

COLCHIAN AMPHORAE OF THE EARLY BYZANTINE PERIOD FROM GONIO-APSAROS: RESULTS OF ARCHAEOMETRIC RESEARCH

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Abstract. A number of issues concerning the history and archaeology of the Southeastern Black Sea region during the Early Byzantine period remain highly relevant and relatively understudied to this day. Although a rich scientific heritage has been established regarding the monuments and material culture of this period in the region, a variety of topics - particularly from an archaeological perspective are still only partially processed or entirely unexamined. Archaeological excavations are ongoing at certain sites (Gonio-Apsaros, Petra-Tsikhisdziri), and the vast majority of the archaeological material discovered there has been studied primarily using traditional archaeological methodologies (the topo-chronological approach and macroscopic analysis). The same can be said for Colchian amphorae of the Early Byzantine period. For the first time, based on archaeometric, chemical, and petrographic research, this paper provides a comprehensive study of the Colchian amphorae discovered on the territory of the Gonio-Apsaros fortress.

Keywords: Byzantine Empire, Gonio-Apsaros fortress, Colchian amphorae, archaeology, archaeometry.

Researchers. first became interested in the history of the Gonio-Apsaros fortress in the 19th century. Particularly noteworthy is Frédéric Dubois de Montpéreux, who traveled to the Crimea and the countries of the South Caucasus between 1831 and 1834. He published the research results of his expedition-an album with maps, plans, and sketches-in six volumes (1839–1843). He paid special attention to ancient ruins, leaving behind unique descriptions and illustrated material of various archaeological sites. Dubois de Montpéreux was the first to identify ancient Apsaros with the Gonio fortress (Dubois de Montpéreux F., 1839).

Based on archival materials preserved in the archives of St. Petersburg, it is revealed that the history of the fortress and its surroundings also attracted the attention of Heinrich Schliemann, the legendary discoverer of Troy. In 1882, H. Schliemann, who was deeply interested in ancient Greek myths, particularly the myth of the Argonauts, requested permission from the Archaeological Commission of the Russian Empire to conduct archaeological fieldwork around Batumi. He intended to locate the legendary tomb of Medea's brother, Apsyrtus, whose burial place was identified as Apsaros by Procopius of Caesarea. The Archaeological Commission denied the permission; consequently, H. Schliemann's wish was never realized.

Apsaros also drew the attention of the famous Byzantinist Fyodor Uspensky, who dedicated a specific article to the fortress entitled "An Ancient Fortress at the Mouth of the Chorokhi River" (Uspensky Ф. И., 1917). Although the Russian Imperial Court granted the scholar permission to conduct archaeological excavations, due to certain reasons, no archaeological work was carried out in Apsaros at that time.

Later, at the beginning of the 20th century, the prominent scholar Niko Marr obtained a so-called "Open Ticket" (Otkrytity List) to conduct archaeological work on the territory of the fortress, but he was also unable to carry out the research (Breeze D., Karasiewicz-Szczypiorski R., Mamuladze Sh., 2024) (Kakhidze A., Mamuladze Sh., 2016) (Kakhidze A., Mamuladze Sh., 2024).

Conducting the first field-reconnaissance work on the territory of the fortress became possible by the 1906s, following the opening of the Niko Berdzenishvili Research Institute of the Georgian National Academy of Sciences in Batumi (Grdzeliashvili I., Khakhutaishvili D., 1964). However, its intensive study began in 1995 and continues to this day, marked by the establishment of the Gonio-Apsaros Museum-Reserve and the Gonio-Apsaros Permanent Archaeological Expedition. Recently, the Georgian-Polish International Archaeological Expedition has been working productively on the fortress territory. As a result of systematic excavations, rich and multilayered material from various eras has been recovered, including the Dune (8th-7th centuries BC), Roman (1st-3rd centuries AD), Byzantine (6th-7th centuries AD), and Ottoman (16th-19th centuries AD) periods. Remnants of buildings of various purposes have been revealed, including those from the Byzantine period (Kakhidze A., Mamuladze Sh., 2016) (Kakhidze A., Mamuladze Sh., 2024) (Mamuladze Sh., Kakhidze A., Kakshidze e., 2007).

Archaeological excavations have revealed a fairly substantial Byzantine layer and noteworthy material across almost the entire territory of the fortress (Mamuladze Sh., Kakhidze E., Khalvashi M., 2012) (Kakhidze A., Mamuladze Sh., 2016) (Mamuladze Sh., Kakhidze E., Khalvashi M., 2012) (Kakhidze A., Mamuladze Sh., 2024).

The Early Byzantine material discovered in Apsaros through archaeological excavations has already entered scientific circulation. Individual articles and monographs exist regarding these finds, so we will not dwell on them extensively. We will only note that the transit vessels the amphorae discovered here were specifically studied by M. Khalvashi. Along with Roman-era amphorae, the author's monograph, "Ceramic Containers from Gonio-Apsaros," provides a detailed discussion of the early medieval amphorae discovered on the territory of the fortress between 1995 and 1999, identifying seven main types among the Gonio-Apsaros finds (Khalvashi M., 2002).

Research Methods. Along with traditional archaeological approaches topochronological and macroscopic fabric analyses the results of archaeometric research were utilized to address the research problem.

A macroscopic analysis of the Early Byzantine Colchian amphorae preserved in the collections of the Gonio-Apsaros Museum-Reserve was conducted. Based on the study of the amphora fragments, morphological and macroscopic fabric structural groups were identified.

In the second stage of the research, an archaeometric analysis was conducted. The study utilized archaeological material recovered by the Gonio-Apsaros Georgian-Polish International Expedition between 2018 and 2020; specifically, fragments of various amphora types, including Colchian amphorae, were selected for analysis. These samples underwent comprehensive chemical and petrographic testing, within the framework of which we studied three main components in detail: the clay matrix, inclusions, and pores. Furthermore, the general composition of the fabric and the firing temperature regime were determined, and the types and quantities of inclusions and rocks were identified and evaluated.

In the present paper, thin sections were described using a standard methodology, which is primarily based on the approach outlined by P. Quinn in his textbook: the separate description of the three aforementioned components (clay or matrix, inclusions, and pores) (Quinn P.S., 2022). The clay is described in both plane-polarized light (PPL) and cross-polarized light (XPL). In addition to color, the homogeneity or heterogeneity of the material, the orientation of clay minerals, and, to the extent possible, the firing quality are also described.

Discussion. Early Byzantine Colchian amphorae are waisted, brown-fabric ceramic products. In addition to Gonio-Apsaros, this type of ceramic container has also been discovered at contemporary sites in the Northern and Western Black Sea regions. Based on clay analysis, it is believed that they were manufactured

locally in imitation of Colchian ones (Khalvashi M., 2002). This type is quite numerous among the finds of recent years (Fig. 1).



Fig. 1. Types of Colchian amphorae: a -Ch1B, b - Ch1C, c --Ch1D

Early Byzantine brown-fabric amphorae, known as Ch1D amphorae (also classified as Kuzmanov IX, Zeest 103, Tyritake-type, and East Pontic amphorae (EP II–III)), appear around the middle of the 4th century AD, and their production continued until the 7th century. They were manufactured using a fabric that was partially similar to that of the analogously shaped Ch1C amphorae produced in the 1st-3rd centuries AD (typically brown clay containing pyroxene inclusions, as well as other small white, gray, and occasionally red inclusions

[Fabric 2 according to Vnukov]). However, the Ch1D fabric was coarser, containing less pyroxene and more quartz. Ch1D amphorae are smaller in size than Ch1C2. It has been suggested that these amphorae appeared in Sebastopolis around the second half of the 4th century AD, and their production continued into the 5th century. Some of the amphorae discovered in Abkhazia may have been manufactured in the Sebastopolis area; however, based on the fabric analysis conducted by Vnukov, we can assume that similar vessels must have been produced in other parts of Colchis as well, as well as outside this region, for instance, in Heraclea Pontica (Vnukov S., 2010) (Erol A., Tamer D., 2020).

It is suggested that Early Byzantine Colchian amphorae, like their Early Roman predecessors, were used for transporting wine (Vnukov S., 2010) (Inaišvili N., Khalvashi M., 2011). However, olive oil is also thought to have been an alternative cargo.

According to Kassab Tezgör, Late Colchian amphorae were manufactured in both the northern and northwestern parts of Colchis. Moreover, it is possible that production continued in Trapezus, where Roman Colchian amphorae were made, and was likely also carried out in the Chorokhi River basin (ancient Acampsis). Regarding the contents of Ch1D amphorae, it should be noted that the inner surface of their walls was frequently coated with a dark substance, presumably petroleum; for instance, a completely intact Ch1D amphora filled with such petroleum was discovered in Tyritake (Kassab Tezgor D., 2020) (Opait A., 2015).

Colchian amphorae of the Ch1D variant were classified as "Pseudo-Colchian" by Kassab Tezgör and Touma in 2001. With their golden and red inclusions, they resemble Simolean fabric. At the same time, their morphology and clay color resemble Early Roman Colchian amphorae (Kassab Tezgor., Touma M., 2001).

The distribution area of Ch1D is the Black Sea region (Inaišvili N., Khalvashi M., 2013). Outside of Colchis, they have been discovered in Romania, Bulgaria, and the Northern Black Sea region (the Bosphoran Kingdom). Colchian Ch1D2 amphorae, presumably manufactured in the Abkhazia region, have been found in Tyritake (Smokotina A., 2016) and Panticapaeum (Fedoseev N.F., Domizaiski K., Opait A., Kulikov A.V., 2010). A few fragments of Ch1D are held in the collections of the Samsun and Antakya museums, though they were originally discovered in Syria during excavations of the Ibn Hani cistern. It is suggested that the samples found in Syria may have been produced in a workshop in Seleucia Pieria (Kassab Tezgor D., *Corpus des amphores romaines produites dans les centres de mer Noire: collections des musées de la côte turque de la mer Noire* (Eregli, Amasra, Sinop, Samsun, Giresun, Ordu, Trabzon et Amasya), 2020) (Kassab Tezgor., Touma M., 2001). Amphorae of a similar shape recovered from the sea and preserved in the Samsun Museum were published by D. Kassab Tezgör and M. Akkaya (Kassab tezgor D., Akkaya M., 2000). The pseudo-Colchian amphorae of the Samsun Museum were divided into five types: A, B, C, D, and E. The first two are represented by smaller forms, while the remaining three types consist of large transport vessels. All of them feature a triangular or rounded rim, a flared or conical neck, flat handles, an elongated body with a clearly distinct waist, and a pointed base. However, the authors note it remains unclear whether these vessels originated in Colchis. In their view, these amphorae could also have been produced in Sinope or Heraclea Pontica (Kassab tezgor D., Akkaya M., 2000).

The most detailed description of the typological variants of Byzantine Colchian amphorae was presented by Opait, who divides them into East Pontic II and III amphorae (EP II and III) (Opait A., 2015).

EP II-A variant amphorae, classified as Kassab Tezgör and Akkaya types A and B, are characterized by a distinct "waist" in the middle of the body, a sharp conical base, and potential surface features like grooves or longitudinal smoothing traces (Kassab tezgor D., Akkaya M., 2000). These vessels measure between 59-72 cm in height, with a maximum body diameter of 18.7-19.8 cm (Opait A., 2015).

The lower part of the EP II-B variant amphorae (Kassab Tezgör and Akkaya types C–E (Kassab tezgor D., Akkaya M., 2000) is thick and triangular, while the base has the shape of a small, cylindrical toe or knob. The

handles are flattened and rectangular in shape, and they are attached to the neck with less care than in subtype EP II-A. These amphorae are also larger than the previous variant, with their height ranging from 78 to 90 cm and their maximum body diameter varying between 22 and 32 cm (Opait A., 2015).

The EP III subtype amphorae (known in Russian publications as Antonova 1/Romanchuk, Sazanov, and Sedikova 1) were discovered in late 6th and early 7th-century cultural layers in Chersonesus and are divided into three variants (Opait A., 2015).

EP III-A features a ribbed rim, a narrow, cylindrical neck, and an elongated body with a conical base. The handles are flattened and relatively rectangular, similar to the EP II variant. They are always carefully attached to the neck and shoulders. Variant III-A is significantly smaller than its predecessor, with its height ranging between 57–58 cm, while its maximum body diameter does not exceed 19 cm (Opait A., 2015).

EP III-B amphorae feature a rim that curves inward, while the neck is sometimes slightly wider at its lower section. The handles fall almost perpendicularly onto the shoulders, and the conical base ends in a small cylindrical toe. This variant is slightly larger than its EP III-A predecessor, with its height ranging from 68.5 to 74 cm, and its maximum body width varying from 20 to 20.6 cm (Opait A., 2015).

EP III-C variant features an enlarged neck, a rim with a triangular cross-section, a small cylindrical toe, and slanted, carelessly made handles (Opait A., 2015).

The Late Colchian amphorae discovered in Gonio between 2018 and 2020 are mostly represented by rims, necks, and handles. Consequently, it is impossible to provide the exact dimensions of these amphorae. Nevertheless, it was frequently possible to measure the rim diameter, which ranged from 5.7 to 8 centimeters.

The Ch1D amphorae discovered by the Gonio-Apsaros Joint Georgian-Polish International Expedition between 2018 and 2020 were represented by three distinct rim types and manufactured using at least three different fabrics:

Macroscopic Fabric Group B1 features a color palette of brown, light brown-pinkish, and orange, containing variable amounts of pyroxene, quartz, and grayish-reddish fragments. Specimens within this group include both ribbed rims and roll-rims, as described in the archaeological classification.

Macroscopic Fabric Group B2 is characterized by a reddish-brown fabric containing small-to-medium-sized white inclusions and rare rock fragments. Within this fabric group, specimens were confirmed exclusively with roll-rims.

Macroscopic Fabric Group B3 consists of a coarse orange fabric featuring abundant white inclusions, pyroxene, and other unidentified types of inclusions (2 fragments).

Amphorae manufactured from Macroscopic Fabric B1 are the only ones that match the composition of Colchian amphora fabric published by Opait (Opait A., 2015). B1 shows the greatest similarity to the paste used to manufacture variants EP III A and B, which are dated to the late 6th and early 7th centuries AD in Chersonesus. The identification of Ch1D amphorae made with Macroscopic Fabric Group B1 as the EP III subtype is further supported by two arguments: 1. the presence of ribs and the alignment between the chronological ranges of our amphorae (6th-7th centuries), and 2. their classification as EP III (late 6th and early 7th centuries), which makes this identification the most probable (Opait A., 2015).

The absence of Macroscopic Fabric Groups B2 and B3 in Opait's classification should likely be explained by the actual diversity of the fabric (and possibly a multiplicity of morphological variants) and, consequently, an even greater number of production centers.

Chemical and petrographic analyses were conducted on the Colchian amphorae recovered between 2018 and 2020. Based on the results, two fabrics were identified: Fabric 6 and Fabric 7.

Fabric 6 is characterized by a bimodal grain-size distribution, moderate sorting, and inclusions ranging from very angular to sub-rounded in shape. The inclusions consist of iron-rich granules, feldspar, quartz, clinopyroxene, volcanic rock fragments with feldspar and pyroxene phenocrysts, chert, sandstone/quartzite, and occasionally serpentinite and epidote-group minerals (Fig. 2).

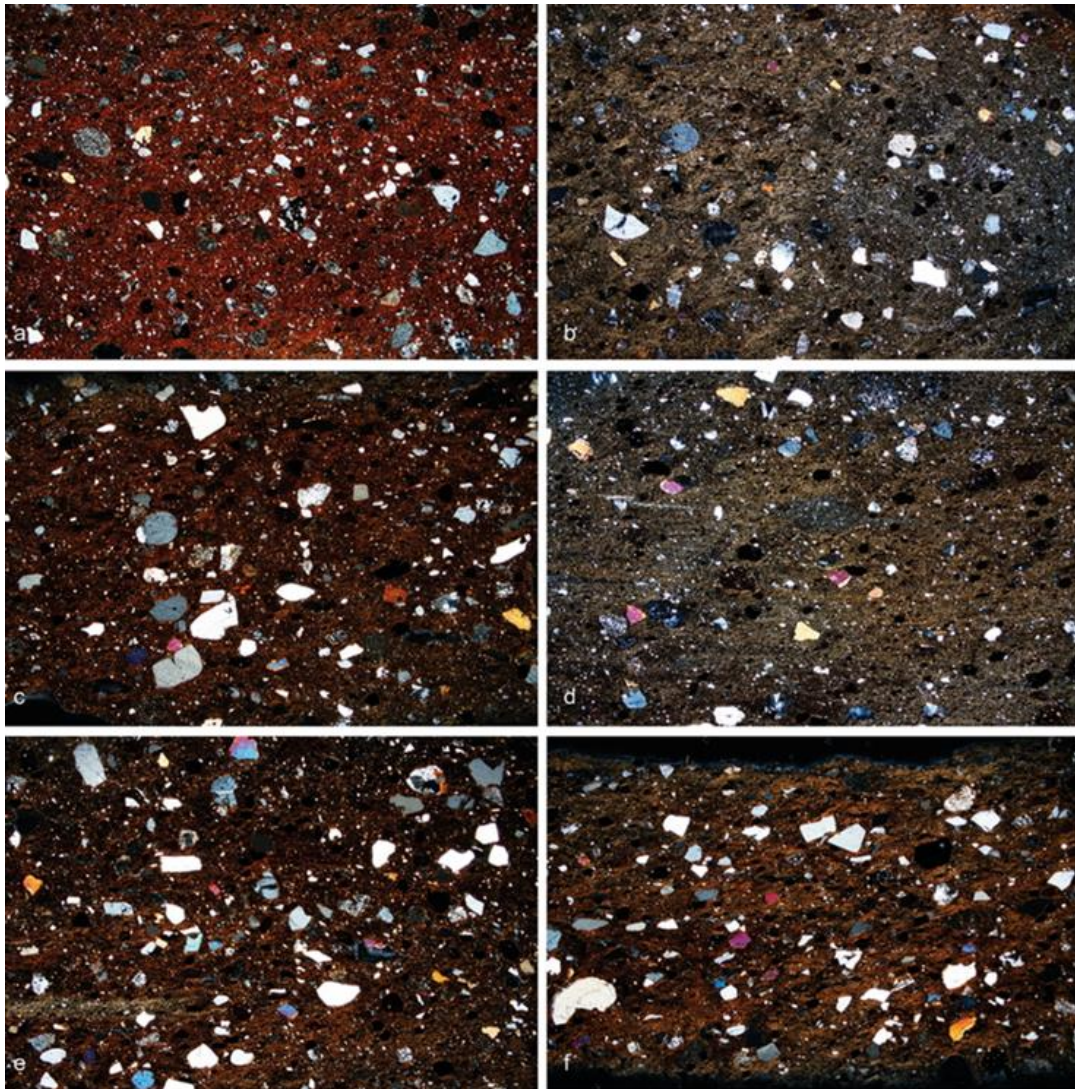


Fig. 2. Photomicrograph of Fabric 6 (XPL): a) 22/101, b) 22/123, c) 22/124, d) 22/125, e) 22/126, and f) 22/128; field of view 9.25 mm.

The inclusions in Fabric 7 exhibit a unimodal distribution. The inclusions are characterized by high density, angular-to-rounded shapes, and moderate sorting. The fabric consists of quartz, feldspar, and volcanic and plutonic rock fragments of medium-to-high acidity, as well as clinopyroxene, serpentinite, and, in exceptional cases, sandstone and mica (Fig. 3). All specimens represent the Colchian Chr1D Type VII of M. Khalvashi's classification and correspond to Macroscopic Fabric Group B2.

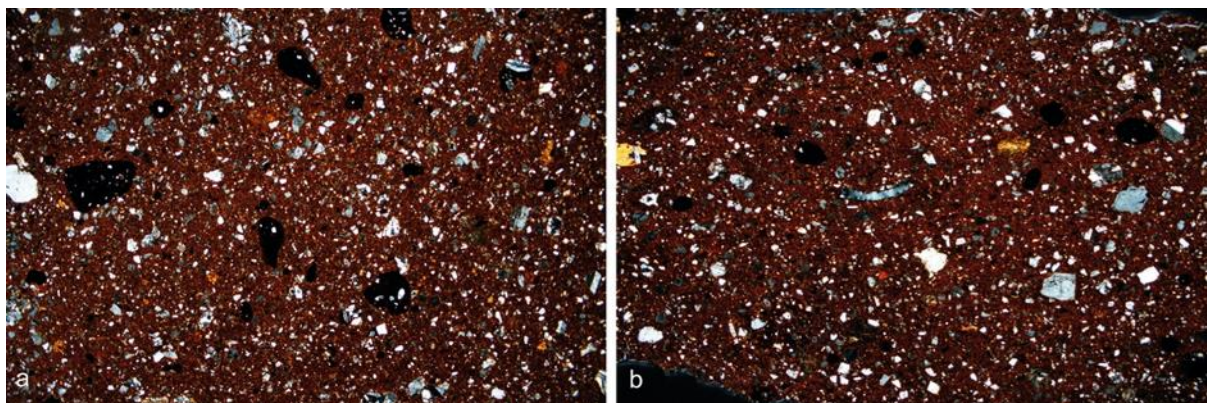


Fig. 3. Photomicrograph of Fabric 7 (XPL): a) 22/122 and b) 22/127; field of view 9.25 mm.

Both Fabric 7 and Fabric 6 correspond to the local geology of Western Georgia, particularly the Trabzon volcano-plutonic belt and its associated sedimentary basins. The composition of Fabric 6 indicates an origin from the South Colchian/Adjara volcanic complexes, which consist of basaltic-andesitic suites. Similar mineralogical features are observed in the Gm-3 petrographic fabric group within the petrographic network described by A. Rogava (thin sections of Colchian amphorae from Gonio-Apsaros), where volcanic rocks containing clinopyroxene and feldspar dominate alongside serpentinite (Rogava A., 2001).

Fabric 7, compared to Fabric 6, has a higher felsic component and relatively fewer mafic minerals. It appears to be similar to the petrographic fabric group Pm-5 described by A. Rogava (Rogava A., 2001).

As the researcher notes, the unusually high frequency of inclusions distinguishes it from typical Colchian amphora fabric and differs significantly from local sand raw materials in terms of mineralogy. However, its composition still indicates an origin from volcano-plutonic reliefs, which corresponds to the Adjara-Trabzon belt (Rogava A., 2001).

Conclusion. Thus, the paste identified in the Colchian amphora samples petrographically corresponds to the local geology of Western Georgia, particularly the Adjara-Trabzon volcanic belt. Significantly, one of the subtypes of Type III amphorae in M. Khalvashi's classification was also manufactured using a similar fabric, which indicates overlapping production traditions and shared clay procurement zones within the Colchian region. The differences between the fabrics may reflect multiple clay procurement zones within the same geological province.

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