

## Identification of Commercial Fish Caught by Fishermen in the Lower Barumun River as Practicum Support Vertebrate Zoology Course

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### Abstract

*Recognizing fish through morphological traits is an important aspect in developing taxonomic skills. It is evident that current students lack the ability to classify fish by species and group. Equipping students with this skill is essential as it serves as a valuable soft skill for future educators. The main objective of this study was to determine the commercial fish species in the downstream area of Barumun River. This study used an exploratory approach, which aims to obtain information on an unknown problem, using identification techniques involving observation of morphological traits and references from fish identification sources such as fish identification books and the Fishbase website. Fish taxonomy in this study relied on data sourced from the International Union for Conservation of Nature (IUCN) website. The results showed that there are 18 species of commercial fish living in the Barumun River, all of which belong to the category of true bony fish.*

**Keywords:** Barumun River; Fish Identification; Vertebrate Zoology



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### INTRODUCTION

Fish are vertebrate animals that are divided into groups, namely: cartilaginous, true bony and jawless fish (Burhanuddin, 2014). Fish and their life aspects are studied in the course material of Vertebrate Zoology. In this course, students are taught to identify fish based on morphological forms (mouth, fins, tail shape, body shape, and color) through practical activities. Students are equipped with the skills to be able to distinguish fish based on the type and group. Target fish are those that have important economic value.

Learning that does not provide opportunities for students to explore and construct their knowledge further makes students reluctant to learn because it has been embedded in their minds that learning is more intended to seek grades without knowing and understanding the benefits of science (Smarabawa *et al.*, 2013). According to Kottelat *et al.* (1993) the tendency to identify economically valuable fishes is very important, because they are often caught by fishermen. Everyone has an interest in knowing the various types of fish found in various types of waters and wants to know the type, so it is necessary to do identification. Taxonomic identification of the possibility of finding new types of fish is definitely there for it must be equipped with qualified skills.

Fish identification has been done by many researchers from various waters. Tamba *et al.* (2021) conducted fish identification in the Lower Asahan River; Abdullah *et al.* (2021) in Tampor Paloh River, East Aceh; Zega *et al.* (2020) conducted in Umban Sari River, Rumbai District, Riau Province; Zega (2020) in Yogi River Nias; Samitra & Rozi (2019) in Kelingi River, South Sumatra Province. Identification of commercial fish caught by fishermen in.

There is no information on the identification of commercial fish caught by fishermen in the lower Barumun River. This study aims to identify the types of commercial fish caught by fishermen in the Barumun River. The identification is also expected to contribute to students to recognize the Barumun River and the types of fish in it. Just like what was done by Daryanto & Dwicahyono (2013) said that through the development of teaching materials that are more contextual in nature, it is hoped that it can contribute to students by introducing mangroves and the types of fish in them to students. The methods and information from the results of this study were adopted as teaching materials for the practicum of Vertebrate Zoology courses for fish identification techniques.

## **METHOD**

The study was conducted in December 2023 in the lower reaches of the Barumun River. Fish were collected with various fishing gears used by fishermen, such as: drag trawl, gill net, net, fishing rod, and bubu. Fish caught were counted and photographs were taken for documentation. The next step was wet preservation with 70% alcohol solution. Fish identification based on morphological characteristics was carried out at the Laboratory of Animal Ecology, Labuhanbatu University with the Fish Identification Book (Kottelat *et al.*, 1993). Taxonomic search based on data available on the Fishbase and IUCN sites. The results of the study were analyzed descriptively.

## **RESULT AND DISCUSSION**

Composition of Fish Catch Based on the identification results, 18 species of commercial fish were caught by fishermen. Fish caught by fishermen using fishing gear in the form of trawls, nets, gill nets, fishing rods, dikes and bubu. The total

number of fish caught was 112 individuals. The complete research data is shown in Table 1.

**Table 1.** Data on Identification Results and Number of Fish Caught

	Scientific Name	Amount of Caught (individu)
1	<i>Megalops cyprinoides</i>	5
2	<i>Taxotes jaculatrix</i>	2
3	<i>Ophiocara porocephala</i>	2
4	<i>Tenualosa Ilisha</i>	10
5	<i>Butis butis</i>	2
6	<i>Glosogobius aureus</i>	4
7	<i>Zenarchopterus dispar</i>	15
8	<i>Plotosus canius</i>	2
9	<i>Doryichthyes boaja</i>	5
10	<i>Mugil chephalus</i>	7
11	<i>Cynoglossus lida</i>	2
12	<i>Piicofillis dussumieri</i>	4
13	<i>Mystus gulio</i>	17
14	<i>Oreochromis niloticus</i>	6
15	<i>Johnius trachycephalus</i>	13
16	<i>Lates calcalifer</i>	2
17	<i>Siganus guttatus</i>	13
18	<i>Ephinefelus coioides</i>	1

Fish caught are dominated by true bony fish. Fish species were caught more towards the mouth of the river, namely fishermen using drag trawl gear. It is suspected that the estuarine waters are a feeding ground for various fish species. According to [Tampubolon et al. \(2018\)](#) estuaries have an important role in the life cycle of fish. Based on the results of research by [Riki et al. \(2023\)](#) fish caught in the Konaweha River estuary were 1,257 individuals. The catch consisted of 24 families and 28 species. The highest relative abundance was found in *Ambassis myops* (85.39%), *Anguilla* spp. (40.31%) and *Valamugil cunnesius* (5.40%). While the lowest abundance values were *Gerres filamentosus* (0.11 %), *Chelonodon patoca* (0.11 %), *Scatophagus argus* (0.11 %), *Mirungua microchir* (0.11 %), and *Rhizoprionodon acutus* (0.11 %). [Kamurahan et al. \(2020\)](#) in the Poigar River estuary obtained 40 species of fish. Furthermore, from the research results of [Tampubolon et al. \(2018\)](#) the number of fish caught in the Cimanuk River estuary area was 1,826 individuals and consisted of 103 species and was dominated by the Ambassidae, Ariidae, Gobiidae, Leiognathidae, and Scianidae families.

### Fish Identification

The results of observations based on morphological characteristics, there are 18 true bony fish (Osteichthyes). The complete identification results can be seen in the following figures:

### 1. *Megalops cyprinoides*

*Megalops cyprinoides* is a true bony fish. It has a superior mouth shape, slender tail, mane behind the dorsal fin, silvery white body color, black tail, dorsal fin consists of weak fingers (12-17 pieces), anal fin (23-25 pieces). The total length of male fish is known to be a maximum of 150 cm (Kottelat *et al.*, (1993)).

<i>Kingdom</i>	= <i>Animalia</i>
<i>Phylum</i>	= <i>Chordata</i>
<i>Class</i>	= <i>Actinopterygii</i>
<i>Order</i>	= <i>Perciformes</i>
<i>Family</i>	= <i>Megalopidae</i>
<i>Genus</i>	= <i>Megalops</i>
<i>Species</i>	= <i>Megalops cyprinoides</i> (Adams <i>et al.</i> , 2016).



Figure 1. *Megalops cyprinoides*

### 2. *Taxotes jaculatrix*

*Taxotes jaculatrix* is a true bony fish, has a terminal mouth shape, yellow body color, silvery white, has 4-5 bands on the upper body, dorsal fins IV-V, 11-13, anal fins III 15-17, faceted tail shape and yellow. Maximum total length is 30 cm (Kottelat *et al.*, (1993)).

<i>Kingdom</i>	= <i>Animalia</i>
<i>Phylum</i>	= <i>Chordata</i>
<i>Class</i>	= <i>Actinopterygii</i>
<i>Order</i>	= <i>Perciformes</i>
<i>Family</i>	= <i>Taxotidae</i>
<i>Genus</i>	= <i>Taxotes</i>
<i>Species</i>	= <i>Taxotes jaculatrix</i> (Hoese, 2012).



Figure 2. *Taxotes jaculatrix*

### 3. *Ophiocara porocephala*

*Ophiocara porocephala* is a true bony fish, has a dominant black body color with yellow spots on the left and right sides of the body, rounded tail shape, and anal and lower fins yellow pectoral fins, terminal mouth shape, has a formula of 8-9 dorsal fin fingers, 7 anal fins. The maximum body length of the fish is 34 cm (Kottelat *et al.*, (1993)).

<i>Kingdom</i>	= <i>Animalia</i>
<i>Phylum</i>	= <i>Chordata</i>
<i>Class</i>	= <i>Actinopterygii</i>
<i>Order</i>	= <i>Gobiiformes</i>
<i>Family</i>	= <i>Eleotridae</i>
<i>Genus</i>	= <i>Ophiocara</i>
<i>Species</i>	= <i>Ophiocara porochepala</i>
	Larson <i>et al.</i> , (2017).



Figure 3. *Ophiocara porochepala*

#### 4. *Tenualosa Ilisha*

*Tenualosa ilisha* is a true bony fish. The fish when alive has a body color of golden silver and purple, has a black spot at the end of the gill cover, a claw-shaped tail, a terminal mouth, has dorsal fin fingers (18-21 pieces), anal fins (18-23 pieces). Maximum length of male fish is 60 cm.

<i>Kingdom</i>	= <i>Animalia</i>
<i>Phylum</i>	= <i>Chordata</i>
<i>Class</i>	= <i>Actinopterygii</i>
<i>Order</i>	= <i>Gobiiformes</i>
<i>Family</i>	= <i>Clupeidae</i> ,
<i>Genus</i>	= <i>Tenualosa</i> ,
<i>Species</i>	= <i>Tenualosa ilisha</i>
	Freyhof, (2014).



Figure 4. *Tenualosa Ilisha*

#### 5. *Butis butis*

*Butis butis* is a true bony fish. It has a solid black body color, at the base of the fin there is a red color and above the tip of the caudal fin, has 7-8 dorsal fins, 8-9 anal fins. Terminal mouth shape, rounded tail shape. Maximum length is 15 cm.

<i>Kingdom</i>	= <i>Animalia</i>
<i>Phylum</i>	= <i>Chordata</i>
<i>Class</i>	= <i>Actinopterygii</i>
<i>Order</i>	= <i>Gobiiformes</i>
<i>Family</i>	= <i>Eleotridae</i>
<i>Genus</i>	= <i>Butis</i>
<i>Species</i>	= <i>Butis butis</i> (Larson & Sparks, 2017).



Figure 5. *Butis butis*

## 6. *Glossogobius aureus*

*Glossogobius aureus* is a true bony fish. According to (Kottelat *et al.*, (1993). has a formula of dorsal fin radius I.9, anal I.8, 30-33 scales, 22-27 scales in front of the dorsal fin, superior mouth, and rounded tail shape.

Kingdom = Animalia  
Phylum = Chordata  
Class = Actinopterygii  
Order = Gobiiformes  
Family = Eleotridae  
Genus = *Glossogobius*  
Species = *Glossogobius aureus*  
(Larson,2019).



Figure 6. *Glossogobius aureus*

## 7. *Zenarchopterus dispar*

*Zenarchopterus dispar* is a true bony fish. The upper jaw is distinctly wider than long. The snout is uniformly brown with no dark band in the midline. Pectoral fins are shorter than head length. The lower jaw is much shorter than the head. Dorsal fin weak radius (11-12), anal fin weak radius (12-13) (Froese & Pauly, 2023).

Kingdom = Animalia  
Phylum = Chordata  
Class = Actinopterygii  
Order = Belaniformes  
Family = Zenarchopteridae  
Genus = *Zenarchopterus*  
Species = *Zenarchopterus dispar*  
(Shaji, 2021).



Figure 7. *Zenarchopterus dispar*

## 8. *Plotosus canius*

*Plotosus canius* is a true bony fish. According to Asriyani & Halili (2021) the morphological characteristics are as follows: has on the upright line between the pelvic fins and anal fins there is a second dorsal fin, plain blackish brown body with black dorsal fin tips, has hard spines called patil on each pectoral and dorsal fins.

Kingdom = Animalia  
Phylum = Chordata  
Class = Actinopterygii  
Order = Siluriformes  
Family = Plotosidae  
Genus = Plotosus  
Species = *Plotosus canius*  
Palmer-Newton (2020).



Figure 8. *Plotosus canius*

### 9. *Doryichthyes boaja*

*Doryichthyes boaja* is a true bony fish. It has a soft dorsal fin (43-65), a striking color pattern with blue and brown stripes; 22-24 trunk rings; 32-38 caudal rings. Maximum length of male fish (41 cm).

Kingdom = Animalia  
Phylum = Chordata  
Class = Actinopterygii  
Order = Syngnathiformes  
Family = Syngnathidae  
Genus = *Doryichthyes*  
Species = *Doryichthyes boaja*  
(Pollom & Chakrabarty, 2018)



Figure 9. *Doryichthyes boaja*

### 10. *Mugil chephalus*

*Mugil chephalus* is a true bony fish. Based on the results of observations (Katili, 2011). the body shape is bilaterally symmetrical, fusiform, the shape of the mouth can be reflected, the position of the mouth is inferior, does not have a snout, the position of the ventral fin to the thoracic pectoral fin, more than one side, the shape of the caudal fin is spotted, the type of double dorsal fin and the shape of the ctenoid scales and has no special characteristics on the body. It has dorsal fin IV.8-9, anal fin III.8, pectoral fin 16-19, caudal fin 19, ventral fin 5.

Kingdom = Animalia  
Phylum = Chordata  
Class = Actinopterygii  
Order = Perciformes  
Family = Mugilidae  
Genus = *Mugil*  
Species = *Mugil chephalus*  
(Camara et al., 2019)



Figure 10. *Mugil chephalus*

### 11. *Cynoglossus lida*

*Cynoglossus lida* is a true bony fish. It has dorsal fin soft fingers (99-108), anal fin soft fingers (77 - 86), upper body color brown with black spots and white underside, eyes located on the upper side, tapered tail shape.

<i>Kingdom</i>	=	<i>Animalia</i>
<i>Phylum</i>	=	<i>Chordata</i>
<i>Class</i>	=	<i>Actinopterygii</i>
<i>Order</i>	=	<i>Pleuronectiformes</i>
<i>Family</i>	=	<i>Cynoglossidae</i>
<i>Genus</i>	=	<i>Cynoglossus</i>
<i>Species</i>	=	<i>Cynoglossus lida</i>

(Munroe *et al.*, 2020)



Figure 11. *Cynoglossus lida*

### 12. *Piicofilis dussumieri*

*Piicofilis dussumieri* is a true bony fish. According to White *et al.* (2013) *Piicofilis dussumieri* has characteristics: 2 palatine teeth slightly separated on each side of the palate, palatine teeth on the back track bluntly tipped, second adipose dorsal fin edged with black, head not too flat and body size can reach up to 80 cm. Sub-terminal mouth type, spotted tail shape.

<i>Kingdom</i>	=	<i>Animalia</i>
<i>Phylum</i>	=	<i>Chordata</i>
<i>Class</i>	=	<i>Actinopterygii</i>
<i>Order</i>	=	<i>Siluriformes</i>
<i>Family</i>	=	<i>Ariidae</i>
<i>Genus</i>	=	<i>Piicofilis</i>
<i>Species</i>	=	<i>Piicofilis dussumieri</i>

(Sparks *et al.*, 2017).



Figure 12. *Piicofilis dussumieri*

### 13. *Mystus gulio*

*Mystus gulio* is a true bony fish. It has 6 snouts, three pectoral fins and 1 dorsal fin, an inferior mouth shape, a spotted tail shape, a silver-yellowish body color, and an anal fin consisting of 14-15 weak fingers. Total length is 450 mm (Kottelat *et al.*, (1993).



Kingdom = Animalia  
Phylum = Chordata  
Class = Actinopterygii  
Order = Siluriformes  
Family = Bagridae  
Genus = *Mystus*  
Species = *Mystus gulio*  
(Ng *et al.*, 2019).



Figure 13. *Mystus gulio*

#### 14. *Oreochromis niloticus*

*Oreochromis niloticus* is a true bony fish. It has dorsal fin hard radius (XV-XVIII) and dorsal fin soft radius (11-13), anal fin hard radius (III) and anal fin soft radius (9 - 11), terminal mouth shape, faceted tail shape. *Oreochromis niloticus* is large and deep bodied, with a relatively small head. The jaws of adult males are not greatly enlarged, the length of the lower jaw being 29-37% of the head length (Kottelat *et al.*, 1993).

Kingdom = Animalia  
Phylum = Chordata  
Class = Actinopterygii  
Order = Perciformes  
Family = Cichlidae  
Genus = *Oreochromis*  
Species = *Oreochromis niloticus*  
(Diallo *et al.*, 2020).



Figure 14. *Oreochromis niloticus*

#### 15. *Johnius trachycephalus*

*Johnius trachycephalus* is a true bony fish. According to (Kottelat *et al.*, 1993). *Johnius trachycephalus* has dorsal fin hard fingers (VIII-IX) and weak fingers (24 - 28), anal fin hard fingers (II) and weak fingers (6 - 7), the whole body and head with cycloid scales, standard length 135 mm, inferior mouth shape, and tail shape tapered tip.

Kingdom = Animalia  
Phylum = Chordata  
Class = Actinopterygii  
Order = Perciformes  
Family = Sciaenidae  
Genus = Johnius  
Species = *Johnius trachycephalus*  
(Seah *et al.*, 2021).

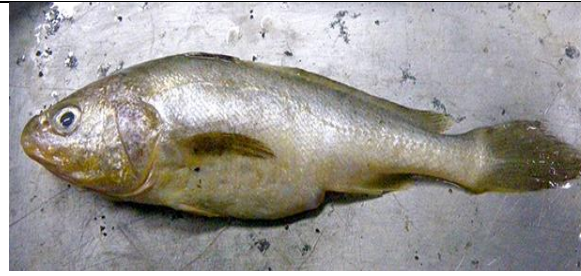


Figure 15. *Johnius trachycephalus*

### 16. *Lates calcalifer*

*Lates calcalifer* is a true bony fish. According to (Kottelat *et al.*, (1993). have dorsal fin hard fingers (VII - IX) and soft fingers (10 - 11), anal fin hard fingers (III) and soft fingers (7 - 8), superior mouth shape, operculum with a small spine and with a jagged cover above the origin of the lateral line, rounded tail fin shape.

Kingdom = Animalia  
Phylum = Chordata  
Class = Actinopterygii  
Order = Perciformes  
Family = Latidae  
Genus = *Lates*  
Species = *Lates calcalifer*  
(Pal & Morgan, 2019)



Figure 16. *Lates calcalifer*

### 17. *Siganus guttatus*

*Siganus guttatus* is a true bony fish. According to (Kottelat *et al.*, (1993). *Siganus guttatus* has a total throughout the body in red color separated by white lines, terminal type mouth shape, spotted tail shape, has dorsal hard fingers (XII) and weak fingers (10), has anal hard fingers (VII) and weak fingers (9).

Kingdom = Animalia  
Phylum = Chordata  
Class = Actinopterygii  
Order = Perciformes  
Family = Siganitidae  
Genus = *Siganus*  
Species = *Siganus guttatus*  
(Carpenter & Smith-Vaniz, 2017)



Figure 17. *Siganus guttatus*

### 18. *Ephinefelus coioides*

*Ephinefelus coioides* is a true bony fish. According to (Kottelat .et al., (1993). *Ephinefelus coioides* has dorsal fin hard radius (XI) and dorsal fin soft radius (13-16), anal fin hard radius (III) and anal fin soft radius (8), head and body are brown dorsally, shaded to whitish ventrally; numerous small brownish-orange or reddish-brown spots on the head, body, and mid-fins; body with 5 faint, irregular, oblique, dark-colored stripes branching ventrally (irregular H-shaped stripes).

Kingdom = Animalia  
Phylum = Chordata  
Class = Actinopterygii  
Order = Perciformes  
Family = Epinephelidae  
Genus = *Ephinefelus*  
Species = *Ephinefelus coioides*  
(Amorim et al., 2016)



Figure 19. *Ephinefelus coioides*

### CONCLUSION

Identification of commercial fish in the Barumon River found 18 species, namely *Megalops cyprinoides*, *Taxotes jaculatrix*, *Ophiocara porocephala*, *Tenualosa Ilisha*, *Butis butis*, *Glosogobius aureus*, *Zenarchopterus dispar*, *Plotosus canius*, *Doryichtyes boaja*, *Mugil chephalus*, *Cynoglossus lida*, *Picofyllis dussumieri*, *Mystus gulio*, *Oreochromis niloticus*, *Johnius trachycephalus*, *Lates calcalifer*, *Siganus guttatus*, and *Ephinefelus coioides*. All of them belong to the true bony fish group. The ability to identify vertebrate animals including pisces is important to distinguish between species based on taxonomic status. The Vertebrate Zoology course taught about the division of fish based on their classification, namely: *Osteichthyes*, *Chondrichthyes*, and *Agnatha*.

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