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Occurrence of the chinese mitten crab *Eriocheir sinensis* (H. Milne Edwards) in South Iraq

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Abstract - The distribution of the invasive Chinese mitten crab *Eriocheir sinensis* in Shatt Al-Basrah Canal and Shatt Al-Arab River was investigated. The earlier published record of this species was in 2006 where only a single specimen was obtained from Shatt Al-Basrah Canal, but the species has long been observed in the region. The present work monitored the recent occurrence of the species where living and non living specimens were captured in large numbers. Although the species migrate to the sea for reproduction, it was not yet recorded from the North West Arabian Gulf region. Detailed description of the captured crabs is provided. Carapace width ranged from 53.4 to 56.6 mm and carapace length ranged from 56 to 62.4 mm. Recent rise in salinity or the change in water chemistry of south Iraq may play vital role in increasing the population of the mitten crab.

Introduction

As its name indicates, this migrating and invasive crab originated in the Far East where its native ground extends from Hong Kong to Korea (Herborg *et al.*, 2003). By the beginning of the last century, this crustacean invaded North Europe by accidental introduction to these regions (Clark *et al.*, 1998), soon after its populations reached North America and Hawaii (Nepszy and Leach 1973). The ability of this crab to adapt to different environments made its world wide distribution rather fast where it has been recorded from places far from its original nursing grounds. It is now recognized as an international invader that has established itself in many countries (Herborg *et al.*, 2005).

The Chinese mitten crab is catadromous, returning to the sea to reproduce once in its life (rarely twice). During its upstream migration, the crab can reach rivers and streams or lakes up to 1200 km from the coast where it become mature (Herborg *et al.*, 2003). Age of maturation differs according to the environment, in its original nursing grounds in China, maturation takes place within 1-3 years (Jin and Xie, 2001), but may be delayed to 3-5 years in Europe (Herborg *et al.*, 2003). When sexually mature, it returns to estuaries for reproduction in late summer. Larvae, however, are released in more marine environments during early spring (Kobayashi, 2001). The larvae are the effective factor of spreading the mitten crab over vast geographical regions (Cohen and Carlton, 1997; Paunovic *et al.*, 2004).

The spread of the mitten crab has several adverse impacts on the biodiversity and humans as it interferes with commercial fishing and shrimp trawlers. The borrowing and digging habits of this crab may cause damage to rivers banks when its population reaches high magnitude. It may also compete with native fauna for food resulting in a serious threat to important invertebrates (Clark *et al.*, 1998).

The first reported record of the Chinese mitten crab from South Iraq was in 2006 (Clark *et al.*, 2006) where a single non ovigerous female was obtained from the Shatt Al-Basrah Canal. These authors considered their record of the species as the first in Iraq but this seems to be an inaccurate speculation as will be discussed later in this work. This record, however, was considered to be the second from central Asia. The aim of the present work is to follow the spread of this species in places other than that of the Shatt Al-Basrah Canal where the only specimen was observed by Clark *et al.* (2006).

Materials

During the period from March 2009 to January 2010, four visits were made to Shatt Al-Basrah Canal for collecting and observing the populations of the Chinese mitten crab *E. sinensis*. A total of 39 individuals were caught by hand near the main gate towards Khor Al-Zubair lagoon (Fig. 1), and brought to the laboratory for examination. Several observations were also made at Shatt Al-Arab river where large population of the species were encountered. A single large male specimen was obtained from Nashwa area, 50 km north of Basrah. Morphometric measurements were taken in the laboratory and some specimens were photographed using Canon Power Shot G10 digital camera.

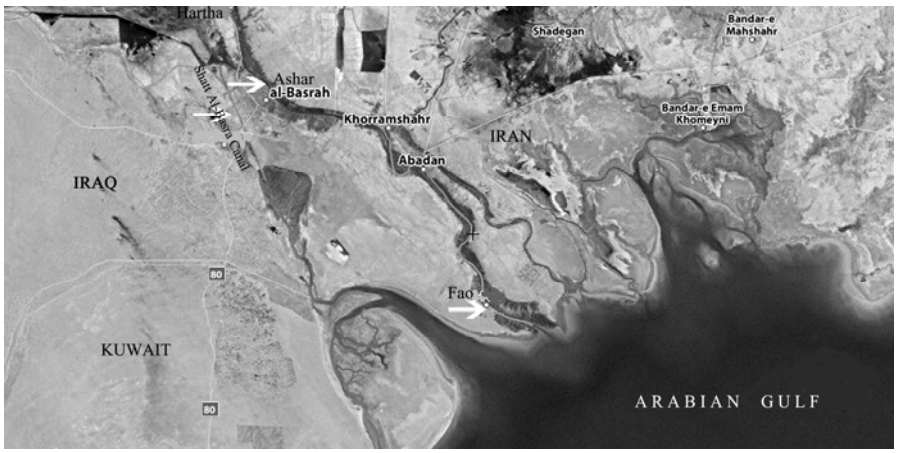

Figure 1. Satellite image showing Shatt Al-Arab river and Shatt Al-Basrah Canal with sampling locations (white arrows).

Results

Several living and non living specimens were captured. Some of the specimens were covered with a green film of microalgae as well as small shells of barnacles spread near the eyes and snout on the dorsal side of the animal (Fig. 2 C, D). These specimens although were alive when captured, yet they were inactive. Table 1 shows dimensions which were measured for both male and female specimens (27 male and 12 female, all non ovegerous), numbers show the average of all measurements:

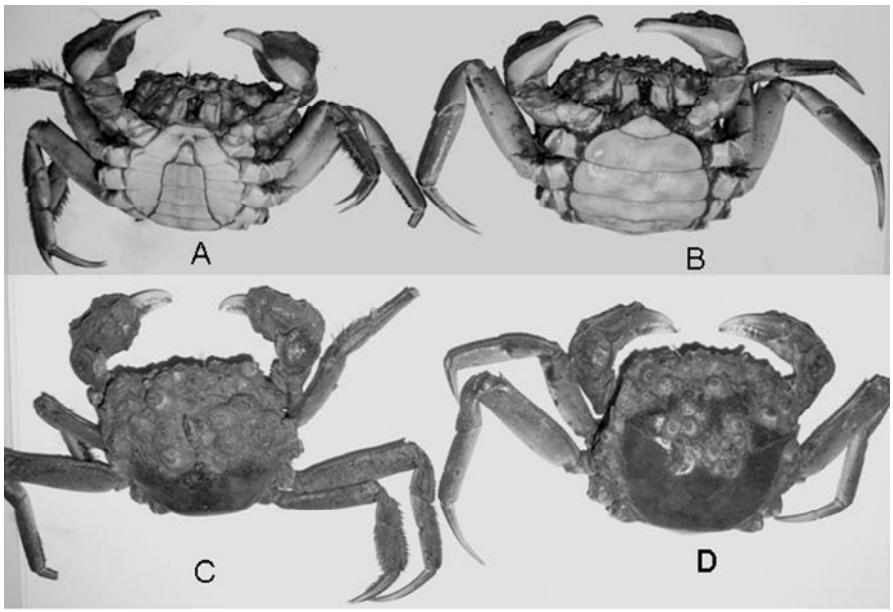

Figure 2. A and B: Male and female mitten crab. C and D: A female covered with barnacles and microalgae.

Table 1. Average measurements of *Eriocheir sinensis* dimensions, cw: carapace width, cl: carapace length.

	Shatt Al-Basrah Canal		Shatt Al-Arab Ashar		Shatt Al-Arab Fao	
	cw	cl	cw	cl	cw	cl
male	53	51	60.2	57.4	52	48.9
female	50.3	48.7	58.3	56	49.3	46.8

Specimen from Nashwa area: cw: 72 mm, cl: 75.3 mm, carapace with chela: 132 mm.

The crab can be easily distinguished and identified by the presence of an extensive mitten-like covering on the claws. The crab is characterized by having a convex and even carapace with four sharply edged epigastric lobes which makes its identification from other brachyuran crabs rather easy.

The species has established large populations in South Iraq. It is spread along the Shatt Al-Basrah Canal, mostly before the main water gate where salinity does not exceed brackish water limits. The specimens encountered in this region were almost healthy and active. These were captured on the Canal banks by hand and both male and female specimens were obtained.

The mitten crab population in Shatt Al-Arab river has also been increased. It was found in moderate number in the region opposite to Ashar city as well as in the lower reaches of the river (Fig. 1). Large number of mitten crab were found dead on the shore, these were captured and killed by fishermen, large numbers were gathered and burned. Twenty five live specimens were obtained from this region containing both males and females.

Discussion

The aim of the present work is to monitor the occurrence and abundance of the Chinese mitten crab *E. sinensis*. The first published record of the species was by Clark *et al.* (2006) who found only a single female. These authors, however, thought that the species started to appear in the region at the time of their observation. In fact, the Chinese mitten crab was first observed in mid 1980's where a single specimen was captured from the Shatt Al-Arab River at Ashar city (Prof. S.D. Salman, Marine Science Centre, Basrah, personal communication). Large numbers of the species were collected later during 1998-1999 from Shatt Al-Arab estuary (Prof. M.H. Ali, Marine Science Centre, Basrah, personal communication). It seems that no investigation has been published to follow the populations of this intruding species. It is very clear, however, that this species has established wide population in the brackish water of South Iraq, particularly in Shatt Al-Basrah Canal from which it may migrate to the Gulf for reproduction. Reentering to the rivers and canals from the sea is by the juvenile crabs but the pelagic larval stages are the most likely vector of spread for *E. sinensis* in ship's ballast water (Cohen and Carlton, 1997).

Water samples for larval study were not collected but juveniles have not been observed during the study period. This may be due to time of collection which was confined to few visits. However, since maturation period extends for 3-5 years, it is unlikely that several cohorts were established. This is not uncommon for this species and such population has been reported in several rivers in Europe (Herborg *et al.*, 2003).

Since *E. sinensis* is an invasive species, its occurrence in a new environment will not be without cost to other native species. Its impact on human and biodiversity is evident (Veldhuizen and Stanish, 1999). Local fishermen in Basrah complain of *E. sinensis* interference with fishing and destroying nets, a reason why large numbers of the crabs were gathered and burned. Similarly, Ingle (1986) has reported a serious damage to nets caused by the crab in Britain.

As has been postulated by Clark *et al.* (2006), the mitten crab reached water systems of South Iraq via incoming ships which transported larvae to Fao and Um Qasr ports. On the other hand, they left its occurrence in Shatt Al-Basrah Canal unexplained and require DNA analysis for certain conclusion. It seems unlikely, however, that this species has migrated through Tigris and Euphrates owing to the long distance these rivers cut from Turkey to South Iraq. The unexplained occurrence of *E. sinensis* in Shatt Al-Basrah Canal by Clark *et al.* (2006) may originated from the fact that they have only found a single female specimen in that waterway, keeping in mind that there was no other published records from the region. At present, and with the increasing numbers of the crab in Shatt Al-Arab river, it is rather reasonable to speculate that the species entered Shatt Al-Basrah Canal through the Gulf via Um Qasr port after being migrated to the Gulf from the river for reproduction.

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تواجد السرطان الصيني *Eriocheir sinensis* (H. Milne Edwards) في جنوب العراق

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المستخلص - درس انتشار وتواجد السرطان الصيني *Eriocheir sinensis* في قناة شط البصرة وشط العرب من خلال عدة عينات جمعت للفترة من آذار 2009 وحتى كانون الثاني 2010. إن أول تسجيل موثق لهذا النوع في جنوب العراق كان في 2006 حيث عثر على نموذج واحد لإنثى ميتة في قناة شط البصرة. إن البحث الحالي يهدف إلى مراقبة إنتشار وتواجد هذا النوع القشري في المنطقة إذ جمعت منه أعداد كبيرة في مناطق متفرقة. على الرغم من أن هذا النوع يهاجر إلى البحر بغية التكاثر إلا أنه لم يعثر على نماذج منه في شمال غرب الخليج. بلغ عرض الدرع للعينات الدروسة 53.4 – 56.6 ملم وبلغ طولها بين 56 – 62.4 ملم. لعل الزيادة الأخيرة في معدلات ملوحة المياه قد ساعدت على إنتشار هذا النوع في جنوب العراق.