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Analysis PF seasonal pattern of crab billions with Bubu Naga and crab gillnet in Segeri waters Pangkep regency

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Article Info

Abstract

This study aims to examine the Analysis of Seasonal Patterns of Caught Caught with Bubu Naga and Gill Net Caught in Segeri Waters, Pangkep Regency. This research was conducted from March to May 2023 in the Bawasalo sub-district, Segeri District, Pangkep Regency. The data collected was primary and secondary data. Analysis of the crab fishing season pattern was determined by using time series analysis technique on the catch per unit monthly fishing effort for the last two years. The lowest percentage of fishing season index was in June 17% and the highest occurred in July 198.8%.

Introduction

Pangkajene and Islands District, South Sulawesi Province. Pangkep Regency is known as a three-dimensional district because the area which is in the range of 4,400–8,000 South Latitude and 1100 – 1130 East Longitude has 3 (three) regional characteristics, namely mountains, lowlands, and islands. Its area is ± 1,122.29 km2 of land and ± 17,100 km2 of sea. The boundaries of the area are in the north bordering Barru Regency; in the South with Maros Regency; on the west with the provinces of South Kalimantan, East Java, Bali and NTB; and on the East with Bone Regency. This makes Pangkep Regency an area rich in biodiversity and non-biological diversity that can be utilized and managed to increase people's income and standard of living (DKP Pangkep Regency, 2018).

Segeri is a sub-district in Pangkajene and Archipelago districts which is located about 75 kilometers north of Makassar city and about 30 kilometers south of Barru District, which consists of 4 sub-districts (Bawasalo Sub-District, Bone Sub-District, Bontomatene Sub-District, Segeri Sub-District) and 2 Villages (Segeri Sub-District, Baring and Parenreng Village) with an area of 78.28 km2 geographically (BPS, 2020) [1].

Bawasalo Village is one of the Segeri areas which is on the coast and directly adjacent to Bawasalo waters with a population of around 2,702 with an area of 3.99 km2 (BPS, 2020) [1]. Because it is an area on the coast, the surrounding community works as fishermen, especially small crabs, where the catch is collected from collectors.

Dragon trap is an environmentally friendly fishing gear used by fishermen to catch crabs in particular. This fishing gear is operated at a depth of 1 to 3 meters under the sea. Dragon traps are widely used by fishermen because many types of catch can be trapped in dragon traps. Dragon trap is a modification of basic fishing gear which has only been used since the Covid 19 pandemic. It is a selective and environmentally friendly fishing gear for fishing activities or business (Abdul Hadi, et.al, 2022) [3].

A gillnet is a fishing gear made from a net made of a rectangular shape, operated at a depth of 4-6 meters and a certain mesh size, so that fish can hit the net, gillnets are equipped with buoys and weights. According to Umar Tangke (2011) [6] Gillnets (gill nets) are fishing gear that is stretched in a waters at a certain depth and a certain size of the mesh, so that fish that hit the net will be entangled or entangled in the mesh.

The crab season pattern integrates various important information in resource exploitation, thus the fishing season can be predicted more precisely. The results of this study are expected to increase efficiency and effectiveness in exploiting crab resources. Accuracy in exploring the fishing area will result in high accuracy and the proper utilization of blue crab resources will increase the sustainable profits of the small crab fisheries business

To achieve this, information support consisting of Seasonal Patterns of Caught Caught with Bubu Dragon and Gill Net in Segeri Waters, Pangkep Regency is very much needed. This study aims to examine the Analysis of Seasonal Patterns of Caught Caught with Bubu Naga and Gill Net Caught in Segeri Waters, Pangkep Regency.

Research purposes
Based on the description of the problem formulation, this study has several objectives as follows:
1. to study the Analysis of Seasonal Patterns of Caught Caught with Bubu Naga and Gill Net Caught in Segeri Waters, Pangkep Regency.

Research Methods
This Research was conducted from March 2023 to May 2023 in the Bawasalo, Segeri District, Pangkep.

Fig 1: Map of research locations in Segeri Waters, Pangkep Regency

Sampling Method
The data collected are primary and secondary data. Primary data is data obtained from fishermen as research samples through interviews or the results of filling out questionnaires that are usually carried out by researchers. The primary data collected is conducting interviews with fishermen, descriptions of fishing gear for dragon traps and gill nets, distribution and distribution of where fishermen catch small crabs, procedures for operating fishing gear, recording production of crab catches for the last 2 years and gillnet. This data was obtained from fisherman collectors at the research location, and each carried out operations within a certain timeframe during the study using trap fishing gear and gill nets.

Secondary data is supporting data collected as supporting material and information for primary data. This data was obtained from various journal reports, the Pangkep Regency Statistics Center (BPS) in the form of district values in numbers and Segeri subdistrict in numbers, existing literature, and various reports obtained from various agencies.

Data analysis
Analysis of the crab fishing season pattern was determined by using time series analysis technique on the catch per unit monthly fishing effort for the last two years. Estimation of the fishing season is carried out by analyzing time series data for swimming crabs from 2021 to 2022 which landed in the waters of Sigeri District, Pangkep Regency. The fishing season pattern is analyzed using the moving average approach. The calculation steps in Ihsan (2014) [4] according to Dajan (1983) and the formula developed by Wiyono (2001) [9] are as follows:

(1) Calculating the first quarter CPUE time series data from 2021 to 2022 namely:

Yi = CPUEi

Where i = 1,2,3,… n and Yi = CPUE ke-i

(2) Compiles the quarterly CPUE (RG) moving average.

$$RGi = \sum_{i=i-2}^{i+1} CPUE$$

where i = 4, 5, 6…, n – 1

(3) Compile centralized CPUE moving average (RGP).

$$RGPi = \frac{1}{2} = \sum_{i=1}^{i+1} CPUE$$

where i = 4, 5, 6…, n – 1

(4)   Calculates the average ratio for each quarter (Rb).

$$Rb_i = \frac{CPUE_i}{RGP_i}$$

Where i = quarter I, II, III, …..VI

(5)   Compile the average ratio values in the j x quarter matrix i compiled for each starting in the VI-I quarter, then calculate the average or seasonal variation and then calculate the fishing season index.

1. Average ratio for the 1st quarter (RRB)

$$RRB_i = \frac{1}{n}\sum_{j=1}^{n} RB_{ij}$$)

2. Total quarterly average ratio (JRRB)

$$JRRB = \sum_{i=1}^{n} RRB_i$$)

Where i = I, II, III…….VI

3. Fishing season indexIndeks musim penangkapan

Because the sum of the quarterly average ratio (JRRB) is not always equal 400, the value of the quarterly average ratio must be corrected with a correction factor (FK).

$$FK = \frac{400}{JRRB}$$

Furthermore, the fishing season index (IMP) is calculated using the IMPi equation: IMPi = RRBi x FK.

Where i = I, II, III,……VI

Determination of fish season with the criteria is if the season index is more than 1 (more than 100%) or above the average, and not season if the season index is less than 1 (less than 100%). If IM = 1 (100%), this value is the same as the monthly average price so that it can be said to be in normal or balanced circumstances.

According to Ramang (2011) [7] that the fishing season index value can be used in determining the right time to carry out fishing operations. The criteria used in determining the fishing season are if the IMP value is equal to or more than 100% it is said to be a fishing season, while it is not a fishing season if the IMP value is less than 100%.

Results and Discussion

According to Ramang (2011) [7] in Ihsan at., al (2014) [4], explains that the fishing season index value can be used in determining the right time to carry out fishing operations. The criteria used in determining the fishing season are if the IMP value is equal to or more than 100% it is said to be a fishing season, while it is not a fishing season if the IMP value is less than 100%. Meanwhile, according to Gaspersz (1996), in Ihsan at., Al (2014) [4] says that if the total season index for a year for the month is 1200 or the average is equal to 100, then the total season index for the month is 400. The monthly average total (RRBi) is 9.272500 and the Correction Factor (FK) value is 129.4%.

Table 1: Results of the analysis of the monthly average (RRBi) and Correction Factor (FK)

Musim	RRBi	IMP
Januari	0,49	64,0
Februari	0,41	52,7
Maret	0,28	36,3
April	0,88	113,4
Mei	0,34	43,7
Juni	0,13	17,0
Juli	1,54	198,8
Agustus	1,11	143,9
September	1,12	145,5
Oktober	0,66	85,8
Nopember	1,31	169,2
Desember	1,00	129,8
Jumlah	9,27	
FK	129,4	

A complete comparison between the RRBi and the correction factor based on two-year crab production data, namely 2021 to 2022, can be seen in table 2.
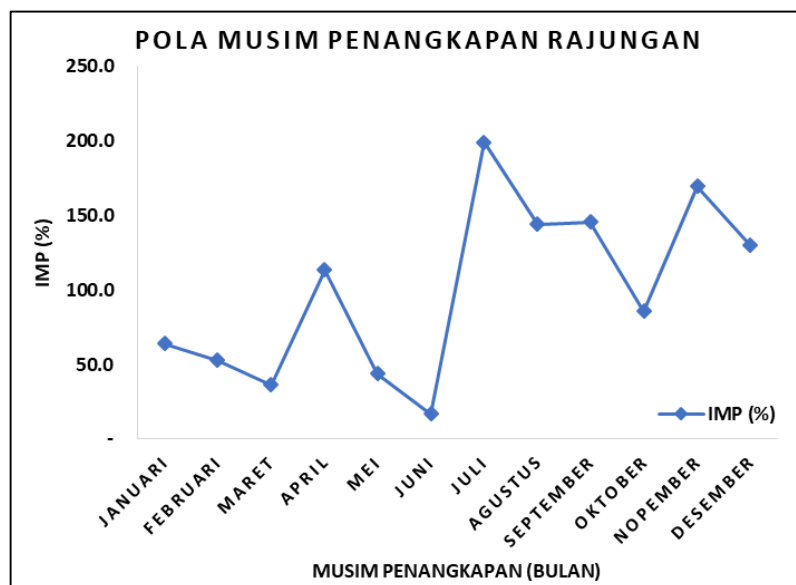

Fig 2: Crab fishing season pattern

The results of the analysis for monthly average (RRBi) and fishing season index (IMP) with crab production data for the last two years 2021 - 2022. The average analysis results for monthly (RRBi) and fishing season index (IMP) for crab

production data for 2 (two) years, namely 2021 - 2022, the monthly average (RRBi) is in the range 0.131298 - 1.536255. The total monthly average (RRBi) is 9.3 and the Correction Factor value is 129.4%. Table of average analysis results for monthly (RRBi) and fishing season index (IMP) for crab.

The results of the analysis of the percentage index of the crab fishing season in Segeri waters, Pangkep Regency, occurred in April, July, August, September, November, December and in the Fig above it shows that the peak season for catching crabs took place in July and November. The lowest percentage of fishing season index was in June 17% and the highest occurred in July 198.8%. Ihsan *et al.* (2014) [4] The peak season for catching crabs is at IMP> 1%, which takes place in June and September. The highest percentage of catch in the fishing area was in September, which was 11.71% and the lowest was in April, which was 5.77%.

Table 2: Percentage of crab fishing season index

Musim	IMP (%)
Januari	64,0
Februari	52,7
Maret	36,3
April	113,4
Mei	43,7
Juni	17,0
Juli	198,8
Agustus	143,9
September	145,5
Oktober	85,8
Nopember	169,2
Desember	129,8

The crab fishing season fell in June with an IMP value of 17 <100% and then in October with an IMP value of 85.8 <100%. June and October are not categorized as peak season because <100%, while the index value for the peak season for crab fishing is > 100%. The results of interviews conducted with local fishermen recognize three seasons, namely the western season, the transitional season and the eastern season. The weather conditions described by fishermen are usually the western season occurring during the rainy season and the eastern monsoon usually occurring during the summer where fishermen catch little.

Based on the table above, it shows that blue swimming crab spawned in August and September so that production decreased. according to Ihsan (2018) [5] said that August is the peak of the crab spawning season, where mature female crabs that have mature gonads are at the bottom of deeper waters and far from the coast. Juwana & Romimohtarto (2005) in Tajuddin *et al*. (2021), explained that the crab spawning season occurs throughout the year with the peak occurring in the west season in December. Effendy et., al (2006) in Ihsan (2018) [5], crabs that live in estuary areas then migrate to waters that have higher salinity, when they are adults, crabs that are ready to enter the mating period will migrate to coastal areas, after mating, the crab will return to the ocean to hatch its eggs. Furthermore, in November the crab fishing season index increases again so that November is the end of the crab fishing season every year. PMI decline from September to October. In December, January, February, March, April, May, June and October Not included in the peak fishing season.

Abusing big waves so that the number of fishing trips is very limited and crab production decreases. The lack of swimming crab fishing trips is very good for supporting crab growth and reproduction. The results of interviews with fishermen every month they continue to carry out fishing operations by paying attention to water conditions and weather conditions. If weather conditions permit they will carry out arrest operations. The distance to the fishing location for fishermen using bubu naga fishing gear is the location not far from the base/beach because, if the fishing gear is operated very far away, fishermen also experience problems when operating while gillnets are operated a bit far from the beach because this tool is easy when withdrawing /appointment.

Conclusion
The pattern of fishing season for swimming crabs caught with bubu dragon and gill net crab in Segeri waters, Pangkep Regency. Analysis of the percentage of crab fishing season index in Segeri waters, Pangkep Regency, occurred in April, July, August, September, November and December. The highest percentage of fishing season index occurs in July every year. The peak season for catching crabs is at IMP> 1%, which takes place in June and November, there is a difference in the crab fishing season for 2 years, but it only differs in every month. The lowest percentage of fishing season index was in June 17% and the highest occurred in July 198.8%.

References
1. [BPS]. Kabupaten pangkep. Badan Statistik Kabupaten Pangkep, 2020.
2. [DKP Kab. Pangkep] Dinas Perikanan Kabupaten Pangkep. Profil Pesisir dan Laut Kabupaten Pangkep, 2018.
3. Abdul Hadi, Didha Andini Putri, Lukman Fitrahsaeri. Analisis Identifikasi Komposisi Hasil Tangkapan Bubu Naga yang Dioperasikan di Perairan Tambak Cangkring Kabupaten Indramayu, Jawa Barat. Barakuda 45: Jurnal Ilmu Perikanan dan Kelautan. 2022; 4(2):281-289.
4. Ihsan Eko, Sri Wiyono, Sugeng Hari Wisudo, John Haluan. Pola Musim dan Daerah Penangkapan Rjungan (*Portunus pelagicus*) di Perairan Kabupaten Pangkep. Marine Fisheries, 2014. ISSN 2087-4235 Vol. 5, No. 2, Hal: 193-200.
5. Ihsan. Distribusi Ukuran dan Pola Musim penangkapan Rajungan *(Portunus pelagicus)* Di Perairan Kabupaten Pangkep, Jurnal Marine Fisheries, Hal, 2018, 73-83.
6. Umar Tangke. Analisis Kelayakan Usaha Perikanan Tangkap Menggunakan Alat Tangkap Gill Net Dan Purse Seine Di Kecamatan leihitu Kabupaten Maluku Tengah Provinsi Maluku. Jurnal Ilmiah agribisnis dan Perikanan (agrikan UMMU-Ternate) Volume 4 Edisi 1 (Mei 2011), 2011.
7. Ramang S. *Manajemen Penangkapan Ikan Pelagis Di Perairan Teluk Apar Kabupaten Paser Provinsi Kalimantan*, 2011.
8. Tajuddin M, Beddu tang dan Muhammad S. Hubungan jarak lokasi penangkapan terhadap hasil tangkapan dan distribusi Frekwensi ukuran rajungan diperairan Kabupaten Pangkep, 2021.
9. Wiyono ES. Optimasi Manajemen Perikanan Skala Kecil di Teluk Pelabuhan ratu [Tesis]. Bogor: Program Pascasarjana, Institut Pertanian Bogor. 102 hlm, 2001.