

Rapid Communication

First record of the Chinese sleeper, *Perccottus glenii* Dybowski, 1877 (Actinopterygii: Odontobutidae) in the Dnieper Estuary, southern Ukraine (Black Sea drainage)

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Abstract

We present the first record of the Chinese sleeper (*Perccottus glenii*), an Asian invasive fish species, in the Dnieper Estuary, southern Ukraine. This new locality is clearly distant from all previous known localities in the Dnieper drainage. As the new finding is situated close to a fish pond outlet, we suggest one possible route of introduction to be fish transfer for aquaculture.

Key words: invasive species, new finding, Dnieper Estuary, Ukraine

Introduction

Over the last few hundred years, numerous aquatic organisms have increased their ranges throughout Europe by spreading along rivers and other inland waterways (Copp et al. 2005). A number of trans-European distribution "routes" have be identified, two of which pass through Ukraine: the Southern Invasion Corridor, via the Danube basin, and the Central Invasion Corridor, via the Dnieper basin (Panov et al. 2009). While movement of some species have been facilitated following connections of previously separate waterbodies, many aquatic invasions have been the result of human-aided transport, e.g. in anglers' bait buckets, through fish transfers or in the ballast water of ships (Alexandrov 2004; Copp et al. 2005). By 2007, around 240 exotic aquatic species had been identified in Ukrainian fresh-, brackish- and marine waters (Alexandrov et al. 2007).

Originally from East Asia, the Chinese sleeper, *Perccottus glenii* Dybowski, 1877 (Actinopterygii: Odontobutidae) has become one of the most successful invasive species in Europe in recent decades (Copp et al. 2005): its wide ecological tolerance and predatory strategy render it a highly adaptable and successful invader (Froese and Pauly 2016). Its natural geographic range extends from a northern limit in the River Uda (Sea of Okhotsk drainage) southward to the Yangtze in the Fujian Province of China, taking in the middle and lower stretches of the River Amur and its tributaries, rivers of the Lake Khanka basin and small rivers in the north-western Korean peninsula and northern Sakhalin (Mori 1936; Bogutskaya and Naseka 2002; Kottelat and Freyhof 2007; Bogutskaya et al. 2008; Reshetnikov 2010).

The Chinese sleeper was first registered in the Belarusian sector of the Dnieper drainage in 1972 (Rizevsky et al. 1999; Semenchenko et al. 2011). From around 2005, it was registered first in the main reach of the Dnieper and then in the River Prypiat (Semenchenko et al. 2009). It is now widely distributed in the Belarusian stretch of the Dnieper and its tributaries, though still not confirmed from the



Figure 1. Map of Ukraine indicating the localities of the Chinese sleeper in the Dnieper drainage. A) Dnieper Estuary: new findings marked by a red spot; B) Dnieper drainage with all confirmed localities of Chinese sleeper marked, new findings marked with the red spot, previous findings marked with pink spots (Sabodash et al. 2002; Sondak et al. 2009; Lukina 2011; Bigun and Afanasyev 2011; Kutsokon 2010, 2012; Kutsokon et al. 2012a, b, 2013; Reshetnikov 2013, see details in the supplementary Table S1); C) location of the Dnieper drainage in Europe.

stretch bordering Ukraine (Lukina 2011). It became established in the Ukrainian stretch of the Dnieper near Kiev in 2000 (Sabodash et al. 2002), and was later found in several tributaries in the middle Dnieper drainage, including the rivers Trubizh, Irpin, Stugna and Ros (Bigun and Afanasyev 2011; Kutsokon 2010, 2012; Kutsokon et al. 2012a, b, 2013). The species' present southernmost occurrence in the Dnieper basin is the River Ros, a right tributary flowing into the Dnieper south of the Kaniv Reservoir (Kutsokon 2010). This paper presents the new occurrences of nonindigenous Chinese sleeper within the Dnieper River drainage of the southern Ukraine.



Figure 2. A) Locality 1: coast of the Dnieper Estuary; B) Locality 1: sampling near the fish pond outlet; C) Locality 2: common reed along the estuary coast; D) Locality 2: fish pond outlet. Photographs by Yuriy Kvach.

Material and methods

On 27 April 2016 (2 p.m. to 6 p.m), we sampled fish in the south-eastern part of the Dnieper Estuary (Zburyivka Bay) using a standard 1.0×0.5 m dip net (Figure 1). Chinese sleeper were caught at two localities, the first at 46°27′43.2″N 32°21′27.5″E and the second at 46°27′47.1″N 32°22′17.0″E (Figure 1), at about 1 m depth. Both localities are situated close to outlet pipes draining water from aquaculture ponds of the Pavlivske fish farm, situated near the village of Stara Zburivka. Both localities are characterised by silt-sand bottom substrates with common reed, *Phragmites australis*, widespread, though less common at the first locality (Figure 2).

The standard (SL, mm) and total lengths (TL, mm) of fish were measured using a metric ruler to 1 mm precision.

Results and discussion

In total, seven specimens were caught (Figure 3), three from locality 1 and four from locality 2. Fish from locality 1 had a mean SL = 82 ± 5.2 mm (min-max 76–85) and TL = 96 ± 6.1 mm (min-max 89–100), while fish at locality 2 had a mean SL = 36 ± 1.3 mm (min-max 34–37) and TL = 47 ± 2.2 mm (min-max 45–50).

This finding represents the first occurrence of Chinese sleeper in the Dnieper estuarine zone, and the species' southernmost occurrence in the Dnieper basin. In Southern Ukraine, the Chinese sleeper has also been recorded in the Danube delta (Kvach 2012), about 250 km from the Dnieper delta. In the Danube delta region, the species has also been confirmed at Lake Kahul on the border between Moldova and Ukraine (occurring off the Moldavian



Figure 3. Chinese sleeper from the Dnieper Estuary. A) specimen with ruler, B) recently caught specimen. Photographs by Yuriy Kvach.

coast; Moshu and Chiriac 2011). The Chinese sleeper appears to have spread downstream through the Danube drainage along the Southern Invasion Corridor (Kvach et al. 2016) from a west Ukrainian source population, having been introduced with Asian phytivorous fishes near the City of Lviv in 1967 (Fedonyuk 2005; Reshetnikov 2013).

This new Chinese sleeper population is geographically isolated from other populations in the

Dnieper drainage, and is distant from the previous southernmost occurrence at the mouth of the River Ros and the Kaniv Reservoir (Kutsokon 2010; Kutsokon et al. 2012a). The presence of a specific parasite, i.e. *Gyrodactylus perccotti* (Zaichenko, 2015), suggests the most plausible source to be the Carpathian Chinese sleeper population (Kvach et al. 2016), with fish originally penetrating the middle Dnieper via the Prypiat, which forms part of the Central Invasion Corridor. The species is presently common in tributaries of the Prypiat river basin and in the Shatsk Lakes and the River Bug, which is connected to the Prypiat by artificial canals (Lyesnik and Dykyy 2013; Lyesnik and Hirna 2015). The Chinese sleeper has also been recorded near the mouth of the Prypiat, as well as in rivers of Belarus and Russia (Lukina 2011; Sokolov et al. 2012, 2013), though these are outside the main route of the Central Invasion Corridor. The dispersed nature of Chinese sleeper distribution, and its frequent presence close to aquaculture ponds, suggests that spread of the species in the Dnieper basin is most likely connected with transfer of commercial fish fry between ponds (Kutsokon et al. 2013), a method of transfer previously recorded at other localities in Eurasia (Erős et al. 2008; Harka et al. 2008; Karabanov et al. 2010).

With a salinity of 0.5–5 ‰, the Dnieper Estuary is oligohaline, though salinity levels vary depending on the outflow (Garkavaya et al. 2000). The Chinese sleeper is typically saline tolerant and is regularly observed in brackish and marine waters in its native range (Bogutskaya and Naseka 2002). Hence, it is highly likely that it will spread into the Dnieper delta in the near future. As this species prefers lentic waters (e.g. ponds, small lakes and marshes; Kottelat and Freyhof 2007), active upstream migration along the Dnieper is unlikely. Intense shipping along the Dnieper, however, especially along the lower stretch, means that further passive upstream dispersal via deposition of eggs on the underside of ships cannot be excluded (Nehring and Steinhof 2015).

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Supplementary material

The following supplementary material is available for this article: **Table S1.** Records of *Perccottus glenii* in the Dniepr River basin.

This material is available as part of online article from:

http://www.reabic.net/journals/bir/2016/Supplements/BIR_2016_Kvach_etal_Supplement.xls