Food habits of belida fish (*Notopterus notopterus*, Pallas 1769) in Sei Gesek Reservoir, Bintan Regency, Riau Island, Indonesia

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Abstract. Sei Gesek Reservoir is located in Bintan Regency, Riau Island Province. The reservoir is one source of water for the community in Tanjungpinang City. One of the freshwater fish that inhabit the Sei Gesek Reservoir is the belida fish (*Notopterus notopterus*). The objective of this study was to determine the Relative Length of the Gut (RLG), type and food composition of belida fish (*N. notopterus*), and food comparative in the digestive tract of the belida fish (*N. notopterus*) with food resources in the substrate Sei Gesek reservoir, Bintan Regency, Riau Island. The method used in this research was the survey method. A sampling of belida fish (*N. notopterus*) was carried out in three months according to the fishing grounds. The data analysis used is Relative Length of the Gut (RLG), Index of Preponderance (IP), and Index of Electivity (E). The result showed that the total fish caught was 30, there were 16 males and 14 females. The relative length of the gut female and male belida fish (*N. notopterus*) were 0.21 and 0.25 respectively. Based on the relative length of the gut value, belida fish (*N. notopterus*) was classified as a carnivore. The food types of belida fish (*N. notopterus*) were fish, crustaceans, microalgae, macrophytes, annelids, nematodes, and detritus. Index of preponderance showed that the main food of belida fish (*N. notopterus*) in Sei Gesek Reservoir was small fish based on sex, the month of capture, and body length measurement. Index of electivity showed that the food type from the microalgae is *Asterionella* sp. and *Closterium* sp. not selected by belida fish (*N. notopterus*) as food.

1. Introduction

The waters of the Sei Gesek Reservoir located in Bintan Regency, Riau Islands are waters that are used to meet the clean water needs of the Tanjungpinang community. This potential availability of water is inseparable from the rainfall that falls throughout the year. Previously, Sei Gesek Reservoir was a small river that became the habitat of various freshwater fish biota, but now it is dammed and used as a reservoir as a source of raw water to be distributed to the community [12]. One of the freshwater fish that inhabits the Sei Gesek Reservoir is the belida fish (*Notopterus notopterus*). These fish are not native to the waters of the Sei Gesek Reservoir, but fish from other aquatic habitats that migrate to the waters of the Sei Gesek Reservoir and live according to the conditions in these waters. Apart from belida fish, the catches of fishermen in Sei Gesek Reservoir are Tawes, Catfish, Gourami, Patin and Tilapia.

Belida fish is a member of the family Notopteridae of inland fishery commodities that have high economic value and are starting to experience a decline in catches in Indonesia [20]. This freshwater fish is very economical at a fairly expensive price of IDR 15,000 – IDR 30,000 per living fish. The price
of this fish is according to the size of the fish's body the bigger it is, the more expensive it is. Fish appearance and body shape are different from other fish and have a unique pattern of scales so that they are used for ornamental fish [24], this is also a factor that belida fish are expensive. Based on the results of interviews with local fishermen who catch belida fish information was obtained that the catch was not too much and sometimes did not get fish.

The population of belida fish currently tends to decline sharply due to high selling prices, causing intensive fishing in Indonesia [19]. The Ministry of Marine Affairs and Fisheries [8] states that several types of belida fish species that have been protected are *Chitala borneensis*, Bleeker 1851; *Chitala hyleslonotus* Bleeker, 1851; *Chitala lopis*, Bleeker 1851, and including the species *Notopterus notopterus*, Pallas 1769. Belida fish are endemic fish (indigenous species) in Indonesia and broadly the distribution of belida fish is in Java, Sumatera and Kalimantan [9]. Another factor that affects the decline in the catch of belida fish is the influence of environmental changes in the Sei Gesek Reservoir. Changes can be seen from the condition of the waters that become the habitat of belida fish experiencing turbidity during rain and heavy water flow as well as activities that are not environmentally friendly and changes in aquatic environmental conditions cause the sustainability of the belida fish to be threatened.

The distribution and availability of fish food are important factors that can affect the survival of fish to grow and develop [2]. Research on the dietary habits of belida fish has been carried out in the Kampar River Basin, Riau Province with the result that the main food of belida fish is fish, complementary foods are eaten by belida fish are shrimp, plants, and pieces of meat. The rest of the additional food is in the form of insects, worms, gravel, and other foods that are not identified [22].

However, information about the food and eating habits of belida fish (*N. notopterus*) in the Riau Islands Province, especially in the Sei Gesek Reservoir, is not yet available. This information about fish food habits can be a support in efforts to manage fisheries resources such as aquaculture. So that the preservation of the population of belida fish which began to decline can be maintained. Therefore, research is needed on the food and eating habits of belida fish in Sei Gesek Reservoir, Bintan Regency, Riau Islands Province. The purpose of this study was to determine the relative intestinal length, type of food and food composition of belida fish and the comparison of food in the stomach of belida fish with food resources on the substrate in Sei Gesek Reservoir, Bintan Regency, Riau Islands Province.

2. Material and Methods

2.1. Research Location

This research was conducted from April to June 2021 in the Sei Gesek Reservoir, Bintan Regency, Riau Islands Province. Fish samples were obtained from local fishermen who caught fish in the Sei Gesek Reservoir. Observations on identification, measurement, and analysis of the types of food eaten by belida fish (*N. notopterus*) were carried out at the Laboratory of the Faculty of Marine and Fisheries Sciences, Raja Ali Haji Maritime University. The research location is presented in Figure 1.
2.2. Tools and Materials

The tools and materials used in the study of the food habits of belida fish (*N. notopterus*) in the Sei Gesek Reservoir, Bintan Regency, Riau Islands are presented in Table 1.

Table 1. Research tools and materials used.

| Tools and materials                       | Utility                                           |
|-------------------------------------------|--------------------------------------------------|
| Digital scales                            | Weigh the fish                                   |
| Calipers                                  | Measuring the length of the body and intestines of fish |
| Tray                                      | Placing fish samples during measurement and surgery |
| Sample bottle                             | Saving samples                                   |
| Cool box                                  | Place to store sample bottles                    |
| Surgical tools                            | Dissecting the fish body                         |
| Drain                                     | Taking the base substrate                        |
| Petri dish                                | Putting the sample                               |
| Microscope                                | Observing the type of fish food                  |
| 10 ml measuring cup                       | Measuring the volume of dilution                 |
| Drop pipette                              | To take a sample                                 |
| SRC (Sedgewick Rafter Counting Cell)      | Gastrointestinal and intestinal contents monitoring apparatus |
| Stationary                                | Record data                                      |
| Camera                                    | For documentation                                |
| GPS (Global Positioning System)           | Determine the coordinates                        |
| Samples of belida fish (*N. notopterus*)  | Materials for observation and analysis            |
| Formalin 10%                              | Preserving samples                               |
| Aquades                                   | Dilute the sample                                |
| Tissue                                    | To clean                                         |
| Identification book [15]                  | To identify the type of food                     |
2.3. Method
The method used in this study is a survey method, namely direct observation of the variables to be studied regarding the food habits of belida fish (*N. notopterus*) in Sei Gesek Reservoir, Bintan Regency, Riau Islands Province. Determination of the sampling point using purposive sampling based on the catchment area of fishermen who catch belida fish (*N. notopterus*). The research flow chart is presented in Figure 2.

![Research flow chart](image)

Figure 2. Research flow chart

2.4. Research Procedure

2.4.1. Data Source and Collection
This study was obtained from primary data sources and secondary data. Primary data is data obtained by researchers in the form of data directly from the field and data analysed in the laboratory. The data obtained by the researchers while in the field were in the form of the state of the research area, observations, and measurements of belida fish (*N. notopterus*). Secondary data is data obtained from the results of pre-existing research, sourced from previous research and journals related to the food habits of belida fish (*N. notopterus*).

2.4.2. Fish Sampling Method
A sampling of belida fish (*N. notopterus*) was carried out for 3 months, at night. The sample used will be adjusted to the number of catches of fishermen who catch belida fish (*N. notopterus*) in Sei Gesek Reservoir, Bintan Regency, Riau Islands Province. The minimum number of samples taken is 30 fish.
samples. Fishermen are fishing based on the places of fishing activity and obtained using a fishing rod with a fishing rod size of number 6 with cricket bait.

2.4.3. Sample Handling Method
Fish samples that have been obtained from fishermen, then measure the total length using a caliper with an accuracy of 0.1 mm, then the bodyweight of the fish is weighed using a digital scale with an accuracy of 0.01 g and perform surgery on the body of the belida fish (*N. notopterus*) starting from the top of the abdomen below the lateral line to the back of the tail rod and the back of the operculum, then ventral to the bottom of the stomach, then horizontally to the anus [26]. Body dissection of belida fish (*N. notopterus*) was carried out to determine gender, and then take parts of the intestines and stomach which are the digestive tract of belida fish (*N. notopterus*). The intestines were measured for the length and weight of the fish's intestines. The intestines and stomach of belida fish (*N. notopterus*) were put into a sample bottle that had been labeled containing 10% formalin and put into a cool box.

The samples that have been obtained are then taken to the laboratory to observe the intestinal and gastric contents of the fish. Before making observations with a microscope, the sample was cleaned first of formalin with running water then dissected and scraped, the contents of the stomach and intestines were put into a petri dish for dilution of the sample using 10 ml of distilled water [26]. The diluted sample was taken using a dropper and inserted into the SRC (Sedgewick rafter counting cell) to be observed using a microscope. Observations were documented and recorded for identification of the type of food by using the book Fresh-Water Invertebrates of the United States [15]. Processing the data that had been obtained using Microsoft Excel.

2.4.4. Basic Substrate Handling Method
Substrate handling is carried out by taking a sample of the base substrate using a scraper according to the fishing area. This tool is lowered to the bottom of the water until it touches the substrate and is scooped, then the substrate sample enters the gutter and is lifted to the surface. Substrate samples were taken with 3 repetitions. The sample taken is put into a sample bag to be taken to the laboratory. Substrate samples brought to the laboratory will be observed to see the organisms present on the substrate. Substrate samples taken for observation were 10 grams with a dilution using 40 ml of distilled water. Then, the diluted sample was taken and inserted into the SRC (Sedgewick Rafter Counting Cell) to be observed using a microscope. Observations are documented and recorded to identify the types of organisms present in the substrate.

2.5. Data Analysis

2.5.1. Relative Length of The Gut (RLG)
The results of measuring the length of the intestine and the total length of the fish's body, can determine the value of the Relative Length of the Gut (RLG) can be calculated using the following formula

\[
RLG = \frac{GL (mm)}{TL (mm)}
\]

Where:
- \(RLG\) : Relative length of the intestine (mm)
- \(GL\) : Fish intestine length (mm)
- \(TL\) : Total length of the fish body (mm)

The value of the calculation can determine the group of belida fish. If the relative gut length is <1 (less than one) then the fish is classified as a carnivore, if the relative gut length is between 1-3 then the fish is classified as an omnivore, while the relative gut length value is >3 (large out of three) then the fish is classified as a herbivore [14].
2.5.2. Index of Preponderance (IP)

Analyzing the food habits of fish can be determined from the calculation of the Index of Preponderance (IP). This method is a combination of the frequency of occurrence method and the volumetric method [5]. The formula for the largest part index is as follows.

\[ IP = \left( \frac{\sum Vi \times Oi}{\sum Vi \times Oi} \right) \times 100\% \]

Where:
- IP: Index of preponderance
- Vi: Volume percentage of one type of food
- Oi: Percentage of the frequency of occurrence of one type of food
- Vi x Oi: Total Vi x Oi of all types of food

Based on the results of the IP value, belida fish food can be divided into three groups, namely: If the IP value is > 40% then it is categorized as the main food if the IP value is 4% - 40%, it is categorized as a complementary food, while the IP value < 4% is a food category additional [1].

2.5.3. Index of Electivity (E)

The comparison of food resources in the digestive tract of fish with resources in the substrate was analyzed using the index of electivity. This equation was developed by Ivlev (1961) [16] as follows.

\[ E = \frac{r_i - n_i}{r_i + n_i} \]

Where:
- E: Food choice index
- ri: Percentage of the i type of food contained in the stomach of the fish
- ni: Percentage of the i type of food on the substrate

The food choice index is between -1 to 1. Food organisms whose value is below 0, means that they are abundant in the substrate but not found in the digestive tract of fish. On the other hand, the greater the food choice index value, it means that the food organisms are not too much in the substrate but are found in the digestive tract of fish.

3. Results and Discussion

3.1. Number of Belida Fish (N. notopterus) Caught

The number of belida fish (N. notopterus) caught in Sei Gesek Reservoir for three months, namely April, May, and June using fishing rods with crickets as bait as many as 30 individuals. Details of the number of fish based on sex, namely 16 male belida fish (N. notopterus) and 14 female belida fish (N. notopterus). The number of belida fish (N. notopterus) caught in Sei Gesek Reservoir is presented in Table 2.

| Sexuality | April | May | June | Total |
|-----------|-------|-----|------|-------|
| Female    | 4     | 4   | 6    | 14    |
| Male      | 8     | 0   | 8    | 16    |
| Total     | 12    | 4   | 14   | 30    |
Overall, the number of belida fish (*N. notopterus*) caught during the study was higher than the number of female belida fish (*N. notopterus*) in June there were 14 fish (Table 2). This difference is caused by several factors, such as the reproductive process related to the size of the first gonad maturity, food habits, roach, or migration [21]. According to Martalena [11], states that the percentage of male fish is more than female fish is influenced by mortality and fish growth. The difference in the number of fish is also due to differences in behavior where male fish prefer to flock than female fish so that male fish are more easily caught [6]. Belida fish (*N. notopterus*) belongs to a group of predatory fish that have a crepuscular or nocturnal activity pattern, namely looking for food in dim light (day transition) and at night [24]. Usually, fish that begin to respond to food in the afternoon and look for food in the dark have sharp hearing, smell, and vision abilities. During the day belida fish (*N. notopterus*) sleep and hide among the plants.

3.2. *Distribution of Belida Fish Length (N. notopterus)*

The fishing of belida fish in the Sei Gesek Reservoir was taken according to all sizes obtained by fishermen, not only large fish but also small ones were used. So that during the study the belida fish (*N. notopterus*) obtained had different lengths. The length of the belida fish (*N. notopterus*) in the Sei Gesek Reservoir is presented in Figure 3.

![Figure 3. Group of belida fish length (*N. notopterus*) caught in Sei Gesek Reservoir.](image)

The length distribution of belida fish (*N. notopterus*) during the study in Sei Gesek Reservoir had 5 groups. The total length range of belida fish (*N. notopterus*) caught was 169-270 mm. The group size 237-253 had more belida fish (*N. notopterus*), namely 13 fish (Figure 3). Based on previous research regarding the total length range of belida fish (*N. notopterus*) which is 135-270 mm in the Sail River [13], 120-249 mm in the Simpur Dam Basin [4], and 154-261 mm in the Pokoriya River [7]. This indicates that the length range of belida fish (*N. notopterus*) obtained during the research in Sei Gesek Reservoir is not much different from the results of the length range of belida fish (*N. notopterus*) found in other habitats. The maximum length of belida fish (*N. notopterus*) can reach 60 cm [8].

The length distribution of belida fish (*N. notopterus*) can be influenced by the fishing gear used [17] which is related to the use of fishing rods used by fishermen, namely numbers 4-7. So that the fish caught are dominated by large fish and the fish caught are more selective. The difference in the size of the belida fish (*N. notopterus*) is thought to be related to the fishing gear used and the difference in the catchment area. Differences in fish size are also influenced by environmental conditions, abundance, and availability of food, temperature, and light in different waters [14].
3.3. Relative Intestine Length of Belida Fish (N. notopterus)
The results of the calculation of the Relative Length of the Gut (RLG) of belida fish (N. notopterus) in Sei Gesek Reservoir are presented in Figure 4. Based on Figure 4, it is known that the body length of the male belida fish (N. notopterus) is longer than the female belida fish (N. notopterus).

![Figure 4. Relative gut length of belida fish (N. notopterus) in Sei Gesek Reservoir.](image)

The average relative gut length of belida fish (N. notopterus) male is 0.25 and female is 0.21. The ratio of the relative intestine length of male fish is longer than that of female fish because male belida fish (N. notopterus) consume more food than female fish. This is in accordance with the statement of Perez-Espana & Abitia-Cardenas (1996) [6], that the increase in the length of the intestine will be in line with the increase in the length of the fish's body because the intestine will increase in length if more food enters so that the intestine will adapt to increase its digestive area. Belida fish (N. notopterus) in Sei Gesek Reservoir has a relative gut length value (RLG) which is classified as a carnivore fish because of the relative gut length of belida fish (N. notopterus) is <1 [14]. The determination of these results is based on the ratio of the length of the intestine and the total body length of the fish which determines that belida fish (N. notopterus) are classified as carnivores, omnivores, or herbivores. Belida fish (N. notopterus) which is a carnivore fish has an intestine that is shorter than the total body length so that the belly of belida fish (N. notopterus) looks small. This condition is due to carnivorous fish food in the form of meat, the intestines of belida fish (N. notopterus) which are short in the process of digesting their food faster than omnivorous and herbivorous fish [6]. So that the food eaten by belida fish (N. notopterus) does not last for a long time.

3.4. Types of Food Belida Fish (N. notopterus)
In general, the type of food for belida fish (N. notopterus) in Sei Gesek Reservoir consists of groups of fish, crustaceans, microalgae, macrophytes, annelids, nematodes, and detritus. The species found in the stomach of belida fish (N. notopterus) in Sei Gesek Reservoir were from the microalgae group with the Chlorophyta division, which has 8 species (Table 3).
Table 3. Types of food for belida fish (*N. notopterus*) in Sei Gesek Reservoir.

| Group         | Class            | Species                  |
|---------------|------------------|--------------------------|
| Fish          | -                | -                        |
| Crustaceans   | Malacostraca     | *Macrobrachium* sp.       |
|               |                  | *Limnoria* sp.           |
|               | Copepods         | *Cyclops* sp.            |
|               | Branchiopods     | *Limnadhopsis* sp.       |
| Microalgae    | Bacilliariophyceae| *Nitzschia* sp.          |
|               |                  | *Pleurosigma* sp.        |
|               |                  | *Navicula* sp.           |
|               |                  | *Diatoma* sp.            |
|               |                  | *Fragilaria* sp.         |
|               | Chlorophyceae    | *Mougeotia* sp.          |
|               |                  | *Cosmarium* sp.          |
|               |                  | *Scenedesmus* sp.        |
|               |                  | *Euastrum* sp.           |
|               |                  | *Pleurotaenium* sp.      |
|               |                  | *Zygnema* sp.            |
|               |                  | *Hyalotheca* sp.         |
|               |                  | *Cladophora* sp.         |
| Nematodes     | Secernentea      | *Trachelomonas* sp.      |
|               |                  | *Hirschmanniella* sp.    |
|               |                  | *Criconemoides* sp.      |
| Annelids      | Oligochaeta      | *Lumbricus* sp.          |
| Macrophytes   | Magnoliophyta    | *Egeria* sp.             |
|               |                  | *Elodea* sp.             |
| Detritus      | Crushed food leftovers| Unidentified |

The food species found in the stomach of belida fish (*N. notopterus*) in Sei Gesek Reservoir were a group of microalgae with the division Chlorophyta (Table 3). Previous research conducted in the Sei Gesek Reservoir also stated that phytoplankton in the Chlorophyta division was more commonly found in the waters of the Sei Gesek Reservoir [12]. While the group of fish is difficult to identify the species eaten by belida fish (*N. notopterus*) because in the stomach of belida fish (*N. notopterus*) the fish body is no longer intact. Habitat and food availability in the waters can be a factor in different types of food for belida fish (*N. notopterus*) and have different food abundances [3]. According to Effendie [1], the amount and type of food consumed by a species of fish usually depends on age, place, and time.

In general, there are several similarities between the food groups of belida fish (*N. notopterus*) in Sei Gesek Reservoir with other locations. This is known from the diet of belida fish (*Chitala lopis*) in the Kampar River Basin, Riau Province consisting of fish, shrimp, plant material, insects, worms, pieces of meat, and gravel [22]. Other research related to the food and eating habits of belida fish (*C. lopis*) in the waters of the Kampar River, Riau Province, and the Cisadane River, Banten Province stated that the types of food found were fish, shrimp, plant material, insects, worms, pieces of meat, benthos and gravel [20]. The two studies were seen from the composition of the food using the largest share index/IP, the main food of belida fish was in the form of fish groups.
3.5. Food Composition of Belida Fish (N. notopterus)

The food composition of belida fish (N. notopterus) in Sei Gesek Reservoir consists of groups of fish, crustaceans, microalgae, macrophytes, annelids, nematodes, and detritus. The results of the analysis of the food composition of belida fish (N. notopterus) in Sei Gesek Reservoir are presented in Table 4, Table 5, and Table 6. Based on Table 4, Table 5, and Table 6 it is known that the main food of belida fish (N. notopterus) in Sei Gesek Reservoir is fish.

Table 4. Food composition of belida fish (N. notopterus) in Sei Gesek Reservoir by sex.

| Sex  | Amount of fish | Index of Preponderance (%) | Fish | Crustaceans | Microalgae | Macrophytes | Annelids | Nematodes | Detritus |
|------|----------------|----------------------------|------|-------------|------------|-------------|----------|-----------|---------|
| Male | 16             |                            | 54.63| 8.00        | 10.45      | 7.43        | 0.09     | -         | 19.39   |
| Female | 14             |                            | 52.93| 14.74       | 7.49       | 4.93        | 0.20     | 0.06      | 19.66   |

The main food of belida fish (N. notopterus) in Sei Gesek Reservoir is the same as other studies, namely fish groups. This similarity is due to the availability of food resources in each research location having the same conditions [10]. The complementary foods of belida fish (N. notopterus) in Sei Gesek Reservoir are crustaceans, microalgae, macrophytes, and detritus. Meanwhile, additional food for belida fish (N. notopterus) in Sei Gesek Reservoir is annelids and nematodes. The composition of the diet of belida fish (N. notopterus) in Sei Gesek Reservoir based on gender, it is known that male belida fish (N. notopterus) have IP values for each group, namely fish (54.63%), crustaceans (8.00%), microalgae (7.43%), annelids (0.09%), and detritus (19.39%). While the female belida fish (N. notopterus) had IP values for each group, namely fish (52.93%), crustaceans (14.74%), microalgae (7.43%), macrophytes (4.93%), annelids (0.20%), nematodes (0.06%), and detritus (19.66%). The group of nematodes was only found in female belida fish (N. notopterus), while male belida fish (N. notopterus) was not found in this group, this is presumably because the nematodes live on the roots of aquatic plants and female belida fish (N. notopterus) often in a protected place and do spawning, so that this group of nematodes is consumed by female belida fish (N. notopterus). Therefore, it was the female belida fish (N. notopterus) that consumed the seven food groups.

Table 5. Food composition of belida fish (N. notopterus) in Sei Gesek Reservoir by month of fishing.

| Months | Amount of fish | Index of Preponderance (%) | Fish | Crustaceans | Microalgae | Macrophytes | Annelids | Nematodes | Detritus |
|--------|----------------|----------------------------|------|-------------|------------|-------------|----------|-----------|---------|
| April  | 12             |                            | 56.26| 11.95       | 4.74       | 1.20        | 0.22     | -         | 25.63   |
| May    | 4              |                            | 54.50| 19.58       | 3.17       | 2.91        | 0.13     | 0.13      | 19.58   |
| June   | 14             |                            | 48.65| 7.46        | 15.77      | 12.76       | 0.09     | 0.02      | 15.25   |

The composition of small fish, crustaceans, annelids, nematodes, and detritus in June decreased compared to April and May. Meanwhile, microalgae and macrophytes have increased. This shows that in June, belida fish (N. notopterus) consume a lot of microalgae and macrophytes. However, it cannot describe the actual composition of the food, because the index results for the largest portion show that the variation in the diet of belida fish (N. notopterus) in April, May, and June did not affect the consumption of the main food of belida fish (N. notopterus) namely fish (Table 5). This is because the type of food eaten by fish is influenced by the availability of food types in a habitat, physiological adaptation, and other factors. As for physiological adaptations such as the nature, length of the intestine, and physiological conditions of digestion of belida fish (N. notopterus). Meanwhile, tooth shape, body shape, and fish behavior are other factors that affect fish food consumption [26].
Table 6. Food composition of belida fish (N. notopterus) in Sei Gesek Reservoir by body size group.

| Length (mm) | Amount of fish | Fish | Crustaceans | Microalgae | Macrophytes | Annelids | Nematodes | Detritus |
|------------|----------------|------|-------------|-------------|-------------|----------|-----------|----------|
| 169-185    | 2              | 64.00| 5.00        | 1.00        | -           | -        | -         | 30.00    |
| 186-202    | 0              | -    | -           | -           | -           | -        | -         | -        |
| 203-219    | 2              | 42.55| 13.83       | 21.81       | 4.79        | -        | -         | 17.02    |
| 220-236    | 9              | 48.33| 12.94       | 11.59       | 11.31       | 0.23     | 0.03      | 15.57    |
| 237-253    | 13             | 53.99| 10.06       | 7.03        | 8.31        | 0.23     | 0.03      | 20.34    |
| 254-270    | 4              | 57.14| 9.17        | 12.70       | 0.53        | -        | -         | 20.46    |

The grouping based on the distribution of the total body length of belida fish (N. notopterus) obtained 5 size groups. The length group 169-185 only consumed fish, crustaceans, microalgae, and detritus food groups. The length group, which ranged from 203-219 and 254-270, consumed 5 food groups, namely fish, crustaceans, microalgae, macrophytes, and detritus. While the length groups 220-236 and 237-253 consumed all food groups, namely fish, crustaceans, microalgae, macrophytes, annelids, nematodes, and detritus. Based on Table 6, belida fish (N. notopterus) from the five size groups still consume fish as the main food even though the percentage of food composition is different. These results have similarities with the research of Wibowo et al. [22] which stated that belida fish (N. notopterus) in the Kampar River Basin of various sizes have the same main diet. Consuming fish as the main food of belida fish (N. notopterus) of various sizes is thought to be due to the availability of fish in Sei Gesek reservoir and it is easier for belida fish (N. notopterus) to use than other types of food. Therefore, IP values >40% in fish make it the main food for belida fish (N. notopterus) in Sei Gesek Reservoir based on sex, fishing time, and body length group of fish. However, different habitats can make a difference to the main type of food for belida fish [25].

3.6. Belida Fish Food Choice Index (N. notopterus)

The results of the analysis of the food choice index of belida fish (N. notopterus) in the Sei Gesek Reservoir are presented in Table 7 it is known that the Asterionella sp. and Closterium sp. found in the substrate but not found in the stomach of belida fish (N. notopterus).

Table 7. Food choice index of belida fish (N. notopterus) in Sei Gesek Reservoir.

| Group         | Class       | Species          | Food Choice Index (E) |
|---------------|-------------|------------------|----------------------|
| Fish          | -           | -                | 1                    |
| Crustaceans   | Malacostraca| Macrobrachium sp.| 1                    |
|               |             | Limnoria sp.     | 0,71                 |
| Copepods      |             | Cyclops sp.      | 1                    |
| Branchiopods  |             | Limnadopsis sp.  | 1                    |
| Microalgae    | Bacillariophyceae| Nitzschia sp. | 1                    |
|               |             | Pleurosigma sp.  | 1                    |
|               |             | Navicula sp.     | 1                    |
|               |             | Diatoma sp.      | 1                    |
|               |             | Fragilaria sp.   | 1                    |
|               |             | Asterionella sp. | -1                   |
| Chlorophyceae |             | Mougeotia sp.    | -0,78                |
|               |             | Cosmarium sp.    | 1                    |
|               |             | Scenedesmus sp.  | 1                    |
The food choice index of belida fish (*N. notopterus*) which shows a value of 1 means that this type of food is only found in the stomach of belida fish (*N. notopterus*) and is the food chosen by belida fish (*N. notopterus*) for consumption, while on the substrate no species is found. This is due to the nature of fish that move freely and the behavior of fish that live in currents is more active in swimming so that the movement of fish is wider in search of food [18]. Vice versa, which shows a value of -1 means that the type of food is found on the substrate while in the stomach of belida fish (*N. notopterus*) this type is not found. So the type of *Asterionella* sp. and *Closterium* sp. suspected to be a type of food that is not favored or chosen by belida fish (*N. notopterus*) as food, even though this type of food is available in the substrate or the waters of the Sei Gesek Reservoir (Table 7). According to Effendie [1], the assessment of fish's preference for food is very relative. Several factors that need to be considered are the distribution of fish food organisms, the availability of food, the choice of fish for their food, as well as physical factors that affect the waters. The type of food that is mostly found in the stomach but little is found in the substrate is *Limnoria* sp. and detritus. While the type of food that is abundant in the substrate or waters, but few are found in the stomach of belida fish (*N. notopterus*), namely in the group of microalgae (*Mougeotia* sp., *Pleurotaenium* sp., *Zygnema* sp.) and macrophytes (*Egeria* sp. and *Elodea* sp.), this is showing that belida fish (*N. notopterus*) in Sei Gesek Reservoir also consumed this type of food, although not as much as other types of food.

4. Conclusion
The relative gut length of belida fish (*N. notopterus*) in Sei Gesek Reservoir, Bintan Regency, Riau Islands has an average value of 0.25 for male belida fish and 0.21 average value for belida fish female with the carnivorous fish group. The types of food for belida fish are fish, crustaceans (Malacostraca, Copepods, and Branchiopods), microalgae (Bacillariophyceae, Chlorophyceae, and Euglenophyceae), macrophytes (Magnoliophyta), nematodes (Secernentea), annelids (Oligochaete), and Detritus. The results of the Index of Propoderance (IP) show that the main food of belida fish in Sei Gesek Reservoir, Bintan Regency, Riau Islands Province is fish eaters. The results of the index of choice of food/Index of Electivity are known that the species *Asterionella* sp. and *Closterium* sp. are suspected to be a type of food that is not favored or not chosen by belida fish as food.

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