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Length-Weight Relationship of the Red Mangrove Root Crab (*Goniopsis cruentata*) fromIsi-Okwaan Estuary, Oyorokoto Rivers State, Nigeria

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Abstract
A growth study on the ecologically important Red Mangrove Root Crab (Goniopsis cruentata) from Isi-Okwaan Estuary, Oyorokoto Rivers State,revealed that the crab had a negatively allometric growth which was recorded as follows; Male 2.344±0.192, Female 2.007±0.154, and combined sex 2.026±0.127. Regression analysis of the width –weight relationship showed that the males had a value of 2.24±0.179, females 1.71±0.145 and combined sex value was 1.84±0.126. The condition factor values for July was 2.373, August 2.112, and September 2.776 with a mean value of 2.42 for both sex. The monthly condition factor showed a steady increase from July to September for the males, while the best condition for females was recorded in September and the least in August. The sex ratio for the species was 1:1.7 (Male: Female), while a test for departure from 1:1 ratio using Chi square test indicated that there was a significant difference in the sex ratio. The Red Mangrove Root Crab (Goniopsis cruentata) was female dominated and in good condition in Isi-Okwaan Estuary.

Key Words: *Crab, Crustacean, Growth, Condition, Sex Ratio*

Introduction

The majority of crabs are scavengers, meaning they spend most of their time looking for food around and near the water's bottom. They are mostly active at night because they are nocturnal animals. Because they primarily live in coastal waters, estuaries, and lagoons, muddy or sandy bottoms are more convenient for them. They can use their claws to delve into the sediment and break apart sand and mud clumps. They are tolerant of a large salinity range, from freshwater to extremely salinized seas. (Rittschof*et al*., 2004).

Goniopsis cruentata is mostly found in the Atlantic region, which includes Brazil (Para to Santa Catarina, including Fernando de Noronha), Mexico, Belize, Panama, the Antilles, Colombia, Venezuela, the Guianas, and Florida to Bermuda. It is also found in the eastern Atlantic region which stretches from Senegal to Angola. (Sealifebase 2024).The Red Mangrove Root Crab can move quickly between the roots and trunks of trees and is found in brackish, murky (muddy) waters, frequently in mangrove swamps. found in burrows in seas from supratidal to intertidal.

They make great mangrove predators. It consumes animal waste and mangrove propagules as food(Andrade *et al* 2012; Fischer *et al* 1981).
The Red Mangrove Root Crab occupies an important ecological niche; where it feeds on a host of intertidal organisms and plants and in turn eaten by some other aquatic carnivores. This study intends to provide data on the growth pattern and condition of*Goniopsis cruentata*in Uweele-Ise Creek Rivers State Nigeria.

Materials and Methods

The study area's coordinates were 4"26'56'N and 7"19'55'E at the Isi-Okwaan Estuary in Oyorokoto Rivers State, Nigeria.
Using various locally made traps, samples of the Red Mangrove Root Crab(*Goniopsis cruentata*)were collected every two weeks for duration of three months. The fish were brought to the lab for examination after being preserved in 10% formaldehyde.
On a measuring board, length and width measurement were taken in centimeters, and weight was measured in grams on a weighing balance.

The following statistical techniques were applied to the length-weight data analysis:
The length-weight and width-weight data was analyzed by the following statistical procedures;
$W=aL^b$ ….. (Pauly 1983) Was applied in regression of the samples
Where,
W= Weight of*Goniopsis cruentata* (grams) a = Intercept, L= Total length (cm), b= (Growth coefficient)
The condition factor (K) for the species was calculated using the equation:

$$K = \frac{100W}{L^3}$$

(Chukwu and Pepple 2021).
Where:
W= Weight of *Goniopsis cruentata*(grams), L= Total length= Condition Factor of *Goniopsis cruentata.*
Sex ration was determined by the actual numbers of males to female samples, and the data subjected to Chi square test for determination of departure from 1:1 ratio in the population

Results

The study of growth of the Red Mangrove Root Crab (*Goniopsis cruentata*) from Isi-Okwaan Estuary, Oyorokoto revealed that the length-weight regression analysis for both male and female sample had a negative allometric growth (Table 1).
The regression analysis for width –weight study showed that the males had Male 2.24±0.179, Female recorded an value of Female 1.71±0.145 while the mean value for both sex was 1.84±0.126 (Table 2). The condition factor values were as follows; July 2.373, August 2.112, September 2.776 with a mean value of 2.42 for both sex. The monthly condition factor showed a steady increase from July to September for the males, while the females had its peak in September and dip in August (Figure 1). The sex ratio for the species gave 1:1.7 for Male: Female samples while a test for departure from 1:1 ratio using Chi square test indicated that there was a significant difference in the sex ratio.

Table .1: Regression analysis for Length-Weight relationship of *Goniopsis cruentata* from Isi-Okwaan Estuary, Oyorokoto

	Growth Coeff (b)	Intercept	Correlation Coeff (r^2)
Male	2.344±0.192	0.21±0.09	0.687
Female	2.007±0.154	0.36±0.07	0.588
Combined	2.026±0.127	0.36±0.06	0.574

Table 2: Regression analysis for Width-Weight relationship of *Goniopsis cruentata* from Isi-Okwaan Estuary, Oyorokoto

	Coeff (b)	Intercept	Correlation Coeff (r^2)
Male	2.24±0.179	0.103±0.101	0.6964
Female	1.71±0.145	0.359±0.078	0.5369
Combined	1.84±0.126	0.305±0.069	0.5280

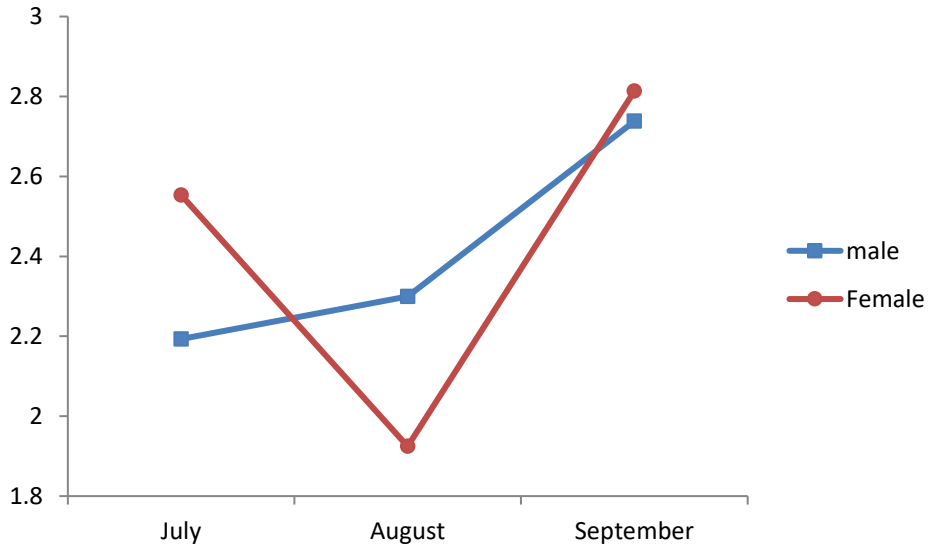

Figure 1: Condition factor of *Goniopsis cruentata*Isi-Okwaan Estuary, Oyorokoto

Discussion

The Red Mangrove Root Crab (*Goniopsis cruentata*) from Isi-Okwaan Estuary, Oyorokoto recorded a negative allometric growth, This was similar to results obtained by Moruf (2020) for *G pelii* from a tropical mangrove swamp in Nigeria. The positive correlation coefficient between Length and weight as well as width –weight is in agreement with the findings of Lawal-Are and Nwankwo 2011, as well as Moruf and Lawal-Are (2017), which indicated that the crab increases in weight with length. The observed condition factor in this study is in agreement with those of

Moruf (2020) where the values recorded suggested that the crab was in very good condition. Eteobong et al (2017) reported a female dominated population in *G pelii*, which agrees with the findings of this research, however Moruf (2020) had a contrary report for the species from a tropical mangrove swamp in Nigeria

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