

LUSITANIAN AMPHORAE: PRODUCTION AND DISTRIBUTION

edited by

**Inês Vaz Pinto, Rui Roberto de Almeida
and Archer Martin**



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Inês Vaz Pinto,* Rui Roberto de Almeida
and Archer Martin*****

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Lusitanian Amphorae in Carthago Nova (Cartagena, Spain): Distribution and Research Questions¹

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The presence of Lusitanian amphorae in the region of Carthago Nova (Cartagena, Spain) has been known for a few years, and yet it has never been the subject of a monographic study. Integrated in the commercial networks of the western Mediterranean, these products circulated within the harbour system of this city between the 1st and the 5th century AD. This paper aims to present a synthesised review of the main Lusitanian imports that were detected: Dressel 14 and Almagro 50, Almagro 51a-b and Almagro 51c. The difficulty in identifying the ceramic fabrics and the scarce documentation regarding some finds pose complex problems. This study extends to the hinterland of the colony and to other nearby settlements, such as Portmán and Puerto de Mazarrón.

KEYWORDS: LUSITANIA; FISH SAUCE; MARITIME TRADE; REDISTRIBUTION; SHIPWRECK.

The geographical milieu

Located in the Southeast of the Iberian Peninsula, Cartagena presents a rugged coastline, alternating steep mountains with a few coastal plains, such as in Águilas and Puerto de Mazarrón, and natural mooring places, such as the Portmán bay.

In an area between Cabo Tiñoso and Cabo de Palos, where the sea penetrates inland, lies the port of Carthago Nova, surrounded by mountains that protect the bay from the winds (Figure 1). These conditions, combined with the breadth and depth of the cove, make the harbour an excellent enclave with the capacity to accommodate a large fleet. The bay had several mooring places, both in the so-called Mar de Mandarache and in the easternmost area, near the present neighbourhood of Santa Lucía (Ramallo Asensio and Martínez Andreu 2010). The topographical changes that occurred over time – especially after the 18th century – make it difficult for to make out the original coastline, even though early sources have many descriptions of the port and the city (Ramallo Asensio

2011). Its orographic advantages and strategic position with respect to commercial routes gave it a prominent role as a storage point and centre of redistribution from the Barquid domination onward (Domergue and Rico forthcoming). Its influence in connecting the vast territory of the *ager Carthaginensis* – whose size and limits are not easy to define – has been thoroughly emphasized (Murcia Muñoz, López Mondéjar and Ramallo Asensio 2013). The study of the several mooring places that line the coast surrounding Cartagena, always located near silver mines, has provided important evidence for the organisation of the trade. Early on, the city was shaped as a maritime terminal where ships would arrive with Italian products (especially wine from Campania) and would leave afterwards loaded with ingots and other mining products (Alonso Campoy 2009: 19-21). The remains of the intense trade and the volume of commercial transactions are reflected in the great amount of imported materials documented in the republican contexts, and, most importantly, in the materials recovered from the bay (Pinedo Reyes 2011) and from the shipwrecks on the neighbouring island of Escombreras (Pinedo Reyes and Alonso Campoy 2004: 139-146; Molina Vidal and Márquez Villora 2005).

Close to Carthago Nova, the existence of mooring places and harbours that supplied the main port is observed (Berrocal Caparrós 2008: 345-346). Towards the east, near El Gorguel and in close connection with the exploitation of the metal resources of Sierra Minera of Cartagena-La Unión, the Portmán bay stands out. Toward the west, where settlement was denser during Roman times, the most important coastal enclaves are Águilas and Puerto de Mazarrón. Although there are still doubts about their nature, the existence in both places of fish-processing factories and amphora kilns associated with this product, mainly from Late Antiquity, give them a special identity (Martínez Alcalde and Iniesta Sanmartín 2007; Hernández García and López Martínez 2011).

¹ This paper is part of the research project DGICYT (HAR 2011-29330/HIST): 'Carthago Nova: topografía y urbanística de una urbe mediterránea privilegiada', which is partly financed with FEDER funds. It is also part of the work developed by the renowned laboratory LabexMed – *Les sciences humaines et sociales au coeur de l'interdisciplinarité pour la Méditerranée* with reference 10-LABX-0090. This paper has, thus, benefited from financial aid granted by the French government, aid that is managed by the *Agence nationale de la recherche* within the project *Investissements d'Avenir A*MIDEX* with reference no. ANR-11-IDEX-0001-02.

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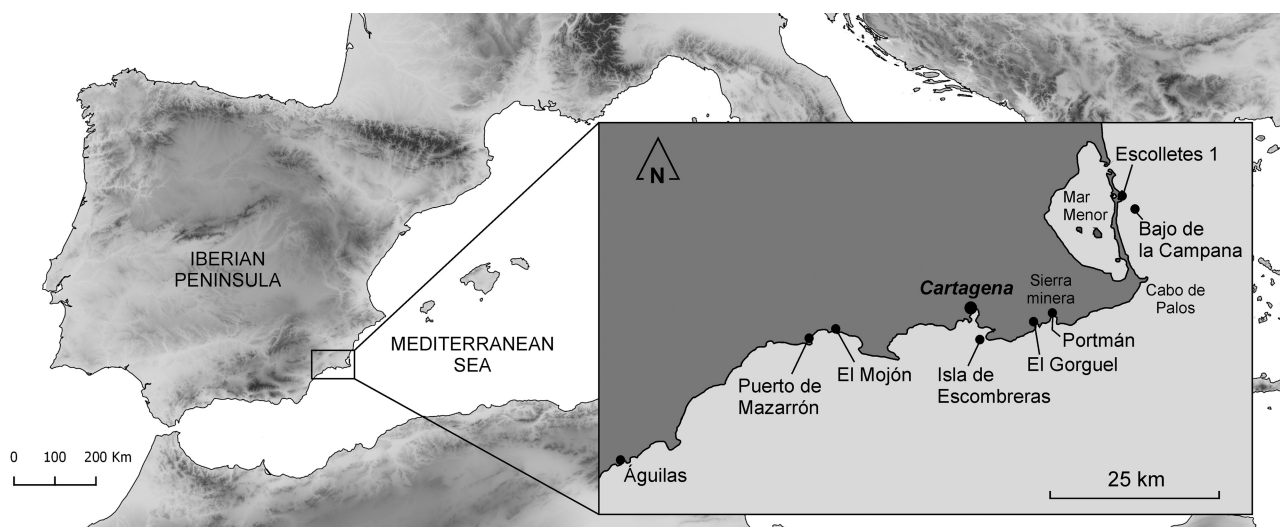


FIGURE 1. COASTLINE OF CARTHAGO NOVA (CARTAGENA). CARTOGRAPHIC BASE COURTESY OF BARTOMEU VALLORI.

Lusitanian amphorae in Carthago Nova and its hinterland

The identification of Lusitanian fabrics has proved problematic, mainly because of developments in archaeological research on Hispanic workshops. Today, it is known that ‘Lusitanian-type’ amphorae (among which are the forms with the largest distribution: Dressel 14, Almagro 50, Almagro 51c and 51a-b) were also produced in parts of the area of the Strait of Gibraltar, as well as almost everywhere in southern Hispania (Bernal Casasola 1998; Bernal Casasola and García Vargas 2008; Fabião 2008). The advances in the studies suggest a reconsideration of the commercial and economic equation of the hinterland of Carthago Nova’s port. In order to do that, it is necessary to reassess the ceramic assemblages that were published in particular up until the 1990s and the inventories held in museums in the light of the new data. On the other hand, the lack of chronological precision and the decontextualisation of many finds did not raise researchers’ interest and were therefore treated as matters of secondary importance, even though, in some cases, there were complete pieces. For that purpose, we studied part of the collections of the Museo Arqueológico Municipal de Cartagena (MAMC), of the Museo Nacional de Arqueología Subacuática (MNAS), of the Museo Arqueológico de Murcia (MAM), of the Museo de la Ciencia y el Agua de Murcia and of the Museo de la Factoría Romana de Salazones of Puerto de Mazarrón, although not always systematically, for reasons connected with the research. The processed data, which relate to the presence of Lusitanian amphorae on the coast of Carthago Nova, have been compiled in the table presented in Figure 2. Whenever it was not possible to confirm Lusitanian provenance, or it seemed unlikely, the reference (SHis) corresponding to ‘South Hispanic fabric’ was introduced.

The port of Cartagena

Underwater archaeological research experienced a period of great dynamism in Cartagena from the middle of the 20th century, and especially after 1970, with the foundation of

the Patronato de Excavaciones Arqueológicas Submarinas de Cartagena, under the supervision of Julio Mas. In collaboration with divers from the Navy, an underwater archaeological survey was carried out in the external areas of the port, where around one thousand pieces were recovered.

Among the amphorae documented, the following stand out: Greco-Italic amphorae, republican Italian amphorae, Baetican Dressel 20 for olive oil and a great number amphora types for fish products, including Dressel 7-11 (Beltrán I), Beltrán II, Dressel 12 (Beltrán III), and Dressel 14 (Beltrán IV). There were also several lead anchor stocks and, near the island of Escombreras, there were ingots connected with the exploitation of the silver mines (Pinedo Reyes and Alonso Campoy 2004: 132; Mas García 1998 and 2004). Unfortunately, the geomorphologic changes that took place in the port (caused by different works, dredging, and earth embankments) do not allow any stratigraphic conclusions as far as archaeological materials are concerned. It should be added that, in the quantification performed in the late 1970s, the Dressel 14 (Beltrán IV), Beltrán IIA, IIB and III amphorae were counted together (14.4%). In total, the fish-sauce amphorae recorded in the port account for more than 52% of the finds (Mas García 1998: 92-96, fig. 14). The materials recovered in the above-mentioned operations are deposited in the aforementioned museums of Cartagena. Due to the methodology used at the time, most of these materials lack references regarding their origin. This is the case for four Lusitanian Dressel 14 amphorae that were identified among a larger assemblage of amphorae of the same type but in Baetican fabric (Figure 5.1). In the MNAS, it was possible to review another Dressel 14 specimen, from the fishing port of Santa Lucía, and an Almagro 50 recovered in the port of Cartagena (Figure 6.2), which probably correspond to the two pieces published by María Angeles Pérez Bonet (1996).

The Dressel 14 of the MAMC were catalogued with the numbers 2318 (complete amphora), 2325 (cylindrical body and a long hollow spike), and 2345B (rim, neck,

A. QUEVEDO AND S. BOMBICO: LUSITANIAN AMPHORAE IN CARTHAGO NOVA (CARTAGENA, SPAIN)

Archaeological context	Typology	Chronology	Archive/Storage	References	TS	C (compl)	R	H	S	MNV (NMI)	Fig.	IN
Port of Cartagena	Almagro 50	First half of 3rd century AD - first quarter of the 5th century AD	MNAS		1		1			1	6.2	175 (SHis)
Fishing port of Santa Lucía	Dressel 14	1st century AD - middle of the 3rd century AD	MNAS		1	1				1	-	483
Island of Escombreras	Dressel 14	1st century AD - middle of the 3rd century AD	MNAS	Pinedo Reyes and Alonso Campoy 2004:132.	1					1	4.3	1007
Escombreras 4 (shipwreck)	Dressel 14	1st century AD - middle of the 3rd century AD	MNAS	Pinedo Reyes and Alonso Campoy 2004: 131-133 and 148, fig.159.	1					1	-	ESC-I/17.17/2/10354
Puerto de Mazarrón	Dressel 14	1st century AD - middle of the 3rd century AD	MNAS		2		2			2	5.3 5.4	2574/1 2633
	Almagro 51c	3rd century AD - 5th century AD	MNAS	Pérez Bonet 1988.	12		12			12	7.2 7.3 7.4 7.5 7.6 7.7 7.8 8.1 8.2 8.3 8.4 8.5	2616 3208/15 2576 2431 3599/25 2647/43 2658/1 4080 4069 2384 3208/51 3102/3
	Lusitana 3	2nd century AD - middle of the 3rd century AD	MNAS		2		2			2	8.7 8.6	5948 17357/1
	Almagro 50	First half of 3rd century AD - First quarter of the 5th century AD	MNAS		3		2		1	3	6.3 6.1 6.4	2538 2430 (SHis) 2645/448 (SHis)
	Almagro 51 a-b	End of the 4th century AD - middle of the 5th century AD	MNAS		3		3			3	9.2 9.3	2401 (SHis) 3102/58 10569/1
Águilas	Almagro 51 a-b or Keya XIXc	End of the 4th century AD - middle of the 5th century AD	MNAS		1	1				1	9.1	480 (SHis)
Unknown underwater provenance	Dressel 14	1st century AD - middle of the 3rd century AD	MNAS		1		1			1	-	17730/2
Unknown underwater provenance	Dressel 14	1st century AD - middle of the 3rd century AD	MAMC		3	1	1		1	3	5.2 4.2 4.1	2318 2325 2345B
Unknown underwater provenance	Almagro 51c	3rd century AD - 5th century AD	MNAS		1	Without the original spike				1	7.1	50273
Unknown underwater provenance	Almagro 51 a-b	End of the 4th century AD - middle of the 5th century AD	MNAS		1	1				1	-	17728/2 (SHis)
Villa of Portmán	Almagro 51c	AD 193-220	MAM	Quevedo 2015: 263 and 268, fig. 202.4	1		1			1	-	06557,
	Almagro 51c/ Lusitana 3	AD 193-220	MAM	Quevedo 2015	1		1	1		1	-	-
The Fortuna Domus (Cartagena)	Almagro 51c/ Lusitana 3	AD 190-200/220	MAMC	Quevedo 2015	1		1	1		1	-	CD. 1002.56.47
Sierra Minera de Cartagena	Almagro 51 a-b	End of the 4th century AD - middle of the 5th century AD	MAMC		1	1				1	9.4	3774 (SHis)
Total										37		

FIGURE 2. LUSITANIAN AMPHORAE REVIEWED AT CARTHAGO NOVA AND ITS HINTERLAND.

Shipwreck	Cargo	Chronology	References
Escolletes 1	Presumed shipwreck site with Lusitanian amphorae of types Almagro 51c, Almagro 50, Keay 78 and Dressel 28.	First half of 4th century AD.	Mas García 1985; Cerezo Andreo 2011; Cerezo Andreo, in this volume
Escombreras 4	Presumed shipwreck of a merchant ship coming from <i>Baetica</i> with a main cargo of Haltern 70, Dressel 8 and 9, and some Beltrán IIB and Lusitanian Dressel 14. Accompanied by a very small number of Dressel 20.	Second half of the 1st century AD.	Pinedo Reyes and Alonso Campoy 2004: 148, fig.159.
Bajo de la Campana	Presumed shipwreck of a merchant ship coming from <i>Baetica</i> with Dressel 7-11, Dressel 20 and Dressel 14 (more abundant). At least five fragments of Lusitanian Dressel 14 were recovered from the site.	1st century AD.	Roldán Bernal, Martín Camino and Pérez Bonet 1995; Pinedo Reys 1996; Pinedo Reyes and Polzer 2011.
Yacimiento 2 (Port of Cartagena)	Presumed shipwreck site with a heterogeneous cargo which includes North African amphorae for wine and oil, Baetican and Lusitanian fish sauce amphorae of types Almagro 51c, 50, 51a-b and Keay XVI.	End of the 4th century AD – Beginning of the 5th century AD.	MNAS – Excavation campaign of 2013.
Playa de Poniente 1 (Águilas)	Presumed shipwreck site with a heterogeneous cargo which includes fish sauce amphorae of types Almagro 51 and Almagro 50 (probably from <i>Baetica</i> and <i>Lusitania</i>), North African amphorae, African cooking ware (Hayes 23B) and ARS type D (Hayes 61A).	Second quarter of the 4th century AD.	Miñano Domínguez and Castillo Belinchón 2013a: 911 and 2013b: 928.

FIGURE 3. SHIPWRECKS IN THE COAST OF CARTHAGO NOVA (CARTAGENA).

two handles and cylindrical body) (Figures 5.2, 4.2 and 4.1, respectively). The complete piece² presents a rounded lip, and the handles are attached immediately below the rim, resembling some pieces from the workshop of Bugio (Mayet, Schmitt and Silva 1996: 93, fig. 32, no. 24). Vessel no. 483, from the MNAS, has similar characteristics. On the other hand, rim 2345B is similar to Variants C of Abul (Mayet and Silva 2002: 144, fig. 66).

From the island of Escombreras come several pieces that were recovered in 1947 as a result of works directed by Captain J. Jáuregui, with the collaboration of A. Beltrán, director of the MAMC. At the time, an area called the ‘amphorae field’ was surveyed, and, while the description of the material recovered is brief, there are fish containers of types Dressel 7-11, Beltrán IIB, and Dressel 14³ datable to the 1st-2nd century AD. Some Almagro 51c were also recovered—but a smaller number. The fact that the amphorae are scattered and not in a cluster and that most of them are missing the bottom part, led Jáuregui to suggest that these were amphorae that had been thrown away *ex professo* by sailors in front of the presumed Temple of Hercules. Between 1997 and 2001, surveys and rescue excavations were carried out in the framework of the extension of the port of Escombreras. During those operations, Lusitanian Dressel 14 amphorae were recovered on the underwater site of Escombreras 4 (Pinedo Reyes and Alonso Campoy 2004: 131-133 and 148, fig. 159). In the summer of 2013, during the course of research work carried out by the MNAS in the port of Cartagena, a new shipwreck called Yacimiento 2 was identified, in which amphorae of types Almagro 51c, Almagro 50, Almagro 51a-b and Keay XVI⁴

were documented. The presence of Lusitanian amphorae in shipwreck contexts is summarised in Figure 3.

As far as urban finds are concerned, a recent review of the several contexts of the 2nd-3rd century AD reveals a scarce presence of amphorae – a dynamic that also applies to Lusitanian products (Quevedo 2015). In the abandonment



FIGURE 4. DRESSSEL 14 AMPHORAE: NO. 1 - 2345B AND NO. 2 – 2325 (MAMC); NO. 3 - 1007 FROM THE ISLAND OF ESCOMBRERAS (PHOTO: MNAS).

² A colour picture of this amphora is available online on Roman Amphorae, a digital resource (University of Southampton, 2005): http://archaeologydataservice.ac.uk/archives/view/amphora_ahrb_2005/zoom.cfm?id=68&img=PEC294&CFID=28288&CFTOKEN=4B324B78-8BBD-4786-A986A451E7A93CD3

³ In ARQUA, it was possible to review a specimen of Dressel 14 (no. 1007) that could belong to this assemblage.

⁴ <http://museoarqua.mcu.es/actividades/proyectos/index.html> and personal information from the research team.

levels of the western *cardo* and of the Fortuna Domus, dated between AD 190/200-220, the presence of Almagro 51c from the South of Hispania is registered (Quevedo 2015: 210-211, fig. 151, nos. 7-8), even though only one Lusitanian specimen has been identified. It is a fragment of a neck whose fabric and formal characteristics make it a Lusitanian piece, although the type is uncertain between Almagro 51c and Lusitana 3.

Puerto de Mazarrón

Puerto de Mazarrón is the other great point of interest for the study of Lusitanian amphorae on the coast of Carthago Nova. The MNAS holds an assemblage of materials that resulted from the dredging carried out here in 1978. Some of those materials were published, based on a selective analysis of the late antique amphorae (Pérez Bonet 1988: 471-473). In that publication, there is an assemblage of 10 specimens of Key XVI amphorae (2.38%) – catalogued as being from the South of Hispania – and a total of 23 fragments of Key XXIII/Almagro 51c (5.47%) of Lusitanian origin (Pérez Bonet 1988: 501). However, it was not possible to fully compare those data with the MNAS inventory records (DOMUS data base) that relate to the finds of the port of Mazarrón. In addition, it is also difficult to determine the origin of the containers based on the observation of fabrics. This difficulty revolves around the production of types similar to the Lusitanian ones in different parts of Baetica. But the issue becomes particularly complex in the case of the coast of Cartagena, due to the activity of the workshop of El Mojón (Figure 1). Together with Águilas, La Azohía and the *figlina* of Puerto de Mazarrón, this workshop was part of a group of workshops that was linked to the fish-sauce and salted-fish industry and was known for its production of *spatheia* (Ramallo Asensio 1984 and 1985). The advances in the research in El Mojón made it possible to document a whole series of imitations of types Key XXIII/Almagro 51c and Key XIX C⁵ (Berrocal Caparrós 2012: 263-265). Formally identical to Lusitanian products, these local amphorae have a very distinctive, hard fabric, containing frequent flecks of mica, which turns yellowish orange when subjected to the marine environment (Figure 8, nos. 8 and 9). In light of these new data, the percentages of amphorae in Puerto de Mazarrón that were once considered to be Lusitanian (Pérez Bonet 1988) had to be reassessed. As a result, once the review was over, the following Lusitanian types were documented (Figure 2): Dressel 14 (Figure 5, nos. 3 and 4), Lusitana 3 (Figure 8, nos. 6 and 7), Almagro 50 (Figure 6, nos. 1, 3 and 4), Almagro 51c (Figure 7, nos. 2 and 8 and Figure 8, nos. 1 and 5), and Almagro 51a-b (Figure 9, nos. 2 and 3).

The two Dressel 14 are quite distinct. Piece 2574-1 presents a wide neck with an oblique triangular rim formally very similar to some types from the workshop of Pinheiro (Mayet and Silva 1998: 89, fig. 19, no. 6). On the other hand, piece 2633, with a wide neck and an everted rim, has

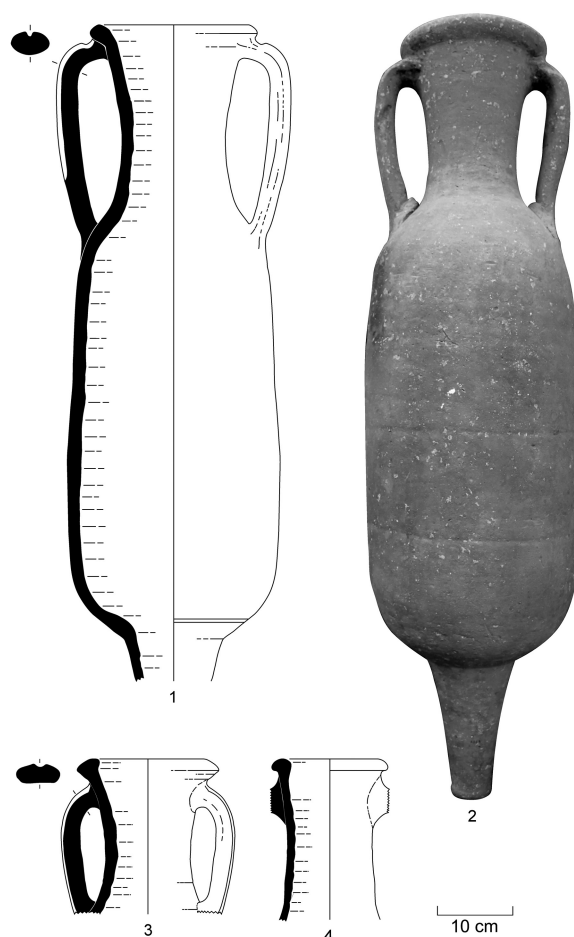


FIGURE 5. DRESSSEL 14 AMPHORAE: NO. 1 – DRESSSEL 14 FROM BAETICA (MUSEO DE LA CIENCIA Y EL AGUA DE MURCIA); NO. 2 – 2318 (MAMC); NO. 3 – 2574.1 (MNAS) AND NO. 4. – 2633 (MNAS – DRAWING OF M. A. PÉREZ BONET).

formal parallels with the late types of Pinheiro and Abul, datable to the middle of the 3rd century (Mayet and Silva 2002: 192-194 and Mayet and Silva 1998: fig. 46, no. 7). In the specific case of the Almagro 51c, it was possible to identify 12 individual Lusitanian specimens belonging to a larger assemblage, which also included local (and possibly Baetican) products. This variety of fabrics is also present among the Almagro 51a-b/Key XIX and XXI. It is, therefore, interesting to note the presence of identical amphora types with different origins in the mooring place of Puerto de Mazarrón. The significant presence of the Lusitanian Almagro 51c type and its morphological affinity allow it to be suggested that it belongs to the same lot. However, the intrinsic difficulty in understanding dredging contexts does not allow further conclusions to be drawn. Moreover, the heterogeneity of the materials and the uncertainty about their origin (shipwrecks, materials lost during loading/unloading activities, discards), which are normal in contexts of mooring places, make it a particularly complicated case.

Further to these problems, the imitation of other types of amphorae complicates the reading of the economic

⁵ Almagro 51 in its variants A-B corresponds to Key XIX and can also be identified with specimens of form Key XXI (Key 1984).

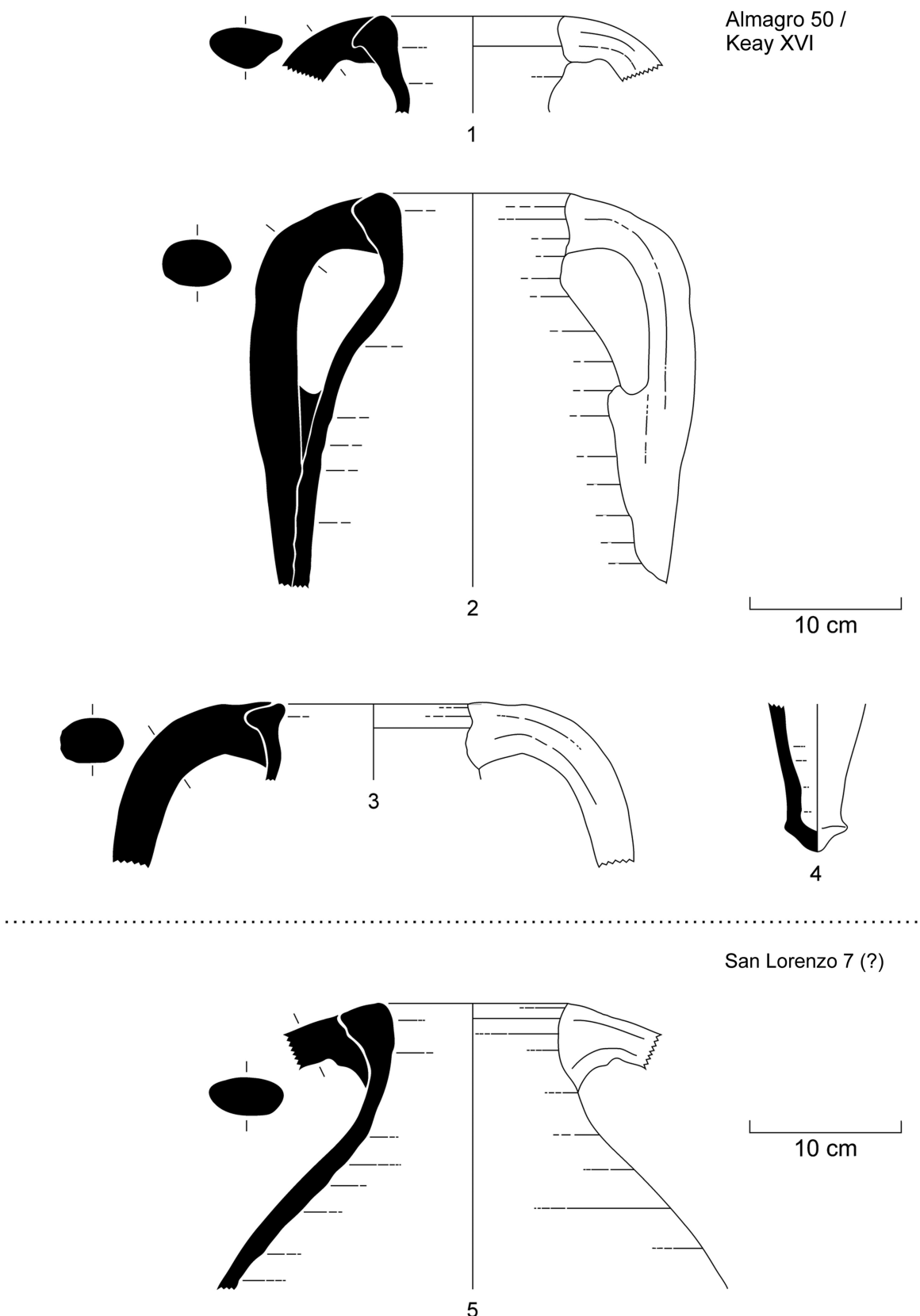


FIGURE 6. ALMAGRO 50 AMPHORAE (MNAS): NOS. 1, 3 AND 4 - PUERTO DE MAZARRÓN; NO. 2 - PORT OF CARTAGENA.

activity in Puerto de Mazarrón. According to Berrocal Caparrós (2012: 272), the percentages assigned to the African forms Keay XXV and XXVI – which account for the majority, with 100 and 75 specimens respectively (Pérez Bonnet 1988: 501) – have to be reviewed. Such a

review, like the one performed in this article for the South Hispanic and Lusitanian types, could invert the notion of the trade dynamics of the port in Late Antiquity. Instead of import-oriented, the port could be seen as markedly export-oriented. The high presence of those containers in

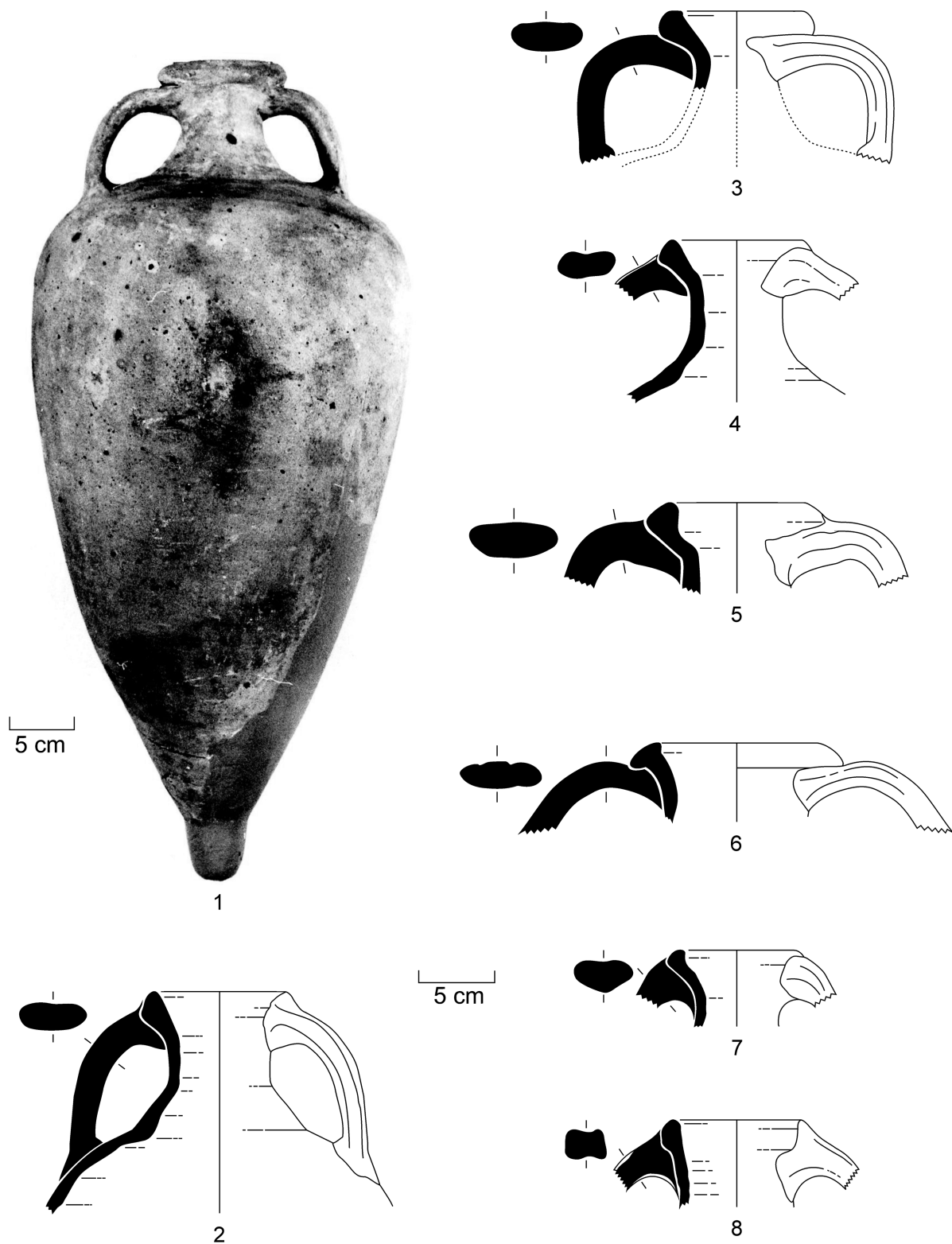


FIGURE 7. ALMAGRO 51C AMPHORAE (MNAs): NO. 1 – UNKNOWN UNDERWATER PROVENANCE; NOS. 2 AND 8 - PUERTO DE MAZARRÓN. (NOS. 2, 5 AND 6 ARE DRAWINGS OF M. A. PÉREZ BONET).

the mooring place could, thus, be related to the maritime activities of loading/unloading and successive departure from Puerto de Mazarrón. The Escombreras 5 shipwreck, located in the outer harbour of Cartagena and whose cargo is composed, in part, of Keay XXV amphorae from

El Mojón, seems to corroborate this theory (Berrocal Caparrós 2012: 272). Although this form is little known, a Keay XXV, Variant 3 in a micaceous fabric defined as an African imitation, documented in Puppit (Tunisia) and in the Sicilian Isis shipwreck (Bonifay 2004: 458-459), can

be identified with the production of El Mojón.⁶ However, only the increase of new finds will allow the map of its distribution to be drawn and the economic importance of its region of origin to be understood.

Other finds from the Carthaginense coast

In addition to the materials from the port contexts of Cartagena and Puerto de Mazarrón, already addressed, an assemblage of other finds that could pertain to Lusitanian amphora products was identified.

Included in the *ager* of Carthago Nova, the villa of Portmán presents a very rich ceramic spectrum (Fernández Díaz 1999: 205-332). The archaeological complex is located at the end of the Portmán bay – the Roman *Portus Magnus* – in an enclave that seems to be an exception in a mountainous and irregular coastal landscape, approximately 13km east of Cartagena. At the foothills of the Sierra de La Unión, this cove performed important maritime functions in the transportation of mineral resources from very early on. The intense traffic continued until the middle of the 20th century, when steamships would anchor in the deep bay to carry the metal extracted from the nearby mines, which was loaded by means of small vessels (Lorenzo Solano 1990: 23). However, in the 1960s and 1980s, the area suffered unprecedented degradation, which was considered one of the biggest environmental disasters in the Mediterranean. The entire bay was filled with mining waste and that changed the landscape completely: the Roman villa, which at the time was located by the sea, found itself inland.

In a recent review of the ceramic materials, some amphorae whose provenance is probably Lusitanian, were identified (Quevedo Sánchez 2015: 263). The reassessment of that assemblage allowed two fragments belonging to Lusitanian fabrics to be distinguished, a rim of Almagro 51c, and an amphora top, with neck, the beginning of the body, and a complete handle, which could belong to Almagro 51c or Lusitana 3. The lack of the rim on this second specimen makes it impossible to draw further conclusions with regard to the exact amphora type. The joint analysis of all the materials allows the ceramic assemblage, in which the above-mentioned Lusitanian forms are included, to be dated from the end of the 2nd century AD, or more likely, from the beginning of the 3rd century AD, as was proposed some years ago (Fernández Díaz 1999: 203). With the exception of the occasional piece that seems to belong to the middle of the 3rd century, the *terminus ante quem* is c. 220 AD. This data is further supported by the massive presence of late forms of ARS Production A (Quevedo 2015: 271-274).

In the deposit of the Museo Arqueológico Municipal de Cartagena, there is a complete amphora of small dimensions, which can be attributed to Almagro 51a-b, from the Sierra Minera of Cartagena. From the macroscopic

observations performed, it seems quite difficult to assign a Lusitanian origin to it (Figure 9, no. 4).

From the assemblage of materials reviewed in the MNAS, three other complete amphorae of underwater provenance must also be highlighted (Figure 2). One is a specimen of Keay XIX, from Águilas, with a gently everted collar rim, ear-shaped handles, cylindrical body, and a solid conical spike, probably in a South Hispanic fabric. (Figure 9, no. 1). The other is an amphora of the same type, for which no provenance is available, with similar characteristics in terms of fabric and also of rim, handle and body form. The characteristics of the rim and handles of these two specimens, which can be attributed to Almagro 51a-b, are similar to some forms from the pottery workshop of Pinheiro (Sado), chronologically framed between the end of the 4th century and the middle of the 5th century, even though the cylindrical body differs from the piriform bodies documented in the mentioned pottery workshop⁷ (Mayet and Silva 1998). That is why we prefer to classify them as South Hispanic. There is also a specimen of Lusitanian Almagro 51c with a fusiform body, also with no provenance, that should be noted (Figure 7, no. 1).

Conclusions: a problem that gets even more complex

The great weakness of our sample is that most of the amphorae do not present a secure archaeological context that allows an assessment of precise dates. Nonetheless, the formal characteristics of the amphorae allow us to establish general dates that by themselves make it possible for some conclusions regarding the circulation of Lusitanian products in the hinterland of Carthago Nova to be drawn. The archaeological data indicate a beginning of the arrival of fish sauce, which was transported in Dressel 14, from the middle of the 1st century onwards. The urban context of the Fortuna Domus or the villa of Portmán, both well studied and with reliable dates, allowed the continuity of the presence of Lusitanian amphorae between the end of the 2nd century and the first half of the 3rd century to be confirmed. The late antique specimens of Almagro 50, Almagro 51c and Almagro 51a-b indicate a continuity of imports until at least the middle of the 5th century.

The preservation of the pieces, only at the level of the rim of Almagro 51c, in Puerto de Mazarrón, does not allow further observations with regard to the possible characteristics of the body and spike, which are normally used to establish a more precise date. The gently everted collar rims of the Almagro 51a-b specimens (Figure 9, no. 3) find parallels in the typologies from Lusitania (Variant A of Pinheiro) datable to the end of the 4th century and first half of the 5th century (Mayet and Silva 1998). The possible presence of Lusitana 3 reflects the progressive recognition of this form in archaeological contexts of

⁶ Personal observation of M. Bonifay and M. C. Berrocal.

⁷ Colour pictures of these two amphorae are available online on Roman Amphorae, a digital resource (University of Southampton, 2005): http://archaeologydataservice.ac.uk/archives/view/amphora_ahrb_2005/pictures.cfm?id=13

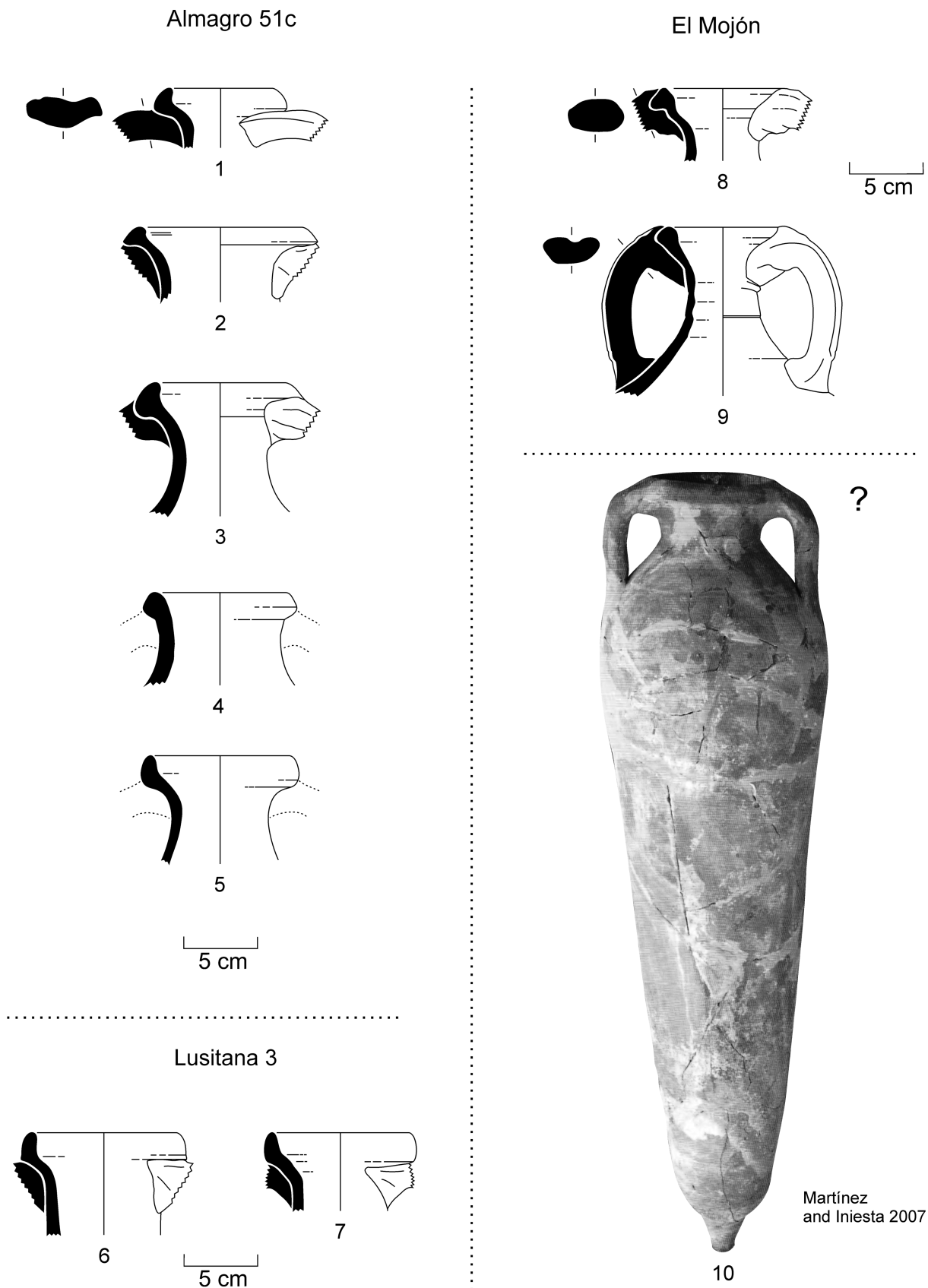


FIGURE 8. ALMAGRO 51C AMPHORAE (MNAS): NOS. 1-5 – PUERTO DE MAZARRÓN (NOS. 3 AND 5 ARE DRAWINGS OF M. A. PÉREZ BONET); LUSITANA 3 AMPHORAE: NOS. 6 AND 7 – PUERTO DE MAZARRÓN; LOCAL PRODUCTIONS OF EL MOJÓN: NOS. 8 AND 9 (DRAWING OF M. A. PÉREZ BONET); AND NO. 10 – PROBABLY LOCAL PRODUCTION AMPHORA (FACTORÍA ROMANA DE SALAZONES OF PUERTO DE MAZARRÓN).

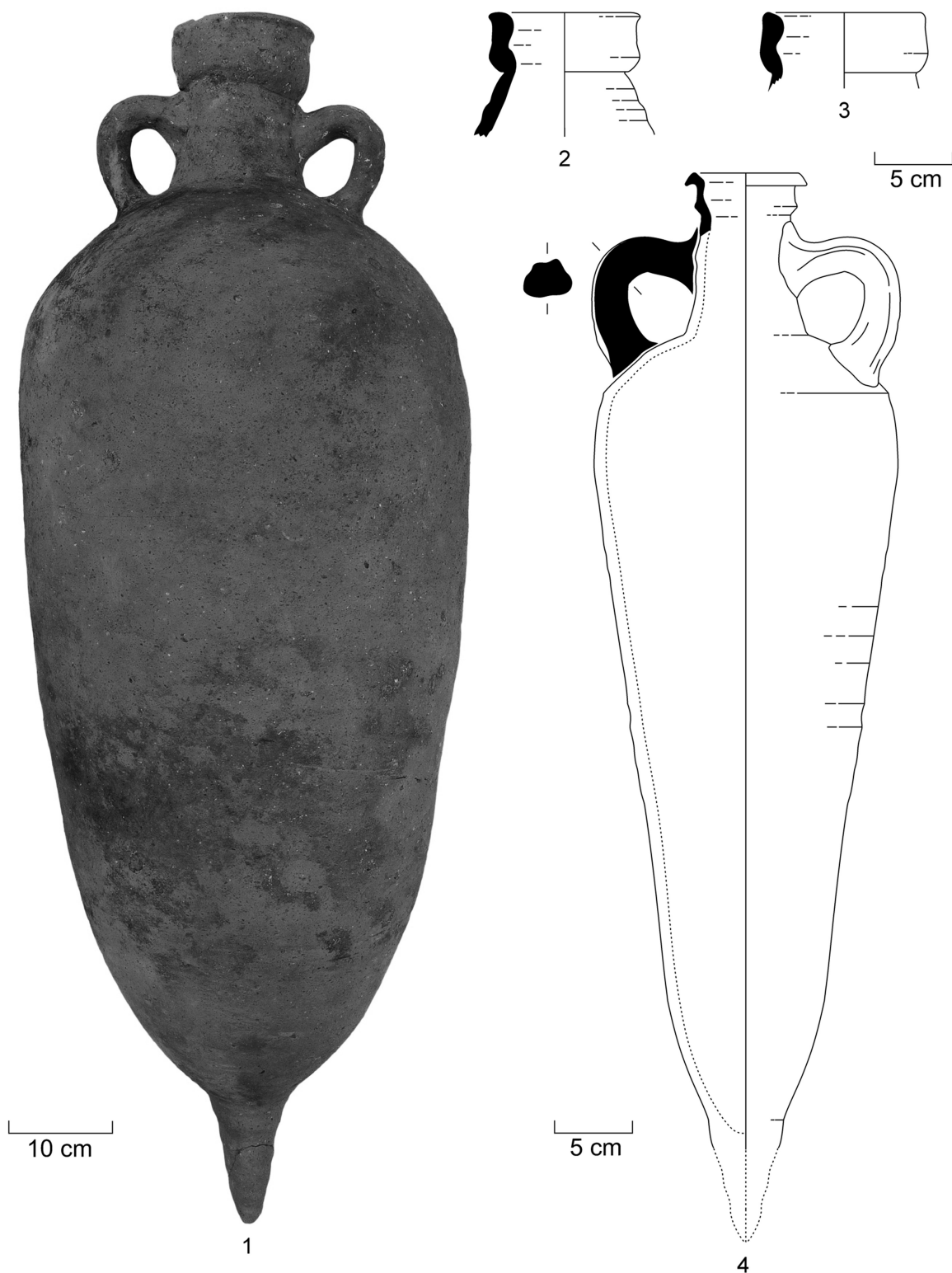


FIGURE 9. ALMAGRO 51A-B AMPHORAE: NO. 1 – ÁGUILAS (PHOTO: MNAS); NOS. 2 AND 3 – PUERTO DE MAZARRÓN (MNAS); NO. 4. SIERRA MINERA DE CARTAGENA (MAMC).

imports outside the province of Lusitania, such as Arles and Seville (Djaoui and Quaresma, in this volume; García Vargas, in this volume). Furthermore, it opens the discussion of a possible export of wine from Lusitania in addition to fish sauce – the great Lusitanian product that was exported to the Mediterranean in amphorae.

The problems related to the determination of fabric and origin, based solely on a macroscopic analysis, become more complex when the late antique forms Keay XIX / Almagro 51a-b, Almagro 51c, Almagro 50 / Keay XXII and or Keay XVI of Baetican, Lusitanian and local production are associated in the same contexts, as in Puerto de Mazarrón and in the villa of Portmán. This demonstrates the complexity of the situation and the complexity of commercial exchanges in Roman times. On the other hand, in addition to the problem of identification of the production areas, there are also the changes caused by the prolonged immersion of the pieces, mainly at the level of the colour of the ceramic fabrics.

But there are other aspects to this problem. Archaeologists are often faced with the unknown, i.e. hypothetical production centres that have not yet been identified. Hence, the number of amphora fragments characterised as being of undetermined origin still accounts for considerable percentages in most Roman archaeological contexts. In this respect, there are two more data pertaining to the problematic presence of ‘Lusitanian-type’ amphorae on the Carthaginian coast that we should consider.

The top of an amphora from the villa of Portmán, with the rim, two handles, and part of the body, is hard to classify (Figure 6, no. 5). Similar to the Almagro 50 type, the piece presents a fabric whose characteristics differ greatly from the characteristics of Lusitanian or Baetican fabrics. Hard, reddish, containing frequent flecks of mica, the fabric presents some affinity with the local products of El Mojón. But so far, the production of this form is not documented in that pottery workshop. On the other hand, the fragment could fall formally within the San Lorenzo 7 type: an amphora similar to Almagro 50, yet different in section and dimensions, about 70-75cm in height, usually considered a product of the eastern Mediterranean but without any more precise identification (Dobrevá 2012: 104; Auriemma and Pesavento, in this volume, Figures 4-5).

The second case concerns an amphora on display in the Museo de la Factoría Romana de Salazones of Puerto de Mazarrón (Figure 8, no. 10). The piece presents many formal similarities with the Lusitanian Sado 3 type, even though the connection of the handles to the rim and body presents different characteristics. The fabric is, however, not Lusitanian and presents affinities with local products. Sado 3 appears in the late 4th century or in the 5th century, and its production is documented in the pottery workshop of Pinheiro (Mayet and Silva 1998: 299, fig. 132, no. 14; Fabião 2008: 742). We may, therefore, be in the presence of an amphora of local production which, similarly to the South Hispanic forms Almagro 51c and Keay XIX, may

have been produced in one of the pottery workshops of this coastal strip.

Bibliographical references

- Alonso Campoy, D. 2009. Minería y tráfico marítimo. Pecos y enclaves costeros para el estudio de la actividad minera en Carthago Noua. *Argentvm* 1: 11-55.
- Bernal Casasola, D. (ed.) 1998. *Excavaciones arqueológicas en el alfar romano de la Venta del Carmén, Los Barrios (Cádiz): una aproximación a la producción de ánforas en la Bahía de Algeciras en época altoimperial*. Madrid, Universidad Autónoma de Madrid.
- Bernal Casasola, D. and García Vargas, E. 2008. Ánforas de la Bética. In D. Bernal Casasola and A. Ribera i Lacomba (eds), *Cerámicas hispanorromanas. Un estado de la cuestión: 725-745*. Cádiz, Universidad de Cádiz.
- Berrocal Caparrós, M. C. 2008. El puerto de Cartagena y los fondeaderos desde Cabo de Palos a Cabo Tinoso. In J. Perez Ballester and G. Pascual (eds), *Comercio, redistribución y fondeaderos. La navegación a vela en el Mediterráneo* (Gandia, 8 a 10 de noviembre de 2006): 337-348. Valencia, Universitat de Valencia.
- Berrocal Caparrós, M. del C. 2012. Producciones anfóricas en la costa meridional de Carthago-Spartaria. In D. Bernal Casasola and A. Ribera i Lacomba (eds), *Cerámicas hispanorromanas II - Producciones regionales*. Monografías Historia y Arte: 255-277. Cádiz, Universidad de Cádiz.
- Bonifay, M. 2004. *Études sur la céramique romaine tardive d’Afrique*. British Archaeological Reports International Series 1301. Oxford, Archaeopress.
- Cerezo Andreo, F. 2011. *La colección material del yacimiento subacuático de Escolletes. Arqueología náutica y dinámicas comerciales en el Sureste Ibérico en Época Bajo Imperial*. Unpublished MA thesis, Universidad de Murcia.
- Dobrevá, D. 2012. I Materiali archeologici. In J. Bonetto and A. R. Ghiotto (eds), *Aquileia – Fondi ex Cossar. Missione archeologica 2012*: 101-136. Padova.
- Domergue, C. and Rico, C. forthcoming. L’exportation des métaux de l’Occident méditerranéen à l’époque romaine. L’exemple de la Gaule et l’Hispanie. In M. Paquinucci and S. Menchelli (eds), *Porti antichi e retroterra produttivi* (26-28 marzo 2009).
- Fabião, C. 2008. Las ánforas de Lusitania. In D. Bernal Casasola and A. Ribera i Lacomba (eds), *Cerámicas hispanorromanas. Un estado de la cuestión: 725-745*. Cádiz, Universidad de Cádiz.
- Fernández Díaz, A. 1999. *La villa romana de Portmán. Programa decorativo ornamental y otros elementos para su estudio*. Murcia, Universidad de Murcia.
- Hernández García, J. de D. and López Martínez, C. M. (eds.) 2011. *Guía del Museo Arqueológico de Águilas*. Águilas.
- Keay, S. 1984. *Late Roman Amphorae in the Western Mediterranean. A typology and economic study: the*

- Catalan evidence*. British Archaeological Reports International Series 196. Oxford, Hands and Walker.
- Lorenzo Solano, J. A. 1990. *Portmán II (1920-1960) (Portus Magnus Romano)*. Murcia.
- Martínez Alcalde, M. and Iniesta Sanmartín, A. (eds) 2007. *Factoría Romana de Salazones: guía Museo Arqueológico Municipal de Mazarrón*. Mazarrón, Ayuntamiento de Mazarrón.
- Mas García, J. 1985. El polígono submarino de Cabo de Palos. Sus aportaciones al estudio del tráfico marítimo antiguo. In *VI Congreso Internacional de Arqueología Submarina* (Cartagena, 1982): 153-171. Madrid.
- Mas García, J. 1998. Portus Carthaginiensis. Simbiosis de un emporio y una gran base militar. In *Puertos antiguos y comercio marítimo. Actas de las III Jornadas de Arqueología Subacuática* (Valencia, 1997): 77-97. Valencia.
- Mas García, J. 2004. El puerto de Cartagena y su hinterland en la vanguardia de la arqueología submarina española. In M. Pérez, J. A. Soler and P. Martínez (eds), *Scombraria. La historia oculta bajo el Mar*. Catálogo de la Exposición: 48-65. Murcia.
- Mayet, F., Schmitt, A. and Silva, C. T. 1996. *Les amphores du Sado (Portugal). Prospection des fours et analyse du matériel*. Paris, E. de Boccard.
- Mayet, F. and Silva, C. T. 1998. *L'atelier d'amphores de Pinheiro (Portugal)*. Paris, E. de Boccard.
- Mayet, F. and Silva, C. T. 2002. *L'atelier d'amphores d'Abul (Portugal)*. Paris, E. de Boccard.
- Miñano Domínguez, A. and Castillo Belinchón, R. 2013a. La gestión del patrimonio cultural subacuático: prospecciones y cartas arqueológicas. In *Actas del I Congreso de Arqueología Náutica y Subacuática Española* (Cartagena, 14-16 marzo de 2013): 906-922. Museo Nacional de Arqueología Subacuática and Ministerio de Educación, Cultura y Deporte.
- Miñano Domínguez, A. and Castillo Belinchón, R. 2013b. Últimas campañas arqueológicas subacuáticas del Museo Nacional de Arqueología Subacuática (2011-2012). In *Actas del I Congreso de Arqueología Náutica y Subacuática Española* (Cartagena, 14-16 marzo de 2013): 923-935. Museo Nacional de Arqueología Subacuática and Ministerio de Educación, Cultura y Deporte.
- Molina Vidal, J. and Márquez Villora, J. C. 2005. *Del Hiberus a Carthago Nova. Comercio de alimentos y epigrafía anfórica grecolatina*. Col.lecció Instrumenta 18. Barcelona, Universitat de Barcelona.
- Murcia Muñoz, A. J., López Mondéjar, L. and Ramallo Asensio, S. F. 2013. El territorio de Carthago Nova entre los siglos II a.C. y II d.C. In J.-L. Fiches, R. Plana and V. Revilla (eds), *Paysages ruraux et territoires dans les cités de l'Occident romain. Gaule et Hispania / Paisajes rurales y territorios en las ciudades del Occidente romano*. Galia y Hispania. Actes du colloque international AGER IX (Barcelona, 25-27 mars 2010): 121-135. Montpellier, Presses Universitaires de la Méditerranée.
- Pérez Bonet, M. A. 1988. La economía tardorromana del sureste peninsular: el ejemplo del puerto de Mazarrón (Murcia). In *Arte y poblamiento en el SE peninsular. Antigüedad Cristiana V*: 471-501. Murcia, Universidad de Murcia.
- Pérez Bonet, M. A. 1996. El tráfico Marítimo en el Puerto de Carthago-Nova: Las ánforas romanas. *Cuadernos de Arqueología Marítima* 4: 39-55.
- Pinedo Reyes, J. 1996. Inventario de yacimientos arqueológicos subacuáticos del litoral murciano. *Cuadernos de Arqueología Marítima* 4: 57-90.
- Pinedo Reyes, J. 2011. Actuaciones arqueológicas submarinas en nueva dársena deportiva "Marina d Curra", Cartagena. In *Actas de las Jornadas de ARQUA 2011* (Cartagena, 3-4 diciembre 2011): 47-51. Museo Nacional de Arqueología Subacuática and Ministerio de Educación, Cultura y Deporte.
- Pinedo Reyes, J. and Alonso Campoy, D. 2004. El yacimiento submarino de la Isla de Escombreras. In M. Pérez, J. A. Soler and P. Martínez (eds), *Scombraria. La historia oculta bajo el Mar*. Catálogo de la Exposición: 129-151. Murcia, Museo Arqueológico de Alicante.
- Pinedo Reyes, J. and Polzer, M. E. 2011. *El yacimiento subacuático del bajo de la Campana*. In *Actas de las Jornadas de ARQUA 2011* (Cartagena, 3-4 diciembre 2011): 90-95. Museo Nacional de Arqueología Subacuática. Ministerio de Educación, Cultura y Deporte.
- Quevedo, A. 2015. *Contextos cerámicos y transformaciones urbanas en Carthago Nova (s. II-III d.C.)*. Roman and Late Antique Mediterranean Pottery 7: Oxford, Archaeopress.
- Ramallo Asensio, S. F. 1984. Algunas consideraciones sobre el Bajo Imperio en el litoral murciano: Los hallazgos romanos en Águilas. In *Anales de la Universidad de Murcia, Letras* 42, 3-4: 97-125.
- Ramallo Asensio, S. F. 1985. Envases para salazón en el Bajo Imperio (I). In *VI Congreso Internacional de Arqueología Submarina* (Cartagena 1982): 435-442. Ministerio de Educación, Cultura y Deporte, Dirección General de Bellas Artes y de Conservación y Restauración de Bienes Culturales.
- Ramallo Asensio, S. F. 2011. *Carthago Nova. Puerto mediterráneo de Hispania*. Murcia, Fundación Cajamurcia.
- Ramallo Asensio, S. F. and Martínez Andreu, M. 2010. El puerto de Carthago Nova: eje de vertebración de la actividad comercial en el sureste de la Península Ibérica. In *XVII International Congress of Classical Archaeology* (Roma, 22-26 September 2008). Bolletino di Archeologia on line, Volume speciale: 141-159.
- Roldán Bernal, B., Martín Camino, M. and Pérez Bonet, M. A. 1995. El yacimiento submarino del Bajo de la Campana (Cartagena, Murcia). Catálogo y estudio de los materiales Arqueológicos. *Cuadernos de Arqueología Marítima* 3: 11-61.