

# FOOD, FEEDING HABITS, AND BIOLOGICAL CONTROL POTENTIALS OF THE ORNAMENTAL FISH IN IKPOBA DAM, BENIN - CITY

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## Abstract

The food and feeding habits of the ornamental fish, *Hemichromis fasciatus* (Peters) from Ikpoba dam was studied. Fifty fish specimens were procured from fishermen, using gill nets, fish traps, hooks and lines for fishing. They were chilled with ice-blocks in a heat – insulated cooler and transported to the laboratory at the University of Benin for analysis. Their stomach contents were analyzed using the frequency of occurrence method and Volumetric method. Experiments were also performed on life fishes in aquarium tanks to investigate their biological control potentials on mosquito larvae. Results gave a comprehensive picture of what the fish feed on (aquatic insects and their Larvae, fish fry and few plankton), and that it can effectively be used as a biological control measure to reduce the population of mosquito Larvae in production ponds of some other cultured fishes which are built in residential areas.

## Introduction

Investigation into the food and feed habits of fish species is of high interest to both the aquaculturist and fish biologist. This is because it contributes to the basis for the development of a successful fisheries management programme on fish capture and culture. Fagade and Olaniyan (1973) studied the food and feeding relationships of fishes on the Lagos Lagoon. Other investigators include Olatunde (1979) in the Ogun River, Adebisi (1981) in Lagos and Lekki Lagoons, Tetsola (1988) in the Niger Delta area and Warri River; Voss, Koster and Dickman (2003) in the Baltic sea, Methratta and Link (2004) in the Northeastern continental shelf; Edema *et al* (2008) in Okhuo River, Benin City.

The Ikpoba Dam was constructed across the Ikpoba River, it is very important because it is the main water source used by the Urban Water Board to supply portable water to Benin City metropolis and its environs. Available literature as well as search on the internet shows that no comprehensive work has been published on the food and feeding habits of the ornamental fish *Hemichromis fasciatus*. This paper intends to provide such information which would be very useful to aquaculturists and fish biologists.

## Materials and Methods

### Study Area

Ikpoba Dam is located within Lat. 6°, 30°N and Long. 5° 12'E (fig. 1). The area has a tropical rain forest climate, characterized by two main seasons; the dry season and the rainy season. The rainy season lasts from April to November, while the dry season lasts from December to March.

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## **Procedure**

Fifty fish specimens were collected with the help of hired fishermen, using gill net, fish traps, hooks and lines for fishing. The study was carried out from March to October 2008. Fish specimens were chilled with ice-blocks in a heat – insulated cooler and transported to the laboratory at the University of Benin for analysis. Fish identification was done using published works and identification keys by Boulenger (19:6); Holden and Reed (1972). Each fish specimen was weighed on a top-loading balance (Mettler E200) after mopping off excess water with a filter paper. Standard and total lengths of each fish were measured to an accuracy of 1.0mm (Lagler, 1964). The stomach, from the oesophagus to the pylorus of each fish was removed and preserved in 5% formalin. In order to establish the diet of the fish, each stomach was then slit open and its content emptied into a Petri-dish for analysis. The frequency of occurrence and volumetric methods were used.

## **Frequency of Occurrence Method**

The number of stomachs of each fish species, having different types of food items was recorded. They were expressed as the percentage of the total number of stomachs of the species examined and the proportion of the fish population of that species that fed on a particular food item (Hynes, 1950). The percentage frequency of occurrence was then tabulated against each type of food item. This method has also been used by Ugwumba and Mbu-Oben (1990) and Oboh *et al* (2003).

## **Volumetric Method**

The volume of the stomach and its food content for each fish species was determined by the application of Archimedes principle (displacement of water) using a measuring cylinder. The volume of the stomach contents of each fish was then expressed as percentage (%) of the volume of the stomach.

## **Experiments in Aquarium Tanks**

Experiments on its biological control potential was carried out using two aquarium tanks. Life fishes were fed mainly on mosquito larvae in one tank and on fish fry in another tank.

## **Results**

The result of the stomach content analysis using the frequency of occurrence method is given in table 1.

*Food, Feeding Habits, And Biological Control Potentials Of The Ornamental Fish In Ikpoba Dam, Benin - City*

**Table 1: Stomach Content of *Hemichromis Fasciatus* Using Frequency of Occurrence Method.**

Food Items	Percentage frequency of occurrence (%)
Insect part/Larvae	76
Plant Materials	32
Fish remains	53
Sand grains	22
Filamentous Algae	28
Detrital materials	10
Unidentified materials	12

The table gives a comprehensive picture of what this fish species feeds on (i.e. insects/larvae, fish and plankton).

**Table 2: Stomach Content Analysis of *Hemichromis Fasciatus* using Volumetric Method**

Number of stomach	Volume of stomach content (as % age)
06	15 – 19
08	20 – 24
13	25 – 29
11	30 – 34
12	35 – 40

### **Result of Experiment in Aquarium Tanks**

The fishes in the first aquarium tank fed voraciously on the mosquito larvae. Those in the second tank also ate up the fish fries. This shows that the fish can be stocked in the production pond of another cultured fish, such as *Heterobronchus* or *Tilapia* species where it can biologically control the population of mosquito larvae. This would be very useful to aquaculturists because of the recent practice of building fish ponds near residential areas. Since they ate up the fish fries, they should never be stocked in breeding/nursery ponds.

### **Discussion**

The result of the stomach content analysis has given a comprehensive picture of what *H. fasciatus* feeds on. Showing that it feeds on insects, fish, plankton and plant materials. This agrees with Holden and Reed (1972) who reported the fish to be a carnivore. The plant materials must have been taken in by the fish in the course of feeding on the aquatic insects which are attached to the plant materials, from the result of experiment in aquarium tanks, the fish can effectively be used as a biological control measure to reduce the population of mosquito larvae in production ponds of some other cultured fishes. *H. fasciatus* is widely distributed in both northern and southern freshwater rivers of Nigeria. Reed *et al* (1967) found it when they studied the fish and fisheries of Northern

Nigeria. Ita (1978) recorded its presence when he studied the distribution of fishes in Kanji dam, Odum (1995). Reported its occurrence in River Ethiope, Southern Nigeria. Thus, this fish can easily be collected alive for stocking using fish traps.

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***Food, Feeding Habits, And Biological Control Potentials Of The Ornamental Fish In Ikpoba Dam, Benin - City***

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**Fig 1 Map of the Study Area**

