



FSN-FB 0002

## A PRELIMINARY STUDY OF DIET IN THE JUVENILE GOREAN SNAPPER, *Lutjanus goreensis* (VALENCIENNES, 1830) FROM FIVE COWRIE CREEK, LAGOS, NIGERIA

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This paper was prepared for presentation at the 25<sup>th</sup> Annual International Conference and Exhibition in Administrative Staff College of Nigeria (ASCON), Topo-Badagry, Lagos, Nigeria, 25<sup>th</sup> – 29<sup>th</sup> October, 2010.

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### ABSTRACT

*Diet of the juvenile gorean snapper, Lutjanus goreensis from Five Cowrie Creek was investigated between April 2008 and January 2009. Analyses of 184 specimens by numerical (NO), frequency of occurrence (FO) and geometric index of importance (GII) methods, respectively revealed a moderately high proportion (47.83%) of stomachs with food or prey. Shrimps and crabs constituted more than 80 % of total prey items. Other dietary components included lobsters, stomatopods, whole fish and fish parts. Similarly, analysis of diet composition by size - groups also indicated a predominance of the shrimps and crabs over all other prey items. In conclusion, L. goreensis can be described as a top-level carnivore feeding almost exclusively on epibenthic crustaceans in the juvenile stage.*

**Keywords:** *Lutjanus goreensis*, five cowrie creek, juvenile, diet, carnivore

### INTRODUCTION

The gorean snapper, *Lutjanus goreensis* (Valenciennes, 1830) is one of the 6 species in the Family Lutjanidae widely distributed along the West African coast and the Cape Verde Islands (Allens, 1985). In Nigeria, snappers occur as incidental catches in trawl landings and are also an important component of the artisanal fishery in estuaries, coastal wetlands and the sea (Ayodele and Jenyo – Oni, 2002; Oribhabor and Ogbeibu as cited in Oribhabor *et al.*, 2005). According to the Federal Department of Fisheries (2008), snappers contributed 1.33% to 615, 507 tonnes total domestic fish production in 2007. Their excellent flesh quality and high demand is an attestation of the relatively high price of N800 per kilogram in the market today. Snappers have potential for culture and fingerling production (Ezenwa, 1990; Madu, 1996). The earliest record of snapper cultivation dates back to 60 years in earthen ponds near Onikan in Lagos (McLaren, 1949). Snappers are also highly favoured as control predators for *Tilapia spp.* and as viable candidates for cage culture in the brackish and marine environments (Ezenwa, 1984; Ezenwa *et al.*, 1985; Ezenwa *et al.*, 1990). However, despite their economic importance and culturable potentials, there is scanty information on their biological information including aspects of food habits in West Africa. The objective of this study is to describe the diet of juvenile *L. goreensis* in Five

Cowrie Creek, Lagos, South – West, Nigeria.

## MATERIALS AND METHODS

Between April 2008 and January 2009, juveniles of *L. goreensis* were obtained from artisanal fishermen stationed on the bridge overlying the Five Cowrie Creek. The creek stretching about 7 km in length is one of the numerous adjoining creeks to the Lagos Lagoon. It separates Lagos Island and Ikoyi from Victoria Island. It is connected to the lagoon at two ends; the Lagos Harbour which opens to the inshore (coastal) waters off Lagos and at the extreme of the eastern part of Ikoyi, respectively. It is also connected to the Kuramo Creek which drains the Kuramo Lagoon. Consequently, it is a route of migration or transport in and out of the lagoon to the Atlantic Ocean for many estuarine – dependent marine fish species at various developmental stages.

Fish specimens were caught by the artisans using mostly fish bait on hooks and lines. Thereafter, the specimens were taken to the laboratory for further analysis. Total lengths and body weights of fish specimens were measured to the nearest 0.1cm and nearest 0.1g respectively. Stomach contents of fish specimens were examined for dietary items sorted into taxonomical categories and recorded quantitatively by the frequency of occurrence (FO) and numerical method (N0) (Hyslop, 1980). The Geometric Index of Importance (GII) of Gumus *et al.* (2002) combines the relative measures of dietary items and was used to determine the preference or importance of each prey type. The number of fishes with empty stomachs were noted and consequently excluded from the analysis.

## RESULTS AND DISCUSSION

There is a paucity of studies about the food habits of juvenile *L. goreensis* and the other 5 lutjanid species in West Africa. A total of 184 stomachs were examined of

which 88 (47.83%) had prey or food in their stomach. This study presented a moderately high percentage of stomachs with food or prey (47.83%) in juveniles from the creek. Rooker (1995) and Szedlmayer (2004) also showed similar results in diets of juvenile schoolmaster snapper, *L. apodus* (69%) and red snapper, *L. campechanus* (48%), respectively when fish were sampled from shallow depths. Snappers have often been described as opportunistic carnivores feeding on a variety of prey items mainly at night. Two major groups of food habits have been identified in snappers: carnivores represented by the larger, deep - bodied snappers mostly in the genus *Lutjanus* which generally feed on fishes and benthic crustaceans; planktivores such as species of the subfamilies *Etelinae* and *Apsilinae*, especially in the genera *Pristipomoides* and *Paracesio* and some species of the subfamily Lutjaninae (*Ocyurus chrysurus* and *Rhombopolites aurorubens*) (Allens, 1985). In this study, 5 prey items consisting of prey of teleost origin (fish parts and whole fish), stomatopods, lobsters, crabs and shrimps were identified (Table 1). Larval stages of clupeids, polynemids, portunid crabs and penaeid shrimps were often identified when whole prey items were found undigested. Throughout the study period, only 2 dietary items, namely shrimps and crabs were more important (> 80 % of the total diet) than other dietary components in the juveniles. By number, the most important prey items were shrimps (56.34), crabs (29.58%). Lobsters also were important while the rest of the food components including stomatopods, whole fish and fish remains had low values (less than 5%). The shrimps (55.42%) and crabs (32.53%) also predominated in percentages for frequency of occurrence. Also, according to GII, shrimps (79.03%) and crabs (43.92%) were the most important dietary components. Bradley and Bryan (1975) reported that young red snapper, *L. campechanus* depended almost exclusively

on invertebrates. According to Vasquez *et al.*, (2008), crustaceans are primary dietary items which may occur in some species of juvenile snappers throughout the year. Particularly, shrimps are highly important prey items in snappers (Rooker, 1995, Heck and Weinstein, 1989; Sanchez, 1994; Thayer *et al.*, 1987). Moseley (1966) indicated shrimps, stomatopods, detritus and fish as primary prey items in the diet of 28 juvenile red snapper collected off Louisiana Coast. Similarly, shrimps, crabs and mysid shrimps were also reported as more important in the diet of 45 juvenile red snapper collected off the Texas Coast.

Pref: Preference 1: Preferred prey 2: Secondary prey 3: Occasional prey  
NO: Numbers

FO: Frequency of occurrence GII: Geometric index of importance

Fish specimens were also divided into 3 size - groups with a view of comparing ontogenetic variations in the diet of the species. The first group consisted of small - sized fish ranging from 10-15.9cm (TL), the second group consisted of medium-sized fish of 16-21.9 (TL) and the third group consisted of large-sized fish of 22-28.9 (TL). Ontogenetic variations occur in food habits of some snapper species (Moseley, 1966; Bradley and Bryan, 1975; Sedberry and Cuellar, 1993). However in this study, gorean snapper throughout their juvenile phase showed a tendency to deviate very little from consumption of shrimps and crabs to other prey items. Crustaceans were the most important dietary components for both small-sized and medium-sized fishes. By number, shrimps contributed 64.15% and 48.57% to the total diet of small-sized and medium - sized fish, respectively. Small- sized fish equally fed on crabs (24.53%). Crabs (34.29) were also relevant in the diet of the medium - sized fish. Also, by frequency of occurrence, the most important dietary items in the diet of small - sized fish and medium-sized fish were shrimps (58.73% and 51.25%, respectively) and crabs (31.74% and 33.75%). However, lobsters

were significantly less important than crabs and shrimps but slightly more important than fish in the small sized fish. They were almost equally important in the diet of the medium-sized fish (Table 2). Similarly, major prey items consumed by the large-sized fish did not differ from the small and medium-sized fishes because they also fed on shrimps and crabs. Both constituted 30% by number and 40% by occurrence, respectively.

## CONCLUSION

In conclusion, juvenile *L. goreensis* from Five Cowrie Creek can be categorized as top-level carnivore feeding almost exclusively on epibenthic crustaceans throughout the juvenile stage.

## ACKNOWLEDGEMENTS

We are grateful to the Laboratory Staff, including the Late Mr. Adeola Fagbohun in the Department of Fisheries, Lagos State University, Ojo, for providing the necessary assistance during the study period

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**Table 1: Summary of prey items found in the stomach of *L. goreensis* from Five Cowrie Creek**

Prey item	N	N%	FO	FO%	GII	Pref
Whole fish	4	2.82	4	2.41	3.70	3
Fish parts	2	1.41	2	1.20	1.85	3
Shrimps	80	56.34	92	55.42	79.03	1
Crabs	42	29.58	54	32.53	43.92	2
Stomatopod	4	2.82	4	2.41	3.70	3
Lobsters	10	7.04	10	6.02	9.23	3

**Table 2: Summary of the stomach contents of juvenile *L. goreensis* by 3 size - groups from Five Cowrie Creek**

Prey item	10.0-15.9(TL)				16.0-21.9(TL)				22-28.9			
	Numerical		Frequency		Numerical		Frequency		Numerical		Frequency	
	N	N%	FO	FO%	N	N%	FO	FO%	N	N%	FO	FO%
Whole fish	1	1.89	1	1.59	5	7.14	5	6.25	-	-	-	-
Fish parts	1	1.89	1	1.59	1	1.43	1	1.25	-	-	-	-
Shrimps	34	64.15	37	8.73	34	48.57	41	51.25	4	-	6	40
Crabs	13	24.53	20	31.74	24	34.29	27	33.75	3	-	6	40
Stomatopods	1	1.89	1	1.59	-	-	-	-	3	-	3	20
Lobsters	3	5.66	3	4.76	6	8.57	6	7.5	-	-	-	-