

## COMPOSITION OF CATCH RESULTS AND CATCH RATE OF IRON TRAP IN KERINCI LAKE, KERINCI REGENCY

Komposisi Hasil Tangkapan dan Laju Tangkap Bubu Besi di Danau Kerinci  
Kabupaten Kerinci

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### ABSTRACT

The catch is influenced by the catch rate of fishing gear. This study aims to analyze the catch composition, catch rate, frequency of fish emergence, and factors affecting the catch of iron traps in Lake Kerinci. The study was conducted from August–October 2025 with 10 fishermen on 30 fishing trips. The total catch reached 467 fish weighing 90.743 kg, dominated by tilapia at 77.74%, followed by medic fish, freshwater lobster, and climbing perch. Tilapia had the highest occurrence frequency (100%), indicating high abundance in the lake waters. The average catch rate was 30.25 kg/trip with variations between fishermen due to differences in location and water conditions. Regression analysis showed that the operating duration, number, and dimensions of the traps did not significantly affect the catch ( $R^2 = 0.10$ ). In general, iron traps are classified as effective, selective, and environmentally friendly, thus having the potential to support sustainable capture fisheries in Lake Kerinci.

Keywords: Catch Composition, Catch Rate, Frequency of Occurrence, Lake Kerinci, Traps

### ABSTRAK

Hasil tangkapan dipengaruhi oleh laju tangkap alat penangkapan ikan. Penelitian ini bertujuan menganalisis komposisi hasil tangkapan, laju tangkap, frekuensi kemunculan ikan, serta faktor yang memengaruhi hasil tangkapan bubu besi di Danau Kerinci. Penelitian dilaksanakan pada Agustus–Oktober 2025 terhadap 10 nelayan dengan 30 trip penangkapan. Total hasil tangkapan mencapai 467 ekor dengan berat 90,743 kg, didominasi ikan nila sebesar 77,74%, diikuti ikan medik, lobster air tawar, dan ikan betok. Ikan nila memiliki frekuensi kemunculan tertinggi (100%), menunjukkan kelimpahan yang tinggi di perairan danau. Rata-rata laju tangkap sebesar 30,25 kg/trip dengan variasi antar nelayan akibat perbedaan lokasi dan kondisi perairan. Analisis regresi menunjukkan bahwa durasi pengoperasian, jumlah, dan dimensi bubu tidak berpengaruh signifikan terhadap hasil tangkapan ( $R^2 = 0,10$ ). Secara umum, bubu besi

tergolong efektif, selektif, dan ramah lingkungan sehingga berpotensi mendukung perikanan tangkap berkelanjutan di Danau Kerinci.

Kata Kunci: Bubu Besi, Danau Kerinci, Komposisi Hasil Tangkapan, Laju Tangkap, Frekuensi Kemunculan

## INTRODUCTION

Kerinci Regency is located in Jambi Province, with geographic coordinates between 01°40' and 02°26' South Latitude and 101°08' and 101°50' East Longitude. This region covers approximately 332,807 hectares, or 3,328.14 km<sup>2</sup>. More than half of this area, approximately 1,990.89 km<sup>2</sup>, is within the Kerinci Seblat National Park (TNKS). Kerinci Regency also boasts several lakes, one of which is Lake Kerinci, which spans 4,200 hectares (Ministry of Environment and Forestry, 2025).

Lake Kerinci encompasses two sub-districts: Danau Kerinci and Keliling Danau. Geographically, Lake Kerinci is located at 2°08'58" South Latitude and 101°29'19" East Longitude, situated at the foot of Mount Rayo. Lake Kerinci is a body of water used for aquaculture and capture fisheries (Kerinci Regency Central Statistics Agency, 2013).

Fishing in Lake Kerinci is generally carried out in the morning and evening, depending on the type of fishing gear used by local fishermen. Common fishing gear in this lake includes tangkul/pesap, gillnets, nets, fixed-nets, and lukah or bubu. Among these fishing gear, bubu are the most widely used. Approximately 1,300 bubu are recorded as operating in Lake Kerinci, with 590 in Danau Kerinci District and 710 in Keliling Danau District (Amallya et al., 2020).

The use of bubu is significantly influenced by the time and duration of soaking, which ultimately impacts the catch. This aligns with Nelwan et al. (2015) statement that catch yields are largely determined by the performance of fishing gear in capturing organisms, known as the catch rate. Furthermore, catch composition is also important in assessing gear performance, which refers to the type and number of fish species caught by a particular gear.

Fishermen in Lake Kerinci choose to use fish traps as their fishing gear because they are known to be highly resistant to damage. In practice, these traps are typically baited with golden snails. In a single fishing trip, fishermen generally set between 20 and 50 traps, soaking them for approximately 24 hours and checking them in the morning. The traps are set at a depth of 1 to 2 meters below the water surface. Research by Aldita et al. (2014) in Rawapening waters showed that the soaking time for the traps can vary, from a few hours to three days and three nights, or even up to seven days and seven nights, depending on the target fish species and the fishing location. The research also revealed that shorter soaking times tended to yield more optimal catches than longer soaking times, especially when using golden apple snails as bait. Furthermore, the dimensions of the fishing gear also influenced the catch.

The catches obtained in Lake Kerinci are quite diverse. Some species commonly caught using traps include tilapia (*Oreochromis niloticus*), barau (*Hampala macrolepidota*), medic or nilem fish (*Osteochilus vittatus*) (Agustin et al., 2024), climbing perch (*Anabas testudineus*), seluang fish or juvenile fish (*Rasbora* sp.), and freshwater lobster (*Cherax quadricarinatus*) (Idma & Mohd, 2022). This species diversity indicates that Lake Kerinci has quite high potential for capture fisheries, as well as an aquatic ecosystem that supports various species of fish and other aquatic organisms.

This study aims to assess the performance of traps in Lake Kerinci. Research on this aspect is still limited, particularly regarding catch composition, catch rates, and the factors influencing these. One study conducted in Lake Kerinci by Abdul et al. (2024) examined differences in catches of rice paddy eels (*Monopterus albus*) using PVC pipe traps. Therefore, further research on catch composition and catch rates is needed to gain more information, which can be used as a basis for evaluation and policy-making in sustainable fisheries resource

management.

## METHODS

The materials used in this study were the catches from iron traps. The equipment used included traps for catching fish, digital scales for weighing and totaling the catch, writing materials for recording catch data, such as the type of catch, weight, and number of fish, Microsoft Excel for managing the catch data, a mobile phone camera for documenting the research, and a stopwatch.

The method used in this study was a survey with quantitative descriptive analysis, covering the catch obtained from the operation of the trap fishing gear. Data collection was conducted through participant observation, which involved directly observing the research object with fishermen. This included collecting data on the type of fish and the weight of each species, identifying individual fish, and recording the total weight of the catch. Purposive sampling was used to determine respondents or informants, namely the local community who were the target of the study (Subekti et al., 2013).

Respondents were selected using purposive sampling, consisting of fishermen using iron traps with 10–30 traps. Of 104 fishermen, 10 respondents (10%) were selected, with three replicates of the same fishermen, resulting in 30 catch data sets. The study aimed to analyze the catch composition and catch rate of iron traps in Lake Kerinci, Kerinci Regency. Data collection was conducted directly in the field through trap operation (setting and hauling), recording the quantity and type of catch, weighing the total weight, taking fish samples, and measuring the dimensions of the fishing gear. The data were then processed and analyzed using Microsoft Excel to calculate the catch rate and compile the catch composition.

The data used in this study consisted of primary and secondary data. Primary data were obtained directly through field observations and included data on individual fish species, fish weight, total catch, fishing time per trip, differences in fishing gear dimensions, and the number of traps used. Secondary data included fisheries production data obtained from the local government and the Department, as well as literature reviews in the form of books and scientific journals, which served as research references.

### 1. Composition of Fish Species and Weight

The composition of the catch can be calculated using the following formula (Septiani et al., 2024):

$$\text{Composition (P)} = \frac{n_i}{N} \times 100$$

Where:

- P : Composition of the catch (%)  
n<sub>i</sub> : Number of each fish species (Kg)  
N : Total catch (Kg)

### 2. Catch Rate

The catch rate can be determined using CPUE development data. Catch Per Unit Effort (CPUE) is the catch per fishing effort; the CPUE value is usually calculated from the catch per unit of effort per year. Meanwhile, the catch rate (Cr) is the basis for calculating CPUE, calculated by dividing the total catch in kilograms per trip by the hourly fishing effort, calculated from setup to hauling. Catch rate analysis uses the following equation (Sparre & Venema, 1999).

$$\text{Catch rate (Cr)} = \frac{\text{catch}}{\text{effort}}$$

Where:

- Cr : Catch rate (kg/trip)  
Catch : Total catch (kg)

Effort : Fishing effort (trip)

### 3. Frequency of Sighting

The frequency of sighting is calculated according to (Kadir et al., 2019) using the following equation:

$$\text{Frequency of Sighting (Fr)} = \frac{Jk}{T} \times 100\%$$

Where:

Fr : Frequency of sighting (%)  $\times 100\%$

Jk : Number of sightings of each fish species caught

T : Total data collection trips

### 4. Factors Influencing Catch

To determine the relationship between the independent variables (operation duration in hours, fishing gear dimensions in square meters, and number of traps per trip) and the dependent variable Y, namely catch, multiple regression analysis can be performed using Microsoft Excel 2019. According to (Indara et al., 2017), a common data analysis technique used to examine the relationship between several variables and predict a single variable is to use a regression line to estimate the value.

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3$$

Where:

Y = Catch (Related Variable)

X1 = Operation Duration (Hours)

X2 = Fishing Gear Dimensions (m<sup>3</sup>)

X3 = Number of Fishing Nets

a = Constant

b = Regression Coefficient

## RESULTS

Table 1. Composition of the Catch

Tilapia	<i>Oreochromis niloticus</i>	70,542	77.74	191	40.90
Medik	<i>Osteochilus wandersii</i>	10,711	11.80	111	23.77
Climbing perch	<i>Anabas testudineus</i>	2,129	2.35	25	5.35
Lobster	<i>Cherax quadricarinatus</i>	7,361	8.11	140	29.98
Total		90,743	100	467	100

Table 2. Catch Rate of Iron Trap Fishing Gear

Fishermen	Total Weight (ni) (Kg)	Catch Rate (Cr) (Kg/Trip)
1	12.911	4.30
2	5.502	1.83
3	5.202	1.73
4	4.008	1.34
5	12.721	4.24
6	9.666	3.22
7	3.617	1.21
8	11.2	3.73
9	5.236	1.75
10	20.68	6.89
Average	9.0743	3.025

Note: No. = 1-10 symbols of the fishermen's names

Table 3. Number of Occurrences

No	Species Name	Scientific Name	Number of Occurrences	Fr (%)
1	Tilapia	<i>Oreochromis niloticus</i>	30	100
2	Medik	<i>Osteochilus waandersii</i>	16	53.33
3	Climbing perch	<i>Anabas testudineus</i>	5	16.67
4	Lobster	<i>Cherax quadricarinatus</i>	18	60

Table 4. Results of Analysis of Factors Affecting Catch Results

Variable	Coefficient	P-value
Intercept	18.43	0.20
Operation duration (hours)	-0.86	0.30
Number of traps	-0.22	0.18
Trap fishing gear dimensions	1.44	0.47
R Square = 0.10		

Note: \*Significant at the test level  $\alpha = 5\%$

## DISCUSSION

### 1. Catch Composition

Based on Table 1, it is recorded that the iron trap fishing gear yielded a catch of 467 individuals with a total weight of 90.743 kg. The catch consisted of four species, dominated by tilapia (*Oreochromis niloticus*) with 191 individuals and a total weight of 70.542 kg. The second most abundant species was the medic fish (*Osteochilus waandersii*) with 111 individuals and a total weight of 10.711 kg. Additionally, 140 freshwater lobsters (*Cherax quadricarinatus*) were also caught with a total weight of 7.361 kg. Meanwhile, the species with the lowest number and weight was the climbing perch (*Anabas testudineus*), with only 25 caught with a total weight of 2.129 kg. This distribution of species composition indicates that the iron trap fishing gear tends to be effective in catching tilapia, the dominant species. This is according to research by Samuel & Suryati (2014). The species caught in Lake Kerinci are quite diverse, including tilapia (*Oreochromis niloticus*), mujair (*Oreochromis mossambicus*), barau (*Hampala macrolepidota*), medika (*Osteochilus waandersii*), semah (*Tor douronensis*), rayo or common carp (*Cyprinus carpio*), seluang (*Rasbora* sp.), snakehead (*Channa striata*), sepat (*Trichopodus pectoralis*), catfish (*Clarias* sp.), gourami (*Osphronemus goramy*), tilan (*Mastacembelus erythrotaenia*), and freshwater lobster (*Cherax quadricarinatus*).

The proportion of catches shows that tilapia (*Oreochromis mossambicus*) is the most dominant species, accounting for 40.90% of the total catch. Freshwater lobster (*Cherax quadricarinatus*) contributed 29.98%, while medic fish (*Osteochilus waandersii*) contributed 23.77%. Meanwhile, climbing perch (*Anabas testudineus*) had the lowest proportion, at only 5.35% of the total catch. These results align with research by Amallya et al. (2020), which stated that tilapia (*Oreochromis niloticus*) is the most dominant species caught in Lake Kerinci, particularly using traditional fishing gear such as traps.

By understanding the catch composition, this study identified four types of catch: tilapia (*Oreochromis niloticus*), medic fish (*Osteochilus waandersii*), climbing perch (*Anabas testudineus*), and freshwater lobster (*Cherax quadricarinatus*). The difference in catch composition is likely influenced by the study location, which is located on the lake's edge or in shallow waters. Tilapia and medic fish utilize aquatic plants, moss, and phytoplankton as natural food (Rahanti & Widyorini, 2017).

Based on the table above, the capture of climbing perch is thought to be related to the characteristics of its habitat, which generally prefers rivers, swamps, and lakes with calm currents, muddy bottoms, and abundant aquatic vegetation. These environmental conditions

provide suitable habitat for climbing perch for shelter, foraging, and breeding. This finding aligns with research findings (Mustakim et al., 2009).

## 2. Catch Rate

The catch rate calculated from all fishermen using iron traps shows an average catch per trip of 3,025 kg. This calculation aims to provide a general overview of the catch efficiency achieved by fishermen during fishing activities. The highest catch rate was achieved by Fisherman 10, at 6.89 kg per trip, with a catch of 20.68 kg per trip. Conversely, the lowest catch rate was achieved by Fisherman 7, at 1.21 kg per trip, with a catch of 3,617 kg per trip.

Fisherman 10's high catch is thought to be related to the placement of the iron traps in waterfront areas with abundant moss and other vegetation. These areas are preferred feeding areas for various fish species because they provide natural food sources, such as small organisms and detritus. The presence of aquatic vegetation supports fish activity around the fishing location, increasing the likelihood of fish entering the traps. This condition results in a higher catch compared to other fishing locations.

The low catch rate of Fisherman 7 is thought to be due to unfavorable water conditions during the study, particularly during the dry season. The decrease in water discharge and water level during the study resulted in suboptimal trap installation and limited fishing locations. Shallow water conditions also reduced the effectiveness of fishing gear and the availability of fish in the fishing area. As a result, Fisherman 7's catch was lower than that of other fishermen. This condition aligns with the statement by Hamka & Naping (2019) who stated that fishing activities continue during the dry season, but with lower intensity and yields due to reduced fish availability.

## 3. Frequency of Occurrence

Based on the data presented in Table 3, the fish species with the highest frequency of occurrence during fishing activities was tilapia (*Oreochromis niloticus*), with a value of 100.00%. This indicates that tilapia was the fish species caught on every fishing trip. The second-highest frequency of occurrence was freshwater lobster (*Cherax quadricarinatus*), with a value of 60.00%, followed by medic fish (*Osteochilus waandersii*), with a frequency of occurrence of 53.33%. Meanwhile, climbing perch (*Anabas testudineus*) had the lowest frequency of occurrence, at 16.67%. The high occurrence rate of tilapia is due to its large population and rapid reproductive and growth capabilities, which is consistent with research (Samuel et al., 2017).

Based on the catch composition table, tilapia was the fish species with the highest catch compared to other fish species. The high occurrence rate of tilapia is related to its population and high reproductive capacity. Tilapia are known as a species that easily adapts to various aquatic environments, including freshwater such as lakes. This is in line with the statement by Rhamadini et al. (2024), who stated that tilapia have a fast growth rate and good resilience, enabling them to survive and thrive in a variety of aquatic environments.

The climbing perch showed the lowest occurrence frequency compared to other fish species. This low occurrence frequency is thought to be related to its relatively limited distribution and lower population compared to other species in lake ecosystems. Suhendra et al. (2021) stated that the climbing perch has a habitat preference that leans more towards rivers and swamps than open lakes. Therefore, the relatively open conditions of lake waters and the environmental characteristics that differ from the natural habitat of the climbing perch are thought to influence the low abundance and frequency of occurrence at the study site.

#### 4. Influencing Factors

Factors influencing the catch include the duration of the fishing operation, the dimensions of the fishing gear, and the number of traps. The first independent variable (X1) is the duration of the operation, calculated based on the duration of three stages: setting time (10 minutes to 2 hours), immersion time (2 to 4 hours), and hauling time (30 minutes to 2 hours). The second independent variable (X2) is the dimensions of the fishing gear, which are the results of measurements of the length, width, and height of the iron traps used by 10 fishermen. The third independent variable (X3) is the number of traps used, which totaled 187 units. The dependent variable (Y) is the total catch obtained.

The coefficient of determination (R-square) obtained was 0.10. This figure indicates that 10% of the variation in catches using iron traps as the dependent variable is influenced by the independent variables: the duration of the operation, the number of fishing gears, and the dimensions of the fishing gear. Meanwhile, the remaining 90% is influenced by factors other than the variables examined in this study. According to Rhamadhani & Saputri (2023), the coefficient of determination (R-square) is an indicator that shows how much influence the independent variable has on the dependent variable in a research model.

$$Y = 18.42 - 0.86 X1 - 0.22 X2 + 1.44 X3$$

The regression coefficient for fishing duration (X1) of -0.86 indicates that each one-unit increase in fishing duration results in a 0.86 kg decrease in catch. Meanwhile, the coefficient for the number of traps (X2) of -0.22 indicates that adding one trap will actually reduce catch by 0.22 kg. Conversely, the coefficient for fishing gear dimensions (X3) of 1.44 indicates that a 1 m<sup>3</sup> increase in fishing gear volume can increase catch by 1.44 kg.

A negative regression constant value is not a problem as long as the model meets basic assumptions, such as data normality. In regression analysis, the primary focus is on the coefficient value (slope) of each independent variable. As long as the slope is non-zero and indicates a consistent direction of the relationship, a negative constant value is not a cause for concern. This situation is common, especially when there are differences in scale between the independent and dependent variables. According to Ghozali (2018), the primary goal of regression is to predict the value of Y based on variations in variable X, so the primary focus should be on the independent variables, not the model constant.

The coefficient value for the operating duration variable (X1) is 0.86 with a P-value of  $0.30 > 0.05$  (not significant at the  $\alpha = 5\%$  test level), indicating that operating duration does not significantly affect the weight of the fish catch. However, this positive coefficient value indicates that longer operating duration tends to increase the catch. Meanwhile, the coefficient of the fishing gear quantity variable (X2) of -0.22 with a P-value of  $0.18 > 0.05$  also indicates that this variable does not significantly influence the catch. The negative coefficient value indicates that each additional unit of fishing gear has the potential to reduce the catch by 0.22 kg, although this effect is not statistically significant. Furthermore, the coefficient of the fishing gear dimension variable (X3) of 1.44 with a P-value  $> 0.47$  also indicates that the fishing gear dimension does not significantly influence the weight of the catch. These results are in line with the findings of Irawan (2016). The study concluded that the size of fishing gear does not always significantly influence the amount of catch, especially when analyzed based on the influencing factors.

#### CONCLUSION

Based on the results of the research on throwing nets in Lake Kerinci, the composition of the catch of iron traps consists of four species, with the dominance of tilapia (77.74%), followed by medic fish (11.80%), freshwater lobster (8.11%), and climbing perch (2.35%). The average catch rate was 3.025 kg/hour, with the highest value in fisherman 10 (6.89 kg/hour) and the lowest in fisherman 7 (1.21 kg/hour). The highest frequency of occurrence was also

found in tilapia (100%), while the lowest was in climbing perch (16%). Factors that influence the catch include the duration of operation, the number of traps, and the dimensions of the fishing gear.

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