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THE ASSEMBLAGE OF FISH OF THE TYLIGUL RIVER (BLACK-SEA BASIN OF SOUTH-WESTERN UKRAINE)

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In this paper, the fish assemblage of the lower flow of the Tyligul River (173 km length), North-Western Black Sea basin is described. Studies were conducted at the Odessa region in 2012 and 2014. The riverbed in there sites is overgrown, boggy, and the salinity is up to 2 ‰. In total, 12 fish species from four families were registered from 690 specimens. Some of the materials are transferred to the collection fund of the National Museum of Natural History of NAS of Ukraine in Kyiv. This is the first collection of samples in the museum collections of the basin, excluding Tyligul Estuary, it has high salinity and therefore is close to marine fish fauna. The fish assemblage includes two introduced species, the stone moroko *Pseudorasbora parva* (Temminck et Schlegel, 1846), and the Prussian carp *Carassius gibelio* (Bloch, 1782), while the others are native. The most numerous species were the belica, *Leucaspius delineatus* (Heckel, 1843) and the stone moroko. Predominant fish limnophyls are unpretentious to the oxygen content in water. Some of Ukrainian sticklebacks *Pungitius platygaster* (Kessler, 1859) had parasites *Lernaea* cf. *elegans* (Copepoda: Lerneidae), and the majority of the studied specimens were infected. Species belonging to white-fin gudgeon *Romanogobio* sp. from Tyligul is controversial and needs further investigation as river basin is on the verge of habitat of several species of the genus.

Keywords: Tyligul River, fish, assemblage, Northern Black Sea, museum collections.

INTRODUCTION

The determination of flora and fauna communities is important for the natural protection of particular territories and water bodies and also for the economic activities on these localities. The fishes of fresh water bodies of Ukraine were thoroughly studied in the last century. The ichthyological collection of the Zoological Museum of the Natural History Museum of NAS of Ukraine is very valuable due to the number of specimen and geographical origin. Nevertheless, the small- and middle-size rivers, especially located out of the basins of the great rivers, have not the great amount by its fishery importance. Therefore the small rivers are usually excluded from the main ichthyological studies and their

fauna is not presented in the museum collections. It concerns also small rivers near the coast, traditionally more attention given to study of marine fish species which are important for fisheries. There are two such regions in Ukraine: North-West Black Sea and North Azov Sea.The steppe rivers of the Northern Azov coast are studied much better [4, 5]. The Tyligul is one of rivers of the North-Western Black Sea coast, which are less studied.

The Tyligul River is located between the drainages of the rivers of Southern Bug and Dniester. This is a periodically drying steppe river, overgrown with aquatic plants, mainly hydrophytes.

The bed of the Tyligul River is oriented from north to south. The river streams from the Podolian Upland and inflows to the Tyligul Estuary on the North Black Sea coast. The estuary is formed by marine waters flooding of riverine lower reach with subsequent separation from the sea by sandbar [13]. The river is 173 km long; the catchment area 5 420 km^2, inclination 0.9 m/km, mesh density 0.11 km/km^2 [11, 12]. The Tyligul River basin includes 63 smaller rivers. The largest among them are Zhurivka (right bank), Slipukha and Tartakay (left banks).

Through the southern part of the Podolia Highland, the Tyligul River flows in a narrow, 1.0–1.5 km wide, valley. Beneath, in the Black Sea Lowland, the valley widens up to 3 km (the riverine width up to 10–20 m). The valley is mostly asymmetrical and its slopes are fragmented by ravines and gullies. The floodplain is partly bogged, 300–600 m wide. The river is mostly snow fed and partially dries out at summer. Its waters are used for irrigation. The riverine banks serve as cattle pasture. The entire drainage is located in the natural steppe area.

In the published data, the information about the benthic macroinvertebrates is taken from Anistratenko et al. [2]. In total of 32 mollusk species and some taxonomic groups of arthropods are described for the Tyligul River. In addition, the flora of rare plants of the Tyligul valley is studied, consisting of 189 plant species, including 10 rare [3], and the macrophytobenthos includes 74 species [7].

The data about the fish fauna of the Tyligul River are absent. Also in the ichthyological collection of the Zoological Museum of the Natural History Museum of NAS of Kyiv, Ukraine, we did not find any fishes marked as caught in the Tyligul River. Instead, in the collections of the mentioned museum there are data and samples from the Tyligul Estuary (9 fish species in 15 jars) [10]. However, the ichthyofauna of the river and the estuary is very different because of the different water salinity, which is about 30 ‰ in the estuary.

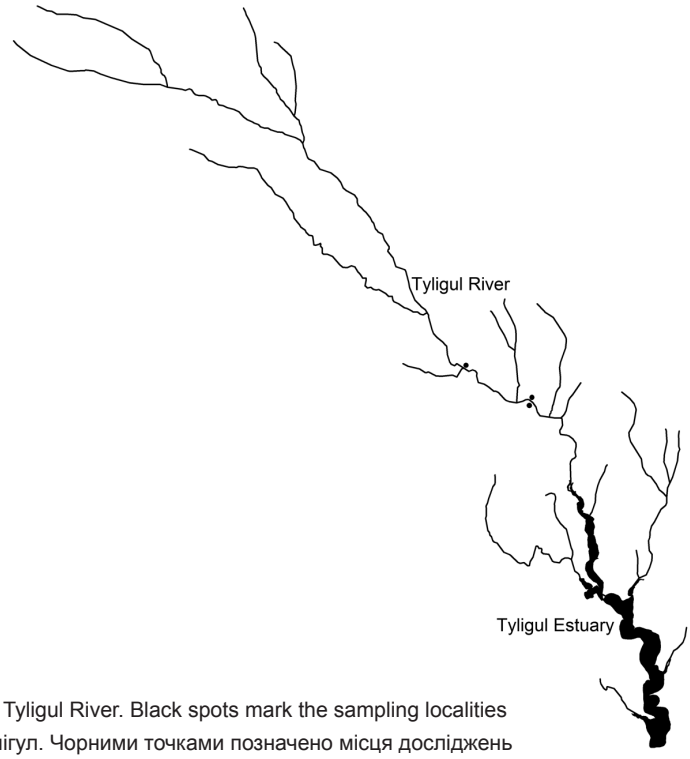
MATERIALS AND METHODS

The ichthiological sampling was conducted in May 2012 and August 2014 in the villages Zavodivka, Mykhailo-Oleksandrivka, and Demydove, Berezivka region, Odessa district (Fig.). The sampling localities have 1.0–1.5 m depth, bottom is muddy, and the banks are slope. The flow is almost absent; the water is opaque and turbid, used as watering place for cattle. The aquatic vegetation includes both hydato- and hydrophytes (mainly reeds and mannagrass). In general, the lower reach of the Tyligul River is almost totally overgrown with reed, complicating the sampling, and the fishing was organized just in several useful, ingrown, places.

The fish was sampled by the 10 m long seine, with 4–6 mm cell, and the deep-nets with the same cell [8]. Also the catchments of the local anglers were observed. The scientific names of the fish are given according to FishBase [6]. The some specimens were fixed in 4 % formalin or in 70 % ethanol for further deposition in the ichthyological collection of the National Museum of Natural History in Kyiv.

RESULTS AND DISCUSSION

In total, 690 fish specimen related to 12 species and four families were caught. The samples of 2012 have the catalogue numbers 9806, 9807 and 9808, and those of 2014 – 9862 and 9863. The samples related to five fish species were deposited (Table).



The map of the Tyligul River. Black spots mark the sampling localities
Карта річки Тилігул. Чорними точками позначено місця досліджень

Two fishes, the Prussian carp *Carassius gibelio* (Bloch, 1782) and the stone moroko *Pseudorasbora parva* (Temminck et Schlegel, 1846) are invasive species, introduced and widely distributed at the beginning of 20th century. All other species are indigenous. Among the indigenous species, two fishes, the belica *Leucaspius delineatus* (Heckel, 1843) and the Ukrainian stickleback *Pungitius platygaster* (Kessler, 1859), are representatives of the Ponto-Caspian neolimnetic fauna. The other 8 species are typical for the European freshwater fauna.

The belica and the stone moroko were most numerous in the catchments. According to flow preferences the group of limnophyls is dominant but grouping by other ecological preferences reveals the prevalence of euryhalline and oligooxide-tolerant species. The mentioned species assemblage is fully adapted to the conditions of the Tyligul River.

The presence of the white-fin gudgeon *Romanogobio* sp. in the catchments causes the discussion. The taxonomy of the gobiin fishes is recently revised basing on molecular data, and the drainages of the Southern Bug Rivers, in east, and the Dniester River, in west, are the border of ranges of two cryptic species from this group, *R. belingi* and *R. kessleri* [9]. Therefore, the species identification of the gudgeons inhabiting the Tyligul River is still questionable.

The species composition of the lower Tyligul River ichthyofauna
Видовий склад рибного населення нижньої течії річки Тилігул

Species	Percentage
Cyprinidae	
Rhodeus amarus (Bloch, 1782) – European bitterling	0.73
Carassius gibelio (Bloch, 1782) – Prussian carp	8.56
Pseudorasbora parva (Temminck et Schlegel, 1846) – Stone moroko	31.93*
Romanogobio sp. – White-fin gudgeon	0.15
Blicca bjoerkna (Linnaeus, 1758) – White bream	0.15*
Alburnus alburnus (Linnaeus, 1758) – Bleak	2.32
Leucaspius delineatus (Heckel, 1843) – Belica	38.46*
Rutilus rutilus (Linnaeus, 1758) – Roach	1.45
Scardinius erythrophthalmus (Linnaeus, 1758) – Rudd	5.06*
Cobitidae	
Misgurnus fossilis (Linnaeus, 1758) – European weather loach	5.81
Esocidae	
Esox lucius Linnaeus, 1758 – Northern pike	0.15
Gasterosteidae	
Pungitius platygaster (Kessler, 1859) – Ukrainian stickleback	5.22*
Total	12

Comment: * deposited in the National Museum of Natural History, NAS of Ukraine.

Примітка: * передано до фондів Національного науково-природничого музею НАН України.

The study of the fixed sample of the Ukrainian stickleback discovered the infection of parasitic crustaceans *Lernaea* cf. *elegans* (Copepoda: Lerneidae). 12 of 18 studied specimen were parasitized with 2–3 crustaceans, and only 6 fishes were parasite-free. The length of the studied stickleback varied from 18 to 27 mm.

Compared with the rivers of the North Azov coasts, the Ponto-Caspian gobiids (Gobiidae: Benthophilinae), typical for all the rivers of the Azov basin, were not found in the Tyligul River. The absence of these brackishwater, marine, and anadromous species can be explained by the lack of direct inflow into the sea. The mentioned species were also absent in the small rivers of the Azov basin, which inflow into the closed-off lagoons [4]. The white-fin gudgeons are absent in the Azov rivers. All other species that we found in the Tyligul River, were also registered in the rivers of the Northern Azov coast that is generally typical of this type of waterbody. The decreasing species diversity of small rivers of the Azov basin is due to currently observed disappearance of the anadromous and reophylic fish species [4, 5]. None of the 12 species found in the Tyligul is not anadromous and reophylic is white-fin gudgeon only. So, may be similar changes are taking place of fish population of the rivers of the two regions, though for Tyligul this regularity can not be established because of the lack of previous data.

However, we did not find in the Tyligul River species present in the Ukrainian Red List [1].

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РИБНЕ НАСЕЛЕННЯ РІЧКИ ТИЛІГУЛ (ЧОРНОМОРСЬКИЙ БАСЕЙН, ПІВДЕННО-ЗАХІДНА УКРАЇНА)

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Описано видовий склад риб нижньої течії річки Тилігул (довжина 173 км), Північно-західне Причорномор'я. Дослідження були проведені 2012 і 2014 рр. в Одеській області. Русло в цій ділянці зарослe, заболочене, солоність сягає 2 ‰. Усього виявлено 690 особин із 12 видів з 4 родин. Частину дослідженого матеріалу передано до фондів ННПМ НАН України (м. Київ), це перші збори у фондах музею із цього басейну, не враховуючи Тилігульського лиману, який має високу солоність і, відповідно, близьку до морської іхтіофауну. Наявні два види інтродуцентів – чебачок

амурський *Pseudorasbora parva* (Temminck et Schlegel, 1846) і карась китайський, або сріблястий *Carassius gibelio* (Bloch, 1782), інші види є аборигенними. Наймасовіші види – вівсянка *Leucaspius delineatus* (Heckel, 1843) і чебачок амурський. Переважають риби лімнофільної екологічної групи, а також невибагливі до вмісту кисню у воді. На особинах колючки південної *Pungitius platygaster* (Kessler, 1859) знайдено паразита *Lernaea* cf. *elegans* (Copepoda: Lerneidae), більшість досліджених особин були заражені. Видова приналежність пічкура-білопера *Romanogobio* sp. з Тилігулу є дискусійною і потребує подальшого дослідження, оскільки басейн річки лежить на межі ареалів кількох видів цього роду.

Ключові слова: річка Тилігул, риби, видовий склад, Північне Причорномор'я, музейні колекції.

РЫБНОЕ НАСЕЛЕНИЕ РЕКИ ТИЛИГУЛ (ЧЕРНОМОРСКИЙ БАССЕЙН, ЮГО-ЗАПАДНАЯ УКРАИНА)

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Описан видовой состав рыб нижнего течения реки Тилигул (длина 173 км), северо-западное Причерноморье. Исследования были проведены 2012 и 2014 гг. в Одесской области. Русло на этом участке заросшее, заболоченное, соленость достигает 2 ‰. Всего обнаружено 690 особей из 12 видов из 4 семейств. Часть исследованного материала передана в фонды ННПМ НАН Украины (г. Киев), это первое собрание в фондах этого музея из данного бассейна, не считая Тилигульского лимана, который имеет высокую соленость и, соответственно, близкую к морской ихтиофауну. Присутствуют два вида интродуцентов – чебачок амурский *Pseudorasbora parva* (Temminck et Schlegel, 1846) и карась китайский, или серебристый *Carassius gibelio* (Bloch, 1782), другие виды являются аборигенными. Массовые виды – овсянка *Leucaspius delineatus* (Heckel, 1843) и чебачок амурский. Преобладают рыбы лимнофильной экологической группы, а также неприхотливые к содержанию кислорода в воде. На особях колючки южной *Pungitius platygaster* (Kessler, 1859) найден паразит *Lernaea* cf. *elegans* (Copepoda: Lerneidae), большинство исследованных особей были заражены. Видовая принадлежность пескаря белоперого *Romanogobio* sp. из Тилигула является дискуссионной и требует дальнейшего исследования, поскольку бассейн реки находится на границе ареалов нескольких видов этого рода.

Ключевые слова: река Тилигул, рыбы, видовой состав, Северное Причерноморье, музейные коллекции.

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