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Biological Analysis of Kejen Shark *(Carcharinus falciformis)* at Paotere Fish Landing Base

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Abstract

This study was conducted to analyze the biology of kejen shark (Carcharinus falciformis) that was dropped at the Paotere Fish Landing Base (PPI). The research was conducted in January-March 2025 at the Paotere Fish Landing Base in Makassar city. The variables of this study are size, growth, class maturity, and sex comparison of the male shark. The research method used was a direct survey by taking data through measurements of total length, weight, observation of the maturity level of the class, and sex comparison in the sharks that had been landed. The results of the study with a sample of 50 showed that the landed kejen shark had a variety of sizes ranging from 65-145 cm in the male sex, size in the range of 65-145 cm in the female sex. Then the results in male sex weight range from 1-14 kg while in female sex range from 1-25 kg. The shark class is at the I and II levels or is still in a state of non-calcification and non-full calcification, the length of the clasp is 2-7 cm. The comparison between males is not significant or still in the balanced category, 56% males and 44% females. This study reveals that the kejen sharks found have not yet reached a state of readiness to reproduce, so that the excess catch will have an impact on the sustainability of the kejen shark population in the wild.

Keywords: *Biology, Shark Tank, PPI Paotere*

Abstrak

Penelitian ini dilakukan untuk menganalisis biologi ikan hiu kejen (Carcharinus falciformis) yang diturunkan di Pangkalan Pendaratan Ikan (PPI) Paotere. Penelitian dilakukan pada bulan Januari-Maret 2025 di Pangkalan Pendaratan Ikan Paotere kota Makassar. Variabel penelitian ini yaitu, srtuktur ukuran,pertumbuhan, tingkat kematangan klasper, dan perbandingan jenis kelamin hiu kejen. metode penelitian yang digunakan adalah survei langsung dengan pengambilan data melalui pengukuran panjang total, berat, pengamatan tingat kematangan klasper setra perbandingan jenis kelamin pada hiu kejen yang telah didaratkan. Hasil penelitian dengan jumlah sampel 50 ekor menunjukkan bahwa hiu kejen yang didaratkan memiliki variasi ukuran mulai dari kisaran 65-145 cm pada jenis kelamin jantan, ukuran kisaran 65-145 cm pada jenis kelamin betina. Kemudian hasil pada berat jenis kelamin jantan kisaran 1-14 kg sedangkan pada jenis kelamin betina kisaran 1-25 kg. Klasper hiu kejen berada pada tingkatan I dan II atau masih dalam keadaan non calcification dan non-full calcification kisaran ukuran panjang klasper 2-7 cm. Perbandingan antara jantan tidak signifikan atau masih dalam kategori seimbang, 56% jantan dan 44% betina. Penelitian ini mengungkapkan bahwa hiu kejen yang ditemukan masih belum mencapai keadaan siap bereproduksi, sehingga hasil tangkapan yang berlebih akan berdampak pada keberlangsungan populasi ikan hiu kejen di alam.

Kata Kunci: *Biologi, hiu kejen, PPI Paotere*

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INTRODUCTION

Sharks are a type of fish that are protected with the support of various regulations that apply nationally and internationally. According to Fahmi and Dharmadi (2013), almost all types of sharks have economic value in Indonesia but are classified in the conservation status of concern, namely one species *is* critically endangered, *five species are* endangered, 23 *species are in the vulnerable category*, and 35 shark species are included in the *near threatened* category. Shark production in Indonesia is still highly dependent on natural catches.

Although there are several regulations that regulate the catch, utilization and protection status of sharks, their implementation in practice is still lacking discipline. Information about the biological aspects of sharks is very important. One is about shark biology that shows that shark growth takes place very slowly and takes years to reach the adult stage. In addition, the reproductive cycle of sharks is also relatively long. Sharks to become adults must wait 7-15 years and only give birth once in a vulnerable period of 2 to 3 years. The number of offspring born is between one and ten, this condition causes sharks to have a high level of vulnerability to extinction (Caesar *et al*., 2018; Aditya dan Al-Fatih, 2017). Analysis of the maturity level of the clasper is very important in determining the size of the shark that is suitable for catching.

According to, Hanifah (2018) The results of data collection on the maturity level of shark clasp show that there are three categories of clasper maturity, namely, *non calcification, non-full calcification, and full calcification*. The *non-calcification* category consists of 32 individuals, the *non-full calcification* category consists of 21 *individuals and full calcification* consists of 13 individuals. The maturity of the male sex illustrates that as many as 88% of shark catches still have not undergone the reproductive process. Catches that do not match the size of the catch risk depleting shark populations in their natural habitat because many individuals have not had time to reproduce when caught.

Research on biological aspects in shark fisheries management is very important as a basis for decision-making in the context of sustainable management of shark fishery resources Research results from (Wahyudi *et al*., 2019) reported that during the period of March-August 2018, there were 2,754 lanjaman sharks or kejen sharks and 382 hammerhead sharks landed at TPI Tanjung Luar. Landed lanjaman sharks or sharks (*Carcharinus falciformis*) generally have a total length ranging from 37.3–282.0 cm and a weight ranging from 1–86 kg. Meanwhile, the hammerhead shark (*S. lewini*) has a total length ranging from 48-309 cm and a weight ranging from 0.3–168.0 kg. This study aims to analyze the biological aspects of the kejen shark (*Carcharinus falciformis*) which will be carried out at the Paotere Fish Landing Base in Makassar.

METHOD

This research is included in the quantitative type with a survey method. Quantitative research or empirical models can be measured accurately and precisely. Quantitative research involves empirical exploration through the collection of numerical data that can be quantified and presented in numerical format. In addition, quantitative research is characterized as assumption-guided research, including the identification of variables and the application of valid research methodologies for analysis (Punch, 2013). Survey research is research by collecting information from a sample to describe various aspects in a population. The essence of this study is the size structure, growth, maturity level of the clasp, and sex ratio in kejen sharks *(Carcharinus falciformis)*.

RESULT AND DISCUSSION

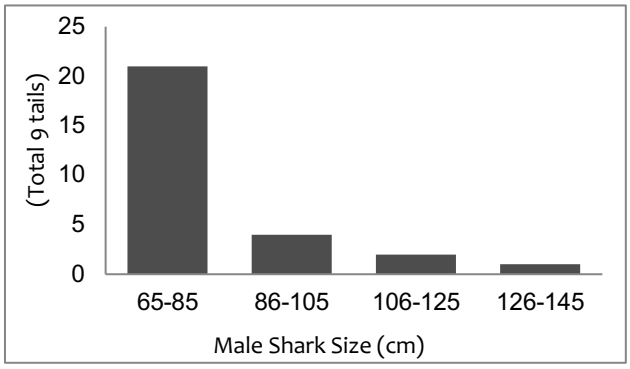
At the Paotere Fish Landing Base (PPI), kejen sharks are one of the types of sharks that are routinely caught by fishermen. The arrests were made on two islands, namely Kapoposang Island and Panangan Island. Then the results obtained will be taken to the collector in Paotere. However, sharks are included in the CITES Appendix ll list and are categorized as *Vulnerable* by the IUCN Red List. Overexploitation without proper management has the potential to lead to significant population declines (Rigby *et al*., 2019).

Size structure on the kejen shark *(Carcharinus falciformis)* at the Paotere Fish Landing Base

Based on the results of the study, the biology was obtained, namely the length and weight of the kejen shark landed at the Paotere Fish Landing Base. The size of the length and weight of the kejen shark has decreased significantly as the size and weight shown in the male and female sexes increase. Based on the results of the research, it can be seen in several tables, including, namely:

Total Length (Total Leght) of Male Kejen Shark

Figure 1:
Size structure of male shark

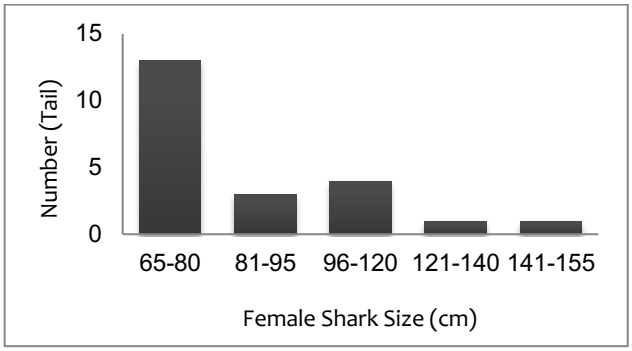


Source: Results of research data analysis

Based on the results of Figure 1 of a study conducted at the Paotere Fish Landing Base (PPI), the structure of the total length of the kejen shark shows that the individuals caught are mostly small in the range of 65-85 cm, with a total of 21 individuals, while the largest size is in the range of 126-145 there is only one male kejen shark. This suggests that sharks of large sizes are rarely caught. The larger the size of the body (total length), the number of individuals decreases significantly. This suggests that most of the male sharks caught are juvenile or immature.

Total Length (Total Leght) of Female Shark

Figure 2:
Size structure of female shark



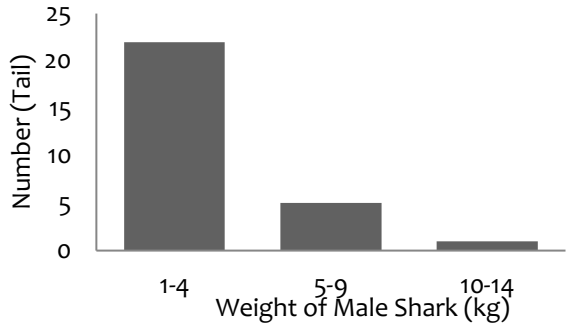
Source: Results of research data analysis

Almost the same pattern is shown in the total length of small female sharks showing a size ranging from 65-80 cm to 13 fish, while in large sharks of 141-155 cm there is only one fish Figure 2. Just like the growth pattern in males, the number of female individuals decreases as the body size increases. The largest size prone observed is 141-155 cm, however only one individual is in this size range. Female sharks that were caught were also dominated by immature individuals.

This pattern suggests that most female sharks caught are medium-sized individuals, who generally have not yet reached adult size. It also indicates that the catch in the Paotere area is not selective about the size of the fish. This is consistent with the findings Wahyudi *et al*., (2019), which shows the variation in the size of the kejen shark at TPI Tanjung Luar with a length of up to 282 cm. Meanwhile, in this study, the maximum size of the female shark caught only reached 155 cm, far from the actual adult size. This condition strengthens the indication that the capture of the kejen shark in Paotere is the capture of immature individuals.

Weight of Male Sharks

Figure 3:
Size structure of female shark

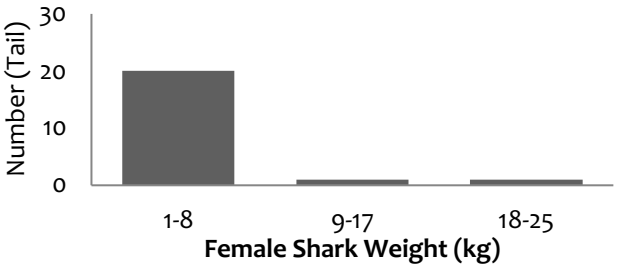


Source: Results of research data analysis

Figure 3 shows the catch of fishermen in Paotere the weight of kejen sharks shows that the highest peak is in the weight range of 1-4 kg with a total of 23 fish, while in the lowest weight group it is in the range of 10-14 kg where there is only 1 male kejen shark. This weight distribution shows a similar pattern to total length, where individuals with smaller weights are caught more than larger ones. This indicates that the sharks caught have not reached optimal body maturity.

Weight of Female Shark Fish

Figure 4:
Weight of female sharks



Source: Results of research data analysis

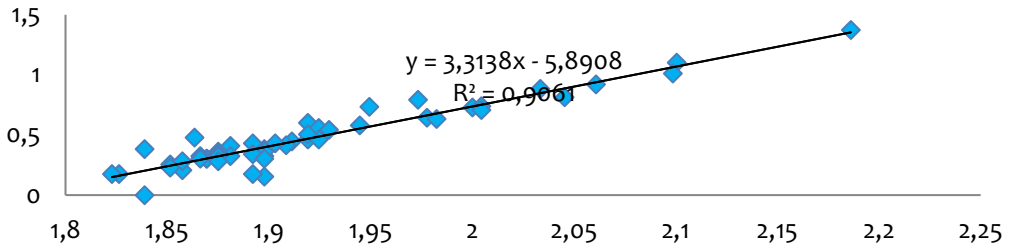
Figure 4 shows that the number of female sharks, the weight range of 1-8 kg is the most because there are 20 female sharks, and in the range of 9-17 kg and 18-25 kg each there is only 1 fish. The weight of male and female sharks is more than that of males, which suggests that females can grow to greater weights. This pattern in distribution also indicates that the population of the captured kejen shark is dominated by young individuals.

The results of this study are in line with research from Wahyudi *et al*., (2019) at TPI Tanjung Luar, where the landed shark is 37.3-282 cm long and weighs 1-86 kg. This shows that the catch made in Paotere is not selective about size, so the size caught is still in the juvenile category.

Growth in the kejen shark (*Carcharinus falciformis*) at the Paotere Shark Landing Base

Based on the growth data of the kejen shark (*Carcharinus falciformis*) caught by fishermen in Paotere in figure 5 which shows the values of Log L (Length) and Log W (Weight)).

Figure 5:
Growth of kejen sharks (*Carcharinus falciformis*)



Source: *Results of research data analysis*

In this study, the relationship between long logarithms (Log L) and heavy logarithms (Log W) in the genus shark (*Carcharinus falciformis*). The regression equation listed in the graph (Figure 5) is y = 3.3188×- 5.8908 with a coefficient value of determination (*R2*) of 0.9061. This high R2 value shows that the relationship between the length and weight of the observed shark is very strong, meaning that the change in body length greatly affects the change in body weight of the shark.

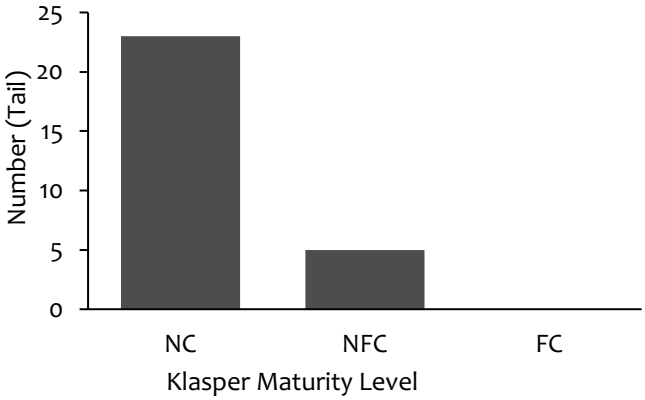
The regression *coefficient b* of 3.3188 shows a positive *allometric* growth pattern, where the shark's body weight gain is faster than the increase in length. In contrast to the results of the study which showed that the relationship between the weight of the shark and the size of the shark was allometric negative with a b value of 2.792, which means that the growth in length is faster than the growth in weight Qonitah *et al*., (2024). This is reinforced by Effendi (2002), If the B value of the shellfish is 3 then it is allometric growth which indicates that the growth of the length is faster compared to the growth of the weight.

Maturity level of the kingfisher shark clade (*Carcharinus falciformis*) at the Paotere Fish Platelage Base

Based on the data on the catch, the number of sexes in males is 28. Indicates that the average length of the clasp is still at the level of l of clasp maturity (*non calcification*).

Klasper Maturity Rate

Figure 6:
The Maturity Rate of the Shark Tank

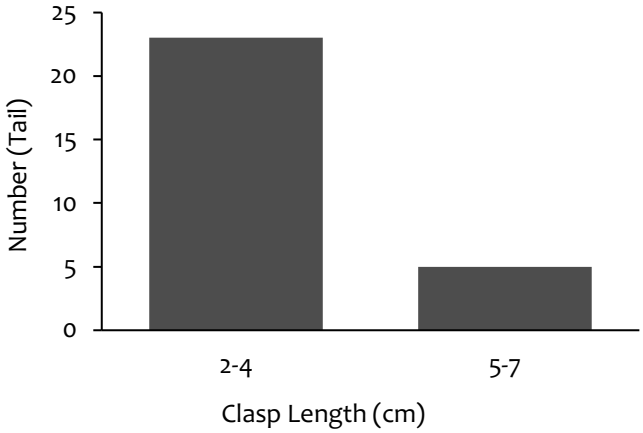


Source: research results

Figure 6 shows that the results of the study show that the maturity level of the clasper is at the levels l and ll which means that it is included in the category *of non-calcification* and *non-full calcification,* where at the level l there are 23 male sharks with a range of clasper sizes, namely; 2-4 cm while the category of maturity level ll in 5 sharks is in the range of 5-7 cm. However, At the LLL level, there are no kejen sharks that have undergone total calcification or are ready to reproduce.

Klasper Length

Figure 7:
Long Klasper Shark Kejen



Source: Research results

In Figure 7, it shows that the length of the clump of the clump shark (*Carcharinus falciformis*) landed at the Paotere Fish Landing Base, many sharks observed have a clump

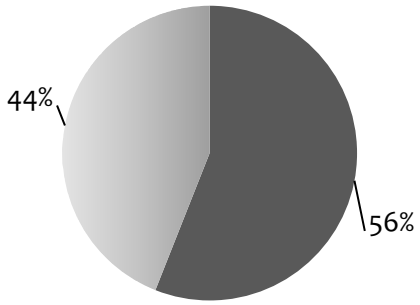
length in the range of 2-4 cm amounting to 23 sharks, in the range of 5-7 cm there are 5 sharks. This condition indicates that the sharks are not yet sexually mature, so they are not ready to breed. In other words, most of the kejen sharks caught at the Paotere research site are still young or immature reproductively, so it is important to pay attention to the management of shark catches.

In contrast to the research of the catch of Muncar Banyuwangi fishermen, where there are several individuals who are included in the lll level category who can already reproduce. At the level of maturity of the clasper there were 11 individuals of *the shark Carcharinus falciformis, the* level of maturity there were 8 individuals and at the level of the maturity of the clasp there were 11 individuals (Wibowo *et al*., 2024). The difference in the morphology of male and female sharks can be distinguished through their reproductive organs, seen directly, namely male sharks have claspers while female sharks have cloacs. The function of the clasper in the male kelmin apparatus is a modification of the abdominal fin that forms the sperm duct that functions to channel sperm to the cloaca or reproductive organs in females (Laili and Sudibyo, 2017).

Sex comparison of kejen sharks (*Carcharinus falciformis*)

Based on the catch obtained by Paotere fishermen, there were 50 kejen sharks that were landed where the male sex was 28 while the female sex was 22.

Figure 8:
Sex ratio of sharks



Source: research results

A comparative analysis of the sex between the male and female sexes at the Paotere Fish Landing Base showed variation, but statistically there was no significant difference between the number of males and females in (Figure 8). Of the 50 samples with more males (56%) than females (44%), it means that the male sex is slightly more than the female sex.

The percentage of total samples of sharks that have been observed, there is a greater proportion of males compared to females, namely 56% males while in females 44% or 1.27:1 (males-females), this study is different from the results presented by Yulianto *et al.,* (2018) In his research, in *Carcharinus falciformis* the ratio or sex ratio of 0.9:1 (male-female) means that

there are fewer males than females. This shows that the population of sharks caught during the observation is dominated by male individuals.

CONCLUSION

Based on the results of the research that has been carried out, the size and growth structure of the kejen shark *(Carcharinus falciformis)* landed at the Paotere Fish Landing Base shows the catch of various sizes. The growth of sharks is different from the results of the research obtained a positive allometric growth pattern where weight growth is faster than long growth. The level of maturity of the clasp, analysis on male sharks shows that those caught are in categories I and II (non-cacification and non-full calcification). Comparison of male sharks is more compared to female sharks.

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