

BIODIVERSITY OF FISH FAMILY OSPHRONEMIDAE IN SWAMP WATERS IN BAGAN BILAH VILLAGE, DISTRICT OF PANAI TENGAH LABUHANBATU REGENCY

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Article Info

Article history:

Received December 15, 2021

Revised March 6, 2022

Accepted April 20, 2022

Keywords:

Ecological index

Family osphronemidae

Swamp waters

ABSTRACT

One of the swamp waters is located in Bagan Bilah Village, Panai Tengah District, Labuhanbatu Regency, North Sumatra Province. These swamp waters store a lot of fish diversity that has been used by the surrounding community. Among them are fish from the Osphronemidae family. This study aims to determine the biodiversity of fish of the Osphronemidae family in the swamp waters of Bagan Bilah Village. Fish sampling was carried out for 3 months, starting from October to December 2021. Fish are caught using traditional fishing gear called tangkol. The caught fish are collected, counted in number and then identified by species. The research data is calculated for its ecological index using the 2010 version of the Microsoft Excel application, then the data is displayed in tabular form. Based on the results of this study obtained 5 species of fish family Osphronemidae (*Belontia hasselti*, *Betta imbellis*, *Trichogaster trichopterus*, *Trichopodus pectoralis*, and *Trichopsis vittatus*). The Diversity Index (H') of Station 1 (0.78), Station 2 (0.76), and Station 3 (1.26). Uniformity Index (E) for Station 1 (0.43), Station 2 (0.42), and Station 3 (0.70). Dominance Index (C) for Station 1 (0.13), Station 2 (0.16), and Station 3 (0.28).

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1. INTRODUCTION

The diversity of fish species describes the entire scope of adaptation to the environment as well as interactions between living aquatic biota. This shows an adjustment to changes in the shape and nature of the species in the environment where they live. The diversity of fish species differs from place to place (Syafei, 2017).

Osphronemidae is a type of fish group that has a labyrinth as a breathing apparatus. Its habitat is mostly found in swamps and Mula rivers. Its distribution is found in Asia, from Indonesia, India to China. This group of fish makes nests by making foam which is then used as a spawning ground for eggs (Sari, 2019). Fish belonging to the Osphronemidae family, namely twill fish (*Belontia hasselti*) (Fauziah *et al.*, 2017) besides that there are also betta fish (*Betta edithae*), Siamese sepat (*Trichopodus pectoralis*), red-eyed sepat (*Trichopodus trichopterus*) (Iqbal *et al.*, 2019).

Fish of the Osphronemidae family are consumption fish and can also be used as ornamental fish (Ajai *et al.*, 2020). In addition, in nature the fish group Osphronemidae has an important ecological role for nature and humans. Siamese finches are fish that eat everything, be it aquatic plants, mosses and phytoplankton (Murjani, 2009); (Ramadhan *et al.*, 2020). Furthermore, Diniya *et al.* (2014) explained that in addition to eating small animals in the water, these fish also include grazer fish which eat the remains of organisms attached to the sidelines of aquatic plants such as weeds (Nursyamsiah *et al.*, 2017). Sepat fish play an important role in controlling weeds and phytoplankton so that there is no blooming, so that the surrounding ecosystem remains stable. In addition to eating aquatic plants and phytoplankton, the sepat fish also eats the larvae of the Anopheles sp mosquito which causes malaria in humans (Asmiani *et al.*, 2012). Referring to the reference above, it is necessary to conduct a study to examine the diversity of fish family Osphronemidae in an area that is their habitat. Considering the importance of the economic and ecological benefits of fish of the Osphronemidae

family in nature, data and information related to the biodiversity of fish of the Osphronemidae family are needed as an effort to manage the genetic resources of these fish in order to maintain their sustainability.

2. RESEARCH METHOD

This research is exploratory. The observation station was determined by purposive sampling, namely based on information from the community who used to catch fish in the swamp waters of Sei Dondong, Bagan Bilah Village, Panai Tengah District, Labuhanbatu Regency. Fish sampling was carried out for three months, starting from October to December 2021. For Station 1 (2°25'19.64'N 100°12'7.74'E), Station 2 (2°25'23.79'N 100°12'15.93'E), and Station 3 (2°25'34.25'N 100°12'45.93'E). Fish samples were taken using a traditional fishing gear called tangkol, namely a net with a length of 5 meters, a front width of 3 meters, a front width of 1.5 meters, a net of 0.8 inches, made of green polyethylene. How to operate the tangkol fishing gear can be seen in Figure 1.



Figure 1. Fishing Gear (Tangkol)

3. RESULTS AND DISCUSSION

Fish Type Composition

The results of this study obtained the catch as many as 64 individuals. After being identified, there were 5 types of fish species that belonged to the family Osphronemidae. The data can be seen in table 1 below.

Table 1. Fish Species Composition of the Osphronemidae Family in the Swamp Waters of Bagan Bilah Village

Genera	Species	St. 1	St. 2	St. 3	Σ
<i>Trichopodus</i>	<i>Trichopodus pectoralis</i>	4	2	0	6
<i>Trichogaster</i>	<i>Trichogaster trichopterus</i>	15	23	5	43
<i>Belontia</i>	<i>Belontia hasselti</i>	0	1	4	5
<i>Betta</i>	<i>Trichopsis vittatus</i>	2	4	1	7
<i>Betta</i>	<i>Betta imbellis</i>	0	0	3	3
Total Number		21	30	13	64

Source: Research Result Data (2021)

The composition of the five fish species of the Osphronemidae family in the swamp waters of Bagan Bilah Village consisted of *Trichopodus pectoralis* (6 individuals), *Trichogaster trichopterus* (43 individuals), *Belontia hasselti* (5 individuals), *Trichopsis vittatus* (7 individuals), and *Betta imbellis* (3 individuals). The results of this study showed that the most caught fish were *Trichogaster trichopterus* species. This shows that the *Trichogaster trichopterus* species is very suitable to occupy the habitat until the population dominates. Sepat fish species *Trichopodus trichopterus* is a fish whose habitat is mostly found in swamps and rivers. This fish is known to often enter the rice fields when floods (Irianto et al., 2019). *Trichopodus trichopterus* is a fish that lives in swampy waters, where its distribution is mostly found on the islands of Java, Sumatra, and Kalimantan. (Athar & Prakoso, 2014).

Diversity Index (H')

The results of the analysis of the fish diversity index data of the Osphronemidae family in the swamp waters of Bagan Bilah Village can be seen in table 2. below:

Tabel 2. Diversity Index Value (H')

Station	Diversity Index (H')	Criteria
1	0.78	Low
2	0.76	Low
3	1.26	Moderate

Source: Research Result Data (2021)

Diversity values (H') were obtained at Station 1 (0.78), Station 2 (0.76), and Station 3 (1.26). At Stations 1 and 2 the Diversity Index value is categorized as low, where the value obtained indicates the condition of heavily polluted waters. Furthermore, at Station 3 the diversity index is categorized as moderate, indicating moderately polluted water conditions (Fachrul, 2007).

It is suspected that the condition of the swamp waters in the study area is contaminated with pesticides from agricultural waste. According to Ivaini (2019) In today's modern era, in the agricultural sector, the use of pesticides has become an inseparable part of farmers' activities, especially to eradicate nuisance pests. Next according to Swacita (2017) the use of pesticides in agriculture is an effort to increase production, but over time excessive it uses can pollute the environment.

Uniformity/Evenness Index (E)

Based on the results of the data analysis of the uniformity index of fish of the Osphronemidae family in the swamp waters of Bagan Bilah Village, it can be seen in table 3.

Tabel 3. Evenness Index Value (E')

Station	Evenness Index (E')	Criteria
1	0.43	Low
2	0.42	Low
3	0.70	Low

Source: Research Result Data (2021)

The Uniformity Index (Evenness Index = E) was obtained at Station 1 (0.43), Station 2 (0.42), and Station 3 (0.70). Based on the results of data analysis from the three observation stations, it is categorized as low, this can be interpreted that the individual wealth of each species is very much different. If the population of species living in the habitat is quite abundant, this is because the carrying capacity of the environment or ecosystem is balanced and disturbances to another biota living in the environment do not greatly affect the environment (Efizon *et al.*, 2015). Environmental conditions, especially water quality, greatly affect fish life, while for the area it affects the population and formation of fish communities (Kartamihardja, 2008).

Dominance Index (D)

The results of data analysis for the value of D in fish of the Osphronemidae family in the swamp waters of Bagan Bilah Village can be seen in the table 4.

Table 4. Dominance Index Value (D)

Station	Dominance Index (D)	Criteria
1	0.13	No one dominates
2	0.16	No one dominates
3	0.28	No one dominates

Source: Research Result Data (2021)

Based on the data from the analysis of the value of D, it is obtained at Station 1 (0.13), Station 2 (0.16), and Station 3 (0.28). This shows that there is no dominant fish species. The results of this study indicate that of several species of fish caught, the number of individuals is relatively small. According to Efizon *et al.* (2015) if the uniformity index value is close to 1, it indicates that the number of individuals in each species is the same or almost the same. According to Erika *et al.*, (2018), if the dominance index is low or there are no species that dominate other species and fish species are evenly distributed, then the aquatic ecosystem can be said to be stable.

4. CONCLUSION

The fish species composition of the Osphronemidae family that caught the most were *Trichogaster trichopterus* (43 individuals), *Trichopsis vittatus* (7 individuals), *Trichopodus pectoralis* (6 individuals), *Belontia hasselti* (5 individuals), and *Betta imbellis* (3 individuals). Ecological indexes include: the Diversity Index (H') at Stations 1 and 2 shows a low category, and at Station 3 the medium category, the Evenness Index (E') at all stations shows a low category, and the Dominance Index (D) at each station. indicates that no species dominates. It can be concluded that the swamp waters of Bagan Bilah Village which are the habitat of fish of the Osphronemidae family have been heavily and moderately polluted by agricultural waste.

5. REFERENCES

- Ajai, O. N., Anwari, M. S., & Dirhamsyah, M. (2020). Keanekaragaman Jenis Ikan Di Sungai Embaloh Desa Banua Ujung Kecamatan Embaloh Hulu Kabupaten Kapuas Hulu. In *Jurnal Hutan Lestari*, 8(1), 61-68.
- Asmiani, Widarso, S. E., & Istiqomah, S. H. (2012). Kemampuan Predasi Ikan Sepat (*Trichogaster Trichopterus*) Dalam Memangsa Larva *Anopheles* Sp. *Jurnal Kesehatan Lingkungan*, 4(3), 136-141.
- Ath-Thar, M. H. F., & Prakoso, V. A. (2014). Performa Pertumbuhan Ikan Sepat Rawa *Trichopodus Trichopterus* (Pallas 1770) Asal Sumatera, Jawa, Dan Kalimantan. *Media Akuakultur*, 9(1), 1-5.
- Diniya, A., Putra, R. M., & Efizon, D. (2014). Stomach Analyse Of *Trichogaster Pectoralis*. *JOM Paperika*, 1(1), 1-14.
- Efizon, D., Putra, R. M., Kurnia, F., Hindri Yani, A., & Fauzi, M. (2015). Keanekaragaman Jenis Jenis Ikan Di Oxbow Pinang Dalam Desa Buluh Cina Kabupaten Kampar Riau. *Prosiding Seminar Antarabangsa Ke 8: Ekologi, Habitat, Manusia dan Perubahan Persekitaran*, Hal. 23-46.
- Erika, R., Kurniawan, &, & Umroh. (2018). Keanekaragaman Ikan Di Perairan Sungai Linggang, Kabupaten Belitung Timur. *Akuatik: Jurnal Sumberdaya Perairan*, 12(2), 17-25.
- Fachrul, M. F. (2007). *Metode Sampling Bioekologi*. Bumi Aksara, Jakarta.
- Fauziah, P., Purnama, A., Yolanda, R., & Karno, R. (2017). Keanekaragaman Ikan (Pisces) Di Danau Sipogas Kabupaten Rokan Hulu Provinsi Riau. *Jurnal Biologi Udayana*, 21(1), 17-20.
- Iqbal, M. (2011). *Ikan- Ikan Di Hutan Rawa Gambut Merang Kepayang Dan Sekitarnya*. Merang RDD Pilot Project, Palembang. www.Merang-Redd.Org.
- Iqbal, Muhammad, Setiawan, A., Yustian, I., Pormansyah, Indrianti, W., Firman Saputra, R., & D.Salaki, L. (2019). *Ikan-Ikan Air Tawar Sembilang Dangku* (Issue November). ZSL Indonesia, Jakarta.
- Irianto, A. F., Taufikkurrahman, Purnamasari, D. W., Erwan, Wiryawan, I. K. G., Syamsuhaidi, & Pardi. (2019). Kajian Potensi Ikan Sepat Rawa (. *Jurnal Ilmu Dan Teknologi Peternakan Indonesia*, 5(1), 35-45.
- Ivnaini, A. (2019). Analisa Kebijakan Hukum Lingkungan Dalam Pengelolaan Pestisida. *Bestuur*, 7(2), 93-105.
- Kartamihardja, E. S. (2008). Perubahan Komposisi Komunitas Ikan dan Faktor-Faktor Penting Yang Mempengaruhi Selama Empat Puluh Tahun Umur Waduk Ir. H. Djuanda. *Jurnal-Iktiologi Indonesia*, 8(2), 67-78.
- Kottelat, M., Whitten, A. J., Kartikasari, S. N., & Wiroatmodjo, S. (1993). *Freshwater Fishes of Western Indonesia and Sulawesi*. Periplus Editions Limited, Singapura.
- Maknun, D. (2017). *Ekologi: Populasi, Komunitas, Ekosistem*. Nurjati Press, Cirebon.
- Manullang, H. M. & Khairul. (2020). Monitoring Biodiversitas Ikan Sebagai Bioindikator Kesehatan Lingkungan Di Ekosistem Sungai Belawan. *Jurnal Ilmu Alam Dan Lingkungan*, 11(2), 1-7.
- Murjani, A. (2009). *Budidaya Ikan Sepat Rawa (Trichogaster Trichopterus) Dengan Pemberian Pakan Komersil*. Laporan Penelitian Mandiri. Universitas Lambung Mangkurat, Banjarbaru.

- Nursyamsiah, Efizon, D. & Winarti. (2017). Kemampuan Ikan Sepat Siam (*Trichogaster Pectoralis*) Dalam Mengendalikan Populasi Kiapu (*Pistia Stratiotes*). *JOM Paperika*, 4(2), 1–12.
- Odum, E. P. (1953). *Fundamentals Of Ecology*. W.B. Saunders Company, London.
- Ramadhan, R., Mutiara, D., & Yusanti, I. A. (2020). Keanekaragaman Jenis Pakan Pada Lambung Ikan Sepat Siam (*Trichogaster Pectoralis*) Di Rawa Banjiran Desa Sedang Kecamatan Suak Tapeh Kabupaten Banyuasin. *Jurnal Akuakultur Rawa Indonesia*, 8(2), 164–175.
- Sari, D. M. (2019). *Keanekaragaman Jenis Ikan Di Danau Laut Tawar Sebagai Media Pendukung Pembelajaran Biologi Pada Materi Keanekaragaman Hayati Di MAN 2 Aceh Tengah*. Skripsi Universitas Islam Negeri Ar-Raniry, Darussalam, Banda Aceh.
- Swacita, I. B. N. (2017). *Pestisidan dan Dampaknya Terhadap Lingkungan*. Bahan Ajar Kesehatan Lingkungan. Universitas Udayana, Bali.
- Syafei, L. S. (2017). Keanekaragaman Hayati dan Konservasi Ikan Air Tawar. *Jurnal Penyuluhan Kelautan dan Perikanan Indonesia*, 11(1), 48–62.