ISBN: 4-925135-08-2

TUF - JSPS International Project
Volume 8 March 2000

Proceedings of
The 3rd JSPS International Seminar on
Fisheries Science in Tropical Area
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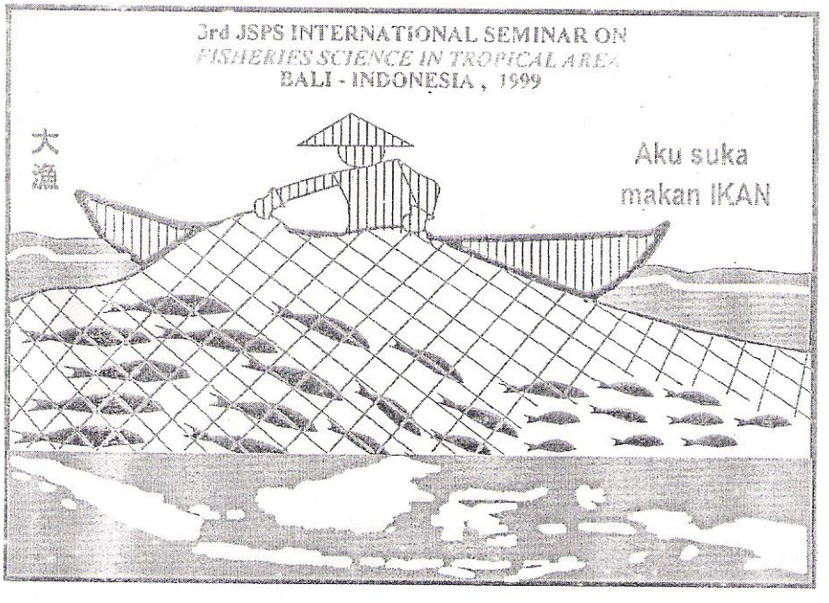
Edited by T.Arimoto and J.Haluan



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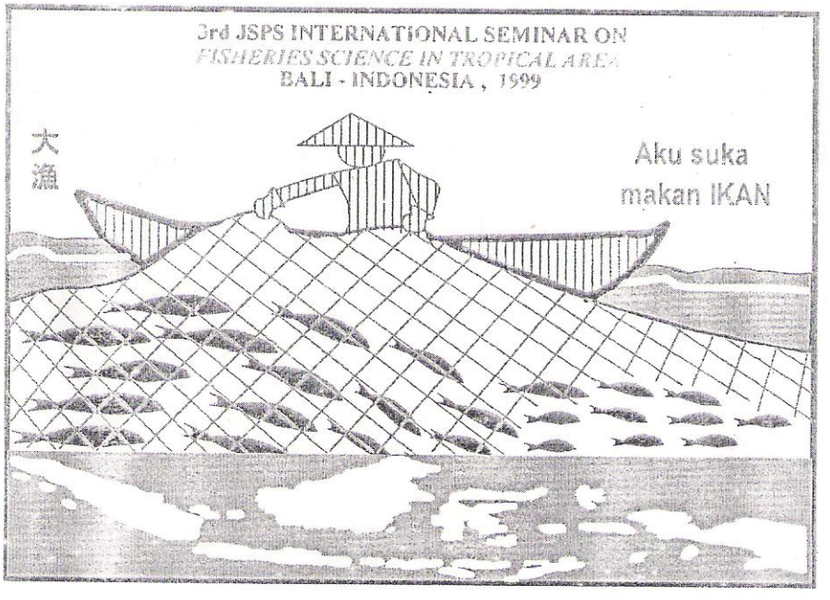

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EFFECT OF THE DIFFERENT FISHING TECHNIQUE OF TRAMMELNET AND LUNARDAY ON CATCH

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Trammelnet is the most appropriate gear in Indonesian shrimp fisheries after trawling banned era. However, productivity of trammelnet is still small compared with of trawl. To increas productivity, it is important to seek the suitable fishing time and techniques by doing experimental fishing in a lunardate cicle involved two fishing techniques, i.e. passive and active operation.

Experimental fishings were conducted using two trammelnet units consisting of ten pieces net of the same design and construction. One unit was operated in passive technique, whereas the other was done actively, during the night for one month. There are 28 trips done succesfully. To show the effects of different techniques, of lunardate, and of piece position, the related catch data were analyzed separately and the results are presented in the forms of table or graphic.

The catches weight obtained from active technique were higher than passive technique. There is a tendency that nearer the piece to the boat, the higher the catch in active technique, which was not in passive technique, where the catches seemed constant in ammount by piece position. These revealed that the increasing swept area of piece toward boat signicantly affect- ting the catches ammounts. Light intensity in the third quarter apparantly was the most suitable condition for trammelnet operation.

Introduction

Trawl fisheries had caused social conflicts between trawl fishermen and traditional fishermen, and also decreasing of shrimp population in the sea. Therefore, trawl operation prohibited in Indonesian waters through Presidential Decree No 39/1980, except in the eastern Indonesian waters. As a result, shrimp production and export became decrease abruptly in the successive years[3)].

The most appropriate gear in catching shrimp after trawling banned era is trammelnet. Trammelnet is triple-walled net and consists of one innernet and two outernets[1)]. Innernet is inserted between outernets. The outer-nets are hanged tighter and have wider mesh size than of innernet, that is hanged rather loose and has narrow mesh size. Consequently, when a fish swims through the wide outernet it encounters and pushes against the loose innernet so that a pocket is formed around the fish body in which it becomes entrapped.

At present, productivity of trammelnet is still relatively very small compared with productivity of trawl. Many attempts have been introducing in order to increase productivity. These were improvement fishing operation, seeking the suit fishing time and proper fishing ground, improvement fishing gear design and construction, etc. This study was focused to deal with effects of two important factors, i.e., fishing technique and lunar period on catch

The objectives of this research are: (1) To know the effect of difference between active and passive technique of trammelnet on catch composition, (2) To study the effect of the lunarday on catch composition and (3) To compare the number of catch weight among pieces.

Methods

This research needs equipment as follows: (1) two trammelnets, each unit is used for active and passive techniques, had the same construction, consists of 10 pie-ces, (2) one unit fishing boat, that made of wood material, with long over all (LOA) of 9.50-m., (3) scales to measure catch weight, (4) compass, (5) stopwatch to count duration of towing, and (6) boxes to keep the catches.

This research was conducted in Kapetakan waters, Cirebon, West Java, Indonesia, with water depth of 5-60 meters. But the stations of setting range from 5 meters to 10 meters, which were determined by simple random sampling procedure. Catch data collection was conducted by direct observation during the experimental fishing of trammelnet at the night (18.00-06.00) during 28 lunardays. Experimental fishing was conducted with active and passive technique. During the setting, boat moved from one end side of trammelnet where the float with flag was installed (tenth piece) until the other end side, where the boat drew the net (first piece), in order to webbing can stretch as well (Figure 1). In active technique, trammelnet was dragged to sweep fishing ground in half circle form, whereas in passive, trammelnet was operated in straight line form without sweeping (Figure 2).

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KEYWORDS : catch composition, fishing technique, lunarday and trammelnet

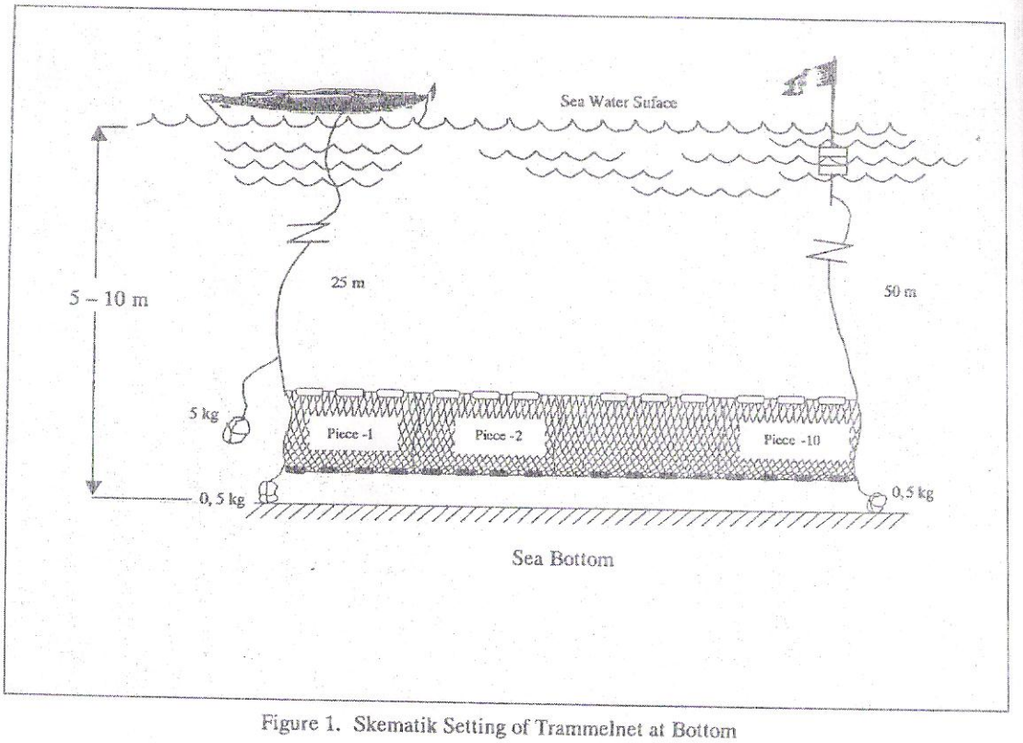

Figure 1. Skematik Setting of Trammelnet at Bottom

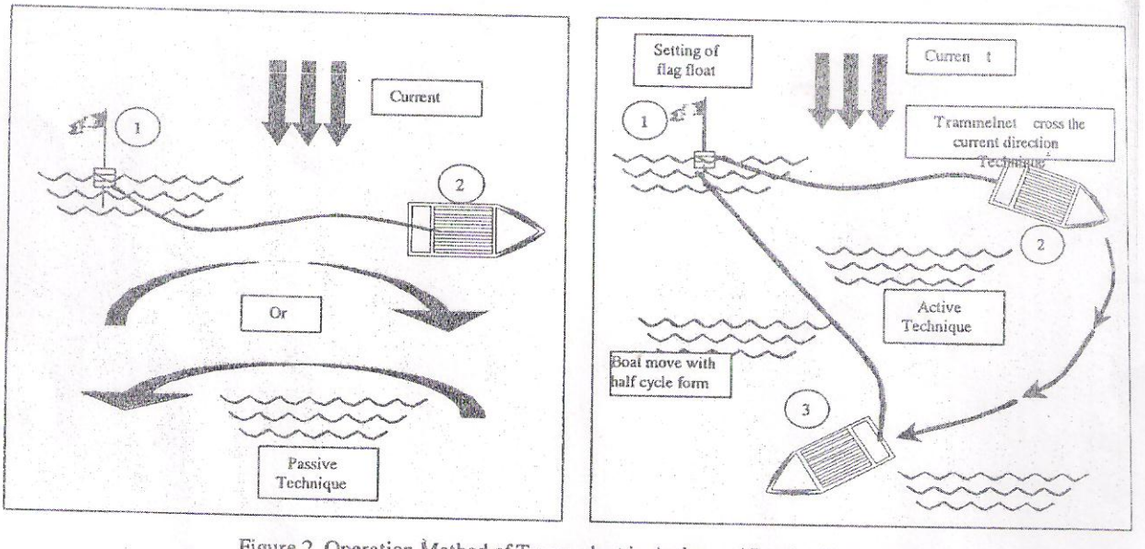

Figure 2. Operation Method of Trammelnet in Active and Passive Technique

Hauling was begun in opposite to setting position, i.e., from the first piece to the tenth piece.

Both of active and passive operations used the same boat with two units of trammelnet. One of net was set for the first operation with passive technique

The other net used for active technique after find the proper fishing ground without disturbance to passive technique. There were four haulings every trip, with consist of two haulings for each technique. However, the catches of the same technique were combined later

The catch data were analyzed by comparative study between active and passive technique. The catchablity performance of these techniques by species composition, by piece position, and lunarday were shown and presented in table and graphic forms. The lunarday period consists of dark moon (first quarter), first transition (second quarter), full moon (third quarter), and second transition (fourth quarter).

Results and Discussion

Catch Composition

There were 13 species that caught during research as presented in Table 1. The major catches of shrimp in active fishing technique were *Penaeus merguiensis* and *Penaeus monodon*, whereas demersal fish were dominated by *Osteogeneiosus militaris* and *Leognathus spp.*

The major catch shrimp in passive technique was *Penaeus merguiensis*, whereas demersal fish were dominated by *Osteogeneiosus militaris, Leognathus spp., Stolephorus commersonii,* and *Otolithes argenteus*. Thus, *Penaeus merguiensis* and *Osteogeneiosus militaris* were more abundant compared with others in the research location

The shrimp species that caught in this research were *Penaeus merguiensis, Penaeus monodon*, and *Oratosquilla sp*. The dominant shrimp catch was *P.merguiensis,* both for active and passive techniques, with percentage of 60.87 % for active technique and 52.47 % for passive tech-nique. The percentage of *P. monodon* and *Oratosquilla sp*. were 28.14 % and 11.00 % for active technique, and 25.52 % and 22.01 % for passive technique. It maybe caused by *P. merguiensis* (banana shrimp) was more pleasant and adaptable in these waters compared with the others. The bottom of waters where conducted consists of mud caused by the river flow into the location. The rivers flows maybe contain a lot of nutrients for their food source, and then they would stay in this estuary area. However, it is important to conduct the advanced research in the future for finding the composition of material in the mud. As additional information, Sumiono *et al.* (1987) said, that *P. merguiensis* was more pleasant to stay in the soft mud, but *Penaeus monodon* was more pleasant to stay in bottom with mud relatively hard.

Table 1. Species Composition in weight (gram) obtained from two Fishing Techniques

No.	Local Name	Scientific Name	Fishing Technique		Total
			Active	Passive	
1.	Udang Jerbung	*Penaeus merguiensis*	7375.62	3236.79	10612.41
2.	Udang windu	*Penaeus monodon*	3409.71	1574.46	4984.17
3.	Udang Jerbung	*Oratosquilla sp.*	1332.65	1357.47	2690.12
4.	Rajungan	*Portunus sanguinolentus*	1259.25	1277.04	2536.29
5.	Kepiting	*Scylla serrata*	1738.68	1146.13	2884.81
6.	Gilingan	*Otolithes ruber*	1691.8	1419.74	3111.54
7.	Tetet	*Otolithes argenteus*	1092.27	1747.44	2839.71
8.	Pepetek	*Leiognathus spp.*	2388.16	1908.61	4296.77
9.	Bilis	*Stolephorus commersonii*	1983.83	1826.7	3810.53
10.	Ilat-ilat	*Cynoglossus sp.*	1369.4	1368.84	2738.24
11.	Keting	*Osteogeneiosus militaris*	2608.18	2713.13	5321.31
12.	Sembilang	*Plotusus canius*	1727.14	1339.62	3066.76
13.	Blakutak	*Sepia sp.*	1601.28	1528.54	3129.82
	Average		2275.23	1726.5	4001.73
	St. dev.		1659.14	606.02	2179.83

Effect of Lunarday

The number of shrimp and demersal fish catched by different techniques and lunardays presented in Table 2. The number of catch in passive technique relatively small compared with catch in active technique, both for shrimp and demersal fish. Shrimp catches were 6168.72 grams for passive technique, but while active fishing technique was used, the catch increases become 12117.98 grams (96.44 %). In the same case, demersal fish were 16275.79 grams for passive technique and increase becomes 17459.99 grams (7.28 %) while active technique was used. It means that,

application of active technique more productive than passive technique.

There were sweeping area and noise occurred from sinker as long as towing in active technique. The noise maybe startled the shrimp and demersal fish, and they came out from their hiding. On the other hand, there was sweeping area in passive technique, so catch just limited fish and shrimp swimming toward net. There-fore, act technique would have more probability to catch the shri and demersal fish than passive technique.

Table 2. Daily Total Catchs (In Grams) And Quarterly Average And Standard Deviation Values Of Demersal Fish And Shrimp Obtained By Passive And Active Technique.

Lunarday Period	Trip	Demersal Fish (Grams)		Shrimp (Grams)	
		Active	Passive	Active	Passive
1 First quarter	1	332.86	515.22	161.13	99.66
	2	278.50	621.89	181.00	100.38
	3	425.49	424.54	223.56	106.36
	4	268.75	574.04	273.89	160.10
	5	396.25	441.31	241.25	209.89
	6	557.74	358.85	192.55	65.42
	7	483.75	318.75	420.00	163.75
	Average	**391.91**	**464.94**	**241.91**	**129.37**
	Std. Dev.	**106.93**	**110.97**	**87.32**	**49.92**
2 Second quarter	8	426.75	471.67	314.75	172.92
	9	547.86	548.29	400.64	190.11
	10	548.97	1069.91	245.44	262.65
	11	723.83	448.88	292.65	254.35
	12	603.75	733.45	497.50	211.02
	13	880.35	397.24	444.92	224.99
	14	1224.62	812.36	392.17	293.62
	Average	**708.02**	**640.26**	**369.72**	**233.11**
	Std. Dev.	**270.11**	**243.40**	**89.30**	**45.88**
3 Third quarter	15	1643.01	1795.36	1049.66	539.48
	16	1080.71	984.75	1074.14	514.59
	17	1115.87	652.13	1054.21	355.20
	18	455.00	432.92	900.00	275.48
	19	719.22	484.40	740.08	224.10
	20	556.32	412.44	699.75	264.08
	21	620.93	283.67	489.55	177.73
	Average	**884.44**	**720.81**	**858.20**	**335.81**
	Std. Dev.	**419.59**	**525.04**	**223.02**	**141.46**
4 Fourth quarter	22	701.05	854.33	413.34	250.92
	23	642.09	514.73	311.67	201.18
	24	663.86	598.04	243.48	317.11
	25	625.00	573.83	281.25	136.50
	26	451.95	247.61	252.24	178.31
	27	236.72	280.18	175.91	115.87
	28	248.75	425.00	151.25	102.95
	Average	**509.92**	**499.10**	**261.31**	**186.12**
	Std. Dev.	**198.81**	**207.55**	**87.42**	**77.42**

In general, the number of demersal fish and shrimp increased from the first quarter (dark moon) to the second quarter (first transition) and continued to reach the catch peak in the third quarter (full moon), but declined again in fourth quarter (second transition), both for active and passive techniques (Figure 3). It means that, fishing operation with trammelnet in the third quarter were more productive than the first quarter at research location. The condition also indicates that light intensity of moon can attract attention of demersal fish and shrimp when the third quarter. But, during

very trip. Accumulation of moon intensity after 23.00 o'clock was more than before 23.00 o'clock. As a result, he moon intensity after 23.00 o'clock more intensive to ttract demersal fish and shrimp, and caused the more ggressive and responsive moving in the waters. Therefore, lemersal fish and shrimp after 23.00 o'clock became more bundant compared with before 23.00 o'clock in same ishing ground.

Effect of Piece Position

According to the piece position, there was the lifference of catch between active and passive techniques. The number of catch for active technique tends decreased rom the first piece to the tenth piece, whereas for passive echnique relatively constant (Figure 4). The pieces nearer o fishing boat swept more area than the pieces farther from ishing boat. Therefore, the near piece with boat such as the irst piece until the fifth piece got more catch compared vith the other pieces such as the sixth piece until the tenth iece.

Acknowledgments

The authors thank Ahmad for his assistance in the field survey. We are also grateful to fishermen of trammelnet at Kapetakan and Bungko villages, Cirebon waters for per-mission to use their fishing boat and trammelnets during field survey.

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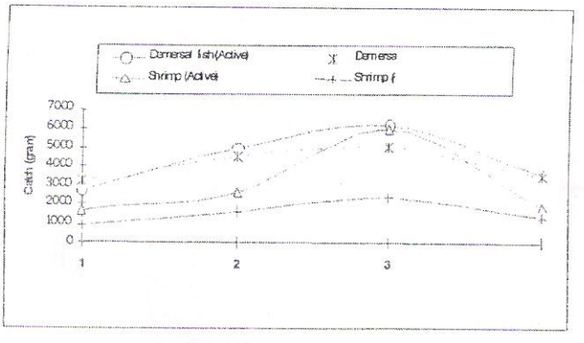

Fig. 3. Number of demersal fish and shrimp obtained within luanrday period.

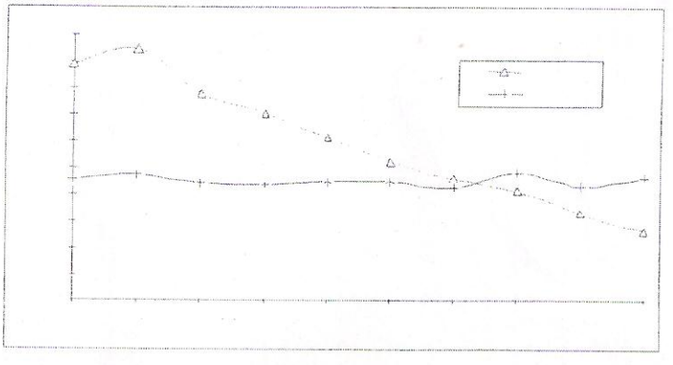

Fig. 4. The number of catcth by active (-Δ-) and passive (-+-) technique