

THE CRISIS OF THE 6TH CENTURY BCE IN THE SOUTHWEST OF THE IBERIAN PENINSULA AND THE POSSIBLE RELATIONSHIP WITH *MALARIA FALCIPARUM*: THE CASE OF THE TIERRA LLANA (“FLAT LAND”) OF HUELVA

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Abstract: The general goal of the present work is the reconstruction of the historical process of the society that inhabited the Southwest of the Iberian Peninsula throughout the Second Iron Age by looking at the diachronic evolution of the territory. This has been achieved by carrying out an analysis at three distinct levels: the micro-level, that is, the study of each of the settlements from a diachronic point of view; the meso-level, focused on the region known as Tierra Llana of Huelva; and the macro-level, with the establishment of parallelisms in the study of Turdetania. One of the main topics is the new hypothesis that would explain the so-called “crisis of the 6th century BCE”, based on the effects of an epidemic outbreak of *falciparum malaria*, since all the necessary conditions for the propagation of such an outbreak were met in the Southwest of the Iberian Peninsula: ideal environmental factors, existence of vector and host, an important ploughing of the soil in immediately preceding moments, demographic increase followed by a high immigration rate, and poor health conditions. The reasons above could explain the dissimilar impact in the different areas, regardless of their economic activity or their location, since that would depend on the level of development of the disease. The recovery from these types of outbreaks in about 50 years coincided in time with the changes that took place in the Southwest of the Peninsula in the 6th century BCE. However, it should be added the presence of a genetic mutation, called thalassemia, the propagation of which is related to malaria outbreaks or epidemics, to which it is immune. We can further determine the expansion of thalassemia if we focus on the Sardinian area in the 6th century BCE, which matches, chronologically speaking, the evidence compatible with the beta thalassemia of the osseous remains that were found in a grave in the necropolis of *Gadir*.

Keywords: Southwest of the Iberian Peninsula; Tartessos-Turdetanians; Second Iron Age; Crisis of the 6th Century BCE; End of Tartessos; Malaria *falciparum*.

1. INTRODUCTION

The origin of this paper is our PhD, obtained in 2016, which has been improved upon since then.

In the following pages we present an alternative explanation regarding the changes that took place in the Southwest of the Iberian Peninsula during the 6th century BCE. To do this, first of all, we will describe the defining characteristics of the period, both in our area of study as well as in the rest of Turdetanian settlements.

The following section reviews the main theories that have tried to explain the phenomena that took place in this century, from Schulten’s diffusionist presuppositions to the most recent hypothesis that take into account possible changes in the mentality of the populations that occupied the area. Finally, we present our hypothesis, which can only be contrasted by future archaeological interventions aimed, among other issues, at responding one of the most significant changes in Iberian Protohistory.

The starting point has been determined by the sources used and their nature, since it is in these elements that we find the first contradiction between the literary and the archaeological evidences. Thus, the first goal was to define the object of study, since the ethnic ascription of the inhabitants was not completely

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delimited, even though the spatial and chronological framework was: the Tierra Llana (“flat lands”) of Huelva between the 6th and the 3rd centuries BCE.

2. TURDETANIANS. ORIGIN AND MEANING OF THE NAME

Conventionally, this period has been named “Turdetanian” or “Punic” and the inhabitants have received the name of Turdetanians. Therefore, we started to seek the origin of this name and its meaning, which is connected to the term “Tartessian”, given by Greek literary sources when referring to the inhabitants of the area between the river Guadiana and the Guadalquivir during this time period.

After the analysis of the Greco-Roman sources, we thought it is necessary to consider the exact value that they have before we can extract the information contained within them. In most cases, they offer the view that Greeks and Romans had of that society and territory, which is a reason why we should not identify ethnic groups or even specific archaeological cultures using these literary sources as if they were the only ones.¹ Similarly, we should not extrapolate concepts that in Antiquity did not have the same meaning as they do nowadays, as are for example *basileus* or *ethnos*.²

In Greek literature, the Far West is always described as a liminal, peripheral, and exotic place (almost unknown until Herodotus), which motivated the description of mythological beings and events that were identified with this territory in literary works.³ Later, thanks to a better knowledge of the area, it was integrated into the literary genre that was typical of the time which was finally established in the 2nd century BCE thanks to Polybius, who was the first to use the name Turdetania and Turdetanians to refer to the area and its inhabitants respectively, names that prevail to this day.

Sometime later, Strabo included this area in his descriptive geographical work, the objective of which was not the detailed exposition of the territorial complexities, but a unification and general characterization of the area, which led him to simplify different elements.⁴

It is possible to interpret that the term Tartessian as a geographical concept, among other reasons, because of the changes in the myth of Geryon, since in the Tartessian territory took place after it was firstly located in Epirus, the same place as the Gigantomachy. It was not until the arrival of the Romans that this idea of it being an unknown, peripheral and liminal land disappeared.⁵

The proliferation of the uses that the term “Tartessian” has made it extremely difficult to determine its exact meaning. One of the Greek versions of the word differentiated the Phoenicians and the indigenous populations that existed before their arrival to the Iberian Peninsula. However, the fact that the Greeks used a term that had the root of the indigenous name, does not exclude or negate the fact that Phoenician populations also existed in the area.⁶

Thus, the idea that the allusions to Tartessos refer only to the population living in this territory prior to the settlement of eastern populations has prevailed within the collective imagination, without taking into account that most of the references of Greco-Roman literary sources do not refer to an ethnic group, but rather to a geographical concept in most cases – river, region, kingdom, city.

1 Downs 1998, p. 40.

2 Ferrer – García 2002, p. 144.

3 Ferrer – García 2002, p. 138.

4 Alonso-Núñez 1999, pp. 105-119; Cruz Andreotti 2011, pp. 44-45; Alvar 2013, p. 247.

5 Gómez Espelosín 1999, p. 65.

6 Escacena 2013, p. 140.

The literary sources make an indiscriminate use of the term Tartessos, based on the origin and the context in which it was written. Moreover, they have traditionally been given authority without a deep examination of the texts, and are generally influenced by the interests that each theoretical school had, as a consequence of a lack of knowledge in some cases, and of neglect in others.

Moreover, these assertions have been used to refer to moments that were previous to the ones they actually referred to. For this reason, we find anachronisms were successful and have been repeated over time, which created a false idea based on uncorroborated suppositions of the historical reality: the restriction of Tartessos to the indigenous context; the idea of the settlement of Phoenicians on the coast and indigenous people inland. These ideas would be subsequently extrapolated to Punics and Turdetanians respectively.

On the other hand, we should bear in mind that it is an anachronism to name the people who lived in the Southwest of the Iberian Peninsula before the arrival of the Phoenicians using a term that the Greeks employed some centuries later to refer to the territory and its inhabitants, since this place was also inhabited by easterners.⁷

Other more complex terms used to deal with a complicated moment in the Mediterranean Early Iron Age are “orientalization” and “orientalizing”, understood as the process whereby the indigenous population appropriated certain elements of eastern origin. We consider that the use of this term has unintentionally legitimized some theories that could be seen as excessively pro-indigenous, some of them even defending the idea that the eastern symbols that are present in many elements need to be understood as the result of a trend.

We should also take into account that an ethnic identity is defined by its fluidity and evolution based on the needs of the group and the individual, as well as on the understanding of the “other” and from the point of view of that “other”, that is, the perception that other communities have of a second community. Such perception, highly complex since it does not come directly from the main source, is the one we must work with for the area under study, which means dealing with a mosaic composed of the vision that foreign agents had, sometimes direct, but most of the times indirect, and taking into account that they had different interests in mind when composing of some texts that in many cases were altered for political reasons and interests.

We consider, therefore, that the terms Tartessos and Tartessian refer to a specific territory and its inhabitants, but not to an ethnic group that would exclude the Phoenicians. The same happens with the concepts of Turdetania and Turdetanian, which could also refer to Punics or even Celts.

We defend the idea that, in the context of the pre-Roman populations in the Southwest of the Peninsula, we find a similar case to the one described for the Celts.⁸

However, taking into account how widespread these terms are, we use “Tartessian” and “Turdetanian” to refer to the area of the Southwest of the Iberian Peninsula during the First and Second Iron Age respectively.

3. THE TIERRA LLANA (“FLAT LAND”) OF HUELVA

Once our object of study is defined and the Greco-Roman literary sources analyzed, in a way that allows us to separate the wheat from the chaff, we could establish a spatial and chronological framework for every level of our analysis: the micro-level, that is, the study of each of the settlements from a diachronic point of view; the meso-level, focused on the Tierra Llana of Huelva; and the macro-level, with the establishment of parallelisms in the study of Turdetania (FIG. 1).

⁷ Koch 2003, pp. 2-3.

⁸ «Un mosaico de pueblos con algunos rasgos comunes, entre los cuales las lenguas y las costumbres debieron ser mejor percibidas por los “ojos mediterráneos”» (Ruiz Zapatero 2001, p. 79).

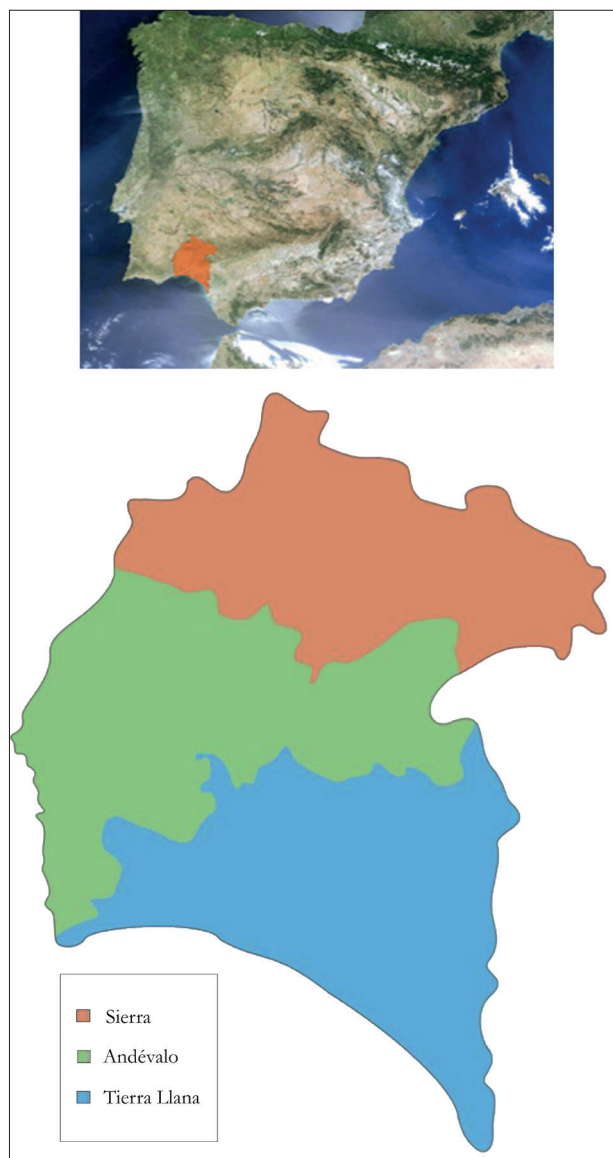


FIG. 1. The region of Huelva (author's elaboration).

coasts of the Iberian Peninsula is what has conventionally been named Tartessos. The result of this contact is what we know as the Orientalizing Period, which goes from the 8th to the 6th centuries BCE, to which we must add the inclusion of ancient Greek commerce that began in the late 7th century and continued throughout the 6th century BCE.

In the Orientalizing Period the previous models continue, whereas the territory is structured around three hegemonic centers: Huelva, Niebla, and Aznalcóllar-Tejada la Vieja, from where the economy based on the exploitation and commerce of minerals and metallurgical elements from the Iberian Pyrite Belt would be controlled, which brought the hierarchical organization of the territory, the accumulation of surplus and the trade.

This triple analysis allowed us to both delimit our object of study to the Tierra Llana of Huelva and also to take into consideration the most important questions on a broader scale. Thus, we have been able to relate the events that happened on a local scale to those that had a wider resonance.

The choice of the Tierra Llana as the central unit in this study is motivated by the geographical homogeneity and cultural tradition of this chorological unit. Its first occupation took place in the Quaternary.

The heterogeneity regarding occupation patterns allowed the territory to become one of the most important in the South of the Iberian Peninsula during the Late Bronze Age, to the point of attracting external commerce, since traders found a specialized structure around the hegemonic centers, which were linked to other hut settlements devoted to agriculture, stockbreeding, copper extraction or fishing depending on their location: in the case of Aznalcóllar, it was specialized in mining and metallurgy; Niebla, in its turn, took advantage of the agricultural resources and controlled the main communication roads; finally, Huelva was a commercial port for products coming in and out of the region, which favored the arrival of external influences since, at least, the mid-13th century BCE, most of them coming from the Mediterranean, although we also take into account those from the area of the Iberian Central Plateau and the Atlantic.⁹

Later, between the late 9th and the early 8th centuries BCE, the structure that the Phoenicians found at their arrival to the Atlantic

9 Campos – Gómez 1995, p. 151; Gómez – Campos 2008, p. 133.

This is precisely the period when the city of Huelva reached its peak as a trade center and central hub of the region. The city does not count with evidence of a Chalcolithic or Neolithic occupation, with the exception for some decontextualized objects. The nearest can be found in the neighboring settlement of La Orden-Seminario. The earliest evidence of occupation is from the 9th century BCE, as many artifacts exhumed in different interventions of the city date back to that period, the most relevant of these being those recovered at the Cabezo de San Pedro and 7-13 Méndez Núñez Street. Unfortunately, there is no clear archaeological stratigraphy of any of the interventions in which the oldest materials were documented.

With regards to architectural elements, the oldest examples are the stone structures in a wall documented at Cabezo de San Pedro, since there are no surviving archaeological remains that could confirm the hypothesis of an earlier occupation in semi-subterranean huts.

The evidence that has traditionally acted as a guide for the pre-Phoenician Late Bronze Age period is the polished pottery, found both at the top and along the hillsides of Cabezo de San Pedro, La Esperanza and La Horca. Therefore, the domestic area would cover these hills and perhaps the disappeared Old Cemetery and Molino de Viento hillock.¹⁰

The chronology that has traditionally been accepted was that of the 9th to the 8th centuries for the pre-Phoenician occupation, and the 8th century BCE for a permanent established Phoenician presence. However, with the finding of an important quantity of imported materials of Phoenician, Greek, Cypriot and Sardinian origins in the 9th century BCE, it is essential to revise this traditional chronology.

Despite the fact that the aforementioned materials do not belong to an archaeological stratigraphy in the traditional sense (they come from the excavation of the plot in 7-13 Méndez Núñez Street), their sole presence confirms the commercial activity that this enclave already had before 9th century BCE the time in which the famous hoard of the Huelva Estuary had been dated.¹¹

The consequence of the contact between external elements and the native society, traditionally referred to as Tartessian, was what has conventionally been named as the Orientalizing Period, of which much has been written. In this area it refers to the most thriving period for the city, which saw its widest expansion and highest splendor at this moment in time, with the presence of eastern peoples. This was the reason, and the consequence too, of the intensification of silver metallurgical production through the cupellation and its trade.

The attention of the scientific community for this period of the city of Huelva has been such, that an occupation of 15 ha and 2000-3000 people has been considered by some,¹² while others propose an extension of 35 ha.¹³ The importance of this historical stage should not surprise us, given the presence of quadrangular structures built with stones and adobe, as well as the urban planning of streets, the presence of industrial areas, habitat zones, a port area, sacred areas and the famous “princely” necropolis of La Joya. Therefore, it is in this phase when it seems there was a planned occupation of both upper and lower areas of the city.

A similar case is that of Niebla (roman *Ilipla*), which had a permanent occupation since the 1st millennium BCE as a result of the need to control the territory, since, as we have seen, it is one of the main centres – together with Aznalcóllar and Huelva – within the Atlantic-Mediterranean silver trade network.¹⁴

10 Ruiz Mata 1991, p. 64; Fernández *et al.* 1997, p. 24; Gómez – Campos 2001, p. 113.

11 González – Serrano – Llompart 2004, pp. 179-199; Mederos Martín 2006.

12 Ruiz Mata 1991, p. 64.

13 Gómez – Campos 2001, p. 117.

14 Pérez – Campos – Gómez 2000; Campos – Gómez 2001, p. 134; Campos – Gómez – Pérez 2006, p. 333.

Its privileged location offered an access to the sea through Huelva, as well as to all the countryside of the territory, so it is logical to deduce that there should exist, from the very beginning a route connecting Niebla, Tejada la Vieja, Aznalcóllar, Cerro de las Cabezas (Olivares) and the Guadalquivir riverbanks. Nowadays, we can deduce that it would be the same route that became the Roman road in the future, described in the Antonine Itinerary, which connected *Onoba* with *Ilipla*, *Ilipa* with *Tucci*, and *Tucci* with *Italica*.

The earliest occupation of the city already counted with a walled perimeter made of rough stone with semicircular bastions that dates to the Bronze Age, which would soon be covered by the layers of the pre-Phoenician Late Bronze of the inner city. It is upon this wall that the settlement belonging to the Orientalizing Period was built, a period to which we associate wheel-made pottery and to which we assign the so-called “Droop’s Wall” or “Muro de Droop”.¹⁵ Given its identical building technique to what has been identified as the inner wall of the casemates, as well as their stratigraphic correlation, we suppose that what had been thought a buttress, was actually a defensive tower, dismantled to make use of its materials. In one of the interventions carried out in this area a number of Tartessian scripts engraved in grey pottery were documented in a stratum dating to the late 7th or early 6th century. Its sole presence gives us information regarding the society of the time, since it shows a great knowledge of the technique and the use writing necessary for the creation of these objects.

In spite of the continued occupation, as was also the case of Huelva, the Orientalizing Period is that of the highest splendor of the city of Niebla, as shown in the archaeological remains exhumed in the interventions carried out, especially in the surroundings of the city wall, having documented an area dated from the 7th-6th centuries BCE near the “Puerta de Sevilla” (Gate of Seville), where a complex and meticulous building structure was documented. Traces of a possible necropolis with rich funerary objects, situated in the area known as “Cabezo del Palmarón”, also belong to this period.

We have seen that the city wall from the Orientalizing Period, with casemates, of clear oriental influence, replaced the previous one, made of masonry. This same structure would be modified in the second Iron Age, as can be seen in the section of the city wall that is located between the towers 24 and 25.¹⁶

Another of the walled enclaves in this time is Tejada la Vieja, a place that was very well communicated with both the Guadalquivir and the coast by a waterway. By land it was also a strategic location, since there was a road crossing it that connected the Tierra Llana and the mountains, before crossing the valley of “Pata del Caballo” on its way to Riotinto. The success and importance of this route is evidenced thanks to its continued use to this day.

This settlement grew thanks to the union of small neighboring centers that, like Peñalosa, are established in this enclave of 6.5 ha. Although there is no evidence that could confirm it, it should not be ruled out the idea of an initial settlement with semi-subterranean huts before the construction of its city wall and its urban planning where structures were built in stone during the 8th century BCE. However, other authors see the Canaanites as responsible for the initial creation and occupation of this site.¹⁷ Nevertheless, this question will remain open for debate until we obtain novel information from new archaeological interventions in the settlement.

However, there is no doubt that in the 7th to the mid-6th centuries BCE this settlement would reach its peak occupation and expansion, when greater urban and commercial activity was documented. It is precisely in this moment when public buildings were built, the urban design of the city was established and to which the industrial structures are dated to.

15 Campos – Gómez – Pérez 2006, p. 380.

16 Gómez – Beltrán 2006; Campos – Gómez – Pérez 2006, p. 380.

17 García Sanz 2003, p. 15; Esteban – Escacena 2013, p. 124.

4. CHANGES IN 6TH CENTURY BCE

Following the chronological sequence, the 6th century BCE is a time of changes in the Mediterranean generally speaking, and in the Southwest of the Peninsula particularly (FIG. 2).

According to the traditional historiography, in the 6th century BCE there was a crisis that was responsible for the end of the Tartessian world and the rise of the Turdetanians.

In the Tierra Llana of Huelva we can observe a number of changes that, despite their importance, not have to imply the existence of deep crisis. Moreover, both regional and local distinctive features should be taken into account, given that the changes that occurred did not take place in all the settlements. Furthermore, the changes that did take place varied notably from one site to another.

For example, in the city of Huelva, the changes are more visible than in other places, precisely because they took place immediately after a period of flowering and growth.

For example, the import of luxury goods from Eastern Greece, Laconia and Corinth, among which the pottery from Ergotimos painted by Klitias is of special importance, date back to the 6th century BCE. This trend continued until the middle of the 6th century BCE,¹⁸ when these imports ceased in favor of those from Attica and Massalia, though to a lesser degree. The level of foreign trade that existed before the crisis would not reach the previous levels until the 4th century BCE, with the presence of Attic and Punic imports.

In the 6th century BCE we also witness an extensive and diversified occupation in the city of Huelva,¹⁹ which showed a division of the space in functional areas: domestic,²⁰ industrial,²¹ funerary,²² a port area,²³ and ritualistic places.²⁴

At the end of this century many of these spaces were abandoned, most of them in the lower part of the city, initially devoted to the industrial activities and, some of them, to the domestic spaces. In the upper part of the settlement the necropolis was abandoned, and was not reoccupied until the Roman period.

In places like Niebla a number of changes that took place during this century can also be observed. Although the city managed to maintain its dominance over the region, there is a substantial amount of archaeological evidence around elevation contour line 40 of the plateau that implies, more than a crisis, a restructuring of the settlement.²⁵ This was possibly related with an economic reorientation based on diversification, since besides its role as a redistribution centre for metals, it was also devoted to agriculture and stockbreeding.²⁶

In the case of Tejada la Vieja (Escacena del Campo) we observe a reorganization of the urban space that began in the 6th century and continued until the abandonment of the city in the 4th century BCE. An

18 Almagro-Gorbea – González – Llompart 2018.

19 The individualized bibliography can be found at Toscano-Pérez 2016.

20 Archaeological interventions with the presence of domestic spaces: La Fuente St. 13-15 (1985), 19-21 (1996); Méndez Núñez St. 5 (1985), 4-6 (1985) and 8 (1987); Tres de Agosto St. 9-11 (1988), 3 (1996); Puerto St. 12 (1989); Cabezo de San Sebastián (1995); San Salvador/esquina Fernando el Católico St. (1999); Cardenal Cisneros St. 11 (2001); Vázquez López St. 8 (2001); Fernando el Católico St. 28 (2004).

21 Archaeological interventions with evidences of industry: Botica St. 10-12 (1983); Méndez Núñez St. 8 (1987), 7-13 (1997); Puerto St. 29 (1987), 12 (1989), 22 (1994); Tres de Agosto St. 9-11 (1988); Palos St. 12 (1990 and 1992); Fernando el Católico St. 9 (1991); San Salvador/esquina Fernando el Católico St. (1999); Concepción St. 5 (2005); Alcalde Mora Claros St. 2 (2006); La Fuente St. 21 (2006).

22 Archaeological interventions with funerary evidences: Necropolis of La Joya (1969) and Parque Moret.

23 Archaeological interventions with evidence of the presence of a harbour: Berdigón St. 13 (2006).

24 Evidences of ritualistic places: Corinthian Helmet (1930); Cabezo de San Pedro; Puerto St. 8-10 (1980), 6 (1982) and 9 (1983); Méndez Núñez St. 7-13 (1997).

25 Campos Carrasco 2005.

26 Campos – Gómez – Pérez 2006, p. 343; Gómez Toscano 2008; Almagro – Toscano 2011.

example of this urban reorganization is the construction of a quadrangular buttresses that was added to the city wall, or the construction of an important public building.²⁷

The most relevant artifacts from this period, besides the pottery, is the abundant number of spindle whorls, which could point to an economic reorientation, that can also be evidenced in the number of amphorae and hand mills that have been recovered from archaeological levels belonging to this period.

Thus, the places connected with more than one economic activity could survive this century of changes more easily than those that were focused on a single economic activity, as were the case of Cerro de la Matanza (Escacena del Campo),²⁸ La Atalayuela (La Palma del Condado),²⁹ Aljaraque,³⁰ Saltés,³¹ and La Monacilla (Aljaraque).³²

We have already seen that the changes did not affect all the settlements in the Tierra Llana of Huelva in the same way, and the same can be said in general for the settlements from the Southwest of the Iberian Peninsula, although in general terms we could say that the area was immersed in a process of ecological imbalance as a consequence of the intensive agriculture and stockbreeding. Furthermore, sites exclusively dedicated to the extraction and processing of minerals were abandoned, a dynamic that can also be observed at small rural exploitation, necropolises and some places of worship.

We could conclude that there was a tendency towards centralization in first order settlements, although with an unequal impact depending on the area and the settlement.

In the case of the Lower Guadalquivir, the places in which we observe the clearest evidence of change are Carmona and Lebrija, with the identification of destruction layers that date back to the first half of the 6th century BCE³³ Others, however, show a lighter impact: a hiatus in the case of Montemolín³⁴ and Écija³⁵ and a phase of decline in Alhonor³⁶ and *Ilipa*.³⁷

On the other hand, in other enclaves we can observe that these changes are not that impactful, as are the case of Cerro Macareno,³⁸ Cerro de la Cabeza,³⁹ *Spal*,⁴⁰ *Caura*,⁴¹ and Cabezo del Castillo de Lebrija,⁴² mainly due to the diversification in production.

27 Fernández Jurado 1989, pp. 158-182; 1990, pp. 291-293; 1991a, pp. 169-175; 1991b, pp. 55-66; 1993, pp. 136-137; 2003, p. 44; Fernández – García 1989, p. 109; García Sanz 1989, pp. 98-105; Esteban – Escacena 2013.

28 Campos – Gómez 2001, p. 196; Campos – Castiñeira – Borja 1991; Campos – Guerrero – Pérez 1999, pp. 462-465.

29 Campos *et al.* 1992; 1995; Guerrero – Gómez 1999, p. 100; Campos – Guerrero – Pérez 1999, p. 461; Campos – Gómez 2001, p. 168.

30 Blázquez – Luzón – Ruiz 1971, pp. 309-310; Campos – Guerrero – Pérez 1999, p. 460; Campos – Gómez 2001, p. 148; Ferrer Albelda 2004, p. 293; Escacena – Vázquez 2009, pp. 53-54.

31 Bazzana – Bedia 1992, pp. 253-257.

32 Campos Jara – Martín – García 1999, pp. 218-220; Campos Jara *et al.* 2001, p. 345; Campos Jara 2002, pp. 129-135.

33 Belén Deamos 1996, p. 28; Escacena Carrasco 2001, pp. 29-34; Ferrer Albelda 2007.

34 Chaves *et al.* 2000, p. 575.

35 Rodríguez González 2014, p. 252.

36 Belén Deamos 2011-2012, pp. 333-334; López Palomo 1999, pp. 82-133.

37 Ferrer – García 2007, pp. 123-126.

38 Pellicer – Escacena – Bendala 1983, p. 108; Escacena – Belén – Izquierdo 1996, p. 24.

39 Escacena – Belén – Izquierdo 1996, p. 24; Caballos – Escacena – Chaves 2005, p. 54.

40 Campos – Moreno – Vera 1988, pp. 21-22; Ferrer – García 2007, pp. 123-126.

41 Belén Deamos 1993, p. 53; 2007, pp. 166-169; Escacena – Belén – Izquierdo 1996, 24.

42 Escacena – Belén – Izquierdo 1996, p. 24.

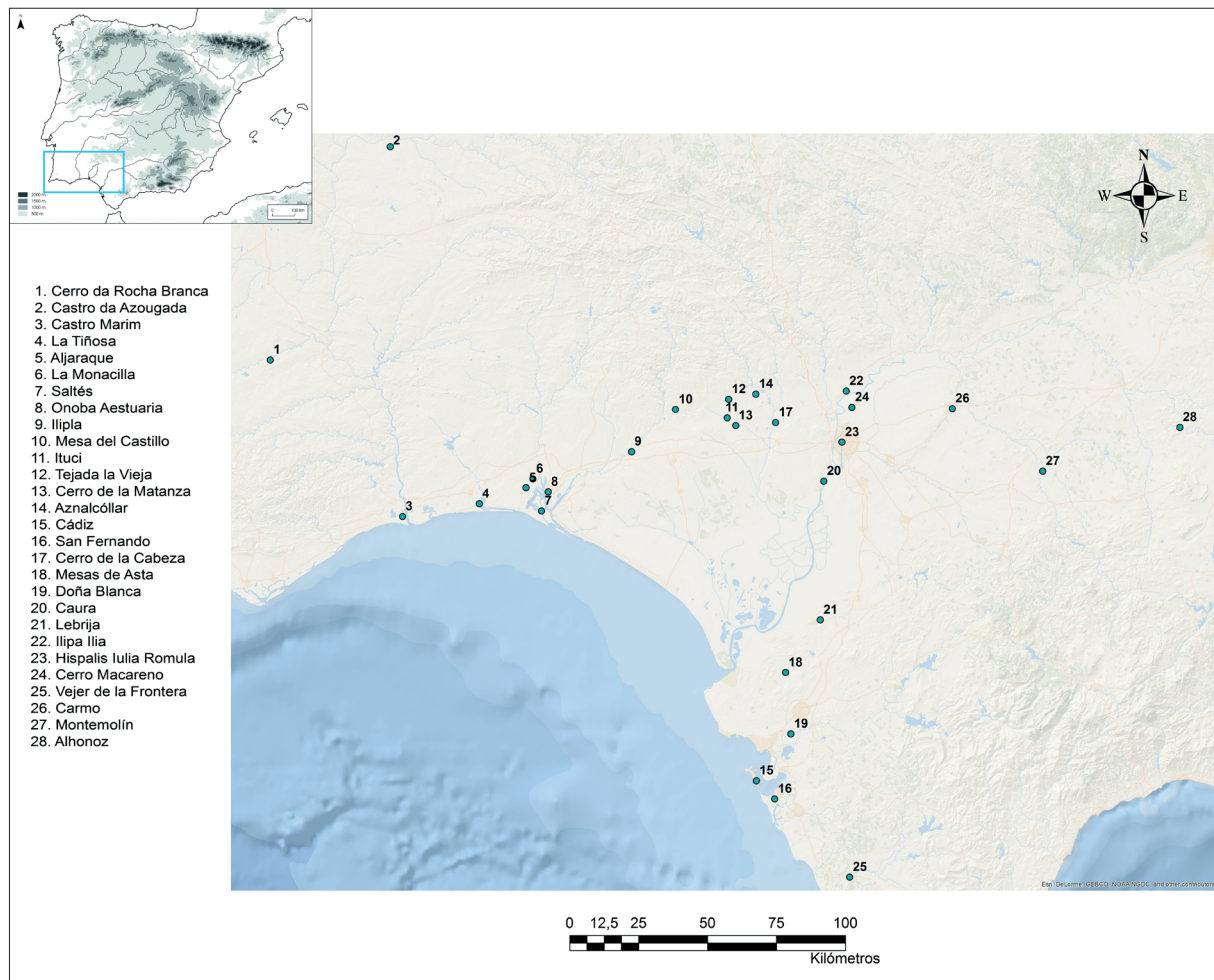


FIG. 2. Places cited in text (author's elaboration).

The area of Cadiz, in its turn, presents some regional distinctive features. While in Doña Blanca a constructive decadence in the 6th century BCE is evident,⁴³ in other places we can find hiatuses, as in *Baessipo*, Vejer de la Frontera,⁴⁴ or a reduction in size, as is the case of Mesas de Asta (Jerez),⁴⁵ or even Cadiz, where in some areas a hiatus has been identified spanning from the 6th to the 2nd century BCE.⁴⁶ In contrast, the places devoted to salting activities, such as San Fernando were not as affected.⁴⁷

Similar changes took place in the Portuguese Algarve, having documented a lower amount of materials in Cerro da Rocha Branca⁴⁸ and the abandonment of sanctuaries in the cases of Castro da Azougada⁴⁹ and

43 Ruiz Mata 1985, p. 243; 1986, p. 544; Ruiz – Pérez 1995, pp. 70-73.

44 Domínguez Pérez 2006, p. 43.

45 Domínguez Pérez 2006, p. 33.

46 Niveau de Villedary 2011; Gener *et al.* 2012; Sáez Romero 2018.

47 Domínguez Pérez 2006, pp. 60-61.

48 Gomes 1993, p. 105; Arruda – Bargão – de Sousa 2005, p. 205.

49 Antunes 2009, p. 131.

Castro Marim,⁵⁰ the latter with visible signs of deterioration of its sanctuary in the late 6th century BCE, in which layer with three inhumations belonging to children were found.⁵¹

As the changes that occurred in the Southwest of the Iberian Peninsula during the 6th century BCE were general but very restricted in time, we should ask ourselves about their causes. The explanations given have been diverse, according to the different historiographical trends dominant in each moment. Thus, they can be summed in three main groups, which we will further elaborate: those that defend a cause that is extrinsic to the territory; those that consider the internal factors responsible for these changes; and the multi-causal explanations that link aspects from the two previous approaches.

The traditional interpretation viewed the crisis to be caused by external factors, as is the case for the interpretations of A. Schulten⁵² and García-Bellido,⁵³ who defended that the destruction of Tartessos was due to Carthaginian expansion and military conquest.

The fall of Tyre at the hands of the Babylonians in 573 BCE was another factor frequently used to explain the changes that took place throughout the 6th century BCE, which also explained the rise of Carthage as the hegemonic power and the fall of Tartessos due to the collapse of the trading routes where they exported their silver.⁵⁴ Subsequently, commercial oligarchies would rise to power in detriment of traditional aristocracies.⁵⁵

The problem with this theory is the excessive importance that is given to Tyre as the monopolizing centre of Western trade activity. If a fall of such magnitude had occurred, there is a large probability that the main commercial centre would have been moved to a different oriental city and would not have impacted the Iberian Peninsula to such a degree, with which there was no true direct trade given that it was channelled through intermediaries from the Central Mediterranean. It would have been another factor that would lessen the impact of any commercial reorganization in the East.

Another theory that defends exogenous factors is that the founding of Massalia would trigger this change, since it would modify previous trade routes for tin that the Phoenicians would use to supply the Tartesian market. Therefore, this route would reach the supply areas through the Gulf of Leon.⁵⁶

According to our point of view, this theory does not explain in and of itself the changes that took place in the Southwest of the Iberian Peninsula, given that it takes for granted the modern idea of the correlation between productive sectors, without taking into account that if the large market were to fall there would not be necessarily any repercussions in the agricultural sector, from small rural sites to large *oppida* with a diversified economy. A similar critique can be made to another theory, this one defending internal factors, that defends that the crisis was triggered by the collapse of the silver mining system, creating a series of direct and indirect consequences that would lead to the crisis that took place in the Southwest of the Iberian Peninsula towards the end of the 6th century BCE.⁵⁷

Other authors add the agricultural crises to the previous one, since they defend that idea to explain all these factors there must be a phenomenon that is able to affect both populations with an economy struc-

50 Arruda – Teixeira 2008, p. 436; Arruda – Celestino 2009, p. 34; Arruda *et al.* 2009, p. 79.

51 Arruda *et al.* 2009, p. 80; Gomes 2012, pp. 95-96.

52 Schulten 1945.

53 García-Bellido 1942.

54 Aubet 1987, pp. 293-297; Ruiz Mata 1994, p. 340.

55 Arteaga 2001, pp. 243-244.

56 Alvar Ezquerro 1980; Wagner 1983, pp. 29-31; 1984, pp. 215-216; 1995, pp. 121; Almagro-Gorbea – Lorrio – Torres 2021.

57 Fernández Jurado 1986a; 1986b; Escacena Carrasco 1987; 1993; Alvar Ezquerro 1991; Wagner 1995; Martínez – Myro – Romero 1995, p. 489; Eshel *et al.* 2022.

tured around mining and metallurgy, as well as settlements with an agro-pastoral economic base, that would especially affect the demography of the region.⁵⁸

But these multicausal explanations do not take into consideration, in our opinion, each and every aspects of the crisis that took place, such as changes in consumption habits or funerary rituals, among others. All the previous theories only take into account a decline of the economic base as the cause for the changes that took place during the 6th century BCE.

E. Ferrer add to the previous theory a rupture in the socio-political stability of the region, given that the metallurgical crisis would have ultimately affected society since it was controlled by the local aristocracy, which at the same time was sustained by their relations with eastern traders. Due to the changes that would have taken place, military conflicts would arise that would end up disrupting the social structure that existed to that point, which archaeologically would be evidenced by the presence of arrow heads.⁵⁹

Despite the fact that this theory would explain most of the problems and the characteristics that would end up leading to the structural change that took place, there are still many questions that are left with no answer. On one hand, no destruction levels have been found at most sites that should have suffered said conflicts. On the other, and what is even more strange, is that no arrowheads belonging to the “harpoon and double edge” or “hook” typologies have been found in the area of Huelva, which supposedly would be the area most affected by these changes.⁶⁰

Therefore, we agree with the series of events that are defined by E. Ferrer, though due to the lack of evidence in the region of Huelva, what for E. Ferrer would be the spark that ignited the series of events, for us would be the consequence of a different factor.

Finally, within this same line of thought, F. J. García Fernández, considers that both the metallurgical crisis and the international events – fall of Tyre – would lead to a collapse of prestige goods trade and agricultural products by the eastern communities, which would cause to a weakened local aristocracy who based their wealth on prestige goods trade, which would ultimately generate conflicts in which traditional precolonial values would become predominant once more.⁶¹

Nonetheless, the reduction in the demand for silver, in our opinion, did not lead to a collapse of the agro-pastoral system, nor did the elites base their power exclusively on prestige goods trade.

Recently, some authors consider high-energy marine event as responsible or a decisive factor in this crisis.⁶²

To sum up, some of the main causes that have been used to explain the crisis of the 6th century BCE have been the fall of Tyre;⁶³ the foundation of Massalia and the resulting modification in the commercial routes;⁶⁴ the internal crisis of silver mining;⁶⁵ the combination the mineral exploitation collapse with an agricultural crisis;⁶⁶ the sum of an internal economic crisis and social crises;⁶⁷ the decrease in the demand for prestige goods and agricultural products due to the fall of Tyre, which resulted in the weakening of the local

58 Belén – Escacena 1992; Escacena Carrasco 1987, p. 297; 1993, p. 210; 2004, p. 16.

59 Ferrer Albelda 1994, p. 51.

60 Ferrer Albelda 1994, pp. 34-40.

61 García Fernández 2003, p. 1021; 2007, pp. 92-93.

62 Álvarez – Machuca 2022.

63 Aubet 1987, pp. 293-297; Ruiz Mata 1994, p. 340.

64 Alvar Ezquerria 1980; Wagner 1983, pp. 29-31; 1984, pp. 215-216; 1995, p. 121.

65 Fernández Jurado 1986a; 1986b; Escacena 1987; 1993; Alvar Ezquerria 1991; Wagner 1995; Martínez – Myro – Romero. 1995, p. 489.

66 Belén – Escacena 1992; Escacena 1987, p. 297; 1993, p. 210; 2004, p. 16.

67 Ferrer Albelda 1994, p. 51; Martín Ruiz 2007, pp. 160-164; Celestino – López-Ruiz 2020, pp. 259-267.

aristocracies and the return to pre-colonial systems.⁶⁸ However, the absence of destruction layers in most of the settlements, in both small and large centers, the damage to the places devoted to the mining as well as the agricultural and livestock activities, and the change in the funerary traditions, lead us to think that none of the theories proposed above solve all the questions that the changes mentioned here pose, which is why we considered other approaches.

5. NEW APPROACHES: MALARIA

The fact that we are dealing with agriculturally based societies with poorly hygienic settlements make us consider the possibility of a disease or an epidemic as the reason behind the aforementioned changes.⁶⁹ In order to determine which of the existing ones at the time could have been responsible, we identified the common features of the places that were affected, and the changes that were related with the different consequences of each illness.

The result was remarkable, since it coincided that one of the known distribution maps of the Iberian Peninsula indicated the area that has traditionally been assigned to Tartessos. We refer to the parasitic disease known as malaria or paludism that is transmitted through the *Anopheles* mosquito.

For this disease to propagate, any parasite must have a vector and a host. In the case of malaria, its parasite – *Plasmodium* – is transmitted through a propagating agent, in this case the *Anopheles* mosquito – commonly found in the Southwest of the Iberian Peninsula –, while its reservoir or host are humans, though it can also be transmitted to a fetus through its mother.⁷⁰

Therefore, the vector transmits the disease by having previously bitten a host and transforming parasitic larvae to a new reservoir.

Ideal temperature for the propagation of malaria is between 15 and 30°C, temperature at which the parasite – *Plasmodium* – reproduces within the vector – *Anopheles*. To be precise estival temperatures, not the modern day annual means, are responsible for endemic outbreaks. Temperatures below 14° completely stop the propagation of paludism. Therefore, outbreaks begin and end at certain times throughout the year: beginning in June, reaching its peak in August, and ending in fall. Therefore, temperatures between 20 and 30 degrees factor the development of *Plasmodium* within the *Anopheles* avoiding the premature death of the larvae.⁷¹

Not only temperature is important for the propagation of the parasite. There are other conditions that also favor it, such as lacustrine or marsh environments, where the vector can reproduce more easily. This gives origin to the name “malaria” – “mal aire” or “bad air” in Italian – or “paludism”, from lat. *Palus -ūdis*, Lake.

Furthermore, the exploitation of the terrain is an important contributing factor for the expansion of this illness, especially in an agricultural based society that modifies the terrain significantly, especially through deforestation. If we also add demographic growth, immigration, poor hydrological resource management, malnutrition, poor hygienic conditions and a lack of political assistance, we have an ideal location for an epidemic outbreak.⁷²

68 García Fernández 2003, p. 1021; 2007, pp. 92-93.

69 Martín Almagro already advanced it when he investigated the necropolis of Medellín (Almagro-Gorbea *et al.* 2008, p. 932).

70 Fernández Astasio 2002, p. 95.

71 Fernández Astasio 2002, pp. 39-41.

72 Giménez-Font 2008, p. 154.

Nowadays, between 200 and 300 million cases take place each year throughout the world with over a million deaths. It is one of the leading death factors in endemic countries, as well as one of the main causes of chronic anaemias in children and pregnant women, abortions, low weight at birth and having neurological consequences, especially affecting the psychomotor functions.

Death of new-borns are proven to be one of the consequences of *malaria falciparum*, especially in children younger than five and pregnant women, who face more risk of death due to malaria, since small children do not have an adequate immune response to the parasite and the response in pregnant women is weaker.⁷³

The three phases of a person infected with paludism are, in order of appearance: shivering, high fevers and sweat, and the time can vary depending on the type of paludism, which in its worst case is caused by *P. falciparum*, which also leads to coughing, diarrhea, difficulty in breathing and can even evolve in to shock with cuagulopatía, renal and hepatic insufficiency, pulmonary enema and acute encephalopathy which can cause entering a coma or death (cerebral paludism).

Other forms of paludism, such as those caused by *P. vivax*, *P. malariae* and *P. ovale*, do not lead to death with the exception of young children, the elderly, or patients with other concurrent diseases or immunodeficiencies.

After some time without a fever, the cycle of shivers, fever and sweating repeats every day, every other day or every three days. The duration of an untreated primary attack can vary from one week to a month or even more. Relapse is common (in the cases of infections caused by *P. vivax* and *P. ovale*) and can regularly reappear during five or more years. Paludic infections caused by *P. malariae* can persist up to 50 years, with recurring fevers. This symptomatology is caused due to the fact that *P. falciparum* hijacks red blood cells within the microcirculation, and blocks microcirculation through the spleen and destroys them.

5.1. History of the Disease

There are many theories regarding when and where the first malaria outbreak took place in Europe. On the one hand, some considered that the existence of malaria was already known in Greece in Hippocrates' time (460-370 BCE), based on the description of an illness that appears in areas surrounding lakes and marshes.⁷⁴ Nonetheless, written sources only establish an *ante quem* date to the 5th century BCE.

Another theory defends that it appeared at the same time as the effective establishment of agriculture in the Eastern Mediterranean during the 2nd millennium BCE.⁷⁵ The most common theory, on the other hand, is that it appeared in Northern Africa and extended to Sicily and Sardinia around the year 700 BCE and from there to Southern Italy around 600 BCE to finally reach central Italy during the 5th century BCE.⁷⁶

A recent thesis regarding malaria in Sardinia summarizes the introduction of malaria to the island in four main theories: those who defend that it appeared during the neolithic with the presence of agriculture; others that it was a consequence of Aegean populations during the Late Bronze Age; those who defend that

73 Sallares – Bouwman – Anderung 2004, p. 320.

74 «Entre las calenturas hay unas, que son continuas, otras que moles tan de día a los enfermos, y quedan libres por la noche, y otras, en que por la noche hay calentura, y están libres de día. Hay también semitercianas, tercianas, cuartanas, quintanas, septimanas y nonanas. En las calenturas, cuando son continuas, suele haber males muy acelerados, muy grandes y de gran peligro, y tal vez mortales. La más segura, la más apacible, y la más larga de todas es la cuartana, porque por sí misma no sólo tiene estas propiedades sino que libra a los enfermos de otras dolencias. La calentura, que se llama semiterciana, no sólo va acompañada de males vehementes, sino que es la más fatal de las que hemos propuesto» (Hipp. *Epidemiae* I 6; I 24; III 12; traducción de Andrés Piquer).

75 Angel 1964, p. 370.

76 Fermi 1934; Tognotti 1997, pp. 237-239; Sallares – Bouwman – Anderung 2004, pp. 316-317; Setzer 2010, p. 99.

it was introduced to the island by the Carthaginians during the 6th century BCE; and finally due to contact with the Phoenicians, sometime around the 7th century BCE.⁷⁷

5.2. *Malaria in Spain*

Unfortunately the data regarding malaria in Spain did not begin to be recorded until the XIX century when there was an important outbreak of paludism at the Riotinto mines, which led the Riotinto Company doctors to carry out a detailed study of this outbreak of it. This interest turned them into pioneers regarding the establishment of health guidelines in mining areas and the study and treatment of paludism, carried out by doctors Sutherland Mackay and Ian Macdonald. They studied the outbreak and its consequences from Riotinto to Huelva, reaching the conclusion that the most affected areas were those located on hill slopes near riverbanks that would partially dry-out in summer.⁷⁸

The earliest data regarding malaria in Spain draws a distribution map that mostly affected the provinces of Cáceres, Badajoz, Huelva, Cordoba, Seville, Cadiz, Ciudad Real, Jaen, Murcia, Salamanca and Alicante. In Huelva's case, the mining region of Riotinto was the most affected of the entire province. In fact, in 1925 the only cases of paludism caused by *P. Falciparum* were in Badajoz and Huelva, at the Calañas, Gibraleón and El Repilado mines, despite the introduction decades earlier of mosquitofish to try to control mosquito populations in the area.⁷⁹

Oddly enough, the distribution map coincide with the area affected by the so-called “crisis of the 6th century BCE”.

Doctors Pulido and Cortezo, according to the account of Dr. Macdonald in the early 20th century, echoed their concern for farmers and field workers, since strength and productivity were lowered during the months of greatest agricultural work.⁸⁰ This was also reported by those who were affected by the epidemic at the end of the 18th century, where 94% declared that they were unable to carry out their agricultural tasks.⁸¹

So far we have indirect evidence regarding a possible outbreak of malaria that would have affected the Southwest of the Iberian Peninsula in the 6th century BCE.

However, we have direct information that can confirm this hypothesis. This is the identification of a genetic mutation – thalassemia – that appears in areas that are frequently affected by malaria.

Thalassemia, also known as “mediterranean anemia” or “Cooley's anemia”, is a hereditary illness related to the production of hemoglobin. The propagation of this illness throughout the world – 5% of the world population has it – is related to the immune effects towards malaria, and its emergence is related to malaria outbreaks or epidemics.⁸² Therefore, the frequency of the gen would increase until reaching a constant value based on the proportion of malaria that is present, directly related to *P. Falciparum*.⁸³

The cause of this illness is an alteration of the hemoglobin that creates a grave case of anemia which, in turn, lead bone marrow to suffer hyperplasia, as well as the spleen, and in many cases would affect the skull and long bones.⁸⁴

The different types of thalassemia are related to the type of defective protein in hemoglobin, either alpha or beta, since the illness occurs when there is a defect in the gen that helps to control the production

77 Sallares – Bouwman – Anderung 2004, p. 327; Setzer 2010, p. 104.

78 Fernández Astasio 2002, pp. 189-190.

79 Fernández Astasio 2002, pp. 229-235, 296.

80 Fernández Astasio 2002, p. 185.

81 Giménez-Font 2008.

82 Weatherall – Clegg 2008, pp. 32-33.

83 Campillo 1993, p. 151.

84 Sallares – Bouwman – Anderung 2004, p. 323.

of one of these proteins. Therefore, thalassemia alpha takes place more frequently in populations in the Southeast of Asia, the Near East, China and people of African descent, while the beta variant usually affects people of Mediterranean origin.⁸⁵

Within beta thalassemia there are two points of expansion which are differentiated by the genetic mutation that took place as a response to past malaria outbreaks: one related with the Greek colonies in Italy (B+ IVS nt 110 mutation); another related to the Phoenician colonization of the Western Mediterranean (CD39 mutation), despite it being thought that it originated in Levant,⁸⁶ it is almost exclusively found in the East, though it seems most probable to have originated in Northern Africa and had gradually expanded to Sardinia, Sicily and Spain throughout the 1st millennium BCE.⁸⁷

Therefore, the same genetic mutation that took place throughout the Eastern Mediterranean was the consequence of a coetaneous outbreak or epidemic that took place throughout the 1st millennium BCE. The precision within this timeframe is determined because it is thought to have arrived to Sardinia due to the Carthaginians in the 6th century BCE when, aside from the presence of a vector and a host, the environmental conditions were met: intense deforestation and the creations of favorable spaces for the development of the vector.⁸⁸

Therefore, the presences of thalassemia in Sardinia throughout the 6th century BCE would be the consequence of a malaria epidemic or outbreak.

It is in this same time period when evidence of β -Thalassemia was documented, belonging to the human remains of an individual from one of the tombs from the necropolis of Gadir, located during the excavations at Tolosa Latour street in 1996. The genetic mutation was identified in a woman of advanced age, and who presented injuries that are compatible with the disease, such as cribra orbitalia (FIG. 3).⁸⁹

This pathology, as well as porotic hyperostosis are commonly related to anemic processes, that are especially related to β -Thalassemia in the Mediterranean region. It is a type of hyperostosis that affects the final third of the orbital ceiling.⁹⁰

6. FINAL REMARKS

The data presented above show a complete coincidence between the situation documented for the 6th century BCE in the Southwest of the Iberian Peninsula and the consequences of malaria outbreaks in different regions, these being: demographic decline after a period of growth, interruption of the agricultural and mining activities and recovery in half a century. Moreover, the distribution map of the disease in the Iberian Peninsula, since there are records of it, would match the territory traditionally named Tartessian, as it meets the environmental conditions that are favorable for an outbreak of malaria: average summer temperature between 15 and 30 degrees, areas of wetlands and marshlands, agricultural based economy with changes in the uses of the soil, generally in conjunction with deforestation, demographic growth and immigration, inadequate water management and bad hygienic conditions.⁹¹ The consequence of an outbreak of malaria *falciparum* malaria are: high mortality rates, especially among pregnant women and children up to the

85 Weatherall 2001.

86 Campillo 1993, p. 153.

87 Sallares – Bouwman – Anderung 2004, p. 326.

88 Ferri 1934; Tognotti 1997, pp. 237-239, 2009; Setzer 2010, p. 100.

89 Macías López 2010, p. 544.

90 Campillo 1993, pp. 150-151.

91 Fernández Astasio 2002, p. 95; Giménez – Font 2008, p. 154.



FIG. 3. Case of *Cribra orbitalia* (after Campillo 1993, pp. 149-150).

different areas of expansion as a response to the different mutated genes, which indicate a different response to malaria in the past. In this case, the Western Mediterranean area had a different mutation if compared to those in Italy and Greece, which has been related to the expansion of malaria from the North of Africa to Sicily, Sardinia and the Iberian Peninsula during the 1st millennium BCE.⁹⁷

Within the broad framework that is the 1st millennium BCE, the spread of the disease can be further delimited if we focus on the Sardinian area in the 6th century BCE,⁹⁸ which matches, chronologically speaking, the evidence compatible with the beta thalassemia of the bone remains that were found in a grave

age of five,⁹² as well as resulting illness and consequences in the form of chronic anaemia, abortions and neurological effects. The relapses in people who get sick can last up to 50 years, with recurring febrile crises.

This indirect evidence does not confirm that a malaria outbreak was the starting point of these changes in the 6th century BCE in the Southwest of the Peninsula, although it does not contradict them. Although data suggest that the disease did not exist in the Peninsula throughout prehistory, and was imported during the Carthaginian period,⁹³ direct evidence can be provided in addition to indirect evidence.

In this case we refer to the appearance of a genetic mutation, called thalassemia, the propagation of which is related to malaria outbreaks or epidemics.⁹⁴ The cause of this illness, a genetic modification of the alpha or beta protein of the hemoglobin,⁹⁵ is different according to the geographic area of its development. In other words, the one of Mediterranean origin -beta thalassemia- is different from those of Asian and African origin.⁹⁶ Moreover, within the beta thalassemia, we can also distinguish

92 Sallares – Bouwman – Anderung 2004, p. 320.

93 Tognotti *et al.* 2017.

94 Weatherall – Clegg 2008, pp. 32-33.

95 Sallares – Bouwman – Anderung 2004, p. 323.

96 Weatherall 2001.

97 Sallares – Bouwman – Anderung 2004, p. 326; Bianucci *et al.* 2014; Viagnó *et al.* 2017; De Sanctis *et al.* 2017.

98 Fermi 1934; Tognotti 1997, pp. 237-239, 2009; Setzer 2010, p. 100.

belonging to the necropolis of *Gadir – cribra orbitalia* –,⁹⁹ in the intervention carried out in Tolosa Latour street in 1996.¹⁰⁰

In the southwest of the Iberian Peninsula, therefore, there were two necessary factors for the propagation of a malaria epidemic outbreak: favorable environmental factors, existence of vector and host, important agricultural activities including the ploughing of large areas of land in previous moments, demographic increase followed by a high immigration rate, and poor health conditions.

The reasons above could explain the dissimilar impact in the different areas, regardless of their economic activity or their location, since that would depend on the level of development of the disease. The 50-year recovery rate coincides with the changes that took place in the Southwest of the Iberian Peninsula in the 6th century BCE. Moreover, an event of this magnitude could cause a change in the funerary customs and in the mentality of the people – we need to remember that mortality rates would highly impact neonates –, as well as creating social and economic imbalance.

In spite of that, we need to point out that this is an initial hypothesis from which we will continue to work in the future, and can only be corroborated by further studies carried out in this field. Initially, these could be based on a paleopathological analysis of the osseous remains from the necropolis of La Joya (Huelva). We are also working on the paleoenvironmental reconstruction to determine where there was a slight increase in temperature during this period, which would have also favored the proliferation of this illness. However, we consider this an approach worth taking into account in the future.

REFERENCES

- Almagro-Gorbea – Toscano-Pérez 2011 = M. Almagro-Gorbea – C. Toscano-Pérez, *Annulus aureus de Ilipla (Niebla, Huelva)*, in «RStFen» 39, 2011, pp. 117-144.
- Almagro-Gorbea – González – Llompert 2018 = M. Almagro-Gorbea – F. González de Canales – J. Llompert, *Un ánfora ática de la “Botkin class” en Huelva y la fecha final del emporio focense*, in «MM» 59, 2018, pp. 298-313.
- Almagro-Gorbea – Lorrio – Torres 2021 = M. Almagro-Gorbea – A. Lorrio – M. Torres, *Los focenses y la crisis de c. 500 a.C. en el Sureste: de La Fonteta y Peña Negra a La Alcudia de Elche*, in «Lucentum» 40, 2021, pp. 63-110.
- Almagro-Gorbea et al. 2008 = M. Almagro-Gorbea – A.J. Lorrio – A. Mederos – M. Torres, *La necrópolis de Medellín. III. Estudio de los hallazgos*, Madrid 2008 («Bibliotheca Archaeologica Hispana», 26).
- Alonso-Núñez 1999 = J.M. Alonso-Núñez, *La Turdetania de Estrabón*, in G. Cruz Andreotti (ed.), *Estrabón e Iberia: nuevas perspectivas de estudio*, Málaga 1999, pp. 101-119.
- Alvar 1980 = J. Alvar Ezquerro, *El comercio del estaño atlántico durante el período orientalizante*, in «MemHistAnt» 4, 1980, pp. 43-49.
- Alvar 1991 = J. Alvar Ezquerro, *La caída de Tiro y sus repercusiones en el Mediterráneo*, in *La caída de Tiro y el auge de Cartago. V Jornadas de Arqueología Fenicio-Púnica (Ibiza, 1990)*, Ibiza 1991, pp. 19-27.
- Alvar 2013 = J. Alvar Ezquerro, *Tartessos: reflexiones desde la literatura geo-etnográfica antigua*, in J.M. Campos – J. Alvar (edd.), *Tartessos. El emporio del metal*, Córdoba 2013, pp. 247-260.
- Álvarez – Machuca 2022 = M. Álvarez-Martí-Aguilar – F. Machuca Prieto (edd.), *Historical Earthquakes, Tsunamis and Archaeology in the Iberian Peninsula*, Singapore 2022.
- Antunes 2009 = A.S.T. Antunes, *Castro da Azougada (Moura, Portugal): sacralidade e dinamismo comercial no Baixo Guadiana durante o Pós-Orientalizante*, in Mateos et al. 2009, pp. 131-151.
- Arruda – Celestino 2009 = A.M. Arruda – S. Celestino, *Arquitectura religiosa en Tartessos*, in Mateos et al. 2009, pp. 29-77.

99 Campillo 1993, p. 150-151.

100 Macías López 2010, p. 544.

- Arruda – Teixeira 2008 = A.M. Arruda – V.T. Teixeira, *O castelo de Castro Marim durante os séculos VI e V a.n.e.*, in J. Jiménez Ávila (ed.), *Sidereum Ana I. El río Guadiana en época post-orientalizante*, Mérida 2008 («Anejos de AEspA», 46), pp. 429-446.
- Arruda – Bargão – de Sousa 2005 = A.M. Arruda – P. Bargão – E. de Sousa, *A ocupação pré-romana de Faro. Alguns dados novos*, in «RPortA» 8, 2005, pp. 177-208.
- Arruda *et al.* 2009 = A.M. Arruda – P.A. Carretero – V. Teixeira – E. Sousa – P. Bargão – P. Lourenço – C.F. Oliveira, *Castro Marim: un santuario en la desembocadura del Guadiana*, in Mateos *et al.* 2009, pp. 79-88.
- Arteaga Matute 2001 = O. Arteaga Matute, *La polis malacitana. Una aproximación desde la economía política, las relaciones interétnicas y la política económica referida al intercambio comercial*, in F. Wulff Alonso – G. Cruz Andreotti – C. Martínez Maza (edd.), *Comercio y comerciantes en la Historia Antigua de Málaga. II Congreso de Historia Antigua de Málaga*, Málaga 2001, pp. 203-275.
- Aubert 1987 = M.E. Aubert Semmler, *Tiro y las colonias fenicias de occidente*, Barcelona 1987.
- Bazzana – Bedia 1992 = A. Bazzana – J. Bedia, *Excavaciones de Saltés (Huelva) 1990*, in «AnArqAnd» 2, 1992, pp. 252-257.
- Belén 1993 = M. Belén Deamos, *Mil años de historia de Coria: la ciudad prerromana*, in «Azotea» 11-12, 1993, pp. 35-62.
- Belén 1996 = M. Belén Deamos, *Carmona Prerromana. Nuevos datos para la historia de la ciudad durante el I milenio a.C.*, in *Museo arqueológico nacional (Madrid). Leyenda y arqueología de las ciudades prerromanas de la Península Ibérica*, Madrid 1996, pp. 17-32.
- Belén 2011-2012 = M. Belén Deamos, *Notas sobre religiosidad turdetana. Los depósitos sagrados del oppidum de Alhonor (Herrera, Sevilla)*, in «CuPAUAMin» 37-38, 2011-2012, pp. 333-348.
- Belén – Escacena 1992 = M. Belén – J.L. Escacena, *Las comunidades prerromanas de Andalucía occidental*, in M. Almagro-Gorbea – G. Ruiz Zapatero (edd.), *Paleoetnología de la Península Ibérica. Actas de la Reunión celebrada en la Facultad de Geografía e Historia de la Universidad Complutense (Madrid, 13-15 diciembre de 1989)*, Madrid 1992 («Complutum», 2-3), pp. 65-87.
- Bianucci *et al.* 2014 = R. Bianucci – E. Tognotti – V. Giuffra – G. Fornaciari – A. Montella – M. Milanese – R. Floris – P. Bandiera, *Origins of Malaria and Leishmaniasis in Sardinia: First Results of a Paleoimmunological Study*, in *I Meeting nazionale del gruppo italiano di paleopatologia*, Roma 2014, p. 89.
- Blázquez – Luzón – Ruiz 1971 = J.M. Blázquez – J.M. Luzón – D. Ruiz Mata, *La factoría púnica de Aljaraque en la provincia de Huelva*, in «NotAHisp» 13-14, 1971, pp. 304-331.
- Caballos – Escacena – Chaves 2005 = A. Caballos – J.L. Escacena – F. Chaves, *Arqueología en Laelia (Cerro de la Cabeza, Olivares, Sevilla). Campaña de Excavación de 1981*, Sevilla 2005 («Spal Monografías», 6).
- Campillo 1993 = D. Campillo, *Paleopatología. Los primeros vestigios de la enfermedad. Primera Parte*, Barcelona 1993.
- Campos Carrasco 2005 = J.M. Campos Carrasco, *Niebla, ciudad tartésica, romana y medieval*, Huelva 2005.
- Campos – Gómez 1995 = J.M. Campos – F. Gómez, *El territorio onubense durante el Bronce Final*, in *Tartessos 25 años después. 1968-1993, Actas del Congreso Conmemorativo del 5. Symposium Internacional de Prehistoria peninsular*, Jerez de la Frontera 1995, pp. 137-158.
- Campos – Gómez 2001 = J.M. Campos – F. Gómez, *La Tierra Llana de Huelva: Arqueología y evolución del paisaje*, Sevilla 2001.
- Campos – Gómez – Pérez 2006 = J.M. Campos – F. Gómez – J.A. Pérez, *Ilipla-Niebla. Evolución urbana y ocupación del territorio*, Huelva 2006.
- Campos – Guerrero – Pérez 1999 = J.M. Campos – O. Guerrero – J.A. Pérez, *La ocupación turdetana de la Tierra Llana de Huelva*, in R. de Balbín – P. Bueno (edd.), *II Congreso de Arqueología Peninsular (Zamora, 24-27 septiembre de 1996)*, 3, Zamora 1999, pp. 459-466.
- Campos – Moreno – Vera 1988 = J.M. Campos – M.T. Moreno – M. Vera, *Protohistoria de la ciudad de Sevilla. El corte estratigráfico San Isidoro 85-6*, Sevilla 1988 («Monografías de Arqueología Andaluza», 1).
- Campos – Castiñeira – Borja 1991 = J.M. Campos – J. Castiñeira – J.M. García – F. Borja, *Arqueología y evolución del paisaje: un proyecto geoarqueológico en la Tierra Llana de Huelva*, in «Cuadernos del Suroeste» 2, 1991, pp. 43-72.
- Campos *et al.* 1992 = J.M. Campos – J.M., F. Borja – J. Castiñeira – F. Gómez – J.M. García, *Prospección arqueológica superficial en el litoral y prelitoral entre el Guadiana y el Guadalquivir*, in «AnArqAnd» 1990, 1992, pp. 76-83.

- Campos Jara 2002 = P. Campos Jara, *Carta Arqueológica del término municipal de Aljaraque (Huelva)*, in «AnArqAnd» 1999, 2002, pp. 121-137.
- Campos Jara – Martín – García 1999 = P. Campos Jara – J. Martín – M. García, *Prospección arqueológica de urgencia en la Debesa Golf, 3ª fase (Aljaraque, Huelva)*, in «AnArqAnd» 1995, 1999, pp. 212-222.
- Campos Jara *et al.* 2001 = P. Campos Jara – M. García – J.M. Maldonado – J. Martín, *Excavación arqueológica de urgencia en La Monacilla (Aljaraque, Huelva)*, in «Anuario Arqueológico de Andalucía» 1997, 2001, pp. 340-349.
- Celestino – López-Ruiz 2020 = S. Celestino Pérez – C. López-Ruiz, *Tarteso y los fenicios de Occidente*, Córdoba 2020.
- Eshel *et al.* 2022 = T. Eshel – Y. Eres – N. Yahalom-Mack – O. Tirosh – A. Gilboa, *From Iberia to Laurion: Interpreting Changes in Silver Supply to the Levant in the Late Iron Age Based on Lead Isotope Analysis*, in «Archaeological and Anthropological Sciences» 2022, 14, 120, DOI: <https://doi.org/10.1007/s12520-022-01584-5>
- Chaves *et al.* 2000 = F. Chaves – M.L. de la Bandera – E. Ferrer – E. Bernáldez, *El complejo sacrificial de Montemolín*, in M. Barthélemy – M.E. Aubet (edd.), *Actas del IV Congreso internacional de estudios fenicios y púnicos* (Cádiz 2 al 6 de octubre de 1995), Cádiz 2000, pp. 573-581.
- Cruz Andreotti 2011 = G. Cruz Andreotti, *Tartessos-Turdetania o la deconstrucción de un mito identitario*, in M.L. de la Bandera – E. Ferrer (edd.), *El Carambolo. 50 años de un tesoro*, Sevilla 2011, pp. 17-52.
- De Sanctis *et al.* 2017 = V. De Sanctis – C. Kattamis – D. Canatan – A.T. Soliman – H. Elsedfy – M. Karimi – S. Daar – Y. Wali – M. Yassin – N. Soliman – P. Sobti – S. Al Jaouni – M. El Kholy – B. Fiscina – M. Angastiniotis, *β -thalassemia Distribution in the Old World: An Ancient Disease Seen from a Historical Standpoint*, in «Mediterranean Journal of Hematology and Infectious Diseases» 9, pp. 1-14. DOI: <http://dx.doi.org/10.4084/MJHID.2017.018>
- Domínguez Pérez 2006 = J.C. Domínguez Pérez, *Gadir y los fenicios occidentales federados V-III AC. Dialéctica aplicada al territorio productivo turdetano*, Oxford 2006 («BAR Internacional Series», 1513).
- Downs 1998 = M. Downs, *Turdetani and Bastetani: Cultural Identity in Iberian and Early Roman Baetica*, in S. Keay (ed.), *The Archaeology of Early Roman Baetica*, Portsmouth-Rhode Island 1998, pp. 39-54.
- Escacena 1987 = J.L. Escacena Carrasco, *El poblamiento ibérico en el Bajo Guadalquivir*, in A. Ruiz – M. Molinos (edd.), *Iberos. Actas de las I Jornadas sobre el Mundo Ibérico*, Jaén 1985, pp. 273-298.
- Escacena 1993 = J.L. Escacena Carrasco, *De la muerte en Tartessos. Evidencias en el registro poblacional*, in «Spal» 2, 1993, pp. 183-218.
- Escacena 2001 = J.L. Escacena Carrasco, *Podando a Carmo. Perfiles del sustrato turdetano*, in A. Caballos Rufino (ed.), *Actas del II Congreso de Historia de Carmona. Carmona Romana*, Carmona 2001, pp. 21-35.
- Escacena 2004 = J.L. Escacena Carrasco, *Tartessos (des)orientado*, in B. Costa – J.H. Fernandez (edd.), *Colonialismo e interacción cultural: el impacto fenicio púnico en las sociedades autóctonas de Occidente. XVIII Jornadas de Arqueología Fenicio-Púnica*, Ibiza 2004, pp. 7-55.
- Escacena 2013 = J.L. Escacena Carrasco, *El espejismo tartésico*, in J.M. Campos – J. Alvar (edd.), *Tartessos el emporio del metal*, Córdoba 2013, pp. 137-195.
- Escacena – Vázquez 2009 = J.L. Escacena Carrasco – M.I. Vázquez, *Conchas de salvación*, in «Spal» 18, 2009, pp. 51-82.
- Escacena – Belén – Izquierdo 1996 = J.L. Escacena Carrasco – M. Belén – R. Izquierdo, *Caura protohistórica*, in «RA-Madrid» 184, 1996, pp. 16-25.
- Eshel *et al.* 2022 = T. Eshel – Y. Eres – N. Yahalom-Mack – O. Tirosh – A. Gilboa, *From Iberia to Laurion: Interpreting Changes in Silver Supply to the Levant in the Late Iron Age Based on Lead Isotope Analysis*, in «Archaeological and Anthropological Sciences» 14, 2022. DOI: <https://doi.org/10.1007/s12520-022-01584-5>.
- Esteban – Escacena 2013 = C. Esteban – J.L. Escacena, *Arqueología del cielo. Orientaciones astronómicas en edificios protohistóricos del sur de la Península Ibérica*, in «TrabPrehist» 70, 2013, pp. 114-139.
- Fermi 1934 = C. Fermi, *Regione Malariche, decadenze, risanamento e spesa: Sardegna*, Roma 1934.
- Fernández Astasio 2002 = B. Fernández Astasio, *La erradicación del paludismo en España: aspectos biológicos de la lucha antipalúdica. Tesis Doctoral*, Universidad Complutense de Madrid, 2002, url: <https://eprints.ucm.es/id/eprint/4801/1/T26827.pdf>
- Fernández Jurado 1986a = J. Fernández Jurado, *Economía tartésica: minería y metalurgia*, in «Huelva en su Historia» 1, 1986, pp. 149-170.
- Fernández Jurado 1986b = J. Fernández Jurado, *Fenicios y griegos en Huelva*, in *Homenaje a Luis Siret. Actas del Congreso "Homenaje a Luis Siret"* (Cuevas de Almanzora, Junio de 1984), Sevilla 1986, pp. 562-574.

- Fernández Jurado 1989 = J. Fernández Jurado, *Campañas de excavaciones*, in «HuelvaA» 9, 1989, pp. 53-92.
- Fernández Jurado 1990 = J. Fernández Jurado, *Tejada la Vieja. Campaña de 1987*, in «AnArqAnd» 1987, 1990, pp. 291-293.
- Fernández Jurado 1991a = J. Fernández Jurado, *Influencia fenicia en la arquitectura tartésica*, in VVAA, *III Jornadas de Arqueología Fenicio-Púnica 1988*, Ibiza 1991, pp. 169-175.
- Fernández Jurado 1991b = J. Fernández Jurado, *Ciudades y fortificaciones turdetanas: problemas de interpretación*, in *Fortificacions. La problemàtica de l'Ibèric Plè: (segles IV-III a.C.)*, Manresa 1991, pp. 55-66.
- Fernández Jurado 1993 = J. Fernández Jurado, *Plata y plomo en el comercio fenicio-tartésico*, in R. Arana – A.M. Muñoz – S. Ramallo – M.M. Ros (edd.), *Metalurgia en la Península Ibérica durante el primer milenio a.C. Estado actual de la investigación*, Murcia 1993, pp. 131-165.
- Fernández Jurado 2003 = J. Fernández Jurado, *Indígenas y fenicios en Huelva*, in «HuelvaA» 18, 2003, pp. 33-54.
- Fernández – García 1987 = J. Fernández Jurado – C. García Sanz, *Arquitectura y urbanismo de Tejada*, in «HuelvaA» 9, 1987, pp. 107-116.
- Fernández – García – Rufete 1997 = J. Fernández Jurado – C. García Sanz – P. Rufete Tomico, *De Tartessos a Onuba. 15 años de arqueología en Huelva*, Huelva 1997.
- Ferrer 1994 = E. Ferrer Albelda, *Algunas cuestiones sobre cronología y dispersión de las puntas de flecha orientalizantes en la Península Ibérica*, in «AnCord» 5, 1994, pp. 33-60.
- Ferrer 2004 = E. Ferrer Albelda, *Sustratos fenicios y adstratos púnicos. Los bástulos entre el Guadiana y el Guadalquivir*, in «HuelvaA» 20, 2004, pp. 281-298.
- Ferrer 2007 = E. Ferrer Albelda, *Fenicios y cartagineses en el Tartessos postcolonial*, in M. Bendala – M. Belén (edd.), *El nacimiento de la ciudad: la Carmona protohistórica*, Carmona 2007, pp. 195-223.
- Ferrer – García 2002 = E. Ferrer Albelda – F.J. García Fernández, *Turdetania y turdetanos: contribución a una problemática historiográfica y arqueológica*, in «Mainake» 24, 2002, pp. 133-151.
- Ferrer – García 2007 = E. Ferrer Albelda – F.J. García Fernández, *Primeros datos sobre la Ilipa turdetana*, in E. Ferrer Albelda – A. Fernández Flores – J.L. Escacena Carrasco – A. Rodríguez Azogue (edd.), *Ilipa Antiqua. De la Prehistoria a la época romana*, Alcalá del Río 2007, pp. 103-130.
- García Fernández 2003 = F.J. García Fernández, *El poblamiento turdetano del Bajo Guadalquivir*. Tesis doctoral, Sevilla 2003.
- García Fernández 2007 = F.J. García Fernández, *Etnología y etnias de la Turdetania en época prerromana*, in «CuPaUAM» 33, 2007, pp. 117-143.
- García Sanz 1989 = C. García Sanz, *Excavación de la muralla de Tejada*, in «HuelvaA» 9, 1989, pp. 93-106.
- García Sanz 2003 = C. García Sanz, *¿Unas ruinas merecen tantos escritos?*, in «HuelvaA» 18, 2003, pp. 5-32.
- García y Bellido 1942 = A. García y Bellido, *Fenicios y Cartagineses en Occidente*, Madrid 1942
- Gener *et al.* 2012 = J.M. Gener Basallote – M.A. Navarro García – J.M. Pajuelo Sáez – M. Torres Ortiz – S. Domínguez-Bella, *Las crétulas del s. VIII a.C. de las excavaciones del solar del Cine Cómic (Cádiz)*, in «MM» 53, 2012, pp. 134-186.
- Giménez-Font 2008 = P. Giménez-Font, *La epidemia de malaria de 1783-1786: notas sobre la influencia de anomalías climáticas y cambios de usos del suelo en la salud humana*, in «Investigaciones Geográficas» 46, 2008, pp. 141-157.
- Gomes 1993 = M.V. Gomes, *O estabelecimento fenicio-punico do Cerro da Rocha Branca (Silves)*, in «Estudos Orientais» 4, 1993, pp. 73-107.
- Gomes 2012 = F. Gomes, *Aspectos do Sagrado na Colonização Fenícia*, Lisboa 2012.
- Gómez Espelosín 1999 = F.J. Gómez Espelosín, *Estrabón y la tradición mítica sobre el extremo Occidente*, in G. Cruz Andreotti (edd.), *Estrabón e Iberia: nuevas perspectivas de estudio*, Málaga 1999, pp. 63-79.
- Gómez Toscano 2008 = F. Gómez Toscano, *El final del Hierro antiguo en la provincia de Huelva (siglos VI-V a.C.)*, in J. Jiménez Ávila (ed.), *Sidereum Ana I. El río Guadiana en época post-orientalizante*, Mérida 2008 («Anejos de AEspA», 46), pp. 415-427.
- Gómez – Beltrán 2006 = F. Gómez Toscano – J.M. Beltrán Pinzón, *Seguimiento arqueológico de apoyo a la restauración de las murallas de Niebla (Huelva): fases de amurallamiento en el tramo Puerta de Sevilla-Torre 26*, in «AnArqAnd» 2003, 2006, pp. 640-652.
- Gómez – Campos 2001 = F. Gómez Toscano – J.M. Campos Carrasco, *Arqueología en la ciudad de Huelva (1966-2000)*, Huelva 2001.

- Gómez – Campos 2008 = F. Gómez Toscano – J.M. Campos Carrasco, *El Bronce Final preferencio en Huelva según el registro arqueológico del Cabezo de San Pedro. Una revisión cuarenta años después*, in «Complutum» 19, 2008, pp. 121-138.
- González – Serrano – Llompart. 2004 = F. González de Canales – L. Serrano Pichardo – J. Llompart Gómez, *El emporio fenicio precolonial de Huelva (ca. 900-770 a.C.)*, Madrid 2004.
- Macías López 2010 = M.M. Macías López, *Estudio bioantropológico de los restos óseos humanos cremados procedentes de la excavación del solar de Tolosa-Latour 1996 (Cádiz): Identificación de un agrupamiento familiar en una urna de incineración fenicia*, in A.M. Niveau de Villedary (ed.), *Las Necrópolis de Cádiz: apuntes de arqueología gaditana en homenaje a J.F. Sibón Olano*, Cádiz 2010, pp. 531-556.
- Martín Ruiz 2007 = A. Martín Ruiz, *La crisis del siglo VI a.C. en los asentamientos fenicios de Andalucía*, Málaga 2007.
- Martínez – Myro – Romero 1995 = C. Martínez – M.M. Myro – M. Romero, *El final de Tartessos y el orientalizante*, in «HispanAnt» 19, 1995, pp. 485-495.
- Mateos et al. 2009 = P. Mateos – S. Celestino – A. Pizzo – T. Tortosa (edd.), *Santuarios, Oppida y ciudades: arquitectura sacra en el origen y desarrollo urbano del Mediterráneo occidental*, Mérida 2009 («Anejos de AEspA», 45).
- Mederos Martín 2016 = A. Mederos Martín, *Fenicios en Huelva, en el siglo X a.C., durante el reinado de Hiram I de Tiro*, in «Spal» 15, 2006, pp. 167-188.
- Niveau 2011 = A.M. Niveau de Villedary y Mariñas, *El consumo de vino en la Bahía de Cádiz en época púnica*, in «Revista de Historia de El Puerto» 46, 2011, pp. 9-50.
- Pellicer – Escacena – Bendala 1983 = M. Pellicer Catalán – J.L. Escacena Carrasco – M. Bendala Galán, *El Cerro Macareno*, Madrid 1983 («Excavaciones Arqueológicas en España» 124).
- Pérez – Campos – Gómez 2000 = J.A. Pérez Macías – J.M. Campos Carrasco – F. Gómez Toscano, *Niebla de oppidum a madina*, in «AnCord» 11, 2000, pp. 91-122.
- Rodríguez González 2014 = E. Rodríguez González, *Astigi vetus Arqueología y urbanismo de la Écija turdetana (ss. VI - I a.C.)*, Madrid 2014.
- Ruiz Mata 1985 = D. Ruiz Mata, *Las cerámicas fenicias del Castillo de Doña Blanca (Puerto de Santa María, Cádiz)*, in «AulaOr» 3, 1985, pp. 241-263.
- Ruiz Mata 1986 = D. Ruiz Mata, *Aportación al análisis de los inicios de la presencia fenicia en Andalucía sudoccidental, según las excavaciones del Cabezo de San Pedro (Huelva), S. Bartolomé (Almonte, Huelva), Castillo de Doña Blanca (Puerto de Santa María, Cádiz) y El Carambolo (Camas, Sevilla)*, in *Homenaje a Luis Siret. Actas del Congreso "Homenaje a Luis Siret"* (Cuevas de Almanzora, Junio de 1984), Sevilla 1986, pp. 537-556.
- Ruiz Mata 1991 = D. Ruiz Mata, *La Ría de Huelva: un foco clave de la Protohistoria peninsular*, in «Clásicos de Arqueología onubense» 3, 1991, pp. 55-70.
- Ruiz Mata 1994 = D. Ruiz Mata, *Fenicios, tartesios y turdetanos*, in «HuelvaA» 14, 1994, pp. 325-365.
- Ruiz Mata – Pérez 1995 = D. Ruiz Mata – C. Pérez Pérez, *El poblado fenicio el Castillo de Doña Blanca (El Puerto de Santa María, Cádiz)*, El Puerto de Santa María 1995.
- Ruiz Zapatero 2001 = G. Ruiz Zapatero, *¿Quiénes fueron los celtas? Disipando la niebla: mitología de un collage histórico*, in *Celtas y vetones*, Ávila 2001, pp. 73-91.
- Sáez Romero 2018 = A. Sáez Romero, *Apuntes sobre las dinámicas comerciales de Gadir entre los siglos VI y III a.C.*, in «Gerión» 36, 2018, pp. 11-40.
- Sallares – Bouwman – Anderung 2004 = R. Sallares – A. Bouwman – C. Anderung, *The Spread of Malaria to Southern Europe in Antiquity: New Approaches to Old Problems*, in «Medical History» 48, 2004, pp. 311-328.
- Schulten 1945 = A. Schulten, *Tartessos*, Madrid 1945.
- Setzer 2010 = T.J. Setzer, *Malaria in Prehistoric Sardinia (Italy): An Examination of Skeletal Remains from the Middle Bronze Age*. Tesis doctoral. Inédita. University of South Florida 2010. Url: <https://digitalcommons.usf.edu/etd/1765/>
- Tognotti 1997 = E. Tognotti, *The Spread of Malaria in Sardinia: An Historical Perspective*, in L.S. Green – M. Danubio (edd.), *Adaptation to Malaria: The Interaction of Biology and Culture*, Amsterdam 1997, pp. 237-247.
- Tognotti 2009 = E. Tognotti, *Program to Eradicate Malaria in Sardinia, 1946– 1950*, in «Emerging Infectious Diseases», 15, 2009, pp. 1460-1466.
- Tognotti et al. 2017 = E. Tognotti – A. Montella – P. Brown – P. Bandiera, *New Osteological Data on Malaria in Sardinia from Antiquity to the Modern Era*, in «Advances in Infectious Diseases» 7, 2017, pp. 37-44.

- Toscano-Pérez 2016 = C. Toscano-Pérez, *El suroeste hispano en la Turdetania atlántica: dinámica poblacional y evolución cultural (ss. VI-III a.C.)*. Tesis doctoral. Universidad de Huelva 2016. Url: <http://hdl.handle.net/10272/12522>
- Toscano-Pérez – Campos 2018 = C. Toscano-Pérez – J.M. Campos, *Elementos religiosos orientales en la Turdetania atlántica: ¿Novedad o perduración del período orientalizante?*, in «Folia Phoenicia» 2, 2018, pp. 341-348.
- Viganó *et al.* 2017 = C. Viganó – C. Haas – F.J. Rühli – A. Bouwman, *2,000 Year Old B-thalassemia Case in Sardinia Suggests Malaria Was Endemic by the Roman Period*, in «American Journal of Physical Anthropology» 164, 2017, pp. 362-370.
- Wagner 1983 = C.G. Wagner, *Aproximación al proceso histórico de Tartessos*, in «AEspA» 56, 1983, pp. 3-36.
- Wagner 1984 = C.G. Wagner, *El comercio púnico en el Mediterráneo a la luz de una nueva interpretación de los tratados concluidos entre Cartago y Roma*, in «MemHistAnt» 6, 1984, pp. 211-224.
- Wagner 1995 = C.G. Wagner, *Fenicios y autóctonos en Tartessos. Consideraciones sobre las relaciones coloniales y la dinámica de cambio en el suroeste de la Península Ibérica*, in «TrabPrehist» 52, 1995, pp. 109-126.
- Weatherall 2001 = D.J. Weatherall, *Phenotype-genotype Relationships in Monogenic Disease: Lessons from the Thalassaemias*, in «Nature reviews genetics» 2, 2001, pp. 245-255.
- Weatherall – Clegg 2008 = D.J. Weatherall – J.B. Clegg, *The Thalassaemia Syndromes*, Oxford 2008.