The population and habitat of mungkus fish (*Sicyopterus cynocephalus*) in Bengkenang Waters South of Bengkulu

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Abstract. *Sicyopterus cynocephalus* is a high-value consumption and is one of the freshwater fish species with special characteristics. It has united belly fins forming a sucking disk to attach itself to its position in a fast-current river with rocky substrate. The habitat of mungkus is currently threatened due to the decreasing environmental quality and productivity caused by pollution of household waste, siltation of the river, fishing with forbidden equipment and the high demand for mungkus meat. This report aims to determine structure of population and habitat of mungkus in waters Bengkenang and Nelengau rivers, South of Bengkulu using catched method per unit of effort with four station. The results showed that 115 mungkus, consist of 37 males, 78 females. Meanwhile, it was shown that three mungkus habitat types; the most favored one is rocky waters with the heavy current, the water quality was suitable for living of mungkus fish. It is expected that the results of this study can be used as a first step to support the success of the process of ex-situ conservation of mungkus fish through domestication activities.

1. Introduction

A term of percent of the population is used in connection with aspects of biology. The population has certain properties as abundance (density), the rate of or level of the birth (natality), the level of death (mortality), to scatter size and the ratio of sex. As parameter aimed to know the state population and changes in the population because change of natural environment [1].

Mungkus (*Sicyopterus cynocephalus*), is a high-value consumption fish with white meat texture and has a distinctively fishy smell, which is widely favored by the public. This is indicated by the high demand for fish wrap though at a high price from the usual price. Mungkus prices usually 20.000 rupiahs per `cupak` with weight less than one kilogram.

These fish are scattered widely in aquatic habitats throughout the temperature and tropical climates. This special characteristic of the fish has a united belly fins forming a sucking disk which serves to attach itself to its position in the fast-current waters, small in size but thick with the tail form thinning [2]. Population of mungkus in nature has already worrying. Because, this fish is endemic
species of Bengkulu Province which is only spread in two places, which are South Bengkulu and Muko-muko.

Mungkus has a high economic value because it is good nutritional and good taste. The local community use this fish as a source of income, resulting in excessive fishing and less environmentally friendly. This fish is endangered due to conversion of forest into agricultural land and oil palm plantations in the upper reaches of the Nelengau River, South Bengkulu and causes erosion and flooding. The original habitat of mungkus is generally on the upstream part of the river in hilly areas with clean water current [2, 5]. In its natural habitat, the mungkus fish feed on the moss on the rocks [2].

The life of the Mungkus fish is estimated the same as the salmon that lay eggs of the river, and attach their eggs under the boulders and there are also drifted eggs downstream of the river and hatch downstream. The young wrapped fish will fight the current to spawn back upstream. Based on information from the people, August and September (early rainy season) is the period of hatching of mungkus fish in down stream. People call it ipun (hordes of small young fish). The Local Community still catch fish using stuns that are powered battery, putas and nets. This will threaten the mungkus fish population which decrease. Because capturing in this way will cause to die.

High demand and increasingly critical fish populations mungkus in nature due to its unique life cycle, it is necessary to study that leads to sustainable utilization efforts, one of which concerning the condition of the population and its habitat. This report aims to determine structure of population and habitat mungkus in waters Bengkenang and Nelengau rivers, South of Bengkulu. This results of research expected to support the success of the ex-situ conservation process through domestication activities.

2. Research Methods

The research was conducted at Bengkenang Watershed, upstream and downstream of Nelengau River in South Bengkulu Regency from January until February 2018. Population uses the calculation catches of per unit efforts with 4 stations. 3 stations in Nelengau river and 1 station in Bengkenang river. Each station is divided into two plots using line transect method.

At each station, Sicyopterus cynocephalus was captured and taken for thirty minutes using nets and hooks as many as four replicates in each zone at intervals of one week. For Calculation and Measurement of weight of S.cynocephalus is done using OAUS scales.

![Figure 1](image-url)  
**Figure 1.** Study Areas from Google Maps

Observation of mungkus habitat is done directly on each station that has been done. Parameters observed include Water temperature, Degree of acidity (pH), depth, Water Purification of the river, Current river, O₂, and BOD.
3. Result and Discussion

Based on the results of the research, the type of mungkus fish that exist in the research location is *Sicyopterus cynocephalus*. The characteristics of the *Sicyopterus cynocephalus* are 75 - 80 of scales along the sides of the body, 35 scales in front of the dorsal fin, the inside of the upper lip is papilla, the scales on the front of the body are smaller than the scales on the tail, dark purple and orange in the abdomen with 6-7 vague color bands, dorsal fins and orange anal fin, orange anal fin base, sometimes there are dark spots on the second dorsal fin [6].

![Figure 2. Sicyopterus cynocephalus](image)

From each station and plot determined, the average number of captured fishes was 115 individuals with a total length ranging from 4.96 - 13.95 cm grouped into three classes. The most caught size ranges from 6-10 cm by 50 tail (43.47%). From the results of the observation in Table 1, it is known that the fish population structure of the mungkus at the site consists of tillers with a body length under 5 cm as many as 17 head (14.78%), and adults with a body length above 11 cm of 48 tail (41.73%). The number of sapling fish puppets found in station 3 (Nelengau downstream) whose habitat type is more supportive for the size of the tillers.

| Length of Class (cm) | Frequency | Sex          |
|---------------------|-----------|--------------|
|                     |           | Males | Females |
| I : 1 – 5           | 17        | 7     | 10      |
| II : 6 – 10         | 50        | 14    | 36      |
| III : 11 - 15       | 48        | 16    | 32      |

To maintain populations sustainability, the ideal ratio of sex is 1:1 or at least a female is more than male. But, it did not support the efforts to control mungkus viewed from the ratio of sex [10]. The aspect of the ratio of sex can be controlled that the more male fish has caused it difficult to reproduce due to the small number of a female fish. The reality in nature comparison male and female sex is not absolute, it is influenced by a pattern the spread of caused by the increased availability of food, density of populations, and balance the food chain [12].
One of the population parameters is the density as the number of individuals per unit area [7]. The fish population of Mungkus in the original habitat studied averaged 10-15 individuals per 30 meshes. The results showed that fish populations were very rare with only 15 fish per unit effort. The decline in abundance fish because mortality, migration, and the period of the presence of age group different in different times [3]. The low fish populations in the study sites are thought to be due to the high level of catching by the population because these fish species become the main target of hunting. This is closely related to the level of delicacy of delicious fish wrapper. The use of unfiltered fishing gear (stun) also began to exist. The existence of logging activities around the waters and community activities around the waters allegedly indirectly affect the reduced population of Mungkus fish, because of the decreasing quality of river water.

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3.1 Mungkus Fish Habitat

S. cynocephalus is a fish that likes to be near a bottom of rocky area, because it likes to stick to rocks, immersing it self in sand and pebbles. Habitat wrappings in the Bengkenang River can be divided into three types based on their size, is habitat for larvae / juvenile, puppies until adolescence, and adults with the following characteristics:

i. The larva/juvenile habitat is generally on the banks of the river marked by substrate/sand water base, calm current, clear water color, and shallow (<50 cm). This is allegedly related to its still low ability to fight water currents. Habitat like this is also a place to spawn fish spawning (spawning ground).

ii. Habitat of small to medium size fish/adolescents with the following characteristics of rock bottom waters <50 cm diameter, medium to heavy water flow, clear water color, 15-20 m wide river, water depth <1 m, the substrate is composed of gravel and sand, canopy closure 50-75%.

iii. Large fish habitats/breeders, generally a river with a river width of 15-20 m long, 20-60 m long, quiet to slow currents, water depth > 1.5 m, rock bottom waters, a substrate composed of sand and gravel, clear water color, and canopy closure > 75%. Fish breeding habitats can be grouped into three, i.e. phytophils (requiring vegetation), lithophils (condensing base rocks and sand), and pelagophils (requiring open water). Based on these criteria then the fish mungkus belong to
the group lithopils because spawning on the river that essentially rocks and sand/gravel substrate [11].

The measurements of the average physical-chemical parameters are the range of water temperature 26°C, pH 9.15, depth 1, DO 2 ppm, COD 86 mg / l, strength of current 2 m/s, and clarity 1 (Table 2). The results of observation in Table 2 indicate that suitable sites for the life and breeding of mungkus fish especially in the middle (S2) upstream of the river (S1) are characterized by the color of clear water and the surrounding environment in the form of primary forest. In the downstream (S3) the forest condition is not good because there are logging activities and there are many agricultural areas (fields). At the bottom of the river, the depth of the river water is relatively shallow, so the captured juvenile of mungkus fish are mostly.

| Parameters     | S1 (Nelengau Upstream) | S2 (Nelengau of midle) | S3 (Nelengau downstream) | S4 (Bengkenang of estuary) |
|----------------|-----------------------|------------------------|--------------------------|----------------------------|
| Water temperature | 26.5                  | 24.25                  | 27.5                     | 25.75                      |
| Air temperature  | 35.25                 | 35.75                  | 37                       | 35.75                      |
| pH              | 9.52                  | 9.1                    | 9.25                     | 8.75                       |
| Depth water     | 0.55                  | 0.42                   | 0.33                     | 0.61                       |
| DO₂             | 1.37                  | 2.08                   | 1.05                     | 1.67                       |
| COD             | 78.18                 | 82.97                  | 98.92                    | 80.82                      |
| Current         | 1.58                  | 2.1                    | 1.25                     | 1.25                       |
| clarity         | 1.00                  | 0.56                   | 1.28                     | 0.5                        |

Table 2 shows that in general, the three stations can still support the life of mungkus fish or other fish species. The temperature in the waters to what is good for the life of fishes range about 30°C, oxygen saturation dissolved (DO) >5 ppm; turbidity <50 mg / L, hardness <60 mg / L, alkalinity 25-40 mg / L, nitrate <10, Iron <1 mg / L, mercury <0.002 mg / L [12]. Meanwhile the range of pH is good for fish life between 6.5-8.5. Water temperature during observation of the temperature range is good enough for the fish mungkus and plankton. Good water temperature for fish growth is in the range 15 °C - 27.5 °C, which is optimal between 180°C - 250°C [13]. Based on this, the water temperature during the study can support the life of mungkus fish and plankton. Temperatures safe for fish and other aquatic fauna is less than 32°C and the CO₂ is less than 12 ppm [4]. Water quality is a reflection of the environmental quality of water and is a medium for the life of aquatic organisms. Therefore, this water quality influences and determines the survival and development of the aquatic organisms.

4. Conclusion

Mungkus population in the waters of the Bengkenang and Nelengau rivers are rare and include rare; population structure is largely the size of adolescents. Fish habitat is primarily upstream of the river and can be grouped into three habitat types (habitat for juveniles/larvae, seedlings to medium, and adult/mother).

5. Acknowledgements

The authors would like to thanks the Ministry of Research, Technology, and Higher Education Republic of Indonesia who has provided research funding support through the pascasarjana group research grant entitled development of outdoor learning model based on natural environment for student elementary school-senior high school (Contract Number 182/UN30.15/LT/2017)
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