Environmental Research Journal 6 (2): 121-123, 2012
ISSN: 1994-5396

Diet Composition and Feeding Strategy of Bait Caught Skipjack Tuna (*Kastuwanus pelamis*) Caught Along Saurashtra Coast

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Abstract: The food and feeding habits of the skipjack tuna based on the data for the period 2009-2010 is given here. Fishes, crustaceans and cephalopod formed the main food items. Among fishes, *Decapterus* sp. is the most dominant species found almost throughout the year. In crustacean, *Acetes indicus* was found to occur in month of October and February while the pelagic crab was seen during January-March. Cephalopods fully comprised by squid. But in general empty condition dominated. The feeding habits in relation to the catch are discussed in addition to the comparison of the present observation with the earlier studies from here.

Key words: Skipjack tuna, *Katsuwanus pelamis*, food and feeding habit, Saurashtra coast, squid, India

INTRODUCTION

Skipjack tuna *Katsuwonus pelamis* is a pelagic fish residing in the oceanic columnar waters and actively prey on fishes, crustaceans and cephalopods. The survival of these apex predators depends on their efficiency to locate prey-rich areas in the vicinity of their environment. The study of food and feeding in skipjack tuna thus, becomes very important not only in using the data to evolve improved exploitation strategy but also to understand the substantial structural changes brought about in the ecosystem when they are removed by fishing.

Studies have been carried out on the food and feeding habits of *K. pelamis* in the laboratory of Central Marine Fisheries Research Institute. The food studies may reveal the existence of the correlation between the distribution of food elements and the congregation of skipjack schools and thus, may aid in indicating the unexploited skipjack areas from Indian ocean of Saurashtra region. The result of the preliminary study on the food and feeding habits of *K. pelamis* from Indian ocean around Saurashtra coast are processed in this study.

MATERIALS AND METHODS

A total of 140 numbers of skipjack tuna samples in size from 22-78 cm FL were collected from the different landing centers along Saurashtra coast during October 2009 to September 2010. The fork length (cm) and wet weight (kg) of the fishes were noted which were then cut open and the entire stomach was carefully removed for further detailed analysis. The degree of dimension of the stomach fullness was visually recorded into five categories as full, three-fourth full, half full, one-fourth full and empty based on the distension of the stomach due to the presence or absence of food. Others found in traces and in few stomachs sporadically were considered as fortuitous entry. The average intensity of feeding was evaluated by point's method (Hynes, 1950; Bapat and Bal, 1952). During analysis, the total weight of stomach content was taken and the contents were divided into broad prey classes sorted by large categories (fish, cephalopods, crustacean and others) and the weight of each category was noted.

RESULTS AND DISCUSSION

Feeding intensity: It is seen that the percentage of full condition of stomach found very few almost all the months. The stomach analysis showed that 54% of stomachs were empty. Among the remaining, 1/4th full, 1/2 full, 3/4th full and full stomachs formed 9, 14, 18 and 5%, respectively (Fig. 1). The monthly average feeding condition assuming stomachs containing baitfishes alone as empty show dominance of empty condition in all the months except June and July. During June to August, fishing is banned because of monsoon and unfavorable weather condition. The dominance of empty stomach condition is in agreement with the observations by Raju (1964), Thomas (1964) and Varghese and Shanmugham (1983).

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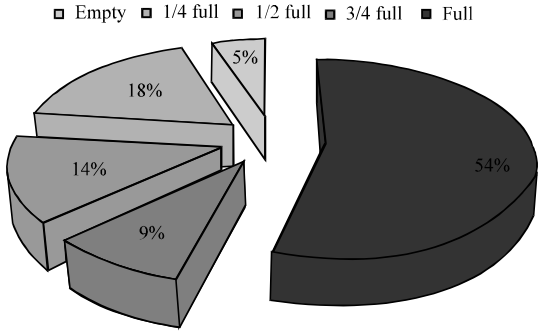

Fig. 1: Average annual feeding intensity of the stomach contents of skipjack tuna

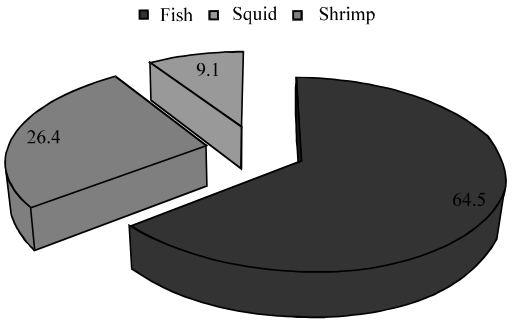

Fig. 2: Average annual percentage composition by volume of the stomach contents

Stomach content: The natural food consisted of fishes, cephalopods and crustaceans. The percentage composition by volume of the stomach content show that fishes formed mainly semi digested fish (64.5%), squids (26.4%) and deep sea shrimps (9.1%) (Fig. 2).

Fishes: The important food items found in the stomach were contributed by larval and juvenile fishes. They formed 64.5% by volume of total content of stomach examined during the study period.

Among the important items of fishes, *Decapterus* sp., *Trichiurus* sp., *Tetrodon* sp., carangids, balistids. *Decapterus* sp. were found throughout the period of investigation. *Trichiurus* sp. was also observed during period of investigation except in month of January and March.

Crusteceans: These are dominated by mysids, deep sea prawns, pelagic crab, juveniles of squilla and *Acetes indicus*. The pelagic crab was seen only one or twice during the investigation period and their percentage volume was also very low. Like that the juveniles of squilla are sporadically seen that too one or two numbers in one stomach. The pelagic crab was seen during January-March. *Acetes indicus* was found to occur in the stomachs of skipjack in October and February.

Cephalopods: Juvenile and adult cephalopods were observed in substantial quantities in the stomach contents practically throughout the period except in the month of May and July. As the various characteristic features used in identifying these forms like the general body shape, number of arms, arrangement and modification of the suckers, presence of tentacles etc. are structures that are susceptible to the digestive action of the enzymes these were therefore identified as squids and octopodids only.

The food of skipjack is mainly constituted by fishes, crustaceans and cephalopods are in agreement with the earlier observations from this areas even though there is a wide variation in the species composition. The dominant species of fish viz. *Tetrodon* sp. recorded in the present investigation has never been recorded earlier. This can perhaps be due to the fat that their investigations were based mainly on 1 year period.

Suyehiro (1938) observed that the skipjack which had fed recently did not bite as well as those that were hungry and skipjack feeding on pelagic forms responded to chum better than those feeding on inshore forms. But in present investigation, the natural food contained in the stomachs of majority of skipjack were almost intact indicating clearly that they were fed only recently or the tuna must have been feeding on them at the time of fishing.

According to Raju (1964), fast swimmers like squid and carangids were seen to contribute a much higher proportion of the food of only large sixed fish (about 70 cm FL) which were only very poorly represented in the fishery. During the present observation also, these large sized tunas were only poorly represented. However, the carangids, *Decapterus* sp. and squid were found to be the dominant food of the tunas of sizes <75 cm FL also.

Number of fishes caught in a boat in relation to the stomach condition and contents. No major difference is discernible in the number of fishes caught with respect to stomach condition. However, it is seen that the number of fishes obtained from a shoal associated with floats is much more than from other shoals and interestingly the stomachs of these fishes are invariably empty also. According to Suyehiro (1938), the resident population living in shallow and coastal waters where abundant food is available, eat almost anything and can always find food in contrast to the migratory skipjack swimming in the open ocean or deep coastal waters.

CONCLUSION

This study is about shoals of these fishes caught from the deep coastal waters and researchers cannot specifically distinguished between the resident and migratory fishes, chances of tunas associated with floats to be migratory are high as the stomachs of these tunas are invariably empty and they always show a feeding frenzy when the live bait fishes are thrown from the boat.

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