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RESEARCH ARTICLE

Feeding Habits and Stomach Contents of Asian seabass *Lates calcarifer* from Nizampatnam Coast, Andhra Pradesh, India.

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Abstract

Food is a significant factor in the ecology of fishes and required survival, growth, reproduction and extensive migration. Food and feeding habits of fish is a helpful of fishery biology and culture aspects. The feeding strategies and diet composition of Asian seabass *Lates calcarifer* from Nizampatnam during January to December 2015. There was a preponderance of empty stomach is all the months. Crustaceans 31%, fish larvae 21%, polychaets worms, 15% and algae 8% of the food item in the food spectrum of the fishes. Further items were semi digested 13% and unidentified 12% and also monthly fluctuations were also observed in the percentage occurrence of stomach with different degrees of fullness. It is evident that higher percentage of fullness of the stomach was recorded in premonsoon due to prespawning flattening process. The monthly Gastro Somatic Index ranged from 2.1 to 5.1 and higher values were recorded in the month of July.

Introduction:-

Food is one of the essential requisites of living beings in nature for persistence of their vital needs viz., growth and reproduction for survival and thus maintain their kind. The importance of the knowledge of food and feeding habits of a fish in understanding its biology has been well established. Some times the rate of feeding has a influence the spawning rate of fish. The nature of food composition of a fish species will also throw light on the possible habits it frequents. Fishes directly depend upon their surrounding aquatic environment for their food requirements and are highly adopt in their food and feeding habits, utilizing most of the readily available food. Studies on the food and feeding habits, an important aspect in the biology of fishes, have shown that the requirements at different stages in their life cycle differ with space and time (Hardy 1936).

The magnitude of fish population in a region is a function of its food potentialities and food enriches of the biochemical components of fishes. Seasonal and diurnal abundance of different food organisms may influence the movements and migration of fishes. Hence it is very essential to gain an insight into the relationship between the fishes and their food organisms for prediction and exploitation of fish resources. Ganapathi and Chacko (1950) explained that the groups of several fishes are cultivable importance into surface, column and bottom feeders. There are also terms like Piscivorous-feeding mainly on fish, Carnivorous- feeding mainly on animal food, Planktivorous-feeding on plankton, Detrivorous-feeding on detritus and Cannibalistic-feeding on their own kind. Mookherjii et al., (1964) reported that the feeding habits of some fishes on the basis of the presence of maximum percentage of the type of food in the guts of the fishes. Das and Moitra (1963) observed that the fishes into herbivores which feed on plant material, carnivores which feed on animal material and omnivores which feed on one or more groups of organisms, i.e., plankton, nekton or benthos and or detritus.

Lates calcarifer commonly called as seabass/barramundi is one of the commercially important marine food fishes which also thrive in brackish water and fresh water. It widely distributed in tropical and subtropical waters of the

Indo-west pacific (Katayama and Taki, 1984). This large centropomid species with a 'delicate-flavored' fresh is a euryhaline, eury thermal, highly predacious and protrandous hermaphrodite which grows to a comparatively large size. Young ones spend of their growing period in fresh water such as rivers, lakes, creeks and canals etc. which are connected to sea but the adults migrates to the sea, where salinity range is 30 to 32% for gonads maturation. Subsequently they spawn according to the lunar cycle and the larvae migrate further upstream for growth. The distribution pattern of different life stages is diverse in various ecosystems such as coastal waters, estuaries, lagoons, brackish water and even in fresh water (Ghosh, 1973). Kungvankij et al., (1986) reported that *L.calcarifer* is a diadromus species and inhabiting rivers before returning to the estuaries to spawn. Small ones are inhabit the upper reaches of rivers (Allen et al., 2002). Some common habits of *L.calcarifer* are found in estuaries of Krishna and Godavari and remaining estuarine parts of the Bay of Bengal. The seasonal variations of food items and feeding activities of *Lates calcarifer* in Krishna estuarine region particularly Nizampatnam Coast are scanty. Therefore, the result of this study provides valuable information for the future studies in the Nizampatnam Coast.

Materials and Methods:-

Samples of the present study were collected over a period of one year from different stations of in the Nizampatnam Coast. The data of fish length and weight are recorded. The gut contents were dissected and preserved 5% formalin. The content of each stomach was examined using binocular microscope. A weight of the stomach of the individual fish was recorded, based on the weight of the stomach and body weight of the fish. Gastro Somatic Index of individual fish was calculated using the following formula.

Gastro Somatic Index (GSI) $= \frac{Weight\ of\ the\ Stomach}{Weight\ of\ the\ fish}\ X\ 100$

Gut contents are analyzed both qualitatively and quantitatively (Hynes, 1950). The volume of food in each gut of fish was measured by Pillay, (1952) and various food items are identified. The food content found in the stomach was divided into five groups.

1. Gorged : Stomach was heavy food
2. Full : Stomach was full with food
3. ½ Full : Stomach was ½ full and slightly distended
4. ¼ Full : Stomach was ¼ food
5. Empty : Stomach without food

Point's method: The degree of apparent fullness of the stomach was determined and point's was assigned. Gorged (1.25), Full (1.00), ½ Full (0.50), ¼ Full (0.25), Empty (0.00).

Result and Discussion:-

The average percent total food item contributed to the analysis of one year (Fig: 1) shows that the major component of the diet was crustaceans and fish larvae. Among the crustaceans shrimps, crabs and their larvae were identified in fish *Lates calcarifer*. The next major groups were fish larvae followed by polychaets 15% and algae were 8%. Among the identified algae in the stomach content was Bacillariophyceae. The remaining items 13% are observed semi digested and also 12% are unidentified. The analysis of stomach content of *L. calcarifer* from Nizampatnam Coast revealed that this species consumed a variety of food items in this region. The presence of considerable quantities of semi digested matter might be due to rapid digestion that takes place in the tropical waters and the metabolic rate is high (Kalita and Jayabalan, 2000).

Monthly fluctuations were also witnessed in the presence of occurrence of stomachs with different degrees of fullness. It is evident that higher percentage of fullness of the stomach was recorded in the month of July month and lowest percentage in the October. The lowest percentage due to non availability of food organisms. On the other hand moderately fed stomach is observed through the year. Ferry et al., (1997) reported that the fishes, crustaceans, mollusca and echinodermties as the main food item for spotted sand bass from Los Angeles Bay in the Gulf of California. Mendoza-Carranaza and Rosales- Casian (2000) observed food and feeding habits of spotted sand bass (*Paralabrax maculatofsciatur*) for the Punta Banda Estuary, Baja California and found that this fish takes prominently crustaceans, teleostei, eelgrass, molluscs and zooplankton as their food. Krishna (2008) reported that the snake head fish *Channa punctata* found 27.06% of fishes were empty, 20.42% was ¼ full, 18.5% was 1/2 full, 3/4 full was 13.87%, 12.66% are with full stomach and only 7.47% were gorged stomach. In the present study the 30.5% are empty stomachs, 22.0% was ¼ full, 14.5% was ½ full, 12.5% was ¾ full, 10.5% was 12.5% was full and only 10% were gorged stomachs.

Gastro Somatic Index values as an indication of the fullness of stomach and find out the feeding rhythm. The selectivity and preference of the fish to different food items in different habitats give indicators on the flexibility of the species to adjust to diverse environmental conditions. Kanna (1993) stated that the Gastro Somatic Index of several species showed seasonal variations and maximum during post spawning period and minimum during breeding season. The maximum GSI recorded (5.1) in the month of July (Fig.2). Menzel (1960) reported that the feeding efficiency and growth rate decreased with increase size. Braga (2012), reported that the feeding ecology of a species is thoroughly linked to its population dynamics, know ledge of the feeding ecology, habit preferences, prey selection, predation evolution, competition and energy transfer within and between ecosystems. EI- Drawany and Elnagar, (2015) concluded that the stomach content analysis, should be extended to other native fish species so as to provide the scientific information for their management. Krishna (2004) also reported similar observation in *Heteropneustes fossils.*

Interspecific relations between the fish and food organisms are an important clue for the factors underlying seasonal variations in fishery biology. Seasonal and diurnal abundance of food items influences horizontal and vertical migrations of the fish stocks (Krishna, 2008). Jambo and Maduko,(2015) reported that the food and feeding habit of *Mugli cephalis* in Niger delta, was fish larvae, crustaceans, insect parts, annelids and plant material along with sand particles. Krishna et al, (2015) reported that the food of the *Upeneus sulphureus* was crustaceans, small fishes, polycheate worms and semi digested food in the Nizampatnam Coast. Yeragi and Yeragi (2015) concluded that the *Sillago sihama* in the coastal waters of Mithbav is planktonivorous and feeding on a wide range of food of planktonic and benthic organisms. Biological aspects like growth, maturity which are important from the management point of view are better understood in the light of adequate knowledge about food and feeding habits of fish and also much of our current understanding of the auto ecology production is derived from studies of food based on analysis of stomach contents. An understanding of the relationship between fishes and their food organisms especially the preferential food items and their distribution may help to locate the potential feeding grounds and it also provides clue of the prediction and exploitation of fish stocks. Environmental protection has attracted the attention of the wide section of the people all over the world and now it has become global issue among the scientists and researchers working in this area. Unfortunately, several hazards and pollutants are being regularly discharged in large quantities into the environment especially into the aquatic environment even some of them are unknown and unidentified, but it must be affecting the biota. Affected biota component, may also be responsible for shifting of feeding behavior in fishes.

Fig: 1 Index of preponderance of food items for *Lates calcarifer*

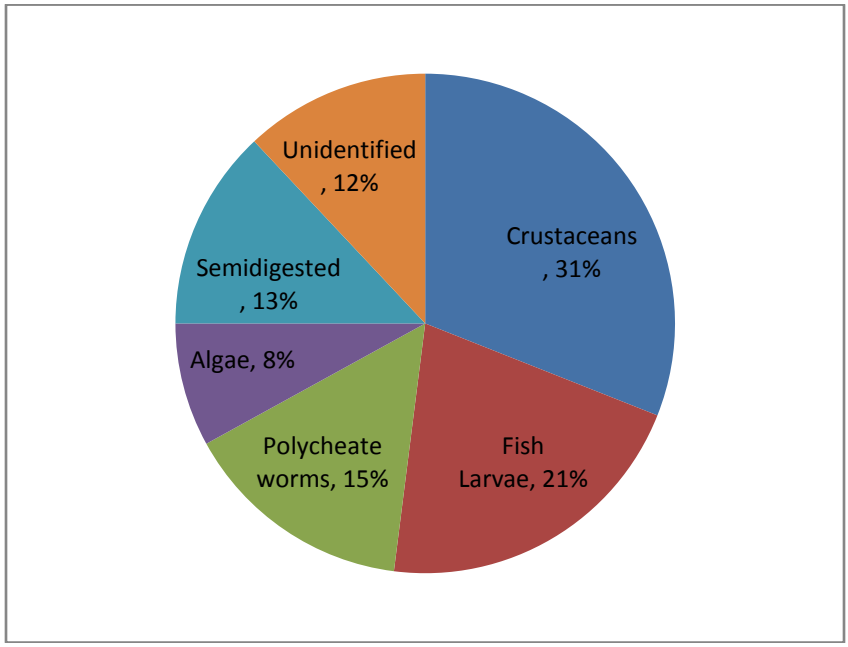
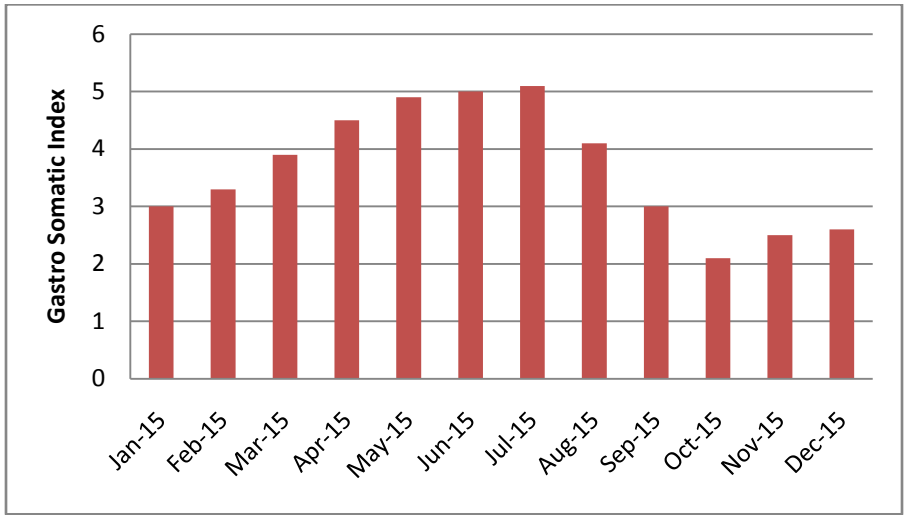


Fig: 2 Monthly variations in the Gastro-Somatic Index of *Lates calcarifer*



References:-

1. Allen, G.R., S.H. Midgley and M. Allen, 2002. Field guide to the freshwater fishes of Australia. Western Australian Museum, Perth, Western Australia. 394 p.
2. Braga RR, Bornatowski H,and Vitule, JRS. 2012. Feeding ecology of fishes: an overview of worldwide publications. Reviews in Fish Biology and Fisheries. 22: 915-929.
3. Das. S.M. and S.K. Moitra 1963. Studies on the food and feeding habits of some freshwater fishes of India. IV. A review on the food and feeding habits of 24 freshwater fishes, with general conclusions. *Ichthyologica. 2* (1-2): 107-115.
4. El-Drawany MA and Elnagar WG, 2015. Growth, Food and Feeding Habits of Bagrus bayad and Bagrus docmac Inhibiting Muess Channel, Sharkia Province, Egypt. J Aquac Res Development, 6(7).348-355.
5. Ferry, L. A., S. L. Clark, and G. M. Calliet, 1997. Food habits of spotted sand bass from the Los-Angeles, Baja California. South. Calif. Acad. Sci. 16(1):1-17.
6. Ganapati, S.V. and Chacko, P.I. 1950. "Suggestions for stocking fish ponds in Madras" Agric J 37: 15 [6].
7. Ghosh, A., 1973. Observations on the larvae and juveniles of the Bhetki Lates *calcarifer* (Bloch) from the Hoogly-Matlah estuaries system. I.J.F., 20(2): 372-379.
8. Hardy, A.E. 1936. The ecological relation between the herring and the plankton investigated with plankton indicator. J. Mar. Biol. Ass. U.K., **21:** 147 - 291.
9. Hynes HBN. 1950. The food of freshwater stickleback with a review of the methods used in studies of fishes. J Anim Ecol 19, 41-57.
10. Jambo, N.A and Maduako,N.C. 2015. Food and feeding habits of Mugail cephlis[Linnaeus,1758] in Elechi Creek, Niger Delta. Nigeria. International Journal of Fisheries and Aquaculture. 7(3): 25-29.
11. Kalitha,B. and N.Jayabalan.2000. Food and feeding habits of the golden scad *Caranx kalla* (Cuv. and Val.) along the Mangalore coast. Environment and Ecology 18:869-873.
12. Kanna, S.S. 1993. An introduction to fishes. Central Book Dept. Allahabad
13. Katayama, M. & Y.Taki, 1984. *Lates japonicas*, a new centropomid fish from Japan. Japanese Journal of Ichthyology, 30:361-367.
14. Krishna, P.V., 2004. Food and feeding habit of *Heteropneustes fossils* (Bloch) from ponds in Guntur A.P. J.Aquacult., 5: 97-100.
15. Krishna, P.V., 2008. Food spectrum of spotted Murrel *Channa punctata* from Repalle area Guntur District, Andhra Pradesh. Aquacult, 9 (1): 83-88.
16. Krishna, P.V., Panchakshari., and K. Prabhavathi, 2015. Food and feeding habits of goat fish *Upeneus sulphureus* from Nizampatnam coast, Andhra Pradesh, India. International Journal of Advanced Research. 3 (11): 1066-1070.

17. Kungvankij P, Pudadera BJ, Tiro JRLB, Potestas IO. 1986. Biology and culture of sea bass (*Lates calcarifer*), NACA training manual series No. 3, Bangkok, Thailand. 70 pp.
18. Mendoza-Carranaza M. and Rosales-Casian J. A., 2000. The feeding habits of Spotted sand bass *(Paralabrax maculatofaciatus)* in Punta banda estuary, Ensenada, Baja California, Mexico. *CalCOFl Rep*., 41:194-199.
19. Menzel, D.W, 1960. Utilization of food by a Bermuda reef fish *Epinepholus guttatus.* J.Conseil Internatnb. Explor.Mer. 25 (2): 216-222.
20. Mookerjee, H.K., S.N. Sen Gupta and P.K. Roy Chowdhury, 1964. Food and its percentage composition of the common adult food fishes of Bengal. Sci. & Cult., 12: 247-49.
21. Pillay, T. 1952. A critique of the methods of study of food of fishes. J. Zool. Soc. India, 4 (2): 185-200.
22. Yeragi SS and Yeragi SG. 2015. Food and feeding of an economic important estuarine fish *Sillago sihama* (Forsskal). Int. J.of Life sciences. 3(2): 147-151.