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Roman lamps in the far Western Mediterranean as evidence of cultural adoptions: between originality and (re)productions.

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Abstract: The long and complex process of Roman conquest of Hispania, also involves, aside from social, political and administrative issues, a period of cultural integration. In fact, the main artefacts reflect the transmission of some Roman traditions that demonstrates the relations between Romans and locals. The contact with the products brought by Romans promoted the circulation of new types of vessels, but also inspired the local productions. If, on one hand, we can suggest that italic products promoted the 'Romanity' of Hispanic populations, on the other, we must consider these artefacts as a symbiosis between two different cultures. We present an overview of the Hispanic productions of Roman lamps, from the 2nd century BCE to the 1st century AD, exposing some chronological and typological questions that are relevant to the understanding of the Roman social-cultural adaptation. The more antique lamp (re)produtions are linked to military movements and the conquest of Hispania, but some artefacts show different influences, materialised in lamps with Roman morphologies and local details.
Some strategic settlements will be presented in order to establish a coherent and diachronic perspective of the consumption and production of Roman lamps. This analysis is relevant

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to the understanding of the evolution of the production of lychonological artefacts in the far Western Mediterranean and its morphological features.
Keywords: Roman lamps, Western, Hispania, evolution, Hispanic productions.

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1. INTRODUCTION

For a long time, studies on Roman lamps were mainly driven by typology, iconography or epigraphy[1]. Researchers undervalued the relevance of lamp analysis, or studies on its provenance or consumption. We can say that lamps were considered small objects of art, disregarding the fact that they also provided important data on their production and trade – ultimately enabling a fine-tuned chronology for each type, when properly contextualized. Today, we increasingly value these aspects, relying on the most up-to-date methodologies applied to Archaeology. For this reason, many museum collections have been subjected to analysis or re-analysis.

Research on Roman lamps has not evolved in the same way as other ceramic categories, but we should nonetheless recognize that studying the economics or consumption of these artefacts in Antiquity is a hard task[2]. In

[1] PEREIRA 2014b, p. 192; MORILLO CERDÁN 2015, p. 324.
[2] HARRIS 1980.

order to enable such studies, and to fine-tune lamp dating, we must identify the places where such artefacts were made. Only a comparative analysis of different production and consumption centres, backed up by shipwreck contexts, can help us to establish the timeframes and clarify several issues related to lamp production and trade.

Unlike other ceramic types, very few of the excavated production contexts were exclusively devoted to lamp making. Lamps were produced along with common table ware[3], and even construction ceramics. Also, when we report on production contexts exclusively devoted to lamp making, these were sometimes found in the middle of urban centres, in domestic environments, as occurred in Seville[4]. This situation renders their registration and interpretation considerably difficult.

Since both the topic and its geographical scope are so vast, we had to limit this study to the lamps produced between the 2nd century BCE and the 1st century AD, mainly in Western Iberia. Recent research in this geography has substantially changed our previous ideas about the production and consumption of Roman lamps in the Western region of the Empire. We once presumed that production/imports from Italy had prevailed in Iberian trade at least up to the late 1st century AD[5], but now archaeological and analytical facts prove that the success of Italic productions in Western Iberian was ephemeral.

Nevertheless, lamps produced in, and imported from, Italy were responsible for the settlement of craftsmen who manufactured these lighting artefacts in Hispania. In fact, Balil[6] had already suggested the

[3] BERTRAND *et alii* 1997.
[4] VAZQUEZ PAZ 2012.
[5] MORILLO CERDÁN, RODRÍGUEZ MARTÍN 2008, p. 291; PEREIRA 2014b, p. 192.
[6] BALIL 1968-69; BALIL 1969; BALIL 1980; BALIL 1982.

existence of a relevant lamp production in Iberia. From a given moment onwards, Iberian production surpassed Italian imports, and so today the existence of a massive East-West lychnological trade is disproved.

Some of the reasons for this change are not new: high transportation cost of these artefacts (especially by land), easy production, easy access to raw-material and the possibility to make copies from imported prototypes[7]. In addition, we should remember the long-standing tradition of ceramic production in certain geographies – as was the case of the Bay of Cadiz and the Ebro Valley, in Spain. We do not mean to deny this product was traded, which is duly proved by many extant shipwrecks with lamps among their cargo[8]. Such trade would, however, be restricted to the most important coastal cities of Iberia and other inland towns that benefited from the proximity of navigable rivers – e.g. Tagus and Guadiana, in Portugal, and Guadalquivir and Ebro, in Spain.

As with other products, by the 1st century AD lamps were already rooted in provincial societies; the existence of Hispanic productions that combined exogenous attributes with their own innovations also proves it. Precisely for this reason, it is no wonder that some of these provincial *figlinae* were possibly created to fulfil local needs, and eventually conquered the markets[9]. Although emerging productions proliferated throughout the Roman Empire, not all were equally successful. Special reference should be made to Northern Italic, North-African and some Gallic *figlinae*; most of them simply supplied their surrounding area.

[7] MORILLO CERDÁN, RODRÍGUEZ MARTÍN 2008, p. 291.
[8] ALAMINOS *et alii* 1989, pp. 121-122; DOMERGUE 1968; MANERA 1983; BAILEY 1987, p. 61; RICCI, 2002.
[9] PAVOLINI 1987, pp. 148-149; MORILLO CERDÁN 1999, p. 69.

For these reasons, as shown below, the evolution of the production and imports of lamps in Hispania is not linear, and the proliferation of workshops focused on the manufacture of lighting ceramics in the Western Empire is not clear. As an example, the oldest lamps were not always imported, and conversely not all the late lamps surely correspond to Hispanic productions.

2. EARLY PRODUCTIONS AT THE TIME OF THE ROMAN REPUBLIC

The first Roman black-gloss lamps, influenced by Hellenistic morphologies, appeared in the 3rd century BCE, but their dissemination to the West of the Empire did not happen before the mid-2nd century BCE[10]. In fact, the presence of Hellenistic-influenced lamps in the West seems strongly dependent of the armies[11]. They were mainly found in coastal sites or in military contexts, which may imply some resistance to the adoption of a new type of lighting. Even in military contexts – e.g. camps, lamps only represent a small percentage of the consumed products. The Roman camp of Cáceres el Viejo (Spain), located in the outskirts of today's city of Cáceres[12], is a rare exception; many lamps were found there, most of which locally produced.

However, this situation is contradicted by the Hispanic production of certain lamps of Hellenistic influence, as is the case of the Ricci G type lamp (fig. 1). The manufacture of this lamp is documented in Córdoba, Spain,

[10] PAVOLINI 1987, pp. 140-141; MORILLO CERDÁN 2015, p. 382.
[11] MORILLO CERDÁN, SALIDO DOMÍNGUEZ, 2010; SALIDO DOMÍNGUEZ, 2013; PEREIRA 2018, p. 45.
[12] ULBERT 1984, pp. 453-161.

from 125 to 30 BCE[13], replicating the features of Italic prototypes. This is the oldest type manufactured in Hispania, but some authors think that the so-called *Biconico dell'Esquilino* type was also made in the West[14], given its abundance. This production, however, remains unproved.

These artefacts are more clearly associated with military contexts at the camp of Cáceres el Viejo, as a quite intensive production of the G and H forms of the Ricci type were found there (fig. 2). This is evidenced by the body features, but mainly by the fact that the G shaped pieces acquire new morphological details that, up to then, only existed there. It was also interesting to verify that the adoption of bivalve moulds by lychnological production, already mentioned by Ulbert[15], hails back at least to the H Ricci form, as most copies share the same dimensions and the same manufacturing defect. In the case of Cáceres el Viejo, it seems that although the pieces were produced in Hispania, the craftsman who made them for this military facility should be of Italic origin. In fact, most local productions are reproductions of the Italic set, without any innovations; only a craftsman who knew those models would be able to replicate them.

The existence of local/regional productions associated with military camps is acknowledged by the scientific community, since a relationship of dependence between the armies and the producers/tradesmen who accompanied them was usually established. The big picture is not easily perceivable in this period, which ranges from the arrival of the first legions and the first decades of the 1st century BCE. Perhaps that dependence existed in permanent, or semi-permanent military camps, in which a long-

[13] MORENO JIMÉNEZ 1991, pp. 186-197, tipo 44; AMARÉ 1988-89, pp. 105-106.
[14] PAVOLINI 1987, p. 141; BERNAL 1993, p. 70.
[15] ULBERT 1984, p. 157, nº 485-491; PEREIRA 2014a, p. 21.

term presence allowed the access to previously established, and secure, supply networks[16]. However, in temporary camps, such as campaign or sleeping camps, the material culture[17] might prove different. In such camps, austerity was required by constant insecurity and the extreme need for army mobility, thus restricting the use of artefacts.

Likewise, some productions are puzzling since we cannot determine if they were locally made in military settings, or on the contrary if they correspond to the first civilian productions. That is precisely the case of *Scallabis* (Santarém, Portugal), where a manufacture of H Ricci type lamp was found[18]. Maybe other identical cases exist in the Portuguese territory.

This is also the reason why Late Republican lamps are not abundant in the Hispanic West. Maybe the local populations refused to use such artefacts, but we also know that the 1st century BCE was a time of serious political and military instability[19], which strongly impacted in the West. Only thus can we explain why the introduction of the bivalve mould used in pieces of Hellenistic influence did not contribute to increase the lamp production in the Western regions of the Empire.

Roman lighting ceramics is found beyond military camps. We also find them in early Romanized settlements. In these cases, we must consider the possible presence of the so-called hidden armies, a concept used by Carlos Fabião[20] to define the permanence of armies in allied cities, which is not always clear in the archaeological record.

[16] MUÑIZ COELHO 1978; CARRERAS MONFORT 1997; ROTH 1999, pp. 150-220.
[17] NOGUERA GUILLÉN 2008.
[18] PEREIRA 2014a, p. 21.
[19] HARRIS 1989; SALINAS DE FRÍAS 2014.
[20] FABIÃO 2007, pp. 128-132.

The use of the bivalve mould for manufacturing lamps was one of the main drivers that favoured the quick proliferation of lychnological workshops in the 1st century BCE and enabled a taxonomic distancing *vis-à-vis* the Hellenistic prototypes. The possibility of over-moulding original pieces also contributed to this phenomenon.

The presence of Late Republican lamps in Hispania is more significant when compared to their predecessors and this may have justified their production at some sites. In fact, the finding of a mould for a Dressel-Ricci 2 type enables to attribute its production to Cadiz, *Valentia*[21] and to *Tarraco*[22]. It has also been suggested that Dressel-Ricci type 3 pieces were produced at *Tarraco*[23], while Dressel-Ricci 4 lamps were manufactured at El Monastil[24] and at the *legio III Macedonica* camp, Herrera de Pisuerga[25] (tab. 1).

Although Roman lamp productions have been documented before the turn of the Era, imported Italic lamps prevailed. Besides, if we consider that most known productions can be associated with military contexts, we should highlight the interesting case of Cáceres el Viejo, where lamps were manufactured by a craftsman from the Italic Peninsula who accompanied the Roman army deployed at the site. Even so, given the small quantity of lighting ceramics at this stage, we must acknowledge that Rome was more concerned with its expansionist policy than with the acculturation of Hispanic peoples, or trading with them. We should also recall that the 1st century BCE was highly unstable, both politically and socially[26].

[21] VICENT LERMA 1990, pp. 31-32.
[22] BERNAL 1993, p. 153; MORILLO CERDÁN 2015, p. 383.
[23] BERNAL 1993, p. 68.
[24] POVEDA NAVARRO 2012; 2013.
[25] MORILLO CERDÁN 1992, pp. 89-90; MORILLO CERDÁN 1993; MORILLO CERDÁN 1999, pp. 65-66, pp. 635-646.
[26] MORILLO CERDÁN, SALA-SELLÉS 2019, pp. 50-51.

This outlook changed considerably after Octavian's Principate, when lamps became an artefact that could be owned by most people. It was no longer mainly associated with the army and it became gradually democratized. In fact, the high costs of importing lamps from the Italic Peninsula, namely to inland regions, and the access to raw-material and potentially replicable prototypes encouraged an increasing number of local/regional productions that replicated the Roman originals.

3. HEYDAY DURING THE EARLY EMPIRE

Replication of Italic prototypes continued through the entire first half of the 1st century AD. Craftsmen did not seek to change or innovate lamp forms imported from the Italic Peninsula, particularly of the Dressel-Lamboglia type 9. Though the oldest imported artefacts were found in areas closer to the Mediterranean and the valleys of the main navigable rivers[27], at this time Hispanic-made lamps possibly exceeded imports[28]. Only after the mid-1st century AD do we find the first forms of lamps with clear Hispanic features[29], as were the Andújar or the Riotinto-Aljustrel type lamps.

This demonstrates that provincial societies had widely accepted Roman lamps by the mid-1st century AD, and that they accepted other forms, different from the original Italic prototypes: true regional identities that show a symbiosis of two separate traditions. Initially, Roman Republican lamps were not very used, and their production increased very slowly. The

[27] MORILLO CERDÁN 2015, p. 383.
[28] PEREIRA 2014b, pp. 193-194.
[29] MORILLO CERDÁN, RODRÍGUEZ MARTÍN 2008.

consolidation of the trading networks and the intensification of lychnological production in the first half of the 1st century AD were key drivers that decisively contributed to spread lighting ceramics throughout Hispania (tab. 2).

According to currently available data, we know very little about Hispanic manufactures, which tried to acquire their own identity in local and regional markets. In fact, most Hispanic productions just copied or replicated the imported models. We can hardly establish whether this was due to a consumers' preference for 'conventional lamps', or to other factors. Maybe the Hispanic productions were limited by geographical constraints, and the pieces were manufactured by less important workshops that were unable to extensively market their products. In contrast, the workshops that replicated exogenous imports, particularly those located on the coast, near important trading networks, had better conditions to distribute and spread their products.

In fact, the number of workshops that manufactured volute lamps with round nozzles (tab. 3) seems was the same than those that made volute lamps with triangular nozzles (tab. 2), but the production and consumption was much more intense. This fact also helps to confirm that the manufacture of these artefacts intensified and became autonomous in Hispania as from the mid-1st century AD The production of round nozzle volute series has been documented in *Italica*[30], *Hispalis*[31], Andújar[32], Braga[33], Mérida[34],

[30] LÓPEZ RODRÍGUEZ 1981, pp. 19-20.
[31] VÁZQUEZ PAZ 2012.
[32] LUZON NOGUE 1967; SOTOMAYOR *et alii* 1976; SOTOMAYOR *et alii* 1979: 1981.
[33] SOUSSA 1965-66; 1969; MORAIS 2002; MORAIS 2004; MORAIS 2005, pp. 366-379; MORAIS 2012.
[34] RODRÍGUEZ MARTÍN 1996, pp. 143-147; RODRÍGUEZ MARTÍN 2005.

Córdoba[35], *Turiaso*[36] and Cadiz[37]. Most of these productions are proved by archaeological evidence, based on existing moulds or kilns, but others have been inferred from pieces with manufacturing defects, or by comparing lamp clays with those of other locally produced ceramics.

Special reference should be made to the kiln excavated in Seville[38], Spain, located in an urban structure exclusively devoted to lamp manufacturing. This situation may seem quite atypical but contributes to demonstrate why sometimes it is so difficult to identify the lamp-making workshops – namely small-sized domestic units within the urban fabric. Also, this context allows to demonstrate that lamps replicating Classical models, which represented the majority, were manufactured alongside with lamps showing original Hispanic forms, though inspired by Italic prototypes.

This overlapping of Hispanic and Italic models is important for us to understand that, although they did not achieve a sizeable geographical dissemination, genuinely Hispanic lamps (fig. 3) subsisted in the markets for a relatively long period of time, from the mid-1st century to the 3rd century AD In our opinion, this proves their wide acceptance by provincial societies; they even resisted the arrival of the new plain nozzle lamp model.

Plain nozzle lamps kept the manufacturing, marketing and consumption patterns of the preceding series. They abound in the entire Mediterranean coast, especially the ones imported from Italy and North Africa, but we also have knowledge of a considerable number of Hispanic workshops that replicated foreign models – the most common being the Dressel-Lamboglia

[35] AMARÉ 1988-89; BERNAL, 1993, pp. 214-215; BERNAL, GARCÍA GIMÉNEZ 1995, pp. 178; GARCÍA GIMÉNEZ *et alii* 1999.
[36] AMARÉ *et alii* 1983; AGUAROD, AMARÉ 1987.
[37] CORZO 1981-82.
[38] VÁZQUEZ PAZ 2012.

20 type. The quick acceptance of the new lamp model by Hispanic markets contrasts with the slow adoption of this new lighting concept at the time of the Roman Republic. This paper only studies volute-series lamps, but others present syntheses on the evolution of production and consumption of lighting ceramics in the West[39] after the turn of the 1st century to the 2nd century AD Some of them discuss the possible reasons for the deep morphological and iconographic changes that marked the transition from the plain nozzle lamp series to the late-ancient series produced in Africa[40].

4. CONCLUSIONS

While we presented a brief lychnological overview, with special emphasis on Western Iberia based on the research of several authors[41], today we have a relatively clear idea of lamp production, marketing and consumption in Hispania. Future data will certainly help us adjust some assertions of our synthesis; for example, we still do not know the *figlinae* that produced lamps in some areas. That is precisely the case of the Cadiz area, which became one of the key manufacturing regions from a very early stage.

Based on the notion of 'cultural adoption', we may divide Roman lamp production and trade in the West into three different phases. Such division and evolution must, of course, be flexible, as times and forms may vary depending on the targeted region of the Iberian Peninsula.

[39] PEREIRA 2014b; PEREIRA 2017; PEREIRA 2018; MORILLO CERDÁN, RODRÍGUEZ MARTÍN 2008; MORILLO CERDÁN 2015.
[40] PEREIRA 2017.
[41] ALMEIDA 1953; AMARÉ 1989-90; BALIL 1969; BALIL 1980; BALIL 1982; HARRIS 1980; BEMONT, BONNET 1984; BAILEY 1988; BERNAL 1990-91; BERNAL 1993; GARCIA GIMÉNEZ *et alii* 1999; MORILLO CERDÁN 1990; MORILLO CERDÁN 1993; MORILLO CERDÁN 1999; MORILLO CERDÁN 2015; MORILLO CERDÁN, RODRÍGUEZ MARTÍN 2008. These references are merely indicative.

At first, from the arrival of the first Roman military contingents to the time of Augustus, lamps were both imported and locally produced. Imported pieces were, however, the majority and the Hispanic productions (fig. 4) were apparently associated with craftsmen with a good knowledge of the Italic models. At this stage, lamps were not a basic item of everyday life and were mostly used by groups who were early Romanized – if not of Italic origin. Their presence has been found mainly in the Mediterranean coast and along the banks of the main navigable rivers, although they gradually penetrated inland.

We find several production units in hinterland sites, as in Cáceres el Viejo, Herrera de Pisuerga and eventually Numantia. But these cases, from different timeframes, were certainly associated with the presence of armies, which, as aforementioned, required exclusive supply networks. It is harder to ascertain which type of production took place near the Mediterranean coast. State-of-the-art knowledge of lamp production and trade during this period is still insufficient, but we plan to expand it in the future.

In the second phase, up to the mid-1st century AD, lamps were increasingly accepted by the Hispanic societies, and their use became widespread. Imported pieces represented a significant share of used lamps, as demonstrated at *Scallabis* (Santarém, Portugal)[42], but the number of *figlinae* devoted to lamp production significantly grew – as well as their circulation (fig. 4). Now it is more difficult to establish the origin of the craftsmen, as in some cases we cannot determine whether certain brands are linked to Italic branches or correspond to imitations of foreign models – e.g. the case of *L. Munatius Threptus*[43].

[42] PEREIRA 2014a, pp. 14-16;
[43] MORAIS 2004; MORAIS 2005, p. 372, nº 28;

While we know there were some productions in Western Hispania, most manufacturers were apparently concentrated in the Ebro Valley. Even though the map indicating their geographical distribution shows a prevalence of manufacturing centres in that area, we should remember that the area of Cadiz, as well as the Guadalquivir valley, must have been important producing and exporting regions.

The third phase, spanning from the mid-1st century and the 3rd century AD, was marked by the consolidation of Hispanic productions (fig. 4). There was a stronger dissemination of workshops devoted to lamp manufacturing, but mainly in the aforementioned areas, some of which were specialized, in domestic urban contexts. At this stage craftsmen tried new forms, the so-called 'genuinely Hispanic lamps'. Although their dissemination was not significant, their acceptance was widespread and lasted for a long time, resisting the imitations of volute-series and plain nozzle lamps.

In the 3rd century AD, the strong demand for, and consumption of, lamps that existed in the High Empire began to show symptoms of change[44], impacting both on the *figlinae* and the percentages and forms of manufactured pieces. This discussion, however, clearly exceeds the scope of the present paper.

[44] PEREIRA 2014b; PEREIRA 2017.

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Fig. 1. Ricci G lamp from Monte Molião (Lagos, Portugal), probably from a manufacture of Córdoba, Spain. (Author picture).

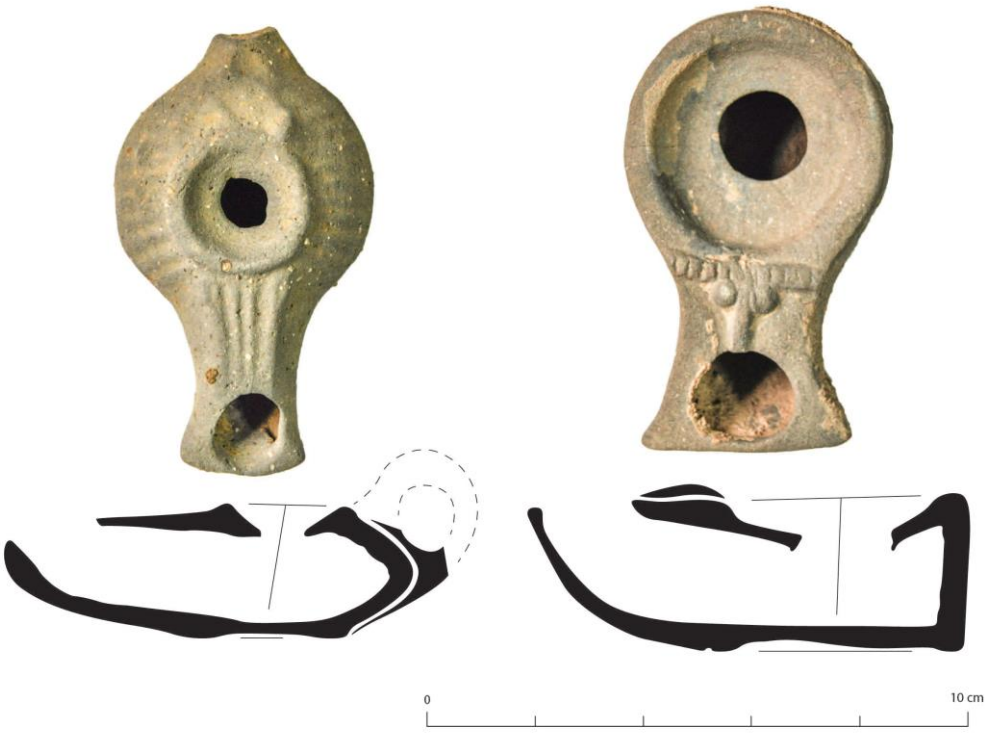


Fig. 2. Ricci G and H local productions from Cáceres el Viejo (Cáceres, Spain) (Author pictures and drawings).

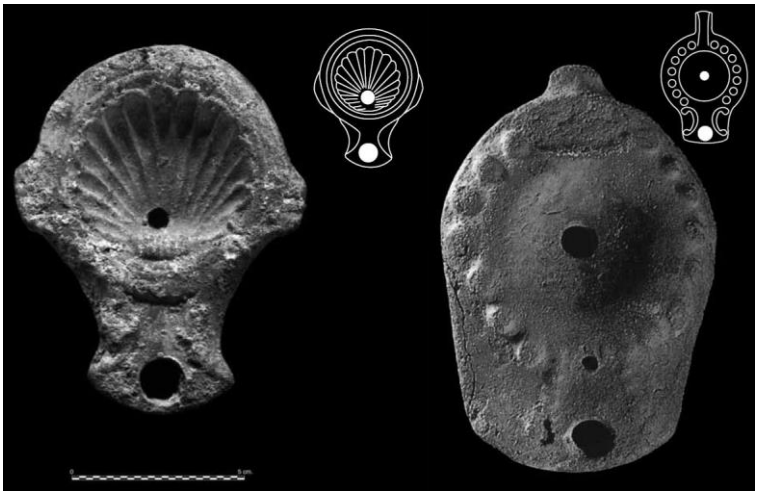


Fig. 3. Hispanic lamp types inspired in the volute lamp series (from Morillo, Rodríguez 2008, adapted).

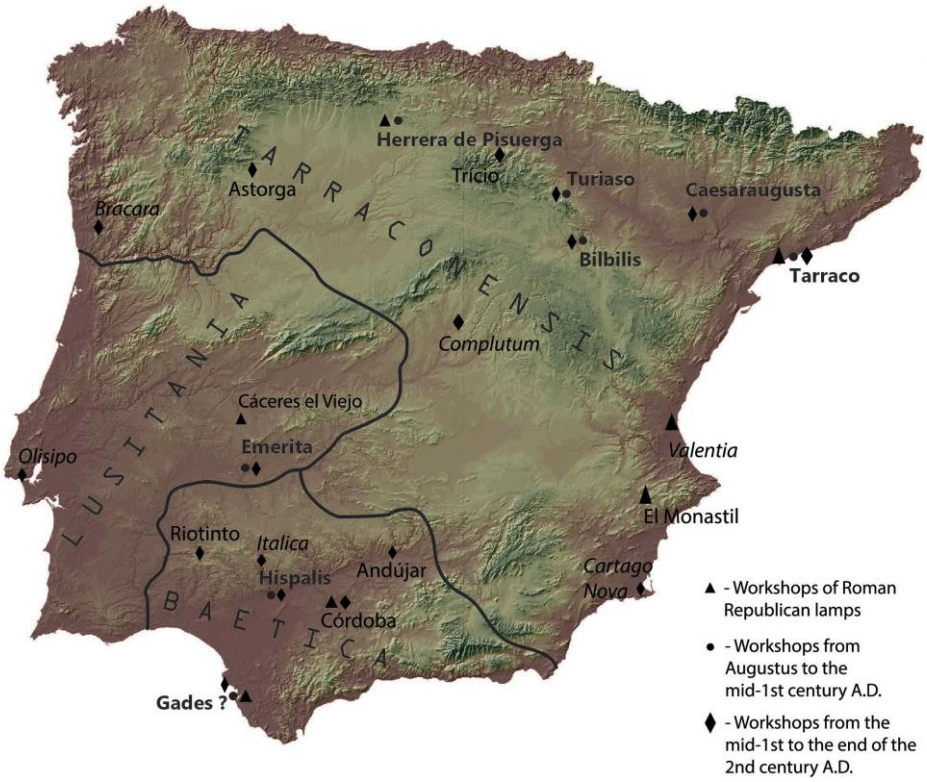
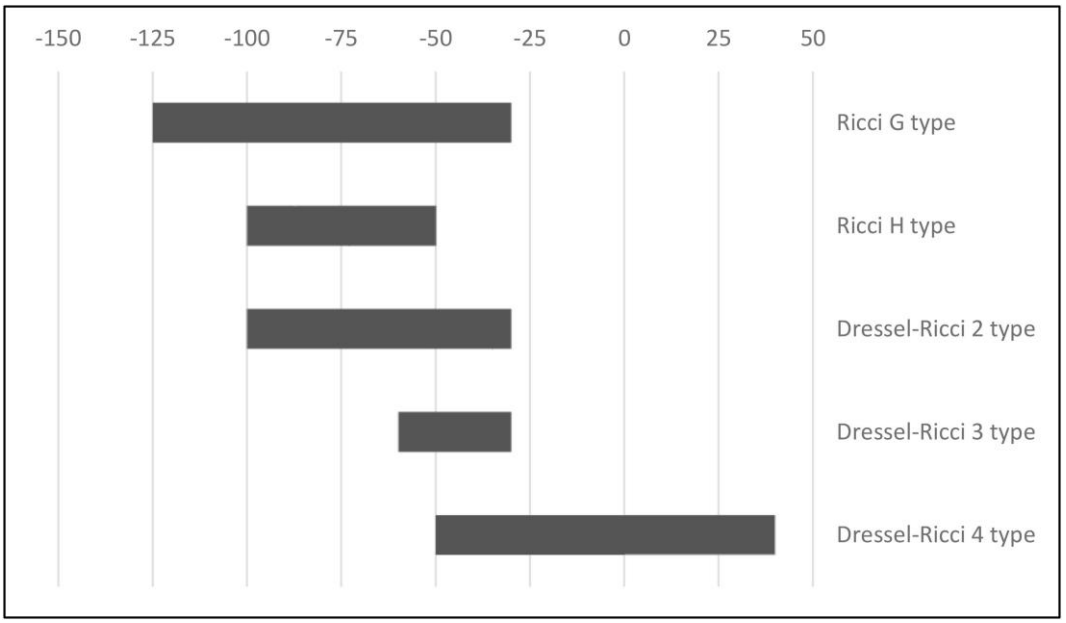


Fig. 4. Distribution of the Hispanic productions, between 2nd century BCE. and the end of 2nd century AD, known until this moment (Author picture).



Tab. 1. Chronology of the Roman-Republican lamps productions in Hispania. (el. by Author).

Location	Type of production	Scope	Evidences	Lychnological series	Produced types	Chronology of production	Bibliography
Barrio de las Termas (*Bilbilis*)	Not specialised	Urban	Mould	Volute lamps	Dressel-Lamboglia 9 ?	I and II century AD	AMARÉ TAFALLA & SÁENZ PRECIADO 2004
Hispalis	Specialised	Urban	Kiln and chemical analysis	Volute lamps	Dressel-Lamboglia 9B	20/40 to 60/70 AD	VÁZQUEZ 2012
Caesaraugusta				Volute lamps	Dressel-Lamboglia 9		HERNÁNDEZ 2014; MORILLO 2018, p. 384
Herrera de Pisuerga			Chemical analysis	Volute lamps	Dressel-Lamboglia 9A	Augusto-Tiberius	MORILLO 1992, pp. 89-90; 1993; 1999, pp 65-66; 635-646
Tarraco				Volute lamps	Dressel-Lamboglia 9B		BERNAL 1993, p. 153
Tarazona (*Turiaso*)	Specialised	Urban		Volute lamps but also firmalampen	Dressel-Lamboglia 9	I century and first half of the II AD	AMARÉ, BONA & BORQUE 1983; AMARÉ & AGUAROD 1985-87
Mérida (*Emerita Augusta*)	Specialised	Urban	Chemical analysis and new marks	Volute lamps but also plain nozzle lamps and firmalampen	Dressel-Lamboglia 9B	Claudio/Nero until II century AD	RODRÍGUEZ MARTÍN, 1996, pp. 143-147; 2005

Tab. 2. Workshops of volute lamp series, with triangular nozzles, in Hispania. (el. by Author).

Location	Type of production	Scope	Evidences	Lychnological series	Produced types	Chronology of production	Bibliography
Bracara Augusta	Specialised	Urban	Stamps, chemical analysis and three moulds	Volute lamps but also produced plain nozzle lamp series and firmalampen	Dressel-Lamboglia 10/11 Dressel-Lamboglia 14/15	I to III century AD	RIGAUD de SOUSSA, 1965-68 y 1969; ALMEIDA, 1973-74, pp. 48-49; MORAIS, 2002; 2004; 2005, pp. 366-379; 2012
Hispalis	Specialised	Urban	Kiln and chemical analysis	Volute lamps Also produced Riotinto-Aljustrel type and bilychnis lamps	Dressel-Lamboglia 11 Dressel-Lamboglia 12	20/40 to 60/70 AD	VÁZQUEZ 2012
Italica		Urban	Unprecedented type	Volute lamps	Dressel-Lamboglia 10/11 (Minotaur type)	Second half of the I century AD	LÓPEZ RODRÍGUEZ, 1981, pp. 19-20
Los Villares de Andújar	Specialised		Stamps, Workshop evidences and unprecedented type	Volute lamps	Dressel-Lamboglia 10/11 Also produced the Andújar type	Since Claudio until the flavians	LUZÓN, 1967; SOTOMAYOR et alii, 1976; 1979; 1981
Córdoba	Not specialised	Urban?	Production evidences and chemical analysis	Volute lamps but also produced plain nozzle lamp series	Dressel-Lamboglia 10/11	Second half of the I and beginning of the II century AD	AMARÉ, 1988-89; BERNAL, 1993, pp. 214-215; BERNAL, GARCÍA GIMÉNEZ, 1995, p. 178; GARCÍA GIMÉNEZ *et alii*, 1999
Tarazona (*Turiaso*)	Specialised	Urban		Volute lamps but also firmalampen	Dressel-Lamboglia 10/11 Dressel-Lamboglia 14/15	I century and first half of the II AD	AMARÉ, BONA, BORQUE 1983; AMARÉ, AGUAROD 1985-87
Mérida (*Emerita Augusta*)	Specialised	Urban	Chemical analysis and new stamps	Volute lamps but also plain nozzle lamps, firmalampen and Andújar type	Dressel-Lamboglia 10/11 Lamboglia 12/13 Dressel-Lamboglia 14/15	Claudio/Nero until II century AD	RODRÍGUEZ MARTÍN, 1996, pp. 143-147; 2005

Tab. 3. Workshops of volute lamp series, with round nozzles, in Hispania. (el. by Author).