



## Identifikasi morfologi dan morfometrik jenis-jenis ikan kakap (*Famili Lutjanidae*) yang di daratkan di Tangkahan Pulau Balai, Aceh Singkil [Morphological and morphometric identification of snapper (*Family Lutjanidae*) that landed in the Pulau Balai Fishing Port, Aceh Singkil]

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**ABSTRACT** | Pulau Banyak are one of the areas in Indonesia that have potential fishery resources. Accurate range determination and species identification are essential parts of fisheries resource management and must be done. This study aims to obtain information on the various types of snapper landed through morphological and morphometric approaches. The research was conducted in Fishing Port, Pulau Balai village, Pulau Banyak sub-district from September to October 2023. The method used in this research is descriptive analysis to describe fish morphology and measure several morphometric characteristics of fish. There were 12 characters measured using a ruler. The results of the study found ten species of 2 genera part of the family Lutjanidae with 36 individuals landed at the study site, namely *Lutjanus synergies*, *Pristipomoides typus*, *Lutjanus vitta*, *Lutjanus madras*, *Lutjanus argentimaculatus*, *Lutjanus decussatus*, *Lutjanus erythropterus*, *Lutjanus gibbus*, *Lutjanus malabaricus*, and *Lutjanus papuensis*. All fish species encountered have different morphological and morphometric characteristics, and the bambangan fish (*Lutjanus erythropterus*) is the fish with the largest morphometric size in the study site.

**Key words** | Aceh Singkil, snapper fish, fish landing port, Pulau Banyak

**ABSTRAK** | Pulau Banyak merupakan salah satu wilayah di Indonesia yang memiliki potensi sumber daya perikanan. Penentuan kisaran dan identifikasi spesies yang akurat merupakan bagian penting dari pengelolaan sumber daya perikanan dan harus dilakukan. Penelitian ini bertujuan untuk mendapatkan informasi mengenai berbagai jenis ikan kakap apa saja yang didaratkan melalui pendekatan morfologi dan morfometrik. Penelitian dilaksanakan di Tangkahan Desa Pulau Balai, kecamatan Pulau Banyak dari bulan September hingga Oktober 2023. Metode yang digunakan dalam penelitian ini yaitu analisis deskriptif guna mendeskripsikan morfologi ikan dan melakukan pengukuran beberapa karakter morfometrik pada ikan. Terdapat 12 karakter yang diukur menggunakan mistar. Hasil penelitian menemukan 10 spesies dari 2 genus dari 2 genus bagian dari famili lutjanidae dengan 36 individu yang didaratkan di lokasi penelitian, yaitu *Lutjanus synagris*, *Pristipomoides typus*, *Lutjanus vitta*, *Lutjanus madras*, *Lutjanus argentimaculatus*, *Lutjanus decussatus*, *Lutjanus erythropterus*, *Lutjanus gibbus*, *Lutjanus malabaricus*, dan *Lutjanus papuensis*. Seluruh jenis ikan yang ditemui memiliki karakter morfologi dan morfometrik yang berbeda-beda dan ikan bambangan (*Lutjanus erythropterus*) menjadi ikan dengan ukuran morfometrik terbesar di lokasi penelitian tersebut.

**Kata kunci** | Aceh Singkil, ikan kakap, tangkahan, Pulau Banyak

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## INTRODUCTION

One form of richness in fisheries potential in Indonesia is the diversity of fish species, primarily commercial fish species that benefit humans (Saleky *et al.*, 2021). Based on the water layers that are fish

habitats, it is known that there are two types of fish, namely pelagic and demersal. The type of demersal fish that fishermen often target is coral fish. Coralfish are aquatic organisms that spend most of their lives in coral reef ecosystems (Greenfield, 2003). There are

ten leading families of coral fish, namely Gobiidae, Labridae, Pomacentridae, Apogonidae, Bleniidae, Serranidae, Mueeanidae, Syngnathidae, Chaetpniidae, and Lutjanidae. The Lutjanidae family, also known as snapper, is a vital fish resource because it has economic value and is a superior product from Indonesia (Oktaviyani, 2018).

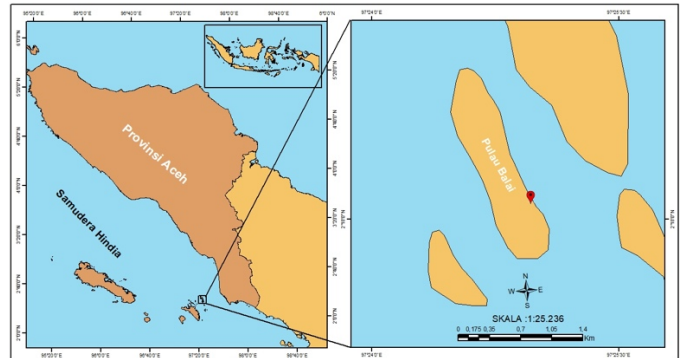
There is one region in Indonesia that has potential fishery resources, namely Banyak Island. Banyak Island is divided into three villages, namely Balai Island Village, Baguk Island Village and Teluk Nibung Village. Pulau Balai Village is a village with a very active fish landing site. This landing place is called Fishing Port. Fishing Port is a location for fish landing business activities run by the private sector. Its activities resemble a fishing port, and its management is carried out individually or in groups (Simatupang and Lubis, 2012). Based on data from the Aceh Singkil Central Statistics Agency (2020) shows that the catch of snapper in Pulau Balai Village reached 4.7 tons in 2019. Management of coral fish, especially snapper in Pulau Balai Village, is critical to avoid damage, which leads to decline. Snapper population and fishermen productivity. Sugara et al. (2022) stated that looking at coral fish communities can be used as an index of changes in the aquatic environment.

The initial method in managing and conserving fish diversity is through the identification of various fish species (Katarina et al., 2019). Through morphological and morphometric identification can certainly provide comprehensive and unambiguous information in fish taxonomy (Asiah et al., 2016). As the basis for proper sustainable fisheries management, determining the range and accurate identification of species is an important part of fisheries resource management and must be done (Khaerudin et al., 2018). However, information data regarding the types of snapper landed in the catchment of Pulau Balai Village are not yet available. Therefore, the purpose of this study is to identify the morphology and morphometrics of snapper species landed in the catch of Pulau Balai Village, Aceh Singkil. The data obtained later can be used as a reference or comparison in further research.

## MATERIALS AND METHODS

This research was conducted in Fishing Port, Pulau Balai Village, Pulau Banyak District (Figure 1). The

sampling data collection period was carried out from September to October 2023, and the samples taken were various species of snapper (family Lutjanidae) that were landed in the catchment. The tools and materials used in this research consisted of field and laboratory equipment. A list of tools and materials used is attached in the table below (Table 1).



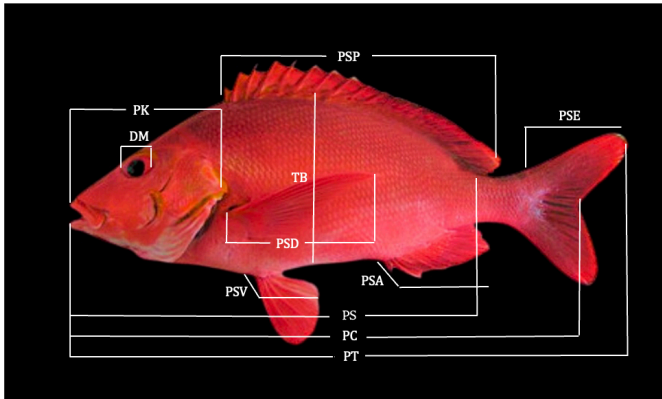
**Figure 1.** Map of fish data collection locations in Fishing Port, Pulau Balai Village, Aceh Singkil

**Table 1.** Research tools and materials

No.	Tools and Materials	Utilities
1.	Camera	Documentation of snapper species
2.	Stationery	Taking notes in the field
3.	Ruler	Snapper sample morphometric measurement tool
4.	Digital scales	Weigh the weight of the snapper sample
5.	Base board	Container for placing the sample
6.	Identification book	Reference in snapper identification
7.	Latex gloves	Hand protection to prevent contamination
8.	Alcohol 70%	Liquid for sterilizing hands

## Data Collection

Data collection in this study was carried out using the survey method at Tangkahan, Pulau Balai Village, Pulau Banyak District. The samples that will be obtained are all types of snapper from the Lutjanidae family that are landed at that location. Then, the samples obtained will be identified through their morphological shape and measured using a ruler for their morphometric shape. Morphological identification of snapper species was carried out based on the literature of the book Market fishes of Indonesia and through the website [fishider.org](http://fishider.org). There were 12 morphometric characters measured. Descriptions and notations were measured and presented in Figure 2 (Febrianti, 2022).



**Figure 2.** Morphometric characteristics measured

Description and notation of measurements measured against the sample in this study. The details are presented in table 2 below.

**Table 2.** Notations, names and descriptions of morphometric characters of fish measured

No.	Notation	Character Name	Description
1.	PT	Total length	Distance from the front tip of the head to the tail fin
2.	PC	Fork length	Distance from the front tip of the head to the outer end of the notch of the caudal fin branches
3.	PS	Standard length	Distance from the front tip of the head to the base of the caudal fin
4.	PK	Head length	Distance from the front of the head to the back of the head
5.	PSD	Pectoral fin length	Linear distance from the base to the rear end of the pectoral fin
6.	PSP	Dorsal fin length	Distance from the front to the rear dorsal fin
7.	PSV	Ventral fin length	Distance from the front pelvic fins to the hindlimbs
8.	PSA	Anal fin length	Distance from the front anal fin to the rear anal fin
9.	PSE	Tail fin length	Distance from the base of the caudal fin to the tip of the fin
10.	DM	Eye diameter	Length of eyeball diameter
11.	TB	Fish body height	Vertical distance from the base of the dorsal fin to the base of the anal fin
12.	BT	Body weight	Weight of fish sample

**Data analysis**

Data obtained from morphology and morphometric measurements of fish are analyzed descriptively, where descriptive analysis is a statistic used to describe data that has been collected and make conclusions based on these data (Tarigan et al., 2022). In addition, to determine the percentage of the types of snapper landed and know the species that have the longest size and heaviest weight will be analyzed using Microsoft Excel software.

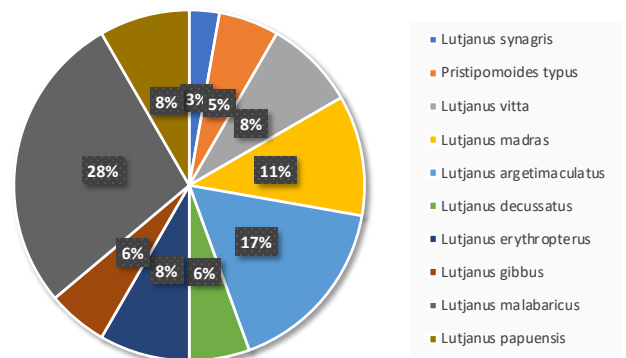
**RESULTS**

**Identification of snapper species and their morphology**

The results of research at the observation location found 36 individuals from 10 species of snapper that landed in the Fishing Port of Pulau Balai Village, Pulau Banyak District. Of these ten species, there are two genera, namely *Lutjanus* and *Pristipomoides*. These species include *Lutjanus synagris*, *Pristipomoides typus*, *Lutjanus vitta*, *Lutjanus madras*, *Lutjanus argentimaculatus*, *Lutjanus*

*decussatus*, *Lutjanus erythropterus*, *Lutjanus gibbus*, *Lutjanus malabaricus*, and *Lutjanus papuensis*. The percentage of snapper species in the Fishing Port of Pulau Balai Village is attached in Figure 3.






**Percentage Of Snapper Species Landed At Pulau Balai Fishing Port, Aceh Singkil**








**Figure 3.** Percentage of snapper species in the Fishing Port, Pulau Balai Village

The following is a morphological description of each species of snapper found attached in Table 3.

**Table 3.** Morphological description of snapper species

No.	Species name and figure	Morphology description
1.	 <p data-bbox="400 573 632 600"><i>Lutjanus synagris</i></p>	<p>In Indonesian, <i>Lutjanus synagris</i> is called pond snapper, which has morphological characteristics: one black spot on its body, a protractile mouth type, its tail is emarginate, and its body is bilaterally symmetrical. This species also has yellow or gold horizontal stripes on each side of its body.</p>
2.	 <p data-bbox="384 909 652 936"><i>Pristipomoides typus</i></p>	<p><i>Pristipomoides typus</i>, commonly known as Balinese kurisi, is a member of the Lutjanidae family of the genus <i>Pristipomoides</i>. The morphological description of this species is that its body shape is long and flat, its mouth is terminal, and its tail fin is forked. The body colour of this species is predominantly pinkish silver. A slight yellowish colour is on the front of the dorsal fin.</p>
3.	 <p data-bbox="424 1245 608 1272"><i>Lutjanus vitta</i></p>	<p><i>Lutjanus vitta</i> or Brownstripe snapper belongs to the Lutjanidae family, which lives mainly in coral areas and is widespread throughout the Indo-Pacific region at a depth of 40-12 meters (Palla and Bawah, 2021). The morphology of this species has rows of scales sticking out above the lateral line, pale brown to pink in colour, a brownish line following the lateral line, the shape of the tail is emarginate, and the location of the mouth is terminal. The colour of each fin of this species is predominantly yellowish.</p>
4.	 <p data-bbox="408 1626 632 1653"><i>Lutjanus madras</i></p>	<p><i>Lutjanus madras</i> is a snapper that mostly lives in coral reef ecosystems. In Indonesia, this fish is known as cawene. This species has almost similar morphological characteristics to <i>Lutjanus vitta</i>, the only difference being the colour and horizontal lines on the sides of its body. This species is dominated by yellow, while <i>Lutjanus vitta</i> combines yellow and red.</p>
5.	 <p data-bbox="344 1962 687 1989"><i>Lutjanus argentimaculatus</i></p>	<p><i>Lutjanus argentimaculatus</i> has an Indonesian name: red snapper, sparse tooth or ganggrang eca. This species generally lives in coral and rocky areas with a 10 to 100 meters depth. Morphologically, this fish has a flat body shape, short tail fin, terminal mouth shape, and emarginate tail fin shape. The body colour of this species is red to dark due to its body stripes.</p>

No.	Species name and figure	Morphology description
6.	 <p data-bbox="384 533 647 562"><i>Lutjanus decussatus</i></p>	<p><i>Lutjanus decussatus</i>, familiarly known as the rock-mark snapper, has a unique characteristic: its checkered shape on its body. This pattern can be formed because five horizontal red lines are crossed with seven vertical brown lines. Other physical characteristics that can be seen from this species are that it has a large black spot at the base of its tail fin and a variety of body colours, ranging from white to pale greyish brown.</p>
7.	 <p data-bbox="368 869 663 898"><i>Lutjanus erythropterus</i></p>	<p><i>Lutjanus erythropterus</i> (Bambangan) in English is called the Crimson Snapper, which has a truncate tail fin shape, is reddish-red and has an elongated round body shape. The location of the mouth is terminal, and the size is relatively small. This species is almost similar to <i>Lutjanus malabaricus</i>, but there are differences in body shape and eye position.</p>
8.	 <p data-bbox="411 1205 616 1234"><i>Lutjanus gibbus</i></p>	<p>In Indonesia itself, this fish is known as Condeng or Jenaha. <i>Lutjanus gibbus</i> is part of the species originating from the Indian and Pacific Oceans. The morphology of this fish is that the mouth is terminal, has a deep reddish colour, and the body shape is similar to <i>Lutjanus erythropterus</i>, namely elongated round, the tail fin is forked with round lobes and is dark in colour. Generally, this species is found at depths of 1-150 meters.</p>
9.	 <p data-bbox="376 1541 657 1570"><i>Lutjanus malabaricus</i></p>	<p>The red snapper (<i>Lutjanus malabaricus</i>) is a fish from the Lutjanidae family. It has very high economic value because it is a delicious meat that is widely consumed by people worldwide, including Indonesians (Dafiq et al., 2019). The morphological characteristics of this species are that the head shape is more humped, and the tail fin is shorter compared to other snapper species.</p>
10.	 <p data-bbox="389 1921 641 1951"><i>Lutjanus papuensis</i></p>	<p><i>Lutjanus papuensis</i>, known as the Papuan snapper, is part of the genus <i>Lutjanus</i>. The striking morphological characteristic of this species lies in the blackish pattern of the tail fin combined with the red colour in the form of emarginate. Apart from that, the tail fins on the anal and pelvic fins have a slight yellowish colour which is dominant with red. The distribution of this species is spread throughout Indonesia's tropical waters, and its living habitat is in coral reef areas with a depth of 6 to 15 meters.</p>

**Morphometric identification**

The morphometric characterization carried out in this

research was to describe the morphology of the types of snapper landed by fishermen in Fishing Port, Pulau

Balai Village, Pulau Banyak District. Morphometric and heaviest species are presented in Figure 4 character data is presented in Table 4, and the longest

**Table 4.** Snapper morphometric character data

Type of Fish	PT	PC	PS	PK	PSP	PSV	PSA	PSD	PSC	DM	TB	BT
<i>Lutjanus synagris</i>	32	31,5	27	6,5	6	3	5,5	14	6	1,1	9,5	478
<i>Pristipomoides typus</i>	34	29,5	26,5	5	7,5	4	4,5	13,5	5	1,3	8,5	399
	33	28	25,5	4,5	7	3,9	4,5	12,5	5	1	8	381
<i>Lutjanus vitta</i>	28,5	27,5	24,5	6	4	3	5	13	5	1,2	8	294
	30	29	25	7	4,5	3,9	5,5	13,5	5,5	1,3	8,3	314
	27	25	23	5,5	3,9	3	4,5	13	5	1	8	277
<i>Lutjanus madras</i>	25,5	24,5	21	5	4	3	4,5	11,5	4	1	7	229
	26	25	21,5	5	4,3	3	4,5	12	4	1	7,5	245
	21	19,5	16	4	3,5	3	4	10,5	4	1	6,5	195
	22,5	22	19,5	4	4	3	4,5	11	4	1	6,8	211
<i>Lutjanus argentimaculatus</i>	41	39	34	14	11	7	7	13	6	1,4	10	800
	53,5	49	44	16	13	9	8	17	7,5	1,7	12	2100
	35,5	34	30	12,5	9,5	6	5	12	5,5	1	8	633
	36	33,5	30	13,5	10	6,5	5,5	13	7	1,3	9	598
	36	34,5	29,5	13,5	10	6,5	5,5	12,5	7	1,2	9,5	635
	35,5	35	31	12	9,5	6	6	12	5,5	1,3	8	740
<i>Lutjanus decussatus</i>	28	24	22	7	6	4	6	11,5	5	1	7,5	325
	25	23	20,5	6,5	5,5	4	5,5	10	4,5	1	7	318
<i>Lutjanus erythropterus</i>	50,5	48,5	43	14	13,5	8	8,5	23	9	1,3	14	1687
	44	42	38	13	10,5	7	6	18	7,5	1,1	11	1380
	62	59	53	15	16,5	8,5	9,5	24	10	1,9	18	2600
<i>Lutjanus gibbus</i>	38	36,5	33	10	8	4,5	6	15,5	6,5	1,2	11	800
	40	37,5	35	11,5	9	5	6,5	17	7	1,3	11,5	846
<i>Lutjanus malabaricus</i>	37	36	30	7	5	4	5	13	4	1,2	12	805
	35	33	29	6,5	4,5	3	4	12	3,5	1,2	11	789
	33	30	27,5	6	4,5	3,5	4	12	3	1,1	9,5	486
	24,5	23,8	19	3,5	4	4	3,5	11	2,8	1	8	213
	30	29	24	5	4,5	3	3	12	3	1,2	9	387
	20	19	16	3	3	2,5	3	9	2	1	6	134
	30	29,5	25,5	5	4,5	4	3,5	12	3	1,1	9	401
	25	24,5	21	4,5	4	3,5	3,5	9,5	3	1	7,5	250
	26	25,5	22,5	4,5	4	3,5	4	9	3	1,1	7	240
24	22	20	4,5	4	3,5	4	9	3	1	6,5	218	
<i>Lutjanus papuensis</i>	34	31	28	5	4,5	4	3	14	5	1,1	7	465
	32	31	27	5	4,4	4	4	14	5	1,1	7	482
	41	38	34	5,5	4,8	6	6,5	18	5,5	1,4	8,5	1050
<b>Average</b>	33,1	31,3	27,7	7,6	6,5	4,5	5	13,2	5	1,1	8,9	622

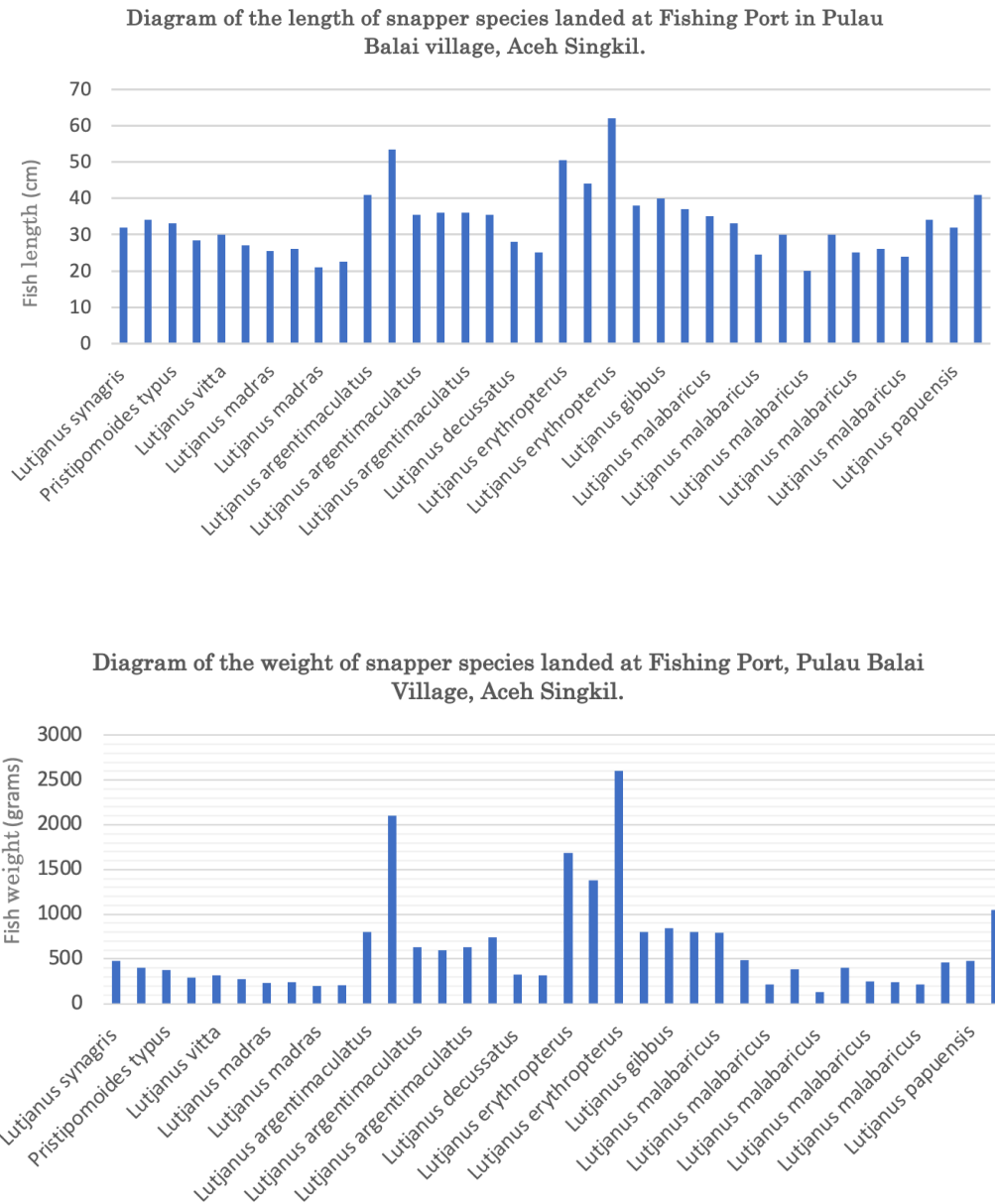


Figure 4. Diagram of length and weight of snapper species landed at the study site

## DISCUSSION

### Identification of snapper species

Based on this data, the most common type of fish caught was *Lutjanus malabaricus*, with a percentage of 28%, while the smallest was the *Lutjanus synagris* species, with 3%. The *Lutjanus malabaricus* species is often the target fish or targets of fishermen because this species is a fishery commodity with high selling value and is included in the class of exported fish (Rapi, 2023).

The variety of types of coral fish, especially snapper, which are landed in the Fishing Port of Pulau Balai Village, Pulau Banyak District, is thought to be because this area is an island that has quite a large

area of coral reefs and has quite a lot of types of coral reefs. As stated by Mujiyanto and Amran (2015), the diversity of snapper species encountered is caused by variations in coral types. Nurjirana and Burhanuddin (2017) stated that each island group has a different physical condition of coral reefs, which will affect the distribution and variation of coral fish. The coral reef's condition influences the presence of coralfish in coral reef areas, so the coralfish's distribution and associations are primarily determined by the cover of the coral community (Pratama, 2022).

The diversity of snapper fish landed in Fishing Port Pulau Balai Village is assumed to be influenced by the season. The fishing months or seasons in Indonesia usually occur in the transition season (March–May

and September – November) (Azizah *et al.*, 2021). This is in line with the results of previous research from Ulinnuha *et al.* (2023) which states that based on the results of interviews with fishermen, it is known that the highest catch of red snapper is in the peak season (August-October).

### Morphometric identification

The number of snapper species (Family Lutjanidae) landed at the study site in September 2023 was 10 species with a total of 36 individuals. Table 4. above shows that there are various size variations measured based on 12 morphometric characteristics. For the total length (PT) of the whole species has a size range of 20-62 cm with an average of 33.1 cm; stout length (PC) has a size range of 19-59 cm with an average of 31.4 cm; standard length (PS) has a size range of 16-53 cm with an average of 27.7 cm; head length (PK) has a size range of 3-15 cm with an average of 7.6 cm; pectoral fin length (PSP) has a size range of 3-16.5 with an average of 6.5 cm; ventral fin length (PSV) has a size range of 2.5-8.5 cm with an average of 4.5 cm; anal fin length (PSA) has a size range of 3-9.5 cm with an average of 5 cm; dorsal fin length (PSD) has a size range of 9-24 with an average of 13.2 cm; cauda fin length (PSC) has a size of 2-10 cm with an average of 5 cm; eye diameter (DM) has a size range of 1-1.9 cm with an average of 1.1 cm; height (TB) has a size range of 6-18 cm with an average of 8.9 cm; and body weight has a weight range of 134-2600 gr with an average of 622 gr.

Morphometric variation of some species can be caused by differences in environmental conditions or geography. This is in line with the opinion of Handoco and Mastiur (2021) which states that morphometric studies need to be published widely and morphometric variations in a population can differ due to differences in environmental conditions and genetic structure. In addition, differences in the various sizes of fish in this study area are thought to be due to changes in migration patterns. According to Herawaty *et al.* (2023), the migration process can occur from April to October. This migration is carried out to obtain suitable space and food availability for survival (Nurlita and Sanjaya, 2022), and this condition causes density, so that the size becomes more varied (Stige *et al.*, 2019).

The data in Figure 4 shows that the most prolonged and heaviest type of fish is the *Lutjanus erythropterus* species, which has a length of 62 cm and a weight of up to 2600 grams. Fry and Milton

(2009) explain that this species is often found in large forms because this fish has a long lifespan and a low mortality rate. Meanwhile, the species with the smallest size was obtained from *Lutjanus malabaricus*. This is likely due to the large number of species being caught and the increase in mortality. Rudd and Thorson (2018) report that an increase in fishing mortality is expected to decrease the average length because more individuals are caught. Therefore, all that remains are small individuals, which impacts the population's size structure (Rumagia *et al.*, 2021).

### CONCLUSION

Based on the results of research conducted in Tangkahan, Pulau Balai Village, Pulau Banyak Subdistrict, 10 species from 2 genus parts of the Lutjanidae family were found, namely *Lutjanus synagris*, *Pristipomoides typus*, *Lutjanus vitta*, *Lutjanus madras*, *Lutjanus argentimaculatus*, *Lutjanus decussatus*, *Lutjanus erythropterus*, *Lutjanus gibbus*, *Lutjanus malabaricus*, and *Lutjanus papuensis*. All fish species encountered have different morphological and morphometric characters and bambangan fish (*Lutjanus erythropterus*) is the fish with the largest morphometric size with a length of 62 cm and a weight of 2600 grams at the study site.

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