

## Fish and Crustaceans from a Roman Amphora in Northern Italy

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**ABSTRACT:** In this paper, the study of the contents of an amphora dating to the Roman Empire from the city of Vicenza in northern Italy is discussed. The amphora, along with others, formed part of the foundation of a roadway, which probably functioned for rainwater drainage. The residue in the amphora consisted of remains of very small fish mixed with fragments of crustaceans. Preservation was poor, and only a small proportion of the fragments were identifiable. Due to the small size of the remains, identification was only possible with the use of a microscope. Both freshwater and marine species were identified, suggesting that these fish came from a location on the northern Adriatic shore, where lagoons and estuaries are common.

**KEYWORDS:** FISH, CRUSTACEANS, *ALLEC*, AMPHORA, ROMAN PERIOD, ADRIATIC, ITALY

**RESUMEN:** En este trabajo se presenta el estudio de los restos aparecidos en un ánfora procedente de la provincia de Vicenza en el norte de Italia, fechada en época romano imperial. El recipiente fue colocado en una capa bajo el pavimento de una carretera, siendo su probable función la de drenaje del agua de lluvia. En su interior se detectaron diminutos restos de peces mezclados con fragmentos de crustáceos. Sólo una pequeña fracción de los restos tienen valor diagnóstico debido a su mal estado de conservación y minúsculo tamaño que obligó al uso de un microscopio para su estudio. La identificación de especies marinas, junto con otras de agua dulce, nos hace postular que estas producciones se pueden ubicar en algún lugar del norte del Adriático donde los biotopos de lagunas costeras y estuarios son comunes.

**PALABRAS CLAVE:** PECES, CRUSTÁCEOS, *ALLEC*, ÁNFORA, ÉPOCA ROMANA, ITALIA, MAR ADRIÁTICO

## INTRODUCTION

In the southeastern part of the city of Vicenza, northern Italy (Figure 1), an archaeological excavation uncovered an artificial roadway, whose foundation was composed of two overlapping layers of re-utilized amphorae superimposed over horizontal layers of disturbed earth. A total of 311 amphorae were found, mostly of Adriatic and northern Italic origin, and some of oriental and Iberian origin. Typological and epigraphic analyses of the containers and of the different ceramic classes found in these levels date the structure to the middle of the 1<sup>st</sup> century A.D.



FIGURE 1  
Map of Italy and Vicenza.

Among the amphorae that formed the lower level of the foundation of the Roman earthwork, a Dressel 6A amphora was uncovered, the contents of which were still intact (Figures 2 and 3).

The amphora is currently split in two halves at its shoulder. The fracture appears to be recent, however, and it may be assumed that the vessel was whole when found. Dressel 6A amphorae were containers used for transporting wine in the upper Adriatic region and were the most common type of amphora used during the 1<sup>st</sup> century A.D. It replaced the Lamboglia 2 type which had been



FIGURE 2  
Amphora with contents.



FIGURE 3  
The amphora.

used in the 1<sup>st</sup> century B.C. (ca. 30 B.C.). Dressel 6A amphorae were not produced after the 2<sup>nd</sup> century A.D. The morphological differences among amphorae mirror the numerous areas of their production, which included Abruzzo, Emilia, Marche, and Aquileia (Carre *et al.*, 2009).

## MATERIALS AND METHODS

The contents of the amphora were poorly preserved, and only a few of the remains could be identified. The base of the material consisted of an aggregated mass of disarticulated fish remains, which included all skeletal elements including scales (Figure 4). The remains belonged to very small-sized fish and therefore could only be iden-



FIGURE 4  
A part of the studied sample.

tified under a microscope (x 20) or with a large magnifying glass for some of the larger fragments.

The zooarchaeological assemblage was embedded within a residual concretion inside the amphora and was collected in its entirety. The amphora and other cultural artifacts recovered at the site were analyzed by S. Mazzocchin. The faunal materials found within the amphora, which consisted of two samples, were studied by B. Wilkens in the archaeozoological laboratory at the University of Sassari. Identification of specimens was carried out by comparison with her own personal comparative collection. Quantification of the faunal remains included a count of the number of identified specimens for each taxon (NISP) and estimations of the minimum number of individual animals (MNI) represented. The MNI determinations were based on the most common skeletal ele-

ment represented for each taxon. Estimates of relative abundance of each taxon were approximations as parts of the samples were concreted together.

## RESULTS

A total of 306 fish and crustacean remains were recovered (Table 1). The majority of the identifiable fragments (premaxillary, dentary, and hyomandibular) belonged to picarel (*Spicara smaris*) (Bini, 1967; Bailly, 2010), a gregarious marine fish, of which at least 14 individuals were present in the material identified (Figures 5 and 6). In addition, three fragments (2 pharyngeals and one dentary) of a freshwater carp/minnow (Cyprinidae) were found. In terms of the bone structure, the dentary (Figure 7) was similar to that of European chub (*Leuciscus cephalus*), while the pharyngeal bones were more problematic, as teeth were wholly absent or in a state of deterioration (Figure 8). The remains included at least two young individuals. The fish remains, as was the case for the crustaceans, showed no sign of cutting or other modification.

Besides fish remains, numerous fragments of crustaceans were also found. At least nine specimens were shrimp which could be attributed to the genus *Palaemon* and were very similar to the lagoon shrimp (*Palaemon adspersus* Rathke) (Fransen & Türkay, 2011) in terms of the characteristics of the rostrum (Figures 9 and 10). This crustacean reaches sizes of 7 cm in length and lives in shallow waters with seaweed, or *Posidonia*, in calm or even brackish waters. The individuals represented in the amphora were large in size, close to the maximum dimensions of this species (Costello *et al.*, 2008). This species is currently

|  | NISP       | % NISP         | NMI       | % NMI          |
|--|------------|----------------|-----------|----------------|
| <i>Palaemon cf. adspersus</i>            | 11         | 3,59%          | 9         | 33,33%         |
| Brachiura                                | 35         | 11,44%         | 2         | 7,41%          |
| Crustacea                                | 26         | 8,50%          |           |                |
| <i>Spicara smaris</i>                    | 40         | 13,07%         | 14        | 51,85%         |
| Cyprinidae cf. <i>Leuciscus cephalus</i> | 3          | 0,98%          | 2         | 7,41%          |
| Pisces                                   | 191        | 62,42%         |           |                |
| <b>TOTALS</b>                            | <b>306</b> | <b>100,00%</b> | <b>27</b> | <b>100,00%</b> |

TABLE 1  
List of taxa and quantification.



FIGURE 5  
*Spicara smaris*, premaxillary.



FIGURE 8  
Cyprinidae, pharyngeal bone.

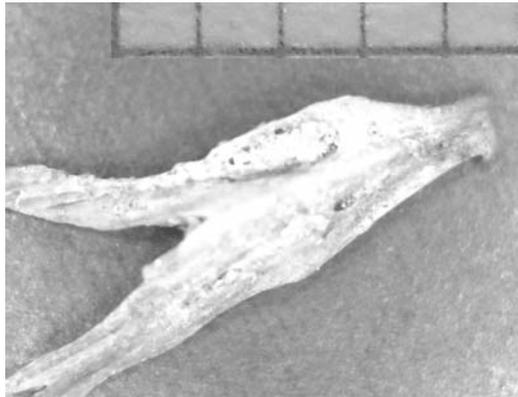


FIGURE 6  
*Spicara smaris*, dentary.



FIGURE 9  
*Palaemon adspersus*, rostrum.



FIGURE 7  
*Leuciscus cephalus*, dentary.



FIGURE 10  
*Palaemon adspersus*, tail parts.

present throughout the Mediterranean and also in the upper Adriatic but is not extensively fished today. On the other hand, it is of greater commercial interest in the Black, North, and Baltic Seas (Fransen & Türkay, 2011). Some of the other crustacean remains were attributed to crabs (*Brachiu-  
ra*), which were of medium size and were not further identified due to a lack of diagnostic parts. Numerous limbs belonging to this group were present (Figure 11). These crab remains included at least two individuals.



FIGURE 11  
Limb parts of crabs.

Examination of the fish vertebrae demonstrated the presence of older individuals (up to 8 years of age) that were small in size. These corresponded with the other picarel (*Spicara smaris*) remains. Because of their small size, cleaning and studying the articular face were difficult. In a few cases where observations could be made, it appeared that these were fished in late spring or summer, the most suitable season, for the preparation of preserves, among other uses. Even today, fish preserves are prepared on a household basis in numerous coastal localities in Italy. This takes place in the warmer seasons (spring or summer), when there is greater availability of fish, both due to the habits of certain species that approach the coast to reproduce and to the better weather conditions that permit the smaller boats to leave the harbor. Furthermore, these seasons offer more sunlight, which is necessary for fermentation. For example, the filtering of anchovies, a sauce similar to *garum*, is produced in Campania during the anchovy fishing

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season, which normally takes place between the end of March and the beginning of July (Carranante *et al.*, 2011).

## DISCUSSION

The remains found within the amphora are unusual in comparison to the most common finds typically present within amphorae in the Mediterranean area. The base, formed of a mixture of very small and disarticulated fish, may be interpreted as *allec*, of which the crustaceans constituted the fragments of larger size. Pliny the Elder (XXXI, 95) wrote that *allec* was originally composed of the non-filtered sediment of *garum* (*Vitium huius est hallex atque imperfecta nec colata faex*). Subsequently, it was especially made from small-sized fish (*Coepit tamen et privatim ex inutili pisciculo minimatim confici*). The production of *allec* later became almost as important as that of *garum*, and invertebrates such as oysters, sea urchins, and snakelocks anemone, as well as delicacies such as red mullet livers were used (*sic hallex pervenit ad ostreas, echinos, urticas mari, mullorum iocinera, innumerisque generibus ad sapes gulae coepit sal tabescere*).

Due to the presence of marine species, and to a lesser degree those of freshwater, the source for these species must have been in areas where both types of waters intermix, such as in lagoons, or at the mouth of a river, and such species occur together (Figure 12). In any case, fishing activity focused on picarel (*Spicara smaris*) and only occasionally on cyprinids (Cyprinidae), given their very low numbers in the study sample. Crustaceans, on the other hand, constituted a more consistent component that could not have gone unobserved during production of the *allec* mixture.

Hence, we may envision *allec* as derived from the result of unspecialized fishing activity in a lagoon area, at the edge of a lagoon, or at the mouth of a river. The deliberate addition of crustaceans, however, to obtain a different flavor to the mixture cannot be ruled out. Given the species identified and the location of the amphora find, one may think that this sauce could have been produced, certainly not on a large scale, along the north Adriatic coast, in a mixed lagoon-marine area, or at the mouth of the great rivers of the Po plain.

The Dressel 6A amphora was thus occasionally used as a container for transporting this product

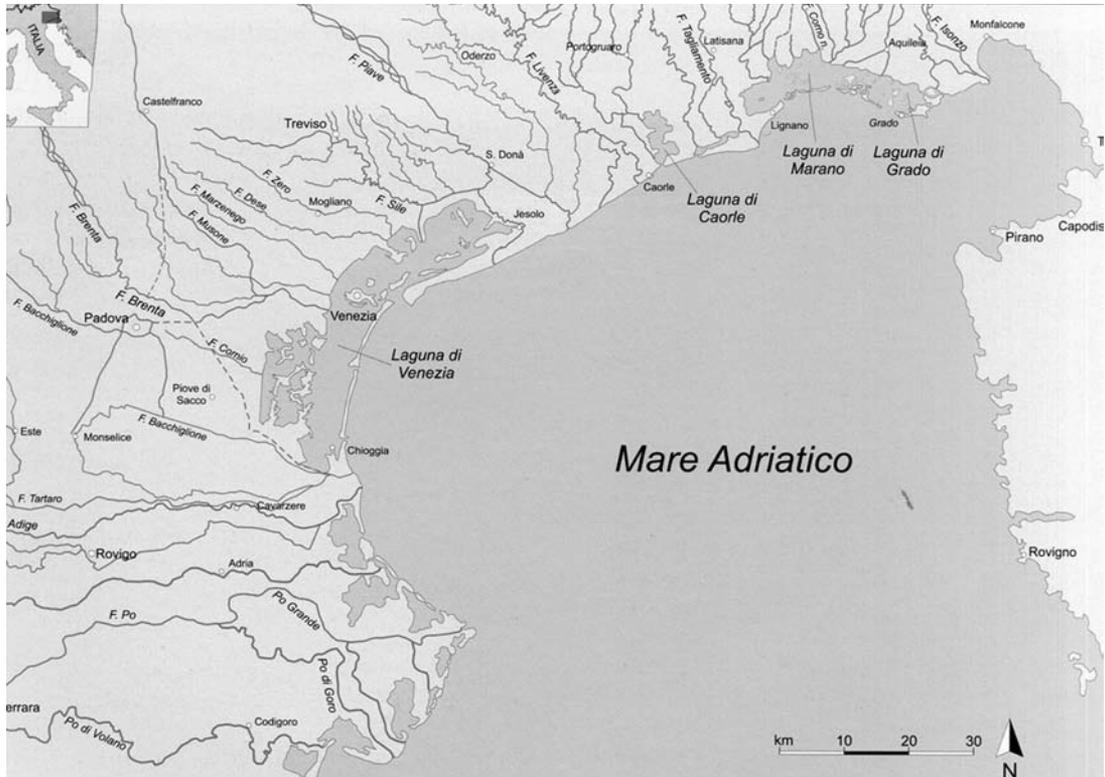


FIGURE 12

Map of the mouth of Po River and lagoons in the northern Adriatic area (Source: [www.archeoveneto.it](http://www.archeoveneto.it)).

and surprisingly does not possess, as is attested by several cases studied, such as Verona, Milano, Novara, and Salzburg (Carre *et al.*, 2009), a *titulus pictus* to indicate its anomalous contents. The reuse of the amphora to form part of the base of the earthwork and its location within a humid context may, however, have caused any *titulus* to disappear. In light of these data, we may hence hypothesize that the Dressel 6A amphora came from a nearby lagoon and was used to transport wine in the Adriatic region. It appears reasonable to assume that fish products for short- or medium-range trade were produced and, that once the amphora container was emptied of its primary contents, it was filled with *allec* and sent to Vicenza, possibly via river. Having arrived at this location and while still partly full, it was used for the foundation of an earthwork.

In regard to the evidence for productive fishing in the north and central Adriatic and in Istria regions, it should be emphasized that such activity

was far less visible and widespread than that of the Tyrrhenian, Iberian, and North African regions. The literature, however, refers to the great fishing grounds of the north Adriatic and to the production of fish sauce (Buonopane, 2009). Furthermore, there are archaeological traces of installations for fish breeding in the Po delta and on the Adriatic and Istrian coasts (Busana *et al.*, 2009), data which confirm the production of fish sauces in the Adriatic (Carre *et al.*, 2009).

These products were transported on the Adriatic trade routes, in addition to small quantities of *garum* and *salsamenta* imported from the Iberian Peninsula, the eastern Mediterranean, and Sicily from the 1<sup>st</sup> century B.C. onwards (Cipriano & Mazzocchin, 1999)<sup>1</sup>. Within the eastern Po Valley

<sup>1</sup> The Padua example, which may be extended to other cities in *Venetia*, demonstrates that *garum* was imported, in particular from the Iberian Peninsula, in quantities that were small, but nevertheless almost consistently during the different chronological phases identified (Cipriano & Mazzocchin, 1999: 301).

and provinces south of the Alps, several Dressel 6A and Dressel 6B amphorae after having been emptied of wine or oil, were re-used for the transportation of fish sauces. This re-utilization is confirmed by the writing *titulus pictus* or an incision, which indicates their unique contents and the insertion of the containers within a second commercial cycle (Carre *et al.*, 2009).

This practice would lead us to believe that fish sauces produced along the Adriatic coasts were sold locally, probably in common containers, such as vases or small amphorae, and only occasionally did they travel longer distances. In these cases, local amphorae were re-utilized, up to the period when Adriatic fish amphorae were used for this purpose<sup>2</sup> (probably by the middle of the 1<sup>st</sup> century A.D., but certainly by the 2<sup>nd</sup> century A.D.).

## REFERENCES

- BAILLY, N. 2010: *Spicara smaris*. *FishBase*. Accessed through: World Register of Marine Species at <http://www.marinespecies.org/aphia.php?p=taxdetails&id=126830> on 2011-10-17
- BINI, G. 1967: *Atlante dei pesci delle coste italiane*. Mondo Sommerso Editrice, Roma.
- BUONOPANE, A. 2009: *La produzione olearia e la lavorazione del pesce lungo il medio e l'alto Adriatico: le fonti letterarie*. In: Pesavento Mattioli, S. & Carre, M.B. (eds.): *Olio e pesce in epoca romana. Produzione e commercio nelle regioni dell'alto adriatico*: 25-36. Roma.
- BUSANA, M.S.; D'INCÀ, C. & FORTI, S. 2009: *Olio e pesce in epoca romana nell'alto e medio Adriatico*. In: Pesavento Mattioli, S. & Carre, M.B. (eds.): *Olio e pesce in epoca romana. Produzione e commercio nelle regioni dell'alto adriatico*: 37-81. Roma.
- CARRANNANTE, A.; GIARDINO, C. & SAVARESE, U. 2011: In search of garum. The «colatura d'alicci» from the amalfitan coast (Campania, Italy): an heir of the ancient Mediterranean fish sauces. In: Lugli, F.; Stoppiello, A.A. & Biagetti, S. (eds.): *Proceedings of the 4<sup>th</sup> Italian Congress of Ethnoarchaeology*, Rome, 17-19 May, 2006. B.A.R. (International Series) 2235. Oxford.
- CARRE, M.B. & PESAVENTO MATTIOLI, S. 2003: *Anfore e commerci nell'Adriatico*. In: Lenzi, F. (ed.): *L'archeologia dell'Adriatico dalla Preistoria al Medioevo*, Atti del convegno, Ravenna 7-9 giugno 2001: 268-285. Firenze.
- CARRE, M.B. & AURIEMMA, R. 2009: *Piscine e vivaria nell'Adriatico settentrionale: tipologie e funzioni*. In: Pesavento Mattioli, S. & Carre, M.B. (eds.): *Olio e pesce in epoca romana. Produzione e commercio nelle regioni dell'alto adriatico*: 83-100. Roma.
- CARRE, M.B.; PESAVENTO MATTIOLI, S. & BELOTTI, C. 2009: *Le anfore da pesce adriatiche*. In: Pesavento Mattioli, S. & Carre, M.B. (eds.): *Olio e pesce in epoca romana. Produzione e commercio nelle regioni dell'alto adriatico*: 215-238. Roma.
- CIPRIANO, S. & MAZZOCCHIN, S. 1999: Il quadro economico di Padova tra il I secolo a.C. e il I secolo d.C.: i dati dalle bonifiche con anfore. *Archeologia e Calcolatori* 10: 289-304.
- COSTELLO, M.J.; BOUCHET, P.; BOXSHALL, G.; ARVANTIDIS, C. & APPELTANS, W. 2008: *European Register of Marine Species*. <http://www.marbef.org/data/erms.php>
- FRANSEN, C. & TÜRKEY, M. 2011: *Palaemon adspersus*. Accessed through: World Register of Marine Species at <http://www.marinespecies.org/aphia.php?p=taxdetails&id=107613> on 2011-10-17.

<sup>2</sup> Concerning typologies see recent work by Carre *et al.* (2009: 221-234).

