

# FISHING IN THE BLACK SEA BASIN IN ANCIENT TIMES. TECHNOLOGICAL, ECONOMIC AND SOCIAL APPROACHES

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**Abstract:** The author proposes the presentation of some preliminary results obtained in the research project *Halientica Scythiae Minoris. Fishing and Fish Industry at the Mouth of the Danube in Roman and Early Byzantine Times*. We attempted to develop an interdisciplinary research model for Pontic fishery resources, which involves both traditional investigations and the integration of the achieved results into digital media. The integration of data related to ichthyofauna as identified in the works of various ancient writers was performed by creating separate spatial data sets for each species, namely: native range distribution, the presence/absence in the Pontic basin of each species selected according to archaeological evidence, as well as the presence/absence of these types in the Scythia Minor fishing area. We overlapped the representation of fish resources with the maps concerning the processing centres, occupations or fishing and commercial professional associations, as well as with the destinations of exported products, according to ancient sources.

**Keywords:** Black Sea, antiquity, fishing, technology, economy, ancient sources.

## INTRODUCTION

Human behaviour frequently depends heavily on environmental factors. It specifically refers to the ways that ancient people obtained and produced food. Certain natural features are necessary for the growth of various industries. Fisheries would not be able to survive without abundant resources in the form of good, fish-rich water areas that are close to human dwellings. As we are aware, the Black Sea region's connection to the sea and well-developed river system facilitated the growth of the fishing industry.

Fishing was expected to be one of the main activities of the Pontic residents and to play a significant role in the economic lives of the communities due to the ideal natural conditions for fishing and fish processing. Without question, among the extractive sectors that shaped the Pontic economy, fishing held the top spot. This is demonstrated by the profusion of fish bones, gill shields, sturgeon bugs, and scales that are frequently found during excavations of various portions of the settlements.

## FISH RESOURCES

Fish scale remnants can sometimes be found in complete layers, a situation showing that a lot of fish has been consumed and processed. Without a doubt, fish played a vital role in the nutrition of the people of the circum-Pontic area. It must be kept in mind, however, that the majority of archaeological contexts practically do not provide cases with the ability to define the type of halieutic activity and to assess whether fish were collected just for local inhabitants' consumption or for further sale.<sup>1</sup> This result is particularly valid for historical sites where no signs of a fish processing infrastructure have been found.

A total of 55 fish species mentioned in ancient literary sources were examined, of which 54 could be recognised, starting with the list of fish obtained from Ovid's *Halieutics*.<sup>2</sup> There have been taken into account, in addition to the information provided by Ovid, the main sources for ancient ichthyology (Aristotle, Aelian and Pliny the Elder) and Oppian's fishing treatise, and the sometimes-indirect mentions of

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<sup>1</sup> Шелов 1970, 186.

<sup>2</sup> For the complete list of fish species identified in literary sources, see Dumitrache 2022a, especially Table 1.

other authors, covering chronologically an interval between the 8<sup>th</sup> century BC (Hesiod) – the 16<sup>th</sup> century AD (Pierre Belon) (Fig. 1). Even if this temporal segment exceeds in both directions the chronology targeted by the study, such an approach was necessary in order to follow, on the one hand, the route of the information taken from one author to another, and, on the other hand, the constancy or hiatus recorded in the exploitation of the fish resource over time or variations in food habits. Last but not least, for a period or a space for which direct information is extremely scarce or even absent, we can intuit, by analogy, how things must have unfolded. The majority of literary sources give us broad descriptions of fish from the Black Sea, noting things like their biological characteristics,<sup>3</sup> behaviour, and migratory patterns (Fig. 2).<sup>4</sup>

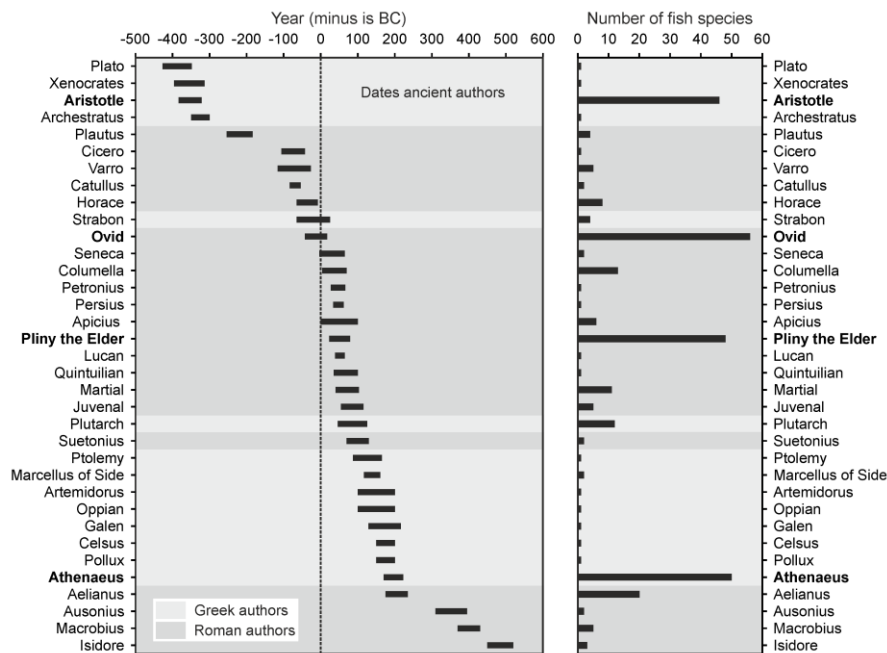


Fig. 1. The dates of ancient authors (left chart) and the number of fish species they described (right chart).

Anchovies, herring, sturgeon, sea roach, flounder, and mackerel are just a few of the many species whose bones archaeologists have discovered. The Olbia and Berezan bone remnants from the Dnieper and Bug estuaries, on the northern shore of the Black Sea, are the subject of the most significant study on the historic ichthyofauna in this region.<sup>5</sup> Sturgeon, pike, and catfish were mostly found in the material, according to an investigation of the samples, whereas carp and roach, despite being present in significant numbers, appeared to be of less. This, it appears, is a result of fish preferring to live in parts of rivers with slow currents.

It should be mentioned that a significant portion of sturgeon bones include information that may be related to the biology of these species.<sup>6</sup> These fish migrate and enter the rivers to spawn. In most rivers, there are two passages that occur simultaneously: spring and fall. Fish from the second migration hibernate in river pits and only reproduce in the spring of the following year. Stellate sturgeon and beluga are said to have been caught primarily all at once during spawning and wintering on the river, when the concentration of fish was fairly high and might have greatly increased catches.

A number of fish osteological samples were recently examined from the Argamum, Noviodunum, Halmyris, and Ibida sites.<sup>7</sup> The examined samples contained remains from small, medium, and large fish. Sturgeon (*Acipenser sp.*), carp (*Cyprinus carpio*), pike (*Essox lucius*), catfish (*Silurus glanis*), shad (*Stizostedion lucioperca*), and other Teleost fish remains were the principal fish species found. Similar data were obtained

<sup>3</sup> Munk Højte 2005, esp. 140-141.

<sup>4</sup> For the analysis of the ancient literary sources, see Peurière 2003; Dumitrache 2015.

<sup>5</sup> See Marepa 2017, 171 with bibliography.

<sup>6</sup> See Marepa 2017, 171.

<sup>7</sup> I express my gratitude to Daniel Malaxa, from the Institute of Archaeology of Iași, who provided me the results of the fish bones remains.

for some other sites located within the Deltaic area.<sup>8</sup> The contradiction is found in the discrepancies between the information gleaned from literary and epigraphic sources, which almost exclusively focus on marine fish, and the conclusions drawn from the examination of the osseous material. When compared to Argamum and Halmyris, where the strongholds were situated on the coast in ancient times, the results for Noviodunum and Ibida are not the same. This is because of their separate locations on the banks of the Danube, close to freshwater courses. (Map. 2)

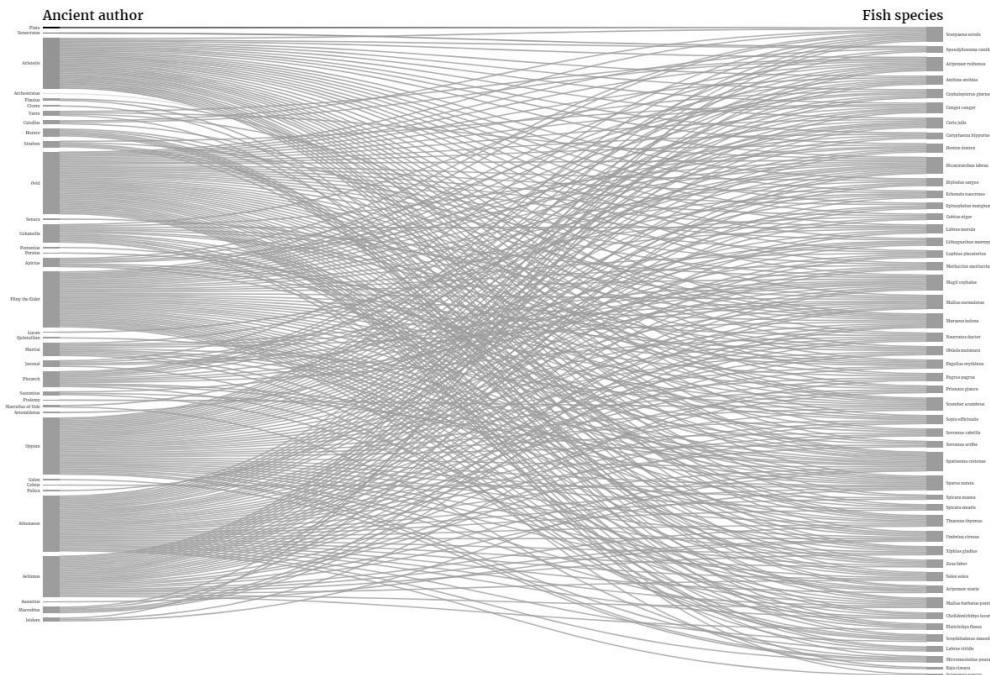
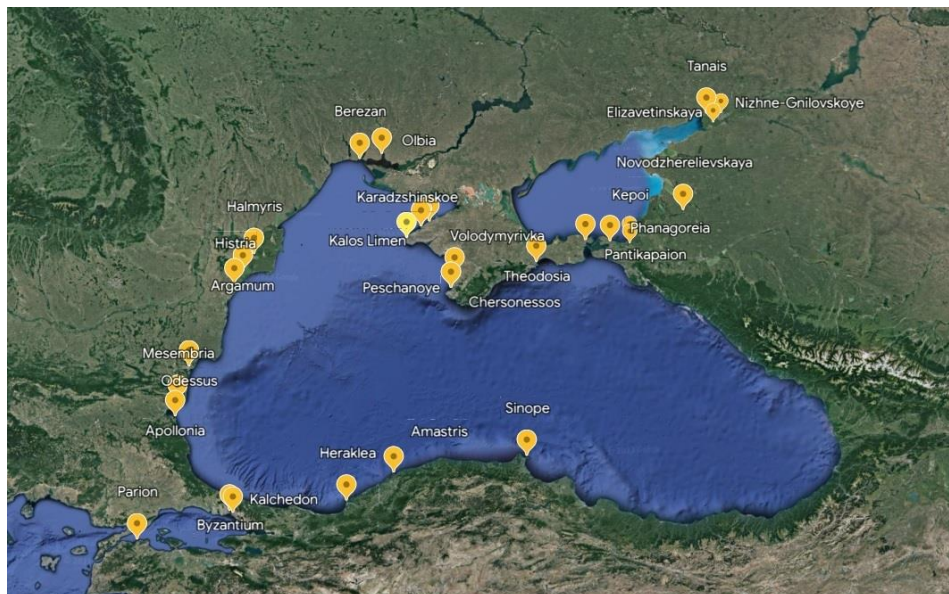


Fig. 2. Sankey diagram related to the number of fish species described by each ancient author.



Map 1. The main halieutic centres from the Black Sea basin.

Unfortunately, no assiduous attempt was made throughout the lengthy, meticulous excavations of almost every circum-Pontic site to wash or sift the entire earth from a chosen, tiny region. It would enable a thorough collection of samples from every variety of fish in every layer. The use of selective fishing would

<sup>8</sup> Haimovici 2003; Stanc 2009; Stanc et al. 2022 etc.



only get a thorough scientific justification after that. The list of exploited fish would have indubitably contained species of small fish, but selective fishing would have most likely been practised, given the percentages of discovered bone material.



Map. 2. Geographic location of the Scythia Minor and the ancient to modern shoreline along the western Black Sea coast (© Alin Mihu-Pintilie).

## TECHNOLOGY

The infrastructure needed for fishing was significant: boats, and the ability to repair them; iron or bronze hooks, ropes, access to lead or other raw materials for net weights, stone sinkers and anchors, net flotation devices, fabrication and maintenance of nets, animals to transport the fish, processing or retail facilities, and baskets or jars for carrying the catch.<sup>9</sup> It also needed the utilisation of the numerous different moles, as well as authorised access to the shoreline from which boats and nets might be sailed.

Some of these materials either required specialised production or were not readily available locally. As a result, craftspeople who worked in those industries and other productive and commercial networks were necessary connected to fishers. For instance, we should imagine that shipwrights manufactured fishing boats rather than actual fishermen and either sold them to the fishermen or to a third party fishing contractor.

However, the repairs were probably made by fishermen. We could suppose numerous interventions needed, that could reveal quite different degrees of craftsmanship than those used by the original shipwright. The possession of a boat, whether through ownership or a lease, was a sizable capital asset, therefore it was in the owner's best interest to maintain it in good condition and make the most of it.

<sup>9</sup> For the fishing techniques used on the Western shore of the Black Sea, see Antipa 1916, 12-21; Giurescu 1964, 43-52.

We may assume that a fisherman's boat would be used for fishing only during the seasons of the year when fishing was most effective. However, the boat would have been used or rented out for other forms of transportation in the summer and autumn.<sup>10</sup>

Of course, nets and sails were also necessary for fishing, and for this, linen was crucial. It appears improbable that the fishermen made their own nets or sails; instead, they probably bought them from weavers. Although linen nets are successful because they are undetectable to fish, they are also not very robust, necessitating periodic replacement. This suggests that there was a necessary connection between the fishing sector and linen weavers. Oppian's *Haliēntica* 3.83-84 provides a list of net-types:<sup>11</sup> ἀμφιβλήστρον (casting-net); γρῖφος (draw-net); γάγγαμον (drag-net); ὑποχή περιήγης (round bag-net); σαγήνη (seine net); κάλυμμα (cover net, perhaps with a fine weave); πέζα (ground-net); σφαιροῶν (ball-net); and σκολιὸς πᾶναγρος (crooked trawl).<sup>12</sup> Net repairs, like boat repairs, however, were probably done by the fishermen themselves.<sup>13</sup>

Some examples came from the Don Delta area. It seems that in some circumstances it was simpler for fishermen to drill one new hole or more in a damaged sinker than to look for a new stone suitable for producing a fully new tool for nets.<sup>14</sup> Studies on drilling holes in limestone have revealed that 3 mm of limestone can be spilled after using a flint point for three minutes. This means that the typical group may be drilled in around 20 minutes using a gilt that is roughly 2.0 cm thick.<sup>15</sup> This exclusion of cases of repair or recycling of any loads of other individuals is somewhat explained. First off, such a fix is possible on the fly. Furthermore, it was completed very rapidly. All sinkers built of amphora handles fall within the concept of reuse.

## LEGAL FRAME

One of the likely causes of Greek colonisation in the north of the Black Sea was the demand for fish, which may have started in the 7<sup>th</sup> century BC. From the Hellespont and other parts of the Pontus, including Bosphorus, Athens imported salted fish.<sup>16</sup>

Romans have valued Pontic goods since the 2<sup>nd</sup> century BC,<sup>17</sup> when Cato the Elder bemoaned the price of mackerel that would suggest that trade in salted fish from the Black Sea area in the Western Mediterranean was not fully developed or that only the most expensive kinds came from that region.<sup>18</sup> Pontic salted fish is listed by Polybius as one of the most expensive imports into Greece.<sup>19</sup> Contrary to other writers who speak broadly of Pontic goods, Horace specifically names Byzantium as an exporting city.<sup>20</sup>

As can be expected, the majority of information of the taxes applied on fishing can be deduced indirectly, either from literary sources or by drawing comparisons to specific official documents published outside of the subject matter.

The relatively modest number of sources compared to the time period they cover is the limitation of the overall examination of all of these sources. Additionally, as Egypt produced the majority of the documents in this category, they cannot be regarded as being representative of the entire Empire. We are dealing with many temporal, geographic, and metric units (including the capacity of cans for salted fish and fish sauces,

<sup>10</sup> Boetto 2010.

<sup>11</sup> Oppian, *Haliēntica*, 3. 83-84.

<sup>12</sup> Bekker-Nielsen 2002. See also Bekker-Nielsen 2005, 83-95; Bekker-Nielsen 2010, 187-204.

<sup>13</sup> Alciphron, *Letters*, 1, 7; 1.13: "here was abundance of fish and the chance of a good catch; but I had torn my seine and did not know what to do. I puzzled my brains like Old Harry and at last decided to go to Cash the money-lender and mortgage my boat to him for four pounds, so as to renew the net" (translated by F. A. Wright).

<sup>14</sup> Marepa 2017, 171.

<sup>15</sup> Marepa 2017, 171.

<sup>16</sup> Dumont 1976-1977, 117-118; Curtis 1991, 114.

<sup>17</sup> For the trade with salted fish from the Black Sea area, see Thompson 1931; Dumitrache 2022b.

<sup>18</sup> Polybius, 31.25.5.

<sup>19</sup> Polybius, 4.38.4.

<sup>20</sup> Horace, *Satires*, 2.4.63-66.

which is frequently unknown, as well as the circulation of money and the monetary standard in use here).<sup>21</sup> However, it must be remembered that Roman law was unitary; as a result, imperial edicts, for instance, were valid throughout the Empire. Fiscal legislation was also widespread in the sense that even in the absence of specifics, one may infer how customs constituencies are organised.

The circumstance of exemption from specific taxes that apply only locally, however, is unusual. Evidently, this is the case with Histria, where the *Chorothesia* of Laberius Maximus serves as one illustration of how adaptable the Roman legal system is, as well as with Olbia, which similarly enjoys fiscal immunity for the sale of some goods but whose nature is less precisely defined than in the case of Histria.

"Although the custom's circumscription lays to sea and your city is situated so far from the mouth of the river, your emissaries assured me, and the prefect Asiaticus told me that almost all of your city's revenue comes from selling salted fish, I decided that you keep your right of fishing in the Danube Delta without paying any fee". This is stated in the letters of the governor of Moesia at the beginning of the 2<sup>nd</sup> century AD.<sup>22</sup> The *Chorothesia* of Laberius Maximus demonstrates that Roman rulers did not improperly abuse their authority to deny privileges if they had already been approved by custom. The epigraphic folder has a number of significant meanings for our issue. The first is the claim that the city's primary source of income is salted fish, indicating that Histria's primary economic activity were fishing and fish processing.<sup>23</sup> Therefore, we take into account the abundance of the Danube Delta's halieutic resources as well as significant evidence of firewood used for fishing.<sup>24</sup> Of course, the existence of a significant halieutic activity inside the Histrian realm is the most crucial conclusion for my study.<sup>25</sup>

The state or the people whose land bordered the water typically had jurisdiction over the right to fish, particularly in lakes and rivers. There are numerous deeds of sale that show fishing rights were regarded as property that could be bought, sold, or inherited issued in Egypt.<sup>26</sup> Fish, like birds and wild creatures, were considered *res nullius* but susceptible to ownership by virtue of being captured, while the sea was recognised as common property.<sup>27</sup>

The idea that coastal waters were not subject to ownership claims can be traced at least as far back as Plato, who distinguished between the sea and harbours, rivers, marshes, and lakes.<sup>28</sup> While unrestricted access to rivers and lakes was guaranteed for navigational purposes, fishing was not included in these rights. The state or, in certain cases, temples were the owners of the fishing rights in the majority of lakes, rivers, marshes, canals, and even ports.

Even if, as Lytle has claimed, the open sea could not be owned (and access to it was consequently rented), the sea's products were undoubtedly taxed. While fishermen had unrestricted access to the sea, this right in no way guaranteed that their catch would have free access to the market,<sup>29</sup> according to the evidence of a customs house built in Ephesus between 54 and 59 AD by those working in the fishing industry. On the other hand, taxes were levied against the value at wholesale of the catch.

An inscription from Parion, from the Sea of Marmara,<sup>30</sup> dating from the 1<sup>st</sup> to 2<sup>nd</sup> centuries AD, is the most significant epigraphic record that provides details about the organisation of large-scale fishing in the

<sup>21</sup> Duncan-Jones 1974, 9. See also, for the fish taxation in Egypt, Wallace 1938; Sijpesteijn 1987, especially 62; Temin 2006; Dumitrache 2011.

<sup>22</sup> *ISM I*, 68, l. 15-27.

<sup>23</sup> Bounegru 2013, 76; Oliver 1975.

<sup>24</sup> Oliver 1975.

<sup>25</sup> See also Dumitrache 2021, 74-75.

<sup>26</sup> P. Mich. V 274-275; for the fiscality of fish and fishing in Egypt, see also Kloppenborg 2018.

<sup>27</sup> Lytle 2012, 4. See also Marzano 2013, 235-242.

<sup>28</sup> Plato, *Leges* 7.824c.

<sup>29</sup> I.Eph. 20.

<sup>30</sup> I.Parion 5: ἐπὶ ἱερέως Καίσαρος [. . . ca.4 . . .] Λευκίου Φλαβίου ἰ τὸ δεύτερον, οἱ δικτυαρχήσαντε[ς] καὶ τε[λων]α[ρχ]ήσαντες ἐν τῷ Νε[ι]λαίῳ, ἀρχωνοῦντος Ποπλίου Ἀουίου Λυσιμάχου, δικ[τ]υαρχούντων Ποπλίου Ἀουίου ἢ Λυσιμάχου, Ποπλίου Ἀουίου Ποπλίου υἱοῦ Ποντικοῦ, Μάρκου Ἀπικίου Κουαδράτου, Ἐπαγάθου τοῦ Ἀρτεμιδώρου, ἢ Ποπλίου Ἀουίου Βεΐθουδος, σκοπιαζόντων Ἐπαγάθου ἢ τοῦ Ἀρτεμιδώρου, Ποπλίου Ἀουίου Βεΐθουδος, κυβερνήτων Σεκο[ύ]νδου τοῦ Ἀ[ο]υίου Λυσιμάχου, Τυβελλίου Λ[.] ἢ ΛΑΙΤΟΥ, φε[λ]λο[χ]αλαστοῦντος Τονγιλίου Κόσμου, ἐρη[μ]ερεύοντος Κασσίου Δαμασίππου, ἀντιγραφομένου Σεκο[ύ]νδου τοῦ Ἀ<ο>υίου

Black Sea area. The lease of a fishing spot, the existence of a partnership with more than thirty individuals, the organisation of fishing, and the delegation of tasks in accordance with a predetermined hierarchy are all attested in the document. The size of the operations associated to the capture of mackerel and tuna during the seasonal migration in the Sea of Marmara (minimum five boats with a crew of 5-7 men; the presence of an accountant and a financial controller) suggests fishing related to processing.

If true, Lytle's proposed translation of a text omission as τε[μαχ]α[ρχ]ήσαντες (masters of fish-salting operations)<sup>31</sup> would show that the commercial partnership confirmed by this inscription was established especially for the shared goal of fishing and salting fish. Given their prominent placement at the top of the inscription and the fact that a boat captain is the son of a net owner, net owners certainly outnumber boat owners. These technical services appear to be the same as the ε[λων]α[ρχ]ήσαντες, the 'tax administrators' or even the 'main contractors'. The clear conclusion seems to be that they are accountable to both the association's members and the authorities in charge of collecting the revenue for paying a tax or fishing tax. A 2<sup>nd</sup> century inscription<sup>32</sup> mentioning a *manceps* acting on behalf of the 'fishing contractors' (*conductores piscatus*) offers an analogy.<sup>33</sup> The second possibility, which does not rule out the first, is that the tax will be assessed as a tax on the net itself rather than a portion of the catch, in which case the net owners would naturally be responsible for its payment. Again, the distinction between land and marine duties suggests that each participant is entitled to a portion of the common catch. The catch was likely divided and sold shortly after landing because the association has a designated member for practically every conceivable task, but none is in charge of gutting, chopping, or preserving the fish.

The profitability of fishing, the relative economic or social standing of fishermen, and, more broadly, the organisation of the fishery in the Black Sea region in the early centuries AD remain unanswered in the absence of additional information regarding fishing. At this point, there is a wealth of additional information from Egypt—pretty much the only evidence we have—that paints a fairly detailed picture of fishing, fishermen, fish prices, and the structure of the industry.

In an Oxyrhynchus papyrus record, a piece of a fishing ledger from the Roman era has been preserved.<sup>34</sup> The affiliation of freshwater fishermen is mentioned, but it can also provide insight into sea fishing. The paper lists the earnings from each net cast and breaks down income and expenses over a three-week period. In this instance, the association is in charge of the entire process, from fishing to turning the catch into *tarichos*, salted fish. The fish designated for processing comes not from the last cast of the day, but is rather the result of a certain cast, sometimes even the first. Additionally, we see that after several days in a row with good catches, no fish were assigned to *taricheia*. The salting vats were likely full since no fish was being processed in the fish tank.

Even if many specifics elude us, there are certain broad generalisations that can be made. The catch-to-catch variety and the intricate accounting procedure both suggest that a net is employed, and that it is a vast net that needs several hands. Approximately 8% of the profits are set aside for *theagos*, which has been translated as a lease charge for fishing privileges or as a rent for the use of boats. Although freshwater and marine fishing cannot be directly compared, similarities between Parion and Oxyrhynchus show that the two fishing groups were set up in a similar manner.

It is certain that the Pontic region has engaged in extensive fisheries and has consumed a significant amount of fish during practically all periods of its history. More cutting-edge studies on the subject of fishing are still needed concerning fish export or its potential scale and the fish trade's direction. At the moment, the size of the source base only allows for building more or less believable hypotheses.

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Λυσιμάχου, λεμβαρχ[ού]ων Ασκλη[πί]δου τοῦ Ασκληπίδου, Ἐρμαίσκου τοῦ Ἀλουίου Λυσι[μά]χου, Εὐτύχου τοῦ Ἀλούϊου Βεΐθουδος, Ἰ Μεγάνοδ[ρου τοῦ] Λευκίου, Πάροου τοῦ Ασκληπιάδου, συνναῦται.

<sup>31</sup> Lytle 2006, 87.

<sup>32</sup> *CIL* XIII, 8830.

<sup>33</sup> Marzano 2018, 440.

<sup>34</sup> P.Oxy. 3495.

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