NEWLY RECORD OF THE *POTAMON MAGNUM* IN THE MIDDLE EUPHRATES AND THE IMPACT OF ENVIRONMENTAL FACTORS

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ABSTRACT

In the present study, newly record of the crustacean animal *Potamon magnum*, and the study samples of river crab were collected monthly by a network with a radius of (30) cm for the period from August 2014 until May 2015 of three stations in the al-Kufa river, the first station is located north bridge Imam Ali, the second near the Nissan trocar and the third near the old bridge. also the effect of environmental factors on the presence and the spread of river crab *P. magnum*, which belong to the order Decapods, the highest density has recorded the first station in April (32.89) individual / m³ and the second station (24.92) individual / m³ while In the third station (30.8) individual / m³ also the animal disappeared in the all study stations during the months of January and February. Environmental measurements showed that there is a positive correlation between intensity *P. magnum* and all of the air and water temperature, Biological Oxygen Demand (BOD₅), electrical conductivity, salinity and turbidity and Total Hardness (T. H.), also found negative relationship between river crab density and all of pH, dissolved oxygen, calcium ion

KEYWORDS: Crustacean, Crabs, Hardness, Tigris

INTRODUCTION

*Potamon magnum* is a freshwater crab, distributed Tigris. Due to their economical and medical importance, crabs, in general, have attracted the attention of many researchers, allover the world, to study their reproduction and to investigate their reproductive organs, in details (Al – Barwary , 2011) Freshwater crabs comprise about 1300 extant species at present and are one of the most diverse groups of brachyuran crustaceans (NG et al. 2008) Freshwater crabs play a key role in the ecology of tropical inland waters worldwide (Yeo et al., 2008; Shih et al., 2006)

Freshwater crabs are also medically important as intermediate hosts of paragonimiasis in Asia, Africa, and the Neotropics. Paragonimiasis, as a food-borne zoonosis, has infected more than 20 million people worldwide by one of the 15 species of lung flukes (i.e. genus *Paragonimus*) that possibly indicates a wide consumption of freshwater crabs by humans Adams, 2006; Maleewong, 2003)

Despite, many species of freshwater crabs are in risk of extinction, conservation assessment of them has not received enough attention since the beginning of the 21st century. A fine scale conservation assessment of freshwater crabs in Malaysia evidenced that several species are differently threatened (Ng & Yeo, 2007). A similar study on Sri Lankan freshwater crabs showed that 37 species (72%) are threatened with global extinction as a result of water quality deterioration (e.g. unregulated use of pesticides), habitat fragmentation and undistributed habitat (Bahit et al., 2005)
Freshwater crabs may tolerate some degree of salinity but they have a low capacity for transoceanic dispersal (Morris & Van Aardt, 1998).

Many species of the Potamidae family migrated to different geographically isolated regions and they well adapted themselves with prevailing conditions (Bott, 1970; Pretzmann, 1976).

**MATERIALS AND METHODS**

River crab samples collected per month for a period of ten months from the August 2014 until May 2015 from the Kufa River near the plant areas by network radius (30 cm) from three stations the first station is located near the bridge imam Ali, the second near the Nissan and the third station is located near the old bridge from the depth (1 meter) and kept the samples in a plastic bowl and learned according the collection area and the date and time of sample collection and preserved by using formalin 10%. And the river crab samples sent to the Natural History Museum in Baghdad for the diagnosis and classification of samples. Also measured physical and chemical factors in different ways such as temperature of the water and air C°, pH and conductivity electrical (MS / CM) directly in the field by using a multi-digital measurements mobile device after calibration standard solution, and measured the salinity depending on the electrical conductivity of the samples values After that hit the value of the electrical conductivity with factor 0.64, according to the way (Mackereth, 1978) also measurement dissolved oxygen (DO), turbidity, total hardness and the calcium ion in the laboratory by using different devices. While calculated the value of the Biological Oxygen Demand (BOD<sub>5</sub>) according to the method described by the American Health Association (APHA.1998). used the statistical analysis of variance Tow Way ANOVA)) at the significant level of 5% to find the differences between months and stations study, also used Correlation Coefficient (r) the positive and negative relation between the animal density and environmental factors (physical and chemical).

**RESULTS AND DISCUSSIONS**

Recorded the species *P. magnum* for the first time in Kufa river, as the animal’s Characterization has dark green in
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the dorsal region and the bottom rigon as white diagonal of yellow this animal has five pairs of walking legs as in the picture (2). Carapace Length ranged from 16 mm to 55 mm and Carapace ranged from 20 to 6.5 mm and the length of forceps Chela between 10 to 33 mm and this disagreed with (Salih and Al- Barwary, 2013) in the Shatt al-Mosul, the animal diameter reached 55 mm to 75 mm.

Record highest density of the animal *P. magnum* in the month April in the all study stations , in the first station (32.89) individual / m³, followed by the third station 30.80 individual / m³ and finally the second station (24.92) individual / m³ and This agreement with Sultan (1987) who record the highest density in the month April ( 54.5) individual / m³ and recorded the lowest density of the animal in all study stations during the months January and February where there is no appearance of the animal during those months Table 1, Figure 1.

Table 1: Shows Mean the Monthly Density of River Crab *P. Magnum* in the Study Stations

<table>
<thead>
<tr>
<th>Month</th>
<th>Station 1</th>
<th>Station 2</th>
<th>Station 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 2014</td>
<td>21.86</td>
<td>17.91</td>
<td>20.71</td>
</tr>
<tr>
<td>September</td>
<td>27.44</td>
<td>20.8</td>
<td>22.35</td>
</tr>
<tr>
<td>October</td>
<td>18.21</td>
<td>16.71</td>
<td>18.2</td>
</tr>
<tr>
<td>November</td>
<td>12.04</td>
<td>9.2</td>
<td>16.61</td>
</tr>
<tr>
<td>December</td>
<td>7.52</td>
<td>5.06</td>
<td>5.53</td>
</tr>
<tr>
<td>January 2015</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>February</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>March</td>
<td>0</td>
<td>7.37</td>
<td>10.25</td>
</tr>
<tr>
<td>April</td>
<td>32.89</td>
<td>24.92</td>
<td>30.8</td>
</tr>
<tr>
<td>May</td>
<td>14.93</td>
<td>15.36</td>
<td>10.92</td>
</tr>
<tr>
<td>June</td>
<td>9.91</td>
<td>8.23</td>
<td>8.88</td>
</tr>
<tr>
<td>July</td>
<td>8.96</td>
<td>4.29</td>
<td>7.08</td>
</tr>
<tr>
<td>Density years</td>
<td>12.81</td>
<td>10.82</td>
<td>12.61</td>
</tr>
</tbody>
</table>

Figure 2: Shows Mean the Monthly Density of River Crab *P. magnum* in the Study Stations

Picture 1: Anterior Region of River Crab *P. magnum*
The Impact of Environmental Factors on the Intensity Crustaceans

The results showed that the most important factors that have an impact on the presence of this river crab is the water temperature and salinity which results shows less density of the river crab in the first station in January, February and March 2015, where this animal does not appear during those months when the temperature of 13.4 and 13 and 18.1 °C respectively. The highest density reached (32.89) individual / M³ at a temperature of 20 °C during April, while the lowest density in the second station was during January and February where is not recorded any intensity of this animal at a temperature of 14.5 and 14.1 respectively and the highest density reached in the April 24.92 individual / m³ at a temperature of 22.4.

Temperature

Temperature of the air in the first station Ranged between 14.8 °C in the February month 2015 and 42.2 °C in August 2014, and the water temperature between 13 °C in the February month and 27.7 °C in August, and in the second station air temperature ranged between 15 °C in the December month in 2015 and 39.5 °C in August 2014 and the water temperature is between 14.1 °C in the February month and 29.1 °C, while in the third station air temperature ranged between 13 °C in the January month 2015 and 30.4 °C in August 2014, as well as there are positive relationship between air temperature and density of river crab P. magnum. Correlation coefficient ( r = 0.722, r = 0.729, r = 0.529) in all study stations, respectively, also showed positive relation between the water temperature and the density of river crabs with correlation coefficient (r = 0.661, r = 0.903, r = 0.658) In the all study, all stations respectively at p <0.05. Temperature have direct impact in the distribution of organisms in the aquatic environment which impact on gases soluble such as oxygen and carbon dioxide, as well as impact on the water content of nutrients and the salinity which have positive correlation with temperature (Hauer and Lamberti, 2007). Also, the considers temperature the main factor in controlling the distribution of organisms which impact on main biological processes as a main factor in breathing, nutrition, growth, productivity and Osmoregulation, as regulated the productivity in several ways and controlled the maturity of the gonads and the formation of sperm and eggs, soothe temperature have major effects on the reproduction rate and mortality rates during the first stages of the evolution and life the larvae (Al-Saadi, 2006).

The variations of temperatures in the study areas is natural variation as a result of the change in the weather throughout the year (Al-Zurfi, 2010)
Potential of Hydrogen Ion (pH)

The value of pH ranged between 6.7 in May 2015 to 9.6 in the January, it was noted a negative relationship between pH value and the density of river crabs with correlation coefficient ($r = -0.148$, $r = -0.401$, $r = -0.268$) in the all study stations at $p < 0.05$. The pH is one of the most important environmental characteristics that have an impact on the metabolism and physiology and growth of organisms that live in different aquatic environments (Lowson, 2011) pH in the surface water have a great importance to aquatic life which impact on physiological natural functions for aquatic organisms, such as ion exchange with water and breathing and the vital aquatic organisms activity naturally at acidic range function ranging from (9 - 6) (El-DeebGhazy et al., 2011).

Dissolved Oxygen (DO)

Dissolved oxygen value ranged between 2.9 mg / L in August 2014 to 9.1 mg / L in the February 2015, and noted the negative correlation in the first and third station between the dissolved oxygen value and the density *Potamon magnum* with correlation coefficient ($r = -0.794$, $r = -0.012$), while in the second station observed positive correlation coefficient $r = (0.155)$ at $p < 0.05$. Dissolved oxygen is a one important chemical variables in the water ecosystem as well as the main determinant for the aquatic environment which controlling on the solute and toxicity of a lot of material (Smith, 2004)

Biological Oxygen Demand (BOD$_5$)

Were studied over water pollution in terms of bio-oxygen demand (BOD), the(BOD) ranged from 0.7 mg / L in the February 2015 to 4.3 mg / L in the August 2014, where it was noted the existence of a positive correlation between the value of the (BOD) and intensity river crab *Potamon magnum* with correlation coefficient ($r = 0.222$, $r = 0.754$, $r = 0.024$) in all study stations respectively at $p < 0.05$, as it uses a bio-oxygen demand Kmahr of the extent of dissolved oxygen consumption of neighborhoods (Coleman and Pettiqvove, 2001 Between Dhembare (2011) that high concentrations of the vital requirement for oxygen is suitable for the growth of zooplankton in Mola dam in India.

Salinity

The water salinity ranged between 0.71 ppt in the January 2015 to 1.31 ppt in August 2014, as it was noted that there is a positive correlation between the value of the salinity and density of river crab *Potamon magnum* with correlation coefficient ($r = 0.525$, $r = 0.071$, $r = 0.370$) in all study stations respectively at $p < 0.05$. salinity play an important role in the life of aquatic organisms through the Osmoregulation, Fresh water organisms differ in salinity so the high salt concentrations lead to a breach of balance between salt concentration in the blood and its concentration in the outer environment (Braunstein et al.,2007)

Turbidity

Turbidity value ranging from 1.4 Mg /L in the March 2015 to 14.3 Mg /L in the August 2015, and noted that there is a positive correlation between the value of the turbidity and the density of crab river *Potamon magnum* correlation coefficient of ($r = 0.608$, $r = 0.464$, $r = 0.076$) in all study stations respectively at $p < 0.05$. Turbidity refers to the amount of suspended solids in the water, as a metal, such as soil molecules or organic such as algae, and the turbidity measure is of the amount of scattered light as a result of suspended molecules in the water (water Internet Site, 2005).
Calcium Ion

Calcium ion value ranged from 119 Mg/L in August 2014 to 380 mg/L in the February 2015, also observed a negative correlation between the value of calcium and density of river crab *P. magnum* with correlation coefficient (r = -0.701, r = -0.620, r = -0.007) in the study and all stations respectively at p <0.05.

Figure 3: (A, B, C): Shows the Relationship between Air Temperature and the Density of River Crab *P. magnum* in the Study Stations
Figure 4: (A, B, C) Shows the Relationship between Water Temperature and the Density of River Crab *P. magnum* in the Study Stations

Station 1

Station 2

Station 3

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Figure 5: (A, B, C) Shows the Relationship between pH and Density of River Crab P. magnum in the Study Stations

Station 1

Station 2

Station 3
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Figure 6: (A, B, C) Shows the Relationship between DO and the Density of River Crab *P. magnum* in the Study Stations

Station 3

Figure 7: (A, B, C) Shows the Relationship between BOD and the Density of River Crab *P. magnum* in the Study Stations
Figure 8: (A, B, C): Shows the Relationship between Salinity and the Density of River crab *P. magnum* in the Study Stations
Figure 9: (A, B, C) Shows the Relationship between Turbidity and the Density of River Crab *P. magnum* in the Study Stations
Figure 10: (A, B, C) Shows the Relationship between Turbidity and the Density of River Crab *P.magnus* in the Study Stations

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growth and reproduction rates


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