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Research Article

FOOD AND FEEDING HABITS OF *CYNOGLOSSUS MACROSTOMUS* (SOLE FISH) FROM KARWAR COAST, WEST COAST OF INDIA

PradnyaD.Bandekar and Ulhas G. Naik

Department of Studies in Marine Biology, Karnataka University Post Graduate Centre, KodibagKarwar

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ABSTRACT

The food and feeding habits *Cynoglossuss macrostomus* were studied during January 2016 to June 2016 along Karwar coast. The samples were collected widely from fishing harbour Karwar. The fish mainly adapted to bottom habitat feeding on polychaetes, crustaceans, molluscs, detritus sand-mud, miscellaneous. Using point's methods the composition of food of different size groups were calculated.

INTRODUCTION

Sole Fishes are excellent food fishes and these are marketed mostly fresh and frozen. Sole fishes are abundant in the open continental shelf and are fished on a commercial scale Munro [1]. *Cynoglossus* sp. mainly inhabits the soft muddy bottom, but some inhabit the areas of gravel and sand. They are considered one of the most important predators in benthic communities. Flatfish serve as a major energy pathway for conservation of benthic production into a form suitable for human consumption. De-Groot [1971] found that flatfish tend to be of different feeding groups; polychaete/mollusks-feeders, fish-feeders, crustacean feeders, thereby minimizing competition for food (Lande, Stickney *et.al.*, Kravitz *et.al.*, Pearcy and Hancock, Steinarsson, Livingston[1973] showed that flatfish primarily consume benthic invertebrates,. Studies on the feeding habits of flatfishes that have been conducted all over the world and been studied by a number of workers included, Braber and De-Groot [1971], Only a few studies were made on the food and feeding habits of Cynoglossus sp.; notably among them are Rao [1989]. Seshappa and Bhimachar [1955], Kuthlingham [1967], Rajaguru [1992], Jayaprakash [2000] The taxonomical studies of this species have been carried out by Day [1889], Fisher &Bianchi [1990], Ramanathan [1977], Hoda and Munro [1967, 2000]. The present study gives information on the food and feeding habits of Cynoglossus *macrostomus* in the months and at different size groups.

MATERIAL AND METHODS

A total of 445 specimens of *Cynoglossus macrostomus* of size range151-360$_{mm}$ were collected from commercial landing centre of Karwar fish Harbour during June 2015 to June 2016. Each fish in the sample were measured from the tip of the snout to the end of the caudal fin. Stomachs were removed and opened to determine the degree of fullness and examined qualitatively. Food contents were grouped into five categories such as polychaetes, molluscs, crustaceans, fishes and miscellaneous food materials.

The stomach contents were weighed and preserved in 5% formalin for further analysis based on the occurrence method and points method by Natarajan and Jhingran (1961) was followed in the analysis. The extent of feeding was based on the degree of fullness of the stomach and the amount of food contained in it was expressed as ¾ full, ½ full, ¼ full trace and empty with points 100,80,60,40,20.10 and 0 assigned respectively.

RESULTS

Food in relation to season

The data on the stomach contents of 445 specimens of *C.macroctomus* are shown in table 1.The fish with highest percentage of intensity of feeding in 6 categories was marked during spring-summer i.e. February-May and minimum feeding in winter i.e. September –December.

**Corresponding author: PradnyaD.Bandekar*
Department of Studies in Marine Biology, Karnataka University Post Graduate Centre, KodibagKarwar

The feeding intensity did not vary in June –August and January. The type of the amount of different food group taken by fish is shown in fig.1.

Among the different food groups, miscellaneous items were the most dominant food group by percentage of total occurrence in Pre-Monsoon (47.66%), Monsoon (52.42%), Post- Monsoon (59.18%). Crustaceans were the second most important food group Pre-Monsoon (23.48%), Monsoon (17.45 %), Post-Monsoon (13.44%). Followed by sand –mud Pre-Monsoon (13.18%), Monsoon (14.01%), Post Monsoon (2.93%). polychaetes Pre-Monsoon (10.38%), Monsoon (5.42%), Post-Monsoon (12.95%). Molluscs Pre-Monsoon (4.19%), Monsoon (10.82%), Post-Monsoon (13.10%) and fish Pre-Monsoon (2.17%), Monsoon (1.65 %), Post- Monsoon(9.54 %).

Crustaceans occurred in all the season of the year with the maximum frequencies during Spring –Summer, February-May and a moderate feeding during August and November-January. Low feeding during September-October, Polychaetes occurred in all the seasons except July – October and Molluscs were absent in May. Fish occurred in minute quantity during June, July, September, October.

Sand-mud occurred frequently in all months except January Miscellaneous items occurred in all seasons with more than 50% August to March.

Table1 Percentage occurrence various groups of food item in the stomach of *Cynoglossus macrostomus* in different Season

	Pre-Monsoon %	Monsoon %	Post- Monsoon%
Polychaetes	10.38	5.42	12.95
Crustaceans	23.48	17.45	13.44
Molluscs	4.19	10.82	13.10
Fish	2.17	1.65	9.54
Sand-Mud	13.18	14.01	2.93
Miscellaneous	47.66	52.42	59.18

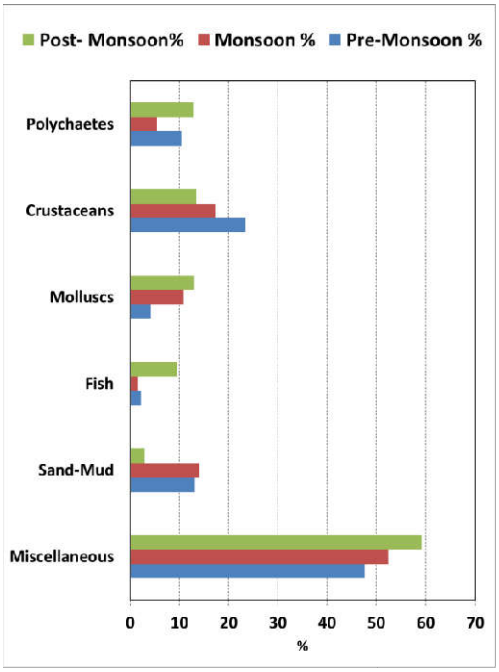

Fig. 1 Histogram showing Percentage occurrence various groups of food item in the stomach of *Cynoglossus macrostomus* in different Season.

Food in relation to fish size

The variation of food items with length was illustrated in Table (2) and shown in fig.2.The intensity of feeding was least during young groups, 150-240$_{mm}$, - 330$_{mm}$. Both polychaetes and crustaceans occurred till 230$_{mm}$ TL after which molluscs joined them to form the food contents from 231- 300 $_{mm}$ and 341-350 $_{mm}$ TL. Fish if available occurred in large groups above 241-250 $_{mm}$.

Miscellaneous items formed the major constituents of food contents in all size groups and sand–mud particles appeared to be taken along with the other food substance from the bottom.

Molluscs and fish were absent in young individuals till 231$_{mm}$. after which crustaceans, polychaetes, molluscs and sand mud appeared in varying percentages. However, in large species, molluscs and fish were not found in 350 $_{mm}$ sample and above miscellaneous items occurred very frequently in all sizes.

That the intensity of food out of 445 stomach 270 (93.27%) were with food and 30 (6.73%) without food. Among these 3 (0.67%) stomach were gorged full with food, 4 (0.90%) were 3/4 full, 32 (7.18%) were 1/2 full, 61(13.68%) were 1/4 full, 316 (70.85%) were barely full.

Food contents of *C. macrostomus* divide into 6 categories: 1.Polychaetes, 2. Crustaceans, 3. Molluscs, 4. Fish, 5. Sand - mud, 6.Miscellaneous.

Table 2 Percentage occurrence of various groups of food items of *Cynoglossus macrostomus* in different size groups

Size group(mm,TL)	Polychaetes	Crustaceans	Molluscs	Fish	Sand-Mud	Miscellaneous
151-160	-	-	-	-	-	100.00
161-170	33.33	33.33	-	-	-	33.33
171-180	-	-	-	-	-	100.00
181-190	42.86	14.29	-	-	-	42.86
191-200	25.00	-	-	-	-	75.00
201-210	-	-	-	-	-	100.00
211-220	-	-	-	-	-	100.00
221-230	9.09	9.09	9.09		18.18	54.55
231-240	5.88	17.65	17.65	2.94	5.88	50.00
241-250	10.53	18.95	9.47	2.11	12.63	46.32
251-260	5.33	16.00	2.67	1.33	17.33	57.33
261-270	4.13	15.70	13.22		11.57	55.37
271-280	8.89	19.26	6.67	0.74	14.82	49.63
281-290	6.59	20.88	7.69	1.10	9.89	53.39
291-300	9.57	20.21	8.51	-	5.32	56.38
301-310	6.06	15.15	10.61	-	10.61	57.58
311-320	10.53	13.16	23.68	-	-	52.63
321-330	23.53	11.77	11.77	-	-	52.94
331-340	-	27.27	9.09	4.56	9.09	50.00
341-350	11.11	11.11	-	-	-	77.78
351-360	14.29	14.29	-	-	14.29	57.14

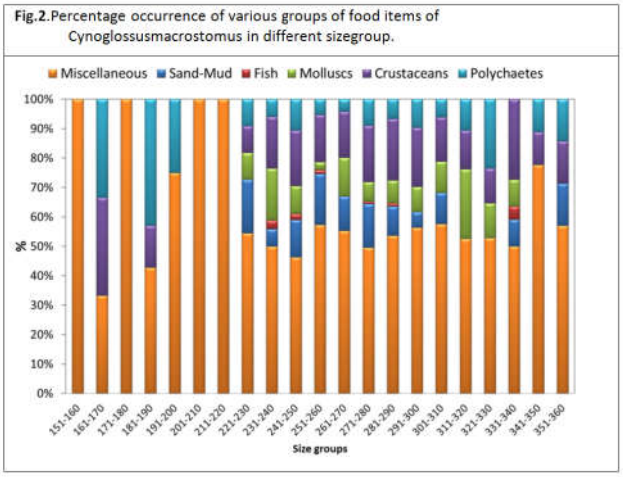

Fig.2.Percentage occurrence of various groups of food items of Cynoglossusmacrostomus in different sizegroup.

The details of food contents are shown in Appendix 1.

Appendix 1

Polychaetes	Crustaceans	Molluscs	Fish	Sand-mud	Miscellaneous
Prionospiopinnata	Penieads	Gastropods shells	Cynoglossus sp.	Sand grains	Eyes, head, appendages, chelae, carapace and antennae of crabs and shrimps (crustacean),
Capitella sp.	Amphipods	Bivalve shell		Pebbles	Pieces of shells (Molluscs)
Neries sp.	Squilla empusa	Mytilus sp.		gravel and mud	Scales and eggs of fish
Glycera alba	Copepods	Solen sp.			Elytra and remains of tubiculous (Polychaetes)
Orbiniids sp.	Isopods	Pholladidea sp.			Small fragment of plants Holothurians
Polynoids sp.	Mysis	Tellina sp.			pieces of star fish (Echinoderms)
Diopatra sp.	Porcellain crabs	Codelia			Semi digested and unidentified specimens.

DISCUSSION

Present study indicates that *Cynoglossuss. Macrostomus* is a carnivorous feeder in nature, these fish which mainly feed on polychaetes crustaceans, molluscs, and smaller fishes. Among polychaetes *Prinospiopinnata*, Capitella spp. Cossuridae spp. are the most favoured diet of *C. macrostomus*. Seasonal variations in feeding habits are marked considerably.

That the intensity of food out of 445 stomach 270 (93.27%) were with food and 30 (6.73%) without food. Among these 3 (0.67%) stomach were gorged full with food, 4 (0.90%) were 3/4 full, 32 (7.18%) were 1/2 full, 61(13.68%) were 1/4 full, 316 (70.85%) were barely full.

Fish with the highest percentage of feeding-intensity of feeding in 6categories was marked during Spring – Summer i.e. February –May and minimum feeding in winter i.e. January while in other months feeding appeared normal as judged by the barely full and empty stomachs.

C. macrostomus mainly feed on polychaetes with crustaceans, Large growing flatfishes are voracious crustacean and fish feeders.

CONCLUSIONS

In the present work, although the primary diets of this demersal flatfish Cynoglossuss *macrostomus* is a typical bottom feeder mostly feeding on detritus and macro benthos such as polychaetes crustaceans, molluscs. Among polychaetes *Prinospio pinnata,* Capitella sp was found to be the favourite food item in all the months.

References

Day,F.(1889) The Fauna of British India Including Ceylon and Burma Today & Tomarrow Printers and Publishers, New Delhi, Vols I and II.Reprinted 1989.

De-Groot S J. (1971) on the interrelationships between morphology of the alimentary tract, food and feeding behavior in flatfishes (Pisces: Pleuronectiformes). *Neth J Sea Res*. 5:121-196.

Jayaprakash AA. (2000) Food and Feeding habits of Malabar sole *Cynoglossus macrostomus. J marbiol Ass India*.; 42(1&2):124-134.

Kuthalingham MDK. (1967) Life history and Feeding habits of *Cynoglossus lingua* (Ham-Bich.). *J ZoolSoc, India*, 9:208-215.

Lande R.(1973) Feeding and feeding habits of plaice(*Pleuronectesplatessa*L) in Bergenf, Jordan, North Trandelog, Norway, *Norwegian J Zool*.; 21:91-100.

Munro SR. (1967) the fishes of New Guinea. Depart of Agriculture, Stock and Fisheries. New Guinea, 651pp.

Munro SR (2000 the marine and Fresh water fishes of Ceylon, Biotech books, Tri Nagar, Delhi, PP.349.

Rao M. (1989) Food and and feeding habits of the fish *Cynoglossus macrolepidotus*of Bombay coast, Matraga Bombay. Environ. Ecol.7 (3):666-668

Ramanathan NP. (1977) VijayaRamaiyan V, Natarajan R. On thebiology of the large-scaled tongue sole *Cynoglossus macrolepidotus* (Bleeker), *Ind J Fish*. 24:83-89.

Rajaguru A.(1992) Biology of co-occurring tonguefishes, *Cynoglossus arel*, and *C. lida*(Pleuronectiformes: Cynoglossidae), from Indian waters. Fishery Bulletin U.S 90:328-367.

Seshappa G, Bhimachar BS. (1955) Studies on the fishery and biology of the Malabar sole, *Cynoglossus semifasciatus* Day. J. Fish.; 2(1):180-230.

Stickney RR, Taylor GL, Heard RW. (1974) Food habits of Georgia estuarine fishes. Four species of flounders (Pleuronectiformes: Bothidae). Fishery bulletin, 72:515-524.

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