The study of natural food composition for tempuring fish (\textit{puntius gemellus}) in Bangka Island

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Abstract. Tempuring fish (\textit{Puntius gemellus}) is a freshwater local fish in Bangka Island. Based on morphology and dimorphism, tempuring fish have a decoratively potential, because it’s have a small body size and distinctive color patterns. Potential of tempuring fish as ornamental fish can increase the economic value of local fish resources at the national or international level if its development on a great scale can be done well with due regard to the biological and ecological nature. The purpose of this study is to identify the composition and types of food found in the stomach of tempuring fish and to know the type of eating Tempuring Fish (\textit{Puntius gemellus}) through food types. Sampling location had done in river at Tua Tunu, Pangkalpinang City and identification of samples had done in Laboratory of Aquatic Resources Management, Universitas Bangka Belitung. The result showed tempuring fish (\textit{Puntius gemellus}) consist of phytoplankton feeding (Herbivore) with the highest preponderancy index is \textit{Treubaria} sp: 73.22%. The results of the study are expected to be a reference in the efforts of domestication of Tempuring fish in fish cultivation activities, by providing feed derived from vegetable protein. It aims to follow the habit of eating fish in nature so that in the process of fish cultivation in a controlled tub the fish can still eat and grow well.

1. Introduction

Tempuring fish (\textit{Puntius gemellus}) is a freshwater local fish at Bangka Island. Tempuring fish consists of puntius genus, Cyprinidae family. Tempuring fish are generally used by the people of Bangka Island in the form of fresh processed in a limited circle, because some people believe Tempuring fish have a less tasty meat taste, compared to other river fish. Based on morphology and dimorphism, Tempuring fish has a decoratively potential, because it has a small body size and distinctive color patterns [1]. Potential of tempuring fish as ornamental fish can increase the economic value of local fish resources at the national or international level if its development on a great scale can be done well with due regard to the biological and ecological nature. One of the efforts to preserve organisms from wildlife into more controlled cultivation activities is called domestication [2]. Domestication efforts can be running well if we understand the important factors in the growth process, one of which is food. Food in fish is one of the factors that influence the growth, reproduction, and survival of the fish in their habitat [3].
The research of food aspect for Tempuring fish (*Puntius gemellus*) has a minimum data, therefore it’s becomes difficult for fisheries managers to simulate suitable feed content for the growth of Tempuring fish in cultivation media at activity aquaculture fishes. The study of the ecology of *Puntius gemellus* has only been carried out on the aspects of growth [4] and [5] in the Musi River Basin in Palembang. Therefore, the authors feel interested and need to carry out food-related research activities on *Puntius gemellus* in order to find information on food habits that can be utilized in the context of the domestication of local Bangka Island fish. The purpose of this study is to identify the composition and types of food found in the stomach of tempuring fish through kinds of food.

2. Methodology

This research uses purposive sampling method. Step by step methodology divide from place and time, tools and materials, method and Data Analysis

2.1 Place and Time

This research was implemented starting from March of 2018 to December of 2019. Data sampling was done at Tua Tunu River as a fishes habitat. Sample identification conducted in the Laboratory of Faculty of Agriculture, Fishery and Biology, University of Bangka Belitung.

2.2 Tools and Materials

The tools and materials used in this study consists of gill net, roll meter, sample plastic, bucket, paper labels, global positioning system, cameras, thermometer, scale poles, current balls, caliper, 4% formalin, and the identification book.

2.3 Sampling Methods

This research was conducted by purposive sampling, a method of data retrieval is done by recording some data from the population and the results are expected to describe the nature of the population of the object under study [6]. Sampling of fish is done by gill net with a size of ½, ¾ in, 1 in, 1 ¼ in, 1 ½ in. The gill net is operated by stretching the net blocking the direction of the current. The installation of the gill net is carried out in the afternoon and removed in the morning. The number of fish caught is recorded, photographed, weighed, measured in total length and then put into 5-10% formalin solution and labeled in each sample. At the laboratorium, sample of fishes was cleaned from formalin, and saved into alcohol solution 70%. The sample of fishes from the field was brought to Laboratory of Faculty of Agriculture, Fishery and Biology, University of Bangka Belitung.

![Figure 1. Location of Study](image.png)
Determination of sampling stations is done by purposive sampling method, which is a method of determining the location of sampling conducted based on individual considerations or researchers at the research location [7]. Sampling stations are located in 3 places, namely upstream (adjacent to cow pens and plantations), mid-river (swamp), and downstream (adjacent to fishponds and plantations).

2.4 Data Analysis
The analysis of food composition conducted with using IP (preponderance index) [7].

\[ IP = \frac{V_i \times O_i}{\sum (V_i \times O_i)} \times 100 \]

where: \( V_i \) : Percentage of volume of one type of food (%), \( O_i \) : Percentage of frequency of one type of food (%), IP : Preponderance Index

3. Result and Discussion
Based on analysis result of gastric organ for 12 tempuring fish (Puntius gemellus) which taken at Tua Tunu River is obtained tabulation of food composition with the preponderance index (IP) value as follows: (look at Table 1). Analysis of food habits is carried out to determine the composition and types of food eaten by fish. Based on the analysis of Tempuring fish food (Puntius gemellus) found 17 types of food consisting of 16 genera of 14 families and 1 type of food that was not identified. These types include Ankistrodesmus sp, Spyogyra sp, Geminella sp, Ulothrix sp, Lingbya sp, Anabaena sp, Cyttaroclis sp, Hildenbrandi sp, Pleurococcus sp, Oedogonium sp, Stichococcus sp, Cornutella sp, Desmidium sp, Spondylosium sp, Cosmarium sp, and 0.7% unidentified.

Table 1. The value of Puntius Gemellus Prepoderance Index in Sungai Lubuk Bakong Tua Tunu, Pangkalpinang City

| No | Organism               | Group          | IP Value (%) |
|----|------------------------|----------------|--------------|
| 1  | Ankistrodesmus sp      | Phytoplankton  | 2.51         |
| 2  | Treubaria sp           | Phytoplankton  | 73.22        |
| 3  | Spyogyra sp            | Phytoplankton  | 1.46         |
| 4  | Geminella sp           | Phytoplankton  | 6.92         |
| 5  | Ulothrix               | Phyoplankton   | 4.65         |
| 6  | Desmidium sp           | Phytoplankton  | 3.78         |
| 7  | Lingbya sp             | Phytoplankton  | 3.85         |
| 8  | Anabaena sp            | Phytoplankton  | 0.18         |
| 9  | Cyttaroclis sp         | Phytoplankton  | 0.10         |
| 10 | Hildenbrandia sp       | Phytoplankton  | 0.56         |
| 11 | Pleurococcus sp        | Phytoplankton  | 0.18         |
| 12 | Oedogonium sp          | Phytoplankton  | 0.64         |
| 13 | Stichococcus sp        | Phytoplankton  | 0.18         |
| 14 | Cornutella sp          | Phytoplankton  | 0.18         |
| 15 | Spondylosium sp        | Phytoplankton  | 0.84         |
| 16 | Cosmarium sp           | Phytoplankton  | 0.10         |
| 17 | Unidentified           | Unidentified   | 0.67         |

Based on the food type group, 16 types of Tempuring fish food analyzed in this study belong to the phytoplankton group. This indicates that Tempuring fish (Puntius gemellus) are a group of herbivorous fish based on the types of organisms eaten. According to Ariyanto (2002) in Zuliani (2016) the type of food eaten by one species of fish usually depends on the preference of the fish for certain types of food, the size and age of the fish, its season and habitat [8].
The Index value of Preponderance (IP) or the largest part of Tempuring fish food is *Treubaria sp* (73.22%), this indicates that *Treubaria sp* is the main food organism in Tempuring fish (73.22%), while *Geminella sp* is a complementary food (6.92%), and the remainder as supplementary food (<5%), this criterion refers to the category of food habits according to Nikolsky (1963) [9], the percentage of food ranking, i.e. if the IP value > 25 is categorized as a main food; b. If the value of 5-25 is categorized as complementary food; c. If the IP value < 5 as additional food. In contrast to the results of research on relatives, *Puntius johorensis* in the research of Sharif (2008) in the Musi River Basin shows an omnivorous type that tends to herbivores and is eurytopic with the main food of the Diatom or Bacillariophyceae group [5].

Based on the results of research that has been done, a recommendation can be given follow-up research results as follows: 1) In the context of efforts to domesticate fisheries resources, especially the food of Tempuring fish (*Puntius gemellus*). 2) In accordance with the analysis of food in Tempuring fish, the selection of foods from vegetable elements is more recommended to adjust to eating habits in their natural habitat.

4. Conclusion

Based on the results of research that has been done eating can be concluded include: 1) Based on the analysis of Tempuring fish food (*Puntius gemellus*) found 17 types of food consisting of 16 genera and 1 type of food that was not identified. These types include *Ankistrodesmus* sp, *Spyogyra* sp, *Geminella* sp, *Ulothrix*, *Lingbya* sp, *Anabaena* sp, *Cyttarocliss* sp, *Hildenbrandia* sp, *Pleurococcus* sp, *Oedogonium* sp, *Stichococcus* sp, *Cornutella* sp, *Desmidium* sp, *Spytolyssia* sp, *Geminella* sp, *Hildenbrandia* sp, *Pleurococcus* sp, *Oedogonium* sp, *Stichococcus* sp, *Cornuttella* sp, *Desmidium* sp, *Spytolyssia* sp, *Hildenbrandia* sp, *Pleurococcus* sp, *Oedogonium* sp, *Stichococcus* sp, *Cornuttella* sp, *Desmidium* sp, *Spytolyssia* sp, 0.7% not identified, 2) Based on the type of food found, Tempuring fish belong to the herbivorous fish group. Therefore, it could be recommended that to support and undergo the effort of domestication of local Bangka Belitung fish, especially Tempuring (*Puntius gemellus*) fish into ornamental fish, the process of testing tempuring fish feed in a controlled container by feeding on plant elements or predominantly vegetable compositions can be carried out.

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