THE EFFECT OF DIFFERENT BAITS ON HAIRTAIL (*Trichiurus* sp.) CATCH OF VERTICAL HANDLINE IN PELABUHANRATU WATERS

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Vertical handline with three hooks using three different baits, the hairtail (*Trichiurus* sp.), ponyfish (*Leiognathus* sp.) and frigate tuna (*Auxis thazard*) fish meat; assumed to be giving different total amount and weight on hairtail (*Trichiurus* sp.) catch. Fishing experiment was done on July and August 1997 in Pelabuhanratu, southern part of West Java Province, Indian Ocean coastal area waters. The unique technique of this fishing method is the bait of the hairtail meat employed by the fisherman. Statistical test give the results as : -using hairtail (*Trichiurus* sp.) bait gives better total amount and weight of catch than ponyfish (*Leiognathus* sp.) bait; -using hairtail (*Trichiurus* sp.) bait gives better total amount and weight of catch than frigate tuna (*Auxis thazard*) bait; -using ponyfish (*Leiognathus* sp.) bait gives no significant difference on total amount and weight of catch to frigate tuna (*Auxis thazard*) bait.

Introduction

Handline is one of the fishing gear which operated by the fisherman, especially in the traditional fisheries. Its characteristics are having simple construction and low investment, and sometimes this fishing gear can be operated in several area where the others fishing gear couldn't be operated. In Pelabuhanratu waters, the hairtail (*Trichiurus* sp.) fish is one of the species which can be fished by the handline. The unique technique of this fishing method is the bait of the hairtail meat employed by the fisherman. Nowadays there are quite much demand from abroad to buy the hair tail, so the fish become one of the economically important fish.

This research is done to know the effect of different baits on the yields of hair tail fishing using the handline in Pelabuhanratu waters.

General conditions

Pelabuhanratu Bay is administered under the municipality of Sukabumi, located in the southern part of West Java, 106°22'-106°33' East and 6°57'-7°07' South. The topography of Pelabuhanratu Bay extending off 300m from the shoreline shows shallow water having depth less than 200m. Beyond that it is predicated to be not less than 600m depth [Pariwono *et.al.*[3]]. The area is influenced by a monsoon climate and characterized by two weather patterns, namely; West Monsoon and East Monsoon, plus a transitional period called "*liwung*". East Monsoon is recognized as the peak season for fishing operation [Dharmayanti, [1]].

Tidal pattern on that area appears to be dominated by semi-diurnal type. Temperature distribution pattern reveals low temperature in September and it increases during November-December.

A fishing unit comprises motorboat, fishing gear and fishermen. The boat size is length x breadth x depth = 3 x 0.6 x 0.75 m3, using longshape gasoline engine (5-8 HP), with shaft 2.5 m length (Fig. 1).

Methods

Research was being conducted from July 23 until August 5, 1997, in Pelabuhanratu, Sukabumi, West Java.

Material and Sampling Methods

Materials and equipments used were motorboat, 6 handline units, ruler, scaler, compass, map, hairtail (*Trichiurus* sp.) bait, ponyfish (*Leiognathus* sp.) bait, and frigate tuna (*Auxis thazard*) bait. The gear and baits used are arranged as seen in Figure 1. Each handline has two hooks. The bait size is 8 – 10 cm length, 1.5 cm width and 0.5 – 1.0 cm thickness; its shape can be seen in Fig. 2. One kilogram of each bait is brought along one trip of the fishing operation.

The fishing operation is done after sunset from 18.00 through the night to 09.00 in the next morning. The hooks are set in 30 – 50 m water depth. Three fishermen manage two units handline simultanously on the left and right side of the motorboat. Two kerosene lamps are used as light source during this night-fishing. The fishing ground is along Pelabuhanratu bay about 5 miles from the fishing base and the sea is between 30 – 60 m depth.

Research done, was an experimental fishing that utilize handline with three kinds of baits. Primary data was collected directly on site.

Data Analysis

Data that collected was analyzed by using statistical analysis. Lilliefors test was used to know if collected data were spreading normal or not [Nasution and Barizi,[2]]. Lilliefors arranged model was based on :

$L = Ma \mid F(Z1) - S(Z1) \mid, \mid F(Z2) - (Z2) \mid, ..., \mid F(Zn) - S(Zn) \mid$ or maximum absolute different was $F(Zi) - S(Zi)$; $i = 1, 2, 3, ...,$

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n.

F (Zi) = standard normal of spread function

S (Zi) = standard empiric of spread function

Rule of decision was :

if : $L_{count} \leq L\,\alpha\,(n)$, Ho accepted, or

$L_{count} > L\,\alpha\,(n)$, Ho rejected and accepted H1

Hypothesis was :

Ho = data was spreading normal

H1 = data wasn't spreading normal

L_{table} or $L\alpha(n)$ value was seen in the table of Lilliefors and it was standard test for this rule. After that, all data was analyzed by Wilcoxon test. The purpose of Wilcoxon test was to know the different influence of baits that was used on catch of hairtail.

Rule of decision was :

if : $T_{count} \geq T\alpha$, Ho accepted , or

$T_{count} < T\alpha$, Ho rejected or accepted H1

Hypothesis was :

Ho = the kinds of bait used didn't give influence on catch of hairtail

H1 = the kinds of bait used gave influence on catch of hairtail

Result and Discussion

Twelve settings were done, resulting in 263 fish weighting 47.7 kg, and all of catch is hairtail, appropriate with the purpose of this research. The proportional of catch every trip from trip I until trip XII was 13.51%, 8.05%, 4.54%, 11.39%, 7.33%, 9.41%, 8.16%, 10.19%, 12.61%, 4.74%, 7.29% and 2.79% of all total catch. While the proportional of catch by using hairtail bait was 65.46% or 31.2 kg, ponyfish bait was 18.33% or 8.8 kg and frigate tuna bait was 16.21% or 7.7 kg from total of catch. Hairtail bait was the highest proportion among all (Fig. 3 and Apendix 1).

Lilliefors test result on total number of catch for the fishing experiment with 12 times of setting rejected hypothesis Ho, its means data wasn't spreading normal. L_{table} for 12 times setting was 0.242 for standard evidence 0.05. While L count maximum that obtained from the calculation for each treatment was bigger than 0.242. L_{count} value on total number of hairtail caught that using hairtail bait was 0.261, while L_{count} value on total number of hairtail caught that using ponyfish bait was 0.257 and L_{count} value on total number of hairtail caught that using frigate tuna was 0.245, so the conclusion was that total number of hairtail caught didn't spreading normal.

Lilliefors test result on total weight of catch for the experiment with 12 times of setting rejected hypothesis Ho, its means data wasn't spreading normal. L_{table} for 12 times setting was 0.242 for standard evidence 0.05. While, L_{count} maximum that obtained from calculation for the treatment was bigger than 0.242. L_{count} value on total weight of hairtail catch that using hairtail bait was 0.246, while L_{count} value on total weight of hairtail catch that using ponyfish bait was 0.250 and L_{count} value on total weight of hair tail catch that using frigate tuna bait was 0.246, and we can make conclusion that total weight of hair tail caught wasn't spreading normal.

So then,Wilcoxon test was done to know the influence of the different kinds of bait used on handlining the hairtail fish.

Wilcoxon test on total number of hairtail catch using hairtail bait versus ponyfish bait obtained T_{count} as 1.5 and the test between total number of hairtail catch using hairtail bait versus frigate tuna bait obtained T_{count} as 0.0, while test between total number of hairtail catch with using ponyfish bait versus frigate tuna bait obtained T_{count} as 32.5. T_{table} or $T\alpha$ value for 12 times setting was 14 for standard evidence 0.05. Test on total number of hairtail catch with using hairtail bait versus ponyfish bait, and also test between using hairtail bait versus frigate tuna bait rejected Ho and accepted H1, it means there was influence of the different baits on hairtail catch, while test on total number of hairtail catch with using ponyfish bait versus frigate tuna bait accepted Ho, it means there was no influence of different baits on total number of hairtail catch.

Wilcoxon test on total weight of hairtail catch using hairtail bait versus ponyfish bait obtained T_{count} as 1, and test between total weight of hairtail catch using hairtail bait versus frigate tuna bait obtained T_{count} as 0, while test between total weight of hairtail catch with ponyfish bait versus frigate tuna bait obtained T_{count} as 28. The T_{table} value for 12 times setting was 14 for standard evidence 0.05. Test on total weight of hairtail catch using hairtail bait versus ponyfish bait, and also test on total weight of hairtail catch using hairtail bait versus frigate tuna bait rejected Ho and accepted H1, it means there was influence of the different baits on hairtail catch, while test on total weight of hairtail catch with using ponyfish bait versus frigate tuna bait accepted Ho, it means there was no influence of the different baits on total weight of hairtail catch.

The results indicated that only ponyfish and frigate tuna bait give no difference on hairtail catch. Quantitatively and statistically the hairtail bait is the best for catching hairtail fish in Pelabuhanratu waters, and fortunately the fishermen in Pelabuhanratu had already using hairtail bait due to their long experience catching hairtail by handlining. It was supposed that because hairtail flesh had a good and strong texture than ponyfish flesh in the sea water; and gave bright color than frigate tuna flesh in the waters.

Conclucion

The statistics analysis done through Wilcoxon test concluded that using hairtail (*Trichiurus* sp.) bait gives better total amount and weight of catch than ponyfish (*Leiognathus* sp.) bait. Using hairtail (*Trichiurus* sp.) bait gives better total amount and weight of catch than frigate tuna (*Auxis thazard*) bait. Using ponyfish (*Leiognathus* sp.) bait gives no significant difference on total amount and weight of catch to frigate tuna (*Auxis thazard*) bait.

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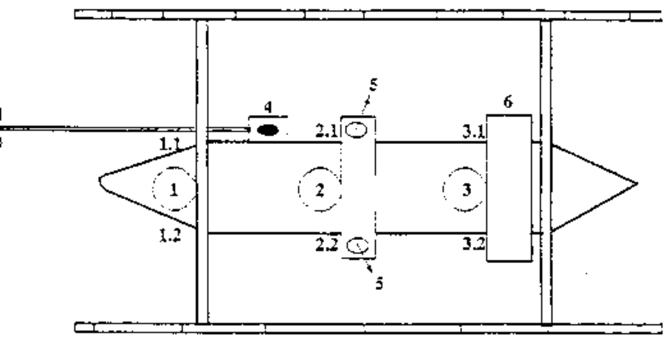

Fig. 1 Motorboat, Fishermen and Handline Arrangement
1: First fisherman at the aft; 1.1: Handline with *Trichiurus* sp. bait; 1.2: Handline with *Auxis thazard* bait; 2: Second fisherman at the middle: 2.1: Handline with *Auxis thazard* bait; 2.2: Handline with *Leiognathus* sp. bait; 3: Third fisherman; 3.1: Handline with *Leiognathus* sp. bait: 3.2: Handline with *Trichiurus* sp. bait; 4: Longshaft engine (5-8HP); 5: Kerosene lamp; 6: Styroform box for fish catch

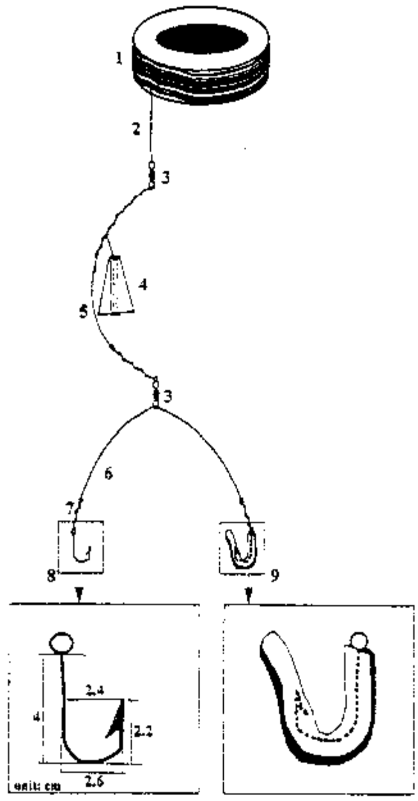

Fig. 2 Hairtail Handline with Bait Attached.
1: Wooden roller (diameter:20cm); 2: Nylon monofilament (No.1000), 300-500m length; 3: Swivel; 4: Lead sinker (200gr); 5: Branch line (1.5m) with 0.5m stainless steel wire at both end; 6: Nylon snood (1.25m); 7: Stainless steel wire (0.2m) attaching the hook; 8: Hook without bait; 9: Hook with bait attached.

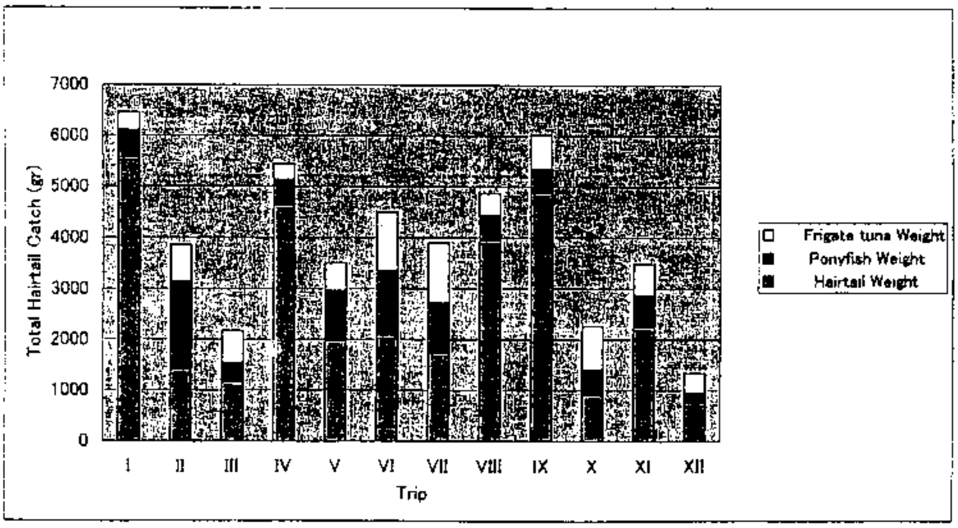

Figure 3. Proportional Hairtail Catch Using 3 Different Baits From I – XII Trip

Apendix 1. Catch of Hairtail by Different Baits

Trip I

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	55.7	145	1.	62.5	200	1.	56.2	170
2.	68.3	265	2.	55.7	165	2.	57.5	175
3.	52.2	110	3.	56.4	175			
4.	64.5	250						
5.	54.4	125						
6.	62.4	245						
7.	50.2	105						
8.	53.6	135						
9.	55.5	160						
10.	67.2	265						
11.	58.9	175						
12.	54.5	140						
13.	62.3	240						
14.	65.5	250						
15.	55.4	165						
16.	72	300						
17.	42.4	50						
18.	56.4	180						
19.	67.4	255						
20.	52.3	115						
21.	53.4	130						
22.	63.2	230						
23.	67.1	260						
24.	47.8	80						
25.	54.5	150						
26.	67.8	265						
27.	54.8	155						
28.	55.1	160						
29.	49.5	95						
30.	52.5	125						
31.	63.4	240						

Trip II

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	63	235	1.	62	200	1.	55	155
2.	56	175	2.	55	150	2.	53	125
3.	68	260	3.	59	190	3.	54	150
4.	54	135	4.	58	185	4.	55	150
5.	61	210	5.	63	240	5.	53	125
6.	61	210	6.	62	225			
7.	57	180	7.	67	250			
			8.	53	125			
			9.	57	170			

Trip III

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	47	65	1.	63	205	1.	57	155
2.	59	170	2.	59	175	2.	62	200
3.	55	140				3.	55	160
4.	75	320				4.	52	120
5.	61	185						
6.	68	270						

Trip IV

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	57	180	1.	61	185	1.	48	80
2.	53	125	2.	61	195	2.	52	120
3.	63	215	3.	53	120	3.	50	100
4.	66	250						
5.	54	135						
6.	57	165						
7.	62	220						
8.	62	205						
9.	56	170						
10.	61	190						
11.	53	125						
12.	63	240						
13.	74	310						
14.	55	140						
15.	66	235						
16.	54	135						
17.	54	125						
18.	56	145						
19.	61	190						
20.	67	245						
21.	53	120						
22.	56	145						
23.	68	260						
24.	67	250						
25.	52	115						

Trip V

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	56	140	1.	64	220	1.	62	195
2.	53	125	2.	65	225	2.	51	105
3.	62	200	3.	58	160	3.	65	235
4.	54	130	4.	69	270			
5.	68	255	5.	53	120			
6.	64	220						
7.	67	245						
8.	62	185						
9.	58	165						
10.	50	105						
11.	62	200						

Trip VI

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	58	165	1.	72	290	1.	53	145
2.	74	320	2.	63	210	2.	50	120
3.	50	100	3.	59	165	3.	47	105
4.	70	280	4.	46	60	4.	64	215
5.	54	125	5.	69	270	5.	55	155
6.	62	200	6.	52	135	6.	59	175
7.	59	170	7.	53	150	7.	52	130
8.	56	150				8.	47	90
9.	80	370						
10.	48	85						
11.	51	110						

Trip VII

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	57	155	1.	55	140	1.	54	135
2.	46	65	2.	70	275	2.	66	240
3.	51	105	3.	57	160	3.	58	170
4.	62	200	4.	56	150	4.	69	265
5.	49	90	5.	69	270	5.	53	125
6.	61	195				6.	65	235
7.	57	155						
8.	67	240						
9.	74	315						
10.	63	210						

Trip VIII

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	76	325	1.	63	215	1.	67	250
2.	67	250	2.	54	135	2.	60	180
3.	66	235	3.	55	140			
4.	72	300						
5.	53	120						
6.	63	210						
7.	54	125						
8.	47	70						
9.	63	220						
10.	58	165						
11.	56	145						
12.	62	190						
13.	58	160						
14.	72	290						
15.	53	130						
16.	55	140						
17.	51	110						
18.	62	205						
19.	55	140						
20.	49	85						
21.	62	195						
22.	54	135						

Trip IX

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	55	145	1.	62	195	1.	82	380
2.	59	180	2.	53	120	2.	71	290
3.	54	135	3.	58	155			
4.	57	150						
5.	53	125						
6.	61	195						
7.	63	205						
8.	75	320						
9.	69	270						
10.	63	215						
11.	58	155						
12.	56	140						
13.	54	135						
14.	50	90						
15.	63	205						
16.	63	210						
17.	67	255						
18.	58	165						
19.	56	150						
20.	64	215						
21.	56	150						
22.	59	175						
23.	67	245						
24.	50	105						
25.	64	215						
26.	58	170						
27.	58	160						

Trip X

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	68	265	1.	57	155	1.	66	240
2.	48	80	2.	55	140	2.	53	125
3.	63	210	3.	64	215	3.	51	100
4.	61	190				4.	58	170
5.	57	155				5.	64	220

Trip XI

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	65	225	1.	62	200	1.	71	285
2.	61	185	2.	52	115	2.	73	310
3.	62	205	3.	57	155			
4.	67	250	4.	59	170			
5.	63	205						
6.	63	250						
7.	59	175						
8.	64	220						
9.	53	120						
10.	58	175						
11.	51	110						
12.	54	125						

Trip XII

Hairtail			Ponyfish			Frigate tuna		
No.	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)	No	Length (cm)	Weight (gr)
1.	68	260	1.	64	215	1.	58	165
2.	63	210				2.	62	200
3.	49	85						
4.	62	195						