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# Food and feeding habits of two species ornamental fishes from Bira Cot, Aceh Besar, Indonesia

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**Abstract.** Food and feeding habits of the two ornamental fish species confined to 2 genera and 1 family from Bira Cot River. The study has been conducted between February, 2020 and July, 2020. A total of 20 fishes were randomly collected from Bira Cot River during the study period. Observation was made for the total length, standard length, body weight, relative length of alimentary canal and qualitative and quantitative analysis of stomach contents. The relative length of alimentary canal was described in relation to feeding habit. The stomach content analysis indicated that *Danio albolineatus* omnivores while *Puntius oligolepis* herbivores. In the present study, the determination of food composition and feeding habits of studied fish species may give some important information for culture of these ornamental freshwater fish species.

## 1. Introduction

Food and feeding habits are one of the main aspects of the study of fish biology. Food and feeding habit of fish are important for culture [1]. It is difficult to get information of food and feeding habit of fish without analysed gut contents [2]. Information food and feeding habit of fish its importance for fish culture [3]. Food is one of many factor for the determinants growth and condition of fish [4]. An analysis of the gut contents of fish has become the standard [5-8]. However, there are a lot of methodologies being used in food and feeding habits being used, such as non-lethal methods of extracting the gut contents on Longsnout seahorse, *Hippocampus reidi* [9], stable isotope analysis on Yellowfin tuna, *Thunnus albacares* [10] and Scaldfish, *Arnoglossus laterna* [11], fatty acid analysis on Creole perch, *Percichthys trucha* [12] and swordfish, *Xiphias gladius* [13] and direct observations on Wrasse, *Labrichthys unilineatus*, *Labropsis alleni* and *Diproctacanthus xanthurus* [14]. These methodologies have both positives and negatives, the good effect this method is more accurate and can reveal even the items which cannot be identified by the microscopic study, and the negative effect of this method is complicated procedures and also expensive. On another hand, the direct gut content analysis is still the most favorite method for the researcher because the easiest method with great potential for ecological studies [15].

Understanding fish guts is useful in artificial feed formulations in fish farming in the future [16]. Fish look for food in aquatic ecosystems according to their adaptations including the type of mouth,



gills, teeth and intestinal system. The length of the intestine of a fish reflects its diet and the percentage of food composition in the stomach reflects the eating habits of fish [17]. To get information about food, eating habits and selective feeding of fish analysis of the contents in the stomach and features of the digestive system must be done [18]. Zebrafish and Checker barb are species are found in streams and rivers with shallow, clear water, and a variety of substrates [19]. So, food and fish-eating habits are determined based on the contents of the stomach and the length of the digestive tract. There is no information about the food and feeding habits of Zebrafish and Checker barb from Aceh waters. The purpose of this study was to determine variations in food composition and eating habits of two species of ornamental freshwater fish.

## 2. Material and Methods

### 2.1. Location and Measurement of Specimens

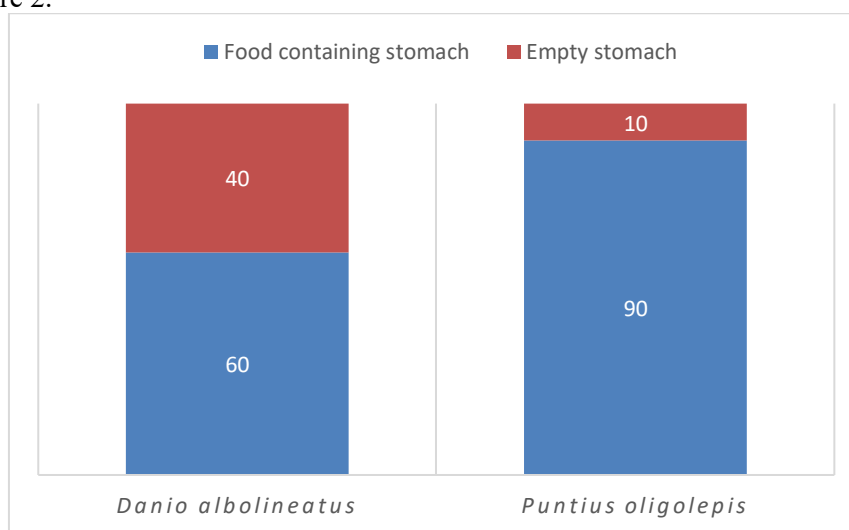
The study was conducted on July, 2020. Sampel fish were collected from Bira Cot River at Aceh Besar district (05° 29.895' N and 095° 27.939' E). A total of twenty fish samples were monthly collected from Bira Cot River. The collected specimens were preserved in formalin (10%). Standard length and total length (mm) and body weight (g) was measured.

### 2.2. Analysis Data

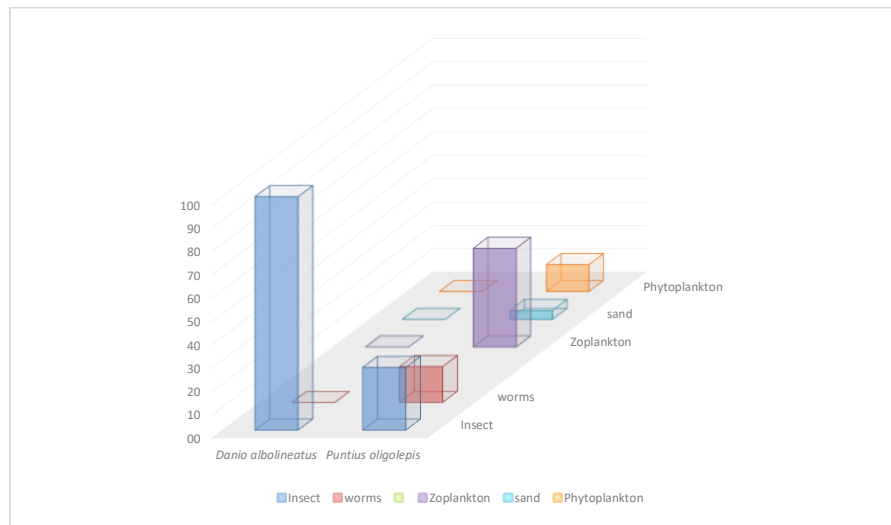
Each fish was dissected ventrolateral, the length alimentary canal was measured. Calculation of relative length of alimentary canal based on Taki [20]. If the stomach was found with food item, then all contents were transferred into object glass for identified used microscope zeiss primo star. Food items were identified base on Imms [21]. The stomach contents were analyzed using frequency according to Hyslop [5].

## 3. Results and Discussion

*Danio albolineatus* have total length and body weight 30.96-42.46 mm and 0.23-0.81, while *Puntius oligolepis* (21.89-31.45 and 0.11-0.40) Table 1). The lengths of alimentary canals and the ratio of lengths of alimentary canals to the standard lengths are given in Table 2. *Puntius oligolepis* have Alimentary Canal Length 0.46-0.90 while *Danio albolineatus* (0.34-0.46). The categorization of stomach fullness is presented in Figure 1 and the categorization of the composition of the percentage composition of food shown in Figure 2.



**Figure 1.** Categorization of stomach fullness of *Danio albolineatus* and *Puntius oligolepis*



**Figure 2.** Percent composition of food two species ornamental fish species.

**Table 1.** Measurement of length and weight of *Danio albolineatus* and *Puntius oligolepis*

Species	Standard Length (mm)		Total Length (mm)		Body Weight(g)	
	Range	Mean	Range	Mean	Range	Mean
<i>Danio albolineatus</i>	24.03-33.15	27.73	30.96-42.46	35.39	0.23-0.81	0.41
<i>Puntius oligolepis</i>	15.51-24.10	20.17	21.89-31.45	26.27	0.11-0.40	0.24

**Table 2.** Measurement of length alimentary, relative alimentary canal and relative stomach weight of two species ornamental fish species (n=10)

Species	Alimentary Canal Length (cm)		Relative Length of Alimentary Canal		Relative stomach weight		Feeding habit
	Range	Mean	Range	Mean	Range	Mean	
<i>Danio albolineatus</i>	0.34-0.46	0.4	33.68-46.49	41.65	0.02-0.04	0.07	carnivora
<i>Puntius oligolepis</i>	0.46-0.90	0.8	51.80-90.39	77.31	0.03-0.05	0.03	omnivore

Based on the results of the analysis of the stomach of *Danio albolineatus* eating insects (100%). The length of the alimentary canal ranges from 0.34 mm to 0.40 mm. The relative length of the alimentary canal ranges from 33.68 to 46.49, with an average value of 41.65 (Table 2). The results showed that the average length of the digestive tract of *Danio albolineatus* fish was 0.4 (40%) of its body length so that it was classified as carnivorous fish. *Puntius oligolepis* ate insects, worms, zooplankton and phytoplankton, with the highest percentage of zooplankton, 42.3% and the lowest 3.8% (sand). The length of the alimentary canal ranges from 0.46 to 0.90 mm, while the relative length of the alimentary canal ranges from 51.80 to 90.39, with an average value of 77.31 (Table 2). The results showed that the average length of the digestive tract of *Puntius oligolepis* fish was 0.8 (90%) of its body length so that it was classified as an omnivorous fish in nature.

Three types of fish according to their food such as omnivores, herbivores and carnivores. According to Taki [20] carnivores, 1.5 times have a relative length of the digestive tract shorter from SL, if than three times standard length is considered a herbivore, while fish with intermediate the digestive tract considered omnivores. In this study, *Danio albolineatus* stomachs were observed as an empty stomach higher than *Puntius oligolepis*. An empty stomach may be due to food has been digested when the fish tries to escape [18], a lower percentage of empty stomachs were found in this study, indicating the food they consume is abundant in their habitat. From this research, the determination of food composition

and eating habits of the studied fish species can give some important information for the culture of these ornamental freshwater fish species.

#### 4. Conclusion

Analysis of stomach content and relative length of the digestive tract showed that *Danio albolineatus* was carnivorous while *Puntius oligolepis* was omnivore. The variation in several foods and the composition of the percentage of different food items in the stomach were studied related to fish eating habits. The Bira Cot tributary provides abundant food needed by fish and is an important area for aquatic fish.

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