Article

A study on occurrence and density of sesarmid and brachyuran crabs (Decapoda, Brachyura) in intertidal zone of Shatt Al-Arab River, Basrah, Iraq

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Abstract

Samples were collected monthly from intertidal zone of Shatt Al-Arab River at three stations by using the quadrate (25 by 25 cm), three species of a sesarmid crabs were collected monthly from intertidal zone Shatt Al-Arab River. Occurrence of these Sesarmid crabs were studied duringthe period from January to December 2017. A total of 17678 specimens for three species of seasarmid crabs; *Chiromantes* (*Sesarma*) *boulengeri* with density 10-40 individuals/m^2 in Ashar station and 44-140 individuals/m^2 in Sebia station then *Parasesarma plicatum* with density 226-990 individuals/m^2 in FAO station and 0-52 individuals/m^2 in Sebia station followed by *Nanosesarma sarii w*ith density 256-1248 individuals/m^2 in FAO station and 0-44 individuals/m^2 in Sebia station. During this survey, 8 species of the other crabs were observed, including *Ucas edenisus*, *Leptochryseus kuwaitensis*, *Opusia indica*, *Nasima dotilliformis*, *Macropthelmus dentipes*, *Macrophthalmus depresus*, *Eurycarcinus orientalis*, and *Eriocheir sinensis*, belonging to the five families.

Keywords Shatt Al-Arab River; intertidal zone; seasarmid crabs.

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1 Introduction

Three sesarmid crab species, *Parasesarma plicatum* (Latreille, 1806), *Nanosesarma sarii* (Naderloo and Turkay, 2009) and *Chiromantes boulengeri* (Calman, 1920), are typical decapod crustacean inhabitants in south area of the Shatt Al-Arab river. Naderloo and Turkay (2009) described the crab *Nanosesarma sari* from the Arabian gulf. Naser et al (2013) recorded the crab, *Nanosesarma sari* (Naderloo and Turkay, 2009) from khor AL-zubair south of Iraq. There was little study on the biology and distribution of some species In shatt Al-Arab river. Ali (1997) studied the ecological behavior of crab *Chiromantes boulengeri* (Calman, 1920) and the determined the density which ranged from 33ind/m² to 137 ind/m². Sultan (1987) studied the population dynamic and borrowing behavior of crab *Chiromontes boulengeri* and reported that the density ranged from

54.5 ind/m² to 330.5 ind/m² and the result of borrowing behavior showed that the crab prefers the clay-silt soil and the loan-sand soil. Many other research were made on various crabs (Sakthivel and Fernando, 2012; Trivedi and Vachhrajani, 2012; Varadharajan et al., 2013; Viswanathan et al., 2013). This study aims to compare the spatial occurrence and density of these sesarmid crabs in relation to important environmental factors in intertidal zone along banks south part of Shatt Al-Arab River in Basrah city, Iraq.

2 Material and Methods

The specimens of sesarmid crabs were collected from three stations in south part of Shatt Al-Arab River (Fig. 1). Specimens were collected by hand-picking from intertidal zone of Shatt Al-Arab River.

1. First-station in Shatt Al-Arab River in south of Al-Fao city (Rass Al-Besha) (St. 1)
2. Second-station in Shatt Al-Arab River in Al-Sebia city (St. 2).
3. Third station near Al-Ashar city (St. 3).

by using the quadrate (25 × 25 cm) during the period from January to December 2017 by monthly intervals. Hands picked up crabs. Some physico-chemical parameters recorded from the three stations during the periods of sampling. Specimens were preserved in 70% alcohol.

The number of crabs species and individuals were counted in three stations. crab's species were classified according to Jones (1986) and Naderloo (2011).

All illustrations were photography with the digital camera.

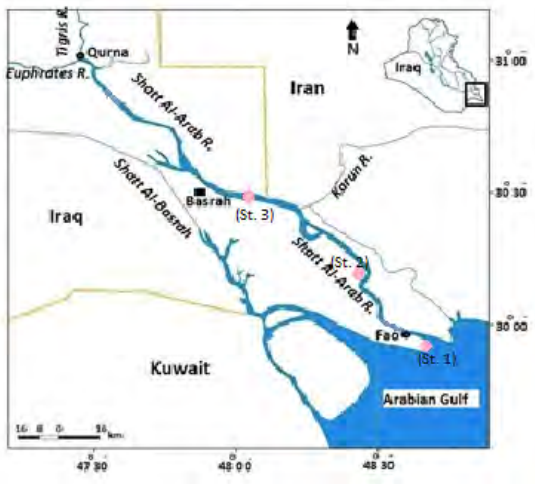

Fig. 1 Map of three station in study area in Shatt Al-Arab River.

3 Results and Discussion

3.1 Some physical and chemical parameters

The values of air and water temperatures as well as salinity were measured in site (Fig. 2, 3, 4), during the period from January to December 2017 at the three stations at low tide in study area of Shatt Al-Arab River. The highest air and water temperature (46, 32^{0}C) was recorded in August 2017 at St.1. Thelowest air and water temperatures (16, 14^{0}C) occurred in January and February 2017 at St. 3, respectively. While salinity varied from 18.5 psu at station 1 in September 2017 to 2.1 psu at St. 3 in April 2017, respectively. A significant correlation was found between density, temperature and salinity ($p<0.05$).

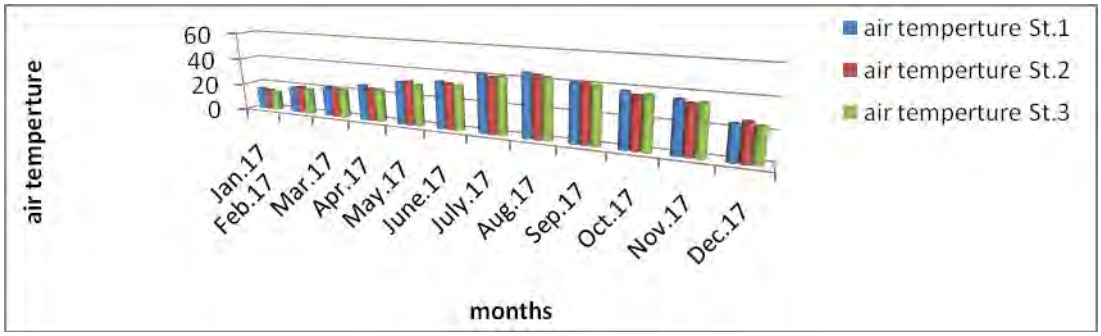

Fig. 2 Air temperature parameter at Shatt Al-Arab River during months of 2017 in three station of study area.

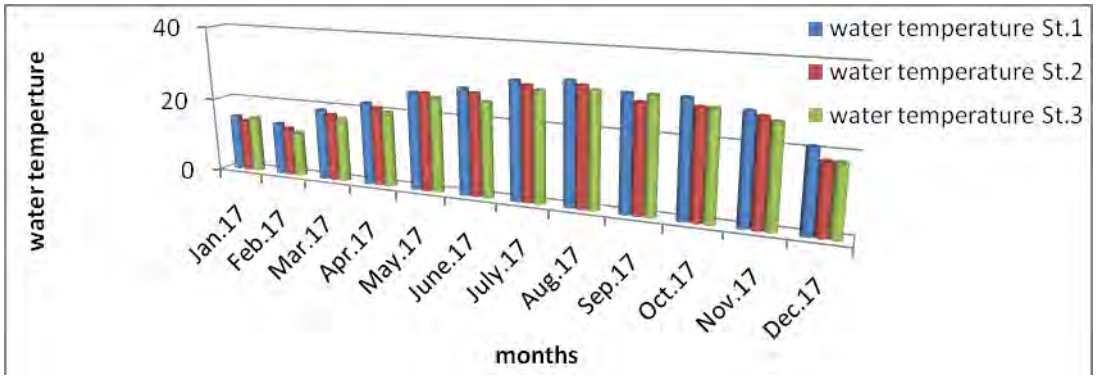

Fig. 3 water temperature parameter in Shatt Al-Arab River during months of 2017 in three station of study area.

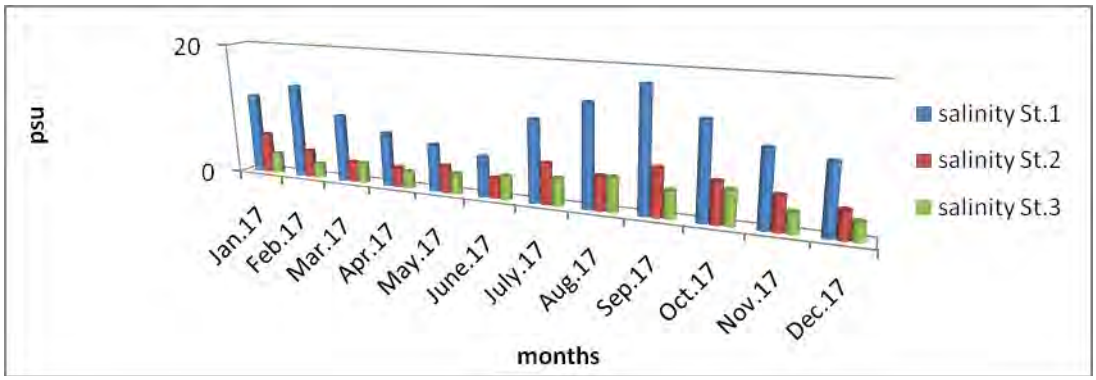

Fig. 4 Salinity parameter in Shatt Al-Arab River during months of 2017 in three station of study area.

3.2 Occurrence and density

Results of the occurrence and density of three Sesarmid crabs species in the three stations were observed during the study period.

Chiromantes boulengeri (Picture 1) was found to be the most abundant sesarmid species inAl-Sebaa station (St2), it density varied from 140 ind./m^2 in July 2017 to 44 ind./m^2 in December 2017. in Al-Ashar Station (St3) of Shatt Al-Arab River its density varied from 40.0 ind./m^2 in August 2017 to 10.0 ind./m^2 in January 2017. (Table 1). But in Al-Fao station (St1) that is no recorded of occurrence of any individuals of *C .boulengeri*.

The crab *Parasesarma plicatum* (Picture 2) was found in Al-Fao station (St1) in high density reached to maximum 990 ind./m^2 in April 2017, while the minimum density was 226 ind./m^2 in November 2017. While in Sebaa and Al-Ashar Station (St2, 3) there is no recorded for any individual.

For the crab *Nanosesarma sarii* (Picture 3) is also founded in higher density in Al-Fao station (St 1) varied from 1248 ind./m^2 in October 2017 to 256 ind./m^2 in December 2017, while in Al-Sebaa station (St2) there is a little individual were found ranged between 44.0 ind/m^2 in December to 0.0 ind/m^2 in some months of 2017, and there is no occurrence in Al-Ashar station (St3).

Table 1 Mean monthly densities (ind./m²) of the three Sesarmid crabsfrom banks of south part of Shatt Al-Arab river southern of Iraq during January to December 2017.

Species		**Jan. 2o17**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**	**Total**
Nanosesarma sari	**St. 1**	480	320	704	960	1232	800	704	608	1120	1248	688	256	9120
	St. 2	0	24	0	16	0	0	30	`16	32	0	16	44	178
	St. 3	0	0	0	0	0	0	0	0	0	0	0	0	0
Parasesarma plicatum	**St. 1**	550	630	800	990	682	732	336	358	459	601	226	270	6634
	St. 2	18	32	44	42	30	18	24	32	46	52	0	0	338
	St. 3	0	0	0	0	0	0	0	0	0	0	0	0	0
Chiromantes boulengeri	**St. 1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	St. 2	64	72	80	108	126	96	140	76	100	120	80	44	1106
	St. 3	10	0	26	33	32	26	19	40	34	22	27	15	302
Total														17678

Picture 1 *Chiromantes* (*Seasarma*) *boulengeri* (Calman, 1920), male north part of Shatt Al-Basrah River, Iraq. (a) dorsal view; (b) ventral view.

Picture 2 *Parasesarma plicatum* (Latreille, 1806), male south part of Shatt Al-Basrah River, Iraq. (a) dorsal view; (b) ventral view.

Picture 3 *Nanosesarma sarii* (Naderloo and Turkay, 2009), male south part of Shatt Al-Basrah River, Iraq. (a) dorsal view; (b) ventral view.

3.3 The occurrence and distribution of other crabs

In the present study, 8 species of other crabs from fivefamilieswere founded during collected the Sesarmid crabs in intertidal zone of Shatt Al-Arab River,Brachyuran crabs families including Macrophthalmidae, Pilumnidae, Ocypodidae, Camptandriidae and Varunidae individuals of these species were observed in Al-Fao station (St 1) (Table 2).

Table 2 List of other crabs species were observed in Al-Fao station (St 1) at the intertidal zone of ShattAl- Arab river during periods at collected samples in the present study.

Species list
1-Family Ocypodidae:
Ucas indensis (Alcock, 1900)
2-Family Pilumnidae*:*
Eurycarcinus orientalis (Milne Edwards, 1867)
3-Family Macrophthalmidae:
Macrophthalmus dentipes(Lucas, 1836)
Macrophthalmus depresus
4- family; Camptandriidae
Opusia indica (Alcock, 1900)
Leptochryseus kuwaitensis (Jones & Clayton, 1983)
Nasima dotilliformis(Alcock, 1900)
5- Family Varunidae
Eriocheir sinensis (H. Milne Edwards, 1853)

Note: that there is no record of the occurrence of any species belonging to the family Seasarmide in the northern of Shatt Al-Arab River in the Basrah city (at the Qurna city) and notes the occurrence and reported the specimens of freshwater crab species *Botamon sp.* (Picture 4) that very similar to specimens of species *C. (Seasarma) boulengeri.*This proves beyond doubt the absence of any species of family Sesarmidae in any water body north of the Basrahcity.

Picture 4 *Botamon sp.*, male (CL: 60.15 mm, CW: 46.34 mm), north part of Shatt Al-Basrah River, Iraq. (a) dorsal view; (b) ventral view.

4 Conclusions

Spatial and temporal occurrence of Sesarmidand other brachyuran crabs at the intertidal zone from three stations in Shatt Al-Arab river in south of Al-Fao city (Rass Al-Bessa) (St. 1), second-station in Shatt Al-Arab river in Al-Seeba city (St. 2). Third station near Al-Ashar Creek (St. 3), by using the quadrate (25 X 25 cm) were studied.

The present study was based on the occurrence and density of Sesarmidcrabs in the three stations in the intertidal of Shatt Al-Arab River.

Brachyuran crabs families including Macrophthalmidae, Pilumnidae, Ocypodidae, Camptandriidae, and Varunidae. individuals of these species were observed in Al-Fao station (St 1) during the present study.

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