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Fish Biodiversity in Daek Teluk Kenidae Village, Tambang District, Kampar Regency Riau Province

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A B S T R A C T

Daek Lake is an *oxbow* lake which was formed due to the interruption of the meander flow at one time there was silting at the turn. Lake Daek is a habitat for various species of fish. However, research had never been done in Daek Lake so there is no information about what fish in the lake. This study aims to determine types of fish in this lake, both ornamental or consumption fish. A study has been conducted in July 2022. The method used is a survey method. There were 3 sampling points namely, inlet, in the middle of lake and outlet. Fishing was do every day during two weeks until there are no more new fish species. Fishes was catched fishing rods, traps and gill nets. Water quality parameters measured were temperature, transparency, depth, DO, CO_2, pH, nitrate and phosphate. The results shown that there were 19 types of fish consist of 13 species as consumption fish and 6 species as ornamental-consumption fish. Fish consumption by were *Thynnichthys thynnoides*, *Oxygaster anomalura*, *Barbichthys laevis*, *Osteochilus hasselti*, *Labiobarbus festivus*, *Puntius bulu*, *Channa striata*, *Osphronemus gourami*, *Pristolepis grootii*, *Notopterus boornensis*, *Mystus nigriceps*, *Ompok hypopthalmus* and *Kriptopterus lais*. Where as ornamental fish-consumption were *Esomus metallicus*, *Rasbora argyrotaenia*, *Trichogaster pectoralis*, *Trichogaster trichopterus*, *Trichogaster leerii* and *Helostoma temminckii*. Diversity index of fish in Daek Lake, was 2.83 (moderate). Based on diversity index, it can be concluded that this lake can still support the life of fishes.

Keywords: Oxbow lake, Ornamental fish, Edible fishes, Ornamental-edible fishes

1. INTRODUCTION

The Kampar River Basin (DAS) has had a very significant influence on the lives of the people along its stream. The Kampar watershed is not only meaningful in the physical dimension, but also as a medium for socio-cultural interaction, so it is not surprising to mention that the existence of this river is one of the factors in the history of the island of Sumatra [1]. Kampar waters consist of rivers and lakes. One of the lakes in the Kampar stream is Lake Daek.

Physically, the relationship between rivers and lakes has lost, the ecological relationship between the two can only occur during floods [2]. The relationship that occurs between rivers and lakes during floods causes an increase in water volume, the entry of nutrients into the lake, so that it can increase the fertility of the waters in the lake. In addition, it creates a variety of habitats available for aquatic organisms in the lake. Daek Lake is an oxbow lake which was formed as a result of a cut off from the winding Kampar River when siltation occurred. Lake Daek is located in Teluk Kenidae Village, Tambang District, Kampar Regency, Riau Province. This lake has an area of ±56,600 m2 (±5.66 ha) and has a depth of 1.2-5.8 m.

Daek Lake has an important role for the community as a place for fishing, fish caught by fishermen are used as a daily side dish and sold in the market. Indirectly, Daek Lake helps the economy of fishermen who catch fish in Daek Lake. Research on fish biodiversity has never been done in Daek Lake. Based on the results of interviews with fishermen in Lake Daek it is known that the types of fish found in Lake Daek are snakehead fish, motan, tambakan, jamis, carp, tilapia, cotton, baung, tokang, tapah, catfish, lomak, sepimping and monitoring.

The fish in Daek Lake are diverse and can be grouped into ornamental fish and consumption fish. Ornamental fish are fish that generally have a distinctive shape, color and character. Generally, male ornamental fish have a more beautiful shape and color performance than females [3]. This study aims to find out what types of fish are in Daek Lake and the types of ornamental fish and consumption fish in Daek Lake, Teluk Kenidae Village, Tambang District, Kampar Regency, Riau Province.

2. Materials and Methods

The method used in this research is survey method. Fish caught in Daek Lake are used as research objects. Fish sampling was carried out by sampling and census, by sampling used for fish obtained in large quantities and 3 fish were taken as representatives. While the census is used for fish caught in small quantities or less than 3 fish. Fish samples were taken every day for two weeks until no new fish species were found. Fish samples were taken fresh with different types and sizes ranging from small, medium and large. Fish samples were caught directly using fishing gear adapted to the operating

technique. The fish obtained were then put into a cool box and given ice cubes so that the fish samples obtained were kept fresh before being identified at the Aquatic Biology Laboratory.

The chemical parameters measured were dissolved oxygen, free carbon dioxide, degree of acidity, nitrate and phosphate. While the physical parameters are brightness, temperature and depth. Calculation of species composition (P) is carried out using the equation [4], namely:

$P = \frac{ni}{n} \times 100\%$

Information:

P : Composition of species (%)

ni : The number of individuals of each species

n : Number of individuals of all species

The diversity index was carried out using the Shannon-Wiener formulation [5], namely:

$$H' = -\sum_{i=1}^{n} pi \log2 \, pi$$

Information :

H': Diversity index according to Shannon-Wiener

pi : A probability function for each part separately overall (ni/N)

ni : The number of individuals in type I

n : Total number of individuals

The uniformity index (E) calculation is carried out using the formula [6], namely:

$$E = \frac{H'}{\log2 S}$$

Information :

E : Species uniformity index

S : Number of types

H : Species diversity index

Calculation of the dominance index (C) uses the Simpson formula [6], namely:

$C = \sum (pi)^2$

Information :

C : Simpson dominance index

Pi : a probability function for each part separately overall (ni/N)

ni : number of individuals of type i

N : Number of individuals of all species

3. Results and Discussion

From the results of research conducted at Daek Lake, the catch was 2,756 individuals belonging to 19 species, 17 genera, 8 families and 3 orders. For analysis and identification, 3 individuals were taken per species.

Table 1. Types of Fish Caught in Lake Daek

Number	Ordo	Family	Local Name	Genus	Species
1.	Cypriniformes	Cyprinidae	Motan	Thynnichthys	*T. thynnoides*
			Sepimping	Oxygaster	*O. anomalura*
			Pitulu	Barbichthys	*B. laevis*
			Pantau janggut	Esomus	*E. metallicus*
			Pantau	Rasbora	*R. argyrotaenia*
			Paweh	Osteochilus	*O. hasselti*
			Mali	Labiobarbus	*L. festivus*
			Subahan	Puntius	*P. bulu*

2.	Perciformes	Channidae	Gabus	Channa	*C.striata*
		Osphronemidae	Sepat siam	Trichogaster	*T. pectoralis*
			Sepat rawa		*T. trichopterus*
			Sepat mutiara		*T. leerii*
			Gurami	Osphronemus	*O. gouramy*
		Pristolepididae	Katung	Pristolepis	*P. grootii*
		Helostomatidae	Tambakan	Helostoma	*H. temminckii*
		Notopteridae	Belida	Notopterus	*N. boornensis*
3.	Siluriformes	Bagridae	Ingir-ingir	Mystus	*M. nigriceps*
		Siluridae	Selais danau	Ompok	*O. hypopthalmus*
			Lais	Kryptopterus	*K. lais*
	Amount				**19 Type of fish**

The most common fish species caught in Daek Lake were from the Cyprinidae family 8 species (44%), the Osphronemidae family 3 species (17%), the Siluridae family 2 species (11%), the Helostomatidae family, Notopteridae, Bagridae each 1 species (6%), families Channidae and Pristolepididae 1 species (5%). For more details can be seen in Figure 1.
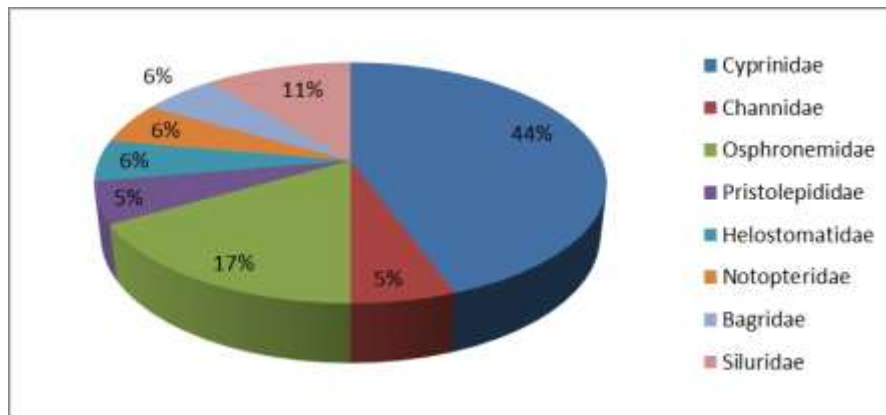

Figure 1. Percentage of Number of Species of Each Family

The most common fish species in Daek Lake are from the Cyprinidae family (Figure 1). The results of data from several studies that have been conducted in Riau waters also show that several types of fish from the Cyprinidae family are found more frequently than fish from other families. The Cyprinidae family is the family with the most species found in fresh waters. The Cyprinidae family has been known as the main inhabitant of the largest population for several waters in Sumatra [7].

The lowest H' value was found at sampling point 1 which was 2.7 and the highest H' was found at sampling point 3 which was 3,03. For more details can be seen in Figure 2.
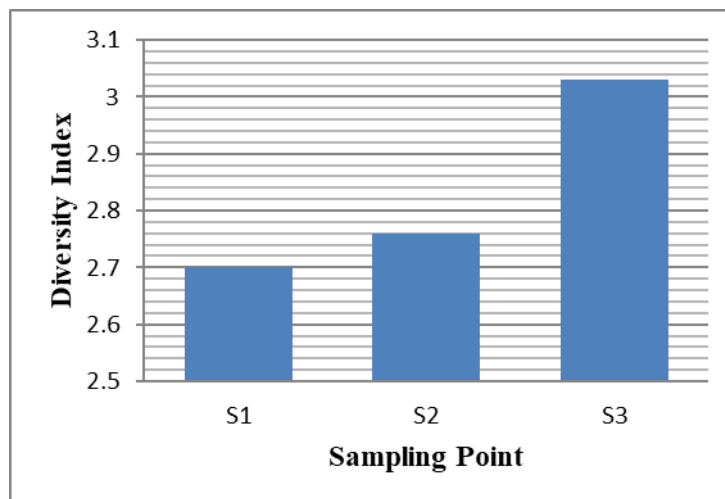

Figure 2. Fish Diversity Index in Lake Daek

The average diversity index value in Daek Lake is 2.83. This value can be categorized as moderate and stable. The diversity index shows the number of fish species that are able to adapt to the aquatic environment as a place to live. The higher the diversity index value, the more species are able to survive in the aquatic environment.

The lowest E value was found at sampling point 1 which was 0.66 and the highest E value was found at sampling point 3 which was 0.75. For more details can be seen in Figure 3.
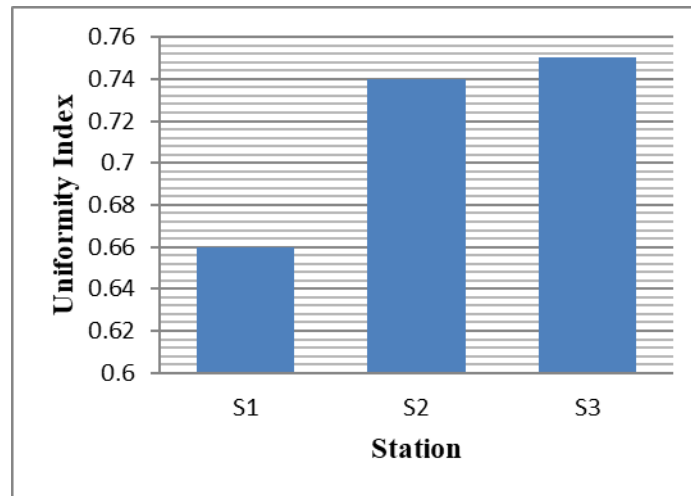

Figure 3. Fish Uniformity Index in Daek Lake

The average uniformity index value in Daek Lake is 0.71. Based on the results of the analysis of the uniformity index value criteria, it shows that the distribution of individual fish in Daek Lake is the same or almost the same between species.

The lowest C value was found at Sampling Point 3, namely 0.15, while the highest C value was found at Sampling Point 1, namely 0.22. For more details can be seen in Figure 4.
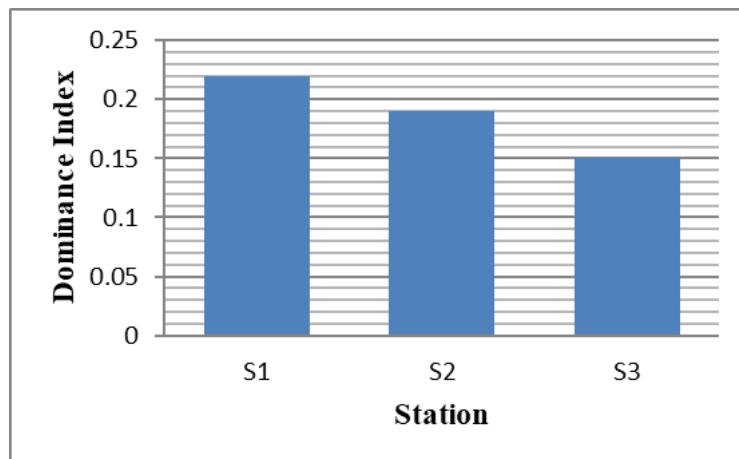

Figure 4. Dominance Index Value in Lake Daek

The average dominance index value in Lake Daek is 0.18. Based on these values, it indicates that the dominance index in Lake Daek is low. This shows that there are no fish species that dominate the waters in Lake Daek.

The grouping of consumption fish and ornamental fish-consumption can be seen in Table 2.

Table 2. Grouping of Fish Types Caught

Number	Scientific name	Name Local	Group ornamental	Consumption	Ornamental-Consumable
1.	*Thynnichthys thynnoides*	Motan	-	√	-
2.	*Oxygaster anomalura*	Sepimping	-	√	-
3.	*Barbichthys laevis*	Pitulu	-	√	-
4.	*Esomus metallicus*	Pantau janggut		-	√
5.	*Rasbora argyrotaenia*	Pantau	-	-	√
6.	*Osteochilus hasselti*	Paweh	-	√	-

No.	Species	Name			
7.	*Labiobarbus festivus*	Mali	-	√	-
8.	*Puntius bulu*	Subahan	-	√	-
9.	*Channa striata*	Gabus	-	√	-
10.	*Trichogaster pectoralis*	Sepat siam	-		√
11.	*Trichogaster trichopterus*	Sepat rawa	-	-	√
12.	*Trichogaster leerii*	Sepat mutiara	-	-	√
13.	*Osphronemus gouramy*	Gurami		√	-
14.	*Pristolepis grootii*	Katung	-	√	-
15.	*Helostoma temminckii*	Tambakan	-	-	√
16.	*Notopterus boornensis*	Belida		√	-
17.	*Mystus nigriceps*	Ingir-ingir	-	√	-
18.	*Ompok hypopthalmus*	Selais danau	-	√	-
19.	*Kriptopterus lais*	Lais	-	√	-

The results of the study can be seen (Table 2) 13 species of fish caught for consumption fish while 6 species for ornamental fish for consumption. Based on the results of interviews with fishermen that the classification of these fish includes fish with high economic value such as fish jamis, belida, gourami and cork.

A water is considered feasible if the quality of the water is able to support the survival of organisms found in a waters. For more details can be seen in Table 3.

Table 2. Water Quality Parameters

Number	Parameter	Unit	Early			End		
			Inlet	Middle	*Outlet*	*Inlet*	Middle	*Outlet*
I	**Physics**							
	Temperature	ºC	29	30	30	30	30	30
	Brightness	Cm	64,5	70,2	60,5	62,5	63,5	63
	Depth	M	1,79	5,5	1,2	2,4	5,9	1,7
II	**Chemical**							
	Acidity (pH)	-	5	5	5	5	5	5
	Dissolved oxygen	mg/L	6,8	7,6	4	7,6	8,8	4,3
	Free carbon dioxide	mg/L	7,99	9,59	11,98	7,99	9,99	12,99
	Nitrate	mg/L	0,0542	0,0646	0,0542			
	Phosphate	mg/L	0,0465	0,0509	0,0420			

4. Conclusion

The results showed that the number of fish caught in this study was 19 species, 17 genera, 8 families and 3 orders, the number of fish caught was 2,756 fish. The index value of diversity (H') is 2.83, the index of uniformity (E) is 0.71 and the value of the dominance index (C) is 0.18. This indicates that the diversity of fish in Lake Daek is still moderate. The types of fish obtained during the research were 19 species. While the type of fish consumption of 13 species and ornamental fish-consumption of 6 species. The results of water quality measurements carried out in Daek Lake were still able to support fish life in these waters, it was proven that there were still many types of fish caught during the research.

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