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Three New Fish Sauce Workshops Detected in Kekova Island Research

Kekova Adası Araştırmalarında Tespit Edilen Üç Yeni Balık Sosu İşliği

Erdoğan ASLAN*

Abstract: The production of fish products salted with fish sauces, which were among the fermented food products in the ancient age, started in the VIIth century BC and have since become widespread and important, especially in Spain, the Black Sea and North Africa. It was understood from the graphite on amphoras, archaeological remains and written sources that large production facilities spread across the Black Sea in the Roman period, as well as in the Western Mediterranean and the Aegean Sea. The production and trade in fish sauce, in which freed slaves commonly worked during the Roman Period, continues to exist even today despite the fact that it is practiced in different ways and methods – even centuries after the collapse of the Roman Empire. Knowledge about fish sauce production in the ancient age can be learned through ancient texts and archeological remains. The subject of this study is the contribution to the region of the fish sauce workshops found on Kekova Island – the largest Turkish island in the Mediterranean – and its vicinity, which is in the Üçağz District of the Antalya province of Demre.

Keywords: Fish Sauce, Allec, Garum, Liquamen, Kekova

Öz: Antikçağ deniz ticareti ürünleri arasında da yer alan balık sosları ve diğer balık ürünleri, MÖ VII. yüzyıldan itibaren başlamış ve sonraki dönemlerde özellikle İspanya, Karadeniz ve Kuzey Afrika'da yaygınlaşarak önem kazanmıştır. Büyük üretim tesislerinin Roma Dönemi'nde Karadeniz'in yanı sıra Batı Akdeniz ve Ege'de de yaygınlaştığı, amphoralar üzerindeki grafitlerden, arkeolojik kalıntılardan ve yazılı kaynaklardan anlaşılmaktadır. Roma Dönemi boyunca daha çok azatlı kölelerin meslek edindiği balık sosu üretimi ve ticareti, en yaygın olduğu Roma İmparatorluğu'nun çöküşünden sonraki yüzyıllarda ve hatta günümüzde bile farklı biçin ve yöntemlerde icra edilmesine rağmen devam etmektedir. Antikçağ balık sosu üretimi ile ilgili bilgilere, antik yazarlara ait yazınsal metinler ve arkeolojik kalıntılar yoluyla ulaşılabilir. Bu kapsamda Antalya İli Demre İlçesi Üçağz Mevkiinde bulunan ve ülkemizin Akdeniz'deki en büyük adası olan Kekova Adası ve çevresinde yapılan yüzey araştırmalarında tespit edilen balık sosu işliklerinin mimarisi, kapasiteleri ve bölge ekonomisine katkısı çalışmanın konusunu oluşturmaktadır.

Anahtar sözcükler: Balık Sosu, Allec, Garum, Liquamen, Kekova

Our surface surveys of Kekova Island and its vicinity, which is located in the Üçağz District in the province of Antalya, is still ongoing. This research has been carried out both in the urban settlements on the island and underwater beneath the shores of the island¹. There are three

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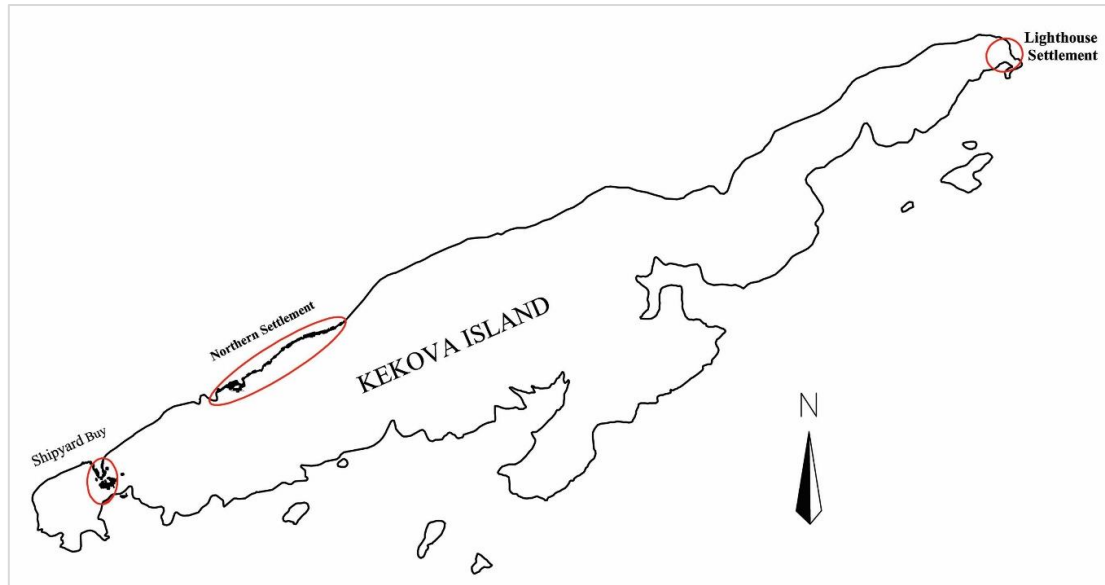


Fig. 1. Kekova Island Settlements

separate settlement areas on the island: Tersane Bay, the North Settlement and Fener Bay, the Fener Settlement (Fig. 1). In all three terrestrial settlements, there are a large number of houses, workshops, water storage tanks, churches and chapels, and a smaller number of military defense structures, watchtowers and harbor structures. In these areas, the fish sauce workshop facilities occupy a separate place and give an idea about the production economy of the island as well as the characteristic structural features, and this is the subject of the article. Six places of fish sauce production have been identified in the town of Teimiusa on the mainland opposite Kekova Island by our previous research as well as one fish sauce workshop in Tersane Bay located on the island itself; this has been shared with the world of science². However, at the latter stages of the study, the entire island was screened and three new workshops were identified in the North Settlement area (Fig. 2). Therefore, both the fish sauce production capacity of the island and the Kekova region, and the structural characteristics of the workshops, need to be compared typologically. Our previous article on fish sauce workshops in the region is summarized below, as the production methods, varieties, historical sources, usage areas, archaeological data and significance of fish sauce have been previously and extensively discussed³.

The production of fish products salted with fish sauces⁴, which were among the fermented food products⁵ in the ancient age, started in the VIIth century BC and have since become widespread and important, especially in Spain, the Black Sea and North Africa⁶. It is understood

² Aslan 2015, 141-162.

³ Aslan 2015, 141-145.

⁴ *Garum, Liquamen, Allec, Muria*: Foodstuffs obtained by brining various seafood with fresh water and salt. Corcoran 1963, 204; Andre 1981, 198-199; Étienne – Mayet 2002, 48; Bursa 2007, 39; Lenger 2008, 69; Atik 2008, 19; Grainger 2011, 122; Aslan 2015, 141.

⁵ *Salsamentum* or *τάριχος*: Salted fish products. Corcoran 1963, 204; Andre 1981, 198; Curtis 2005, 31; Lenger 2008, 73.

⁶ Zimmerman 2003, 288; Curtis 2005, 38

from the graphite on amphoras, archaeological remains and written sources⁷ that large production facilities spread across the Black Sea in the Roman period, as well as in the Western Mediterranean and the Aegean. The production and trade of fish sauce, in which freed slaves commonly worked during the Roman Period⁸, continues to exist even today⁹ despite the fact that it is practiced in different ways and methods¹⁰ – even centuries after the collapse of the Roman Empire¹¹. Knowledge about ancient age fish sauce production can be learned through ancient texts¹² and archeological remains¹³. There are different versions and different names for fish sauce – which is called trigonum in Greek – according to the fish type it is made from and the processing steps¹⁴. These names translate to salsamenta in Latin, and it is used as the general name for all fish sauces¹⁵.

A variety of information is available from ancient sources about the places where the fish sauce production workshops were located, but there is limited information on the production process. The first information on this subject dates back to a book by Archestratus in the IVth century BC, who recounts many of the dishes that used fish sauce, stating that there were many fish sauce workshops in Sicily and suggested that the salted fish produced there should be used in meals¹⁶. Afterwards, the book refers to some of the workshops between the Ist century BC and the Ist century AD in Strabon, Spain, Italy, the Black Sea and North Africa¹⁷. It is known that fish sauce was produced in Sinope, Byzantium, Clazomenai and Rhodes on the Anatolian coasts, but that is not yet supported by any physical remains¹⁸. In North Africa, it has been reported that there are a large number of salted fish production workshops in the coastal

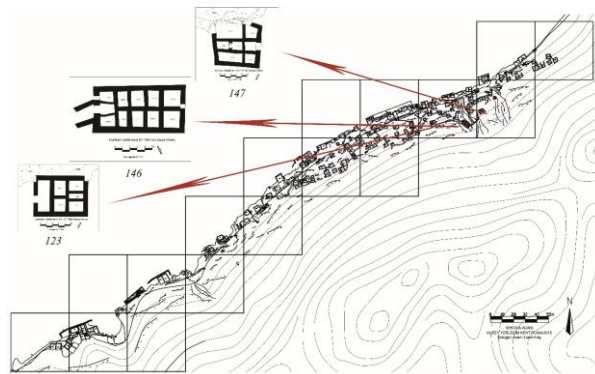


Fig. 2. North Settlement Area Plan

⁷ Étienne- Mayet 2002, 7-11.

⁸ Haley 1990, 72; Étienne – Mayet 1998, 199.

⁹ Kılınç 2003, 264.

¹⁰ Curtis 1984, 31; Trakadas 2005, 48.

¹¹ Chroné-Vakalopoulos – Vakalopoulos, 123.

¹² Aristoph. *Akh.* I. 489, 970, 1250; Plaut. *Capt.* I. 910; Quint. *Inst.* VIII. 2. 3.; Galen. *de Aliment.* III. 30. 5; Cato *de agr.* XXIII. 1; LVIII. 1; LXXXVIII. 1; Var. *R.* III. 3.; Colum. *de rust.* II. 10. 16; XII. 55. 4.; Cassian. *de re rust.* XX. 46.; Isidor. *Hisp. etym.* IV. 109.; Plin. *nat.* IV. 370; V. 384; VI. 386; VIII. 573; XXXI. 93-95; Mart. *Ep.* XIII. 102-103; Isidor. *Hisp. etym.* IV. 109; Polyb. IV. 38. 3-11.

¹³ Étienne 1970, 297; Mackie *et al.* 1971, 1; Nicolaou – Flinder 1976, 133; Curtis 1979, 5; 1983, 232; 1984, 430; 1988, 205; 1991, 1; 2005, 31; Beddows 1985, 1; Haley 1990, 72; Martin-Kilcher 1990, 37; Étienne – Mayet 1991, 187; Drexhage 1993, 27; Ivanova 1994, 278; Neer – Lentacker 1994, 53; Ben Lazreg *et al.* 1995, 103; Cotton *et al.* 1996, 223; Lernau *et al.* 1996, 35; Ørsted 1998, 13; Desse-Berset – Desse 2000, 84; Aquerreta *et al.* 2001, 107; Gildberg 2004, 3; Trakadas 2004, 20; 2005, 47; Stolba 2005, 115; Wilkins 2005, 21; Neer *et al.* 2006, 173; Barrios 2007, 273; Berdowski 2008, 107; Lenger 2008, 69; Bernal *et al.* 2009, 125. Curtis 2005, 35.

¹⁴ Corcoran 1963, 205; Etienne-Mayet 1991, 187 vd; Gildberg 2004, 3; Curtis 2005, 35.

¹⁵ Wilkins 1994, 2.

¹⁶ Strab. III. 1. 8; III. 4. 2; III. 4. 6; VI. 1. 1.

¹⁷ Curtis 2005, 38.

settlements near the town of Zarzis in today's Tunisia, which is located in the same region as Strabon's Zuchis¹⁹. On the other hand, Polybius, in the IInd century AD, mentioned that many food items and conserved fish products were made in the Roman and Hellenic colonies in the Black Sea²⁰. In the IInd century AD, Galenus mentioned that good-salted fish was produced on the island of Sardinia to the west of today's Italy²¹. The ancient sources tell us that fish workshops spread across a wide geography from Spain to the Black Sea and then to North Africa. However, looking at the data obtained as a result of archaeological excavations today, it is seen that fish sauce and salted fish workshops are found in many more settlements not included in ancient sources²². Examining the scientific studies, it is understood that the vast majority of the fish sauce workshops that were revealed by archaeological excavations were located on the shores of Spain, Portugal and Morocco²³.

Kekova Island Northern Settlement Research

The second residential area on the island, called the North Settlement, is on the north-facing slope of the island. This settlement is now known as "Batik Kent (Sunken City)" by the people of the region and is located about 1km from Tersane Bay on the western tip of the island. It is on the steeply sloped coastline to the east. This residential area is about 1km long and is a terraced coastal settlement (Fig. 2). By terracing the main rock starting from the coastal line, with an arrangement of nine terraces on top of each other, a large number of quadrangular structures are seen consisting of one or two stories, the ground and the southern walls being completely formed by the main rock. The wooden beams for the roofs and the second floor of the constructions can still be seen today. Some of the buildings are still standing today, with cut stone blocks and rubble stones. The doors of the small number of buildings with standing fronts can be seen in-situ. The staircase carved into the main rock, rising from sea level to the upper terraces and providing access to the terraces where the structures are located, can also still be seen today. In addition, many water storage structures are among those that are still standing, especially near the staircases that reach the upper terraces. The main rock-cut channels, which feed these water storage tanks with rain water and allow the excess water to be transferred to the sea or to a lower tank after filling, and the wider, deeper channels used for sewage carved into the main rock, have also lasted to the present day. The three newly discovered fish sauce workshops in this area are detailed below.

Northern Settlement KY-123 Fish Sauce Works

The Kekova Island North Settlement Area KY-123 fish sauce workshop is located in the middle part of settlement, about 700 meters along, running parallel to the shore. The area is relatively isolated from other structures at the top of the elevated residential structures, starting at the shoreline and steeply sloping towards the terraces. In a rectangular form, with an east-west

¹⁹ Strab. XII. 3.18.

²⁰ Polyb. IV. 38. 3-11.

²¹ Powell 2003, 4.

²² Trakadas 2005, 47.

²³ Étienne 1970; Mackie *et al.* 1971; Nicolaou – Flinder 1976; Curtis 1979; 1983; 1984; 1988; 1991; 2005; Beddows 1985; Haley 1990; Martin-Kilcher 1990; Étienne – Mayet 1991; Drexhage 1993; Ivanova 1994; Neer – Lentacker 1994; Ben Lazreg *et al.* 1995; Cotton *et al.* 1996; Lernau *et al.* 1996; Ørsted 1998; Desse-Berset – Desse 2000; Aquerrete *et al.* 2001; Gildberg 2004; Trakadas 2004; 2005; Stolba 2005; Wilkins 2005; Neer *et al.* 2006; Barrios 2007; Berdowski 2008; Aslan 2015.

extension, the walls are constructed with non-rectangular blocks and mortar, and the measurements are about 9.00×7.40 meters (Fig. 3–4). The southern wall of the building is based on the section formed by cutting the main-rock. The upper structure is unprotected and the southern wall is protected to a height of 2 meters. It is understood from the slope on the wall that the construction has upper covered vaults (Fig. 5–6). The other 0.70meter-wide walls were elevated in a sloping manner and protected to a height of about 1.50meters. The entrance to the workshop is in the easterly direction and it is 1.30meters wide. Entering into the workshop, there is a front room measuring 5.70×2.00 meters with 5 *cetariae*²⁴ divided by walls behind this room. The largest of the differently sized *cetariae* has an approximate depth of 2.00 meters and is 2.75×1.86 meters in size giving a volume of 10.1m^3 ; the smallest one is 2.40×0.94 meters with a volume of 4.1m^3 . It is understood that the total production capacity of the workshop, along with other *cetariae*, is about 40.6m^3 .

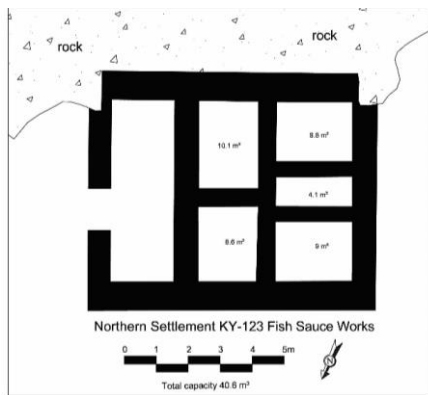


Fig. 3. Northern Settlement KY-123 Fish Sauce Works



Fig. 4. KY-123 Fish Sauce Works View From Above



Fig. 5. KY-123 Fish Sauce Works View From North



Fig. 6. KY-123 Fish Sauce Works View From West

Northern Settlement KY-146 Fish Sauce Works

On Kekova Island, the Northern Settlement Area KY-146 is located about 45meters to the east of workshop KY-123. Also, the structure, built on the upper elevations and isolated from other structures, is found on the slope of a deep valley (Fig. 9). The rectangular structure in the northwest–southeast direction measures approximately 12.40×6.70 meters (Fig. 7–8). The roof of the structure, with walls 0.85m wide and made of non-rectangular blocks and mortar, has not reached today, but the side walls are protected to a height of 3.00meters. The collapsed

²⁴ *Cetariae*: It is the Latin name of architectural cells like plastered cisterns with small square or rounded *opus signinum* found in fish sauce production workshops and used for sauce production. Berdowski 2013, 47.

walls and the debris forming the upper building are scattered within the structure. A total of 10 *cetariae* were formed by walls in the building that were not completely rectangular (Fig. 10). In the structure, whose wall thickness is 0.70 meters, there are two window openings 0.55 meters-wide in the middle of the southeastern wall to the west and directly opposite the entrance. On the long walls of the structure, there are girder holes, measuring approximately 0.15 × 0.25 meters, approximately 0.30 meters above the walls that form the partitions. The entrance to the workshop faces the northwest, and two parallel walls are built diagonally to the main building to form a 3.00 meter-long corridor at the entrance. Behind this corridor there is a 1.05 meter-wide doorway. Entering into the workshop, there is a front room measuring 1.80 × 1.50 meters and there are 10 *cetariae* divided between both sides of this room and behind the walls. The largest of the *cetariae* of different sizes has an approximate depth of 1.90 meters, is 2.34 × 2.15 meters in size and has a volume of 10.2 m³, whereas the smallest is 2.15 × 1.08 meters and has a volume of 4.6 m³. It is understood that the total production capacity of the workshop, along with other *cetariae*, was about 67.7 m³.

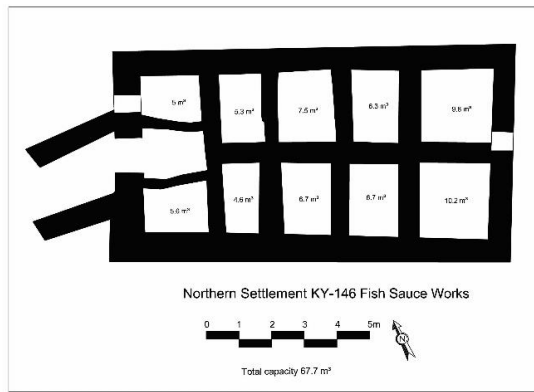


Fig. 7. Northern Settlement KY-146 Fish Sauce Works



Fig. 8. KY-146 Fish Sauce Works View From Above



Fig. 9. KY-146 Fish Sauce Works View From East

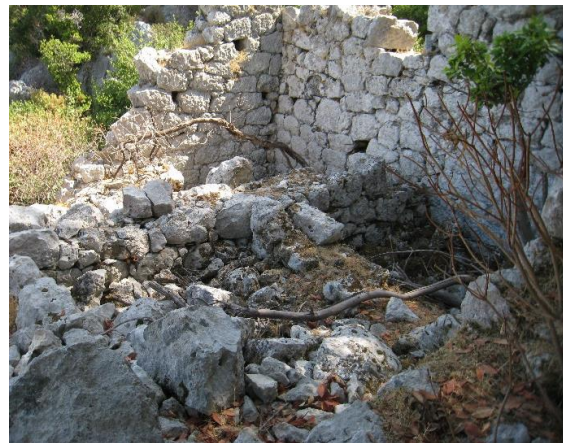


Fig. 10. KY-146 Fish Sauce Works Detail

Northern Settlement KY-147 Fish Sauce Works

The fish sauce workshop KY-147 is located about 30 meters east of the KY-146 fish sauce workshop, on the opposite side of the valley from the KY-146 workshop located on its slope. It is at the same level as the KY-146 fish sauce workshop, and it is also in an area isolated from other

structures. In a rectangular form with an east–west extension, the walls are constructed with non-rectangular blocks and mortar, and the measurements are about 8.30×7.70 meters (Fig. 11–12). The southern wall of the building is based on the section formed by cutting the main-rock. The upper structure is unprotected, and the northern wall of 0.80 meter width is protected to a height of 2.00 meters. The 1.00 meter-wide entrance is in a westerly direction, and the door knobs and lentos have survived in-situ to the present day. Entering into the workshop, there is a front room measuring 2.00×1.60 meters and there are 6 *cetariae* divided between both sides of this room and behind the walls. The largest of the *cetariae* of different sizes has a depth of approximately 2.00 meters and is 4.80×2.82 meters in size with a volume of 27.1 m^3 , whereas the smallest is 1.92×1.52 meters and has a volume of 5.8 m^3 . It is understood that the total production capacity of the workshop, along with other *cetariae*, is about 68.9 m^3 .

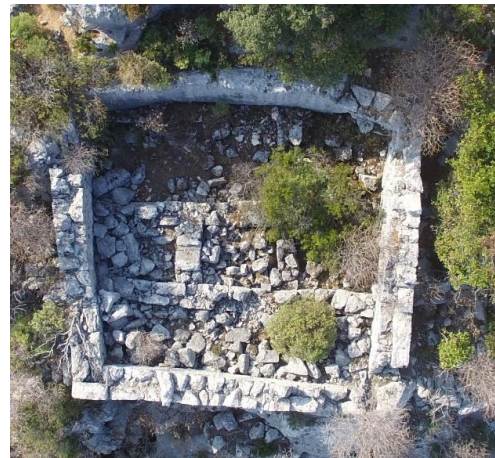
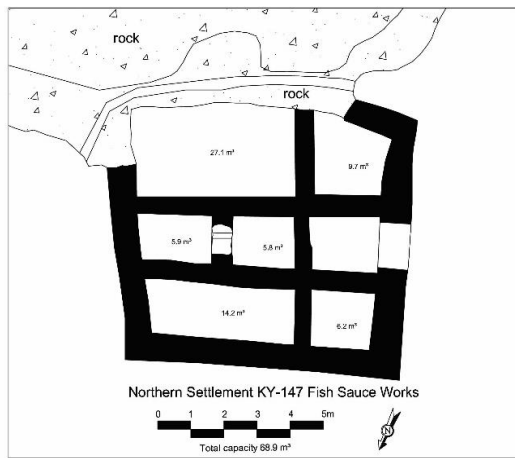


Fig. 11. Northern Settlement KY-147 Fish Sauce Works Fig. 12. KY-147 Fish Sauce Works View From Above

Conclusions

The three fish sauce workshops in Kekova Island's Northern Settlement, and their architecture²⁵, are similar to the fish sauce workshops previously found in the area, and they were built in an area partly isolated from other settlements. It is noted that the other examples on the Mediterranean coast, which have been found during archaeological investigations, were located in a similar way²⁶. The main reason for this is to avoid the smells formed during fermentation from disturbing city settlers. None of the upper structures of the three fish sauce workshops found in the Northern Settlement has reached today, but it is known that both the other workshops in the region, and the workshops from the coasts of Spain and Morocco, were covered with roofs. The purpose of enclosing the fish sauce workshops with a roof is to prevent the sunlight affecting the production process and to prevent the water, fish and salt mixture in the *cetariae* from losing water quickly, causing the product to deteriorate. In general, considering the plans of the fish sauce workshops, one or two rows of *cetariae*, mostly of rectangular shapes, are seen in different sizes. Some workshops are part of larger complexes, while others are independent of the city and other structures²⁷.

The total production capacity of the seven workshops identified in the previous years in the

²⁵ Aslan 2015, 146-153.

²⁶ Trakadas 2005, 53-55.

²⁷ Bezecky 1996, 329; Trakadas 2005, 47; Neer *et al.* 2006, 174.

Kekova Region was estimated to be 412.7m³ ²⁸. The production capacity of the three fish sauce workshops located at the Kekova Island Northern Settlement is calculated to be 177.2m³. Therefore, with the latest findings, the total volume of fish sauce production in the region reaches a volume of 589.9m³. It is understood that in ancient times when trade amphoras were known to carry fish sauce²⁹, they had an average capacity of 15 liters. It was understood that the Kekova region produced enough fish sauce to fill about 40,000 amphora in a single batch. Considering that production occurred two or three times a year, it is understood how much contribution it made to the region and the city economy.

Since there were no small discoveries or inscriptions found at the time, the three fish sauce workshops located at the Kekova Island Northern Site had to be compared with other workshops in the region. They showed similarities to the Teimiusa fish sauce workshops 2 and 3 that were located in the Kekova region, in terms of the medium-sized, quadrangular-cut stone and the stone workmanship used on the walls. They also showed similarities to the stones and workmanship used during the renovation of the Kyanei Antoninus Pius Bath, and this wall work has characteristics dated to the IIIrd century AD³⁰. The Kekova Island Tersane Bay fish sauce workshop also has the same architecture and workmanship, and it is dated to the IIIrd century AD³¹. In the three wall works of the Northern Settlement, the planning and the rubble stones used indicated a similar pattern, and further indicated that they belonged to the same period.

²⁸ Aslan 2015, 154.

²⁹ Almagro 50-51 amphoras, Spatheia amphoras, Mana C2 amphoras, Beltran 72 amphoras, Dressel 7-8-9-10-12-38 amphoras, Pompei VII amphoras, Afrikan Tip 1-2 amphoras etc.

³⁰ Zimmermann 2003, 290.

³¹ Aslan 2015, 155.

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