International Journal of Agriculture and Earth Science (IJAES) E-ISSN 2489-0081
P-ISSN 2695-1894 Vol 10. No. 5 2024 www.iiardjournals.org Online Version

Length-Weight Relationship and Stomach Content of *Caranx carangus* (Jack Cravelle) from Isi-Okwaan Estuary Oyorokoto Rivers State Nigeria

CHUKWU. K. O. and I.G. Sokari
Department of Fisheries and Aquatic Environment,
Rivers State University, Port Harcourt, Nigeria
Corresponding Author Email: king4c2004@yahoo.com

DOI: 10.56201/ijaes.v10.no5.2024.pg318.322

Abstract
A study on the growth (Length-weight relationship and condition) of the Jack Cravelle (Caranx carangus) in Isi-Okwani Estuary Oyorokoto was conducted to provide key basic data that are very useful in the management of the stock. The length-weight data by means of regression indicated that the fish growth was negatively allometric (2.0046±0.0793), while the overall condition of the fish was good (1.29) the condition factor peaked in September and dipped in October. The Index of Relative importance technique used for its stomach content analysis revealed that shrimps were the most important (most consumed) food item. Palaemon africanus was the most preferred shrimp with a percentage value of 60.21 while Palaemon maculatus contributed 39.79 percent of shrimp consumption. Other items found in the fish's stomach were teleost 0.13 percent and unidentified items 34.57percent. Caranx carangus in Isi-Okwani Estuary was carnivorous specializing in shrimps especially Palaemon africanus.

Key Words: *Carangids, Growth, Food, Feeding, Habits.*

Introduction

Although carangids are mostly carnivores (pisvorous), they can exhibit a wide variety of food habits, including scale eating. Suspension feeding, ambush hunting, are common behaviors among carangids. In coastal waters, caranx species are primarily diurnal, carnivores(predators) that feed on fish and various crustaceans. (Sancho 2000). In fish ecology and stock management, fish food and feeding habits are valuable tools for examining a species' natural history and its place in trophic (such as predator-prey) relationships in aquatic environments. (Braga *et al*., 2012; Odo *et al*., 2012).Fish feeding behaviours can change seasonally and geographically based on the availability of prey and surrounding ecological factors. S. maderensis, for instance, feeds on copepods during the upwelling season in the Canary Current upwelling system and transitions to dinoflagellates and diatoms during the non-upwelling season. (Bode *et al.*, 2016).

For the appropriate exploitation and management (conservation) of fish populations, the length-weight information is crucial. Fish sample programs typically yield relevant results, such as weight and length measurements. To estimate growth rates, lengths, and age structures, these data are

required for an effective fish stock management (Bolarinwa, and Popoola, 2013 ;Kamaruddin et al., 2011)

Caranx carangus is a very important fish commercially and commands premium value. It is therefore imperative to have useful data on such species that would make its management effective for a sustainable fishery.

Materials and Methods

The study was carried out in Isi-Okwaan Estuary OyorokotoRivers State Nigeria with the co ordinates 4"26'56'N and 7"19'55'E.

Samples of *Caranx carangus* were caught biweekly for a period of three months using drag and cast nets. The catch were preserved in 10% formaldehyde and taken to the laboratory for analysis. Length was measured in centimeters on a measuring board while weight was measured on weighing balance (grams).

The length-weight data was further analysed using the following statistical methods;

$W=aL^b$….. Was used for regression

Where,

W= Weight of *Caranx carangus* (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 *Caranx carangus*(grams), L= Total length= Condition Factor of *Caranx carangus.*

Stomachs of *Caranx carangus* dissected and the content analysed by the following methods

Number method:

This method was based on the number of each kind of food items found in the gut. It was expressed as:

$$\text{Percentage by number (\%N)} = \frac{\text{Total Number of the particular food item}}{\text{Total number of all food items}} \times 100$$ (Ezenwaji and Offiah, 2003; Chukwu and Deekae 2013)

Frequency of Occurrence Method

Frequency of occurrence of each type of diet found in the gut was expressed as:

$$\text{\% Occurence of the food item} = \frac{\text{Total Number of stomachs with the particular food item}}{\text{Total number of stomachs with food}} \times 100$$ (Ezenwaji and Offiah, 2003;)

Index of Food Significance (IFS)

$IFS = \frac{\%F \times \%N}{\sum \%F \times \%N} \times 100$ (Ezenwaji and Offiah, 2003)Where,

IFS= Index of Food Significance

%F= Percentage frequency of occurrence of each kind food item.

%P= Percentage Number of each kind food item.

Results

Regression analysis for *Caranx carangus* from Isi-Okwaan Estuary Oyorokoto (n = 213) revealed the growth coefficient was 2.0046±0.0793, an intercept of -0.6036±0.102 and an R square value of 0.7518. The average condition factor recorded a value of 1.29, with a peak in September and a dip in October (Figure 1).

Analysis of stomach content (Table 1) showed that the most important food for the species was shrimp with an IRI of 65.3 percent and teleost constituting the least important item. A further look at the most important food item (shrimp) indicated that *Palaemon africanus* made up 60.21 percent and *Palaemon maculatus* had 39.79 percent (Figure 2)

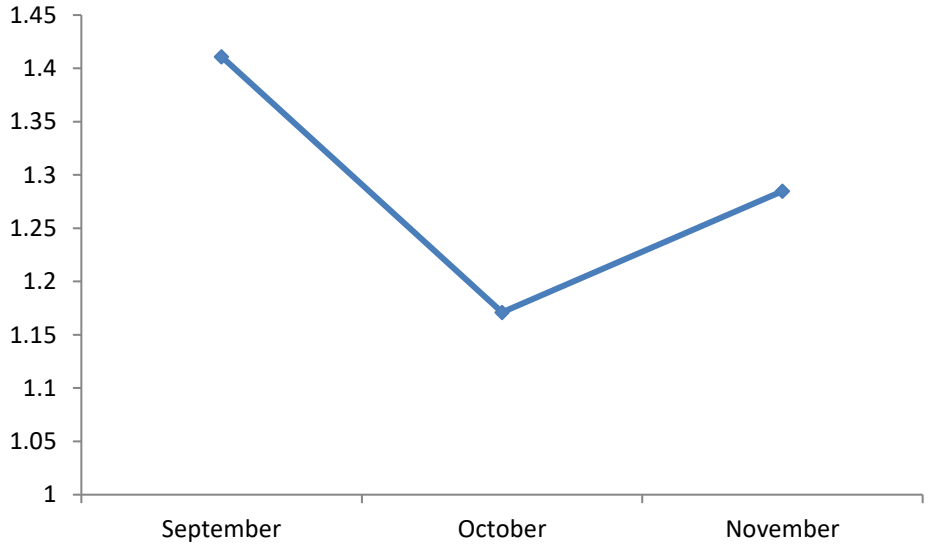

Figure 1: Condition Factor of *Caranx carangus*

Table 1: IRI for Stomach content of *Caranx carangus*

Food item	Number	C_N	Weight	C_W	Frequency	%F	IRI	%IRI
Shrimp	107	85.6	18.71	60.75	6	26.09	3818.27	65.30
Teleost	3	2.4	2.58	8.4	2	8.70	7.52	0.13
Unidentified items	15	12.0	9.51	30.88	15	65.21	2021.51	34.57
Total	125		30.8		23		5847.3	

C_N = percentage number , C_w = percentage weight

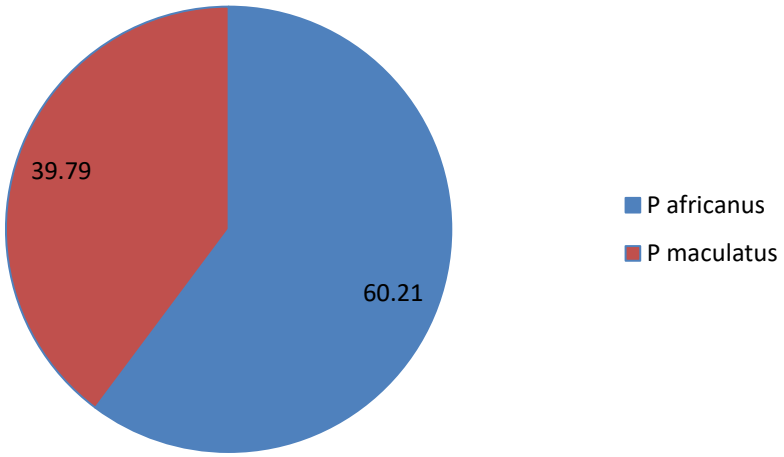

Figure 2: IRI of shrimp found in the Stomach of *Caranx carangus*

Discussion

The observed growth coefficient for *Caranx carangus*was negatively allometric, this was in contrast to those of Bolarinwa (2017) for *Caranx hippos* from Epe Lagoon, Nigeria. Allometry, positive and negative as well as isometry are determined by intrinsic factors like genetic makeup and extrinsic factors like food availability and other environmental factors. The condition factor for Caranx carangus in this study was 1.29 which indicated that the fish's well being was optimum, although results for Caranx hippos from from Epe Lagoon was higher with a value of 2.24 (Bolarinwa 2017).

The major food item for *Caranx carangus* in this study was Shrimps; other food items found were teleost and unidentified foods. Silvano (2001) reported that *Caranx latus* preyed on copepods, crustaceans, and teleost fishes. This presented both species as carnivores, but with different preferences. These variations could be due to differences in the predator species as well as prey availability.

References

Bode, A., Hernández-León, S., Almeida, C., *et al.* (2016). Seasonal and interannual variability of *Sardinella maderensis* feeding in the Canary Current upwelling system inferred from fatty acid analysis. Marine Ecology Progress Series, 550, 161-174.

Bolarinwa, J, B (2017). Length- Weight Relationships and Condition Factors of CynoglossusCynoglossus and Caranx Hippos in Epe Lagoon, Nigeria. *International Journal of Research in Agriculture and Forestry*. Volume 4, Issue 3. P 1-5.

Bolarinwa, J.B and Popoola,Q (2013). Length-weight relationship and condition factors of six economic fishes of Ibeshe water side, Lagos Lagoon, Nigeria. Proceedings of the internationalconference on Oceanography, Orlando-Florida, U.S.A, pp54-59.

Braga, R. R., Bornatowski, H and Vitule, J. R. S. (2012). Feeding ecology of fishes: An overview of worldwide publications. *Reviews in Fish Biology and Fisheries*, 22 (4): 915-929.

Chukwu, K.O. &Deekae, S.N. (2013). Foods of the mudskipper (*Periophthalmusbarbarus*) from New Calabar River, Nigeria. *Journal of Agriculture and Veterinary Science*, 5(6): 45-48.

Chukwu, K.O. & Pepple, M. (2021). Length/Weight Relationships and Condition Factor of *Trachinotus goreensis* from Bonny Estuary, Nigeria. *Associatio of Aquatic Sciences of Nigeria*, 36(2):133-138.

Ezenwaji, M. G. and F. N. Offiah (2003). The Biology of *PellonulaLeomensisBonlenger*. 1916 (Osteichthyes; clupeidae) in Anambra River, Nigeria. *Journal of Biological Resources*, 1(2):33-50.

Kamaruddin, I.S., Mustafa-Kamal, A.S, Christianus, A, Daud, S.K, Amin, SM.N and Yu-Abit, L (2011). Length-weight relationship and condition factor of three dominant species from the lake TasikKenyir, Terengganu, Malaysia. J. Fish. Aquatic Sci., 6: 852.

Odo, G. E., Onoja, S. U and Onyishi, G. C (2012). The biology of *Parachanna obscura* (Osteichthyes: Channidae) in Anambra River, Nigeria. *International Journal of Fisheries and Aquaculture*, 4 (8): 154-169.

Sancho, G. 2000. Predatory behaviors of Caranx melampygus(Carangidae) feeding on spawning reef fishes: a novel ambushing strategy. Bull. Mar. Sci. 66: 487–496.

Silvano, R. A .M (2001). Feeding habits and interspecific feeding associations of Caranx latus (Carangidae) in a subtropical reef. Environmental Biology of Fishes 60: 465–470.