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# PROCEEDINGS

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### Food Sovereignty and Natural Resources in Archipelago Region

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## **LIVE BAIT HOLDING TOWARD STEFISHING GROUND SKIPJACK**

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### **Abstract**

This study aimed to determine the effect of density on live bait tank skipjack fish to temperature and dissolved oxygen as well as the relationship of mortality to the density of live bait for skip jack fishing ground. The method used was a survey method to make observations on the Holding of live bait tank every 30 minutes. After the live bait tank then transferred to the observed water temperature, dissolved oxygen, density, and mortality of fish species. The results showed live bait densities between 222.2 to 1404.6 fish/m<sup>3</sup>. Live bait density affect the temperature and dissolved oxygen. The more solid live bait tank will increase water temperatures and lower dissolved oxygen. A link density on mortality live bait. Mortality between 2.2 to 3.3% with a density of 222.2 to 890 fish/m<sup>3</sup>, the density of > 890 fish/m<sup>3</sup> significantly increased mortality 4.2 to 6.9%. Simple regression analysis showed that the density of live bait effect on mortality in all three types of bait that Sardinellasp, Stelophorussp, and Caesiosp. There are indications that the longer the fish are in the tank shows increasing mortality.

Keywords : *pole and line, live bait holding, density, mortality*

### **INTRODUCTION**

One type of effective fishing gear to catch skip jack (*Katsuwonus pelamis*) in the Maluku waters at *pole and line*. Main requirements that must be met *pole and line* fishing effort is the availability of live bait fish, both the type and quality to be brought to the *skip jack* fishing ground. Live bait fish is a limiting factor in the pole and line fishery.

Supply of live bait for fishing this skip jack obtained from lift net fishing effort and bouke-ami. Availability of live bait and lures characteristics of a problem in fishing operations skip jack that have an impact on the number of days fishing operations and the expansion of the fishing area that affects production and income of fishermen catch. One way to increase the production of the catch is handling live bait fish in the boat with a pole and line well.

Factors affecting the durability of live bait are the external conditions at the time of arrest, type of fish and internal conditions, tools and methods used

during the arrestand handling. The mortality ratein the live bait tank pole and linevessels, fish density and environmental conditionsie water temperature and dissolved oxygen.

Handling live bait at the time of removal of the liftnet and bouke-amior bait tank needs to be done well. Handling during a trip to the fishing ground, if not done properl yallows a high mortality rate that affects the production of pole and line fishery.

This studyaimed to determine the effect of density in the live bait tank pole and linevessels to temperature and dissolved oxygen, and the relationship of the density of bait fish mortality during the arrestto the fishing ground.

## **METHOD**

The study was conducted from April-June 2011 the fishing ground in Seram Sea Waters. Live bait obtained at fishing liftnet in the waters of the coastal of Pelita Jaya .

The data was collected through survey method, following the process of catching skip jack by pole and linevessels. Observations handling live bait fish from the fishput in to the tank until they were fishing bait, bait tank sizep; 3mxl; 1.10mxt; 2.10m. Observations made during the study 10 replications. Observations handling of bait fishis done every 30 minutes after the bait was transfer in to a tank. Measure water temperature, dissolved oxygen, and count every number and type of fish that die after catching upin the fishing ground. Observations stages as follows :

1. The Measure volume of water in the tank
2. Counting the numberof individuals of each kind of fish, which do as much as 2 times
3. Measure the temperature of the water and taking water samples in the tankis then stored in sample bottles for analysis of dissolved oxygen levels. Temperature measurements and water sampling performed every 30 minutes until the start of fishing.
4. Counting every type and number of fisht hat diedprior to fishing

To determine the relation ship of each observed variableis done by a simple regression analysis and the effect on the dependent variable independent variable used simple regression analysis of variance. Data analysis to determine the mortality rate of any live bait fishing operations :

$$M = \frac{JM_i}{JT_i} \times 100$$

Where :

- M : Mortality rate (%)  
JT<sub>i</sub> : Total number of fish type bait (individu)  
JM<sub>i</sub> : Number of fish species mortality (individu)

## RESULT AND DISCUSSION

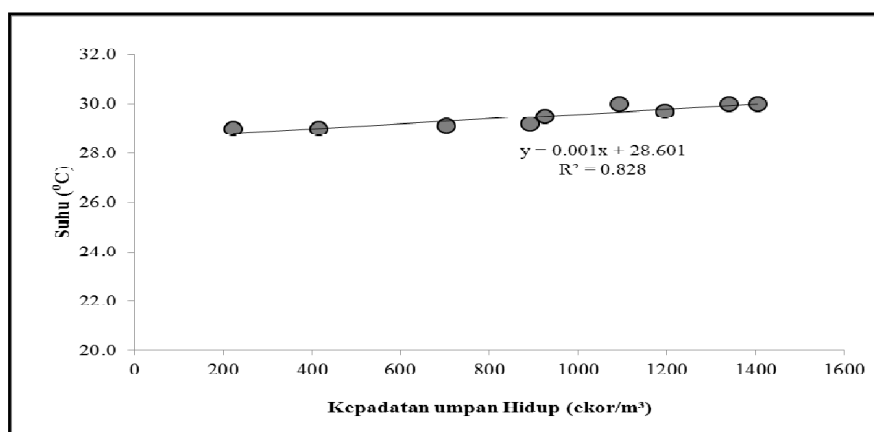
### Handling Live Bait

Used for live bait fishing skip jack fishery liftnet obtained from operating in waters around Pelita Jaya and bouke-ami of species *Stelophorus sp*, *Caesio sp*, and *Sardinella sp*. The process of removal of fish from a floating chart or bouke-ami in tobait tank made carefully. The transfer of live bait by slowly poured in to the tank. Used bait during fishing operations for the bait tank 5 to 21 bucket swith a volume of 5.1 m<sup>3</sup> of water with bait density ranged from 222.2 to 1404.6 indv/m<sup>3</sup>. Travel time to get to the fishing grounds skip jack about 45 to 180 minutes.

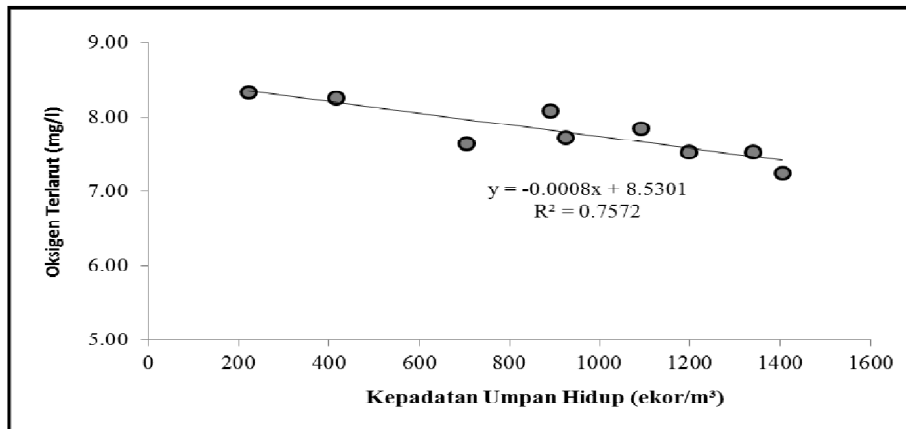
### Effect of Density live bait with Temperature and Dissolved Oxygen

Average temperature range during observation in the bait tank between 29<sup>o</sup> C to 30<sup>o</sup> C. Results of analysis of variance, calculated F value >  $\alpha$  0.05, the density difference bait fish in the tank affect the water temperature. Figure 1 shows that increasing the density of fish there is a tendency to increase the water temperature in the tank. This relationship is shown by the value of  $R^2 = 0.828$ .

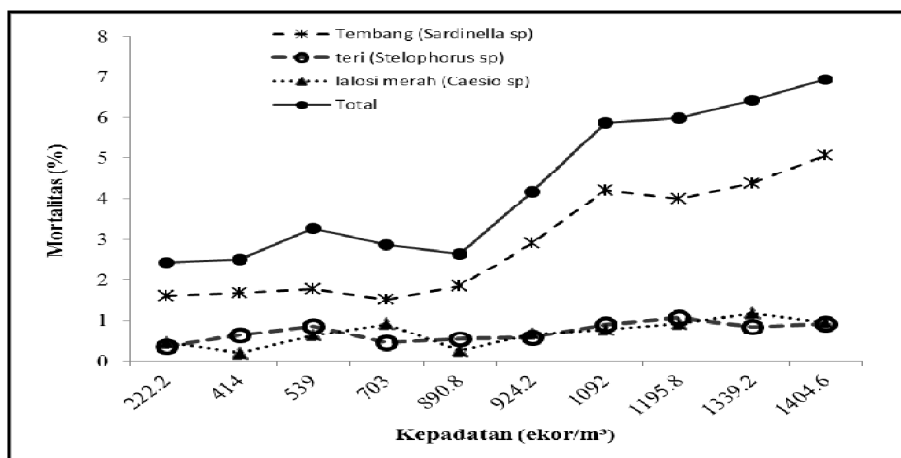
The average concentration of dissolved oxygen in the feed tank ranged from 7.25 to 8.35 mg/liter. Figure 2 shows that the more dense bait fish, dissolved oxygen decreases with  $R^2=0.757$ . This means that the more dense the fish in the tank increasing dissolved oxygen consumption resulting in reduced levels of dissolved oxygen. This influence can be demonstrated in the analysis of variance, where of F value >  $\alpha$  0.05.



**Figure1 Relation to the density of fishin the tank water temperature**



**Figure 2** Relianto the density of fish in the tank dissolved oxygen



**Figure 3** The relationship density with mortality of fish in the tank

Dissolved oxygen levels in the water depends on the biological balance of dissolved oxygen for respiration and other oxidation processes. The amount of oxygen in the water is obtained from photosynthesis and the accumulation of water on the surface of air diffusion. Oxygen consumption related to the number of organisms in the water that require oxygen for respiration activity by live bait fish in the tank.

### The Relationship Fish Density and Mortality

The relationship between the density of fish in the tank and mortality after arriving at the fishing ground is shown in Figure 3, shows that the solid feed increased the mortality rate. Among the types of bait, the highest mortality is shown on the type of bait *sardinellasp* than *Stellophorussp* and *Casio sp*. Fish densities between 222.2 to 890 fish/m<sup>3</sup>, it is seen that the mortality rate fluctuated in the range of 2.2 to 3.3,%, but the density exceeds 890 fish/m<sup>3</sup> cause mortality increased from 4.2 to 6.9% .

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Bait fish mortality during the observations between 2.4 to 6.9 %, *Stellophorus sp* mortality rate between 0.4 to 1.1%, *Sardinella sp* 1.5 to 5.1%, and *Casio sp* between 0.2 to 1.2 %. Tampubolon (1980) that the content of dissolved oxygen in a good live bait tanks ranging from 5 to 10 mg/m<sup>3</sup> and temperature of 20°C to 30°C. Analysis of variance density of live bait fish in the tank for the fish mortality *Sardinella sp*, *Stellophorus sp*, *Casio sp*, and total mortality showed that the density of fish in the tank affect the mortality rate in each type of fish where the value of F value > α 0.05 (Tables 1, 2, 3, and 4).

**Table 1 Analysis of variance density of live bait in a tank of mortality *Sardinella sp***

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
<b>Regression</b>	1	1160676	1160676	34.51325	0.000372
<b>Residual</b>	8	269038.9	33629.87		
<b>Total</b>	9	1429715			

**Table 2 Analysis of variance density of live bait in a tank of mortality *Stellophorus sp***

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
<b>Regression</b>	1	697491.4	697491.4	7.620528	0.024655
<b>Residual</b>	8	732223.7	91527.96		
<b>Total</b>	9	1429715			

**Table 3 Analysis of variance density of live bait in a fish tank of mortality *Caesio sp***

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
<b>Regression</b>	1	725009	725009	8.230484	0.020865
<b>Residual</b>	8	704706.1	88088.26		
<b>Total</b>	9	1429715			

**Table 4 Analysis of variance density of live bait in a fish tank of total mortality**

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
<b>Regression</b>	1	1174946	1174946	36.89452	0.000298
<b>Residual</b>	8	254768.7	31846.09		
<b>Total</b>	9	1429715			

Fishing mortality rate in bait tank is visible from the detached scales or injured while charging in the live bait tank. The more dense the fish in the tank resulting in friction occurs between the fish so that the scales part. Probably not influence dissolved oxygen and temperature on mortality due to good water circulation and the effect on survival of bait fish in the tank.

Increased density in handling live bait with pole and line vessels in the Seram Sea waters shows the percentage mortality rate is still low at under the 10%. The third variable percentage of density, temperature, and dissolved oxygen on mortality is well within the tolerance of the water quality of fish bait. This condition is influenced by good handling bait fish, water circulation, capacities of fish to the tank size, and the length of time the fish in the tank as shown in Figure 4, the longer the fish are in the tank showed higher mortality rates.

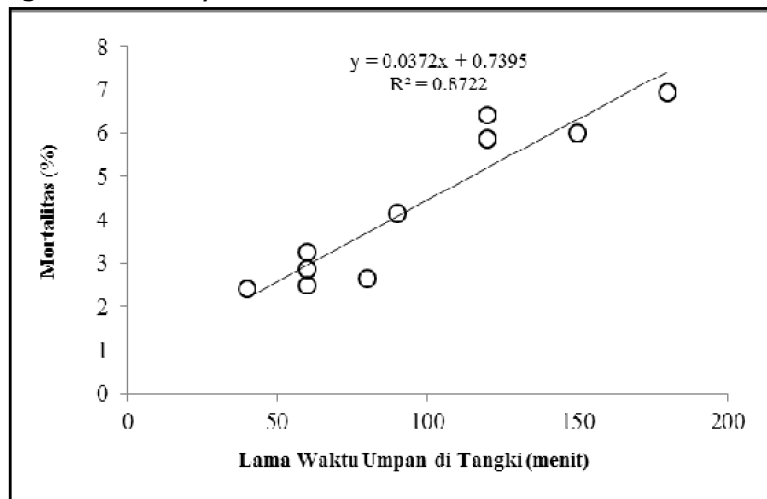


Figure 4 The relationship between mortality and the length of time the bait in the bait tank

The increased density of fish caused dissolved oxygen consumption also increased. Effect of low temperature on fish causes the ability to take oxygen (*hypoxia*) is low, the higher the water temperature is high dissolved oxygen up take ability. Increased temperatures lead to increased metabolic rate and respiration of aquatic organisms, followed by an increase in oxygen consumption due to the density and activity of fish kept moving around the tank. Unisa R, (2000) the increased water temperature of 10°C led to increased consumption of oxygen organisms 2-3 times. The optimal temperature range for tropical fish about 25 to 32°C. Herlina and Rahmansyah, (2010) that the minimum amount of dissolved oxygen needs of each different type of fish, fish need oxygen more agile than a quiet fish, but at least the water form a intenance of dissolved oxygen, the fish should be 5 mg/liter.

### **CONCLUSION AND SUGGESTION**

1. Live bait tank density in pole and line vessels affect the temperature and dissolved oxygen. The more dense bait fish in the tank will increase water temperature and dissolved oxygen decreases.
2. Density in the live bait tank effect on mortality, increasing the density of bait fish mortality increased.
3. The mortality rate is higher than *Sardinella sp*, *Stelophorus sp* and *Caesio sp*. Mortality rates are three types of bait fish below 10 % during the treatment to wards the arrest fishing ground.

To suppress the mortality rate below 5 % should live bait tank density is around 890 indv/m<sup>3</sup>. It is recommended to separate the live bait before input in to the tank.

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