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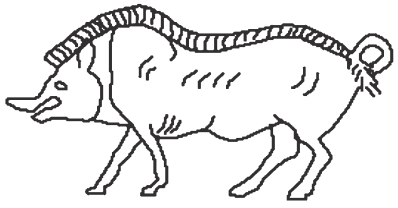


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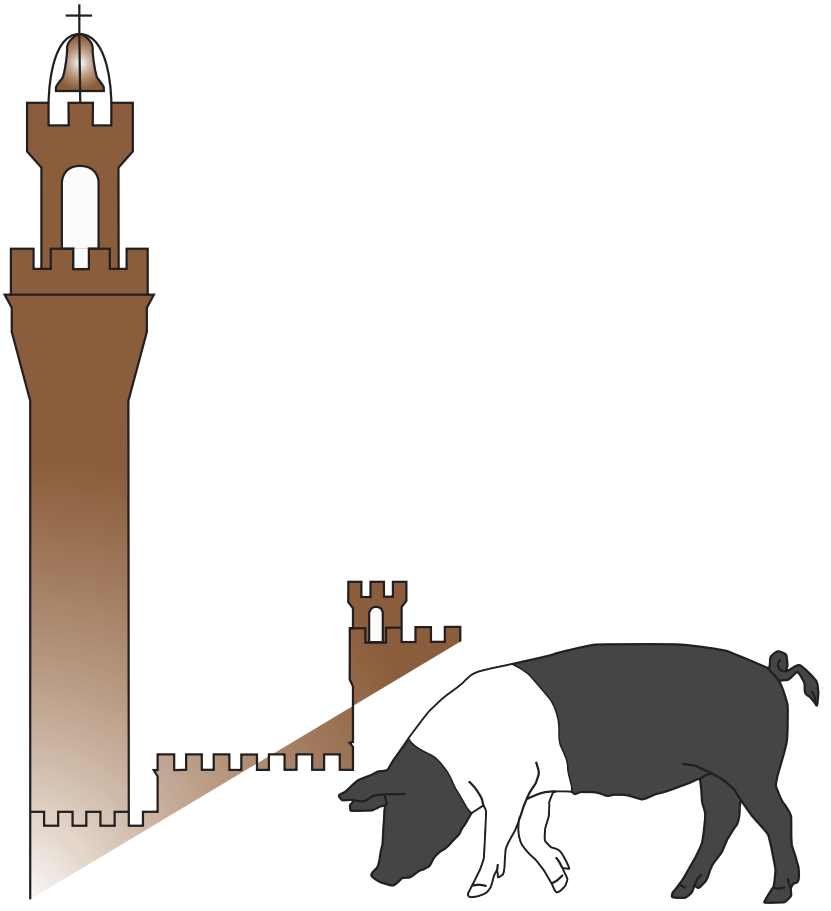

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Archaeofauna 34(1) (2025): 389-396

# Collection and modification of *Glycymeris* shells during the Bronze Age. A case study from Larda I and Larda II (Rovigo, North-eastern Italy)

# Raccolta e lavorazione delle conchiglie di *Glycymeris* nell'Età del Bronzo. Il caso studio di Larda I e Larda II (Rovigo, Italia nord-orientale)

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ABSTRACT: The Palaeolithic saw the first use of marine molluscs as ornaments, representing one of humankind's first forms of symbolic material culture.
The earliest evidence of a deliberate collection of *Glycymeris* shells as ornaments comes from Middle Paleolithic sites. This trend is well documented during the Upper Paleolithic, becoming particularly widespread in the late prehistoric contexts of Northern Italy.
This study aims at investigating the modalities of collection, modification and use of perforated *Glycymeris* shells from the Bronze Age sites of Larda I and Larda II, in the eastern area of Polesine (southern Veneto).
Taphonomic analyses carried out on the shell assemblages allowed us to identify a natural origin for almost the totality of the holes, suggesting opportunistic exploitation of naturally perforated shells.

KEYWORDS: SHELLS, BRONZE AGE, GLYCYMERIS, ORNAMENTS, MANUFACTURING

RIASSUNTO: L'utilizzo ornamentale delle conchiglie marine è documentato a partire dal Paleolitico, costituendo una delle più antiche forme di comportamento simbolico.
Le prime evidenze della raccolta di conchiglie appartenenti al genere *Glycymeris*, per la realizzazione di oggetti ornamentali o simbolici, risalgono al Paleolitico medio. Questa tendenza si consolida nel corso del Paleolitico superiore ed è particolarmente frequente nei contesti protostorici dell'Italia settentrionale.
Il presente lavoro si propone di indagare le modalità di raccolta, lavorazione e utilizzo delle conchiglie forate rinvenute nei siti dell'Età del Bronzo di Larda I e Larda II, situati nel Polesine orientale (Veneto meridionale).
L'analisi tafonomica ha permesso di riconoscere un'origine naturale per la quasi totalità dei fori, suggerendo uno sfruttamento opportunistico di esemplari naturalmente forati in corrispondenza dell'umbone.

PAROLE CHIAVE: MALACOFAUNA, ETÀ DEL BRONZO, GLYCYMERIS, ORNAMENTI, LAVORAZIONE

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## INTRODUCTION

The exploitation of seashells to be used as decoration form an integral part of modern humans' material culture. This tradition starts with the Palaeolithic and continues throughout the Holocene, improving the processing techniques, and giving rise to new trends.

A modest collection and use of shells belonging to the genus *Glycymeris* is well documented in Mediterranean, Near Eastern and Atlantic archaeological sites since the Middle Palaeolithic (Sivan *et al*., 2006; Bar-Yosef Mayer, 2007; Bar-Yosef Mayer *et al*., 2009; Colonese *et al*., 2011; Douka, 2011; Bosch *et al*., 2015; Cabral & Martins, 2016). However, it was during the Early Bronze Age that they occurred in large quantities.

Valves of *Glycymeris* played a multi-functional role during Prehistory: not only they were used for decoration purposes (i.e., pendants or bracelets), but they also served as functional tools (i.e., containers for dye, scrapers, burnishing tools for pottery decoration, filling material for floor foundations, temper in pottery) (Cabral & Martins, 2016).

The use of *Glycymeris* valves for ornament production represents a real trend in northern Italy during the Bronze Age. *Glycymeris* shells are very common in sandy bottoms of the Adriatic Sea, where sometimes they can be found very beach worn and already holed at the umbo due to marine abrasion. Human groups from northern Italy usually collected naturally perforated valves as ready-to-use ornaments, allowing an easier suspension of the shells with no need for anthropic intervention (Del Lucchese, 1984; Bernabò Brea & Cremaschi, 2004; Miari *et al*., 2009).

The present paper focuses on taphonomic and techno-functional analyses conducted on perforated *Glycymeris* valves retrieved in the Bronze Age sites of Larda I and Larda II, in north-eastern Italy. This study contributes to reconstructing new strategies of shell exploitation adopted by Bronze Age people, shedding light on shared trends and trading networks developed in a period marked by vast changes in technology and social organisation.

## THE SETTLEMENTS

The discovery of Middle and Recent Bronze Age settlements like Larda I and Larda II provided a wealth of information concerning the social and economic organisation of the territory between the Adriatic Sea and the Valli Grandi Veronesi (Bellintani, 2000; Peretto & Salzani, 2004; Mischiatti *et al*., 2011).

These sites both lie on small higher ground zones within a low wet area. They are situated in the locality of "Larda", not far from the present town of Gavello, about 15 km south-east of Rovigo (Bellintani, 2000; Peretto & Salzani, 2004; Mischiatti *et al*., 2011). They are located along the main rivers of northern Italy such as the palaeo-Po ("Po di Adria"), its tributary, the Tartaro River, and the northern branch of the Po River, which have suffered important hydrographic changes during the Holocene (Veggiani, 1972; Marcolongo & Zaffannella, 1987; Piovan, 2008; Piovan *et al*., 2010). The site of Larda I was interpreted as a village endowed with a bank. The field excavations (1998-1999 and 2002-2004) highlighted two main settlement stages, dated between the Middle and the Recent Bronze Age (Peretto & Salzani, 2004).

Larda II is located only a few hundred metres west of Larda I. During rescue excavations (2006-2007) two different settlement phases were recognized for the Late Bronze Age I (Mischiatti *et al*., 2011). From a typological point of view, the potsherds found in the two sites reveal a correlation with the sub-Apennine facies rather than the "Terramare" culture (Mischiatti *et al*., 2011; Peretto & Salzani, 2004).

The faunal assemblages from both sites are characterised by the predominance of domestic animals (83.1%) over the wild. The zooarchaeological record shows significant percentages of goat, sheep and pig remains, which implies an important agro pastoral component of the economy, including the exploitation of both primary and secondary products (Bertolini & Thun Hohenstein, 2016). The economy of the meat resources is similar to that of known sites in the region, with the majority of domestic share supplemented by the consumption of red deer, roe deer and wild boars. Other species, such as fish, birds and pond tortoises, were also regularly consumed in smaller numbers.

Rich malacological assemblages were found in the Bronze Age deposits during different field campaigns (1999, 2003, 2006 and 2007). Among the most abundant molluscs are *Unio*, a very common genus of medium-sized freshwater mussels, and *Glycymeris*, a genus of saltwater clams, of which

the primary species identified in the archaeological record include *G. nummaria*.

## MATERIALS AND METHODS

A systematic study of marine mollusc remains has examined a total of 177 remains, which have been identified at the lowest possible taxonomic level (Table 1). On a total of 144 identified *Glycymeris* remains (81.4%), 18.1% are perforated (LI = NISP 21; LII = NISP 5).

Malacological remains were quantified using standard zooarchaeological methods: to estimate the abundance of each species, we calculated the Number of Identified Specimens (NISP) and the Minimum Number of Individuals (MNI), which served as a proxy for biomass (Chaix & Méniel, 1996). MNI calculations were achieved according to the combination method (Chaplin, 1971): the frequency of Non-Repetitive Elements (NREs) is combined with laterality, morphology, size and age differences. For bivalves, pair-matching is included in MNI estimates by adding unpaired left and right elements and subtracting the number of matched pairs. For example, if the MNI count was three lefts and four rights, and no match can be established between pairs due to symmetry, the MNI would be estimated as follows: three unpaired left valves + four unpaired right valves = MNI of seven, rather than the traditional MNI count of four, taken from the maximum NRE given by the right side (Poplin, 1976). Refitting exercises were carried out to match pairs of left and right valves that might represent the same individuals. Fragments for which side could not be determined were not included in the final MNI. count.

A comparison between archaeological and modern dead specimens accumulated on beaches, retrieved in the vicinity of Larda (50 km ca.), allowed us to identify the origin of perforations (natural *vs* man-made holes).

| | LARDA I | | | LARDA II | | |
|---|---|---|---|---|---|---|
| ***TAXA*** | **NISP** | **%NISP** | **MNI** | **NISP** | **%NISP** | **MNI** |
| **BIVALVIA** | | | | | | |
| *Glycymeris nummaria* | 95 | 57.6 | 94 (50) | 3 | 25 | 3 (2) |
| *Glycymeris* sp. | 36 | 21.8 | 26 (16) | 8 | 66.7 | 2 (2) |
| *Glycymeris glycymeris* | 2 | 1.2 | 2 (2) | - | - | - |
| *Arca noae* | 1 | 0.6 | 1 (1) | - | - | - |
| *Chamelea gallina* | 2 | 1.2 | 1 (1) | - | - | - |
| *Cerastoderma glaucum* | 9 | 5.5 | 9 (6) | - | - | - |
| *Acanthocardia tuberculata* | 2 | 1.2 | 1 (1) | - | - | - |
| *Pinna nobilis* | 1 | 0.6 | 1 (1) | - | - | - |
| *Mactra stultorum* | 3 | 1.8 | 2 (2) | - | - | - |
| *Pecten* sp. | 1 | 0.6 | 1 (1) | - | - | - |
| *Flexopecten glaber* | 2 | 1.2 | 2 (2) | - | - | - |
| **GASTROPODA** | | | | | | |
| *Bolinus brandaris* | 7 | 4.2 | 7 | 1 | 8.3 | 1 |
| *Cerithium vulgatum* | 3 | 1.8 | 3 | - | - | - |
| **CEPHALOPODA** | | | | | | |
| *Sepia* sp. | 1 | 0.6 | 1 | - | - | - |
| **TOTAL** | **165** | **100** | **145 (94)** | **12** | **100** | **6 (5)** |

TABLE 1

Taxonomic composition (NISP and MNI) of the marine shell assemblages from Larda I and Larda II. Traditional MNI estimates are reported in parentheses.

Holes were observed at both low and high magnification. We used a stereomicroscope Leica S6D Greenough (magnification ranging from 0.75x to 70x), also employed for capturing images (camera EC3). Some transparent positive replicas made by casting epoxy resin (Araldite ® LY554, Hardener HY956) in the mold (Provil Novo ® Fast Light Set, Heraeus Kulzer) were observed with a Scanning Electron Microscope (SEM Zeiss EVO 40) to better identify technological and use-wear traces around the holes. Diffused surface modifications due to post-depositional processes, such as decalcification, prevented the traceological analysis of a total of seven perforated valves.

A morphometric description of the perforations was achieved by measuring the diameter and height of the hole, following Bar-Yosef *et al*. (2009).

The main morphological types of perforations were identified according to the typological classifications established by Cabral & Martins (2006).

## RESULTS AND DISCUSSION

All the perforated *Glycymeris* bear a hole at the umbo. Table 2 includes more detailed information about perforations. Apart from three exceptions, none of the analysed shells shows detectable signs of human intervention, suggesting that the umbo holed by natural processes of abrasion (LI, 71.4%; LII, 60%) (Figure 1). This is a very common mechanic process that affects the most prominent regions of the valves.

Human groups from Larda I and II must have reached the coast a few dozen kilometres from the sites to collect the valves. The shells were likely collected dead on the foreshore and do not probably derive from recycling previously consumed molluscs.

As observed from the reference collection, the most distinctive features of naturally perforated umbos are their flat baseline, regularity, and diffused smoothing developed around the margins. Moreover, holes caused by natural processes of abrasion are usually associated with a general worn appearance of the shell.

Two different perforation techniques were identified for human-made holes at Larda I: (1) abrasion, suggested by the presence of parallel striations located in the hole region (Figure 2 A-B); and (2) indirect percussion from the internal part of the valve, most likely using an anvil as support. The latter is mainly proved by the presence of very irregular margins associated with external detachments. The use-wear analysis allowed us to identify modifications related to the suspension of the valves.

The presence of lateral notches and polished areas observed around the holes can easily be interpreted as evidence of friction from a string, suggesting that several valves were suspended for ornamental purposes. Some shells show signs of pronounced use-wear on the lower margin of the perforation, which may indicate the existence of a cord attaching the shells around the hinge (Figure 2 C-D).

No evidence of accidental breakage due to the very prolonged use of the ornaments was noted. The ratio between perforated and unperforated *Glycymeris* valves is quite different at the two sites, indicating a higher proportion of perforated shells at Larda II (45.5%), while only 15.8% of *Glycymeris* valves are perforated at Larda I (Figure 3). The presence of both perforated and unperforated shells belonging to the same species may suggest that only part of the collected valves served as decoration. It is therefore possible to hypothesise that non-perforated valves were considered as a stockpiling of materials waiting for processing.

Concerning the metrical data, we measured the holes in the Larda *Glycymeris* valves and found that natural holes are within the same size range as the anthropic perforations. A complete information set of the entire sample is presented in Table 2.

Finally, it was noted that three natural perforations were further enlarged by means of pointed and/or sharp-edged instruments.

## CONCLUSION

The predominance of regular, smooth holes with flat baselines indicates that most of the *Glycymeris* valves retrieved at both Larda sites were collected already dead from nearby sandy beaches, where their umbos were already holed due to natural abrasion. This reveals opportunistic exploitation of naturally perforated shells aimed at the suspension of the valves without the need for a consuming procedure. Only a few specimens show clear signs of human activity on the umbonal region of the shell, indicating the will to imitate natural holes, both in shape and localization.

| ID | Site | Level | Species | Diameter (mm) | Height (mm) | Morphology | Margin (profile) | Type (Cabral & Martins, 2006) | Detachments | Hole origin |
|---|---|---|---|---|---|---|---|---|---|---|
| **3** | Larda I | 102A | *Glycymeris* sp. | 3.8 | 2.3 | Sub-circular | Irregular | D18 | NO | Natural |
| **312** | Larda I | 300 | *Glycymeris nummaria*. | 3.5 | 2.9 | Circular | Irregular | D16 | NO | Natural |
| **74** | Larda I | 103 | *Glycymeris nummaria* | 3.8 | 2.6 | Circular | Irregular | D16 | NO | Natural |
| **208** | Larda I | 104 | *Glycymeris nummaria* | 3.7 | 3.2 | Circular | Irregular (above)+rounded (below) | D16 | NO | Natural |
| **207** | Larda I | 104 | *Glycymeris nummaria* | 4.7 | 3.3 | Circular | Irregular (above)+rounded (below) | D16 | NO | Natural |
| **179** | Larda I | 104 | *Glycymeris nummaria* | 5.1 | 3.9 | Circular | Irregular (above)+rounded (below) | D16 | NO | Natural |
| **176** | Larda I | 104 | *Glycymeris nummaria* | 6.1 | 6.4 | Irregular | Irregular (above)+rounded (below) | - | NO | Natural (further enlarged) |
| **177** | Larda I | 104 | *Glycymeris nummaria* | 6.7 | 4 | Elongated | Rounded | D06 | NO | Natural |
| **178** | Larda I | 104 | *Glycymeris* sp. | 3.5 | 2.5 | Elongated | Rounded | D06 | NO | Natural |
| **175** | Larda I | 104 | *Glycymeris* sp. | 5.9 | 3.5 | Elongated | Rounded | D05 | NO | Natural |
| **180** | Larda I | 104 | *Glycymeris nummaria* | 7.1 | 4.6 | Elongated | Rounded | D06 | NO | Natural |
| **213** | Larda I | 104 | *Glycymeris nummaria* | 6.1 | 3 | Elongated | Irregular (above)+rounded (below) | D15 | NO | Natural |
| **101** | Larda I | 104 | *Glycymeris nummaria* | 3.5 | 2 | Elongated | Not identified | D06 | NO | Natural |
| **189** | Larda I | 104 | *Glycymeris nummaria* | 1.8 | 1.1 | Elongated | Exfoliated | D03 | NO | Natural |
| **60** | Larda I | 103 | *Glycymeris nummaria* | 3.1 | 4.3 | Irregular | Rounded | D18 | NO | Natural (further enlarged) |
| **338** | Larda I | 216 | *Glycymeris* sp. | 4.1 | 6.2 | Irregular | Irregular | - | YES | Anthropic (percussion) |
| **314** | Larda I | 202 | *Glycymeris nummaria* | 4.6 | 4.9 | Irregular | Irregular | D18 | YES | Anthropic (percussion) |
| **194** | Larda I | 104 | *Glycymeris* sp. | 5.9 | 2.8 | Elongated | Exfoliated | D06 | NO | Natural |
| **339** | Larda I | 216 | *Glycymeris* sp. | 2.8 | 1.8 | Irregular | Exfoliated | - | NO | - |
| **93** | Larda I | 103 | *Glycymeris glycymeris* | 2.7 | 2.2 | Circular | Exfoliated | D16 | NO | Natural |
| **375** | Larda I | 104 | *Glycymeris nummaria* | 3.4 | 3.4 | Circular | Rounded | D16 | NO | Anthropic (abrasion) |
| **758** | Larda II | 132 | *Glycymeris* sp. | 4.4 | 2.8 | Elongated | Irregular (above)+rounded (below) | D12 | NO | Natural |
| **158** | Larda II | 66 A/B | *Glycymeris* sp. | 6 | 4.9 | Sub-circular | Exfoliated | D04 | NO | Natural |
| **875** | Larda II | 303 | *Glycymeris nummaria* | 2.2 | 2.8 | Circular | Irregular | - | NO | - |
| **312** | Larda II | 303 | *Glycymeris* sp. | 4.8 | 2.6 | Elongated | Exfoliated | D08 | NO | Natural |
| **1124** | Larda II | 510 | *Glycymeris nummaria* | 5 | 5.8 | Irregular | Irregular | - | NO | Natural (further enlarged) |

TABLE 2

Specific features of Larda I and Larda II *Glycymeris* shells by level.

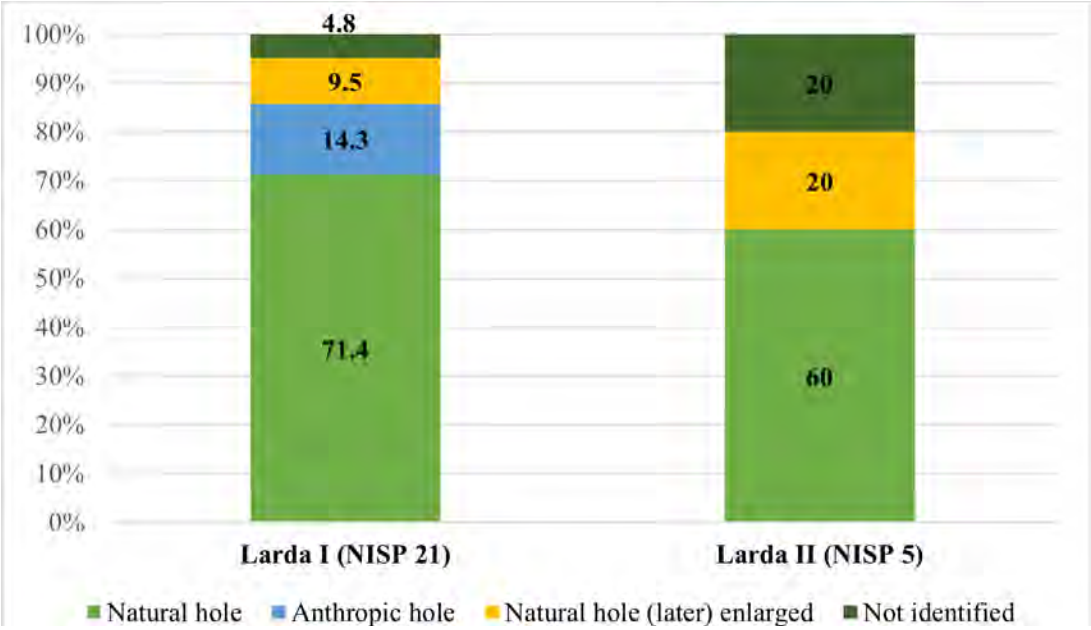


FIGURE 1

Origin of perforations at the umbo of *Glycymeris* from Larda I and Larda II.

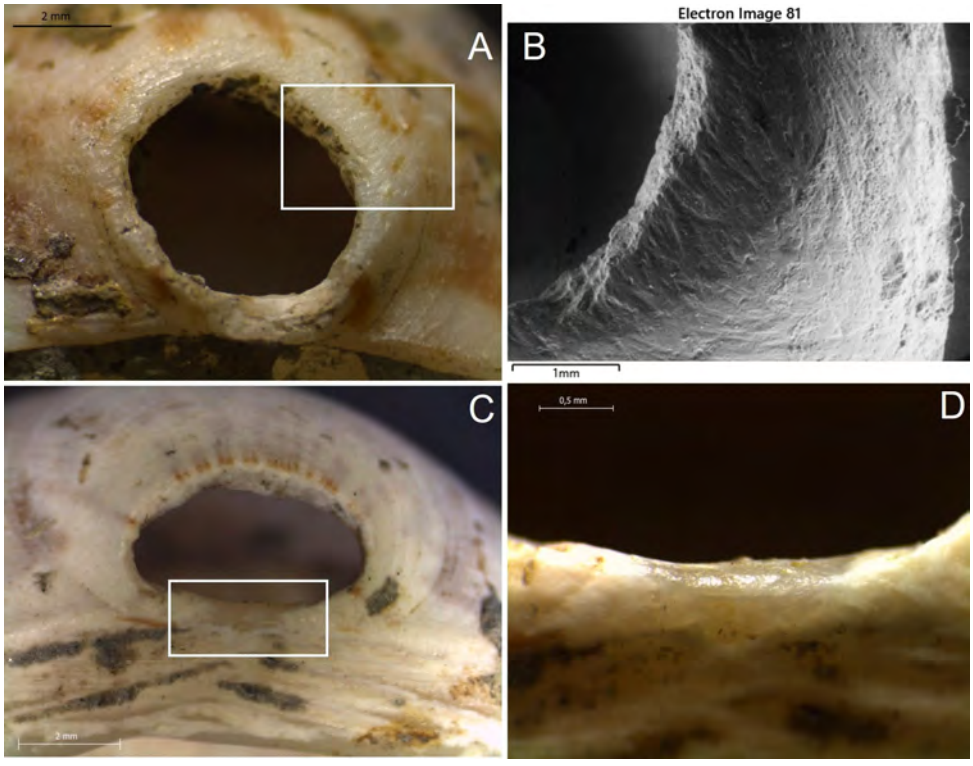


FIGURE 2

*G. nummaria* (ID:375) anthropic hole made by abrasion (A), SEM images allow the identification of parallel striations around the hole (B), *G. nummaria* (ID: 213) naturally perforated (C) and details of use-wear traces on the lower margin of the perforation (D). Specimens from Larda I.

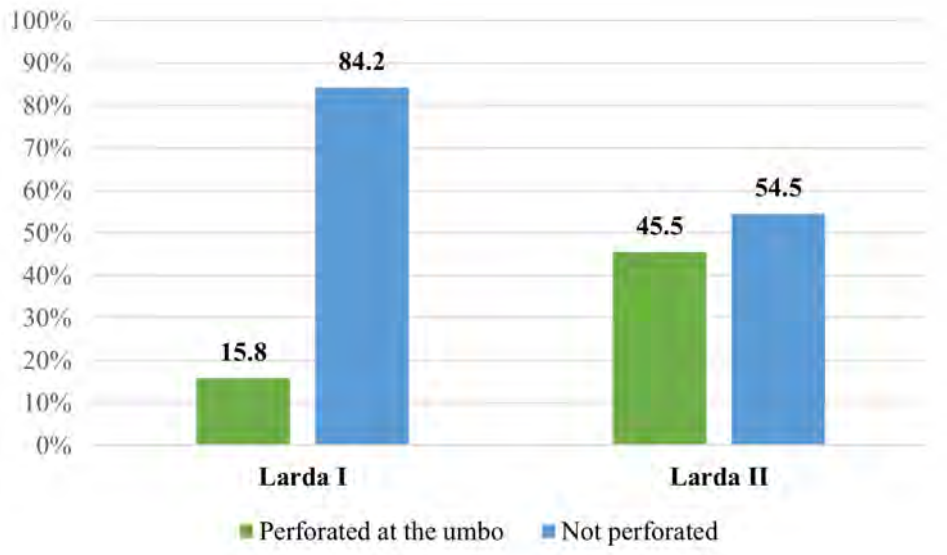


FIGURE 3
%NISP of perforated and unperforated *Glycymeris* shells at Larda I and Larda II.

It was concluded that human groups from Larda I and Larda II have widely exploited marine resources for symbolic purposes, suggesting a strong relationship between local settlements with both the rivers and the coastline that surrounded the sites.

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