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KEANEKARAGAMAN HASIL TANGKAPAN TANGKUL (*Portable lift net*) DI DANAU TELUK KELURAHAN OLAK KEMANG KECAMATAN DANAU TELUK KOTA JAMBI

Diversity Of Tangkul Catches (Portable Lift Net) In Teluk Lake Olak Kemang Village Danau Teluk Distric Jambi City

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ABSTRAK

Tangkul atau jaring angkat merupakan alat tangkap sejenis anco yang berbeda hanya ukurannya besar. Tangkul berbentuk bujur sangkar, pada umumnya berukuran 5x5 m dengan ukuran mata jaring cukup bervariasi antara 1/4 - 1,5 inci, disesuaikan dengan musim ikan. Tujuan penelitian ini untuk mengetahui keanekaragaman hasil tangkapan tangkul (*Portable lift net*) di Danau Teluk kelurahan Olak Kemang Kecamatan Danau Teluk Kota Jambi. Penelitian ini dilaksanakan pada tanggal 21 Maret 2022 sampai 21 April 2022. Metode yang digunakan dalam penelitian ini adalah metode survei yaitu dengan pengamatan langsung dilapangan serta melakukan wawancara kepada nelayan. Data yang dihimpun yaitu hasil tangkapan alat tangkap tangkul yang meliputi jenis ikan, jumlah hasil tangkapan (ekor) dan jumlah berat hasil tangkapan (gram). Selanjutnya parameter lingkungan yaitu suhu, derajat keasaman (pH), dan kedalaman. Hasil penelitian yang telah didapatkan yaitu komposisi hasil tangkapan tangkul terdapat 9 spesies ikan dengan komposisi tertinggi ikan lambak pipih (*Thynnichtys polylepis*) dengan nilai 42,52 % dan komposisi terendah yaitu pada spesies ikan patin (*Pangasianodon hypophthalmus*) dengan nilai 0,30 %. Indeks keanekaragaman (H') yang diperoleh dengan nilai 1,39 termasuk kategori sedang, indeks kemerataan (E) yang diperoleh dengan nilai 0,64 termasuk kategori tingi dan indeks dominansi (C) yang diperoleh dengan nilai 0,30 termasuk kategori rendah. Kesimpulan dari penelitian ini adalah indeks keanekaragaman hasil tangkapan tangkul (Portable lift net) termasuk ke dalam kategori sedang dan tidak ada jenis ikan yang mendominansi atau termasuk ke dalam kategori rendah di Danau Teluk Kelurahan Olak Kemang Kecamatan Danau Teluk Kota Jambi.

ABSTRACT

Tangkul or lift net is a type of anco fishing gear that differs only in large size. Tangkul is a square, generally measuring 5x5 m with a mesh size varying between 1/4 - 1.5 inches, depending on the fishing season. The purpose of this determine the diversity of tangkul catches (Portable lift net) in Teluk Lake, Olak Kemang Village, Danau Teluk Distric Jambi City. This research was conducted on March 21, 2022 to April 21, 2022. The method used

in this research is a survey method, namely by direct observation in the field and conducting interviews with fishermen. The data collected is the catch of tangkul fishing gear which includes the type of fish, the number of catches (tails) and the total weight of the catch (grams). Furthermore, environmental parameters are temperature, degree of acidity (pH), and depth. The results of the research that have been obtained are the composition of tangkul catches, there are 9 species of fish with the highest composition being flatback fish (*Thynnichtys polylepis*) with a value of 42.52% and the lowest composition being catfish species (*Pangasianodon hypophthalmus*) with a value of 0.30%. The diversity index (H') obtained with a value of 1.39 is in the medium category, the evenness index (E) obtained with a value of 0.64 is in the high category and the dominance index (C) obtained with a value of 0.30 is in the low category. The conclusion of this study is the diversity index of Tangkul catches (Portable lift net) is in the medium category and no fish species dominate or are included in the low category in Teluk Lake, Olak Kemang Village, Danau Teluk District, Jambi City.

Kata Kunci	*Alat Tangkap Tangkul, Keanekaragaman, Komposisi, Kemerataan, Jumlah Hasil Tangkapan*
Keywords	*Tangkul Fishing Gear, Diversity, Composition, Evenness, Number of Catches*
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INTRODUCTION

Teluk Lake is located on Jalan K.H Hasan Anang, Olak Kemang Village, Danau Teluk District, Jambi City. This lake was formed naturally at a height of 20 meters above sea level with a water temperature ranging from 33 - 38°C, which is a good temperature for the growth and development of aquatic biota, especially fish (Widarmanto *et al.,* 2006). Most of the people around the lake use the lake for floating net cage (KJA) cultivation, especially tilapia.

The number of active Tangkul (Portable lift net) fishermen in Teluk Olak Kemang Lake is around 15 people. The types of fishing gear available in Teluk Olak Kemang Lake are quite diverse, including portable lift nets, line fishing, gill nets, tubular traps and cash net fishing. Of the several types of fishing gear, tangkul is the dominant fishing gear operated by fishermen (Sukandi, 2008).

Tangkul is a simple fishing tool because it does not require many fishermen involved, even 1 fisherman is enough. The embankment is operated in an open area to make installation easier and can also be installed on river banks. The operation of this fishing gear can be carried out by 2 fishermen, 1 fisherman lifts the hook and 1 fisherman is tasked with scooping or collecting the caught fish.

Diversity indices are the simplest biomonitoring approach, often developed to describe the response of a community of organisms to environmental variation. High species diversity in a body of water indicates a good community condition, whereas low diversity means there is an ecological imbalance in that water (Utomo *et al.,* 2014). In

general, polluted waters have relatively low species richness and are dominated by certain species. However, so far the diversity of types of portable lift net catches in Lake Teluk, Olak Kemang Village, Danau Teluk District, is not yet known. Fishermen in Lake Teluk, Olak Kemang Village, use various types of fishing gear. The catches obtained from each type of fishing gear also vary.

This research aims to determine the diversity of portable lift net catches in Lake Teluk, Olak Kemang Village, Danau Teluk District, Jambi City.

METHODS

Time and Place Research

This research was carried out in Danau Teluk, Olak Kemang Village, Danau Teluk District, Jambi City. On March 21, 2022 to April 21, 2022.

Tools and materials

The materials used in this research were 15 units of portable lift net, measuring 7 x 7 m2 with a mesh size of 3/4 inch. Meanwhile, the tools used in this research are boats as a means of transportation and also for transporting catches, scales to measure the weight of fish, thermometers as a temperature measuring tool, long ropes with weights to measure depth, pH meters to measure the pH of water, books and tools. write to record research results and camera for documentation during research.

Research Design

The method used in this research is a survey method, namely by direct observation in the field and conducting interviews with fishermen. There are 15 fishermen who use portable lift net fishing gear on Lake Teluk Olak Kemang. Data sampling was done directly with 15 fishermen/tangkuls, each sampling represented the habitat characteristics, composition and diversity of the number of catches from tangkul fishing gear. The samples taken to be used as data were 15 tangkul fishing gear and carried out in 3 repetitions for 15 days. The fishing operation was carried out in the morning at 08.00 WIB with a soaking time of 3 hours, namely every 1 hour the embankment was lifted and then soaked again. Then environmental parameters were measured, namely temperature, degree of acidity (pH) and depth.

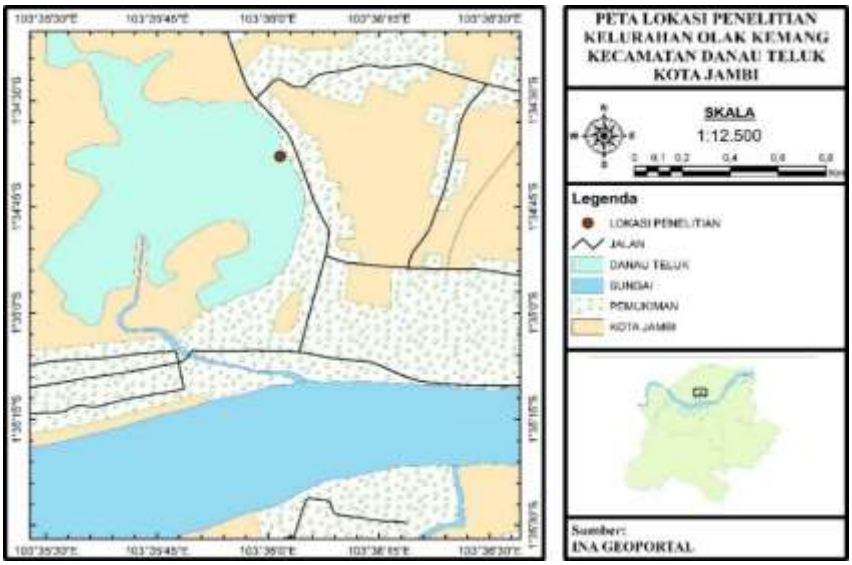

Figure 1. Research Place

Collected Data

The data collected in this research includes catches from tangkul fishing gear, the catch data includes the type of fish and the number of catches (fish) and weight (grams). Furthermore, the environmental parameters are temperature, degree of acidity (pH), and depth.

Data analysis

The data analysis used in this research is descriptive analysis and is presented in the form of tables and graphs. To calculate the diversity of catch types, use the following formula:

1. Compotition

   To calculate the composition of the tangkul catch in Teluk Olak Kemang Lake, it is determined using the formula Krebs (1972):

$$TC = \frac{ni}{N} X\ 100\%$$

   Note:
   TC = Type Composition (%)
   ni = Number of individuals of the i-th species
   N = Total number of individuals of all species

2. Diversity Index

   Diversity index analysis is used to determine the diversity of species. The equation used to calculate this index is the Shanon-Wiener equation as follows (Odum, 1971):

$$H' = - \sum \frac{ni}{N} \text{ x } \ln \frac{ni}{N}$$

   Note:
   H' = Shanon-Wiener Diversity Index
   ni = Number of individuals in one species
   N = Total number of individuals of the species found

   The range of uniformity index (H') values is classified as follows:
   H' < 1 = Low, meaning that species diversity is low with the number of individuals not being uniform and one species dominating.
   1 < H'< 3 = Medium, meaning moderate species diversity with a uniform number of individuals and no dominating species.
   H' > 3 = High, meaning high species diversity with a high number of individuals of each species.

3. Evenness Index

   The distribution of the number of individuals in each organism can be determined by comparing the diversity index value with the maximum value. Analysis of the species composition evenness index uses the following formula (Odum, 1971):

$$E = \frac{H'}{H\ maks}$$

Note:
E = Evenness Index
H' = Diversity Index
H max = In S
S = Number of Species

The criteria for the range of evenness index (E) of aquatic biota according to Krebs (1972) are if E<0.4, then the population evenness is small; if 0.4<E<0.6, then population evenness is moderate; if E>0.6, then population evenness is high.

The smaller the diversity index, the smaller the evenness index, which means that there is dominance of one type over another.

4. Dominance Index

The dominance index is calculated using Simpson's "Index of Dominance" formula (Odum, 1971).

$$C = \sum \left(\frac{ni}{N}\right)^2$$

Note:
C = Simpson Domination
ni = Number of individuals per species
N = Number of individuals in all species

According to (Odum, 1971), the dominance index ranges from 0 to 1, where the smaller the dominance index value, it indicates that no species dominates and conversely, the greater the dominance index, it indicates that there is a certain species.

According to (Fernita, 2007), the range of dominance index (C) values is classified as follows:

C < 0.4	= Low, meaning low dominance with a diverse number of individuals.
0.4 ≤C ≤ 0.6	= Medium, meaning moderate dominance with a less diverse number of individuals.
C > 0.6	= High, meaning high dominance with a number of individuals of the same type.

RESULT AND DISCUSSION

Composition of Tangkul Catch

The composition of the catch of the tangkul (Portable lift net) contains 9 species of fish in the form of pelagic fish groups, namely Flat Lambak (*Thynnichtys polylepis*), Muncung Lambak (*Labiobarbus ocellatus*), Sand Lambak (*Labiobarbus festivus*), Kapiat (*Barbonymus gonionotus*), Semuruk (*Osteochilus microcephalus*), Red Eye Aro (*Thryssocyprisornithostoma*), Gabus (*Channa striata*), Baung (*Hemibagrus capitulum*), Patin (*Pangasianodon hypophthalmus*).

Pelagic fish are fish that live on the surface of the water. Pelagic fish have the habit of forming schools (schooling) to carry out their lives, whether by immigrating (ruaya), looking for food, or even spawning. The types of fish caught by the portable lift net in Teluk Olak Lake, Kemang, Danau Teluk District, Jambi City can be seen in Table 1.

Table 1. Composition of Tangkul (Portable lift net) catches in Lake Teluk, Olak Kemang Village, Danau Teluk District, Jambi City

No	Type of Fishes		Number (Tails)	Compotition (%)	Weight (Gram)	Compotition (%)	Note
	Local Name	Scientific Name					
1	Lambak Pipih	*Thynnichtys polylepis*	1.293	42,52	14.821	43,44	HTU
2	Lambak Muncung	*Labiobarbus ocellatus*	898	29,53	9.155	26,83	HTU
3	Lambak Pasir	*Labiobarbus festivus*	554	17,76	4.108	12,04	HTU
4	Kapiat	*Barbonymus gonionotus*	183	5,95	2.695	7,90	HTU
5	Semuruk	*Osteochilus microcephalus*	53	1,58	506	1,48	HTU
6	Aro Mata Merah	*Thryssocyprisornithostoma*	44	1,38	460	1,35	HTS
7	Gabus	*Channa striata*	15	0,49	896	2,63	HTS
8	Baung	*Hemibagrus capitulum*	15	0,49	376	1,10	HTS
9	Patin	*Pangasianodon hypophthalmus*	9	0,30	1.101	3,23	HTS
Number			3.064	100	34.118	100	
Average Catch/day			204		2.275		

Diversity, Evenness and Dominance Index of Tangkul Catch

The diversity of Tangkul (Portable lift net) catches during the research was 9 species of fish. The diversity index values can be seen in Table 2.

Table 2. Diversity Index Value, Evenness Index and Dominance Index

Indeks	Value	Category
H'	1,30	Middle
E	0,64	High
C	0,38	Low

Note: H'= Diversity Index
E = Evenness Index
C = Dominance Index

Environmental Parameters

Measuring environmental parameters is one of the factors that is very influential in determining success in fishing. The aim of observing environmental parameters is to determine the suitability of water quality for fish habitat. The environmental parameters measured during the research were temperature, pH and water depth. The following results of environmental parameter measurements during the research can be seen in Table 3.

Table 3. Measurement of Environmental Parameters

Environmental Parameter	Unit	Result
Temperature	˚C	27-30
pH	-	7,-7,8
Depth	M	4-5

Teluk Olak Kemang Lake is one of the lakes in Jambi City, precisely on Jalan K.H. Hasan Anang, Olak Kemang Village, Danau Teluk District, Jambi City. Based on the morphology of its formation, Teluk Lake is a type of oxbow lake (horseshoe-shaped), with conditions at high tide the lake waters will merge with the waters of the Batanghari river (Widarmanto *et al.*,, 2006). This lake has quite high economic potential for development, especially in the field of catching and cultivating freshwater fish. According to Sukmono (2010) Teluk Lake has high fisheries potential, from this there are several fish catches, namely: gabus, baung, toman, catfish, but in general the number of these types of fish is low. There are several types of fish that are most dominant, namely the flat lambak, snout lambak, and capiat.

The entire surface of Teluk Lake, Olak Kemang Village, Teluk Teluk District, Jambi City, is almost covered by fish cultivation cages. The result of the large number of cages causes a buildup of leftover food at the bottom of the lake, so that during the rainy season changes in temperature and upwelling of lake water can cause fish to die (Harahap, 2018) Fishing equipment is very necessary in the fishing process. The types of fishing gear that currently exist in Lake Teluk Olak Kemang are: tangkul (Portable lift net), gerugu trap (Tubular trap), net (Cash net fishing), gill net (Gill net), and longline (Long line) (Widarmanto *et al.,* 2006). Fishing with pole fishing gear is carried out in the waters of Teluk Lake which is located in the middle, a little far from the settlement. Installation of fishing gear is carried out in the morning and removal is carried out in the afternoon. The arrest was carried out for 15 days. At the time of research the water conditions were receding or dry.

Based on Table 1, Composition of Tangkul (Portable lift net) Catches in Lake Teluk, Olak Kemang Subdistrict, it can be seen that the total number of catches by tangkul fishing equipment was 3,041 fish weighing 34,118 grams with the highest catch being Flathead Lambak (*Thynnichtys polylepis*) with 1,293 fish. weighs 14,821 grams. This is in accordance with the opinion of Simanjuntak (2006) which states that the flat lambfish (*Thynnichtys polylepis*) is a type of fish that is abundant in flooded swamps in the form of horseshoe lakes on the Kampar Kiri River with sand and mud substrates.

The flat lamb (*Thynnichtys polylepis*) has morphological characteristics, the head is tapered, the overculum has large petals, the mouth is anterior and small, there is no upper lip and lower jaw, it has a small lip fold at the angle of the jaw (Novrizal, 2015). This is also supported by the opinion of Fauziah (2017)who stated that several studies regarding the diversity of freshwater fish found in lake waters also reported that fish from the Cyprinidae family were the most numerous/dominant group inhabiting lake waters. Then one of the factors that influences the number of fish in freshwater waters is the rate of water flow.

Based on this table, it can also be explained that the highest amount of composition is in the flathead fish (*Thynnichtys polylepis*) with a value of 42.20%. Flattened lambfish (*Thynnichtys polylepis*) are more commonly found because they are located a little far from

residential areas, so flattened lambfish can easily enter nets. Flattened lambfish are pelagic fish that like to gather together, are agile and very sensitive to movement. Apart from that, flathead fish can also live in all water conditions, even in acidic waters.

This is in accordance with the opinion of Simanjuntak (2006) that lambak fish is a type of fish that is abundant in flooded swamps in the form of horseshoe lakes on the Kampar Kiri River. The availability of natural food is a source of food for lambak fish. This is also the opinion of Nurdawati (2006) who explains that in the flooded swamp waters of Teluk Lake, especially in parts of the waters that are overgrown with submerged aquatic vegetation, the abundance of lambak fish is very dominant.

The lowest catch was 9 Patin fish (*Pangasianodon hypophthalmus*) weighing 1,101 grams. This is in accordance with the opinion of Kordi (2010)who explains that this is because the habitat of catfish is on the banks of large rivers and estuaries and lakes. Judging from the catfish's mouth, which is located slightly downwards, the fish is a fish that lives at the bottom of the water. Patin is known as a nocturnal animal, namely one that is active at night. This fish likes to hide in riverside burrows. Therefore, catfish are rarely caught because their natural habitat is on the banks of large rivers.

Based on Table 2, it can be seen that the diversity index value obtained from observations is in the medium category with a diversity index value of 1.30. According to the Shanon-Wiener equation, if H' (Diversity Index) is in the range of 1-3 then it is categorized as medium diversity and there are no dominant species. This means that the number of fish species that live in Teluk Lake, Olak Kemang Village is quite large because it has a balanced ecosystem and there is no disturbance to the fish's habitat. This is supported by the opinion of Eddy (2013) who explains that the fish diversity index at a location describes the richness of fish at that location. The diversity index value depends on variations in the number of individuals of each species, so that the diversity of an ecosystem will be smaller and vice versa. and is also supported by the opinion of Odum (1971) that a stable environment is characterized by balanced conditions and contains diverse life without any dominant species.

The evenness index value obtained was 0.64. According to Odum (1971), the E value is between 0 and 1. If the E value is smaller, the population evenness will be smaller, meaning that the distribution of the number of individuals in each genus is not the same and there is a tendency for one genera to dominate the population. Conversely, if the value of E is greater, then the populations are relatively the same, or not much different. According to the research results, the dominance index value was 0.38. According to Odum (1971) states that if the C value is close to 0 then there is no dominant type and the C value is close to 1 then there is a dominant type.

Dominance index analysis used in this research is useful for seeing whether or not a type of fish is dominant in a body of water. The dominance index used is the Simpson Dominance Index with a value range of 0–1, where the smaller the dominance index value means there is no species that dominates a particular body of water and conversely the greater the dominance means there is a certain species that dominates in that water.

Tangkul (Portable lift net) is a permanent fishing gear, in terms of mesh size this fishing gear is quite selective because the mesh size used is ¾ inch, according to the results of this research, tangkul catches have moderate diversity which means this fishing gear is still classified as selective because the target catch is only pelagic fish. In terms of selectivity, if a fishing gear has a high diversity of catches, it indicates that the fishing gear is not selective.

Based on Table 3, it can be seen that the results of temperature measurements in Lake Teluk, Olak Kemang Village range between 27°C-30°C. With this temperature range,

it can be said that the temperature in these waters is the optimum temperature. This is in accordance with the opinion of Effendi (2003) which states that the optimal temperature for fish in tropical waters is between 25℃-32℃. In this range, the oxygen consumed reaches 2.2 mg/g body weight/hour. Below a temperature of 25℃, oxygen consumed reaches 1.2 mg/g body weight/hour. At temperatures of 18℃- 25℃ fish can still survive, but their appetite decreases. Water temperatures of 12℃- 18℃ start to be dangerous for fish, and at temperatures below 12℃ tropical fish can freeze to death. This is also supported by the opinion of Gusriana (2008) who states that the water temperature range that is necessary for the growth of fish in tropical waters so that they can survive well is between 25℃-32℃.

pH measurements during the study ranged from 7-8. The pH value characterizes the balance between acids and bases in water and is a measurement of the hydrogen ions (H+) contained in water. In table 4 it can be seen that the pH range in Lake Teluk, Olak Kemang Village is still considered optimal. This is in accordance with the opinion of Barus (2004) which states that pH (Degree of acidity) is a measure of the concentration of hydrogen ions which indicates whether water is acidic or alkaline. Water is said to be alkaline if the pH is >7 and is said to be acidic if the pH is <7. Naturally, the pH of waters is influenced by the concentration of carbon dioxide and acidic compounds. Water pH is very influential on fish life, the ideal water pH for fish life is between 6.5-7.5. Fresh water from the mountains usually has a higher pH. Water pH less than 6 or more than 8.5 needs to be watched out for because there may be contamination. This can also cause metabolic and respiratory disorders in fish.

This is also supported by the opinion of Effendi (2003) stating that waters with strong acidic conditions will cause heavy metals such as aluminum to have increased mobility and because metals are toxic they can threaten biota life. The ideal pH for fish life is between 7-8.5.

The depth at the time of research ranged from 4-5 m. The depth of the lake affects the fishing process because the tangkul fishing gear is operated by lowering it into the body of water, this makes fishermen who use the tangkul unable to operate it when the water recedes to a depth of less than 3 meters because if it is operated it will cause the net to be easily damaged by touching the bottom of the water. This is in accordance with the opinion of Gusriana (2008) who states that water depth influences the distribution and types of fish. Water that is too shallow causes large temperature changes because sunlight penetrates directly to the bottom of the water. If the water is too deep, it will result in a very clear temperature difference between the upper water and the lower water because sunlight does not reach the bottom of the water. The optimal water depth for fish life is between 70-120 cm.

CONCLUSSION AND SUGGESTION

Based on the research results, it can be concluded that the diversity of portable lift net catches in Lake Teluk, Olak Kemang Village, Danau Teluk District, Jambi City, namely the composition of portable lift net catches, contains 9 species. The highest catch was 1,293 flathead fish (*Thynnichtys polylepis*) weighing 14,821 grams and the lowest catch was 9 Patin fish (*Pangasianodon hypophthalmus*) weighing 1,101 grams. The diversity index obtained with a value of 1.30 is included in the medium category. The evenness index obtained with a value of 0.64 is included in the high category and the dominance index obtained with a value of 0.38 is included in the low category, which means there is no dominant fish species in Teluk Lake, Olak Kemang Village, Danau Teluk District, Jambi City.

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