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Sab, 29 Agu 2020 jam 15.42

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Name of the authors: Erick Nugraha

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Corresponding author

Erick Nugraha

Date, August 29, 2020

The Relationship between Sea Surface Temperature and Catching Time of Skipjack tuna (*Katsuwonus pelamis*) in FMA-715, Seram Sea Indonesia

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Abstract. Skipjack tuna (*Katsuwonus pelamis*) has a wide distribution in the tropics, especially in eastern Indonesia. The types of fishing gear used consist of purse seines, pole and line, tuna longlines, hand lines and trolling lines. The purpose of this study was to determine the relationship between sea surface temperature (SST) and fishing time on the number and size of tuna catches. This research is an associative study which aims to determine the relationship between the variable fishing time and SST on the amount of catch and size of skipjack tuna. These relationships were analyzed using correlation and simple linear regression. The results showed that SST had an effect on the yield and size of the fish caught. The largest catch and the largest skipjack tuna size were found at SST 28.0^{0}C - 29.9^{0}C and decreased with increasing temperature. Catching time affects the yield and size of the fish caught. The largest catch and the largest skipjack tuna size were found in the time range 05.00 - 08.59 AM and decreased with increasing time.

Key Words: Pole and line, Tuna (*Thunnus sp.*), Sea surface temperature, Fish size,

Introduction.

Indonesia plays an important role in the world's Tuna (*Thunnus sp.),* bullet tuna (*Auxis rochei)* and Skipjack tuna (*Katsuwonus pelamis*) fisheries, which have supplied more than 16% of world production (Firdaus, 2019). *Thunnus sp.* and *K. pelamis* rank third among marine resources that support global fisheries (Soukotta, Bambang, Sya'Rani, & Saputra, 2017).

Matsumoto et al. (1984) in (Kiyofuji et al., 2019) said that tuna and *K. pelamis* are highly migratory species with a wide geographical distribution from the equatorial zone to temperate areas. Anderson et al. (2012) in (Waileruny, Wiyono, Wisodo, Purbayanto, & Nurani, 2014) explain that *K. pelamis* is present in all tropical oceans, has a large population size, relatively fast growth, and high reproductive potential. As a result, in general, the ability to withstand fishing pressure is relatively high and it is relatively difficult to over fishing and is considered to be constantly changing places.

The distribution area of *thunnus sp.* and *K. pelamis* in Indonesia is mainly in the Eastern Indonesia Region (Supriatna, et al., 2014). The results of the parameters of oceanographic characteristics indicate that West Papua waters have good marine resource potential for the survival of pelagic fish, especially *K. pelamis.*

K. pelamis fishing can be done throughout the year with the most fishing places caught in the Seram Sea and Fakfak waters (Tjarles et al., 2019). Fish distribution can be found in several locations, such as the waters of Tomini Bay and Seram Sea waters. The movement of water masses from the Pacific Ocean towards the Indian Ocean is characterized by high salinity (33.9 - 34.2 psu), warm temperatures (28 - 30°C), chlorophyll (1 - 2.5 mg/m^3) and oxygen dissolved (5.6-6.2 mg/m^3). Such characteristics are preferred by large pelagic groups compared to small pelagic (Ma'mun et al. 2018). The exploitation of *K. pelamis* in the Banda Sea has been going on for a long time. Currently the *K. pelamis* resource has shown signs of overfishing. This indication, among others, is marked by a decrease in the catch and individual size, changes in the composition of the catch, and the tendency to increase in the proportion of several types of small fish (B. Nugraha et al., 2017).

The Banda Sea is one of the potential tuna fishing areas in Indonesia.The types of fishing gear used consist of purse seine, pole and line, tuna longlines, hand lines and trolling lines (Anung Widodo Agustinus, Mahulette, & Satria Fayakun, 2015). Information about pole and line fisheries. in the waters of the Fisheries Management Area (FMA) 715 of the Republic of Indonesia. Pole and line catch consists of *K. pelamis*, *Thunnus albacares* and *Auxis rochei* (Nainggolan et al., 2017).

The purpose of this study was to determine the relationship between sea surface temperature and fishing time on the number and size of tuna catches and to determine the sea surface temperature and the most ideal fishing time to carry out fishing activities of *K. pelamis* with pole and line.

Material and Method

This research lasted for approximately 6 months, from 24 November 2018 to 05 May 2019. The fishing area which is the research location is in the Seram sea at the position 02°18'47" - 02°40'51" S and 130°03'35" - 130°35'33" E. Seram Sea is included in the Fisheries Management Area of the Republic of Indonesia (FMA-RI) 715 which includes the waters of Tomini Bay, Maluku Sea, Halmahera Sea, Seram Sea and Berau Bay (Figure 1).

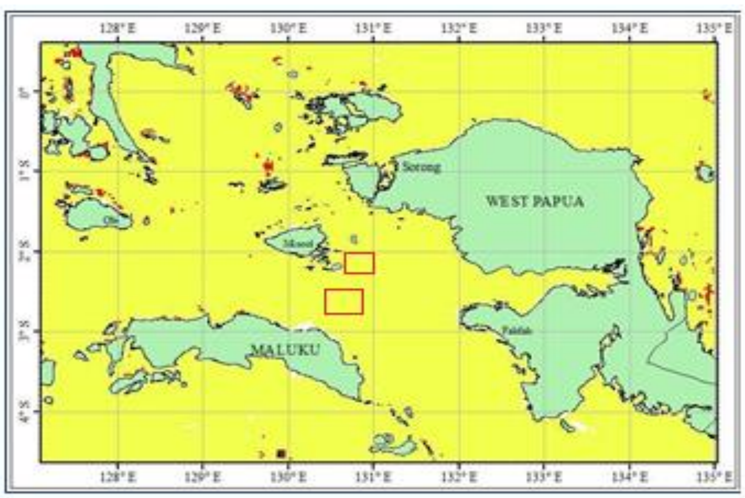

Figure 1. Map of Research Location (Tjarles Lay, et al., 2019)

The equipment used is in the form of a pole and line vessel with a ship size of 60 GT, Length Over All (LOA) of 25.68 m, width 4.86 m, within 2.20 m (Figure 2). Other equipment used such as marine maps no 210, magnetic compass, GPS (Global Positioning System), binocullar, digital thermometer, roll meter, watch, camera and calcuator.

Figure 2. Pole and Line fishing boat

The data collection method was carried out by following the fishing operation which lasted 6 fishing trips and 50 settings. The data collected included: setting position, number of catch according to fish species, setting time, SST at setting time, data on the size of the *K. pelamis* sample. The data is recorded in the log fishing operation journal. Sea surface temperature measurements are carried out in situ, which is according to where the setting is made. Sea surface temperature is measured using a digital thermometer. Seawater samples were taken using a bucket bucket, then a digital thermometer was directed to the sea water. Scan button is pressed for 5 seconds. The temperature data will automatically appear on the thermometer screen. The measurement results are recorded in the capture journal. The setting position is measured using the Global Positioning System (GPS). The measured latitude and longitude position data is at the time of the fishing gear setting. Measuring the size of *K. pelamis* is done by taking a sample of 30 *K. pelamis* after each setting. The sample fish were measured from head to tip of tail (fork length) using a roll meter. The number of catches is recorded when handling the fish caught. After finishing the fishing activity, the catch is arranged in a basket with a size of 50 kg/basket. The number of catch per setting is done by counting the number of baskets filled with fish.

This research is an associative study, namely research that aims to determine the relationship between two or more variables. The relationship to be studied is the time of catching and sea surface temperature to the number of catches and to the size of *K. pelamis*.

The hypothesis of this study is that fishing time and sea surface temperature have an effect on the amount of catch and on the size of *K. pelamis*. To measure the presence or absence of correlation between variables, it is analyzed by simple linear regression with the following regression line equation (Hasan, 2001):

$$Y = a + bX$$

$$a = \frac{(\sum Y)(\sum X^2) - (\sum X)(\sum XY)}{(n)(\sum X^2) - (\sum X)^2}$$

$$b = \frac{(n)(\sum XY) - (\sum X)(\sum Y)}{(n)(\sum X^2) - (\sum X)^2}$$

To measure the closeness of the relationship between two variables, the Pearson correlation coefficient using the least squere method is used as follows:

$$r = \frac{n\sum XY - (\sum X)(\sum Y)}{\sqrt{(n\sum X^2 - (\sum X)^2)(n\sum Y^2 - (\sum Y)^2)}}$$

Information:
Y = number of catch or size of *K. pelamis*
X = Sea Surface Temperature

To determine the closeness of the relationship or correlation between these variables, the benchmark value "r" is used as follows:

$0 < r \leq 0.20$, the correlation is very weak
$0.20 < r \leq 0.40$, weak correlation
$0.40 < r \leq 0.70$, a significant correlation
$0.70 < r \leq 0.90$, strong correlation
$0.90 < r < 1.00$, the correlation is very strong
r = 1, perfect correlation

For the purpose of testing the model parameter values hypothesis, the linear regression model also assumes what is known as the classic assumption test, namely the normality test, heteroscedasticity test, linearity test and autocorrelation test for time series data (Janie, 2012). The normality test aims to test whether the data used in the study is normally distributed or not. The linearity test aims to determine whether the predictor or independent variable has a significant linear relationship with the criterion or dependent variable. Multicollinearity test aims to test whether the regression model found a strong correlation or relationship between the independent variables or the independent variables. The heteroscedasticity test aims to test whether in the regression model there is an unequal variance from the residual value of one observation to another. If the variance from the residual value from one observation to another is constant, it is called homoscedasticity, conversely if the variance from the residual value from one observation to another is different, it is called heteroscedasticity. A good regression model should not have heteroscedasticity symptoms.

Results and Discussion

Composition of Catch

Pole and line catch targets are large pelagic fish such as *thunnus sp*. and *K. pelamis*. There are also by-catch products such as Mahi Mahi (*Coryphaena hippurus*), mackerel (*Scomberomorus commerson)* and others. The amount of bycatch is insignificant and is not caught every time. On the table 1 shows that the catch during 6 fishing trips consisting of 50 settings is 83.575 kg with an average of 1.672 kg/setting. The composition of the catch is dominated by *K. pelamis* as much as 75.480 kg or 90%. While yellowfin is only 8.095 kg or 10%. The largest catch of *K. pelamis* is 5.000 kg/setting and the smallest is 20 kg/setting. The largest catch of tuna fish is 1.200 kg/setting and the smallest is 0 kg/setting.

Table 1

Composition of Catched Fish

No	Name of fish	Total catching (kg)	%	Average per Setting (kg)	Large catching per Setting (kg)	Lower Catching per Setting(kg)
1	*K. pelamis*	75.480	90	1,510	5.000	20
2	*T. Albacares*	8.095	10	162	1.200	0
	Total	83.575	100	1.672	-	-

Relationship between Sea Surface Temperature (SST) to the total of K. pelamis Catch.

There is a strong relationship between the dynamics of oceanographic conditions with fluctuations in the catch of large pelagic fish (Safruddin, Dewi, Hidayat, Umar, & Zainuddin, 2018) and SST is the most important predictor of habitat for *K. pelamis* migration (Mugo, Saitoh, Nihira & Kuroyama, 2010). The relationship SST to the number of *K. pelamis* catches was analyzed using simple linear regression. SPL as the independent variable or independent variable or variable X. The amount of catch as the dependent variable or dependent variable or variable Y.

Normality test of data distribution was carried out by using the Kolmogorov-Smirnov normality test and the Asymp significance value was obtained. Sig. (2-tailed) of 0.559> 0.05., It can be concluded that the data is normally distributed. The results of the linearity test obtained the Deviation from linearity sig. amounting to 0.598>0.05, it can be concluded that there is a significant linear relationship between the independent variable and the dependent variable. Heteroscedasticity test used the Glejser test and obtained a significance value of the SPL variable of 0.560. This variable has a significance value greater than 0.05, it can be concluded that there is no symptom of heteroscedasticity in the regression model. Thus the assumptions or requirements to perform simple linear regression analysis have been met.

To find out whether or not there is a relationship between the catch time variable (X) and the *K. pelamis* fishing yield variable (Y), it is carried out through the t test as shown in table 2.The t test results obtained a significance value of 0.000<0.05 and a t-count value of -4.835> t table. -2.029, it can be concluded that there is a relationship between the SPL (X) variable and the Catchangfish Catch variable (Y) variable.

Table 2

Regression Analysis of the Relationship between SST and Catch of *K. pelamis*

Variable	Regression Coefficient	T_{count}	Sig.
Constant	25.518.091		
SST	- 805.762	- 4.835	.000

r = - 0.572
r_{squere} = 0.327
t_{table} = 2.029

The coefficient of determination or R squere is 0.327 or 32.7%, which means that the SST (X) variable is related to the *K. pelamis* Catch Amount variable of 32.7% while the rest (67.3%) is connected by other variables outside this regression equation. Furthermore, the value of r = -0.572 which means an increase in SST followed by a decrease in catch and the closeness of the relationship or correlation between the two variables can be categorized as having a significant correlation. In contrast to what was said by Nugraha E, et al. (2020) that SST does not have a significant relationship with the number and size of *K. pelamis* caught in the Banda Sea.

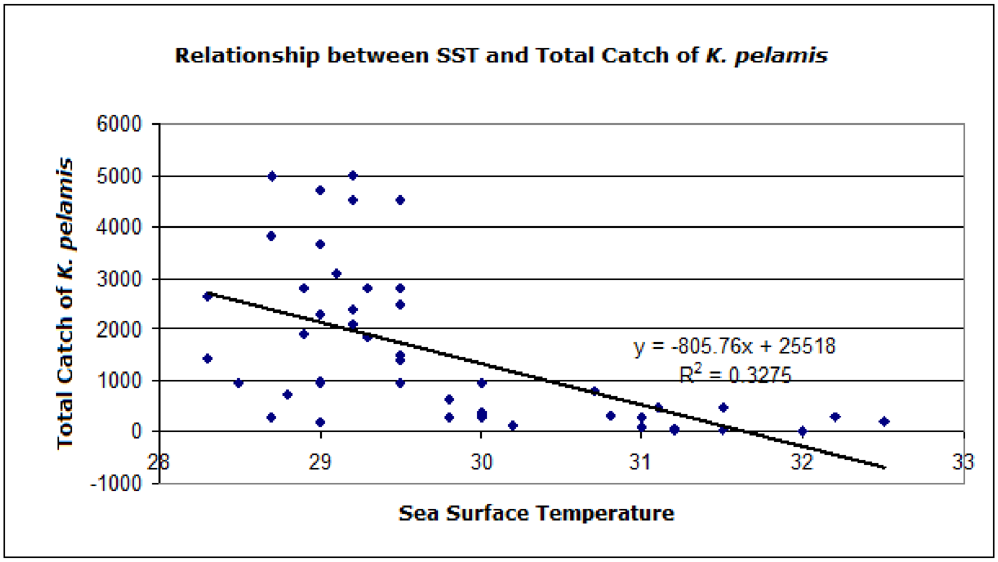

Figure 3. Relationship between SST and Total Catch of *K. pelamis*

The relationship between SST and Total Catched *K. pelamis* Products as shown in Figure 3, is formulated in the regression equation as follows:

$$Y = 25{,}518{,}091 - 805{,}762\ X$$

Note :
Y = Number of *K. pelamis* Catch
X = SST

The regression equation above shows that each increase in temperature of 1^0C will reduce the catch by 805.762 kg, or in other words, an increase in temperature will reduce the number of tuna catches. Thus it can be concluded that to obtain the most results is the low SST. In contrast to what Wyrtki, 1961 in (Baskoro, Taurusman, & Sudirman, 2011) said, the relationship of temperature to fisheries in Indonesian waters which are tropical waters is unclear. This is because tropical waters have small annual temperature variations compared to subtropical waters.

Relationship between Sea Surface Temperature (SST) and *K. pelamis* Size

The relationship of SST to *K. pelamis* size was also analyzed using simple linear regression. SST as independent variable or independent variable or X variable. *K. pelamis* size as dependent variable or dependent variable or Y variable.

Normality test of data distribution was carried out by using the Kolmogorov-Smirnov normality test and the Asymp significance value was obtained. Sig. (2-tailed) 0.194> 0.05., It can be concluded that the data is normally distributed. The results of the linearity test obtained the Deviation from linearity sig. amounting to 0.063> 0.05, it can be concluded that there is a significant linear relationship between the independent variable and the dependent variable. Heteroscedasticity test used the Glejser test and obtained a significance value of the SST variable of 0.218. This variable has a significance value greater than 0.05, it can be concluded that there is no heteroscedasticity symptom in the regression model. Thus the assumptions or requirements to perform simple linear regression analysis have been met.

To find out whether or not there is a relationship between the fishing time variable (X) and the *K. pelamis* size variable (Y), it is carried out through the t test as shown in table 3.The t test results obtained a significance value of 0.000<0.05 and a t_{count} value of -6.125> t_{table} -2.029, it can be concluded that there is a relationship between the SST variable (X) and the variable variable Catching *K. pelamis* (Y).

Table 3

Regression Analysis of the Relationship between SST and *K. pelamis* Size

Variable	Regression Coefficient	T_{count}	Sig.
Constant	238.92		
SPL	- 6.214	- 6.125	.000

r = - 0.662
r_{squere} = 0.439
t_{table} = 2.029

The coefficient of determination or R squere is 0.439 or 43.9%, which means that the SPL (X) variable is related to the *K. pelamis* size variable by 43.9% while the rest (56.1%) is related by other variables outside this regression equation. Furthermore, the value of r = 0.662 which means that an increase in sea surface temperature is followed by a decrease in the size of *K. pelamis* and the closeness of the relationship or correlation between the two variables can be categorized as having a significant correlation.

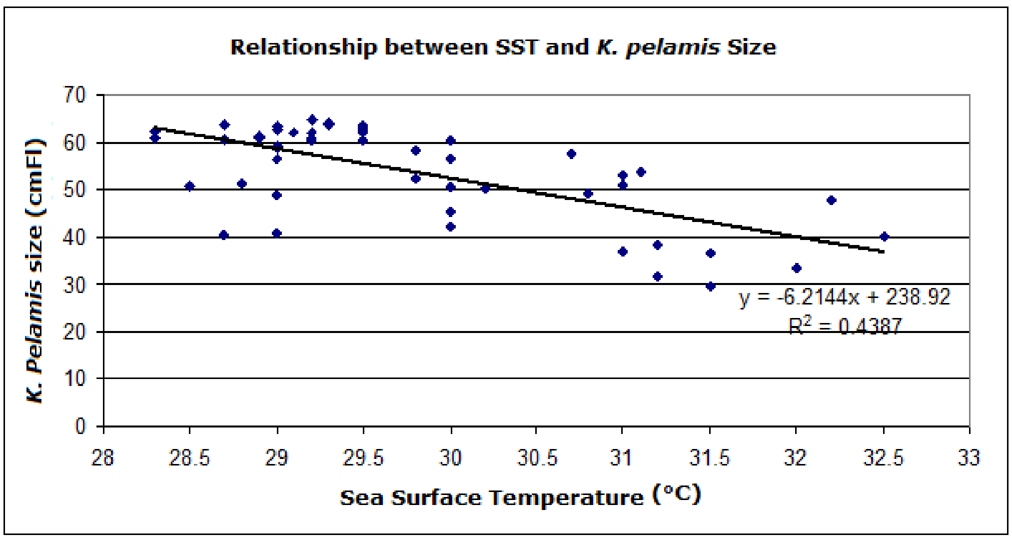

Figure 4. Relationship between SST and *K. pelamis* Size

The relationship between SST and *K. pelamis* Size as shown in Figure 4, is formulated in the regression equation as follows:

Y = 238.92 - 6,214 X

Where :

Y = Size of *K. pelamis*

X = SPL

The regression equation above shows that each increase in temperature of 1°C will reduce the size of *K. pelamis* by 6,214 cm, or in other words, an increase in temperature will reduce the size of *K. pelamis*. Thus it can be concluded that to obtain the most results is the low SST.

The Relationship of SST to the Number and Size of Catch of *K. pelamis.* To find the right temperature for obtaining large numbers of fish and larger fish, it is analyzed using a line chart. The temperature range during the capture operation (setting) is from 28°C to 33°C. Sea surface temperature is divided into five classes, with a class length of 1°C.

In Figure 5, it can be seen that the average catch at a temperature of 28.0-28.9°C is 2.178 kg per setting, increasing to 2.278 kg per setting at a temperature of 29.0-29.9°C then decreasing sharply at a temperature of 30.0-30.9°C to 446 kg per setting and be 209 kg per setting and at a temperature of 31.0-31.9°C to 173 kg per setting at a temperature of 32.0-32.9°C. Standard error at 28.0-28.9°C is 512 kg, at 29.0- 29.9°C is 314 kg, at 30.0-30.9°C is 98 kg, at 31.0-31.9°C is 69 kg and at 32.0-32.9°C is 82 kg. The highest catch is at a temperature of 28.0-28.9°C and 29.0-29.9°C reaching 5.000 kg per setting. Meanwhile, at a temperature of 30.0-30.9°C it is 950 kg per setting, at a temperature of 31.0-31.9°C it is 500 kg per setting and at a temperature of 32.0-32.9°C it is 300 kg per setting.

The average size of *K. pelamis* at 28.0-28.9°C was 56.9 cmFl per setting, increased to 59.7 cmFl per setting at 29.0-29.9°C then decreased sharply at 30.0-30.9°C to 51.4 cmFl per setting and became 41.3 cmFl per setting and at temperatures of 31.0-31.9°C to 40.4 cmFl per setting at 32.0-32.9°C. Standard error at 28.0-28.9°C is 2.6 cm, at 29.0-29.9°C is 1.2 cm, at 30.0-30.9°C is 2.2 cm, at 31.0-31.9°C is 3.4 cm and at 32.0-32.9°C is 4.1 cm. The highest catch is at a temperature of 28.0-28.9°C and a temperature of 29.0-29.9°C reaching 5.000 kg per setting. Meanwhile, at a temperature of 30.0-30.9°C it is 950 kg per setting, at a temperature of 31.0-31.9°C it is 500 kg per setting and at a temperature of 32.0-32.9°C it is 300 kg per setting. This is in accordance with what E. Nugraha et al. (2020) that, there is a pattern or trend that shows that small size fish are caught more at high temperatures. In line with that, Gunarso (1985) states that larger and older fish will tend to move towards cooler waters, while smaller fish will remain in their normal distribution area.

From the results of the description above, it can be seen that the largest catch and the largest *K. pelamis* size were caught at a temperature of 28.0-29.9°C. The same thing was said by Gunarso (1985) that the optimum temperature preferred by cakialang fish in Indonesia is at a temperature of 28.0-29.0°C. Similar to that, E. Nugraha et al. (2020) and Nainggolan et al. (2017) said that the largest catch of *K. pelamis* is at SST between 29.0-30.0° C. The same thing was stated by Putri, Jaya, and Pujiyati (2018) that Cakalang is generally found caught in the sea surface temperature range of 28.42-30.73°C. Slightly different from Angraeni et al. (2014), which states that the waters favored by *K. pelamis* are in the range of 29.5-31.0^{o}C with the highest catch in the range of 31.0-31.4^{o}C.

Thus it can be concluded that SST affects the yield and size of the fish caught. The largest catch and the largest *K. pelamis* size were found at SPL 28.0-29.9^{0}C and decreased with increasing temperature. The most ideal SST for conducting *K. pelamis* fishing activities with pole and line is at a temperature of 28.0-29.9^{0}C.

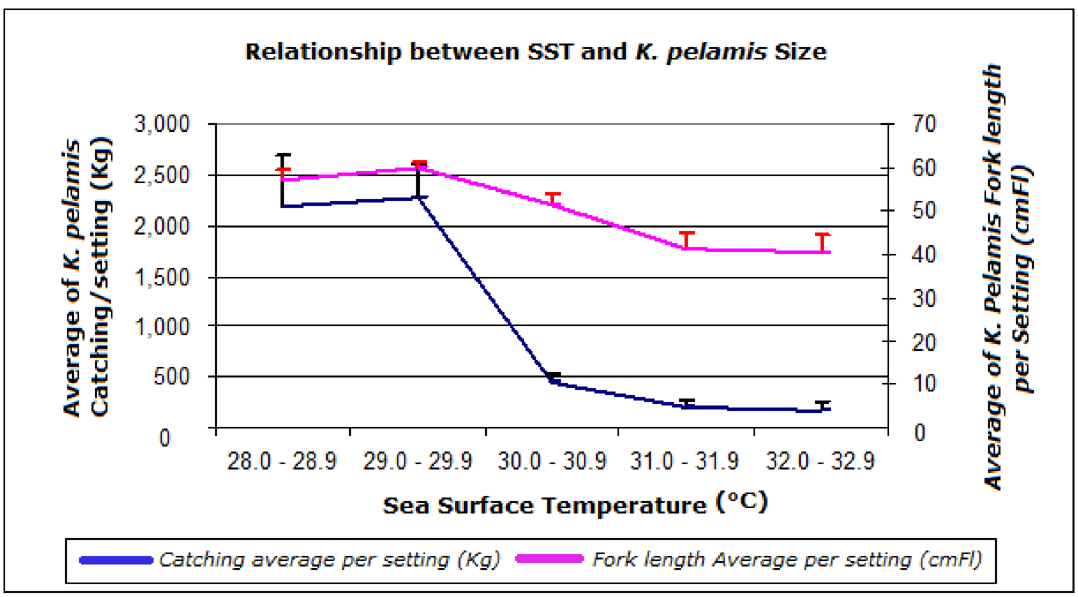

Figure 5. The relationship of sea surface temperature to the number and size of *K. pelamis* catches

The Relationship between Catching Time and Number and Size of Catch of *K. pelamis*

To find out the right time to get fish in large numbers and fish that are bigger, it is analyzed using a line chart. The arrest operation (setting) took place starting around 05.00 and ending around 17.00. The fishing time is divided into three classes, namely the class in the time range 05.00-8.59 which is then called the morning group and the afternoon group in the time range 09.00-12.59 and the last one is the afternoon group in the time range 13.00-16.59.

In Figure 6, it can be seen that the highest average catch is in the morning, which is 2.155 kg per setting, then decreases sharply during the day to 416 kg per setting and continues to decline to 175 kg per setting in the afternoon. Standard error in the morning 268 kg, 105 kg during the day and 81 kg in the afternoon. The highest catch in the morning reaches 5.000 kg per setting, during the day 1.400 kg per setting and 330 kg per setting in the evening.

The highest average size of *K. pelamis* is in the morning, which is 58.1 cmFl per setting, then drops sharply at noon to 47.7 cmFl per setting and continues to decrease to 40 cmFl per setting in the afternoon. Standard error is 1.2 cm in the morning, 2.6 cm in the afternoon and 5.0 cm in the afternoon. The largest size of fish in the morning is 64.8 cmFl, 60.3 cmFl in the afternoon and 49.1 cmFl in the afternoon.

From the results of the description above, it can be seen that the largest catch and the largest *K. pelamis* is caught in the morning. Mardlijah (2017) said that fish also have time to eat*. Thunnus albacares* starts eating at around 07.00 am. Furthermore, Nakamura (1965) in Mardlijah (2017) states that *K. pelamis* caught in the morning have a larger stomach volume than fish caught at midday.

Thus it can be concluded that the time of catching affects the yield and size of the fish caught. The largest catch and the largest *K. pelamis* size were found in the time range 05.00-08.59 and decreased with increasing time. The ideal time to catch *K. pelamis* with pole and line is in the morning, which is between 05.00-08.59.

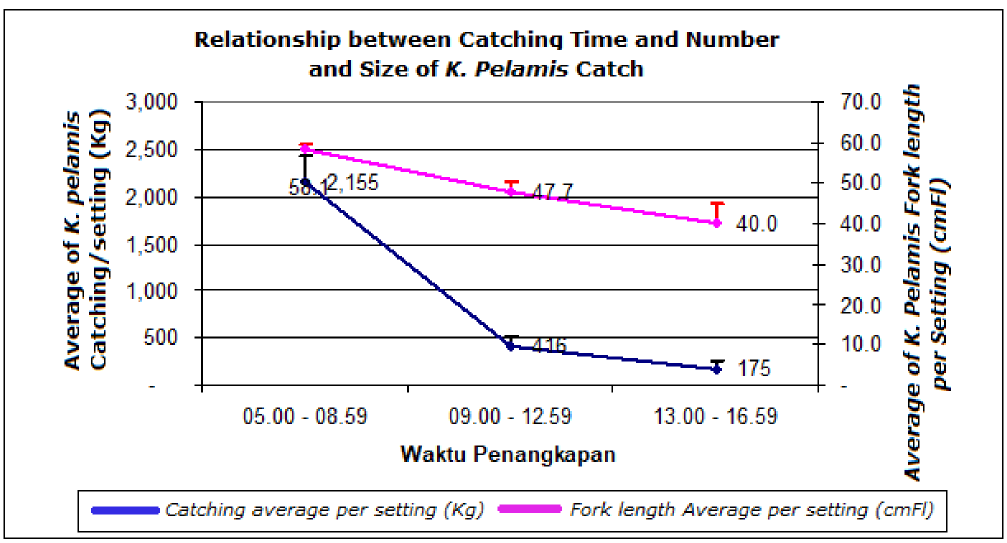

Figure 6. Relationship between Catching Time and Number and Size of *K. pelamis* Catch

Conclusion.

1. Composition of pole and line catches in Seram waters at position 02°18'47"-02° 40'51"S and 130°03'35"-130°35'33"E is dominated by *K. pelamis* 90% and the rest 10% yellowfin.

2. SST affects the yield and size of the fish caught. The largest catch and the largest *K. pelamis* size were found at SST 28.0-29.9°C and decreased with increasing temperature. The most ideal SST for conducting *K. pelamis* fishing activities with pole and line is at a temperature of 28.0-29.9°C.
3. Catching time affects the yield and size of the fish caught. The largest catch and the largest *K. pelamis* size were found in the time range 05.00-08.59 and decreased with increasing time. The most ideal time to do *K. pelamis* fishing activities with pole and line is in the morning, which is between 05.00-08.59.

Acknowledgment. We would like to thank to all skipper and crew of FV. Mina Fintura 01 who have allowed us to do research on pole and line fishing boat, provided tremendous opportunities, attention and assistance during the research. Thanks also go to all related parties, so that this research can be carried out and published.

References

Angraeni, Rezkyanti, N.I., Safruddin, & Zainuddin, M. (2014). Spatial and Temporal Analysis of Skipjack Tuna (*Katsuwonus pelamis*) Catch and Thermal Front during the Transition Season in the Bone Bay. *Journal IPTEKS PSP*.

Anung Widodo Agustinus, Mahulette, R.T., & Satria Fayakun (2015). Stock Status, Exploitation and The Management Option of Tuna Resources in Banda Sea. Indonesian Fisheries Policy Journa*l.* https://doi.org/10.15578/jkpi.7.1.2015.45-54

Baskoro, M.S., Taurusman, A.A., & Sudirman, H. (2011). FISH BEHAVIOR Relationship with Capture Fisheries Science and Technology. Bandung: CV Lubuk Agung.

Firdaus, M. (2019). The Profile of Tuna and Skipjack Fishery in Indonesia. Marine and Fisheries Socio-Economic Marina Scientific Bulletin*.* https://doi.org/10.15578/marina.v4i1.7328

Gunarso, W. (1985). Fish Behvior in Relation to Tools, Methods and Fishing Technique. Bogor: Faculty of Fisheries, Bogor Agricultural Institute.

Hasan, M. I. (2001). Statistics 1 (Descriptive Statistics). Jakarta: PT Bumi Aksara.

Janie, A.D. (2012). Descriptive Statistics and Multiple Linear Regression with SPSS. In Descriptive Statistics and Multiple Linear Regression with SPSS.

Kiyofuji, H., Aoki, Y., Kinoshita, J., Okamoto, S., Masujima, M., Matsumoto, T., Kitagawa, T. (2019). Northward migration dynamics of skipjack tuna (*Katsuwonus pelamis*) associated with the lower thermal limit in the western Pacific Ocean. *Progress in Oceanography*. https://doi.org/10.1016/j.pocean.2019.03.006

Ma'mun, A., Priatna, A., & Herlisman, H. (2018). Distribution Pattern of Pelagic Fish and Oceanogrphic Conditions in The Fisheries Management Area of The Republic of Indonesia-715 (RI-FMA 715) During The Northwest Intermonsoon. *Jurnal Penelitian Perikanan Indonesia*. https://doi.org/10.15578/jppi.24.3.2018.197-208

Mardlijah, S. (2017). Stomach content analysis of skipjack tuna and yellow fin tuna landed in Bitung, North Sulawesi. JPPI. https://doi.org/10.15578/jppi.14.2.2008.227-235

Mugo, R., Saitoh, S. I., Nihira, A., & Kuroyama, T. (2010). Habitat characteristics of skipjack tuna (*Katsuwonus pelamis*) in the western North Pacific: a remote sensing perspective. *Fisheries Oceanography*. https://doi.org/10.1111/j.1365-2419.2010.00552.x

Nainggolan, C., Suwardjo, D., Hutajulu, J., Suharyanto, Syamsuddin, S., Effendy, A., Novianto, D. (2017). Analyses of pole and line fishery: Catch composition and use of live bait for catching skipjack tuna (*Katsuwonus pelamis)* and yellowfin tuna *(Thunnus albacares)* in Fisheries Management Area 715, Indonesia. *AACL Bioflux*, *10*(6).

Nugraha, B., Mardlijah, S., & Rahmat, E. (2017). Size Composition Of Skipjack Tuna (*Katsuwonus Pelamis*) Caught By Pole And Line Landed In The Tulehu, Ambon. *BAWAL Widya Riset Perikanan Tangkap*. https://doi.org/10.15578/bawal.3.3.2010.199-207

Nugraha, E., Gunawan, R., Danapraja, S., Yusrizal, Kusdinar, A., Waluyo, A. S., Sutisna, D. H. (2020). The Sea Surface Temperature Effect On The Length And Size Of Skipjack Tuna (*Katsuwonus Pelamis*) Catches In The Banda Sea, Indonesia. *AACL Bioflux*.

Putri, R. S., Jaya, I., & Pujiyati, S. (2018). Fisheries Survey on The Present of Skipjack (*Katsuwonus pelamis*) in Bone Bay. Journal of Tropical Marine Science and Technology. https://doi.org/10.29244/jitkt.v10i1.18850

Safruddin, Dewi, Y. K., Hidayat, R., Umar, M. T., & Zainuddin, M. (2018). Study of the Oceanographic Conditions of Fishing Grounds of Large Pelagic Fish using Pole and Line in the Gulf of Bone Waters. Hasanuddin University V National Symposium on Marine Affairs and Fisheries, Makassar May 5 2018.

Soukotta, I. V. T., Bambang, A. N., Sya'Rani, L., & Saputra, S. W. (2017). Estimation of MSY and MEY of skipjack tuna (*Katsuwonus pelamis*) fisheries of Banda sea, moluccas. *AACL Bioflux*.

Supriatna, A., Hascaryo, B., Wisudo, S. H., Baskoro, M., & Victor PH Nikijuluw. (2014). Value Chain Model Development of Tuna and Tuna Alike In Indonesia. Journal of Indonesian Fisheries Product Processing. https://doi.org/10.17844/jphpi.v17i2.8718

Tjarles, L., Matruty, D. D. P., & Waas, H. J. D. (2019). Model Development of Potential Area Suitability Determination of Skipjack Tuna Catch Using Multi Sensor Satellite and Geographic Information System in West Papua Waters. Russian Journal of Agricultural and Socio-Economic Sciences. https://doi.org/10.18551/rjoas.2019-10.07

Waileruny, W., Wiyono, E.S., Wisodo, S.H., Purbayanto, A., & Nurani, T.W. (2014). Monsoon and Skipjack Fishing Ground in The Banda Sea and It Surrounding Moluccas Province. Journal of Fisheries and Marine Technology https://doi.org/10.24319/jtpk.5.41-54

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