

Ancient literary sources concerning fishing and fish processing
in the Black Sea region *

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Abstract. *This article proposes a revision of the ancient literary sources concerning the conservation of fish stocks in the Black Sea region in Greek and Roman classical antiquity. The abundance and the chronological variety of the sources indicate, on the one hand, that these economic activities have always been part of people's lives, and on the other hand the quality of Pontic fish products, known from Britannia to Egypt. It seeks, in addition to spatial and chronological approach, the types of sources that are subject to submission, taking into account the category of recipients to whom they were addressed and the purpose for which they were written, in order to verify their typicality and credibility.*

Rezumat. *Articolul de față își propune trecerea în revistă a surselor literare antice cu privire la conservarea peștelui în bazinul Mării Negre în Antichitatea clasică grecească și romană. Abundența și varietatea cronologică a surselor indică, pe de o parte, faptul că aceste activități economice au făcut parte dintotdeauna din viața oamenilor, iar pe de altă parte calitatea produselor halieutice pontice, binecunoscute în timp din Britannia până în Egipt. Se urmărește, pe lângă abordarea cronologică și spațială, tipologia surselor care fac subiectul studiului, în funcție de categoria de receptori cărora le erau adresate și scopul în care au fost scrise, cu scopul de a verifica tipicitatea și credibilitatea lor.*

Keywords: Black Sea region, Antiquity, literary sources, fishing, fish processing.

Introduction

The theoretical and methodological assumptions underlying this study are closely linked to the idea that ancient social and economic phenomena should be viewed not only globally, but also in their local context. The existence of significant common features to emphasize the unity and the socio-economic development of the Roman world is limited by certain factors, such as: geographical units and regional cultural traditions; different semantics depending on the object of production or the agencies involved in production and distribution; chronological variability and historical changes affecting industry and commerce; the diversity of production systems.

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The halieutic circuit comprises the potential of the exploitable biological resources of resources (fish resources and sources of salt) and the strategy of valorisation of this potential (processing and marketing the obtained resources). The artisanal transformation of fish uses all possibilities offered by nature for the exploitation of this categories of resource: all kinds of fish and all kinds of processing methods available in antiquity (salting, drying, smoking, used separately or combined); involves the development of perennial workshop networks, both individual and collective, but at the same time ensures a substantial income.

In recent years, there has been a quantitative and qualitative revival of interest in ancient economy, especially for the Roman times. However, with some notable exceptions, coastal and marine resources as a whole do not enjoy an intensive and meticulous research, in terms of importance held in the Roman economy. For Rostovtzeff, there was no doubt that fishing in certain regions of the ancient world, such as the Sea of Marmara and the Black Sea must have played a key role in regional economic development². In 1985, the book T. W. Gallant, *A Fisherman's Tale*, published by the Belgian Archaeological Mission in Greece, expressed a sceptical vision over fishing and fish processing industry in ancient economy and diet, based on two arguments: the inefficiency of the ancient technology, and the inadequacy of the nutritional qualities of fish meat. The latest findings in the field contradict the theory of Gallant³, but the general view is still that aquaculture practices in antiquity were too rudimentary to have a considerable effect on the economy and everyday life.

However, the research polarizes the latinophone Mediterranean half of the Roman Empire. Anything the Black Sea produces, the Mediterranean can produce, too, and may produce even better. The significantly higher amount of sources (archaeological, epigraphic, iconographical) promotes not only a quantitative, but especially a qualitative growth of the studies in the field, whose main characteristic is interdisciplinary. The latest research focuses on: mapping and historical interpretation of the network of the circum-mediterranean fish processing centers⁴, paleolimnology and landscape archaeology⁵; archaeozoology, amphoric archaeology and epigraphy⁶; anthropology of food⁷.

If the Mediterranean and the western provinces enjoyed and are still enjoying a careful research, the circum-pontic area is still far to provide coherent and consistent results. The archaeological research undertaken in the Sea of Azov region, and in in southern Crimea, on the one hand, and in the southern Black Sea and the Bosphorus, on the other hand, have unearthed numerous pottery workshops, and fish processing workshops that can provide an

² ROSTOVITZEFF 1988, 196.

³ BEKKER-NIELSON 2005, 83-96; BEKKER-NIELSON 2012; LUND JACOBSEN 2005, 97-104; MARZANO 2013.

⁴ CARUSI 2008; BERNAL CASASOLA 2009; ROBINSON, WILSON 2011; MARZANO 2013.

⁵ AURIEMMA, KARINJA 2008; DI RITA, CELANT, MAGRI, 2010, 51-67.

⁶ BOETTO 2010, 243-255.

⁷ CURTIS 2009, 712-718.

overview on the amplitude of salted fish industry in the Hellenophone part of the Roman Empire⁸.

The literary and epigraphic sources from classical and Hellenistic periods show a substantial production of salted fish from the 5th century BC; this does not mean that such activities were not conducted even before. Therefore, we considered necessary the resumption of the information from the literary sources concerning the fish resources in the Black Sea.

As spatial delimitation of the Pontic area, we took into account the geographical definition stated by R. I. Curtis: “the lands bordering both sides of the Hellespont and Propontus, the Thracian Bosphorus, and regions surrounding the Pontus Euxinus and Palus Maeotis (Sea of Azov). This area included portions of the provinces of Thrace, Moesia Inferior, Asia, Pontus, Bithynia, and Cappadocia, as well as the Crimea (Tauric Chersonese) and the semi-independent client kingdom of the Bosphorus, centered in the Cimmerian Bosphorus and the Taman peninsula”⁹.

Properties of the Black Sea

Most of the sources prize the quantity and the quality of the pontic fish, no doubt due to the habitat offered by the sea¹⁰: the low salinity, calm waters, and the lack of predators:

“For that gulf is the sweetest of all the sea, watered as it is by infinite rivers of abundant water; and it has soft and sandy bays; therein are goodly feeding-grounds and waveless shores and caverned rocks and silty clefts and shady headlands and all that fish most love; but no fierce Sea-monster inhabits there nor any deadly bane of the finny race nor any of those which prey upon the smaller fishes—no coiling Poulpe nor Lobster nor Crab”¹¹; “the majority of fishes are eager for sexual intercourse throughout the springtime, and withdraw for choice to the Black Sea, for it contains caverns and resting-places which are Nature’s gift for Fishes. Besides, its waters are free from the savage creatures which the sea breeds. Only dolphins roam there, and they are small and feeble. Moreover it is devoid of octopuses; it produces no crabs and does not breed lobsters: these are the bane of small fishes”¹²; “all Fish that have a

⁸ Recent historical research is far from being extensive: BEKKER-NIELSON 2005 (ed.) is the most comprehensive synthesis on the subject to date; COLLIN BOUFFIER 1999, 37-50; LYTLE 2012, 253-303; YERMOLIN, FEDOSEEV 2013, 185-200).

⁹ CURTIS 1991, 118, n. 27.

¹⁰ PLINIUS, 9. 19: “Fishes of all kinds grow up exceptionally fast, especially in the Black Sea”, information taken from ARISTOTLE, *History of animals*, 6. 17: “Moreover almost all other fish also have a rapid growth, but that of all fish from Pont is still faster”. See also DION CHRYSOSTOMOS, 33. 24: „You are told that the people of Byzantium yonder, who dwell elose beside the Pontus itself but a short distance outside its entrance [reap much profit from their situation], since from time to time fish are thrown out upon their shores without man’s intervention; but still no one would call Byzantines blessed because of the fish – unless he would say the same of cormorants – nor would call Egyptians blessed because of the Nile, or Babylonians because of their wall”.

¹¹ OPPIAN, *Halieutica*, 1, 595-637.

¹² AELIAN, *On animals*, 4. 9.

river or some lake near to their native sea, when they are about to spawn swim out of the salt water, choosing in preference to the waves water that is calm and not at all upheaved and lashed by gales. For the tranquillity of river and lake is well adapted to receive their offspring and to preserve their young from harm and from attack, both for other reasons and especially because of the absence or paucity of savage creatures. And lakes and rivers normally enjoy this freedom. That is the reason why the Euxine abounds in such a quantity of fish: it has not learnt to foster monsters. If it does breed the seal and dolphins, they are of the smallest, but from all other pests the fishes here are protected”¹³; “fishes of all kinds grow up exceptionally fast, especially in the Black Sea; this is due to the fresh water carried into it by a large number of rivers”¹⁴.

Species of fish

Most of the literary sources offer us general information about the fish from the Black Sea, mentioning their biological traits, their behaviour, and their migration¹⁵.

Although many different kinds of fish were caught and processed in salting factories from the Black Sea region, the tunny, and particularly the pelamys, was the most important¹⁶. Several cities drew specific mentioning sometimes even praise for their fish products. These included Sinope¹⁷, for its mullets; Parion, on the southern coast of the Hellespont, for its salted mackerel¹⁸; Byzantium, in the Thracian Bosphorus, which Eutydemus calls “the mother of salted tunny”¹⁹. Other cities in the Roman period which received praise for their fish products include Trapezus²⁰ and Chalcedon²¹, for their pelamydes; Tium and Heraclea Pontica²² for their tunny; and Panticapaeum²³, for its sturgeon.

¹³ AELIAN, *On animals*, 9. 59.

¹⁴ PLINIUS, 9. 19.

¹⁵ OPPIAN, *Halieutica*, 1, 595-599: When in spring the oviparous fishes are full of roe, some of them remain quietly in their homes, each tribe in its own place; but many gather together and pursue a common path to the Euxine Sea; see also AELIAN, *On animals*, 4. 9. For tunny, see AELIAN, *On animals*, 9. 42; PLINIUS, 9. 18; PLINIUS, 9. 20; ARISTOTLE, *History of animals*, 6. 17; for mackerel, see AELIAN, *On animals*, 10. 6: “It seems that the Spanish Mackerel of the Euxine imitate the Persian king who spends the winter at Susa and the summer in Ecbatana. For these fish pass the winter in the Propontis as it is called, since that region is warm, but in the summer they live about Aegialus, because the first-named sea affords them gentle breezes”; PLINIUS, 9. 19; ARISTOTLE, *History of animals*, 8. 13; for other species, see: PLINIUS, 9. 20: “Many pass the summer in the Sea of Marmara without entering the Black Sea; the same is the case with the sole, though the turbot does enter it. Nor does the sepia occur there, though the cuttle-fish is found. Of rock-fish the sea-bream and whiting are lacking, as are some shell-fish, though oysters are plentiful; but they all winter in the Aegean”; LUCIAN, *Dialogues of the courtesans*, 2 (perches); OPPIAN, *Halieutica*, 1, 509-512 (breams); OPPIAN, *Halieutica*, 1, 595-637; AELIAN, *On animals*, 9. 59 (dolphins).

¹⁶ See THOMPSON 1947, s.v. *τύννος* (79-90); *πηλαμύς* (197-199); THOMPSON 1932, 246-248; DUMONT 1976-1977, 96-117.

¹⁷ DORION, *apud* ATHENAIOS 3. 118c.

¹⁸ HERMIPPUS, fr. 63 (Edmonds ed.)

¹⁹ EUTHYDEMUS, *apud* ATHENAIOS 3. 116b. See also ATHENAIOS 3. 120f; 4. 132c-d (Diphilus); 3. 118b; 7. 303f (Antiphanes); 3. 117a; 7. 303e; 314e-f (Archestrates).

²⁰ STRABO, 7. 6. 2.

Archaeologists have uncovered bones of many species, such as anchovies, herring, sturgeon, sea roach, flounder, and mackerel²⁴. The most important study on the ancient ichthyofauna in this area refers to the bone remains from Olbia and Berezan of the Dnieper and Bug estuaries²⁵. The analysis of the material indicated the presence of predominantly large fishes: sturgeon, pike, and catfish, while carp and roach, though occurring in large amounts, seem to have been of secondary importance. Apparently this is due preference for fish living in areas of slow currents in the rivers.

Meanwhile, within the sites from Tyritake and Chersonesos dominates saltwater fish, most bones originating from species such as catfish and various types of sturgeons: sterlet, beluga, sevriuga, Russian sturgeon and pikeperch²⁶.

The analysis of the osteological material dating from the 4th and 3rd centuries BC from Pantikapaion, Phanagoreia and other settlements on the eastern coast of the Sea of Azov demonstrates that in this area the most consumed species was pikeperch, closely followed by different types of sturgeon. The material from the 2nd century BC from Pantikapaion corresponds roughly to that of Olbia. In the 3rd and 4th centuries AD, there was identified the largest share of carp bones²⁷.

Not so many texts refer to **fishing and fishing methods** in the Black Sea region. The most important writing belongs to Oppian, and dates from the early 2nd century AD²⁸, strongly influenced by a lost work of Leonidas of Byzantium (c. 100 AD) and Aristotle. Oppian mentions the use, by “Thracians and the inhabitants of Byzantium” of tridents in order to catch dolphins²⁹. He also remembers an ingenious device used by the fishermen in the Black Sea to catch young tunny:

“These the Thracians who dwell above the deep expanse of the Black Gulf capture in the unkindly season of winter by a cruel and unpleasant form of fishing under the bloody law of war and savage doom of death. They have a stout log, not long but as thick as may be, about a cubit in length. On the end of it are put abundant lead and many three-pronged spears set close together; and about it runs a well-twisted cable exceeding long. Sailing up in a boat to where the gulf is deepest, mightily they launch into the murky deep the pine-log's stubborn strength. Straightway with swift rush, weighed down by lead and iron, it speeds to the nether foundations of the sea, where it strikes upon the weak Pelamyds huddling in the mud and kills and transfixes as many as it reaches of the hapless crowd. And the fishermen swiftly draw them up, impaled upon the bronze and struggling pitifully under the iron torture. Beholding them even a stone-hearted man would pity them for their unhappy capture and death. For

²¹ AULUS GELLIUS, 6. 16. 5.

²² AELIAN, *On animals*, 15. 5.

²³ STRABO, 7. 3. 18.

²⁴ CURTIS 1991, 121.

²⁵ MUNK HØJTE 2005, 140.

²⁶ MUNK HØJTE 2005, 140.

²⁷ MUNK HØJTE 2005, 141.

²⁸ On *Halieutica*, see BEKKER-NIELSEN 2005, 83–84.

²⁹ OPPIAN, *Halieutica*, 4. 521–522.

the spear-point has entered the flanks of one, the swift shaft has transfixed the head of another ; one is wounded over the tail, the groin of this, the back of that is victim of the bitter warfare, and yet another is pierced in the midst of the belly”³⁰.

Some other ancient fishing techniques presented by Oppian are by using semi-permanent nets or trap³¹, and light nets:

“The fishers set up very light nets of buoyant flax and wheel in a circle round about while they violently strike the surface of the sea with their oars and make a din with sweeping blow of poles. At the flashing of the swift oars and the noise the fishes bound in terror and rush into the bosom of the net which stands at rest, thinking it to be a shelter: foolish fishes which, frightened by a noise, enter the gates of doom. Then the fishers on either side hasten with the ropes to draw the net ashore. And when they see the moving rope, the fish, in vain terror, huddle and cower together and are coiled in a mass. Then would the fisher offer many prayers to the gods of hunting that nothing may leap out of the net nor anything make a move and show the way ; for if the Pelamyds see such a thing, speedily they all bound over the light net into the deep and leave the fishing fruitless”³².

Fish preservation formed a substantial portion of fishing activity in the Black Sea region from the pre-Roman period. Eutydemus stated that the Bosphorus³³ was rich in salted fish and that the inhabitants cut the fish into squares and pickled them³⁴. Cratinus uses the term *τάριχος Ποντικός*³⁵, and Pollux uses *ταρίχη Ποντικά*³⁶.

Greek terms designating salted fish products show that there were two main categories of products. First, *τάριχος* was a generic term designating any kind of pickled meat, but especially fish³⁷. The fish were used either whole or cut in pieces³⁸: *τέμαχος* was the name for products made from pieces of fish, while whole specimens were used for *τάριχος*. Salting begins with the direct contact between fish and salt and ended when the fish salinity was enough, on the one hand, to avoid the contaminating bacterial growth, and secondly to acquire the taste, aroma and consistency of specific products ready for consumption³⁹.

Products received specific names depending on the form in which they were handled, the degree of concentration of the brine or of the row fish species or their age. Thus, *τρίγωνον*⁴⁰, *τετράγωνον*⁴¹, and *κύβιον*⁴² indicated the shape of salted fish; *ἀκρόπαστος*⁴³ (slightly salty),

³⁰ OPPIAN, *Halieutica*, 4. 535-548.

³¹ OPPIAN, *Halieutica*, 6. 637-648.

³² OPPIAN, *Halieutica*, 4. 566-582.

³³ For the discussion whether he refers to the Thracian or Cimerian Bosphorus see CURTIS 1991, 119.

³⁴ EUTYDEMUS *apud* Athenaios 3.116b

³⁵ CRATINUS, fr. 40 (Edmonds ed.).

³⁶ POLLUX, *Onomasticon*, 6. 48.

³⁷ ÉTIENNE, MAYET 2002, 8.

³⁸ DESSE-BERSET, DESSE 2000, 74.

³⁹ STERNBERG 2000, 148.

⁴⁰ ATHENAIOS, 3. 116c.

⁴¹ ATHENAIOS, 3. 116b.

⁴² ATHENAIOS, 3. 116e; 3. 118a-b.

⁴³ XENOCRATES *apud* Oribasius 2. 58. 150.

ἡμιτάριχος⁴⁴ (with a moderate amount of salt), or τέλειον⁴⁵ (very salty) refers to the concentration of the brine in which the fish was preserved; τάριχος πιλτόν (salted fish with scales) and τάριχος λεπίδωτόν⁴⁶ (fish without scales) involves the use of certain special methods of production; ὑπογάστρια⁴⁷ (the stomach) indicates which particular part was used for conservation.

Commerce in salted fish products from the Black Sea area was also attested by the literary sources. The demand for fish may have begun since the 7th century BC⁴⁸ that being probably one of the reasons of the Greek colonization in the north of the Black Sea. Athens imported salted fish from the Hellespont and other areas of the Pontus Euxinus and Bosphorus⁴⁹. Demosthenes notes that salted fish was transported from Panticapaeum, in the Cimmerian Bosphorus (Strait of Kerch), to Theodosia in Crimea with an Athenian ship⁵⁰. Romans appreciated Pontic products since the 2nd century BC, when Cato the Elder decried the expense of τάριχος⁵¹ that may indicate “that commerce in the Western Mediterranean in salted fish from the Black Sea area was not fully developed or that only the most expensive kinds came from that region”⁵². Polybius, at his turn, registers Pontic salted fish among the most expensive merchandises imported in Greece⁵³. Horace, unlike other authors, who refer generally to Pontic products, specifically mentions Byzantium as an exporting city to the West⁵⁴. In the 2nd century AD, Galen refers to Pontic *salsamenta* as inferior to those of Spain⁵⁵. Strabo notes that since the times of Mithridates Eupator the Bosphorus had been subject to the Romans, but remarks that prior to that time the salteries of Lake Maeotis had sent salted fish to the Greeks⁵⁶. Pontic τάριχος was found also in Cleopatra’s Alexandria, as Plutarch remembers in *Life of Antony*⁵⁷. Lucian writes about “cuts of Pontic tunny”⁵⁸, brought by “the merchant traders, and particularly the Phoenicians among them, who not only sail into the Pontus or as far as Lake Maeotis and the Cimmerian Bosphorus, but cruise everywhere in Greek and foreign waters; for these fellows comb every single shore and every strand, you may say, each year before returning late in the autumn to their own country. On the same principle,

⁴⁴ ATHENAIOS, 3. 117a; 118f.

⁴⁵ ATHENAIOS, 3. 120d.

⁴⁶ POLLUX, 6. 48.

⁴⁷ ATHENAIOS, 3. 116b; 7. 302d; 9. 399c.

⁴⁸ CURTIS 1991, 114.

⁴⁹ NICOSTRATUS, frs. 4–5 (Edmonds ed.); ANTIPHANES, fr. 77 (Edmonds ed.); ALEXIS, fr. 77 (Edmonds ed.)

⁵⁰ DEMOSTHENES, *In Lacritum*, 934.

⁵¹ See POLYBIUS 31. 25. 5.

⁵² CURTIS 1991, 126.

⁵³ POLYBIUS 4. 38. 4.

⁵⁴ HORACE, *Satires*, 2. 4. 63–66.

⁵⁵ GALEN, *De alimentorum facultatibus*, 3. 30. 5.

⁵⁶ STRABO 7. 4. 6.

⁵⁷ PLUTARCH, *Life of Antony*, 29. 3–4.

⁵⁸ LUCIAN, *Lexiphanes*, 6.

you should account them gods, even though most of them are pedlars and, it may be, fishmongers!”⁵⁹.

Conclusion

The Pontic fish resources enjoy the attention of ancient authors from classical Greece time to Late Antiquity. Most authors take the same information on fish migration and on the morphology of the Black Sea, seen as a geographical unit which includes the Sea of Azov (Lake Maeotis), the Bosphorus and the Marmara Sea (Propontis). But, with no exception, they prove that the Pontic salted fish was praised throughout the ancient world. There is more literary information on certain Pontic fish processing and selling centers, such as Byzantium. It is necessary to synchronize the sources literary, epigraphic, iconographic and, not least, archaeological.

REFERENCES

- AURIEMMA, R., KARINJA S. (eds.) 2008. *Atti del convegno internazionale di studi, Trieste, 8-10 novembre 2007*. Trieste.
- BEKKER-NIELSON, T. 2005. The Technology and Productivity of Ancient Sea Fishing. In: T. Bekker-Nielson (ed.), *Ancient Fishing and Fish Processing in the Black Sea Region*, 83-96. Aarhus.
- BEKKER-NIELSON, T. 2012. *The Black Sea in the Mediterranean Economy*. Presentation within the Workshop *Fish&Ships*, Rome.
- BERNAL CASASOLA, D. (ed.) 2009. *Arqueología de la pesca en el Estrecho de Gibraltar de la prehistoria al fin del mundo antiguo*. Cadiz.
- BOETTO, G. 2010. Fishing vessels in Antiquity: the archaeological evidence from Ostia. In: T. Bekker-Nielsen, D. Bernal Casasola (eds.), *Ancient Nets and Fishing Gear: Proceedings of the International Workshop on 'Nets and Fishing Gear in Classical Antiquity: A First Approach'*, Cádiz, November 15-17, 2007, 243-255. Aarhus.
- CARUSI, C. 2008. *Il sale nel mondo greco (VI a.C. -III d.C.): luoghi di produzione, circolazione commerciale, regimi di sfruttamento nel contesto del Mediterraneo antico*. Bari.
- COLLIN BOUFFIER, S. 1999. La pisciculture dans le monde grec. État de la question. *Mélanges de l'École française de Rome. Antiquité* 111, 1, 37-50.
- CURTIS, R.I. 1991. *Garum and Salsamenta. Production and Commerce in Materia Medica*. Leiden.
- CURTIS, R.I. 2009. Umami and the Foods of Classical Antiquity. *American Journal of Clinical Nutrition* 90, 712-718.
- DELUSSU, F., WILKENS, B. 2000. Le conserve di pesce. Alcuni dati da contesti italiani. *Mélanges de l'École française de Rome. Antiquité* 112, 1, 53-65.
- DESSE-BERSET, N., DESSE, J. 2000. Salsamenta, garum et autres préparations de poisson. Ce qu'en disent les os. *Mélanges de l'École française de Rome. Antiquité* 112, 1, 73-97.
- DI RITA, F., CELANT, A., MAGRI, D. 2010. Holocene environmental instability in the wetland north of the Tiber Delta (Rome, Italy): sea-lake-man interactions. *Journal of Paleolimnology* 44, 1, 51-67.

⁵⁹ LUCIAN, *Toxaris*, 4.

- DUMONT, J. 1976-1977. La pêche du thon à Byzance à l'époque hellénistique. *Revue des Études Anciennes* 78-79, 96-119.
- ÉTIENNE R., MAYET, F. 2002. *Salaisons et sauces de poisson hispaniques*. Paris.
- GALLANT, T.W. 1985. *A Fisherman's Tale*. Leuven.
- LUND JACOBSEN, A.L. 2005. The Reliability of Fishing Statistics as a Source for Catches and Fish Stocks in Antiquity. In: T. Bekker-Nielson (ed.), *Ancient Fishing and Fish Processing in the Black Sea Region*, 97-104. Aarhus.
- LYTLE, E. 2012. Ἡ θάλασσα κοινή: Fishermen, the Sea, and the Limits of Ancient Greek Regulatory Reach. *Classical Antiquity* 31(1), 253-303.
- MARZANO, A. 2013. *Harvesting the Sea The Exploitation of Marine Resources in the Roman Mediterranean*. Oxford.
- MUNK HØJTE, J. 2005. The archaeological evidence for fish processing in the Black Sea Region. In: T. Bekker-Nielson (ed.), *Ancient Fishing and Fish Processing in the Black Sea Region*, 133-160. Aarhus.
- PONSICH, M. 1988. *Aceite de olivas y las salazones de pescado. Factores geo-economicos de Betica y Tingitania*. Madrid.
- ROBINSON, D., WILSON, A. (eds.) 2011. *Maritime Archaeology and Ancient Trade in the Mediterranean*. Oxford.
- ROSTOVITZEFF, M.I. 1988. *Histoire économique et sociale de l'Empire Romain*. Paris.
- STERNBERG, M. 2000. Données sur les produits fabriqués dans une officine de Neapolis (Nabeul, Tunisie). *Mélanges de l'École française de Rome. Antiquité* 112, 1, 135-153.
- THOMPSON, D.W. 1932. 'Byzantios olent lacertos' (Stat. S. 4, 9, 13). *The Classical Review* 46, 246-248.
- THOMPSON, D.W. 1947. *A Glossary of Greek Fishes*. London.
- YERMOLIN, A.L., FEDOSEEV, N.F. 2013. A ceramic amphorae production workshop of the first half of the 3rd century AD in Panticapaeum. In: L. Buzoianu (ed.), *PATABS III: Production and Trade of Amphorae in the Black Sea*, 185-200. Constanța.

