

FOOD AND FEEDING HABITS OF *PARAPLAGUSIA BILINEATA* FROM MANGALORE COAST

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ABSTRACT : The study deals with nature and composition of food items, feeding habits, intensity of feeding of *Paraplagusia bilineata* from Mangalore region. The gut contents comprised of Molluscs 7.51%, Polychaetes 11.521%, Crustaceans 10%, Diatoms 4.67%, Fish scales 6.69%, Plant material 5.28%, Unidentified 7.88% and Semidigested 46.43%. The present study indicates that *Paraplagusia bilineata* is a carnivorous feeder. The active feeding during all the months except during January and February in female and February, March and April in male.

Key words : Food and feeding habits, *Paraplagusia bilineata*, Mangalore region.

INTRODUCTION

Flatfishes belong to the order Plueronectiformes which comprise flounders, turbot, plaices, halibuts, soles and tongue soles. Among these, some species of flounders, halibuts, turbot and soles form commercially important fishery of considerable magnitude in several countries. Flatfishes are distributed virtually at all latitudes (Pauly, 1994). Flatfishes are characterized by their dorso-ventrally compressed body, with sinistral or dextral. This group of fish is specialized in bottom dwelling habits inhabiting benthic region occupying continental shelf and upper continental shelf. Rajguru *et al.* (1987) recorded flatfishes from the Karnataka coast. Biological studies were conducted by Bijukumar (1996), Seshappa (1998), Jayaprakash (1999, 2000) and Ashwath Reddy (2002). Flatfishes are locally called as "Nangu" and several flatfishes from an important component from the demersal catches of both Dakshina Kannada and Udupi districts of Karnataka.

MATERIAL AND METHODS

Fortnightly samples were collected from the Mangalore main fish landing centre and fish market, from November, 2006 to June, 2007. The study was based on 544 individuals consisting of 196 males, 348 females. The methods of Hynes (1950) and Pillay (1952) were followed for qualitative estimation of food items. Feeding intensity in various months was studied by the degree of fullness of the stomach in relation to size of the fish. The fullness of the stomach was classified as Full, $\frac{3}{4}$ full, $\frac{1}{2}$ full, $\frac{1}{4}$ full, little (containing traces of food) and empty when practically the stomach did not contain any food. Fishes with full stomach and $\frac{3}{4}$ full were considered to have been feeding actively. Similarly, stomachs with $\frac{1}{2}$ full, $\frac{1}{4}$ full and little were considered to denote poor feeding.

RESULTS AND DISCUSSION

The composition of food components is presented in the Table.1. The composition of gut contents comprised of Molluscs, Polychaetes, Crustaceans, Diatoms, Fish scales, Plant material, Unidentified and Semidigested. The proportion of the gut contents for the whole period of study was Molluscs 7.51%, Polychaetes 11.521%, Crustaceans 10%, Diatoms 4.67%, Fish scales 6.69%, Plant material 5.28%, Unidentified 7.88% and Semidigested 46.43%.

The most important food items observed in the gut contents were polychaetes, crustaceans and molluscs. Polychaetes formed a major constituent (11.52%) of the stomach content throughout the year. The highest quantity of polychaetes were found in the month of January (16.65%) and lowest in April (5.21%). Crustaceans (10.00%) formed an important food item next to polychaetes. Higher percentages of crustaceans were recorded in March (14.47%), lower percentage in the month of December (7.86%). After crustaceans molluscs (7.51%) formed the most important food item. Highest quantities were found in the month of March (10.18%) and lowest quantity found in January (3.01%). Other food items *viz.*, diatoms, fish scales and plant materials were consumed in lesser quantities compared to the above groups. Semi-digested matter formed an important constituent of food item in different proportion in all the months. The quantity of semi digested matter was maximum in March (50.15%) and minimum in January (43.36%).

Studies on the food and feeding habits is an important parameter in fishery biology studies since food is one of the factors that profoundly influence the shoaling behaviour, aggregation, condition and even the fishery (Jayaprakash, 2000). He observed showed small variation in the ranks obtained by the forage organisms. The food items in the order of dominance were Polychaetes, detritus, mysids, copepods, amphipods, foraminifera and bivalves. Polychaetes and detritus occurred in the diet

throughout the year. Studies conducted by Jayprakash (1999) indicated that the percentage composition of the food items in both immature and mature fishes in both sexes of *Cynoglossus marostomus* in the order of dominance were detritus, polychaetes, amphipods, mysids, copepods and molluscs. Studies on food and feeding habits of *Cynoglossus macrostomus* revealed that it is a bottom feeding carnivore feeding mainly on polychaetes, crustaceans, molluscs, diatoms, fish scales and plant materials (Ashwatha Reddy, 2002).

Feeding intensity : The stomach contents of sample collected for the study of food and feeding were classified depending on their relative fullness into Full, $\frac{3}{4}$ full, $\frac{1}{2}$ full, $\frac{1}{3}$ full, $\frac{1}{4}$ full and empty. Fishes with full, $\frac{3}{4}$ full and $\frac{1}{2}$ full were considered to have actively fed, whereas those with $\frac{1}{3}$ full, $\frac{1}{4}$ full and empty as poorly fed. Data on the percentage occurrence of these categories are presented in Tables.2a&2b.

Table. 1 Quantitative food composition (%) of the gut content of *Paraplagusia bilineata*.

| Food items/Month | Molluscs | Polychaetes | Crustaceans | Diatoms | Fish scales | Plant material | Unidentified | Semidigested |
|------------------|-------------|--------------|-------------|-------------|-------------|----------------|--------------|--------------|
| November,2006 | 6.88 | 12.88 | 7.95 | 7.24 | 4.47 | 6.80 | 8.88 | 44.9 |
| December,2006 | 7.53 | 10.73 | 7.86 | 6.08 | 5.14 | 5.79 | 12.25 | 44.62 |
| January,2007 | 3.01 | 16.65 | 10.16 | 7.86 | 7.86 | 3.94 | 5.06 | 43.36 |
| February,2007 | 9.47 | 12.63 | 9.23 | 6.22 | 8.28 | 3.60 | 4.99 | 45.58 |
| March,2007 | 10.18 | 7.68 | 14.47 | 1.20 | 3.46 | 4.52 | 8.34 | 50.15 |
| April,2007 | 8.96 | 5.21 | 11.69 | 1.28 | 11.21 | 7.73 | 5.48 | 48.04 |
| May,2007 | 6.82 | 14.26 | 9.78 | 3.48 | 6.48 | 5.08 | 8.20 | 45.90 |
| June,2007 | 7.26 | 12.16 | 8.86 | 4.01 | 6.64 | 4.82 | 7.36 | 48.89 |
| Average | 7.51 | 11.52 | 10 | 4.67 | 6.69 | 5.28 | 7.88 | 46.43 |

Table. 2a Percentage occurrence of female *Paraplagusia bilineata* in various degrees of fullness of stomach.

| Months/fullness of stomach | Nov.,2006 | Dec.,2006 | Jan.,2007 | Feb.,2007 | Mar.,2007 | April,2007 | May,2007 | June,2007 |
|----------------------------|-----------|-----------|-----------|-----------|-----------|------------|----------|-----------|
| Sample size | 38 | 40 | 48 | 43 | 38 | 52 | 46 | 38 |
| Empty | 1.36 | 2.80 | 1.62 | 1.88 | 2.10 | - | - | 1.12 |
| $\frac{1}{4}$ | 22.91 | 18.86 | 2.43 | 26.85 | 4.20 | 11.80 | 6.86 | 6.21 |
| $\frac{1}{3}$ | - | 1.30 | 0.67 | - | - | - | - | - |
| $\frac{1}{2}$ | 40.96 | 42.25 | 50.36 | 54.67 | 34.50 | 53.68 | 67.04 | 64.60 |
| $\frac{3}{4}$ | 22.86 | 20.25 | 15.61 | 16.6 | 35.00 | 35.14 | 15.01 | 16.81 |
| Full | 11.91 | 14.54 | 9.31 | - | 24.20 | - | 11.09 | 11.26 |

Table. 2b Percentage occurrence of male *Paraplagusia bilineata* in various degrees of fullness of stomach.

| Months/fullness of stomach | Nov.,2006 | Dec.,2006 | Jan.,2007 | Feb.,2007 | Mar.,2007 | April,2007 | May,2007 | June,2007 |
|----------------------------|-----------|-----------|-----------|-----------|-----------|------------|----------|-----------|
| Sample size | 22 | 26 | 24 | 23 | 26 | 21 | 34 | 29 |
| Empty | - | - | 11.80 | 10.08 | - | - | - | - |
| $\frac{1}{4}$ | 6.86 | 18.96 | 8.60 | 21.81 | 6.45 | 31.26 | 12.86 | 14.86 |
| $\frac{1}{3}$ | 1.96 | 1.86 | - | - | - | - | - | - |
| $\frac{1}{2}$ | 32.16 | 36.11 | 56.24 | 44.86 | 42.44 | 54.00 | 36.83 | 32.36 |
| $\frac{3}{4}$ | 37.27 | 33.45 | 23.26 | 18.46 | 22.83 | 14.74 | 35.48 | 39.48 |
| Full | 21.77 | 9.62 | - | 6.75 | 28.28 | - | 14.83 | 13.30 |

It can be seen from the table that greater percentage of fishes had stomachs with considerable food, indicating active feeding during all the months except during January, February in female and February, March and April in males. Large proportion of $\frac{1}{2}$ full stomachs could be observed in both the species in almost all the month.

This could be due to the corresponding abundance or otherwise relevant food items and active feeding of spent, spent recovery and juvenile fishes. It can also be seen from the result that the poor feeding was noticed during spawning season. The poor feeding during April to June could be due to less availability of food or occurrence of low density of favoured food in the habitat. Venkatesh Moorthy (1990) reported that higher feeding intensity in *P.arsius* could be attributed to the efforts to overcome the strain from the process of maturation and spawning.

REFERENCES

Ashwath Reddy, G. R. (2002). Study of some biological aspects of *Cynoglossus macrostomus* (Norman) *M.F.Sc. Thesis*. Univ. Agril. Sci., Bangalore, p. 40.

Bijkumar, A. (1996). *J. Mar. Bio. Ass. India*, **38(1&2)** : 34 - 39.

Hynes, H. B. (1950). *J. Anim. Ecol.*, **19** : 35-38.

Jayaprakash, A. A. (1999). *J. Mar. Biol. Ass. India*, **41(1&2)** : 85-95.

Jayaprakash, A. A. (2000). *J. Mar. Biol. Ass. India*, **41(1&2)** : 124 -134.

Pauly, D. (1994). *Netherlands Journal of Sea Research*, **32** : 107-118.

Pillay, T. V. R. (1952). *J. Zool. Sco. India*, **4** : 185-200.

Rajguru, A.; Shantha, G. and Natarajn, R. (1987). *CMFRI Spec. Publ., No.*, **40** : 62.

Seshappa, G. (1998). *J. Mar. Boil. Ass. India*, **40(1&2)** : 133-141.

Venkatesha Moorthy, K. S.; Mohan Joseph, M. and Santha Joseph, P. (1993). *The third Fisheries Forum Proceedings*, **11(14)** : 141-150.