# Distribution, Abundance and Biological Studies of Economically Important Fishes in the South China Sea, Area II: Sarawak, Sabah and Brunei Darussalam Waters.

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# ABSTRACT

The studies were carried out between 9th July and 3rd August 1996 (3rd cruise) and 30th April and 30<sup>th</sup> May, 1997 (4<sup>th</sup> cruise) in the Exclusive Economic Zone of Sarawak and the western part of Sabah. The species distribution, abundance, composition and length-weight relationships of some commercially important fish were investigated and compared for both cruises. The results indicates that the overall catch rate ranged from 3.5 to 194 kg/hr and averaged at 55.9 kg/hr during the 3<sup>rd</sup> cruise. For the 4<sup>th</sup> cruise, it ranged from 10.9 to 90.5 kg/hr and averaged at 50.2 kg/hr. During the 3<sup>rd</sup> cruise, 46.9% of the catch were dominated by demersal fish followed by 41.6% trash fish, 7.8% pelagic fish and 3.1% cephalopod. Priacanthidae was the most dominant family, which made up of 14.1% of the catch followed by Nemipteridae (10.8%), Carangidae (5.0%), Lutjanidae (3.7%) and Mullidae (2.1%). The ten most dominant species found during the  $3^{rd}$  cruise were 1. Priacanthus macracanthus (13.2%), 2. Nemipterus bathybius (3.3%), 3. Abalistes stellaris (2.8%), 4. Arius spp.(2.5%), 5. N. nematophorus (2.2%), 6. Gymnocranius griseus (1.9%), 7. N. marginatus (1.7%), 8. Sepia spp. (1.7%), 9. Decapterus spp. (1.6%) and 10. Carcharhinus spp (1.3%). During the 4<sup>th</sup> cruise, the family Nemipteridae (12.7%) formed the most dominant fish family followed by Carangidae (8.7%), Mullidae (7.1%), Lutjanidae (4.9%) and Priacanthidae (2.2%). The ten most dominant species were: 1. Loligo *spp.* (5.7%), 2. Nemipterus bathybius (4.2%), 3. Abalistes stellaris (4.0%), 4. Upeneus moluccensi (3.8%), 5. Nemipterus nemurus (3.8%), 6. Gymnocranius griseus (3.2%), 7. Carangoides malabaricus (3.2%), 8. Plectorhynchus pictus (3.1%), 9. Upeneus bensasi (2.4%) and 10. Arius spp. (1.8%). The morphometric study shows that the population of fish are normally distributed.

Key words: Distribution, abundance, biological, fish, Sarawak, Sabah, Brunei Darussalam

# Introduction

In 1995, a total of 1,108,436 m.t. of marine fish was landed in Malaysia and valued at RM2.71 billion. Out of this total landings, 99,255 m.t. were landed in Sarawak and 166,462 m.t. in Sabah (Anon., 1995). Demersal fish was considered as one of the important fish resources in Sarawak and Sabah. The total landings by trawl net (which consisted mainly of demersal fish) were estimated at 61,958 m.t in Sarawak and 49,106 m.t. in Sabah. Pelagic fish production in Sarawak was very low (about 1,313 m.t. only) as compared to the landings in Sabah i.e. 28,875 m.t.

This paper compares the distribution, abundance, species composition and biological parameters of some commercially important fish species following the two surveys conducted using a research vessel, KK MANCHONG in the Exclusive Economic Zone (EEZ) of Sarawak and the western part of Sabah. The sampling stations selected were based on the acoustic stations which were surveyed by MV SEAFDEC.

#### **Materials and Methods**

Two surveys were conducted using KK MANCHONG, a research vessel of the Fisheries Research Institute (FRI), Sarawak Branch, Department of Fisheries, Malaysia on 9<sup>th</sup> July until 3<sup>rd</sup> August 1996 (3<sup>rd</sup> cruise) and 30<sup>th</sup> April until 30<sup>th</sup> May 1997 (4<sup>th</sup> cruise) respectively. The principal characteristics of KK MANCHONG are given as follows:

Type/Hull : Fibre Reinforced Plastic (FRP)				
Length	: 27.50 m			
Breadth	: 6.40 m			
Depth	: 3.00 m			
Draft	: 2.20 m			
Gross tonnage	: 150 tons			
Registered tonnage : 45 tons				
Main engine	: 900 hp Yanmar diesel engine			
Speed (trial max.): 12.48 knots				
Complement (crew and scientists): 22 persons				

The sampling gear used in these studies was a high opening otter trawl net as shown in Figure 1 with a horizontal net opening of 20.5 m and a cod-end mesh size of 38 m. A diagrammatic presentation of the net is shown in Figure 1. The net was towed at 3.5 knots for a one-hour duration at a specific station which coincides with its acoustic station (Figure 2).

During the surveys the total catch of each haul was sorted out according to commercial fish and trash fish without considering size categories. Subsequently the commercial fish species were sorted according to demersal fish, pelagic fish, cephalopods, shrimps, crabs, shells and true trash fish i.e. those which have no commercial values.

The dominant fish species from each sampling station were kept frozen and brought back to the laboratory of the FRI, Sarawak Branch for further biological examinations. The measurements on total length (L)an total body weight (W) of individual fish to the nearest millimeter and gram respectively were made in the laboratory.

The frequency distribution patterns for a number of fish species in the combined samples from entire samplings stations were examined. Length-weight relationships were determined separately for each fish species. Equation of the form  $W=aL^b$ , where *a* and *b* are constants of regression, were fitted by transforming the data into logarithms and deriving the regression line by the least square method (Sparre and Venema, 1992).

## Results

#### **Overall catch rate**

Altogether 17 stations were sampled successfully with one haul per station during the 3<sup>rd</sup> cruise. During the 4<sup>th</sup> cruise, only 12 stations were successfully trawled. Appendix 1 and 2 shows the overall catch rate of the various species caught from individual stations of the two cruises. The total catch (inclusive of both commercial and trash fish) from individual stations ranged from 3.5 kg to 194.0 kg for the 3<sup>rd</sup> cruise and 10.9 to 90.5 kg for the 4<sup>th</sup> cruise. The overall average catch rate for 3<sup>rd</sup> cruise was 55.9 kg/hr. Of this, 32.6 kg (58.3%) were commercial fish and 23.3 kg (41.7%) trash fish (Table 1). During the 4<sup>th</sup> cruise, the overall average catch rate was 50.2 kg/hr. It comprised of about 34.4 kg (68.7%) commercial fish and 15.8 kg (31.3%) trash fish (Table 2).

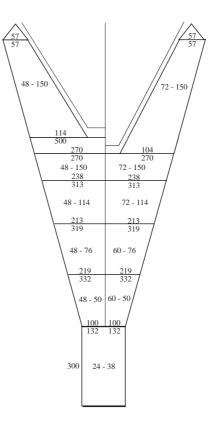


Fig. 1 Design of the high opening trawl net used by KK Manchong

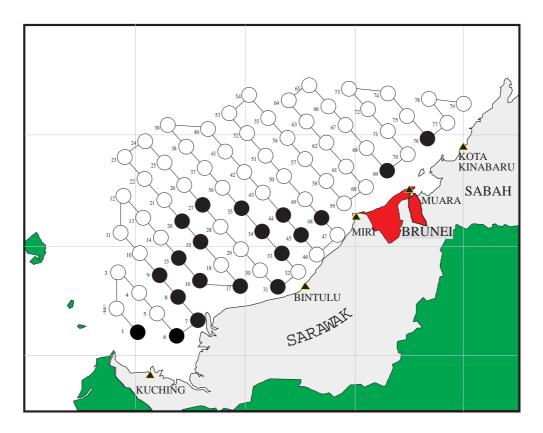


Fig. 2 Trawling stations of KK Manchong

## **Species composition**

Catch percentage by weight of each species and family caught during both cruises were shown in Table 1 and 2 respectively. During the 3<sup>rd</sup> cruise, commercial fish formed 58.5% of the total catch while the remaining 41.5% made up of trash fish. Among the commercial fish, demersal fish group was the most dominant category making up 46.9% of the total catch followed by pelagic fish, 7.8% and cephalopods, 3.1%.

During the 4<sup>th</sup> cruise, commercial fish made up of 68.7% of the total catch and the remaining 31.4% was trash fish. The most dominant commercial fish group was demersal fish (44.6%), followed by cephalopods (11.3%) and pelagic fish (10.8%). Table 3 below shows the summarized catch composition of the major fishery group from the entire sampling stations of the cruises.

Numerous species, genera and families of fish were caught during the surveys. Some of these were much more dominant than the others in terms of catch percentage by weight. During the  $3^{rd}$  cruise (Table 1), the family Priacanthidae appeared to be the most dominant fish family (14.1%), followed by Nemipteridae (10.8%), Carangidae (5.0%), Lutjanidae (3.7%), and Mullidae (2.1%). On the other hand, the family Nemipteridae (12.7%) formed the most dominant fish family during the 4<sup>th</sup> cruise (Table 2) followed by Carangidae (8.7%), Mullidae (7.1%), Lutjanidae (4.9%) and Priacanthidae (2.2%).

Ten most dominant species caught during the 3<sup>rd</sup> cruise were: 1. *Priacanthus macracanthus* (13.2%), 2. *Nemipterus bathybius* (3.3%), 3. *Abalistes stellaris* (2.8%), 4. *Arius spp.* (2.5%), 5. *Nemipterus nematophorus* (2.2%), 6. *Gymnocranius griseus* (1.9%), 7. *Nemipterus marginatus* (1.7%), 8. *Sepia spp.* (1.7%), 9. *Decapterus spp.* (1.6%) and 10. *Carcharhinus spp.* (1.3%).

During the 4<sup>th</sup> cruise, the ten most dominant species were: 1. Loligo *spp*. (5.7%), 2. *Nemipterus bathybius* (4.2%), 3. *Abalistes stellaris* (4.0%), 4. *Upeneus moluccensi* (3.8%), 5. *Nemipterus nemurus* (3.8%), 6. *Gymnocranius griseus* (3.2%), 7. *Carangoides malabaricus* (3.2%), 8. *Plectorhynchus pictus* (3.1%), 9. *Upeneus bensasi* (2.4%) and 10. *Arius spp*. (1.8%).

#### Abundance

The highest overall catch rate during the  $3^{rd}$  cruise was recorded at station 44 (193.7 kg/hr) and station 33 (160.2 kg/hr). The lowest catch rate was at station 35 (3.5 kg/hr) and station 10 (9.7 kg/hr). During the 4<sup>th</sup> cruise, the highest overall catch rate was attained at station 31 (90.46 kg/hr) and station 7 (82.0 kg/hr). Meanwhile, the lowest overall catch rate was registered at station 16 (12.5 kg/hr) and station 9 (22.4 kg/hr).

Commercial fish have an average catch rate of 32.6 kg/hr during the 3<sup>rd</sup> cruise. The highest catch rate was at station 44, (119.3 kg/hr) and station 33 (94.2 kg/hr) as shown in Figure 3. Demersal fish which was the most dominant among the fish group registered an average catch rate of 26.1 kg/hr and appeared to be most abundant at station 44 with catch rate of 106.7 kg/hr and station 33 (75.6 kg/hr). Pelagic fish which have an average catch rate of 4.4 kg/hr was more abundant at station 33 and 44 with catch rate of 16.1 kg/hr and 11.0 kg/hr respectively. Cephalopods attained an average catch rate of 1.7 kg/hr and were more abundant at station 69 with catch rate of 10.2 kg/hr.

During the 4<sup>th</sup> cruise, commercial fish registered an average catch rate of 34.4 kg/hr. The highest catch rate was at station 27, (62.9 kg/hr) and station 6, (51.0 kg/hr) as shown in Figure 4. Demersal fish attained an average catch rate of 22.4 kg/hr and the highest catch rate was at station 27 (57.5 kg/ hr). Pelagic fish have an average catch rate of 5.4 kg/hr and was most abundant at station 7 and 6 with catch rate of 16.5 kg/hr 13.9 kg/hr. Cephalopods have an average catch rate of 5.6 kg/hr and were more abundant at station 6 (16.6 kg/hr).

Trash fish have an average catch rate of 23.3 kg/hr and were more abundant at station 44 (74.4 kg/hr) and station 7 (71.0 kg/hr) during the 3<sup>rd</sup> cruise. The trash fish was dominated by *Pentaprion* 

 Table 1
 Average catch rate (kg/hr) and percentage composition from entire sampling stations (3rd Cruise )

COMMERCIAL FISH	Total	Mean	%
Selar crumenophthalmus	18.68	1.17	1.05
Atule mate	1.68	0.11	0.11
Megalaspis cordyla	0.01	0.00	0.00
Decapterus spp.	33.71	2.11	1.64
Atropus atropus	1.55	0.10	0.09
Alepes kalla	0.12	0.01	
Alectis cilliaris	0.04	0.00	0.00
Carangoides armatus	0.22		
C. hedlandensis C. malabaricus	0.21 21.11	0.05 1.32	0.01 1.16
C. talamparoides	1.23	0.08	0.06
Carangoides sp.	2.90	0.18	0.14
Selar sp.	0.43	0.03	0.02
Seriolina nigrofasciata	8.38	0.52	0.44
Uraspis uraspis	4.33	0.27	0.21
Carangidae	94.52	5.91	4.94
Pellona sp.	0.47	0.03	0.04
Amblygaster sp.	26.01	1.63	1.26
Clupeidae	26.47	1.65	1.30
Rastrelliger kanagurta	0.93	0.06	0.05
Scomber australascicus	0.17	0.01	0.01
Scombridae	1.10	0.07	0.05
Sphyraena forsteri	20.10	1.26	0.98
Sphyraena langsar	0.56	0.04	0.03
Sphyraena jello	1.08	0.07	0.05
Sphyraenidae	21.75	1.36	1.06
Chirocentrus dorab	0.91	0.06	0.04
Parastromateus niger	2.18	0.14	0.12
Dussumieria sp.	5.73	0.64	0.27
Pelagic fish	152.56	9.54	7.79
Abalistes stellaris	55.44	3.47	2.78
Argyrops spinifer	1.30	0.08	0.06
Arius spp.	32.12	2.01	2.51
Ariomma indica	16.16	1.01	0.79
Bothidae	0.35	0.02	0.02
Carcharhinus spp.	28.34 15.94	1.77	1.56
Dasyatis sp.		1.00	0.86
Drepane longimana	2.76	0.17	0.22
Epinephelus areolatus Epinephelus coioides	12.98	0.01	0.63
Epinephelus diacanthus	0.06	0.00	0.00
Epinephelus heniochus	1.23	0.00	0.00
Epinephelus sexfasciatus	2.45	0.08	0.08
Serranidae	16.81	1.05	0.12
Gymnocranius griseus	34.44	2.15	1.92
Gymnura sp.	3.03	0.19	0.15
Lactarius lactarius	0.43	0.03	0.02
Lutjanus malabaricus	21.35	1.33	1.06
Lutjanus lineolatus	11.53	0.72	0.91
Lutjanus lutjanus	3.79	0.24	0.21
Lutjanus sebae	1.37	0.27	0.05
Lutjanus vitta	18.31	1.22	0.89
Pristipomoides multidens	10.37	0.65	0.53
Pristipomoides typus	0.13	0.01	0.01
Lutjanidae	66.40	4.15	3.66
Parupeneus cinnabarinus	13.73	0.86	0.74
Upeneus bensasi	1.85	0.12	0.16
Upeneus moluccensis	23.44	1.47	1.17
Mullidae	39.03	2.44	2.07
Nemipterus bathybius	61.02	3.81	3.31
N. isacanthus	2.80	0.18	0.15
N. japonicus	9.73	1.08	0.48
N. marginatus	35.30	2.52	1.68
N. mesoprion	13.94	0.87	0.68
N. nematophorus	42.02	2.63	2.16
N. nemurus	12.10	0.76	0.65
N. oveniides	0.04	0.01	0.00
N. peronii	17.76	1.18	0.96
N. virgatus	14.83	0.93	0.72
Nemipteridae	208.48	13.03	10.80
Platax sp.	2.38	0.15	0.12
Plectorhynchus pictus	11.39	0.71	0.86
Pomadasys hasta	0.47	0.03	0.04
Psenopsis anomala	0.06	0.00	0.00
Psettodes erumei	16.21	1.01	0.81
Priacanthus macracanthus	268.24	16.76	13.19
P. tayenus	9.37	0.59	0.85
Priacanthus sp.	0.65	0.04	0.03
Priacanthidae	278.26	17.39	14.07
Rhynchobatus djeddensis	10.33	0.65	0.60
Saurida micropectoralis	17.68	1.11	0.87
Sciaenidae	13.00	0.81	0.91
		0.30	0.26
Scolopsis taeniopterus	4.82	0.30	

Demersal fish	879.51	54.97	46.96
Shells	0.70	0.05	0.06
Trichiurus lepturus	4.39	0.27	0.21
Loligo duvauceli	17.26	1.08	0.89
Loligo chinensis	7.34	0.46	0.38
Sepioteuthis lessoniana	2.54	0.16	0.17
Sepia spp.	33.65	2.10	1.67
Cephalopods	60.79	3.80	3.11
Metapenaeus ensis	0.15	0.01	0.01
Metapenaeopsis stridulans	0.39	0.02	0.02
Parapenaeopsis sp.	0.04	0.00	0.00
Solenocera subnuda	0.02	0.00	0.00
Trachypenaeus fulvus	0.45	0.03	0.02
Shrimps	1.06	0.07	0.05
Panulirus polyphagus	1.34	0.08	0.07
Thenus orientalis	2.53	0.17	0.14
Crabs	1.15	0.08	0.06
TOTAL (COMMERCIAL)	1104.02	69.00	58.45
Trash fish			
Aluterus monoceros	6.29	0.39	0.33
Anthiidae	12.12	0.76	0.59
Apogon spp. Argurops, spinifor	14.69 0.30	0.92	0.71
Argyrops spinifer Bothidae	0.30	0.02	0.01
Callionymidae	0.19	0.01	0.01
Canthigaster sp.	1.97	0.12	0.10
Carangoides equala	0.02	0.00	0.00
Coradion chrysozonus	0.06	0.00	0.01
Crabs	0.06	0.00	0.00
Dactyloptena sp.	5.28	0.33	0.26
Decapterus spp.	1.17	0.07	0.06
Diodon holocanthus	13.75	0.86	0.79
Dipterygonotus balteatus	0.02	0.00	0.00
Echeneis naucrates	1.04	0.06	0.05
Eutherapon theraps	1.19	0.07	0.11
Fistularia petimba	26.08	1.63	1.28
Heterodontus sp.	4.07	0.25	0.20
Holocentrus sp.	0.35	0.02	0.02
Inimicus sinensis	0.13	0.01	0.01
Lagocephalus spp.	12.47	0.78	0.86
Leiognathus spp.	129.98	8.12	6.63
Lepidotrigla sp.	5.01	0.31	0.25
Loligo duvauceli	3.12	0.19	0.15
Nemipterus marginatus	0.65	0.04	0.03
Nemipterus nematophorus	1.54	0.10	0.07
Octopus sp.	1.23	0.08	0.06
Paramonacanthus spp.	0.66	0.04	0.04
Parascolpsis eriomma	1.82	0.11	0.09
Parupeneus cinnabarinus	0.32	0.02	0.02
Pentaprion longimanus	146.45	9.15	7.13
Platycephalus spp.	1.15	0.07	0.06
Pleuronectes spp.	3.07	0.19	0.00
Priacanthus macracanthus	4.54	0.13	0.13
Priacanthus tayenus	29.31	1.83	1.43
Pristotis jerdoni	1.21	0.08	0.11
Pterois sp.	0.61	0.08	0.03
Pterocaesio chrysozona	0.61	0.04	0.03
		0.04	0.03
Rays	0.55	0.03	0.05
Rhynchostracion nasus			0.04
Round sponges	15.99	1.00	4.40
Saurida micropectoralis	82.11	5.13	4.18
Saurida undosquamis	46.35	2.90	2.27
Saurida hoshinonis	0.28	0.02	0.01
Saurida spp.	36.40	2.27	1.77
Scolopsis spp.	0.00	0.00	0.00
Sea cucumber	0.23	0.01	0.02
Sepia spp.	4.91	0.31	0.24
Shells	0.06	0.00	0.00
Stolephorus sp.	0.24	0.01	0.01
Scorpaena scabra	4.39	0.27	0.21
Starfish	0.28	0.02	0.01
Tetrosomus sp.	4.16	0.26	0.22
Torquigener sp.	2.29	0.14	0.11
Triacanthus spp.	0.76	0.05	0.04
Upeneus sulphureus	17.96	1.12	0.87
	49.44	3.09	2.42
Upeneus moluccensis			c 20
Upeneus moluccensis Upeneus spp.	68.90	4.31	6.22
	68.90 0.80	4.31 0.05	0.22
Upeneus spp.			

Table 2	Average catch rate (kg/hr) and percentage composition from entire sampling stations (4th
	Cruise)

Sale recursoppin landsus         0.00         0.00           Magnalagis corplya         0.91         0.08         0.17           Magnalagis corplya         260         0.22         0.43           Atropus singues         1.20         0.10         0.22           Atropus singues         0.20         0.43         0.22           Atropus singues         0.20         0.43         0.22           Atropus singues         0.20         0.00         0.00           Atropus singues         0.22         0.44         0.99           Atropus singues         0.20         0.00         0.00           Calamyobios sp.         0.10         0.00         0.00           Calamyobios sp.         0.10         0.01         0.02           Camanyobios sp.         0.20         0.00         0.00           Camanyobios sp.         0.21         0.22         0.23         0.25           Cam		Total	Meen	%
Alde rank         1046         0.87         1.74           Megalaspic corvyin         0.91         0.08         0.15           Decaptorus spp.         2.60         0.22         0.43           Akpope dedhan         0.16         0.01         0.03           Akpope dedhan         0.16         0.01         0.03           Akpope dedhan         0.16         0.01         0.03           Carangodos armatas         0.00         0.00         0.00           C. Indiandarrisus         19.01         1.58         3.16           C. Indiandarrisus         19.01         1.58         3.16           C. Indiandarrisus         1.00         0.00         0.00           Carangodos sp.         0.00         0.00         0.00           Carangodos sp.         0.00         0.00         0.00           Solina nigrofaculta         2.64         0.22         0.43           Salarobic laptologia         1.98         0.91         1.82           Carangodos sp.         0.00         0.00         0.00           Carangodos sp.         0.00         0.00         0.00           Carangodos sp.         0.00         0.00         0.00           Salarobic s	Selar crumenophthalmus	<b>Total</b>	0.00	
Decagetars spp.         260         1.22         0.43           Alepes kindli         0.00         0.00         Alepes kindli         0.00         0.00           Alepes dedaba         0.16         0.01         0.03         Alepes kindli         0.00         0.00           Alepes dedaba         0.16         0.00         0.00         0.00         0.00           C. Inditurtorisis         0.00         0.00         0.00         0.00         0.00           C. Inditurtorisis         0.00         0.00         0.00         0.00         0.00           Scientra ingrotescata         2.44         0.22         0.44         0.00         0.00           Scientra ingrotescata         2.64         0.22         0.43         Scientra ingrotescata         0.00         0.00           Reletaba         2.80         0.22         0.43         Scientra ingrotescata         0.00         0.	Atule mate	10.46	0.87	1.74
Atopus analogues         1.20         0.10         0.20           Alepes relation of the second of the secon				
Abepes melanophy         0.15         0.04         0.09           Alectic cilluria         0.00         0.00         0.00           C. maduarious         10.01         1.53         3.15           C. malaarious         10.01         0.02         0.02           C. manus advactures         10.01         0.02         0.02           Canany advactures         10.01         0.02         0.02           Canany advactures         0.00         0.00         0.00           Canany advactures         0.00         0.00         0.00           Solar spin         0.00         0.00         0.00           Canany advactures         0.00         0.00         0.00	Atropus atropus			
Adepes metalencythere         0.22         0.44         0.09           Carangolies annatus         0.00         0.00         0.00           C. matabaricus         1901         158         3.16           C. natabaricus         1901         158         3.16           C. matabaricus         1901         0.00         0.00           C. matabaricus         100         0.00         0.00           Sanoina nigrolasciata         2.24         0.22         0.44           Varapsis uragita         0.00         0.00         0.00           Rebelson         2.00         0.22         0.43           Sanoina nigrolasciata         2.26         0.32         0.33           Ambriggetar sp.         0.00         0.00         0.00           Chipids         0.32         0.03         0.05           Sanoinen forsten         6.51         0.54         1.08           Scombrida         4.30         0.00         0.00           Sanoinen forsten         6.51         0.54         1.08           Scombrida         4.40         0.03         0.07           Scombrida         0.40         0.03         0.07           Sanoinen forsten <t< td=""><td>Alepes kalla</td><td></td><td></td><td></td></t<>	Alepes kalla			
Alectic citizaria         0.00         0.00         0.00           C. Indiadraciasi         0.00         0.00         0.00           Camary cachesis         0.00         0.00         0.00           Carana cachasciatus         1.00         0.00         0.00           Solar radio cachasis         2.61         0.22         0.43           Solar radio septotipois         0.00         0.00         0.00           Changida         2.218         4.35         8.66           Paloria sp.         0.00         0.00         0.00           Changida         0.22         0.03         0.05           Changida         0.22         0.03         0.05           Changida         0.32         0.03         0.00           Changida         0.32         0.03         0.00           Solar cachasing sp.         0.00         0.00         0.00           Solar cachasing sp.         0.44         0.37         0.73           Sphyneana fordia	Alepes djedaba Alepes melanoptera			
C. heliandracias         0.00         0.00         0.00           C. malabaricas         1901         158         316           C. tamapacitas         0.00         0.00         0.00           Caranysexps,         0.10         0.01         0.02           Caranysexps,         0.00         0.00         0.00           Solar sign,         0.00         0.00         0.00           Changlades         52.16         4.35         8.66           Palons, p.         0.00         0.00         0.00           Changlades         0.32         0.03         0.05           Changlades         0.32         0.03         0.05           Sonthar australinaciza:         0.00         0.00         0.00           Sonthar australinaciza:         0.00         0.00         0.00           Sonthar australinaciza:         0.01         0.00         0.00           Sonthar australinaciza:         0.02         0.00         0.00           Sontharaustralinaciza:	Alectis cilliaris	0.00	0.00	0.00
C. maleparicus         1911         1.88         3.16           C. tatemparicus         0.00         0.00         0.00           Carams sedusciatus         0.00         0.00         0.00           Solin sp.         0.00         0.00         0.00           Solin sp.         0.00         0.00         0.00           Reideba         2.80         0.22         0.43           Salinitian ingrofasciata         2.84         0.22         0.43           Salinarides ingrofasciata         2.80         0.22         0.43           Salinarides ingrofasciata         0.00         0.00         0.00           Ambigaster sp.         0.00         0.00         0.00           Chaptida         0.32         0.03         0.05           Scombrida         4.80         0.40         0.80           Scombrida         6.51         0.54         1.88           Sphynaena langsa         0.00         0.00         0.00           Sphynaena jubit         0.45         0.42         1.83           Sphynaena jubit         0.45         0.42         1.83           Sphynaena jubit         0.00         0.00         0.00           Dobastastastist				
Carangoles sp.         0.10         0.01         0.02           Carans subsidiations         1.00         0.00         0.00           Solar sp.         0.00         0.00         0.00           R. djobelan         2.64         0.22         0.43           Salaracios laptopiapia         10.96         0.91         1.82           Carangidan         2.516         4.35         8.66           Pallona sp.         0.00         0.00         0.00           Ambigaster sp.         0.00         0.00         0.00           Scomber australisscicus         0.00         0.00         0.00           Scomber australisscicus         0.00         0.00         0.00           Sphyaena languar         1.00         0.00         0.00           D	C. malabaricus			
Caranx sardisaciatus         1.00         0.08         0.17           Sariar surgalis         0.00         0.00         0.00           Sariar surgalis         0.00         0.00         0.00           Sariar surgalis         0.00         0.00         0.00           Salaracidas leptologis         10.96         0.91         1.82           Carangida         52.16         4.35         8.66           Charbigatis         0.32         0.03         0.00           Chapidas         0.32         0.03         0.05           Chupidas         0.32         0.03         0.05           Sombra sustansocia:         0.00         0.00         0.00           Sombra sustansocia:         0.00         0.00         0.00           Sombra sustansocia:         0.00         0.00         0.00           Sphyraenal angear         0.00         0.00         0.00           Sphyraena ingear         0.00         0.00         0.00           Sphyraena ingear         0.40         0.03         0.07           Dasastis singear         0.40         0.03         0.07           Dasastis singear         0.40         0.00         0.00           Dasastis	C. talamparoides			
Salar op.         0.00         0.00         0.00           Seriolan ingrofasciata         2.64         0.22         0.44           Virapis urappis         0.00         0.00         0.00           R deichela         2.60         0.22         0.43           Salarodes laptolopis         10.96         0.91         1.82           Carangidae         52.16         4.35         8.66           Pallona sp.         0.00         0.00         0.00           Ambigaster sp.         0.00         0.00         0.00           Chipdia         0.32         0.03         0.05           Scombratical stallascicus         0.00         0.00         0.00           Scombratical stallascicus         0.00         0.00         0.00           Sphynama largas         0.00         0.00         0.00           Dessimilitis         2.425         2.62         0.63           Advisos stallantis         2.445         0.72         0.73           Despala fi				
Uraspis         0.00         0.00         0.00           Solaracidos laptologis         1995         0.91         1.82           Salaracidos laptologis         10.95         0.91         1.82           Carangidas         62.16         4.35         8.66           Peliona sp.         0.00         0.00         0.00           Arabigaster sp.         0.00         0.00         0.00           Schedela         0.32         0.03         0.05           Rastelliger Ausangurta         4.80         0.40         0.80           Scomber australisacicus         0.00         0.00         0.00           Sphyraena Job         0.45         0.44         0.83           Sphyraena Job         0.40         0.03         0.07           Dussamierios sp.         0.45         0.44         0.80           Anar sp.         0.70         0.89         1.78           Anar sp.         1.07         8.84         1.75           Dasaletis sp.         1.	Selar sp.			
R. djedala         2.60         0.22         0.43           Stancika spinopis         10.96         0.91         1.82           Carangidae         52.15         4.35         8.66           Pallona sp.         0.00         0.00         0.00           Chipidae         0.32         0.03         0.05           Chupidae         0.32         0.03         0.05           Scomber australinacicus         0.00         0.00         0.00           Scomber australinacicus         0.00         0.00         0.00           Sphynaena Ingara         0.00         0.00         0.00           Sphynaenia Ingar         0.40         0.03         0.07           Parastornatizus Ingar         0.40         0.03         0.07           Dussumioris gp.         0.44         0.03         0.07           Dussumioris gp.         0.44         0.03         0.07           Dussumioris gp.         0.44         0.03         0.07           Dussumioris gp.         0.45         0.44         0.07           Design finh         65.04         0.40         0.00           Dussumioris gp.         1.44         0.12         0.23           Dusyatis sp.				
Salaraks kptologis         10.96         0.91         1.82           Carangida         52.16         4.35         866           Pallona sp.         0.00         0.00         0.00           Ambiguestir sp.         0.02         0.03         0.05           Rastelliger Anangurta         4.80         0.40         0.80           Scombrida         4.80         0.40         0.80           Scombrida         4.80         0.40         0.80           Sphynana forsteri         6.51         0.54         1.08           Sphynana forsteri         6.51         0.54         1.08           Sphynana forsteri         0.00         0.00         0.00           Sphynana forsteri         0.40         0.03         0.07           Desumieria         0.41         0.03         0.07           Desumieria         0.00         0.00         0.00           Desumieria         0.00         0.00         0.00           Desumieria         9.00         0.00         0.00           Desumieria         1.40         0.12         0.23           Carnaria         0.00         0.00         0.00           Desumieria         9.00         0.0				
Pations ap.         0.00         0.00         0.00           Arnibygester sp.         0.00         0.00         0.00           Chipelis         0.32         0.03         0.05           Rastenliger kanagurta         4.80         0.40         0.80           Scomber australascicus         0.00         0.00         0.00           Sphyraena forstari         6.51         0.54         1.08           Sphyraena forstari         6.51         0.54         1.08           Sphyraena forstari         0.40         0.03         0.07           Parastondiger sorba         0.40         0.03         0.07           Desamineria sp.         0.45         0.44         0.07           Desamineria sp.         0.45         0.44         0.07           Desamineria sp.         0.40         0.00         0.00           Abalistes stellaris         2425         2.02         4.03           Adorman indica         0.00         0.00         0.00           Desyntes sp.         1.40         0.12         0.23           Despine bolis socides         4.50         0.38         0.75           Epinepholes coldus         1.75         0.15         0.23	Selaroides leptolepis	10.96	0.91	
Ambygaster sp.         0.00         0.00         0.00           Chipida         0.32         0.03         0.06           Rastrelliger kanaguta         4.80         0.40         0.80           Scomber australisocius         0.00         0.00         0.00           Scombridae         4.80         0.40         0.80           Sphyraena forsteri         6.61         0.54         1.08           Sphyraena forsteri         6.61         0.54         1.08           Sphyraena langsar         0.00         0.00         0.00           Sphyraena langsar         0.40         0.03         0.07           Parastormateus riger         0.44         0.03         0.07           Dussatiniaria sp.         0.45         0.44         0.80           Atalistes stellaria         2.42.5         2.02         4.03           Anguropa spinifer         0.00         0.00         0.00           Dasyatic sp.         0.00         0.00         0.00           Dasyatic sp.         0.00         0.00         0.00           Dasyatic sp.         1.07         0.89         1.73           Epinepholis atsociatus         1.07         0.18         2.29	Carangidae			
Chupielae         0.32         0.03         0.05           Rastraligar kanagurta         4.80         0.40         0.80           Scombar australascicus         0.00         0.00         0.00           Scombra australascicus         0.00         0.00         0.00           Sphyraena forstari         6.51         0.54         1.08           Sphyraena langsar         0.00         0.00         0.00           Sphyraena langsar         0.40         0.03         0.07           Parastormitous orap         0.40         0.03         0.07           Dussamientas spin         0.45         0.44         0.03         0.07           Dussamientas spin         0.45         0.44         0.03         0.07           Apalyros spinfer         0.00         0.00         0.00         Anagyrops spinfer         0.00         0.00           Argyrops spinfer         0.00         0.00         0.00         Dasyratis spin         0.00         0.00         Dasyratis spin         0.00         0.00         Dasyratis spin         0.00         0.00         Dasyratis spin         Disperipherasis activatis         1.75         0.15         D.29         Epinepherasis activatis         D.25         D.25         Disperipherasis ac	Peliona sp. Amblygaster sp.			
Rastelliger kanagurta         4.80         0.40         0.80           Scombar australascicus         0.00         0.00         0.00           Scombar australascicus         0.00         0.00         0.00           Sphyraena langsar         0.00         0.00         0.00           Sphyraena langsar         0.00         0.00         0.00           Sphyraena lang         0.40         0.03         0.07           Parastromateus niger         0.40         0.03         0.07           Dessamienta sp.         0.45         0.44         0.07           Pelagic fish         55.64         5.42         10.80           Advars sp.         10.70         0.89         1.78           Ariomra indica         0.00         0.00         0.00           Dasyatis sp.         10.70         0.89         1.78           Ariomra indica         0.00         0.00         0.00           Denpane longimana         0.00         0.00         0.00           Denpane longimana         0.00         0.00         0.00           Epinepholus arediatus         1.75         0.15         2.29           Epinepholus arediatus         0.14         0.01         0.02	Clupids			
Scomber australassicus         0.00         0.00         0.00           Scombridae         4.80         0.40         0.80           Sphyraena forstart         6.51         0.54         1.08           Sphyraena langsar         0.00         0.00         0.00           Sphyraena langsar         0.40         0.03         0.07           Parastromateus niger         0.40         0.03         0.07           Dussamieria sp.         0.45         0.04         0.00           Anyropes spinifer         0.00         0.00         0.00           Adouts stellants         2425         2.02         4.03           Argropes spinifer         0.00         0.00         0.00           Adouts stellants         1.76         0.12         0.25           Carchardinus sp.         1.40         0.12         0.25           Carchardinus sp.         0.00         0.00         0.00           Despatis sp.         0.00         0.00         0.00           Despatis sp.         0.00         0.00         0.00           Despatis sp.         0.00         0.00         0.00           Epinephelus stoksociutus         1.17         0.14         0.22		0.02		
Sphyraena langsar         6.51         0.54         1.06           Sphyraena langsar         0.00         0.00         0.00           Sphyraena langsar         0.00         0.00         0.00           Sphyraena langsar         0.40         0.03         0.07           Parastoronateus nigar         0.40         0.03         0.07           Dussumieria sp.         0.45         0.04         0.07           Palagit fish         6.651         5.42         1.080           Abalistes stellaris         2.425         2.02         4.03           Argrynops spirifier         0.00         0.00         0.00           Achorma indica         0.00         0.00         0.00           Dasyatis sp.         1.07         0.89         1.78           Achorma indica         0.00         0.00         0.00           Dasyatis sp.         0.00         0.00         0.00           Dispatis spis         4.40         0.37         0.73           Epinepholits caloidus         4.50         0.38         0.75           Diphipper Sotias Sociatus         0.14         0.01         0.02           Epinepholits caloidus sociatus         0.00         0.00         0.00     <	Scomber australascicus			
Sphyraena langsar         0.00         0.00         0.00           Sphyraenide         6.51         0.54         1.08           Chirocentrus dorab         0.40         0.03         0.07           Parastornates injeer         0.40         0.03         0.07           Dussumieria sp.         0.45         0.04         0.07           Parastornates injeer         0.40         0.03         0.07           Abalistes stallaris         24.25         2.02         4.03           Argyrops spirifer         0.00         0.00         0.00           Anorma indica         0.00         0.00         0.00           Bachidae         1.49         0.12         0.23           Carcharhins sp.         1.40         0.12         0.23           Despates sp.         0.00         0.00         0.00           Depane longimana         0.00         0.00         0.00           Depane longimana         0.00         0.00         0.00           Epinephetics acoldus         1.15         0.14         0.01         0.02           Epinephetics acoldus         0.14         0.01         0.02         0.03           Epinephetics acoldus         0.51         0.53	Scombridae			
Sphymens.jelo         0.00         0.00         0.00           Sphymens.jelo         6.51         0.54         1.08           Chicoentrus Gorab.         0.40         0.03         0.07           Parastomateus niger         0.40         0.03         0.07           Dessumieria sp.         0.45         0.44         0.07           Pelagic fish         65.04         5.42         10.80           Advalues stellaris         2.42.5         2.02         4.03           Arymons spinter         0.00         0.00         0.00           Advarma indica         0.00         0.00         0.00           Bayatis sp.         0.00         0.00         0.00           Despatis sp.         0.00         0.00         0.00           Despatis sp.         0.00         0.00         0.00           Epinepholis aciodides         4.50         0.38         0.75           Epinepholis aciodides         4.50         0.38         0.75           Epinepholis aciodides         4.50         0.34         0.02           Sermanidae dicanthus         0.00         0.00         0.00           Epinepholis aciodides         1.51         0.32         2.55				
Chrocentrus dorab         0.40         0.03         0.07           Parastromateus niger         0.40         0.03         0.07           Dessamieria sp.         0.45         0.04         0.07           Pelagic fish         6554         5.42         10.80           Adartses stellaris         24.25         2.02         4.03           Argyrops spinifer         0.00         0.00         0.00           Ans spp.         10.70         0.89         1.78           Arhorma indica         0.00         0.00         0.00           Bothidae         1.49         0.12         0.23           Dasyntis sp.         0.00         0.00         0.00           Darspane longimana         0.00         0.00         0.00           Epinepholes areolatis         1.75         0.15         0.29           Epinepholes areolatis         1.75         0.15         0.29           Epinepholes areolatis         0.00         0.00         0.00           Epinepholes areolatis         0.12         0.01         0.02           Epinepholes areolatis         0.12         0.01         0.02           Epinepholes areolatis         0.20         0.02         0.03      <	Sphyraena jello	0.00	0.00	0.00
Parastonatous niger         0.40         0.03         0.07           Dussumieria sp.         0.45         0.04         0.07           Dussumieria sp.         0.64         5.42         10.80           Abalistes stellaris         24.25         2.02         4.03           Argryops spirifer         0.00         0.00         0.00           Aronma indica         0.00         0.00         0.00           Desystis sp.         0.00         0.00         0.00           Epinephelus coloides         4.50         0.38         0.75           Epinephelus coloides         4.50         0.38         0.75           Epinephelus sexthsciatus         0.14         0.01         0.02           Serranidae         6.51         0.54         1.08           Gymnoranius griseus         1.955         1.63         3.25           Gymnura sp.         1.70         0.14         0.28           Ladratu	Sphyraenidae Chirocentrus dorah			
Dessurieria sp.         0.45         0.04         0.07           Palagic fish         65.04         5.42         10.80           Adalistes stellaris         24.25         2.02         4.03           Argyrops spirifer         0.00         0.00         0.00           Arlow sp.         10.70         0.89         1.78           Aronma indica         0.00         0.00         0.00           Borhida         1.49         0.12         0.23           Carcharhinus sp.         1.40         0.12         0.23           Despate longinana         0.00         0.00         0.00           Epinepholics areolatus         1.75         0.15         0.29           Epinepholics areolatus         0.00         0.00         0.00           Epinepholics areolatus         0.17         0.14         0.01         0.02           Epinepholics areolatus         0.12         0.01         0.02         Epinepholics areolatus         0.12         0.03           Cymmura sp.         1.70         0.14         0.28         1.22         1.13           Latarius lactarius         0.20         0.02         0.03         1.12           Latareus lactarius         0.20         0.	Chirocentrus dorab Parastromateus niger			
Abalises stellaris         2425         2.02         4.03           Argyrops spinifer         0.00         0.00         4.03           Arkus spo.         1070         0.89         1.78           Arkormia indica         0.00         0.00         0.00           Bothidae         1.49         0.12         0.25           Carcharbinus spo.         1.40         0.12         0.25           Carcharbinus spo.         1.40         0.12         0.25           Dasyatis sp.         0.00         0.00         0.00           Ephaphous sonolus         1.75         0.15         0.29           Epinophous coloides         4.50         0.38         0.75           Epinophous coloides         4.50         0.38         0.75           Epinophous sontasciatus         0.00         0.00         0.00           Commoranius griseus         1955         1.63         3.25           Gymmura sp.         1.70         0.14         0.28           Lactarbins lonctarius         0.20         0.02         0.03           Luignus milandicias         1.03         0.86         1.12           Luignus milandicias         0.20         0.00         0.00	Dussumieria sp.			
Agyrops spinifer         0.00         0.00         0.00           Anus sp.         1070         0.89         1.78           Anus sp.         1070         0.89         1.78           Anus sp.         1.40         0.12         0.23           Bothidae         1.49         0.12         0.23           Carcharhins sp.         1.40         0.12         0.23           Dasyatis sp.         0.00         0.00         0.00           Drepane longiman         0.00         0.00         0.00           Epinepholes acoidots         4.50         0.38         0.75           Epinepholes acoidots         4.50         0.38         0.75           Epinepholes socidots         4.50         0.00         0.00           Epinepholes socidots         4.50         0.38         0.75           Epinepholes socidots         0.00         0.00         0.00           Epinepholes socidots         0.12         0.01         0.02           Cormanics griseus         1955         1.63         3.25           Gymura sp.         1.70         0.14         0.28           Luifarus incidatus         0.00         0.00         0.01           Luifarus incidau				
Arius sp.         1070         0.89         1.78           Ariomma indica         0.00         0.00         0.00           Bothidae         1.49         0.12         0.25           Carcharhinus sp.         1.40         0.12         0.25           Dasyatis sp.         0.00         0.00         0.00           Drapane longimana         0.00         0.00         0.00           Dispate longimana         0.00         0.00         0.00           Epinephelus aveolatus         1.75         0.15         0.29           Epinephelus sendestrus         0.01         0.00         0.00           Epinephelus sendestrus         0.14         0.01         0.02           Serranidae         6.51         0.54         1.08           Gymnorasp.         1.70         0.14         0.28           Lafarus inlacharus         0.20         0.02         0.03           Luifarus subtarius         0.30         0.06         0.12           Luifarus subtarius         1.70         0.14         0.28           Luifarus subtarius         0.70         0.66         1.12           Luifarus subtarius         1.70         0.64         1.28           Luif	Argyrops spinifer		2.02	
Bothidae         1.49         0.12         0.25           Carcharhinus spp.         1.40         0.12         0.23           Despatis sp.         0.00         0.00         0.00           Drepane longimana         0.00         0.00         0.00           Epinepholus anolatus         1.75         0.15         0.29           Epinepholus anolatus         1.75         0.15         0.29           Epinepholus coloides         4.50         0.38         0.75           Epinepholus anolatus         0.00         0.00         0.00           Epinepholus sobaciculus         0.14         0.01         0.02           Serranidae         6.51         0.54         1.08           Gymnocranius grissus         1955         1.63         3.25           Gymnocranius grissus         0.90         0.08         0.15           Luiganus inalabaricus         10.34         0.86         1.12           Luiganus ineolatus         0.90         0.06         0.01           Luiganus ineolatus         0.00         0.00         0.00           Luiganus ineolatus         0.00         0.00         0.00           Luiganus ingriseus         7.70         0.64         1.28	Arius spp.			
Carchardinus spp.         1.40         0.12         0.23           Dasyatis sp.         0.00         0.00         0.00           Ephapus orbis         4.40         0.37         0.73           Ephapus orbis         4.40         0.37         0.73           Epinopholas modulus         1.75         0.15         0.29           Epinopholas modulus         0.00         0.00         0.00           Epinopholas homolocus         0.00         0.00         0.00           Epinopholas modulus         0.01         0.02         Seranidae           Epinopholas sortasciatus         0.14         0.01         0.02           Seranidae         6.51         0.54         1.08           Gymmura sp.         1.70         0.14         0.28           Ladratinis labrativas         0.20         0.02         0.03           Lulgianus miabativas         10.34         0.88         1.72           Lulgianus miabativas         0.90         0.08         0.15           Lulgianus miabativas         0.70         0.66         1.12           Lulgianus miabativas         0.35         0.03         0.00           Epinopholes splusopailus         7.23         0.44         0.87<				
Drepane longimane         0.00         0.00         0.00           Ephippus oxbis         4.40         0.37         0.73           Ephippus avoidus         1.75         0.15         0.29           Ephipphelus coloides         4.50         0.38         0.75           Ephipphelus coloides         4.50         0.38         0.75           Ephipphelus candachus         0.00         0.00         0.00           Ephipphelus sextasciaus         0.14         0.01         0.02           Serranica         6.51         0.54         1.08           Gymmoranius griseus         1955         163         3.25           Gymmoranius lectarius         0.20         0.02         0.03           Lufgarus malabaricus         0.30         0.06         0.12           Lufgarus instancius         0.70         0.06         0.12           Lufgarus withe         1.04         0.09         0.17           Pristipomoides multidens         6.70         0.56         1.11           Pristipomoides splus         0.03         0.06           Pristipomoides splus         0.35         0.03         0.06           Pristipomoides splus         5.23         0.44         0.88	Carcharhinus spp.			
Ephippus orbis         4.40         0.37         0.73           Epinephics aroolatus         1.75         0.15         0.29           Epinephics oxides         4.50         0.38         0.75           Epinephics discanthus         0.00         0.00         0.00           Epinephics haroolatus         0.01         0.02         Epinephics haroolatus         0.01         0.02           Epinephics haroolatus         0.14         0.01         0.02         Epinephics haroolatus         0.12         0.01         0.02           Gymmora sp.         0.12         0.01         0.02         0.03         Lactarius lactarius         0.20         0.02         0.03           Lufjarus inclaturius         0.90         0.08         0.15         Lufjarus inclatus         0.90         0.08         0.15           Lufjarus inclaturus         1.70         0.14         0.28         0.00         0.00         0.00         1.11         Pristopmoides multidens         6.70         0.56         1.11         Pristopmoides multidens         6.70         0.56         1.11         Pristopmoides splus         0.03         0.06         Pristopmoides multidens         6.70         0.64         1.28         Lufjanus witta         1.04         0.93	Dasyatis sp.			
Epinephelus anolatus         1.75         0.15         0.29           Epinephelus anolatus         1.76         0.18         0.75           Epinephelus anolatus         0.00         0.00         0.00           Epinephelus honicohus         0.00         0.00         0.00           Epinephelus Stasciatus         0.14         0.01         0.02           Serranidae         6.51         0.54         1.08           Gymnoranius griseus         1955         1.63         3.25           Gymnoranius griseus         10.34         0.86         1.12           Ludjanus ineolatus         0.90         0.08         0.15           Ludjanus ineolatus         0.90         0.08         1.15           Ludjanus ineolatus         0.70         0.06         0.12           Ludjanus sebee         0.70         0.06         1.11           Pristpomoides nultidens         6.70         0.56         1.11           Pristpomoides pleurospilus         7.70         0.64         1.28           Ludjanus unorspitus         2.23         0.44         0.87           Parupeneus chinabaritus         0.00         0.00         0.00           Pristopomoides spleurospitus         5.23				
Épinephelus diacanthus         0.00         0.00         0.00           Epinephelus sondsociatus         0.00         0.00         0.00           Epinephelus sondsociatus         0.14         0.01         0.02           Epinephelus sondsociatus         0.12         0.01         0.02           Serranidas         6.51         0.54         1.08           Grimocranius griseus         1955         1.63         3.25           Gymnura sp.         1.70         0.14         0.28           Lufjarus malabaricus         10.34         0.86         1.72           Lufjarus incolatus         0.90         0.08         0.15           Lufjarus sebae         0.70         0.14         0.28           Lufjarus sebae         0.70         0.66         1.11           Pristipomoides spus         0.00         0.00         0.00           Pristipomoides plaurosplus         7.70         0.64         1.28           Lufjarus bensasi         1460         1.22         2.43           Upeneus crinnabarirus         0.00         0.00         0.00           Noraenesox sp         4.10         0.34         0.87           Upeneus benesasi         1460         1.22	Epinephelus areolatus	1.75		
Épinephelus heniochus         0.00         0.00         0.00           Épinephelus sexăsciaus         0.14         0.01         0.02           Serranidae         6.51         0.54         1.08           Grmnoranius griseus         1955         16.3         3.25           Gymnura sp.         1.70         0.14         0.28           Lactarius lectarius         0.20         0.02         0.03           Lufigrus malbarius         1.70         0.14         0.28           Lufigrus indiventi sectarius         0.90         0.08         0.17           Pristipomoides multidens         6.70         0.66         1.11           Pristipomoides multidens         6.70         0.66         1.12           Lufianus batis         0.00         0.00         0.00           Pristipomoides multidens         7.70         0.64         1.28           Lufianus batis         0.00         0.00         0.00           Parupeneus cinnabarinus         0.00	Epinephelus coioides			
Epinepholus savfasciatus         0.14         0.01         0.02           Epinepholus sapp.         0.12         0.01         0.02           Serranidae         6.51         0.54         1.08           Gymnoranius griseus         1955         1.83         3.25           Gymnura sp.         1.70         0.14         0.28           Lactarius lactarius         0.20         0.02         0.03           Luiginus inolabaricus         10.34         0.86         1.72           Luiginus inolabaricus         0.90         0.08         0.15           Luiginus inolabaricus         0.70         0.66         0.12           Luiginus solutions         6.70         0.56         1.11           Pristpomoides multidens         6.70         0.56         1.11           Pristpomoides subjuers plus         0.00         0.00         0.00           Pristpomoides sup         0.35         0.03         0.66           Parupeneus chrabarinus         0.00         0.00         0.00           Parupeneus pleurspilus         5.23         0.44         0.87           Upeneus consulturs         5.23         0.44         0.87           Upeneus bensasi         1.460         1.22 <td></td> <td></td> <td></td> <td></td>				
Serranica         6.51         0.54         1.08           Gymnoranius griseus         1955         1.63         3.25           Gymnoranius griseus         1.00         0.14         0.28           Lactarius inctatius         0.20         0.02         0.03           Ladianus inteolatus         0.90         0.08         0.15           Luignus malbaricus         1.170         0.14         0.28           Luignus subaricus         1.03         0.06         0.12           Luignus vita         1.04         0.09         0.17           Pristipomoides multidens         6.70         0.66         1.11           Pristipomoides multidens         6.70         0.56         1.11           Pristipomoides spp         0.35         0.03         0.06           Pristipomoides spp         0.25         0.03         0.00           Parupeneus churaspilus         5.23         0.44         0.87           Upeneus benussi         14.60         1.22         2.43           Upeneus benuscennis         2.262         1.89         3.76           Muildae         4.245         3.54         7.05           Maraenesox sp         4.10         0.34         0.68 <td>Epinephelus sexfasciatus</td> <td></td> <td></td> <td></td>	Epinephelus sexfasciatus			
Gymucranius griseus         1955         1.63         3.25           Gymrura sp.         1.70         0.14         0.28           Lactarius lactarius         0.20         0.02         0.03           Lufjarus malabaricus         10.34         0.86         1.72           Lufjarus malabaricus         0.90         0.08         0.15           Lufjarus malabaricus         1.00         0.06         0.12           Lufjarus iknoldatus         0.90         0.06         0.12           Lufjarus vita         1.04         0.09         0.17           Pristpomoides plavus         0.00         0.00         0.00           Pristpomoides plavuspilus         7.70         0.64         1.28           Lufjanica         2.94.3         2.45         4.89           Parupeneus plavuspilus         5.23         0.44         0.87           Upeneus chrabarinus         0.00         0.00         0.00           Upeneus chrabarinus         0.00         0.00         0.00           Nexado         2.262         1.89         3.76           Muralenessox sp         4.10         0.34         0.68           Nexadom         0.60         0.00         0.00 <t< td=""><td></td><td>-</td><td></td><td></td></t<>		-		
Lactarius Inctarius         0.20         0.02         0.03           Luigenus melabaricus         10.34         0.86         1.72           Luigenus melabaricus         0.90         0.08         0.15           Luigenus melabaricus         1.70         0.14         0.28           Luigenus sindebaricus         0.70         0.06         0.12           Luigenus sobae         0.70         0.06         0.12           Luigenus sobae         0.70         0.06         0.12           Luigenus sobae         0.70         0.64         0.12           Luigenus sobae         0.70         0.64         1.28           Luigenus sobae         0.03         0.00         0.00           Pristipomoides sop         0.35         0.03         0.06           Pristipomoides pleurospilus         7.70         6.64         1.28           Luigenus bensasi         14.60         1.22         2.43           Upeneus moluccensis         5.23         0.44         0.87           Upeneus moluccensis         2.262         1.89         3.76           Muraeneesox sp         4.10         0.34         0.88           N. hoxadon         0.60         0.00         0.00 <td>Gymnocranius griseus</td> <td></td> <td></td> <td></td>	Gymnocranius griseus			
Lujavis malabaricus         1034         0.86         1.72           Lujavis lineolatus         0.90         0.08         0.15           Lujavis lineolatus         0.90         0.08         0.15           Lujavis lineolatus         1.70         0.14         0.28           Lujavis vita         1.07         0.14         0.28           Lujavis vita         1.04         0.09         0.17           Pristpomoides multidens         6.70         0.56         1.11           Pristpomoides spp         0.35         0.03         0.06           Pristpomoides pleurospilus         7.70         0.64         1.28           Lujanica         2.943         2.45         4.89           Parupeneus cinnabarinus         0.00         0.00         0.00           Parupeneus pleurospilus         5.23         0.44         0.87           Upeneus bensisi         2.242         1.89         3.76           Muraenesco sp         4.10         0.34         0.68           Nemiptorus bathybus         2.540         2.12         4.22           Nascon         0.60         0.05         0.10           N isacarithus         0.00         0.00         0.00 <tr< td=""><td>Gymnura sp.</td><td></td><td></td><td></td></tr<>	Gymnura sp.			
Lufjenus innocitatus         0.90         0.08         0.15           Lufjenus innocitatus         1.70         0.14         0.28           Lufjenus intjenus         1.70         0.06         0.12           Lufjenus intjenus         1.70         0.06         0.12           Lufjenus vitta         1.04         0.09         0.17           Pristpornoides multidens         6.70         0.56         1.11           Pristpornoides typus         0.00         0.00         Pristpornoides pleurospilus         7.70         6.64         1.28           Lutjanitae         29.43         2.45         4.89         Perupenez cirinatenirus         0.00         0.00         Perupenez cirinatenirus         2.67         1.22         2.43           Neadorin         0.60         0.65         1.10         N. Neadorin         3.66         N.00         0.00         0.00         N.00         0.00         N.00         N.00         0.00         0.00         N.00				
Lufjenus sebae         0.70         0.06         0.12           Lufjanus vitta         1.04         0.09         0.17           Pristpomoldes mulidens         6.70         0.56         1.11           Pristpomoldes mulidens         6.70         0.56         1.11           Pristpomoldes typus         0.00         0.00         0.00           Pristpomoldes spleurospilus         7.70         0.64         1.28           Lufjanidae         2943         2.45         4.89           Parupeneus pleurospilus         5.23         0.44         0.87           Upeneus benrasai         14.60         1.22         2.43           Upeneus nolucconsis         22.62         1.89         3.76           Muildae         42.45         3.54         7.05           Maraenesox sp         4.10         0.34         0.88           Nematorus batybius         25.40         2.12         4.22           N. hascanthus         0.00         0.00         0.00           N. isacanthus         0.00         0.00         0.00           N. nemidophorus         0.00         0.00         0.00           N. nemidophorus         0.00         0.00         0.00      N	Lutjanus lineolatus	0.90		
Lulgious vita         1.04         0.09         0.17           Pristipomoides typus         0.00         0.00         0.00           Pristipomoides typus         0.00         0.00         0.00           Pristipomoides typus         0.00         0.00         0.00           Pristipomoides typus         7.70         0.64         1.88           Lutjanidae         29.43         2.45         4.99           Parupeneus chrabarinus         0.00         0.00         0.00           Parupeneus chrabarinus         5.23         0.44         0.87           Upeneus consais         5.23         0.44         0.87           Upeneus bonsasi         14.60         1.22         2.43           Upeneus molucensis         2.262         1.89         3.76           Multidae         4.245         3.54         7.05           Maraeneox sp         4.10         0.34         0.68           N. isscanthus         0.00         0.00         0.00           N. isscanthus         0.00         0.00         0.00           N. insponicus         7.50         0.63         1.25           N. nemotys         2.262         1.89         3.76           N.	Lutjanus lutjanus			
Pristgomoides typus         0.00         0.00         0.00           Pristgomoides pleurospilus         7.70         0.64         1.28           Lutjanidae         2943         2.45         4.89           Parupeneus cinnabarinus         0.00         0.00         Parupeneus cinnabarinus           Parupeneus cinnabarinus         5.23         0.44         0.87           Upeneus pleurospilus         5.23         0.44         0.87           Upeneus bansasi         14.60         1.22         2.43           Upeneus bansasi         14.60         1.22         2.43           Upeneus banksa         4.40         0.88         7.70           Muilidae         4.245         3.54         7.05           Muraenesox sp         4.10         0.34         0.68           Neadori         0.60         0.00         0.00           N. isacanthus         0.00         0.00         0.00           N. isacanthus         0.00         0.00         0.00           N. nemotidos         0.65         0.63         1.35           N. nemotidos         0.00         0.00         0.00           N. nemotidos         0.00         0.00         0.00	Lutjanus vitta			
Pristgomoides spip         0.35         0.03         0.06           Pristgomoides pleurospilus         7.70         0.64         1.28           Lulginida         2943         2.45         4.89           Parupeneus chinabaritus         0.00         0.00         0.00           Parupeneus chinabaritus         5.23         0.44         0.87           Upeneus consolus consults         5.23         0.44         0.87           Upeneus beneasi         14.80         1.22         2.43           Upeneus moluccensis         22.62         1.89         3.76           Muildice         4.245         3.54         7.05           Muraenescox sp         4.10         0.34         0.68           Nesodomo         0.60         0.00         0.00           N. isacanthus         0.00         0.00         0.00           N. ipponicus         7.50         0.63         1.25           N. mesoprion         3.87         0.32         0.64           N. nematophorus         0.00         0.00         0.00           N. nematophorus         2.80         0.23         0.47           Parascolopsis inermis         0.95         0.08         0.16	Pristipomoides multidens			
Pristipormoides pleurospilus         7.70         0.64         1.28           Lutjanidau         2943         2.45         4.89           Parupeneus climabainirus         0.00         0.00         9.00           Parupeneus pleurospilus         5.23         0.44         0.87           Upeneus benospilus         5.23         0.44         0.87           Upeneus benospilus         5.23         0.44         0.87           Upeneus benospilus         5.23         0.44         0.87           Muilidae         4245         3.54         7.06           Muraenesox sp         4.10         0.34         0.68           Nematorsus bathybus         25.40         2.12         4.22           N. isacanthus         0.00         0.00         0.00           N. isacanthus         0.00         0.00         0.00           N. isacanthus         0.00         0.00         0.00           N. nemotidos         0.00         0.00         0.00           N. ne				
Parupeneus cinnabarinus         0.00         0.00         0.00           Parupeneus pleurospilus         5.23         0.44         0.87           Upeneus poleurospilus         5.23         0.44         0.87           Upeneus moluccensis         22.62         1.89         3.76           Mulidae         42.45         3.54         7.05           Mulidae         42.45         3.54         7.05           Mulidae         42.45         3.54         7.05           Mulidae         42.45         3.54         7.05           Muraenesox sp         4.10         0.34         0.68           Nemiptorus bathybius         25.40         2.12         4.22           Nemiptorus bathybius         25.60         0.00         0.00           N. isoacanthus         0.00         0.00         0.00           N. inagrinatus         2.67         0.22         0.44           N. marginatus         2.67         0.22         0.44           N. memitus         2.262         1.89         3.76           N. nemutus         2.262         1.89         3.76           N. ovenides         0.00         0.00         0.00           N. nemutus	Pristipomoides pleurospilus			
Parupenus pleurospilus         5.23         0.44         0.87           Upeneus bensasi         14.60         1.22         2.43           Upeneus moluconsis         22.62         1.89         3.76           Mullidae         42.45         3.54         7.05           Munamenesox sp         4.10         0.34         0.68           Nerraportus bathybius         25.40         2.12         4.22           N. horadon         0.60         0.00         0.00           N. isacanthus         0.00         0.00         0.00           N. isacanthus         0.00         0.00         0.00           N. marginatus         2.87         0.22         0.44           N. nematighhorus         0.00         0.00         0.00           N. nematighhorus         0.00         0.00         0.00           N. nematighhorus         2.86         1.30         N.16           Parascolopsis inormis         0.55         0.08         0.16           Poratagothus	Lutjanidae			
Upeneus bensasi         14.60         1.22         2.43           Upeneus moluccensis         22.62         1.89         3.76           Muralenescox sp         4.245         3.54         7.05           Muralenescox sp         4.10         0.34         0.68           Nensolation         0.60         0.05         0.10           N. isacanthybias         2.57         0.63         1.25           N. navalon         0.60         0.00         0.00           N. isacanthys         0.00         0.00         0.00           N. isacanthys         2.67         0.22         0.44           N. mesoprion         3.87         0.32         0.64           N. nematophorus         0.00         0.00         0.00           N. nematophorus         0.00         0.00         0.00           N. normidios         0.00         0.00         0.00              N. tohu         0.20         0.02         0.03           N. virgatus         1.40         0.12         0.23           Parascolopsis inermis         0.95         0.08         0.16           Parascolopsis stosus         3.70         0.31         0.61           Portapodus sotosus				
Autranences sp         4.245         3.54         7.05           Muranences sp         4.10         0.34         0.68           Muranences sp         4.10         0.34         0.68           Nemipterus bathybus         2540         2.12         4.22           N. hexadon         0.60         0.05         0.10           N. isscanthus         0.00         0.00         0.00           N. isscanthus         0.00         0.00         0.00           N. merginatus         2.67         0.22         0.44           N. memotyphone         3.87         0.32         0.64           N. nemotyphone         3.87         0.32         0.64           N. nemotyphone         2.26.2         1.89         3.76           N. ovenides         0.00         0.00         0.00           N. ovenides         0.00         0.00         0.00           N. tolu         0.20         0.02         0.03           N. vitoglus         1.40         0.12         0.23           Parascolopsis inermis         0.95         0.08         0.16           Paratapodus soltosus         3.70         0.31         0.61           Portadpodus soltosus	Parupeneus pieurospilus Upeneus bensasi			
Muraenesox sp         4.10         0.34         0.68           Nemipterus bathybis         2540         2.12         4.22           N. hoxadon         0.60         0.05         0.10           N. isacainthus         0.00         0.00         0.00           N. isacainthus         0.00         0.00         0.00           N. isacainthus         2.67         0.22         0.44           N. marginatus         2.67         0.22         0.44           N. mesoprion         3.87         0.32         0.64           N. nematophorus         0.00         0.00         0.00           N. nematophorus         0.00         0.00         0.00           N. ovenides         0.00         0.00         0.00           N. ovenides         0.00         0.02         0.33           N. virgatus         1.40         0.12         0.23           Parascolopsis inermis         0.95         0.08         0.16           Pentapouls setosus         3.70         0.31         0.61           Pentadasys hasta         0.26         0.02         0.04           Pomadasys argentcus         0.12         0.01         0.02           Penapasis anomala	Upeneus moluccensis			
Nemipterus bathybius         25.40         2.12         4.22           N hexadorn         0.60         0.05         0.10           N hexadorn         0.60         0.00         0.00           N ispacentrus         0.00         0.00         0.00           N ispacentrus         7.50         0.63         1.25           N merginatus         2.67         0.22         0.44           N mesoprion         3.87         0.32         0.64           N nematophorus         0.00         0.00         0.00           N nemitoby         22.62         1.89         3.76           N nematophorus         0.00         0.00         0.00           N nematophorus         0.20         0.02         0.03           N voranitides         0.00         0.00         0.00           N tolu         0.20         0.02         0.03           N virgatus         1.40         0.12         0.23           Parascolopsis inormis         0.55         0.08         0.16           Portagotus stosus         3.70         0.31         0.61           Portagotus stosus         3.70         0.31         0.61           Portagotus stosus         0.12	Mullidae Muraenesox sp			
N. isacanthus         0.00         0.00         0.00           N. ipaponicus         7.50         0.63         1.25           N. marginatus         2.57         0.22         0.44           N. marginatus         2.57         0.22         0.44           N. nematophorus         0.00         0.00         0.00           N. nematophorus         0.00         0.00         0.00           N. nematophorus         0.00         0.00         0.00           N. nematos         2.252         1.89         3.76           N. ovenides         0.00         0.00         0.00           N. variatos         2.265         1.39         3.76           N. totu         0.20         0.02         0.03           N. virgatus         1.40         0.12         0.23           Parascolopsis inermis         0.95         0.08         0.16           Parascolopsis inermis         0.95         0.03         0.47           Petrabaye sayontus         1.61         3.12         Parascolopsis inermis           Petrabaye sayontus         1.880         1.57         3.12           Pomadayes hasha         0.26         0.02         0.04      Pomadayes hasha	Nemipterus bathybius	25.40	2.12	4.22
N. Japonicus         7.50         0.63         1.25           N. marginatus         2.67         0.22         0.44           N. mesophon         3.87         0.32         0.64           N. nematophorus         0.00         0.00         0.00           N. nemutos         2.262         1.89         3.76           N. vennickos         0.00         0.00         0.00           N. nemutos         2.262         1.89         3.76           N. vonickos         0.00         0.00         0.00           N. peronii         7.80         0.65         1.30           N. kitaj         0.20         0.03         0.01         N.vigatus           N. kitaj         0.20         0.02         0.03           N. kitajatus         1.40         0.12         0.23           Partascologisti inermis         0.95         0.08         0.16           Partascologisti inermis         0.50         0.82         0.47           Pletothynchus pictus         18.80         1.57         3.12           Pomadasys targenteus         0.12         0.01         0.02           Pomadasys argenteus         0.12         0.01         0.02           Pomad	N. hexadon N. isacanthus			
N. marginatus         2.67         0.22         0.44           N. marginatus         3.87         0.32         0.64           N. nematophorus         0.00         0.00         0.00           N. ovenides         0.00         0.00         0.00           N. toku         0.20         0.02         0.03           N. toku         0.20         0.02         0.03           N. vigatus         1.40         0.12         0.23           Parascolopsis inermis         0.95         0.08         0.16           Pentapolics setosus         3.70         0.31         0.61           Nemipteridae         76.71         6.39         1.274           Plator sp.         2.80         0.23         0.47           Penadesys hasta         0.26         0.02         0.04           Pomadesys argenteus         0.12         0.01         0.02           Pracanthus macracanthus         8.65         0.72         1.44           Priacanthus signdefensis	N. isacantnus N. japonicus			
N. nematophorus         0.00         0.00         0.00           N. nemurus         22.62         1.89         3.76           N. ovenildes         0.00         0.00         0.00           N. perroni         7.80         0.65         1.30           N. kolu         0.20         0.02         0.03           N. virgatus         1.40         0.12         0.23           Parascolopsis inermis         0.95         0.08         0.16           Pertapodus software         76.71         6.39         12.74           Portapodus software         76.71         6.39         12.74           Photas operatives         2.80         0.23         0.47           Photas operatives         0.26         0.02         0.04           Pornadasys argenteus         0.12         0.11         0.02           Paradoso argenteus         0.12         0.01         0.02           Petodos enrunei         2.70         0.23         0.45           Pretados argenteus         0.12         0.01         0.02           Pandasys argenteus         0.12         0.01         0.02           Protachus argenteus         0.20         0.23         0.45           P	N. marginatus	2.67	0.22	0.44
N. nemurus         22.62         1.89         3.76           N. ovenidides         0.00         0.00         0.00           N. peroni         7.80         0.65         1.30           N. heroni         7.80         0.65         1.30           N. totu         0.20         0.02         0.03           N. vigatus         1.40         0.12         0.23           Parascolopsis inermis         0.95         0.08         0.16           Pentapodus setosus         3.70         0.31         0.61           Nemipteridae         76.71         6.39         12.74           Platax sp.         2.80         0.23         0.47           Peradays hasta         0.26         0.02         0.04           Pomadays argenteus         0.12         0.01         0.02           Psanopsis anomala         0.00         0.00         0.00           Priacanthus macracanthus         8.85         0.72         1.44           Priacanthus sp.         0.00         0.00         0.00           Priacanthus sp.         0.00         0.00         0.00           Sauruda micropectoralis         0.00         0.00         0.00           Scolopsist merioripoteru				
N. ovanidas         0.00         0.00         0.00           N. peronii         7.80         0.65         1.30           N. kolu         0.20         0.02         0.03           N. virgatus         1.40         0.12         0.23           Parascolopsis inernis         0.95         0.08         0.16           Portapodus setosus         3.70         0.31         0.61           Nuriperidae         76.71         6.39         12.74           Pleatorynchus pictus         18.80         1.57         3.12           Pornadasy: hansta         0.26         0.02         0.04           Pornadasy: argenteus         0.12         0.01         0.02           Pasetodop si anomala         0.00         0.00         0.00           Priacanthus macracanthus         8.65         0.72         1.44           P. typenus         4.33         0.36         0.72           Priacanthus sp.         0.00         0.00         0.00           Sourde micropectoralis         0.00         0.00         Sauda micropectoralis         0.00         0.00           Scolopsis taenicipterus         6.16         0.51         1.01         2.8         1.04         2.8         1.04 </td <td>N. nemurus</td> <td></td> <td></td> <td></td>	N. nemurus			
N tolu         0.20         0.02         0.03           N. virgatus         1.40         0.12         0.23           Parascolopiss inermis         0.95         0.08         0.16           Pertascolus setosus         3.70         0.31         0.61           Nomipteridae         76.71         6.39         12.74           Platax sp.         2.80         0.23         0.47           Pletotryinchus pictus         18.80         1.57         3.12           Pomadasys hasta         0.26         0.02         0.04           Pomadasys argenteus         0.12         0.01         0.02           Psenopsis anomala         0.00         0.00         0.00           Priacanthus macracanthus         8.65         0.72         1.44           P tagenus         4.33         0.36         0.72           Priacanthus sp.         0.00         0.00         0.00           Priacanthus ideddensis         0.00         0.00         0.00           Saurida micropectoralis         0.00         0.00         0.00           Sciopsist meteriopterus         6.16         0.51         1.01	N. oveniides			
N. virgatus         1.40         0.12         0.23           Parascolopsis inermis         0.95         0.06         0.16           Parascolopsis inermis         0.95         0.08         0.61           Nomiperidae         76.71         6.39         12.74           Pletorbynchus pictus         1880         1.57         3.12           Pletorhynchus pictus         1880         1.57         3.12           Pornadasys argenteus         0.12         0.01         0.02           Psencepis anomala         0.00         0.00         0.00           Pestochos marmai         2.70         0.23         0.45           Pretadosty argenteus         0.12         0.01         0.02           Psencepis anomala         0.00         0.00         0.00           Priacanthus macracanthus         8.65         0.72         1.44           P. tayenus         4.33         0.36         0.72           Priacanthus sp.         0.00         0.00         0.00           Sauruta micropectoralis         0.00         0.00         0.00           Scolopsis tenicipiterus         1.67         0.14         0.28	N. peronii N. tolu			
Pentapodus setissus         3.70         0.31         0.61           Namiptoridas         767.1         6.39         12.74           Platax sp.         2.80         0.23         0.47           Plectorynchus pictus         18.80         1.57         3.12           Pomadasy: hasta         0.26         0.02         0.04           Pomadasy: sargenteus         0.12         0.01         0.02           Psenchysis anomala         0.00         0.00         0.00           Psettoches arumai         2.70         0.23         0.45           Priacanthus macracanthus         8.65         0.72         1.44           Phacanthus sp.         0.00         0.00         0.00           Priacanthus sp.         0.00         0.00         0.00           Suitadi didensis         0.00         0.00         0.00           Suitadi micropectoralis         0.00         0.00         0.00           Sciolapsis taenicipterus         6.10         0.51         1.01	N. virgatus	1.40	0.12	0.23
Nemipteridae         7671         6.39         12.74           Platax sp.         2.80         0.23         0.47           Platax sp.         2.80         0.23         0.47           Plotchrynchus pictus         18.80         1.57         3.12           Pomadasys hasta         0.26         0.02         0.04           Pomadasys argenteus         0.12         0.01         0.02           Psenopsia anomala         0.00         0.00         0.00           Pattodes erumei         2.70         0.23         0.45           Priacanthus macracanthus         8.65         0.72         1.44           Pitaonthus sp.         0.00         0.00         0.00           Priacanthidae         12.98         1.08         2.16           Rhynchobauts djeddensis         0.00         0.00         0.00           Saurida micropectoralis         0.00         0.00         0.00           Scalogiss taenicipterus         1.67         0.14         0.28	Parascolopsis inermis Pentanodus setosus			
Platex sp.         2.80         0.23         0.47           Plactorhynchus pictus         18.80         1.57         3.12           Pomadasys hasta         0.26         0.02         0.04           Pomadasys argenteus         0.12         0.01         0.02           Psenapias aromala         0.00         0.00         0.00           Psettodes erumei         2.70         0.23         0.45           Priacanthus macracanthus         8.65         0.72         1.44           P tagenus         4.33         0.36         0.72           Priacanthus sp.         0.00         0.00         0.00           Seurida micropectoralis         0.00         0.00         0.00           Sauida micropectoralis         0.00         0.00         0.00           Sciopisst taenicipterus         6.10         0.51         1.01	Nemipteridae			
Pornadasys hasta         0.26         0.02         0.04           Pornadasys argenteus         0.12         0.01         0.02           Psenopsis anomala         0.00         0.00         0.00           Psettodes erurnei         2.70         0.23         0.45           Priacanthus macracanthus         8.65         0.72         1.44           Priacanthus sp.         0.00         0.00         0.00           Priacanthus sp.         0.00         0.00         0.00           Priacanthidae         12.98         1.08         2.16           Rhynchobaus djeddensis         0.00         0.00         0.00           Saurida micropectoralis         0.00         0.00         0.00           Scalenidae         1.67         0.14         0.28           Scalopists tenicripterus         6.10         0.51         1.01	Platax sp.			
Pornadass argenteus         0.12         0.01         0.02           Psanopsis anomala         0.00         0.00         0.00           Psatoches anomala         0.00         0.00         0.00           Psatoches anomala         2.70         0.23         0.45           Priacanthus macracanthus         8.65         0.72         1.44           P tagenus         4.33         0.36         0.72           Priacanthus sp.         0.00         0.00         0.00           Priacanthidae         12.98         1.08         2.16           Princhidatus djeddensis         0.00         0.00         0.00           Saurida micropectoralis         0.00         0.00         0.00           Scolopsis taenicipterus         6.10         0.51         1.01				
Psettodes erumei         2.70         0.23         0.45           Priacanthus macracanthus         8.65         0.72         1.44           Priacanthus spaceanthus         4.33         0.36         0.72           Priacanthus spaceanthus         9.000         0.00         0.00           Priacanthidae         12.98         1.88         2.16           Rhynchobatus djeddensis         0.00         0.00         0.00           Saurida micropectoralis         0.00         0.00         0.00           Scalepaidae         1.67         0.14         0.28           Scolopisst benicipterus         6.10         0.51         1.01	Pomadasys nasta Pomadasys argenteus	0.12	0.01	0.02
Priacanthus macracanthus         8.65         0.72         1.44           P tayonus         4.33         0.36         0.72           Priacanthus sp.         0.00         0.00         0.00           Priacanthidae         12.98         1.08         2.16           Rhynchobaus djeddensis         0.00         0.00         0.00           Saurida micropectoralis         0.00         0.00         0.00           Scalaenidae         1.67         0.14         0.28           Scolopiss tencipiqerus         6.10         0.51         1.01	Psenopsis anomala			
P. tayenus         4.33         0.36         0.72           Priacanthus sp.         0.00         0.00         0.00           Priacanthudae         12.98         1.08         2.16           Rhynchobatus djeddensis         0.00         0.00         0.00           Saurida micropectoralis         0.00         0.00         0.00           Scalenidae         157         0.14         0.28           Scolopsis taeriopterus         6.10         0.51         1.01				
Priacanthidae         1298         1.08         2.16           Rhyncholatus djeddensis         0.00         0.00         0.00           Saurida micropectoralis         0.00         0.00         0.00           Scalenidae         157         0.14         0.28           Scolopsis taenicpterus         6.10         0.51         1.01	P. tayenus			
Rhynchobatus djeddensis         0.00         0.00         0.00           Saurida micropectoralis         0.00         0.00         0.00         0.00           Scalenidae         1.67         0.14         0.28         0.51         1.01	Priacanthus sp.			
Saurida micropectoralis         0.00         0.00         0.00           Sciaenidae         1.67         0.14         0.28           Scolopsis taeniopterus         6.10         0.51         1.01				
Sciaenidae         1.67         0.14         0.28           Scolopsis taeniopterus         6.10         0.51         1.01	Saurida micropectoralis			
	Sciaenidae			

Demersal fish	268.32	22.36	44.57
Shells Trichiurus lepturus	0.00	0.00	0.00
Loligo duvauceli	15.24	1.27	2.53
Loligo chinensis	14.34	1.20	2.38
Loligo sp	34.14	2.85	5.67
Sepioteuthis lessoniana	1.06	0.09	0.18
Sepia spp.	2.94	0.25	0.49
Cephalopods	67.72	5.64	11.25
Metapenaeus ensis Metapenaeopsis stridulans	0.10	0.01	0.02
Parapenaeopsis snuulans	0.00	0.00	0.00
Penaeus japonicus	0.06	0.01	0.00
Solenocera subnuda	0.00	0.00	0.00
Trachypenaeus fulvus	0.05	0.00	0.01
T. haumela	0.87	0.07	0.14
T. myops	1.31	0.11	0.22
Shrimps	2.39	0.20	0.40
Panulirus polyphagus Thenus orientalis	0.49 8.56	0.04	0.08 1.42
Crabs	0.75	0.06	0.12
TOTAL (COMMERCIAL)	413.27	34.44	68.65
Trash fish			
Aluterus monoceros	0.53	0.04	0.09
Alutera	0.19	0.02	0.03
Anthiidae	0.00	0.00	0.00
Apogon spp.	1.76	0.15	0.29
Argyrops spinifer	0.00	0.00	0.00
Arothron sp. Bothidae	1.10	0.09	0.18
Callionvmidae	0.00	0.00	0.00
Canthigaster sp.	0.00	0.00	0.00
Carangoides equala	0.00	0.00	0.00
Coradion chrysozonus	0.00	0.00	0.00
Crabs	0.00	0.00	0.00
Dactyloptena sp.	0.20	0.02	0.03
Decapterus spp. Diodon holocanthus	1.99 2.14	0.17 0.18	0.33
Diodon holocanthus Diodon spp.	2.14	0.18	0.36
Dipterygonotus balteatus	0.92	0.08	0.15
Echeneis naucrates	0.00	0.00	0.00
Eutherapon theraps	0.00	0.00	0.00
Fistularia petimba	1.23	0.10	0.20
Fistularia spp	1.94	0.16	0.32
Heterodontus sp.	0.00	0.00	0.00
Holocentrus sp. Inimicus sinensis	9.50	0.79	1.58 0.00
Labridae	0.00	0.00	0.00
Lagocephalus spp.	3.81	0.32	0.63
Leiognathus spp.	2.32	0.19	0.39
Lepidotrigla sp.	0.28	0.02	0.05
Loligo duvauceli	0.00	0.00	0.00
Lophodiodon	0.38	0.03	0.06
Nemipterus marginatus	0.00	0.00	0.00
Nemipterus nematophorus Octopus sp.	0.00	0.00	0.00
Ostracion sp	0.19	0.00	0.03
Paramonacanthus spp.	0.00	0.00	0.00
Parascolpsis eriomma	0.00	0.00	0.00
Parapercids	0.28	0.02	0.05
Parupeneus cinnabarinus	0.00	0.00	0.00
Pentaprion longimanus	18.26	1.52	3.03
Platycephalus spp. Plauropactas spp.	0.26 3.76	0.02 0.31	0.04
Pleuronectes spp. Priacanthus macracanthus	3.76	0.31	0.62
Priacanthus tayenus	0.00	0.00	0.00
Pristotis jerdoni	14.40	1.20	2.39
Pseudomonocanthus sp	0.03	0.00	0.00
Pterois sp.	0.00	0.00	0.00
Pterocaesio chrysozona	0.00	0.00	0.00
Pterocaesis	1.07 27.05	0.09 2.25	0.18 4.49
Rays Rhynchostracion	27.05	2.25	4.49 0.15
Rhynchostracion nasus	0.50	0.08	0.13
Round sponges	0.00	0.00	0.00
Saurida micropectoralis	0.00	0.00	0.00
Saurida undosquamis	15.12	1.26	2.51
Saurida hoshinonis	0.00	0.00	0.00
Saurida elongata Saurida son	5.55 14.60	0.46	0.92 2.43
Saurida spp. Saurida tumbil	14.60	1.22	2.43 1.76
Scolopsis spp.	0.00	0.00	0.00
Sea cucumber	0.00	0.00	0.00
Sepia spp.	0.00	0.00	0.00
Shells	0.00	0.00	0.00
Stolephorus sp.	0.10	0.01	0.02
Scorpaena scabra	0.00	0.00	0.00
Siganus oramin Sillago	0.20 3.00	0.02	0.03
Sillago sihama	3.00	0.25	0.50
Starfish	0.00	0.40	0.91
Synodous hoshinonis	0.19	0.02	0.03
Tetrosomus sp.	1.19	0.10	0.20
Therapon theraps	12.00	1.00	1.99
Torquigener sp.	0.00	0.00	0.00
Triacanthus spp.	0.13	0.01	0.02
Upeneus sulphureus	25.00 0.00	2.08	4.15
		0.00	0.00
Upeneus moluccensis		0.05	0.10
Upeneus spp.	0.60	0.05	0.10
		0.05 0.00 15.73	0.10 0.00 31.35

Fishery group	Total (kg)		Average catch (kg/hr)		Percentage (%)	
	3rd cruise	4th cruise	3rd cruise	4th cruise	3rd cruise	4th cruise
Demersal fish	444.72	268.32	26.16	22.36	46.96	44.57
Pelagic fish	74.18	65.04	4.36	5.42	7.79	10.8
Cephalopods	29.32	67.72	1.72	5.64	3.11	11.25
Shrimps	0.49	2.39	0.03	0.2	0.05	0.40
Crab	0.54	0.75	0.04	0.06	0.06	0.12
Shell fish	0.60	0.00	0.04	0.00	0.06	0.00
Trash fish	395.81	188.74	23.28	15.73	41.55	31.35
Others	3.98	9.05	0.24	0.75	0.42	1.51
Total catch	949.63	602.01	55.86	50.16	100.00	100.00

Table 3	Summary of the catc	h composition of th	ne major fish group

*longimanus*, *Leiognatus spp.*, *Upeneus spp*.and *Saurida micropectoralis*. During the 4<sup>th</sup> cruise, trash fish registered an average catch rate of 15.7 kg/hr. Most trash fish were caught at station 31 (53.1 kg/hr) followed by station 7 (41.1 kg/hr). The trash fish were dominated by *Upeneus sulphureus*, *Pentaprion longimanus* and *Saurida spp*.

Priacanthids, the most dominant among the fish family in the 3<sup>rd</sup> cruise have an average catch rate of 7.9 kg/hr. The highest catch rate was at station 44, (100.0 kg/hr) and was recorded only by *Priacanthus macracanthus*. Nemipterids attained an average catch rate of 6.1 kg/hr. *Nemipterus bathybius* recorded the highest average catch rate of 1.9 kg/hr. Nemipterids were most abundant at station 33 with catch rate of 22.2 kg/hr. Carangidae, the third most dominant fish family registered an average catch rate of 2.8 kg/hr. In terms of individual species within the family, *Decapterus spp*. attained the highest average catch rate (1.0 kg/hr) and the others recorded an average catch rate of less than 1.0 kg/hr. Carangidae was most abundant at station 34 with catch rate of 8.7 kg/hr.

During the 4<sup>th</sup> cruise, the most dominant family i.e Nemipteridae have an average catch rate of 6.4 kg/hr. The highest catch rate was at station 27 with catch rate of 14.62 kg/hr. Carangidae attained an average catch rate of 4.3 kg/hr and the highest catch rate was recorded at station 7 (15.9 kg/hr). Among the carangids, *Atule mate* registered the highest catch rate (9.5 kg/hr) at station 6.

Species	n	а	b	r <sup>2</sup>
Selar crumenophthalmus	123	0.0057	3.4063	0.92
Decapterus kurroides	56	0.0067	3.1937	0.88
Decapterus ruselli	204	0.0053	3.2989	0.91
Decapterus macrosoma	85	0.0076	3.1082	0.86
C. malabaricus	144	0.0104	3.2704	0.96
Carangoides equala	54	0.0323	2.8953	0.92
<i>Dussumieria</i> spp.	198	0.0095	3.0511	0.67
Ariomma indica	53	0.0244	3.0545	0.63
Nemipterus bathybius	250	0.0172	3.0350	0.98
Nemipterus marginatus	96	0.0152	3.1071	0.98
Nemipterus mesoprion	143	0.0139	3.1161	0.99
Nemipterus nematophorus	186	0.0194	2.9862	0.98
Nemipterus nemurus	79	0.0188	2.9585	0.90
Nemipterus virgatus	55	0.0212	2.9414	0.98
Priacanthus macracanthus	151	0.0142	2.9997	0.98

Table 4 Length-weight relationship of selected species

The b values obtained ranged from 2.89 to 3.40.

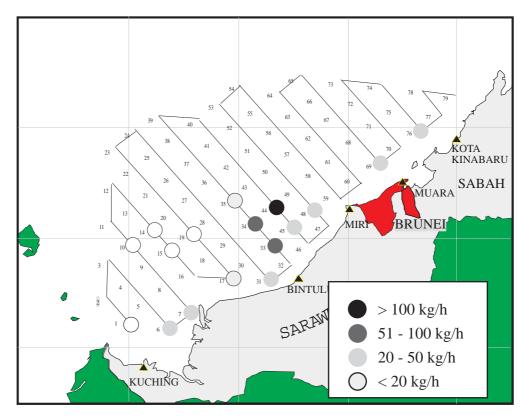


Fig. 3 Catch rate of commercial fish of individual station during 3rd cruise (9th - 3rd August 1996)

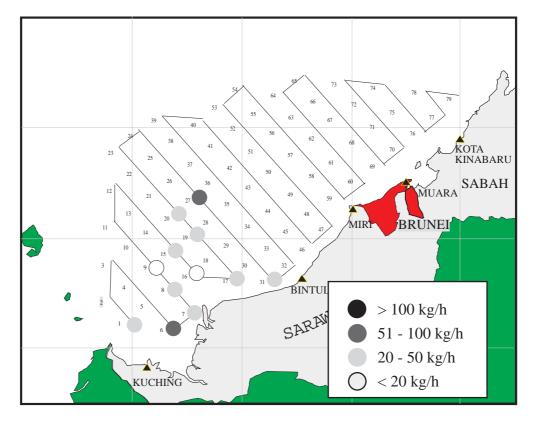


Fig. 4 Catch rate of commercial fish of individual station during 4th cruise (30th April - 30th May 1997)

#### Length-Weight Relationship

The length-weight relationship of the selected species are as shown in Table 4 below:

# Discussions

The overall average catch rate from individual stations during 3<sup>rd</sup> cruise (55.9 kg/hr) and 4<sup>th</sup> cruise (50.2 kg/hr) is very low compared to 318 kg/hr and 210 kg/hr obtained from previous surveys within the same areas in 1972 (Mohammed Shaari et al, 1976a) and 1973 (Mohammed Shaari et al, 1976b) respectively. However, in the present survey, the number of hauls is very small in number (i.e. 17 and 12 hauls for 3<sup>rd</sup> and 4<sup>th</sup> cruise respectively) as compared to 118 hauls during the previous survey (Mohammed Shaari et al, 1976b).

The other factor that might contributed to the low overall average catch rate of commercial fish after 17 and 12 hours trawling respectively is the openning of the trawl net. It could be that the net mouth did not open properly.

For an ideal fish which maintains the same shape, b=3, and this has occasionally been observed (Allen, 1938). In the present study, it seemed that the cube law is being obeyed as most of the *b* values lies close to 3. In general, the fish are also normally distributed. This was based on the findings by Carlender (1969) that fish with *b* values equal to 3 are more representative of the population. It was found that the *b* values for nemipterids varies excepts for 3 species (*N. nematophorus, N. nemurus and N. virgatus*). This suggests that the nemipterids have different growth rate. The lower values of *b* can be considered to be the result of biological features of the species.

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