

GRAECO-ITALIC AMPHORAE IN THE REGION OF OSTIA: ARCHAEOLOGY AND ARCHAEOOMETRY.

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Abstract: Recent excavations carried out by the Soprintendenza archeologica di Ostia in the Ager Portuensis near Ostia brought to light a number of republican sites which are thought to be connected to the production and commercialization of salt. This region has played an important role in Rome's history, because of the presence of the salt marshes and its strategic position on the mouth of the Tiber. The excavated contexts contain graeco-italic wine amphorae of types 5, 5-6 and 6 of van der Mersch's classification associated with black-slip ware and local common wares. The circulation of wine and amphorae in Northern Latium in general has not been studied yet, and these excavations provide the opportunity for an assessment of the situation in the republican period (www.immensaeaquora.org). The archaeometric study comprises petrographical and chemical analyses (X-ray Fluorescence WDS) chosen among amphorae from various sites. The provenance determination relies on existing databases of kiln sites of Roman Amphorae (Università La Sapienza, Facoltà di Lettere, Roma, Project Immensa Aequora; Laboratoire de céramologie de Lyon; Dpt of geosciences of the University of Fribourg).

Keywords: Graeco-Italic amphorae, ceramic data base, Ostia

THE CONTEXT

Recent excavations carried out by the Soprintendenza Archeologica of Ostia in the Ager Portuensis, near Ostia, brought to light a number of Republican sites which are thought to be connected to the production and commercialization of salt (Morelli *et al.* 2004). Indeed, because of the presence of salt marshes and its strategic position at the mouth of the River Tiber, this region has played an important role in Rome's history.

Thanks to a recent collaboration between the University La Sapienza of Rome and the Soprintendenza Archeologica of Ostia, it has been possible to undertake research aimed at expanding on a few themes related to the economy and pottery production in the Ostian territory in the Republican age (IV – I century B.C.) (Olcese, *Suburbium II*). Actually, this is a not very well known period in the area, and also in other ones of Central Italy as for settlement modalities, exploitation of agricultural resources, establishment of craft activities (Morel 1997, Zevi 2002). Even the information about the material culture of this period on the pottery production areas is little, especially if compared with the information available for the Imperial age (Pellegrino 1983 and 1984; Carbonara *et al.* 2003).

Therefore, the project has been under way since 2003 not only provides for the study of a few of the main ceramic categories documented in the area, and their associations and find contexts; but it also aims at contributing to the reconstruction of the area's economic and productive situation, connecting to archaeological and archaeometric researches already carried through in the Roman area (Olcese 2003).



Fig. 1 Ostia, Ager Portuensis

A further aspect of the research is then related to the enlargement of the data bank of the archaeometric analyses (chemical and mineralogical analyses) of the ceramics produced in Latium (as well as in southern Etruria and in Campania), within the FIRB project, funded by the Ministry for Research over the triennium 2005-2008 and coordinated by G. Olcese (www.immensaeaquora.org).

THE GRAECO-ITALIC AMPHORAE IN THE REGION OF OSTIA

The circulation of wine and amphorae in Northern Latium in general has not been studied yet, and these excavations provide the opportunity for an assessment of the situation in the Republican period (Empereur, Hesnard 1987; van der Mersch 2001; Olcese 2004).

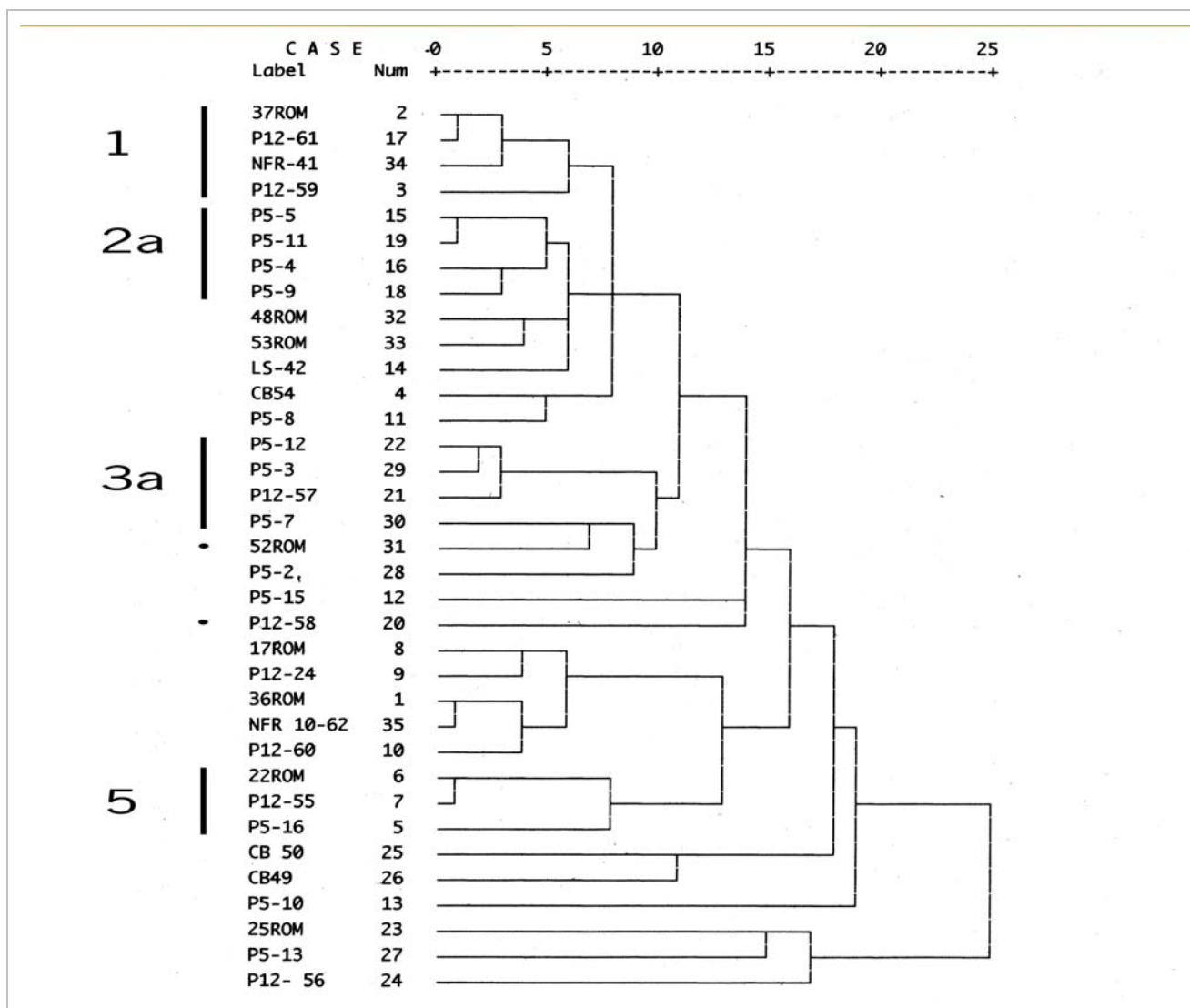


Fig. 2 Cluster of the chemical groups (Average Linkage, Euclidian distances, z-scores)

Van der Mersch has recently hypothesized the existence of a production parallel to the Magno-Graeco one (MGS) labelling it with the acronym RMR (amphores *romaines médio-republicaines*) (van der Mersch 1994 and 2001), to be also possibly located in Latium.

Different contexts of the *Ager Portuensis* have yielded Graeco - Italic amphorae, except for a few cases without any stamps, amphorae whose use is not always clear nor is their origin known. The excavated contexts (Fiumicino L23 P5, L23 P12, Nuova Fiera di Roma, Lunga Sosta, Casal Bernocchi) contain types 5, 5-6 and 6 of van der Mersch's classification associated with black-slip ware (of the Atelier des petites estampilles type, Morel 1969) and local common wares (Olcese 2003). In most cases, the kneading ('fabrics') of the raw materials are different from the ones of the Graeco-Italic amphorae usually traded, such as the ones produced in the Ischia and in the

Gulf of Naples areas and, more in general, from the fabrics of the Campanian amphorae (for these amphorae, Olcese 2004 and 2005/06).

These first data have therefore led to expand on the issue of the origin of the Graeco-Italic ones found in the Ostia area, also adopting laboratory methods.

METHODS, MATERIAL AND QUESTIONS

The archaeometric study comprises petrographical and chemical analyses (X-ray Fluorescence WDS) chosen among amphorae from various sites. Chemical analyses by X-ray Fluorescence Spectroscopy (WDS) and petrographical analyses by polarization microscopy included 34 amphorae samples from 5 sites in the Fiumicino – Ostia region.

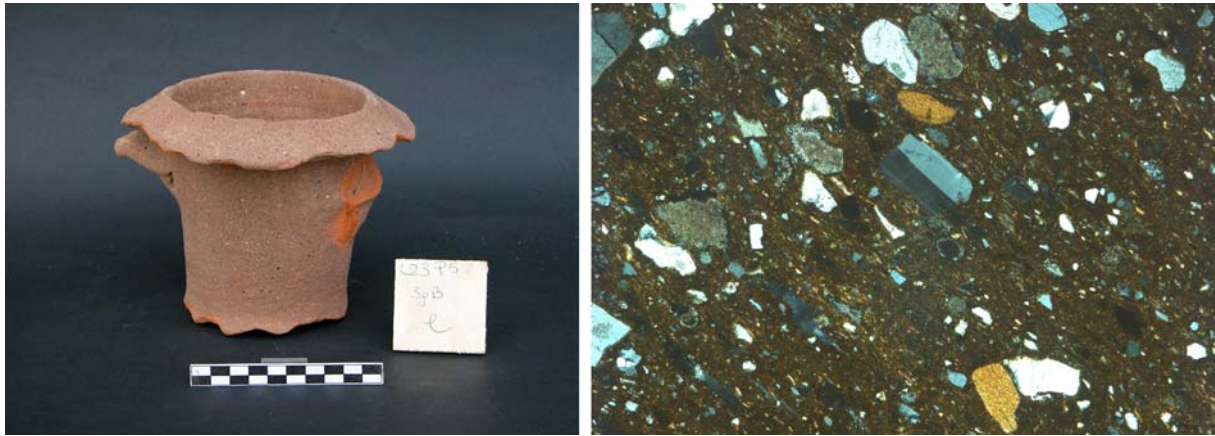


Fig. 3 (a) Graeco-Italic amphora van der Mersch type 5, (b) sample P5-4 (analytical group 2a)

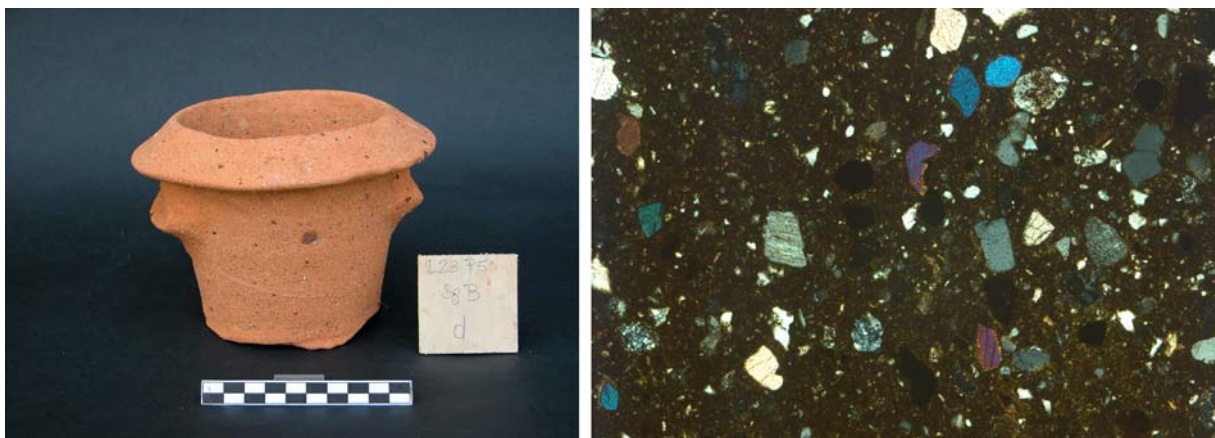


Fig. 4 (a) Graeco-Italic amphora van der Mersch type 5, 5/6 , (b) sample P5-3 (analytical group 3a)

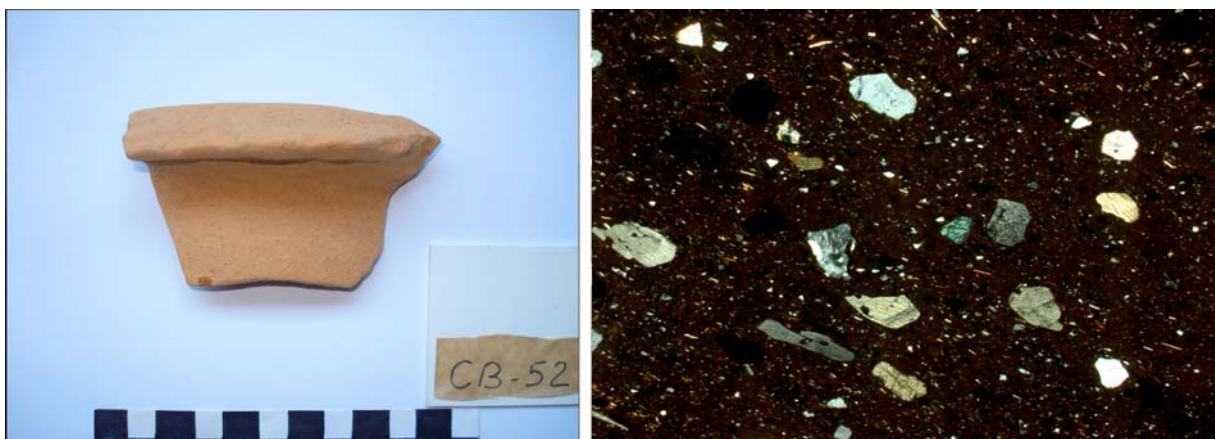


Fig. 5 (a) Graeco-Italic amphora van der Mersch type 5, 5/6, (b) sample 52ROM (attribution Minturno)

Analyses in glass tablets of 10 major (Al_2O_3 , CaO , Fe_2O_3 , K_2O , MgO , MnO , Na_2O , P_2O_5 , SiO_2 , TiO_2) and 12 trace elements (Ba, Cr, La, Ni, Pb, Rb, Sr, Th, V, Y, Zn, Zr) were carried out on a Philips PW1480/10 spectrometer at the laboratories of CNR-Istituto Geoscienze e Georisorse di Roma.

The provenance determination relies on existing databases of kiln sites in Central Southern Italy (University La Sapienza, Faculty of Humanities, FIRB Project) and analyses carried out by the Laboratoire de céramologie de Lyon; Dept of Geosciences of the University of Fribourg.



Fig. 6 (a) Graeco-Italic amphora type 4 (?), (b) sample 22ROM (analytical group 5)

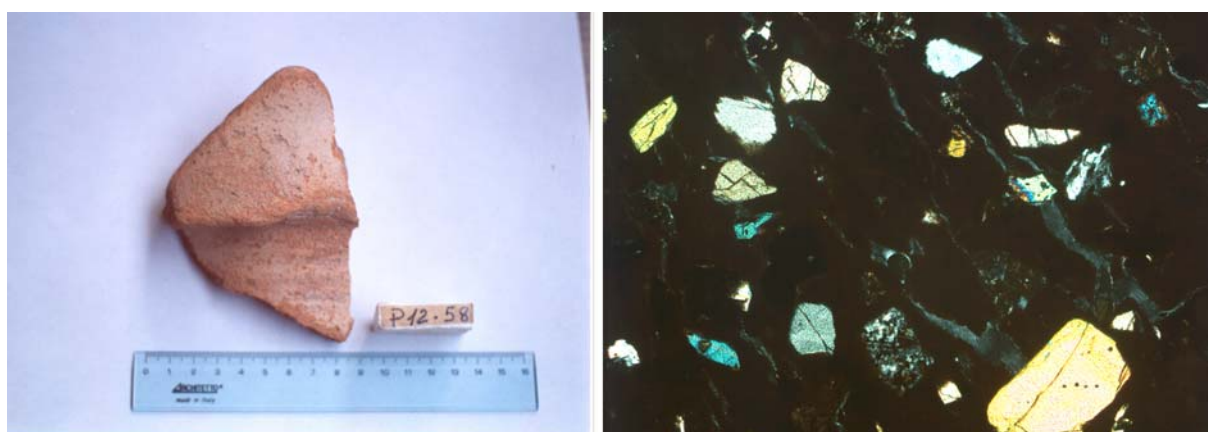


Fig. 7 (a) Dressel 1, (b) sample P12-58 (attribution Pompeii) (scale fig. 3-7 b: large side = 2.75mm)

The basic question is: *Where do the amphorae come from?* This question could easily be answered *if* all important amphora kiln sites were known and available as a reference, *or if* there existed reasonable arguments allowing a differentiation of provenance regions without reference groups. However, at present neither is given. Within the project, under way, a census of all the ceramic production sites, and a review and characterization of the materials stored in warehouses and museums are being carried out. The main question is, therefore, *how* to get some answers concerning provenance.

The FIRB project proposes several strategies, one of which is presented here at the example of the Graeco-Italic amphorae from 5 sites around Ostia (**Fig. 1**). The idea is to break down the general provenance question into sub-questions addressing specific hypotheses based on macroscopical observations and archaeological context.

Macroscopically, the amphorae are subdivided into more than 6 fabric groups. The analyses concentrate mainly on

three of them (A1, A2, B), each one is present on several of the studied sites, which allowed to draw hypotheses concerning their origin. The only stamped piece, discovered at the studied sites, shows characteristics most similar to the main fabric group, but with slightly coarser inclusions.

Questions regarding these groups were: 1) Are they homogeneous? 2) Do they belong to a known amphora production? Possibilities are Mondragone (N-Campania), Minturno, Astura (Latium), or Pompeii for different fabric groups (for reference groups, *Thierrin Michael 1992, Thierrin Michael 1996, Olcese et al. 1996*). 3) If not, are there properties arguing for a local or regional production? At present, no kiln sites are known for amphorae of that period in the region.

FIRST RESULTS

Chemically, the samples fall roughly into two categories. The first is characterized by low to medium calcium oxide content, between 5.8 and 9 weight%, the second by

higher calcium oxide content up to 16 weight% (the chemical data will be published in the final edition of the project). These categories are subdivided into several small entities with significant compositional differences, mainly in their iron and aluminium contents. The dendrogram (**Fig. 2**) shows this diversity as the amphorae are divided in small clusters. The fabrics, as seen under the microscope, reflect this heterogeneity.

The analyses also reveal that each macroscopically defined fabric group is, as a matter of fact, made up of several compositional groups. However, most samples belonging to fabric groups A1 and A2 form the largest entities in the low- to medium calcium oxide category, distinguished basically by their content in iron oxide (and related parameters). Their petrographical characteristics and differences are illustrated by **Figs. 3-4**. The formed hypotheses concerning the provenance could be confirmed only for two samples:

- One attribution to Minturno, illustrated in **Fig. 5**. Some other samples are also close to references from Minturno, but small discrepancies do not allow a safe attribution. The samples from fabric group B (**Fig. 6**) did not match either the Minturno production nor the one from Astura, but certainly come from another kiln site.

- One attribution to the region of Pompeii (**Fig. 7**). This amphora is of type Dressel 1. The other analysed samples of black sand fabric belong to unknown productions.

- Whereas five samples macroscopically and petrographically strongly resemble the production of Mondragone, their chemical compositions do not confirm these resemblances beyond doubt.

(Detailed descriptions of the groups are found in the **Appendix**.)

CONCLUSIONS

The analysed amphora material from consumer sites around Ostia proved to be extremely heterogeneous. *Answers to questions 1 and 2: Are they homogeneous? Do they belong to a known amphora production?*

Macroscopically defined fabric groups proved to consist several compositional entities. Isolated samples were attributed to Minturno and Pompeii; and several other cases are close to the productions of Minturno and Mondragone, but are not sufficiently well integrated into the reference groups. Therefore, the hypothesis of North-Campanian amphorae among the material from Ostia could not be fully confirmed. Most groups cannot be assigned to known production centres.

Such outcome confirms both that most of the production centres of Graeco-Italic amphorae (and probably of Dr. 1 as well) supplying the *Ager Portuensis* are unknown, and

that the research in Southern Etruria and Northern and interior Latium has to be intensified.

Question 3 (are there properties arguing for a local or regional production?) has yet to be further explored.

There are affinities between samples from group 2a and 3a and common wares from the Tiber valley around Rome (*Olcese 2003, with the contribution of Picon and Thierrin Michael*), but these do not rule out the possibility that they were made on the coast, relatively close to a volcanic complex for 3a, and further away for 2a.

ACKNOWLEDGEMENTS

Many thanks to the Soprintendenza Archeologica of Ostia and in particular to A. Gallina Zevi, C. Morelli and A. Pellegrino, responsible for the research in the Ostia area and the *Ager Portuensis*, to A. Rinaldi, FIRB Project, who looked after and made the work feasible. Drawings are by E. Serafini and A. Festuccia. Graphic of the poster is by G. Murro.

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APPENDIX

Analytical group 2a (Fig.3)

Most of the samples from macroscopically defined fabric group A1 are characterized by a scatter of sub-rounded volcanic inclusions among which there are sub-rounded non-volcanic grains. Non-volcanic inclusions and generally light inclusions predominate. There is no analogy among the known amphorae productions. Chemical composition (comparison among the analysed samples): the group is lowest in titanium oxide, iron oxide and magnesium oxide. Also low in aluminium, potassium and calcium oxides.

Analytical group 3a (Fig.4)

Most samples from macroscopically defined fabric group A2 are characterized by frequent sub-rounded volcanic inclusions, which dominate. There are more dark volcanic minerals than light grains, but most often some large sanidines are present. There are frequent inclusions of opaque minerals (volcanic). There is no analogy among the known amphorae productions. Chemical composition: relatively high in iron oxide (>8.4 weight%), low in aluminium, potassium and calcium content.

Attribution to Minturno (Fig.5)

It shows a scatter of rounded, well sorted volcanic mineral grains of very diverse nature and some non- volcanic grains (quartz and carbonate) in a fine matrix. There is a marked presence of opaque mineral inclusions. This isolated sample can be attributed to the production of Minturno, matching the references lower in calcium oxide. Chemical composition: Particularly high content of iron and titanium (11.53 and 1.13 weight%), and relatively low CaO and MgO values are the most characteristic.

Analytical group 5 (Fig.6)

Frequent carbonate inclusions and rounded volcanic grains in a carbonatic matrix characterize most of the samples from fabric group B. There is no analogy among the known amphorae productions. Chemical composition: high CaO, MgO and MnO values, low content of aluminium oxide.

Attribution to Pompeii region (Fig.7)

It shows almost exclusively volcanic inclusions of various kinds, including a large part of volcanic rock fragments in an opaque matrix with elongated pores. This corresponds to references from the region of Pompeii. Chemical composition: high in aluminium and potassium oxides (19.01 and 3.24 weight%), and shows medium iron and calcium oxide content.