*Fisheries Journal,* 15 (1), 214-225 (2025)
http://doi.org/10.29303/jp.v15i1.1326

# ELASTICITY OF MANTIS SHRIMP (Harpiosquilla raphidea) CATCH WITH MESH SIZE AND LENGTH OF GILL NET IN KAMPUNG NELAYAN KUALA TUNGKAL VILLAGE

## Elastisitas Hasil Tangkapan Udang Mantis (Harpiosquilla Raphidea) Dengan Mesh Size Dan Panjang Jaring Insang Di Kelurahan Kampung Nelayan Kuala Tungkal

Sindi Triani[1], Firmansyah[2], M. Hariski[1*], Yun Alwi[2], Bs Monica Arfiana[1], Wulandari[1]

[1]Fisheries Resources Utilization Study Program, Jambi University, [2]Animal Husbandry Study Program, Jambi University

*Jambi street – Muara Bulian Road No.KM. 15, Muaro Jambi Regency, Jambi*

*Corresponding author : muhammadhariski@unja.ac.id

(Received December 14th 2024; Accepted January 20th 2025)

**ABSTRACT**

The fishing gear used by fishermen in catching mantis shrimp is a gillnet. The purpose of the study was to determine the elasticity of mesh size and net length to the production of mantis shrimp catch. The gillnet used in this study has a mesh size of 3.5 inches and 4 inches and a net length of 900 m, 1050 m and 1200 m. The method used in this study is a survey, and the data analysis used is the Cobb Douglas production function using SPSS version 26 and subsequently in the elasticity analysis. The results of the descriptive study both in number and composition show that the production of mantis shrimp catch based on mesh size in Kuala Tungkal waters is the most using a size of 4 inches, which is as many as 480 fish or 50.57%, while based on the length of the net, the most is using a size of 1,200 m, which is 419 fish or 45.15%. Simultaneous analysis of the signification obtained was 0.00 < 0.05, meaning that the mesh size and net length together had a significant influence on the production of mantis shrimp catch, while partially the significance value for the mesh size was 0.00 < 0.05 and the net length also had a significance of 0.00 < 0.05 which means that the mesh size and net length had an effect on the production of mantis shrimp catch. Based on the elasticity analysis, the value of the parameter coefficient of the cobb douglas regression equation is 1.229 or greater than 1, which means that the production of mantis shrimp catch is included in the category of increasing return to scale or the change in output obtained will be greater than the input used.

**Keywords**: Mantis Shrimp, Mesh size, Net Length

**ABSTRAK**

Alat tangkap yang digunakan oleh nelayan dalam penangkapan udang mantis adalah gillnet. Tujuan dari penelitian adalah untuk mengetahui elastisitas *mesh size* dan panjang jaring terhadap produksi tangkapan udang mantis. Gillnet yang digunakan pada penelitian ini adalah yang memiliki mesh size 3,5 inchi dan 4 inchi dan panjang jaring 900 m, 1050 m dan 1200 m.

Metode yang digunakan pada penelitian ini adalah survey, dan analisis data yang digunakan adalah fungsi produksi *Cobb Douglas* menggunakan SPSS versi 26 dan selanjutnya di analisis elastisitasnya. Hasil penelitian secara deskriptif baik jumlah maupun komposisi menunjukkan bahwa produksi tangkapan udang mantis berdasarkan mesh size di perairan kuala tungkal yang terbanyak adalah menggunakan ukuran 4 inci yaitu sebanyak 480 ekor atau sebesar 50,57 % sedangkan berdasarkan panjang jaring yang terbanyak adalah menggunakan ukuran 1.200 m yaitu sebanyak 419 ekor atau sebesar 45,15%. Analisis secara simultan siginifikasi yang didapatkan adalah sebesar 0,00 < 0,05 artinya mesh size dan panjang jaring secara bersama sama memiliki pengaruh yang signifikan terhadap produksi hasil tangkapan udang mantis, sedangkan secara parsial didapatkan nilai signifikasi untuk mesh size sebesar 0,00 < 0,05 dan panjang jaring juga memiliki signifikasi sebesar 0,00 < 0,05 yang artinya mesh size dan panjang jaring berpengaruh terhadap produksi hasil tangkapan udang mantis. Berdasarkan analsisis elastisitas didapatkan nilai koefisien parameter dari persamaan *regresi cobb douglas* sebesar 1,229 atau lebih besar dari 1 yang artinya produksi hasil tangkapan udang mantis termasuk kedalam katagori *increasing return to scale* atau perubahan output yang didapatkan akan lebih besar dari input yang digunakan.

**Katai kunci** : Udang Mantis, Mesh size, Panjang Jaring

## INTRODUCTION

Tanjung Jabung Barat Regency is one of the fisheries business centers in Jambi Province which has an area of 5,503 km2 consisting of 28,763 Ha which is a tidal area. The amount of marine fisheries production in Tanjung Jabung Barat Regency reaches 16,733.10 tons/year which includes all catches such as mackerel, mantis shrimp, rebon shrimp, dogol shrimp, white shrimp, senangin, gulama, gerot (Fisheries and Marine Service of Tanjung Jabung Barat Regency, 2020). The area in Tanjung Jabung Barat Regency which is one of the mainstays of the fisheries sector is Kampung Nelayan Village. The Kampung Nelayan Village area is a mainstay for the capture fisheries sector with the leading commodity being mantis shrimp (*Harpiosquilla raphidea*) (Nofrizal *et al*., 2020). The amount of mantis shrimp production in 2020 was 479.60 tons, in an effort to optimize the utilization of mantis shrimp potential, fishing gear is needed that is in accordance with the characteristics and living habits (Department of Fisheries and Marine Affairs, West Tanjung Jabung Regency, 2021).

The fishing gear used by fishermen in Kampung Nelayan Village to catch mantis shrimp is a gillnet which is included in the bottom gillnet and is operated by drifting in the waters. Gillnets are one of the fishing gear in the form of a rectangle equipped with floats, upper ris rope weights, lower ris ropes, and the same mesh size on the entire body of the net. According to Lisna *et al*., (2019) said that gillnets are fishing gear that have the same mesh size on the entire net. The gillnets that are usually used by fishermen in Kampung Nelayan Village to catch mantis shrimp have a mesh size of 3.5 inches and 4 inches.

The difference in the length of the net used by fishermen in Kampung Nelayan Village is 900 m, 1,050 m, and 1,200 m. The length of the gillnet is also adjusted to the capacity and power of the fishing boat's towing engine. The larger the size of the ship, the longer the gill net that can be operated (Kurnia *et al*., 2020). This is in line with the opinion of Hariski *et al*., (2022) who stated that the length of the net has a significant effect on the catch of the gill net.

The size of the net mesh determines the type and size of fish that can be caught, a mesh size that is too small can cause non-selective catches, including fish that have not reached reproductive size. On the other hand, a mesh size that is too large can cause many fish to escape the net. Meanwhile, the length of the net will affect the number of fish that can be caught. Nets that are too long can cause overfishing, while nets that are too short can reduce the catch, by

choosing the right mesh size and net length, fishermen can increase their catch without damaging the environment.

## RESEARCH METHODS

### Place and Time

This research was conducted in the waters of the Kuala Tungkal Fishermen's Village, West Tanjung Jabung, Jambi Province. The research implementation period began on March 7 - March 26, 2024.

### Tools and Materials

The materials used in this study were the catch of mantis shrimp (Harpiosquilla raphidea). While the equipment used to catch mantis shrimp was a gill net measuring 3.5 inches and 4 inches with a net length of 900 m, 1050 m and 1200 m, data collection tools using questionnaires, stationery, cameras as documentation tools.

### Methods

The method used in this study is a survey method to the landing site of mantis shrimp in Gudang Ijal, Kampung Nelayan Village, which receives mantis shrimp from gillnet catches with data collection in the form of a questionnaire. According to Hasanah, (2022) who stated that the survey method is a method that uses questionnaires and interviews in data collection.

The method for determining respondents in this study was purposive sampling, namely with the criteria being fishermen who own boats in Kampung Nelayan Kuala Tungkal Village who work as fishermen who use gillnets to catch mantis shrimp and then the number of samples was determined using the Slovin formula. Based on data from the Central Statistics Agency, (2020) the number of fishermen who use gillnet fishing gear is 308 fishermen and from the results of determining the number of respondent samples using the Slovin formula, the number of respondent samples was 75 fishermen who own gillnets. The results of determining the number of respondent samples obtained using the Slovin formula can be seen as follows:

$$n = \frac{N}{Ni\ d^2+1}$$

$$n = \frac{308}{308\ 0{,}10^2+1}$$

n = 75,49 (rounded up to 75)

Where:

n : sample size
Ni : population size
d : deviation from the population or desired degree of accuracy, namely 0.10

### Procedure

The procedures carried out in this study are as follows:

1. Heading to the fish landing area in the Kuala Tungkal Fishermen's Village.
2. Prepare the equipment that will be used when collecting data in the field, such as questionnaires, books, pens, cameras, etc.
3. Conducting enumeration (data collection) on the production of mantis shrimp catches based on the tails landed at the Ijal warehouse using gillnet fishing gear with a mesh size of 3.5 inches and 4 inches with a net length of 900 m, 1050 and 1200 m.
4. Conducting interviews with mantis shrimp fishermen who have landed their catch.
5. Next, carry out documentation as proof that research has been carried out.

**Data collected**

The primary data collected in this study were the results of mantis shrimp catches in numbers (tails) which were then calculated by calculating the number and composition of mantis shrimp based on the mesh size and net length. While secondary data were obtained from journals, theses, books and the Marine and Fisheries Service of West Tanjung Jabung Regency.

**Data Analysis**

The data analysis used in this study uses the Cobb Douglash production function, the calculations of which are assisted by the SPSS Statistics program version 26.

**1. Coob Douglas**

Referring to the objectives, the analysis model used is the Cobb Douglas production function which is used to determine the effect of independent variables on dependent variables. Cobb Douglas functions to test two or more variables against factors that affect the catch. According to Gultom *et al*., (2020) Cobb Douglas has easy and simple properties in its application, able to describe the scale of results if there is an increase and decrease. In this study, the variables used to determine how much influence the independent variables have are the length of the net ($X_1$), mesh size (X2). According to (Nurprihatin & Tannady, 2017) mathematically, the Cobb Douglas function can be written as follows:

$$Y = aX^b$$

The form of the natural logarithm transformation is as follows:

$$Ln = Ln\ a + b_1\ Ln\ X_1 + b_2\ Ln\ X_2 + u\ Ln\ e$$

Information:

| | |
|---|---|
| Ln Y | = The catch (Kg) |
| Ln $X_1$ | = Net length (m) |
| Ln $X_2$ | = Mesh size (inch)) |
| Ln a | = Constant |
| $B_1 \ldots b_2$ | = Regression coefficient value |
| $X_1 \ldots x_2$ | = Independent Variable |
| e | = error |

**2. Coefficient of Determination ($R^2$)**

The coefficient of determination is a value that describes how much change or variation in the dependent variable can be explained by changes in the independent variable. The higher the coefficient of determination, the better the ability of the independent variable to explain the dependent.

The R2 value has an interval ranging from 0 to 1 ($0 \leq R2 \geq 1$). The greater the R2 (approaching 1), the better the regression model. The closer to 0, the independent variable as a whole cannot explain the variability of the dependent variable.

**3. F Test**

The F test is used to see the overall influence of independent variables on the dependent variable. This test is done by comparing the calculated F value with the F table. Simultaneous testing (F test) is used to see how much influence the independent variables have on the dependent variable together by comparing the F-statistic value with the F-table value at a 95% confidence level or = 0.05 or simply looking at the probability number with the condition that the probability value of the F-statistic must be less than = 0.05 or <5%.

**4. T Test**

To determine the effect of independent variables on dependent variables partially, a t-test is performed. The t-test is used to see the significant effect of independent variables individually on dependent variables by assuming other variables are constant. If t count > t table at a certain level of degrees of freedom, then the independent variable / production factor (X) has a significant effect on production (Y). Conversely, if t count < t table at a certain level of degrees of freedom, then the independent variable / production factor (X) does not have a significant effect on production (Y) or simply look at the probability figures with the condition that the probability value of the t-statistic must be less than = 0.05 or < 5%.

**5. Elasticity**

Elasticity is used to measure the level of technical efficiency along with the economic efficiency of using variable inputs. The level of technical efficiency in using inputs is achieved when Ep = 1. According to Thamrin *et al*., (2016), the elasticity equation is as follows.:

$$b_1+b_2=1>1.$$

Information:
$b_1$ = Net Length Coefficient Value
$b_2$ = Mesh size coefficient value
With decision criteria:

1. $b_1 + b_2 = 1$, then the use of constant return scale production factors means that if there is an additional input of 1% it will produce an output of 1%.
2. $b_1 + b_2 > 1$, then the use of production factors increases returns to scale where if there is an increase in output of 1% it will produce output of more than 1%.
3. $b_1 + b_2 < 1$, then the use of production factors with decreasing returns to scale where if there is an increase in input of 1% will produce an output that is less than 1%.

## RESULT

Table 1. Fishing Gear Specifications in Kampung Nelayan Village

| No | Gill Net | Mesh size 3.5 inches | Mesh size 4 inches |
|---|---|---|---|
| 1. | Material | Nylon Monofilament | Nylon Monofilament |
| 2. | Color | Green | Green |
| 3. | Thread Diameter (cm) | 0.40 | 0.40 |
| 4. | Mesh Size (inch) | 3.5 | 4 |
| 5. | Net Length (m) | 900, 1050, 1200 | 900, 1050, 1200 |
| 4. | Buoy | Sausage | Sausage |
| 5. | Sink | Apolo | Apolo |
| 6. | Ris Rope | Top, Bottom | Top, Bottom |

Table 2. Production of Catch Results Based on Net Length.

| No | Net Length (m) | Mantis Shrimp Catch Results | |
|---|---|---|---|
| | | Tail | Composition (%) |
| 1. | 900 | 229 | 24,67 |
| 2. | 1.050 | 280 | 30,17 |
| 3. | 1.200 | 419 | 45,15 |
| | Amount | 928 | 100,00 |

Table 3. Production Amount of Catch Based on Mesh Size

| | Mesh size (inches) | Mantis Shrimp Catch Results | |
|---|---|---|---|
| | | Tail | Percentage (%) |
| 1. | 3,5 | 469 | 49,42 |
| 2. | 4,0 | 480 | 50,57 |
| | Amount | 949 | 100,00 |

Table 4. Coefficient of Determination ($R^2$)

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,939 | ,882 | ,878 | ,26226 |

Table 5. F Test

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 36,840 | 2 | 18,420 | 267,817 | ,000[b] |
| Residual | 4,952 | 72 | ,069 | | |
| Total | 41,792 | 74 | | | |

Table 6. T Test

| Model | B | Std. Error | Beta | t | Sig. |
|---|---|---|---|---|---|
| (Cons) | -29,648 | 2,084 | | -14,228 | ,000 |
| $LNX_1$ | 5,444 | ,272 | ,820 | 19,982 | ,000 |
| $LNX_2$ | -4,215 | ,492 | -,352 | -8,573 | ,000 |

Information:
- Significant level of use α = 5% (0,05)
- Ho accepted if the Sig value > 0,1
- Ho rejected if the Sig value < 0,1

Table 7. The elasticity value of the catch

| | Unstandardized Coefficients |
|---|---|
| Model | B |
| 1 (Constant) | -29,648 |
| $LNX_1$ | 5,444 |
| $LNX_2$ | -4,215 |

## DISCUSSION

### General Conditions of Research Locations

West Tanjung Jabung Regency has a fairly large sea area and is home to a variety of fishery biological resources which also have the potential to be used as marine fishery cultivation land. In addition, there are also mangrove forests which are useful for maintaining coastal conditions from sea erosion (Central Statistics Agency, 2008).

Geographically, the research area of Kampung Nelayan Village, West Tanjung Jabung Regency is located on the coast where the majority of the population works as fishermen. The geographical conditions of Kampung Nelayan Village, West Tanjung Jabung Regency can be seen in the picture 4.

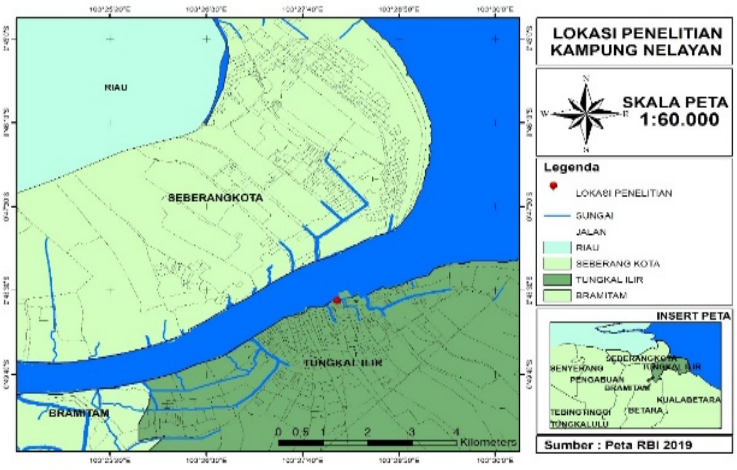


Figure 4. Map of research location in Kuala Tungkal

According to the Central Statistics Agency (2020), the Tanjung Jabung Barat Regency area is one of the areas in Jambi Province that has a sea area. Tanjung Jabung Barat Regency consists of 13 sub-districts, 20 sub-districts, and 114 villages. The area of Tanjung Jabung Barat Regency is 5,009.82 km2 with a water/ocean area of 141.75 km2. Geographically, Tanjung Jabung Barat Regency is located on the East Coast of Sumatra Island with a geographical position of 0053 '- 1º41' LS and 103º23' - 104º21' BT.

Tungkal Ilir District itself consists of eight sub-districts, including: Tungkal II, Tungkal III, Tungkal IV Kota, Tungkal Harapan, Kampung Nelayan, Patunas, Sriwijaya, Sungai Nibung and two villages, namely Tungkal I Village and Teluk Sialang Village.

**Condition of Gill Net Fishing Equipment in Fisherman's Village**

The first technique for operating the basic gill net fishing gear is to prepare by checking the fishing gear, checking the condition of the ship unit, fuel, supplies and storage place for the catch (basket and styrofoam). After all the equipment and needs are prepared, the ship can depart carrying 1 unit of fishing gear. According to (Pattiasina *et al*., 2021) the preparation stage is divided into two, namely the preparation stage on land such as checking the net while the preparation at sea is checking and arranging the buoy rope and weight rope so that when it is lowered, its position is neat and stretches straight on the seabed.

Arriving at the fishing ground location, the fishing gear is lowered (setting) which starts from lowering the marker buoy. The marker buoy on the gill net fishing gear that is being studied is orange in color, it is lowered on the left side of the ship, then continued with lowering the net and buoy, weights and additional weights in the form of stones. The lowering of this fishing gear is done when the ship's engine is off, only after it is finished the engine is turned on again and left. The lowering of the net (setting) is usually done in the morning and when the weather is favorable and the lifting of the net (hauling) is done in the afternoon. The net that has been lowered is then lifted by taking the marker buoy and starting to pull the selamba rope, the upper ris rope and additional weights. If there are some parts of the net that are entangled in the additional weights in the form of stones, they must be returned to their original state, namely in the form of an untangled net, then the hauling process can be carried out again. According to (Pattiasina *et al*., 2021) At the time that has been determined for lifting (hauling), and it is seen that the shrimp have been entangled, the net is lifted into the boat and that's where the catch obtained is seen. The hauling process continues until it is finished and the results

obtained are immediately put into the provided kulbox, then the catch is handled until it returns to the fishing base to be landed.

Based on the results of the interviews that have been conducted, the gill net fishing gear in the fishing village is 900 m, 1,050 m, 1,200 m long with a mesh size of 3.5 inches and 4.0 inches. The fleet used is the pompong type (1 GT) which can accommodate 2 people including ABK (Crew) and also the ship owner. The gill net fishing gear in the Fishing Village is the result of the assembly of local fishermen.

This study used gill nets with a mesh size of 3.5 to 4 inches and varying net lengths, namely 900 m, 1,050 m, 1,200 m to evaluate the selectivity of fishing gear to the catch. The gill nets commonly used by local fishermen in the Fishing Village are generally made of green nylon monofilament with a string diameter of 0.40 cm.

In this study, there are 2 types of buoys, namely sausage buoys with a frequency of placement of one every 15 m of net length, each buoy is equipped with two ris ropes, where the first ris rope functions to tie the buoy to the net, while the second ris rope acts as an additional hook. Next is the marker buoy according to the opinion of Setiawati *et al*., (2015) The function of the marker buoy is as a marker for the free end of the net (which is not tied by the ship), so that fishermen can easily find the end of the gill net that they operate in the waters. The weight section is also designed with two similar ris ropes, with a greater number of weights compared to the number of buoys, namely 31 pieces every 15 m of net, to keep the net submerged at the desired depth.

**Production Amount of Catch Based on Net Length**

One aspect that needs to be considered in increasing fishing efficiency is optimizing the use of fishing gear. The length of the net as an important component of fishing gear has the potential to affect the catch.

Based on table 2, it can be seen that the amount of production of the catch of the mantis shrimp production net length obtained the highest catch with a net length of 1,200 m (45.15%), and the least catch was found in a net length of 900 m (24.67%). Based on these results, it can be seen that the longer the net, the more catches are obtained, the optimal net length can maximize the catch, reduce the possibility of shrimp escaping and increase fishing efficiency. According to Aji *et al*., (2013) there is an effect of net length on catch production because the length of the net used will increase the sweep area during operation, so that it can affect the amount of catch that will be obtained.

In the research of Kusumasuci *et al*., (2018) every 1% increase in net length on the 5 inch Gillnet fishing gear causes 0.50%, an increase in catch results. This is thought to be because the longer the net, the wider the net fishing area so that the catch obtained is greater, meaning that the length of the net affects the catch results. According to Lucchetti *et al*., (2015) stated that Gillnet is a passive fishing gear where as one type of passive fishing gear, the length of the net greatly affects the net's catch capacity.

**Production Amount of Catch Based on Mesh Size**

The shape of the gill net fishing gear is rectangular equipped with the top of the net as a float and the bottom of the net is equipped with a weight. The mesh size is one of the factors that affects the amount of catch that is the target of the gill net fishing gear consists of 2 mesh sizes, namely 3.5 inches and 4 inches.

Based on table 3, it shows a difference in the catch of mantis shrimp based on the mesh size. Gill nets with a mesh size of 4 inches produced a higher catch, which was 50.57% of the total catch, compared to a mesh size of 3.5 inches which only produced (49.42%). This indicates that the mesh size of 4 inches is more effective in catching mantis shrimp in this study because fishermen in the Fishermen's Village use more mesh sizes of 4.0 inches, seen from the

average catch of each mesh size, there is a difference in the percentage of each mantis shrimp caught. According to City, (2024) the size of the net mesh is said to be selective or appropriate if small fish are given the opportunity to develop in such a way that it does not result in excessive exploitation in the fishery area by being able to get a size that is suitable for catching. This can be done by paying attention to the size of the net mesh.

Meanwhile, research by Prabhita *et al*., (2021) states that the mesh size of the gill net is a factor that greatly influences the size of the catch, the mesh size of the gill net not only affects the size of the catch but also the amount of catch.

**Coefficient of Determination ($R^2$)**

The coefficient of determination ($R^2$) is a number that shows how well a statistical model predicts a result. The coefficient of determination value ranges between 0 and 1, with the provision that the closer to 1 the better the model. In the regression, the coefficient of determination R2 (R square) is 0.882, which indicates that 88.2% of the catch is influenced by the length of the net and mesh size. While 11.8% is influenced by other factors not examined in this study, these other factors include environmental factors or conditions of the fishing area such as weather, fishing season and resource conditions. This is in accordance with the statement of Illahi *et al*., (2023) Wave height, rainfall and wind speed affect production. According to Nugraheni *et al*., (2015) one of the factors that causes a decrease in catch is the wind conditions at the time of the fishing operation. In accordance with the opinion of Gultom *et al*., (2020), the coefficient of determination is used to determine the magnitude of the contribution of all independent variables to their influence on the dependent variable (Y), while the rest is influenced by other variables that are not included in the model. It can be interpreted that if the coefficient value approaches 1, the relationship is getting closer, conversely, if the coefficient value approaches 0, the relationship is getting weaker.

**F Test**

The F test is used to determine whether the independent variables (net length and mesh size) together have a significant effect on the dependent variable (mantis shrimp catch) by comparing the f-statistic value with the F-table value at a 95% confidence level or $\alpha = 0.05$. Based on the SPSS output results, the F count value is 267.817 or greater than the F table value of 2.361 with a significance value of 0.000 <0.05. This means that Ho is rejected and HI is accepted or in other words the independent variables (net length and mesh size) have a joint effect or a significant effect on the dependent variable (mantis shrimp catch) in the Kuala Tungkal Fisherman Village. In line with the opinion of Kusumasuci et al., (2018) The results of data processing show that the p-value (sig) is 0.00, this shows that 0.00i <0.05, which means that the independent variables together have an effect on the dependent variable. Similar to the research of Lestari et al., (2017) using $\alpha = 0.05$ (5%) obtained an F table value of 2.19 and a calculated F of 18.606, so the calculated F > F table, which means rejecting Ho, meaning there is a significant influence between the amount of fuel (BBM), the experience of fishermen, the size of the boat, engine power, and the length of the trip together on the fish catch factor.

**T Test**

The T-test is a statistical test used to compare the average of two groups and determine whether there is a significant difference between the two, where in this study there were 2 groups, namely net length and mesh size.

**1. Net Length**

Based on the regression analysis, a regression coefficient of 5.444 was obtained for the net length variable, with a very significant t-statistic value (19.982> 1.993) or a significant

value of 0.000 smaller than the value of α = 5% (0.00 <0.05). These results indicate that there is a strong and significant relationship between the length of the net used and the catch of mantis shrimp. The results of the study showed a positive effect between the length of the net and the number of shrimp caught, indicating that the length of the net is an important factor in the success of the catch. This means that every 1 meter increase in the length of the net will increase the catch by 5.444%. According to Hariski *et al*., (2022) who stated that the length of the net has a significant effect on the catch of the gill net. According to Aji *et al*., (2013) the effect of the length of the net on the production of the catch is because the length of the net used will increase the sweep area during operation, so that it can affect the amount of catch that will be obtained.

**2. Mesh Size**

From the results of the regression analysis, the mesh size coefficient value obtained was (-4.215) or negative with a t-statistic value of 8.573> t table 1.993 or a significance value of 0.000 which is smaller than the value of α = 5% (0.00 <0.05), which means that the mesh size has a negative effect on the catch of mantis shrimp where every additional 1 inch of mesh size will reduce the catch of mantis shrimp by 4.215%. According to Prabhita *et al*. (2021) the mesh size of the gill net is a factor that greatly influences the size of the catch, the mesh size of the gill net not only affects the size of the catch but also the amount of catch. Pala & Yuksel, (2010) explained that the size of the gill net mesh has a significant effect on the efficiency and composition of the catch.

**Elasticity**

The elasticity value can be used to determine how much the catch will change if there is a change in certain factors, namely the length of the net and the mesh size of the catch. From the analysis results above, it is obtained b1 + b2 = 5.444 + (-4.215) = 1.229, where b1 is the length of the net and b2 is the mesh size. The analysis of production elasticity shows that every 1% increase in mantis shrimp production input will be directly proportional to an increase in output of 1.229%. An elasticity value greater than one indicates an increase in scale efficiency in mantis shrimp production. Thus, an elasticity value of 1.229 is obtained, so it can be concluded that the elasticity value> 1 is called the production of mantis shrimp catches in the increasing return to scale category if there is a change in output greater than the change in input. This is in accordance with the opinion of Yusuf *et al*., (2011) which states that if the production elasticity value is greater than 1, the proportion of additional output to 1 will produce a large proportion of input.

Production factors that can affect the catch need to be known so that efficiency and effectiveness can be carried out on input factors to produce optimal output, thus ultimately it is hoped that the production of the catch obtained can be increased so that the welfare of fishermen also increases (Aji *et al*., 2013).

## CONCLUSION

Based on the results obtained, it can be concluded that the elasticity of the mesh size and net length on the production of mantis shrimp catches in Kampung Nelayan Village, Tungkal Ilir District, West Tanjung Jabung Regency is in the increasing return to scale criteria, meaning that every additional output will increase input.

## ACKNOWLEDGEMENT

The author would like to thank the Kuala Tungkal community, who helped the author in conducting the research.

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