

New Records of the Invasive *Eriocheir sinensis* H. Milne-Edwards, 1853 (Decapoda: Varunidae) in the Serbian Part of the Danube River

Ivana M. Živić & Nikola R. Vesović

Faculty of Biology, University of Belgrade, Studentski trg 16, 11000 Belgrade, Serbia; E-mails: ivanas@bio.bg.ac.rs, nikola.vesovic@bio.bg.ac.rs

Abstract: Two male specimens of the Chinese mitten crab *Eriocheir sinensis* H. Milne-Edwards, 1853 (Decapoda: Varunidae) were found in the immediate vicinity of Belgrade (near the city of Pančevo) at a distance of 150 m upstream from the place where a branch of the Tamiš River flows into the Danube River, river km 1154. This is the first record of *E. sinensis* in the Serbian part of the Danube River since 2011 and 11th since its first finding in 1995. The results presented in this paper confirm the high invasive potential of the species and point to a need for much closer monitoring of its appearance in Serbia.

Key words: *Eriocheir sinensis*, invasive species, Danube River, Serbia

Introduction

The carnivorous Chinese mitten crab *Eriocheir sinensis* H. Milne-Edwards, 1853 (Decapoda: Varunidae) was first introduced to Europe from China in 1912. Introduced on the territory of Germany, it then spread rapidly throughout Northern Europe (PANNING 1939). Today it is widely disseminated in Denmark, Sweden, Finland, Poland, the Netherlands, Belgium, France and Great Britain, where it was introduced already in 1940s (PANNING 1939, HERBORG et al. 2003, 2005). It has also been recorded on the basin of the Baltic Sea and along the coast of the North Atlantic (HERBORG et al. 2003, 2005, OJAVEER et al. 2007). It was found in the 1990s in Spain and Portugal, and somewhat later in Russia, Canada, Serbia, Iran and Iraq (DITTEL & EPIFANIO 2009).

Riverboat traffic (the ballast water of riverboats) is the main vector by which the Chinese mitten crab has been introduced on the territory of Serbia. However, one case was recorded where it was imported for use in aquarium rearing. *E. sinensis* has been first recorded in the Lower Danube River in Romania in 1997 (OTEL 2004) and in the river's upstream part in Hungary in 2003 (PAUNOVIĆ

et al. 2004). It has also been found in the Serbian part of the Danube River (PAUNOVIĆ et al. 2004, ŠKRABA et al. 2013). It is clear that *E. sinensis* has been successfully introduced on the territory of Serbia. However, since the Chinese mitten crab is still not used as food for humans in Serbia and is not imported for rearing purposes, its uncontrolled expansion in this country is not likely.

Materials and Methods

Two male specimens of *E. sinensis* (Fig. 1) were found in the immediate vicinity of Belgrade (near the city of Pančevo) at a distance of 150 m upstream from the place where a branch of the Tamiš River flows into the Danube River. The locality is situated at the river km 1154 of the Danube's watercourse (44°50'53.6" N; 20°38'08.0" E).

Results

Two specimens of *E. sinensis* were caught in July of 2017. One of the specimens had a carapace width (CW) of 35 mm and carapace length (CL) of 30 mm,

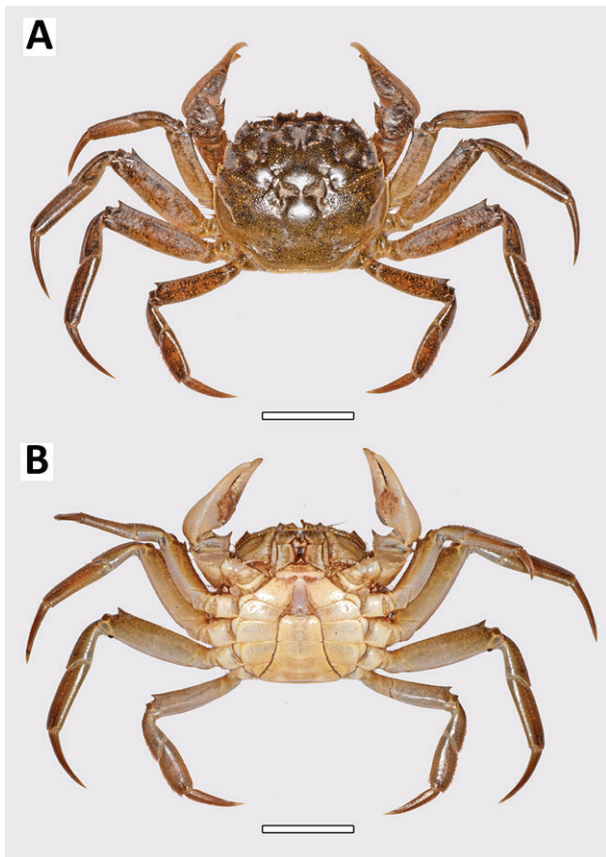


Fig. 1. Whole specimen, male. **A.** Dorsal view. **B.** Ventral view. Scale-bar: 2 cm.

while the other male was slightly larger (with CW of 42 mm and CL of 35 mm). Details of morphological structure are shown in Fig. 2. The samples were collected with a hand-held benthos net and fixed with 96% alcohol. They were deposited in the collection of the Institute of Zoology, University of Belgrade - Faculty of Biology.

The substratum from which the samples were collected consisted of sludge, clay and very fine sand (with grain diameter of 0.125 mm). In the locality's immediate vicinity, there were also coarse sand (0.5-1.5 mm) and gravel (2-20 mm).

Discussion

Chinese mitten crabs have been captured from time to time in the Serbian part of the Danube River over the past 23 years, since the first finding in 1995; one additional male specimen was recorded in 2001 (PAUNOVIĆ et al. 2004). In the period 2004–2013, eight specimens of Chinese mitten crabs (six males and two females) were found at a total of eight localities in the Serbian part of the Danube River, while one male was recorded in the Tisza River in 1973

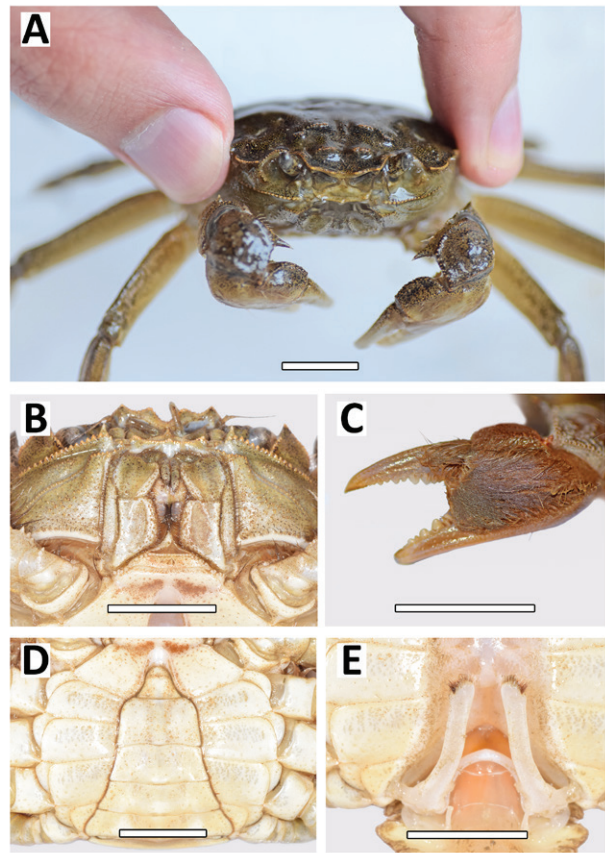


Fig. 2. Morphology, male: **A.** Frontal view of head. **B.** Ventral view of head. **C.** Appearance of left thoracopod I. **D.** Ventral view of abdomen. **E.** Gonopods. Scale-bar: 1 cm.

(ŠKRABA et al. 2013). Based on the later review, the last finding of this invasive crab species was in November of 2011. Moreover, Škraba et al. (2013) reported that the rate of biological contamination in the Serbian part of the Danube River for the period of 1995 to 2011 was 0.56, while the degree of invasiveness of the Chinese mitten crab (FI-ISK score) on the aquatic ecosystem in Serbia was 37. The findings reported in the present paper merely confirm the high potential invasiveness of this species, which six years after the last record has now been found again in the Serbian part of the Danube River. Therefore, we affirm that the Chinese mitten crab continues to be found occasionally in small numbers on the territory of Serbia. Regardless of their small size, populations of Chinese mitten crabs can have a very negative effect on native species, especially the rare or threatened ones, owing to the fact the crabs feed on other aquatic invertebrates, fish eggs and young fish (HYMANSON et al. 1999). On the other hand, despite the long tradition of reports, the relatively small number of registered findings suggests that the spreading of this species in Serbia has been promoted far more by human ac-

tivity than by natural means of dispersion. Among the specimens recorded in the fauna of Serbia, males are dominant (males have been reported at 8 out of 10 studied localities, while females only at two), which is in keeping with the data from other parts of Europe (CZERNIEJEWSKI et al. 2007) and indicates that human activity does not have a decisive role in the spreading of the Chinese mitten crab in Serbia. To be specific, the dominance of males points both to the different forms of behaviour of females in relation to males and to their different rate of survival, as also outlined in previous studies on the crab populations in Serbia (ŠKRABA et al. 2013).

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