**Productivity of fourfinger threadfin (*Eleutheronema tertadactylum*) capture fishery in Bungur Village Rangsang Pesisir Sub-District Meranti Islands District, Riau Province**

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| **Article Info** |  | **Abstract**  |
| **Keywords:***Catch,* *Effort,* *Eleutheronema tetradactylum,* *Productivity*  |  | This study aimed to determine the productivity value of turtle catching in Bungur Village, Rangsang Pesisir District, Meranti District, Riau Province. The production of kurau nets for five years shows that fourfinger threadfin fishing effort and production fluctuate yearly. In the period from 2017-2021, 2018 was the year with the most production of kurau nets, with a total catch of kurau nets totaling 7205 kg/year, and the highest catch occurred in March, namely 867.7 kg while the lowest catch occurred in July, namely 166.6 kg. Based on the results of the calculation of the fishing season index, it is known that the fish catch is abundant from January to March. In these months, fishing is excellent, and the peak season is in February. From April to September, the fish catch is minimal, and this month is the wrong time to catch fish. |
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1. **INTRODUCTION**

The Meranti Islands are one of the areas in Riau Province where the majority of fishermen still use kurau nets. Meranti Islands Regency has good fisheries potential as indicated by capture fisheries production reaching 5947.07 tons in 2016 (BPS Meranti Islands, 2017). The importance of good fishing gear is that it can be used to catch fish in waters, so that the objectives of making and operating fishing gear can be achieved well. One of the fish resources found in the Meranti Islands is the type of Fourfinger threadfin which has high economic value on the market and is therefore the main target for fishing by fishermen.

Fourfinger threadfin *(Eleutherema tetradactylum)* is the favorite fish hunted by the fishing community of Meranti Islands Regency. Fourfinger threadfin caught on a large scale because of the high selling price has added value apart from its flesh like a swim bladder. Dried fourfinger threadfin swim bladders have a relatively high selling price of around 4 million/kg or even more, depending on the quality and size of the swim bladder. This fish's swim bladder is believed to be able to treat various diseases such as asthma, heart disease, appendicitis, pregnancy disorders, and sewing thread for surgery (Simanjorang, 2019).

According to Izma (2017), from 2010 to 2014, the number of fishing fleets continued to increase every year, whereas, in interviews conducted in 2019, fishermen often obtained unsatisfactory catches, especially with fourfinger threadfin fishing, due to the occurrence of overfishing in their fishing areas, which is indicated by the decline in catches and the smaller size of the fish caught by fishermen. Therefore, to find out the productivity value of capture fisheries and the causes of the decline in catches in Bungur Village, Rangsang Pesisir District, Meranti Islands Regency, it is necessary to conduct research. This research aims to determine the productivity value of catching fourfinger threadfin in Bungur Village, Rangsang Pesisir District, Meranti Regency, Riau Province.

1. **RESEARCH METHODS**

***Time and Place***

This research was conducted in March 2022 in Bungur Village, Rangsang Pesisir District, Meranti Islands Regency, Riau Province.is at coordinates between approximately 0˚ 42' 30"-1˚ 28' 0" N, and 102˚ 12' 0"-103˚ 10' 0" E, and is located on the east coast of the island of Sumatra. The tools and materials used include kurau fishing gear, scales, thermometers, stopwatches, refractometers, meters, smartphones and laptops.

***Research method***

***Data retrieval***

Primary data collection, namely participating in the techniques of operating kurau nets with fishermen and seeing the construction of kurau nets. The next step is to count the catch from the kurau net, then weigh it and measure the body length of the fish to determine the size suitable for catching. Then, conduct interviews with kurau net fishermen using the questionnaire provided. The interviews were related to the catch, environmental conditions and the obstacles faced by fishermen when fishing. In conducting this research, the steps taken were collecting secondary data, namely the results of fourfinger threadfin catches and fishing efforts in the form of statistical reports at the Meranti Fisheries Service Office. This data is used as the primary data to see the productivity of kurau nets in Meranti.

***Data analysis***

Calculating the productivity of kurau net fishing gear uses the Dahle (1989) formula modified by Nelwan, this formula is modified for calculating kurau nets with the following equation:

$$Productivity= \frac{C}{l.t}$$

information:

|  |  |  |
| --- | --- | --- |
| Productivity | = | kurau net productivity (kg/m2.t) |
| C | = | number of catches (kg) |
| t | = | arrest attempt (trip) |
| l | = | kurau net area (pl) |

According to Martasuganda (2002) to determine the estimated fishing season by using an equation form:

IM=$\frac{X}{µ}i-1$

Information:

𝑥̅ = Average monthly production for a particular year

𝜇̅ = Average monthly production for the entire year

IM = Fishing season index.

*i =* Year i

**3. RESULTS AND DISCUSSION**

***Fishing Productivity***

The results of kurau net catches in Bungur Village from 2017-2021 can be seen in Table 1. Based on the results of kurau net catches for five years, fishing production results fluctuate yearly. In the last three years, 2019-2021, it shows that catch production is decreasing. It is suspected that there are symptoms of overfishing.

**Table 1. Catch results from kurau nets in Bungur Village**

|  |  |
| --- | --- |
| Month | Year |
| 2017 (kg) | 2018 (kg) | 2019 (kg) | 2020 (kg) | 2021 (kg) |
| January | 750.8 | 480.3 | 608.3 | 570.3 | 408.3 |
| February | 789.2 | 600.7 | 762.2 | 673.2 | 312.2 |
| March | 867.7 | 410.2 | 640 | 630.2 | 430.1 |
| April | 617.4 | 369.2 | 418.2 | 511.8 | 187.2 |
| May | 230.2 | 204.3 | 370.3 | 407.2 | 211.3 |
| June | 214.8 | 89 | 108.3 | 109.1 | 142.3 |
| July | 166.6 | 104 | 192.1 | 107.2 | 107.2 |
| August | 586.7 | 200 | 232.2 | 131 | 112.1 |
| September | 743 | 344.2 | 630.2 | 232.1 | 178.2 |
| October | 825.2 | 386.7 | 800.2 | 401.8 | 387 |
| November | 747 | 443 | 740.2 | 432.3 | 423.8 |
| December | 667.6 | 429 | 724 | 583.6 | 483.2 |
| Amount | 7206.2 | 4060.6 | 6226.2 | 4789.8 | 3382.9 |

Kurau net fishing effort is calculated based on data on days of capture. Efforts to catch kurau nets in Bungur Village from 2017-2021 can be seen in Table 2.

**Table 2. Efforts to catch kurau nets in Bungur Village**

| Month | Year |
| --- | --- |
| 2017 (Day) | 2018 (Day) | 2019 (Day) | 2020 (Day) | 2021 (Day) |
| January | 38 | 42 | 36 | 43 | 39 |
| February | 42 | 40 | 33 | 40 | 40 |
| March | 40 | 36 | 35 | 38 | 32 |
| April | 42 | 36 | 38 | 37 | 38 |
| May | 33 | 27 | 40 | 28 | 36 |
| June | 40 | 36 | 35 | 42 | 26 |
| July | 31 | 38 | 40 | 38 | 32 |
| August | 23 | 27 | 38 | 32 | 28 |
| September | 38 | 28 | 35 | 27 | 28 |
| October | 41 | 25 | 42 | 38 | 32 |
| November | 43 | 31 | 27 | 21 | 41 |
| December | 40 | 29 | 31 | 32 | 39 |
| Amount | 451 | 395 | 430 | 416 | 411 |

Based on the results of kurau net catches for five years, Table 2 shows that fishing effort fluctuates yearly. Fishing efforts have decreased in the last three years, 2019-2021. During the research, kurau net fishing gear production was erratic every day. This is because, during the research process, it could have been a better fishing season in Meranti waters. The North and South monsoons greatly influence fishermen's catches. In this lean season, fishermen also continue to catch fish due to the need for subsistence. Productivity in kurau net fishing gear is calculated using kurau net productivity data analysis, where monthly fishing gear productivity in 2017-2021 can be seen in (Table 3). The lowest, highest, and average productivity values ​​can be summarized as explained in Table 4.

The productivity of kurau net fishing equipment calculated using analysis of kurau net productivity data shows the highest value, namely 9.37x10-3kg/m2.t, in 2019, while the productivity value was the lowest, namely 8.45x10-4kg/m2.t in 2018. This means that 2018 had high kurau net productivity compared to other years, and 2019 had low kurau net productivity compared to the previous year.

**Table 3. Productivity of kurau nets**

| Year | Month | Amount of catch (kg) | t (trip) | PL | t(PL) | Productivity |
| --- | --- | --- | --- | --- | --- | --- |
| 2017 | January | 750.8 | 38 | 2925 | 111150 | 6.75x10-3 |
| February | 789.2 | 42 | 2925 | 122850 | 6.42x10-3 |
| March | 867.7 | 40 | 2925 | 117000 | 7.42x10-3 |
| April | 617.4 | 42 | 2925 | 122850 | 5.03x10-3 |
| May | 230.2 | 33 | 2925 | 96525 | 2.38x10-3 |
| June | 214.8 | 40 | 2925 | 117000 | 1.84x10-3 |
| July | 166.6 | 31 | 2925 | 90675 | 1.84x10-3 |
| August | 586.7 | 23 | 2925 | 67275 | 8.72x10-3 |
| September | 743 | 38 | 2925 | 111150 | 6.68x10-3 |
| October | 825.2 | 41 | 2925 | 119925 | 6.88x10-3 |
| November | 747 | 43 | 2925 | 125775 | 5.94x10-3 |
| December | 667.6 | 40 | 2925 | 117000 | 5.71x10-3 |
| 2018 | January | 480.3 | 42 | 2925 | 122850 | 3.91x10-3 |
| February | 600.7 | 40 | 2925 | 117000 | 5.13x10-3 |
| March | 410.2 | 36 | 2925 | 105300 | 3.90x10-3 |
| April | 369.2 | 36 | 2925 | 105300 | 3.51x10-3 |
| May | 204.3 | 27 | 2925 | 78975 | 2.59x10-3 |
| June | 89 | 36 | 2925 | 105300 | 8.45x10-4 |
| July | 104 | 38 | 2925 | 111150 | 9.36 x10-4 |
| August | 200 | 27 | 2925 | 78975 | 2.53x10-3 |
| September | 344.2 | 28 | 2925 | 81900 | 4.20x10-3 |
| October | 386.7 | 25 | 2925 | 73125 | 5.29x10-3 |
| November | 443 | 31 | 2925 | 90675 | 4.89x10-3 |
| December | 429 | 29 | 2925 | 84825 | 5.06x10-3 |
| 2019 | January | 608.3 | 36 | 2925 | 105300 | 5.78x10-3 |
| February | 762.2 | 33 | 2925 | 96525 | 7.90x10-3 |
| March | 640 | 35 | 2925 | 102375 | 6.25x10-3 |
| April | 418.2 | 38 | 2925 | 111150 | 3.76x10-3 |
| May | 370.3 | 40 | 2925 | 117000 | 3.16x10-3 |
| June | 108.3 | 35 | 2925 | 102375 | 1.06x10-3 |
| July | 192.1 | 40 | 2925 | 117000 | 1.64x10-3 |
| August | 232.2 | 38 | 2925 | 111150 | 2.09x10-3 |
| September | 630.2 | 35 | 2925 | 102375 | 6.16x10-3 |
| October | 800.2 | 42 | 2925 | 122850 | 6.51x10-3 |
| November | 740.2 | 27 | 2925 | 78975 | 9.37x10-3 |
| December | 724 | 31 | 2925 | 90675 | 7.98x10-3 |
| 2020 | January | 570.3 | 43 | 2925 | 125775 | 4.53x10-3 |
| February | 673.2 | 40 | 2925 | 117000 | 5.75x10-3 |
| March | 630.2 | 38 | 2925 | 111150 | 5.67x10-3 |
| April | 511.8 | 37 | 2925 | 108225 | 4.73x10-3 |
| May | 407.2 | 28 | 2925 | 81900 | 4.97x10-3 |
| June | 109.1 | 42 | 2925 | 122850 | 8.88x10-4 |
| July | 107.2 | 38 | 2925 | 111150 | 9.64x10-4 |
| August | 131 | 32 | 2925 | 93600 | 1.40x10-3 |
| September | 232.1 | 27 | 2925 | 78975 | 2.94x10-3 |
| October | 401.8 | 38 | 2925 | 111150 | 3.61x10-3 |
| November | 432.3 | 21 | 2925 | 61425 | 7.04x10-3 |
| December | 583.6 | 32 | 2925 | 93600 | 6.24x10-3 |
| 2021 | January | 408.3 | 39 | 2925 | 114075 | 3.58x10-3 |
| February | 312.2 | 40 | 2925 | 117000 | 2.67x10-3 |
| March | 430.1 | 32 | 2925 | 93600 | 4.60x10-3 |
| April | 187.2 | 38 | 2925 | 111150 | 1.68x10-3 |
| May | 211.3 | 36 | 2925 | 105300 | 2.01x10-3 |
| June | 142.3 | 26 | 2925 | 76050 | 1.87x10-3 |
| July | 107.2 | 32 | 2925 | 93600 | 1.15x10-3 |
| August | 112.1 | 28 | 2925 | 81900 | 1.37x10-3 |
| September | 178.2 | 28 | 2925 | 81900 | 2.18x10-3 |
| October | 387 | 32 | 2925 | 93600 | 4.13x10-3 |
| November | 423.8 | 41 | 2925 | 119925 | 3.53x10-3 |
| December | 483.2 | 39 | 2925 | 114075 | 4.24x10-3 |

**Table 4. Average productivity value**

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Lowest Productivity Value | Highest Productivity Value | Average Productivity Score |
| 2017 | 1.84x10-3 | 8.72x10-3 | 5.47x10-3 |
| 2018 | 8.45x10-4 | 5.29x10-3 | 3.56x10-3 |
| 2019 | 1.06x10-3 | 9.37x10-3 | 5.14x10-3 |
| 2020 | 8.88x10-4 | 7.04x10-3 | 4.06x10-3 |
| 2021 | 1.15x10-3 | 4.60x10-3 | 2.75x10-3 |

The average productivity value of kurau nets is 2.75x10-3 to 5.47x10-3 kg/m2.t during 2017-2021. The daily productivity value of kurau nets can be seen in Table 5.

**Table 5. Daily productivity of kurau nets**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | Number of Catches (kg) | t (trip) | PL | t. (PL) | Productivity |
| June 4, 2022 | 6.2 | 2 | 2925 | 5850 | 1.06x10-3 |
| June 5, 2022 | 0 | 2 | 2925 | 5850 | 0 |
| June 6, 2022 | 0 | 2 | 2925 | 5850 | 0 |
| June 7, 2022 | 7.1 | 2 | 2925 | 5850 | 1.21x10-3 |
| June 8, 2022 | 15.3 | 2 | 2925 | 5850 | 2.62x10-3 |
| June 9, 2022 | 0 | 2 | 2925 | 5850 | 0 |
| June 10, 2022 | 4.6 | 2 | 2925 | 5850 | 7.86x10-4 |

The productivity of kurau net fishing equipment calculated using analysis of kurau net productivity data shows the highest value, namely2.62x10-3 kg/m2.t on June 10 2022, while the lowest productivity value was 7.86x10-5 kg/m2.t. The size of the fish caught by the kurau net is shown in Table 6.

The size of the fourfinger threadfin caught was various types. On day 1, the size of the fourfinger threadfin caught weighed 6.2 kg, body length 60.2 cm and body width 21.1 cm. On day 4, weighing 7.1 kg, body length was 70.2 cm, and body width was 24.3 cm. On day 5, weighing 15.3 kg, the fish's body length was 70.1 and 76.4 cm, width 24.1 and 26.2 cm. On day 7, weighing 4.6 kg, the body length was 45.2 cm with a body width of 19.6 cm. The size of fourfinger threadfin that is suitable for catching is based on the Lm (Length Maturity) value of fourfinger threadfin according to Permata (2017), namely 350 mm (35 cm) for males and 450 mm (45 cm) for females. Based on these results, the size of the fourfinger threadfin caught is included in the fish size category that is suitable for catching.

**Table 6. Size of fish caught**

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Length (cm) | Weight (kg) | Width (cm) |
| June 4, 2022 | 60.1 | 6.2 | 21.1 |
| June 5, 2022 | 0 | 0 | 0 |
| June 6, 2022 | 0 | 0 | 0 |
| June 7, 2022 | 70.2 | 7.1 | 24.3 |
| June 8, 2022 | 70.1 | 15.3 | 24.1 |
| 76.4 | 26.2 |
| June 9, 2022 | 0 | 0 | 0 |
| June 10, 2022 | 45.2 | 4.6 | 19.6 |

The size of fourfinger threadfin that is suitable for catching is quite tricky to determine, and there still needs to be more research regarding the size that is suitable for catching fourfinger threadfin. Difficulties are also influenced by fishermen who do not provide enough information to identify the gender of the fourfinger threadfin themselves. Most fourfinger threadfin caught with kurau nets are 3-10 kg fish. This is due to the influence of the kurau net's mesh size, resulting in entangled fish being large in size. The mesh size used in kurau fishing nets in Bungur Village is 190.5 mm. This makes it very possible to catch significant and worth-catching fish.

***Kurau Net Catching Season Index***

To obtain the season index for catching kurau nets in Bungur Village, we used monthly production data over five years, namely 2017-2021, the results of which can be seen in Figure 1.

|  |
| --- |
|  |
| **Figure 1. Kurau net fishing season index in Bungur Village** |

Availability of catch data kurau net in Bungur Village over a long time is very difficult to carry out. The size of the available data tends to be minimal and only consists of monthly data. This is due to the need for more awareness among fishermen to record the number of catches in kurau nets and the lack of knowledge and socialization of logbooks

1. **CONCLUSIONS**

Based on the research results, several conclusions were obtained. Namely, the production of kurau Net catches for five years shows that the effort to catch fourfinger threadfin and the effects of production fluctuate yearly. In the period starting from 2017 to 2021, 2018 was the year with the highest output of kurau nets, with the number of kurau net catches amounting to 7205 kg/year, and the highest catch occurred in March, namely 867.7 kg, while the lowest yield occurred in July, namely 166.6 kg. Based on the results of the fishing season index calculation, it is known that the fish catch is abundant from January to March. These months are perfect for fishing; the peak season is in February. From April to September, there are very few fish catches. This month is the wrong time for catching fish.

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