

SPECIES COMPOSITION AND BIOLOGICAL ASPECTS OF CUTTLEFISH LANDED AT TANJUNG LUAR FISH LANDING SITE EAST LOMBOK DISTRICT

Komposisi Jenis Dan Aspek Biologi Sotong Yang Didaratkan Pada Pangkalan Pendaratan Ikan Tanjung Luar Kabupaten Lombok Timur

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ABSTRACT

Cuttlefish are a fishery resource classified under the class Cephalopods. The potential for cuttlefish fisheries in Indonesia is quite significant, considering the country has vast and diverse marine waters. The demand for fishery products, including cuttlefish, both in domestic and international markets, continues to increase. Despite the great potential, sustainable management and protection of marine ecosystems are key to ensuring that the utilization of these resources does not harm the environment and can continue in the long term. Research on the species composition and biological aspects of cuttlefish is necessary to understand the condition of the aquatic ecosystem. Data collection was carried out using the accidental sampling method and direct surveys conducted. A total of 457 specimens were obtained during the study. Data analysis included species composition analysis, gender analysis, and the analysis of the length-weight relationship of cuttlefish. The result of this study shows that the captured cuttlefish consists of two species: *Sepia latimanus* and *Sepia pharaonis*. The number of males is higher than females; however, the ratio is approximately 1:1. Based on this result, the sex ratio is categorized as nearly balanced, with a ratio of 1:1. The length-weight relationship of all landed cuttlefish, specifically the two species *Sepia latimanus* and *Sepia pharaonis*, shows a negative allometric growth, where length growth is faster than weight growth. The purpose of this study is to determine the composition of the type, sex ratio and the relationship between the length and weight of the landed cuttlefish.

Keyword: Cuttlefish, composition, biology, East Lombok

ABSTRAK

Sotong merupakan sumberdaya perikanan yang tergolong ke dalam kelas cephalopods. Potensi perikanan sotong di Indonesia cukup besar, mengingat Indonesia memiliki perairan laut yang luas dan beragam. Permintaan akan produk perikanan, termasuk sotong, baik di pasar domestik maupun internasional, terus meningkat. Meskipun potensi besar, pengelolaan yang berkelanjutan dan perlindungan terhadap ekosistem laut menjadi kunci untuk memastikan bahwa pemanfaatan sumber daya ini tidak merugikan lingkungan dan dapat berlanjut dalam

jangka panjang. Perlunya dilakukan penelitian komposisi jenis dan aspek biologi sotong agar mengetahui kondisi ekosistem perairan. Pengumpulan data dilakukan dengan menggunakan metode *accidental sampling*, penelitian ini dilakukan dengan survei langsung, jumlah sampel yang di dapatkan selama penelitian berjumlah 457 ekor. Analisis data meliputi analisis komposisi jenis, analisis jenis kelamin dan analisis hubungan panjang dan berat sotong. Hasil penelitian menunjukkan bahwa jenis sotong yang tertangkap terdiri dari dua spesies yaitu *Sepia latimanud* dan *Sepia pharonis*. Jumlah jenis kelamin jantan lebih banyak dari pada betina namun demikian, perbandingan ini menunjukkan 1:1. Berdasarkan hasil penelitian perbandingan nisbah kelamin dikategorikan berada pada kondisi mendekati seimbang yaitu di angka 1:1. Hasil hubungan panjang dan berat seluruh sotong yang didaratkan dengan dua spesies jenis spesies *Sepia latimanus* dan *Sepia pharaonis*, memiliki hubungan panjang dan berat bersifat allometrik negatif dimana pertumbuhan panjang lebih cepat daripada pertumbuhan berat. Tujuan penelitian ini mengetahui komposisi jenis, nisbah kelamin dan hubungan panjang dan berat sotong yang didaratkan.

Kata Kunci: Sotong, komposisi, biologi, Lombok Timur

INTRODUCTION

Cuttlefish are fishery resources that belong to the class of cephalopods. The potential for cuttlefish fisheries in Indonesia is quite large, considering that Indonesia has vast and diverse marine waters (Widiastuti et al., 2019). Indonesian waters that have a tropical climate provide good conditions for the life cycle of cuttlefish. In addition to catching from nature, cuttlefish cultivation also has significant potential. Cuttlefish are inhabitants of the seabed in various habitats, including rocky, sandy, muddy bottoms, to seagrass beds, seaweed and coral reefs. The habitat of cuttlefish has a distribution area from the lowest low tide limit to a depth of 200 meters. Some species have a habit of migrating seasonally in response to temperature changes and congregating, usually in shallow waters at the time of spawning. Each type of cuttlefish has its own characteristics and habitat priorities. Climate factors, including seasons, can affect cuttlefish reproduction and migration. Indonesian waters that have a tropical climate provide good conditions for the life cycle of cuttlefish. In addition to catching from nature, cuttlefish cultivation also has significant potential. Indonesia has developed several cuttlefish cultivation businesses to increase production sustainably (Prasetyo, 2020).

Demand for fishery products, including cuttlefish, in both domestic and international markets, continues to increase. Indonesia's cuttlefish exports are also an important contributor to the economy. Cephalopods capture fishery production in West Nusa Tenggara Province includes cuttlefish in 2019-2021, cuttlefish data in 2019 produced a total of 838.09 tons and increased to 2,799.63 tons in 2021 (KKP Statistics). The utilization of fish resources must be carried out optimally in order to support sustainable fisheries development (Likumahua & Nifan, 2020).

The Fish Landing Base (PPI) is one way to record the increase in catch from fishermen and is one of the main functions of fishery activities and a driving factor and can improve the welfare of fishermen. The catch of cuttlefish landed at PPI Tanjung Luar by fishermen has not been identified as a whole, therefore it is necessary to conduct research related to the composition of species and biological aspects of cuttlefish species landed at PPI Tanjung Luar, Keruak District, NTB Province. The purpose of this study is to find out the composition of cuttlefish species, the sex ratio of cuttlefish and to determine the relationship between the length and weight of the landed squid species.

METHODS

The research was conducted in March 2024. Sampling was carried out at the Tanjung Luar Fish Landing Base (PPI), East Lombok Regency. With the number of samples used as many as 457.

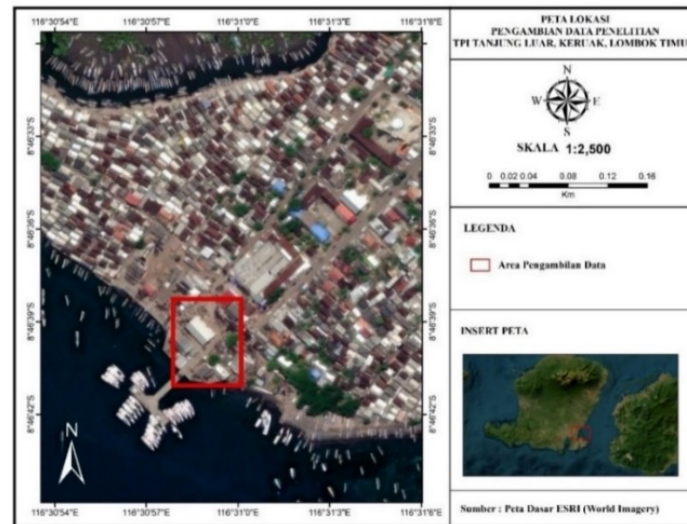


Fig 1. Map of the Research Location

The first stage is preliminary research conducted by surveying and interviewing several fishermen who landed fish at the research site. The method used in this study is using a quantitative descriptive method, this research was conducted by a direct survey to fish traders at PPI Tanjung Luar, with the number of respondents used as many as 10 respondents. According to Sujarweni, (2022) the quantitative descriptive method is a method carried out because the research data that will be obtained in the form of numbers will then be described in the form of sentences and pictures. All data used in this study are primary data, namely cuttlefish catches taken directly from fishermen or fish traders at PPI Tanjung Luar. Primary data is data obtained directly or in-situ, namely field data (Wandasari, 2013). The data collection technique used is an accidental sampling method, a data collection method carried out by searching for samples in a predetermined research area (Hariputra & Defit, 2022). The data analysis used using regression analysis all data obtained will be processed using Microsoft Excel. To find out the composition of the type, sex ratio and the relationship between the length and weight of the squid, the following formula is used:

a. Composition, Types and Quantities of Squid

Calculated by calculating the species composition using the formula Sparre and Venema (1999) in Setyohadi et al., (2016)

$$KJ = \frac{N_i}{N} 100 \%$$

Information:

KJ= Composition of species of catches (%)

N_i= Number of individuals per species

N= Number of individuals of all species (total number of individuals per sampling)

b. Sex Ratio

According to Omar et al., (2011) calculating the sex ratio is calculated using the following formula:

$$NB = \frac{\sum J}{\sum B}$$

Information:

NB = Sex ratio

$\sum J$ = Number of male squid (tail)

$\sum B$ = Number of female cuttlefish (tail)

Sex ratio is important to know the ratio of the percentage of males and females to the total number of fish.

$$J = \frac{\text{Number of males}}{\text{Total number of individuals}} \times 100$$

$$B = \frac{\text{the number of female individuals}}{\text{Total number of individuals}} \times 100$$

c. Long and Heavy Relationships

The analysis of the relationship between length and weight is calculated using a formula (Setyohadi et al., 2024).

$$W = aDML^b$$

The constants a and b used to estimate the formula are converted to regression:

$$\ln W = \ln a + b \ln DML$$

Information:

W = fish body weight (grams)

DML = *Dorsal Mantel Length* (cm)

a = Regression equation intercept

b = slope regression equation

RESULT

Types of Species Caught

Based on the findings during the research conducted at PPI Tanjung Luar, there are 2 species of cuttlefish, including: (a) *Sepia latimanus* and (b) *Sepia pharaonis*.

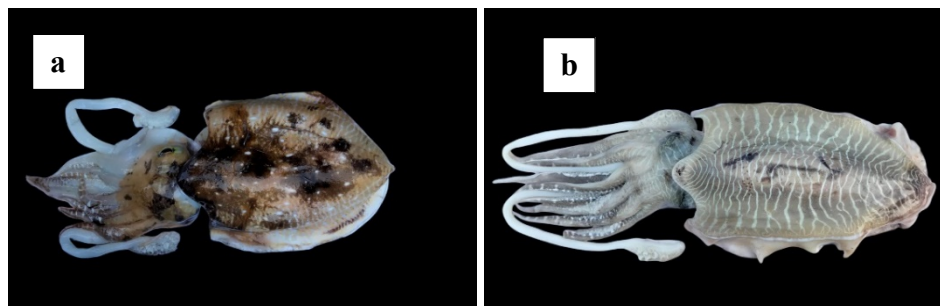


Fig 2. Caught Squid

The *sepia latimanus* has a crescent-shaped shape, the face of the suction pillow is flat; With 6 suckers in a transverse row, the size is very different from some enlarged sucker medians, the surface of the suction pads, the protective membrane of the back and abdomen are fused at the base of the mace, separated from the stem by a membrane, the protective membrane of the back forms a deep gap at the junction with the stalk. Meanwhile, *Sepia pharaonis*, or better known locally as the *kenaus squid* which has a backbone, is a species of squid characterized by a motif of transverse stripes that resemble a zebra pattern on its coat. The coat is oval in shape and is usually purplish-red. This species has 8 suckers on its tentacular club transversely Carpenter & Niem (1998).

Composition of Types of Squid Species

Data on the composition of cuttlefish species obtained from catches landed at PPI Tanjung Luar using arrow fishing gear and fishing jigs, data collection was carried out every day during the research period.

Table 1. Number of cuttlefish caught

No	Local Name	Latin Names	Catch	Type Composition (%)
1	Kenaus	<i>Sepia latimanus</i>	137	30
2	Kenaus	<i>Sepia pharaonis</i>	320	70
Sum			457	100

There were 457 cuttlefish caught during the research period with 2 different species types, namely 137 *Sepia latimanus* and 320 *Sepia pharaonis*. From the amount of data obtained, the most species were landed in the research period, *Sepia pharaonis*. Factors that can affect the number of species caught such as habitat availability, environmental conditions and having migration patterns that are the basis for determining an abundance are spawning areas (Syahailatua, 1993 in Henggu et al., 2019). It can be seen that the percentage of species composition of *Sepia latimanus* species has a percentage of 30% while the percentage of *Sepia pharaonis* is 70% can be seen in Table 1.

DISCUSSION

Sex Ratio

Know the sex ratio to see the ratio of the number between the male and female sexes. The way to find out the sex of the cuttlefish is done by observing the morphology or physical characteristics. From the results of the study, the number of cuttlefish was obtained as many as 457 samples of cuttlefish that were landed. Based on the results of the samples obtained, 246 male cuttlefish were identified while 211 females were identified.

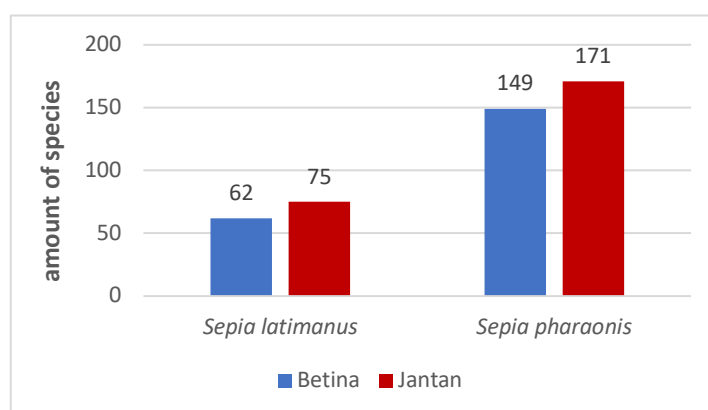


Fig 3. Number of Squid Genders Landed at PPI Tanjung Luar

The results of the data analysis of the sex ratio of male and female cuttlefish with a total sample of 457 heads obtained a male percentage of 54% and a female percentage of 46% which shows that the male sex is more than the female and the sex ratio ratio shows a figure of 1:1 According to Nikolsky (1963) in Arsyad (2022). This study shows that the ratio of the sex of the landed cuttlefish is in the almost equal category. Based on the results of research, the male sex is caught more than the female sex, caused by various environmental factors such as changes in water temperature, food availability, and other things (Pulungan et al., 1994 in Arsyad, 2022). From the results of the analysis of the length measurements obtained, the minimum size of the squid *Sepia pharaonis* is 9 cm, where this squid is still in the mature phase of the gonads, but the growth phase is in line with the opinion of Ispahdianto & Fitri, (2016).

The Long Relationship of Weight of All Landed Squid Species

The relationship between the length and weight of fish is one to find out information on the size that is suitable for fishing and to find out the growth pattern in nature (Rauf et al., 2019). From the results of the analysis of the relationship between the length and weight of the cuttlefish that were landed, as many as 457 fish. Where according to Nurhayati et al., (2016) the growth pattern of fish is divided into 3, namely: if the value of $b > 3$ the growth pattern is allometric negative where the growth of length is faster than the growth of weight, if the value of $b < 3$ is allometric and positive, the growth of weight is faster in terms of growth in length, if the intention b is equal to 3 growth is isometric where the growth of length and weight will be balanced. The results of the regression analysis of the overall cuttlefish weight length relationship can be seen in figure 4.

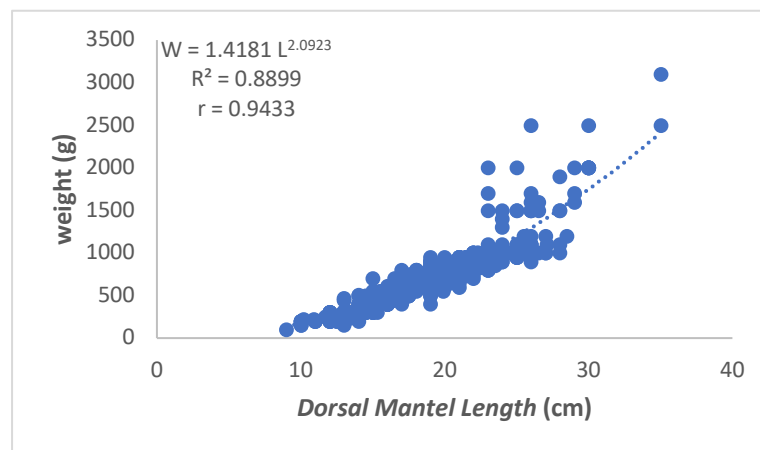


Fig 4. The Length Relationship of Weight of All Landed Species

Based on the results of the relationship between length and weight of cuttlefish with a sample of 457 heads, the relationship between length and weight $W = 1.4181 L^{2.0923}$ with an R^2 value of 0.8899 and an r value of 0.9433. From the results of the weight-length relationship equation above, a value of 1.4181 and a b value of 2.0923 were obtained, which showed that the growth pattern in the allometry cuttlefish was negative, namely the growth of length was faster than the growth of weight. The determination coefficient obtained is 0.8899.

According to Muthmainnah, (2013) a high correlation coefficient value can show a close relationship between weight gain and length increase. If the weight value increases by 1, the length value will increase by 1.418, so the correlation value obtained in this study can be said that the length and weight have a very close relationship. Influenced by internal and external factors such as physiological conditions, genetics, gender, age, parasites or diseases. External factors are influenced by environmental conditions such as temperature, pH, salinity and geographical location (Muchlisin & Cheng, 2014).

Weight Length Relationship Based on Species

1. Species *Sepia latimanus*

Long-weight relationships of species (*Sepia latimanus*) to look at the growth and health of aquatic populations and to look at environmental changes from overfishing. From the analysis of the relationship between the length of cuttlefish weight per species that has been carried out, the results can be seen in Figure 5.

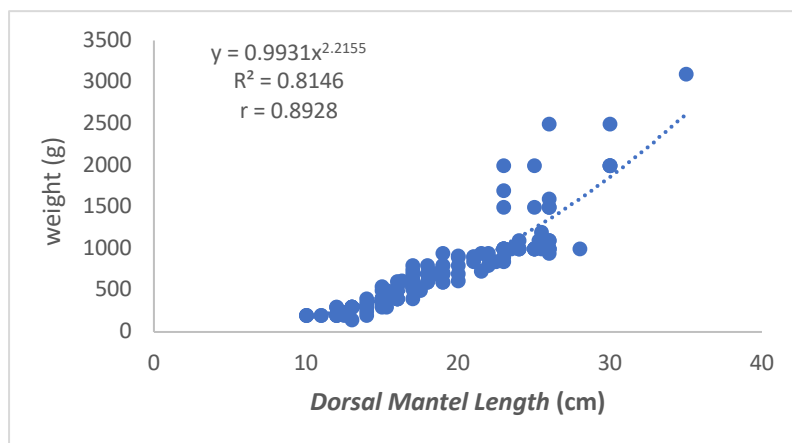


Fig 5. Sepia Latimanus' Severe Long Relationship

Based on the results of the relationship between length and weight of Sepia latimanus cuttlefish with a sample of 137 heads, the length and weight relationship of $W = 0.9931x^{2.2155}$ with an R^2 value of 0.8146 and an r value of 0.8928. From the results of the weight-length relationship equation above, a value of 0.9931 and a b value of 2.2155 were obtained, which showed that the growth pattern in Sepia latimanus allometry cuttlefish was negative, namely the growth of length was faster than the growth of weight. The determination coefficient obtained is 0.8146, it is known that the length variable has an influence of 94.48% on the weight variable of the two variables has a close relationship of 0.8928. The growth pattern in Sepia latimanus cuttlefish is negatively allometric, where the growth of length is faster than the growth of weight (Daronido et al., 2014).

2. Species Sepia pharaonis

The long-term relationship of the weight of the species Sepia pharaonis to see the growth and health of the population of cuttlefish landed in the Tanjung Luar PPI and to look at environmental change factors such as overfishing. The results of the weight-length relationship analysis can be seen in Figure 6.

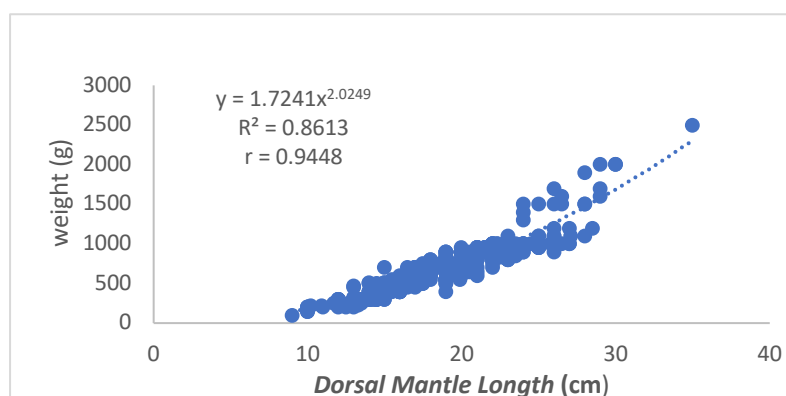


Fig 6. Sepia Pharaonis's Severe Long Relationship

From the results of the analysis of the relationship between the length and weight of 320 Sepia pharaonis cuttlefish that were landed, a value of b of 2.0249 can be concluded that the growth pattern is zero negative allometric where the value of $b < 3$ long growth is faster than the growth of weight. According to Widianingroem & Soepamo, (2003) if the b value is negative allometric, it can be said that the growth in the Sepia pharaonis cuttlefish is not ideal, the ideal growth of fish is isometric where the growth of length and weight is balanced. Muchlisin (2010) in Gunadi et al., (2021) said that the size of the value of b can also be

influenced by fish behavior. This is suspected to be related to the presence of factors that affect the growth of fish such as environmental factors, changes in temperature, pH, salinity and the availability of food.

CONCLUSION

Based on the results of the study, it can be concluded as follows:

1. Two types of squid species were found, namely, *Sepia latimanus* and *Sepia pharaonis*, with a total catch of 457.
2. Of the 457 cuttlefish, 246 males and 211 females are known. The sex ratio ratio can be categorized as being in a condition close to balance, namely at 1:1.
3. Of the two species *Sepia latimanus* and *Sepia pharaonis*, there is a negative allometric relationship between length and weight where the pattern of long growth is faster than the growth of weight.

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