FOOD AND FEEDING HABITS OF TILAPIA ZILLI (PISCES: CICHLIDAE) IN ONDO STATE UNIVERSITY FISH FARM

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ABSTRACT

The food and feeding habits of Tilapia zilli in the fish farm of Ondo State University, Akungba - Akoko were studied by gut analysis . Examinations of one hundred and fifty members showed that Nymphea formed the main bulk of food consumed. Spirogyra , Pithophora and Compsopogon occurred frequently while Pistia detritus and plant remains featured less frequently. Variation in the frequency of occurrence of the various food items was observed among the various sizes of samples. The samples within the middles - size group fed on both higher plant and filamentous algae while the young and higher fish consumed exclusively filamentous algae. On the basis of food items found in the gut, T . zilli was classified as primary consumers.
Key words: food, feeding habits, Tilapia

INTRODUCTION:

Tilapia are important in the ecology of tropical waters as well as in the resources of aquatic systems of the sub - tropical regions. Fagade (1971) observed that Tilapia species are suitable for fish culture and are among the commercially important inland water fish of Africa. The outstanding culturable qualities of this fish species in warm waters have been well reported (Fryer and Iles, 1972; Avtallion , 1982 and Ugwumba, 1988). They are a hardy species and can tolerate a wide range of ecological conditions with a high reproductive rate.

Extensive research had been carried out on food and feeding habits of African cichlids (Fish, 1955; Macdonald,1956; Fagade, 1971; Ugwumba,1988). These reports showed that some species of Tilapia had diatoms, unicellular algae , filamentous algae debris in their stomach . However, fishery biologists have observed that stomach contents alone may not accurately reflect the consumers diet. This is because some important contents of the diet may be processed so fast that they leave little or no recognisable particles . Some important particles are also destroyed by mastication beyond the level of recognition In addition, Jobling (1981) observed that the different rates of food progression for various items may lead to selective accumulation of those food items or parts which are digested more slowly. Thus, relative abundance of food items in the gut may not reflect the proportions in which they were ingested.

Nonetheless, the study of the food and feeding habits is useful in determining the population level, in as much as the number of individuals on the population depends on the amount of food available . It also determines the rate of growth of fish species, as well as revealing the status of the foraging fish species. Gut analysis also gives information on seasonal and life history changes of fish because the types and magnitude of food available as well as the season it occurs play an important role in the history of fish.

T. zilli forms a major species in the stockings of the fish of Ondo State University, Akungba - Akoko (OSUA). The farm acquired from its original owners and primarily meant for commercial purposes, is now being used for research and demonstration.

There is presently no biological data on the ponds, although established some years ago. The major aim of the research was to study and understand the qualitative and quantitative connections between the fish species in the ponds and their food organisms.

MATERIALS AND METHODS

Fish samples consisting of 150 Tilapia zilli were regularly sorted out during croppings from Ondo State University fish farm. Routine investigations consisted of measurement (in cm), weighing (in gm) and subsequent analysis of stomach content. The total length of fish was measured from the tip of the mouth to the end of the base of the fork of the tail fin in the spread position. Specimens were preserved in the deep freezer at - 200 F immediately after measuring and weighing . The preserved fish were later dissected, the gut taken and preserved in 4% formalin for later analysis .

The gut was dissected and washed into a petri - dish with 1ml distilled water. In most of the fish samples, only the stomach contents were examined but in small specimens where the distinction between the stomach and the rest of the gut was not well marked, the whole gut contents were examined. Individual food items were identified and counted under a binocular microscope.

The occurrence method of gut analysis was used as follows:

The number of fish in which each food item occurred was recorded and expressed as a percentage of the total number of fish.

That is: Frequency of Food item X 100 Number of fish with food in stomach 1

RESULTS , DISCUSSION AND CONCLUSION

Figure 1 shows the length frequency distribution of the fish samples. Table 1 shows the occurrence of food items in the stomachs of 150 specimens of T. zilli.

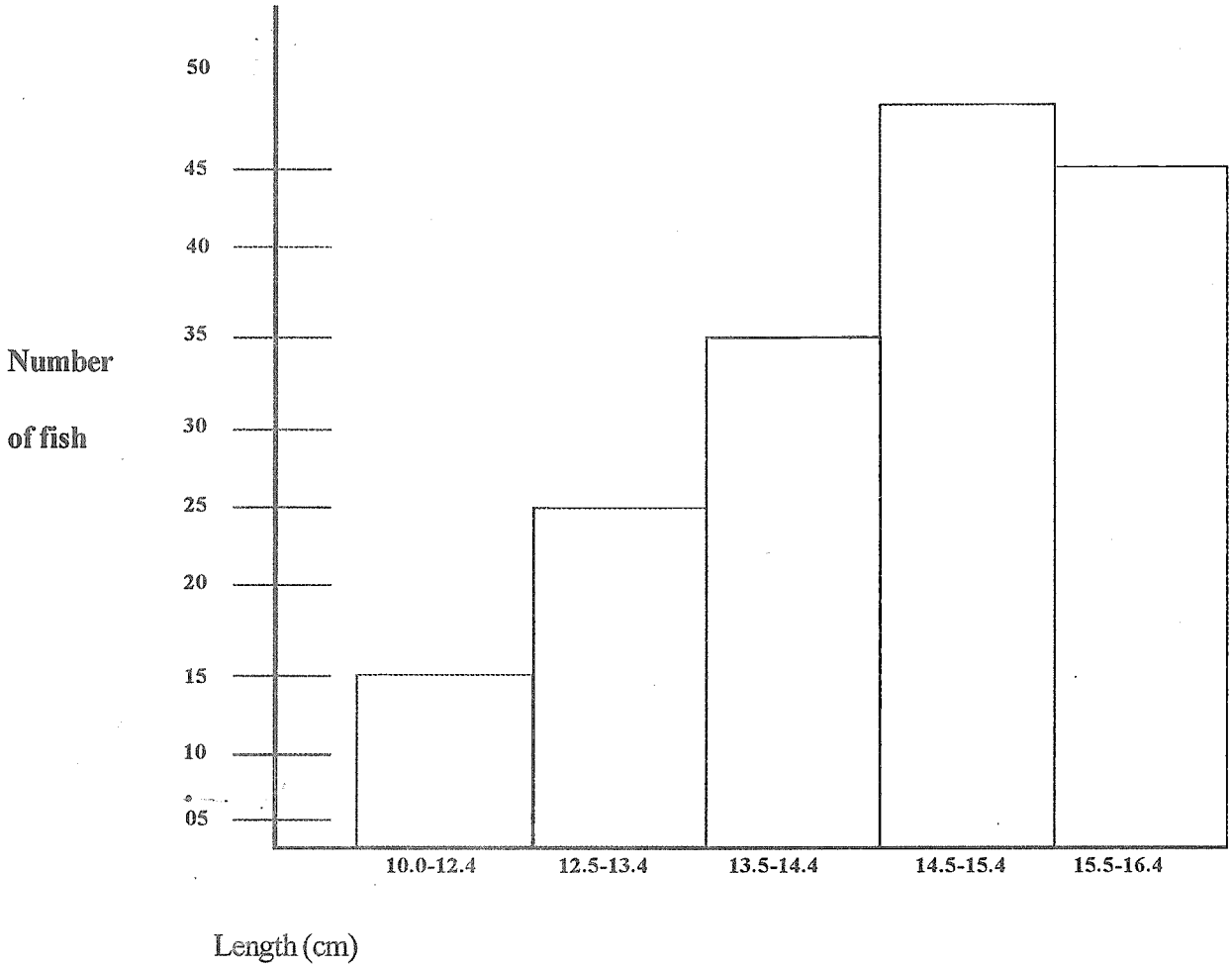

Fig. 1. Length - frequency distribution of Tilapia zilli.

Table 1. Occurrence of food items in stomach of Tilapia zilli

Food item	Percentage
Closterium	33.3
Spirogyra	100.0
Pithophora	100.0
Compsopogon	33.0
Higher Plants:	
Nymphea	100.0
Pistia	11.1
Others:	
Detritus	26.6
Plant remains	22.2
Sand particles	40.0
Total fish examined	150
Number with food in gut	150

The commonest higher plant frequently found in the stomach was Nymphea . Spirogyra and Pithophora both filamentous algae occurred frequently in the gut of T. zilli. Closterium and Compsopogon also filamentous algae, occurred less frequently. It was difficult to estimate the amount of filamentous algae taken since they were mixed with the macerated fragments of Nymphea . It was possible that the algae were taken by the fish because they were growing on the petioles of Nymphea. Microscope examination of the stomach and rectal contents showed that most of the fragments and filamentous algae appeared to pass through the gut undigested. Observation showed that digestion occurred in T. zilli whenever plant or algae cell was ruptured. Only a small proportion of the cells in the rectum were broken down and where the cell - wall was damaged, no digestion appeared to take place. It appears therefore that the amount of digestible food substance obtained from plants depends on the degree of maceration prior to passing into the stomach.

Figure 2 shows the variation in the frequency of occurrence of the various food item in the stomach of T. zilli . There is some similarity both in the types and the frequency of occurrence of food consumed by the length groups 10.0 -12.4cm and over 16.0cm and also between 12.5 - 14.4cm and 14.5 - 16.0cm . The figure shows that the two middle size groups consumed both higher plants and filamentous algae and also detritus . While the juvenile (10.0 - 12.4cm) and adult groups (over 16.0cm) depended exclusively on filamentous algae .

The feeding habit of Tilapia has been found to be overlapping (Crozier, 1985;Ugwumba, 1988).They utilize various materials found in the environment, thus can live as herbivores, predators, detrivores as well as plantivores (Brown, 1986). A number of factors are attributable to changes in the feeding habits of fish species. Fryer and Iles (1972) and Jobling (1981) listed the size of the fish, sex, season, water temperature, habitat and competition as some of these factors. Morphological changes in the feeding apparatus of the fish as a result of age may also lead to a change in the feeding habits . As a result of the feeding habits, members of T. zilli have been variously classified as plankton feeders, higher plant and algae feeders or macrophagous as well as mud suckers (Fagade, 1971;Brown and Colgan, 1984). This study revealed that T. zilli fed mostly on higher plants. The feeding habits changed with size (or age) of the fish . The middle sized group fed on both higher plants, filamentous algae and detritus while the juvenile and adult groups depended exclusively on filamentous algae.

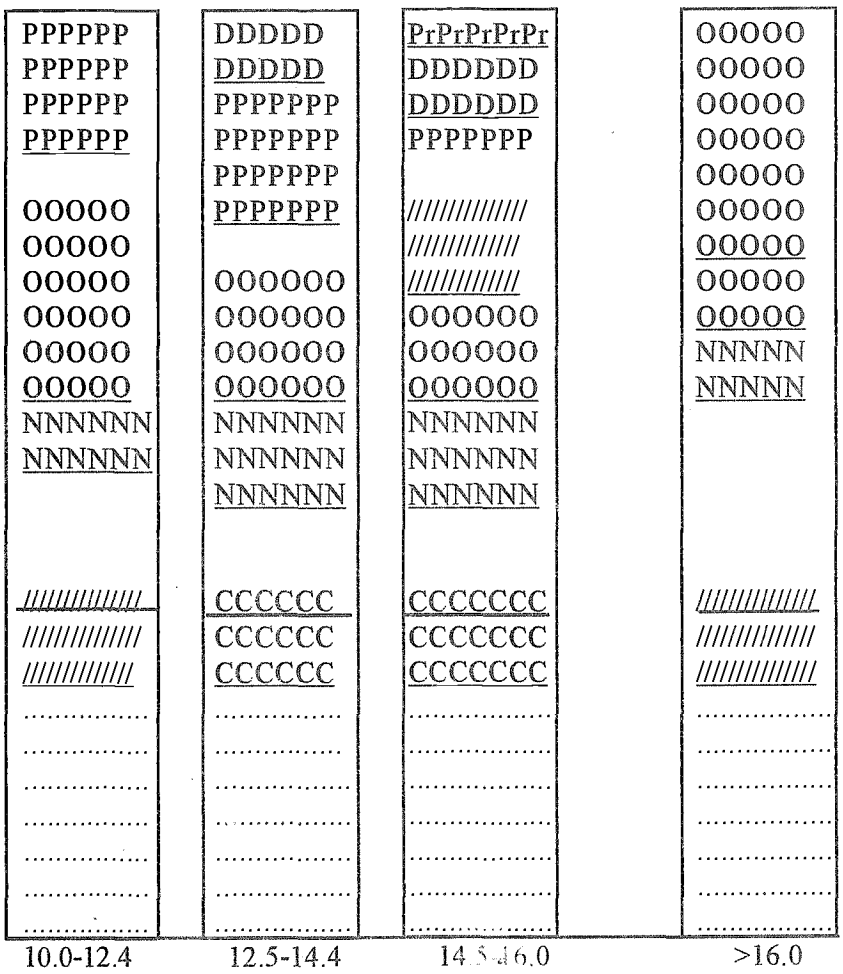

Fig. 2 Diagrammatic representation of variation in food items in Tilapia zilli

Key

.....	Spirogyra
//////	Closterium
_____	Cosmopogon
NNN	Nymphea
OOO	Sand particles
PPP	Pithophora
CCC	Pistia
DDD	Detritus
prPr	Plant remains

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