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The ontogenic and feed consumtion of Silver Rasbora

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The ontogenic and feed consumtion of Silver Rasbora

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Abstract. Silver Rasbora fish (*Rasbora argyrotaenia*) has yellowish fins with shiny scales, wide mouth and protruding forwards with a maximum length of about 170 mm. Its habitat is found mostly in the rivers of Sumatra Island and lives in groups. Silver Rasbora is an omnivorous group, both from phytoplankton and zooplankton. The purpose of this study was to know the eating habits of Silver Rasbora fish in the Musi River through observing the diversity of feed in their stomach. The study was conducted in July - September 2017 in three locations (Mariana Village, Kenten Laut Village and Pulo Kerto Village). The method used is the method of description and method of determining the location carried out by purposive random sampling. The results showed that the percentage of feed type based on its class, the highest percentage was in the *Chlorophyceae* class with an average of 50.38% and *Bacillariophyceae* class with a percentage of 37.02%, while the *Cyanophiceae* class percentage was 11.33%.

1. Introduction

Silver Rasbora Fish (*Rasbora argyrotaenia*) is known as Seluang Batang in the area of South Sumatra (Palembang and its surroundings) or Lunjar Padi in Java. Members of the Rasbora genus are widespread throughout the eastern and southeastern regions of the Asian continent [1], and in Africa [2], and in Sumatra, Kalimantan, Java, Bali and Lombok. On the island of Java, this species is found in several streams that live in shallow areas with relatively fast water and lots of gravel on the riverbed. Seluang fish is an important source of protein for Palembang residents from the past until now. However, since the last decade, environmental degradation, large fishing, illegal use of poisons, and river fragmentation by the construction of several dams along these fish habitats have pushed it to the edge of extinction [3]. Although officially not yet registered as an endangered species in Indonesia. In Yogyakarta the sharp decline in seluang fish has occurred since building dams on the Ngrancah river [4,5]. Tropic ecology is a key in evaluating the ecological role of population or species in the community of any ecosystem. There is a general understanding that yellow rasbora occupies low trophic levels, the adults feeding mainly on phytoplankton and zooplankton [6].

Silver Rasbora is a type of fish that is very familiar in Indonesia, especially the island of Sumatra because it is commonly consumed as savory, fried and crispy food and a lot of processed foods are made directly from Seluang fish. This fish has a small and flat body shape. And has yellowish fins. The scales are also shiny, have a wide mouth and protrude forward with a maximum length of about 170 mm. Food has an important function in the life of every organism. An organism lives, grows and reproduces because of the energy that comes from its food. No exception Seluang fish also need food for growth

and development. Husnah and Arsyad [7] explained that the food of Seluang fish was an omnivorous group that preyed on everything, both from phytoplankton and zooplankton. Ecological diversity, topography and habitat found in the Musi River Basin allow for different types of feed in Seluang fish.

The problem in this study is how the diversity of feed types in the Silver Rasbora fish stomach in the Musi tributary stream. Djumanto and Setyawan [3] stated that the food types of yellow rasbora fish in the Ngrancah River were Chrysophyta and protozoa found most dominantly from phytoplankton and zooplankton in intestinal contents, respectively. The Spawning Seasons of Rasbora tawarensis were three times a year and September, while at the lake Laut Tawar, Aceh. This species is classified as a group synchronous spawner. The purpose of this study was to determine the feeding habits of Seluang fish in the flow of the Musi River children through observing the diversity of feed on the Seluang fish hull.

2. Materials and method

2.1. Research time and location

The research was carried out in July 2017 to September 2017 at 3 station locations in the waters of the Musi River (Figure 1). Station 1 (one) is located in the Musi tributary in Kenten Laut Village (2053'38.4 "S 104046'42.0" E), station 2 (two) is located on the Musi tributary in Pulo Kerto Village (3001'44.6 "S 104039'39.7 "E), and station 3 (three) is located on the tributary of Musi on the Island of No Name Mariana Village (2057'32.0" S 104051'49.9 "E). The observation of Silver Rasbora hull was carried out at the Research Institute for Public Aquatic Fisheries (BPPPU) Palembang.

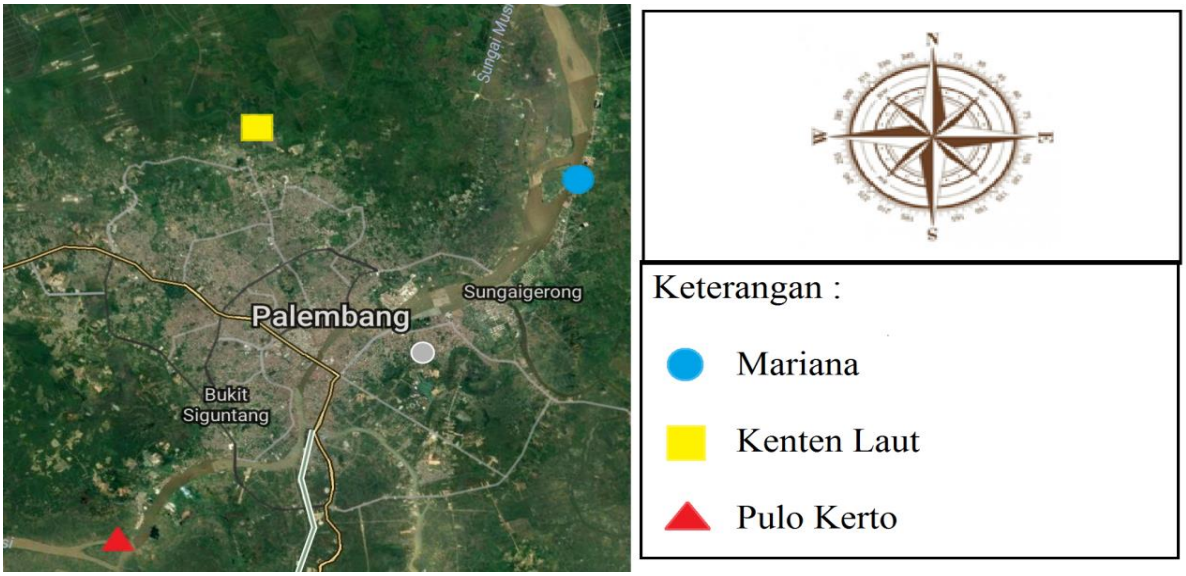

Figure 1. Map of the sampling location (*Source*: Personal Documents, 2017)

The research method used is the description method, Whintney [8] states that the descriptive method is the search for facts with the right interpretation. The data obtained is then processed in the form of tables and graphs which are then described according to the results obtained. The sampling method uses a survey method, Sevilla [9] states that if we intend to conduct a research activity by collecting relatively limited data from a number of cases relatively large in number, the research methods that can be used are survey methods and purposive random sampling. The sample data was obtained directly from the Rasbora catch from the waters of the Musi River using the Tangkul fishing gear on 3 different stations. The selection of the 3 stations was based on the basic assumption that the three locations could represent the source of the location of Rasbora fishing in Palembang. These three locations are the branch of the Musi River, which are often found in Rasbora fishing freely in nature.

2.2. Catch of silver Rasbora

Silver Rasbora fishing in the three locations is carried out with the lift nets with local name is Tangkul or Anco tool. Tangkul or anco is a type of lift nets operated by hand. This fishing gear consists of a square net which has four edges tied to two bamboo sticks or wood mounted crossed perpendicular.The use of this method was carried out to get Silver Rasbora that were free of defects during the arrest, which was carried out in the morning at 07.00 WIB. Arrest at this time is a suitable time for researchers because Silver Rasbora begin to emerge and fishing is easily done optimally. Silver Rasbora obtained directly measured their weight and length. Fishing was carried out in July 2017, as many as 10 Silver Rasbora were taken from each station location. Thus the overall sample of the study was 30.

2.3. Sample packaging of Silver Rasbora

The sample of Silver Rasbora are packaging begins with dilution of 4% formalin solution into a transparent plastic bottle. After being caught, the fish is dissected and the stomach is taken. Next, each fish hull was put into 30 transparent plastic bottles to be preserved and put into the Cooler Box. Silver Rasbora hulls that have been preserved are then analyzed in the Laboratory of Research Institute for Public Aquatic Fisheries (BPPPU) Palembang to be further identified.

2.4. Laboratory test of Silver Rasbora

Stomach of Silver Rasbora which has been taken to the Laboratory of Research Institute for Public Aquatic Fisheries (BPPPU) Palembang, then analyzed by referring to the book "Title, Illustrations of the Freshwater Plankton of Japan" by Mizuno [10]. As for the steps in observing the gastric contents of fish are as follows [11].

- The fish hull was removed from the film bottle and put into a petridisk for washing with water and rinsed three times so that the smell of formalin was lost.
- The fish hull is placed in a petridisk and split to take its contents.
- Sorting and classifying the types of fish food in plain view, if the stomach contents are not identified with the naked eye then identified using a microscope or luv.
- Each type of feed is grouped and calculated by adding up all types of individuals, and adding up all (total) types of individuals.
- After getting the number of individual types, then each number of types of feed is shared with the total feed which aims as the first step to calculate the diversity index.
- Before implementing the diversity index method, calculation of the diversity index of a type of food used by fish is carried out.
- The food diversity index is calculated to determine the percentage of a type of food organism used by fish.
- Grouping of diversity index types of food eaten by fish, then sorted by genus or the type of food used by the fish, then used as a basis for decision making to get the desired goal.

3. Results

3.1. Water quality from the environment of Silver Rasbora

Based on direct observations at the three observation locations, the original environmental conditions (physical, chemical and biological environment in public waters). Water quality parameters observed were supporting data such as pH, depth temperature, DO, and ammonia. Measurements are carried out in the morning, afternoon and evening. The results of water quality can be seen in Table 1.

Table 1. Data of water quality on tree station catching of Silver Rasbora.

NO	Parameters	Unit	Station			SNI
			1	2	3	
1	Depth	m	1,5-5,5	2.3-6.5	2-7,5	-
2	Temperature	^{0}C	26-29	26-28	25-27	± 3°C
3	DO	Mg/l	6,4-7,1	6,7-7,2	6,5-7,3	Min 4
4	pH	-	7,8-8.1	7,9-8.1	7,9-8.3	6,5-8,5
5	Ammonia	Mg/l	0.12-0.17	0.11-0.16	0.09-0.16	Max 1,5

Silver Rasbora is a type of primary freshwater tropical fish, both inundated and flowing water types such as lakes, reservoirs, floodplains, main bodies and creeks [12]. Therefore Silver Rasbora can be found in shallow waters or deep waters, which still get the penetration of sunlight and which are equipped with substrate, whether in the form of rocks or plants. According to Husnah and Arsyad [7], the Silver Rasbora (*Rasbora argyrotaenia*). Physical and chemical characteristics of the habitat Silver Rasbora the following stem with its varin (Variants A and B) will be divided into two types, namely flow type and inundated type. In habitat types flowing like the main body and tributaries, Silver Rasbora live in waters with a fairly wide current velocity range with current velocities in the upper, middle and downstream parts of the river in the range 4.4 - 16.7 m/seck, 0.2 - 1.1 m/sec, and 0 - 1.0 m/sec. However, the preferred current speed is in the range of 0.2-1.1 m/sec. As with current velocity Silver Rasbora can live and breed in the temperature range of 22.0 - 31.1 ^{0}C. But Seluang fish in large quantities were found in waters with a temperature range of 26.5 - 28.0 ^{0}C.

Water brightness is related to the amount of light transmitted in the waters. In accordance with the nature of the fish as the bentofelagic, which generally requires sunlight, the brightness of the waters where the Silver Rasbora in river waters is 11-30 cm, while in the swamp waters is 20 - 105 cm. The level of water brightness is very closely related to the presence of the amount of suspended solids in water (Total suspended solids) or known as TSS. Suspended solids can come from living materials such as plankton or from mud particles. TSS values in Silver Rasbora habitat in river waters are in the range 11 - 380 mg / L [7]. Aquatic chemical parameters such as acidity (pH value), dissolved oxygen, alkalinity, hardness, conductivity, and nutrients play an important role in aquatic productivity. Aquatic productivity will show the amount of organic material that can be produced by water, either in the form of natural fish feed or fish itself. The study of several research institutions reported that the chemical characteristics of the waters of the Silver Rasbora habitat in the main body and tributaries are as follows: pH values 5.5 - 7.0, Dissolved Oxygen 3.6 - 7.2 mg / L, and total alkalinity of 20-50 mg CaCO3 / L (Rupawan *et al*., 2003). While in floodwater swamp waters with the range as follows: Value of pH 5.0 - 6.5, Dissolved Oxygen 2.4 - 4.8 mg / L, Total Alkalinity 9.4 - 25 mg CaCO3 / L, Hardness 6.3 - 16.3 mg CaCO3 / L, and Sulfate (SO4) 0.51 - 4.03 mg / L (Asyari et al., 2007; Rupawan *et al*., 2003; Nurdawati and Prasetyo, 2006). While nutrients such as Ammonia nitrogen (NH3-N) 0.2 - 0.31 mg / L, Nitrite (NO2-N) 0.1 - 0.14 mg / L, Nitrate (NO3-N) 0.16 - 0 , 21 mg / L, and Orthophosphate 0.04 - 0.07 mg / L (Nurdawati and Prasetyo, 2006).

3.2. Diversity of feed types in fish stomach of Silver Rasbora

According to Effendie [13], in order to study the eating habits of a fish species whose food is not yet known, it is necessary to make a selection in the field to determine fish samples. Then surgery is performed to see the presence or absence of the stomach in the fish. Gastric surgery aims to get a standard description of the food consumed by fish. If the fish has stomach, the stomach is taken to be identified in the laboratory. Based on observations on the fish's part Silver Rasbora, seen from the shape of the stomach has a rounded stomach like a pocket with the intestines wrapped around in a circle. Silver Rasbora intestine has a length of about one and a half the length of the body as shown in picture 2. Observation of Silver Rasbora hull condition before identification can be seen in picture 2 below.

Figure 2. Hull of Silver Rasbora (*Source*: Personal Documents, 2017).

Observations in the BPPPU Palembang fish laboratory, food in Silver Rasbora can be grouped into 2 groups, namely Phytoplankton and Zooplankton and consists of 5 classes namely Bacillariophyceae, Chlorophyceae, Cyanophyceae, Crustaceae, and Maxillopoda. In more detail are explained as follows.

3.2.1. Phytoplankton. From the observations that researchers did on the type of Silver Rasbora, there was a group of Phytoplankton consisting of Bacillariophyceae, Chlorophyceae, and Cyanophyceae. The explanation of Phytoplankton is as follows.

- Bacillariophyceae. Bacillariophyceae is a class of golden algae or Chrysophyta. Golden algae or Chrysophyta are found in fresh water, in the sea, and in moist soil.
- Chlorophyceae. Chlorophyceae (green algae) is one of the classes of algae whose cells are eukaryotine (the core material is wrapped by the nucleus membrane), the corophyll pigment is present in the highest number so that this algae is green.
- Cyanophyceae. Cyanophyceae or blue green algae are prokaryotic phytoplankton. The Cyanophyceae cell form is generally in the form of single cells, colonies or filaments. In the form of algae colonies or filaments, nitrogen fixation can be carried out so that it can cause an explosion of blooming populations in both freshwater and marine waters.

3.2.2. Zooplankton. From the results of observations that researchers did on the type of gastric fish Seluang there Zooplankton group consisting of Crustaceae, and Maxillopoda. Crustaceans are a large group of arthropods, consisting of approximately 52,000 species that are described, and are usually regarded as a subfilum.

3.3. Feed types diversity index on stomach of Silver Rasbora

Diversity index or the largest part index to determine a type of food organism that is used by Silver Rasbora. From the observations found 5 classes, namely Bacillariophyceae, Chlorophyceae, Cyanophyceae, Crustaceae, and Maxillopoda. The diversity index in each genus can be seen in Table 2 below.

Table 2. Diversity index a type of food organism of Silver Rasbora.

Class	St. 1	St. 2	St. 3
	(%)	(%)	(%)
Bacillariophyceae	48.27	37.43	33.61
Chlorophyceae	44.92	51.58	50.45
Cyanophyceae	4.14	8.78	12.55
Crustaceae	2.67	4.22	3.37
Total	100	100	100

Percentage of Silver Rasbora Diversity Index at each location can be seen in picture 3, 4, and 5 below.

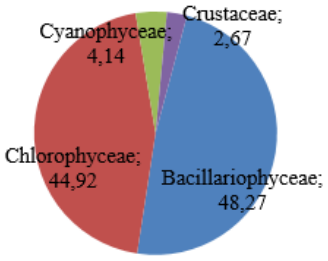

Figure 3. Feed type in Rasbora hull at station 1.

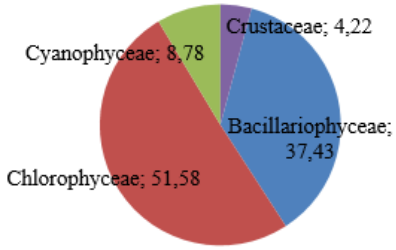

Figure 4. Feed type in Rasbora hull at station 2.

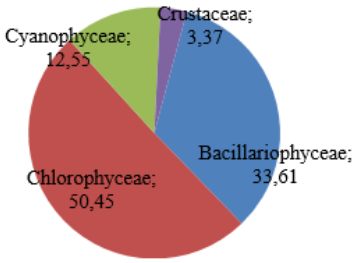

Figure 5. Feed type in Rasbora hull at station 3.

In the Musi River location in station 1 (Kenten Laut Village), the highest percentage was found in Bacillariophyceae (47.29%) and Chlorophyceae classes (45.90%) as the main food. After that, followed by the Cyanophyceae class (5.16%) as complementary food and Crustaceae class (1.65%) as supplementary food. In the Musi River Location station 2 (in Pulokerto Village), the highest percentage was found in the Bacillariophyceae class (36.42%) and the Chlorophyceae class (50.59%) as the main food. After that, followed by the Cyanophyceae class (10.79%) as complementary food and the Maxillopoda class (2.21%) as supplementary food. In the Musi River Location in station 3 (Mariana Village), the highest percentage was found in Chlorophyceae (52.43%) and Bacillariophyceae (31.64%) as the main food. After that, followed by the Cyanophyceae class (13.56%) as complementary food and the Maxillopoda class (2.38%) as supplementary food.

The overall diversity index based on class can be seen in Table 3 below.

Table 3. Percentage of feed types Silver Rasbora by class.

Class	Amount	Persentage (%)
1. Phytoplankton		
Chlorophyceae	20108	50,38
Bacillariophyceae	14776	37,02
Cyanophiceae	4521	11,33
2. Zooplankton		
Maxillopoda	283	0,71
Crustaceae	226	0,57
Jumlah	**39914**	**100**

The results of the observation stated that the highest percentage was in the Chlorophyceae class with an average of 50.38% and Bacillariophyceae class with a percentage of 37.02%, while the percentage of the Cyanophiceae class was 11.33%. In the Maxillopoda class and Crustaceae class is the lowest percentage class, which is 0.71% and 0.57%.

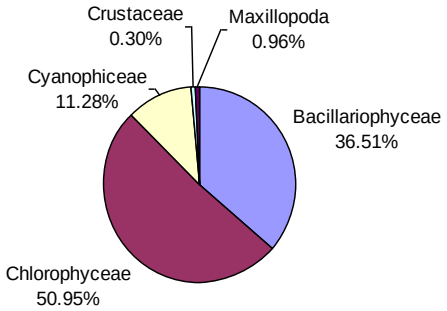

Figure 6. Percentage of feed types Silver Rasbora by class.

In the class of Bacillariophyceae and Chlorophyceae is the highest percentage class, followed by the Cyanophiceae class, the Maxillopod class and the Crustaceae class, which is the lowest percentage class.

4. Conclusion

The results of this research concluded that the percentage of feed type of Silver Rasbora was based on the class, the highest percentage was in the Chlorophyceae class with an average of 50.38% and Bacillariophyceae class with a percentage of 37.02%, while the percentage of the Cyanophiceae class was 11.33%. In the Crustaceae class and Maxillopoda class is the lowest percentage class, which is 0.71% and 0.57%. By obtaining information about feeding habits from these Silver Rasbora, it is necessary to formulate a type of artificial feed that resembles Silver Rasbora natural feed for domestic purposes.

References

[1] Kottelat M, Whitten A J, Kartikasari S N and S Wirjoatmojo 1993 *Freshwater Fishes of Westwrn Indonesia and Sulawesi* (Jakarta: Periplus Edditions) 221
[2] Nelson J S 2006 *Fishes of the world, Fourth edition* (John Wiley & Sons, Inc.) 601
[3] Djumanto, Setyawan F 2009 Food habits of the yellow rasbora, Rasbora lateristriata, broodfish during moving to spawning ground *Journal of Fisheries Sciences* **11**(1) 133-145
[4] Triyatmo, B Rustadi, Djumanto and Susilo B P 1997 Fisheries Study in Sermo Reservoir *Research report* 65
[5] Setyobudi E 2000 *Structure and potential reproduction of Nile Tilapia (Oreochromis sp.) population in Sermo Reservoir* (Yogyakarta: GMU)
[6] Piet G J and W A H P Guruge 1997 Diel variation in feeding and vertical distribution of ten co-occurring fi sh species: consequences for resource partitioning *Environmental Biology of Fishe* **50** 293-307
[7] Husnah and N M Arsyad 2009 *Keragaman Jenieluang (Rasbora sp.) di Perairan Umum* (Palembang: Universitas PGRI Palembang Bekerjasama dengan Balai Riset Perikanan Perairan Umum Palembang) 56
[8] Whitney F 1963 *The elements of research*
[9] C G Sevilla 1993 Pengantar Metode Penelitian (Jakarta: UI Press)
[10] Burnawi 2008 *Penggunaan Alat Tangkap Sengkirai Bilah di Perairan Lubuk Lampam, Sumatera Selatan. Buletin Teknik Litkayasa Sumber Daya dan Penangkapan* Volume 6 Nomor 2 Desember 2008, ISSN 1693-7961 (Jakarta: Pusat Riset Perikanan Tangkap, Badan Riset Kelautan dan Perikanan, Departemen Kelautan dan Perikanan) 41-43
[11] Mizuno T 1978 *Illustrations of the freshwater plankton of Japan* (Tokyo: Hoikusha)
[12] Hails A J and Abdullah Z 1982 Reproductive biology of the tropical fish Trichogaster pectoralis (Regan) *J Fish Biol.* **21** 157-170
[13] Effendie M I 1997 *Biologi Perikanan* (Yogyakarta: Yayasan Pustaka Nusantara)