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**Fishing and Greek colonisation in the Black Sea during  
Antiquity, International congress, Aix-en-Provence  
(3th-4th June 2021) - Aix-Marseille University / CNRS  
/ Centre Camille Jullian/ Musée du Louvre**

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# International Congress

Maison méditerranéenne des sciences de l'Homme  
5, rue du Château de l'Horloge, Aix-en-Provence

Conference room Georges DUBY, Building B



## 3-4 June 2021





## SCIENTIFIC PURPOSES

According to Polybius (IV, 38), goods exported from the Black Sea included salted fish, suggesting that fishing played an important role in the colonisation process along the Pontic shores, possibly from a very early date (Dupont 2007). However, in addition to the question of the containers used for this trade, raised by J. Lund (2005) and V. Gabrielsen (2005), there is also the issue of eventual discrepancies between sources and archaeological data. Perhaps due to the haphazard preservation of archaeological structures, or simply to a geographic imbalance in research, studies have until now revealed evidence of fish drying and salting mainly in the northern Pontic region, during a period that came after the testimony of Polybius.

Nonetheless, careful analysis of ancient sources reveals the full range of complex factors involved in fishing in a region where species were zoned and subject to seasonal migration. A dichotomy between northern and southern Black Sea coasts, in addition to the distinctive characteristics of the deltas punctuating the north and northwest shores, may have had an impact on the resources produced, as enlightened by the Franco-Romanian archaeological mission around Orgame at the settlements of the Golovita lagoon (Baralis *et al.* 2017). Varied local resources, such as highly migratory species, may indeed explain different fishing management strategies, which in turn would have shaped local and regional exchange networks, including those stretching over greater distances to connect Pontic colonies with the Aegean world.

Some fifteen years after the very promising symposium held at the University of Aarhus (2003), it is time to re-examine this key issue for the understanding of the colonial process in the Pontic region, particularly in light of the recent synthesis by T. Bekker-Nielsen (2016) and the latest studies carried out in the northern Black Sea region and Danube delta. The goal of this symposium is to shed light on the latest data, with a special focus on regional specificities resulting from the characteristics of species exploited within the perimeters of each site, in accordance with the aims of ichthyofaunal studies. Such research does sometimes produce results that contradict textual and epigraphic data, opening up new avenues for the analysis of local networks, where the participation of local populations has not always been taken into account (Gavriljuk 2005). In the framework of the research programme on the Greek colonisation in the Black Sea area (Musée du Louvre -Centre Camille Jullian, CNRS-Aix-Marseille University), we would like to bring together ichthyofaunal analyses, studies or reinterpretation of production structures and publication of archaeological material linked to fish exploitation and trade, all too often neglected and more often than not left unpublished. Through these various contributions, we wish to enrich the debate around fish-related trade and its potential role in Greek colonial process in the Black Sea and the Straights.



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# PROGRAM

## Thursday 3<sup>rd</sup> June 2021

**9h** – Welcome Address **Giulia Boetto** & **Jean-Paul Morel** (Centre Camille Jullian, Aix-Marseille University, France)

### **9h30** – Introduction

**Alexandre Baralis** (Musée du Louvre, Paris, France) & **Myriam Sternberg** (Centre Camille Jullian, Aix-Marseille University, France)

*Why is there a need to reconsider data about fishing activities in the Black Sea during Antique period?*

## **I. Fish resources, past and current ecosystems in the Black Sea**

Chairman: **Jean-Christophe Sourisseau** (Centre Camille Jullian, Aix-Marseille University, France)

**9h45** – **Tonnes Bekker-Nielsen** (University of Southern Denmark)

*The Black Sea in the Mediterranean economy*

**10h10** – **Violin Raykov** (Institute of Oceanology, Marine Biology and Ecology, Bulgarian Academy of sciences, Varna, Bulgaria)

*Challenges and opportunities for sustainable Black Sea fisheries*

**10h30** – **Arturo Morales & Eufrasia Rosello-Izquierdo** (Laboratory of Archaeozoology, Autonomous University of Madrid, Spain)

*Fisheries and Greek colonisation in Northern Black Sea: state of the ichtyo-archaeological evidence*

**10h50** – Questions

**11h15** – Coffee break

## **II. The South-Western coast of the Black Sea: the Pontic Thrace**

Chairman: **Jean-Christophe Sourisseau** (Centre Camille Jullian, Aix-Marseille University, France)

**11h30** – **Nayden Prahov** (National Archaeological Institute with Museum, Bulgarian Academy of Sciences, Program Director of *Balkan Heritage* Foundation, Sofia, Bulgaria), **Kalin Dimitrov** (National Archaeological Institute with Museum, Bulgarian Academy of Sciences, National Center for Underwater Archaeology, Sozopol, Bulgaria), **Pavel Georgiev** (National Center for Underwater Archaeology, Sozopol, Bulgaria)

*Ancient artificial harbour facilities along the Bulgarian Black Sea coast*

**11h50** – **Nicolas Morand** (Royal Belgian Institut of Natural Sciences, Belgium), **Teodora Bogdanova** (Municipal cultural center, Sozopol, Bulgaria), **Maguelone Bastide** (ArchMGr-Si, Université Paris Nanterre, France)

*Fishing in Thrace: new insights from the Early Iron Age period at the settlement of Malkoto Kale (Sozopol, Bulgaria)*

**12h10 – Dimitar Nedev & Teodora Bogdanova** (Municipal cultural Center, Sozopol, Bulgaria)

*Archaeological data on fishing and the exploitation of fishery resources in Apollonia Pontica (6<sup>th</sup>-2<sup>nd</sup> c. BC)*

**12h30 – Kalina Yordanova** (National Museum of History, Sofia, Bulgaria) & **Nayden Prahov** (National Archaeological Institute with Museum, Bulgarian Academy of Sciences, Program Director of Balkan Heritage Foundation, Sofia, Bulgaria)

*The crustacean on Apollonia Pontica's coins: a hidden marine creature, lost marine knowledge and practices*

**12h50 - 13h10** – Questions/Discussion/Debate

**13h10 - 14h30** – Lunch Break

### III. The North-Western Coast of the Black Sea: The Danubian Delta and the Shore of Dobruja

Chairman: **Alexandru Avram** (Le Mans University, France)

**14h30 – Alexandra Bivolaru, Christophe Morhange** (Cerege, IMBE, Aix-Marseille University, France), **Valérie Andrieu Ponel** (Mediterranean Institute of Biodiversity and Ecology, Aix-Marseille University, France) & **Valentin Bottez** (University of Bucharest)

*Geomorphological evolution of the distal lagoons of the Danube delta and reconstruction of ancient environments*

**14h50 – Alexandre Baralis** (Musée du Louvre, Paris, France) & **Vasilica Lungu** (Institute of South-Eastern European Studies, Romanian Academy, Bucharest, Romania)

*Colonising a marshy area: the settlements of the Northern chôra of Istros*

**15h10 – Myriam Sternberg** (CNRS, Centre Camille Jullian, CNRS-Aix-Marseille University, France)

*Fishing in the Southern Danube Delta: a focus on the Caraburun-Acic Suat settlement based on archaeo-ichthyofaunic data*

**15h30** – Questions

**15h45** – Coffee break

**16h – Alexandru Nicolaie** (Archaeological Museum of Callatis, Mangalia, Romania) & **Smaranda Andrews** (Iowa State University, USA)

*Watercourses of ancient times in the territories of the cities of Kallatis, Tomis and Histria*

**16h20 – Gabriel Mircea Talmatchi & Irina Sodoleanu** (National Museum of History and Archaeology, Constanța, Romania)

*New data on fish fauna found in the Western Pontos Euxeinos, indicated by specially cast monetary signs used for exchange purposes (6<sup>th</sup>-5<sup>th</sup> c. BC)*

**16h40 - 17h** – Questions/Discussion/Debate

## Friday 4<sup>th</sup> June 2021

### IV. The Northern Black Sea: Bug, Dniepr, Crimea and Azov Sea

Chairman: **Tønnes Bekker-Nielsen** (University of Southern Denmark)

**9h10 – Dmitry Chistov** (State Hermitage Museum, Saint Petersburg, Russia)



*Fishing and fishing sinkers of the archaic Berezan settlement*

**9h30 – Yevheniia Yanish** (I. I. Schmalhausen Institute of Zoology, Kiev, Ukraine) & **Alla Buyskikh** (National Institute of Archaeology, Ukrainian Academy of Sciences, Kiev, Ukraine)

*Fisheries in the Northern Black Sea region on the example of Olbia and synchronous settlements*

**9h50 – Martina Čechová** (Institute of Slavonic Studies, Czech Academy of Sciences, Czech Republic)

*Fishing and fish processing as resource of prestige and wealth: the case of Crimean Chersonesos in Late Antiquity/Early Middle Ages*

**10h10 – Alexander Butyagin** (State Hermitage Museum, Saint Petersburg, Russia)

*The foundation of the “small cities” of the Bosphorus and fishing (based on Myrmekion investigations)*

**10h45** – Questions

**11h** – Coffee break

**11h20 – Marina Vakhtina & Aleksey Kasparov** (Institute for History of Material Culture, Russian Academy of Sciences, Saint Petersburg, Russia)

*Fishing in Porthmion, a Bosphorean town near Kerch Strait (according excavations of 2005-2013)*

**11h40 – Urszula Iwaszczuk** (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences, Warsaw, Poland), **Marcin Matera** (Faculty of

Archaeology, University of Warsaw, Poland) & **Denis Bunin** (Vladimir State University, Russia)

*Fishing on the border of the ancient world: natural conditions for fishing and their influence on the exploitation of local resources in Tanais*

**12h – Emzar Kakhidze** (Shota Rustaveli State University, Batumi, Georgia)

*Fishing on the Eastern Black Sea area coast in Classical Period: archaeological data found at Pichvnari*

**[Poster] – Alik Gabeliia** (Abkhazian State University)

*The ecological and geographical situation in Abkhazia in the ancient era: issues related to the development of fisheries*

**12h20 - 12h40** – Questions/Discussion/Debate

**12h40 - 14h** – Lunch break

## **V. The Southern Black Sea area: the Pontos region**

Chairman: **Arturo Morales** (Autonomous University of Madrid)

**14h – Mustafa Zengin** (Central Fisheries Research Institute, Trabzon, Turkey)

*Historical Adventure of Bonito (Sarda sarda) in the Black Sea from Ancient Times to the Present*

**14h20 – Owen Doonan** (California State University - Northridge, USA) & **Hüseyin Vural** (Archaeological Museum, Sinop, Turkey)

*Evidence for incipient fishing in Black Sea mariculture from Bronze Age and Iron Age Sinope*

**14h40 – Claire Barat** (Polytechnic University of Hauts-de-France, Valenciennes, France)

*Fishing resources and Greek colonisation at Sinope*

**15h – Ayşe F. Erol** (Hacı Bayram Veli University, Ankara, Turkey)

*Fishing equipment obtained from Fatsa/Cingirt Kayası excavations in the Southern Black Sea region*

**15h20 – Questions**

**15h35 – Coffee break**

## **VI. Techniques, Commercial and Exchange networks**

Chairman: **Arturo Morales** (Autonomous University of Madrid)

**15h50 – John Brendan Knight** (University of Liverpool, United Kingdom)

*Fishing and Migration Processes in the Black Sea*

**16h10 – Stéphane Lebreton** (University of Artois, Arras, France)

*Fisheries activities: an ethnographic entry*

**16h30 – Pierre Dupont** (ArAr, Maison de l'Orient et de la Méditerranée, Lyon, France)

*Fishnet-watchers around the Pontic area and Propontis*

**16h50 – Stefania Gallota** (University of Basilicata, Potenza, Italy)

*The Tax system for fishing trade in the Black sea: a new perspective*

**17h10 – Questions/Discussion/Debate**

**17h25 – Conclusion**

**Arturo Morales** (Laboratory of Archaeozoology, Autonomous University of Madrid, Spain)

**Saturday 5<sup>th</sup> June 2021**

**9h15 –13h:** Visit to the Museum of History and the Museum of Roman Docks (Marseille): **cancelled**





## PRACTICAL INFORMATION

### Lunches

**Thursday 3<sup>rd</sup> June 2021**

**13h – 14h** self-service restaurant of the MMSH (building B, 1st floor)

**Friday 4<sup>th</sup> June 2021**

**13h – 14h** self-service restaurant of the MMSH (building B, 1st floor)

### Dinners

**Thursday 3<sup>rd</sup> June 2021**

**20h** Restaurant: Place to be specified

### Optional excursion

**Saturday 5<sup>th</sup> June 2021**

**cancelled**



# SESSION I

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**Thursday 3<sup>rd</sup> June 2021**

## **Fish resources, past and current ecosystems in the Black Sea**

# BEKKER-NIELSEN Tønnes

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Senior lecturer in Greek history, Department of History (*University of Southern Denmark, Odense, DENMARK*)

## The Black Sea in the Mediterranean Economy

**Key-words:** spheres of exchange, amphorae, transport, reciprocity, salting

Studies of trade networks in the Black Sea have traditionally been focused on the 'big three' of the ancient economy: grain, wine and olive oil. Trade flows of these commodities are easily traceable in the source material: grain exports from the Black sea to Athens are frequently mentioned in the textual sources, while the trail of discarded amphorae permits us to track the flow of wine and oil into, and across, the Black Sea.

Other important Pontic export commodities – the 'next three' – were timber, slaves and processed fish. The first two are often mentioned in the textual sources (e.g., the Scythian slaves who served as a police force in Athens). The trade in fish products (salted fish and garum) is occasionally mentioned in the texts, but the archaeological evidence seems self-contradictory. Extensive fish-salting installations have been excavated along the northern Black Sea coasts, but the numbers of amphorae finds associated with the finished product are negligible by comparison.

Furthermore, while fish were abundant in the northern Black Sea, environmental conditions (brackish water, lower solar angle) were not suited for production of salt, copious amounts of which were required to process the fish. *A priori*, north Pontic salteries were at a disadvantage compared to the fish-salters of the Straits or of the Aegean.

This paper attempts to trace the dynamics of the Black Sea trade over time and proposes a model that will explain some of the apparent contradictions in our present evidence, using the 'spheres of exchange' model of Paul Bohannan and Maurice Bloch. The export of fish products from the Black Sea was not driven by Aegean demand for fish products, but by the demand for prestige goods such as oil and Aegean wine among the Pontic elite: exports were needed to pay for imports, and to balance a decline in the volume of another major export commodity – slaves – over time, the volume of Pontic fish-salting had to be increased, regardless of its economic competitiveness.

It is also proposed that fish products were not as a rule exported by Pontic merchants, but acquired at the production site by Aegean fish packers, a business model not unlike the Italian mercanti di campagna of the nineteenth c. This could explain the scarcity of Pontic fish sauce amphorae in the archaeological record.

# RAYKOV Violin

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Associate Professor, Institute of Oceanology, Marine Biology and Ecology (*Bulgarian Academy of Sciences, Varna, BULGARIA*)

## Challenges and opportunities for sustainable Black Sea fisheries

**Key-words:** Black Sea, ecosystem, fisheries, evolution, challenges

Fishing is an important economic activity throughout the Black Sea. First sale value of Black Sea landings is US\$629 million. Economic impact of fisheries may be as much as 2.6 times the reported landing value.

In line with an ecosystem approach to fisheries, any attempt at adopting sustainable fisheries should involve ensuring the conservation of marine species whose populations' survival can be directly and indirectly affected by fishing. About 85% of assessed stocks are fished at biologically unsustainable levels, and the overall level of overfishing is around 2–3 times of FMSY. Fish population processes are complex and their understanding requires a multidisciplinary approach. Present-day fisheries management aims to optimize exploitation rates to achieve management objectives in the context of an ecosystem approach. This requires that models used for assessment and prediction integrate ecosystem processes with traditional population dynamics. The incorporation of oceanographic information and modern molecular techniques provides an opportunity to integrate physical environmental variables and genetic information, which together with GIS informational tools, has the potential to provide a flexible modeling approach to stock delineation. In both the Mediterranean and Black Seas, the effect of fishing can be exacerbated by the ongoing rapid warming trend, which is believed to act synergistically with fisheries exploitation. For all these reasons, the development of the EAF in the Mediterranean and Black Seas is considered a priority. Despite the increasing use of microsatellites and mitochondrial DNA-based markers in fishery research over recent decades, the gains in discrimination power afforded by the combination of different genetic markers to address complex processes, e.g. distribution shifts, population expansions in response to climatic fluctuations, overfishing and fishery collapses, has still not been widely realized in current fishery research tasks. Molecular markers are essential in determining genetic variation and biodiversity with a high degree of accuracy and reproducibility. High genetic diversity is key to the survival of fish populations, increasing their resistance to various stressors on the environment (eg. climate change, contaminants, and pathogens). The main issues related to the sustainable Black Sea fisheries are addressing the decreasing and fluctuating catches; to mitigate pollution and the effect of alien species; to decrease incidental catches of vulnerable species and to improve cooperation between riparian states.

# MORALES-MUNIZ Arturo, ROSELLO-IZQUIERDO Eufrasia

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Professor of Zoology, Director of the Laboratory of Archaeozoology (*Autonomous University of Madrid, SPAIN*)

Professor of Zoology, Laboratory of Archaeozoology (*Autonomous University of Madrid, SPAIN*)

## **Fisheries and Greek Colonisation in the Northern Black Sea: state of the Ichthyo-archaeological evidence**

**Key-words:** Fishes, classical antiquity, byzantine, northern Black Sea, fishing

In this presentation, an overview of the fish remains from archaeological sites of the Northern Black Sea region in the period from the VII<sup>th</sup> c. BC to the XIII<sup>th</sup> c. AD is undertaken. The sample is extremely heterogeneous and includes data from excavations from Russian authors that started in the XIX<sup>th</sup> c. and others mainly from the Bosphoran Kingdom carried out in the 1940s and 1950s as well as data from recent excavations that research centers from outside and inside Russia carried out at the beginning of the XXI<sup>st</sup> c. Data on the biology and features of the fish species reported are incorporated in an attempt to get a better grasp of the cultural (economic) meaning of the fish assemblages, and a comparative overview is attempted in order to find hints of spatial or diachronic patterning that might explain additional features of the fish assemblages. Although still on an incipient level of analysis despite the effort placed on these materials for almost 150 years, the data suggest that one of the major targets of this fishing, the marine taxa –in particular the clupeid fishes- is still lacking reliable material evidence. Until this sector is systematically analyzed, the impression is that what we are seeing in the archaeological record are often the features of a local (i.e., non-commercial) fishery that apparently focused on brackish and freshwater species that remains essentially stable for the period under consideration and does not hint at the features of the presumably “industrial” fishing activity that for so many centuries coexisted with it.



## SESSION II

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**Thursday 3<sup>rd</sup> June 2021**

# **The South-Western coast of the Black Sea: the Pontic Thrace**



# **PRAHOV Nayden, DIMITROV Kalin, GEORGIEV Pavel**

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Assistant Professor, National Archaeological Institute with Museum, Bulgarian Academy of Sciences, Program Director of Balkan Heritage Foundation (*BULGARIA*)

Assistant Professor, National Archaeological Institute with Museum, Bulgarian Academy of Sciences and Director of the Center for Underwater Archaeology (*Sozopol, BULGARIA*)  
Archaeologist, National Center for Underwater Archaeology (*Sozopol, BULGARIA*)

## **Ancient artificial harbour facilities along the Bulgarian Black Sea coast**

**Key-words:** Harbour facilities, ancient coastal cities, submerged ancient monuments, Apollonia pontica, Mesambria

In 1964 Goranka Toncheva, a Bulgarian underwater archaeologist, publishes her popular science book *Submerged Harbours*. In the volume she summarizes the underwater archaeological surveys and discoveries that her team made along the Northern and Southern Bulgarian Black Sea Coast. She describes several artificial facilities found underwater that she associates with ancient harbours. They are linear structures made of clustered stones, most probably jetties. Such have been discovered in the aquatories of Sozopol, ancient Apollonia pontica, Varna, ancient Odessos, Kavarna, ancient Byzone. The jetties near Sozopol were described also in a publications by other authors in the 1980-s. The later underwater surveys though don't confirm these observations what puts under question their validity.

The recent underwater surveys (2017-2019) in the aquatory of Nesebar, ancient Mesambria, revealed massive linear stone structures from the Northern and South-Eastern side of Nesebar Peninsula. Their construction reminds quite much to the jetties described by G. Toncheva and it is very probable that they have been part of Mesambria's harbour facilities.

The presentation will discuss the artificial harbour facilities along the Bulgarian Black Sea Coast in the light of the recent underwater surveys and discoveries and of the publications of several pioneers of the Bulgarian underwater archaeology. The recently recorded submerged fortification walls and stone breakwaters of Mesambria will be presented. Special attention will be paid to the harbours of Apollonia pontica and Mesambria.

# GYUZELEV Martin, ORACHEV Atanas

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DSc Associate Professor, University "Prof. Dr. Assen Zlatarov" (*Burgas, BULGARIA*)

Curator, Anchor Museum (*Ahtopol, BULGARIA*)

## Excused

### Sea-Fishing and Fishing Tools on the Black Sea Coast

**Key-words:** Sea-fishing, Black sea, Antiquity, fishing devices

Various fishing devices and tools (such as harpoons, fishing net weights, clay sinkers, different types of fishing nets, hooks, etc.), anchors, transportation vessels, vessels for fish preparation and consumption as well as coins and other finds connected with sea-fishing and fishing-related beliefs and superstitions, are kept at the coastal museums in Bulgaria (mainly the Museum in Sozopol and Anchor History Museum in Ahtopol).

Nearly all the fishing tools known to us today were invented as early as the appearance of the first occupations (cattle-breeding and agriculture) in the Neolithic Period (7<sup>th</sup>-6<sup>th</sup> millennium BC) and the settlement of the population at permanent settlements. The Greek settlers were the first who began catching fish for economic (export) purposes and the ancient writers provided a lot of information about different species of Black Sea fishes, manner of their fish-catching, their taste and migrations: it was Aristotle who gave a very detailed account of fish migrations, we know from the mentioned sources that Byzantium had become the most prominent centre of belted bonito catch, and that mainly Thracian fishermen did fishing in the Bosphorus Strait during the Roman Period. Unlike the Hellenes, the Thracians also caught dolphins in huge quantities as dolphin fat was used in leather-working.

The manners of fish-catching and cooking are described by Oppian in his work titled "On Fishing". The processing of sturgeon, belted bonito, mackerel and anchovy for the needs of the market was priced high. For example, the price of one amphora of preserved Black Sea fish (anchovy) in Rome was 300 drachms. The fish were "salted" in pithoi and special *cetaria* and exported by sea in amphorae and other vessels.

In the following periods the fishing tools, fish processing and fish markets remained basically unchanged. Regarding fishery and trading in the Black Sea region in general, Ottomans accepted the Byzantine law as evidenced by the port and market "licence fees" (baç) that have remained in use till present.

**MORAND Nicolas, BOGDANOVA Teodora,  
BASTIDE Maguelone**

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Curator, Municipal cultural center (*Sozopol, BULGARIA*)

PhD student, ArchMGr-Si, Université Paris Nanterre, (*Nanterre, FRANCE*)

**Fishing in Thrace: new insights from the Early Iron Age  
period at the settlement of Malkoto Kale  
(Sozopol, Bulgaria)**

**Key-words:** Fishing, Thrace, Early Iron Age

# NEDEV Dimitar, BOGDANOVA Teodora

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Director, Municipal cultural Center (*Sozopol, BULGARIA*)

Curator, Municipal cultural Center (*Sozopol, BULGARIA*)

## **Archaeological data on fishing and the exploitation of fishery resources in Apollonia pontica (6th-2nd c. BC)**

**Key-words:** Apollonia pontica, fishing activities, fishing tools, trade

The development of the *polis*, during the considered period, is directly dependent on the exploitation of the rich natural resources of the region and the possibilities for their realization on the Mediterranean markets. Through the Hellenic colonization, a new civilization model was introduced into the economic structure of Apollonia, related to the promotion of urban culture in Thracian environment.

The main sources of wealth, that shape the specifics of the local economy, are metallurgy, salt production, timber and handicraft productions. Given the limited amount of fertile land, the traditional for ancient society agriculture is losing ground. In this context, the sea becomes a prime source of livelihood for the population. Convenient and naturally protected ports favor the development of shipping and maritime crafts, related to the exploitation of available fisheries resources.

The subject of this study is fishing and exploitation of fishery resources, as one of the important aspects in the socio-economic development of the *polis* and the near controlled area along the coast, north of Cape Antheia (present day Atia) and south to Cape Urdoviza (present day Kiten). In the area, several large settlements – ports, functioning as fishing centers and trade factories, have been registered along the route of seasonal migration of passage fish.

Given the lack of direct historical and epigraphic sources, regarding fishing and trade with fish in Apollonia pontica and the region, the study is based mainly on the results of archaeological excavations and analysis of the discovered artifacts.

The systematization of archaeological materials, found in the waters of the Sozopol Bay, in urban environment and in necropolis context, is presented in three main groups, according to their functional characteristics. First of all, these are stone anchors and lead stocks, associated with vessels with low displacement, intended for fishing. Secondly, fishing gear - ceramic and stone weights for nets, bronze needles for knitting nets, bronze fishing hooks of different sizes, all of them dated in a wide chronological range, which implies the sustainability and conservatism of traditional fishing techniques (fishing with nets, baskets and fishing rod). The third group is

represented by numerous finds of fish plates and grills, found in both residential and necropolis contexts, which testify for the high consumption of different types of fish and its importance in burial and post-burial rituals.

This topic is an attempt to reconstruct fishing and the use fish, based on empirical material, which are inherently sustainable and conservative, preserved to this day.

# YORDANOVA Kalina, PRAHOV Nayden

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Keeper, National Museum of History (*Sofia, BULGARIA*)

Assistant Professor, National Archaeological Institute with Museum, Bulgarian Academy of Sciences and Program Director of Balkan Heritage Foundation (*Sofia, BULGARIA*)

## **The crustacean on Apollonia pontica's coins: a hidden marine creature recalling lost marine knowledge and practices**

**Key-words:** Crustacean symbol, coins, Apollonia pontica, interdisciplinary approach

The crustacean is one of the first symbols that appeared on Apollonia pontica's silver coins along with the main parasemon - the anchor on most of the coin types and variants of city's coinage until its Roman conquest. The anchor, which appears on all known silver and bronze coins, in the period considered, has been associated with the city's harbor, known as the best one along the Southern Black Sea coast. It is also the first protected shelter on the sailing route from Bosphorus northwards. The symbol of crustacean is not very clear and has different explanation – some scholars interpreted it as a freshwater crayfish, other - as a lobster.

The aim of this presentation is to introduce another hypothesis. The origin of the image of the crustacean could be associated with Upogebia, a genus of decapod mud shrimps, most probably of the *Upogebia pusilla* (or *litoralis*) species. These marine creatures are quite common for the Black Sea coast, as well as for the Mediterranean and the European coasts of the Atlantic Ocean. Nowadays *Upogebia pusilla* is widespread throughout the Burgas gulf as well as the aquatory of Sozopol, including Gradina bay, where its population is quite dense. These shrimps resemble quite much to the crustacean engraved on Apollonia's coins. But why *Upogebia*? *Upogebia* usually inhabits protected coastal areas, silty sands or sandy silt bottoms, usually gulfs, hidden in shallow protected by winds and waves, where wave action can't affect their tunnel system i.e. places suitable for harbor. That is why this crustacean is an ideal allegory for a harbor – the symbol of Euxine Apollonia. The combination of the anchor and the crustacean probably represent the harbor's sea bottom. In this case the anchor is not “reversed” (something which wasn't clearly explained by researchers), but is laying on the seafloor along with the *Upogebia*. This composition represents a view from above, from the sea surface to the bottom.

Although nowadays *Upogebia pusilla* is quite widespread along the Bulgarian Black Sea coast it is unknown species for the local fishermen. The reason is that it lives in underground tunnels and goes out for food only during the night. So how the ancient mariners from Apollonia knew about it? In the current presentation some hypothetical explanations are exposed.





## **SESSION III**

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**Thursday 3<sup>rd</sup> June 2021**

**The North-Western Coast  
of the Black Sea:  
The Danubian Delta and  
the Shore of Dobruja**



# **BIVOLARU Alexandra, MORHANGE Christophe, ANDRIEU-PONEL Valérie, BOTTEZ Valentin**

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PhD Student, CEREGE, Mediterranean Institute of Biodiversity and Ecology (*Aix Marseille University, FRANCE*)

Professor, CEREGE (*Aix-Marseille University, and Institut Universitaire de France, FRANCE*)

Mediterranean Institute of Biodiversity and Ecology (*Aix-Marseille University, FRANCE*)

Assistant Professor, Faculty of History, Department of Ancient History and Archaeology (*University of Bucharest, ROMANIA*)

## **Geomorphological evolution of the distal lagoons of the Danube delta and reconstruction of ancient environments**

**Key-words:** Geoarchaeology, palaeo-environment, resources, deltas, Antiquity

In our communication we will present a comparative approach of three archaic foundations (Istros, Caraburun, Orgame) disposed along the Danube delta (Romania). The sites are located in a fluvio-lagoonal environment, which is very dynamic from a geomorphological point of view. A geoarchaeological perspective of these ancient cities allows us to develop a new approach on the exploitation of the territories, given the diversity of the physical contexts and the multiplicity of the processes at work (sedimentary budget, proximity of the fluvial mouths, relative sea level mobility, currents and littoral drift). These settlements, located on the delta shores, are strategic points along the seaways connecting the Aegean world to the Euxine settlements.

This research is devoted to the study of spatial occupation networks and their intrinsic relation with littoral and fluvial environments in a very mobile deltaic context. Environmental constraints can limit the economic potential, but any limitations are dependent on the technological advantages that a society can employ in the improvement of the natural setting or mitigation of environmental problems. A high-resolution analysis of the evolution of the environmental matrix and a spatial study of the organization of the ancient colonial territories are the means that will allow us to better understand the potentialities and the constraints of the deltaic milieu in ancient times.

## **BARALIS Alexandre, LUNGU Vasilica**

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Address: Musée du Louvre, Département des antiquités grecques, étrusques et romaines, 75058 Paris Cedex 1, France; Associate Researcher, IFEA (*French Research Institute of Anatolian Sciences, USR 3131, Istanbul*)

Senior researcher, Institute of South-European Studies, Romania Academy (*Bucharest, ROMANIA*)

### **Colonising a marshy area: Greek settlements of the Northern chora of Istros**

**Key-words:** Black Sea, Greek colonization, Antiquity, fishing activities, Orgame, Istros

To the North of the city of Istros, the Danube alluvium formed a lagoon landscape, which made up the outer reaches of the delta. In the mid-7<sup>th</sup> c. BC, one of the most ancient Greek settlements was founded in this compartmentalised area (mentioned by Polybius and Strabo), on the Cape Dolojman. Excavations conducted on the shores of Lake Golovița have revealed the foundation of a series of secondary settlements in the early 6<sup>th</sup> c. BC, whose status during the Archaic period is still uncertain. Nonetheless, in the 4<sup>th</sup> and 3<sup>rd</sup> c. BC, they formed the Northern *chora* of Istros, justifying the city's claim to legitimacy over this vast area in the early Roman period. Since 2011, the site of Caraburun-Acic Suat has been the subject of a multidisciplinary research project conducted by the Louvre, the University of Aix-Marseille and the Institute of South-East European Studies. This study has revealed the economic and social strategies developed by the Greek communities in the early years of colonisation at this specific site, where fishing seems to have played a major role.

# STERNBERG Myriam

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Researcher, National Center of Scientific Research (CNRS), Centre Camille Jullian (CNRS-Aix-Marseille University, Aix-en-Provence, FRANCE)

## **Fishing in the Southern Danube Delta: a focus on the Caraburun-Acic Suat settlement based on archaeo-ichtyofaunic data**

**Key-words:** Fishes, classical Antiquity, Black Sea fishing, food in colonial context, lagoon fishing

The Caraburun-Acic Suat settlement, located south of the present Danube Delta, opposite the Razelm-Golovita lagoon complex, was developed between the second quarter of the 6<sup>th</sup> c. BC and the early/mid 3<sup>rd</sup> c. AD. In the spatial network of land occupation, Caraburun-Acic Suat is within a territory controlled by the Greeks, halfway between Orgamè and Istros. The significance of the influence of either of these cities on the Caraburun settlement is still being debated. As early as the first excavation campaign, manual sampling revealed the presence of fish remains among the archaeozoological remains. In 2016, the mission decided to undertake a further study of the role of fishing in the economy of this settlement. Four sampling campaigns (2016-2019) were then set up to establish an archaeoichthyological database based on fine sieving of the sediments (1mm mesh) and to verify the first results obtained from the manual sampling, known to be insufficient and to be deficient in quantity.

The application of the fine sieving method of sampling revealed a proportion of residues about 7 at 8 times higher than by hand. It revealed the predominance of cyprinids, whereas pikes, perch and sturgeons appeared more discreet. The interspecific ratios change slightly according to the phases of occupation, but not significantly. A stability in the spectrum of species consumed is therefore indicative of the consumption profile at Caraburun-Acic Suat, from the 6<sup>th</sup> to the 3<sup>rd</sup> c. BC. The Roman levels, for their part, revealed very few information. The identified species belong to the spectrum of the so-called freshwater species, with a strong eurhyaline capacity, allowing them to frequent beyond the rivers and mouths, brackish and/or lagoon environments. As for sturgeons, they are benthic or semi-pelagic fishes, migrating between coastal marine waters and the rivers where they spawn. The question then arises as to where the fishes are caught: rivers and/or Danube mouth, brackish environments and/or lagoons (attested to in the 6<sup>th</sup> c. BC)?

However, this spectrum of species does not reproduce the one expected in the Greek context, as we understand it. Indeed, the complete absence of marine species

characterising Mediterranean lagoon environments, which Greek literary sources describe as commercialised, appreciated and consumed by the Greeks inhabitants, raises the question of the appropriateness of the consumption profile highlighted at Caraburun and of an "expected Greek model". It is therefore not excluded that the consumption profile observed does may stem from exchanges with local Danubian populations. In short, it raises the question of the complexity of food in a colonised/mixed/multi-ethnic environment studied here and of the limits of what food can reveal about ethnic identity. It is also the issue of how to resolve the food emergency in the context of colonial settlement that this study raises.

# NICOLAIE Alexandru, Smaranda Andrews

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Researcher, Archaeological Museum of Callatis (*Mangalia, ROMANIA*)  
(*Iowa State University, USA*)

## **Watercourses of ancient time and the territories of the cities Kallatis, Tomis and Histria**

**Key-words:** Watercourses, ancient, Dobrudja, colonies, territories

In Classic and Hellenistic eras the rural settlements from the territories of ancient cities from Dobrudja, were built on the lakesides and along the valleys which continue to the west. Some of these valleys have been watercourses in ancient times, now being dry.

As we can see on some maps from 15<sup>th</sup> – 18<sup>th</sup> centuries, the territory occupied by Kallatis was crossed by a river, with two or three affluents, which was flowing from southwest in today's Mangalia Lake. These watercourses have been an important element in the foundation and the delimitation of the agricultural territories of the west coast colonies. This is the situation with Histria, where the limits of the territory from the polis were fixed on some watercourses. If the sources are from Roman era, ISM I 67, 68, after some hydronyms – Gabranus, Sanpaeus, Calabaeus, they are sending to old situation, existing and in the Classical and Hellenistic eras.

The evolution of Tomis was also related to a watercourse, the one in the Carasu Valley nowadays. Tomis experiences an economic revival after Lysimachus founded Axiopolis on the shore of the Danube river. The position of Axiopolis was very important by providing made connection between Tomis (through Carasu Valley) and Lower Danube area, Muntenia and Moldova through the Danube affluents. Tomis became a very important city in economy trading with the territories controlled by Gets, importance that grew much more after the sanding of the Histria harbor.

We can conclude that the ancient hydrographic network, in Dobrudja, was richer in Antiquity compared to today and navigable due to the higher level of the sea. We can, even partially, remake this hydrographic network, using the information from literary and epigraphic sources, medieval maps or geological studies.

# TALMATCHI Gabriel-Mircea, SODOLEANU Irina

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Researcher, National Museum of History and Archaeology (*Constanța, ROMANIA*)

Researcher, National Museum of History and Archaeology (*Constanța, ROMANIA*)

## **New data on fish fauna found in the Western Pontos Euxeinos, indicated by specially cast monetary signs used for exchange purposes (6<sup>th</sup>-5<sup>th</sup> c. BC)**

**Key-words:** Histria, monetary sign

The 6<sup>th</sup> and the 5<sup>th</sup> centuries AD are very scarce in information regarding fishing and fish trade for the western part of Pontos Euxeinos (Danube's and Dnieper's mouths for example). For most of the times only circumstantial clues can indicate the existence of fish trade (salted or marinated fish). For instance, the numismatic evidence of various iconographical types applied on coins minted in the Greek cities on the Black Sea shores, has demonstrated the important presence of marine symbols (for example different types of fish). Taking into account the geographic positioning of Histria, the two complementary activities are strongly interconnected by the existence of fish and can be truly considered real specialisations, which were probably practiced daily, not only in the archaic period, but later on as well. A monetary sign of those especially casted for commercial purposes, discovered not far from the archaic settlement, stresses once more the probably important role played by fishing/fish trade in Histria and the space where its economic interest spanned. The sturgeon, one of the important species from the Danube and the Black Sea, is represented on this monetary sign. Such items with different symbols depicted on them are casted in moulds, in the late phase of production of this monetary signs (as, for example, the wheel, letter A, the fir, the hatchet etc.), probably the late 6<sup>th</sup> - early 5<sup>th</sup> c. BC.





## SESSION IV

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**Friday 4<sup>th</sup> June 2021**

# **The Northern Black Sea: Bug, Dniepr, Crimea and Azov Sea**



# CHISTOV Dmitry

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Senior Researcher, Curator, State Hermitage Museum, Department of Antiquity  
(St. Petersburg, RUSSIA)

## Fishing and fishing sinkers of the archaic Berezan settlement

**Key-words:** Fishing, sinkers, nets, Berezan settlement, Borystheneis

Fishing, obviously, played a significant role in the diet of the inhabitants of the archaic Berezan settlement. According to recent studies of bone residues of fish (Yanish, Kasparov 2015), freshwater species were mainly consumed, with sturgeon fish species accounting for more than 62%. The Dnieper-Bug and Berezansky Limans, apparently, served the main area for fishing.

During the research of the north-eastern part of the Berezan settlement by the Hermitage Archaeological Mission in 2004-2018, 145 objects were found that can be attributed as fishing sinkers. 87 (60%) of them are made of stone. This is mainly local limestone, as well as green slate - a stone characteristic of the archaic buildings of Histria, and, obviously, brought from there to Berezan as ballast for ships. The ease of processing and drilling of this stone, obviously, made it a very convenient material for the manufacture of fishing sinkers. Sinkers made of marble and volcanic rocks are much less common - since these materials that could be brought to the Berezan settlement only from Aegean. There were only 12 metal sinkers made from lead and iron. The remaining sinkers are ceramic. Some of them are made from fragments of transport amphorae or coarseware vessels, but also some specially made ones. The latter, obviously, do not apply to local production. The distribution of sinkers in the investigated area is uneven; areas and structures (as storage pits) with a higher concentration of such finds were identified, which may indicate the occupation of residents of individual households. In one case, in the corner of the courtyard with a round altar of the late 6th- first third of the 5<sup>th</sup> c. BC a group of thirteen small stone and ceramic sinkers was found, probably belonging to a set of one fishing net.

The distribution of fishing sinker finds from dated contexts of different stratigraphic periods and phases also looks uneven. Only 16% of their finds relate to the structures of the earliest period, preceding urbanized colony (until the middle of the 6<sup>th</sup> c. BC). Later stratigraphic phases spanning time from the 540s BC until the last quarter of the same c., as well as from the end of the 6th c. BC until the second quarter of the 5<sup>th</sup> c. BC, are represented by approximately equal number of fishing sinkers (about 30%).

# YANISH Yevheniia, BUYSKIKH Alla

Researcher, I. I. Schmalhausen Institute of Zoology (Ukraine, Kiev, UKRAINE)

Vice-director of scientific work, National Institute of Archaeology, Ukrainian Academy of Sciences (Kiev, UKRAINE)

## Fisheries in the Northern Black Sea region on the example of Olbia and synchronous settlements

Archaeozoological materials from 10 antique sites of archeology of the Northern Black Sea region were investigated: Olbia (2007, 2009, 2011, 2016-2019 years, Nikolaev region), Belozerskoye settlement (1998-2007, Kherson region), Berezan (1975, 2012, 2013, Nikolaev region), Chersonesus (2010, 2011, Crimea), Mirmeky (2016, Crimea), Zolotoye Vostochnoye (2013, Crimea), Nimfey (2014, Crimea), Polyanka (2012, Crimea), Tiritaka (2013-2014, Crimea) and Opuk (2013, Crimea).

In total, 23753 animal remains were investigated, including 11961 fish bones, 10930 mammalian bones, 109 bird bones, 63 reptile remains, 659 mollusks, and 31 crab carapaces. The main part of the osteological material was obtained as a result of excavations on the archaeological site of Olbia (15603 animal remains). Fishing in Olbia pontica started from the time of foundation, 6<sup>th</sup> c. BC.

Revealed bones of 27 species of fish: sturgeon (*Acipenser gueldenstaedtii*), stellate sturgeon (*Acipenser stellatus*), sterlet (*Acipenser ruthenus*), beluga (*Huso huso*), catfish (*Silurus glanis*), vyrezub (*Rutilus frisii*), crucian carp (*Carassius carassius*), roach (*Rutilus rutilus*), tench (*Tinca tinca*), carp (*Cyprinus carpio*), gurbell (*Umbrina cirrosa*), common rudd (*Scardinius erythrophthalmus*), bream (*Abramis brama*), pike (*Esox lucius*), white bream (*Blicca bjoerkna*), ide (*Leuciscus idus*), asp (*Leuciscus aspius*), common bleak (*Alburnus alburnus*), european chub (*Squalius cephalus*), zander (*Sander lucioperca*), perch (*Perca fluviatilis*), Black Sea kalkan (*Scophthalmus maeoticus*), thornback ray (*Raja clavata*), black scorpionfish (*Scorpaena porcus*), common stingray (*Dasyatis pastinaca*), european flounder (*Platichthys flesus*), Mullet sp. (*Mugilidae*).

In addition, fishing tools from Olbia was investigated. Fishing tools and instruments are represented with local production – specially made ceramic sinkers with one or two holes (6-5<sup>th</sup> c. BC), amphora bodies (6-2<sup>nd</sup> c. BC), amphora sherds and flat stones with special cuttings (6-4<sup>th</sup> c. BC), rounded or unrounded small limestones (6<sup>th</sup> c. BC – 3<sup>rd</sup> c. AD), loom-weights' shape sinkers (1-3<sup>rd</sup> c. AD), lead sinkers (4<sup>th</sup> c. BC – 3<sup>rd</sup> c. AD). For fishing the special bronze hooks were used during large chronological span. Raw stones with central cutting were used like anchors for fish-boats. Locally produced fish plated, both in gray and red clay were popular in Olbia in the period the end of 6<sup>th</sup> – the second half of 4<sup>th</sup> c. BC.

## **Fishing and fish processing as a resource of prestige and wealth: the case of Crimean Chersonesos in Late Antiquity/early Middle Ages**

**Key-words:** Crimean Chersonesos, fish industry

Fishing has always been natural occupation of inhabitants of any maritime town. Crimean Chersonesos was no exception. According to the archeological research, fishing was highly developed from the very beginning of the existence of the town, which was founded in 421 BC. In the 2<sup>nd</sup> c. BC, fish started to be produced in fish sauce, *garum*, which is documented by many fish vats – great structures in which *garum* was made. This activity did not cease in Chersonesos until the 11<sup>th</sup> c. AD. In my paper, I will mention archeological monuments that show evidence of the extensiveness of fish processing in Chersonesos. Furthermore, I will consider the importance of this “industry” for this coastal town.

# BUTYAGIN Alexander

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Senior Researcher, Curator, State Hermitage Museum (*St Petersburg, RUSSIA*)

## **The foundation of the “small cities” of the Bosphorus and fishing (based on Myrmekion investigations)**

**Key-words:** Fishing, colonization, Myrmekion, Cimmerian Bosphorus, colonization

The presence on the shores of the Cimmerian Bosphorus Strait of a large number of urban settlements, among which a significant number are "small towns" - small settlements with a town structure, surrounded by defensive walls. Sometimes they are located several kilometers from each other or large cities.

Studies of archaic Myrmekion allow us to answer the reasons for the appearance of the "small cities" of the Bosphorus. Usually fishing activities for the residents of Bosphorus in archaic time are ascertained, but no detailed research has been carried out. In Myrmekion over the past 20 years, animal bones have been carefully studied by Alexei Kasparov, however, only a general calculation was made regarding for fish bones. Their share was 10% of the total number of bones for the second half of the 6th - beginning of the 5<sup>th</sup> centuries BC, but in some contexts reaching more than 30%. The fish bones from the early layers of the 2016 excavation (261 bones) were studied in detail by Eugene Yanish, reaching interesting results. The vast majority of bones belonged to sturgeons - almost 80%! In addition, flounder, zander and carp were represented in a relatively large number. Also found were single bones of roach, carp, and bream pike. Most of these fish can live in desalinated sea water, but now they are not found in the Kerch Strait. In ancient times, when the Kuban River flowed into the Black Sea (now it flows into the Azov Sea), the strait was more fresh and allowed freshwater fish to exist here.

It can be seen that the inhabitants of Myrmekion showed the main interest in sturgeon fish, which could be caught for commercial purposes and exported to the Mediterranean. Freshwater fish went for food.

This observation is confirmed by an isotopic study of the bones of the bones buried in the recently discovered Myrmekion necropolis of the second half of the 6<sup>th</sup> c. BC. Analysis of human bones indicates a fish diet.

Thus, we can state the crucial importance of fishing for early settlements on the shores of the Cimmerian Bosphorus. Most likely, many of them were founded by immigrants from Pantikapaion for more convenient fishing, passing through the strait, and only subsequently developed into small towns.

# VAKHTINA Marina, KASPAROV Aleksey

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Researcher, Institute for History of Material Culture, Russian Academy of Sciences  
(Saint-Petersburg, RUSSIA)

Senior Researcher, Institute for History of Material Culture, Russian Academy of Sciences  
(Saint-Petersburg, RUSSIA)

## **Fishing in Porthmion, a Bosporan town near Kerch Strait (according the excavations of 2005-2013)**

**Key-words:** Bosphorus, Kerch strait, Porthmion, fishery

Traditionally, Porthmion is identified with the remains of the Greek town, situated to the north-east to the modern city of Kerch in Eastern Crimea, close to the Strait of Kerch. During the excavations of the site a considerable amount of materials concerning the everyday life of the citizens of this “small” Bosporan town has been gathered. Archeological evidences belonged to the latest, Hellenistic period of the existence of the site are the most numerous. Materials show the increasing role of fishing in the life of city population. We can divide the finds from the site which reflect popularity and the wide spread of fishing into two big groups: 1) the remains of equipment used for fishery and 2) osteology materials. In the osteological materials from layers and complexes dated to the Late Archaic and Classical periods of the existence of Porthmion (6<sup>th</sup> – first half of the 4<sup>th</sup> c. BC) a portion of fish bones reached only to 8.4% of the total amount of animal bones. But in the Hellenistic period (second half of 4<sup>th</sup> 2<sup>nd</sup> c. BC) it ranged up to 21.9%. Only 5.8 % of fish bones belonged to the final period of existence of the settlement, the data shows the decay of fishing for this time. Among the determined fish bones from Porthmion a number belonged to carp (*Cyprinus carpio*) i.e. freshwater fish. Useful for examining fisheries at this specific place close to the sea rout connected Black and Azov seas may be the analysis of the ways of fish migration in ancient and modern time as well as examining of paleogeography data.

**IWASZCZUK Urszula, MATERA Marcin,**

**BUNIN Denis**

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Assistant Professor, Institute of Mediterranean and Oriental Cultures, (*Polish Academy of Sciences, Warsaw, POLAND*)

Assistant Professor, Faculty of Archaeology (*University of Warsaw, POLAND*)

Associate Professor (*Vladimir State University, Vladimir, RUSSIA*)

## **Fishing on the borders of the ancient world: natural conditions for fishing and their influence on the exploitation of local resources in Tanais**

**Key-words:** Tanais, fishing, exploitation of local resources, palaeoenvironmental conditions for fish exploitation

According to the ancient geographer Strabo: “Upon the river, and on the lake, stands a city Tanais, founded by the Greeks, who possess the Bosphorus [...]” (Strabo XI. 2. 3). Such natural conditions and localization of ancient Tanais were really propitious to the development of fishing and fish industry. The archaeological and archaeo-ichthyological materials confirm that fishing played a particularly important role in the economic life of the local society. Fish remains were excavated in a great number in Tanais, they were often discovered as layers of bones, scutes and scales. The artefacts connected with fishing and fish processing, such as anchors, hooks, net weights and others, were also very frequent in almost all the archaeological contexts. A complex analysis of palaeosoils, geomorphology and changes of the sea level in ancient times allowed the reconstruction of palaeoclimatic and palaeoenvironmental factors affecting fishing development during the whole period of Tanais existence and the presentation of a complex picture of natural conditions for the exploitation of local resources. The results indicate that at the time of its foundation in the 3rd c. BC, the town could be located at the confluence of the Don River into the sea. The hydrological changes taking place over the centuries have led to the fact that at the end of Tanais existence the town could have already been located farther in the delta, nowadays the distance is much bigger – about 8 km in a straight line from the sea. Having such results in mind, it seems interesting that the excavated fish remains dated to both Hellenistic and Roman periods came from exclusively freshwater and anadromous species, such as Cyprinids, catfish, pike, zander and different species of sturgeon. The goal of this paper is to present a comprehensive study of all issues related to fishing at Tanais: archaeo-ichthyological, archaeological, palaeoenvironmental and palaeogeographical as evidence of specific local fishing methods and a way of the exploitation of local resources.

### **Fishing on the Eastern Black Sea area coast in Classical period: archaeological data found at Pichvnari**

**Key-words:** Fishing, Eastern Black Sea, Classical period, Pichvnari

The settlement site and polytechnics cemetery of the Classical period at Pichvnari has produced useful material for the study of ancient history and culture of the eastern Black Sea area. During the whole Classical period, local Colchians and Greek settlers peacefully co-existence there. It is clear from the archaeological finds that Pichvnari was the economic, cultural and religious centre of its surrounding *chora* over a long period.

Pichvnari occupied a vast territory, extending to the environs of the Choloki-Ochkhamuri confluence with sea. It is placed in sandy soil. This circumstance, together with the specific climatic conditions, significantly preconditioned the possibility for the organic materials (bone, leather, fabric, wood, etc.) to reach present time. Despite this fact, the materials of Pichvnari cemetery and settlement site still reveal many information.

Among the various branches of farming, fishing was a major activity thanks to proximity to rivers and the sea. An especially large stone sinker, weighing 3.8kg, points to the use of very large nets, and thus sea fishing on an industrial scale.

Many pebble weights used for sinking fish-nets of an elongated, oval form, with a groove hacked at their widest parts (to attach them to the net) were found. They vary in length between 7 and 11.5cm, and in width between 6 and 8cm. Apart from bronze hooks, we often come across various numbers of lead weights for nets. A whole net with sixty lead weights was deposited in one burial. Similar items were found at Tsikhisdziri and Gonio-Apsarus, to the south no very far from Pichvnari.

Without a doubt, fishing and the production of dolphin oil were on a commercial scale. It is likely that, as in other centres of the Black Sea area, the bulk of salted fish was exported towards the Greek world, where it was very much in demand.

### **Ecological and geographical situation in Abkhazia in the ancient era: issues related to development of fisheries**

**Key-words:** Greek colonization, paleogeography, demography, fishing

The ancient Greek colonization of Abkhazia, its chronology, the ways of development of ancient cities, their impact on the socio-economic situation of the local population are still the subject of controversy among historians- specialists in antiquity. This is due to the paucity of written sources and insufficient archaeological research of the main monuments of this period, although the said problem is the subject of discussion by many generations of researchers. The presence of different points of view on the nature of Greek colonization is explained by significant technogenic changes in the territory of ancient cities, as well as a different understanding of Greek colonization in archaeological and typological terms.

For the study of the process of Greek colonization (especially at its early stage), issues of demography and paleogeography, reconstruction of the landscape and geomorphological appearance of the territory are of great importance. Attempts to use palaeogeographic and topographic data in solving historical and archaeological issues date back to the beginning of the 19<sup>th</sup> c., however, due to insufficient archaeological and palaeogeographic knowledge of the coast and bottom of Sukhum Bay, most of them remain open. One of the primary tasks of ancient archeology should be related to the compilation of a complete map of flooded objects, which will make it possible to trace the sequence of development of the coast by the Greek colonists, as well as solve a number of specific socio and economic issues, such as trade, agriculture and the role of fishing.

The history of the emergence and development of fishery in Abkhazia covers more than five thousand years, the region with its wide river system is a territory of ancient fishery.

According to excavations of archaeologists in Abkhazia, harpoons have been found since the Mesolithic era, and in the subsequent Neolithic era, stone chisels were found in cultural strata, which were obviously used to make primitive boats, and nets and shingle weights from pebbles that were already used in the sea were found in monuments of the Bronze Age.

In the subsequent era, in connection with the development of navigation in the region, the importance of the sea for the economy of the region increases, and brisk



trade in the ancient era contributed to the improvement of shipbuilding and means of transportation among the Abkhazians. Since ancient times, the communication of Abkhazians with the sea and intensive fishery contributed to the emergence in the Abkhazian language of an extensive marine vocabulary.

Fishery in Abkhazia is an ancient trade. Already from the ancient era, fishery has been gaining wide scale, as evidenced by knitting needles that been specially made from antique samples for knitting nets and bronze fishing hooks, as well as the presence of ceramic dishes for fish.

The connection of the Abkhazians with the sea, with the marine trade, undoubtedly, remained active throughout the subsequent era, when the external relations of the region were activated, especially with Byzantium.



## SESSION V

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**Friday 4<sup>th</sup> June 2021**

# **The Southern Black Sea area: the Pontos region**

## Historical Adventure of Bonito (*Sarda sarda*) in the Black Sea from Ancient Times to the Present

**Key-words:** *Sarda sarda*, Byzantium, fishing, migration, Bosphorus

Bonito (*Sarda sarda*) is an important food source since very old times for the archaic communities living around the Black Sea, Aegean and Mediterranean coasts. Because, bonito is a fast growing species which reach catch length in a very short time especially in Black Sea. Fishing is very easy with simple methods compare to other species. Also it is consumed whole year around not only fresh but as salted which is a traditional storage method.

The school of bonitos that once flocked to the Bosphorus and the Golden Horn during the migration season became the symbol of this city. Fish and fishery have a very important place in the history of Istanbul, which was named Byzantium in the ancient times. We can see that the bonito became the symbol of Byzantium from the bonito figure on the coins. Due to its location on the Bosphorus, Byzantium was one of the most important centers of ancient times in fishing, consuming and exporting migratory fish such as tons, bonito and mackerel. Brine (salting) fish of this colonial city which is famous as '*tuna land*' was recommended almost everywhere. No other important city in the world has penetrated the history and culture of a city as much as these two fish like bluefish and bonito. The symbol of Byzantium was '*king bonito*'. The easy-to-catch bonito was a delicious and satisfying fish that enriched the poor's table for centuries. He was a generous king for the people!

In spring, large schools of bonito began their migration from the Sea of Marmara to the Black Sea for spawning and in late autumn, return back to the Sea of Marmara. Historically, this migration period of large bonitos '*torik*' through the Bosphorus was a culturally important festive period in Istanbul, called the '*surge in torik*'. In ancient times, the Golden Horn and Bosphorus are remembered for their important fishing grounds with very rich fish biodiversity, and a notable presence of top predators such as dolphins, swordfish, tunny, bonito, bluefish and mackerel.

Starting from the second half of October, the torik of the adult members of the mooring begin their migration movements from the Black Sea to the southern seas. Beginning in May, individuals of the same size enter the Black Sea. '*Palamut, torik, sivri, altıparmak and peçuta*' are all the same species of fish, and their name changes as they grow. Torik of all sizes cross into the Black Sea on '*St. Yeoryios*'.

Fish is lubricated in October and its length reaches 40-45 cm. In this period, a safe bonito consists of five or six pairs. Bonitos are offered for sale on a double account (a pair of two fish). It becomes suitable for salting. Fish that have reached the age of one year are called '*fake*' (*zindandelen*). When he turns two, he becomes '*torik*'. Three-year-old big bonitos are called '*spikes*' (*Sivri*). The *Torik* begin to flow smoothly from the Black Sea as of October 21, the '*Saint Pelagie*' and their transition to the Mediterranean is completed by the end of November at the latest.

Based on sales records from the Istanbul fish market, 1940 had the highest peak of bonito from 1928-1952 with 6 million fish. In the 1950s, this stock was so healthy that in just one day, 600,000 bonito and 240,000 *torik* were caught. However, after the early 1960s onwards, *torik* gradually decreased and bonito became dominant. *Torik* were last reported in Turkey in 1991 with 41 tons. In the last few decades, the spawning stock has not been caught during their spring northern migration to the Black Sea as the stock size has been drastically reduced.

# DOONAN Owen, VURAL Hüseyin

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Professor, Art History Department (*California State University Northridge, USA*)

Director, Archaeological Museum of Sinop (*TURKEY*)

## Evidence for incipient fishing and Black Sea mariculture from Bronze and Iron Age Sinope

**Key-words:** mobile fishing communities, incipient trade, pre-colonial interaction Black Sea, Sinope

Sinop (ancient *Sinope*) was one of the earliest Ionian Greek colonies in the Black Sea and the earliest colony on its Anatolian coast. The Sinop kale site is set directly overlooking the sea where a narrow sandy isthmus connects the mainland to a prominent basalt headland. The site, atop a 15-meter cliff above the shore, affords an unobstructed view of the coast in all directions. The site is ideally located for fishing and defensive purposes, and has little access to a terrestrial catchment more suited to a diversified agricultural economy. Fishing in this region is determined by the annual migrations of the major Black Sea fish species. These spawn in the shallow waters along the north coast and migrate in highly predictable cycles around the sea. The seasonal mobility patterns of Black Sea fish populations appears to have been a powerful determining factor that drove fishing communities to adopt mobile settlement strategies that led to incipient trade networks in the region.

Excavations in pre-colonial strata of Sinop Kale operations 1 and 4 (2015-17) documented a bone fish-hook and fish bones, consistent with our interpretation of it as an intermittent fishing camp. An early Iron Age hut in Operation 1 revealed a large one-handed globular pot in which were found numerous anchovy (*hamsi*) vertebrae and scales. Finds of terrestrial animal bones may suggest exchange between outside transient fishermen and indigenous communities. A limited number of Iron Age burnished buff-wares with faceted handles and rims suggest another connection with the Bafra plain, ca. 100 km to the east.

Our provisional working model is that these two houses and their associated ceramics document that Sinop was an early node in a mobile fishing network in which fishermen from various Black Sea coastal communities took advantage of seasonal opportunities. It is likely that mutually beneficial relationships with inland communities were established as early as the Early Bronze Age (mid-late 3rd millennium BCE) and that this accounts for a limited spread of ceramics from as far away as the north and west coasts of the sea. It seems clear that these early interactions became much more intensive during the early first millennium BCE. The results from Sinope are considered in light of models for mobile fishing communities to incipient trade in the north Atlantic, Indian Ocean and other regions.

# BARAT Claire

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## Fishing resources and Greek colonisation at Sinope

**Key-words:** Bonito, Salted Fish, *Chôra*, Resources, Harbours

Halieutical Resources and Greek Colonization in Sinope

According to Strabo, *Geography*, XII, 3, 11, the Milesian colony of Sinope was well-known for being the first place in the Black Sea where it was possible to catch adult pelamides (bonito). Black Sea salted fish was a luxury article in Greece and Rome in Antiquity.

The aim of this paper is to have a reflection about the link between fishing resources and colonization in Sinope in the 7<sup>th</sup> c. BC. The idea that will be developed is that Sinope site was chosen by Milesian colonists because of the good conditions of its double harbour and because it was also easy to have fishing resources for the first colonists, before the organization and the exploitation of a land *chora*. This paper will use the results of archaeological researches in Sinope and will present a reflection about the shore layout during the first time of Greek colonization. The importance of other resources in Sinope will be also approached.

## EROL Ayşe F.

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### **Fishing Equipments Obtained From Fatsa/Cıngırt Kayası Excavations in the Southern Black Sea Region**

**Key-words:** Southern Black Sea Region, Cıngırt Kayası, Fishery, Pyramidal and Folded Lead Sinkers, Fishing Hooks

Cıngırt Kayası is located in a region called “Pontos” in ancient times, which is currently within the borders of Yapraklı village, in the town of Fatsa, province of Ordu in the eastern part of the Southern Black Sea region. It is located on a hill with two summits, 200 meters above sea level, strategically overlooking the valley and the sea. Based on the excavations conducted predominantly on the summit of Cıngırt Kayası, it is suggested that Cıngırt Kayası was part of a security chain that consisted of *Phrourion* to provide control and defense of the Pontic Region during the reign of Mithradates VI. The continuity of settlement in Roman and Byzantine periods has been verified. The material that constitutes the subject of study was discovered from excavations carried out at the top of the settlement during the ongoing excavations between the years 2012-2014. The lead weights obtained from the Fatsa/Cıngırt Kayası excavations, have been treated as related to fishing activities. Pyramidal fishing hook weights and folded rectangular fishing net weights belonging Hellenistic and Roman periods were discovered during the excavations. Cıngırt Kayası's proximity and access to sea, and its geographical position, considered along with the presence of fishing hooks, lead sinkers used in fishing hooks and nets clearly suggest the practice of fishing. There have been few excavations conducted in the Eastern Black Sea Region of Turkey, and thus this study aims to share one of the first findings of the lead weights obtained from Cıngırt Kayası excavations and to contribute to the studies related to the fishing activities through the Black Sea Basin.



## SESSION VI

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**Friday 4<sup>th</sup> June 2021**

# **Techniques, Commercial and Exchange networks**



# KNIGHT John Brendan

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Post Graduate Research Student, Department of Archaeology, Classics and Egyptology  
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## Fishing and Migration Processes in the Black Sea

**Key-words:** Fishing camp, temporary settlements, artisanal fishing, Greek colonization, urbanization

From ancient literary sources it is clear that the fishing industry played an important role in the economies of the Greek cities and indigenous peoples of the Black Sea littoral. It has even been posited by many as one of the ultimate drivers of Greek migration to the region. However, the processes underlying the mobility and migration of individual, and groups of fishers are less well understood. Using approaches formulated in the field of Migration Studies, this paper will attempt to approach the role of fishers in migration processes and trajectories in the Black Sea during the pre-Roman era. It will explore questions relating to the drivers of fisher migration, migration capital amongst fishers and the temporal conjunctures of fisher migration within macro and meso level migration trajectories. These issues will be explored by looking at the evidence from the Bug estuary region and the Kimmerian Bosphorus. Through these examples we aim to offer a more theoretically nuanced way of approaching at the role of fisher migration in the wider trajectories of migration and mobility in the northern Black Sea.

# LEBRETON Stéphane

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## Fisheries activities: an ethnographic entry

**Key-words:** Geography, Ethnography, Fishing, Ichthyophagus, Representations

What significance should be given to the indications given by the authors on fisheries activities? Do they always result from a knowledge that is intended to be useful, specific to an inventory of the natural resources of a territory or from presentations of technical knowledge? In a previous publication on the description by Strabo of the southern coast of the Pontic Sea, we drew attention to the fact that the fishing techniques envisaged on side or the other of the Halys could be a criterion for classifying cities and peoples between the state of nature and culture. In fact, the development of a construction on otherness by reference to consumption and fishing activities did exist, at least for the Red Sea and the North Sea with the inclusion of ichthyophage populations. Was this Framework also applied to the Pontic Sea? Could interest in fish stocks, fishing techniques or seafood consumption be included in a more general discourse on the categorization of riparian populations? In this case, the data presented by the authors would be, perhaps in some cases, to be put into perspective.

## DUPONT Pierre

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### **Fishnet-watchers around the Pontic area and Propontis**

**Key-words:** Black Sea, Propontis, fishing technique, madrague, fishnet-watchers, Antiquity, modern times

A specific type of stationary fishnet, mainly intended for thunny-fishing, is mentioned by ancient literary sources, which involved the assistance of watchers stationed either nearby in dominant position (promontory, hill, high tree...) or as gate-warders perched on top of a high pole on each side of the entrance. Particularly well attested around the Pontic area and Propontis in Antiquity, its use has persisted until modern times in several variants which are reviewed here.

# GALLOTA Stefania

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Associate Professor, Ancient Greek History in the Department of Humanities (*University of Basilicata, ITALY*)

## **The Tax system on fish trade from and to Black Sea: a new perspective**

**Key-words:** Fish-taxes, trade, Athens, Olbia pontica, Herakleia pontica

Object of particular interest and heated debate among scholars are the rules regulating ancient Greek trade and in particular ancient fish trade.

More complicated is the taxation of fish trade in the Black Sea region, in particular because the few sources available to us: the question is still particularly obscure. Despite the few literary sources and the few inscriptions about the taxes on fish trade, we have a rather complex and varied picture, that does not allow us to speak about a fixed and systematic tax system on fish trade.

My intention will be to analyze the complicated tax system on the fish trade in the Black sea region, and in particular relating to the 4<sup>th</sup> c. BC.





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