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NEW ARCHAEOLOGICAL AND ARCHAOMETRIC DATA ON SICILIAN WINE AMPHORAE IN THE ROMAN PERIOD (1ST TO 6TH CENTURY AD)

Typology, origin and distribution in selected western Mediterranean contexts

Introduction and archaeological background

This contribution will attempt to present an initial assessment of Sicilian wine amphorae through the analysis of a more expanded catalogue of forms and fabric data, with the primary aim of establishing amphorae origins.¹

Despite the agricultural prosperity of Sicily in the Roman period and its overall strategic topographical position, at the crossroads of the Mediterranean, the study of transport amphorae has, so far, been understudied.² In regards to typology, chronology and distribution our current knowledge on regional containers has not reached a level which could be compared to that of amphorae manufactured in other territories.

On the other hand, in the last twenty years archaeological investigations have uncovered evidence of a wide flat-bottomed amphora industry in Sicily. These containers, which are all very similar but still discernible, were probably intended for transporting local wine³ and were manufactured from the 1st to the 6th centuries AD.

Nevertheless, these studies did not examine the whole evidence of types and variants and their fabric composition, particularly needed for comparison when similar forms and production techniques are being used. Therefore, an integrated archaeological and archaeometric study was started to fill this gap in our current knowledge on Sicilian amphorae and the first results will be summarized herewith.

The data available

1. The archaeological data: workshops and possible areas of wine amphorae production (fig 1)

The distribution map (**fig. 1**) illustrates all known flat-bottomed production sites in Sicily as evident from the published contributions and from the petrographic data which are gradually being revealed by our research.

The relatively scarce evidence of kilns from the Late Republican period to the Early Byzantine Period is due to a general lack of systematic surveys primarily focused on recording furnaces or areas of pottery manufacture. It is reasonable to infer the existence of more numerous production sites which have not yet been discovered, as is furthermore suggested by the variability in fabrics and forms of the amphora types analysed (see *ultra*).

So far, the studies have recognized a total number of three preserved amphora workshops which have been published in varying degrees of detail. Along the north-eastern coast of Sicily, opposite the Aeolian Islands, is located the workshop of Capo D'Orlando.⁴ Along the eastern Ionian coast are located the Naxos workshop⁵ and S. Venera al Pozzo kiln.⁶ In a considerable number of cases – such as in the case of the Giammaritano Quarter⁷, Caronia Marina⁸ and Furnari⁹ – the identification is based on the finding of pottery wasters. In some instances – such as in the case of Termini Imerese¹⁰ – the pottery production has been inferred on the basis of petrographic analyses performed on amphora samples of a single typological group. It is important to stress that several areas of amphorae production – areas of Messina and Catania – have been determined on the basis of the petrographic analyses carried out within our project, proving how

¹ This contribution summarizes the first results and observations gathered from the doctoral research entitled “Sicilian amphorae (I–VI AD): an economic analysis of production and distribution” which Carmela Franco is conducting at Oxford University under the supervision of Professor Andrew Wilson. We are particularly grateful to M. Bonifay and A. Wilson for direction and advice. – The identification of the possible provenance of the fragments is the result of joint work; the analysis of aspects of production and their projection into the social and historical context is the work of the present author.

² Fuller information is available on Dressel type 21–22 amphorae produced in the Alcamo Marina workshop (north-western Sicily) in the 1st century AD: E. BOTTE, *Salaisons et sauces de poissons en Italie du sud et en Sicile durant l'Antiquité*. Coll. Centre Jean Bérard 31/Arch. de l'Artisanat Ant. 1 (Naples 2009); D. GIORGETTI, *Le fornaci romane di Alcamo. Rassegna ricerche e scavi 2003/2005* (Roma 2006).

³ The presence of the flat base is attested in other widely exported amphorae manufactured in different regions of the Roman Empire that have all transported wine. Furthermore, the majority of the specimens analysed preserve traces of pitch lining, suggesting wine as the primary content.

⁴ SPIGO/OLLÀ/CAPELLI 2006.

⁵ OLLÀ 2001.

⁶ BRANCIFORTI 2006.

⁷ First general description of the amphorae found close to the modern day town of Aragona (Agrigento area) in M. C. PARELLO/A. AMICO/F. D'ANGELO, *L'insediamento alla foce del Verdura in territorio di Sciacca (Agrigento-Sicilia-Italia). I Materiali*. In: S. Menchelli/S. Santoro/M. Pasquinucci/G. Guiducci (eds.), *LRCW 3. Late Roman Coarse Wares, Cooking Wares and Amphorae in the Mediterranean: Archaeology and Archaeometry 3. Comparison between Western and Eastern Mediterranean*. BAR Internat. Ser. 2185 (Oxford 2010) 283–291.

⁸ C. BONANNO, *Kalè Akté*. In: Ead. (ed.), *Scavi in contrada Pantano di Caronia Marina 2003–2005* (Roma 2009).

⁹ BONANNO 2007.

¹⁰ BELVEDERE ET AL. 1993, 223–225.

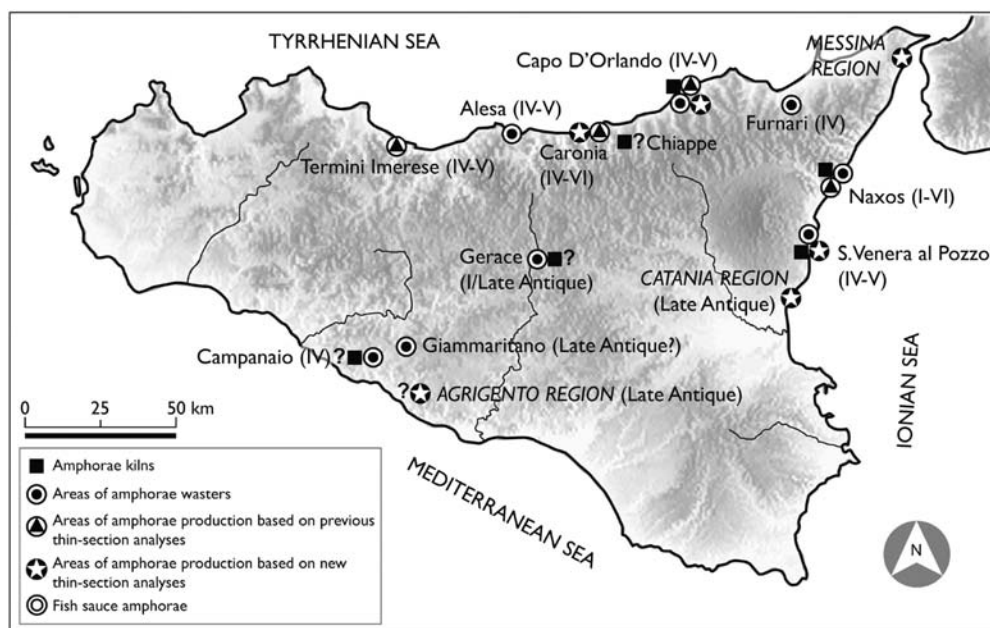


Fig. 1. Distribution map illustrating all known and possible flat-bottomed amphorae production sites in Sicily.

significant is the contribution of the archaeometric analyses (petrographic in this instance) to the determination of the pottery origin (see *ultra*).

2. Archaeometry

Studies carried out on the pottery and flat-bottomed amphorae found in the late Roman strata of Termini Imerese¹¹ and Agrigento¹², published in the late 1990s, did not clearly identify their geographical origin, because they were limited to the definition of chemical compositional groups, and these were not assigned to any specific manufacture sites or local workshop. Archaeometric (thin-sections) investigations of the Keay 52 amphorae demonstrated their production in several workshops mainly located in the area of the Strait of Messina.¹³ Flat-bottomed amphorae types produced at Naxos,¹⁴ Capo d'Orlando,¹⁵ Caronia and Furnari Tonnarella¹⁶ were also characterised. For the Mid Roman 1 amphora, the analyses of

a few samples from Jerba, *Leptis Magna* and southern France did not support the previous archaeological hypothesis of a major production in Tripolitania, pointing instead to north-eastern Sicily as the main source area, even if some African minor productions existed as well.¹⁷ Furthermore, recent discoveries have also provided evidence for a Cyrenaican production of the same amphora type, in Erythron (Latrun) close to the ancient city of *Apollonia*.¹⁸ (C. C.)

The new data of the research

1. Petrography

Out of a total of 212 amphorae of probable Sicilian origin analysed under the stereomicroscope, 92 samples from both production¹⁹ and consumption sites²⁰ were carefully selected²¹ for thin-section analyses. The analyses allowed the identification of several homogeneous groups and subgroups of fabrics that could be referred to different production/geological areas or workshops. These groups were compared where possible to sherds of known provenance.

¹¹ Termini Imerese and Agrigento: C. GIOIA, Analisi mineralogiche e petrografiche dei materiali ceramici. In: O. Belvedere et al., Termini Imerese. Ricerche di topografia e di archeologia urbana (Palermo 1993) 297–391 (flat-bottomed amphorae sampled: A.21); O. BELVEDERE ET AL., Le ceramiche comuni di Agrigento, Segesta e Termini Imerese: risultati archeometrici e problemi archeologici: Anfore e ceramiche comuni di Termini Imerese. In: S. Santoro Bianchi/B. Fabbri (eds.), Il contributo delle analisi archeometriche allo studio delle ceramiche grezze e comuni: il rapporto forma/funzione/impasto. Atti della prima giornata di archeometria della ceramica (Bologna 1998) 60–67; O. BELVEDERE ET AL., Indagini archeometriche di ceramiche antiche e medievali provenienti da Termini Imerese (Sicilia). In: Proceedings of 1st International Congress on “Science and Technology for the Safeguard of Cultural Heritage in the Mediterranean Basin”, Catania 1995 (Palermo 1998) 501–520.

¹² R. M. BONACASA-CARRA (ed.), Agrigento. La necropoli paleocristiana sub divo. Studi e Materiali (Roma, 1995) 365–416 (addendum R. Alaimo ed.). CAPELLI 1998.

¹³ CAPELLI 1998.

¹⁴ Ibid.

¹⁵ SPIGO/OLLÀ/CAPELLI 2006.

¹⁶ CABELLA/CAPELLI/PIAZZA 2009.

¹⁷ C. CAPELLI/M. BONIFAY, Archéométrie et archéologie des céramiques africaines: une approche multidisciplinaire. In: M. Bonifay/J.-Chr. Trégliat (eds.), LRCW 2. Late Roman Coarse Wares, Cooking Wares and Amphorae in the Mediterranean: Archaeology and Archaeometry 2. BAR Internat. Ser. 1662 (Oxford 2007) 551–568.

¹⁸ L. MAZOU/C. CAPELLI, A local production of Mid Roman 1 amphorae at Latrun, Cyrenaica. *Libyan Stud.* 42, 2011, 73–76.

¹⁹ S. Venera al Pozzo, Gerace, Caronia Marina and Capo d'Orlando.

²⁰ Underwater recoveries from Southern France (Drassm); Marseille (Marsiglia/La Bourse), Corsica (Quattrina); Arles and recoveries from the River Rhone (Gare Maritime; Theatre; wreck Arles-Rhone 3; Archaeological Museum collection); Narbonne (Port-la-Nautique), Lyon; Leptis Magna (Thermes du Levant).

²¹ Selection was based on the sherds that best represented particular variants in terms of typology and fabric. Samples that displayed unusual typological characteristics were analysed as well.

Three main fabric groups and several subgroups have been identified on the basis of their compositional and technical characteristics.

Group 1: The fabrics are characterized by inclusions mainly formed by acid metamorphic rocks (quartz-micaschists, gneisses, metagranitoids) and derived minerals (quartz, micas, feldspars) linked to the Calabro-Peloritan palaeozoic basement.

1.1 Fewer samples presenting only acid metamorphic inclusions could probably have been produced in Southern Calabria. This subgroup includes Keay 52 forms and other forms not yet identified.

1.2 A number of samples show subordinate to occasional volcanic inclusions, and can possibly be attributed to the Etna volcanic complex, associated with the metamorphic components. On an archaeological basis, this subgroup can fairly confidently be placed within the modern-day Giardini Naxos zone.

Group 2: The fabrics contain abundant quartz inclusions associated to a lesser extent with metamorphic rocks and quartz-arenite fragments.

2.1 Part of this group, because of its similarity to reference materials, can be attributed to the Caronia/Pantano, Furnari and Capo d'Orlando production areas located along the north-eastern coast of Sicily.

2.2 In other samples, the fabrics show some variation when compared to the sherds produced in the above cited production centres. This could suggest that there were a number of workshops in close proximity along the coastal Tyrrhenian metamorphic area.

Group 3: The majority of the samples analysed show pastes characterised by the presence of volcanic elements (in particular basaltic fragments and derived plagioclase and pyroxene individuals) linked to the Etna lavas associated with (rounded, marine) quartz grains and other sedimentary components. These fabrics are peculiar to two different forms: MR 1A and 1B. The archaeological evidence suggests the southern area of Etna/Catania area as the production zone. This Eastern Sicilian fabric shows some variation.

3.1. A few samples are distinguished by a "purer" clay matrix. The samples are more similar to the reference material coming from the workshop of S. Venera al Pozzo/*Statio Acium*. Nevertheless, the wider picture shows the paucity of the samples coming from this site.

3.2. The majority of the MRA 1A attested in the contexts analysed show a fabric characterised by abundant silt inclusions. The workshop has not yet been discovered but was most probably located in the area of Acireale/Catania.

(C. C.)

2. Typology and chronology

A total number of 350 specimens have been selected for the creation of a more articulate chrono-typology²² which takes

into account amphorae fabric composition and archaeological data (wasters, kilns, pottery dumps) in order to establish the regional provenance. The integrated archaeological and archaeometric approach has allowed for the identification of distinct types as summarized in **fig. 2**. A re-assessment of the amphorae chronology has been achieved through the evidence of a wide range of archaeological contexts across the Mediterranean region and Northern Europe which have also provided significant data for their association with other artefacts.

(1) North-eastern Sicilian amphorae group (fabric 2 and subgroups 2.1 and 2.2)

Ostia I, 455 type

This form appears from the first half of the 3rd century (*Ostia*, Puppit, Lyon, *Leptis*)²³ to at least the late 5th/early 6th century (Rome).²⁴

The recent discovery of the Capo d'Orlando workshop (4th/5th? century) and the Furnari kiln dump site (3rd/4th? century), both along the north-eastern coast of Sicily, where *Ostia I, 455 type* was produced in Late Antiquity, strongly suggests the simultaneous production of the same type in different kilns. The type produced, possibly the 4th century variant, corresponds to Capo Orlando no. 3²⁵ and Furnari type 1.²⁶

The range of fabrics for *Ostia I, 455 type* are particularly varied. However the petrography suggests that the same type (or a very similar one) was produced along the Tyrrhenian north-eastern coast of Sicily in multiple workshops. The plurality of production centres is archaeologically proven by the above cited data and it is also shown by the difference in manufacturing techniques and formal morphological details. The majority of the samples analysed show a granular fabric, brown/brick-red/dark reddish in colour, with white inclusions; greyish-brown on the outside.²⁷ Less attested is an orange fabric, light brown on the outside with fairly abundant inclusions.²⁸

Ostia IV, 166 type

The production of *Ostia IV, 166 type* along the Tyrrhenian coast of Sicily is archaeologically attested on the basis of the evidence of amphorae wasters in the Capo d'Orlando and Caronia Marina workshops which produced this type in the Late Antique period. It corresponds to Capo Orlando nos. 6 and 7²⁹ and Caronia Marina type.³⁰ Previous thin-section

ET AL. 2013. An exhaustive detailed typology will be presented in C. Franco Ph.D. in Archaeology, University of Oxford.

²³ See among the other contexts, *Ostia*, from the first half of the 3rd century and more numerous find-spots from the second half of the same century. It is not attested in the second half 2nd century strata (PANELLA 1973, 487); *Leptis Magna*/Thermes du Levant from the second half of 3rd century (BONIFAY/CAPELLI ET AL. 2013, context 1).

²⁴ Rome, Palatine East sequence (PENÀ 1999, 78 fig. 11).

²⁵ SPIGO/OLLÀ/CAPELLI 2006, 456 fig. 4.3.

²⁶ From the kiln dump found in day-modern Furnari: BONANNO 2007, 356. For the type: Ibid. 356, fig. 3.3.

²⁷ *Leptis Magna*, Thermes du Levant, contexts 1 and 3: Cat. 1.13, Inv. 103.12. Thin-section no. 9756; cat. 1.14, Inv. 103.13. Thin-section no. 9757; cat. 3.1, Inv. 003.1. Thin-section no. 9669.

²⁸ *Leptis Magna*, Thermes du Levant, context 4: Cat. 4.5, Inv. 166.15. Thin-section no. 9748.

²⁹ SPIGO/OLLÀ/CAPELLI 2006, 456 fig. 4.6–7.

³⁰ BONANNO 2007 fig. 3.1.

²² A first attempt of classification is in D. MALFITANA ET AL., Roman Sicily project: ceramics and trade. *Facta*, 2, 2008, 127–192. For a first classification of five Sicilian main types as attested from the 3rd/4th century strata of *Leptis Magna* (Thermes du Levant) see BONIFAY/CAPELLI

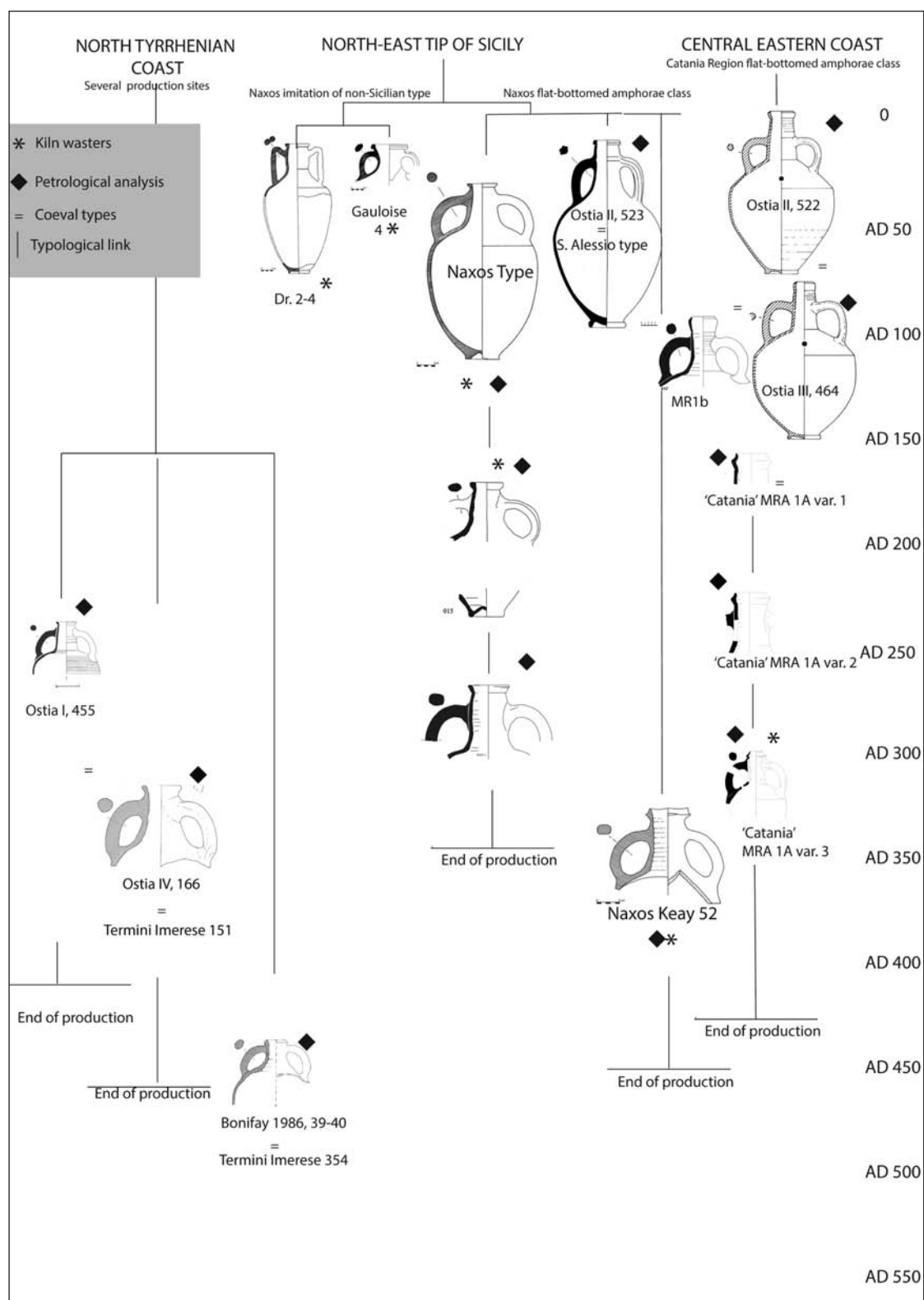


Fig. 2. Sicilian amphorae evolution charts.

analyses undertaken on samples from Caronia and Capo d'Orlando had shown a provenance from a local area or from north-eastern Sicily.³¹

Morphologically this type can be identified with a small container abundantly found in the urban strata of Termini Imerese dating back to the end of 4th and the first three decades of 5th century.³² The amphora is currently known as

³¹ SPIGO/OLLA/CAPELLI 2006; CABELLA/CAPELLI/PIAZZA 2009.

³² BELVEDERE ET AL. 1993, 224.

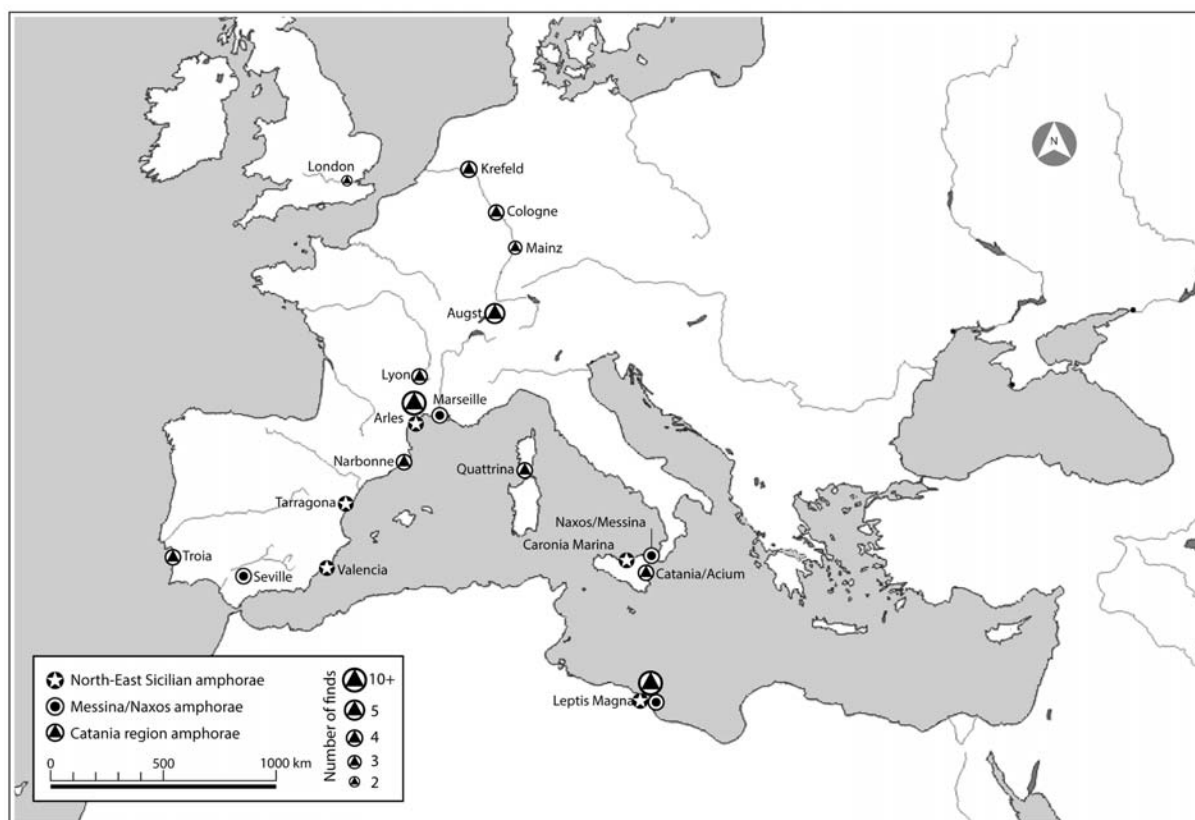


Fig. 3. Distribution of Sicilian amphorae in selected Western Mediterranean contexts considered by the research.

“Termini Imerese 151” type³³ and it is frequently attested in other late antique Sicilian contexts especially along the northern coast (with the exception of the area of Palermo and its hinterland) and in the nearby island of Lipari.³⁴ The same type is also widely attested in Rome.³⁵

The analyses carried out on two specimens of similar type found in the end of 4th century context of the Thermes du Levant³⁶, have shown slightly different characteristics when directly compared to other thin sections from the Capo d’Orlando and Caronia Marina workshops, suggesting the presence of multiple workshops in the north-eastern area of Sicily. The fabric of one specimen found in *Leptis Magna* is orange-brown in colour, while the surface is reddish brown and has volcanic inclusions.³⁷ The fabric does not match the material associated with the Naxos production area (see below).

The fabric of Ostia IV, 166 type with volcanic inclusions shows fairly strict similarities with the *Crypta Balbi* 2 fabric.³⁸

It is well known, this amphora class shows a high degree of variability of shape and macroscopic characteristics of the fabric, and it should be divided into types and variants. The containers were produced between the 4th and the 7th century.³⁹ The petrographic evidence could represent a very important discriminating factor.⁴⁰

To sum up, the amphora type Ostia IV, 166 was produced in at least two different Sicilian workshops – Capo d’Orlando and Caronia (the so-called ‘Termini Imerese no. 151’) – towards the end of the 4th century AD. This amphora type was exported regionally and overseas. Its production should have ceased by the second half of 5th century.

Part of its production can be located in north-east Sicily, in the same geological area of production as the later *Crypta Balbi* 2.

Bonifay 1986, nn. 39-40/Capo Orlando n. 4/ Termini Imerese 354 type con orlo ripiegato

We recognize in this amphora a type attested in Marseille/ La Bourse around the mid 5th century.⁴¹ Three fragments from this context have been analysed.⁴² Morphologically the finds have shown strict similarities with amphorae pro-

³³ BELVEDERE ET AL. 1993, 164 fig. 151.

³⁴ E. MESSINA, Alcune anfore tardoromane di Lipari. In: U. Spigo/M. C. Martinelli (eds.), Nuovi studi di archeologia eoliana (Messina 2000) 116 tav. IV, 1 cat. 2 (from the Jewish hypogeum/end 4th–beginning 5th century).

³⁵ #. PANELLA ET AL., Contesti tardoantichi di roma: una rilettura alla luce di nuovi dati. In: S. Menchelli/S. Santoro/M. Pasquinucci/G. Guiducci (eds.), LRCW 3. Late Roman Coarse Wares, Cooking Wares and Amphorae in the Mediterranean: Archaeology and Archaeometry 3. Comparison between Western and Eastern Mediterranean. BAR Internat. Ser. 2185 (Oxford 2010) 58 (Sanctuary of Magna Mater and published and unpublished contexts of the north-eastern slopes of the Palatine Hill).

³⁶ BONIFAY/CAPELLI ET AL. 2013.

³⁷ Thermes du Levant, Context 4: Cat. 4.6; Inv. 167.21. Thin-section no. 9747.

³⁸ CAPELLI 1998, 332. Thin-section no. 4593 (from Celio, Ospedale militare/

late 5th–beginning 6th century) and no. 4600 (from *Crypta Balbi*).

³⁹ L. SAGUI, Anfore. In: M. Arena et al. (eds.), Roma dall’antichità al medioevo. Archeologia e storia (Milano 2001) 293–294 fig. II,3.

⁴⁰ CAPELLI 1998, 332–333.

⁴¹ BONIFAY 1986, nos. 39–40.

⁴² Marseille, La Bourse: Thin-section analyses: 9648 (BONIFAY 1986, fig. 9, no. 39); 9649 (BONIFAY 1986 fig. 9 n.40); 9650 (as type no. 40 not drawn). Their origin in the area of the Capo d’Orlando kiln is probable.

bably produced in the Capo d'Orlando kiln (Capo d'Orlando no. 4).⁴³ The new thin-section analyses have shown that the specimens belong to a homogenous fabric group presenting close similarities with the fabric samples from the Caronia Marina production site.

The general shape of this amphora type can be likened to the so-called "Termini Imerese Type 354".⁴⁴

Precise chronological indications from several assemblages⁴⁵ show that Bonifay 1986, nos. 39–40 type was produced around the middle of the 5th century, at a later time than Ostia I, 455 (see *supra*).

Conclusion: The composition of the fabric of the specimens analysed for this study seems to suggest a manufacture in Caronia Marina (Pantano workshop). The production of this type in Caronia is only corroborated by these new analyses: in the published data amphora wasters of a similar shape are not known from the Caronia area. On the other hand, given the limited number of specimens of this type analysed for this study we should not completely rule out the possibility that the same amphora model was produced in more kilns, not yet located archaeologically. The isolated fabric which shows volcanic inclusions belonging to Ostia IV, 166 type (and later Crypta Balbi 2) must not be ignored and suggests that production of this type was probably divided between more numerous manufacturing sites.

(2) North-eastern tip of Sicily

Naxos region (fabric 1.2)

The study has demonstrated the overseas export of several flat-bottomed amphorae types produced in the area of Naxos (**fabric 1.2**) and with less certainty probably Messina. The identification of the amphorae origin is based on typological, archaeological (wasters) and petrographic data. The ancient Naxos is situated close to the bay of modern-day Giardini Naxos, located in the northern sector of the Ionian coast of Sicily and to the North of Mount Etna. The local geology presents metamorphites as well as volcanic rocks from Etna.⁴⁶ It seems to be possible to distinguish the Naxos amphorae fabric from the Catania ones (see below).

Sant'Alessio Type

The so-called Sant'Alessio Type⁴⁷ was produced in Naxos on the basis of archaeological evidence in the course of the 1st century.⁴⁸ The type can be identified with the form Ostia II, 523 = Ostia III, 632 fig. 43. The research has attested its widespread export in Southern France – especially Arles – and in Corsica.⁴⁹

Palatine East 1 class/Naxos flat-bottomed ovoid amphorae class

This class takes its name from the Palatine East context, where it is attested from the second half of the 1st century until the first half of the 5th century.⁵⁰ The origin of the amphorae in Naxos is confirmed on the basis of the remarkable quantities of amphorae wasters of the same types found in the city.⁵¹

The finds from the contexts analysed have allowed the drawing of a typological evolution. The 1st–2nd century flat-bottomed amphorae subtype 1 can be assimilated to the so-called Spinella⁵²/Via Larunchi amphora type.⁵³ The later form 2 (Mastrociccio kiln type)⁵⁴ is attested from the late 3rd–early 4th century layers in *Leptis Magna*⁵⁵ and it is associated with MRA 1A variant 2 (see below). The latter form 3 is attested in the 4th century context of the Palatine East⁵⁶ and in the mid-4th century assemblage in *Leptis Magna*.⁵⁷ Despite few similarities with the MRA 1 – such as the presence of carination in the shoulder and circular handles with the same arched profile – the development of the rim, the general appearance⁵⁸ and the macroscopic characteristics of the fabrics are different.

Furthermore, our program of thin-section analyses carried out on several samples of both amphorae classes have revealed their dissimilar geological origins. The analyses of the flat-bottomed Naxian amphorae subtypes 2 and 3 found in the Thermes du Levant have shown the same fabric composition, characterized by a temper containing acid metamorphic rocks, quartz and rare volcanic inclusions.⁵⁹ This data suggests the hypothesis of their provenance from a single production site to be located in the area of Naxos.⁶⁰ Their

⁵⁰ PEÑA 1999, 76–77.

⁵¹ Kiln wasters from 'Spinella quarter' and 'via Larunchi' in present day Giardini Naxos: WILSON 1990, 264; 402 note 128; ID. 1999, 534 fig. 317; ID., Sicily under the Roman Empire: The Archaeology of a Roman Province, 36 BC–AD 535 (Warminster 1990); ID., Iscrizioni su manufatti siciliani in età ellenistico-romana. In: G. Nenci (ed.), Sicilia epigrafica. Atti del Convegno di Erice 15–18 ottobre 1998. Annali Scuola Normale Superiore Pisa, Quad. 1999 (2000) 531–356.

⁵² LENTINI 2001, 24, fig. 23.

⁵³ OLLÀ 2001 fig. 7; 57 no. 18 and 21 (Keay 52 by the author). The amphorae were found in the Keay 52 deposit from the Mastrociccio kilns. This suggests their production in the same workshop area. B. BASILE, Ricognizioni subacquee lungo la costa Siracusana nell'ultimo quinquennio. In: M. C. Lentini (ed.), Dioniso e il mare. Atti della VI Rassegna di archeologia subacquea, Giardini Naxos 25–27 ottobre 1991 (Messina 1995) 11–29 fig. 23.

⁵⁴ The amphorae were found in the Keay 52 deposit from the Mastrociccio kilns. This suggests their production in the same workshop area. B. BASILE, Ricognizioni subacquee lungo la costa Siracusana nell'ultimo quinquennio. In: M. C. Lentini (ed.), Dioniso e il mare. Atti della VI Rassegna di archeologia subacquea, Giardini Naxos 25–27 ottobre 1991 (Messina 1995) 11–29 fig. 23.

⁵⁵ Thermes du Levant, Context 2. Cat. 2.14, Inv. 217.1. Thin-section no. 9664. Cat. 2.15. Inv. 217.8. Thin-section no. 9759. For the type: BONIFAY/CAPELLI ET AL. 2013 fig. 25, c.

⁵⁶ PEÑA 1999 fig. 10, 12.

⁵⁷ Thermes du Levant, Context 3 (middle 4th century). Cat. 3.4; Inv. 010.1. Thin-section no. 9753; cat. 3.5; Inv. 083.1. Thin section no. 9758; cat. 3.6; Inv. 083.39; cat. 3.7, Inv. 003.28. Thin-section no. 9751.

⁵⁸ The body of form 2 and 3 is longer and more slender than the MRA 1A.

⁵⁹ Data in BONIFAY/CAPELLI ET AL. 2013 (in part. chapter 3 on Sicilian amphorae).

⁶⁰ Previous analyses carried out on two samples of PE1 subtype 2, one of which was found in the foundation strata of the Arch of Constantine, among the material dated in the beginning of the 4th century, had shown a Naxian origin: CAPELLI 1998, 339 tav. 3, 4596.4998. Remarkably, Keay 52 and Ostia I, 453 (PENSABENE/C. PANELLA [eds.], Arco di Costantino tra archeologia e archeometria [Roma 2001] 132 fig. 14) are among

⁴³ SPIGO/OLLÀ/CAPELLI 2006, 456 fig. 4, 4.

⁴⁴ BELVEDERE ET AL. 1993, 83 fig. 354.

⁴⁵ Among them, Marseille/La Bourse and also Rome/north-eastern slopes of the Palatine.

⁴⁶ The lava flow from Etna created the promontory of Capo Schisò in the Holocene period.

⁴⁷ OLLÀ 2001, 56 no. 12.

⁴⁸ F. MUSCOLINO, Anfore proto-imperiali dall'area portuale di Naxos: l'inizio della produzione di anfore nassie a fondo piano. In: M. C. Lentini (ed.), Naxos di Sicilia. L'abitato coloniale e l'arsenale navale. Scavi 2003–2006 (Messina/Sicania 2009) 110–130.

⁴⁹ 1st century contexts. Thin-sections no. 9632; 9652; 9740/ 9969.

fabric differs from the Catania fabric which is consistently associated with MRA1 (see below).

North-East Sicilian Keay 52

The heterogeneous evolution of this amphora class has been widely recognised by scholars⁶¹, as furthermore suggested by the variability in fabrics and variants. The differences can be connected either to the typological amphorae development spanning three centuries, from the first half of the 4th to the mid-7th century⁶² or to contemporary variations in shape due to their manufacture in different workshops.

A Southern Calabrian manufacture is confirmed from the second half of the 4th century.⁶³ A north-east Sicilian production is attested from the kilns of the Late Roman *mansio* found in the Mastrociccio quarter of Naxos,⁶⁴ dating from the second half of the 4th and in use until the middle/end of the 5th century.⁶⁵

The analyses carried out on the Keay 52 types recovered in the contexts under examination have demonstrated the overseas export of the variant produced in North-East Sicily. The earliest example comes from the second half of 4th century strata in the Thermes du Levant. The fabric is pale brown in colour, fine grained in the core, gritty and lighter in colour on the exterior.⁶⁶ A North-East Sicilian origin -rather than Calabrian- is likely. Two other examples of the same type from Southern France (Arles and Marseille La Bourse) corroborate with certainty a North-East Sicilian origin on the basis of the presence in the paste of rare volcanic inclusions.⁶⁷ The Calabrian version of Keay 52 type (**fabric 1.1**), with its very pale fabric is also attested in the context of La Bourse in Marseille,⁶⁸ pointing out the contemporaneous production and overseas trade of the same amphora type produced at different locations.

To sum up: from the second half of the 4th century and especially from the second quarter of the 5th, when Keay 52 trade figures rise dramatically in the western Mediterranean contexts⁶⁹, there is strong evidence that the Sicilian wine produced in the north-eastern tip of Sicily was part of the same supply system as the South Calabrian wine. In this period a unified distribution of the “wine of the Messina Strait” which includes the wine produced in the two portions of the strait is likely. The end of the production in Naxos towards the end of the 5th century may

reflect the changing rôle of this area of Sicily in regard to the wine supply system; while the Southern Calabrian production takes over. Regrettably, a detailed assessment of the Calabrian 6th century Keay 52 production is hampered by the lack of kilns/workshops evidence, despite the fact that containers found in several 6th/7th contexts have shown a probable Calabrian origin.⁷⁰

Conclusion: A well represented Sicilian fabric group is characterized by inclusions of acid metamorphic rocks from the Paleozoic basement of the Peloritani Massif (north/north-east Sicily). A homogeneous subgroup is correlated to the Palatine East 1 class and was produced in Naxos = Naxos flat-amphora type, form 1–3 (**fabric 1.1**) In the Naxos workshop, contrary to what has been so far asserted, there is no evidence of production of MR1. The analyses have instead corroborated that the MR1 were produced in the Catania area (see below).

(3) Volcanic area of Sicily/area of modern-day Catania and Acireale (Group 3 and subgroups)

The **fabric 3** is associated only with the flat-bottomed Riley Mid Roman 1a and 1b amphora types. The samples from the contexts analysed, some of them still unpublished, have greatly improved our understanding of their morphological features/variants and have helped to define their chronology. To this group belong the majority of the amphorae analysed.

The chronological evolution of Ostia III, 464 (= MR 1b) and Ostia I, 453–454 (= MR 1a) proposed by C. Panella⁷¹ and J. A. Riley⁷² is archaeologically attested in the contexts analysed.⁷³

The finds from the well-excavated mid 3rd/end of 4th century strata of the Thermes du Levant have represented the best source and the foundation for the clarification of the typo-chronology of the MR 1A type.

The Early variant 1 with an asymmetrical biconical rim, sharper in profile in its upper part,⁷⁴ can be dated before the first half of the 3rd century.⁷⁵ The “Classic” variant 2 with a symmetrical biconical rim⁷⁶ (= Ostia I, 453–455) is manufactured between the first half and the second half of the 3rd century.⁷⁷ The Late variant 3⁷⁸ (S. Venera type⁷⁹ = Agora M254)⁸⁰ has an asymmetrical biconical rim which is sharper in profile in its lower part. This variant is attested in Leptis Magna from the beginning until the end of the 4th century.⁸¹ MRA 1a and 1b are macroscopically characterized by a fairly

the amphorae types found in association showing the same association attested in the Thermes du Levant assemblages.

⁶¹ F. PACETTI, La questione delle Keay LII nell’ambito della produzione anforica in Italia. In: L. Sagui (a cura di), *Ceramica in Italia: VI–VII secolo*. Atti del Convegno in onore di John W. Hayes, Roma 11–13 maggio 1995. *Bibl. Arch. Medievale* 14 (Firenze 1998) 187 figs. 4–6 for the different main sub-types recognized.

⁶² See for example the different sub-types attested in the ceramic assemblages of the Athenian Agora from the mid 4th to the early 6th century (ROBINSON 1959, M234, M302 and M323 types); see also the different contexts in L. Sagui (a cura di), *Ceramica in Italia: VI–VII secolo*. Atti del Convegno in onore di John W. Hayes, Roma 11–13 maggio 1995. *Bibl. Arch. Medievale* 14 (Firenze 1998).

⁶³ P. ARTHUR, Some observations on the economy of Bruttium under the Later Empire. *Journal Roman Arch.* 2, 1989, 133–142.

⁶⁴ A. M. FALLICO, Naxos fornaci tardoromane. *Kokalos* 2/1, 1976–77, 632–633.

⁶⁵ OLLÀ 2001, 57 no. 13–17; 19–20; 23–24.

⁶⁶ Thermes du Levant, context 4: cat. 4.7. Inv. 164.7. Thin-section 9754.

⁶⁷ Thin-section no. 9645 (Marseille/La Bourse: BONIFAY 1986 fig. 8.32.9659 (Arles, unpublished).

⁶⁸ Marseille, La Bourse: Thin-section no. 9647 (BONIFAY 1986 fig. 8.31).

⁶⁹ REYNOLDS 2010, 89; id., *Hispania and the Roman Mediterranean*, AD 100–700 (London 2010).

⁷⁰ CAPELLI 1998, 337. Subgroups MA3, tav. 4

⁷¹ PANELLA 1973, 470.

⁷² J. A. RILEY, The coarse pottery from Berenice. Excavations at Sidi Khrebish Benghazi (Berenice) 2. *Libya Antiqua* 5 Suppl. (Tripoli 1979) 177.

⁷³ A new typological development of the MR 1B type is outlined in Franco Ph. D.

⁷⁴ BONIFAY/CAPELLI ET AL. 2013 fig. 25a.

⁷⁵ *Leptis Magna*, Thermes du Levant, context 2. Cat. 2.4–5. Thin-section no. 9667.

⁷⁶ BONIFAY/CAPELLI ET AL. fig. 25a.

⁷⁷ *Leptis Magna*, Thermes du Levant, context 2. Cat. 2.6–10. Thin-sections no. 9666 and 9670.

⁷⁸ S. AMARI, I materiali in esposizione nell’Antiquarium. Sale I–II–III. In: Branciforti 2006, 105–183 (Keay 52 type by the author).

⁷⁹ Ibid. 143 no. 5–6.

⁸⁰ ROBINSON 1959, 108 (from a mid 4th century context).

⁸¹ *Leptis Magna*, Thermes du Levant, context 3 and 4. Cat. 3.2. Inv. 082.1; cat. 4.2. Inv. 166.14. Thin section no. 9744; cat. 4.3, Inv. 166.85. Cat. 4.4, Inv. 166.13.

similar fabric, which is well refined, red-orange in colour with a few visible black inclusions, often with a whitened surface, probably related to the use of brackish water.

The volcanic inclusions found in MR1 specimens from all the contexts analyzed indicate the region of Etna/area of Catania as the zone of production for both types. Nevertheless, the presence of few samples morphologically very similar to the Sicilian ones, but with different petrographic characteristics testify the process of imitation in other regions, probably including Tripolitania.⁸²

Conclusion: The Mid Roman Amphorae 1 class (type A and B and their variants) is part of a homogeneous fabric group with volcanic inclusions, which are rarely visible to the naked eye. Both geological (the vicinity of Etna) and archaeological evidence (the production of MR1a.3 late variant in the workshop of S. Venera al Pozzo near Acireale)⁸³ suggest a common origin in the region of Catania. Out of the 92 analysed amphorae 31 (34%) were probably produced in the Catania area. The figure rises when taking into consideration only the samples from the Thermes du Levant. A total number of 40 out of 62 (64.5%) Sicilian samples examined microscopically were produced in the region of Catania, indicating a prosperous amphorae industry and wine production territory between the 3rd and the end of the 4th century. Of great interest is that within the 31 samples from the Catania group 23 (74%) were possibly produced at a single production site (**fabric 3.2**). They show differences when compared to the fabric of the S. Venera al Pozzo Kiln (**fabric 3.1**). This evidence suggests that there were a number of workshops in Catania area, not yet fully discovered, related to different fabrics. One of these exported the bulk of Catania wine which found its way to *Leptis Magna* and Southern France. (C. F.)

Distribution of Sicilian amphorae in *Leptis Magna* and Southern France: general observations

The 3rd/4th century context in *Leptis Magna* (Thermes du Levant) has shown a clear and strong preference towards the wine from Sicily, in varying degrees from 16% to 43%.⁸⁴ The wine from the region of Catania -transported in MR 1b and 1a and its variants- represents the main source; but wine produced along the north-eastern coast (Ostia I, 455/Ostia IV, 166) and from Naxos (Palatine East 1 class) were exported as well.

In Southern France, the samples from Arles (underwater recoveries) favour the south Etna zone productions (MR 1a and b). At Marseille the groups were more mixed with the association in the same mid 5th context of La Bourse of wine produced along the north-eastern coast of Sicily (Bonifay 1986 nn. 39-40 type and 41), wine from the Messina/Naxos region (Keay 52) and wine produced in Southern Calabria (Keay 52) amphorae.

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⁸² *Leptis Magna*, Thermes du Levant, context 1: 1.28. Inv. 096.24. Thin-section no. 8185.

⁸³ BRANCIFORTI 2006.

⁸⁴ BONIFAY/CAPELLI ET AL. 2013 chapter 3.

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