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FISH FAUNA OF THE OSTER RIVER BASIN (DESNA RIVER BASIN, UKRAINE) - RECENT DATA

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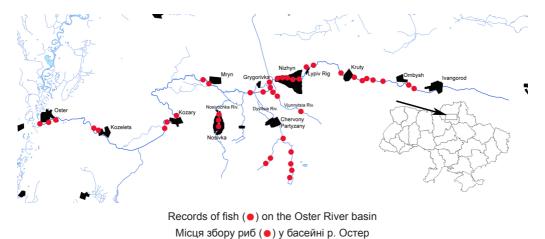
According to recent data, fish fauna of the Oster River basin numbers 21 species, including two introduced species: *Perccottus glenii* and *Pseudorasbora parva*. 17 species of fish were registered in the lower section of the river (4 of them for the first time), 21 species were found in the middle section (12 of them were not previously noted for this section) and only 11 species were found in the upper section (6 species were not previously noted for this section). Six species – *Pseudorasbora parva*, *Misgurnus fossilis*, *Pungitius platygaster*, *Gymnocephalus cernua*, *Babka gymnotrachelus* and *Proterorhinus semilunaris* – are recordered in the Oster River for the first time. Fish population of the lower part differs by qualitative composition, primarily due to its link with the Desna River. Only 11 species were registered in three tributaries of the Oster River and in their basins. Nosivochka River has 6 species, including introduced *Cyprinus carpio* and *Hypophthalmichthys molitrix*. Five species were recorded in the Divytsia River basin and six species are found in the V'iunnytsia River. The most frequently caught species in the Oster River basin were *Leucaspius delineatus* and *Rhodeus amarus* (F = 75.0), *Scardinius erythrophthalmus* and *Tinca tinca* (F = 66.7).

Keywords: Ukraine, Oster River, Desna River, ichthiofauna, introduced species.

INTRODUCTION

The Oster River is a left tributary of the Desna River which flows within the Kozelets', Nosivka, Nizhyn and Borzna regions of Chernihiv district. It is 226 km long [2] with the basin area of 2,950 km² and the slope of 0.17 m/km. The river has four main tribataries: V'iunnytsia River (26 km long), Divytsia River (20 km long), Rudka River (19 km long), Nosivochka River (14 km long), and 9 tributaries with the length less than 10 km [2]. In addition, a big number of reclamation channels is integrated with it. The Oster River is connected with the Veresoch River (tributary of the Desna River) in the north by the reclamation channels of Smolianka swamp. In the south (at Kozelets' town, see Figure), the Oster River is united with the Trubizh River (from the Dnieper River basin) by the reclamation chanal.

At present, the river is shallow and partially dring up during summer. It is turning into a cascade of reservoirs, especially in the upper part. The Oster riverbed is marshy, regulated by dams which prevent its complete dehydration during summer—autumn period.



The Oster River fish fauna is poorly known. Some fragmentary data on the composition of the Oster River fish populations are presented in the publications of Kessler [3] who revealed *Silurus glanis* Linnaeus, 1758 in the Oster River, Belynh [1], who registered *Rhynchocypris percnurus* (Pallas, 1814) and *Leucaspius delineatus* (Heckel, 1843) and Güldenstäedt (Cited by [1]), who revealed *Anguilla anguilla* (Linnaeus, 1758) in the Oster River at Nizhyn town. However, Kessler [3] questioned this finding and considered as an erroneous data. In fact, the only work who presenting data on the distribution of fish in this river is an article of Poltavchuk and Shcherbukha [6]. The authors cited a list of 20 species of fish: 19 species of fish listed for lower section of the Oster River (at vicinities of Kozelets' town), 9 – for middle (Mryn village – Nizhyn town) and 7 – for upper one (Ombysh village – Ivangorod village) respectively (Table 1). Also we [8] registered the *Perccottus glenii* Dybowskii, 1877 in the Oster River basin for the first time, with remarks about some other species.

It should be noted that researchers were often confused about the Oster River – the tributary of the Desna River, with other Oster River which is the tributary of the Sozh River. The data on fish fauna of the latter are presented given in publications of the last century [13, 14] and some modern works [4].

The aim of this work is to analyze the current state of fish fauna of the Oster River and its changes over the last 30 years, that occurred under the influence of significant changes in the hydrological regime of the river, as a result of land reclamation and anthropogenic loading.

MATERIAL AND METHODS

The original material analyzed in the present work was collected during 2012–2015 in spring–summer–autumn period. Fish were caught in the river channel and in the reclamation chanals adjacent to it, as well as in lakes and ponds located within the drainage basin of the river. Totally 638 specimens of 24 species from 42 points were collected and processed. Places of sampling are marked on the map (see Figure). All specimens were collected using nets and draggers. We have also studied the material from fish collections of Nizhyn Gogol State University [7] and those of the Zoological Department of National Museum of Natural History at the National Academy of Sciences of Ukraine [5]. We used frequency factor (F) which essentially reflects a percentage

Table 1. The species composition of fish in the Oster River basin Таблиця 1. Видовий склад риб басейну р. Остер

	Chasing	oltavch erbukha		Our data			
No	Species	J		a, 1900 	1	Ш	Ш
	Esocidae		"	111		- 11	111
1	Esox lucius Linnaeus, 1758	+	_	_	+	+	+
•	Cyprinidae						
2	Abramis brama (Linnaeus, 1758)	+	_	_	+?	_	_
3	Alburnus alburnus (Linnaeus, 1758)	+	_	_	+	+	_
4	Blicca bjoerkna (Linnaeus, 1758)	+	_	_	+	+	_
5	Carassius carassius (Linnaeus, 1758)*	+	_	_	_	+	+
6	Carassius gibelio (Bloch, 1782)	+	+	+	_	+	+
7	Chondrostoma nasus (Linnaeus, 1758)*	+	_	_	_	_	_
8	Cyprinus carpio Linnaeus, 1758	_	_	_	_	+?	_
9	Gobio gobio (Linnaeus, 1758)	+	+	+	_	+	_
10	Idus idus (Linnaeus, 1758)	+	+	+	+	+	_
11	Leucaspius delineatus (Heckel, 1843)	+	+	+	_	+	+
12	Leuciscus leuciscus (Linnaeus, 1758)*	+	_	_	+	_	_
13	Pseudorasbora parva (Temminck & Schlegel, 1846)	_	_	_	_	+	_
14	Rhodeus amarus (Bloch, 1782)	+	+	+	+	+	+
15	Rhynchocypris percnurus (Pallas, 1814)*	_	_	_	_	+	_
16	Rutilus rutilus (Linnaeus, 1758)	+	+	_	+	+	+
17	Scardinius erythrophthalmus (Linnaeus, 1758)	+	_	_	+	+	+
18	Squalius cephalus (Linnaeus, 1758)	+	+	-	+	+	_
19	Tinca tinca (Linnaeus, 1758)	+	_	-	_	+	+
	Balitoridae						
20	Barbatula barbatula (Linnaeus, 1758)	_	_	+	_	+	-
	Cobitidae						
21	Cobitis taenia (Linnaeus, 1758)	+	+	+	+	+	+
22	Misgurnus fossilis (Linnaeus, 1758)	-	_	_	_	+	+
	Gasterosteidae						
23	Pungitius platygaster (Kessler, 1859)	-	_	_	+	-	-
	Percidae						
24	Gymnocephalus cernua (Linnaeus, 1758)	_	_	_	+	-	_
25	Perca fluviatilis Linnaeus, 1758	+	+	_	+	+	+
	Odontobutidae						
26	Perccottus glenii Dybowskii, 1877	-	_	_	_	+	-
	Gobiidae						
27	Babka gymnotrachelus (Kessler, 1857)	-	-	-	+	-	-
28	Neogobius fluviatilis (Pallas, 1814)	+	-	_	+	+	-
29	Proterorhinus semilunaris (Heckel, 1837)	_	-	_	+	_	-
	Number of species	19	9	7	17	21	11

Comment: * - Fishes of the Red Book of Ukraine [11]

Примітка: * – Риби, занесені до Червоної книги України [11]

of species to the total number of points, to describe their frequency in separate locations. The Sorensen similarity coefficient (S) calculated as S = 2M/(2M+N) where M is the number of matches and N is the total number of columns with presence in just one row, was used to compare species compositions of three sections of the Oster River.

The Oster River was divided into three sections [6]: the lower, the middle, and the upper one. Such division is arbitrary because it is almost never associated with the hydrologic conditions or any other factors. We accept it only for the comfortability of comparison our data with literature (Table 1). However, we consider as an appropriate to attribute river section from the mouth to the first dam to the lower reaches [6].

RESULTS AND DISCUSSION

According to our data, fish fauna of the lower, middle, and upper sections of the Oster River lists 29 species (Table 1) including the lower section with 17 species, middle section – with 21 species and upper section – with 11 species. Six species are recorded in the Oster River for the first time: *Pseudorasbora parva* (Temminck & Schlegel, 1846), *Misgurnus fossilis* (Linnaeus, 1758), *Pungitius platygaster* (Kessler, 1859), *Gymnocephalus cernua* (Linnaeus, 1758), *Babka gymnotrachelus* (Kessler, 1857), *Proterorhinus semilunaris* (Heckel, 1837), and probably *Cyprinus carpio* Linnaeus, 1758. According to data of local fishermen, some years ago this species was released into the Oster River by fishfarmers at Kozelets' town. *B. gymnotrachelus* was registered in the Desna River basin for the first time. Previously, it was given only for the Desna River mouth [9, 10, 12].

Our investigation revealed 4 more species (Table 1) in the lower section of the river which were not recorded there before [6]: *P. platygaster*, *G. cernua*, *B. gymnotrachelus* and *P. semilunaris*. For the middle section, we listed 12 species: *Esox lucius* Linnaeus, 1758, *Alburnus alburnus* (Linnaeus, 1758), *Blicca bjoerkna* (Linnaeus, 1758), *Carassius carassius* (Linnaeus, 1758), *P. parva*, *Rh. percnurus*, *Scardinius erythrophthalmus* (Linnaeus, 1758), *Tinca tinca* (Linnaeus, 1758), *Barbatula barbatula* (Linnaeus, 1758), *M. fossilis*, *P. glenii* and *Neogobius fluviatilis* (Pallas, 1811). For upper section, we listed 6 species for the first time, respectively: *E. lucius*, *C. carassius*, *Rutilus rutilus* (Linnaeus, 1758), *T. tinca*, *M. fossilis* and *Perca fluviatilis* (Linnaeus, 1758). At the same time, we have not revealed *Gobio gobio* (Linnaeus, 1758), *Idus idus* (Linnaeus, 1758), and *B. barbatula* in the upper section of the Oster River, though they were listed by Poltavchuk and Shcherbukha [6].

Additionally, our study did not reveale previously listed *Rh. percnurus* and *N. fluvia-tilis* in the river and its reclamation chanals. Nevertheless, both species are presented in fish collections of Nizhyn State University – they were caught in a lake near Lypiv Rih village in 2005 by Ruhmedeva O.P. (see Fig.).

Three species (*Abramis brama* (Linnaeus, 1758), *Chondrostoma nasus* (Linnaeus, 1758) and *Leuciscus leuciscus* (Linnaeus, 1758) were not registered in the middle and upper sections of the Oster River. They were listed by Poltavchuk and Shcherbukha [6] only for the lower section (Table 1). Also, we have not revealed *S. glanis* which was noted for the Oster River by Kessler [3].

Four species (*C. carassius*, *Ch. nasus*, *L. leuciscus* and *Rh. percnurus*) were listed as endangered [11]. However only two of them *C. carassius* and *L. leuciscus* were registered.

Fish fauna of three parts of the Oster River was compared by Sorensen coefficient (Table 2). The similarity of the lower and middle sections was 0.56, lower and upper – 0.41,

and middle and upper -0.71. Poltavchuk and Shcherbukha [6] have got similar values: 0.64, 0.46 and 0.75, correspondingly. Based on these data, we concluded that fish population of the lower section differs by a qualitative composition, primarily due to its link with the Desna River. Our data confirm this, since the value of the coefficient of Sorensen for similar comparisons is 0.56, 0.41 and 0.71, respectively. Some discrepancies presented in Table 2 can be explained by the fact that we considered the lower part as a free section of the river from the mouth to the first dam (other authors also included a part with tree dams in the lower section).

Table 2. Sorensen coefficient (S) for three parts of the Oster River (including literature [6] and our data)

Таблиця 2. Значення коефіцієнта Сьоренсена (S) для трьох ділянок р. Остер (включа-
ючи літературні [6] та власні дані)

			Poltavchuk, herbukha, 1		Our data					
		1	II	III	1	II	III			
uk, Kha,	I	1	0.64	0.46	0.72	0.78	0.71			
Poltavchuk, Shcherbukha 1988	II	0.64	1	0,75	0.46	0.58	0.67			
Pol	III	0.46	0.75	1	0.25	0.48	0.53			
ğ	1	0.72	0.46	0.25	1	0.56	0.41			
Our data	II	0.78	0.58	0.48	0.56	1	0.71			
0	III	0.71	0.67	0.53	0.41	0.71	1			

When comparing the quality of fish population in the same areas over the years, including 1988 and 2015 (Table 1), one can see that the similarity between the sections in the direction from lower to upper ones is reduced, while Sorensen coefficient is equal to the lower part of 0.72; only for the top 0.53. It can be explained by much higher species richness in the relevant parts of the Oster River.

Table 3 presents data on the composition of fish fauna of the Oster River. The highest number of species was recorded at river section from the Oster River to the mouth (it is actually the entire lower current). 16 species were found in the river at the territory of Nizhyn town (Table 3). Here, high diversity of habitats is seen and the sampling process was very intensive. The most frequently caught species at this area were *L. delineatus* and *Rh. amarus* (F = 75,0), *S. erythrophthalmus* and *T. tinca* (F = 66,7). Thus, they can be attributed to the most numerous industrial species in the Oster River. At some other areas, they can be considered as background species. There was also a number of fish which had only one sample point, mainly in the lower part of the river: *L. leuciscus*, *P. platygaster*, *G. cernua*, *B. gymnotrachelus*, *N. fluviatilis*, *P. semilunaris*, *A. brama*, *C. carpio* (noted only by personal data of local fishermen) and introduced *Hypophthalmichthys molitrix* (Valenciennes, 1844). Obviously, these species could penetrate into the studied area from the Desna River. On the other hand, *L. delineatus*, *M. fossilis* and some other fish were not registered at lower section, though they are common at middle and upper parts of the Oster River.

Table 3.The distribution of species composition of fish in the Oster River basinТаблиця 3.Видове різноманіття риб на окремих ділянках в басейні р. Остер

Species	Lower		Middle Upper Tribut		buta	ries	F						
	I	Ш	III	IV	٧	VI	VII	VIII	IX	Χ	ΧI	XII	
Esocidae													
Esox lucius			+			+			+	+	+	+	50.0
Cyprinidae													
Abramis brama		+?											8.3
Alburnus alburnus	+					+							16.6
Blicca bjoerkna	+												8.3
Carassius carassius*							+	+	+				25.0
Carassius gibelio			+		+	+	+		+	+		+	58.3
Cyprinus carpio		+?								+			16.6
Gobio gobio			+	+	+	+					+		41.7
Idus idus	+					+							16.6
Hypophthalmichthys molitrix										+			8.3
Leucaspius delineatus		+	+	+	+	+	+	+	+		+		75.0
Leuciscus leuciscus*	+												8.3
Pseudorasbora parva					+	+							16.6
Rhodeus amarus	+	+	+	+	+	+		+	+		+		75.0
Rutilus rutilus	+	+	+			+							33.3
Scardinius erythrophthalmus	+	+	+	+	+	+		+	+				66.7
Squalius cephalus	+		+		+	+							33.3
Tinca tinca		+	+	+		+		+	+	+		+	66.7
Balitoridae													
Barbatula barbatula			+	+	+	+							33.3
Cobitidae													
Cobitis taenia	+	+	+	+	+	+					+		58.3
Misgurnus fossilis			+				+	+	+	+	+	+	58.3
Gasterosteidae													
Pungitius platygaster	+												8.3
Percidae													
Gymnocephalus cernua	+												8.3
Perca fluviatilis				+		+	+	+					33.3
Odontobuttidae													
Perccottus glenii						+				+	+	+	33.3
Gobiidae													
Babka gymnotrachelus	+												8.3
Neogobius fluviatilis	+												8.3
Proterorhinus semilunaris	+												8.3
Number of species	17	8	12	8	9	16	5	7	8	6	6	5	

Comments: I – Oster; II – Kozelets'; III – Kozary; IV – Mryn; V – Hryhorivka; VI – Nizhyn; VII – Lypiv Rih; VIII – Kruty; IX – Ombysh; X – Nosivochka River; XI – V'iunnytsia River; XII – Divytsia River basin (including reclamation system chanals)

Примітки: I — Остер; II — Козелець; III — Козари; IV — Мрин; V — Григорівка; VI — Ніжин; VII — Липів Ріг; VIII — Крути; IX — Омбиш; X — р. Носівочка; XI — р. В'юнниця; XII — басейн р. Дівиця (включаючи систему меліоративних каналів)

We also examined three of four tributaries of the Oster River (Table 3, X–XII) – No-sivochka, V'iunnytsia and Divitsia Rivers (excluding Rudka River). Only 11 species were registered in these rivers and their basins. Nosivochka River has 6 species including *C. carpio* and *H. molitrix* which were introduced into the Nosivochka River pounds. Five species were recorded in the Divytsia River basin and six species were found in the V'iunnytsia River. However, the composition of fish fauna of this rivers cannot be considered as constant, because they are subjected to a periodic drying.

Thus, at present fish fauna of the Oster River numbers at least 29 species including 2 introduced species (*P. glenii* and *P. parva*) and 4 species (*C. carassius*, *Ch. nasus*, *L. leuciscus* and *Rh. percnurus*) listed as endangered [11]. We suppose that the ichthyofauna of the lower section of the river can be even more diverse because this part of the river is not separated from the Desna River, as opposed to the middle and upper sections which are cut from the Desna River by numerous dams.

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ІХТІОФАУНА БАСЕЙНУ РІЧКИ ОСТЕР (БАСЕЙН РІЧКИ ДЕСНА, УКРАЇНА) – СУЧАСНИЙ СТАН

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Згідно зі сучасними даними, іхтіофауна р. Остер налічує 21 вид риб, включаючи 2 види-інтродуценти: Perccottus glenii і Pseudorasbora parva. На нижній ділянці р. Остер зареєстровано 17 видів риб (4 з яких – уперше для ділянки), для середньої ділянки зареєстровано 21 вид (12 із них раніше для цієї ділянки вказані не були) і тільки 11 видів зазначені для верхньої ділянки річки (6 із яких для неї вказані вперше). Шість видів — Pseudorasbora parva, Misgurnus fossilis, Pungitius platygaster, Gymnocephalus cernua, Babka gymnotrachelus і Proterorhinus semilunaris — вказані для р. Остер уперше. Іхтіофауна нижньої ділянки річки значно відрізняється за якісним складом, що насамперед пояснюється наявністю постійного зв'язку з Десною. Лише 11 видів зареєстровано у трьох притоках річки Остер та їх басейнах. У річці Носівочці виявлено 6 видів, включаючи Cyprinus carpio і Hypophthalmichthys molitrix. В річці Дівиці виявлено 5 видів і 6 видів у річці В'юнниці. Найпоширенішими в басейні Остра видами виявились Leucaspius delineatus і Rhodeus amarus (F = 75,0) та Scardinius erythrophthalmus і Tinca tinca (F = 66,7).

Ключові слова: Україна, р. Остер, р. Десна, іхтіофауна, інтродуценти.

ИХТИОФАУНА БАССЕЙНА РЕКИ ОСТЁР (БАССЕЙН РЕКИ ДЕСНА, УКРАИНА) – СОВРЕМЕННОЕ СОСТОЯНИЕ

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Согласно современным данным, ихтиофауна р. Остёр насчитывает 21 вид, включая 2 вида-интродуцента: Perccottus glenii и Pseudorasbora parva. В нижнем участке р. Остёр зарегистрировано 17 видов рыб (4 из них — впервые для участка), для среднего участка зарегистрировано 21 вид (12 из них ранее для данного участка указаны не были) и лишь 11 видов указаны для верхнего участка реки (6 из которых указаны впервые). Шесть видов — Pseudorasbora parva, Misgurnus fossilis, Pungitius platygaster, Gymnocephalus cernua, Babka gymnotrachelus и Proterorhinus semilunaris — указаны для р. Остёр впервые. Ихтиофауна нижнего участка реки значительно отличается по качественному составу, что прежде всего объясняется наличием постоянной связи с Десной.Только 11 видов зарегистрированы в трёх притоках реки Остёр и их бассейнах. В речке Носовочке обнаружено 6 видов, включая Cyprinus carpio и Hypophthalmichthys molitrix. В реке Дивице обнаружено 5 видов и 6 видов в реке Вьюннице. Наиболее часто встречающиеся в бассейне Остра виды — это Leucaspius delineatus и Rhodeus amarus (F = 75,0), Scardinius erythrophthalmus и Tinca tinca (F = 66,7).

Ключевые слова: Украина, р. Остёр, р. Десна, ихтиофауна, интродуценты.

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