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THE SUPPLY SYSTEM AND THE LR1 AMPHORAE IN LATE ANTIQUITY: A HISTORICAL AND ARCHAEOLOGICAL ANALYSIS OF THE EASTERN MEDITERRANEAN THROUGH THE OLBA MODEL

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Keywords: LR1, amphora, Cilicia, Olba, Diocesis Orientis, trade, supply network, military campaigns

Abstract: This study provides a new interpretation of the emergence of LR1 amphorae in the 4th century AD, linking the development of their canonical form directly to military and logistical imperatives. During the second half of the century, particularly amid the wars along the Sasanian frontier and the Isaurian revolts, both food supply and commercial security in the Eastern Mediterranean faced serious threats. Under these circumstances, the central Roman administration was compelled to implement measures to restore the military supply chain, which, despite its vital importance, had become increasingly dysfunctional. Emperors who established residence in Antioch and treated the city as a de facto capital appear to have played an active role in these initiatives. While the Isaurian revolts – largely overlooked in earlier studies – were ongoing, the ports of Korasion and Palaea along the Olba coast were transformed into strategically important supply depots, and the earliest examples of the LR1 form were intensively produced at Elaiussa Sebaste on the same coast. This study argues that the proto-LR1 amphora, much like the Dressel 20 type, emerged primarily from military necessity, and that attributing its development solely to commercial motives is inconsistent with the precarious conditions created by the revolts. The Olba region preserves material evidence of agricultural and architectural development from this period, making it a valuable micro-model for examining the economic transformations of Late Antiquity on a regional scale.

Cuvinte cheie: LR1, amforă, Cilicia, Olba, Diocesis Orientis, comerț, rețea de aprovizionare, campanii militare

Rezumat: Studiul de față oferă o nouă interpretare a apariției amforelor LR1 în secolul al IV-lea d.Chr., prin realizarea unei legături directe între dezvoltarea formei lor canonice și imperative militare și logistice. În a doua jumătate a secolului, în special pe fondul războaielor de-a lungul frontierei sasanide și al revoltelor isauriene, atât aprovizionarea cu alimente, cât și securitatea comercială în Mediterana de Est, au fost serios amenințate. În aceste condiții, administrația centrală romană a fost nevoită să pună în aplicare o serie de măsuri necesare restabilirii lanțului de aprovizionare militară, care, în ciuda importanței sale vitale, era din ce în ce mai disfuncțional. Împărații care și-au stabilit reședința la Antiohia și au tratat orașul ca pe o capitală de facto par să fi jucat un rol activ în acest sens. În timp ce revoltele isauriene – în mare parte trecute cu vederea în studiile anterioare – erau în desfășurare, porturile Korasion și Palaea localizate pe țărmul mediteraneean al Ciliciei, în regiunea Olba, au fost transformate în depozite de aprovizionare de importanță strategică, iar cele mai timpurii exemple ale formei LR1 au fost produse intens la Elaiussa Sebaste, așezare aflată în imediata vecinătate. Studiul prezintă argumente în favoarea ideii că amfora proto-LR1, la fel ca și tipul Dressel 20, a apărut în primul rând din necesități militare, iar atribuirea dezvoltării sale exclusiv unor cauze comerciale este incompatibilă cu condițiile precare create de confruntările militare. Așezările antice din regiunea Olba păstrează dovezi materiale ale dezvoltării agricole și arhitecturale datate în această perioadă, ceea ce o transformă într-un studiu de caz valoros pe plan regional pentru examinarea transformărilor economice specifice antichității târzii.

In the Hellenistic and early Roman periods, the area located between the Kalykadnos and Lamos rivers in southern Anatolia was designated as the Olba region¹ (Fig. 1).

Characterized by steep cliffs, the Olba region functions almost as an open-air museum, where the passage of time is readily observable due to the exceptional preservation and visibility of its archaeological remains, both on the surface and within well-protected sites². These remains, reflecting transformations driven by military, political, and economic developments, render Olba and its surroundings a unique case study – or a micro-model – for understanding the broader evolutionary processes that shaped not only Cilicia but the Eastern Mediterranean as a whole.

Although the region is naturally bounded by seas, mountains, and rivers, and long-term archaeological investigations have illuminated many aspects of its history, agricultural production remains insufficiently explored. This lacuna is particularly significant, as evidence suggests that the region's agricultural capacity, notwithstanding occasional interruptions, expanded steadily and with increasing intensity until the 7th century AD.

Two distinct phases of extraordinary agricultural growth are particularly notable in the region. The first spans approximately a century, beginning with the Hadrianic period in the 2nd century AD and extending through the reign of Alexander Severus in the 3rd century AD³. The second, more pronounced phase commenced in the

¹ Strabo XIV.5.2.

² For some fundamental works on the archaeological potential of the region, see Hild, Hellenkemper 1990; Machatschek 1967; Heberdey, Wilhelm 1896; Keil, Wilhelm 1931; Mackay 1967; Hill 1996.

³ The emergence process of large farms in the 2nd century AD; the subsequent increase in production and details of architectural richness connected to it are being prepared for publication as a separate article.

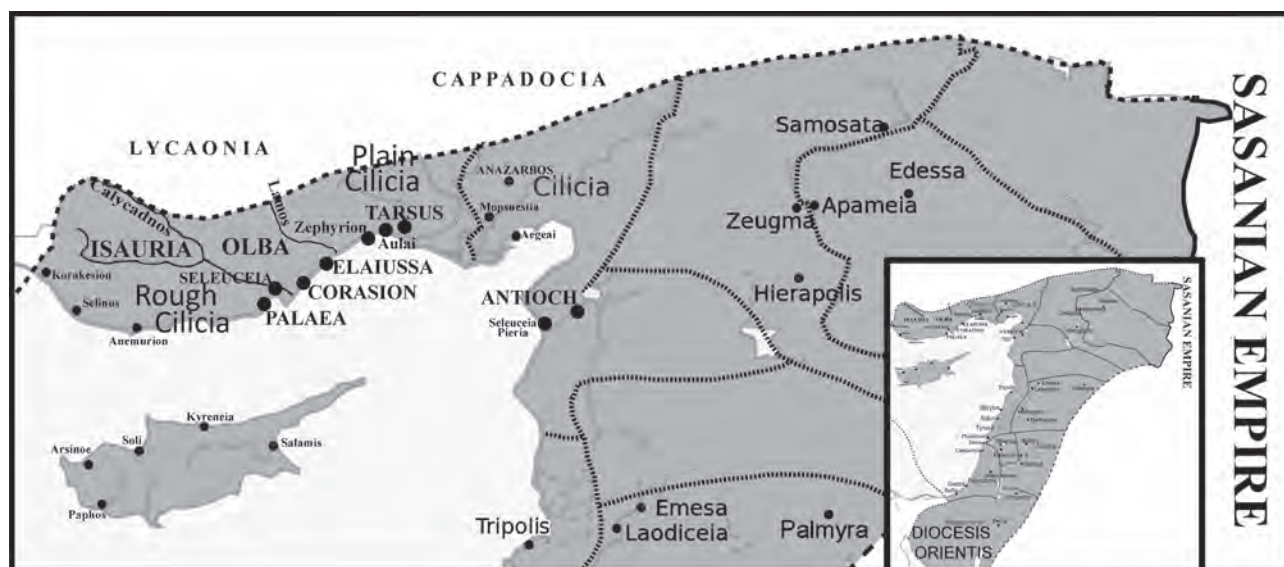


Figure 1. Region Olba in Southern Anatolia.

mid-4th century AD, accelerated during the 5th century AD, and subsequently continued without significant interruption. The accumulated cultural heritage of the rural sector from this period reflects the influence of military, political, and economic developments. Evidence of these changes is particularly marked in the density of settlements, churches, villas, and affluent residences⁴. The production of LR1 amphorae, which became widespread throughout Cilicia and forms the focus of this study, provides tangible material evidence linking this architectural and settlement richness to agricultural output. Nevertheless, the underlying causes for the initiation of LR1 production, the remarkable surge in its distribution, and the concurrent expansion of agricultural activity in rural areas remain insufficiently explained⁵.

Although other areas of Cilicia, and indeed much of the Eastern Mediterranean, do not match the Olba region in the density of surviving archaeological remains, evidence such as the widespread distribution of LR1 production workshops demonstrates that agricultural output expanded across the Eastern Mediterranean during the 5th century AD and beyond. The broad scale of this growth suggests that local factors alone cannot account for the phenomenon; rather, it reflects underlying forces operating at an imperial level. The increase in production far surpassed local consumption, pointing to a likely connection with the imperial supply network. Accordingly, assessments of agricultural expansion, even when based on localized findings, must be contextualized within the broader historical developments of the Roman Empire. Nevertheless, the dynamics of the 4th century AD – which represent the preparatory phase for this expansive

growth – should be considered separately from these subsequent developments.

CILICIA AND THE EASTERN MEDITERRANEAN IN THE 4TH CENTURY AD: CHAOS AND SUPPLY

Following the foundation of Constantinople, the presence of commercial routes linked to the Silk Road and the Spice Route coincided with the westward movement of grain shipments along the corridor connecting Cyprus and Anatolia⁶. Ships departing from Egypt now reached the new capital by following the coasts of Palestine, Syria, and Cilicia, rather than the previous route south of Crete⁷. This shift, together with the unceasing demands of Constantinople, contributed to increased production and commerce throughout the Eastern Mediterranean, including the Cilicia region, during the first half of the 4th century AD⁸.

The second half of the century, however, presents a more complex scenario in Cilicia: agricultural production increased, yet the region was simultaneously engulfed in significant instability due to the Isaurian revolts and the Sasanian wars. In this context, it appears unlikely that commercial motives alone can account for the observed production increase, indicating that alternative, primarily administrative and military factors were at work.

Specific evidence, such as the conversion of Palaea port (Tahtalimani), located just west of the Kalykadnos River, into a storage base⁹, along with the transformation of Korasion

⁴ Hill 1996; Eichner 2018, p. 267–292.

⁵ Iacomi 2010, p. 26; Durukan 2015a, p. 242.

⁶ Durukan 2015a, p. 241.

⁷ Komar 2016, p. 180.

⁸ For LR1 amphorae being the most widespread type among the Saraçhane finds, see Hayes 1992, p. 63–64.

⁹ Amm. Marc. 14.2.13; Rizos 2015, p. 293.

(Susanoğlu) on the Olba coast into a significant supply center through the construction of a *horreum*, highlights both the increase in agricultural output and the transformation of the region into a hub for storage and distribution, particularly within Olba and its immediate surroundings.

An inscription indicates that Korasion was founded by Flavius Uranius, governor of Isauria, during the joint reigns of Emperors Valentinianus I, Valens, and Gratianus (367–375 AD)¹⁰. The presence of a *horreum* in this settlement provides valuable insights into the supply system, while the secure dating of the site further underscores its significance.

Equally noteworthy is the production of the earliest LR1 amphorae in the same period and region, specifically at Elaiussa Sebaste. The substantial quantities of LR1 amphorae recovered at this site, together with associated kiln remains, confirm that Elaiussa Sebaste functioned as both a production and storage center throughout the 4th century AD and beyond¹¹.

Collectively, these developments, which appear to form part of a coherent strategy, indicate that the system of agricultural production, storage, and distribution along the Cilician coasts was organized under central direction during the second half of the 4th century AD.

THE SASANIAN WARS AND ISAURIAN REVOLTS

Given the pervasive instability in the Eastern Mediterranean during the 4th century AD, it is crucial to examine these motivations within the context of imperial military policies and to determine which challenges generated specific logistical responses. Indeed, the chaotic conditions in the region heightened the strategic significance of Cilicia. Among the primary concerns confronting Rome at this time was the persistent Sasanian threat, which prompted the deployment of substantial military forces along the eastern frontier¹².

In the second half of the same century, a series of major revolts erupted in Isauria¹³. These uprisings, which demanded considerable attention from Rome, illustrate the prolonged nature of conflict that underlines the strategic importance of the Cilicia region. Although often

overshadowed by tensions with the Sasanians, these revolts provide essential insights for understanding the establishment of agricultural production and Rome's supply network in Cilicia. To fully comprehend these connections, it is necessary to examine the scale and chronology of the revolts, the prevailing conditions of the period, and the administrative measures undertaken.

The first revolt, occurring in 353–354 AD, saw the Isaurians attack provision depots at the port of Palaea, besiege the city of Seleukeia, seize supply ships along the Kalykadnos River, and place the Roman legions stationed there under the threat of starvation. Nebridius, serving as *Comes Orientis*, intervened with a substantial force and restored order¹⁴. These events demonstrate that the region was already integrated into the imperial supply chain, that the Isaurians specifically targeted provision depots, and that their attacks extended into the cities of Pamphylia¹⁵.

Subsequent revolts in 359 and 367 AD again saw the Isaurians ravage Cilician and Pamphylian cities, systematically looting urban centers and affluent rural estates. Ultimately, the Romans were compelled to negotiate treaties with the Isaurians, following terms analogous to those used in agreements with foreign adversaries¹⁶.

Although administrative measures were implemented around 370 AD, including the establishment of the province of Lycaonia and the reduction of Isauria's borders, these precautions proved insufficient to prevent further unrest. In 377 AD, Valens, stationed in Antioch, personally intervened and successfully suppressed a revolt that erupted the previous year¹⁷.

Despite the recurring nature of Isaurian uprisings, the events of 404 AD eclipsed all previous disturbances. By this time, the Isaurians – likely supported by Hunnic and Gothic groups – inflicted devastation across an extensive territory. Advancing through Cilicia, the rebels reached Syria, Phoenicia, and Palestine, pushing as far as the Sasanian frontier before returning to Isauria via Mesopotamia. Their raids continued into Pamphylia and Lycia, extended to Cyprus, and even reached Lycaonia, Pisidia, Cappadocia, and Pontus¹⁸.

After this period, Isaurian bands continued to traverse and plunder Asia Minor. A decree issued by Arcadius on 27 April 408 AD specifically mandated that the trials of Isaurian bandits should not be postponed, even during religious festivals¹⁹. This chronology highlights that the Isaurian threat persisted well beyond the 4th century AD and that the insecurity along the Cilician coasts had repercussions for the broader Eastern Mediterranean.

The persistently volatile province of Isauria, together with the Sasanian frontier, fell, like Cilicia, under the administrative jurisdiction of the *Diocesis Orientis* (Fig. 1).

¹⁰ Keil, Wilhelm 1931, p. 102–107; Hild, Hellenkemper 1990, p. 311; Rizos 2015, p. 293.

¹¹ On Elaiussa Sebaste and other LR1 production centers, see Ricci 2007, p. 170–171; Ferrazzoli-Ricci 2007, p. 671; Burragato *et alii* 2007, p. 690–691; Schneider 2008, p. 118–120; Ferrazzoli-Ricci 2009, p. 37; Empereur, Picon 1989, p. 239, fig. 18–19; Alkaç 2012, p. 323; Opaît 2004, p. 295; Pieri 2005, p. 70; Bezecsky 2013, p. 158–159; Gillett, Iacomi 2025, p. 17–19. Furthermore, concerning recent studies on LR1 production centers in the Cilicia region, see Alkaç 2013, p. 107–124; Alkaç 2015, p. 151–159; Şenol, Alkaç 2017, p. 831–843; Aydın *et alii* 2021, p. 137–174; Alkaç, Adibelli 2024, p. 85–97; Alkaç-Arici 2025. Regarding the ceramic dumps identified in the settlements of Zephyrion and Aulai pointing to LR1 production, see Durukan 2015b, p. 15, 50.

¹² Lenski 2002, p. 167–185.

¹³ Amm. Marc. 14.2.1–20; Hild, Hellenkemper 1990, p. 35–39; Lenski 2002, p. 198–200; Kurt 2018, p. 808–809.

¹⁴ Hild, Hellenkemper 1990, p. 35–36.

¹⁵ Lenski 1999b, p. 423; Kurt 2018, p. 808; Alkaç 2024, p. 156.

¹⁶ Hild, Hellenkemper 1990, p. 36–38.

¹⁷ Hild, Hellenkemper 1990, p. 37.

¹⁸ Hild, Hellenkemper 1990, p. 38–39.

¹⁹ Hild, Hellenkemper 1990, p. 38.

This arrangement conferred considerable military, political, and strategic significance on the *Diocesis Orientis*, necessitating the establishment of a reliable supply chain. According to the administrative design, border forts were to be provisioned primarily by nearby farms, thereby minimizing transport difficulties. Consequently, the frontier provinces were obliged to supply the garrison units (*limitanei*) stationed within their territories²⁰.

Given the Sasanian and Isaurian threats, it is difficult to regard any stage of the Eastern Mediterranean supply chain as independent of the Roman state's central decision-making apparatus. On the contrary, the specific circumstances surrounding the conversion of the port of Palaea, immediately west of Seleukeia, into a storage base, the construction of a *horreum* at Korasion, just east of Seleukeia, and the production of the earliest LR1 amphorae at Elaiussa Sebaste on the Olba coast gain added significance when considered in the context of the Isaurian revolts. These activities, forming integral components of the supply chain, were strategically implemented in coastal settlements closest to Roman forces stationed in Isauria.

During the revolt of 353–354 AD, Seleukeia hosted a garrison and three legions in its vicinity²¹. These measures were primarily intended to provision the armies engaged against the Isaurians and to maintain regional security. The evidence thus reinforces the likelihood that the state played a decisive role in the emergence of LR1 amphorae. In a region rendered unsuitable for trade by security risks, complementary investments were made to support military operations. Alongside production, storage, and logistical facilities—which constituted the main elements of the supply system—a specific type of transport container was devised. From this perspective, the emergence of LR1 amphorae should be understood not as an isolated phenomenon, but as an integral component of a broader, centrally coordinated supply network.

In short, the appearance of the LR1 form must be interpreted primarily in relation to military requirements rather than commercial considerations. The historical developments of the 4th century AD suggest a strong connection between this type of amphorae and the regional military and administrative context. A holistic approach that integrates archaeological evidence with historical background offers a new perspective on the role of the state in the emergence and chronological development of the LR1 amphora. To this end, it is essential to examine the historical circumstances that clarify these archaeological correlations.

THE 'DE FACTO' CAPITAL OF THE EAST: ANTIOCH

At this juncture, a crucial detail must be emphasized. For much of the forty-one-year period between Constantine's

death (337 AD) and that of Valens (378 AD), Antioch functioned as the residential center and *de facto* capital for the emperors. Specifically, Constantius II (337–361 AD), Julian (363–364 AD), and Valens (364–378 AD) spent significant periods of their reigns in the city. Constantius maintained a continuous residence in Antioch from 338 to 350 AD²², while Valens governed from the city between 371 and 378 AD²³. Julian, though ruling for only two years, spent approximately fifteen months in Antioch. During this period, significant developments in the organization of the supply system occurred.

This period, during which Antioch served as the *de facto* capital, coincided with ongoing conflicts along the Sasanian frontier and repeated revolts in Isauria. The emperors' decision to reside in Antioch reflected the necessity for rapid and direct intervention in response to these security challenges. Consequently, the provisioning of both a large civilian population and substantial military forces in Antioch necessarily implies the existence of a robust supply system. Within this context, any examination of the supply network and the chronology of its associated components must focus in particular on the developments that occurred during Antioch's tenure as the imperial seat.

THE REIGN OF JULIAN

By the 4th century AD, the organization of the imperial supply system had become a central concern, recognized as crucial by every emperor, yet remaining unresolved despite repeated reform attempts. The acute crisis faced by Julian in Antioch, resulting from grain shortages and systemic failures in provisioning, constitutes the most striking example of this problem. During his residence in Antioch in preparation for his Sasanian campaign²⁴, a severe food shortage emerged, attributed both to scarcity and a series of misguided administrative decisions²⁵.

In response to the shortage, Julian imposed a ceiling price on wheat; however, this measure inadvertently enabled a group of wealthy individuals to acquire the entire supply, exacerbating the crisis. The consequent strain on provisioning the army placed severe pressure on the civilian population of Antioch. Concurrently, inflation and social unrest intensified, prompting the public to openly express their dissatisfaction with the emperor²⁶.

This tension is narrated with irony in Julian's own *Misopogon*. While the emperor censures the people of Antioch for idleness, indulgence, and luxury, the populace accuses him of stinginess and hostility to pleasure. Beneath these exchanges, however, the core issue is not moral but

²² Baker-Brian 2023, p. 7.

²³ Kelly 2018, p. 137.

²⁴ Gibbon 1836, Vol. 2, Chp. XXIV, p. 367; Jones 1964, p. 123.

²⁵ Amm. Marc. 22.13.4; 22.14.1; Libanius, *Orationes*, 1.103, 126, 208, 15.21, 18.195–198.

²⁶ Gibbon 1836, Vol. 2, Chp. XXIV, p. 367–369.

²⁰ Jones 1964, p. 458.

²¹ Amm. Marc. 14.2.14; Lenski 1999a, p. 313, n. 21; Kurt 2018, p. 819–820.

practical: the army's substantial demands paralyzed the local economy and precipitated a food crisis²⁷.

Although the food crisis that unfolded in the city is recounted in Julian's *Misopogon* as well as in the works of prominent contemporary authors, Ammianus and Libanius, none of these sources provides any indication of an effective supply system. Julian's interventions to mitigate the burden of provisioning on the city's population are generally interpreted as conventional measures, reflecting the routine strategies employed by emperors in response to subsistence crises²⁸. Moreover, some scholars argue that such measures might not have been implemented at all had the emperor not been personally present in Antioch:

*"Another example will show that it is the administrative, and not the geographical status of the imperial residence, which ensured that it was so carefully provided for. In 362–363 Julian resided in Antioch while preparing for war with Persia. Due to the concentration of troops in the city, and also due to a recent drought that had destroyed the crops, a severe shortage broke out in the city. The measures that Julian took to relieve the crisis were remarkable – and needless to say – were not again applied to that city, either before or after this incident. At first he took administrative measures against the crisis, regulated the market prices of the city, and exempted citizens from taxes. Then, when all this had failed, he had large amounts of grain imported from the nearby cities of Chalkis and Hierapolis. Subsequently, he continued to offer a sizeable quantity of corn from his own patrimony and household and finally he had Egyptian grain brought to the city and sold at an extremely low price. This would never had occurred in Antioch, if the emperor had not resided there at that time."*²⁹

These measures, taken together, illustrate the absence of a stable and institutionalized supply system, forcing the emperor to rely on a sequence of *ad hoc* interventions. Rather than reflecting a coordinated logistical framework, Julian's response reveals a reactive and situational approach to provisioning, shaped by immediate necessity rather than long-term planning.

Viewed from this perspective, the food crisis that unfolded in Antioch in 363 AD assumes particular significance as a *terminus post quem*, revealing the fragility of the existing supply system, the absence of a coordinated logistical network, as well as the reliance on *ad hoc* decisions to manage the crisis.

Under these conditions, Julian's campaign ended in failure, and the harsh treaty imposed on his successor, Jovian, in the same year further compounded Rome's difficulties along the eastern frontier. With key frontier fortresses and strategic sites, such as Nisibis, ceded to the Sasanians, Antioch's centrality increased markedly³⁰. Consequently, the urgency of addressing the deficiencies in

the supply system became increasingly evident in parallel with the escalation of these challenges.

THE REIGN OF VALENS

By the time of Valens, the list of major challenges confronting the empire had expanded significantly. Alongside the Gothic threat, the Isaurian revolts and the wars against the Sasanians demanded urgent attention³¹. In response, Valens transferred the administrative and military center of the state to Antioch in AD 371 and organized regular summer campaigns along the eastern frontier. He also departed from Antioch both to suppress the Isaurian revolt in 377 and to conduct his final campaign – the Gothic War – in 378³². In short, during Valens' reign, Antioch functioned not merely as the emperor's residence but as the military and diplomatic heart of the East, serving as the central hub of frontier defense and imperial authority³³.

Lenski's comprehensive analysis of Valens highlights that notable developments related to the economy are concentrated during this emperor's reign³⁴, with particular emphasis on the supply system. Both Valentinianus and Valens were aware that certain prior revolts had been triggered by deficiencies in food provisioning. Consequently, ensuring the reliable supply of food not only for the army but also for the metropolises was recognized as essential for maintaining internal security. To this end, they exerted considerable effort to guarantee the seamless functioning of the supply system and, owing to the measures they implemented, experienced no severe disruptions, even during periods of famine³⁵:

*"To the credit of both emperors, the careful measures they took for provisioning forestalled any potential troubles in the metropoleis. Despite the famine of 370, the Constantinopolitans seem never to have rioted over food under Valens. And in Rome, even a devastating flood in 374 did not interfere with the efficient distribution of food under Valentinian's new system."*³⁶

In addition, by the second half of the 4th century AD, it had become evident that the number of *horrea* across the empire was insufficient, or that the locations of strategic risk zones had shifted. Simultaneously, while the state bureaucracy – hampered by corruption and theft – imposed restrictions on the construction or repair of other public buildings, it actively encouraged local administrators to erect *horrea* and *stabula* during this period³⁷. Throughout his extended residence in Antioch, Valens, seeking solutions to both security and supply challenges, is known to have attempted to improve the logistical organization

²⁷ Julian, *Misopogon* 368d–370d.

²⁸ Jones 1964, p. 446; Marvin 2023, p. 310.

²⁹ Stathakopoulos 2007, p. 216.

³⁰ Ostrogorsky 1991, p. 47.

³¹ Ostrogorsky 1991, p. 47–48.

³² Jones 1964, p. 153.

³³ Lenski 2002, p. 153–185.

³⁴ Lenski 2002, p. 185, 287.

³⁵ Lenski 2002, p. 279–280.

³⁶ Lenski 2002, p. 281.

³⁷ Rickman 1971, p. 192; Lenski 2002, p. 281.

by constructing *horrea* at key points, in collaboration with Valentinian, to regulate the transportation of state grain, wine, and oil³⁸. A notable example of this policy is the harbor of Korasion on the Olba coast, together with its *horreum*; Flavius Uranius, appointed governor of Isauria by Valens, is recorded as having constructed this complex between 367 and 375 AD³⁹. During the same period and along the same coastline, the harbor of Palaea was similarly converted into a storage facility⁴⁰. Although the region's principal cities (Seleuceia and Elaiussa Sebaste) already possessed extensive storage centers, the establishment of these new depots in close proximity to the epicenter of the Isaurian uprisings reflects deliberate efforts to ensure uninterrupted provisioning for the troops.

However, as Rizos noted, while a substantial number of *horrea* were constructed during the first half of the 4th century AD, this policy shifted in the latter half of the century: new *horrea* were erected only when strictly necessary, and the supply system previously sustained through the *annona* gradually gave way to the practice of making cash payments (*adaeratio*) to soldiers⁴¹.

The *horreum* at Korasion, constructed during this period, provides valuable insight into the practical implications of these imperial policies for the Olba coastline and, more broadly, for the Eastern Mediterranean. As is well documented, the Isaurian revolts – beginning in the mid-4th century, recurring intermittently, and continuing into the late 5th century – posed a prolonged, exhausting, and destructive challenge that engaged both emperors and the army. The construction of the Korasion settlement and its *horreum* coincided with the most intense phase of these uprisings. Under such circumstances, commercial activity along the Cilician coast would have been severely constrained. Consequently, it is evident that the harbor and *horreum* at Korasion were not intended for trade or export, but were strategically designed to supply the Roman forces stationed primarily in Isauria, as well as those in Antioch and along the Sasanian frontier. In essence, the Korasion *horreum* reflects a broader effort along the Olba coast to expand the Antioch-centered logistical network and establish a reliable supply chain to meet the army's needs. Similarly, during the reigns of Valens and Valentinian, specific regulations were introduced to oversee and reinforce the *cursus publicus*, which functioned as the logistical backbone of the *annona militaris*.

"It seems likely that every province was first charged with the maintenance of its own governor and his officium, and of the local stations of the cursus publicus. The latter needed some regulation: in 365 the consular Anatolius reported that in the Suburbicarian provinces fodder for the several post stations was arbitrarily demanded, and laid down a scheme whereby each city should provide fixed

*quantities at predetermined dates, proper regard being had to the length and difficulty of the journey".*⁴²

The *cursus publicus* constituted a crucial institution that ensured the rapid and regular delivery of the *annona* required by the garrisons. Efforts to place this system under stricter oversight appear to have been part of a broader program aimed at strengthening the imperial supply network. In this context, during the reigns of Valens and Valentinian, measures were undertaken to repair the logistical backbone of the supply system and to enhance the operational effectiveness of the army.

Notably, no supply crises are recorded during the annual campaigns against the Sasanians and Isaurians in the lead-up to the Gothic War of 378 AD. The fact that some of these operations were conducted by Valens' generals (Arintheus, Terentius, Traianus, and Vadomarius)⁴³ suggests that by this period the supply system could respond to multiple, overlapping military demands within a centrally coordinated framework. Indeed, authors such as Zosimus and Themistius emphasize the attention devoted to the supply system, particularly during the Gothic campaigns in Thrace, noting that earlier disruptions had precipitated civil unrest and food shortages. Their accounts further underscore the significance of Valens' contributions to the logistical apparatus⁴⁴.

THE EMERGENCE AND STATUS OF LR1 AMPHORAE

Events during the reigns of Julian and Valens provide important clues for dating the emergence of LR1 amphorae. This amphora type represents a period in which the supply system functioned more effectively. Literary accounts of the food crisis in Antioch under Julian make no mention of either a well-organized supply network or the existence of LR1 amphorae, underscoring the shortcomings of the system at that time. Therefore, if LR1 amphorae were part of an operational supply network, they did not yet exist in 363 AD.

It is estimated that LR1 amphorae assumed their characteristic form by the mid-4th century AD⁴⁵, with the earliest examples attested at Elaiussa Sebaste. This suggests that the amphora group may have been part of the extensive program under Emperor Valens aimed at reforming the supply system. The efficient and timely delivery of provisions and military equipment was a critical aspect of Roman logistical operations. Beyond serving as transport containers for various supplies, amphorae also functioned as standardized units within the logistical record-keeping system, forming an integral link in the overall supply chain.

³⁸ Rickman 1971, p. 184.

³⁹ Keil, Wilhelm 1931, p. 102–107; Hild, Hellenkemper 1990, p. 311.

⁴⁰ Amm. Marc. 14.2.13; Rizos 2015, p. 293.

⁴¹ Rizos 2013, p. 681.

⁴² Jones 1964, p. 458.

⁴³ Kelly 2018, p. 151.

⁴⁴ Zosimus 4.10.3–4; Themistius 10, 138 b–c; Lenski 2002, p. 127–137; Rizos 2013, p. 681.

⁴⁵ Opař 2010, p. 1017; Reynolds 2005, p. 575; Gillett, Iacomi 2025, p. 42.

Within this framework, it is necessary to consider the state's potential role in the emergence of the LR1 form. The continuous production of amphorae of approximately the same type between the 4th and 7th centuries reflects a systematic phenomenon unlikely to have arisen by coincidence. Some scholars argue that LR1 amphorae represent a regional type, produced by multiple cities independently of state control⁴⁶. However, the chronological parallel between periods in which several emperors personally resided in Antioch due to military necessities – such as the Sasanian wars and the Isaurian revolts – and the appearance of LR1 amphorae suggests a centrally coordinated and programmatic organization within the supply chain rather than mere coincidence. Indeed, the southern coasts of Anatolia were strongly affected by the Isaurian revolts during the period in which these amphorae appeared, making it more meaningful to associate the 4th-century production at Elaiussa Sebaste with military provisioning rather than commercial activity in a region engulfed by chaos. From this perspective, it can be inferred that the emergence and standardization of the LR1 form were largely shaped by the central Roman administration and the logistical hub at Antioch.

To understand the rationale behind this standardization, it is instructive – at least comparatively – to consider the Dressel 20 amphorae. Emerging suddenly in the 30s AD and specifically selected by the Roman state as strategic carriers for military provisioning in Germania, Dressel 20 amphorae were produced in a uniform form for roughly 250 years, reflecting direct state control⁴⁷. In a similar manner, the standardized shape of LR1 amphorae may have functioned as a “brand” representing the products of the Eastern provinces and the state itself, much as Dressel 20 did in the West. This suggests that a mechanism of standardization was likely implemented to ensure state supervision of the supply process. Within this framework, one of the earliest production centers may have been located in the vicinity of Antioch, the *de facto* capital⁴⁸. Moreover, if the initial outputs from Elaiussa Sebaste were intended to provision armies operating in Isauria, it is plausible that Seleuceia ad Kalykadnos, the provincial capital of Isauria, was among the first production sites. However, in the absence of systematic archaeological excavations in Seleuceia, this remains a speculative hypothesis.

⁴⁶ Reynolds 2005, p. 575–577.

⁴⁷ Bernal-Casasola *et alii* 2023, p. 104–107.

⁴⁸ Reynolds rejects this view and argues that Antioch and its immediate surroundings were not involved in the initial production of LR1 amphorae, suggesting instead that the origin should be sought in small settlements located in the highlands of Eastern Cilicia, see Reynolds 2005, p. 578. In contrast, Decker, based on the density of workshops, characterizes Syria during the Late Roman and Early Byzantine periods as “a land overflowing with grain, wine, and oil.” Taking into account the discovered kilns and production waste, he also indicates that the area around Antioch could have served as an LR1 production center, see Decker 2001, p. 77, 82. For early LR1 finds at Seleuceia Pieria, see Pieri 2005, p. 80, fig. 38; Gillett, Iacomini 2025, p. 34.

In summary, during the second half of the 4th century AD, amid Sasanian tensions and the Isaurian revolts, there was a pressing need for an organized supply system in the *Diocesis Orientis*, with Antioch playing a central role in its development. Notably, under Valens, considerable efforts were devoted to coordinating production, storage, and distribution. It is therefore plausible that the LR1 amphora form was integrated into the supply system during this same period.

CONCLUSION

The emergence of the LR1 amphora type cannot be fully understood without reference to the military and administrative pressures that intensified during the second half of the 4th century AD. In Late Antiquity, both the distribution and the sheer density of LR1 amphorae indicate an agricultural output far surpassing local demand. The evidence presented here (the Isaurian revolts and the Sasanian threat, the establishment of storage bases at Palaea and Korasion, the earliest production of LR1 amphorae at Elaiussa Sebaste, and the food crisis experienced in Antioch) demonstrates that the LR1 form did not originate as a commercial innovation. Rather, it functioned as an integral component of a centrally coordinated provisioning program, primarily designed to sustain the eastern armies. Within this framework, it is crucial to distinguish the developments of the 4th century AD from those that unfolded in the 5th century and beyond.

During the 4th century AD, the transformation of Constantinople into a major metropolis altered the established trade routes, directing merchants from Egypt and the broader Eastern Mediterranean along the Cilician coasts. This reorientation provided favorable conditions for the distribution of agricultural products from Cilician cities across the ancient world. More importantly, these circumstances contributed to the rapid expansion of agricultural production throughout the Eastern Mediterranean, reinforcing the underlying production infrastructure. Yet, this period of commercial opportunity was profoundly reshaped by the Sasanian Wars and the Isaurian revolts, which began in the mid-4th century AD and persisted until the century's end; the existing agricultural infrastructure was increasingly redirected to serve the military supply system.

One of the primary criteria for selecting regions dedicated to agricultural production within the supply system was the imperative to locate them in close proximity to areas where logistical and security challenges were most acute. According to Roman administrative practice, frontier provinces bore responsibility for provisioning the garrisons stationed within their territories⁴⁹. In this context, Cilicia emerged as one of the most suitable production zones capable of meeting the needs of the eastern armies during

⁴⁹ Jones 1964, p. 458.

the 4th century AD. Moreover, the presence of Isauria and the Sasanian frontier (two of the most volatile and strategically sensitive regions of the empire) within the administrative boundaries of the *Diocesis Orientis* rendered the intensification of agricultural production across the Eastern Mediterranean, and particularly in Cilicia, both expected and virtually inevitable.

In this framework, agricultural production and LR1 amphorae functioned as complementary components of a unified supply chain. The development of a coherent supply program within the *Diocesis Orientis* in the fourth century AD thus appears to have been driven by both bureaucratic requirements and military necessity. Cilicia and the Olba region, in turn, became not merely a frontier landscape marked by rebellion and warfare but also the central locus for production, storage, and distribution. The prolonged use of Antioch as the *de facto* administrative center following Constantine's death further amplified the urgency and strategic significance of this supply network. Viewed in conjunction with the supply obligations imposed upon the frontier provinces, the archaeological, philological, and historical evidence collectively supports the conclusion that military and administrative priorities were decisive factors in the emergence of the LR1 amphora form.

In parallel with these developments, LR1 amphorae are estimated to have assumed their canonical form in the mid-4th century AD or shortly thereafter, coinciding with the period of wars and revolts. The identification of early examples, dated to the 4th century AD and referred to as Proto-LR1, produced at Elaiussa Sebaste, holds particular significance for this phase. It is also plausible that early production occurred at major centers such as Antioch, Seleucia, and Tarsus⁵⁰. Nevertheless, the recognition that Proto-LR1 amphorae were produced within the Cilicia region itself is of critical importance. This development coincides with the transformation of Korasion – immediately west of Elaiussa Sebaste – into a strategic harbor with the construction of a *horreum*, and with the conversion of the nearby Palaea harbor (Tahtalimanı) into a storage facility.

The conflicts of the 4th century AD amplified the need for provisioning, prompting the planning of a structured production organization. While scholars such as Reynolds and Tate have questioned the presence of direct state control over production, it is evident that by the second half of the 4th century AD, the state exercised decisive influence over every aspect of the production organization. Moreover, given the insecurity of the period, commercial activity is unlikely to have been a significant factor. In particular, at a time when the Isaurians were capable of devastating the coasts between Cilicia and Pamphylia, linking the increase in agricultural production

and the initiation of LR1 amphora manufacture to purely commercial motives appears implausible.

In short, during the second half of the 4th century AD, a period marked by recurrent wars and revolts, agricultural production and associated processes were more likely determined in accordance with state priorities, with LR1 amphora production commencing in parallel. The military and political developments of the time indicate that the organizational framework associated with LR1 amphorae and the broader supply chain was planned during the reign of Valens.

The turbulent conditions created by these historical developments also correspond with the trajectory of construction activities in the region and the local chronology of a major ceramic group that was widely distributed across the Mediterranean. In the Olba region, no distinctive architectural phase can be assigned to the 4th century AD; only a few churches are attested⁵¹, and there is no evidence for high-status residential architecture. The securely dated structures of this period consist mainly of functional installations such as harbors, warehouses, and a *horreum*. By contrast, the 5th century AD represents the most prosperous phase of construction activity, demonstrated by the emergence of large villas and a notably high number of churches, clear indicators of accumulated wealth and expanding commercial activity. Given the instability of the preceding decades, it is more reasonable to date this flourishing architectural landscape to the mid-5th century AD or slightly later.

A similar pattern can be observed in the ceramic record, particularly in the distribution of red-slipped pottery identified in the ancient cities excavated along the Cilician coast. Widely recognized as indicators of commercial exchange, these ceramics offer a meaningful contrast to LR1 amphorae, which are interpreted here as products of a state-directed military supply system.

*“Red-slipped ceramics, the most important commercial vessels of the Mediterranean world, have yielded similar results on the southern coasts. The historical density of Cypriot, African and Phokaian ceramics found at Tarsus, Soli and Kelenderis increases from the late 4th–5th century AD. The African and Phokaian ceramics from Elaiussa Sebaste also increase from the end of the 4th century AD. The examples of red-slipped ceramics from these cities dating to the second half of the 4th century AD are limited”*⁵².

Red-slipped pottery, one of the Mediterranean's most significant archaeological assemblages with considerable chronological importance, provides a valuable indicator of the intensifying commercial activity along the Cilician coast in the late 4th century AD. The absence of this ceramic group throughout the second half of the 4th century, combined with the dating of its earliest examples to the end of the century, suggests that the effects of the Isaurian

⁵⁰ For the discovery of a group of amphorae (Proto-LR1) in Tarsus, dated to the second half of the 4th century AD, see Alkaç 2024, p. 157. I would like to thank Erkan Alkaç and Işık Adıbelli for providing information indicating that the production center of these amphorae, currently under analytical study, may have been Elaiussa Sebaste or Tarsus.

⁵¹ Hill 1985, p. 97; Ceylan 2009, p. 52.

⁵² Alkaç 2024, p. 157.

threat persisted and that regular, secure trade was unlikely to have been established before that time.

These observations, based on both construction activities and ceramic evidence, highlight the security challenges faced in the Olba region during the second half of the 4th century AD. Under these conditions, it is reasonable to conclude that production and supply were driven more by military needs than by commercial interests, under state supervision.

The available archaeological, historical, literary, and architectural evidence considered together indicates that the emergence of the LR1 form coincided with the development of an increasingly structured supply system. All these developments observed in the Eastern Mediterranean and the Olba region are dated to the second half of the 4th century AD and should therefore be considered separately from the 5th century. While a range of factors may have contributed to the emergence of the LR1 form, the evidence presented here consistently points to state-directed, military-driven production as the primary determining force. The entire process cannot be adequately explained by trade alone; rather, it reflects the specific administrative and logistical conditions of the period and the region.

In the 4th century AD, the emergence of the LR1 form is best understood—much like Dressel 20 amphorae—as the result of a centrally directed decision shaped by military necessity. The available evidence supports this interpretation. During a period marked by the Isaurian revolts and intense Sasanian conflicts, LR1 production appears to have been concentrated within a limited geographical zone. Although the precise duration of state oversight remains uncertain, the Olba region—where the earliest archaeological evidence is concentrated—offers a micro-model for understanding these broader economic and logistical transformations.

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ABREVIERI / ABRÉVIATIONS / ABBREVIATIONS

AAC – Acta Archaeologica Carpatica, Kraków
ACMI – Anuarul Comisiunii Monumentelor Istorice, București
ActaArchHung – Acta Archaeologica Academiae Scientiarum Hungaricae, Budapest
Acta Classica Univ. Scient. Debrecen – Acta Classica Universitatis Scientiarum Debreceniensis, Debrecen, Ungaria
ActaMN – Acta Musei Napocensis, Cluj
ActaMP – Acta Musei Porolissensis, Zalău
ActaPraehistA – Acta praehistorica et archaeologica
AIGR - Anuarul Institutului Geologic al României, București
AIIAC – Anuarul Institutului de Istorie „George Barițiu”, Cluj
AJA – American Journal of Archaeology, Boston
AJPA – American Journal of Physical Anthropology
Alba Regia – Alba Regia. Annales Musei Stephani regis, Székesfehérvár
Anatolia Antiqua – Anatolia Antiqua. Revue internationale d'archéologie anatolienne. Institut Français d'Etudes anatoliennes d'Istanbul
Anatolica – Anatolica. The Netherlands Institute for the Near East in Leiden
AnB – Analele Banatului, Muzeul Banatului, Timișoara
AncNearEastSt – Ancient Near Eastern Studies, Leuven, Belgia
Angustia – Angustia. Arheologie, Etnografie, Sfântu Gheorghe
Anmed – Anmed. Anadolu Akdenizi Arkeoloji Haberleri, Antalya, Turcia
AnSt – Anatolian Studies. British Institute of Ankara
AnUCraiova – Analele Universității din Craiova, Craiova (seria Istorie)
AnUVT – Annales d'Université “Valahia” Târgoviște, Section d'Archéologie et d'Histoire
Apulum – Acta Musei Apulensis. Muzeul Național al Unirii, Alba Iulia
ArchBulg – Archaeologia Bulgarica, Sofia
ArchÉrt – Archaeológiai Értesítő, Budapest
ArchHung – Archaeologia Hungarica, Acta Archaeologica Musei Nationalis Hungarici, Budapest
ArchKorr – Archäologisches Korrespondenzblatt, Mainz
ArchMűh – Archeometriai Műhely
ArchRozhledy – Archeologické Rozhledy, Praha
Argesis – Argesis. Muzeul Județean Argeș. Pitești
Arheologia Medievală. Complexul Muzeal Bistrița-Năsăud, Bistrița
ArheologijaSSSR – Arheologija SSSR. Svod Archeologičeskikh Istočnikov, Moscova
Arheološki vestnik – The Research Center of the Slovenian Academy of Sciences and Arts
ArhMold – Arheologia Moldovei, Iași
AS – Archeologica Slovaca, Bratislava
AST – Eski Eserler ve Müzeler Genel Müdürlüğü, I. Araştırma Sonuçları Toplantısı, Istanbul / General Directorate of Ancient Monuments and Museums
AȘUI – Analele științifice ale Universității Alexandru Ioan Cuza, Iași
BA – Biblioteca de Arheologie, București
BaBesch – Bulletin antieke beschaving. Annual Papers on Classical Archaeology
BAI – Bibliotheca Archaeologica lassiensis, Iași
Baltic-Pontic Studies – Adam Mickiewicz University, Poznań, Institute of Archaeology, Institute of Eastern Studies, Poland
Banatica – Banatica. Muzeul Banatului Montan, Reșița
BarBrSer – British Archaeological Reports. British Series, Oxford
BARIntSer – British Archaeological Reports. International Series, Oxford
BCMI – Buletinul Comisiunii Monumentelor Istorice
Be-Ja – Bulgarian e-Journal of Archaeology
BerRGK – Bericht der Römisch-Germanischen Kommission des Deutschen Archäologischen Instituts, Frankfurt am Main
BIAA Monograph – British Institute of Archaeology at Ankara
BiblEphemNap – Bibliotheca Ephemeris Napocensis, Cluj-Napoca
BiblMemAnt – Bibliotheca Memoriae Antiquitatis, Piatra-Neamț
BiblThrac – Bibliotheca Thracologica, București

- BMC – *Coins of the Roman Empire in the British Museum*, Londra; II, *Vespasian to Domitian*, 1930; IV, *Antoninus Pius to Commodus*, 1968; V, *Pertinax to Elagabalus*, 1950 (H. Mattingly)
- BMI – Buletinul Monumentelor Istorice, București
- BMJT – Buletinul Muzeului Județean Teleorman, Alexandria
- BMTAG – Buletinul Muzeului Județean „Teohari Antonescu”, Giurgiu
- BSA – British School at Athens, Athens
- BSNR – Buletinul Societății Numismatice Române, București
- BSPF – Bulletin de la Société Préhistorique Française, Paris
- BSSC – Buletinul Societății de Științe din Cluj
- București-MIM – București. Materiale de Istorie și Muzeografie. Muzeul Municipiului București
- BYZAS – German Archaeological Institute of Istanbul
- CA – Cercetări Arheologice. Muzeul Național de Istorie a României, București
- CAB – Cercetări arheologice în București. Muzeul Municipiului București
- Caiete ARA – Caietele ARA, Revistă de Arhitectură. Restaurare și Arheologie, Asociația ARA, București
- Carpica – Carpica. Complexul Muzeal „Iulian Antonescu” Bacău, Bacău
- CCA – Cronica Cercetărilor Arheologice din România, București
- CCDJ – Cultură și Civilizație la Dunărea de Jos, Călărași
- Cerclst – Cercetări Istorice, Muzeul de Istorie a Moldovei, Iași
- CN – Cercetări numismatice, București
- CollAn – Colloquium Anatolicum. Anadolu Sohbetleri, Institutum Turcicum Scientiae Antiquitatis, Istanbul
- Crisia – Crisia. Muzeul Țării Crișurilor, Oradea
- Cuadernos del Museo Geominero – Museo Geominero, Instituto Geológico y Minero de España, Madrid
- Current Anthropology – Current Anthropology. University of California, Merced
- Dacia – Dacia (Nouvelle Série). Revue d'archéologie et d'histoire ancienne. Académie Roumaine. Institut d'archéologie « V. Pârvan », Bucarest
- Danubius – Danubius, Revista Muzeului de Istorie Galați
- Documenta Praehistorica – Documenta Praehistorica, University of Ljubljana, Faculty of Arts, Department of Archaeology, Ljubljana
- DolgCluj – Dolgozatok az Erdélyi Nemzeti Múzeum Érem- és Régiséggyűjtéséről, Kolozsvár
- DTKFD – Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Dergisi
- EJA – European Journal of Archaeology
- ERAUL – Études et Recherches archéologiques de l'Université de Liège
- ÉtAlex – Études Alexandrines, Centre d'Études Alexandrines
- ÉtTrav – Etudes et travaux. Studia i prace. Travaux du Centre d'archéologie méditerranéenne de l'Académie Polonaise des Sciences
- EurAnt – Eurasia Antiqua. Deutsche Archäologisches Institut, Berlin
- FrC – Fragmenta Comica
- FolArch – Folia Archaeologica. A Magyar Nemzeti Múzeum Évkönyve. Annales Musei Nationalis Hungarici, Budapest
- FSI – Forensic Science International
- Germania – Germania. Anzeiger der Römisch-Germanischen Kommission des Deutschen Archäologischen Instituts, Frankfurt
- Geoarchaeology – Geoarchaeology. An International Journal
- Hesperia – Hesperia. Journal of the American School of Classical Studies at Athens, Cambridge
- HOMO – HOMO. Journal of Comparative Human Biology, Stuttgart
- Human Evolution – Human Evolution, International Institute for Humankind Studies and University of Florence
- Ialomița – Ialomița. Studii de cercetări de arheologie, istorie, etnografie și muzeologie, Slobozia
- IJO – International Journal of Osteoarchaeology
- Iran – Iran. Journal of the British Institute of Persian Studies
- IstMitt – Istanbul Mitteilungen, Istanbul
- Istros – Istros, Muzeul Brăilei, Brăila
- IzvestijaVarna – Izvestija na Archeologiceskii Institut, Sofia
- JAHA – Journal of Ancient History and Archaeology, Cluj-Napoca
- JAnat – Journal of Anatomy
- JAS – Journal of Archaeological Science
- JAS: Reports - Journal of Archaeological Sciences: Reports
- JDAI.AA – Jahrbuch des Deutschen Archäologischen Instituts, Archäologischer Anzeiger, Berlin
- JFS – Journal of Forensic Sciences

- JHE – Journal of Human Evolution
 JRA – Journal of Roman Archaeology
 JRGZM – Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz, Mainz
 JRS – The Journal of Roman Studies
 KST – T. C. Kültür Bakanlığı, Eski Eserler ve Müzeler Genel Müdürlüğü, I. Kazı Sonuçları Toplantısı, Ankara / Republic of Turkey, General Directorate of Ancient Monuments and Museums, Ankara, Turkey
 LIMC – Lexicon Iconographicum Mythologiae Classicae, Zürich, München, Düsseldorf
 Litua – Litua, Studii și cercetări, Târgu-Jiu
 LRBC – *Late Roman Bronze Coinage A.D. 394-498*, Londra, 1965: I, *The Bronze Coinage of the House of Constantine A.D. 324-346* (P. V. Hill, J. P. C. Kent); II, *Bronze Roman Imperial Coinage of the Later Empire A.D. 346-498* (R. A. G. Carson, J. P. C. Kent).
 Macedoniae Acta Archaeologica – Macedonian Archaeological Society, Skopje, Republic of Macedonia
 MAMA – Monumenta Asiae Minoris antiqua. Publications of the American Society for Archaeological Research in Asia Minor
 Marisia – Marisia. Studii și materiale. Arheologie – Istorie – Etnografie, Târgu Mureș
 Marmatia – Muzeul Județean de Istorie și Arheologie Maramureș, Baia Mare
 MarNero – Il Mar Nero. Annali di archeologia e storia
 MCA – Materiale și Cercetări Arheologice, București
 MDOG – Mitteilungen der Deutschen Orient Gesellschaft
 MemAnt – Memoria Antiquitatis, Piatra Neamț
 MFMÉ – A Móra Ferenc Múzeum Évkönyve, Szeged
 Mousaios – Mousaios. Buletinul Științific al Muzeului Județean Buzău
 MuzNaț – Muzeul Național, București
 NAC – Numismatica e Antichità Classiche, Lugano-Pregassona
 OIP – Oriental Institute Publications, University of Chicago
 OJA – Oxford Journal of Archaeology, Oxford
 Olba – Mersin University Publications of the Research Center of Cilician Archaeology, Mersin, Turkey
 PALMA – Papers on Archaeology of the Leiden Museum of Antiquities, Leiden, Olanda
 PAS – Prähistorische Archäologie in Südosteuropa, München-Berlin
 PBF – Prähistorische Bronzefunde, Münster
 Peuce – Peuce. Studii și cercetări de istorie și arheologie, Institutul de Cercetări Eco-Muzeale, Tulcea
 Phoenix – Phoenix. The Journal of the Classical Association of Canada
 Plural – Journal of the History and Geography Department „Ion Creangă” Pedagogical State University, History, Culture. Society. Seria Archaeologica II, Chișinău
 PMMB – Publicațiile Muzeului Municipiului București
 Pontica – Pontica. Studii și materiale de istorie, arheologie și muzeografie, Muzeul de Istorie Națională și Arheologie Constanța
 PZ – Prähistorische Zeitschrift, Berlin-Mainz
 Quaternary International – Quaternary International. The Journal of the International Union for Quaternary Research
 Quaternary Science Reviews – Quaternary Science Reviews. The International Multidisciplinary Research and Review Journal
 RA – Revue Archéologique, Paris
 RAASI – Revista de Arheologie, Antropologie și Studii Interdisciplinare, Institutul de Cercetări Bioarheologice și Etnoculturale, Republica Moldova
 Radiocarbon – An International Journal of Cosmogenic Isotope Research, Cambridge
 RCAN – Revista de Cercetări Arheologice și Numismatice, Muzeul Municipiului București
 RevBistr – Revista Bistriței. Complexul Muzeal Bistrița-Năsăud, Bistrița
 RevMuz – Revista Muzeelor, București
 RGZM – Römisch-Germanisches Zentralmuseums Mainz, Mainz
 RIC – *The Roman Imperial Coinage*, Londra: I², *From 31 BC to AD 69*, 1984 (C. H. V. Sutherland); II, *Vespasian to Hadrian*, 1926 (H. Mattingly, E. A. Sydenham); II.1, *From AD 69-96. Vespasian to Domitian*, 2007 (I. A. Carradice, T.V. Buttrey); II.3, *From AD 117-138. Hadrian*, 2019 (R. A. Abdy, P. F. Mittag); III, *Antoninus Pius to Commodus*, 1930; IV.1, *Pertinax to Geta*, 1968 (H. Mattingly, E. A. Sydenham); IV.2, *Macrinus to Pupienus*, 1938; IV.3, *Gordian III – Uranius Antoninus*, 1949 (H. Mattingly, E. A. Sydenham, C. H. V. Sutherland); V.1, 1927 (reimprimat 1968; P. H. Webb); VII, *Constantine and Licinius A.D. 313-337*, 1966 (P. M. Bruun); VIII, *The Family of Constantine I A.D. 337-364*, 1981; X, *The Divided Empire and the Fall of the Western Parts A.D. 395-491*, 1994 (J. P. C. Kent)
 SAA – Studia Antiqua et Archaeologica, Iași
 Sargetia – Sargetia. Acta Musei Devensis. Buletinul Muzeului județean Hunedoara, Deva

SAV – Študijné zvesti Archeologicky ústav SAV, Nitra
Sci Rep – Scientific Reports
SCIV(A) – Studii și Cercetări de Istorie Veche (și Arheologie), București
SCN – Studii și Cercetări de Numismatică, București
Seleucia – Seleucia. Olban Excavations Series
SP – Studii de Preistorie, București
SprawArch – Sprawozdania Archeologiczne, Warsaw
SRMKA – Seramik Araştırmaları Dergisi, The Journal of Ceramic Research
StArchBrno – Studia Archaeologica Brunensia, Masaryk University, Brno
Starinar – Starinar. Arheološki institut Beograd
StComPitești – Studii și Comunicări, Seria Istorie, Muzeul Județean Argeș, Pitești
StudCom Satu Mare – Studii și comunicări Satu Mare
Studia Praehistorica – National Archaeological Institute with Museum of the Bulgarian Academy of Sciences
Syria – Syria. Archéologie, art et histoire. Institut Français du Proche-Orient
Terra Sebus – Terra Sebus. Acta Musei Sabesiensis, Anuarul Muzeului Municipal „Ioan Raica”, Sebeș
Th-D – Thraco-Dacica, București
Thracia – Thracia, Sofia
TIB – *Tabula Imperii Byzantini*, Wien
Transylvanian Review – Transylvanian Review. Centrul de Studii Transilvane, Cluj-Napoca
TÜBA-AR – TÜBA-AR Türkiye Bilimler Akademisi arkeoloji dergisi (TÜBA-AR Turkish Academy of Sciences Journal of Archeology)
UPA – Universitätsforschungen zur Prähistorischen Archäologie, Bonn
VAH – *Varia Archaeologica Hungarica* V. Redigit Csanád Bálint. Publicationes Instituti Archaeologici Academiae Scientiarum Hungaricae, Budapest
Varia Anatolica – *Varia Anatolica*. L'Institut Français d'Études Anatoliennes, Istanbul
Ziridava – Ziridava. Studia Archaeologica, Arad