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TAXONOMIC STRUCTURE AND KERCH STRAIT ICHTHYOFAUNA ENVIRONMENTAL FEATURES

This article provides the information about the Kerch Strait ichthyofauna structure and its environmental features. The list of taxons with the character of habitat in the strait water area is given there. Groups of species according to the habitat allocation in the coastal zone of the strait are singled out in this article.

Keywords: the Kerch Strait, ichthyofauna, migrants, adventitious species, resident species.

PROBLEM STATEMENT. THE ANALYSIS OF THE RECENT RESEARCH AND PUBLICATIONS. THE PURPOSE OF THE PAPER

The Kerch Strait plays a significant role in creating specific features of the Azov-Black Sea hydrological and hydrochemical regime and serves as an ecological corridor enabling to establish links between the Black Sea and the Sea of Azov ecosystems. One of the functions of this corridor is to provide migration of aquatic organisms including the fish. Migration through the strait is an important life cycle for many species.

The Kerch Strait is a very urbanized zone and its water body is affected by strong anthropogenic impact. Contamination of coastal zone by faecal-domestic and industrial waste waters, environmentally groundless hydrotechnical activities, recreational load, navigation, fishing (including illegal) and other negative anthropogenic factors influence not only ichthyofauna but also the fish habitat. As the result the quality of the Kerch Strait as the ecocorridor for aquatic organisms migration including commercial fish making seasonal migrations via the strait is reduced.

At the same time faunistic structure of ichthyofauna in this area is poorly investigated. There is no information concerning local ichthyocoens in the Kerch Strait, their structure and conditions for their formation.

The purpose of the paper is to analyze

taxonomic structure and environmental features of ichthyofauna of the Crimean coast of the Kerch Strait.

MATERIAL AND METHODS

The material for this paper had been sampled since 1998 to 2012 in depth ranges of 0,1 - 6 m in the Kerch Strait water area from the cape Fonar to the cape Takil (Fig.) by fishing off or by visual underwater observations by means of light diving equipment without self-contained breathing apparatus.

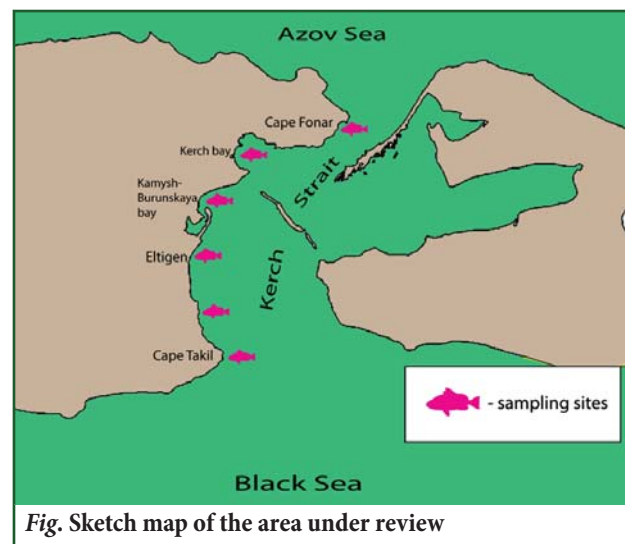


Fig. Sketch map of the area under review

Fishing off was performed by bottom traps, lift nets and hook and line gears. Moreover, catches by fixed gill nets were also analyzed. Those nets are belonged to the coastal fishing gang in the fishing farm "Zhemchuzhina morya". Those fixed gill nets were placed from the village

Naberezhnoye to the natural landmark Pechki and at the Kamysh-Burunskaya bay in the period since March till December.

The list of orders and families in the table is given according to [1]. Russian and Latin names of species are given according to [2, 3].

Red Book fishes of Ukraine are marked * in the list.

OUTCOMES OF THE RESEARCH

The Kerch Strait is a narrow shallow water area, the length is 43 km and breadth 3,7 – 4,2 km. The Strait depth from the Sea of Azov side is not more than 120,5 m, from the Black Sea side – 18,0 and in the centre of the water area - not more than 5,5 m. Salinity of water during the year varies from 14 to 18 ‰. The current in the Azov direction is prevailing. Ice conditions are observed every year [5]. Sand and shell bottoms are prevailing in the open Strait and mud and sand grounds in the corners are typical for the Strait. Hard grounds are typical for the capes and they are formed by lime stones, shell rocks and sandstones.

According to our observations the Kerch Strait is a habitat for 86 species and subspecies of fishes, which belong to 62 genera and 38 families (*table*). The most diverse families are as follows: Gobidae – 9 genera, 15 species; Cyprinidae – 4 genera, 6 species and 1 subspecies; Syngnathidae – 3 genera, 6 species; Clupeidae – 4 genera, 3 species, 2 subspecies; Blenniidae – 3 genera, 5 species. Actually 58 species and subspecies of 31 families attribute to salt-water fishes. Brackish-water fishes are represented by 13 species and Gobiidae are the most diverse (10 species). Semi-anadromous fishes are represented by 6 species and subspecies of the following families: Acipenseridae, Clupeidae and Salmonidae. Semidiadromous fishes are represented by 5 species and subspecies of Cyprinidae and Percidae families. Fresh-water fishes are represented by 3 species of Cyprinidae family and by 1 species of Esocidae family. 14 species in the Kerch Strait are enrolled in the Red Book.

According to the environmental features and migration character the ichthyofauna of the Kerch Strait can be divided into 3 groups: seasonal migrants, adventive species and resident species.

Seasonal migrants and adventive species

are not residents of the strait water area and represented by 51 species (59 % of all species) and form the basis of the Strait ichthyofauna.

Seasonal migrants (13 species and subspecies) are represented by fishes for which migrations via the strait are the most significant part of their life cycle. These fishes migrate to the Sea of Azov for spawning and fish-growing period that ends in June but with the beginning of autumn they come back to the Black Sea for wintering. The representatives of these fishes are important commercial fishes of Azov-Black Sea basin. They are as follows: Azov anchovy, anadromous shads of *Alosa* genus, mullets (*Mugilidae*), Black Sea jack mackerel, garfish, Black Sea red mullet and Black Sea silverside.

Adventive species (38 species and subspecies) are represented by salt-water, brackish-water, anadromous and semi-anadromous fishes that come to the Strait water area from the Black Sea and the Sea of Azov and fresh-water fishes from the Crimean rivers such as Bulganak, Melek-Chesme and Dzhardzhava. They don't use the strait for seasonal migrations and may be observed there occasionally and only by individuals.

Resident species (35 species) are native habitants of the strait water area and their seasonal migrations have local character athwart to the coast. Gobiidae are the basis of this group (15 species and 9 orders). Ten species of the following genera: *Knipowitschia*, *Benthophilus*, *Mesogobius*, *Neogobius* и *Proterorhinus* are the most diverse.

Three biotopes in the coastal zone of this area, namely: sand biotope, stone bottom biotope, sea grass biotope on mud-sand bottoms have been outlined.

Sand bottoms expanded from the tidal edge down to 6 m depth have no shelters for non-migratory fishes. Not more than 10 species are native habitants there and they are represented by non-migratory individuals. They are representatives of Gobiidae (4 species), *Callionymidae* (2 species), *Trachinidae* (1 species), *Uranoscopidae* (1 species), *Pleuronectidae* (1 species), *Soleidae* (1 species), *Ophidiidae* (1 species). Migrants are represented here by stingray, juvenile and mature (full-

grown) fishes of mullets and red mullet (*Mullus barbatus ponticus*).

Biotopes of eelgrass and other higher aquatic plants are forming in the corner areas of the Kerch Strait bays being protected from strong wave action. This biotope includes 11 fish species of the following families: Syngnathidae - 4 species, Labridae - 2 species and Gobiidae - 5 species. Migrant species are represented by juvenile and full-grown fishes of mullets and silversides.

In spite of limited distribution of hard bottoms in the Kerch Strait, fish fauna of these biotopes is diverse and abundant. These biotopes were formed by sedimentary material such as flagstone, rock fragments and bedrock yield. Their main features are variety of fish shelters, rich feed supply and spawning substratum.

Sites without natural biotopes of stone bottoms have different coast-protective structures such as piers, breakwaters and dams. Migrants are represented by 18 species there. They are representatives of such families: Gobiidae - 6 species, Blenniidae - 5 species, Syngnathidae - 3 species, Labridae - 2 species, Gadidae - 1 species

and Scorpaenidae - 1 species. Migrants are as follows: mullets, garfish, silversides and Black Sea horse mackerel. The predominance of soft bottoms in the strait coastal zone substantially reduces biodiversity of lithophilous fishes of Labridae, Blenniidae and Scorpaenidae families being functionally connected with stony biotopes.

CONCLUSION

The findings obtained demonstrate that the major features of the Kerch Strait ichthyofauna are the predominance of migrant species and the lack of resident species. The abundance of migrant species is due to the immediate proximity of the Black Sea and the Sea of Azov. At the same time, a comparatively small number of resident species inhabit the strait water area constantly. It is mainly due to low salinity of water and severe climate conditions in the winter period and also due to the lack of stone biotopes in coastal zone. Owing to this fact non-migratory component of ichthyocoen in the strait is forming mainly from brackish and euryhaline species that are tolerant to low temperatures.

Table. Ichthyofauna composition in the Kerch Strait

Taxon	Environmental group
SQUALIFORMES	
Squalidae <i>Squalus acanthias</i> Linnaeus, 1758	A
RAJIFORMES	
Rajidae <i>Raja clavata</i> Linnaeus, 1758 – thrasher (sea-fox)	A
MYLIOBATIFORMES	
Dasyatidae <i>Dasyatis pastinaca</i> (Linnaeus, 1758)	M
ACIPENCERIFORMES	
Acipenseridae	
* <i>Acipenser gueldenstaedtii</i> Brandt & Ratzeburg, 1833	A
* <i>Acipenser stellatus</i> Pallas, 1771	A
* <i>Huso huso</i> (Linnaeus, 1758)	A
CLUPEIFORMES - СЕЛЬДЕОБРАЗНЫЕ	
Clupeidae-Сельдевые	
<i>Alosa caspia tanaica</i> (Grimm, 1901)	M
<i>Alosa kessleri pontica</i> (Eichwald, 1838)	M
<i>Clupeonella cultriventris</i> (Nordmann, 1840)	A
<i>Sardina pilchardus</i> (Walbaum, 1792)	A
<i>Sprattus sprattus</i> (Linnaeus, 1758)	A

Engraulidae-Анчоусовые	
<i>Engraulis encrasicolus maeoticus</i> Pusanov, 1926	M
<i>Engraulis encrasicolus ponticus</i> Aleksandrov, 1927	M
CYPRINIFORMES	
Cyprinidae	
<i>Alburnus alburnus</i> (Linnaeus, 1758)	A
* <i>A. leobergi</i> Freyhof et Kottelat, 2007	A
* <i>Carassius carassius</i> (Linnaeus, 1758)	A
<i>Carassius gibelio</i> (Bloch, 1782)	A
<i>Cyprinus carpio</i> (Linne, 1758)	A
<i>Rutilus rutilus heckeli</i> (Nordmann, 1840)	A
<i>Pelecus cultratus</i> (Linnaeus, 1758)	A
SALMONIFORMES	
Salmonidae	
* <i>Salmo trutta labrax</i> (Pallas, 1811)	A
ESOCIFORMES	
Esocidae	
<i>Esox lucius</i> Linne, 1758	A
GADIFORMES	
Gadidae	
<i>Merlangius merlangus euxinus</i> (Nordmann, 1840)	A
Phycidae	
<i>Gaidropsarus mediterraneus</i> (Linnaeus, 1758)	R
OPHIDIIFORMES	
Ophidiidae	
<i>Ophidion rochei</i> Müller, 1845	R
MUGILIFORMES	
Mugilidae	
<i>Liza aurata</i> (Risso, 1810)	M
<i>L. saliens</i> (Risso, 1810)	M
<i>L. haematocheila</i> (Temminck & Schlegel, 1845)	M
<i>Mugil cephalus</i> Linnaeus, 1758	M
ATERINIFORMES	
Atherinidae	
<i>Atherina boyeri</i> Risso, 1810	M
<i>Atherina hepsetus</i> (Linnaeus, 1758)	A
BELONIFORMES	
Belonidae	
<i>Belone belone euxini</i> Günther, 1866	M
GASTEROSTEIFORMES	
Gasterosteidae	
<i>Gasterosteus aculeatus</i> Linnaeus, 1758	A
<i>Pungitius platygaster</i> (Kessler, 1859)	A
Syngnathidae	
* <i>Hippocampus hippocampus</i> (Linnaeus, 1758)	R
<i>Nerophis ophidion</i> (Linnaeus, 1758)	R
<i>Syngnathus abaster</i> Risso, 1827	R

* <i>S. tenuirostris</i> Rathke, 1837	A
<i>S. typhle</i> Linnaeus, 1758	R
* <i>S. variegatus</i> Pallas, 1814	A
SCORPAENIFORMES	
Scorpaenidae	
<i>Scorpaena porcus</i> Linnaeus, 1758	R
Triglidae	
* <i>Chelidonichthys lucernus</i> (Linnaeus, 1758)	A
PERCIFORMES	
Percidae	
* <i>Percarina demidoffii</i> Nordmann, 1840	A
<i>Sander lucioperca</i> (Linnaeus, 1758)	A
Pomatomidae	
<i>Pomatomus saltatrix</i> (Linnaeus, 1766)	A
Carangidae	
<i>Trachurus mediterraneus ponticus</i> Aleev	M
Sparidae	
<i>Diplodus annularis</i> (Linnaeus, 1758)	A
Centracanthidae	
<i>Spicara flexuosa</i> (Rafinesque, 1811)	A
Sciaenidae	
* <i>Sciaena umbra</i> Linnaeus, 1758	A
* <i>Umbrina cirrosa</i> (Linnaeus, 1758)	A
Mullidae-Султанковые	
<i>Mullus barbatus ponticus</i> Essipov, 1927	M
Labridae	
<i>Crenilabrus cinereus</i> (Bonnaterre)	R
<i>C. ocellatus</i> (Forsskal)	R
<i>C. roissali</i> (Risso, 1810)	R
<i>C. tinca</i> (L.)	A
Ammodytidae	
<i>Gymnammodytes cicerellus</i> (Rafinesque, 1810)	A
Trachinidae	
<i>Trachinus draco</i> Linnaeus, 1758	R
Uranoscopidae	
<i>Uranoscopus scaber</i> Linnaeus, 1758	R
Blenniidae	
<i>Aidablennius sphyinx</i> (Valenciennes, 1836)	R
<i>Coryphoblennius galerita</i> (Linnaeus, 1758)	R
<i>Parablennius sanguinolentus</i> (Pallas, 1814)	R
<i>P. tentacularis</i> (Brünnich, 1768)	R
<i>P. zvonimiri</i> (Kolombatović, 1892)	R
Callionymidae-Лировые	
<i>Callionymus pusillus</i> Delaroche, 1809	R
<i>C. risso</i> Lesueur, 1814	R
Gobiidae	
<i>Aphia minuta</i> (Risso, 1810)	R

<i>Benthophilus stellatus</i> (Sauvage, 1874)	R
<i>Knipowitschia caucasica</i> (Berg, 1916)	R
<i>Mesogobius batrachocephalus</i> (Pallas, 1814)	R
<i>Gobius niger</i> Linnaeus, 1758	R
<i>Neogobius cephalargoides</i> Pinchuk, 1976	R
<i>N. eurycephalus</i> (Kessler, 1874)	R
<i>N. fluviatilis</i> (Pallas, 1814)	R
<i>N. melanostomus</i> (Pallas, 1814)	R
<i>N. ratan</i> (Nordmann, 1840)	R
<i>N. syrman</i> (Nordmann, 1840)	R
<i>Pomatoschistus marmoratus</i> (Risso, 1810)	R
<i>P. microps</i> (Krøyer, 1838)	R
<i>Proterorhinus marmoratus</i> (Pallas, 1814)	R
<i>Zosterisessor ophiocephalus</i> (Pallas, 1814)	R
Scombridae	
<i>Sarda sarda</i> (Bloch, 1793)	A
PLEURONECTIFORMES	
Scophthalmidae	
<i>Psetta maotica</i> (Pallas, 1814)	A
<i>P. torosa</i> (Rathke, 1837)	A
Pleuronectidae	
<i>Platichthys flesus luscus</i> (Pallas, 1814)	A
Bothidae	
* <i>Arnoglossus kessleri</i> Schmidt, 1915	A
Soleidae	
<i>Pegusa lascaris</i> (Risso, 1810)	R
M – seasonal migrants A – adventive species P – resident species	

REFERENCES

- Nelson J. S. Fishes of the World. 4th ed./ J.S. Nelson - Hoboken, New Jersey; Canada: John Wiley&Sonc, INC, 2006. - 602 p.
- Vasilyeva E. D. 2007. Black Sea fishes. Field guide for sea, brackish, euryhaline and anadromous fish species with colour figures collected by S.V. Bogorodsky /E. D. Vasilyeva. - Moscow: VNIRO Publishing House, 238 p. (In Russian)
- Deripasko O. A. The Fishes of the Sea of Azov / O. A. Deripasko, L. V. Izergin, K. V. Demyanenko – Berdyansk: Publishing House ООО «NPK «Inter – M», Zaporozhie, 2011. – 288 p. (In Russian)
- Red Book of Ukraine. Animal World / edited by I. A. Akimov – Kyiv: Globalconsulting, 2009. – 600 p. (In Ukrainian).
- Yeremeev V.N. OkeanographicheskieslovniaIecologicheckie problem Kerchenskogo proliva / V. N. Yeremeev, V. A. Ivanov, Yu. P. Illyin // Morskoy ekologicheskyy zhurnal. – 2003 - T. 2, №3. – S. 27-40.

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ТАКСОНОМИЧЕСКИЙ СОСТАВ И ЭКОЛОГИЧЕ-

СКИЕ ХАРАКТЕРИСТИКИ ИХТИОФАУНЫ КЕРЧЕНСКОГО ПРОЛИВА

В данной работе приводятся сведения о составе ихтиофауны Керченского пролива и ее экологических особенностях. Дается список таксонов с указанием характера пребывания в акватории пролива. Выделяются группы видов в соответствии с биотопическим распределением в прибрежной зоне пролива.

Ключевые слова: Керченский пролив, ихтиофауна, мигранты, адвентивные виды, виды-резиденты.

В. В. ШАГАНОВ

ТАКСОНОМІЧНИЙ СКЛАД ТА ЕКОЛОГІЧНІ ХАРАКТЕРИСТИКИ ІХТІОФАУНИ КЕРЧЕНСЬКОЇ ПРОТОКИ

В цій роботі надаються дані про склад іхтіофауни Керченської протоки та її екологічні особливості. Дається список таксонов з вказівкою характеру перебування в акваторії протоки. Виділяються групи видів відповідно до біотопічного розподілу в прибережній зоні протоки.

Ключові слова: Керченська протока, іхтіофауна, мигранти, адвентивні види, резиденти.