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Analysis of dietary constitution in *Osteobrama vigorsii* (Sykes,1839) from Nira river, Bhor Maharashtra (India)

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Abstract

The sound physiological working of any organism bank on the type of nutrient found in the environment and their use in the growth and well-being of the organism. Observing and identifying food from the stomach allows us to understand about food intake, nutrition and measurement, food availability at a particular time of year. Local food availability determines the health of fish and their reproductive capacity in their natural aquatic system. Food found in the stomach of *Osteobrama vigorsii* (Sykes, 1839) composed mainly of algae, crustaceans, insect larvae, rotifers, organic matter (rotten Plants) and soil. The fish is omnivorous in diet as per the dietary content analyzed from the alimentary canal. The index of algae preponderance as a dietary component was highest at 3.89 in November and the lowest was 2.89 in April. In rotifers it was the highest at 2.29 in April and the lowest at 1.3 in May. Insects in *Osteobrama vigorsii* (Sykes, 1839) was very high at 0.34 in April and very low at 0.08 in February. The organic matter index was highest at 5.66 in April and at least 3 in December. Sand and mud particles were recorded at 0.49 in January and a minimum of 0.3 in March.

Key words : Index of preponderance, rotifers, insect larvae, algae, soil.

According to the species, unique differences within the structural and anatomical employer are ascertained inside the fish[47,48]. The sound knowledge of anatomy, of digestive machine of fish along with the gut content is of epitome importance in know-how the feeding behavior of fish and might benefit the fishery control programme[1,14,36,40].

It turns into crucial to understand the gut content material to bring about the statistical assumption. The feeding capacity is instantly

related to the physiological status of the fish, sex of individual, it age, and the environmental pressure the fish is been uncovered to in its natural habitat. Seasonal type also performs a significant role within the availability of food. The food availability inside the habitat determines the well being of fishes in addition to their reproductive possibilities of their natural aquatic system[7]. Numerous researchers studied the reproductive biology of fishes have commented upon the food and feeding addiction of fishes from fresh water, marine waters and well as estuaries[4,16,18,27,28]. Researchers who've labored at the food and feeding of fishes have special opinion concerning the converting feeding time and feeding behavior of fishes. The meals and feeding conduct of the fishes varies seasonally[6,18]. The variation in meals and feeding conduct of fish relies upon at the composition of meals organisms going on in special seasons of the year[25]. Food acquired from the habitat which can be take in, digested, absorb and subsequently utilized for energy production. Records on meals and feeding behavior of fishes and offers baseline facts beneficial in synthetic feed formula.

For the species all through artificial way of life units and for correct management practices[2]. Environmental factors which contribute in the direction of the nutrient degree of reservoirs, the abiotic condition, and the physio-chemical attribute of the water all have direct impression on the increase of fish[39]. without the expertise of the meals requirements, feeding behavior pattern, it's far unlikely to understand the trade that could upshot from natural or anthropogenic intervention inside the natural habitat. For the a success planning and implementation of programme in fishery management, a systematic information of the reproductive biology along side their meals and feeding habits plays a fundamental role[21]. meals and feeding behavior of fishes is sizable and important need for production of the fishes[15]. meals is the principle source of strength which is wanted for the general boom improvement and proliferation of the species. The power required in the course of migration and reproduction is derived from the meals resources acquired from the habitat[20].

Given the demand for fish food over the past decade, it is hoped that farmers will re-fish fish, in order to meet market demand[11,22]. Fish represent an essential point of protein as part of the diet for all people living near water sources. There are differences in the use of fish by region and region[8]. In developing countries like India and Bangladesh river fish are used as an important component of protein supplementation, as they are readily available, affordable and inexpensive that can be acquire even in small amount[37]. Comparable patterns observed around the world use significant energy in the farming process to produce a portion of protein-rich foods[43]. Fish are an important feature of many natural food websites and an important source of food and recreation[3]. In order to be aware of eating habits and diet of fish in their natural habitat, food choices can be important parameters needed to understand the aquatic diet and the health of the fish being studied.

Osteobrama vigorsii (Sykes, 1839) was collected from local fishermen from the Nira River located at Bhor (Maharashtra) at 18 ° 10 '0 "N Latitude / 73 ° 51' 0 " E Longitude has been disseminated to study intestinal

content analysis to determine the type / substance of fish-eaten foods. The stomach was separated from 70 fish specimen, the separations were made to study its contents and to be stored with 70% ethanol. Stored stomach components were then studied with a stereo microscope and food content was then calculated and identified. Individual or biological factors found in intestinal content were identified, measured and results presented as a percentage of probability. The method used to assess the quantity and quality of the stomach content of each fish under the study from the Nira River was validated using the weight percentage and the percentage of occurrence frequency[12]. The fish were washed and rinsed with a large amount of water that was poured on a sealing paper and then weighed (gm) using a digital balance.

The fish were operated under laboratory conditions to separate their intestines and intestines. The contents of the stomach were mixed with 10ml of distil water and filtered with a match size of 100, 500, 1000 µm to separate the food used. The digestive tract of each fish was analyzed. Part of the food in the stomach was detected with the help of a separating microscope. The method used was similar to Pennak[33]; Ward & Whipple[46]; Prescott[35]; Needham[29]. An analysis of the quality and quantity of fish intestinal content was performed by studying the percentage of weight and the percentage of frequency of occurrence[12]. The Hyslop method,[17] was used to study Gut content analysis using a numerical method, the frequency of which occurs. Natarajan & Jhingran[30] method for obtaining a preponderance index. The portion of food consumed was filtered and identified for each fish under study and the results were presented as a percentage of the total intestinal volume tested (Zacharia & Abdurahiman, 2004).

Gut content analysis :

The digestive tract that occurs in the abdomen of *Osteobrama vigorsii* (Sykes, 1839) was recorded, tabulated and expressed as a percentage of the total gastrointestinal tract tested according to the method used (Zacharia and Abdurahiman, 2004) (Table 1,2.). The preponderance index provides a related picture of the frequency of food intake and the amount of food part found in the gut throughout the year. It is an important factor in measuring the grading of a portion of the various foods eaten by fish. Percentage weight (W%) Hyslop[17], percentage (Fc%) of the Rosecchi & Nauaze[38]; Gray, *et.al.,* 1997). The Index of preponderance (p%) is an important mathematical tool to understand the combination of frequency (Fc%) and weight percentage (W%) and is used to assess the relative importance of each type of food used by fish to supplement the nutrient in the ecosystem.

Table-1. Food composition by *Osteobrama vigorsii* (Sykes,1839) Average percentage

Food	Average Percentage (%)
Algae	16.23
Crustaceans	28.44
Rotifers	14.55
Insect larvae	3.46
Decaying organic matter	3.15
Plant matter	29.57
Soil	2.71

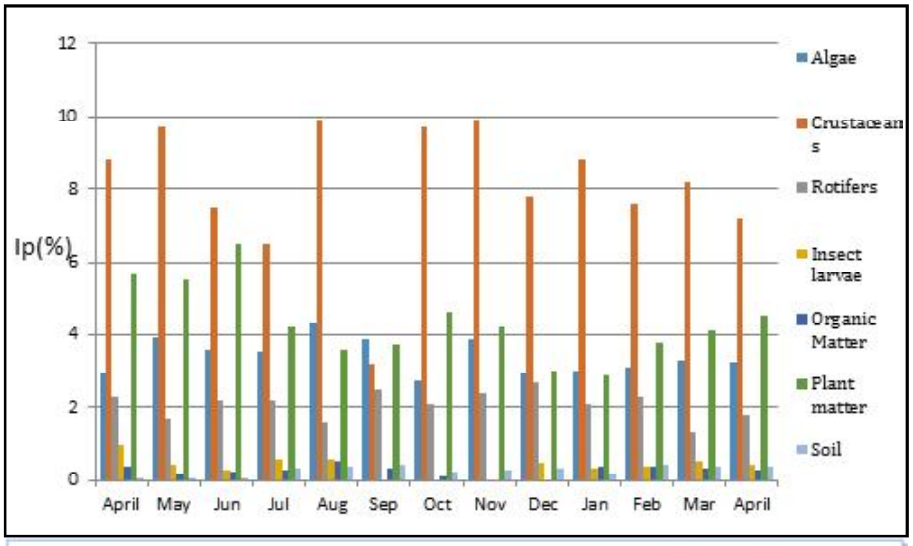

Figure 1. Index Preponderal (Ip %) in case of *Osteobrama vigorsii* (Sykes,1839)

In the case of *Osteobrama vigorsii* (Sykes, 1839) the contents of the stomach reveal a certain portion of food. Fish showed the way to nutrition. Eating and eating habits were assessed using weight percentage, frequency of occurrence and indicator of variance patterns. This test was drawn on a chart and used for statistical analysis and graphing. The portion of food found in the stomach of *Osteobrama vigorsii* (Sykes, 1839) was composed mainly of Algae, crustaceans, Insect larvae, Rotifers, Organic matter (rotten) Plants and soil (Figure 2). Research has revealed the following. The highest percentage of algae was 17.83 in September 2014 and the lowest was 13.76 in April 2015. Algae preponderance index as a dietary component was the highest at 3.89 in November and the lowest was 2.89 in April. *Osteobrama vigorsii* (Sykes, 1839) (Figure 1.).

Table-2. Season wise Food composition by *Osteobrama vigorsii* (Sykes,1839)
Average percentage

Food	Summer	Monsoon	Winter
Algae	14.9	16.68	16.04
Crustaceans	27.17	30.54	28.24
Rotifers	12.88	14.37	14.63
Insect larvae	5.6	2.36	4.98
Decaying organic matter	2.34	3.37	2.45
Plant matter	29.77	28.00	32.04
Soil	2.39	2.77	3.05

In *Osteobrama vigorsii* (Sykes, 1839) intestinal recognition as part of the diet it turned out that rotifers were the highest at 18 January and the lowest at 9.3 in March. The preponderance index for rotifers as part of the diet was the highest at 2.29 in April and the lowest at 1.3 in May. Percentage weight of insect larvae such as food in the intestines of *Osteobrama vigorsii* (Sykes, 1839) was the highest at 5.72 in February 2013 with the lowest being 0.00 at the months of September, October and November. The preponderance index for insect larvae as part of the diet was very high at 0.34 in April 2015 and the lowest was 0.00 in the months of September, October and November 2014 (Figure 1).

Figure 2. Food component in the gut of *Osteobrama vigorsii* (Sykes,1839) from Nira River, Bhor, Maharashtra India.

The rotten organic matter in *Osteobrama vigorsii* (Sykes, 1839) was the highest at 5.14 in April and the lowest at 1. 1 in the months of October. The preponderance index obtained for organic matter in *Osteobrama vigorsii* (Sykes, 1839) was highest at 0.34 in April and very low at 0.08 in February. The plant is a food in *Osteobrama vigorsii* (Sykes, 1839) accounting for a maximum of 30.24 percent in April 2014 and a low of 24.3 in July. Index of plant preponderance as part of the diet *Osteobrama vigorsii* (Sykes, 1839) was the highest at 5.66 in April and at least 3 in December. Sand and soil are not considered part of the diet but your presence has been recognized throughout the year which is why it is considered due to the presence of minerals that carry and play an crucial role in the fish formation process. The maximum weight percentage was recorded at

1.88 in January and a minimum of 2.14 in August 2015. The highest preponderance index for sand and mud particles in *Osteobrama vigorsii* (Sykes, 1839) was recorded at 0.49 in January 2014 and a minimum of 0.3 per month of March 2015. The maximum weight percentage recorded was 2.34 in February and a minimum of 1.7 in June 2014.

The analysis of intestinal content in *Osteobrama vigorsii* (Sykes, 1839) was analyzed by calculating the preponderance (Ip%) index of intestinal content that provided a relative indication of the frequency (Fc%) of fish-eating foods and the percentage of weight (W%) of various digestive foods per year in the intestine[17]. It therefore becomes an important factor in understanding the grading of a different food component eaten by fish in its natural state[17,38]. The diet of fish in developing stages is different from that of adults; depending on the sex of the animal[42]. Current research on *Osteobrama vigorsii* (Sykes, 1839) clearly shows foods that include zooplankton, insect larvae, organic matter, plant material. Therefore, it can be concluded that *Osteobrama vigorsii* (Sykes, 1839) on is a full omnivorous fish. Similar findings have been observed by Basudha & Vishwanath[9] in their studies on *Osteobrama belangeri* (Val.). During the growing season fish are very fond of foods that include zooplankton, insects, worms, (40-60%). It may be due to the need for protein by young fish to grow up to adulthood. *Puntius vittatus*[13].

In the study it was found that the adult food items in the *Osteobrama vigorsii* (Sykes, 1839) contained plant material and other components but the percentage of plant material in the form of leaves, the smoke was higher. It can therefore be said that in adult fish most of the food is vegetarian. A similar observation was made by Basudha & Vishwanath[9] in their studies on *Osteobrama belangeri* (Val.). Such a type of food represented by fish is called omnivorous fish[10]. It can therefore be said that adult fish eat macro-vegetation in the adult stage and zooplankton, worms, protein-rich larvae in the growth stage of their life cycle. The diet of fish in the former provinces differs from that of the adult categories and sometimes the diet of the opposite sex also differs[42]. A study of the eating and eating habits of the *Catla catla* (Hamilton) in Lake Udai Sagar, Udaipur; show a similar view[22].

It has been observed that seasonal changes are directly proportional to the occurrence of food and its effect is reflected in the diet of fish. Fish changed its diet with seasonal changes[19]. The diet of fish is extremely diverse and count on a assortment of factors, including the accessibility of varied types of food, the combination of species and their action[32]. food may also result in higher consumption of other food components from the ecosystem. A similar observation was recorded in the settlement[28,31]. Eating and nutrition habits have been studied in a few fish by a few workers[4,28]. Intestinal analysis clearly shows the seasonal intelligent variation in foods most of which depend on the age of all crustaceans, rotifers, insect larvae, chlorophyceae, bacilariophyceae, myophycea, plant, organic matter is a major part of the diet[9]. A similar fact was noted by Kumar, *et.al.,* (2015) who studied a group of crustaceans in gut content in *Catla catla* accounting to 26.32%. Kumar *et. al.,*[22] also reported that crustaceans form

a significant intestine content of 28.19%. Thus, *Osteobrama vigorsii* (Sykes, 1839) and (Sykes, 1839) are omnivorous fish.

Research on the diet and diet of *Cyprinus carpio* and the gastro-somatic index from Lake Govindgarh, Rewa (M.P), by Shukla & Patel[41] also revealed that common carps are omnivorous, they can eat vegetarian food but and prefer foods such as insects, crustaceans, zooplankton, benthic worms. The wise variations of the season have been observed in different parts of the diet and the results are consistent with studies conducted by Manon & Hossain[25] which noted that the dietary pattern of different fish varies from month to seasons.

Current research on the *Osteobrama vigorsii* (Sykes, 1839) of the Nira River, could assist the fishing industry, planning strategies for the conservation of endangered fish in their natural habitat. The availability of food resources can be organized thus providing a sustainable source of food for the fish in their natural habitat. As food availability is directly related to the reproductive capacity of fish.

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