithic period in Georgia. The oldest domesticated *Vitis* seeds date from the late Bronze Age (Bouby et al., 2021). According to these recent ¹⁴C dates, the other results from archaeological and biomolecular studies need to be reinterpreted.

Today there are still some scientists claiming that Georgia has a continuous 8000-year-old wine culture and can therefore be described as the cradle or original home of wine. Of course, the most important archaeological evidence includes the kernels of domesticated grapes, as well as tartaric acid, which is considered to be the biochemical fingerprint and marker for wine, and one larger clay vessel claimed to be the world's earliest wine vessel, a Georgian *kvevri*. The highest number of grape varieties in the world and pollen from grapevines confirm that humans grew vines in Georgia. All evidence comes from the Neolithic period (Maghradze et al., 2016; McGovern et al., 2017; Corti, 2018; Gavagnin, 2019; Maghradze et al., 2019; Harutyunyan & Malfeito-Ferreira, 2022).

According to the ¹⁴C dating, the settlement of Aruchlo was inhabited only for about 400-500 years, from about 5800-5400 BCE. Afterwards, there were no Chalcolithic settlement levels (Bastert-Lambrechts, 2010). Japaridze and Javachishvili (1971) noted already in the 1970s that the Shulaveri-Shomu settlements were abandoned almost simultaneously after about 500 years. The same picture emerged in the other settlements of the Shulaveri-Shomu culture with slight temporal differences. Sites of the 5th and 4th millennium BCE are barely visible in the archaeological record and the reason for this remains unknown (Lyonnet et al., 2012). Only Mentesh and Kamiltepe in Azerbaijan and some others in the Mill Plain have a bit longer settlement period (Helwing, 2012). There is no 8000-year uninterrupted settlement period in Georgia. Recent ¹⁴C dating confirms that domesticated grapes did not exist in Georgia until the Late Bronze Age (1110-990 BCE) (Bouby et al., 2021).

The clay pot, known as a *kvevri* (Georgian wine jar) has a knob-like decoration that seems to resemble a grape. There exist many other knob decorations on Shulaveri-Shomu clay pots, but only one grape pot. The clay vessels from the Neolithic of Georgia are fired at a low temperature, mostly vegetal tempered, not tight and more important they cannot be tightly closed. McGovern et al. (2017) see it differently saying that “minimally, the ancient jars, best suited for containing a liquid, had come in contact with grapevine.” Yet, as researcher said in an earlier publication (McGovern, 2003), in the early Neolithic they did not have the necessary vessels¹ to store wine for a longer period. The same applies, of course, to the vessels from the excavations at Mentesh where the clay pots are vegetal tempered, fired at low temperature, and sometimes decorated with knobs. Kamiltepe has large storage jars as well, sometimes with knobs (Lyonnet et al., 2012). Alakbarov (2018) writes that coarse pottery is very specific for the Shulaveri-Shomutepe culture and can be considered the main indicator for this culture. This coarse pottery could not be used for any liquid. Probably they could be used for storing grain and pulses. The Neolithic Georgian *kvevri* could not be used for wine.

The botanist and plant geneticist Vavilov (1930, 1992) described the southern Caucasus as a region with a great genetic diversity, including grape varieties, and therefore as a plausible region for the origin for wine. Since then, Georgia has been called the cradle and origin of wine despite contradictory evidence from Türkiye, Azerbaijan, and Armenia.

Türkiye has more than 1500 ampelographically classified varieties. About 1200 grape accessions are in the National Germplasm Repository Vineyard at Tekirdağ (Boz et al., 2012). All of them are currently grown and used for a variety of purposes in the villagers’ private fruit gardens and vineyards; Azerbaijan has more than 500 cultivars, kept in collections with around 250 of them considered to be local varieties; Armenia has less than 100 accessions in national collections, of which very few are indigenous cultivars. Until 1993 there were more than 800 accessions of indigenous and introduced varieties, but most were destroyed after land privatization. Georgia also has more than 500 wine and table grape cultivars that are described, but only half of them exist in four national collections and only a small number of local varieties are still cultivated (Vouillamoz et al., 2006; Boz et al. 2012).

Kvavadze et al. (2010) use the finding of pollen of *Vitis vinifera* and of typical vineyard weeds as an indicator for vine growing in the Neolithic of Georgia. But *Vitis* pollen can only show *Vitis vinifera* and cannot differentiate between the wild and the domestic form (Weiss, 2015; Hirsch, 2016), in this case it is very probably *Vitis vinifera* ssp. *silvestris*.

¹ Early pottery from some southern Caucasus settlements: Guliyev & Nishiaki, 2012; Nishiaki et al., 2015a, 2015b; Alakbarov, 2018.

Tartaric Acid as a Fingerprint and Marker for Grape wine

Tartaric acid was found in the pores of some sherds of clay pots during the excavations of the Shulaveri-Shomu settlements and was referred to as residue from grapes and is considered a fingerprint and marker for wine. As McGovern and his colleagues (McGovern et al., 2017) noted, high levels of tartaric acid provide evidence for the presence of ancient grape/wine in these jars and others from Gadachili. But besides the *Vitis*-berries, fruits from other plants also contain tartaric acid. Some, like hawthorn berries (*Crataegus*), contain even more. While grapes can contain around 4000 ppm of tartaric acid, *Crataegus* can produce about 16.000 ppm (Barnard et al., 2011). Hawthorn (*Crataegus*) was found during excavations at Wadi Hammeh in the Jordan Valley (12.000 BCE) (Edwards et al., 1996). It was also found in large quantities in the excavations of Ain El Kerh (9000 BCE) in the northern Levant (Tsuneki et al., 2006). A hawthorn variety, *Crataegus orientalis*, is known from the Konya plain in Türkiye (Collins et al., 2018). The genetic diversity of *Crataegus* ranges from Türkiye to Iran (Dönmez, 2004). In Georgia, *Crataegus monogyna* is widespread and well known because of its sweet berries. They are either eaten raw or used to make a type of sweet bread (Christensen, 1992). On the other hand, McGovern argued that the results from his residue analyses of Neolithic clay pots (mainly tartaric acid) can be seen as evidence for wine production. Léa Drieu criticizes this interpretation, stating that "... overall, we conclude that currently none of the proposed chemical biomarkers for wine provide unequivocal evidence. Only archaeobotanical evidence providing additional contextual data could support valid interpretations" (Drieu et al., 2020). Finally, only tartaric acid is left of the Georgian wine history. If it is from a *Vitis* product and does not come from another fruit, then tartaric acid could be also a residue from various wild grape products such as fruit juice, wine, vinegar, *pekmez* and raisins.

References to by-products of *Vitis vinifera* are seldom found in archaeological reports. Juice, vinegar and raisins or *pekmez* are hardly mentioned. It seems obvious that grapes are made into wine (White & Miller, 2018). Another most important *Vitis* product is *pekmez*, a syrup made from grape juice. In Türkiye, 4.200.000 tons of grapes are produced every year and 40% of this amount is used for the production of grape *pekmez* (Kalaycıoğlu, 2023). The production of *pekmez* was possibly known as early as in the Neolithic Shulaveri-Shomu culture, because residues found in clay vessels, such as the organic acids oxalic, tartaric, malic, citric, succinic, lactic, gluconic and abietic acids, may well be leftover residues from both wine and *pekmez* (Kalaycıoğlu, 2023).

Nicolas Garnier does not refer to tartaric acid as evidence for wine production either. Researcher describes the weaknesses of different methods for carrying out residue analyses in detail. (Barnard et al., 2011; Garnier & Valamoti, 2016). The genetic richness of the grapevine has developed for several reasons, including the fact that it has been cultivated in areas that were not part of

its original natural habitat because of its many uses. Almost every adaptation of grapes to a new location in history has led to a new variety in the long term. *Pekmez* is not only a sweetener but also a valuable food in combination with other products and is widely used in almost all areas of the Southwest Asia. Türkben et al. (2016) provide a detailed overview of the physical and chemical properties of *pekmez*.

Making Wine from Wild Grapes

Wild vines grow profusely in the valleys that run from the Taurus Mountains in Türkiye to the Mediterranean Sea. Especially in places where larger bushes and trees are hard for goats and sheep to reach, wild vines have a good chance to escape predators, including humans, because it is hard for them to get at the small grapes. The skin of the berries is quite firm, the pips are large, and the quantity of juice squeezed from them is rather insignificant.

Every year the author produces some wine from wild grapes. They can harvest about 5-8 kg (sometimes up to 10 kg) of grapes per day out of the trees and get from 10 kg about 700 ml of juice. The Georgian *kvevri* has a capacity of about 70 liters. In order to fill a *kvevri* with the juice of wild grapes it is needed to harvest about 700 kg of fruit. Fully matured wild grapes are tasty and sweet, but birds like them too, even when unripe. With daytime temperatures of 25-30°C, the grape juice started to ferment with its own yeast the day after harvesting. The fermentation in glass containers is complete after about 6–8 days. The wine obtained in this way is in most cases bitter and contains 7-9% alcohol. Some of the wines can become drinkable. In this case it cannot be excluded that some of the collected grapes originated from formerly domesticated grapevines which became wild again. The storage of wine in Neolithic Georgia would be out of the question since the coarse *kvevri* could not be used for wine. The wine had to be consumed without delay. But since it does not have an attractive, often even a bitter taste, it is hard to imagine that this beverage from wild grapes could have been an incentive for cultivation. However, as the fruit of the wild grapes are sweet and tasty, intensifying its juice by thickening and preserving it as *pekmez* would be a logical step forward.

Grapes need not necessarily be associated with wine but can instead indicate the former presence of grape juice, raisins or concentrated grape syrup or as defrutum as in the Classical period or modern *pekmez* (Barnard et al., 2011). Scientists point to various ways of using grapes differently but believe that these are too unlikely to be dealt with any further (McGovern et al., 2017). In the more recent work on the Neolithic wine from the Early Neolithic of Georgia, which McGovern published together with Georgian and international experts, they explain why *pekmez* is not suitable for residues of tartaric acid in the clay pots from the Shulaveri-Shomu settlements. They say, “grape juice also can be preserved by concentrating it into a syrup, but if this was the intended product, then pottery vessels from the SSC sites should show signs of carbon splotches due to exposure to fire on their exteriors. None do.”

Due to the results of the excavations at Shulaveri-Shomu (at Shulaveri and Imiris Gora in 1964), large numbers of pebbles that were found in every house were interpreted as slingstones (Japaridze & Javachischwili, 1971), but more likely these stones were used as cooking stones for boiling down grape juice and to make *pekmez* (see Supplementary 2). Numerous cooking stones were also found during the Aruchlo excavations (Hansen et al., 2007).

Experimental *Pekmez* Production with Cooking Stones

Pekmez can be heated in a clay pot outside the normally used open fire with the help of cooking stones (Hirst, 2024). It can also be used with clay pots that leak with wine and water but remain tight with *pekmez* (syrup) because of its high viscosity. It is not necessary to seal a *pekmez* pot tightly; just cover it and *pekmez* will keep for a very long time. *Pekmez* production also can be interrupted if not completely boiled down at one time and the boiling can be finished the next day. Carbon splotches do not appear since the clay pot stays outside the fire. It seems quite possible that producing *pekmez* by reducing juice from wild grapes would result in a much higher concentration of acids, including tartaric acid, succinic acid and others, as a residue at the bottom of the clay jar. Naomi Miller suggests that a hyper-skeptic might argue the chemical signature could come from vinegar, raisins, grape juice, or *pekmez*, which all require substantial fuel (as *pekmez* is boiled down from grape juice), while grape juice ferments naturally. At this early stage in vine use, residues likely result from simpler production methods (Miller, 2008). Some of the *pekmez* is produced from wild grapes and domesticated grapes. It is enough to keep the juice for three days in the sun in order to get a tasty *pekmez*. In Türkiye, this kind of *pekmez* is called *gün balı*, translated ‘honey of the day’ or ‘honey of the sun.’ Such descriptive terminology was already used by the Hittites (Gorny, 1996; Alp, 2000).

It can be suggested that the production of *pekmez* is the simpler production technology. To test the Neolithic production of *pekmez*, the author first used the juice of domesticated grapes (later also of wild grapes). Two liters of grape juice, equivalent to a two-day harvest of wild grapes, were heated in an approximately two-liter clay pot standing outside the fire. River stones were put in an open fire for about 10 minutes and then put in the pot with grape juice. After two repeats, the temperature of the grape juice rose to about 60°C. After an hour, the grape juice boiled down from 2000 ml to leave about 1200-1000 ml. No extra fuel was used for heating the *pekmez*. In modern *pekmez* production, some grape juice varieties would turn into a slightly bitter *pekmez*. In this case some fine clay could be added to prevent this (Türkben et al., 2016) (see Supplementary 1).

During the Chalcolithic and Bronze Ages

The Neolithic Shulaveri-Shomu settlements existed from about 5800 to 5400 before they were abandoned. The former settlement areas then seem to have remained uninhabited for more than a thousand years (Japaridze & Javachishvili, 1971; Bastert-Lambrechts, 2010). The sites in neighboring Azerbaijan and Armenia were also abandoned, only at slightly different times. Sites of the 5th and 4th millennium BCE are scarcely visible in the archaeological record and the reason for this remains unknown (Lyonnet et al., 2012).

Dated to about 4000 BCE, the oldest facility so-far known for the production of wine was discovered in Areni-1 cave in the southern Caucasus. The installation consists of a small basin with raised edges for pressing the grapes, a clay barrel for storing the wine and various clay vessels for fermentation. The basin for pressing the grapes is slightly sloped so that the pressed juice can drain directly into a large clay barrel. During the excavations, grape seeds of *Vitis vinifera*, remains of pressed grapes, and other residues of wine were found in clay vessels.

Barnard et al. (2011) developed an analytical method for the identification of syringic acid of malvidin. Malvidin is an anthocyanin which produces the red color in grapes and wine (Cheynier et al., 2006). Malvidin is considered a better chemical indicator for wine than tartaric acid (Barnard et al., 2011). The combination of the Areni-1 wine production plant with the improved chemical indicator for wine seems quite convincing at first glance, but it is certainly not one hundred percent proof.

The essential question of whether domesticated or wild grapes were used could not yet be answered. Since no domesticated grapes from the Chalcolithic period are known in the entire Caucasus, it should be assumed that the Areni-1 finds document *Vitis vinifera* spp. *sylvestris*, i.e., the wild grape (Smith et al., 2014). This means that harvesting the grapes from trees and bushes must have been extremely time-consuming and difficult, with very low juice yields from the small berries and their further processing and storage being rather hard as well. The entrance to the Areni-1 cave is an overhanging rock. In its shelter, various workspaces, several fireplaces and clay pots can be seen on the ground. The site could be described as a large village kitchen. After stepping 20 m into the cave, one reaches a larger room whose floor is almost completely covered with clay pots of different sizes. Some vessels cannot even be reached because the space is too small. Smaller clay pots had been placed inside some of the bigger pots which may not have been usable any longer. The whole room could have been used as a food depot for several families. The so-called wine press consists of a small open area, the edge of which is a few centimeters high and thus looks like a small tub. The tub is so small that only one person can move in it. The outlet of the flat tub leads into a clay barrel embedded in the floor. To make wine here, the following procedure is possible: A small number of wild grapes are brought into the cave from outside and taken to the wine press. Because of the low height of the rim, the

press can only hold about 5 kg of grapes. Pressing this amount of grapes yields about 0,3 – 0,4 liter of juice. The grape remains are then removed from the press and taken outside. There is no space between the various pots for storing a larger quantity of grapes before pressing and the grape residues after pressing, unless the smaller pots of different sizes nearby are empty and can therefore be used. The juice in a larger barrel can ferment within about 14 days. Then the clay pot must be tightly closed, unless the wine is transferred to other waterproof clay vessels of good quality. There is, however, no indication of how and with what material the wine pots were tightly sealed, or whether they were closed at all. If they were left open, the wine could only be consumed once. So, we do not yet know what purpose this wine served. Wine from wild grapes is often bitter and not very attractive.

In Barnard's new method of chemical investigation of the residues of red grapes from clay vessels (Barnard et al., 2011), malvidin is not only obtained from the remains of red wine, but also from those of *pekmez*. Here, the grape juice does not need to ferment. Malvidin is already produced within a short period of maceration of the mash from the solids of grapes, skins, seeds and stems (Cheynier et al., 2006). *Pekmez* from red grapes becomes reddish brown during production. When white grapes are used, the color of the syrup varies from light yellow to sandy.

In the Areni-1 cave, the production of *pekmez* could have gone as follows: Under the overhanging rock, the wild grapes would have been crushed in clay pots by hand or pressed by feet and thus juiced. An alternative to the production of wine from wild grapes is *pekmez* made from grape juice, which can be heated and slowly thickened on several fireplaces under the abris in front of the cave. When the *pekmez* is finished it can be stored in various clay barrels inside the cave. *Pekmez* does not have to be preserved; it is sufficient to cover the opening of the clay barrels.

Wine from wild grapes is not attractive and not useful. *Pekmez* is just the opposite; despite the reduced amount after boiling it down, the advantages are that it is easy to produce, very tasty, and it provides very important nourishment and when needed it can be diluted with water. Following Miller's (2008) remark for a practical solution we can imagine that people of the Chalcolithic period would now start to improve the size and the sweetness of the wild grapes in order to get more *pekmez*.

During the transitional period between the Late Neolithic and the second half of the Chalcolithic the settlement pattern changed in many regions in Southwest Asia. In addition to many villages, several larger settlements and eventually trading centers also developed. New elite groups emerged (Japaridze & Javachishvili, 1971; Lyonnet et al., 2012) and in the transition to the Bronze Age, principalities, city-states and kingdoms grew out of this and writing emerged. From this time on, all requirements for wine production from grapes were in place. The grapes

were domesticated; the clay pots were tight; an elite could afford to make a special drink and dedicate it to the gods.

As Tengberg explains in their work (Tengberg, 2012), the domestication of the first fruit trees, namely olives, figs, dates and grapes, took place in the late Chalcolithic period. At this time, all the prerequisites for successful wine production were in place. Although Tengberg does not rule out a somewhat earlier cultivation of grapes, it remains unclear whether the product was already wine. It is therefore reasonable to assume that the original purpose of the wild grape was not wine but *pekmez*. Accordingly, the development of wine took place from the wild vine via *pekmez* and then via the domestication of the vine (grapevine) to wine. This wine production was difficult and not for everybody. As we know from Powell (1996), the early wines were rare and expensive. In contrast to wine, *pekmez* is easy to produce, to store, and it is available for everybody. In short, *pekmez* comes first and wine later.

The Written Evidence

The Sumerian script emerged in the middle of the 4th millennium; the following Akkadian script was used after 2000 BCE. The early Sumerian tablets confirm the archaeological evidence that cultivation of the vine is at least as old as the 4th millennium BCE (Powell, 1996). However, viticulture is not synonymous with wine culture because the Sumerians and all their successors in southern Mesopotamia continued to raise grapes, but they drank beer, and wine continued to be both rare and expensive there. It remained as a prerogative of the gods and the kings. Powell (1996) believes that during this time the technology for conserving and aging wines does not yet seem to have been in existence.

While it seems likely that in Hittite texts the designation GEŠTIN normally refers to fermented grape wine, it may also serve as an umbrella-term for a group of grape-derived beverages (Gorny, 1996). Gorny also listed other words for various wine products:

SA ₅ GEŠTIN	red wine
SIG ₅ -an-ta-an GEŠTIN	good wine
parkui- GEŠTIN	pure wine
LÀL GEŠTIN	honeyed wine
GEŠTIN KU ₇	sweet wine
GEŠTIN EMŠA	sour wine
GEŠTIN GIBIL	new wine

and sometimes also a generic “wine for drinking” called GEŠTIN NAG = Hittite *Wiyanas akuwanna* (Gorny, 1996).

Alp (2000) mentions:

GEŠTIN KU ₇	sweetened wine
GEŠTIN LÀL	honeyed wine, sweetened wine
GEŠTIN HÁD.DU.A.	raisins as well as fresh grapes

Erdoğan (et al., 2011) adds more designations:

GEŠTIN DÛG.GA	filtered sweet wine,
GEŠTIN LIBIR.RA	mellow wine,
GEŠTIN KAS	wine mixed with beer,
GEŠTIN NAG	smooth wine

Raisins are a power food, but if one tries to dry wild grapes it can be directly seen there will be nothing left besides kernels and skins. It will be completely different when it comes to domesticated grapes. As a result, it can be assumed that there are no raisins from wild grapes in the Neolithic.

The terms GEŠTIN LÀL or GEŠTIN KU₇ for sweetened wine can be found in almost all Hittite texts on grape production. LÀL means honey, but GEŠTIN LÀL mostly has the meaning of wine sweet like honey. Just as often one will also come across GEŠTIN HÁD. DU. A, which means raisins. The description for sweet wine and fine sweet wine is known from Mari. For the general public it is possible that grapes in Anatolia were primarily cultivated as a source of sugar (raisins and syrup) and not meant for fermentation (Barjamovic & Fairbairn, 2018). Raisins were possibly very important products of Hittite grape cultivation. During military operations, soldiers received daily rations, they were used in funerals and in magical rituals when new temples were built. Raisins were mentioned in almost all Hittite documents.

A more specialized use was the production of a distinctive type of raisin wine starting in the Hittite period in Anatolia. Much later Pliny (Pliny the Elder, trans. 1938, NH 14.11: 248-249) describes several types and the process of making this sweet wine. However, recipes for the famous Anatolian raisin wine were already widely known in the Late Bronze Age (Hesiod, trans. 2006, *Works and Days*, lines 611-614). A variety is known as Scybelites from Galatia. Siroeum which is described in more detail, was produced by boiling down the must to one-third of its original volume. These wines, especially when adulterated with honey (Pliny the Elder, trans. 1938, NH 14.11: 248-249) were highly regarded.

Mixed wines are also mentioned in Hittite texts. Water, beer, honey and tree oil are added to them. Tree oil can also mean resin and the term honey is not always clearly referred to as bee honey, but can also consist of grape syrup, which is produced by boiling down grape juice (like *pekmez* today). Here it becomes clear how difficult it is for the translator to find the right term.

They rarely know the variety of possible grape products and the various traditional production methods. They then must find the right term in accordance with the content of the text.

Gorny (1996) explains the highly symbolic status of wine in Hittite times. The use of wine was almost exclusively in the hands of the king, his relatives and the royal servants. Wine and other alcoholic beverages symbolized the high status of an elite, which in turn strengthened his position of power through his control of production, consumption and distribution. The special use of wine in religious practices legitimized the elite through divine favor to present themselves as guarantors of good agricultural production and fertility.

The excavation of İkiztepe is important for the archaeobotanical samples of grapes (wild) of *Vitis vinifera* from the Chalcolithic and the Early Bronze Age onwards and based on what emerges from textual documentation. The use of wine was well established in the society, at least as far as the royal family, high state officials, and the elite were concerned. The terms *wi-yana-* (Hittite), *karam(?)* (Hattian), and *winiya-, maddu-* (Cuneiform Luwian) are described in detail in Corti (2017) along with the terms GEŠTIN LĀL and GEŠTIN KU₇ for sweet or honeyed wine. These descriptions also cover grape-growing regions, cultivation methods, the owners (primarily temples) and religious ceremonies. The type of land in eastern Cappadocia (Kültepe) is described as ‘composed not only of vines but also of a percentage of fruit trees and was comparable in some way to the (modern) Turkish *bağ*’ (Corti, 2017). The garden products were mainly consumed by the households growing them, and are only rarely mentioned in texts (Dercksen, 2008).

Conclusion

Even in the earliest settlements of the Southwest Asia, from around 12.000 BCE, seeds of the wild grapevine (*Vitis vinifera* ssp. *sylvestris*) were found sporadically. As the climate became warmer and more humid, the tree line moved further north (Wick et al., 2003), so that around 6000 BCE the southern Caucasus could be colonized. During the excavations of Neolithic settlements in Georgia in the 1960s, grapevine seeds were sporadically found there. Some of them were attributed to wild vines, others to cultivated vines. Other finds and findings confirmed the idea of the existence of an 8000-year uninterrupted Georgian wine culture. Furthermore, a clay vessel decorated with designs of grapes was described as the world’s oldest vessel to produce wine. Pollen findings were cited as an indicator of grape cultivation and Georgia was described as the country with the greatest genetic diversity of grapes in the world. This wine story was further supported by findings from biomolecular examinations of clay sherds. Residues of tartaric acid, which is often referred to as a fingerprint and marker for wine, were found in the pores of some clay pots.

As part of the new excavations in the southern Caucasus, radiocarbon dating was carried out on *Vitis* seeds for the first time. The seeds from the earlier excavations were also dated. However, these did not yield the expected results, since domesticated *Vitis* seeds from the Neolithic of Georgia had been expected. Instead, the seeds were assigned to the Bronze Age and the modern period. Careful examination revealed that the seeds had been found in a 1.5 m deep tunnel that extended into the Neolithic horizon of the excavation along with cereal grains and other seeds, both carbonized and uncarbonized. After this dramatic incursion into the assumed wine history of Georgia, probably by a mouse, it is now certain that no grape seeds, have yet been found in Georgia from the Neolithic period. Even the dating of other *Vitis* seeds found during recent excavations did not change this. This is where Georgia's wine history ends (for the time being).

If the findings from biomolecular studies originated from grapevine and not from another fruit, the product from the wild vines could have been either fruit juice, wine, vinegar or even *pekmez*. In the author's experience, to make wine from wild grapevines, about 8 to 10 kg of wild grapes can be harvested from bushes and trees per day. Ten kg of wild grapes yields about a maximum of 1 liter of grape juice. To fill the Neolithic Georgian *kvevri* with a capacity of about 70 liters one needs to collect about 700 kg of wild grapes.

The Georgian *kvevri* from the Neolithic period is a coarse clay vessel that is not leak-proof and cannot be sealed tightly. Wine can, therefore, not be stored for any length of time, it must be drunk immediately, which in this case can only be done once a year. Such a wine made from wild grapes usually tastes quite bitter, although it contains 7-9% alcohol. If the result is compared with the effort involved, making wine from wild grapes may not necessarily have been an incentive to cultivate them. However, as the fruits of the wild grape are sweet and tasty and their juice is improved and preserved by thickening, the production of *pekmez* may have been a logical step towards the cultivation of wild grapes. When considering the cultivation of grapes, archaeologists rarely considered *pekmez* as a possible alternative to wine.

Boiling down the juice of the wild grape into a syrup is easy to handle. Even more simple is the production of "sun boiled" *pekmez*. The sweet fruity flavors are very accentuated, the shelf life is guaranteed even in coarse clay pots, and the residues are largely the same as in wine production (tartaric acid will be even more concentrated). It is therefore easy to imagine that from the Chalcolithic to the so-called transition to the Bronze Age attempts were made to improve the size and sweetness of the wild grapes to obtain more *pekmez*. These endeavors ultimately led to *Vitis vinifera vinifera*, the domesticated grape.

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Supplementary Data

First *Pekmez* and Later Wine

Supplementary 1

Protocol of the production of *pekmez* (Figures 3-7)

Material

10 round fist-sized and smaller river and basalt stones (cooking stones)

2 wooden spoons for handling the stones

Thermometer

3-liter clay pot (fired at a minimum of 600°C)

2 liters of fresh grape juice

Method

Ignite a small fire on a stony fireplace; place all the cooking stones in or around the fire and heat them for at least 10 minutes; The pot can stay near, but not in the fire. When sufficiently heated, put 3–4 stones at a time in the grape juice and repeat with the other hot stones every 10 minutes. After about 20 minutes the temperature of the juice will be about 50–60°C. After another 10 minutes the juice starts cooking at about 80–90°C. Replace the stones with hot ones (3–4 at a time) in the juice for another 30 minutes. The grape juice liquid will evaporate by about 30%. After another 20 minutes the juice will turn into *pekmez* (syrup) and further heating up of the stones is no longer required. After 1.5 to 2 hours the *pekmez* cools down and clarifies. This method gives 1 liter of *pekmez* (from 2 liters of grape juice).

Supplementary 2

Pekmez products

In Georgia, the thickened grape juice is called *bakmazi*, products made with different recipes are called *kvatsarakhi* and if the syrup is further reduced, the product is called *tklapi*. *Gozinaki* with *bakmazi* is a famous New Year's meal. *Tutikhmeli* is served at weddings. In some areas, mulberries, cornelian cherries and other fruits are used instead of grapes. In winter, fruit soups are made as a main course. In Azerbaijan, a certain *pekmez* is called *doshap* and a thick fruit porridge with flour and butter is called *khashil*. In Greece and the Balkans, *pekmez* is called *petimez* and is mainly used there as a sweetener.

Fresh and dried fruits are used to produce either liquid or solid *pekmez*, both of which show great variation in different localities, regions, and families. In modern Türkiye, several beverages derived from grapes such as *basduk* and *kesme* are produced by boiling down the grape juice into a syrup which is then dried until it takes on the appearance of leather.

Köftür are like firm cakes, *pestil* are produced as thin slices. They are probably the best-known *pekmez* products in Türkiye (Karababa & Develi-Işıkli, 2005). *Pelte Pekmez* can be described as grape cream. The Turkish name *Gün Balı* is particularly interesting. Translated, *Gün Balı* means sun honey. In reality, it is a grape juice that has been dried in the sun until it has the consistency of thick *pekmez* (like honey). There are other products made from the grapevine, including vinegar and *sarma*. Grape vinegar is made with the juice of the grape and an addition of chickpeas, *Cicer arietinum*. Another method uses wine, also with the addition of chickpeas, or a vinegar mother (*sirke anası*). When making *sarma*, various products such as rice, vegetables, meat, etc. are wrapped in vine leaves and lightly cooked. The recipes vary greatly depending on the region. In recent years, traditional foods in Türkiye have received increasing attention, including, of course, products made with or from grapes (Karababa, & Develi-Işıkli, 2005). Although Türkiye has the largest number of grape varieties, this valuable genetic diversity, which is mainly found in private home gardens, is hardly recognized.

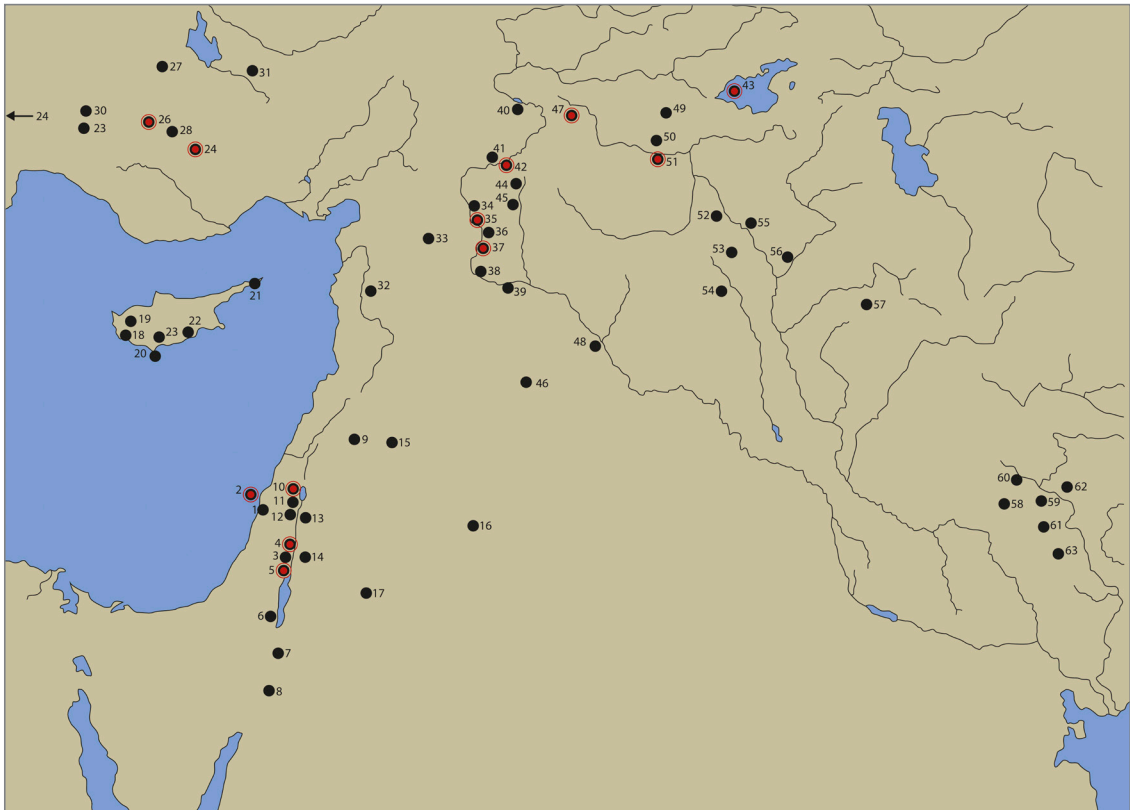


Figure 1. Map of early Neolithic sites studied in this research. Southern Levant sites – (17 sites, 4 with *Vitis*): (1) Nahal Oren (Nadel, 1991; Snir et al., 2015a), (2) Atlit-Yam (Galili & Nir, 1993) single *Vitis*, (3) Gilgal I (Bar-Yosef et al., 2010), (4) Netiv Hagdud (Hopf, 1969) *Vitis* in small amount, (5) Jericho, Tell es Sultan (Bar-Yosef, 1991), single *Vitis*, (6) Nahal Nemar Cave (Solazzo et al., 2016), (7) Wadi Faynan 16 (Finlayson & Mithen, 2007; Mithen et al., 2007), (8) Beidha (Byrd, 2005), (9) Tell Ramad (van Zeist, 2000), (10) Ohalo II (Nadel, 1991, Nadel & Weiss, 2012; Snir et al., 2015b) *Vitis*, (11) Gesher (Garfinkel & Doron, 2006), (12) Wadi al-Hammeh (Edwards et al., 1996), (13) Iraq ed-Dubb (Kuijt, 2004), (14) Ain Ghazal (Simmons et al., 1988), (15) Tell Aswad (Kuijt & Goring-Morris, 2002), (16) Dhuweilla (Wallace et al., 2019), (17) Azraq (Colledge, 2001); Cypriot sites (6 sites, no *Vitis*): (18) Mylouthkia (Peltenburg, 2009), (19) Ais Giorkis (Simmons, 1999), (20) Akrotiri (Simmons, 1999), Akrotiri-Aetokremnos (Mandel & Simmons, 2017), Aetokremnos – Akrotiri (Mandel & Simmons, 2017), (21) Kastros (Hansen, 2001), (22) Tenta (Knapp, 2010), (23) Shillourokambos (Guilaine et al., 2011), Klimonas-Ahillourokambos (Briois & Guilaine, 2012); Central Anatolian sites (8 sites, 2 with *Vitis*): (24) Hacilar (Helbaek, 1970), (25) Erbaba (Van Zeist & Buitenhuis, 1983), (26) Çatalhöyük East (Asouti & Fairbairn, 2002; Asouti & Austin, 2005) carbonized *Vitis* wood, (27) Boncuklu Höyük (Fairbairn et al., 2002), (28) Pınarbaşı (Asouti, 2003), (29) Can Hasan III (https://tr.wikipedia.org/wiki/Can_Hasan_3) *Vitis*, (30) Suberde (Bordaz, 1973), (31) Aşıklı Höyük (Ergun et al., 2018); Northern Levant sites: (17 sites, 5 with *Vitis*) (32) Tell el-Kerkh (Tsuneki et al., 2006), (33) Tell Qaramel (Mazurowski et al., 2009), (34) Tell Abr 3 (Tahér, 2004), (35) Dja'de (Willcox, 1996; Coqueugniot, 1999) *Vitis*, (36) Halula (Willcox, 1996), (37) Jerf el Ahmar (Willcox, 1996) carbonized *Vitis* wood, (38) Mureybet (Willcox et al., 2008), Mureybet (Mellaart, 1975), (39) Abu Hureyra (Hillmann et al., 1997, 2001; Moore et al., 2000; Colledge, 2001), (40) Cafer Höyük (Cauvin & Aurenche, 1999), (41) Gritille (Voigt & Ellis, 1981), (42) Nevalı Çori (Pakize, 2007) *Vitis*, (43) Lake Van (Wick et al., 2003) *Vitis* pollen, (44) Göbeklitepe (Asouti & Fuller, 2013; Dietrich et al., 2019), (45) Tell Sabi Abyad II (Verhoeven & Akkermans, 2000), (46) El Kowm I&II (Le Tonsor et al., 2015), (48) Çayönü (Çambel & Braidwood, 1983) *Vitis*, (49) Tell Bougras (Van Zeist & Waterbolk-Van

Rooijen, 1985); Sites of the eastern Fertile Crescent (15 sites, 1 with *Vitis*): (49) Hallan Çemi (Rosenberg et al., 1995), (50) Demirköy Höyük (Rosenberg & Pearmal, 1998), (51) Körtik Tepe (Özkaya & Coşkun, 2009; Coşkun et al., 2010; Benz et al., 2012) *Vitis*, (52) Tell Maghzaliyah (Bader, 1993), (53) Qermez Dere (Watkins et al., 1989), (54) Yarım Tepe (Stronach, 1972), (55) Nemrik (Kozłowski, 1989), (56) M'lefaat (Kozłowski, 1998), (57) Jarmo (Braidwood et al., 1983), (58) Choga Golan (Riehl et al., 2013), (59) Sheikh-e Abad (Whitlam et al., 2018), (60) Chia Sabz (Darabi et al., 2011), (61) Ali Kosh (Hole et al., 1969; Mellaart, 1975), (62) Ganj Dareh Tepe (Van Zeist et al., 1974; Mellaart, 1975), (63) Chogha Bonut (Alizadeh, 2003).

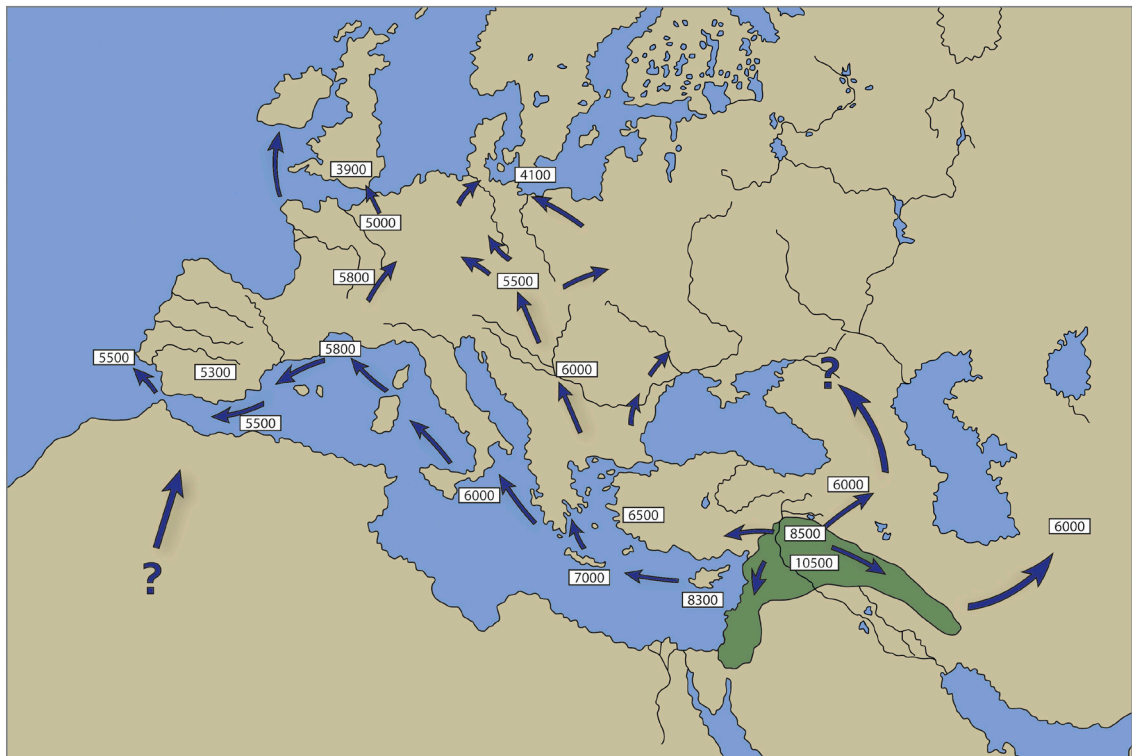


Figure 2. The traditional approach for the spread of the Neolithic economy



Figure 3. *Pekmez* production: Utilities for *pekmez* making



Figure 4. Heated stones to boil the water, a method known since prehistoric times



Figure 5. After cooling down for about two hours and getting clear, the *pekmez* is ready for use



Figure 6. Today villagers producing their *pekmez* in large copper kettles



Figure 7. *Pekmez* products on sale



Amaç & Kapsam

Arkeoloji bir süredir geçmişin yorumlanmasında teknoloji ve doğa bilimleri, mühendislik ve bilgisayar teknolojileri ile yoğun iş birliği içinde yeni bir anlayışa evrilmektedir. Üniversiteler, ilgili kurum ya da enstitülerde yeni açılmakta olan “Arkeoloji Bilimleri” bölümleri ve programları, geleneksel anlayışı terk ederek değişen yeni bilim iklimine adapte olmaya çalışmaktadır. Bilimsel analizlerden elde edilen sonuçların arkeolojik bağlam ile birlikte ele alınması, arkeolojik materyallerin, yerleşmelerin ve çevrenin yorumlanmasında yeni bakış açıları doğurmaktadır.

Türkiye’de de doğa bilimleriyle iş birliği içindeki çalışmaların olduğu kazı ve araştırma projelerinin sayısı her geçen gün artmakta, yeni uzmanlar yetişmektedir. Bu nedenle Arkeoloji Bilimleri Dergisi (ABD), Türkiye’de arkeolojinin bu yeni ivmenin bir parçası olmasına ve arkeoloji içindeki arkeobotanik, arkeozooloji, alet teknolojileri, tarihlendirme, mikromorfoloji, biyoarkeoloji, jeokimyasal ve spektroskopik analizler, Coğrafi Bilgi Sistemleri, iklim ve çevre modellemeleri gibi uzmanlık alanlarının çeşitlenerek yaygınlaşmasına katkı sağlamayı amaçlamaktadır. Derginin ana çizgisi arkeolojik yorumlamaya katkı sağlayan yeni anlayışlara, disiplinlerarası yaklaşımlara, yeni metot ve kuram önerilerine, analiz sonuçlarına öncelik vermek olarak planlanmıştır. Kazı raporlarına, tasnif ve tanıma dayalı çalışmalara, buluntu katalogları ve özgün olmayan derleme yazılarına öncelik verilmeyecektir.

Arkeoloji Bilimleri Dergisi açık erişimli, uluslararası hakemli bir dergidir. Araştırma ve yayın etiğine uygun bulunan makaleler çift taraflı kör hakem değerlendirme sürecinden geçtikten sonra yayınlanır. Dergi, Ege Yayınları tarafından çevrimiçi olarak yayınlanmaktadır.



Aims & Scope

Archaeology is being transformed by integrating innovative methodologies and scientific analyses into archaeological research. With new departments, institutes, and programs focusing on “Archaeological Sciences”, archaeology has moved beyond the traditional approaches of the discipline. When placed within their archaeological context, scientific analyses can provide novel insights and new interpretive perspectives to study archaeological materials, settlements and landscapes.

In Türkiye, the number of interdisciplinary excavation and research projects incorporating scientific techniques is on the rise. A growing number of researchers are being trained in a broad range of scientific fields, including but not limited to archaeobotany, archaeozoology, tool technologies, dating methods, micromorphology, bioarchaeology, geochemical and spectroscopic analysis, Geographical Information Systems, and climate and environmental modeling. The Turkish Journal of Archaeological Sciences (TJAS) aims to situate Turkish archaeology within this new paradigm and to diversify and disseminate scientific research in archaeology. New methods, analytical techniques and interdisciplinary initiatives that contribute to archaeological interpretations and theoretical perspectives fall within the scope of the journal. Excavation reports and manuscripts focusing on the description, classification, and cataloging of finds do not fall within the scope of the journal.

The Turkish Journal of Archaeological Sciences is an open access, international, double-blind peer-reviewed yearly publication. Articles that comply with publication and research ethics are published after the reviewing process. The journal is published online by Ege Yayınları in Türkiye.



Makale Değerlendirme Politikası (Çift Taraflı Kör Hakemlik) ve Yayın Süreci

Arkeoloji Bilimleri Dergisi, Türkçe veya İngilizce özgün araştırma makaleleri yayımlamaktadır.

1. Daha önce yayımlanmamış veya başka bir dergide değerlendirme sürecinde bulunmayan ve tüm yazarlar tarafından onaylanan makaleler değerlendirilmek üzere kabul edilir.
2. Gönderilen makaleler, ön inceleme, intihal taraması, hakem değerlendirmesi ve dil düzenlemesi aşamalarından geçirilir.
3. Ön inceleme aşamasını geçemeyen makaleler, yazar(lar)a iade edilir ve aynı yayın döneminde tekrar değerlendirmeye alınmaz. Ön incelemeyi geçen makaleler, en az iki hakemin değerlendirdiği çift taraflı kör hakem sürecine tabi tutulur.
4. İntihal kontrolünden geçen makaleler, Editör tarafından bilimsel içerik, yöntem, ele alınan konunun önemi ve derginin kapsamına uygunluk açısından değerlendirilir. Editör, makalelerin ön değerlendirmesini yapmak üzere editör yardımcılarına yönlendirir.
5. Editör yardımcıları, her bir makaleyi son gönderim tarihinden önce inceleyerek Arkeoloji Bilimleri Dergisi yayın ilkelerine uygunluğunu değerlendirir. Bu aşamada intihal taraması yapılır ve dergi yazım kurallarına uygunluk kontrol edilir.
6. Editörler ve editör yardımcıları, makalenin etik standartlara, konuya uygunluğa, metin düzenine, dipnotlar ve kaynakçaya, görsel kalitesine ve gerekli telif hakkı izinlerine uyup uymadığını değerlendirir. Bu kriterleri karşılayan makaleler, çift taraflı kör hakemlik süreci korunarak en az iki ulusal/uluslararası hakeme gönderilir.
7. Derginin hakem değerlendirme süreci ve editöryal etik kuralları, değerlendirmelerin milliyet, cinsiyet veya diğer herhangi bir faktöre dayalı önyargılardan arındırılmış olmasını sağlar. Makaleler, doktora derecesine sahip ve güçlü bir araştırma geçmişi bulunan en az iki uzman tarafından değerlendirilir.

8. Hakemler, makalenin yayınlanmaya uygunluğunu değerlendiren bir form doldurur ve gerekli revizyonlara yönelik önerilerde bulunur. Hakemler makaleyi değişiklik yapmadan kabul edebilir, küçük değişikliklerle kabul edebilir, büyük değişiklikler ve yeniden gönderim talep edebilir veya makaleyi reddedebilir. Her iki hakem de küçük değişiklikleri kabul ederse ve revize edilen versiyon onaylanırsa makale kabul edilir. Büyük değişiklikler gerektiğinde, makale Editörler tarafından yeniden değerlendirilir ve gerekli düzeltmeler yapıldıktan sonra hakemlere geri gönderilebilir. Revizyonlar yeterli bulunduğu makale yayımlanmak üzere kabul edilir. Eğer bir hakem makaleyi reddeder veya biri olumlu, diğeri olumsuz görüş bildirirse, makale üçüncü bir hakeme gönderilir. Ancak iki hakemin olumlu görüş bildirmesi durumunda, son yayın kararı Editör Kurulu tarafından verilir. Editöryal kararlar nihaidir ve yalnızca istisnai durumlarda ilgili COPE yönergelerine göre itiraz edilebilir.
9. Hakemlerden, değerlendirmelerinde nazik, saygılı ve bilimsel bir dil kullanmaları beklenir. Saldırgan, saygısız veya kişisel yorumlardan kaçınmaları gerekmektedir. Bilimsel olmayan yorumlar tespit edildiğinde, dergi yönetimi hakemden raporunu gözden geçirmesini ve düzeltmesini talep eder. Hakemlerin değerlendirmelerini belirtilen süre içinde tamamlaması ve burada açıklanan etik sorumluluklara uyması gerekmektedir.
10. Dil düzenlemesi tamamlandıktan sonra, kabul edilen makaleler ilgili dergi sayısında tematik veya kronolojik sıraya göre düzenlenir.
11. Makalelerin mizanpajı, dergi tasarımına uygun olarak yapılır ve ardından Editörler tarafından gözden geçirilir.
12. Makalelerin son PDF versiyonu, nihai kontrol ve onay için yazarlara gönderilir. Yazarlar, makalenin derginin etik standartlarına uygun olduğunu ve çalışmalarının tüm sorumluluğunu kabul ettiklerini teyit etmelidir.
13. Hakemlerin talepleri doğrultusunda yazarlar tarafından yapılan düzenlemeler incelendikten sonra, nihai yayın kararı Yayın Kurulu tarafından verilir.
14. Yukarıda belirtilen süreçler tamamlandıktan sonra ilgili dergi sayısı son haline getirilir ve makalelere DOI numaraları atanır.
15. DOI numaraları atandıktan sonra baskı süreci başlar ve yayın süreci tamamlanır.

Editör Sorumlulukları

1. Editör, makaleleri yalnızca bilimsel içerik temelinde değerlendirir; yazarların etnik kökeni, cinsiyeti, cinsel yönelimi, milliyeti, dini inançları veya siyasi görüşleri dikkate alınmaz.
2. Editör, gönderilen makalelerin tarafsız bir şekilde çift taraflı kör hakem değerlendirmesine tabi tutulmasını sağlar ve yayınlanmadan önce gizliliği korur.

3. Editör, hakemlere makalelerin gizli bilgi içerdiğini ve değerlendirmenin ayrıcalıklı bir etkileşim olduğunu bildirir. Hakemler ve yayın kurulu üyeleri, makaleleri üçüncü şahıslarla tartışamaz. Belirli durumlarda, Editör belirli bir noktayı netleştirmek amacıyla bir hakemin değerlendirmesini diğer hakemlerle paylaşabilir.
4. Editör, derginin içeriği ve genel kalitesinden sorumludur; gerektiğinde düzeltme notu yayımlamak veya geri çekme işlemi yapmak editörün sorumlulukları arasındadır.
5. Editör, yazarlar, editörler ve hakemler arasında çıkar çatışmasına izin vermez. Hakem atama konusunda tam yetkilidir ve makalelerin yayımlanmasına ilişkin nihai karardan sorumludur.

Hakem Sorumlulukları

1. Hakemler, araştırma, yazarlar ve/veya finansman sağlayıcıları ile herhangi bir çıkar çatışması içinde olmamalıdır. Değerlendirmeleri objektif olmalıdır.
2. Hakemler, gönderilen makalelerle ilgili tüm bilgilerin gizli kalmasını sağlamalı ve telif hakkı ihlali veya intihal tespit etmeleri durumunda Editöre bildirmelidir.
3. Kendini makaleyi değerlendirmede yetersiz hisseden veya incelemeyi belirtilen süre içinde tamamlayamayacağı kanısına varan hakem, Editöre haber vermeli ve değerlendirme sürecinden çekilmelidir.

Yazar Sorumlulukları

1. Yazar olarak belirtilen kişiler, makalenin kavramsallaştırılması, tasarımı, veri toplama ve yorumlama, veri analizi veya araştırma ve yazım süreçlerine önemli katkıda bulunmuş olmalıdır. Tüm ortak yazarlar, makalenin son sürümünü onaylamalı ve içeriğinden eşit derecede sorumlu olmalıdır.
2. Yazarlar, görsellerin (fotoğraf veya şekiller) telif hakkı düzenlemelerine uygun olmasını sağlamalı veya gerekli izinleri almalıdır. Eğer etik veya telif hakkı ihlali tespit edilirse, dergi ilgili makaleyi geri çekme veya erişimini engelleme hakkını saklı tutar.
3. Yazarlar, dergi editörleri ile iletişim kurmaktan, düzeltmeleri yapmaktan, makaleyi belirtilen sürede yeniden göndermekten ve etik ile telif hakkı kurallarına uygunluğu onaylamaktan sorumludur. İlk gönderimden sonra yazar isim değişiklikleri dikkate alınmaz.

Düzeltilme Süreci

Hakemler tarafından revizyon talep edilmesi durumunda, ilgili raporlar yazara iletilir ve yazarın en kısa sürede gerekli düzeltmeleri yapması beklenir. Yazar, yaptığı düzeltmeleri işaretleyerek güncellenmiş makaleyi Editörlere sunmalıdır.

Türkçe Dil Düzenlemesi: Hakem sürecinden geçen Türkçe makaleler, Türkçe Dil Editörü tarafından incelenir ve gerekli görüldüğünde yazardan tashih istenebilir.

Yabancı Dil Düzenlemesi: Hakem sürecinden geçen İngilizce makaleler, Yabancı Dil Editörü tarafından gözden geçirilir ve gerekli görüldüğünde yazardan ek düzeltmeler yapılması istenebilir.

Dizgi, Mizanpaj ve Son Okuma Süreci

Yayın Kurulu tarafından yayımlanması onaylanan makaleler, nihai yayına hazırlanmak üzere dizgi ve mizanpaj işlemlerine tabi tutulur. Mizanpaj işlemi tamamlandıktan sonra, yayınlanmadan önce makaleler için son okuma süreci gerçekleştirilir.

DOI Atama

Dijital Nesne Tanımlayıcısı (DOI), elektronik ortamda yayımlanan bir makalenin resmi ve orijinal versiyonuna kalıcı bir bağlantı sağlayan benzersiz bir kimlik numarasıdır. Arkeoloji Bilimleri Dergisi, yayın sürecinin tamamlanmasının ardından kabul edilen tüm bilimsel makalelere DOI numarası atayarak, makalenin dijital ortamda resmi kaydını güvence altına alır.



Article Evaluation Policy (Double-Blind Peer Review) and Publication Process

The Turkish Journal of Archaeological Sciences publishes original research articles in Turkish or English.

1. Manuscripts must be original, unpublished, and not under review elsewhere. All authors must approve the submission.
2. Submitted manuscripts undergo preliminary review, plagiarism screening, peer review, and language editing.
3. Manuscripts that do not pass the preliminary review are returned to the author(s) and are not reconsidered within the same publication period. Those that pass proceed to the double-blind peer review, evaluated by at least two reviewers.
4. The Editors evaluate manuscripts based on scientific content, methodology, significance, and the journal scope. Manuscripts passing this stage are assigned to associate editors for preliminary assessment.
5. Associate editors ensure manuscripts comply with journal principles, including plagiarism screening and adherence to formatting guidelines.
6. Editors and associate editors verify compliance with ethical standards, subject relevance, formatting, references, image quality, and copyright permissions. Approved manuscripts are sent for double-blind peer review.
7. The journal's peer review process maintains fairness and objectivity, free from biases based on nationality, gender, or other factors. Reviewers must have a doctoral degree and a strong research background.
8. The reviewers complete evaluation forms and provide recommendations: accept without changes, accept with minor revisions, request major revisions and resubmission, or reject. If both reviewers recommend minor revisions, and the revised version is approved, the

manuscript is accepted. If major revisions are required, the manuscript may be reassessed before final decision. If there is one positive and one negative review, a third reviewer is consulted. The final decision rests with the Editors. Editorial decisions are final and can only be appealed under COPE guidelines.

9. Reviewers must use respectful, professional, and scientific language. Disrespectful or unscientific comments will prompt a revision request. Reviews must be completed within the assigned timeframe.
10. After final editing, accepted manuscripts undergo thematic or chronological organization before inclusion in the journal.
11. Typesetting is conducted according to journal layout guidelines.
12. The final PDF version is sent to the authors for review and approval. Authors must confirm that the manuscript adheres to the journal's ethical standards and accept full responsibility for their work.
13. The Editorial Board makes the final publication decision after reviewing revisions.
14. Once this process is finalized, DOI numbers are assigned to the articles.
15. Following DOI assignment, the printing stage begins, completing the publication process.

Editor Responsibilities

1. The Editor evaluates manuscripts based solely on scientific merit, without bias toward authors' ethnicity, gender, nationality, or beliefs.
2. The Editor ensures a fair, confidential double-blind peer review process.
3. Manuscripts remain confidential before publication. Reviewers and editorial board members must not discuss them with third parties. If necessary, reviewer evaluations may be shared between reviewers by the Editor for clarification.
4. The Editor ensures journal quality, including corrections and retractions when necessary.
5. The Editor prevents conflicts of interest and has full authority in reviewer assignments and publication decisions.

Reviewer Responsibilities

1. Reviewers must disclose any conflicts of interest regarding the research, authors, or funding sources. Reviews must be objective.
2. Reviewers must maintain confidentiality and report any copyright infringement or plagiarism to the Editor.
3. Reviewers who feel unqualified to evaluate a manuscript or unable to complete their evaluation on time should notify the Editor and withdraw.

Author Responsibilities

1. All authors must have made significant contributions to the manuscript in terms of conceptualization, design, data collection and interpretation, data analysis, or research and writing. All co-authors must approve the final version and share responsibility for its content.
2. Authors must ensure that all images comply with copyright regulations or obtain necessary permissions. The journal reserves the right to retract or restrict access to articles with unresolved copyright or ethical issues. Any such actions will follow COPE guidelines.
3. The corresponding author is responsible for journal communication, revisions, post-publication inquiries, and compliance with the journal's ethical and copyright policies. Changes to authorship after submission will not be considered.

Revision Process

If revisions are requested, the review reports are sent to the authors. The authors must make necessary revisions promptly, highlighting them for clarity, and submit the updated manuscript to the Editors.

Turkish Language Editing: Turkish manuscripts passing peer review are reviewed by the Turkish Language Editor, who may request corrections.

Foreign Language Editing: English manuscripts passing peer review are reviewed by the English Language Editor, who may request corrections.

Typesetting, Layout, and Proofreading Process

Approved manuscripts undergo typesetting and layout formatting, followed by a final proofreading before final publication.

DOI Assignment

Digital Object Identifier (DOI) is a unique identifier that provides a permanent link to the official and original version of an electronically published article. The Turkish Journal of Archaeological Sciences assigns DOI numbers to all accepted scientific articles at the end of the publication process, ensuring the article's official recording in the digital environment.



Arkeoloji Bilimleri Dergisi Yayın Etiği ve Yayın Politikası

Yayın Etiği

Arkeoloji Bilimleri Dergisi, yürütülen tüm süreçlerde; Yazar, Hakem, Editör, Yayıncı ve Okuyucu sorumlulukları bağlamında yayın etiğine ilişkin uluslararası bir standart olarak kabul gören *Committee on Publication Ethics* (COPE) politikalarını benimsemekte ve yönergelerini takip etmektedir.

Editörler için: Editörler kurulunda yer alan araştırmacıların göndermiş olduğu makalelerle ilgili olarak makale hakem sürecindeyken makale sahibi editörlerin editör rolleri askıya alınır ve hakem sürecini görmemeleri sağlanır, böylece çift taraflı kör hakemlik korunur.

Hakemler için: Arkeoloji Bilimleri Dergisi, önyargısız ve en iyi etik standartlara göre çift taraflı kör hakem değerlendirme sistemi işletir ve COPE'nin Akran Hakemleri için Etik İlkelerinde belirtilen akran hakemlerine yönelik kılavuzunu dikkate alır. Hakemlerin, incelemelerini kendilerine ayrılan süre içinde tamamlamaları beklenir. Hakemlerimizin gizliliğine saygı duyuyor, yazarların ve hakemlerin de aynı gizliliğe uymasını bekliyoruz. Hakemlerin önyargısız ve saygılı bir dil kullanarak rapor vermeleri beklenir. Agresif dil veya yazarlar hakkında kişisel görüşler içeren yorumlar dikkate alınmaz. Bir hakem, gönderiyi incelemeye başlamadan önce varsa konuya istinaden veya olası herhangi bir çıkar çatışması hakkında editörleri bilgilendirmelidir.

Yazarlar için: Arkeoloji Bilimleri Dergisi, bilim dünyasına özgün çalışmalar sunmayı amaçlamaktadır. Makaleler özgün bilimsel araştırma olmalıdır. Dergiye çalışmalarını gönderen yazar(lar) söz konusu yazının daha önce başka bir yerde yayımlanmadığını ya da yayımlanmak üzere bir başka yere gönderilmemiş olduğunu kabul etmiş sayılırlar. Yazarlar, araştırma ve yayın etiğine uydıklarını kabul ederler. Yazar/lar etik izin gerektiren çalışmalar için Etik Kurul İzni sunmalıdır. Yazar/lar araştırma sürecinde araştırmaları için mali destek almışlarsa bu desteği makale metninde belirtmelidir. Yayın sonrası hata tespit edilmesi durumunda yazar/lar, hatalı makaleyi geri çekmek ve düzeltmekle yükümlüdür. Dergi ilkelerine uymayan makaleler dergiye kabul edilmezler. Ön değerlendirme ve intihal denetimini başarıyla geçen makaleler hakem değerlendirme süreci için en az iki hakeme gönderilir.

Telif Hakkı

Arkeoloji Bilimleri Dergisi'nde yayımlanan tüm özgün makaleler, Creative Commons Atıf-Gayri Ticari 4.0 International (CC BY-NC 4.0) lisansına tabidir. Bu lisans ile taraflar, Arkeoloji Bilimleri Dergisi'nde yayımlanan tüm makaleleri ve görselleri; atıfta bulunarak dağıtabilir, kopyalayabilir, üzerine çalışma yapabilir, yine sahibine atıfta bulunarak türevi çalışmalar yapabilir. Arkeoloji Bilimleri Dergisi tarafından yayınlanan makalelerin telif hakları CC BY-NC 4.0 lisansı kapsamında yazarlara aittir. Yayınlanan tüm telif hakları yazarın/yazarların sorumluluğundadır. Dergide yayınlamayı kabul ederek, yazarlar bu telif hakkı şartlarına uymayı da kabul ederler. Dergide yayımlanan eserlerin sorumluluğu yazarlarına aittir. Yazarların yayımlanmış olan makalelerine ait PDF dosyaları, kendi kurumsal arşivleri ile başka makale platformlarında ve sosyal medya hesaplarında açık erişim politikası gereği paylaşılabilir. Arkeoloji Bilimleri Dergisi hiçbir çıkar gözetmez.

İntihal

Arkeoloji Bilimleri Dergisi, intihal tespit yazılımı (*iThenticate* veya benzeri) kullanarak metinleri kontrol etme hakkını saklı tutar. İntihal, başkalarına ait çalışmaların (fikirlerin, verilerin, kelimelelerin, görüntülerin vb. her türlü medyatik formun) kaynak göstermeden veya gerekli olduğunda izin veya onay alınmadan kullanılmasıdır. Bu tanım çerçevesinde yazar(lar)ın gerekli referanslar veya izinler olmadan kendi çalışmalarını yeniden üretmeleri, kendinden kendine intihali içerir. İntihal materyali içeren gönderiler otomatik olarak reddedilecektir. Yayınlanmış ise yayımlandıktan sonra dahi, ilgili eyleme karar verilerek COPE'nin Akran Hakemleri için Etik İlkelerine göre sürdürülür.

Makale Geri Çekme Politikası

Bünyesinde özgün makalelere yer veren Arkeoloji Bilimleri Dergisi yayın yönetimi, yayın politikası gereği henüz değerlendirme aşamasında veya dergide yayımlanmış bir makaleye dair etik olmayan bir durum şüphesinin oluşması veya telif hakkı ihlali halinde, söz konusu çalışma hakkında incelemelerde bulunabilir. Yapılan incelemeler sonucunda bu amaçla değerlendirilen makale için COPE'nin makale geri çekme süreçleri uygulanır.

Eğer dergi editörleriyle iletişime geçen çalışma sahibinin kendisinden henüz yayımlanmış, hakem sürecinden geçerek kabul edilmiş ya da değerlendirme aşamasındaki çalışmalarıyla ilgili bir geri çekme talebi gelirse Arkeoloji Bilimleri Dergisi Yayın Kurulu bunu ivedilikle işleme alır. Bu işlemin yapılabilmesi için yazar(lar)ın geri çekme isteklerini kaleme aldıkları bir belge hazırlayıp her bir yazarın ıslak imzasıyla imzalayarak Arkeoloji Bilimleri Dergisi e-posta adresine (editor@arkeolojibilimleridergisi.org) iletmesi gereklidir. Bu süreç COPE'nin Akran Hakemleri için Etik İlkelerine göre sürdürülür. Arkeoloji Bilimleri Dergisi Yayın Kurulu, başvuruyu inceleyip karar vermeden önce yazarların çalışmasını başka bir dergiye yayınlanmak üzere göndermesini katıyetle etik bir davranış olarak kabul görmez.

Finansman

Yayında sunulan çalışmanın tamamlanması için alınan fon ve benzeri araştırma desteği, uygun olduğunda hibe numaraları ve/veya bilimsel proje numaraları da dahil olmak üzere beyan edilmelidir. Arkeoloji Bilimleri Dergisi'nde uygulanan yayın süreçleri, bilginin tarafsız ve saygın bir şekilde gelişimine ve dağıtımına temel oluşturmaktadır. Hakemli çalışmalar bilimsel yöntemi somutlaştıran ve destekleyen çalışmalardır. Bu noktada sürecin bütün paydaşlarının—yazarlar, okuyucular ve araştırmacılar, yayıncı, hakemler ve editörler—etik ilkelere yönelik standartlara uyması önem taşımaktadır. Makalelerde cinsiyetçi, ırkçı veya kültürel ayırım yapmayan, kapsayıcı bir dil kullanılmalıdır (“insanoğlu” yerine “insan”; “bilim adamı” yerine “bilim insanı” gibi). Arkeoloji Bilimleri Dergisi yayın etiği kapsamında tüm paydaşların bu etik sorumlulukları taşımasını beklenmektedir. Burada belirtilen etik görev ve sorumluluklar, Committee on Publication Ethics (COPE) tarafından açık erişimli olarak yayınlanan rehberler ve politikalar dikkate alınarak hazırlanmıştır. Bkz.: COPE İş Akış Diyagramları.

Kişisel Verilerin Korunması

Arkeoloji Bilimleri Dergisi'nde değerlendirilen çalışmalarda gerçek kişilere ait kişisel veriler Kişisel Verilerin Korunması Hakkında Kanun kapsamında koruma altındadır. Yazara ait hiçbir bilgi üçüncü kişi ve kurumlarla paylaşılmaz.



Turkish Journal of Archaeological Sciences Publication Ethics and Policies

Publication Ethics

The Turkish Journal of Archaeological Sciences adheres to the ethical standards set by the Committee on Publication Ethics (COPE), ensuring integrity in all aspects of the publication process for authors, reviewers, editors, publishers, and readers. The journal follows COPE guidelines to uphold ethical publishing practices.

For Editors: If a member of the editorial board submits an article to the journal, their editorial role is suspended during the peer review process to prevent any access to or influence over the review. This measure safeguards the integrity of the double-blind peer review system.

For Reviewers: The Turkish Journal of Archaeological Sciences employs an unbiased and ethical double-blind peer review system in accordance with COPE's Ethical Guidelines for Peer Reviewers. Reviewers are expected to complete their assessments within the assigned timeframe. The journal maintains the confidentiality of reviewers and expects both authors and reviewers to do the same. Reviewers must provide objective and respectful evaluations. Comments containing aggressive language or personal opinions about the authors will not be considered. Before commencing a review, reviewers must disclose any potential conflicts of interest to the editors.

For Authors: The Turkish Journal of Archaeological Sciences aims to contribute original research to the scientific community. Submitted manuscripts must be original and based on scientific research. By submitting a manuscript to the journal, authors confirm that the work has not been published elsewhere and is not under consideration for publication in another journal. Authors must comply with research and publication ethics. If the research requires ethical approval, authors must provide an Ethics Committee Approval. If financial support was received for the research, authors must declare this in the manuscript. Authors are responsible for correcting any errors discovered post-publication. Manuscripts that do not adhere to the journal's ethical principles will be rejected. Following a preliminary evaluation and plagiarism check, manuscripts undergo peer review by at least two independent reviewers.

Copyright Policy

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Plagiarism Policy

The Turkish Journal of Archaeological Sciences reserves the right to check submitted manuscripts using plagiarism detection software (*iThenticate* or similar). Plagiarism includes the use of another's work—whether ideas, data, text, images, or other media—without proper citation or required permission. This also applies to self-plagiarism, where authors reuse their own previously published material without appropriate citation. Manuscripts found to contain plagiarism will be rejected. If plagiarism is identified post-publication, corrective measures will be taken under COPE's Ethical Guidelines for Peer Reviewers.

Article Retraction Policy

The Turkish Journal of Archaeological Sciences is committed to academic integrity and will investigate ethical concerns regarding submitted or published articles. If ethical violations or copyright infringements are suspected, the journal will initiate a review process and follow COPE's retraction procedures as necessary.

If an author wishes to withdraw their manuscript after submission, acceptance, or publication, the Editorial Board will process the request promptly. Authors must submit a signed withdrawal request, endorsed by all co-authors, to the journal's official email address (editor@arkeolojibilimleridergisi.org). Manuscripts must not be submitted to another journal before receiving formal withdrawal confirmation, as this is considered unethical.

Funding Disclosure

If the research was supported by a grant or other financial resources, authors must disclose this in the manuscript, including relevant grant numbers and project identifiers where applicable.

Ethical Standards and Responsibilities

The Turkish Journal of Archaeological Sciences aims to support the objective and reputable dissemination of knowledge. Peer-reviewed publications represent the application of scientific methodology, and all stakeholders—authors, readers, researchers, publishers, reviewers, and editors—must adhere

to ethical standards. Manuscripts should use inclusive language that is free from bias based on sex, race or ethnicity, etc. (e.g., “he or she” or “his/her/their” instead of “he” or “his”) and avoid terms that imply stereotypes (e.g., “humankind” instead of “mankind”). The ethical duties and responsibilities outlined herein align with open-access policies and the Committee on Publication Ethics (COPE) guidelines.

Protection of Personal Data

Personal data of individuals involved in research published in the Turkish Journal of Archaeological Sciences is protected under the Law on the Protection of Personal Data. No personal information of authors will be shared with third parties or external institutions.



Makale Gönderimi ve Yazım Kılavuzu

** Please see below for English*

Makale Kabul Kriterleri

Makalelerin konu aldığı çalışmalar, Arkeoloji Bilimleri Dergisi'nin amaçları ve kapsamı ile uyumlu olmalıdır (bkz.: Amaç ve Kapsam).

Makaleler Türkçe veya İngilizce olarak yazılmalıdır. Makalelerin yayın diline çevirisi yazar(lar)ın sorumluluğundadır. Eğer yazar(lar) makale dilinde akıcı değilse, metin gönderilmeden önce anadili Türkçe ya da İngilizce olan kişilerce kontrol edilmelidir.

Her makaleye 200 kelimeyi aşmayacak uzunlukta Türkçe ve İngilizce yazılmış özet ve beş anahtar kelime eklenmelidir. Özete referans eklenmemelidir.

Yazarın Türkçesi veya İngilizcesi akıcı değilse, özet ve anahtar kelimelerin Türkçe veya İngilizce çevirisi editör kurulu tarafından üstlenilebilir.

Metin, figürler ve diğer dosyalar wetransfer veya e-posta yoluyla archaeologicalsciences@gmail.com adresine gönderilmelidir.

Makale Kontrol Listesi

Lütfen makalenizin aşağıdaki bilgileri içerdiğinden emin olun:

- Yazarlar (yazarların adı-soyadı ve iletişim bilgileri buradaki sırayla makale başlığının hemen altında paylaşılmalıdır)
- Çalışılan kurum (varsa)
- E-mail adresi
- ORCID ID

Makalenin içermesi gerekenler:

- Başlık
- Özet (Türkçe ve İngilizce)
- Anahtar kelimeler
- Metin
- Kaynakça
- Figürler
- Tablolar

Yazım Kuralları

Metin ve Başlıkların Yazımı

- Times New Roman karakterinde yazılan metin 12 punto büyüklüğünde, iki yana yaslı ve tek satır aralıklı yazılmalıdır. Makale word formatında gönderilmelidir.
- Yabancı ve eski dillerdeki kelimeler *italik* olmalıdır.
- Başlık ve alt başlıklar **bold** yazılmalıdır.
- Başlıklar numaralandırılmamalı, italik yapılmamalı, altları çizilmemelidir.
- Başlık ve alt başlıklarda yalnızca her kelimenin ilk harfi büyük olmalıdır.

Referans Yazımı

Ayrıca bkz.: Metin İçi Atıflar ve Kaynakça Yazımı

- Referanslar metin içinde (Yazar yıl, sayfa numarası) şeklinde verilmelidir.
- Referanslar için dipnot ve son not kullanımından kaçınılmalıdır. Bir konuda not düşme amacıyla gerektiği taktirde dipnot tercih edilmelidir.
- Dipnotlar Times New Roman karakterinde, 10 punto büyüklüğünde, iki yana yaslı, tek satır aralıklı yazılmalı ve her sayfa sonuna süreklilik izleyecek şekilde eklenmelidir.

Şekiller ve Tablolar

- Makalenin altına şekiller ve tablolar için bir başlık listesi eklenmelidir. Görsellerde gerektiği taktirde kaynak belirtilmelidir. Her şekil ve tabloya metin içerisinde gönderme yapılmalıdır (Şekil 1 veya Tablo 1).
- Görseller Word dokümanının içerisine yerleştirilmemeli, jpg veya tiff formatında, ayrı olarak gönderilmelidir.
- Görüntü çözünürlüğü basılması istenen boyutta ve 300 dpi'nin üzerinde olmalıdır.
- Görseller Photoshop ve benzeri programlar ile müdahale edilmeden olabildiğince ham haliyle gönderilmelidir.
- Excel'de hazırlanmış tablolar ve grafikler var ise mutlaka bunların PDF ve Excel dokümanları gönderilmelidir.

Tarihlerin ve Sayıların Yazımı

- MÖ ve MS kısaltmalarını harflerin arasına nokta koymadan kullanınız (örn.: M.Ö. yerine MÖ).
- “Bin yıl” ya da “bin yıl” yerine “... binyıl” kullanınız (örn.: MÖ 9.binyıl).
- “Yüzyıl”, “yüz yıl” ya da “yy” yerine “yüzyıl” kullanınız (örn.: MÖ 7.yüzyıl).
- Beş veya daha fazla basamaklı tarihler için sondan sayarak üçlü gruplara ayırmak suretiyle sayı gruplarının arasına nokta koyunuz (örn.: MÖ 10.500).
- Dört veya daha az basamaklı tarihlerde nokta kullanmayınız (örn.: MÖ 8700).
- 0-10 arasındaki sayıları rakamla değil yazıyla yazınız (örn.: “8 kez yenilenmiş taban” yerine “sekiz kez yenilenmiş taban”).

Noktalama ve İşaret Kullanımı

- Ara cümleleri lütfen iki çizgi ile ayırınız (—). Çizgi öncesi ve sonrasında boşluk bırakmayınız.
- Sayfa numaraları, tarih ve yer aralıklarını lütfen tek çizgi (-) ile ayırınız: 1989-2006; İstanbul-Kütahya.

Kısaltmaların Yazımı

- Sık kullanılan bazı kısaltmalar için bkz.:

Yaklaşık:	yak.	Circa:	ca.
Bakınız:	bkz.	Kalibre:	kal.
Örneğin:	örn.	ve diğerleri:	vd.

Özel Fontlar

- Makalede özel bir font kullanıldıysa (Yunanca, Arapça, hiyeroglif vb.) bu font ve orijinal metnin PDF versiyonu da gönderilen dosyalar içerisine eklenmelidir.

Metin İçi Atıflar ve Kaynakça Yazımı

Her makale, metin içinde atıfta bulunulan çalışmalardan oluşan ve “Kaynakça” başlığı altında düzenlenmiş APA7’ye göre bir referans listesi içermelidir. Metin içindeki her referansın kaynakçada yer aldığından emin olunuz.

<https://apastyle.apa.org/style-grammar-guidelines/references/examples>

- **Doğrudan atıf:** *Örnek:* “... Esin (1995)’in belirtmiş olduğu gibi.”
- **Parantez içinde atıf:** *Örnek:* “... analiz sonuçları gösteriyor ki ... (Esin, 1995).”
- **Aynı parantezde birden fazla atıf:** **Yayın yılına** göre sıralanmalı ve noktalı virgül ile ayrılmalıdır. *Örnek:* “... (Dinçol & Kantman, 1969; Esin, 1995; Özbal et al., 2004).”
- **Aynı yazarın farklı yıllara ait yayınlarına atıf:** Yazarın soyadı bir kez kullanılır, yıllar virgül ile ayrılır. *Örnek:* “... (Peterson, 2002, 2010).”
- **Aynı yazarın aynı yıl içindeki farklı yayınlarına atıf:** Yılın yanına alfabetik harf eklenir (örn. “a”, “b”). *Örnek:* “... (Peterson, 2010a, 2010b).”
- **Tek yazarlı ve çok yazarlı kaynaklar:** Tek yazarlı kaynaklar önce sıralanır. Aynı yazarın farklı eş yazarlara sahip kaynakları ikinci yazarın soyadına göre alfabetik sıralanır. *Örnek:* “... (Esin, 1995; Esin & Özbal, 1998).”
- **Kaynakça Yazım Kuralları:** Kaynakça, ilk yazarın soyadına göre **alfabetik** olarak sıralanmalı ve aşağıdaki kurallar izlenmelidir:
 - 1) **Tek yazarlı yayınlar:** Yazarın soyadına göre sıralayın, ardından yayın yılına göre (en eskiden en yeniye doğru) düzenleyin.
 - 2) **İki yazarlı yayınlar:** İlk yazarın soyadına göre sıralayın, ardından ikinci yazarın soyadına göre ve son olarak yayın yılına göre sıralayın.
 - 3) **Üç veya daha fazla yazarlı yayınlar:** İlk yazarın soyadına göre sıralayın, ardından yayın yılına göre (en eskiden en yeniye doğru) düzenleyin. Ek yazarların sırası önemli değildir.

- Metinde atıfta bulunulan tüm çalışmalar “Kaynakça” başlığı altında listelenmelidir.
- Eğer mevcutsa, dergi makaleleri için mutlaka DOI numarası eklenmelidir (örn. “<https://doi.org/abc>”).
- Kişisel iletişimler ve yayımlanmamış çalışmalar yalnızca metin içinde belirtilmelidir ve kaynakçaya eklenmemelidir.

Dergi makalesi

Bickle, P. (2020). Thinking gender differently: New approaches to identity difference in the Central European Neolithic. *Cambridge Archaeological Journal*, 30(2), 201–218. <https://doi.org/10.1017/S0959774319000453>

Hansen, S., Mirtskhulava, G., & Bastert-Lamprichs, K. (2007). Aruchlo: A Neolithic settlement mound in the Caucasus. *Neo-Lithics*, 1, 13–19.

Pearson, J., & Meskell, L. (2015). Isotopes and images: Fleshing out bodies at Çatalhöyük. *Journal of Archaeological Method and Theory*, 22, 461–482. <https://doi.org/10.1007/s10816-013-9184-5>

Metin içi atıf: (Hansen vd., 2007; Pearson & Meskell, 2015; Bickle, 2020). Eğer sayfa numarası eklenecek ise: (Hansel vd., 2007, 16; Pearson & Meskell, 2015, 475; Bickle, 2020, 210–212).

Kitap / e-kitap

Dinçol, A. M., & Kantman, S. (1969). *Analitik arkeoloji: Denemeler*. Edebiyat Fakültesi Basımevi.

Peterson, J. (2002). *Sexual revolutions: Gender and labor at the dawn of agriculture*. AltaMira Press.

Metin içi atıf: (Dinçol & Kantman, 1969; Peterson, 2002).

Editörlü kitap & Kitap içi bölüm

Akkermans, P. M. M. G., & Schwartz, G. M. (Eds.). (2003). *The archaeology of Syria: From complex hunter-gatherers to early urban societies (c. 16,000–300 BC)*. Cambridge University Press.

Esin, U. (1995). Aşıklı Höyük ve radyo-aktif karbon ölçümleri. İçinde A. Erkanal, H. Erkanal, H. Hüryılmaz, & A. T. Ökse (Eds.), *İ. Metin Akyurt - Bahattin Devam anı kitabı. Eski Yakın Doğu kültürleri üzerine incelemeler* (ss. 135–146). Arkeoloji ve Sanat Yayınları.

Özkaya, V., & San, O. (2007). Körtik Tepe: Initial observations on cultural context based on findings. In M. Özdoğan & N. Başgelen (Eds.), *The Neolithic period in Turkey: New excavations and findings* (pp. 21–36). Archaeology and Art Publications.

Metin içi atıf: (Esin, 1995; Akkermans & Schwartz, 2003; Özkaya & San, 2007)

Çeviri kitabı

Foucault, M. ([1954]1992). Deliliğin tarihi. (M. A. Kılıçbay, Çev.). İmge Kitapevi.

Metin içi atıf: (Foucault, 1992)

Yüksek lisans & Doktora tezi

Kayacan, N. (2015). Anadolu’da Neolitik Dönem’de baskı tekniği ile taş yongalama: Uygulama, dağılım ve kültürel farklılıklar [Yayımlanmamış Doktora Tezi]. İstanbul Üniversitesi.

Metin içi atıf: (Kayacan, 2015)



Submission and Style Guideline

Submission Criteria for Articles

The content of the manuscripts should meet the aims and scope of the Turkish Journal of Archaeological Sciences (cf. Aims and Scope).

Manuscripts may be written in Turkish or English. The translation of articles into English is the responsibility of the author(s). If the author(s) are not fluent in the language in which the article is written, they must ensure that the text is reviewed, ideally by a native speaker, prior to submission.

Each manuscript should include a Turkish and an English abstract of up to 200 words and five keywords in both Turkish and English. Citations should not be included in the abstract.

If the author(s) are not fluent in the language of the manuscript, a translation of the abstract and the keywords may be provided by the editorial board.

Manuscripts, figures, and other files should be sent via wetransfer or e-mail to archaeologicalsciences@gmail.com.

Submission Checklist

Each article must contain the following:

- Authors (please provide the name-last name and contact details of each author under the main title of the manuscript)
- Affiliation (where applicable)
- E-mail address
- ORCID ID

The manuscript should contain:

- Title
- Abstract (in English and Turkish)
- Keywords
- Text
- References
- Figures (when applicable)
- Tables (when applicable)

Style Guide

Manuscript Formatting

- Manuscripts should be written in Times New Roman 12-point font, justified and single-spaced. Please submit the manuscript as a word document.
- Words in foreign and ancient languages should be *italicized*.
- Titles and subtitles should appear in **bold**.
- Titles and subtitles should not be numbered, italicized, or underlined.
- Only the first letter of each word in titles and subtitles should be capitalized.

References

Cf.: In-Text Citations and References

- In-text citations should appear inside parenthesis (Author, year, page number).
- Footnotes and endnotes should not be used for references. Comments should be included in footnotes rather than endnotes.
- The footnotes should be written in Times New Roman 10-point font, justified and single-spaced, and should be continuous at the bottom of each page.

Figures and Tables

- Please provide a caption list for figures and tables following the references. Provide credits where applicable. Each figure and table should be referenced in the text (Figure 1, or Table 1), but please do not include figures in the text document.
- Each figure should be submitted separately as a jpg or tiff file.
- Images should be submitted in the dimensions in which they should appear in the published text and their resolution must be over 300 dpi.
- Please avoid editing the figures in Photoshop or similar programs but send the raw version of the figures if possible.
- Tables and graphs prepared in Excel should be sent as both PDF and Excel documents.

Dates and Numbers

- Please use BCE/CE and please avoid using dots without dots (i.e., BCE instead of BC or B.C.).
- Please use a dot for numbers and dates with 5 or more digits (i.e., 10.500 BCE).
- Please avoid using dots for numbers and dates with 4 or less digits (i.e., 8700 BCE).
- Please spell out whole numbers from 0 to 10 (e.g., “the floor was renewed eight times” instead of “the floor was renewed 8 times”).

Punctuation

- Please prefer em dashes (—) for parenthetical sentences: “Children were buried with various items, the adolescents—individuals between the ages of 12-19—had the most variety in terms of grave goods.”
- Please prefer an en dash (-) between page numbers, years, and places: 1989-2006; İstanbul-Kütahya.

Abbreviations

- Commonly used abbreviations:

Approximately:	approx.	Figure:	Fig.
Confer:	cf.	<i>Id est:</i>	i.e.
Circa:	ca.	<i>Exempli gratia:</i>	e.g.
Calibrated:	cal.		

Special Fonts

- If a special font must be used in the text (e.g., Greek or Arabic alphabet or hieroglyphs), the text in the special font and the original manuscript should be sent in separate PDF files.

In-Text Citations and References

Each article must include a reference list titled “References,” containing only works cited in the text, formatted according to APA 7. Ensure that every in-text citation has a corresponding entry in the reference list.

<https://apastyle.apa.org/style-grammar-guidelines/references/examples>

- **Direct Citation:** *Example:* “As Esin (1995) stated...”
- **Parenthetical Citation:** *Example:* “The analysis results indicate... (Esin, 1995).”
- **Multiple Citation in One Parenthesis:** Arrange by **publication year** and separate with semicolons. *Example:* “(Dinçol & Kantman, 1969; Esin, 1995; Özbal et al., 2004).”
- **Publications by the Same Author in Different Years:** List the author once and separate publication years with commas. *Example:* “(Peterson, 2002, 2010).”
- **Multiple Publications by the Same Author in the Same Year:** Add letters alphabetically to the publication year (e.g., “a,” “b”). *Example:* “(Peterson, 2010a, 2010b).”
- **Single and Multiple Authors:** List single-author works before multi-author works. For works by the same first author with different co-authors, arrange alphabetically by the second author’s last name. *Example:* “(Esin, 1995; Esin & Özbal, 1998).”
- **Reference List Formatting:** References should be arranged **alphabetically** by the last name of the first author, following these rules:
 - 1) **Single-author publications:** Order by the author’s last name, then by publication year (earliest to latest).
 - 2) **Two-author publications:** Order by the first author’s last name, then by the second author’s last name, and finally by publication year.
 - 3) **Publications with three or more authors:** Order by the first author’s last name, then by publication year (earliest to latest), regardless of additional authors.
- Include all publications cited in the text under the “References” heading.
- Always include DOI for journal articles in your reference list, if available. (e.g. “<https://doi.org/abc>”).
- Personal communications and unpublished works should only be mentioned in the text.

Journal article

Bickle, P. (2020). Thinking gender differently: New approaches to identity difference in the Central European Neolithic. *Cambridge Archaeological Journal*, 30(2), 201–218. <https://doi.org/10.1017/S0959774319000453>

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In-text citation: (Hansen et al., 2007; Pearson & Meskell, 2015; Bickle, 2020). If page numbers are required: (Hansen et al., 2007, 16; Pearson & Meskell, 2015, 475; Bickle, 2020, 210–212).

Book / eBook

Dinçol, A. M., & Kantman, S. (1969). *Analitik arkeoloji: Denemeler*. Edebiyat Fakültesi Basımevi.

Peterson, J. (2002). *Sexual revolutions: Gender and labor at the dawn of agriculture*. AltaMira Press.

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Edited book & Book chapter

Akkermans, P. M. M. G., & Schwartz, G. M. (Eds.). (2003). *The archaeology of Syria: From complex hunter-gatherers to early urban societies (c. 16,000–300 BC)*. Cambridge University Press.

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In-text citation: (Esin, 1995; Akkermans & Schwartz, 2003; Özkaya & San, 2007)

Translated book

Foucault, M. ([1954]2011). *Madness: The invention of an idea*. (A. Sheridan, Trans.). Harper Perennial Modern Thought.

In-text citation: (Foucault, 2011)

Dissertation & Thesis

Mosek, E. (2017). Team flow: The missing piece in performance [Doctoral dissertation, Victoria University]. Victoria University Research Repository.

In-text citation: (Mosek, 2017)