

COMMUNITY STRUCTURE OF FISH SPECIES IN THE BATANG BUNGO RIVER, BUNGO DISTRICT, JAMBI PROVINCE

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ABSTRACT

This research looks at the types and diversity of fish, dominance index, evenness index, and richness index of fish species found in the Batang Bungo River, Jambi Province, Indonesia. This research was conducted from March to May 2022 at III stations. Station I Dusun Buat, station II Dusun Rantau Pandan, and station III Dusun Rantau Duku. The fishing equipment used are gillnets, nets, traps, shooting, longline fishing, and fixed fishing using local fishermen. The types of fish caught were 18 species in 5 orders, 14 genera from the Cypriniformes order, one genus from the Labyrinthici order, one genus from the Perciformes order, one genus from the Siluriformes order, and one genus from the tetraodontiformes order, the total number caught was 505 fish. The fish species diversity index (H') is in the medium category with a value of 2,576, the species evenness index (E) 0.891, the dominance index (C') 0.095, and the species richness (R) 2.731.

Keywords: Diversity, Evenness, Dominance, Richness of Fish Species

1. INTRODUCTION

The Batang Bungo River is one of the main rivers in Bungo Regency, Jambi Province, with a length of ± 50 km. According to Budiyo¹, 25 species from 16 genera and nine families were found. Furthermore, Syaputra et al.² found 156 individuals of 6 species representing five orders, nine families, and 15 genera in the exact location.

Based on the research above and the author's interview with local fishermen, they stated that there had been a decline in both species and populations of freshwater fish in the waters of the Batang Bungo River from year to year; ecological factors and community activities could cause this. The community uses the Batang Bungo River flow for oil palm plantations, rubber, toilets, agriculture, C excavation, B excavation, PDAM, and fishing by fishermen. According to Purwanto et al.³, among the biotic components, fish is one of the aquatic organisms vulnerable to environmental changes, especially those

caused by human activities, both directly and indirectly.

These waste materials produced by various human activities affect water quality physically, chemically, and biologically, including the distribution and diversity of fish. For each type of fish to live and reproduce well, it must be able to adapt to the environmental conditions in which it lives. Environmental factors greatly influence fish life. Considering the vital role of the types of fish in the waters of the Batang Bungo River and the lack of data or information about the kinds of fish, especially those in the waters of the Batang Bungo River, Bungo Regency, Jambi Province, it is necessary to conduct a scientific study on the community structure of fish species in the Batang Bungo River.

2. RESEARCH METHOD

Time and Place

Fish sampling will be carried out from March to May 2022. Station I is upstream of the Dusun Buat River in the

utilization zone, station II is in Rantau Pandan Hamlet, and Station III is in Rantau Duku Hamlet downstream of the river.

Method

Sampling was carried out selectively (purposive sampling) based on consideration of the conditions, state of the river waters, and the researcher's wishes. The fishing gear in this research is commonly used by local fishermen who use gill nets and longlines following the method⁴. The caught fish samples were preserved in 5% formalin. Measurement and identification of fish refer to Saanin⁵; Kottelat et al.⁶. Fish identification research was carried out in the laboratory of the Fisheries Faculty at Muara Bungo University, Jambi.

Data Analysis

Container Preparation

How little or how much species diversity can be seen from the diversity index (HI). The Diversity Index has the most significant value if all individuals come from different species. The species diversity index is an index to determine the level of species diversity in a community and shows balance in the distribution of the number of individuals of each species⁷. Diversity depends on the number of species and the abundance of each species found in the community⁸. Fish diversity is calculated using the Shannon index^{7,9-10}.

The Shannon - Wiener formula is symbolized by (H1). The performance criteria based on species diversity are $HI < 1$: Low diversity, $HI > 1-3$: Medium diversity, and $HI > 3-4$: High diversity. Next, a test was carried out to see the uniformity of the fish. The uniformity index is an index that describes the size of the number of individuals between species in a fish community⁷.

Uniformity is a measure of the relative abundance of each different species that make up the diversity in an ecosystem⁸. This index shows the even distribution of individuals of each species. The more even

the distribution of individuals between species, the greater the balance of the ecosystem. Community unity can be calculated using the uniformity index equation (evenness)^{7,9-10}. The uniformity index value ranges from 0 to 1. To determine the dominant species, a dominance test is carried out based on the abundance of the species or its biomass in a community. Keystone species are not always the dominant species in a community¹¹. The dominance of a species in a community is calculated using equation⁷.

The dominance index value ranges from 0 to 1. A value close to zero indicates various species in the community, so no particular species dominates. A value close to one suggests that a specific species dominates the community.

$$\text{Species richness (R)} = \frac{S-1}{\ln(n)}$$

Description:

R = Species Richness Index

S = Number of Types

N = Total Number of Individuals of all Types

3. RESULT AND DISCUSSION

Based on the research results, there were 18 types with five orders and 18 genera. Order Cypriniformes: 1 genus of order Labyrinthici, one of order Perciformes, one of order Siluriformes, and one genus of order Tetraodontiformes. The highest number of fish was found at station II, with 13 types. Station III found five classes, and Station I found seven types of fish. The types of fish found in the Batang Bungo River, Jambi Province, can be seen in Table 1.

There were 14 types of fish caught from the Cyprinidae family. According to Hertati¹², Syaputra et al.², Sari et al.¹³. The fish often found in Batang Tebo and Batang Bungo waters are of the Cyprinidae type. The research results on the types of fish often found are from the order Cypriniformes.

According to Kottelat et al.⁶, Yustina¹⁴, Hamida¹⁵, the Cyprinidae fish

species are the principal inhabitants with the largest population in several rivers in Jambi Province apart from the Bagridae species. The large numbers of Cyprinidae families likely found along the banks of the

river are pristine forests and oil palm plantations. The Cyprinidae family is a fish that likes to eat moss that is available in the water from the roots of trees or oil palm fruit that falls into rivers¹⁶.

Table 1. Types of Fish Caught in the Batang Bungo River, Jambi Province

No	Famili	National name	Regional Name
1	Cyprinidae	Lampam (<i>Barbonymus schwanenfeldii</i>)	Lampam
2		Nalis (<i>Crossocheilus cobitis</i>)	Malih
3		Keperas (<i>Cyclocheilichthys Apogon</i>)	kapiék
4		Masai (<i>Cydochaichthys aroplos</i>)	Masai
5		Palau (<i>Osteochillus vittatus</i>)	Palau
6		Masik (<i>Labiobarbus fasciatus</i>)	Abang ikuk
7		Sebarau (<i>Hampala macrolepidota</i>)	Barau
8		Bentulu (<i>Barbichthys laevis</i>)	Mentulu
9		Selimang batu (<i>Chrossocheilus Siamensis</i>)	Selimang Batu
10		Seluang (<i>Rasbora argyrotaenia</i>)	Seluang
11		Semah (<i>Neolissochilus soro</i>)	Semah daun
12		Simancung (<i>Neolissochilus sumatranus</i>)	Simancung
13		Perut perut (<i>Chela laubuca</i>)	Perut
14		Tawes (<i>Barbonymus gonionotus</i>)	tawes
15	Anabantidae	Gurami (<i>Osphronemus gurami</i>)	Kalui
16	Channidae	Bujuk (<i>Channa cyanospilos</i>)	Bujuk
17	Bagridae	Baung (<i>Hemibagrus numurus</i>)	Baung
18	Tetraodontidae	Buntal (<i>Dichotomysctere nigroviridis</i>)	Buntal hijau

Table 2. Species Diversity Index, Species Evenness Index, and Index dominance of fish species in the Batang Bungo River, Jambi Province

Index	Batang Bungo River
Fish species diversity index (H')	2.576637
Type Evenness (E)	0,891455
Dominant (C')	0,095744
Type Wealth (R)	2,731117

The fish diversity index in the Batang Bungo River, Jambi Province, is classified as medium diversity (H') with a value of 2.57. Criteria for fish species diversity index, if the value of $H' < 1$ means low fish species diversity, if the value $1 < H' < 3$ means medium diversity, and if the H' value > 3 means high fish species diversity¹⁷. High and low species diversity values in a community are primarily determined by two things, namely species richness and the distribution of individuals within the species⁷.

The fish species evenness index in the Batang Bungo River obtained a value of

0.89 (E) $0.6 < E \leq 1.0$; high evenness of the community was stable, a high evenness value was found at station II in Rantau Pandan Hamlet with a value of 0.792418 and a low evenness value found at station III, namely 0.490275. The evenness index is a number whose magnitude is between 0-1⁷.

The dominance value of fish species in the Batang Bungo River is moderate, with a value of 0.095744. The highest dominance value was found at station III in Rantau Duku Hamlet, with a value of 0.2745, and the lowest was at station II (0.126).

One fish species that dominates the Batang Bungo River is the Sebarau, which has a value of 0.027. Sebarau likes small and large rivers with clear, fast-flowing water and sandy and muddy bottoms. The substrate conditions of the Batang Bungo river waters are very suitable for the life of sebarau¹⁸.

The fish species richness index for the third station obtained a value of 2.731, showing that the fish species richness index is relatively low. According to Tandipayul & Haryati¹⁹, the high/low status of fish species diversity in waters can be caused by fishing activities carried out by the community/fishermen in those waters. The dominance index has a relationship with the fish species diversity index; if the dominance index value is high, then the diversity index will be low, or on the contrary, the loss of a dominant species will cause changes in the community⁷. The

Cyprinidae family is more dominantly found in the waters of the Batang Bungo River. The indicator value for the abundance of individuals/species is moderate.

4. CONCLUSION

Eighteen types of fish were found; the most types of fish from the Cyprinidae family were 14 types, the fish species diversity index (H') was classified as medium, the species evenness index (E) was classified as high, the community was stable, the dominance index (C') was medium, and the richness index (R) was classified as low. The number of fish caught from year to year has decreased, and some species are no longer found, so it is necessary to collaborate between the community, fishermen, and government in managing sustainable capture fisheries in the waters of the Batang Bungo River.

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