

# Arman 17

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**Species Composition & Ecology Index Of The Family Gobiidae  
At The Mangrove Belawan Of Sicanang Island**

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### Abstract

The Gobiidae family is the biodiversity resource of fish that occupies the habitat of mangrove forest ecosystems. Have an important ecological role, as the level of traffic in the food chain and can be used as environmental bioindicator. A study related to the diversity of Gobiidae has never been done in the mangrove ecosystem Belawan Sicanang. This research is an exploratory, a discrete purposive sampling method for the determination of 3 observation stations. Fish sampling using fishing gear, fishing nets, fishing rod, and fishy fish. Based on the results of the study there were 67 individuals caught fish, namely: *Stigmatogobius Sadan undi* (18 individuals), *Buti samboinensis* (12 individuals), *Butis butis* (12 individuals), *Acentrogobius viridi punctatus* (10 individuals), *Ophio caraporo cephalo* (7 individuals), *Brachy gobiudoriae* (3 individuals), *Gobioides brous sonnetii* (3 individuals), dan *Mugilogobius filifer* (2 individual). Average value of ecological index for  $H'$  (1.76) with medium category;  $J'$  (1.10), high category; and  $C$  (1.11) category there is a type that dominates.

**Keyword:** Composition species, Ecological Index, Family Gobiidae, Mangrove at Belawan Sicanang

### 1. INTRODUCTION

Mangrove forest is left in the area of Medan city of North Sumatra Province is in Belawan Sicanang Village. Mangrove forests in this area have long been degraded due to land function (fish pond, infrastructure, and industry), Settlements, and the ongoing logging of

illegal. The most perceived impacts of the surrounding communities include: Rob and reduced biological resources. One of the increasingly diminished biological resources there are several types of fish, crabs, and shrimp.[1&2] states the change in coastal ecosystem environment indirectly affects the Community system in it, to the diversity of the types and structures of communities within the ecosystem.

The Government of Medan is planning to make mangrove area in Belawan Sicanang Village as an ecotourism location. This is given the role of mangrove ecological that is very important as a buffer life of life that exists around it, included in it is human. According to [2] mangrove has various functions and important role, such as physical function to keep the beach condition to remain stable, beach protects, prevents abrasion and intrusion of water, as well as a trap of pollutants. Then [3]; [4] describes the mangrove forest as natural habitat of wildlife and aquatic biota. The function of mangrove ecosystem as a feeding ground, spawning ground, and nursery ground. Study result [5], we investigated the effects of mangrove habitat degradation on trophic state and food availability, on biodiversity and on ecosystem processes by comparing an undisturbed with a disturbed mangrove forests.

One of the most popular aquatic biota found in the mangrove ecosystem is fish. [6]states that fish is one of the important water resources and has many values of benefits, both ecological and economical. Generally, the most common types of fish found in the mangrove ecosystem are the family Gobiidae. The main character distinguishing the two families is the unification of the pelvic fins to form a disc in the family Gobiidae, otherwise there is no apparent unification of the pelvic fins in the Eleotridae family even though the distance between the fins is very close [7]. It is estimated that 8,500 species of fish live in Indonesian waters or 45% of the number of fish species in the world[8] . The family of fishes commonly known as gobies (Teleostei: Gobiidae) is one of the most diverse lineages of vertebrates in the world. With more than 1700 species of gobies spread among more than 200 genera, gobies are the most species-rich family of marine fishes [9]. Recognizing the diversity of fishery biodiversity that Indonesia has, it needs to be done efforts to preserve and protect its sustainability. This is because biological diversity has an important role in maintaining the stability of the ecosystem, as a source of germplasm and economic resources. Biodiversity also potentially as the object of the ecotourism industry that can be one source of foreign exchange [9].

Biodiversity research fish needs to be studied because associated with the key factors ecologically associated with the rule and function of the ecosystem of the mangrove forest. As the majority of species (especially Gobiidae) inhabit areas with high water quality and intact riparian vegetation, declines in the diversity and abundance of these species from a waterway is often a reliable early indication that water quality is deteriorating and/or riparian vegetation is being removed[10]. In addition, data on the biodiversity of fish is also required by the various parties in the management efforts and determine the status of fish resources in the area of study.

## 2.METHOD

### 14 2.1. Time and place

The research was conducted in January and February 2020. Location of research at the mangrove Belawan of Sicanang Island, Medan Belawan District, Medan City, North Sumatera Province, Indonesia.

### 2.2. Determination of observation stations

The observation station is determined by the family habitat Gobiidae commonly found. Based on the capture of the coordinate point then Station 1 is at the position (3°44'21.51"N 98°39'10.94"E); Station 2 (3°44'57.25"N 98°38'34.44"E); and Station 3 (3°45'22.68"N 98°38'34.30"E).

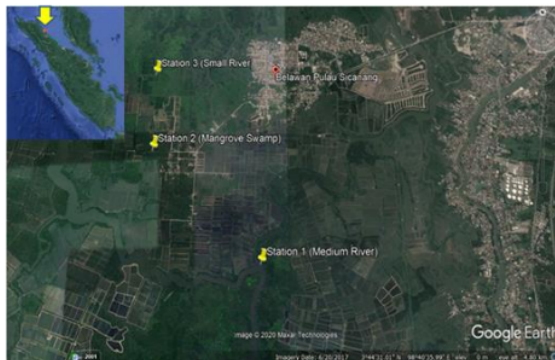


Figure 1. Map of research location

### 2.3. Sampling method

Samples of fish caught using fishing nets, fishing rods, and fishy fish, this is done to get more types of fish. The use of fishing gear is adjusted to the condition of the research station. Sampling in the mangrove swamp area is done in the morning between the hours of 8:00 to 11:30 using a hook and a seser, because the habit of gobi fish in the morning out to get oxygen. In small rivers and medium the sampling time cannot be determined, but at low tide. The fishing gear used is fishing net, fishing rods, and fishy fish.

### 2.4. Fish identification

The fish caught in the stopless was given 70% alcohol and then labeled. Fish identification at the Laboratorium Ekologi of Labuhanbatu University. Identification of fish using the book Freshwater Fish of Western Indonesian and Sulawesi [8] and Taksonomi dan Kunci Identifikasi Ikan, Volume 1 & 2 [11].

### 2.5. Data Analysis

The Data of the research results analyzed include: Biodiversity Index ( $H'$ ) and Uniformity Index ( $J'$ ), using the formula [12]; and Dominance Index ( $C$ ), using the formula [13].

## 3. RESULT AND DISCUSSION

### 3.1. Result

#### Species Composition

There are 7 genera of Family Gobiidae which were caught at the site of research and 8 types of species. Further data can be seen in the following table 1:

Table 1. Species composition of Gobiidae Family at the mangrove Belawan of Sicanang Island.

Genera	Species	Local Name	St. 1	St. 2	St. 3
<i>Acentrogobius</i>	<i>Acentrogobius viridipunctatus</i>	Selubang	1	8	1
<i>Brachygobius</i>	<i>Brachygobius doriae</i>	Belang-belang	0	0	3
<i>Butis</i>	<i>Butis amboinensis</i>	Gabus Pasir	1	5	6
<i>Butis</i>	<i>Butis butis</i>	Butuh Keleng	1	3	8
<i>Gobioides</i>	<i>Gobioides broussonnetii</i>	Janjan	1	2	0
<i>Mugilogobius</i>	<i>Mugilogobius filifer</i>	Pelentus	0	0	2
<i>Ophiocara</i>	<i>Ophiocara porocephala</i>	Lontok	1	3	3
<i>Stigmatogobius</i>	<i>Stigmatogobius sadanundi</i>	Congok-congok	3	8	7
$\Sigma$ Total			8	29	30

#### Ecological Index

The observed ecological indices include: Diversity index (H'), uniformity Index (J), and dominance Index (C). The results of an ecological index analysis are shown in Table 2. Following:

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**Table 2.** Average Value of the Ecological Index of Gobiidae Family at the mangrove Belawan of Sicanang Island.

Station	Ecological Index					
	H'	Category	J'	Category	C	Category
1	1,52	Medium	0,95	High	0,53	No domination
2	1,78	Medium	1,11	High	1,37	There is a species of domination
3	1,99	Medium	1,24	High	1,42	There is a species of domination
$\Sigma$ Average	1,76	Medium	1,10	High	1,11	There is a species of domination

#### 4. Discussion

Based on the catch obtained 67 specimens, with the following details: *Stigmatogobius sadanundi* (18 individuals), *Butis amboinensis* (12 individuals), *Butis butis* (12 individuals), *Acentrogobius viridipunctatus* (10 individuals), *Ophiocara porocephala* (7 individuals), *Brachygobius doriae* (3 individuals), *Gobioides broussonnetii* (3 individuals), and *Mugilogobius filifer* (2 individuals). Family Gobiidae are found in the study area, because this type of fish is a permanent resident of mangrove ecosystem. The fish of the Gobiidae family are common types of mangrove dwellers, it is due to its high adaptation ability especially against salinity. The Gobi type will resemble the basic colour of the waters and often immerse themselves on the substrate [14]; [15].

Although it is not a commercial fish for the community around the village of Belawan Sicanang, but ecologically has a very important role. The fish family Gobiidae as a specialist for phyto-benthos feeding and krustasivora that develops generalist feeding strategies. Fish Gobiidae occupies several different trophic level positions so that it has an important ecological role in the waters of the Pabeang Gulf [16]. Just like in Iran, according to Kalantarian et al (2017) because the gobiid fishes are not economically important in Iran, very limited information exists on stock status and ecological characteristics of their species. The gobies, however, play a crucial role in the Caspian Sea ecosystem as food resources and competitors for many commercially important species. According to [17] fisheries have major impacts on the communities of marine animals and can have far-reaching effects on species level diversity (defined here as species composition and relative dominance). It is generally supposed that mangroves play an important role in supporting a wide range of marine life in near-shore waters and in sustaining coastal fisheries. These highly productive mangrove forests provide critical habitat and food for many organisms, including important fisheries species [18].

Based on the accumulated average amount of the entire sample, then obtained the value H' (1,76), medium category, J' (1,10) high category, and C (1,11) in category there

is a dominating type, the *Stigma togobius sadan undi* is the most widely caught. This indicates that there is dominance in the family Gobiidae in the mangrove ecosystem of Belawan Sicanang, so the mangrove ecosystem in the research area is said to be still good. Remember Gobi as a permanent resident in the mangrove forest waters. According to [16] fish Gobiidae make use of the estuarine area which is of mangrove vegetation as an area of nursery ground, spawning ground, and living habitat. The Gobiidae family is a primary dominant fish group both in diversity and abundance in the mangrove ecosystem. The study was carried out to determine morphometric and meristic characteristics of fish species belonging to Family: Gobiidae, and examined 42 specimens were collected from rivers and estuaries ecosystem in Bangladesh during January and February, 2015 [19]. The mean value of Diversity Index of fish species of 1.972 means moderately condition which indicate mangrove condition goes to moderate stability level [20]. An indicator fish is any fish species or group of species whose function, population, or status reveals the quality of the environment [21]. The species indicator or biological indicator is an organism response that reveals the presence of the pollutants by the occurrence of typical symptoms or measurable responses [22].

## 5. CONCLUSION

Belawan mangrove ecosystem in Sicanang Island is still quite well categorized, this is because the biodiversity of the Gobiidae family fish is still widely found, remember this type is a permanent resident. However, the community and the government need to maintain mangrove habitat so that the preservation of fish resources is maintained.

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