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Amphorae and Coarse Ware Fabrics of Panormos: Evidences for Local Production and Export*

Introduction

Unlike in Motya and Solus, the chrono-typological aspects and the archaeometric features of Panormos' pottery repertoire have still not been studied in detail. Furthermore, to date, we have no information about the localisation of an industrial quarter during the Punic and Roman phase of the site.¹ However, recent archaeological soundings in the area of the *Kalsa*, South to the ancient port, have yielded the rests of kilns for ceramic and glass production during the medieval period.²

Within the framework of the FACEM project,³ in order to conduct an in-depth study of local amphora production, we decided to base our research on a relevant find group of presumable local fabrics found at Panormos itself, in the necropolis as well as in recently excavated settlement contexts.⁴ Furthermore, from the same archaeological deposits, we selected c. 15 coarse ware samples which served to confirm the feature identified for the local amphorae fabrics. Also essential in this regard was the comparison with the sample of an already published jug found in the medieval kiln area of S. Cecilia (Palermo) and of assured local origin.⁵

* Special thanks are due to S. Gallagher, University of Warwick, for his critical input during the correction phase of the English manuscript. Furthermore, I thank R. Lampl, University of Vienna, for the photographic documentation of the samples, the realisation of Figs. 1-2, the digitalisation of all amphorae drawings and the composition of Figs. 3-5.

¹ The continuity of occupation of Panormos up to the modern period, which has caused the frequent demolition and destruction of archaeological stratigraphies, generally makes difficult any kind of archaeological intervention, see Belvedere et al. 2006, 567 with further references.

² Spatafora and Canzonieri 2012 with earlier references.

³ Already within the scope of the first edition of FACEM in 2011, the study of eight samples from Panormos itself undertaken by V. Gassner and M. Trapichler has allowed to identify four fabrics, referring to transport amphorae (PAN-A-1), coarse wares (PAN-C-1 and PAN-C-2) and ceramic building materials (PAN-CBM-1).

⁴ I am extremely grateful to S. Vassallo, C. Aleo Nero and M. Chiovaro (all Soprintendenza BB.CC.AA. di Palermo) for allowing me to include within the present research about 45 samples taken from amphorae yielded by recent rescue excavations (2011-2012) in the following areas: Pz. Bologni, Crs. Calatafimi (civ. 133-137, Pal. Orlando e Pz. Indipendenza, Pal. d'Orléans). For a preliminary report on the excavations see Aleo Nero (forthcoming) and Aleo Nero and Chiovaro (forthcoming). I thank T. Arena (Castellammare del Golfo) for her essential help in selecting, sampling and drawing the materials. The samples from Panormos have been assigned the FACEM site identification number 'M 106', 'M 107', 'M 108'.

⁵ FACEM - <http://facem.at/pan-c-1>.

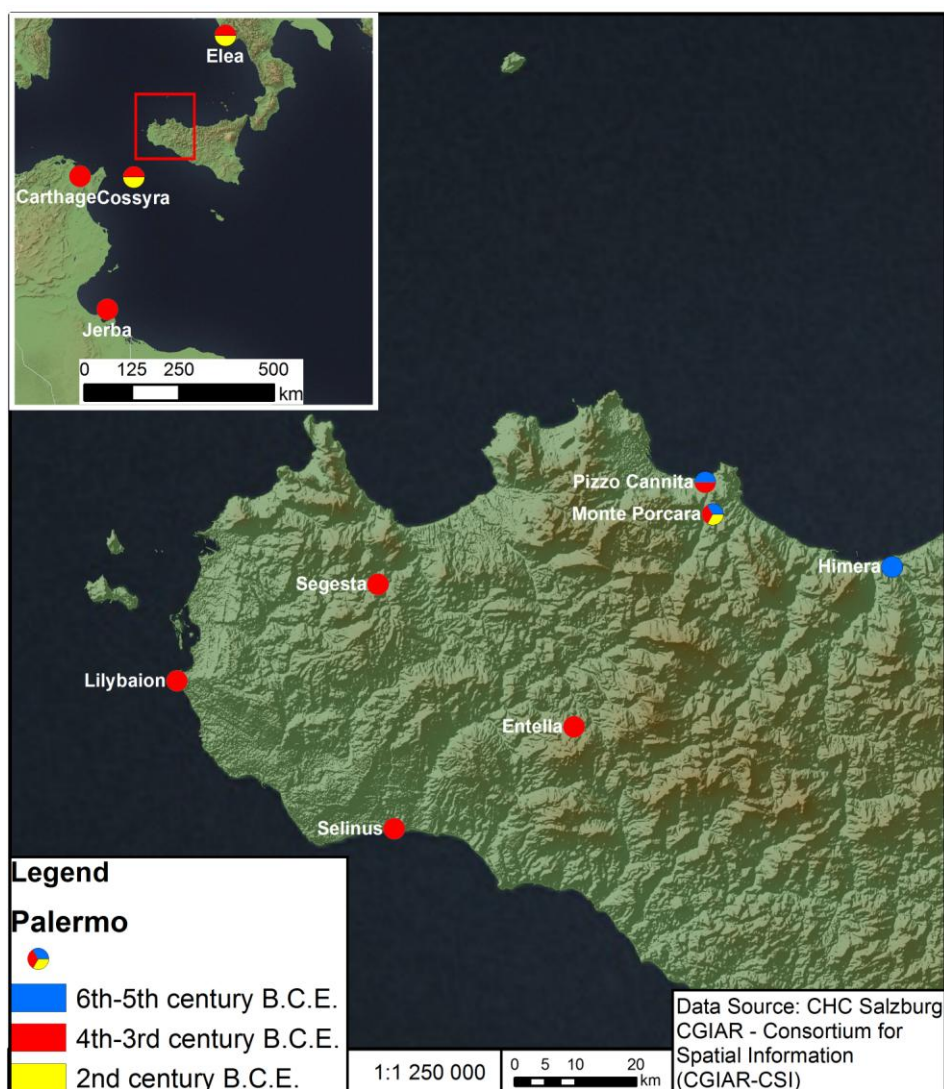


Fig. 1. The sampling sites yielding amphorae from Panormos.

This large assemblage from Panormos was completed with about 85 amphora samples found outside of the production site, at Carthage,⁶ Jerba,⁷ Cossyra (Pantelleria),⁸ Himera,⁹ Pizzo

⁶ I am indebted to B. Maraoui Telmini (University of Tunis) for allowing me to include in the present research one sample (M 92/92, see below) yielded by the Belgium-Tunisian excavations at the Bir Messaouda site at Carthage.

⁷ I am indebted to S. Ben Tahar (Institut National du Patrimoine, Jerba) for allowing me to include within the present research one sample of a Greek amphora (M 149/53, see Bechtold (forthcoming b), cat. 37) from Ghizène, located on the northern coast of the island, in addition to two still unpublished Punic amphorae (M 149/70.71). The samples from Jerba have been assigned the FACEM site identification number 'M 149'.

⁸ I thank M. Almonte (Direzione Generale delle Antichità a Roma), responsible for the Cossyra survey, Th. Schäfer (Universität Tübingen) and M. Osanna (then Scuola di Specializzazione di Matera), co-directors of the excavations on the acropolis of S. Teresa (2000-2011 campaigns), for the liberty to study selected materials yielded by their research. Furthermore, I owe my thanks to the authorities of the Soprintendenza BB.CC.AA. di Trapani for granting sampling permission. All the amphorae samples from Cossyra have been assigned the FACEM site identification number 'M 119'.

⁹ I am very indebted to S. Vassallo (Soprintendenza BB.CC.AA. di Palermo) for the permission to study and sample

Cannita,¹⁰ Monte Porcara,¹¹ Entella,¹² Selinus,¹³ Segesta,¹⁴ Lilybaion¹⁵ and Elea¹⁶ in Lucania, all studied by the use of binocular microscopy and digital photos of freshly broken surfaces (at x8, x16, and x25 magnification). Finally, about 25 items were selected out of the two assemblages for archaeometric analysis.¹⁷ Of special interest was the question of whether the archaeological methods implemented within the scope of the FACEM project would make it possible to clearly distinguish between the local productions of Panormos and the ones of close Solus, even if both made use of the same raw materials and, by consequence, seem to be indistinguishable from one other from an archaeometric point of view (see below, ch. 1).

In ch. 1 we re-assume the few previous archaeometric studies conducted in this area, while ch. 2

the entire assemblage of Punic amphorae yielded by the necropolis of Himera which will be published in Bechtold and Vassallo (in preparation). The samples from Himera have been assigned the FACEM identification number 'M 179/'.

¹⁰ I am indebted to T. Arena (Castellammare del Golfo) for the permission to consider for the present research 26 samples of Punic amphorae found in the Pizzo Cannita survey and already published in Arena's 'tesi di laurea' (Università di Palermo, 2008-2009). For an overview of this assemblage from Pizzo Cannita, see Arena 2015. The samples from Pizzo Cannita have been assigned the FACEM identification number 'M 189/'. I am also indebted to F. Spatafora, director of the Museo Archeologico "Antonino Salinas", for generous sampling permission.

¹¹ I thank S. Muratore (Palermo) for the possibility to sample and study eleven Punic amphorae found within the framework of his survey undertaken at Monte Porcara, object of his 'tesi di laurea' (Università degli Studi di Palermo, 2008-2009). The entire assemblage is discussed in Muratore 2015. The samples from Monte Porcara have been assigned the FACEM identification number 'M 193/'.

¹² I thank M. Quartararo (Pisa) and A. Corretti (Scuola Normale Superiore di Pisa) for the permission to consider, within the framework of the present research, the samples of five amphorae from the excavations of the Scuola Normale Superiore di Pisa at Entella and already characterised by archaeometric analysis (Montana et al. 2015; Quartararo 2012). For an overview of the assemblage of the Punic amphorae from Entella, see Quartararo 2015a. The samples from Entella have been assigned the FACEM identification number 'M 187/'.

¹³ Excavations (2006-2012 campaigns) of the New York University, Institute of Fine Arts, under the direction of C. Marconi, to whom I am very indebted for permission to study the Hellenistic finds, see Bechtold (forthcoming a). I am also indebted to C. Greco, then director of the Parco Archeologico di Selinunte e Cave di Cusa 'Vincenzo Tusa', for generous sampling permission. The amphorae samples from Selinus have been assigned the FACEM site identification number 'M 154/'.

¹⁴ I am indebted to M. de Cesare (Università degli Studi di Palermo) and M. Quartararo (Pisa) for their generous permission to consider for the present research four samples referring to Punic amphorae from the Grotta Vanella dump. The whole assemblage of Grotta Vanella is currently being prepared for publication by M. de Cesare. For an overview of the Punic amphorae from Grotta Vanella, see Quartararo 2015b. More samples refer to published and unpublished Punic amphorae yielded by the excavations of the Soprintendenza BB.CC.AA. di Trapani at the Northern Gate and collected in the Segesta survey undertaken by the University of Siena (for both see previously Bechtold 2008). The samples from Segesta have been assigned the FACEM identification number 'M 165/'.

¹⁵ I am indebted to M.L. Famà, director of the 'Museo archeologico regionale Lilibeo Marsala – Baglio Anselmi', for the authorisation to sample one amphora found in the Punic necropolis and already published in Bechtold 1999. It has been assigned the FACEM site identification number 'M 169/'.

¹⁶ I thank my colleague V. Gassner (Universität Wien) for allowing me to use for the present research a draft of her paper on the Punic amphorae from Elea to be published in Gassner (forthcoming).

¹⁷ G. Montana and L. Randazzo (both Università degli Studi di Palermo), in preparation. Laboratory methodologies applied in this study include thin-section petrography and chemical analyses (combination of Lithium Metaborate/Tetraborate fusion – ICP and ICP/MS).

provides an overview of the local amphora repertoire known from Panormos itself. Ch. 3 briefly discusses some indications for the feature of local coarse ware fabrics. Based on new archaeological data, ch. 4 focuses on the regional and extra-regional distribution of amphorae from Panormos from the late 6th to the early 2nd century B.C.E. The conclusive ch. 5 offers a discussion of the here presented results.

1. Archaeometric research and provenance of raw materials

Much like the archaeological study of Panormos' ceramic repertoire, the archaeometric research of this area is still in a very initial phase. In fact, the only analysis undertaken on indisputable local ceramic artefacts¹⁸ refer to four amphorae fragments (kiln wasters) reused in a fill of the medieval Zisa palace, a context of the second half of the 12th century C.E.¹⁹

According to the archaeometric study related to the analyses undertaken on these four samples, local fabrics show a temper with a packing which ranges between 10% and 35%. It consists in quartz, with a clear prevalence of very fine (0.05–0.1 mm) sized fractions and sporadic larger items (0.3–0.5 mm), and calcareous particles (foraminifera, bioclasts and fragments of carbonatic rocks) of various fractions, from very fine to large (0.05–2 mm), while feldspars appear to be very rare. The ground-mass is characterised by an isotropic texture with a relevant quantity of pores which probably derive from the complete decomposition of the calcareous foraminifera. The presence of deposits of *Argille di Ficarazzi*, the raw materials used by local potters, has been observed in several points of the Palermo plain, especially near the seaside, e. g. at the mouth of the river Oreto and along the coastal strip between the *Acqua dei Corsari* and *Ficarazzi*, at the mouth of the river Eleuterio.²⁰

¹⁸ In this regard, we have also to remember the recent research on 55 black glaze fragments from several western Sicilian sites (also from Panormos) published by Belvedere et al. 2006. The petrographic group II and the chemical group B have been referred to a regional workshop, probably to be localised in the area of Panormos and Solus, which made use of the *Argille di Ficarazzi* as raw material.

¹⁹ Alaimo et al. 1999.

²⁰ Alaimo et al. 1999, 49–50 with further references; Belvedere et al. 2006, 564.

2. Amphorae fabrics and morphological repertoire: evidences from Panormos itself

As a result of the microscopic analysis of about 135 samples, we can state that the bulk of studied materials (about 96%) refers to just one amphora fabric, PAN-A-1 (fig. 2,1, see below, Schmidt) already identified in 2011 (see above, note 3). This fabric appears to be documented from the 6th to at least the late 2nd century B.C.E. and stands for the characteristic amphora production of Punic Panormos. By contrast, the second, more micaceous fabric PAN-A-2 (fig. 2,2) is currently attested only during the short span of time between the second half of the 5th and the 4th century B.C.E. It might therefore be interpreted as the industrial issue of a single workshop, active for about three or four generations.

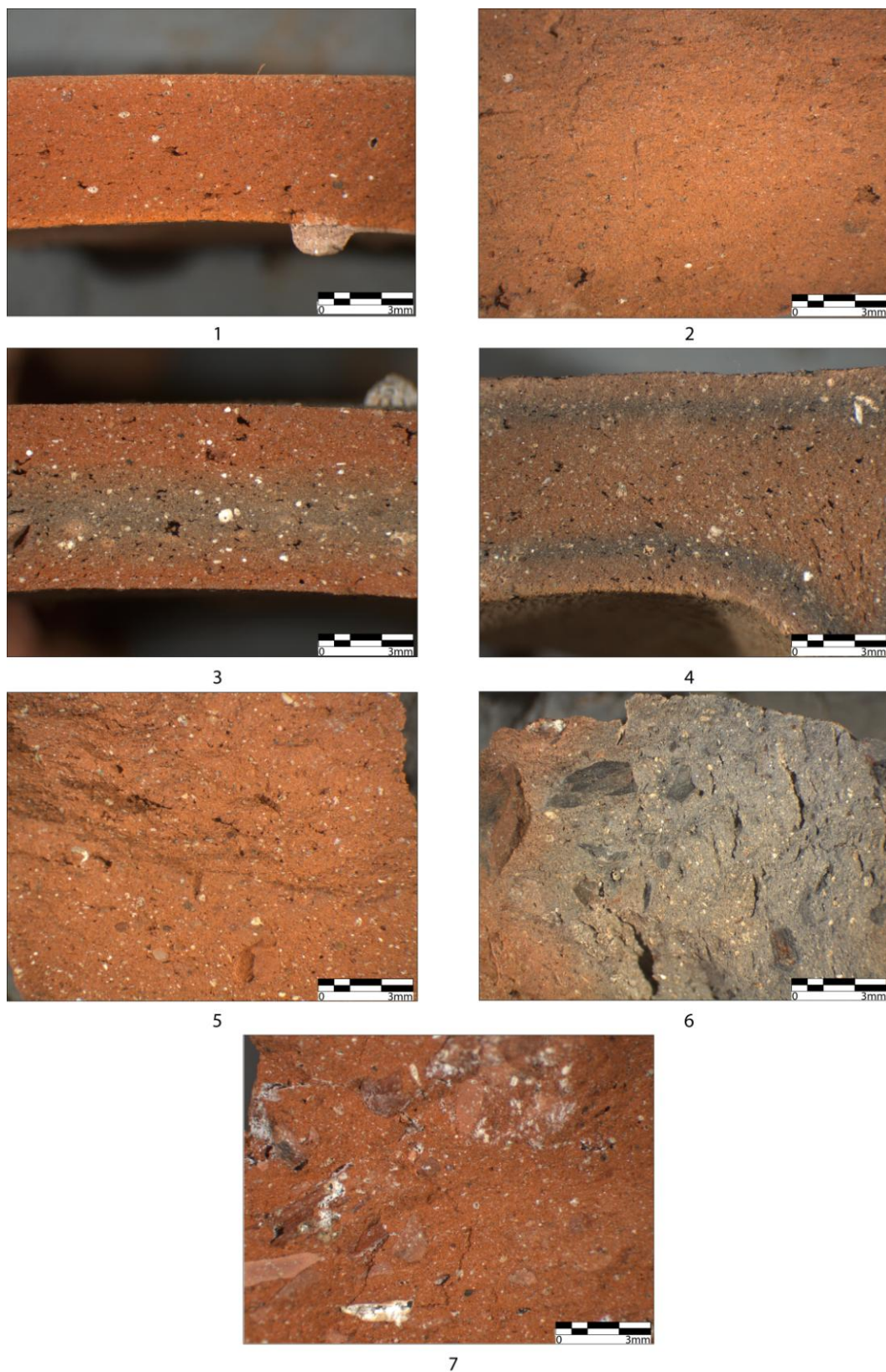


Fig. 2. **Fabrics from Panormos (at x8 magnification).** 1. PAN-A-1 (M 107/3). 2. PAN-A-2 (M 106/11). 3. PAN-C-1 (M 109/2). 4. PAN-C-2 (M 106/3). 5. PAN-C-3 (M 106/87). 6. PAN-OD-1 (M 106/83). 7. PAN-CBM-1 (M 108/3).

Regarding the difficulty of distinguishing between the local production of Panormos from the amphorae issue of close Solus by our archaeological methods (see also above, ch. 1), it is important to state that in the overwhelming number of cases the two fabric groups PAN and SOL show clearly different features: the three earliest Soluntinian fabrics SOL-A-1 to SOL-A-3 are visibly coarser, a feature which can generally be observed by the use of a simple magnifying glass. In certain cases, what might prove more difficult is the distinction of PAN-A-1 (if not extremely fine-grained) from SOL-A-4 and SOL-A-5, riddled with abundant calcium carbonate particles and pseudomorphoses. Admittedly, for this reason, some samples have been attributed only generally to the production area of Panormos and Solus. On the basis of the study of about 270 samples from both the production sites, we can finally state that in at least 80% of cases, amphorae from Panormos appear to be brick red and very hard fired, sometimes with a grey core, while among the amphorae issue of Solus brownish, light-red or orange fired fabrics clearly prevail.

From a morphological point of view, and according to A. Spanò Giammellaro,²¹ the most common amphora type attested in the earliest levels of the local necropolis of the late 7th century B.C.E. are of Ramon's T-13.2.2.1 (fig. 3,1) or Ramon's T-1.1.2.1 / Falsone 1a,²² characterised by ovoid, carinated bodies and short, vertical rims.²³ A variant of this type, Falsone's 1b,²⁴ shows no carination.²⁵ Roughly to the same period should be dated the slightly less carinated type Falsone 2 / Ramon T-2.1.1.2.²⁶ It must be stressed, however, that none of these shapes is found among the sample set analysed within the framework of the present project. More generally, from within the 6th century B.C.E. comes Falsone's type 2,²⁷ probably to be attributed to Ramon's T-1.4.2.1²⁸ (for the type see fig. 3,2).²⁹ Slightly later are probably two

²¹ Spanò Giammellaro 2000, 306-7, figs. 9-10.

²² Falsone 1998, 178, 314, cat. 15.

²³ Spanò Giammellaro 2000, 306-7, figs. 9-10, which corresponds to Falsone's type 1a, see Falsone 1998, 178, 314, cat. 15. A variant of this type shows no carination: Spanò Giammellaro 2000, 307, note 15, 319 from an early 6th century B.C.E. context; Falsone 1998, 314, 317, 319, R 10, type 1b.

²⁴ Falsone 1998, 314, 317, 319, R 10, type 1b.

²⁵ Spanò Giammellaro 2000, 307, note 15, 319 from an early 6th century B.C.E. context.

²⁶ Falsone 1998, 314, 317, 319, R 11. The attribution to Ramon's T-2.1.1.2 is chiefly based on the still very contained height of this item of only 63.5 cm.

²⁷ Falsone 1998, 314, 317, 319, R 11; see furthermore Lauro 2005, 740, 743, 750, fig. 3b of presumably local production, from a mid-3rd century B.C.E. deposit (in detail, see Bechtold 2012, 10).

²⁸ Lauro 2005, 740, 743, 750, fig. 3b of presumably local production, from a mid-3rd century B.C.E. deposit (in detail, see Bechtold 2012, 10).

items close to Ramon's T-1.4.2.2 (fig. 3,4).³⁰ Several items of Ramon's T-1.4.5.1 date to the 5th century B.C.E. (for the type see fig. 3,7)³¹ which develops, towards the early 4th century B.C.E., into Ramon's T-4.2.2.6 (for the type see fig. 3,9).³² A single rim of Ramon's T-2.2.1.2 also dates to the 4th century B.C.E. (for the type see fig. 3,8).³³ During the last decades of the 4th century B.C.E., this latter shape evolves to become Ramon-Greco's T-4.2.2.7 (for the type see fig. 3,10)³⁴ and, finally, to Ramon's T-7.1.2.1 (fig. 4,1)³⁵ and T-6.1.2.1 (fig. 4,2),³⁶ with an intermediate shape of Ramon T-6.1.2.1/7.1.2.1 (fig. 4,3).³⁷ These three latter types are very frequent in local contexts dating to the late 4th and first half of the 3rd century B.C.E.³⁸ The latest evolution of this highly diagnostic, north-west Sicilian amphora family can be identified with an intermediate type Ramon T-6.1.2.1/7.1.1.2 (fig. 4,4), probably characteristic of the decades around the middle of the 3rd century B.C.E. and currently documented by five items yielded by the Piazza Bologni deposit.³⁹

²⁹ Ramon 1995, 174, 512, fig. 149. For one item from the Caserma Tuköry necropolis area in fabric PAN-A-1 see FACEM – <http://facem.at/m-107-2>.

³⁰ FACEM – <http://facem.at/m-106-39>. M 106/66 (unpublished), both in PAN-A-1. For the type see Ramon 1995, 174-5, 513, fig. 150.

³¹ FACEM – <http://facem.at/m-106-61> M 106/17. M 106/24. M 106/128. All unpublished and in PAN-A-1. FACEM – <http://facem.at/m-179-1> in PAN-A-2. Furthermore FACEM – <http://facem.at/m-107-4>, formerly defined as PAN-REG-A-1. Previously see Falsone 1998, types 3b-c, 315, 317, 319-20, R 14-15.

³² M 106/46 (unpublished, in PAN-A-1). The type is also well documented in the necropolis, see Falsone 1998, type 3a, 314-20, R 16 and R 18 (miniaturistic item with flat base).

³³ M 106/122 (unpublished), in PAN-A-1.

³⁴ M 106/26. M 106/47, M 106/48, M 106/53, all unpublished and in PAN-A-1. For the necropolis see furthermore Di Stefano 2009, 138, no. 2 from grave 49 of the 'Caserma Tuköry' area.

³⁵ FACEM – <http://facem.at/m-106-13> in PAN-A-1.

³⁶ FACEM – <http://facem.at/m-106-33> M 106/124 (unpublished), both in PAN-A-1.

³⁷ M 106/10. M 106/20. M 106/21. M 106/28. M 106/76 (all unpublished and in PAN-A-1).

³⁸ For the settlement: Spatafora 2003, 1179, pl. CLXXXVII,2 (Ramon T-6.1.2.1/7.1.2.1), from the rescue excavation inside Palazzo Arcivescovile; *Palermo Punica*, 102, A 22- A24, A 27 (Ramon T-7.1.2.1) unearthed in rescue excavations undertaken in the area of the ancient port; from the same area Di Stefano 1993, 266-7 (Ramon T-7.1.2.1), from rescue excavations beneath Palazzo Mirto; Lauro 2005, 741, 743, 751, fig. 4c-d (Ramon T-6.1.2.1 and T-7.1.2.1), from the frequentation level of the late 4th- mid-3rd century B.C.E. of the hypogeic room excavated in Via d'Alessi: for the cemeteries: *Palermo Punica*, 232-33, VG 180-1, 224 and Falsone 1998, type 6, 232-33 VG 180-181, 315 (Ramon T-7.1.2.1), from the 'Tomba della regina'; Di Stefano 2009, 140, nos. 1.3 (Ramon T-7.1.2.1) from grave 50 of the 'Caserma Tuköry' cemetery.

³⁹ FACEM – <http://facem.at/m-106-31> M 106/32. M 106/34. M 106/35. M 106/36 (all unpublished), all in PAN-A-1.

A highly distinctive group has been found mainly in the Pz. Bologni excavations, but also in the necropolis. This assemblage has very few comparisons (all from the province of modern Palermo)⁴⁰ and is characterised by thick, ovoid-shaped rims. From a morphological point of view, it can be compared to a variant of Ramon's T-1.4.4.1 (fig. 4,5).⁴¹ Unfortunately, none of our items has been yielded by a closed, datable deposit, but the associated materials and the parallels cited above suggest a preliminary dating of this type between the second half of the 4th and the first half of the 3rd century B.C.E.

Even if our sample set gives no evidence for local production under Roman domination, two amphorae rims of Ramon's T-7.2.1.1 (for the type see fig. 4,7) from an apparently late 3rd/early 2nd century B.C.E. deposit found in Via d'Alessi have been identified as vessels of possibly local fabric.⁴²

Finally, recent rescue excavations in the necropolis have yielded first evidences for the local production of Greek-shaped amphorae (see also below, ch. 3), in this case of two presumably late 6th or early 5th century B.C.E. items, morphologically close to Gassner's rim type 2⁴³ (for the type see fig. 5,1) and one rim close to Gassner's rim type 7c (fig. 5,2),⁴⁴ in the Lucanian productions dated between the late 5th and the early 4th century B.C.E.

⁴⁰ For Entella, see Corretti and Capelli 2003, 306, cat. 70, pl. LIX,70 (from the fill of the cave). For the necropolis of Kephalaion (Cefalù), see Aloisio 2008, 95, cat. 10, pl. XVII,5, fig. 53, enchytrismos deposition dated between 350-250 B.C.E. and erroneously attributed to Ramon's T-14.1.1.1. For Cozzo Sannita, see Lauro 1997, 353, fig. 7,32, from the survey in the area of the ancient settlement. For Pizzo di Ciminna, see Rondinella 2012, 61-2, pl. 5,26-29, survey finds here identified as Ramon's T-3.1.1.2 dating to the 7th century B.C.E., but in our opinion very clearly referring to the early Hellenistic shape discussed above. For Panormos, see Lauro 2005, 751, fig. 3B, probably of local fabric, from a mid-3rd century B.C.E. context.

⁴¹ For the type see Ramon 1995, 175-6, 514, fig. 151,65. FACEM – <http://facem.at/m-106-44> in PAN-A-1. FACEM – <http://facem.at/m-106-11>. FACEM – <http://facem.at/m-106-23> in PAN-A-2. Furthermore M 106/22, M 106/29, M 106/37, M 106/38, M 106/40, M 106/43, M 106/50 (all still unpublished and in PAN-A-1).

⁴² Lauro 2005, 743, 747, 753, fig. 6,c-d.

⁴³ FACEM – <http://facem.at/m-106-95> M 106/129 (unpublished), both in PAN-A-1.

⁴⁴ FACEM – <http://facem.at/m-106-59> in PAN-A-1.

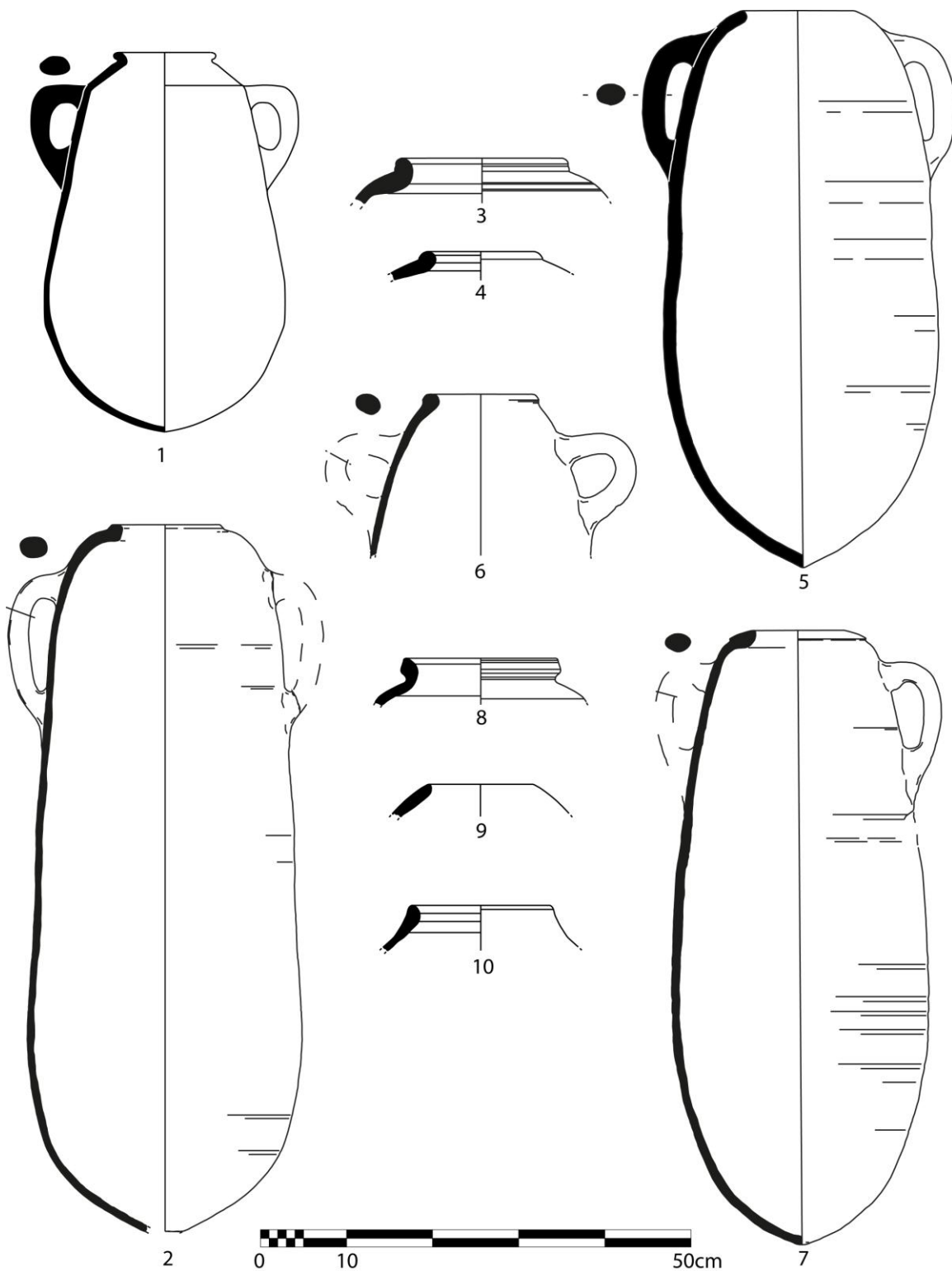


Fig. 3 **The amphorae repertoire of Panormos (6th-4th century B.C.E.):** 1. Ramon T-13.2.2.1. 2. Ramon-T-1.4.2.1. 3. Ramon T-1.3.2.2/1.4.3.1. 4. Ramon T-1.4.2.2. 5. Ramon T-4.2.1.2. 6. Ramon T-1.3.2.3. 7. Ramon T-1.4.5.1. 8. Ramon T-2.2.1.2. 9. Ramon T-4.2.2.6. 10. Ramon-Greco T-4.2.2.7.

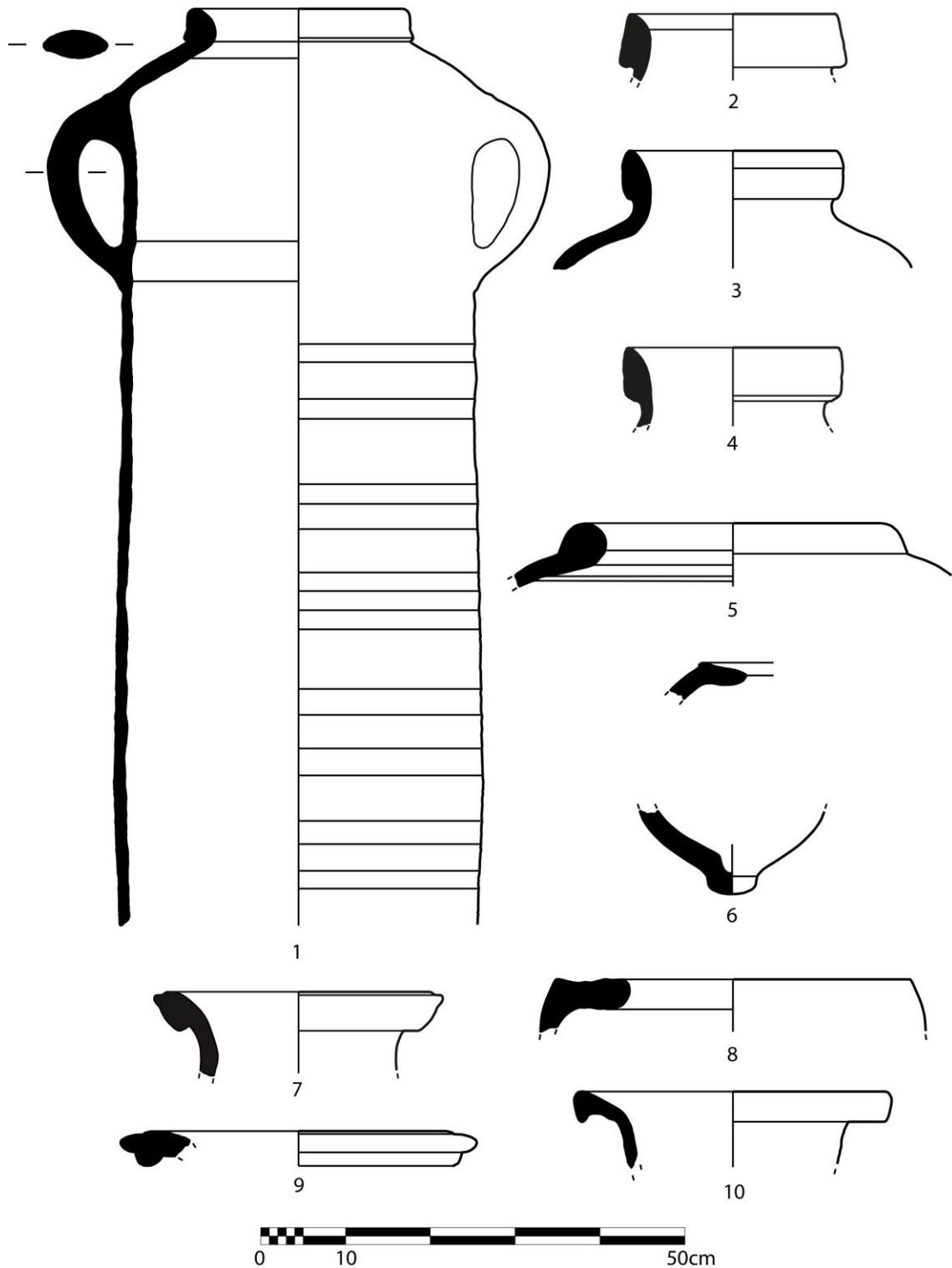


Fig. 4 The amphorae repertoire of Panormos (3rd-2nd century B.C.E.): 1. Ramon T-7.1.2.1. 2. Ramon T-6.1.2.1. 3. Ramon T-6.1.2.1/7.1.2.1. 4. Ramon T-6.1.2.1/7.1.1.2. 5. as Ramon T-1.4.4.1, n. 65. 6. Ramon T-4.2.1.5. 7. Ramon T-7.2.1.1. 8. Ramon T-5.3.2.1. 9. Ramon T-7.4.3.1. 10. Ramon T-7.6.1.1/2.1.

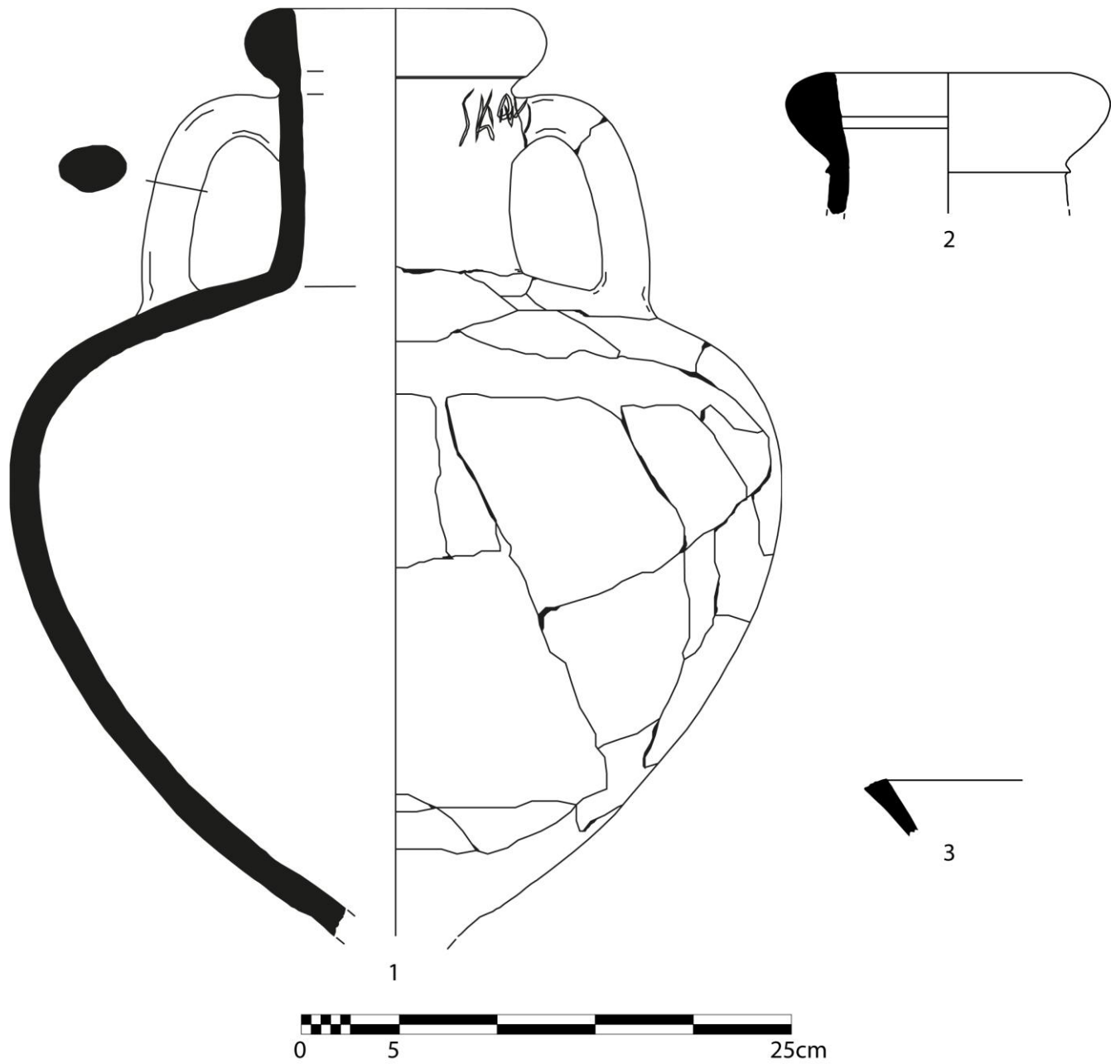


Fig. 5 Greek amphorae produced at Panormos (5th-4th century B.C.E.): 1. as Gassner's rim type 2. 2. as Gassner's rim type 7c. 3. as Corretti's 'ad echino sottolineato' type.

3. First evidences for coarse ware fabrics

Within the present research into amphorae production, the identification of coarse ware fabrics served the sole purpose to confirm the fabric features distinguished for the transport vessels. To this end, we analysed 15 fragments of presumably local production, sampled among the finds from recent rescue excavations at Panormos, which integrated an earlier assemblage already published in the first edition of FACEM in 2011 (see above, note 3). As yet, no attention has been paid to the morphological repertoire⁴⁵ represented by the selected coarse ware items.

Our analysis now allows identification of the formerly published, fine grained PAN-C-1 and PAN-C-2 (fig. 2,3-4), very close to the contemporaneous amphora fabric PAN-A-1, as the typical expression of the ateliers of Punic Panormos (see below, Schmidt). On the basis of our admittedly very small sample set, a third fabric PAN-C-3 (fig. 2,5), probably used for basins and larger vessels, appears to be characterised by a clearly visible, additive tempering of well sorted, rounded quartz particles which might be thought to confer major stability to the vessels. Finally, two body sherds of pithoi represent fabric PAN-OD-1 (fig. 2,6), very close to the tile fabric PAN-CBM-1 (fig. 2,7).

⁴⁵ Currently, we do not dispose of a systematic study of the local coarse ware repertoire. First indications can be found in De Simone and Falsone 1998; Ruvituso 1998; Di Stefano 2009, 24-30. A PhD thesis (in preparation) by T. Arena (Universität Tübingen) will specifically focus on this topic.

4. Amphorae fabrics and morphological repertoire: evidences from other sites

Apart from a single, probably early Archaic item attributable to Ramon's T-2.1.1.2 from Pizzo Cannita,⁴⁶ at present, the earliest amphorae in fabric PAN-A-1 found outside the production site date to the second half of the 6th or early 5th century B.C.E.: four items of Ramon's T-1.4.2.1 are attested at Himera (fig. 3,2)⁴⁷, Pizzo Cannita⁴⁸ and Monte Porcara.⁴⁹ Two fragments of Ramon's T-1.3.2.2/1.4.3.1 from Pizzo Cannita (fig. 3,3)⁵⁰ and Monte Porcara⁵¹ date to the first half of the 5th century B.C.E. During the 5th century B.C.E. amphorae from Panormos can mainly be found in the necropolis of Himera which has yielded four items of Ramon's T-1.4.5.1 (fig. 3,7),⁵² one Ramon T-4.2.1.2 (fig. 3,5)⁵³ and an imitation of the Ebusitanian type Ramon T-1.3.2.3 (fig. 3,6).⁵⁴ Exceptionally, we find one fragment of Ramon's T-1.4.2.2 (for the type see fig. 3,4) at Jerba.⁵⁵ Panormos' amphorae export very clearly rises from the late 5th or the beginning of the 4th century B.C.E. onwards when we find several fragments of Ramon's T-2.2.1.2 documented at Carthage,⁵⁶ Cossyra⁵⁷, Selinus,⁵⁸ Pizzo Cannita (fig. 3,8)⁵⁹ and Elea.⁶⁰ The local fabrication of ovoid amphorae with more or less triangular-shaped, clearly separated rims and very short necks (Ramon's T-2.2.1.1/1.2) is not mentioned explicitly by G. Falsone, but one amphora of this type is included in his typological plates.⁶¹

More or less contemporaneously to this latter type, the morphological evolution of Ramon's T-

⁴⁶ M 189/34, see Arena 2015.

⁴⁷ FACEM – <http://facem.at/m-179-10>. Bechtold and Vassallo (in preparation), cat. 171.

⁴⁸ M 189/28, see Arena 2015.

⁴⁹ M 193/7, M 193/8, see Muratore 2015.

⁵⁰ FACEM – <http://facem.at/m-189-4>, see also Arena 2015.

⁵¹ M 193/10, see Muratore 2015.

⁵² FACEM – <http://facem.at/m-179-1> in PAN-A-2 (Bechtold and Vassallo (in preparation), cat. 173). FACEM – <http://facem.at/m-179-2> (Bechtold and Vassallo (in preparation), cat. 174). M 179/66 (Bechtold and Vassallo (in preparation), cat. 172). M 179/68 (Bechtold and Vassallo (in preparation), cat. 176), all in PAN-A-1. One more item of T-1.4.5.1 has been identified at Pizzo Cannita (M189/18), see Arena 2015.

⁵³ Bechtold and Vassallo (in preparation), cat. 177. This entirely preserved amphora has not been sampled, but the external aspect of its fabric suggests its attribution to the fabrics of Panormos.

⁵⁴ FACEM – <http://facem.at/m-179-60>, in PAN-A-1. Bechtold and Vassallo (in preparation), cat. 178.

⁵⁵ M 149/71 (unpublished, residual find from an Early Imperial level: GH 110234.1419), in PAN-A-1.

⁵⁶ FACEM – <http://facem.at/m-92-92> in PAN-A-1, from a deposit dated around 330 B.C.E.

⁵⁷ M 119/232 in PAN-A-1 published in Bechtold 2014, cat. 6.

⁵⁸ M 154/28 (temple B, saggio E, US 0, P08.503, unpublished) in PAN-A-1.

⁵⁹ M 189/7 in PAN-A-1, see Arena 2015.

⁶⁰ Gassner (forthcoming), ch. V.A.5.3.3, from a context of the first third of the 4th century B.C.E. (period 2.1): inv. 351/99-30, from a context of period 2.3 (last third of the 4th century B.C.E.): inv. 531/97-90, both in PAN-A-1.

⁶¹ Falsone 1998, 319, R 12.

1.4.5.1, that is to say Ramon's T-4.2.2.6, has been found at Elea,⁶² Motya,⁶³ Monte Porcara,⁶⁴ Pizzo Cannita,⁶⁵ Entella⁶⁶ and Segesta (fig. 3,9).⁶⁷

The successive shape Ramon-Greco's T-4.2.2.7 is attested at Monte Porcara,⁶⁸ Pizzo Cannita,⁶⁹ Entella,⁷⁰ Segesta,⁷¹ Selinus (fig. 3,10),⁷² Cossyra⁷³ and Elea,⁷⁴ while Ramon's T-7.1.2.1 (for the type see fig. 4,1) has been recorded at Pizzo Cannita,⁷⁵ Monte Porcara⁷⁶ and Selinus.⁷⁷ The contemporaneous shape Ramon T-6.1.2.1 (for the type see fig. 4,2) has been found at Pizzo Cannita,⁷⁸ while the intermediate type Ramon T-6.1.2.1/7.1.2.1 (for the type see fig. 4,3) occurs at Pizzo Cannita⁷⁹ and on Jerba.⁸⁰ Also very important is the documentation at Pizzo Cannita⁸¹ of five amphorae with thick, ovoid-shaped rims, from a morphological point of view a variant of Ramon's T-1.4.4.1 (for the type see fig. 4,5) already ascertained at Panormos itself (see above). Finally, highly interesting is the identification of three 3rd century B.C.E. amphorae with disc-shaped rims of Ramon's T-4.2.1.5 on Cossyra,⁸² at Segesta⁸³ and at Lilybaion (fig. 4,6),⁸⁴ a type

⁶² Gassner (forthcoming), ch. V.A.5.3.3, from a period 2.1 deposit (400-370 B.C.E.): inv. 230/99-6, in PAN-A-1.

⁶³ Iliopoulos et al. 2002, 358.

⁶⁴ M 193/11, see Muratore 2015.

⁶⁵ M 189/24. M 189/26, see Arena 2015.

⁶⁶ M 187/24 in PAN-A-1, see Montana et al. 2015, 824, tab. 3, impasto 1, ANF 085.

⁶⁷ FACEM – <http://facem.at/m-165-14> in PAN-A-1. M 165/21 (unpublished, from a sealed deposit excavated at the Northern Gate and dated to the first quarter of the 4th century B.C.E.: SG 93 SAS 7, US 5879, in PAN-A-1). FACEM – <http://facem.at/m-165-27> in PAN-A-2.

⁶⁸ M 193/2, see Muratore 2015.

⁶⁹ M 189/12. M 189/32, see Arena 2015.

⁷⁰ M 187/1. M 187/3. M 187/11. M 187/15, all in PAN-A-1, see Quartararo 2015a. For M 187/11 and M 187/15 see also Montana et al. 2015, 824, tab. 3, impasto 1, ANF 006.026.

⁷¹ M 165/20 (surface find from the Northern Gate, unpublished: SG 93 SAS 7, US 5817-1). M 165/24 (from the survey, unpublished: SG 96 RIC UT 147.3). FACEM – <http://facem.at/m-165-26>, all in PAN-A-1.

⁷² From sealed deposits related to the construction of temple B on the acropolis: FACEM – <http://facem.at/m-154-27>, M 154/23, to be published in Bechtold (forthcoming a), cat. 161, both in PAN-A-1.

⁷³ M 119/52, published in Bechtold 2013b, 475, cat. 58.

⁷⁴ Gassner (forthcoming), ch. V.A.5.3.3, from two period 2.4 (300-270 B.C.E.) deposits: inv. 332/99-5, inv. 338/99-14, both in PAN-A-1.

⁷⁵ M 189/2. M 189/8. M 189/23. M 189/25, all in PAN-A-1, see Arena 2015.

⁷⁶ M 193/4, see Muratore 2015.

⁷⁷ FACEM – <http://facem.at/m-154-20>, FACEM – <http://facem.at/m-154-26>, M154/21, to be published in Bechtold (forthcoming a), cat. 15. M 154/22, to be published in Bechtold (forthcoming a), cat. 13. M 154/75, to be published in Bechtold (forthcoming a), cat. 23. M 154/77, to be published in Bechtold (forthcoming a), cat. 143.

⁷⁸ M 189/15, M 189/16, M 189/21, all in PAN-A-1, see Arena 2015.

⁷⁹ M 189/22, see Arena 2015.

⁸⁰ M 149/70 (unpublished, residual find from an Early Imperial level: GH 110235.385), in PAN-A-1.

⁸¹ M 189/10. M 189/13. M 189/20. M 189/33, see Arena 2015.

⁸² M 119/109, published in Bechtold 2013b, 463, cat. 22.

⁸³ FACEM – <http://facem.at/m-165-22>, in PAN-A-1, from a context dated to the first third of the 3rd century B.C.E..

⁸⁴ FACEM – <http://facem.at/m-166-10>, in PAN-A-1, from a context dated to the second quarter of the 3rd century

which, though clearly of Carthaginian origin, is so far not attested to among the productions of the north-western coast of Sicily.⁸⁵

Apparently, the mid and second half of the 3rd century B.C.E. series from Panormos are best attested in Lucania, at Elea. Late 3rd century B.C.E. contexts (period 2.6) bear Ramon's T-7.2.1.1⁸⁶ (for the type see fig. 4,7) and T-6.1.2.1 (for the type see fig. 4,2),⁸⁷ while during period 3 (2nd century B.C.E.) we find items of Ramon's T-6.1.1.3⁸⁸ and again T-7.2.1.1.⁸⁹ Moreover, the Pantelleria survey has yielded two late Punic amphorae in fabric PAN-A-1 which very clearly imitate the Carthaginian types Ramon T-5.3.2.1 (fig. 4,8)⁹⁰ and T-7.4.3.1 (fig. 4,9)⁹¹ Finally, one rim of a Ramon's T-7.6.1.1/2.1 (later 2nd-earlier 1st B.C.E.) has now been identified at Monte Porcara (fig. 4,10).⁹²

In addition to Solus, Panormos also produced Greek-shaped amphorae (see also above, ch. 2). To date, we have identified one late Archaic item close to Gassner's rim shape 2 from the necropolis of Himera (fig. 5,1)⁹³ and one early Hellenistic fragment of Corretti's 'ad echino sottolineato' type from Jerba (fig. 5,3).⁹⁴ The amphora from Himera provides an initial hint at the contemporaneous presence, in the cemeteries of Himera, of Greek and Punic amphorae produced at Palermo. The fragment from Jerba fits perfectly within the distribution pattern, in Carthage's sphere of influence, of Greek-styled amphorae produced in the Punic towns of Solus and Panormos during the 4th century B.C.E. (see Bechtold 2015a, ch. 5.2).

B.C.E.

⁸⁵ In this regard see Bechtold 2008, 548.

⁸⁶ Gassner (forthcoming), ch. V.A.5.3.3, inv. 533-2/98-43, inv. 533-4/98-21, both in PAN-A-1. From the acropolis of Cossyra: FACEM – <http://facem.at/m-119-255>.

⁸⁷ Gassner (forthcoming), ch. V.A.5.3.3, inv. 207/99-1251 and inv. 207/99-1250, previously published as FACEM – <http://facem.at/m-10-61> and identified as Ramon's T-6.1.1.3. More items come from Pizzo Cannita (M 189/5, see Arena 2015) and Cossyra (M 119/53, published in Bechtold 2013b, 475, cat. 59). All in PAN-A-1.

⁸⁸ Gassner (forthcoming), ch. V.A.5.3.3, inv. 703/97-160, in PAN-A-1.

⁸⁹ Gassner (forthcoming), ch. V.A.5.3.3, inv. 515/98-85, both in PAN-A-1.

⁹⁰ M 119/242, published in Bechtold 2013b, 462-3, cat. 23, here considered a Tunisian production.

⁹¹ M 119/244 (PN 04 ACR RIC, UT 83.1-66), unpublished.

⁹² From Monte Porcara: M 193/6, see Muratore 2015.

⁹³ FACEM – <http://facem.at/m-179-39>. This vessel is the only Greek amphora from the necropolis recorded within the framework of the present project and taken in consideration because of the presence of a Punic *graffito* on its neck, previously published by R. De Simone (De Simone 2012).

⁹⁴ FACEM – <http://facem.at/m-149-53>.

5. Conclusions

5.1 Concluding remarks on Panormos' amphorae fabrics

The microscopic study of about 135 amphorae samples, combined with archaeometric analysis, has led to the distinction of fabric PAN-A-1, identified in about 96% of all samples and documented from the second half of the 6th to the 2nd century B.C.E., and PAN-A-2, attested only in a very short span of time from the second half of the 5th to the early 4th century B.C.E. By contrast with Solus (see Bechtold 2015a), the amphorae production of Panormos is therefore not characterised by a gradual refinement of temper and packing of the fabrics. Instead, we observe a remarkable continuity of implemented technology, documented from the Archaic period to the Hellenistic age and apparently still in use during the medieval period.⁹⁵

5.2 Concluding remarks on Panormos' amphorae export

In contrast with Solus, amphorae from Panormos outside of the production site appear only sporadically during the late Archaic period at sites close to Panormos itself. To date, the 5th century B.C.E. series are also scarcely documented, although a minor part of the quite numerous items of Ramon's T-1.4.5.1 (fig. 3,7) yielded by western Sicilian sites might refer to the amphorae issue of Panormos (see Bechtold 2015a, ch. 5.2). However, at Himera, among the about 172 5th century B.C.E. graves equipped with Punic amphorae, only about 5% (in comparison: Solus c. 44%) show fabric PAN-A-1.

Only with the beginning of the production of Ramon's T-4.2.2.6 (fig. 3,9) and T-2.2.1.2 (fig. 3,8) towards the early 4th century B.C.E. the export of amphorae-packed commodities from Panormos becomes sizeable not only in western Sicily, but also at Elea in Lucania, where deposits dating to the first third of the 4th century B.C.E. have yielded amphorae from Panormos and not from Solus.⁹⁶ Single items also occur at Carthage and on Cossyra. Hence, the new amphora data presented here testify to an important rise in the industrial output of the city's workshops, in full harmony with the numismatic evidences⁹⁷, which reflect the dominance of

⁹⁵ See the medieval amphorae attributed to the coarse ware fabric PAN-C-1: FACEM – <http://facem.at/m-109-1>. FACEM – <http://facem.at/m-109-2>.

⁹⁶ It must be stressed, however, that the assemblage of only three fragments identified as Sicilian fabrics and attributed to PAN-A-1 (Gassner (forthcoming), ch. V.A.5.3.3) is still too small to generalise this observation.

⁹⁷ Frey-Kupper 2013, 99.

Panormos within the Punic *epikrateia* after the end of the 5th century B.C.E. This probably occurred as a direct result of the political changes derived from the destruction of the four most western Greek Sicilian colonies during the years 409-406 B.C.E. On the basis of the here presented data, it seems likely that Panormos especially benefited from the elimination of the important port of call of nearby Himera.⁹⁸

In western Sicily, fabric PAN-A-1 continues to be well documented until the first third of the 3rd century B.C.E. by the association, at least among our more important find sets from Selinus and Segesta, of amphorae from Solus and Panormos (Ramon's T-7.1.2.1/6.1.2.1, see fig. 4,1-3). According to the data available for the present study, amphorae produced in fabric PAN-A-1 disappear in the regional archaeological contexts during the years of the First Punic War, since we have currently no evidence for the documentation of the key-types of this period, namely Ramon's T-7.1.1.1/2 and T-6.1.1.3 (see Bechtold 2015a, ch. 5.2). By consequence, of special interest is the identification at Elea of a group of second half of the 3rd and early 2nd century B.C.E. amphorae in fabric PAN-A-1 (see above, ch. 4) which attests to continued, stable economic contacts at least with the lower Tyrrhenian area during the beginning of the period of Roman domination. The extra-regional distribution of Panormos' amphorae issue posterior to the First Punic War is also documented on Cossyra.

Overall, we can state that Panormos' amphorae repertoire developed more or less in parallel with the production of near Solus, at least from the late 6th to the mid-3rd century B.C.E.⁹⁹ In contrast with Solus, the extra-site distribution of its production becomes relevant, however, only at the beginning of the 4th century B.C.E. and is documented in western Sicilian deposits until the first half of the 3rd century B.C.E. The continuous documentation, from the beginning of the 4th to the 2nd century B.C.E., of small quantities of amphorae in fabric PAN-A-1 at Elea suggests that Panormos was the principal Sicilian port of call, involved in the steadily increasing commercial relations between Carthage's eparchia and the lower Tyrrhenian area (Lucania,¹⁰⁰

⁹⁸ For this hypothesis, see previously Docter and Bechtold, 108, note 53.

⁹⁹ Apart from a single item from Pizzo Cannita (see above, note 40), to date we have no evidences, however, for the local production of the Archaic shapes Ramon T-2.1.1.2, T-1.2.1.1 and T-1.3.2.1/2, well attested among the later 7th-6th century B.C.E. series of Solus (Bechtold 2015a, ch. 2.4).

¹⁰⁰ For the evidence of commercial relations between Carthage's sphere of influence and Lucania, see in synthesis Bechtold 2013a, 79-80.

and later on Campania¹⁰¹).

5.3 Hypothesis on the content of the amphorae series produced at Panormos

Similarly to the line of argument outlined for Solus' amphorae production, we suggest fish conserves as possible content for the Punic series of Panormos, while the Greek-shaped vessels might well have carried wine (see Bechtold 2015a, ch. 5.3).

¹⁰¹ For the evidence of trade between Carthage and the area of the Gulf of Naples, see ultimately Bechtold 2013b, 431-2, 435-7.

Table of correspondence for the amphorae illustrated in figs. 3-5.

Fig.	FACEM inv.-no.	Site inventory number	Published
3,1	--	Palermo, necropolis (1954), T. 218	From: Ramon 1995, 577, fig. 214,527
3,2	M 179/110	Himera, necropolis West, W 8123	FACEM – http://facem.at/m-179-110 . Bechtold and Vassallo (in preparation), cat. 171
3,3	M 189/4	Pizzo Cannita, PC 4/61, inv. 57045	FACEM – http://facem.at/m-189-4 . Arena 2015
3,4	M 106/39	Palermo, settlement, Pz. Bogni (2011-2012), US 701/10	FACEM – http://facem.at/m-106-39 .
3,5	--	Himera, necropolis West, W 280	Bechtold and Vassallo (in preparation), cat. 177
3,6	M 179/60	Himera, necropolis West, W 5725	FACEM – http://facem.at/m-179-60 . Bechtold and Vassallo (in preparation), cat. 178
3,7	M 179/2	Himera, necropolis Lo Monaco, L 253	FACEM – http://facem.at/m-179-2 . Bechtold and Vassallo (in preparation), cat. 174
3,8	M 189/7	Pizzo Cannita, PC 4/62, inv. 57046	Arena 2015
3,9	M 165/14	Segesta, survey, SG 96 RIC, UT 652.2	FACEM – http://facem.at/m-165-14 . Bechtold 2015b, fig. 1,2
3,10	M 154/27	Selinunt, temple B, saggio H, US 5, P09.193	FACEM – http://facem.at/m-154-27 . Bechtold (forthcoming a), cat. 247
4,1	M 106/13	Palermo, necropolis Crs. Calatafimi, civ. 133-137, CAL 17.1, US 29, dromos US 15	FACEM – http://facem.at/m-106-13 . Bechtold 2015b, fig. 1,5
4,2	M 106/33	Palermo, settlement, Pz. Bogni, US 701/4	FACEM – http://facem.at/m-106-33 . Bechtold 2015b, fig. 1,9
4,3	M 106/20	Palermo, necropolis Crs. Calatafimi, Pal. Orlando, PORL 1, tomba 10, US 19	unpublished
4,4	M 106/31	Palermo, settlement, Pz. Bogni, US 701/2	FACEM – http://facem.at/m-106-31 . Bechtold 2015b, fig. 1,12
4,5	M 106/44	Palermo, settlement, Pz. Bogni, US 701/15	FACEM – http://facem.at/m-106-44 .
4,6	M 166/10	Marsala, necropolis, Via de Gasperi 1988, T. 137-1, MR 9958	FACEM – http://facem.at/m-166-10 . Bechtold 1999, 322, pl. XXXI,283-284
4,7	M 119/255	Pantelleria, acropolis, PN 14 V/XVI, 6699-1	Bechtold 2015b, fig. 1,13
4,8	M 119/242	Pantelleria, survey, PN 08, ACR RIC, UT 252.1-2	Bechtold 2013b, 463, cat. 23
4,9	M 119/244	Pantelleria, survey, PN 04, ACR RIC, UT 83.1-66	unpublished
4,10	M 193/6	Monte Porcara, EL3-02D.	Muratore 2015
5,1	M 179/39	Himera, necropolis West, W 1751	FACEM – http://facem.at/m-179-39 . De Simone 2012 (only for the inscription)
5,2	M 106/59	Palermo, necropolis Crs. Calatafimi, P. Orlando, PORL 11, T. 10, US 19	FACEM – http://facem.at/m-106-59 .
5,3	M 149/53	Ghizène, GH.110235.2	FACEM – http://facem.at/m-149-53 . Bechtold (forthcoming b), cat. 37, fig. 12,1

KARIN SCHMIDT

Amphorae and Coarse Ware Fabrics of Panormos

Introduction

Due to the use of the same raw materials (*Argille di Ficarazzi*), the fabrics of Panormos are quite similar to the more recent fabrics SOL-A-4 to SOL-A-5 of nearby Solus (see Bechtold, ch. 2).¹ Raw materials found in the PAN group are characterised by a very-fine, regularly distributed sand temper with particles of quite homogeneous sizes.

Within the framework of the first edition of FACEM in 2011, the analysis of a small sample set has led to the identification of four fabrics: PAN-A-1, PAN-C-1, PAN-C-2 and PAN-CBM-1. The here presented research is based on a relevant find group (see above, Bechtold, introduction) and confirms the previous distinction of fabrics PAN-A-1, PAN-C-1, PAN-C-2 and PAN-CBM-1. Furthermore, three new fabrics have been identified: the amphora fabric PAN-A-2, the coarse ware fabric PAN-C-3 and the pithos fabric PAN-OD-1.²

Transport amphorae (PAN-A-1 and PAN-A-2)

FABRIC DESCRIPTION

R. Alaimo's results of analysis (thin sections, macroscopic and microscopic observations) of four medieval amphorae (kiln wasters of the second half of the 12th century C.E.)³ are reported by B. Bechtold (see above, ch. 1). The clay of these samples is characterised by a very-fine, natural sand temper (particle sizes 0.05–0.1 mm, sporadically up to 2.0 mm) with a predominance of calcium carbonate particles and pseudomorphoses, followed by quartz grains. The colours of the matrix vary from red to orange, brick-red, often with grey cores, and brownish. According to R. Alaimo and team, the packing range of three samples is very high (between 25% and 35%, and >15%), whilst those of the last one is clearly lower (between 10% and 15%).⁴ Apart from PAN-C-3

¹ For maps of western Sicily, see Montana et al. 2009b, fig. 1; Montana et al. 2015, fig. 1.

² OD = Opus Doliare.

³ Alaimo et al. 1999, 45-50.

⁴ Alaimo et al. 1999, 47–8, sample 27213: 5%–10% carbonate, 5% quartz.

(see below), all ceramic samples of our PAN group show a low packing range, which has been estimated, on basis of microscopic observation, between 3.5% and 7.5%. We cannot exclude, however, that the use of x25 magnification is still insufficient in order to recognize tiny inclusions sized from very-fine to silt fraction.

PAN-A-1 (M 10/61; M 92/92; M 106/ 13. 31. 33. 39. 44. 59. 61. 95; M 107/1. 2. 3; M 149/53; M 154/20. 26. 27. 68; M 165/13. 14. 26; M 166/10; M 179/2. 39. 60. 66. 110; 189/4) Ref. M 107/3

PAN-A-1 (see above, fig. 2,1) is by far the most common amphora fabric (see above, Bechtold, ch. 2). The main characteristics consist of a fine and compact matrix with a very-fine sand temper, mainly composed of very small-sized calcium carbonate and carbonate pseudomorphoses (<0.04–0.5, sporadically up to 1.0 mm, singularly up to 1.8 mm) and a lower quantity of very small-sized quartz grains (0.04–0.2, rarely up to 0.5, singularly 1.0 mm). Among the carbonate particles we also find foraminera/bioclasts (e.g. M 92/92, M 154/20). Red and reddish-brown particles are very frequent (<0.04–0.4, mm, sporadically up to 1.3 mm, singular 2.4 mm), black particles appear in low quantities (<0.04–0.2 mm, sporadically up to 0.4 mm). The packing ranges between 3.5% and 7.5%, while the porosity is between 1% and 6.5%. The colours of the matrix are light-red to brick-red and orange, red and dark-grey or reddish-grey. Finally, we have to underline the regularity of particle sizes, especially of the quartz grains, and the homogeneity in distribution of the inclusions. Some samples of this group are very similar to fabrics SOL-A-3 to SOL-A-5. PAN-A-1 has been used from the 6th to the late 2nd century B.C.E. at least (see above, Bechtold, ch. 5.1). Presumably, it continued also after the Hellenistic period, since it is identical with PAN-C-1, which is still documented in medieval times (see below).

PAN-A-2 (M 106/11. 23; M 165/27; M 179/1) Ref. M 106/11

Only a small percentage of amphorae has been made in fabric PAN-A-2 (see above, fig. 2,2), which is quite similar to PAN-A-1. It differs from this in that it has a slightly coarser matrix, a high frequency of dark grey or black particles and pseudomorphoses (<0.04–0.8 mm) and a higher amount of mica, especially of dark flakes (<0.04–0.16 mm). Also packing (between 5% and 7.5%) and porosity (1.5% and 7.5%) seem to be slightly higher. At present, this fabric has only been identified among Middle Punic amphorae types.

Coarse wares (PAN-C-1, PAN-C-2, PAN-C-3, PAN-OD-1, PAN-CBM-1)

FABRIC DESCRIPTION

PAN-C-1 (M 106/4. 12. 82. 85. 94; M 109/1. 2) Ref. M 109/2

The coarse ware fabric PAN-C-1 (see above, fig. 2,3) is identical to the amphora fabric PAN-A-1, even if inclusions can be larger-sized. Together, both represent the most typical fabrics of Punic Panormos. The main characteristic is the very-fine sand temper with a high amount of small inclusions (<0.04–0.2, rarely up to 0.8, singularly up to 2.0 mm). Calcium carbonate particles and carbonate pseudomorphoses are predominant, followed by quartz grains. The colours of the matrix are light-red to brick-red or orange, also with grey cores. The brown and grey colour of M 106/3, a variant of PAN-C-1 (see above, introduction), depends on its firing temperature. Fabric PAN-C-1 has been used during the Punic period for jugs, table amphorae, large containers, basins, stands and lamps. For the medieval phase are attested small-sized amphorae (M 109/1) and jugs (M 109/2).

PAN-C-2 (M 106/3) Ref. M 106/3

Fabric PAN-C-2 (see above, fig. 2,4) has been identified within the first edition of FACEM in 2011 (see above, note 3) and represents a variant of PAN-C-1 which has been fired in a non-oxidizing atmosphere, causing a darker color of the matrix.

PAN-C-3 (M 106/87. 98) Ref. M 106/87

PAN-C-3 (see above, fig. 2,5) is a coarser variant of PAN-C-1. Its main difference consists of an artificially-added temper of larger-sized, spherical-rounded quartz grains (up to 0.6 mm), which should confer major stability to the vessel (see above, Bechtold, ch. 3). By consequence, the packing range is higher, between 10% and 17.5%, while the porosity is about 7.5% and hence comparable with the other fabrics of the PAN group. Clay colours are red to orange. PAN-C-3 has been used during the Punic period for open shapes (e.g. basins) as well as for closed forms.

PAN-OD-1 (M 106/83. 88) Ref. M 106/83

Two body sherds of handmade pithoi (see above, fig. 2,6) are characterised by a rather fine matrix with the usual very-fine sand temper, which characterise all samples of the PAN fabrics (mainly carbonate particles and quartz, see above). The main difference consists of an artificially-added temper, composed of mainly large dark grey to black or black and reddish-brown particles (M 106/83, rock fragments?, up to 3.7 mm) or pale-brownish particles (M 106/88, grog and lime stone fragments?, up to 4.4 mm). These added particles are of spherical- to elongated and rounded- to angular shape. The packing ranges between 12.5% and 20%, the porosity is about 10%. The clay colours are orange with grey (M 106/83) and brownish (M 106/88) cores. So far, this fabric has been found in two pithoi.

PAN-CBM-1 (M 108/3) Ref. M 108/3

Fabric PAN-CBM-1 (see above, fig. 2,7) is comparable to PAN-OD-1. It shows the same artificially-added temper of large fragments, which consists of reddish grog, white calcareous and other rock inclusions (spherical-rounded to elongated-angular, minimum up to 3.0 mm). The fine-red matrix has the same fine sand inclusions of the PAN group with a predominance of usually very small to some large carbonate pseudomorphoses (<0.04–2.4 mm). The packing is about 15%, whilst the porosity is about 10%. Sample M 108/3 has been taken from a roof tile.

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