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Rapid Communication

The occurrence of the Chinese sleeper *Perccottus glenii* Dybowski, 1877 in the Southern Bug River Basin, Ukraine

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Abstract

In 2013, 71 specimens of *Perccottus glenii* Dybowski, 1877 were caught in Ukraine in a tributary of the Southern Bug River, known as the Hirskyi Tikych. Present study confirms the expansion of this invasive species in Ukraine and also in Europe.

Key words: alien fishes, *Perccottus glenii*, Southern Bug River, invasive species

Introduction

The Chinese sleeper, *Perccottus glenii* Dybowski, 1877, is a representative of the Odontobutidae family (Acanthopterygii: Perciformes), which originated in freshwater rivers flowing into the Japanese, Okhotsk and Yellow seas, in the Far East, Asia (Mori 1936; Berg 1949). This fish was first introduced to European waterbodies following a release by aquarists. It is currently one of the most successful fish in European waterways (Reshetnikov 2010). The Chinese sleeper is a small fish with a short life cycle, feeding on a wide variety of invertebrates, tadpoles and fish throughout its life cycle. It has no fishery value and therefore considered an undesirable invasive species, with a significant non-native range in both Europe and Asia (Reshetnikov 2010).

In Ukraine, the Chinese sleeper occupies the basins of the Danube (including the Prut and Tisza basins), Dniester, Dnieper and Bug rivers (Movchan 1989; Korte et al. 1999; Sabodash et al. 2002; Movchan et al. 2003; Kosco et al. 2004; Kutsokon 2012; Kvach 2012). The Southern Bug River is one of the largest rivers in Ukraine (806 km); it is the largest river among the rivers flowing exclusively by the territory of Ukraine (Kravchuk 1993). Some data exists regarding the presence of this species in the upper reaches of the Southern Bug system, but site-specific references or geographical coordinates are lacking (Reshetnikov 2013). The purpose of this study was to verify and confirm the presence of *P. glenii* in the Southern Bug River Basin.

Material and methods

Fish fauna analyses were carried out in the Hirsky Tikych River, which is one of the left tributaries of the Southern Bug River. Sampling was located near the village of Buzivka, Central Ukraine (49°6′27.9″N 30°5′55.78″E). The river was characterized by a muddy bottom, sometimes with vegetation including *Ceratophyllum, Phragmites, Potamogeton* and *Typha*. Fish were sampled by trawl (8 m long, 0.5 cm in cell diameter) in both the spring (24.05.2013) and autumn (05.11.2013) seasons; depth of field up to 1 m.

Morphological analysis was carried out on captured fish. Standard length (SL) of each fish was measured. Number of rays on dorsal (D_1, D_2) and anal (A) fins, and the number of transverse rows of scales (Squ) were counted; sex and stage of sexual maturity were also determined.

Table 1. Meristic measures of Chinese sleeper from Hirskyi Tikych River (n=33) and from the Dniester River Basin (Sokolov 2001).

Meristic	lim	M	m	Mode	Lim (Sokolov 2001)
D1	6 – 8	6.60	0.09	7	6 – 9
D2	2	2.00	0.00	2	1 – 3
	9 – 13	11.27	0.14	11	9 – 13
A	1	1.00	0.00	1	1 – 3
	9 – 12	10.45	0.14	11	7 – 11
Squ	37 – 44	39.91	0.30	39	32 – 43

Figure 1. *Perccottus glenii* from the Hirskyi Tikych River. A – live specimen in aquarium, B – dead specimen showing scale.

Standard errors (m) were calculated for mean parameters (M), and maximum and minimum values attained. Maturity stage was identified using a scale developed by Pravdin (1966): Stage I – juveniles, immature; Stage II – gonads very small, eggs almost invisible; Stage III – maturing, eggs visible by eye, weight of gonads increasing, male gonads becoming whitish-pink; Stage IV – mature, eggs and sperm mature, gonads have reached maximum weight but do not emit under light pressure; Stage V – spawning, eggs and sperm emit under light pressure of the belly, weight of gonads decreasing from start to completion of spawning; Stage VI – spawning has occurred, sexual opening inflamed, gonads look like empty sacs, sometimes with residue of sexual products.

Results

In total, 71 specimens of Chinese sleeper were caught in the Hirskyi Tikych River: 49 specimens were caught in May (38.3% of total catchment) and an additional 22 specimens in November (2.8 % of total catchment); SL=62.9±1.4 (47.8–81.4 mm) (n=44) (Figure 1). Meristic features are presented in Table 1. Of the 33 dissected specimens among collected in May, 15 were female and 18 male, while the November sample had 9 females, 11 males and 2 juveniles. Male/female ratio was almost equal (1:1.2) for both seasons.

In May, male specimens were both less mature (stages II and III) and ready to spawn (stage IV). Most males were in the 3rd stage of sexual maturity (61%), with the lesser part in the 2nd and 4th stages (33% and 6% respectively). Most of females had reached maturity Stage IV (87%). Some females (13%) had two well developed batches of eggs: one already realized (stage VI), the other almost ready to be emitted (stage IV). Stage IV individuals were observed among females (22 %) and males (9 %) in November. Other observed individuals of Chinese sleeper were in the following stages: females: Stage II (56 %), III (22 %); males: Stage I (36 %), Stage II (18 %) and III (36 %).

A further 8 fish species were captured in May, and 12 in November (Table 2). An invasive fish species, the stone morocco, *Pseudorasbora parva* (Temminck and Schlegel 1846) dominated the catchment in both seasons (27.3 % in May and 62.5% in November). The percentage of alien species (*Perccottus glenii*, *Pseudorasbora parva*, *Carassius gibelio* and *Pungitius platygaster*) was significant both in spring and autumn, 70.3% and 68.5% respectively.

Discussion

This research confirms the successful penetration of *P. glenii* into the river systems of the Black Sea basin, and also the expansion of its non-native range in Ukraine and Europe. To date, there is no published data regarding the presence of *P. glenii* in the Southern Bug River. Limited data from the upper river system was presented

Table 2. Percentage of fish species in the Hirskyi Tikych River, near Buzivka village, Ukraine (May and November 2013).

Family	Species	May (%)	November (%)
Cyprinidae	*Rhodeus amarus* (Bloch, 1782)	5.5	6.3
	Carassius gibelio (Bloch, 1782)	4.7	3.1
	Cyprinus carpio (Linnaeus, 1758)	-	0.1
	Pseudorasbora parva (Temminck et Schlegel, 1846)	27.3	62.5
	Leucaspius delineatus (Heckel, 1843)	16.4	13.8
	Rutilus rutilus (Linnaeus, 1758)	-	0.9
	Scardinius erythrophthalmus (Linnaeus, 1758)	0.8	0.4
Cobitidae	*Cobitis taenia* Linnaeus, 1758 sensu lato	0.8	-
Siluridae	*Silurus glanis* Linnaeus, 1758	0.8	-
Esocidae	*Esox lucius* Linnaeus, 1758	-	0.9
Gasterosteidae	*Pungitius platygaster* (Kessler, 1859)	-	0.1
Percidae	*Gymnocephalus cernuus* (Linnaeus, 1758)	5.5	0.9
	Perca fluviatilis Linnaeus, 1758	-	7.5
	Sander lucioperca (Linnaeus, 1758)	-	0.9
Odontobutidae	*Perccottus glenii* Dybowski, 1877	38.3	2.8
Total	15 species	9 species	13 species

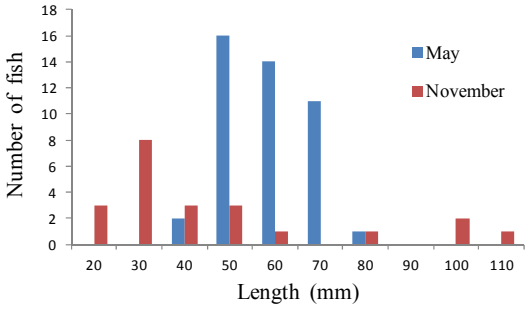

Figure 2. Length of Chinese sleepers from the Hirskyi Tikych River, 2013.

by Reshetnikov in 2013. In Movchan's paper in 2011, there is no reference to the presence of this species in the Southern Bug drainage. However, several sightings have been reported from local fishermen (unpublished data). The Wikimedia Commons file repository possess several images which were released into the public domain by Georgiy (George) Chernilevsky in 2009, and illustrate the Chinese sleeper from a pond in Vinnitsia, Western Ukraine (Chernilevsky 2009). This species may be more widely distributed in the Southern Bug River basin, especially in the upper reaches, close to areas where the Chinese sleeper has spread into the basins of the Dniester and Dnieper, and also where intensive pond fish-farming occurs. The chosen sampling station on the Hirsky Tikych River has several large aquaculture ponds upstream, which could be the source of the inoculation. It also helps this species to spread with the transportation of the juveniles of farming fish. The nearest location of documented occurrence of the Chinese sleeper is 70 km northern, in the Ros River basin (right tributary of the Dnieper River), also in aquaculture ponds (Kutsokon 2010).

The riverbed at the site of the study is also favorable to other alien species. The most numerous alien fish species was the stone morocco. The distribution of this species is also directly related to the location of aquaculture ponds (Karabanov et al. 2010).

Meristic features of *P. glenii* are largely similar to the statistical range of previously published data for Ukraine (Sokolov 2001; Table 1). The number of branched-rays were slightly greater in the anal fins and the number of lateral rows of scales were also higher. There may be some morphological variation of this species in Ukraine. Sampled fish generally measured between 50 to 80 mm (Figure 2).

Specimens of Chinese sleeper sampled in November were ready for spawning. Perhaps this was caused by weather conditions, i.e. a cold September followed by a warm October. Since all specimens examined were sexually mature, the size-class can be considered as a basis for spawning. Data collected corresponds to the reproductive biology of the Chinese sleeper, namely portioned spawning and active care of offspring by the male.

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