Investigation into stomach contents of some fishes in Shar Khe Inn, Kyonpyaw Township

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Abstract

The present study was conducted to investigate into the stomach contents of some locally available fish in Shar Khe Inn, Kyonpyaw Township. The study period lasted from November 2016 to February 2017. A total of six species of six genera belonging to three families under three orders were examined. Length ratio and percent composition of food items were calculated and expressed as tables and graphs. Tissue fragment, pieces of fish, shrimp, fat, mollusks, insect, plant materials, mud and sand and detritus were recorded as food items. The food and feeding habit of each species was noted and the result show that three species were judged to be herbivores, two species carnivores and the remaining one as omnivores.

Keywords: Stomach contents,food item, herbivores, carnivores, omnivores

INTRODUCTION

Fishes require adequate nutrition in order to grow and survive. Most fishers are highly adaptable in their feeding habits and utilize the most readily available food. Fishes can be classified according to their feeding habits as predators, grazers, food strainers, food suckers, and parasites (Lagler *et al.*,1977). The morphological traits of the different fish alimentary canal is so related to the physical characteristics of food, feeding habits, taxonomy, as well as to body shape and size, that guts typical of carnivorous, herbivorous and omnivorous species are found in the same family. In addition, for a given species, the feeding habits differ according to locality, season, age or sex (Grosh and Das, 1987; Boglione *et al.*, 1992; Murray *et al*., 1996).

Fishes having a digestive tract shorter than 1.5 times of the standard length were judged to be the carnivores and those with a digestive tract longer than 3 times of the standard length were regarded as herbivores (Taki, 1978). Based on Suyehiro (1942), fishes having a digestive tract shorter than 1.5 times of the standard length were judged to be carnivorous, those with a digestive tract longer than 3 times of the standard length were regarded as herbivores. Digestive tract of *Osteobrama belangeri* was intermediate in the relative length of digestive tract and standard length (between length ratio of 1.5 and 3.0 times) of the standard length. Thus length ratio of those studied fish species may be omnivores (Taki, 1978).

MATERIAL AND METHODS

Study site and study period

The studied fish were collected from Shar Khe Inn. It is located between 17˚ 18′ N and 95˚ 12′ E which is situated in the east of Kyonpyaw Township (Fig.1). The area of the Shar Khe Inn is approximately 7. 24 km². Study period lasted from November 2016 to February 2017.

Collection of the data

The specimens were measured to get the standard length and the weight was also taken. The abdomen was cut open to expose the viscera and the alimentary canal. The nature

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of the stomach was examined and the weight of the stomach was taken. The stomach was cut open and its contents were taken out for further examination. The digestive tracts were also taken out and their lengths were measured accurately.

Then the stomachs were cut and fixed in 70% alcohol. In this study, the frequency of occurrence method was used to calculate the percentage food item of stomach contents of each species.

Figure (1). Location map of studied sites.

Identification of fish species

Collected fresh specimens were identified according to Talwar and Jhingran (1991).

Data analysis

The ratio between length of the digestive tract and standard length was calculated according to Taki (1978).

$$\text{Length ratio} = \frac{\text{Digestive tract length}}{\text{Standard length}}$$

RESULTS

A total of six fish species of six genera belonging to three families under three orders were chosen to record during the studied periods (Table.1). The morphology of the digestive tracts for different species was also shown in Figure (2). Mean standard length of *Notopterus notopterus* was 28.2 ± 3.16cm, *Catla catla* was 25.7 ± 2.31cm, *Cirrhinus mrigala* was 33.7 ± 8.46 cm, *Labeo rohita* was 34.4 ± 2.37cm, *Osteobrama belangeri* was 17.9 ± 1.97cm and *Channa striatus* was 28.2 ± 3.79 cm respectively. The largest mean standard length was recorded *L.rohita.* Mean body weight of *N.notopterus* was 201.76 ± 72.53g, *C. catla* was

540.54 ± 171.92g, *C.mrigala* was 800.12 ± 601.25g, *L. rohita* was 795.24 ± 109.42g, *O.belangeri* was 145.39 ± 36.23g and *C. striatus was* 241.43 ± 58.45g respectively.The highest mean body weight of *C.mrigala* and the lowest weight of *O.belangeri* were recorded.

Mean length of the digestive tract of *N. notopterus* was 18 ± 2.49cm, *C. catla* was 388 ± 22.93cm, *C.mrigala* was 699.2 ± 68.35cm, *L.rohita* was 739.4 ± 17.65cm, *O.belangeri* was 35.2 ± 1.32cm and *C. striatus* was 34.1 ± 2.02cm respectively. The longest mean length of the digestive tract was recorded in *L.rohita*. Mean length ratio of *N. notopterus* was 0.64 ± 0.02, *C. catla* was 15.13 ± 0.54, *C.mrigala* was 21.41 ± 3.01, *L. rohita* was 21.56 ± 1.02, *O.belangeri* was 1.98 ± 0.17 and *C. striatus* was 1.22 ± 0.08 respectively. The longest length ratio was found in *L. rohita* and the shortest was in *N. Notopterus* (Table. 2).

A major food items found in the stomach content analysis of six fishes from each species showed that the fish fed on a variety of food items. The food types, tissues fragment, pieces of fish, shrimp, fat, mollusks, insect, plant materials, mud and sand and detritus were recorded (Fig.3).

Table (1). Systematic position of the examined fish species.

No	Species	Common Name	Local Name	Family	Order
1	*Notopterus notopterus* (Pallas,1780)	Bronze featherback	Nga-phe	Notopteridae	Osteoglossiformes
2	*Cirrhinus mrigala* (Hamiltion-Buchanan, 1822)	mrigala carp	Nga-gyinn.	Cyprinidae	Cypriniformes
3	*Catla catla* (Hamiltion-Buchanan, 1822)	Catla carp	Nga-thaing gaung pwa		
4	*Labeo rohita* (Hamiltion-Buchanan, 1822)	Rohu, carp	Nga-myit-chinn		
5	*Osteobrama belangeri* (valenciennes,1844)	Carplet	Nga-phe-oung		
6	*Channa striatus*(Bloch , 1793)	Striped snakehead	Nga-yant	Channidae	Perciformes

The analysis of stomach contents of *N. notopterus* revealed that the highest percentage was pieces of fish and fat (28%) followed by shrimp (19 %), plant materials (15%) and detritus(10%)(Table 3). Mud and sand was the most frequently ingested food item(91%) followed by fat(7%) and detritus(2%) in *C.catla* (Table 4). While also the mud and sand was the highest percent and the most frequently encountered food item (96%), followed by fat (3%) and detritus(1%) in *C.mrigala* (Table 5).The highest percent was mud of sand (96%) and the fat (3%) followed by detritus (1%) in *L.rohita* were recorded (Table 6) whereas the stomach content of *O.belangeri* were fat, insect, plant materials , mud, sand and detritus with the percent of 62%, 6%, 13%, 11% and 8% respectively. Fat was the highest and insect was the lowest percent in the stomach of that fish (Table 7). Nine items of food were noted in the stomach of *C.striatus* were tissue fragment (15%), pieces of fish (25%), shrimp (11%), fat (11%), mollusk (7%), insect (4%), plant materials (8%), mud and sand (8%) and detritus (11%) were recorded (Table 8).

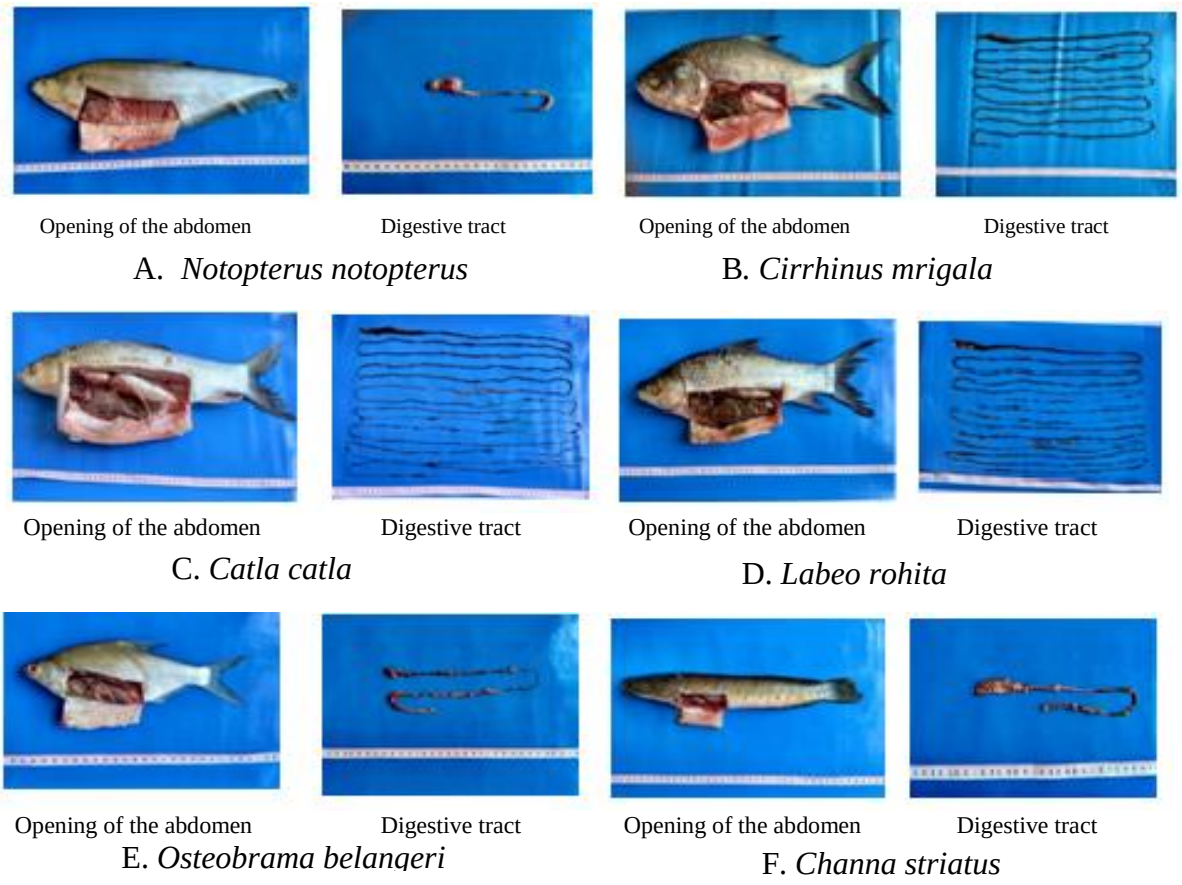

Figure (2). Opening of the abdomen and the morphology of digestive tract

Figure (3). Varieties of food items.

Table (2). Mean value of standard length, body weight, length of digestive length ratio of the studied fish species (n=10)

No	Species	Mean standard length (cm)	Mean body weight (g)	Mean digestive tract length (cm)	Mean length ratio (cm)
1	*N.notopterus*	28.2 ± 3.16	201.8 ± 72.53	18 ± 2.49	0.64 ± 0.02
2	*C. mrigala*	25.7 ± 2.31	540.5 ± 171.92	388 ± 22.93	15.13 ± 0.54
3	*C.catla*	33.7±8.46	800.1 ± 601.25	699 ± 68.35	21.41 ± 3.01
4	*L.rohita*	34.4 ± 2.37	795.2 ± 109.42	739 ± 17.65	21.56 ± 1.02
5	*O.belangeri*	17.9 ± 1.97	145.4 ± 36.23	35 ± 1.32	1.98 ± 0.17
6	*C.striatus*	28.2 ± 3.79	241.4 ± 58.45	34 ± 2.02	1.22 ± 0.08

Table (3). Percent composition of stomach contents in *N. notopterus* (n=10).

No	Food items	Total weight	Mean weight	Percent
1	Tissue fragment	–	–	–
2	Pieces of fish	1.7	0.17	28
3	Shrimp	1.2	0.12	19
4	Fat	1.7	0.18	28
5	Mollusk	–	–	–
6	Insect	–	–	–
7	Plant materials	0.9	0.09	15
8	Mud and sand	–	–	–
9	Detritus	0.6	0.06	10
	TOTAL	6.1		100

Table (4). Percent composition of stomach contents in *C. catla* (n=10).

No	Food item	Total weight	Mean weight	Percent
1	Tissue fragment	–	–	–
2	Pieces of fish	–	–	–
3	Shrimp	–	–	–
4	Fat	12.4	1.24	7
5	Mollusk	–	–	–
6	Insect	–	–	–
7	Plant materials	–	–	–
8	Mud and sand	164.1	16.4	91
9	Detritus	3.2	0.32	2
	TOTAL	179.7		100

Table (5). Percent composition of stomach contents in *C. mrigala* (n=10).

No	Food items	Total weight	Mean weight	Percent
1	Tissue fragment	–	–	–
2	Pieces of fish	–	–	–
3	Shrimp	–	–	–
4	Fat	4.4	0.4	3
5	Mollusk	–	–	–
6	Insect	–	–	–
7	Plant materials	–	–	–
8	Mud and sand	152.0	15.2	96
9	Detritus	2.4	0.2	1
	TOTAL	158.8		100

Table (6). Percent composition of stomach contents in *L. rohita* (n=10).

No	Food item	Total weight	Mean weight	Percent
1	Tissue fragment	–	–	–
2	Pieces of fish	–	–	–
3	Shrimp	–	–	–
4	Fat	7.3	0.73	3
5	Mollusk	–	–	–
6	Insect	–	–	–
7	Plant materials	–	–	–
8	Mud and sand	202.7	20.27	96
9	Detritus	1.4	0.14	1
	TOTAL	211.4		100

Table (7). Percent composition of stomach contents in *O. belangeri* (n=10).

No	Food item	Total weight	Mean weight	Percent
1	Tissue fragment	–	–	–
2	Pieces of fish	–	–	–
3	Shrimp	–	–	–
4	Fat	8.2	0.82	62
5	Mollusk	–	–	–
6	Insect	0.8	0.08	6
7	Plant materials	1.7	0.17	13
8	Mud and sand	1.4	0.14	11
9	Detritus	1	0.10	8
	TOTAL	13.1		100

Table (8). Percent composition of stomach contents in *C.striatus* (n=10).

No	Food item	Total	Mean weight	%
1	Tissue fragment	3.5	0.35	15
2	Pieces of fish	5.8	0.58	25
3	Shrimp	2.5	0.25	11
4	Fat	2.6	0.26	11
5	Mollusk	1.6	0.16	7
6	Insect	0.8	0.08	4
7	Plant materials	1.7	0.17	8
8	Mud and sand	1.9	0.19	8
9	Detritus	2.4	0.24	11
	TOTAL	22.8		100

DISCUSSION AND CONCLUSION

In the present study, feeding habits of six fish species, six genera, three families belonging to Order Osteoglossiformes, Cypriniformes and Perciformes were examined. Length ratio longer than 3 times was regarded as herbivores (Taki,1978). In this study, mean length ratio of *C. catla* (15.13 ± 0.54), *C.mrigala* was (21.41 ± 3.01), *L. rohita* was (21.56 ± 1.02) were longer than three times of standard length and fat, mud and sand and detritus were observed in the stomach. According to Taki (1978), these fishes having the length of digestive tract three times or more than of standard length are herbivores. Length ratio of omnivorous fish was intermediate in the relative length of digestive tract and standard length (between 1.5 and 3.0 times) (Taki,1978). The length ratio of *Osteobrama belangeri* was (1.98 ± 0.17) and fat, insect, plant materials, mud and sand and detritus were found in the stomach. The present study agreed with his findings.

Fishes having a digestive tract shorter than 1.5 times of the standard length were judged to be the carnivores Taki (1978). In the present study the length ratio of *Notopterus notopterus* (0.64 ± 0.02) and *Channa striatus* (1.22 ± 0.08) were shorter than 1.5 times of standard length. Tissue fragment, pieces of fish, shrimp, fat, mollusk, insect, plant materials, mud and sand and detritus were found in the stomach of *Channa striatus* and *Notoptertus notopterus* Taki (1978) and Suyehiro (1942) also stated that large amount of fish in the stomach indicated the fishes to be carnivores. According to Jayaram (1981), the carnivores consumed non-living materials when the natural foods were not available. In the study period, *Channa striatus* consumed the major component of food items as fish and miscellaneous food of plant materials. These findings also coincide with the statement that carnivores consumed non-living materials when the preferred food was scarce.

Based on the present findings, the highest amount of pieces of fish was found in *Channa striatus.* Thus these *Channa striatus* species may be carnivores. This result was coincided with Aye Aye Khaing (1996). Moe Moe Khaing (2014) state that *Cirrhinus mrigala*, *Catla catla* and *Labeo rohita* were herbivores. *Clarias batrachus*, *Notopterus notopterus* and *Puntius chola* were confirmed as omnivorous fish. The present result noted the stomach contents of *C.mrigala*, *C.catla* and *L. rohita*, the fat, mud , sand and detritus. So the feeding habit of these fish species may be herbivores. And also in the stomach contents of *N.notopterus*, the pieces of fish, shrimp, fat, plant materials and detritus were recorded. Therefore these fish species may be omnivores. The present study will give the knowledge as a deeper insight into the morphological and functional aspects of digestive tract of economically important freshwater fish for the production in aquaculture.

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