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Characteristics of Population and Fishing of Goldband Snapper (*Pristipomoides multidens*) in Tomini Bay, Indonesia

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ABSTRACT

The goldband snapper (*Pristipomoides multidens*), a deep-sea species of the family Lutjanidae, has high economic value, yet basic data for its resource management remain limited. This study aimed to describe the population and fishery characteristics of the goldband snapper in Tomini Bay, Indonesia. Data were daily collected from March to December 2017 at the Pagimana fish landing site. Population characteristics included a modal length of 33cm FL, negative allometric growth, a mean condition factor of 1.01, growth rate (K) of 0.31 year^{-1}, asymptotic length ($L\infty$) of 58.75cm FL, natural mortality (M) of 0.7 year^{-1}, total mortality (Z) of 1.13 year^{-1}, and exploitation rate (E) of 0.38 year^{-1}. The sex ratio was 19.64% males to 80.36% females; peak recruitment occurred in April, and the spawning potential ratio (SPR) averaged 22.33%. Fishery characteristics showed that handline was the dominant fishing gear; fishing grounds were spatially restricted; peak fishing season occurred in April; average abundance index was 30.6kg/ trip; and the highest landings were in May. The goldband snapper contributed 24.5% of the Lutjanidae catch, with a first capture length (Lc) of 26.7cm FL. It is recommended to improve fishing gear selectivity and to establish production limits to ensure sustainable management of goldband snapper resources in Tomini Bay.

INTRODUCTION

Pristipomoides multidens in Indonesia is locally known as “Angoli” and “Kurisi Bali.” Taxonomically, it belongs to the family Lutjanidae, the same group as snapper, and is commonly referred to in trade as “goldband snapper.” This species is a deep-sea demersal fish whose distribution is strongly influenced by bottom topography, currents, and temperature **(Newman *et al.*, 2016)**. The goldband snapper inhabit areas characterized by continental slopes, islands, and reefs. They are classified as deep-sea snappers, occupying depths of 60– 250m, with the highest concentrations at 80– 150m **(Marriott *et al.*, 2014)**.

Based on spatial distribution, this species belongs to the tropical fish group, with a global range across the tropical Indo-Pacific, from Samoa in the east to the Red Sea in the west, and from southern Japan in the north to northern Australia in the south **(Lloyd *et al.*, 2000)**. The stock status of the goldband snapper is often used as an indicator for the status of other oceanic demersal fish species **(Jackson *et al.*, 2020)**.

Alongside *Lutjanus malabaricus* and *Lutjanus erythropterus*, *P. multidens* is one of three snapper species with significant economic value for Indonesia as an export commodity **(Anggraeni, 2012)**. Among deep-sea demersal fish in Indonesia, the goldband snapper ranks second in production after *L. malabaricus* **(Mous *et al.*, 2022)**. Additionally, this species holds high economic value in other countries, including Australia **(Newman *et al.*, 2000; Gastauer *et al.*, 2017; Sih *et al.*, 2017; Jackson *et al.*, 2020)** and Papua New Guinea **(Fry *et al.*, 2006)**.

Exploitation of the goldband snapper is generally small-scale **(Blaber *et al.*, 2005; Newman *et al.*, 2016)**, but fishing intensity has been increasing in recent years, both in Australia **(Leigh *et al.*, 2009; Jackson *et al.*, 2020)** and Indonesia **(Anggraeni, 2012)**. In the Arafura Sea, exploitation has shifted to an industrial scale **(Nuraini & Ernawati, 2017)**. The species now contributes significantly to demersal fish landings in Probolinggo **(Anggraeni, 2012)** and to bottom longline catches in the Arafura Sea **(Nuraini & Ernawati, 2017)**. In Northern Australia, production increased from 84 tonnes in 1990 to 385 tonnes in 1997 **(Lloyd *et al.*, 2000)**, with its contribution to demersal fish catches rising to 37.7% **(Newman & Dunk, 2003)** and further to 523 tonnes in 2010 **(Jackson *et al.*, 2020)**. Across Australia, production grew from 600 tonnes in 2000 to 1,400 tonnes in 2010 **(Williams *et al.*, 2017)**. In Indonesia, the goldband snapper production reached 18,886 tonnes in 2020 **(Mous *et al.*, 2022)**.

While production has increased, there are concerns about resource depletion. Although national-scale landings have grown, catches in major fishing grounds such as the eastern Timor Sea, Aru Bay, and Arafura Sea have declined **(Anggraeni, 2012)**. In the Arafura Sea, the length at first capture has decreased; the goldband snapper caught with bottom longlines averaged 43.4cm TL in 2000 but only 40.5cm TL in 2007 **(Nuraini & Ernawati, 2017)**. This decline, combined with biological traits, places the species at high risk of overfishing **(Williams *et al.*, 2017; Jackson *et al.*, 2020)**. Key parameters indicating high exploitation risk are summarized in Table (1).

The contradiction between increasing national landings (in both Indonesia and Australia) and signs of population decline in primary fishing grounds—combined with the species' vulnerability—highlights the need for research to provide data for management and conservation. It is particularly important to study areas where stock status is unknown but which have potential as habitat and fishing grounds.

Tomini Bay, with its underwater slopes, basins, and seamounts **(Marine Geology Research and Development Centre, 2004; Sendjaja *et al.*, 2020)**, resembles habitats known to support goldband snapper in other regions **(Newman *et al.*, 2012; Williams *et al.*, 2017)**. This makes Tomini Bay a potential resource and alternative fishing ground for the species. Despite research on other fish resources in Tomini Bay—such as nautilus, and rabbitfish **(Burhanuddin, 2005)**, skipjack **(Mardlijah *et al.*, 2021)**, mackerel **(Sarif *et al.*, 2020; Olii *et al.*, 2022)**—no studies have addressed the goldband snapper resources.

This study aimed to describe the population and fishery characteristics of the goldband snapper in Tomini Bay.

- **Population characteristics:** length structure, length–weight relationship, condition factor, growth rate, mortality rate, exploitation rate, sex ratio, gonad maturity, length at first maturity, recruitment pattern, and recruitment potential.
- **Fishery characteristics:** fishing gear, fishing grounds, fishing season, fishing trips, abundance index, fish landings, catch composition, and selectivity.

The information from this research will provide an overview of the resource status, forming the basis for management and conservation strategies for the goldband snapper in Tomini Bay, and more broadly, in other potential fishing locations.

MATERIALS AND METHODS

1. Types and collection of data

Data collection was carried out from March to December 2017 at the fish landing site in Pagimana, Central Sulawesi, Indonesia (Fig. 1). Fish population characteristics recorded included length–weight and reproductive aspects, while fishing data covered fishing gear, fishing grounds, number of trips, and catch.

Data on fish length–weight, fishing gear, fishing grounds, number of trips, and catch were collected daily by trained local enumerators. Observations and data on sex and gonadal condition were conducted seasonally—during the west monsoon, east monsoon, transition I, and transition II—by researchers. Sex and gonadal condition were determined visually through dissection of proportionally sampled fish specimens.

2. Sample analysis

Species identification was conducted to ensure the object fish was *Pristipomoides multidens* and related fish species in capture and ecology. Fish species observed are identified based on credible guidebooks **(Senta & Tan, 1975; Ray *et al.*, 2017)**. Analysis the level of gonadal maturity can be divided into immature, developed, maturing, mature and spent **(Hassell *et al.*, 2018)**.

3. Data analysis

Length weight relation was estimated by using the **Froese (2006)** equation:

$$W = aL^b \quad (1)$$

Where, W is the body weight (g), L is the fork length (cm), a is the regression constant or intercept, b is the regression coefficient or slope.

Relative Condition factor was estimated by using the following formula of **Le Cren (1951)** equation**:**

$$\mathbf{Kn = W/aL^b}$$

(2)

Where, Kn is the relative condition factor (g); L is the fork length (cm); a is the regression constant or intercept; b is the regression coefficient or slope.

Growth parameters were estimated based on the von Bertalanffy growth model **(Sparre & Venema, 1992)**:

$$L_t = L_\infty\left[1 - e^{-k(t-t_0)}\right]$$

(3)

Lt is the length of the fish at age t; L∞ is the theoretical maximum length (asymptotic length); K is the growth coefficient; and t0 is the theoretical age of zero length.

Asymptotic length (L_∞) and growth rate (K) were estimated with the ELEFAN I programme in FISAT II **(Gayanilo *et al.*, 2005)**. Age at length 0 (t_0) was estimated based on the equation of **Pauly (1983)**.

$$\mathbf{Log\ (-t0) = -0{,}3922 - 0{,}2752\ log\ (L\infty) - 1{,}038\ log\ (K)}$$

(4)

Mortality parameters included natural mortality (M), fishing mortality (F) and total mortality (Z). Total mortality (Z) was estimated using the length converted catch curve method in the FISAT II programme package **(Pauly, 1983; Gayanilo *et al*., 2005)**. Natural mortality (M) was estimated using the equation of **Pauly (1983)** with the addition of an average water temperature value of 29°C:

$$\mathbf{Log\ (M) = -0{,}0066 - 0{,}279\ log\ (L_\infty) + 0.6543\ log\ (K) + 0.4634\ log\ (T)}$$

(5)

Fishing mortality rate and exploitation rate were estimated using the **Sparre and Venema (1992)** equation:

$$F = Z - M$$

(6)

$$E = \frac{F}{Z}$$

(7)

F = Fisihing mortality, Z = Total mortality, M= Natural mortality, E = Exploitation rate

Potential recruitment is based on Spawning Potential Ratio (SPR) values estimated by comparing spawning stock biomass under fishing conditions (SSBRfished), with no fishing conditions (SSBRunfished), using the equation set in the study of **Hordyk *et al.* (2016)**:

$$SPR = \frac{SSBR_{fished}}{SSBR_{unfished}}$$

(8)

Input data used in the SPR analysis are M/K ratio, asymptotic length (L∞), proportion of 50% gonadal mature population (Lm), proportion of 95% gonadal mature population (Lm95) and fish length. Input data greatly affects the value of the SPR, so in this analysis using three sets of input data obtained based on length base analysis with the method of **Pauly (1983)**, **Froese and Binohlan (2000)** and **Then *et al*. (2015)**.

The fishing season is set based on the Fishing Season Index which was calculated based on the time series analysis of Spiegel **(Merta *et al.*, 2004)**.

$$FSI = ((Pi\ \ X\ \ N\ )/\sum_{i=n}^{n} Pi)\text{- }1$$

(9)

FSI =Fishing season index in month i, Pi = Production in month i, N= Number of months of production

The mean length at first capture (Lc50) of *P. multidens* was analysed with a logistic function based on the equation of **Sparre and Venema (1992)**:

$$S_L = \frac{1}{1+\exp\,(a-b*L)}$$

(10)

Where, S_L is the selectivity of the longline gear, a and b are constants, L is the length of the fish and the Lc50 value is obtained from a/b.

RESULTS

1. Length structure, length-weight correlation and condition factor

Measurements of 2,833 goldband snapper (*Pristipomoides multidens*) revealed a minimum length of 7cm FL, a maximum of 56cm FL, a mean of 28.3cm FL, and a modal

length of 33cm FL. The monthly length structure of landed fish varied (Fig. 2a), with the smallest mean length recorded in June (28.1cm FL) and the largest in May (30.6cm FL).
The length–weight relationship was expressed as:

$$W = 0.0255 L^{2.8709}$$

with a coefficient of determination $R^2 = 0.9746$ (Fig. 2b). The b-value (< 3) indicates a negative allometric growth pattern, meaning length increases proportionally faster than weight.
The relative condition factor ranged from 0.59 to 1.31, with a mean of 1.01 ± 0.16, indicating generally good fish condition across samples.

2. Growth, mortality, and exploitation rates

Length-frequency analysis estimated a growth rate (K) = 0.31 $year^{-1}$ and an asymptotic length ($L\infty$) = 58.75cm FL (Fig. 3a). The age at first gonadal maturity was 3.4 years, while the maximum age was estimated at 10 years (Fig. 3b).
Mortality estimates were:

- Natural mortality (M) = 0.7 $year^{-1}$
- Fishing mortality (F) = 0.43 $year^{-1}$
- Total mortality (Z) = 1.13 $year^{-1}$
- Exploitation rate (E) = 0.38 (Fig. 3c)

3. Reproduction and recruitment

Sex composition showed a strong female bias: males 19.64% and females 80.36%. Gonadal maturity stages indicated 78.57% immature and 21.43% mature individuals. The length at first maturity (Lm) was 37.83cm FL (Fig. 4a).
Recruitment analysis indicated continuous recruitment throughout the year, with a peak in April and the lowest recruitment in January (Fig. 4b). The spawning potential ratio (SPR) was estimated as follows:

- **Pauly (1983)** method: 32%
- **Froese & Binohlan (2000)** method: 18%
- **Then *et al*. (2015)** method: 17%

The average SPR across methods was 22.33% (Fig. 4c).

4. Fishing gear, fishing grounds, and fishing season

Three fishing gears targeted the goldband snapper: handline, bottom longline, and spear. Handline was dominant, accounting for 137 trips/month (86.37%), compared to 13 trips (8.01%) for bottom longline and 9 trips (5.62%) for spear (Fig. 5a).

Handlines used a mainline of no. 50, hooks no. 7–8 for large fish and no. 11–12 for smaller fish, made of titanium. Fishing boats were wooden, 5– 7m long, 0.5– 0.8m wide, with a capacity of 0.5– 2GT, powered by two engines (5–10 HP each). No holds were present; catches were stored in 50kg styrofoam boxes. Outriggers made from bamboo or similar material provided stability.

Fishing depth ranged from 25– 45m (mean 32m). Trips lasted 1 day for nearby grounds (1– 3h travel) and 3 days for distant grounds (5– 8h travel), averaging 2 days with 16h of active fishing.

Eight fishing grounds were identified (Fig. 5b), with intensity as follows: Bajopoat (45.93%), Jepara Cape (27.93%), Boalemo (13.32%), Sidangi (4.08%), Tinalampu (3.50%), Buaya Island (2.34%), Tampo (2.32%), and Tembang (0.58%).

Fishing season indices peaked in April, with additional peaks in May, August, and October. Famine periods occurred in June, September, and December, while July and November represented transitional months (Fig. 5c).

5. Abundance indices and fish landings

The abundance index (CPUE) for the handline fleet targeting the goldband snapper was the highest in May (30.6 kg/trip) and the lowest in March (5.1 kg/trip), with an average of 18.10kg/ trip (Fig. 6a).

The handline fleet contributed 85.64% of total fish landings (Fig. 6b). Total landings peaked in October (26,981kg) and were at their lowest in September (4,496kg). The goldband snapper landings peaked in May (1,888kg) and were the lowest in August (290kg).

6. Catch composition and selectivity

Eight fish families were caught by handline: Serranidae (27.54%), Lutjanidae (25.57%), Lethrinidae (14.97%), Scombridae (12.90%), Carangidae (9.26%), Scaridae (4.82%), Siganidae (3.50%), and Sepiidae (1.50%).

Goldband snapper landings represented 6.27% of total fish catch and 24.52% of Lutjanidae catch. From April–December, enumerators recorded 8,217kg of the goldband snapper landed (Fig. 7a). The highest monthly catch was in May (32.64%), and the lowest was in August (7.16%).

Handline selectivity analysis showed a first capture length (LcL_cLc) of 26.7cm FL, smaller than the first maturity length (LmL_mLm) of 37.83cm FL (Fig. 7b), indicating that many individuals were caught before maturity.

DISCUSSION

Measurements of the goldband snapper (*Pristipomoides multidens*) in Tomini Bay showed a length range of 7– 56cm FL, smaller than the 8.0– 70cm FL reported in Northwest Australia **(Newman & Dunk, 2003)**. The modal length of 33cm in Tomini Bay is also smaller than the commonly caught size of 40cm **(Carpenter & Niem, 2001)**. The condition factor of the goldband snapper in Tomini Bay was >1, indicating that the fish are in good body condition and that the water environment supports growth **(Dinh *et al.*, 2022; Paramo *et al.*, 2024)**. However, because the condition factor can be influenced by various environmental factors, it should be interpreted alongside other growth indicators **(Zhang *et al.*, 2023)**.

The length–weight relationship for the goldband snapper in Tomini Bay shows a negative allometric pattern, meaning length increases faster than weight. This is similar to findings from Northwest Australia **(Newman & Dunk, 2003)**. Such relationships can vary between locations and over time, as observed in Australia between 1995 and 1999 **(Newman & Dunk, 2003; Gubiani *et al.*, 2020; Dinh *et al.*, 2022; Oyetunji *et al.*, 2022)**.

Growth, mortality, and maximum size of goldband snapper vary geographically **(Newman *et al.*, 2016)**. In Tomini Bay, the growth rate (K) was 0.31/year, faster than in northern Australia (0.187/year) **(Newman & Dunk, 2003)** and western Australia (0.26/year) **(Jackson *et al.*, 2020)**. However, it was slower than in Papua New Guinea (0.67/year) **(Fry *et al.*, 2006)**. The higher growth rate in Tomini Bay compared to northern Australia aligns with findings elucidating that the tropical snappers grow faster than those in subtropical waters **(Amorin *et al.*, 2019)**.

The asymptotic length ($L\infty$) in Tomini Bay was 58.75cm FL, slightly less than in northern Australia (59.8cm FL) **(Newman & Dunk, 2003)** and western Australia (59.0cm FL) **(Jackson *et al.*, 2020)**. Moreover, it is considerably smaller than the 70.8– 74.7cm FL reported by **Newman *et al.* (2016)** and 73.6cm FL from the central western Pacific **(Williams *et al.*, 2017)**. It is, however, greater than the 44.2cm FL reported for Papua New Guinea **(Fry *et al.*, 2006)**.

Natural mortality (M) in Tomini Bay (0.7/year) was higher than in Northwest Australia (0.10–0.14/year) **(Newman & Dunk, 2003)** and Western Australia (0.16/year) **(Jackson *et al.*, 2020)**. The estimated maximum age in Tomini Bay was 20 years, shorter than the 28 years reported for western Australia **(Jackson *et al.*, 2020)**, 30 years in northern Australia **(Newman & Dunk, 2003)**, and 45 years in other locations **(Newman *et al.*, 2016)**. These differences reflect a general pattern in which fish at lower latitudes have shorter lifespans and smaller maximum sizes but higher growth and mortality rates. There is also evidence that the goldband snapper in the northern hemisphere may have shorter lifespans than those in the southern hemisphere, influenced by sea–air exchange patterns **(Newman *et al.*, 2016)**.

The exploitation rate (E) of the goldband snapper in Tomini Bay is low at 0.38/year. Fishing mortality (F) was 0.43/year, lower than the 0.55–0.77/year in northern Australia **(Newman & Dunk, 2003)**. This low exploitation is linked to small-scale fishing, typical for deep-sea fisheries, which use specific gear types and operate in limited offshore grounds **(Schemmel *et al.*, 2021)**. In contrast, commercial fisheries such as those in the Arafura and Timor Seas have much higher exploitation rates of 0.53/year and 0.68/year, respectively **(Lloyd, 2006)**.

The length at first gonadal maturity (Lm) in Tomini Bay was 37.83 cm FL, similar to Pelabuhan Ratu (37.6 cm FL) **(Hukom *et al.*, 2006)**, but smaller than in western Australia (44.2cm FL) **(Jackson *et al.*, 2020)** and northern Australia (47cm FL) **(Newman *et al.*, 2012)**. The length at first capture (Lc) was 26.7 cm FL, below the maturity size, indicating that many individuals caught are immature.

The spawning potential ratio (SPR) was estimated at 32%, above the critical threshold of 20% required to sustain populations **(Gabriel & Mace, 1999; Bunnell & Miller, 2005)**, suggesting the current fishing pressure allows for sustainable recruitment. Differences in demographic parameters across studies likely result from population separation **(Bowman, 2022)** and the strong influence of local environmental conditions on deep-sea fish life history **(Matthews & Bohaboy, 2024)**.

Fishing trips and landings peaked in April and October, corresponding with lower wind speeds and calmer seas during transitional monsoon periods **(Habibie *et al.*, 2018; Alfiandy *et al.*, 2020)**. This seasonality is consistent with other fisheries in Tomini Bay, such as mackerel scad, which also show peak catches in April and October **(Amri *et al.*, 2006)**.

Fishing for goldband snapper in Tomini Bay is conducted mainly with handlines in relatively small fishing grounds. This is consistent with the species' bioecological traits: non-schooling, epibenthic, sedentary, inhabiting uneven benthic topography, and exhibiting low horizontal movement **(Jackson *et al.*, 2020; Baremore *et al.*, 2023)**. Handline fishing is also the main gear for goldband snapper in the Timor Sea **(Lloyd, 1996)**, Western Australia **(Jackson *et al.*, 2020)**, and other Indonesian deep-sea fisheries, where it accounts for nearly 50% of demersal catches **(Mous *et al.*, 2022)**.

The abundance index (CPUE) averaged 18.10kg/ trip (1.13kg/ h), which is low compared to other regions **(Fry *et al.*, 2006)**. CPUE varied seasonally, peaking in May and October, and is influenced by environmental conditions, fishing intensity, and oceanographic factors **(Jovanovic & Rafols, 2018; Leontiou *et al.*, 2021)**.

Catch composition in handline fisheries for the goldband snapper in Tomini Bay is dominated by demersal species, including Lutjanidae, Serranidae, and Lethrinidae, with significant pelagic catches from Scombridae and Carangidae. The dominance of carnivorous species indicates no biomass shift and a stable trophic structure **(Nuraini & Ernawati, 2017)**. Similar catch compositions are observed in longline fisheries in Papua New Guinea **(Fry *et al.*, 2006)** and bottom longline fisheries in the Timor and Arafura Seas **(Mous *et al.*, 2020)**. Catch composition can vary by location **(Newman *et al.*, 2016)** and may shift with increased fishing pressure **(Nuraini & Ernawati, 2017)**.

CONCLUSION

Based on the condition factor, goldband snapper in Tomini Bay can grow well and exhibit an isometric negative growth pattern. This species is classified as slow-growing and long-lived, with low natural mortality, fishing mortality, and exploitation rates. The goldband snappers caught in Tomini Bay are generally smaller than the size at first gonadal maturity. Peak recruitment for the population occurs in April, indicating that the species is still capable of reproduction and recruitment sufficient to maintain population balance and sustainability.

The fishing grounds and distribution habitat of the goldband snapper in Tomini Bay cover a relatively narrow area and have a low abundance index. Peak fishing activity occurs in April and October, while the lowest catch period ("famine") is recorded in September. The abundance index for this species remains low. In terms of catch composition, the goldband snapper accounts for 53.1% of the total Lutjanidae catch and 12.56% of the total fish landed by handline.

Although the goldband snapper population in Tomini Bay is growing well and is still capable of balanced recruitment, the combination of a low abundance index and the capture of smaller-sized individuals suggests the need for management measures. It is recommended to increase the selectivity of fishing gear and establish production quotas to ensure sustainable exploitation.

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Tables

Table 1. High risk factors of the goldband snapper (*Pristipomoides multidens*) resource

Parameters	Source
Habitat for mature fish cover a small/ relatively narrow scale	**(Newman *et al.*, 2000)**
Recruitment dependent on spawner biomass of surrounding stocks	**(Newman *et al.*, 2000; Ovenden *et al.*, 2002)**
Low genetic variation	**(Wigati *et al.*, 1970; Ovenden *et al*., 2004)**
Population of similar fish with similar habitat (red snapper) declines.	**(Blaber *et al.*, 2005)**
Long life span/slow recovery	**(Jackson *et al.*, 2020)**
Low production potential and growth rate	**(Newman *et al.*, 2016; Williams *et al*., 2017)**

Figs.

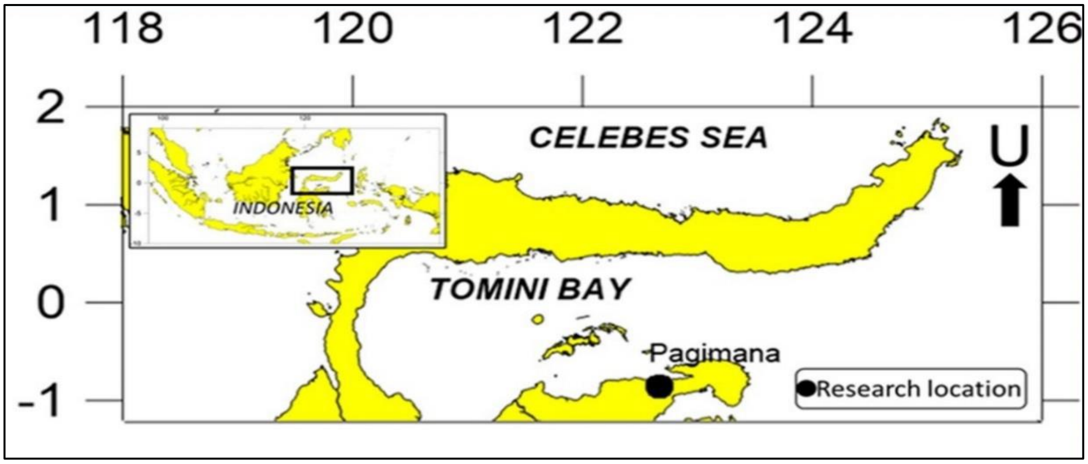

Fig. 1. Sampling locations for goldband snapper (*Pristipomoides multidens*)

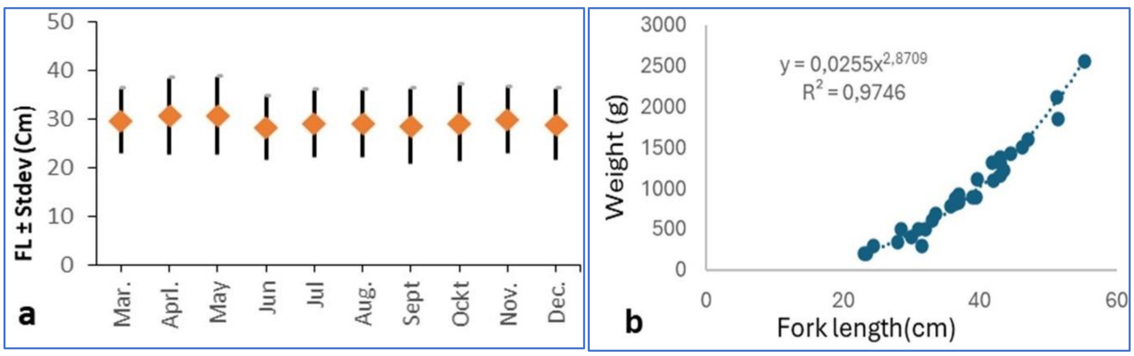

Fig. 2. a) Monthly length structure, b) Length-weight correlation of *Pristipomoides multidens* in Tomini Bay, Indonesia

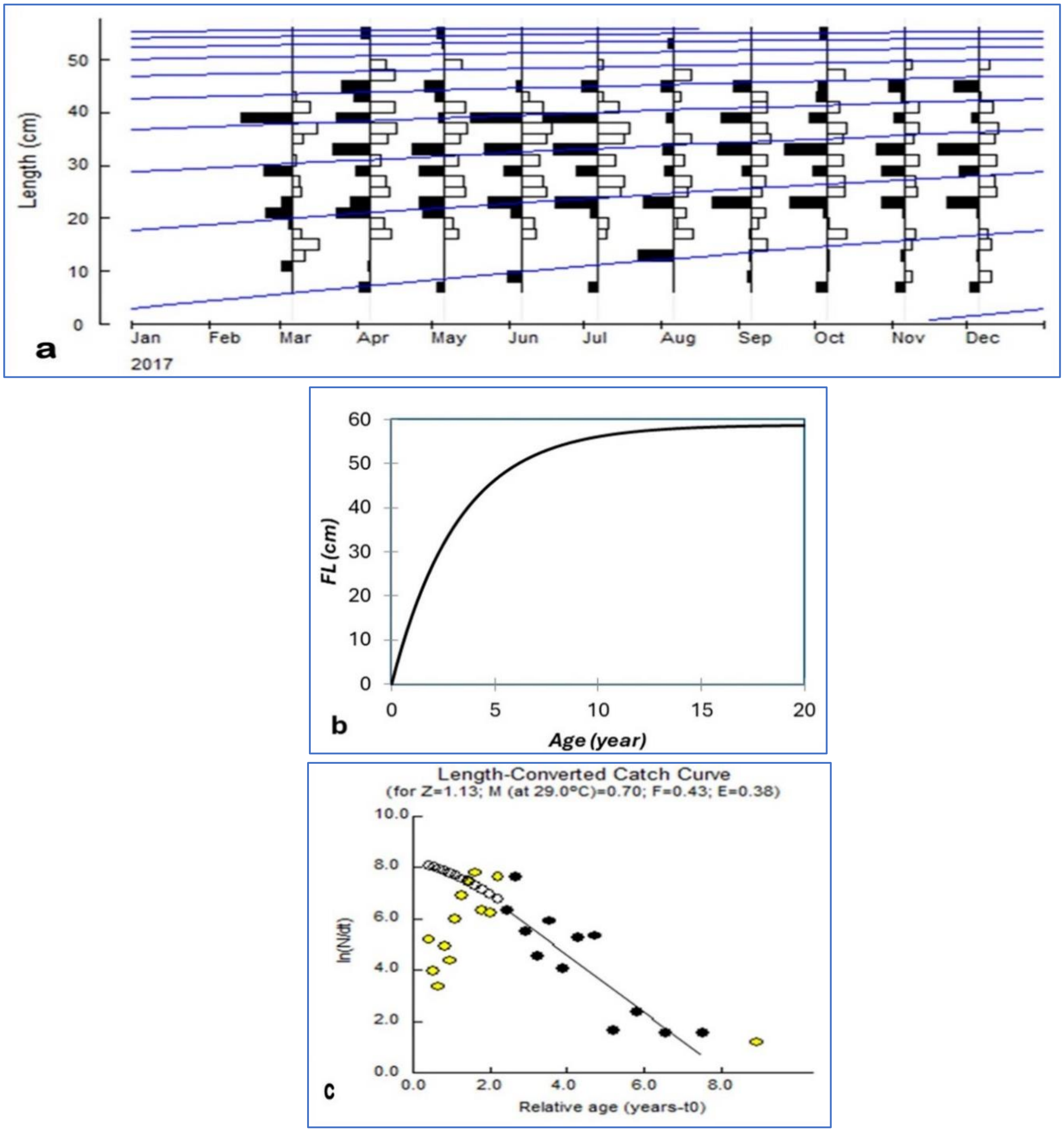

Fig. 3. a) Growth charts, b) Age estimation curves and c) Mortality and exploitation rate curve *Pristipomoides multidens* in Tomini Bay, Indonesia

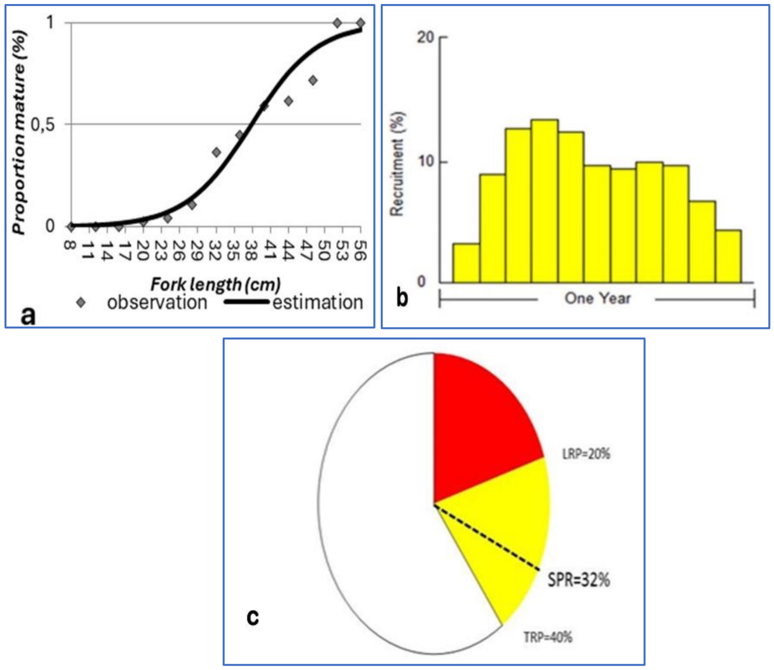

Fig. 4. a) The first gonad maturity, b) Recruitment pattern, c). Potensi recruitment in SPR *Pristipomoides multidens* in Tomini Bay, Indonesia

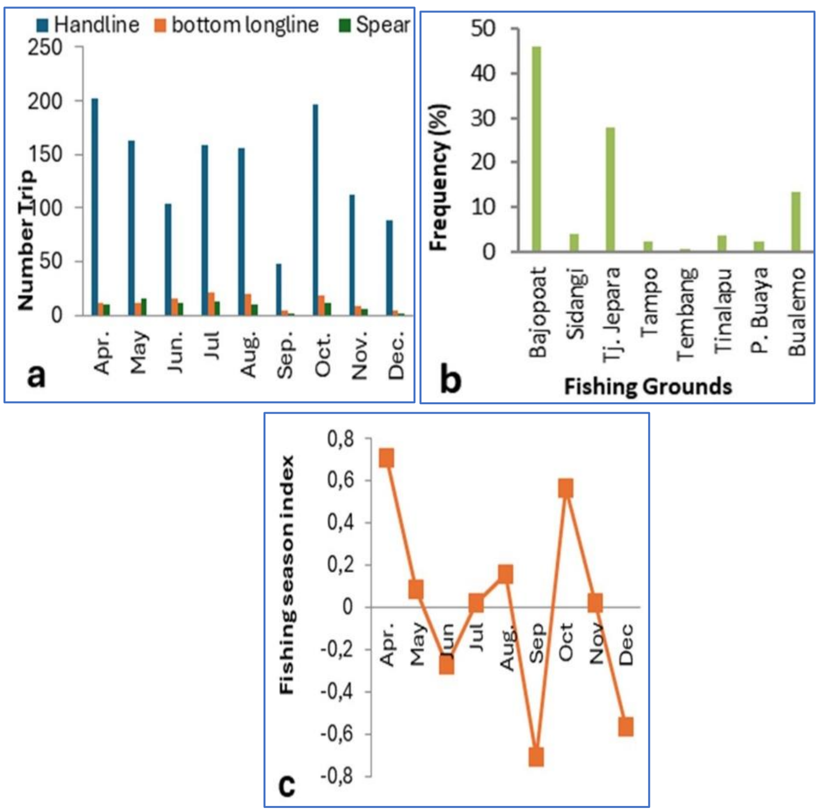

Fig. 5. a). Fishing gear trips, b). Fishing grounds and c) Fishing season index of *Pristipomoides multidens* in Tomini Bay, Indonesia

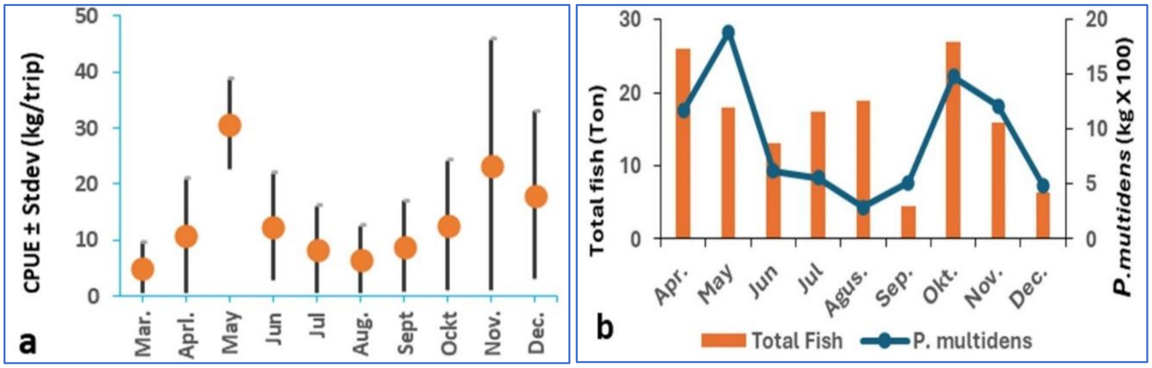

Fig. 6. a). Abundance index and b) Fish landing of *Pristipomoides multidens* in Tomini Bay, Indonesia

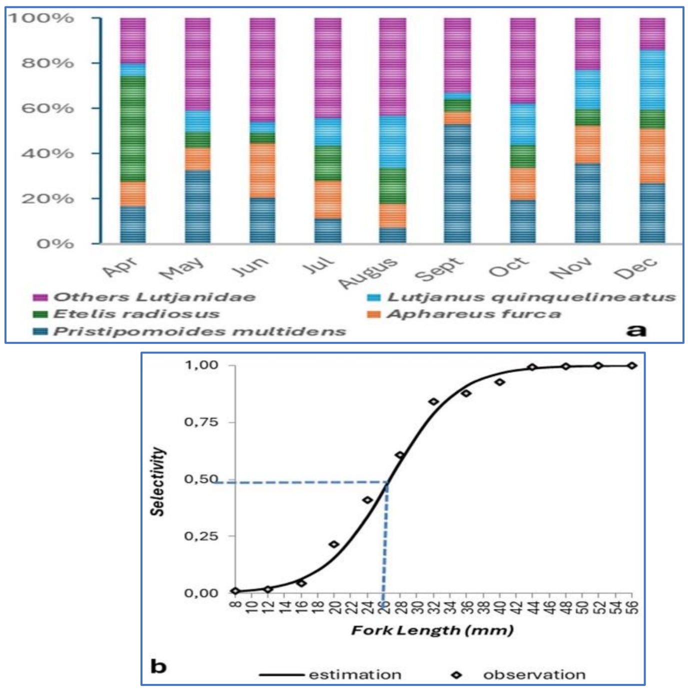

Fig. 7. a). Lutjanidae composition, b) Selectivity of handline catch for *Pristipomoides multidens* from Tomini Bay, Indonesia

Highlights

- Goldband snapper in Tomini Bay have good condition, low growth and exploitation.
- Recruitment Goldband Snapper in Tomini Bay show ability to grow and sustain populations
- Goldband Snapper is a large component of the economically important Lutjanidae group
- Goldband snapper in Tomini Bay has a low abundance index and a narrow fishing ground
- Goldband Snapper fishing in Tomini Bay is conducted at small-scale with low selectivity