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FOOD AND FEEDING HABITS OF *MEGALASPIS CORDYLA* (LINNAEUS, 1758) ALONG THE NORTHWEST COAST OF INDIA

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ABSTRACT

***Megalaspis cordyla* (Linnaeus, 1758) is one of the shoaling commercially important pelagic fish in the Northwest coast of India. The study on food and feeding habits of this fish revealed that it is predominantly a carnivorous species feeding primarily on sergestid shrimps like *Acetes indicus* and small fishes such as *Stolephorus* species. In addition it feeds on juveniles of *Trichiurus, Apogon, Coilia, Sardinella, Nemipterus, Thryssa,* and sciaenids. The food of *M. cordyla* also comprises the young ones of molluscs, especially *Loligo* and *Sepia*, and occassionally ostracods. The choice food is *Acetes indicus*.**

INTRODUCTION

The horse mackerel *Megalaspis cordyla* (Linnaeus, 1758) is an important commercial species commonly found in the Indo-Pacific region. Although it occurs throughout the year, the major catches are recorded during the southwest monsoon season only. In India earlier studies on food and feeding habits of *M. cordyla* are reported from Malabar coast and Vizhingam Bay and the important works are of Chacko and Mathew (1954), Kuthalingam (1959) and Sreenivasan (1974). Studies on food and feeding habits of *M. cordyla* are also available from Singapore waters by Tham Ahkow (1950). However a brief study on this aspect of the fish was done by Datar (1954) and Bapat *et al.* (1982). Thus a deligent search on the available literature reveals that only scanty information is available on the food and feeding habits of *M. cordyla* and hence a detailed investigation was carried out on the same with relation to various size groups, weight, sex, maturity and seasons.

MATERIAL AND METHODS

A total of 1651 specimens mainly caught by purse seines, pelagic trawls, dol nets, gillnets, hook and lines were collected twice a week at random for the present investigation from Ferry Wharf, Sassoon Dock and Versova landing centres in Bombay. In addition, specimens were also collected from CIFE's research-cum-training vessel M.F.V. *Saraswati*. Pelagic trawl catches from northwest coast of India (17°00' to 20°00' N lat., 69°00' to 73°00' E long.) from September 1986 to August, 1988.

Samples of fishes were studied in fresh condition. After recording the total length and total weight, the fishes were dissected to assess the sex, stage of maturity and stomach contents. The intensity of feeding was determined by the degree of distension of stomachs as gorged, full, 3/4, 1/2, 1/4, trace and empty. The volume of stomach contents was determined by displacement method. Further analysis of food was done by the method of Index of preponderance (Natarajan and Jhingran, 1961). The orientation of food items in the stomach was recorded to assess active or passive type of predatory habit.

RESULTS AND DISCUSSION

Composition of food :

Crustaceans dominated in food throughout the year followed by the fishes and molluscs in decreasing order of abundance. (Table I).

Table I : *Table showing percentage and rank of different food items of M. cordyla.*

Food items	Percentage	rank
Acetes indicus	86.87	I
Fishes	2.26	III
Sepia & Loligo	0.84	IV
Ostracods & other crustaceans.	0.27	V
Digested matter	9.14	II

Among Crustaceans *Acetes indicus* contributed 86.87% of the total food, while ostracods, lucifers and juveniles of crab and prawn were represented occasionally in the food. Altogether 8 species of fishes occurred in the gut (Table III) where *Stolephorus* species were dominant. Others observed were juveniles of *Trichiurus, Apogon, Coilia, Sardinella longiceps., Nemipterus japonicus, Thryssa* and sciaenids. Juveniles of *Sepia* and *Loligo* were the only molluscs occasionally found in the gut of the fish.

Food composition in relation to size:

On an average *Acetes indicus* contributed nearly 60% of food in the fishes of all size groups. The fishes of 110 to 200 mm were found to feed primarily on *Acetes indicus* and those above 200mm length were feeding on *Acetes* as well as on juveniles of fishes, but the larger fishes (400-450mm) fed exclusively on *Acetes indicus*.

Food composition in different months:

A wide variation was observed in the food composition in different months during the period of study (Table II). Among the food items *Acetes indicus* was dominating (Fig. 1).

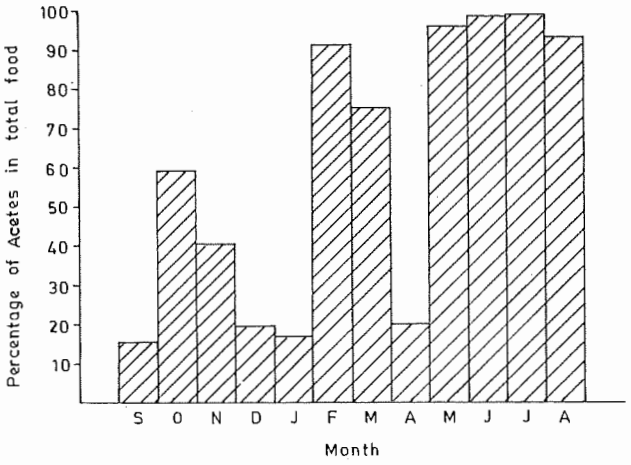

Fig. 1 : *Monthly percentage indices of Acetes indicus in total food*

During May to September the food consisted exclusively of *Acetes indicus* and this coincides with the abundance of *A. indicus* indicating selective feeding of the fish on *Acetes*, whenever it occurs in abundance. During October to April juvenile fishes were the dominant component in the food while in October and November *Stolephorus,* juveniles of *Sardinella*, sciaenids, *Loligo* and ostracods were observed. In December *Acetes indicus*, *Loligo* and *Thryssa* were recorded while in January-February juveniles of *Loligo, Sepia, Trichiurus, Coilia, Nemipterus* and ostracods were recorded. During March-April *Acetes,* juveniles of *Loligo, Sepia* and *Trichiurus* were recorded.

Food composition in relation to sex and maturity stages :

Food of adults of both the sexes of *M. cordyla* was composed of *Acetes indicus,* juveniles of fishes, cephalopods, prawn larvae and ostracods. The juveniles and maturing fishes of *M. cordyla* were found to feed primarily on small crustaceans like *Acetes* and prawn larvae. Fully ripe fishes were not feeding. Some of the spent fishes and adults were feeding on *Acetes indicus* and juveniles of fishes.

Empty stomachs :

It was observed that 25% of the total stomachs examined were empty (Table III & Fig. 2). In June and July no empty stomachs were found while in October-November, January and February percentage of empty stomachs was less ie. 8.23%, 1.96, 18.18 and 11.11% respectively. December (53.84%) May (78.26%) and August (60%) recorded the high percentages of empty stomachs. During September (26.32%) and March (23.78%), moderate percentage of empty stomachs were recorded. Percentage of empty stomachs was very low in juveniles (i.e.100-200 mm) moderate in 200-350 mm size group and maximum in fishes of length group 351-450 mm (Table IV & Fig.3)

Feeding intensity in relation to size, sex and maturity stages:

Table III reveals that there is variation in feeding intensity among different sizes of *M. cordyla*. Fishes of 100-150 mm size group had 65% of full and 9% of gorged stomachs showing very high intensity of feeding and the size group 151 - 200 mm had 25% gorged and 12.9% of full stomachs indicating high feeding intensity. The highest degree of feeding next to young fishes was observed in fishes of 401 - 450 mm size group.

There was no difference in the intensity of feeding between sexes. Thus feeding intensity was highest in young fishes, moderate in maturing and mature fishes. Ripe fishes were found with empty stomachs; spent fishes had high feeding intensity but some of the spent fishes were found with empty stomachs.

The present study shows that *M. cordyla* is a carnivorous fish feeding on crustaceans, fishes and molluscs living preying in the pelagic realm. It seems to be a selective feeder on *Acetes indicus* which is the choice food forming 86.87% of the total diet. It takes other food items only in the absence or scarcity of its choice food. Other food items include small fishes, juveniles of many fishes besides *Sepia* and *Loligo*.

Srinivasan (1978) reported from Vizhingam bay that this fish is piscivorous feeding mainly on fishes. Chacko and Mathew (1955) from Malabar reported this fish to feed mainly on *Anchoviella, Sardinella fimbriata, Metapeneus dobsoni,* while Kuthalingam (1959) described plankton and fishes as food of this fish. Thus there is considerable difference of opinion about the primary food of

Table II: *Monthly percentage indices of food items of M. cordyla during September 1986- August 1988.*

Food items	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
Acetes indicus	15.35	59.18	40.28	19.35	17.05	91.29	75.24	19.73	96.23	98.5	99.34	93.5
Trichiurus spp.	-	-	-	-	14.25	-	-	12.18	-	-	-	-
Apogon spp.	-	18.46	-	-	-	-	-	-	-	-	-	-
Coilia spp.	-	-	-	-	19.58	-	-	-	-	-	-	-
S. longiceps.	-	-	6.94	-	-	-	-	-	-	-	-	-
N. jaiponicus	-	-	-	-	1.04	-	-	-	-	-	-	-
Thryssa spp.	-	-	-	17.4	-	3.88	-	-	-	-	-	-
Ostracod	-	-	0.76	-	0.70	-	-	-	-	-	-	-
Loligo spp.	-	-	1.26	53.76	5.09	-	-	8.52	-	-	-	-
Sepia spp.	-	-	-	-	4.07	-	-	5.17	-	-	-	-
Fish scales & crustacean append.	33.3	0.15	-	-	1.04	0.07	-	0.64	-	-	-	-
Stolephorus spp.	-	-	41.56	-	-	-	3.24	38.97	-	-	-	-
Unidentified fish larvae	-	1.35	-	-	15.27	-	-	0.24	-	-	-	-
Digested matter	50.94	20.86	6.55	9.67	21.64	4.76	21.52	14.55	3.77	1.5	0.66	6.5
Sciaenids	-	-	2.65	-	-	-	-	-	-	-	-	-

Table III : *Percentage occurrence of stomachs in different degrees of fullness in M. cordyla during September 1986 to August, 1988.*

Months	Gorged	Full	3/4	1/2	1/4	Trace	Empty
Sept	-	5.26	-	5.28	15.79	47.37	26.32
Oct.	9.67	36.47	16.47	9.67	5.88	9.41	8.23
Nov.	37.25	17.65	9.80	15.68	5.88	11.76	1.96
Dec.	7.69	-	7.69	7.69	7.67	15.38	53.84
Jan.	6.82	9.10	9.10	2.27	18.18	36.36	18.18
Feb.	31.74	9.52	4.76	12.69	15.87	14.28	11.11
Mar.	19.69	10.60	1.50	6.06	24.24	9.09	28.78
Apr.	18.60	20.90	2.32	6.97	25.58	6.97	18.60
May.	4.34	8.69	8.69	-	-	-	78.26
Jun.	33.33	33.33	-	-	33.33	-	-
July	-	33.33	16.66	-	16.66	33.33	-
Aug.	-	20.00	-	-	-	20.00	60.00

Table IV : *Percentage occurrence of stomachs in different degrees of fullness in different size groups of M. cordyla during September 1986 - August 1988.*

Size range (mm)	Gorged	Full	3/4	1/2	1/4	Trace	Empty
101-150	8.69	65.21	6.52	2.17	2.17	4.34	10.86
151-200	25.80	12.90	6.45	6.45	12.90	25.80	9.67
201-250	2.04	10.20	8.16	8.16	18.36	30.61	22.44
251-300	8.04	18.51	18.51	7.40	11.11	19.75	16.04
301-350	24.17	13.28	4.19	5.60	10.48	20.97	20.97
351-400	15.51	8.62	6.89	8.62	10.34	18.96	31.03
401-451	26.60	13.30	6.66	-	-	20.00	33.33

this fish. Bapat *et al.* (1982) found this fish to feed on *Acetes indicus, Stolephorus* sp., juveniles of fishes, *Sepia*, Alima larva, in much similar a fashion as noted in the present study. It is probable that variation in water quality in the different areas may affect the availability and distribution of the food items which might alter the food and feeding habits of *M. cordyla* in the different areas.

Intensity of feeding was found to be highest in young fishes as it is the most active phase of growth followed by early maturing and late maturing forms. On full maturity fishes ceased to feed as a prelude to spawning activity. Spent fishes had high feeding intensity probably to cover up the loss of energy during spawning activity. Some of the empty stomachs found in spent fishes might be of fishes just spawned and could not feed due to exhaustion. But 25% of total stomachs observed were empty and this may probably be due to the nonavailability of choice food items or may be due to factors related to size of prey which needs further investigation.

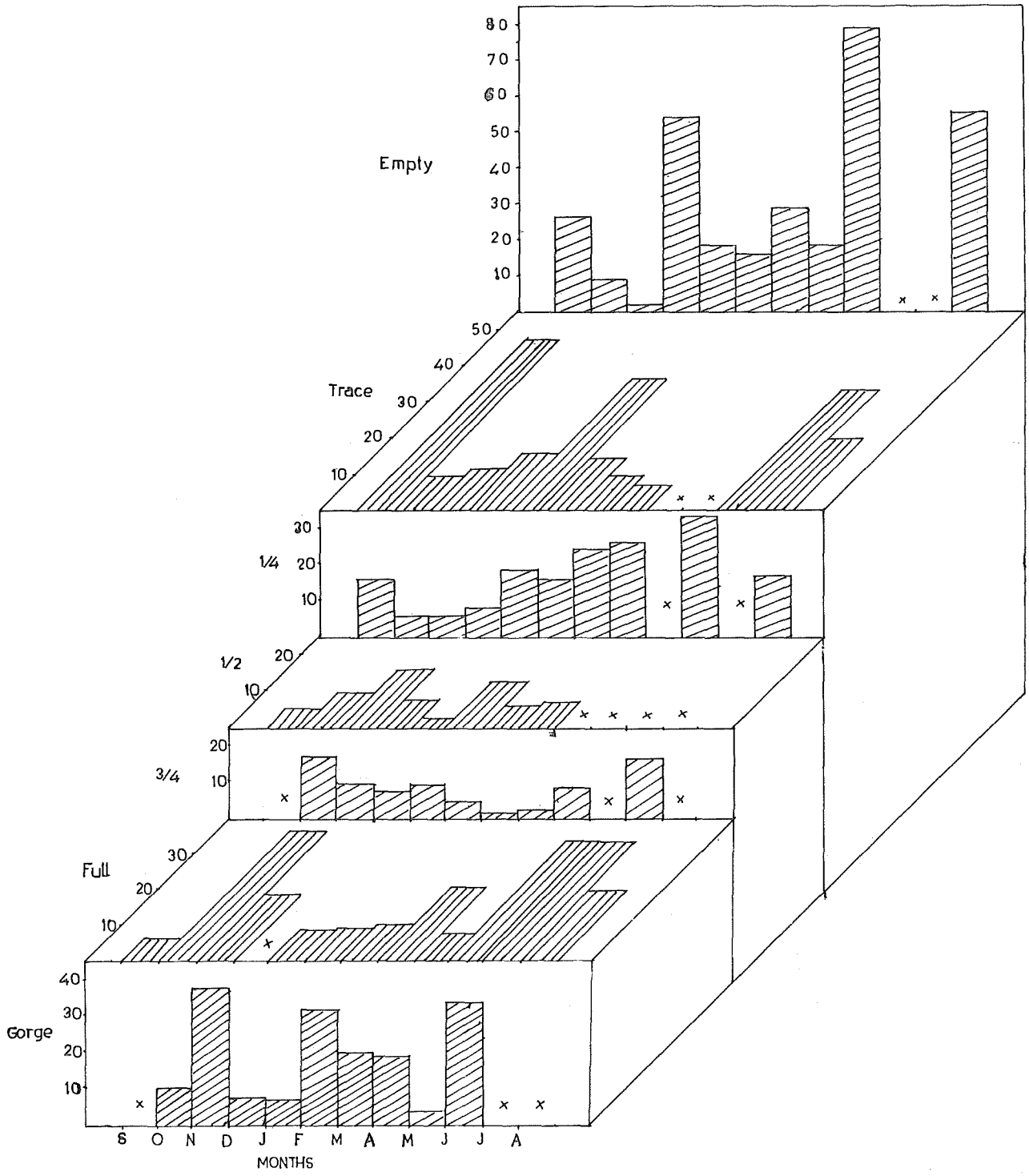

Fig. 2 : *Different degrees of stomach fullness in different months during September 1986 to August 1988 (percentage) in M. cordyla. (X = condition of stomach which was not examined in the particular months)*

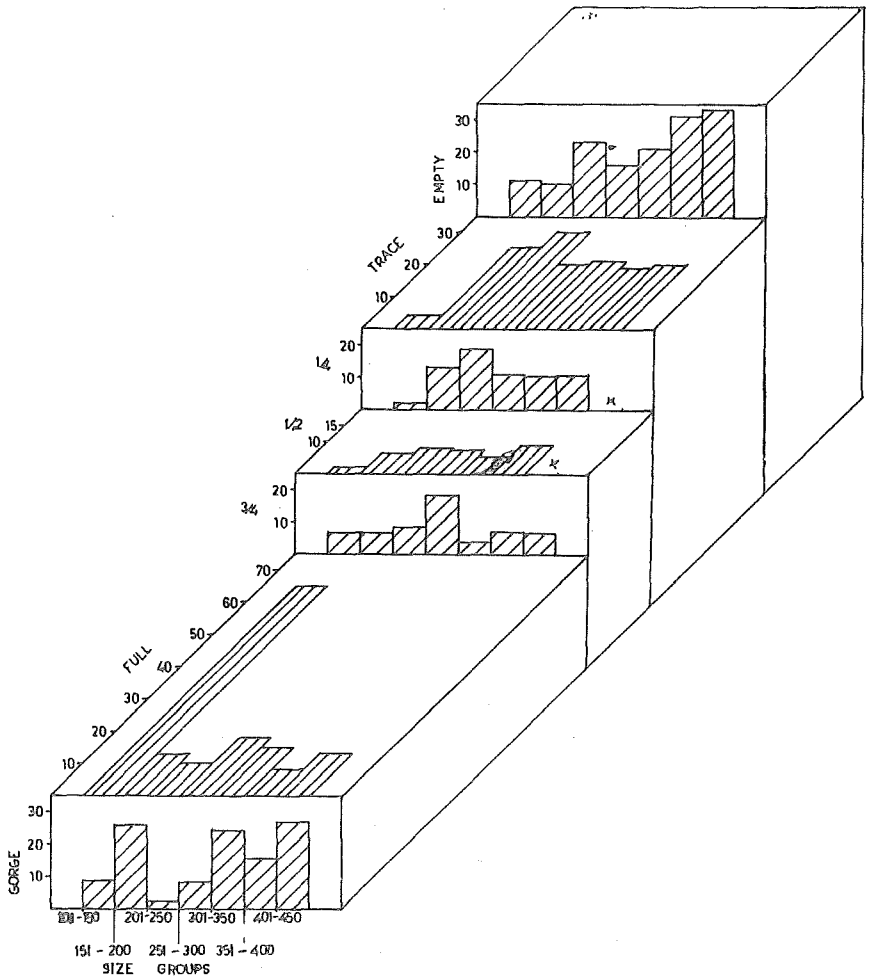

Fig. 3 : *Percentage occurrence of stomach fullness in different size group of M. cordyla during September 1986 to August 1988. (X = condition of stomach which was not examined in that particular size group.)*

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