Feeding Habits of the Pearl-Spot *Etroplus suratensis* (Bloch) in the Nethravati – Gurpur Estuary

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Abstract

Analysis of the stomach contents of 1241 specimens of *Etroplus suratensis* (size range 5.2 to 23.3 cm T.L.) caught from the Nethravti-Gurpur estuary during February 1984 – January 1985 showed that the main food consists of decayed organic matter (38.61%), filamentous algae (29.15%) and miscellaneous matter (8.04%). Sand (3.89%) also formed a component in the stomach content during all months. In general, this fish is a bottom feeding scavenger with a tendency for herbivory. Occurrence of decayed organic matter in the stomach showed seasonal variations which were related to relative abundance of food, selcectivity, age and diurnal variations in feeding. Filamentous algae *Spirogyra* formed an important item of the diet in November. A change in diet with increase in size of fish was noticed. While fish of 8 cm T.L. preferred decayed organic matter and microvegetation, larger fish fed on a variety of food. Increased occurrence of sand grains in larger fish suggests habitual bottom feeding. Intensive feeding was noticed in early mature and spent fish. Feeding intensity appears to be related to spawning activity, besides food abundance.

Introduction

The chromids or the pearl-spots (Family Cichlidae) form an important group among the brackishwater fishes of the tropics. The three species found in India are *Etroplus suratensis* (Bloch), *E. maculatus* (Bloch) and *E. canarensis* Day. Of these, the first two are commercially important and contribute to sizeable market landings from the brackish-waters of the south-west coast of India. Inspite of their economic importance, the feeding ecology of these fishes is poorly known. The present paper deals with the results of a study on the food and feeding of *Etroplus suratensis* inhabiting the Nethravati-Gurpur estuary.

Material and Methods

Fish samples (sample size *ca.* 30) were collected from the landing centres around the Nethravati-Gurpur estuary at weekly intervals from Feburary 1984 to January 1985. The guts, along with their contents were removed and preserved in 5-8% formalin and subsequently analysed both quantitatively and qualitatively. Food items were identified mostly upto the generic level as most of the items were in advanced stages of digestion which rendered specific identification impossible. Quantitative analysis was carried out by using both occurrence and points volumetric methods (Hynes, 1950; Pillay, 1952), since the items of food were smaller in size, their volume could be estimated only by allotment of points. From the food content, volumes obtained for individual fish by the above method, monthly averages and percentages were calculated. The volume index (% volume of each food item) was calculated from the total points of all the items recorded over the whole period of study.

Feeding intensity during various months was studied from the data on the degree of fullness of stomach. Fishes with stomachs gorged, full and 3/4 full were considered to have been feeding actively. Similarly stomachs 1/4 full, little and empty were considered to denote poor feeding activity. The percentage occurrence of stomachs under the different conditions of feeding was also calculated for the whole period of study. Food composition in relation to size of fish was studied by examining the percentage occurrence of each food item against size of fish. A total of 1241 specimens of size range 5.20 to 23.30 cm T.L. were examined for the study of feeding ecology.

Results and Discussion

Results of qualitative analysis indicated dominance of filamentous algae and decayed organic matter in the food content. Sand grains, crustacean and miscellaneous items such as fish, fish scales and Otolith, diatoms, *Oscillatoria,* tintinids, bivalves, insects, and unidentifiable matter also occurred in considerable quantity. The proportions of major food items were: filamentous algae (29.15%), decayed organic matter (38.61%), crustaceans (2.66%), semidigested matter (16.35%), sand and mud (3.89%) and miscellaneous items (9.34%). Fig. 1 gives details of the percentage occurrence of various food items during different months.

Decayed organic matter were recorded in all months except December with peaks in July (70.10%), May (53.75%) and June (53.21%). The least was in November (10.72%). Filamentous algae (29.15%) formed the second major item of food. Maximum quantities were in November (75.11%) and September (51.09%) and the least in July (6.15%) and June (3.21%). *Spirogyra* formed the chief item

among filamentous algae. Semidigested matter (1.39% to 35.82%) formed a fairly good constituent of the stomach throughout the year. The maximum was in August and the minimum in May. Sand particles ranged from 8.05% (March) to 0.48% (May). Miscellaneous food items ranged from 36.11% (December) to 0.43% (October). This mainly included fish, scales and otolith of fish, diatoms, *Oscillatoria*, tintinids, bivalves and insects. Fish scales were recorded from March to May and in December. During February-May and in September and December diatoms such as *Gyrosigma* and *Coscinodiscus* were recorded. The unicellular alga *Nostoc* was recorded during March and April while during March, April and December, *Oscillatoria* was observed. Bivalves were observed in August and September. Insects were recorded in the diet in Febuary, April and October.

Fig. 2 presents data on the food composition in relation to size of fish. Decayed organic matter was the most dominant item in fishes belonging to all the size groups. The highest percentage was (80%) in size group 4.0-5.9 cm T.L. and the lowest (31.44%) in size group 8.0-9.9 cm. Filamentous algae formed the second important food item and were recorded in all size groups except 4.0-5.9 cm group. Their percentage ranged from 8.33% in 6.0 to 7.9 cm size group to 32.92% in the 8.0-9.9 cm size group. Crustaceans were found in all the size groups except 4.0-5.9 cm size groups, with the highest quantity (10.91%) in 20-21.9 cm size group and the lowest (0.91%) in 10-11.9 cm size group.

Fig. 3 presents data on the variations in feeding intensity. Higher feeding intensity was noticed during July followed by March, while poor feeding was obvious in September and November. A decline in feeding activity was noticed during March-June.

The present study shows that *E. suratensis* feeds mostly on decayed organic matter (38.6%), filamentous algae (29.15%) and miscellaneous food items (8.04%). Sand grains (3.89%) present in the stomachs during some months indicate a tendency for feeding at the bottom. Earlier reports had indicated that the young ones of this species are herbivores (Alikunhi, 1957; Hora and Pillay, 1962). Prasadam (1971) and Jhingran and Natarajan (1973) have observed that though it feeds on micro and macro vegetation, its food mainly consists of invertebrates such as insect larvae, bivalves, mysids and decayed organic matter. Devaraj *et al.* (1975) state that in the estuarine habitat of the Mangalore region the major food items of this species are filamentous algae. In these fishes they recorded detritus (24.39%) and sand particles (9.83%) also in appreciable quantities. The present study revealed considerable variations in the quantities of decayed organic matter in the stomachs. These variations may be related to extraneous factors such as relative abundance of decayed organic matter, selectivity by fish, age of fish and diurnal variations in feeding.

Semidigested matter which formed a good percentage in the gut of *E. suratensis*, was constituted by various macroplankters. Sand particles found in small quantities in all the months were probably related to the bottom feeding habit of the fish. However, Thompson (1954) believes that the function of sediments is to act as grinding mill in the degradation of plant cell wall. A detritus feeder is bound to ingest good quantities of sediments and sand particles and therefore it is reasonable to believe that the fish does not actively feed upon sandgrains. The occurrence of bivalves, insects, fish and diatoms indicate a wide range of selectivity of the diet by the fish. Alikunhi (1957), Hora and Pillay (1962), Prasadam (1971) and Jhingran and Natarajan (1973) also had indicated a mixed diet for this species.

A size dependent preference to certain food items was noticed in the present study. While decayed organic matter and micro-vegetation were prefered by fishes of 4.0 to 8.0 cm T.L., the diet mainly consisted of wide variety of food materials such as macro-vegetation, decayed organic matter, filamentous algae, miscellaneous matter and crustaceans in the order of preference in fishes larger than 8.0 cm T.L. Quantity of sand grains ingested increased proportional to increase in size of fish. Thus a distinct change in the diet with increase in size (age) of the fish is evident. Similar observations have been made by earlier workers (Alikunhi, 1957; Prasadam, 1971 and Devaraj *et al.*, 1975.

An interesting phenomenon observed in the present study was the dominance of empty stomachs during most of the months. High feeding intensity was noticed during July, March and April while during the rest of the period feeding intensity was low. These variations were probably related to the intensive feeding by spent fishes as well as those in early stages of maturity. Thus, feeding intensity, might be related to maturation of gonads and spawning activity, besides food availability. Devaraj *et al.* (1975) also have reported large number of empty stomachs (30.77% to 39.50%) in size groups upto 90 mm except in size group 31-40 mm where all stomachs contained food in varying quantities. El – Maghraby *et al.* (1972) reported that *T. zilli* during spawning season reduces the ratio of feeding. Other reasons for empty stomachs are regurgitation (Bull, 1928; Phillips, 1929; Pillai, 1952), periodicities in feeding, availability of food, and its digestibility, physiological reasons and ill health.

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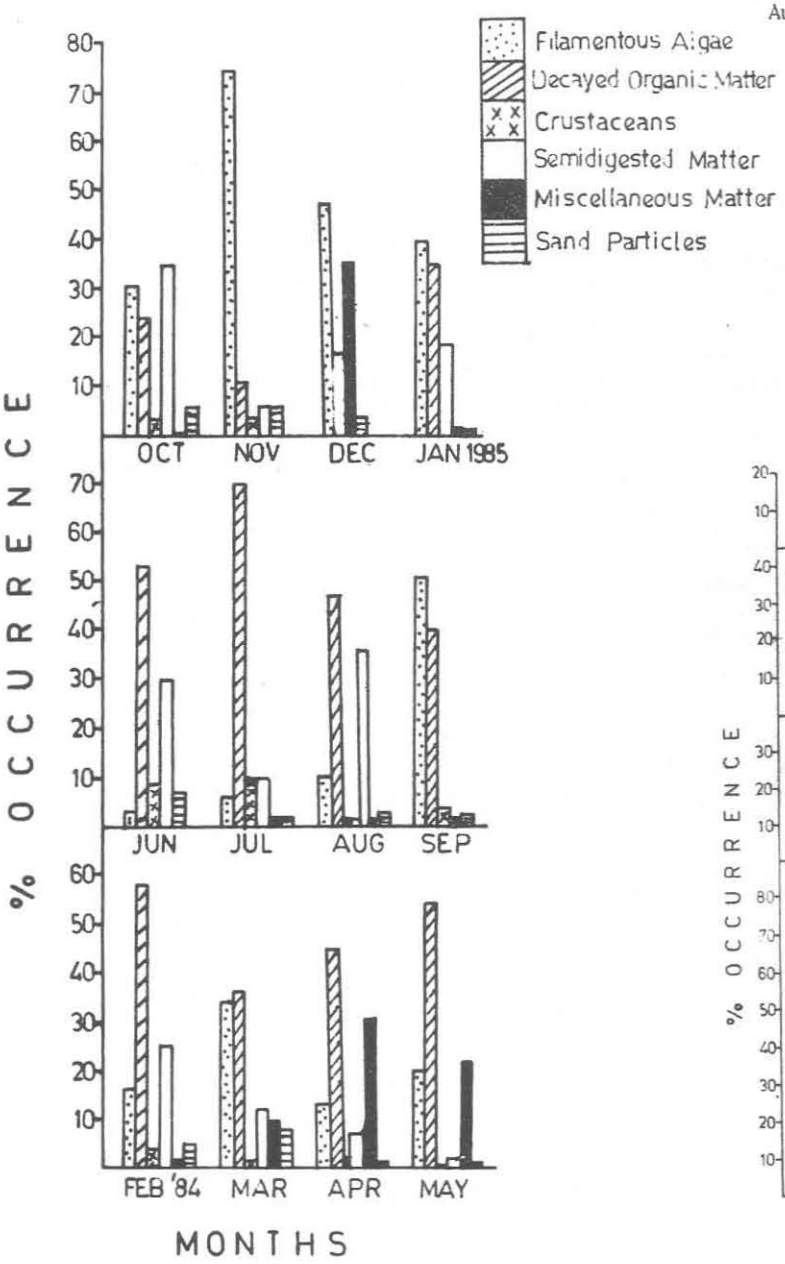

Fig. 1. Percentage composition of various items of food recorded during different months in the stomach of *E. suratensis*.

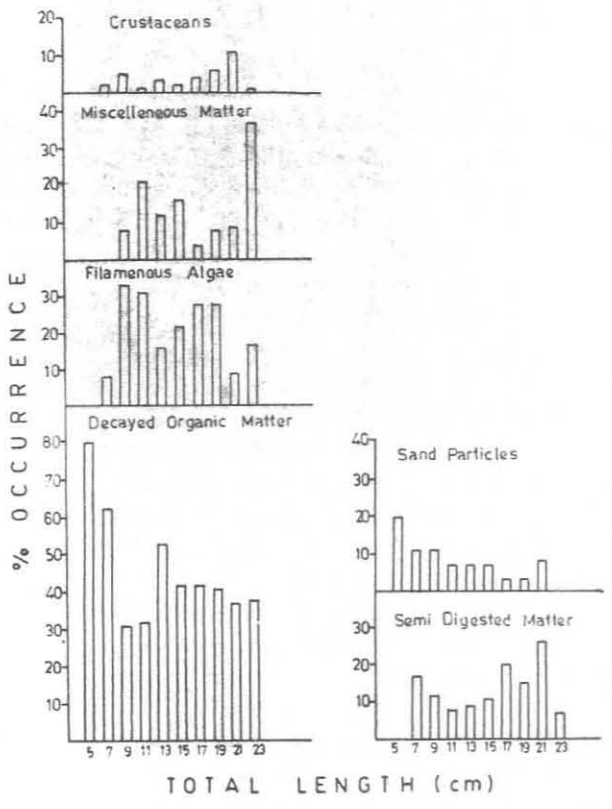

Fig. 2. Percentage occurrence of food items in relation to size of *E. suratensis*.

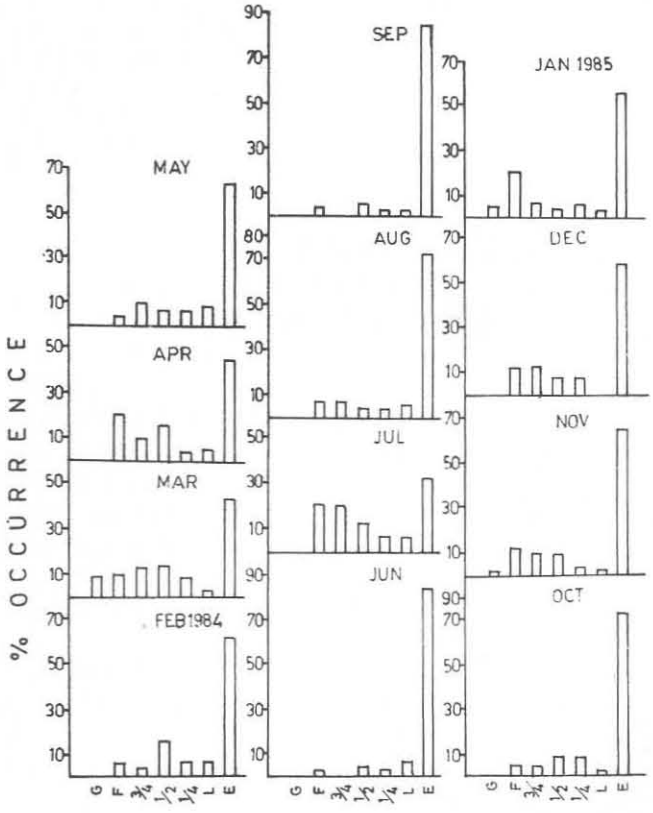

Fig. 3. Percentage occurrence of various degree of fullness of stomach in *E. suratensis* during February 1984 to January 1985.