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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Contents

Fish Bones and Amphorae: New Evidence for the Production and Trade of Fish Products in Setúbal (Portugal)

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The archaeological urban project developed in Setúbal since 1975 by the Museu de Arqueologia e Etnografia do Distrito de Setúbal (MAEDS) indicates that Caetobriga (now known as Setúbal) was a prosperous harbour and an industrial city, economically specialized in the large-scale production of salted fish and fish sauces for export throughout the Roman Empire.

The finds reported here derive from two samples of fish bones found in two Dressel 14 amphorae in Setúbal. They were found in the course of rescue excavations at Rua Francisco Augusto Flamengo, 10-12 (RFAF-10-12) and Rua António Joaquim Granjo, 19 (RAJG-19). The latter constitutes the first evidence of fish remains from the 1st century AD in Lusitania.

*The results show that the products found in the amphorae derive from whole sardines (*Sardina pilchardus*). Sample features and individual size distribution are compared in a description and discussion of the contents of the amphorae. This information is compared to other known finds of similar nature.*

KEYWORDS: FISH PRODUCTS; ROMAN LUSITANIA; DRESSEL 14 AMPHORA; FISH BONES; CAETOBRIGA; SETÚBAL; 1ST CENTURY AD.

Introduction

The production, trade and consumption of fish sauces and salted fish in Roman times are known from various literary sources (Curtis 1991), and are well documented by the excavation and analysis of salting installations found in Portugal and by the nearly ubiquitous remains of amphorae used to trade these products (Bugalhão 2001; Tavares da Silva, Soares and Wrench 2010; Pinto, Magalhães and Brum 2011, among many others).

At present, more than a century after Dressel's first comments on the fish remains found inside the amphorae from the Castro Pretorio and the need to determine which species were present (Dressel 1879 *apud* Van Neer, Ervynck and Monsieur 2010: 161), little archaeozoological evidence has been reported from Portugal. The few published finds cover a very restricted time span and refer to specific contexts - the factories of the 3rd to 5th centuries AD (Desse-Berset and Desse 2000; Assis and Amaro 2006; Gabriel, Fabião and Filipe 2009; Gabriel 2013).

Since 1975, the Museu de Arqueologia e Etnografia do Distrito de Setúbal (MAEDS) has been carrying out archaeological research in the urban area, whose results indicate that ancient Setúbal (Caetobriga) was a prosperous harbour and industrial city, specialized in the large-scale production of salted fish and fish sauces for export to distant markets in the Roman Empire (Tavares da Silva, Soares and Wrench 2010; Tavares da Silva *et al.* 2010).

The samples studied here come from two Dressel 14 amphora bases believed to have carried fish products. The material was recovered from two archaeological sites (see Figure 1 for location): Rua António Joaquim Granjo, 19 (Test-pit C, Layer 5B (Tavares da Silva, Soares and Wrench 2010)); and Rua Francisco Augusto Flamengo, 10-12 (Locus C – Layer 7 (Tavares da Silva *et al.* 2010; Tavares da Silva *et al.* 2014)).

Sample 2 dates to the 1st century AD and constitutes the first archaeozoological evidence of the manufacture and trade of salted-fish products in Lusitania in that century.

Our aim is to characterize Samples 1 and 2 (in terms of species and size), compare them to fish remains from other sites and discuss the type of product found in the amphorae.

The amphorae and their contexts

The two fish-bone samples under scrutiny were recovered from the following contexts excavated at Santa Maria Hill, a residential area in Roman Caetobriga (Setúbal):

1. Sample 1 (RFAF 10-12) – It was found inside a Dressel 14, Variant C amphora (Figure 2) from *Locus* C - Layer 7-8 in the excavation of Rua Francisco Augusto Flamengo, 10-12 (RFAF 10-12), a rubbish dump context accumulated from the end of the 1st century to the 2nd century AD (Tavares da Silva *et al*. 2014: 178). In this stratigraphic horizon, South Gaulish Sigillata (NMI=45) prevails over Hispanic Sigillata (NMI=28). The presence of South Gaulish Sigillata is documented by types Drag. 15/17, Drag. 18, Ritt. 8, Drag. 27 (the most frequent),

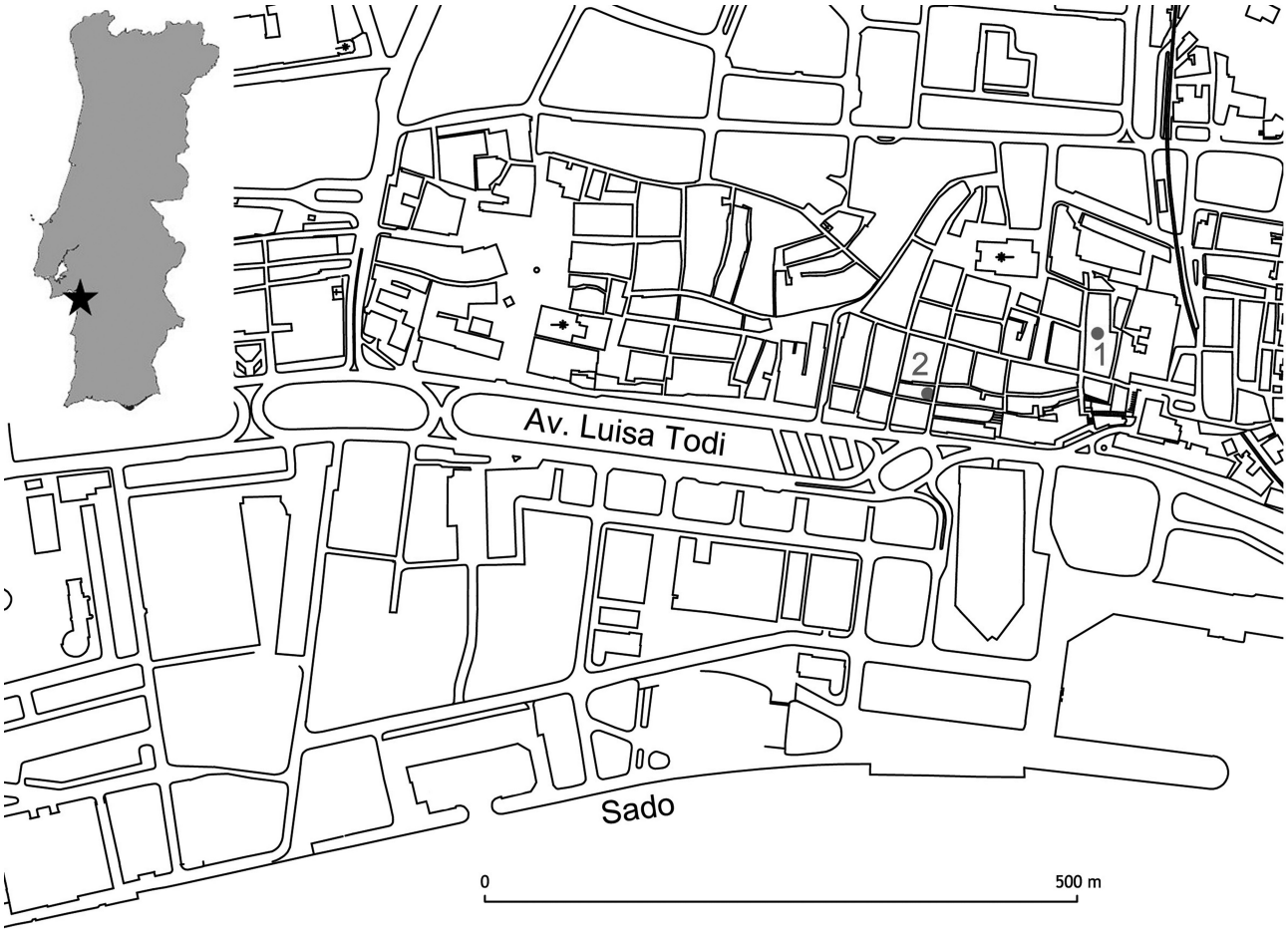


Figure 1. Site location in Setúbal:
1- Rua Francisco Augusto Flamengo (RFAF10-12); 2- Rua António Joaquim Granjo (RAJG-19).

Drag. 33, Drag. 35/36 and Ritt. 12; they show potter stamps attributed to Catlus and Secundus I or II. Hispanic Sigillata, almost exclusively from La Rioja, is documented by shapes Drag. 15/17 (very abundant), Drag. 24/25, Drag. 27, Drag. 33, Drag. 35, Drag. 46, Drag. 29 or 37, Drag. 30 (?) and Drag. 37 (Tavares da Silva *et al*. 2014: Quadro 2), showing potters' stamps attributed to Petronius Eros and Valerius Firmus. As far as amphorae are concerned, Layer 7-8 had plenty of specimens of the imported types Dressel 2-4, Rhodian Type, Haltern 70, Oberaden 83 and Gauloise 4, as well as the regionally produced Dressel 14, Variants A (?), B and C (the most abundant) (Tavares da Silva *et al*. 2014: Quadro 5).

2. Sample 2 (RAJG, 19) – It was found filling a large fragment (lower part) of a Dressel 14 amphora (indeterminate variant) (Figure 2). This specimen was excavated from Pit C - Layer 5B in Rua António Joaquim Granjo, 19 (RAJG, 19) (Tavares da Silva, Soares and Wrench 2010).

Layer 5B in Pit C was formed during the second half of the 1st century AD. Although the datable material was sparse (South Gaulish Sigillata Drag. 18 (?) and regionally produced amphorae Dressel 7-11 and Dressel 14, Variants A and B), Layer 5B belongs to a stratigraphic sequence in which the underlying layer (C. 6) is dated to the third quarter of the 1st century AD (with imported Baetican amphorae Beltrán II and Dressel 20 showing a distinctive rim (Martin-Kilcher 1983) and the regionally produced Haltern 70, Dressel 7-11, Dressel 14, Variants A e B (?)), and the overlying layer (C.5 A) is dated to the last quarter of the 1st century AD (South Gaulish Sigillata Ritt. 8 marbled, Drag. 15/17 and Drag. 37, as well as the regionally produced amphorae Haltern 70 (?) and Dressel 14, Variants A and B).

Dressel 14 amphorae were produced in the pottery workshops of the Lower Sado region from the Tiberio-Claudian period to the late 2nd century or early 3rd century AD (Tavares da Silva 1996; Mayet and Tavares da Silva 1998; Mayet and Tavares da Silva 2002; Mayet, Schmitt and Tavares da Silva 1996). In spite of the long duration of this amphora type, the Dressel 14 of Sample 2 dates from the middle of the second half of the 1st century AD, while the complete amphora with Sample 1, a Dressel 14, Variant C, must be from the end of the 1st century or the beginning of the 2nd century AD, as this variant is dated to the 2nd century AD in the workshops of Abul and Pinheiro (Mayet and Tavares da Silva 1998; Mayet and Tavares da Silva 2002). Therefore, it confirms the production of this variant in an early moment of the 2nd century, if not in a late moment of the 1st century AD.

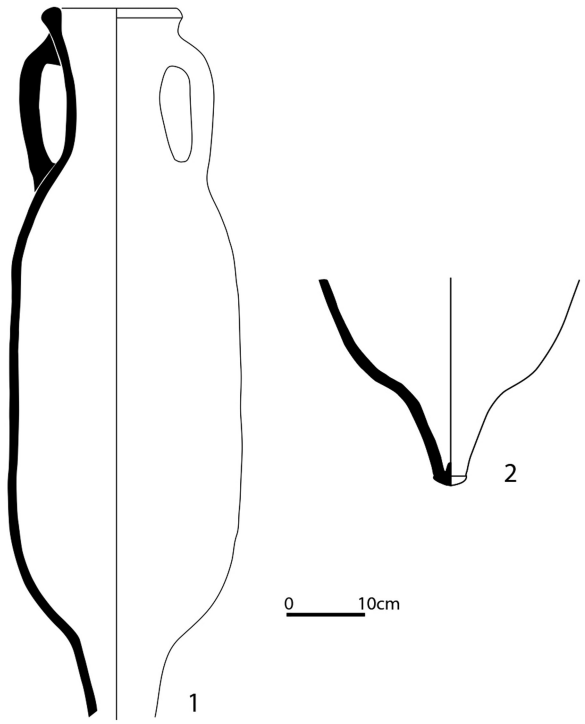


Figure 2. Two Dressel 14 amphorae containing fish remains found in the Setúbal urban area: Rua Francisco Augusto Flamengo (1); and Rua António Joaquim Granjo (2).
Drawings: Susana Duarte (MAEDS).

Material and Methods

The two samples present rather different features (Figure 3): while Sample 1 (RFAF10-12) is a massive concentration of bone (cranial, vertebral and fin elements), many still in articulation and probably resulting from a deposit of entire fish, Sample 2 (RAJG19) is mainly composed of sand particles with rather scattered bone (cranial, rachis and fin elements). Sample 1 was only partially processed (~50%) in order to preserve a portion for further analysis, while Sample 2 was fully processed.

Sample processing was undertaken adapting the standard methods described in Assis and Amaro (2006) and Desse-Berset and Desse (2000), in short: water-sieving (1mm/0.5mm/75µm meshes), sub-sampling (100ml), sorting (stereomicroscope with integrated micrometer, also used for bone measurements). The 1mm sieve was found to retain the most suitable material to carry out identification using the Laboratório de Arqueociências (LARC) reference collections. For the sardine (*Sardina pilchardus*), the minimum number of individuals (MNI) was estimated by counting the first vertebrae (V1). These bones were also used for individual size reconstruction. Bone measurements, and the linear regression formula used to estimate sardine size (TL= 62.87 AL+24.26; r^2= 0.967, where TL is the total length, AL is the anterior length of the first vertebra and r^2 is the correlation coefficient) follow Assis and Amaro (2006: 127, 137).

Results

The bones present in the samples (cranial, vertebrae and appendicular bones) point to the presence of whole fish, though in low frequencies and disarticulated in one sample (RAJG19).

The sardine (*Sardina pilchardus*) is the only fish taxon found in the samples. Individual size reconstruction (total length – TL) using the methods described above (see Material and Methods) indicate the presence of fish 163-207mm long, although there seems to exist a tendency for the presence of larger fish in one of the samples. In RFAF10-12, the individuals range between 163-207mm,

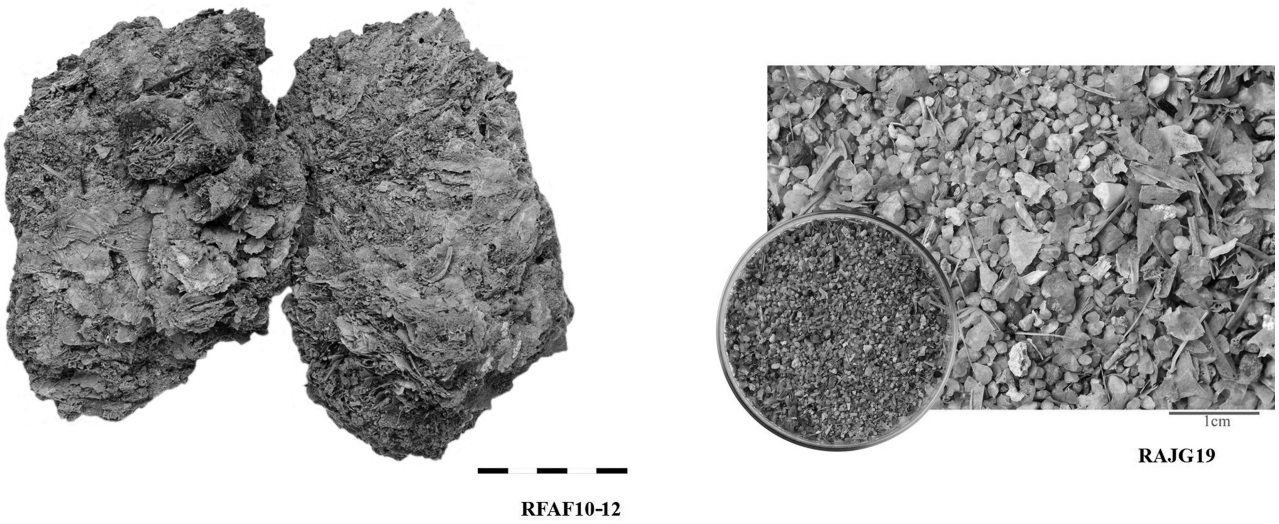
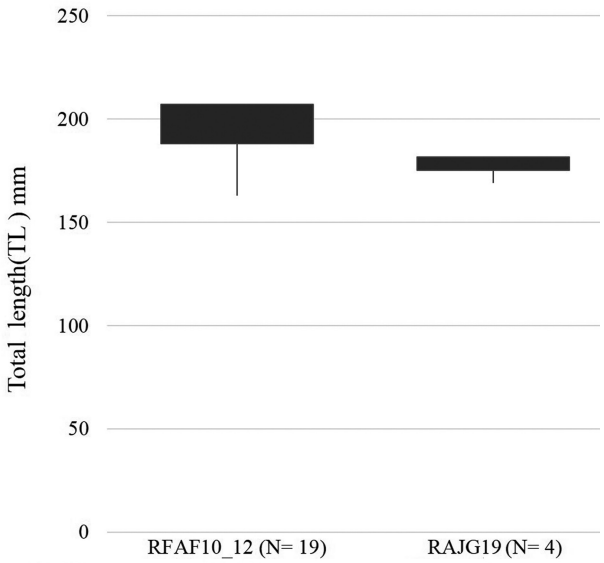


Figure 3. Physical appearance of the fish bone samples recovered at Rua Francisco Augusto Flamengo (RFAF10-12) and Rua António Joaquim Granjo (RAJG-19).
Photos: José Paulo Ruas (DGPC).



	RFAF10_12 (N= 19)	RAJG19 (N= 4)
MAX.	207,00	181,44
MIN.	163,00	169,00
MEDIA	187,00	175,15
MED	188,00	175,15

Figure 4. Estimated length for *Sardina pilchardus* (sardine). Total length (TL) refers to the length of the fish measured from the tip of the snout to the tip of the longer lobe of the caudal fin.

with median size attaining 187mm, while the fish found in RAJG19 range between 169-181mm, with median size attaining 175mm (Figure 4).

The sardines found in the samples studied are distributed in five size classes. Most of the fish in RAJG19 are in the 171-180mm size class (50%), with the remaining 50% equally distributed among two different size classes: 161-170mm (25%), and 191-200mm (25%) (Figure 5).

In RFAF10-12, the vast majority of the fish are in the 181-190mm (58%) and 191-200mm size class (26%). The remaining 22% is divided between two size classes: 161-170mm (11%), and 201-210mm (11%) (Figure 5).

Discussion

The first remarkable fact is that the sardine is the only species found in the two amphorae. The prevalence of sardines in fish-salting vats has been noticed in Algarve (Quinta do Marim, Olhão: Desse-Berset and Desse 2000), Setúbal (Travessa de Frei Gaspar: Desse-Berset and Desse 2000), Tróia (Desse-Berset and Desse 2000), and Lisbon (Mandarim Chinês, Rua dos Correeiros: Assis and Amaro 2006; and Casa do Governador: Gabriel, Fabião and Filipe 2009). Besides these contexts dated from the 3rd to the 5th century, one sample from an amphora dated to the 2nd century, excavated in Tróia, shows similar results (e.g., the prevalence of the sardine: Gabriel 2013). Along with these results, the data obtained in the present study (RAJG-19) show that the sardine was used for processed fish products in Lusitania from the 1st century onwards.

In Portugal, the sardine has always been an important food resource. This is due to its abundance along the coast and low ex-vessel price. Historical documents from the 17th

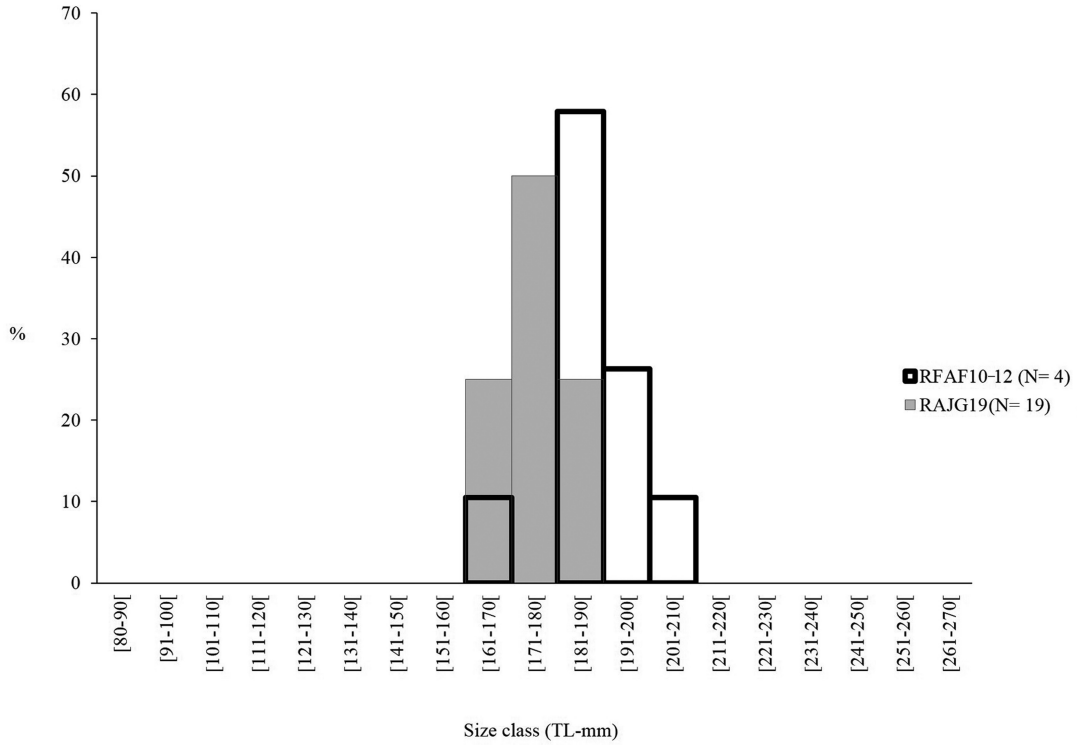


Figure 5. Size class distribution for *Sardina pilchardus* (sardine). Total length (TL) refers to the length of the fish measured from the tip of the snout to the tip of the longer lobe of the caudal fin.

century attest its importance, showing the existence of specific legislation in taxes and its significance as food in the interior of the country (to where it was transported salted). Historical references from the 19th century mention barriers and nets for sardines near Lisbon (in Cascais), as well as the use of drifting gillnet and beach seine nets (Silva 1891). It is possible that these techniques were also used in Roman times.

The sardine constitutes the main pelagic fish resource along the Portuguese coast. It is widely distributed on the continental shelf (depth 20-100m) and can grow up to 270mm (sometimes more) after 14 years. Along the Portuguese coast, juvenile sardines already attain a length of 130-140mm at the end of their first year of life (Silva *et al.* 2008).

The fish found inside the amphorae in the Setúbal region correspond to mature individuals, 163-207mm long (RFAF10/12 and RAJG19), smaller than the ones found in the 2nd-century amphora from Tróia (up to 199-262mm: Gabriel 2013). Size variation may be due to production requirements (size selection according to the product specificities), although overfishing and variations in the sardine life cycle must also be considered.

In the Roman world, fish appears to have been processed in two ways (Edmondson 1987; Van Neer, Ervynck and Monsieur 2010): *salsamenta* and fish sauces. The first is known from literary sources to designate salted fish, frequently of relatively large size, preserved whole or in chunks, with the flesh of the fish as a solid substance. Fish sauces, however, are liquids containing the dissolved soft parts (and sometime also the bones) of mostly smaller fish, and/or the dissolved flesh or blood of larger fishes (Van Neer, Ervynck and Monsieur 2010).

As our knowledge concerning fish remains from sediment samples from salting installations and amphorae has grown, criteria have been developed to provide more precise distinctions between fish sauces and *salsamenta* (Desse-Berset and Desse 2000): condition of the sample, preserved bones and their anatomical position, and the reconstruction of body lengths of the corresponding fish.

By using these criteria, the sample features described for RFAF10-12 with its massive numbers of superimposed bones in articulation (mostly cranial and rachis) (Figure 4) – suggest that these fish remains may represent *salsamenta* manufactured from entire sardines. Similar features were also reported in a sample from the Sud Perduto II shipwreck (1st century AD), where the articulated bones of *Scomber japonicus* (chub mackerel) were interpreted as the production of *salsamenta* (Desse-Berset and Desse 2000: 75-79).

In stark contrast and rather more difficult to interpret is Sample RAJG19. While its bone list suggests the presence of whole fish (cranial, rachis, fins), the low frequency of bones, their disarticulated nature and dispersion among the sandy particles that compose the sample could reflect post-depositional events such as the mingling and dispersion of the contents of the amphorae. An alternative hypothesis is that RAJG19 corresponds to a different kind of fish product.

Compared to previous archaeozoological data from the fish-salting vats in Quinta do Marim and Setúbal, where most sardines are 80-140mm long (Desse-Berset and Desse 2000), the individuals found in amphorae tend to be larger (163-207mm long in RFAF10/12 and RAJG19: this study; and up to 199-262mm in Tróia: Gabriel 2013). Could there be a selection of larger sardines to make *salsamenta* and smaller sardines for sauces?

The likely presence of *salsamenta* in at least one Dressel 14 amphora endorses the suspected multifunctionality of this amphora type, the only one in use in the region during the 1st-2nd centuries AD and known for repeated *tituli picti* of *liquamen* and one of *muria* (Étienne 1990; Djaoui, in this volume). Whatever the case may be, and as suggested in previous archaeozoological studies of fish remains found in amphorae (Gabriel 2013), during the 1st and 2nd centuries AD the sardine appears to have been the basis of the products manufactured, traded, and consumed in ancient Lusitania.

Conclusions

The finds reported here constitute the first fish remains evidence known from the 1st century and possibly the early 2nd century AD in Lusitania, and gathers together most of the samples known from amphorae.

The sardine constitutes the basis of the products found inside these amphorae. The condition of the samples, the bones preserved and their anatomical position suggest the production, trade and consumption of salted sardines (RFAF 10-12).

The reconstructed body lengths indicate that the fish found inside amphorae in the Setúbal/Tróia region correspond to individuals 163-207mm long (Setúbal, 1st century AD), ranging up to 199-262mm (Tróia, 2nd century AD).

Our results can be compared to those obtained from salting installations and literary sources and may allow us to understand how the Romans fished and processed fish over the course of time.

Last but not least, our results suggest that the Dressel 14 amphora, known to have carried fish sauces (*liquamen* and *muria*), could also have been used to the transport of different types of fish products (e.g., salted fish, *salsamenta*).

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