

THE ANCIENT DISTRIBUTION OF BLUEFIN TUNA FISHERY: HOW COINS CAN IMPROVE OUR KNOWLEDGE

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SUMMARY

The bluefin tuna (Thunnus thynnus) trap fishery was an industrial activity since at least the Phoenician times. Evidences of tuna salt factories are very well known in many places, showing the ancient distribution of bluefin tuna. Ancient coins are able to confirm the economic relevance of bluefin tuna in various places, not necessarily the same where tuna factories were located. This paper is a first tentative of assembling most of the information available for better understanding the ancient distribution of bluefin tuna between VI centuries b.C. and V centuries a.C. The difference between the distribution in classic historical times and the current distribution of this species is very evident for the Black Sea area.

RÉSUMÉ

La pêcherie de madragues de thon rouge (Thunnus thynnus) est une activité industrielle remontant au moins à l'époque phénicienne. On peut encore rencontrer des vestiges d'installations de salaison du thon en de nombreux endroits, indiquant l'ancienne zone de répartition du thon rouge. Des pièces de monnaie anciennes peuvent confirmer l'importance économique du thon rouge en divers endroits, pas nécessairement sur les lieux où se trouvaient les installations de salaison du thon. Le présent document tente pour la première fois de rassembler la plupart des informations disponibles afin de mieux appréhender l'ancienne distribution du thon rouge entre le 6^e siècle avant J-C et le 5^e siècle après J-C. La différence entre la distribution au cours des époques historiques classiques et l'actuelle distribution de cette espèce est très manifeste pour la zone de la mer Noire.

RESUMEN

La pesquería de almadrabas de atún rojo (Thunnus thynnus) ha sido una actividad industrial desde por lo menos los tiempos de los fenicios. Las pruebas de factorías de salazón de atún son muy conocidas en muchos lugares, lo que muestra la antigua distribución del atún rojo. Las monedas antiguas confirman la importancia económica del atún rojo en varios lugares, no necesariamente los mismos en los que estaban situadas las factorías de atún. Este documento es el primer intento de unir la mayor parte de la información disponible para entender mejor la antigua distribución del atún rojo entre los siglos VI a C. y V d. C. La diferencia entre la distribución en tiempos históricos clásicos y la distribución actual de esta especie es muy evidente en la zona del mar Negro.

KEYWORDS

Trap fishery, Ancient industry, Bluefin tuna, Historical fish distribution, Atlantic Ocean, Mediterranean Sea, Black Sea, Fish industry, Ancient coins

1. Foreword

Bluefin tuna fishery is the most ancient fishing industry of the world (Di Natale, 2012a, 2012b). Knowing the evolution of a fishery, possibly starting from the first time the pristine fish population was exploited by man, is usually one of the dreams and target of all fishery scientists. This is usually almost impossible, because most of the fisheries have very little details about their very early beginning and several have no written stories.

Maybe the bluefin tuna fishery is an exceptional case, because it is one of the few for which we can find tracks and evidences, by using several tools (Herodotus, V b.C.; Eschilo, 472 b.C.; Philostratus de Lemnos, III b.C.; Solinus, III b.C.; Theocritus, III b.C.; Ulpianus, III b.C.; Aelianus, II a.C.; Ataeneus di Naucratis, II a.C.;

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Polibius, 220-146 b.C.; Oppianus, 177 b.C.; Strabonius, I b.C.; Plinius, 65 a.C.; Giovio, 1524; Esopo, 1592; Aristoteles, 1635; Cirino, 1653; Smidth, 1876; Adams, 1883; Basile, 1899; Mila y Pinell, 1902; Radclife, 1921; Cornwin, 1929; Thomazi, 1947; Moreno Páramo & Abad Casal, 1972; Dumont, 1976-77, 1981; Manfredi, 1987; Doumenge, 1988, 1999; Mastromarco, 1988; Santos Castroviejo, 1990; Merino, 1991; Powell, 1996; Muñoz Vincente & de Frutos Reyes, 1999; VV.AA., 2001, 2004, 2006; Torrente, 2002; Bekker-Nielsen, 2005; Levine, 2006; Pepe, 2006; Morales-Muñiz & Roselló-Izquierdo, 2008; Bernard Casasola, 2009, 2011b; Bekker-Nielsen & Bernal Casasola, 2010; Vargas *et Al.*, 2010; Anon., 2012; . This is particularly true for the trap fishery, certainly the first industrial fishery activity since very ancient times.

While bluefin tuna fishery was carried out with hand lines in several parts of the Mediterranean Sea, the Black Sea and the Eastern Atlantic since prehistorical times (the engravings on the rocky walls of the Genoese's Cave in the isle of Levanzo, Egadi Islands, W. Sicily, Italy, are dated about 9,200 years b.C.), and while Aegean tuna bones in some locations are about from the same period, these individual fishing activities can be considered as having a very limited impact on the bluefin tuna population, even if it is evident that since these remote times, bluefin tuna was regularly a common food resource for the Mediterranean inhabitants and a basic component in their diet (Curtis, 1991; Dumont, 1981; Powell, 1996), at least for those living close to the coasts. In some cases, like in the Aegean area, the bluefin tuna was representing about 80% of the fish food in prehistoric times (Powell, 1966).

The organised exploitation of bluefin tuna begun when somebody invented the tuna traps and the fish factories linked to them. According to our current knowledge and to the recent reviews of literature and iconography of this ancient fishery (Anonymous, 2012; Di Natale, 2012a, Di Natale 2012b), the Phoenicians started this industrial activity, both in the Mediterranean Sea and in the Atlantic, followed by the Greek in the Black Sea and in the Aegean Sea and then by the Romans in many other places in the Mediterranean Sea and in the Atlantic Spanish areas close to Gibraltar.

Besides of very few precise ancient documents, fish salting plants and factories and local coins are among the very limited evidences we can use for mapping the most important sites related to tuna fishery in classical historical times.

The objective of this work is not to revise all papers and evidences concerning the archaeological evidences of fish salting factories, coins or amphores, a work requiring a deep knowledge in other scientific fields and an important dedicated working time, but to have a general idea for SCRS purposes, based of the most known data sources, about the geographical distribution of the historical evidences of the main places where tuna fishery was important in classical historical times, usually between VI b.C. and V a.C. For these reasons this work is certainly incomplete and can be considered as preliminary.

2. Fish salting factories

The distribution of ancient fish factories, which were necessary for salting the fish and for producing the famous *garum* sauce, is relatively well-known and it is not the target of this paper, because a complete revision of the current archaeological knowledge will require a long time for studying all archaeological evidences and the many papers existing on them (Gogarín, 1930; Bacci, 1982, 1984; Purpura, 1982, 1989, 1992; Molina & Jiménez, 1983; Bufardieci, 1985; Aubert, 1987; Edmondson, 1987, 1990; Curtis, 1988; Santos Castroviejo, 1990; Basile, 1992; Hurst, 1994; Cernigliani, 1995; Muñoz Vincente & de Frutos Reyes, 1999, 2004; Atanasio, 2001; VV.AA., 2001, 2004; Étienne & Mayet, 2002; Curtis, 2005; Azcoyta, 2007a; Fernandez Gómez *et Al.*, 2007; Fernández Pérez, s.d.; Ruíz Bravo, 2007; Bernard Casasola, 2011a; Habibi, 2011) . Only some papers clearly particularly describe fish salting plants, while descriptions are more often incorporated in general descriptions of several archaeological coastal sites.

Fish salting factories are easily detectable if ruins are still readable in their general aspect. As a matter of fact, usually they are represented by series of small or large tanks or pools (squared or circular), made by various materials able to keep liquids. Fish was also kept in very large cound-shaped amphoras, called *dolia* (singular *dolium*), kept both out of the soil or partly buried.

The location of these fish salting factories is usually and logically close to “salinas”, coastal areas where sea salt was produced in large quantities, because the marine salt was the essential component of this industrial production (Boscarino, 1963-64; Purpura, 1982, 1989; Manzi-Giusi *et Al.*, 1986; Ríos Jiménez, 1999; García Vargas, 2001; Mederos Martín & Escribano Cobo, 2004; Pérez Gomez *et Al.*, 2007; García Vargas & Florido del

Corral, 2010; Casano del Puglia, 2011; Soler Cervantes, 2011). These fish salting factories were called *taricheiai* by Greeks and *cetaria* by Romans (Campos *et Al.*, 1999) and some of them were quite big, like the one in Baelo Claudia in Southern Spain (Azcoytia, 2008) or Lixus in Morocco (Azcoytia, 2009). Some famous fish factories, noticed in ancient papers, are still to be uncovered, like the one in Pompey, close to Naples, buried by the eruption of the Vesuvio volcano. It is possible that it was located outside the ancient town, because the production of *garum* created such unpleasant smells that factories were generally relegated to the outskirts of cities.

At the end of the production process, salted tuna and *garum* sauce were usually transported inside terracotta amphores (Desse-Berset, 1993) and most models, especially made for transporting *garum*, are very well known, helping in detecting the places where factories were settled (i.e.: Dressel F form, Dressel H form, Dressel 18, Mama C1b, Mama C2c, Mama C2c, etc.). For the purpose of this paper, the distribution of these amphores was not taken into account.

The *garum* sauce was largely used in ancient times and it was made by collecting the liquid coming from the pools where fish meat was preserved under salt during its “maturation” (Mattioli, 1568; Smidh, 1876; Ponsich & Tarradel, 1965, 1988; Curtis, 1991; Ben Lazreg *et Al.*, 1995; Desse-Berset & Desse, 2000; Morales-Muñiz *et Al.*, 2004; Azcoytia, 2007b; Bernard Casasola, 2011a). It was used for increasing the taste of various foods and dishes, particularly by the Romans. The best and more expensive *garum* in the ancient Greek markets was the *arimàtion*, made by salting the stomach, the intestine and the blood of bluefin tunas. The Romans seems preferred the *garum sociorum*, produced in Cartagena and Gadez (Cadiz). It was also called *liquamen*, which is considered a synonymous at least for a number of years. *Garum* sauce was sometimes produced also with other pelagic fish than bluefin tuna, such as anchovies, sardines, bogues and mackerels. The sediment or sludge that remained was called *allec*.

Garum sauce was very nutritious, retaining a high amount of proteins, amino acids, minerals and B vitamins; *Garum* was especially rich in glutamic acid, having the same characteristics of the modern monosodium glutamate, a flavor enhancer because it balances, blends and rounds the total perception of other tastes.

Garum sauce is still produced in a very few places around the world. One is still in the Mediterranean, but it has a more delicate taste for fitting the moder taste and then is made using anchovies instead of bluefin tuna²; it is produced in Cetara, a small town close to Salerno, in S. Italy. Other famous fish sauces similar to *garum* are the Vietnamese *nuoc-mam* and the Thai *nuoc-cham*, the Japanese *ishiru*, *shottsuru* and *ikanago shoyu*, and the Korean *aekjeot* or *jeotgal*. No one of these fish sauces similar to the ancient *garum* is made by using tuna.

According to some literary evidences, it seems the one of the most appreciated *garum* was also including some herbs in the salting process and, among these herbs, the most reputed and expensive was the *Silphium*. *Silphium* is an extinct herb that grew near Cyrene (E. Libya), a Greek colony established by Sparta. The height of *Silphium* production was between VII and II centuries b.C. The Greeks did try to transplant and grow it in other areas, but not successfully. It was practically extinct by the 1st century a.C. due to overharvesting. It is not entirely clear what plant it was; it seems to have been like that of fennel. This ancient and extinct vegetable species is not at all related with the current plants of the genus *Silphium*, mostly distributed in North America.

The fish salting factories in classic historical times were located in all parts of the Mediterranean Sea, in the Eastern Atlantic close the Strait of Gibraltar, in the Black Sea and even in the Azov Sea (Morales *et Al.*, 2007). In some cases it was possible to have a precise location (**Figure 1**), while in other cases there are historical evidences of *garum* production in some areas (i.e.: like in some Greek areas and even in the Canary isles) but without precise locations.

Some of these salt fish and *garum* factories were active since V b.C., but most of them were built in III b.C.; some were active up to V a.C., except the factory in Porto Palo (S. Sicily) which was still active in the X century. Obviously, each site has its own history.

Figure 1 shows the location of the most known fish salting plants in classical history, but it is possible that several other factories were present in other ancient locations.

The most reputed and famous *garum* factories were Byzantium (now Istanbul, Turkey) (Tekin, 2000), Cyzicus (now Aydıncık, Turkey), Barbate, Ayamonte and Baelo Claudia (Spain) (**Figure 2**) (Sillières, 1995; Morales-

² The name of this *garum*-like sauce is “colatura di alici”.

Muñiz & Roselló-Izquierdo, 2007), Lixus (Atlantic Morocco) (**Figure 3**), Cyrene and Apollonia (E. Libya), Leptis Magna (close to Homs, Libya), Neapoli (now Nabeul, Tunisia), Cartagine (close to Tunis, Tunisia), Tipaza (Algeria) (**Figure 4**), Pompei and Gela (Italy).

A particular importance is given to the fish salting factories of Pontikapaion, active in the Azov Sea from III b.C. to IV a.C. (Morales *et Al.*, 2007), and Chersonesus, active in Crimea from I b.C. to III a.C., because these two factories are the only proofs of the bluefin tuna presence in these NE areas of the Black Sea region.

3. Coins with tuna images

Another evidence of the commercial and economic relevance of the bluefin tuna fishery or industry in classical historical times is provided by the coins. As a matter of fact, antique coins were characterised by power or religious images (kings, emperors, gods or divinities) or by images representing symbols or locally relevant productions.

Coins with images of tunas were present in many archaeological sites and they are well known by archaeologist, historians and coins collectors (Savas Lenger, s.d.; García Bellido, 1991; Mederos Martín, 2007; Callegarin & Rippollés, 2010; Marín Martínez, 2011; Ripollés, 2013). In some coins the tunas are very visible while in others are parts or components of other images and then their detection is not always easy. Sometimes, fish images are not clearly showing a bluefin tuna and in these cases it is necessary to examine various coins minted in the same place over the time for better defining the species.

The persistence of tuna images on coins from the same mint or place over centuries or for an extended period of years is considered a good evidence of the continuation of the economic relevance of the tuna fishing and industry activities in that particular place.

Coins with tunas were not very common in the classical historical times and their distribution (**Figure 5**) is partly different and more limited of that of the fish salting factories in the same classical historical times. Furthermore, in some cases, coins with tunas were mint in ancient inland towns, close to rivers or roads, where it is supposed that tuna trade was important for the local economy.

According to the available information, most of the coins with tunas were mint during the III and II centuries b.C., because more ancient coins with tunas were found only in Cyzicus (VI b.C.), Charia Kinda (510 b.C.), Akragas (V b.C.), Solunto and Thurium (IV b.C.).

The places where coins with tunas were mint and the first period on which the coins with tunas were mint are the followings:

Turkey: Byzantion (now Istanbul) – II b.C. Cyzicus (now Aydıncık) – VI b.C.	Spain: Abdera (now Almería) – II b.C. Aipora (now San Lúcar de Barrameda) – II b.C.
Greece: Charia Kinda – VI b.C.	Asido (now Medina Sidonia) – II b.C. Bailo (near Playa de Bolonia) – I b.C.
Italy: Akragas (now Agrigento, Sicily) - V b.C. Solunto (near Santa Flavia, Sicily) – IV b.C. Thurium (near Sibari., Calabria) – IV b.C.	Balsa (now Luz de Tavira) – II b.C. Caura (now Cora del Río) – II b.C. Cumbaria (now Las Cabezas) – I b.C. Gadir or Gadez (now Cadiz) – III b.C. Ilipense (now Alcalá del Río) – II b.C.
Portugal: Baesuris (now Castro Marim) – II b.C. Mirtiles or Mértola (now Mortola) – II b.C. Salacia Ketouibon (now Alcacer do Sal) – II b.C.	Ilse (close to Aznalcóllar) – II b.C. Ituci (now Tejada la Nueva) – II b.C. Lascuda (now Alcalá de los Gazules) – II b.C. Malaka (now Malaga) – III b.C.
Morocco: Lixus (near Larache) – II b.C. Tingi (now Tanger) – II b.C. Tamuda (now Tetuan) – III b.C.	Sexs or Sexsi or Seks (now Almuñécer) – II b.C. Turrirecina (uncertain, maybe Casas de Reina) - II b.C.

From these data, it is very clear that the bluefin tuna reached an important economic importance revealed by coins at first in the eastern part of the Mediterranean basin (the Bosphorus, the Marmara Sea and the Aegean Sea), then in the central part (Sicily and Calabria). In this first period, many coins with tuna were mint particularly in Cyzicus, most using a particular league of metal called *electrum*³, while others were mint in silver or bronze or in fourrée⁴.

The western evidence of the commercial relevance of bluefin tuna is revealed only from the III century b.C. on. Most of the coins with tunas were mint during the Phoenician-Punic period and the Iberic one. Only very few ones were in silver, while the large majority was made in bronze.

Figures 6 to X show some of the several coins with tunas from various locations. Coins with tunas had various values and denominations: Hemihobol, Trihemiobol, Hobol, 1/48 Stater, 1/24 Stater, 1/12 Stater, Stater, El Hemihekte, El Hemihekte 1/48 Stater, 1/12 Stater, El Hekte, El Hekte 1/6 Stater, Double AE, Semis, As, Sextans, Quadrans or Quarter unit, half calcus, Hemidrachm, Drachm, Tetradrachm.

4. Discussion

This preliminary work provides some important elements which are useful for better understanding the distribution and relevance of fishing or commercial activities for bluefin tuna in classic historical times.

The information provided both by the geographic distribution of tuna salting factories and coins having the bluefin tuna represented on a side are telling us that the distribution of bluefin tuna was partly different in classic historical times if compared to the current distribution.

It is quite clear that important catches were obtained in several coastal areas by traps, confirming a major presence of tunas along many coast, including remote areas of the Azov Sea and the Black Sea, where bluefin is missing since about 35 years or even much more for the Azov Sea, even if precise data are missing. The distribution of many factories in the Atlantica areas close to the Strait of Gibraltar, in the Strait and in the Alboran Sea are a clear evidence of a massive migration of bluefin tuna at that time, while the distribution of factories along the coasts of Magreb and Sicily are another evidence of these coastal massive movements.

The tuna coins distribution shows a partly different image, with more focalised areas. The Marmara Sea and the Bosphorus were clearly important trading areas in very ancient times, at least from the VI century b.C. As a matter of fact, it seems that Cyzicus (now Aydinçik) was the most important trading place for bluefin tuna over several centuries, while Byzantion (now Istanbul) became more important much later, but its relevance remained there up to the end of the Ottoman Empire, when Istanbul was the main market for the bluefin tuna fished in the Black Sea, in the Marmara Sea and in the Eastern Aegean Sea.

The large distribution of tuna coins in the western side of the Mediterranean Sea and in the adjacent part of the Atlantic Ocean confirms the very high economic importance of the bluefin tuna fishery and trade in these areas during the Phoenician and Roman times. It is also very clear that the fishery at those times was catching tunas coming from the Atlantic into the Mediterranean for spawning and bluefin tunas returning to the Atlantic foraging areas after spawning. Considering the various mints in the Iberian peninsula, it is also clear that salted bluefin tuna and garum were traded not only by ships travelling in the Mediterranean, but also by river vessels and charrets going inland for reaching towns far from the sea.

More difficult is the image coming from the distribution of tuna coins in the central Mediterranean areas, where bluefin tuna fishery was diffused in several areas, as testified by the salting factories. Tuna coins have been found so far only in a very few places in Sicily and Calabria, even if the distribution of mints during Phoenician and Roman time was considerable even in these areas. The reasons for this very limited distribution of tuna coins should be further investigated, because the presence of tuna salting factories testify an important commerce and then also a relevant economy, either in Phoenician or Roman and Greek times. It is inexplicable why tuna coins were not detected so far along the coast of Tunisia and Libya, while they are present in only two places in Sicily.

³ *Electrum* is a naturally occurring alloy of gold and silver, with trace amounts of copper and other metals. It was used for producing coins since 3,000 b.C. in ancient Egypt, and then by Greeks which used a man-made alloy with 45-55% of gold, instead of the percentage of 70-90% which were naturally present in Anatolia. Coins made with *electrum* were typical from Cyzicus. *Electrum* was called by Greeks "white gold", while it is now currently called "green gold".

⁴ Fourrée is a coin made in non-precious metal and plated with precious metals such as gold or silver. This technique began in Asia Minor in the VII century b.C.

Certainly, during Roman times, when the production of *garum* was massive, the Emperors preferred to have their images and other symbols on the coins, while commercially important elements almost disappeared from all coins.

From a natural history point of view, the most relevant for ICCAT and SCRS purposes, the main points are the followings:

- The large presence of bluefin tuna in the Black Sea, up to the Azov Sea, during classic historical times, while bluefin tuna disappeared from the Black Sea in the '80s;
- The massive presence of bluefin tuna in all coastal areas of the Mediterranean Sea (with a much more important distribution along the traditional migratory course crossing the southern part of the basin) and in the Atlantic areas close to the Strait of Gibraltar; from the second part of the XX century, bluefin tuna is mostly concentrated in offshore waters in the Mediterranean Sea, as a result of the environmental changes occurred in most of the coastal areas.

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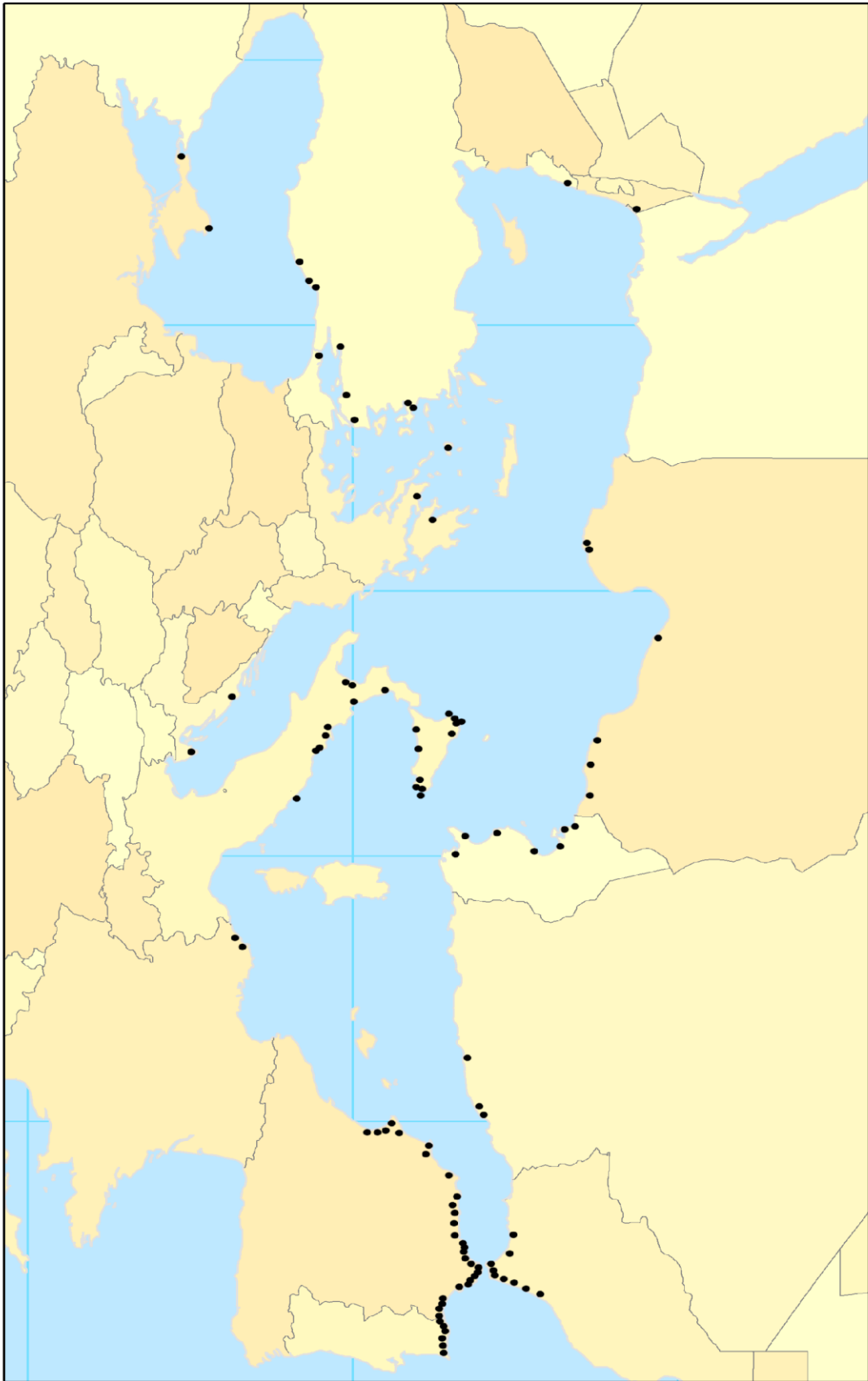


Figure 1. Distribution of the main fish salting factories in classic historical times (from V b.C. to V a.C.) in the Mediterranean Sea and in the adjacent seas.



Figure 2. Fish salting factory in Baelo Claudia (South Spain).



Figure 3. Fish salting factory in Lixus (Atlantic coast of Morocco).



Figure 4. Fish salting factory in Tipaza (Algeria).

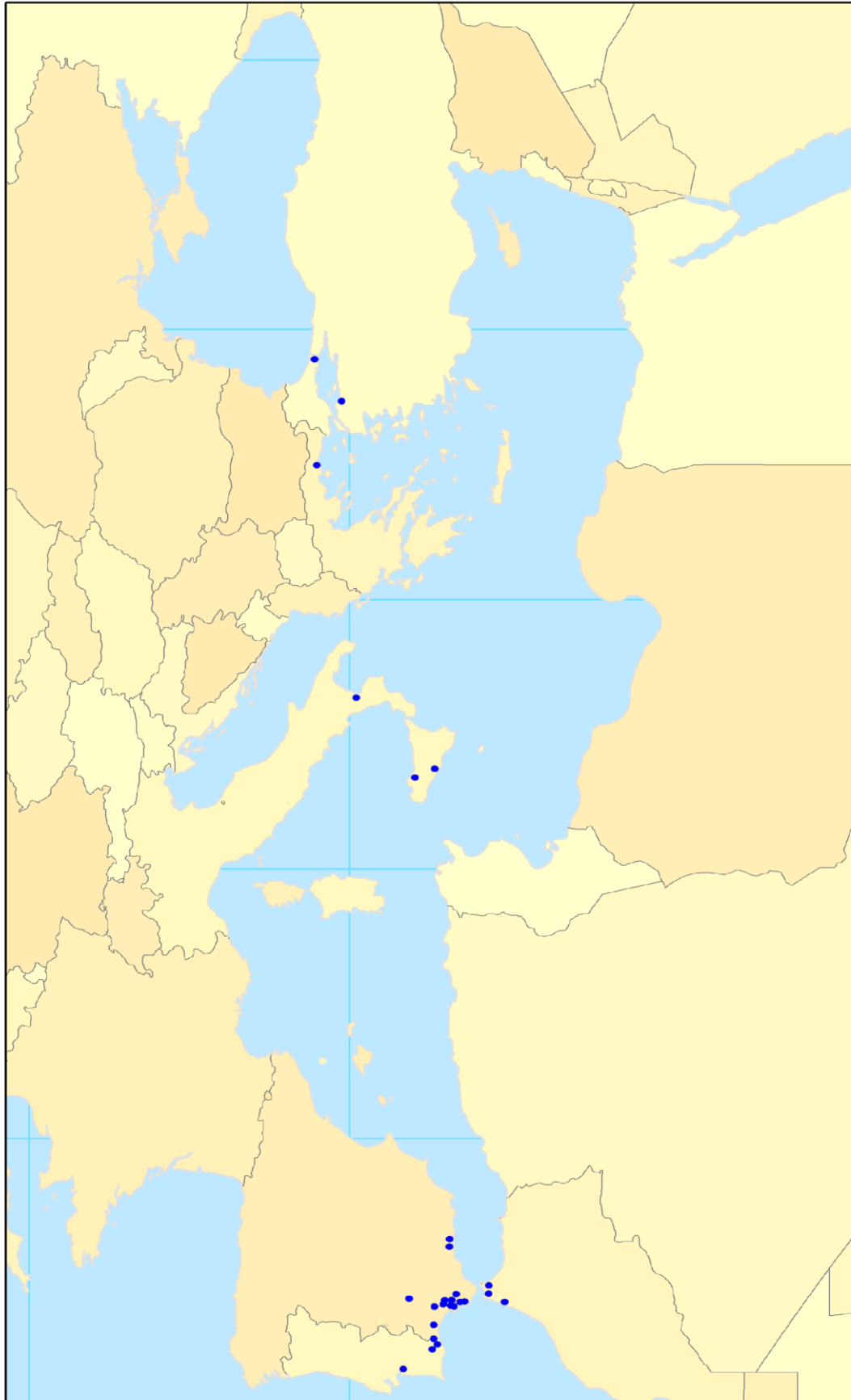


Figure 5. Distribution of ancient towns where coins with tuna were mint in classic historical times (from V b.C. to V a.C.) in the Mediterranean Sea and in the adjacent seas.



Figure 6a (left). Hemiobol, Greek coin in silver from Cyzicus, c. 450 b.C. (0.36 g); obverse: forepart of boar running left, tunny fish upwards behind; reverse: head of roaring lion left, star of four rays above. **Figure 6b (right).** Trihemioobol, Greek coin in silver from Cyzicus, c. 480 b.C. (0.82 g); forepart of boar running left, tunny fish upwards behind; reverse: head of roaring lion left.



Figure 7a (left). Obol, Greek coin in silver from Cyzicus, c. 480 b.C. (0.80 g); obverse: forepart of boar running left, tunny fish upwards behind; reverse: head of roaring lion left, with incuse square. **Figure 7b (right).** El 1/48 Stater, Greek coin in silver from Cyzicus, c. 600 b.C. (0.39 g); obverse: head of tuna right; reverse: incuse square with swastika.



Figure 8a (left). El 1/24 Stater, Greek coin in electrum from Cyzicus, V b.C. (0.69 g); obverse: Zeus AĒtophoros kneeling right on tunny right; reverse: incuse square with swastica. **Figure 8b (right).** El 1/12 Stater, Greek coin in electrum from Cyzicus, c. 500 b.C. (1.34 g); obverse: ram's head left, tuna above; reverse: quadripartite incuse square with swastica.



Figure 9a (left). El Stater, Greek coin in electrum from Cyzicus, c.500 b.C. (16.1 g); obverse: Head of Apollo, wearing laurel wreath, facing slightly right; below, tuna right; reverse: quadripartite incuse square. **Figure 9b (right).** El Stater, Greek coin in electrum from Cyzicus, c. 500 b.C. (16.23 g); obverse: Panther standing left on tuna, raising right forepaw; reverse: quadripartite incuse square.



Figure 10a (left). El Hemihekte, Greek coin in electrum from Cyzicus, c.500 b.C. (1.3 g); obverse: Triton left holding wreath in left hand, on tuna left; reverse: quadripartite incuse square. **Figure 10b (right):** El Hemihekte, Greek coin in electrum from Cyzicus, c. 600 b.C. (1.33 g); obverse: Panther standing left on tuna, raising right forepaw; reverse: quadripartite incuse square.



Figure 11a (left). El Hemihekte 1/12 Stater, Greek coin in electrum from Cyzicus, c.550 b.C. (1.33 g); obverse: Triton(?) left, holding tuna; head of tuna to left; reverse: quadripartite incuse square. **Figure 11b (right):** El Hekte 1/6 Stater, Greek coin in electrum from Cyzicus, c. 600 b.C. (2.71 g); obverse: Eagle standing right on tuna left; to upper left, tuna right; reverse: quadripartite incuse punch.



Figure 12a (left). El Hekte 1/6 Stater, Greek coin in fourrée from Cyzicus, c.500 b.C. (2.01 g); obverse: Sphinx standing left; below, tuna left; reverse: quadripartite incuse punch. **Figure 12b (right):** El Hekte, Greek coin in electrum from Cyzicus, c. 500 b.C. (2.67 g); obverse: Facing head of gorgoneion with protruding tongue, set on tuna left; reverse: quadripartite incuse square.



Figure 13a (left). El Hekte, Greek coin in fourrée from Cyzicus, c.500 b.C. (2.01 g); obverse: Sphinx standing left; below, tuna left; reverse: quadripartite incuse square. **Figure 13b (right):** El Hekte, Greek coin in electrum from Cyzicus, V b.C. (16.7 g); obverse: Head of Attis right, wearing Phrygian headdress; below, tuna right; reverse: quadripartite incuse square.



a b
Figure 14a (left). Double AE, neo-Punic Phoenician coin in bronze from Sexis, II b.C.; obverse: Melkart head right, club on left shoulder; reverse: two tunas right, SKS inscription. **Figure 14b (right):** Semis, neo-Punic Phoenician coin in bronze from Sexis, c. 200 b.C. (4.4 g); obverse: Helmet male head right; reverse: Tuna-fish right, Phoenician letter 'aleph' above.



a b
Figure 15a (left). Semis, Phoenician Punic coin in bronze from Gadir, II b.C.; obverse: Head of Melkart-Herakles left, wearing lion's skin headdress; club on left shoulder; reverse: Tuna left, Phoenician script MP'L above and 'GDR' below. **Figure 15b (right):** Semis, Iberian coin in bronze from Baesuri, II b.C. (2.2 g); obverse: inscription BAE; reverse: Tuna-fish left.



a b
Figure 16a (left). Semis, Phoenician Punic coin in bronze from Sexsi, c. 200 b.C. (4.4 g); obverse: helmet male head right; reverse: Tuna-fish right, Phoenician letter "aleph" above, neo-Punic inscription SKS below. **Figure 16b (right):** As, Iberian coin in bronze from Ilipense, c. 200 b.C. (35 g); obverse: grain ear; reverse: Tuna-fish swimming right, crescent above between two stars, legend "ILIPENSE" below.



a b
Figure 17a (left). As, Phoenician Punic coin in bronze from Abdera, II b.C.; obverse: Tetrastyle 5 temple; reverse: Punic inscription BDRT, two tuna fish left. **Figure 17b (right):** As, Phoenician Punic coin in bronze from Salacia - Ketouibon, c. 150 b.C. (13.53 g); obverse: inscription CAVONIE SIS CRA, laureate bearded head facing to left, dotted border; reverse: two tunas swimming right.



a
Figure 18a (left). Sextants (?), Phoenician Punic coin in bronze from Gadira, I b.C.; obverse: Head of Melkart-Herakles left, wearing lion's skin; reverse: tuna left, Phoenician letter "aleph" below. **Figure 18b (right):** Quadrans – Quarter unit, Phoenician Punic coin in bronze from Gadira, 237 b.C.; obverse: Helios head facing; reverse: Phoenician script MP'L above and 'GDR below, Phoenician letter 'aleph' between two tuna-fish right.



a
Figure 19a (left). Quadrans – Quarter unit, Phoenician Punic coin in bronze from Ituci, I b.C.; obverse: grain ear; reverse: legend ITUCI, tuna right, crescent above. **Figure 19b (right):** unknown Greek coin unit from Thurium, IV b.C.; obverse: helmeted bust of Athena right; reverse: Bull right, head reverted; tuna fish right in exergue.



a
Figure 20a (left). Hemidrachm, Phoenician Punic coin in silver from Gadira, 237 b.C. (2.36 g); obverse: Head of Melkart-Herakles left, wearing lion's skin headdress; club on left shoulder; reverse: tuna-fish left Phoenician script MP'L above and 'GDR below. **Figure 20b (right):** Drachm, Phoenician Punic coin in silver from Gadira, III b.C. (3.3 g); obverse: Head of Melkart-Herakles left, wearing lion's skin headdress; club on left shoulder; reverse: tuna-fish left Phoenician script MP'L above and 'GDR below.



a
Figure 21a (left). Tetrachm, Phoenician Punic coin in silver from Cyzicus, 350 b.C. (15.21 g); obverse: ΣΩΤΕΙΡΑ, Head of Kore Soteira left, hair in sakkos; reverse: legend KI-ZI, Head of lion left, tuna fish left below; wreath behind. **Figure 21b (right):** Tetrachm, Phoenician Punic coin in silver from Cyzicus, 413 b.C. (14.67 g); obverse: ΦΑΡ-Ν-[Α]-ΒΑ, head of Pharnabazos right, wearing satrapal cap tied below his chin, and diadem; reverse: Ornate ship's prow left, decorated with a griffin and prophylactic eye; before and aft, two dolphins downward; below, tuna left.