RESEARCH ARTICLE

Food and feeding of an economically important estuarine fish, *Sillago sihama* (forsskal)

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ABSTRACT

The present investigation revealed that the stomach content of both juvenile (<130 mm SL) and adult (>130mm SL) *Sillago sihama* (Forsskal) in Mithbav (L.16^0 20' N.L.17^0 25')estuary of Sindhudurg District, Maharashtra from April 2011 to March 2012. The gut analysis was carried out using frequency of occurrence and point methods. Diatoms were found to be the most preferable food of plant origin in both the life stages like juvenile and adult in all the season, Diatoms, blue-green algae and dinoflagellactes constituted main food of plant origni. Diatoms were found to be the most preferable food during starvation period of monsoon due to unexpected water currents. During monsoon, the habit of food and feeding was distured for short time. They do not remain in main stream of water but move towards the bank, bay, as well as in lagoons of the estuary. During monsoon it occurred in more than 11.3% of food item by point method. The feeding intensity of juvenile was notice that on increasing along with increase in size group. The quality and quantity of food items were fluctuated seasonwise to season and juvenile to adult stages. Crustacean including shrimps, crabs, their larvae, copepods eggs, and larval forms comprised the maximum part of the food of animal origin. It was concluded that *sillage sihama* in the coastal waters of Mithbav is planktonivorous and feeding on a wide range of food of planktonic and benthic organisms.

Key words: *Sillago sihama*, feeding, Mithbav.

INTRODUCTION

Creeks, estuaries are an aquatic environment provide numerous commercially important resources that solve the problem of

bread and butter of poor coastal natives. It is but natural, that these resources support the human life in different ways. During monsoon, the sea fishery is totally stopped for short time hence food remains the basic need of manking for survival. The organisms like fish, shrimps, oystere, clams mussles crabs are harvested on large scales, of all trophic levels are available in estuarine ecosystem. Those of second, third and highest levels are known to be rich in protein in terms of quantity and quality particularly in eight amino acids necessary for human being. These amino acids are easily consumed through all through edible resource organisms.

In an aquatic ecosystem, every resource organism can serch for favourable habitat to fulfil the demand of their food and safety. There they live, breed to form the nursery ground. Feeding ecology is the significant aspect of the life history strategy of every living speeies to understand the functional role of the fish within their ecosystem (Patole, 2009). It is an important aspect in an aquacultural practices. *Sillago sihama* (Indian, whiting fish) is the commercially important high market prised protein rich fish for coastal people. However without knowledge of the food requirements, feeding behavior pattern and predator-Prey relationships is not possible to understand the predieted changes that might result from any natural or anthropogenic intervention (Yeragi, 1997). *Sillago sihama* (family-Sillaginidae), is commercially and recreationally important estuarine and near shore speeies of Mithbav coastal zone. It is eco-sensitive fish and in future could be used for exploitation of blue revolution to solve the problem of basic food. It is better to understand their hydrological status, selectivity of food and life history in coastal waters. In pre-monsoon time, their schools are migrating in Mithbav estuary for breeding, spawning as well as for nursing purposes. They always prefer sandy-muddy ground for quick burrow to avaid predation. It is golden yellow in colour with sharp mouth which enhance for burrow in soft sandy regions. It has two dorsal fin, first with 10-15 slender spines, second with one leading spine and 16-27 soft rays. Anal fin is long with two leading spines, with 14-20 soft rays. Family-sillaginidae includes 33 species but only one genus. This is the exceptional family amongst the finfish. Larvae and juveniles are pelagic and feeding on plankton. The body encloses two bladder with two anterior and two posterior extension. Sexual maturity attended about 13-19 cm. SL. Maximum length (SL) observed in this estuary was above 30-35 cm. but commercially markatable size was 20 cm and age is around seven years. The spawning was recorded in the month of july-August. In low salinity the growth is faster and within two month period development reached to fingerling stage. The first sexual maturity was observed at L130-140mm. at the age of one year. The ovulation is once in a year.

The objective of the present study were.

1) to explain the stomach contents of juvenile (130 mm<) and audit (130 > mm) of *S.sihama*
2) to justify dietary difference amongst variable size classes of juveniles
3) to determine seasonal changes in the diets of adults of said species
4) to compare feedng habits between the juvenile and adult.

MATERIALS AND METHODS

The study site, Mithbav estuary opening broadly to the west coast of India. Individuals of *Sillage sihama* of 130 mm. in standard length (SL) or more were difined as adults, following histological examination of the gonads. To examine seasonal dietary differences, adults were collected monthly from cast net, gill net and filter (Yendi) net. The fishery was conducted within the estuary from April 2011 to March 2012. The juveniles were collected 3-4 cm. length samples with help of Yendi along with *Penaeus indicus* (white shrimp) on mud-flat region of mangrove swamp. The adults were collected through the bottom fishery of gill-net (Tiyana), cast net and others throughout the year.

In the laboratory (Local), immediately of collection, SL and body weight were measured for each juvenile and adult specimens to the nearest 1mm and 0.1 gm, respectively. Juveniles were sorted into 5 size classees (≤ 10mm SL 11-40 mm SL, 41-70 mm SL, 71-100 mm SL and 101-129mm SL). Food items from the stomach contents of each specimen were identified to the lowest possible tax on and the percentage volume of each in the diet visually estimated under a binocular microscope.

RESULTS AND DISCUSSIOINS

In the present investigation, many live specimens of *Sillago sihama* were used for examination. The species were dissected out to collect the guts carefully under hygenic condition and after word they retured to the coastal people. The length range for adult was 14.21.-21.80 cm (>130mm SL) and for Juveniles (<130mm SL). Bacillario-phyceae (diatoms), Cyanophyceae (blue-green algae) and Dinophyceae (dinoflagellates) constitute the main food of plant origin in monsoon and post-monsoon seasons for both the size groups. The juveniles voraciously feed more than adult on cyanophyceae and Dinophyceae. The detritus was observed highest 11.15% in juvenile during monsoon period and then gradually decline upto pre-monsoon time. In monsoon adults also consumed more detritus to avoid starvation due to speedy water current and flood condition. The percentage composition of detritus was 19.15% in monsoon and lowest 1.17% in pre-monsoon.

Table 1 : Seasonal occurrence of food items of adult *Sillago sihama* in the coastal waters of Mithbav estuary.

Food Categories	Monsoon %	Post monsoon %	Pre-monsoon %
Diatoms	11.13	29.17	07.18
Blue-green algae	05.11⁰	04.28	01.17
Dinoflagellates	04.21	05.19	03.15
Decapods	23.15	24.17	21.15
Mollusca	0.5	01.51	04.17
Foraminifera	01.21	0.15	01.18
Copepods	12.15	26.51	28.91
Polychaetes	01.25	02.12	03.17
Detritus	19.15	02.15	01.17
Animal derivatives	11.19	13.85	15.36
Eggs	08.71	03.15	05.18
Fish	02.24	07.78	08.21

Table 2 : Showing seasonal variation in food items of Juvenile *S. Sihama.*

Food Categories	Monsoon %	Post monsoon %	Pre-monsoon %
Diatoms	17.13	18.24	06.17
Blue-green algae	07.15	09.19	04.45
Dinoflagellates	08.32	09.26	02.18
Decapods	20.18	18.27	17.62
Mollusca	01.71	02.51	08.91
Foraminifera	0.8	02.15	03.31
Copepods	13.18	21.63	24.19
Polychaetes	0.19	01.92	02.61
Detritus	11.15	3.25	03.21
Animal derivatives	07.93	8.26	13.65
Eggs	08.84	03.12	09.18
Fish	03.42	02.22	04.52

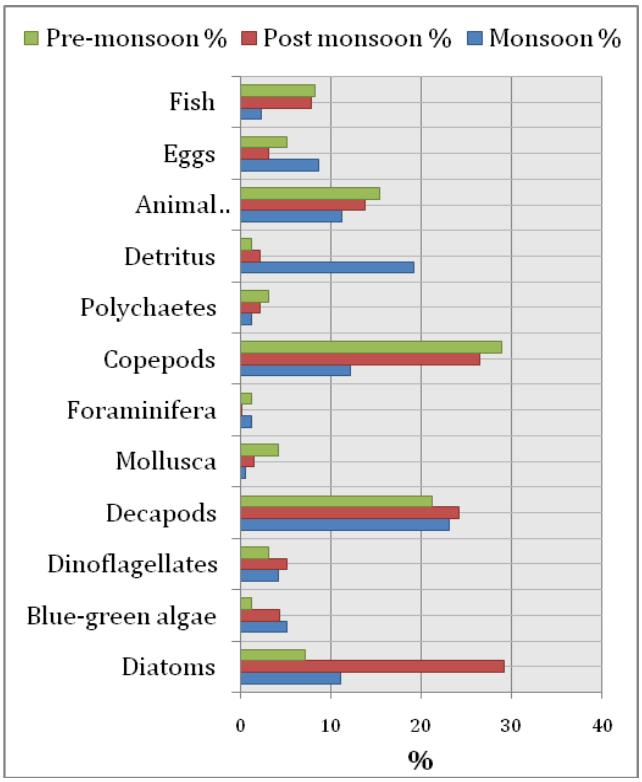

Fig.1: Histogram Showing seasonal variation in food items of Adult *S.Sihama*

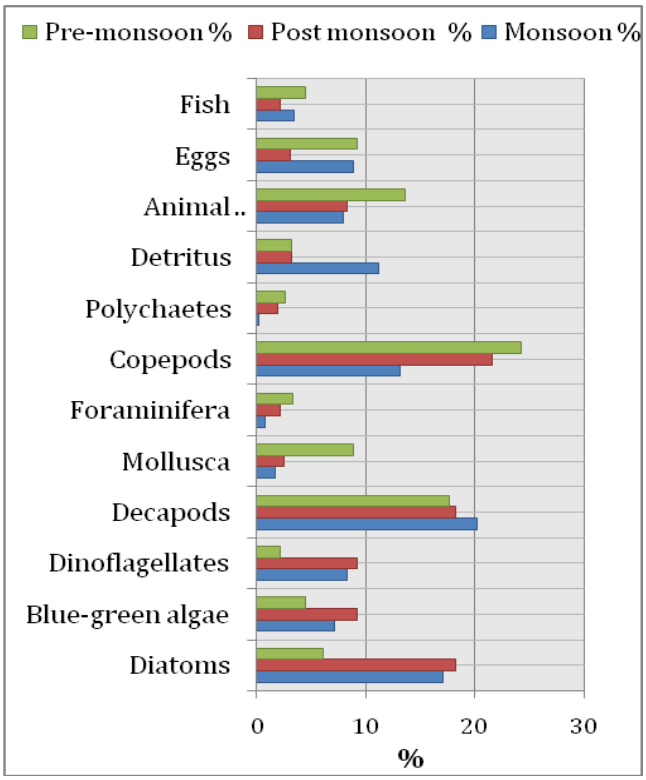

Fig. 2: Histogram showing seasonal Variation in food items of Juvenile *S.sihama.*

During flood time these fish move towards the bank of estuary to avoid unfavorable conditions. The coastal living people catch the fish easily in lagoon, bays and near by the bank with help of cast net. The major food items found in the stomach of *S. sihama* are shown in Table. 1 & 2 In point method, diatoms were found to be the most selective food of plant origin. It was occurred in more than 17.13% in monsoon, 18.24 in post monsoon while decline in pre-monsoon to 6.17%. It was noticed that during pre-monsoon the juveniles voraciously feed on copepods whose percentage composition was 24.19% highest in all the seasons. It is also seen that the Diatoms and copepods were inversely proportion as food items. In aduit the parentage of Diatom as food item was hightest in monsoon (11.13%) and lowest (7.18%) in pre-monsoon due to availability of copepods. Decapods, like juvenile shrimps, crabs, hermit crab were found to be highest in adult during post monsoon (24.17%) while in juverules maximum in monsoon (20.18%). The percentage compositions in both the groups were found to be slightly changed from season to season. It also observed that the highest peak was in monsoon followed by post monsoon. Copepods and animal derivatives as a groups contributed about 11.19% monsoon and highest 15.30% in pre-monsoon in adult while in juvenile lowest 7.91% in monsoon and maximum 9.18% in pre-monsoon. The percentage compositions of food items like mollusks, foraminifera, were least in all the seasons. The molluscan food items was highest in both during pre-monsoon because of clams, oysters, mussels, solri, *Perna*, larvae found to be plenty in pre-monsoon season. The juveniles shrimps were detected heights in monsoon and pre-monsoon period. Animal derivatives (eggs, scales, crustaceans appendages, etc) were peak during post monsoon and pre-monsoon. The choises of food items were found to be maximum in post and pre-monsoon their monsoon than. The intensity, of feeding is directly corelated to season

as well as size groups. The juveniles spend more time in feeding than adults. The adults were restricted to the feeding ground and prefer deep water areas, while jureniles spend more time towards the bank of estuary.

From the above mentioned observation, it is clearly understood that this speeies could be esily cultivated in fish ponds like Shrimp. The *S.Sihama* are tasty fish having high prised therefore the coasted people should used this fish for fish farming to get highest yield production to solve the problem of food. (Yeragi 2004).

The dietory compositions of juveniles of *S.sihama* changed progressively with increasing body size. The change included a shift from the ingestion of small zooplankton, such as calanoid copepods by small juveniles to the consumption of larger benthic prey, such as polychaetes, shrimps, similar to those of audlt of the species. The overall feeding habits of juvenile S. sihama $\leq$10 and 11-45mm. SL size classes preferred major food items of calanoid copepods. In large size classes, however, this prey item was replaced by polychaetes and mollusks. The results also indicated that the percentage of copepods differed significantly between season wise and size wize.

CONCLUSION

S. sihama is ecologically and economically important estuarine fish. Cultivation of this fish is likely to be profitable because of the consumer demand both in local and export markets. It has high rate of tolerance and planktivores. The growth is very fast. The rate of fecundity is also high. It is advisable to local native that they can easily make the fish farm in the adjacent vacant mud-flat region to get high yield production to solve the problem of required amino acids to mankind. considering high rate of tolerance, fast growth, high population dynamic, it is better used for fish farming as model example.

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