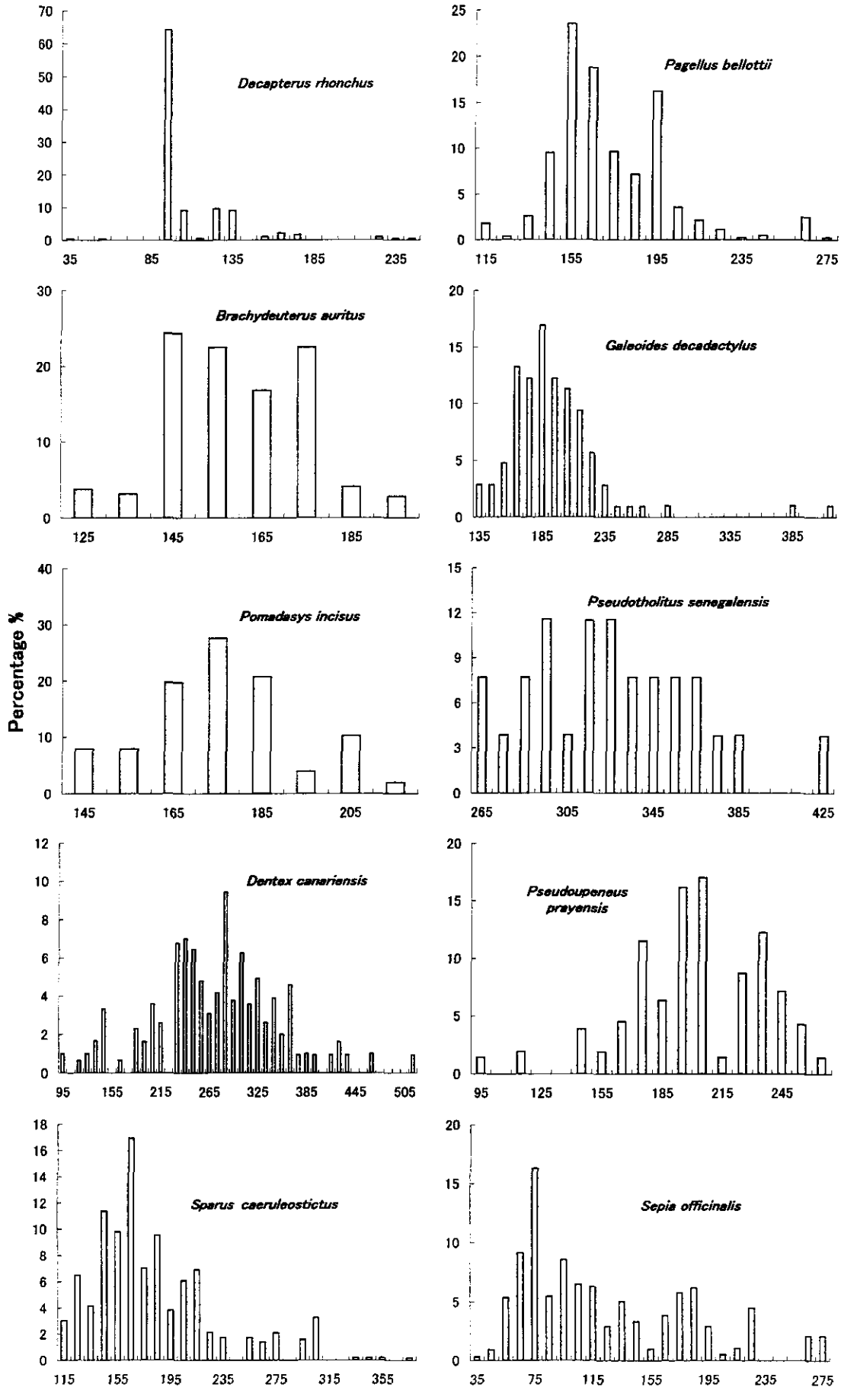


Fig.5-2-2-1(1) Total length frequency distributions of evaluation-target species(October 2～20, 2000).

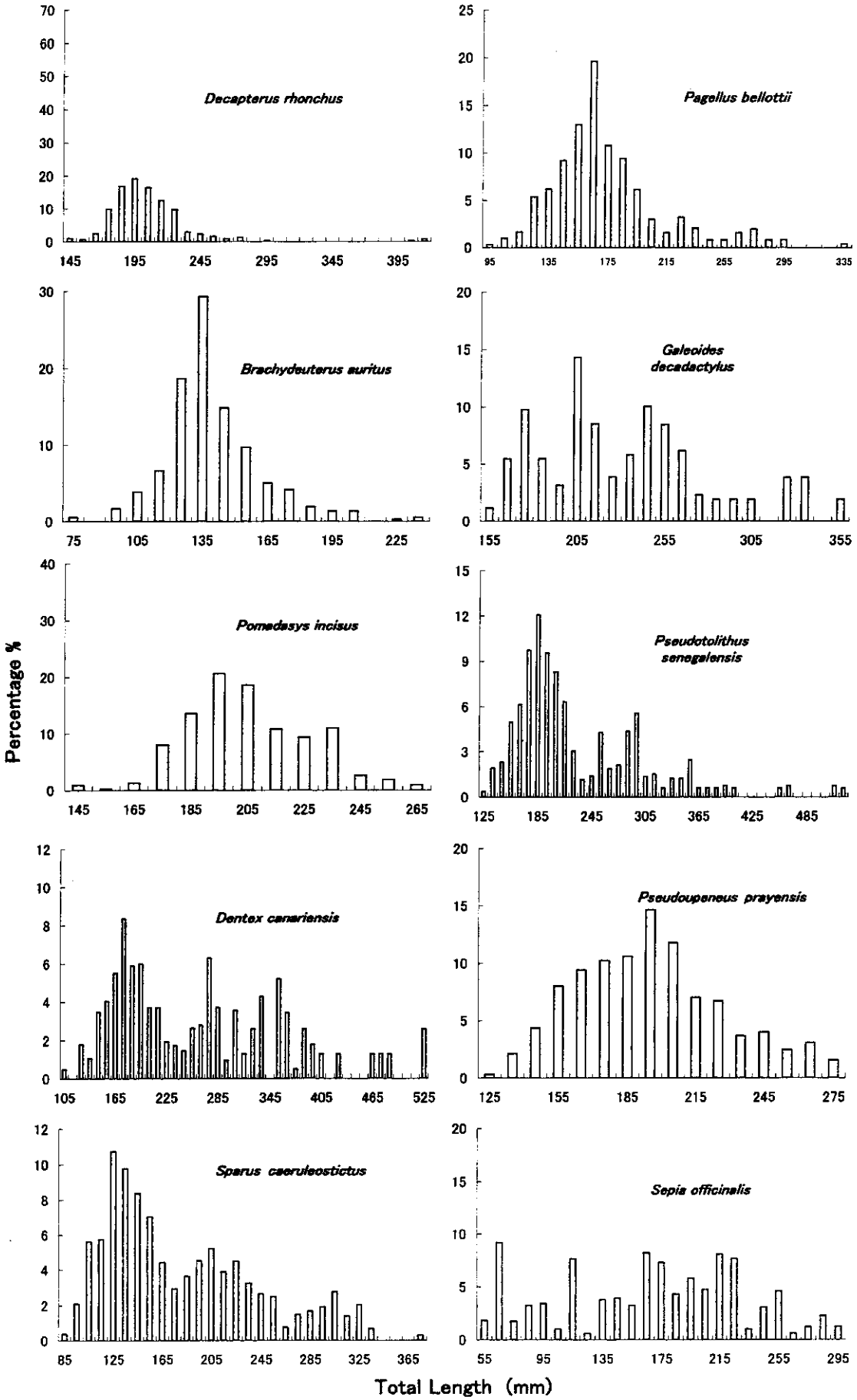


Fig.5-2-2-1(2) Total length frequency distributions of evaluation-target species(July 25～August 13, 2001).

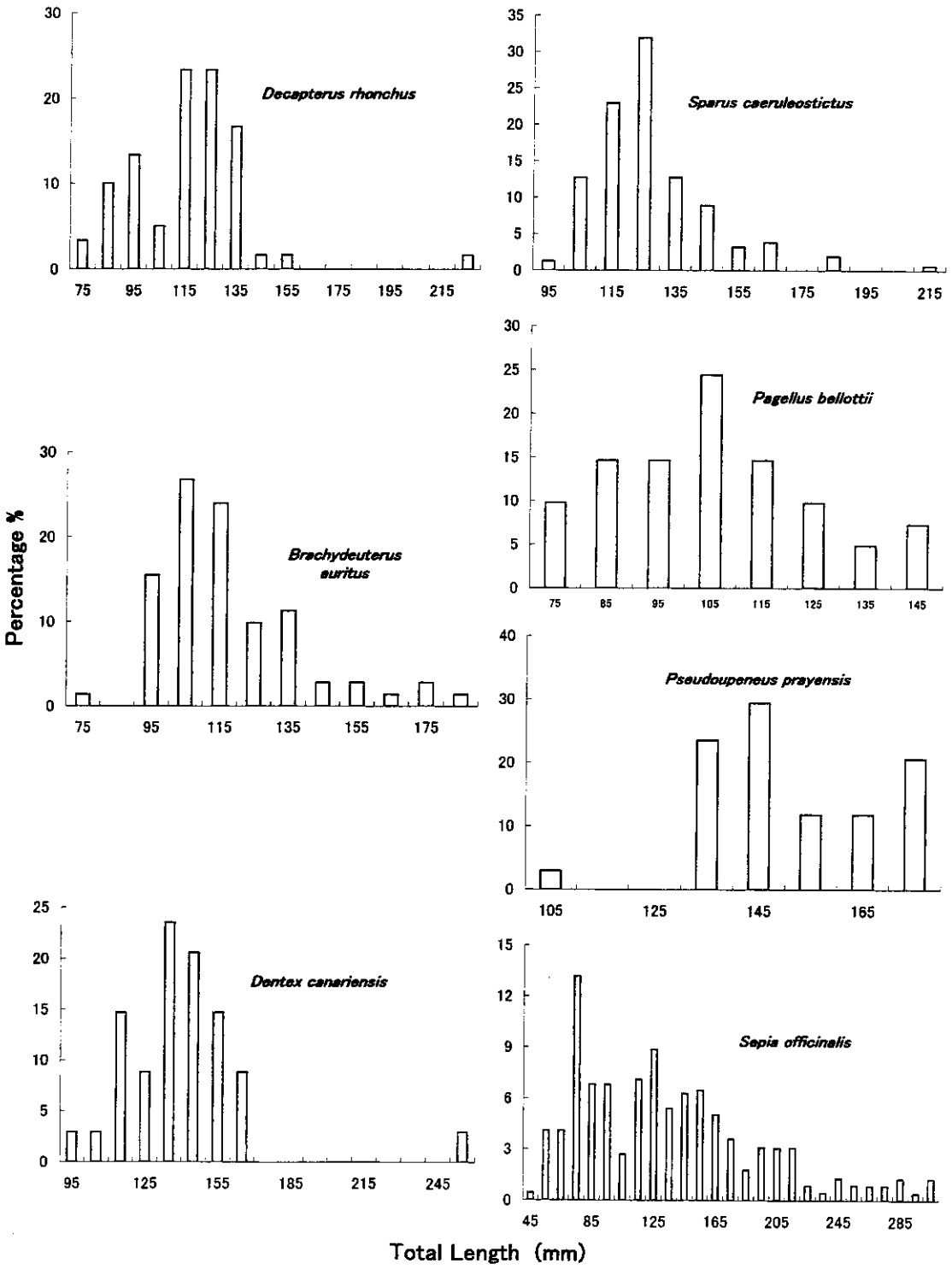


Fig.5-2-2-1(3) Total length frequency distributions of evaluation-target species(October 29～November 16, 2001).

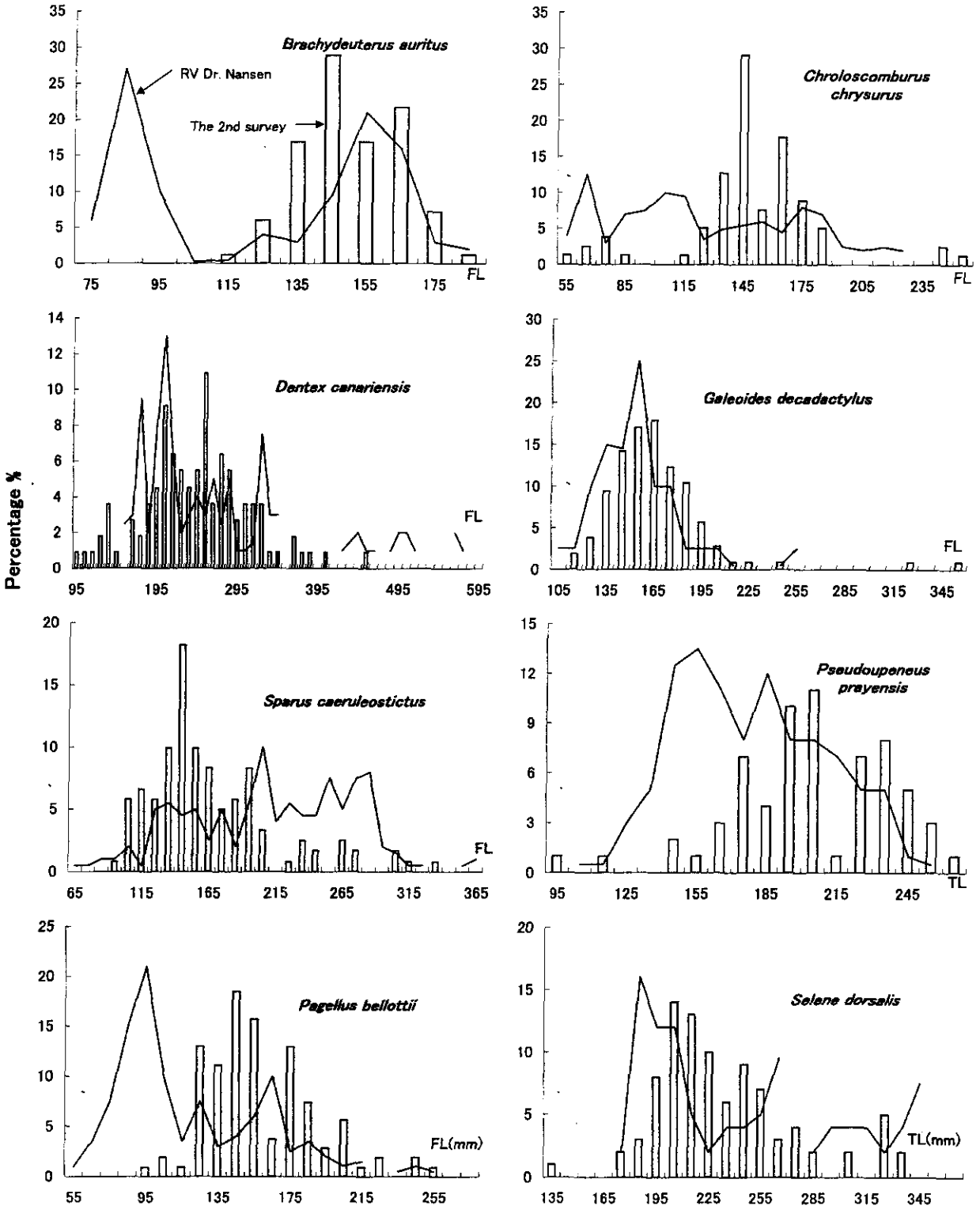


Fig.5-2-2-2(1) Comparisons of body length frequency distribution of main species between RV Dr. Nansen's survey and present project survey(October 2～20,2000).

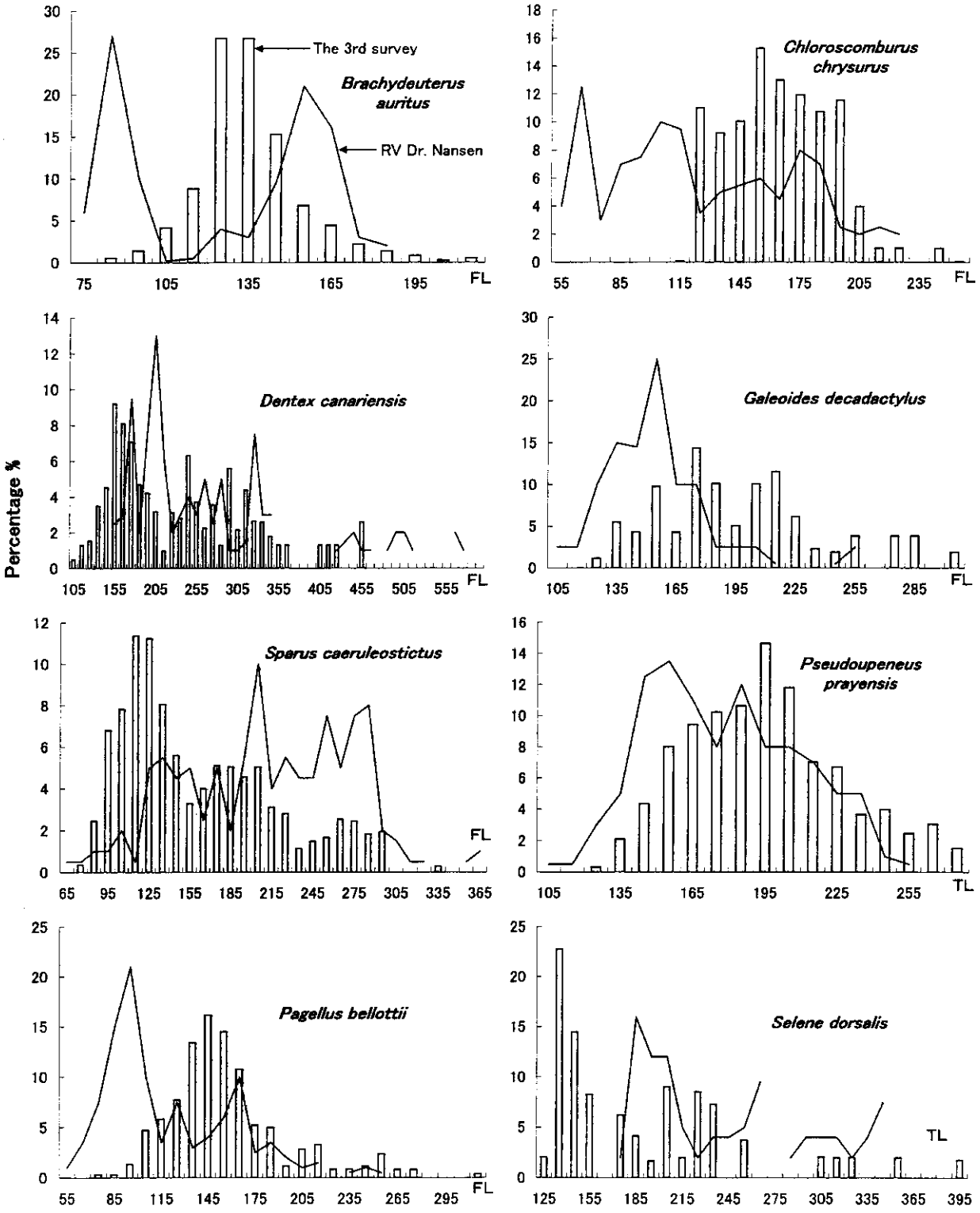


Fig.5-2-2-2(2) Comparisons of body length frequency distribution of main species between RV Dr. Nansen's survey and present project survey(July 25～August 13,2001).

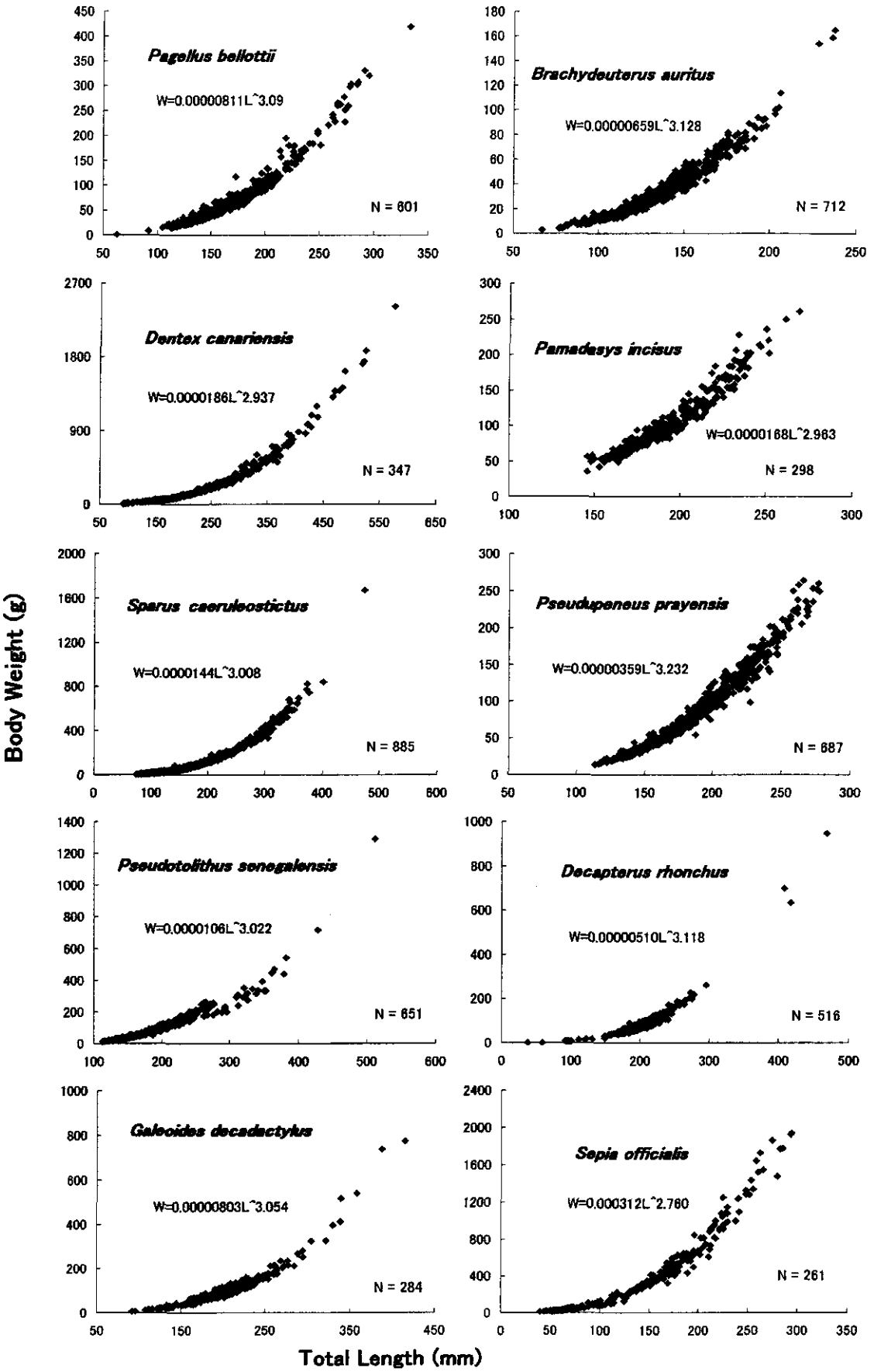


Fig.5-2-2-3(1) Relationships between body length and body weight of evaluation-target species.

Sepia officialis : Mantle length

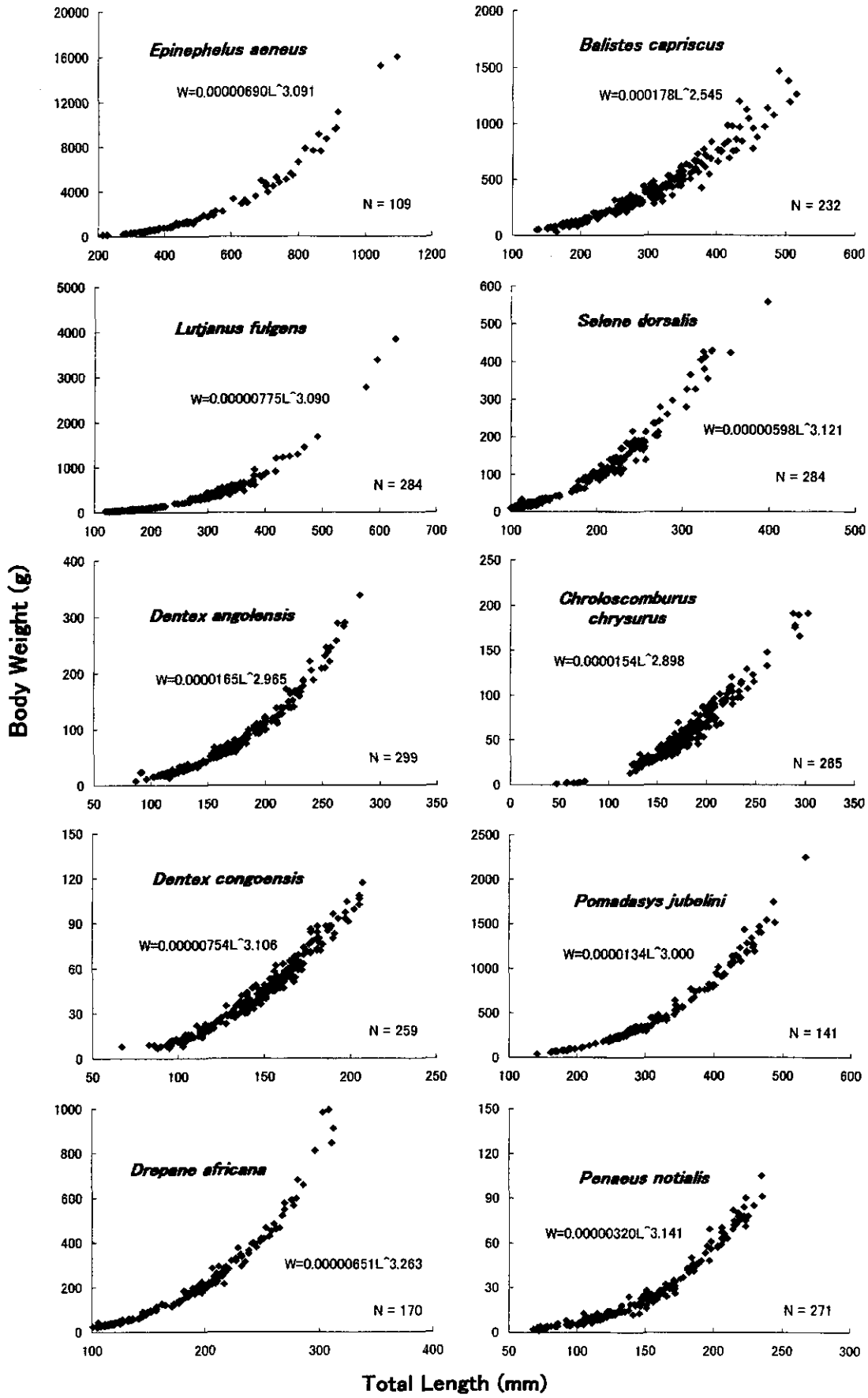


Fig.5-2-2-3(2) Relationships between body length and body weight of survey-target species.

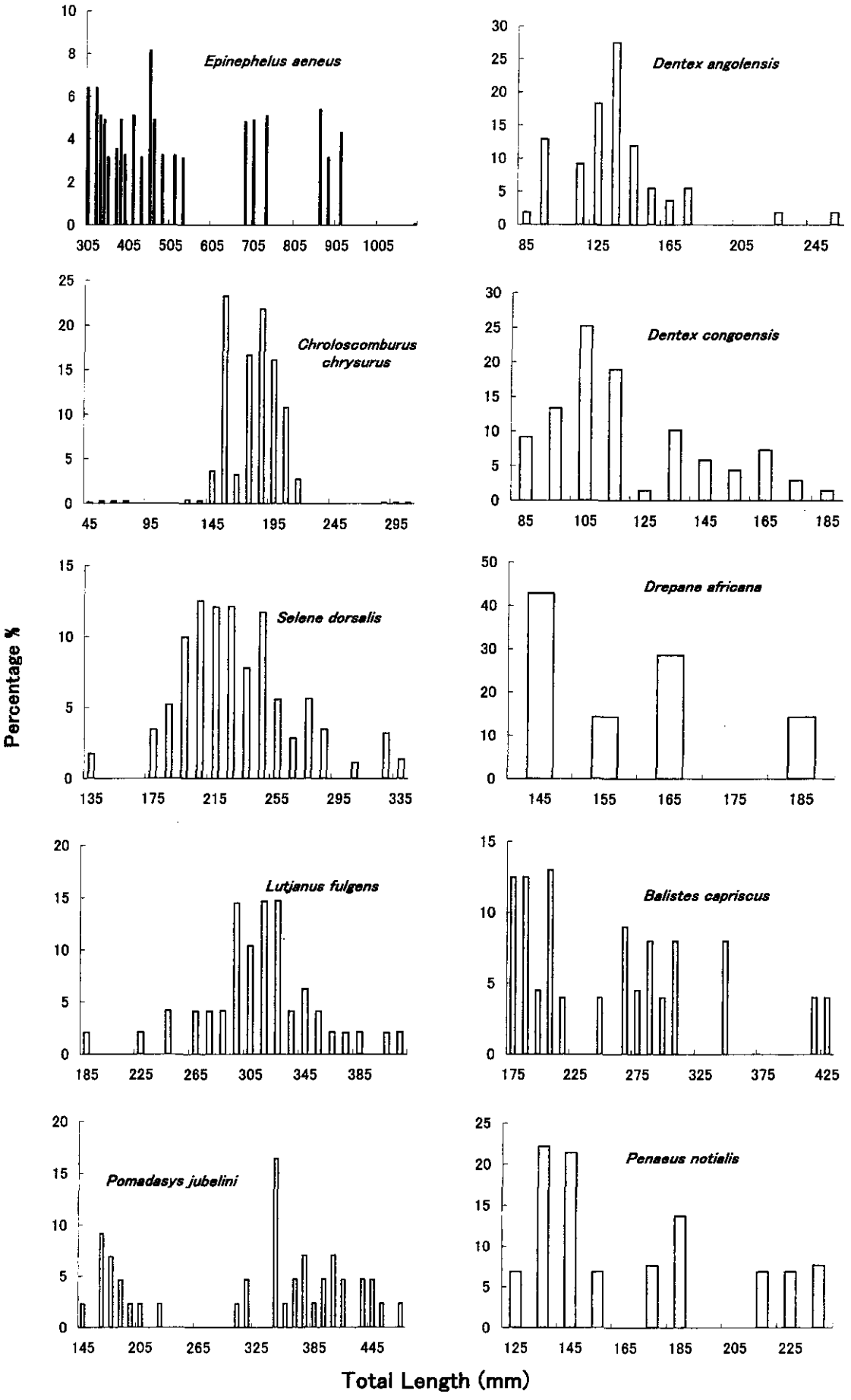


Fig.5-2-2-4(1) Total length frequency distributions of survey-target species(October 2～20, 2000).

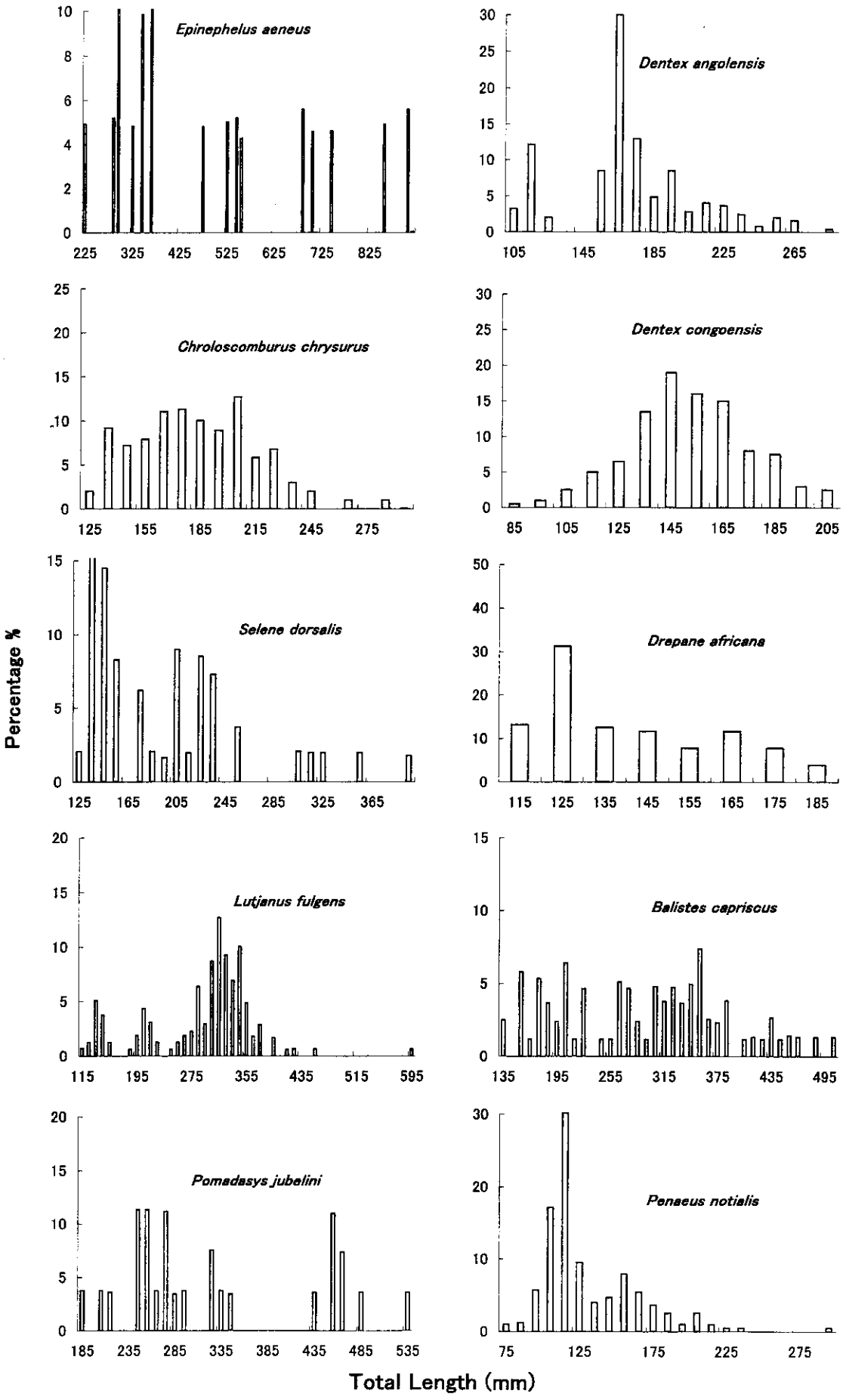


Fig.5-2-2-4(2) Total length frequency distributions of survey-target species(July 25～August 13, 2001).

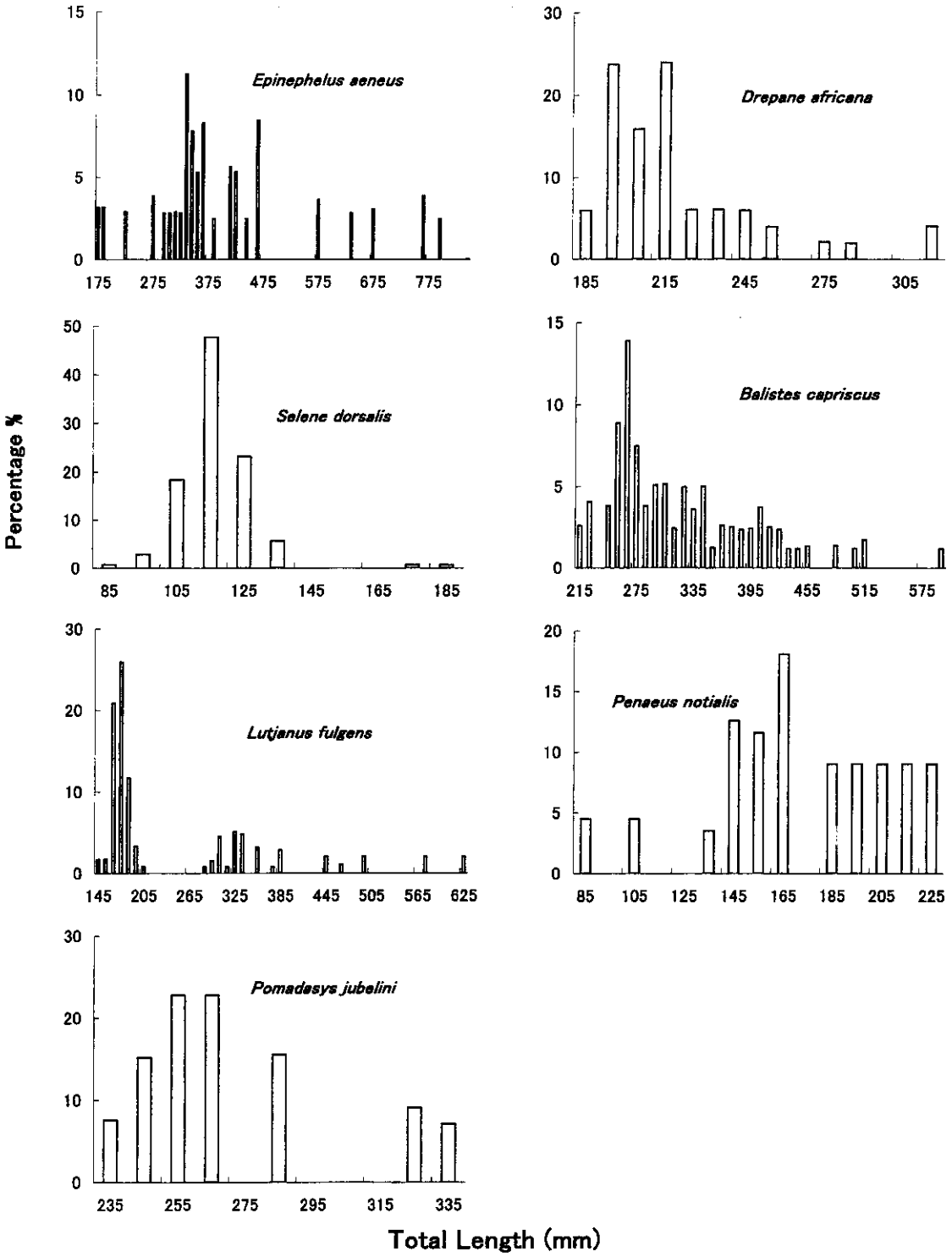


Fig.5-2-2-4(3) Total length frequency distributions of survey-target species(October 29～November 15, 2001).

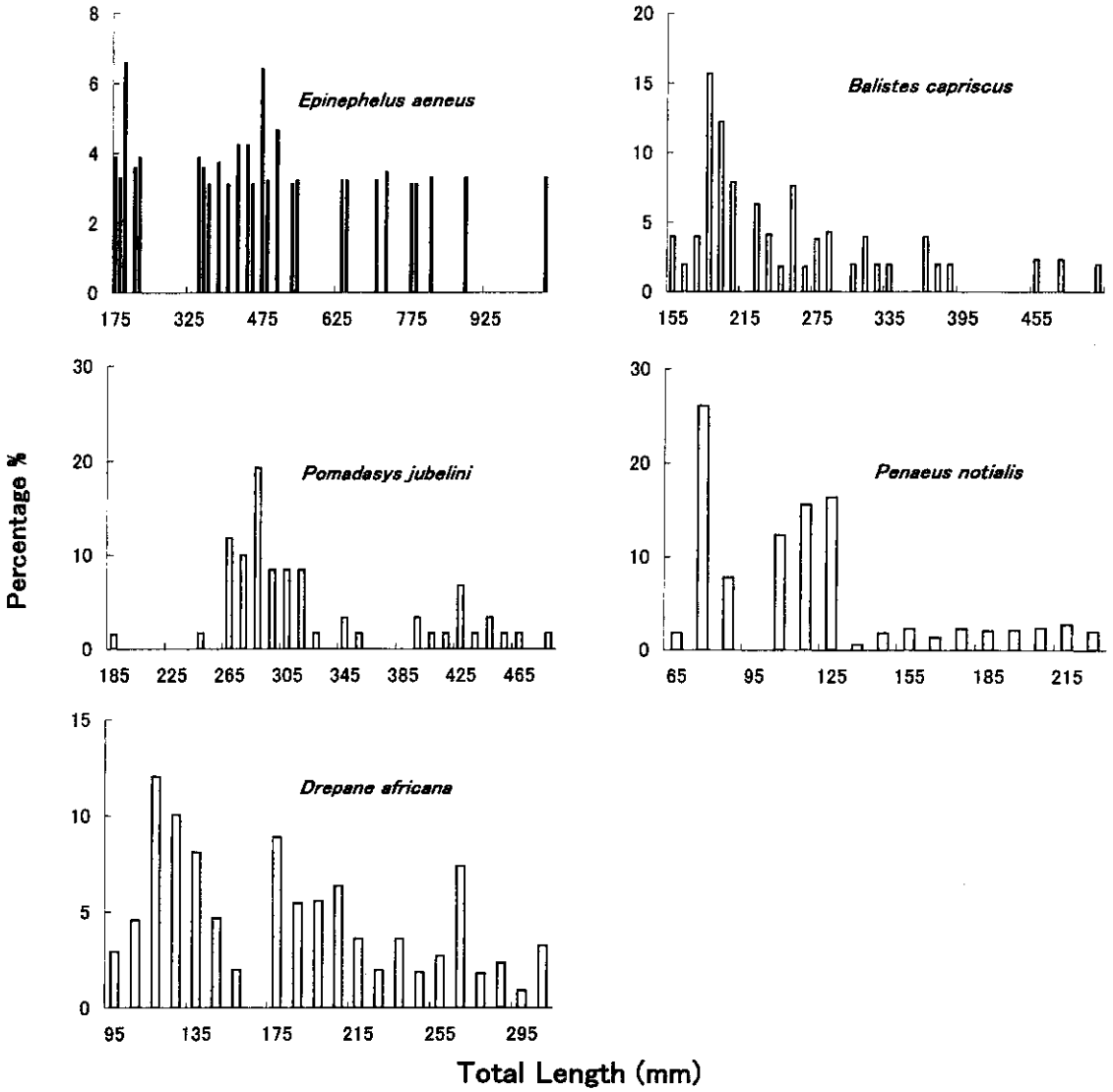


Fig.5-2-2-4(4) Total length frequency distributions of survey-target species(July 20～August 9, 2002).

Table 5-2-2-1(1) List of all the species caught by trawling survey

No.	Family	Species	2nd	3rd	4th	5th
Pisces						
1	Trakidae	*Mustelus mustelus*	+	+	+	+
2	Squatinidae	*Squatina aculeata*		+	+	+
3	Torpedinidae	*Torpedo torpedo*	+	+	+	+
4		*Torpedo marmorata*	+	+	+	+
5	Rhinobatidae	*Rhinobatos irvinei*	+		+	+
6		*Rhinobatos albomaculatus*	+	+		+
7		*Rhinobatos cemiculus*	+			
8	Platyrhinidae	*Zanobatus schoenlenii*	+	+	+	+
9	Rajidae	*Raja doutrei*		+	+	
10		*Raja miraletus*	+	+	+	+
11		*Raja straeleni*		+		+
12	Dasyatidae	*Dasyatis marmorata*	+	+		+
13		*Himantura margarita*	+	+	+	+
14	Elopidae	*Elops lacerta*		+	+	+
15	Alubulidae	*Alubula vulpes*		+	+	+
16	Muraenidae	*Muraena melanotis*	+	+		
17		*Muraena helena*				+
18		*Lycodontis afer*			+	
19	Ophichthidae	*Apterichthus anguiformis*	+			
20		*Echelus myrus*		+	+	+
21	Muraenoesocidae	*Cynoponticus ferox*	+	+		+
22	Congridae	*Conger conger*				+
23	Engraulidae	*Engraulis encrasicolus*	+		+	
24	Clupeidae	*Sardinella aurita*	+	+	+	+
25		*Sardinella maderensis*	+	+	+	+
26		*Sardinella rouxi*	+	+		+
27		*Ethmalosa fimbriata*	+		+	
28		*Ilisha africana*		+	+	+
29	Synodontidae	*Synodus saurus*	+		+	
30		*Saurida brasiliensis*	+		+	+
31		*Trachinocephalus myops*	+	+	+	+
32	Ariidae	*Arius heudelotii*		+		
33	Ophididae	*Brotula barbata*	+	+	+	+
34	Batrachoididae	*Halobatrachus didactylus*	+	+	+	+
35	Lophiidae	*Lophiodes kempi*		+	+	
36	Antennariidae	*Antennarius senegalensis*		+	+	+
37		*Antennarius commersoni*		+		
38	Belonidae	*Strongylura senegalensis*			+	
39	Holocetridae	*Holocentrus hastatus*	+	+		+
40	Zeidae	*Zeus feber*	+	+	+	+
41	Caproidae	*Antigonia capros*			+	
42	Syngnathidae	*Hippocampus kelloggi*			+	
43	Fisturaridae	*Fisturaria tabacaria*	+	+	+	+
44		*Fisturaria petimba*	+	+	+	+
45	Dactylopteridae	*Cephalacanthus volitans*	+	+	+	+
46	Scorpaenidae	*Helicolenus dactylopterus*	+		+	+
47		*Scorpaena stephanica*	+	+	+	+
48		*Scorpaena laevis*		+		
49		*Scorpaena normani*		+		
50		*Scorpaena scrofa*			+	

Table 5-2-2-1(2) List of all the species caught by trawling survey

No.	Family	Species	2nd	3rd	4th	5th
Pisces						
51		*Scorpaena elongata*				+
52	Triglidae	*Chelidonichthys lastoviza*	+	+	+	+
53		*Trigla lyra*	+	+	+	+
54		*Lepidotrigla cadmani*	+	+	+	+
55	Platycephalidae	*Grammoplites gruveli*	+	+	+	+
56	Serranidae	*Serranus accraensis*	+	+	+	+
57		*Epinephelus aeneus*	+	+	+	+
58		*Epinephelus taeniops*	+	+	+	+
59		*Epinephelus guaza*	+			
60		*Epinephelus goreensis*	+			+
61		*Epinephelus itajara*				+
62		*Mycteroperca fusca*				+
63		*Anthias anthias*	+		+	+
64	Grammatidae	*Rypticus saponaceus*		+	+	+
65	Priacanthidae	*Priacanthus arenatus*	+	+	+	+
66	Branchiostegidae	*Branchiostegus semifasciat*	+	+	+	+
67	Echeneidae	*Echeneis naucrates*	+		+	
68	Rachycentridae	*Rachycentrum canadum*		+	+	
69	Carangidae	*Seriola dumerili*	+		+	+
70		*Decapterus punctatus*		+	+	+
71		*Decapterus rhonchus*	+	+	+	+
72		*Trachinotus maxillosus*			+	
73		*Trachurus trachurus*		+	+	+
74		*Chloroscomburus chrysurus*	+	+	+	+
75		*Selar macrophthalmus*	+		+	+
76		*Caranx crysos*	+	+	+	+
77		*Caranx senegallus*			+	
78		*Selene dorsalis*	+	+	+	+
79		*Alectis alexandrinus*	+	+	+	+
80	Lutjanidae	*Lutjanus fulgens*	+	+	+	+
81		*Lutjanus agennes*	+		+	
82		*Lutjanus dendatus*		+	+	+
83		*Lutjanus endecacanthus*			+	
84		*Apsilus fuscus*	+	+	+	+
85	Gerreidae	*Eucinostomus melanopteru*	+	+	+	+
86	Pomadasyidae	*Brachydeuterus auritus*	+	+	+	+
87		*Pomadasys incisus*	+	+	+	+
88		*Pomadasys jubelini*	+	+	+	+
89		*Plectorhynchus mediterran*	+	+	+	+
90		*Plectorhynchus macrolepis*		+	+	
91	Sparidae	*Dentex angolensis*	+	+	+	+
92		*Dentex congoensis*	+	+	+	+
93		*Dentex canariensis*	+	+	+	+
94		*Dentex gibbosus*	+	+	+	+
95		*Sparus caeruleostictus*	+	+	+	+
96		*Pagellus bellottii*	+	+	+	+
97		*Boops boops*	+	+	+	+
98	Lethrinidae	*Lethrinus atlanticus*	+	+	+	+
99	Polynemidae	*Galeoides decadactylus*	+	+	+	+
100		*Pentanemus quinquarius*				+

Table 5-2-2-1(3) List of all the species caught by trawling survey

No.	Family	Species	2nd	3rd	4th	5th
Pisces						
101	Sciaenidae	*Pseudotolithus senegalensis*	+	+	+	+
102		*Umbrina canariensis*	+	+	+	+
103		*Umbrina steindachneri*		+		+
104		*Pteroscion peli*	+	+	+	+
105		*Pentheroscion mbizi*		+		+
106	Mullidae	*Pseudoupeneus prayensis*	+	+	+	+
107	Drepanidae	*Drepane africana*	+	+	+	+
108	Chaetodontidae	*Bauchotia marcellae*	+	+	+	+
109		*Chaetodon hoefleri*	+	+	+	+
110	Pomacanthidae	*Holacanthus africanus*	+	+	+	+
111	Cepolidae	*Cepola pauciradiata*			+	+
112	Pomacentridae	*Chromis chromis*	+	+	+	+
113		*Abudefduf sexfasciatus*			+	
114	Labridae	*Bodianus speciosus*	+	+	+	+
115		*Coris julis*	+	+	+	+
116		*Xyrichthys novacula*	+		+	+
117	Scaridae	*Sparisoma rubripinno*		+	+	+
118		*Scarus hoefleri*		+	+	+
119	Trachinidae	*Trachinus radiatus*	+	+	+	+
120		*Trachinus armatus*	+	+	+	+
121		*Trachinus pellegrini*		+	+	
122	Uranoscopidae	*Uranoscopus polli*	+	+	+	+
123		*Uranoscopus albesca*		+	+	+
124	Ephippidae	*Chaetodipterus lippei*	+	+	+	+
125	Acanthuridae	*Acanthurus monroviae*	+	+	+	+
126	Sphyraenidae	*Sphyraena guachancho*	+	+	+	+
127	Trichiuridae	*Trichiurus lepturus*	+	+	+	+
128	Scombiridae	*Katsuwonus pelamis*	+			
129		*Sarda sarda*		+		
130		*Scomber japonicus*	+	+	+	+
131		*Scomberomorus tritor*	+		+	+
132	Ariommatidae	*Ariomma bondi*	+	+		+
133	Stromateidae	*Stromateus fiatola*	+	+	+	+
134	Psettodidae	*Psettodes belcheri*	+	+	+	+
135	Citharidae	*Citharus macrolepidotus*	+	+	+	+
136	Bothidae	*Syacium micrurum*	+	+	+	+
137		*Bothus podas*	+	+	+	+
138		*Arnoglossus capensis*	+			
139	Soleidae	*Dicologoglossa hexaphthaln*	+	+	+	+
140		*Solea senegalensis*	+	+	+	+
141		*Monochirus hispidus*				+
142	Cynoglossidae	*Cynoglossus monodi*	+	+	+	+
143		*Synaptura cadenati*				+
144	Balistidae	*Balistes capriscus*	+	+	+	+
145		*Balistes punctatus*	+	+	+	+
146	Monacanthidae	*Alutera schoepfii*	+	+	+	+
147		*Alutera monoceros*	+			+
148		*Stephanolepis hispidus*	+	+	+	+
149		*Cantherhines pullus*				+
150	Ostraciontidae	*Acanthostracion guineensis*	+	+	+	+

Table 5-2-2-1(4) List of all the species caught by trawling survey

No.	Family	Species	2nd	3rd	4th	5th
Pisces						
151	Tetraodontidae	*Lagocephalus laevigatus*	+	+	+	+
152		*Ephippion guttiferum*	+	+	+	+
153		*Sphoeroides cutaneus*	+	+	+	+
154		*Sphoeroides marmoratus*		+	+	+
155	Diodontidae	*Diodon hystrix*	+		+	+
156		*Chilomycterus antennatus*	+	+	+	+
	Mollusca					
157	Glycymerididae	*Chlamys purpuratus*		+		
158	Cassidae	*Cassis tesselata*		+		
159	Symatiidae	*Charonia nodifera*				+
160	Volutidae	*Cymbium cymbium*	+	+	+	+
161	Sepiidae	*Sepia officinalis*	+	+	+	+
162	Loliginidae	*Alloteuthis africana*	+		+	
163	Ommastrephidae	*Illex coindetii*	+	+	+	
164		*Todaropsis eblanae*	+			+
165	Octopodidae	*Octopus vulgaris*	+	+	+	+
	Crustacea					
166	Penaeidae	*Penaeus notialis*	+	+	+	+
167		*Penaeus kerathurus*		+		+
168	Palinuridae	*Panulirus argus*	+		+	+
169		*Panurilus regius*		+		
170	Scyllaridae	*Scyllarides herklotsii*		+	+	+
171	Calappidae	*Calappa pelii*	+	+	+	+
172		*Calappa gallus*		+	+	+
173		*Calappa rubrogutata*			+	
174	Majidae	*Maja squinado*		+	+	+
175	Portunidae	*Cronius ruber*		+	+	
176		*Portunus hastatus*		+		+
177		*Portunus validus*			+	
178		*Callinectes marginatus*				+
179	Squillidae	*Squilla cadenati*	+	+		+
	Reptilia					
180	Cheloniidae	*Chelonia mydas*	+	+		

Table5-2-2-2(1) Catch records of trawling surveys(Kg)

Station	St. 1				St. 2				St. 3				St. 4				St. 5			
	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th
Evaluation-target	67.65	60.14	42.53	190.4	138	27.75	82.22	188.3	53.4	44.27	120.5	82.19	44.63	63.77	40.18	107.9	34.48	13.31	43.28	142.9
Survey-target	62.18	28.11	16.56	13.38	36.13	2.431	25	2.746	9.366	8.964	8.266	53.03	0	1.391	13.02	5.302	0.16	1.624	16.53	38.42
Other	26.57	128.2	86.54	53.07	16.02	16.97	7.528	41.98	48.97	36.16	34.94	89.15	11.29	43.42	22.06	50.72	15.87	27.25	20.87	47.06
Total	156.4	216.5	145.6	256.8	190.1	47.15	114.8	233	111.7	89.4	163.7	224.4	55.91	108.6	75.25	164	50.51	42.18	80.69	228.4

Station	St. 6				St. 7				St. 8				St. 9				St.10			
	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th
Evaluation-target	122.6	87.33	124.1	73.2	21.98	263.4	30.62	108.6	33.38	202.8	65.73	698.5	332.6	99.23	124	103.6	6.492	104.6	92.72	65.08
Survey-target	14.5	26.79	7.503	4.442	0	62.25	93.29	1.622	27.84	55.16	1.516	34.24	15.19	6.133	38.08	4.068	0	15.43	20.62	38.5
Other	28.94	64.34	74.3	47.88	406.2	157.3	44.74	89.77	73.21	61.24	120.2	213.3	101.9	70.65	68.52	92.92	49.42	19.2	252.7	89.38
Total	166	178.5	205.9	125.5	428.2	482.9	168.7	200	134.4	319.2	187.4	946.1	449.7	176	230.6	200.6	55.91	139.2	366	193

Station	St.11				St.12				St.13				St.14				St.15			
	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th
Evaluation-target	111.6	174.4	9.258	95.96	237.7	7.348	17.83	110.7	—	0.42	78.36	71.81	138.9	196.5	60.57	60.85	71.91	150.1	37.17	263.4
Survey-target	7.76	22.07	3.978	3.464	3.504	13	5.086	1.816	—	14.2	4.749	11.26	12.42	314.5	2.318	60.74	6.054	30.31	0.116	188.6
Other	46.77	52.96	21.5	31.01	89.34	69.8	37.45	101.6	—	32.53	80.66	116	337.2	201.1	8.76	182.5	58.09	180.2	10.09	173
Total	166.1	249.4	34.73	130.4	330.6	90.16	60.36	214.1	—	47.15	163.8	199.1	488.6	712.1	71.65	304	136.1	360.5	47.38	624.9

Station	St.16				St.17				St.18				St.19				St.20			
	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th
Evaluation-target	36.18	84.66	57.99	85.73	18.47	46.08	23.26	78.12	44.12	24.92	138.7	67.84	298.2	47	154.4	55.32	27.38	24.77	2117	229.1
Survey-target	1.01	3.236	9.904	2.552	6.92	4.48	12.92	4.682	4.734	3.504	5.66	10.9	0	5.842	0	2.36	0.03	0.576	12.87	19.92
Other	38.53	92.91	84.9	75.98	71.96	37.78	76.05	113.2	83.56	45.4	74.97	46.04	262.8	265.3	166.9	1161	14.82	8.835	54.15	43.75
Total	75.72	180.8	152.8	164.3	97.36	88.34	112.2	196	132.4	73.83	219.3	124.8	561	318.1	321.3	1218	42.23	34.18	2184	292.7

Station	St.21				St.22				St.23				St.24				St.25			
	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th
Evaluation-target	32.8	25.2	24.8	215.8	184.1	29.0	23.3	3.5	36.3	8.1	28.4	24.5	43.0	67.8	76.2	73.3	90.6	35.1	201.4	48.7
Survey-target	0.0	6.6	3.0	10.0	4.8	0.0	0.0	0.0	3.8	0.0	0.0	0.2	0.0	1.5	8.3	1.3	15.5	9.3	0.0	16.4
Other	11.2	11.6	12.9	13.9	25.4	7.3	19.4	18.2	68.3	8.2	34.9	111.6	22.2	44.1	125.3	92.1	213.1	298.1	329.7	527.6
Total	44.0	43.5	40.6	239.7	214.3	36.3	42.7	21.7	108.4	16.4	63.3	136.4	65.2	113.3	209.7	166.7	319.2	342.5	531.1	592.8

Station	St.26				St.27				St.28				St.29				St.30			
	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th
Evaluation-target	311.4	78.7	113.2	52.7	200.7	226.8	23.9	39.3	233.5	105.8	70.8	282.8	100.8	47.5	44.8	105.5	218.7	28.8	29.2	113.9
Survey-target	0.8	22.0	3.3	4.7	0.8	42.9	0.0	0.7	12.5	0.9	0.0	16.8	5.4	38.7	0.8	4.4	75.3	7.7	24.4	4.9
Other	127.4	19.4	9.5	27.8	24.2	43.0	14.5	26.3	108.1	41.1	29.7	31.8	38.4	43.1	25.7	27.8	133.1	19.3	50.9	78.1
Total	439.6	120.0	126.0	85.2	225.7	312.8	38.4	66.3	354.1	147.8	100.6	331.4	144.7	129.3	71.2	137.8	427.1	55.8	104.5	197.0

Table5-2-2-2(2) Catch records of trawling surveys(Kg)

Station	St.31				St.32				St.33				St.34				St.35			
	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th
Evaluation-target	17.9	25.8	87.3	119.6	422.7	22.7	206.7	7.2	137.8	92.0	86.3	9.9	93.2	70.1	81.0	136.9	78.2	51.5	573.9	17.0
Survey-target	0.0	0.0	1.3	14.9	43.8	16.8	19.9	2.3	56.5	2.4	6.3	1.7	20.8	30.0	16.2	27.2	2.2	19.7	58.3	19.2
Other	57.8	276.2	82.3	137.7	57.5	20.8	24.8	19.3	86.4	81.7	25.2	54.6	1438.2	142.5	80.1	72.0	6.6	24.3	61.7	28.8
Total	75.7	302.0	170.9	272.2	524.0	60.3	251.4	28.8	280.6	176.2	117.8	66.2	1552.2	242.5	177.3	236.0	87.0	95.5	693.8	65.0

Station	St.36				St.37				St.38				St.39				St.40			
	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th
Evaluation-target	386.7	479.7	254.7	76.1	263.5	36.4	49.8	39.0	135.5	315.4	103.5	48.5	94.8	174.3	24.3	157.0	91.6	87.9	574.4	344.8
Survey-target	11.5	13.3	37.0	64.1	18.3	81.5	20.4	10.6	9.9	179.8	40.2	13.0	4.5	5.9	5.6	1.6	65.5	38.1	163.2	65.4
Other	164.5	53.9	17.9	65.0	193.3	105.5	44.3	52.5	16.0	36.1	73.2	26.4	81.0	86.1	43.6	64.4	116.8	307.3	91.0	801.3
Total	562.7	546.9	309.5	205.2	475.0	223.4	114.5	102.2	161.3	531.3	217.0	87.8	180.4	266.3	73.5	223.0	274.0	433.2	828.6	1211.4

Station	St.41				St.42				St.43				St.44				St.45			
	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th
Evaluation-target	13.7	4.2	107.2	25.4	—	5.4	33.7	—	—	0.9	105.5	13.5	344.7	3.5	316.8	14.0	77.9	—	80.4	53.9
Survey-target	81.0	102.7	11.6	57.8	—	70.5	5.8	—	—	62.4	367.8	919.6	141.8	21.5	694.7	2.8	38.7	—	498.9	7.7
Other	57.6	80.0	69.5	113.8	—	50.2	85.2	—	—	88.4	262.2	346.9	190.8	33.1	703.1	76.0	184.5	—	283.3	328.1
Total	152.3	186.9	188.3	197.0	—	126.1	124.7	—	—	151.6	735.5	1280.0	677.3	58.2	1714.6	92.7	301.2	—	862.6	389.7

Station	St.46				St.47				St.48				St.49				St.50			
	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	4th	5th
Evaluation-target	85.0	2.6	23.8	7.3	60.3	17.5	247.7	7.9	59.7	15.2	22.9	80.2	62.7	33.5	340.8	45.0	104.7	—	323.2	122.2
Survey-target	6.0	47.2	352.4	844.0	0.0	32.3	0.0	0.0	69.2	204.9	44.2	14.6	159.6	76.3	150.7	278.1	172.5	—	134.5	164.8
Other	84.3	76.1	204.6	307.9	73.1	77.0	227.6	24.0	72.4	140.6	1722.4	53.5	159.8	75.8	253.2	284.2	261.1	—	108.9	79.3
Total	175.2	125.9	580.8	1159.2	133.5	126.9	475.3	31.9	201.3	360.7	1789.4	148.2	382.1	185.6	744.7	607.4	538.2	—	566.6	366.3

Station	Total			
	2nd	3rd	4th	5th
Evaluation-target	5821.9	3814.0	7740.3	5165.1
Survey-target	1228.6	1755.0	2966.7	3070.8
Other	5854.6	3902.2	6464.4	6749.8
Total	12905	9471	17171	14986

Table 5-2-2-3 Numbers of fish sampled for biometric studies

Evaluation-target species

	Scientific Name	Total Length(mm)				BW(gr)		Sex			
		2nd	3rd	4th	5th	2nd	3rd	2nd	3rd	4th	5th
1	*Decapterus rhonchus*	29	487	225	20	29	487	8	43	1	3
2	*Brachydeuterus auritus*	83	629	222	87	83	629	38	10	20	—
3	*Pomadasys incisus*	64	243	2	261	64	243	39	40	2	—
4	*Dentex canariensis*	110	237	210	7	110	237	65	33	3	7
5	*Sparus caeruleostictus*	121	764	352	3	121	764	29	35	3	3
6	*Pagellus bellottii*	108	493	197	—	108	493	64	53	10	—
7	*Galeoides decadactylus*	106	178	43	98	106	178	16	40	30	18
8	*Pseudotolithus senegalensis*	27	624	21	27	27	624	27	64	17	24
9	*Pseudoupeneus prayensis*	65	623	79	21	65	623	32	28	7	21
10	*Sepia officinalis*	153	108	247	105	153	108	48	89	247	61
	Total	866	4386	1598	629	866	4386	366	435	340	137

	Scientific Name	Gonad		Stomach Contents		Otolith			
		2nd	3rd	2nd	3rd	2nd	3rd	4th	5th
1	*Decapterus rhonchus*	2	10	5	7	8	2	—	3
2	*Brachydeuterus auritus*	21	3	9	3	6	8	3	—
3	*Pomadasys incisus*	13	17	13	—	5	4	—	—
4	*Dentex canariensis*	14	10	22	—	29	—	—	—
5	*Sparus caeruleostictus*	12	12	9	5	14	3	—	—
6	*Pagellus bellottii*	15	23	9	6	5	3	—	—
7	*Galeoides decadactylus*	11	7	12	—	11	2	—	—
8	*Pseudotolithus senegalensis*	12	21	11	9	7	5	—	—
9	*Pseudoupeneus prayensis*	8	12	18	—	10	4	3	—
10	*Sepia officinalis*	4	—	14	—	16	—	—	—
	Total	112	115	122	30	111	31	6	3

Survey-target species

	Scientific Name	Total Length(mm)				Body weight(gr)			
		2nd	3rd	4th	5th	2nd	3rd	4th	5th
1	*Epinephelus aeneus*	26	20	35	30	26	20	35	30
2	*Chroloscomburus chrysurus*	79	186	—	—	79	186	—	—
3	*Selene dorsalis*	91	48	145	—	91	48	145	—
4	*Lutjanus fulgens*	49	128	106	—	49	128	106	—
5	*Lutjanus agennes*	1	—	1	—	1	—	1	—
6	*Pomadasys jubelini*	16	27	13	58	16	27	13	58
7	*Dentex angolensis*	52	247	—	—	52	247	—	—
8	*Dentex congoensis*	59	200	—	—	59	200	—	—
9	*Drepane africana*	7	24	50	95	7	24	50	95
10	*Balistes capriscus*	52	81	78	50	52	81	78	50
11	*Penaeus notialis*	15	166	23	68	15	166	23	68
	Total	447	1127	451	301	447	1127	451	301

Table 5-2-2-4 Average CPUE(catch/1hour) values, percentage occurrences and average body weight of evaluation-target species caught by present and RV Dr. Nansen's surveys(1999), respectively

	Decapterus rhonchus	*Brachydeuterus auritus*	*Pamadasys incisus*	*Dentex canariensis*	*Sparus caeruleostictus*
CPUE(kg)					
2nd survey	10.6	22.8	3.0	11.5	17.8
3rd survey	2.8	21.0	8.2	8.1	10.5
4th survey	0.3	50.8	2.2	5.5	10.1
5th survey	0.2	25.4	3.1	8.0	12.2
RV Dr. Nansen	0.8	170.7	1.1	6.5	7.1
Average Body Weight(kg)					
2nd survey	0.03	0.05	0.09	0.31	0.13
3rd survey	0.02	0.04	0.10	0.25	0.14
4th survey	0.01	0.03	0.07	0.18	0.08
5th survey	0.12	0.03	0.09	0.17	0.12
RV Dr. Nansen	0.20	0.03	0.05	0.41	0.21
% Occurrence					
2nd survey	40	38	17	77	87
3rd survey	38	44	42	71	77
4th survey	20	64	24	70	94
5th survey	10	51	41	65	86
RV Dr. Nansen	10	40	13	38	58

	Pagellus bellottii	*Galeoides decadactylus*	*Pseudotolithus senegalensis*	*Pseudupeneus prayensis*	*Sepia officiallis*
CPUE(kg)					
2nd survey	31.1	0.5	0.9	8.4	17.2
3rd survey	10.9	0.6	1.7	7.2	8.5
4th survey	31.9	1.6	25.2	5.5	21.7
5th survey	24.5	2.2	1.0	12.0	16.9
RV Dr. Nansen	12.3	2.3	0.1	3.8	12.3
Average Body Weight(kg)					
2nd survey	0.07	0.11	0.19	0.12	0.18
3rd survey	0.06	0.13	0.23	0.09	0.68
4th survey	0.03	0.08	0.30	0.07	0.22
5th survey	0.05	0.11	0.12	0.08	0.54
RV Dr. Nansen	0.07	0.14	0.34	0.09	0.55
% Occurrence					
2nd survey	96	11	9	74	96
3rd survey	83	27	21	75	85
4th survey	86	12	10	78	100
5th survey	82	37	22	76	88
RV Dr. Nansen	63	13	8	38	50

Table 5-2-2-5(1) Total length frequency distributions of evaluation-target species(October 2～20, 2000)

Species	*Pagellus bellottii*						*Dentex canariensis*								*Sparus caeruleostictus*							*Pseudotholitus senegalensis*				*Galeoides decadactylus*			
Station No	St.7	St.2	St.5	St.8	St.3	Total	St.7	St.2	St.5	St.8	St.9	St.6	St.3	St.50	Total	St.4	St.2	St.39	St9	St.6	St.3	Total	St.1	St.38	St.35	Total	St.1	St.38	St.35	Total
TL(mm)	19.6	33.4	38.9	39.8	55		19.6	33.4	38.9	39.8	49	52.5	55	76.7		22	33.4	40.5	49	52.5	55		16.3	25.3	27.5		16.3	25.3	27.5	
91 - 100								1							1															
101 - 110																														
111 - 120	1			1		2	1								1			1	2		1	4								
121 - 130	2					2		1							1		2	2	3		1	8								
131 - 140	2		1			3	1	1							2	1	1		2		1	5					3			3
141 - 150	6		1	2	3	12	2	2							4		2	1	6	1	3	13					2	1		3
151 - 160	4		3	7	5	19													7	1	2	10					5			5
161 - 170	2	1		7	7	17	1								1		3		8	8	2	21					7	7		14
171 - 180	5	2		2	5	14											1		4	3		8					3	10		13
181 - 190	1		1	3		5	2				1				3		1		6	2	1	10					3	15		18
191 - 200	3	4	3	5		15	1				1				2		2		1		1	4					2	11		13
201 - 210	2			2		4	1	1			2				4		1		3	1	2	7					2	10		12
211 - 220	3			1		4	1				2				3				3	3	4	10					1	9		10
221 - 230	3	2				5		2			4			1	7						4	4					1	5		6
231 - 240		1				1	1			1	5	1			8				1		1	2						3		3
241 - 250	1	1				2	1	1			4			1	7													1		1
251 - 260											5				5				1		1	2						1		1
261 - 270		1	1			2		1			1		1		3	1			1			2	2			2		1		1
271 - 280		1				1	2				1			2	5		2					2	1			1				
281 - 290							1				6		1	2	10								2			2			1	1
291 - 300														4	4				1	1		2	3			3				
301 - 310							1	2	1					3	7		2		1			3	1			1				
311 - 320							1	1			1			1	4								2	1	1	4				
321 - 330								3			2				5								3			3				
331 - 340							1	1						1	3	1						1	2			2				
341 - 350								2						2	4	1						1	2			2				
351 - 360								2							2	1						1	2			2				
361 - 370							1	2			2				5								2			2				
371 - 380														1	1	1						1		1	1	2				
381 - 390								1							1								1			1			1	1
391 - 400														1	1															
401 - 410																														
411 - 420														1	1														1	1
421 - 430							1							1	2									1	1	2				
431 - 440														1	1															
441 - 450																														
451 - 460																														
461 - 470								1							1															
471 - 480																														
481 - 490																														
491 - 500																														
501 - 510																														
511 - 520														1	1										1	1				
521 - 530																														
531 - 540																														

The under figure of station number shows the depth(m).

Table 5-2-2-5(2) Total length frequency distributions of evaluation-target species(October 2～20, 2000)

Species	*Brachydeuterus auritus*			*Pomadasys incisus*				*Pseudoupeneus prayensis*							
Station No	St.5	St.9	Total	St.5	St.9	St.6	Total	St.7	St.38	St.2	St.5	St.8	St.6	St.40	Total
TL(mm)	38.9	49		38.9	49	52.5		19.6	25.3	33.4	38.9	39.8	52.5	60.1	
31 - 40															
41 - 50															
51 - 60															
61 - 70															
71 - 80															
81 - 90															
91 - 100									1						1
101 - 110															
111 - 120												1			1
121 - 130	6		6												
131 - 140		2	2												
141 - 150	6	13	19		4		4			1			1		2
151 - 160	8	11	19		4	1	5					1			1
161 - 170	4	9	13		10	5	15	1	1				1		3
171 - 180	3	13	16		14	3	17	1	2		1	2	1		7
181 - 190	4	1	5	3	10	1	14		2			1	1		4
191 - 200	2	1	3		2		2	1	6	1		2			10
201 - 210				1	5		6	2	6	1			2		11
211 - 220					1		1		1						1
221 - 230								2	4					1	7
231 - 240									7	1					8
241 - 250									5						5
251 - 260									3						3
261 - 270									1						1
271 - 280															
281 - 290															
291 - 300															
301 - 310															
311 - 320															
321 - 330															
331 - 340															
341 - 350															
351 - 360															
361 - 370															
371 - 380															
381 - 390															
391 - 400															
401 - 410															
411 - 420															
421 - 430															
431 - 440															
441 - 450															
451 - 460															
461 - 470															

Species	*Decapterus rhonchus*								*Sepia officinalis*								
Station No	St.20	St.38	St.33	St.39	St.6	St.40	St.44	Total	St.7	St.4	St.35	St.5	St.8	St.9	St.3	St.41	Total
TL(mm)	19.5	25.3	36.8	40.5	52.5	60.1	77.6		19.6	22	27.5	38.9	39.8	49	55	76	
31 - 40	1							1							1		1
41 - 50															3		3
51 - 60	1							1			1	1			10	7	19
61 - 70											6	2	2	1	2	14	27
71 - 80											3		3	5	4	9	24
81 - 90											1		1	2		2	6
91 - 100				7				7			1			4			5
101 - 110				1				1			1			3			4
111 - 120							1	1						3			3
121 - 130				1			1	2			3			1		1	5
131 - 140				1				1	1		2			2	1		6
141 - 150											4		1	1			6
151 - 160					1		1	2			2				2		4
161 - 170							4	4			2		1	1	2	1	7
171 - 180							3	3	1		2		5	1	1	1	11
181 - 190									2		3		1	2	2		10
191 - 200													1	1	1		3
201 - 210													1				1
211 - 220													2				2
221 - 230		2				1		3						2	1		3
231 - 240		1						1									
241 - 250		1						1									
251 - 260																	
261 - 270														1			1
271 - 280														1			1
281 - 290																	
291 - 300										1							1
301 - 310																	
311 - 320																	
321 - 330																	
331 - 340																	
341 - 350																	
351 - 360																	
361 - 370																	
371 - 380																	
381 - 390																	
391 - 400																	
401 - 410																	
411 - 420																	
421 - 430																	
431 - 440																	
441 - 450																	
451 - 460																	
461 - 470			1					1									

The under figure of station number shows the depth(m).

Table 5-2-2-5(3) Total length frequency distributions of evaluation-target species(July 25 ～ August 13, 2001)

Species	*Pagellus bellottii*				*Dentex canariensis*						*Sparus caeruleostictus*							*Pseudotolithus senegalensis*								*Galeoides decadactylus*						
Station No	St21	M2	St22	Total	M1	M2	St28	St24	St40	Total	M1	St.20	St.10	St21	M2	St24	Total	St26	M1	St20	St10	St.1	St32	M2	Total	St26	M1	St20	St32	M2	St2	Total
TL(mm)	25.5	25.5	36.1		18.7	25.5	35.5	51.3	64		18.7	19.8	20.2	25.5	25.5	51.3		17	18.7	19.8	20.2	24	24	25.5		17	18.7	19.8	24	25.5	37	
51 - 60																																
61 - 70																																
71 - 80																																
81 - 90												1					1															
91 - 100			1	1								3	1	1	1		6															
101 - 110			3	3		1				1	4	3	9	2	1		19															
111 - 120			5	5							5	7	5	1	1		19															
121 - 130			16	16		1			1	2	9	5	17	4	2		37							1	1							
131 - 140		2	16	18	1	1				2	8	3	12	4	6		33							5	5							
141 - 150		6	20	26	1	6				7	6	4	7	2	8		27							6	6							
151 - 160		7	30	37	1	4	2			7	10		5	2	8		25						1	11	12		1					1
161 - 170	3	6	48	57	1	6	1		1	9	6	1	1		7		15							16	16	2	2					4
171 - 180	1	9	20	30		13	1		1	15	1		3	1	4		9		2				1	21	24	4	3					7
181 - 190	1	9	16	26	1	11				12	2	1	2		6		11		3				4	20	27	2	2				2	6
191 - 200		10	6	16	2	10				12	2	2	3	2	5		14						4	17	21	2					6	8
201 - 210		4	4	8		5			1	6	4	1	4	2	6		17	1	1				5	9	16	7	2			1	5	15
211 - 220		3	1	4		5			1	6	2	2	4		4		12	1					5	5	11	1	4	1			6	12
221 - 230		7	1	8		4				4		3	5	1	4		13						2	4	6	1	2				1	4
231 - 240		5		5		2	1			3	1	1	4	1	3		10							3	3	1	2		1		5	9
241 - 250		2		2		3				3			3		3	2	8	1			1				2	1'	2	1	2		2	8
251 - 260		2		2		1		1	1	3			1		5	1	7	2			1		3		6		2	1	2		1	6
261 - 270		3	1	4		4		1		5		1			1		2						2	1	3			1	2		1	4
271 - 280	1	4		5		5			3	8			2	2		1	5	1				1	1		3		2				2
281 - 290		2		2		5			1	6			2		2	1	5	1				2	3		6				1		1
291 - 300		2		2		2				2			4		1	1	6	5		1	1		1		8				1			1
301 - 310						2			2	4			7	1		1	9	1					1		2				1			1
311 - 320									1	1			2		2		4				1		1		2							
321 - 330									2	2			1	2	3		6	1							1				2			2
331 - 340		1		1				2	2	4				1	1		2	2							2				2			2
341 - 350																		2							2							
351 - 360						1		1	3	5								1							3				1			1
361 - 370								1	2	3								1		2					1							
371 - 380						1				1				1			1	1							1							
381 - 390									2	2								1							1							
391 - 400						1			1	2											1				1							
401 - 410									1	1								1							1							
411 - 420																																
421 - 430									1	1																						
431 - 440																																
441 - 450																																
451 - 460																		1							1							
461 - 470									1	1													1		1							
471 - 480									1	1																						
481 - 490									1	1																						
491 - 500																																
501 - 510																																
511 - 520																							1		1							
521 - 530									2	2								1							1							

The under figure of station number shows the depth(m).

Table 5-2-2-5(4) Total length frequency distributions of evaluation-target species(July 25 ～ August 13, 2001)

Species	*Brachydeuterus auritus*					*Pomadasys incisus*					*Pseudoupeneus prayensis*						*Decapterus rhonchus*							*Sepia officinalis*										
Station No	M1	St20	St21	St35	Total	St26	St17	St40	M2	Total	M1	St20	M2	St24	St34	Total	St4	St14	St21	M2	St38	St29	Total	M1	St20	St1	St35	St28	St22	St34	St31	St47	St48	Total
TL(mm)	18.7	19.8	25.5	27		17	42.6	64	82.5		18.7	19.8	25.5	51.3	60.5		21	21	25.5	25.5	27	44		18.7	19.8	24	27	35.5	36.1	60.5	65	77	85	
51 - 60																															2			2
61 - 70																															3	5		8
71 - 80			2		2																						1						1	2
81 - 90																									1	2								3
91 - 100		1	5		6																			1		2		1						4
101 - 110	5	2	3		10																					1								1
111 - 120	10		7		17																			1		7								8
121 - 130	31	2	11	1	45								1			1								1										1
131 - 140	52		17		69								5	1	1	7								1	1	1				1				4
141 - 150	25		11		36				1	1		1	6	3	4	14					3		3			3				1				4
151 - 160	17		6		23	1				1		1	11	10	4	26					2		2	2		2								4
161 - 170	6		6	2	14		1		1	2			16	14	1	31					6	1	7	2	1	3				3				9
171 - 180	4	1	4	3	12	3	9	3	3	18	2	1	21	10		34				2	24	2	28	2	1	2	1			2				8
181 - 190	1	1		4	6		17	3	7	27	3		20	10	3	36			1	18	22	8	49	1		1	1	1		1				5
191 - 200				5	5		27	5	10	42			17	28	3	48		1	3	26	17	9	56			4	1	1						6
201 - 210				5	5	3	17	8	9	37	1		9	22	7	39		2	1	19	4	22	48			2				2	1			5
211 - 220						1	4	12	4	21			5	15	3	23		5	2	16	6	8	37	3		4					1	1		9
221 - 230				1	1	4	4	5	5	18			4	14	4	22		5		12	1	11	29			1	1		1	2	1		2	8
231 - 240				2	2	3	1	3	9	16			3	8	1	12		1		5		3	9			1								1
241 - 250						1		1	2	4				12	1	13		3		4			7	2						1			1	4
251 - 260									2	2				8		8		4		1			5	1	1	1		1		1				5
261 - 270									1	1			1	9		10		1		2			3	1										1
271 - 280														5		5		3		1			4		1									1
281 - 290																									1				1					2
291 - 300																				1			1		1									1
301 - 310																																		
311 - 320																																		
321 - 330																																		
331 - 340																																		
341 - 350																																		
351 - 360																																		
361 - 370																																		
371 - 380																																		
381 - 390																																		
391 - 400																																		
401 - 410																				1			1												
411 - 420																	1						1												
421 - 430																																		
431 - 440																																		
441 - 450																																		
451 - 460																																		
461 - 470																																		
471 - 480																																		
481 - 490																																		
491 - 500																																		
501 - 510																																		
511 - 520																																		
521 - 530																																		

The under figure of station number shows the depth(m).

Table 5-2-2-5(5) Total length frequency distributions of evaluation-target species(October 29 ～ November 16, 2001)

Species	*Pagellus bellottii*		*Dentex canariensis*		*Sparus caeruleostictus*		*Pseudotolithus senegalensis*		*Brachydeuterus auritus*		*Pseudoupeneus prayensis*		*Decapterus rhonchus*		*Sepia officinalis*					
Station No.	M-1	Total	M-1	Total	M-1	Total	M-1	Total	M-1	Total	M-1	Total	M-1	Total	M-1	M-2	St.22	St.24	St.25	Total
TL(mm)	18		18		18		18		18		18		18		18	23	32.5	52	67.5	
41 - 50																			1	1
51 - 60																		2	7	9
61 - 70																	1		8	9
71 - 80	4	4							1	1			2	2			4	3	22	29
81 - 90	6	6											6	6			6	1	8	15
91 - 100	6	6	1	1	2	2			11	11			8	8		1			14	15
101 - 110	10	10	1	1	20	20			19	19	1	1	3	3		1	3	1	1	6
111 - 120	6	6	5	5	36	36			17	17			14	14		5	6	5		16
121 - 130	4	4	3	3	50	50			7	7			14	14	2	8	1	5	4	20
131 - 140	2	2	8	8	20	20			8	8	8	8	10	10	1	3	1	1	6	12
141 - 150	3	3	7	7	14	14			2	2	10	10	1	1	2	4	1	3	4	14
151 - 160			5	5	5	5			2	2	4	4	1	1	4				10	14
161 - 170			3	3	6	6			1	1	4	4			3	2	1	1	4	11
171 - 180									2	2	7	7			1	2			5	8
181 - 190					3	3	1	1	1	1						1			3	4
191 - 200																3	3		1	7
201 - 210																4	1		2	7
211 - 220					1	1										3	1	1	2	7
221 - 230													1	1		1		1		2
231 - 240																	1			1
241 - 250																2	1			3
251 - 260			1	1												1	1			2
261 - 270																2				2
271 - 280																2				2
281 - 290																3				3
291 - 300																1				1
301 - 310																3				3
311 - 320																				
321 - 330																				
331 - 340																				
341 - 350																				
351 - 360																				
361 - 370							1	1												
371 - 380							1	1												
381 - 390																				
391 - 400							1	1												
401 - 410																				
411 - 420							1	1												

The under figure of station number shows the depth(m).

Table 5-2-2-6 Sex ratio and maturity of evaluation-target species

Species	Range of total length (mm)				Sex ratio %(♀:♂)				Gonad index		Visual observation of ovary	
	2nd	3rd	4th	5th	2nd	3rd	4th	5th	2nd	3rd	2nd	3rd
Decapterus rhonchus	125～465	175～415	317	287～417	25:75	58:42	100:0	67:33	6～9	3～32	I	I～V
Brachydeuterus auritus	125～195	105～235	126～172	—	55:45	63:37	10:90	—	7～74	8～20	I～II	II～V
Pomadasys incisus	145～215	175～245	117	—	54:46	56:44	100:0	—	8～36	26～82	I～III	III～V
Dentex canariensis	145～515	165～525	441～458	419～543	44:56	48:52	0:100	29:71	2～59	0.3～42	I～IV	I～V
Sparus caeruleostictus	145～375	165～375	435～461	364～450	66:37	46:54	33:67	67:33	2～31	0.3～19	I～IV	I～V
Pagellus bellottii	125～275	125～275	218～285	—	40:60	45:55	60:40	—	2～9	10～42	I～II	II～IV
Galeoides decadactylus	145～415	165～355	123～318	189～422	75:25	15:85	7:93	25:75	28～249	6～44	II～IV	IV～V
Pseudotolithus senegalensis	265～515	155～525	256～492	270～567	44:56	35:65	24:76	63:37	3～26	1～58	I～IV	I～V
Pseudoupeneus prayensis	95～255	135～275	263～279	234～282	38:72	50:50	29:71	57:43	3～74	18～39	II～IV	III～V
Sepia officinalis	55～275	55～295	48～248	51～325	38:72	5:95	18:82	21:79	4～6	—	I	—

① Total length of *Sepia officinalis* shows mantle length.
② GI(Gonad Index)=(Gonad weight／Body weight) × 1000

Table5-2-2-7 Stomach contents (%)

Species	No of specimen	Empty	Polychaetes	Bivalves	Cephalopods	Crabs	Shrimps	Fish	Others	Digest
Decapterus rhonchus	12	1			52			21		27
Brachydeuterus auritus	12	1						18		82
Pomadasys incisus	13	1					11		28	62
Dentex canariensis	22	5			6		5	18	6	66
Sparus caeruleostictus	14	2	4	4		8	21	11	4	48
Pagellus bellottii	15	4		9					18	73
Galeoides decadactylus	12	2				80				20
Pseudotholitus senegalensis	20	6					50	29		21
Pseudoupeneus prayensis	18	1		1		5	52		5	37
Sepia officinalis	14	2	4	7		14	7	14	9	44
Total	152									

Table 5-2-2-8 Total length and age

Pagellus bellottii

Period	TL(mm)	Age	Period	TL(mm)	Age
2nd	157	2+	3rd	273	4+
2nd	202	3+	3rd	183	4+
2nd	189	3+	3rd	174	2+
2nd	214	3+	3rd	266	4+
2nd	248	4+			

Dentex canariensis

Period	TL(mm)	Age	Period	TL(mm)	Age
2nd	368	3+	2nd	284	2+
2nd	332	2+	2nd	232	2+
2nd	271	2+	2nd	260	2+
2nd	286	2+	2nd	238	2+
2nd	218	1+	2nd	322	2+
2nd	275	2+	2nd	225	2+
2nd	196	1+	2nd	326	3+
2nd	148	1+	2nd	182	2+
2nd	150	1+	2nd	195	2+
2nd	162	1+	2nd	519	5+
2nd	139	1+	2nd	438	4+
2nd	116	1+	3rd	93	1+ or 2+
2nd	368	3+			

Sparus caeruleostictus

Period	TL(mm)	Age	Period	TL(mm)	Age
2nd	377	3+	2nd	215	2+
2nd	351	3+	2nd	123	1+
2nd	344	3+	2nd	128	1+
2nd	257	2+	2nd	145	1+
2nd	263	2+	2nd	117	1+
2nd	294	2+	3rd	82	2+
2nd	235	2+	3rd	101	1+
2nd	205	1+	3rd	104	1+
2nd	178	2+	3rd	268	2+

Pseudotolithus senegalensis

Period	TL(mm)	Age
2nd	293	3+
2nd	351	3+
2nd	362	4+
2nd	512	5+
2nd	428	5+
2nd	379	4+

Brachydeuterus auritus

Period	TL(mm)	Age	Period	TL(mm)	Age
2nd	192	2+	3rd	101	3+
2nd	163	3+	3rd	98	2+
2nd	175	4+	3rd	237	5+
2nd	163	3+	3rd	228	6+
2nd	185	3+	3rd	128	5+
2nd	123	1+	3rd	180	7+
3rd	129	3+	4th	172	3+
3rd	125	3+	4th	160	3+
3rd	107	2+	4th	155	3+

Pomadasys incisus

Period	TL(mm)	Age	Period	TL(mm)	Age
2nd	204	3+	3rd	223	5+
2nd	215	3+	3rd	241	6+
2nd	181	3+	3rd	179	4+
2nd	203	3+	3rd	155	3+
2nd	205	3+			

Pseudoupeneus prayensis

Period	TL(mm)	Age	Period	TL(mm)	Age
2nd	208	1+	3rd	154	1+
2nd	178	1+	3rd	264	2+
2nd	147	1+	3rd	251	1+
2nd	222	1+	3rd	146	1+
2nd	256	2+	4th	267	2+
2nd	227	2+?	4th	273	2+
3rd	146	1+	4th	273	3+

Decapterus rhonchus

Period	TL(mm)	Age	Period	TL(mm)	Age
2nd	227	1+	2nd	227	1+
2nd	229	1+	2nd	92	0+
2nd	248	1+	3rd	271	2+
2nd	235	1+	3rd	278	2+
2nd	123	1+	5th	325	3+
2nd	96	0+	5th	287	2+
			5th	417	3+

Galeoides decadactylus

Period	TL(mm)	Age	Period	TL(mm)	Age
2nd	221	1+	2nd	161	1+
2nd	165	1+	2nd	165	1+
2nd	207	1+	2nd	145	1+
2nd	415	3+	3rd	163	1+ or 2+
2nd	205	1+	3rd	162	1+
2nd	244	1+			

Table 5-2-2-9 Average CPUE(catch/1hour) values, percentage occurrences and average body weight of survey-target species caught by present and RV Dr. Nansen's surveys(1999), respectively

	Epinephelus aeneus	*Lutjanus fulgens*	*Lutjanus agennes*	*Dentex angolensis*	*Dentex congoensis*	*Drepane africana*
CPUE(kg)						
2nd survey	3.7	1.1	0.1	9.5	5.1	0.0
3rd survey	3.1	2.5	0.0	6.7	6.7	0.9
4th survey	1.9	2.8	0.0	6.8	39.0	0.6
5th survey	3.1	2.4	0	3.5	43.0	1.0
RV Dr. Nansen	1.5	0.6	0	1.5	11.6	2.8
Average Body Weight(kg)						
2nd survey	2.92	0.35	2.36	0.07	0.04	0.11
3rd survey	3.45	0.39	0.00	0.08	0.05	0.08
4th survey	1.30	0.46	0.30	0.07	0.03	0.30
5th survey	2.51	0.23	0	0.04	0.03	0.22
RV Dr. Nansen	2.34	0.30	0	0.12	0.04	0.32
% Occurrence						
2nd survey	32	23	2	21	23	2
3rd survey	25	23	0	25	21	8
4th survey	30	20	2	24	20	10
5th survey	33	20	0	16	18	14
RV Dr. Nansen	18	18	0	18	13	10

	Balistes capriscus	*Selene dorsalis*	*Chloroscombrus chrysurus*	*Pomadasys jubelini*	*Penaeus notialis*
CPUE(kg)					
2nd survey	2.5	2.0	1.0	1.1	0.0
3rd survey	1.6	0.2	13.7	0.7	0.1
4th survey	1.6	2.0	4.1	0.1	0.0
5th survey	0.5	1.6	5.3	1.3	0.2
RV Dr. Nansen	1.1	6.0	9.2	4.3	0.04
Average Body Weight(kg)					
2nd survey	0.44	0.15	0.03	0.59	0.04
3rd survey	0.39	0.10	0.05	0.61	0.02
4th survey	0.50	0.02	0.03	0.27	0.04
5th survey	0.25	0.13	0.07	0.51	0.02
RV Dr. Nansen	0.33	0.24	0.04	0.19	0.03
% Occurrence					
2nd survey	26	11	28	6	6
3rd survey	31	19	42	6	15
4th survey	28	24	42	8	8
5th survey	20	39	35	6	24
RV Dr. Nansen	28	10	33	3	13

Table 5-2-2-10(1) Total length frequency distributions of survey-target species(October 2～20, 2000)

Species	*Chroloscomburus chrysurus*							*Selene dorsalis*				*Lutjanus fulgens*											*Pomadasys jubelini*			*Dentex angolensis*			
Station No.	St.1	St.20	St.15	St.8	St.39	St.9	Total	St.1	St.2	St.36	Total	St.1	St.38	St.28	St.16	St.23	St.30	St.18	St.34	St.25	St.46	Total	St.32	St.38	Total	St.8	St.6	St.3	Total
TL(mm)	16	20	25	40	41	49		16	33	42		16	25	35	36	43	52	53	60	63	76		24	25		40	53	55	
41 - 50		1					1																						
51 - 60		2					2																						
61 - 70		2					2																						
71 - 80		2					2																						
81 - 90																												1	1
91 - 100																										2		1	3
101 - 110																													
111 - 120																												5	5
121 - 130	3						3																					10	10
131 - 140	2						2	1			1																	15	15
141 - 150	7			1			8																1		1		4	4	8
151 - 160	12			8		1	21																					3	3
161 - 170	3			1	1		5																4		4			2	2
171 - 180	1			6		2	9	2			2												3		3			3	3
181 - 190	1			8		1	10	3			3		1									1	2		2				
191 - 200				6			6	5		3	8												1		1				
201 - 210				4			4	5		9	14												1		1				
211 - 220				1			1	5		8	13																		
221 - 230								6		4	10		1									1	1		1			1	1
231 - 240								4		2	6																		
241 - 250								6		3	9		1			1						2							
251 - 260								2		5	7																	1	1
261 - 270								1	1	1	3									2		2							
271 - 280								3		1	4									2		2							
281 - 290			1				1	2			2		1							1		2							
291 - 300			1				1							1				1		5		7							
301 - 310			1				1		1	1	2	1							1	4		6		1	1				
311 - 320																			3	4		7							
321 - 330									4	1	5				1				4	1	1	7							
331 - 340									2		2			1							1	2							
341 - 350														1					1		1	3							
351 - 360																				1	1	2							
361 - 370																			1			1							
371 - 380																					1	1							
381 - 390																			1			1							
391 - 400																													
401 - 410																	1					1							
411 - 420																			1			1	1		1				
421 - 430																													
431 - 440																													
441 - 450																							1		1				

The under figure of station number shows the depth(m).

Table 5-2-2-10(2) Total length frequency distributions of survey-target species(October 2～20, 2000)

Species	*Dentex congoensis*				*Drepane africana*		*Balistes capriscus*								*Penaeus notialis*			
Station No.	St.8	St.6	St.3	Total	St.1	Total	St.26	St.32	St.27	St.2	St.33	St.39	St.29	Total	St.32	St.35	St.36	Total
TL(mm)	40	53	55		16		20	24	26	33	37	41	44		24	28	42	
41 - 50																		
51 - 60																		
61 - 70	1			1														
71 - 80																		
81 - 90		3	2	5														
91 - 100		5	2	7														
101 - 110		10	3	13														
111 - 120		7	3	10														
121 - 130			1	1												1		1
131 - 140			7	7											2	1		3
141 - 150			4	4	3	3									1	2		3
151 - 160			3	3	1	1										1		1
161 - 170			5	5	2	2												
171 - 180			2	2			1					1	1	3	1			1
181 - 190			1	1	1	1						1	2	3		2	1	3
191 - 200												1		1				
201 - 210									1			2		3				
211 - 220							1							1		1		1
221 - 230																1		1
231 - 240								1						1	1			1
241 - 250									1					1				
251 - 260																		
261 - 270												2		2				
271 - 280												1		1				
281 - 290										1			1	2				
291 - 300													1	1				
301 - 310										1			1	2				
311 - 320											2			2				
321 - 330																		
331 - 340																		
341 - 350										1	8		1	10				
351 - 360											1			1				
361 - 370											2			2				
371 - 380											3			3				
381 - 390											1			1				
391 - 400											1			1				
401 - 410											3			3				
411 - 420											1		1	2				
421 - 430										1				1				
431 - 440											2			2				
441 - 450											1			1				
451 - 460											1			1				
461 - 470																		
471 - 480											1			1				

The under figure of station number shows the depth(m).

Table 5-2-2-10(3) Total length frequency distributions of survey-target species(October 2～20, 2000)

Species	*Epinephelus aeneus*														
Station No.	St.15	St.2	St.39	St.36	St.11	St.17	St.9	St.18	St.12	St.34	St.41	St.50	St.49	St.48	Total
TL(mm)	25	33	41	42	44	46	49	53	53	60	76	77	79	83	
301 - 310				1	1										2
311 - 320															
321 - 330	1				1										2
331 - 340		1													1
341 - 350							1								1
351 - 360	1														1
361 - 370															
371 - 380			1												1
381 - 390							1								1
391 - 400					1										1
401 - 410															
411 - 420		1													1
421 - 430															
431 - 440	1														1
441 - 450															
451 - 460					1		1								2
461 - 470							1								1
471 - 480															
481 - 490					1										1
491 - 500															
501 - 510															
511 - 520								1							1
521 - 530															
531 - 540									1						1
541 - 550															
551 - 560															
561 - 570															
571 - 580															
581 - 590															
591 - 600															
601 - 610										1					1
611 - 620															
621 - 630															
631 - 640															
641 - 650															
651 - 660															
661 - 670															
671 - 680															
681 - 690												1			1
691 - 700															
701 - 710							1								1
711 - 720															
721 - 730															
731 - 740		1													1
741 - 750															
751 - 760															
761 - 770															
771 - 780															
781 - 790															
791 - 800															
801 - 810															
811 - 820															
821 - 830															
831 - 840															
841 - 850															
851 - 860															
861 - 870											1				1
871 - 880															
881 - 890						1									1
891 - 900															
901 - 910															
911 - 920														1	1
921 - 930															
931 - 940															
941 - 950															
951 - 960															
961 - 970															
971 - 980															
981 - 990															
991 - 1000															
1001 - 1010															
1011 - 1020															
1021 - 1030															
1031 - 1040															
1041 - 1050															
1051 - 1060															
1061 - 1070															
1071 - 1080															
1081 - 1090															
1091 - 1100													1		1

The under figure of station number shows the depth(m).

Table 5-2-2-10(4) Total length frequency distributions of survey-target species(July 25～August 13, 2001)

Species	*Chroloscomburus chrysurus*					*Selene dorsalis*								*Lutjanus fulgens*												*Pomadasys jubelini*			
Station No.	St14	St32	St21	St39	Total	St10	St4	St14	St35	St38	St5	St36	Total	St7	St14	St1	St21	St15	St16	St9	St24	St19	St34	St25	Total	St32	St35	St33	Total
TL(mm)	21	24	26	40		20	21	21	27	27	42	44		19	21	24	26	26	35	51	51	59	61	66		24	27	43	
111 - 120																	1								1				
121 - 130	2		2		4	1							1		2										2				
131 - 140	9		12		21	9	1				1		11		7		1								8				
141 - 150	7		11		18	7							7		6										6				
151 - 160	8		5		13	2	1						3		2										2				
161 - 170	11		8	2	21																								
171 - 180	11		9	7	27	1	1						2																
181 - 190	10		4	5	19						1		1		1										1	1			1
191 - 200	9		2	4	15			1					1		3										3				
201 - 210	13		3	2	18			1		3		1	5		7										7	1			1
211 - 220	6			2	8							1	1		5										5		1		1
221 - 230	7			1	8			3		2			5		2										2				
231 - 240	3			2	5			2				2	4																
241 - 250	2	1		1	4										1										1	3			3
251 - 260									1	1			2		2										2	3			3
261 - 270	1	1			2										3										3	1			1
271 - 280														2											2	2	1		3
281 - 290	1	1			2									4					3						7			1	1
291 - 300		1			1									2							1				3	1			1
301 - 310						1							1	6					1				2		9				
311 - 320												1	1	4	1								10	1	16				
321 - 330												1	1	4		1		1	1				4		11	2			2
331 - 340														3									4	1	8	1			1
341 - 350														3						2		2	2	3	12			1	1
351 - 360												1	1	2	2								2		6				
361 - 370														1									1		2				
371 - 380																		2				1		1	4				
381 - 390																													
391 - 400										1			1											2	2				
401 - 410																													
411 - 420															1										1				
421 - 430																						1			1				
431 - 440																											1		1
441 - 450																													
451 - 460																		1							1	1	2		3
461 - 470																										1	1		2
471 - 480																													
481 - 490																											1		1
491 - 500																													
501 - 510																													
511 - 520																													
521 - 530																													
531 - 540																											1		1
541 - 550																													
551 - 560																													
561 - 570																													
571 - 580																													
581 - 590																													
591 - 600																		1							1				

The under figure of station number shows the depth(m).

Table 5-2-2-10(5) Total length frequency distributions of survey-target species(July 25～August 13, 2001)

Species	*Drepane africana*				*Balistes capriscus*																*Penaeus notialis*							
Station No.	St26	St32	St35	Total	St26	St10	St1	St21	St15	St27	St38	St28	St11	St2	St39	St29	St9	St24	St30	Total	St10	St4	St32	St35	St2	St5	St36	Total
TL(mm)	17	24	27		17	20	24	26	26	28	27	36	37	37	40	44	51	51	55		20	21	24	27	37	42	44	
71 - 80																							2					2
81 - 90																							1	1				2
91 - 100																							11					11
101 - 110																							27	4				31
111 - 120	1	1	1	3																			28	20			1	49
121 - 130	2	4	1	7																			4	10				14
131 - 140	2	1		3				1			1									2			1	4		1		6
141 - 150	3			3																		1	1			5	1	8
151 - 160	2			2	1				1	1	2									5	1	2	3		2	2	3	13
161 - 170	3			3					1											1		2		1	1	2	2	8
171 - 180	2			2		1									2	1				4			1		1	5		7
181 - 190	1			1							1		1			1				3		1	1			1	1	4
191 - 200											2									2			1			1		2
201 - 210											1		1		2	1				5	1	1	1			1		4
211 - 220											1									1			2					2
221 - 230											2	1				1				4			1					1
231 - 240																										1		1
241 - 250																1				1								
251 - 260																1				1								
261 - 270							1								1	1			1	4								
271 - 280																4				4								
281 - 290																1			1	2								
291 - 300																1				1			1					1
301 - 310																2			2	4								
311 - 320														1		2				3								
321 - 330																3		1		4								
331 - 340							1									2				3								
341 - 350							1									1			2	4								
351 - 360							1									2	1		2	6								
361 - 370															1	1				2								
371 - 380																2				2								
381 - 390							2									1				3								
391 - 400																												
401 - 410																1				1								
411 - 420							1													1								
421 - 430																1				1								
431 - 440							2													2								
441 - 450																1				1								
451 - 460														1						1								
461 - 470							1													1								
471 - 480																												
481 - 490							1													1								
491 - 500																												
501 - 510							1													1								

The under figure of station number shows the depth(m).

Table 5-2-2-10(6) Total length frequency distributions of survey-target species(July 25～August 13, 2001)

Species	*Epinephelus aeneus*											
Station No.	St7	St11	St39	St17	St33	St9	St18	St6	St34	St41	st49	Total
TL(mm)	19	37	40	43	43	51	55	57	61	76	77	
221 - 230		1										1
231 - 240												
241 - 250												
251 - 260												
261 - 270												
271 - 280												
281 - 290				1								1
291 - 300		1	1									2
301 - 310												
311 - 320												
321 - 330					1							1
331 - 340												
341 - 350		2										2
351 - 360												
361 - 370		3										3
371 - 380												
381 - 390												
391 - 400												
401 - 410												
411 - 420												
421 - 430												
431 - 440												
441 - 450												
451 - 460												
461 - 470												
471 - 480						1						1
481 - 490												
491 - 500												
501 - 510												
511 - 520												
521 - 530							1					1
531 - 540												
541 - 550				1								1
551 - 560	1											1
561 - 570												
571 - 580												
581 - 590												
591 - 600												
601 - 610												
611 - 620												
621 - 630												
631 - 640												
641 - 650												
651 - 660												
661 - 670												
671 - 680												
681 - 690										1		1
691 - 700												
701 - 710								1				1
711 - 720												
721 - 730												
731 - 740												
741 - 750									1			1
751 - 760												
761 - 770												
771 - 780												
781 - 790												
791 - 800												
801 - 810												
811 - 820												
821 - 830												
831 - 840												
841 - 850												
851 - 860											1	1
861 - 870												
871 - 880												
881 - 890												
891 - 900												
901 - 910										1		1
911 - 920										1		1

The under figure of station number shows the depth(m).

Table 5-2-2-10(7) Total length frequency distributions of survey-target species · (October 29～November 15, 2001)

Species	*Selene dorsalis*				*Lutjanus fulgens*									*Pomadasys jubelini*					*Drepane africana*				
Station No.	St.20	St.26	St.32	Total	St.10	St.7	St.16	St.17	St.24	St.18	St.40	St.31	Total	St.35	St.38	St.39	St.37	Total	St.10	St.1	St.38	St.39	Total
TL(mm)	18	20	25		20	22	33	41	52	54	54	61		28	30	39	62		20	21	30	39	
81 - 90			1	1																			
91 - 100			4	4																			
101 - 110	22		5	27																			
111 - 120	55	3	12	70																			
121 - 130	14	2	17	33																			
131 - 140	1	1	6	8																			
141 - 150					2								2										
151 - 160					2								2										
161 - 170					25								25										
171 - 180	1			1	31								31										
181 - 190	1			1	14								14								3		3
191 - 200					4								4							1	11		12
201 - 210					1								1								8		8
211 - 220																			1		11		12
221 - 230																					2	1	3
231 - 240															1			1	1		2		3
241 - 250															2			2			3		3
251 - 260															3			3			2		2
261 - 270															3			3					
271 - 280																			1				1
281 - 290									1				1		1	1		2			1		1
291 - 300									1			1	2										
301 - 310						1		1	2				4										
311 - 320									1				1						1		1		2
321 - 330						1			2	1		1	5	1				1					
331 - 340						1	1		1		1		4				1	1					
341 - 350																							
351 - 360						1					1		2										
361 - 370																							
371 - 380									1				1										
381 - 390						1			1				2										
391 - 400																							
401 - 410																							
411 - 420																							
421 - 430																							
431 - 440																							
441 - 450						1							1										
451 - 460																							
461 - 470											1		1										
471 - 480																							
481 - 490																							
491 - 500						1							1										
501 - 510																							
511 - 520																							
521 - 530																							
531 - 540																							
541 - 550																							
551 - 560																							
561 - 570																							
571 - 580						1							1										
581 - 590																							
591 - 600																							
601 - 610																							
611 - 620																							
621 - 630						1							1										

The under figure of station number shows the depth(m).

Table 5-2-2-10(8) Total length frequency distributions of survey-target species(October 29～November 15, 2001)

Species	*Balistes capriscus*															*Penaeus notialis*					
Station No.	St.26	St.1	St.16	St.5	St.2	St.12	St.39	St.29	St.6	St.34	St.18	St.30	St.3	St.42	Total	St.1	St.32	St.35	St.33	St.36	Total
TL(mm)	20	21	33	35	36	39	39	44	53	53	54	54	64	91		21	25	28	35	39	
81 - 90																		1			1
91 - 100																					
101 - 110																		1			1
111 - 120																					
121 - 130																					
131 - 140																			1		1
141 - 150																1	1	1			3
151 - 160																		1		2	3
161 - 170																	1	3			4
171 - 180																					
181 - 190																		2			2
191 - 200																		2			2
201 - 210																		2			2
211 - 220			1									1			2		1	1			2
221 - 230			2			1									3		1	1			2
231 - 240																					
241 - 250							1					2			3						
251 - 260						2				1		4			7						
261 - 270			2							1		8			11						
271 - 280		1	1	1								3			6						
281 - 290									1	1		1			3						
291 - 300			1									3			4						
301 - 310		1				2						1			4						
311 - 320								1				1			2						
321 - 330												4			4						
331 - 340										2		1			3						
341 - 350									1	1	1	1			4						
351 - 360												1			1						
361 - 370	1											1			2						
371 - 380						1				1					2						
381 - 390														1	1						
391 - 400										1		1			2						
401 - 410			1							1	1				3						
411 - 420			1							1					2						
421 - 430										2					2						
431 - 440										1					1						
441 - 450											1				1						
451 - 460					1										1						
461 - 470																					
471 - 480																					
481 - 490			1												1						
491 - 500																					
501 - 510		1												1	1						
511 - 520													1		1						
521 - 530																					
531 - 540																					
541 - 550																					
551 - 560																					
561 - 570																					
571 - 580																					
581 - 590																					
591 - 600		1													1						

The under figure of station number shows the depth(m).

Table 5-2-2-10(9) Total length frequency distributions of survey-target species(October 29～November 15, 2001)

Species	*Epinephelus aeneus*															
Station No.	St.26	St.21	St.4	St.32	St.11	St.5	St.2	St.12	St.17	St.8	St.6	St.40	St.37	St.3	St.41	Total
TL(mm)	20	21	22	25	30	35	36	39	41	41	53	54	62	64	83	
171 - 180				1												1
181 - 190				1												1
191 - 200																
201 - 210																
211 - 220																
221 - 230	1															1
231 - 240																
241 - 250																
251 - 260																
261 - 270																
271 - 280												1				1
281 - 290																
291 - 300					1											1
301 - 310								1								1
311 - 320											1					1
321 - 330					1											1
331 - 340					3		1									4
341 - 350						2	1									3
351 - 360						1	1									2
361 - 370		1					2									3
371 - 380																
381 - 390										1						1
391 - 400																
401 - 410																
411 - 420							2									2
421 - 430			1												1	2
431 - 440																
441 - 450			1													1
451 - 460																
461 - 470							3									3
471 - 480																
481 - 490																
491 - 500																
501 - 510																
511 - 520																
521 - 530																
531 - 540																
541 - 550																
551 - 560																
561 - 570																
571 - 580														1		1
581 - 590																
591 - 600																
601 - 610																
611 - 620																
621 - 630																
631 - 640							1									1
641 - 650																
651 - 660																
661 - 670																
671 - 680									1							1
681 - 690																
691 - 700																
701 - 710																
711 - 720																
721 - 730																
731 - 740																
741 - 750																
751 - 760																
761 - 770												1				1
771 - 780																
781 - 790																
791 - 800						1										1
801 - 810																
811 - 820																
821 - 830																
831 - 840																
841 - 850													1			1

The under figure of station number shows the depth(m).

Table 5-2-2-10(10) Total length frequency distributions of survey-target species(July 20～August 9, 2002)

Species	*Pomadasys jubelini*				*Penaeus notialis*						*Balistes capriscus*												*Drepane africana*							
Station No.	St.10	St.35	St.36	Total	St.26	St.32	St.33	St.35	St.36	Total	St.3	St.8	St.11	St.16	St.17	St.23	St.28	St.29	St.30	St.31	St.39	Total	St.10	St.12	St.14	St.26	St.32	St.35	St.36	Total
TL(mm)	17	30	42		68	23	32	30	42		52	31	24	31	42	42	31	41	50	60	37		17	50	19	19	23	30	42	
61 - 70								1		1																				
71 - 80						7	1	5		13																				
81 - 90					1	3				4																				
91 - 100																											1			1
101 - 110					2	3		2		7													4	1						5
111 - 120					1	4	3	2		10													11			2				13
121 - 130					5	5	1			11													2			5	1			8
131 - 140							1			1													2	1		5				8
141 - 150								1		1													4			1				5
151 - 160						1				1										1	1	2	1			1				2
161 - 170							1		1	2											1	1								
171 - 180						1				1										2		2	9		1					10
181 - 190	1			1	1		2			3						1				7		8				2		1	1	4
191 - 200							1		2	3		1						1		3	1	6	5			1				6
201 - 210					1				2	3										4		4	5		1	1				7
211 - 220							2		2	4													4							4
221 - 230							2		1	3									1	2		3	1			1				2
231 - 240																	1			1		2	4							4
241 - 250			1	1									1									1	1						1	2
251 - 260														1						3		4	3							3
261 - 270			7	7							1											1	3					2		5
271 - 280	1		5	6											1					1		2	2							2
281 - 290		1	9	10															1	1		2						1		1
291 - 300			5	5																			1							1
301 - 310			5	5																1		1	1					1		2
311 - 320			5	5																2		2								
321 - 330			1	1																1		1								
331 - 340																				1		1								
341 - 350			2	2																										
351 - 360			1	1																										
361 - 370												1								1		2								
371 - 380																				1		1								
381 - 390																				1		1								
391 - 400			2	2																										
401 - 410			1	1																										
411 - 420			1	1																										
421 - 430			4	4																										
431 - 440			1	1																										
441 - 450			2	2																										
451 - 460			1	1															1			1								
461 - 470			1	1																										
471 - 480																			1			1								
481 - 490			1	1																										
491 - 500																														
501 - 510																				1		1								

The under figure of station number shows the depth(m).

Table 5-2-2-10(11) Total length frequency distributions of survey-target species(July 20～August 9, 2002)

Species	*Epinephelus aeneus*																
Station No.	St.1	St.2	St.3	St.9	St.10	St.11	St.12	St.13	St.18	St.29	St.34	St.36	St.37	St.39	St.48	St.49	M2	Total
TL(mm)	25	33	52	51	17	24	50	68	52	41	51	42	53	37	76	78	32	
171 - 180							1											1
181 - 190						1												1
191 - 200						2												2
201 - 210																		
211 - 220					1													1
221 - 230							1											1
231 - 240																		
241 - 250																		
251 - 260																		
261 - 270																		
271 - 280																		
281 - 290																		
291 - 300																		
301 - 310																		
311 - 320																		
321 - 330																		
331 - 340																		
341 - 350												1						1
351 - 360														1				1
361 - 370	1																	1
371 - 380																		
381 - 390													1					1
391 - 400																		
401 - 410	1																	1
411 - 420																		
421 - 430										1								1
431 - 440																		
441 - 450										1								1
451 - 460	1																	1
461 - 470																		
471 - 480	1	1																2
481 - 490											1							1
491 - 500																	1	1
501 - 510				1														1
511 - 520																		
521 - 530																		
531 - 540	1																	1
541 - 550											1							1
551 - 560																		
561 - 570																		
571 - 580																		
581 - 590																		
591 - 600																		
601 - 610																		
611 - 620																		
621 - 630																		
631 - 640											1							1
641 - 650											1							1
651 - 660																		
661 - 670																		
671 - 680																		
681 - 690																		
691 - 700																		
701 - 710											1							1
711 - 720																		
721 - 730															1			1
731 - 740																		
741 - 750																		
751 - 760																		
761 - 770																		
771 - 780								1										1
781 - 790									1									1
791 - 800																		
801 - 810																		
811 - 820			1															1
821 - 830																		
831 - 840																		
841 - 850																		
851 - 860																		
861 - 870																		
871 - 880																		
881 - 890			1															1
891 - 900																		
1031 - 1040																		
1041 - 1050																1		1

The under figure of station number shows the depth(m).

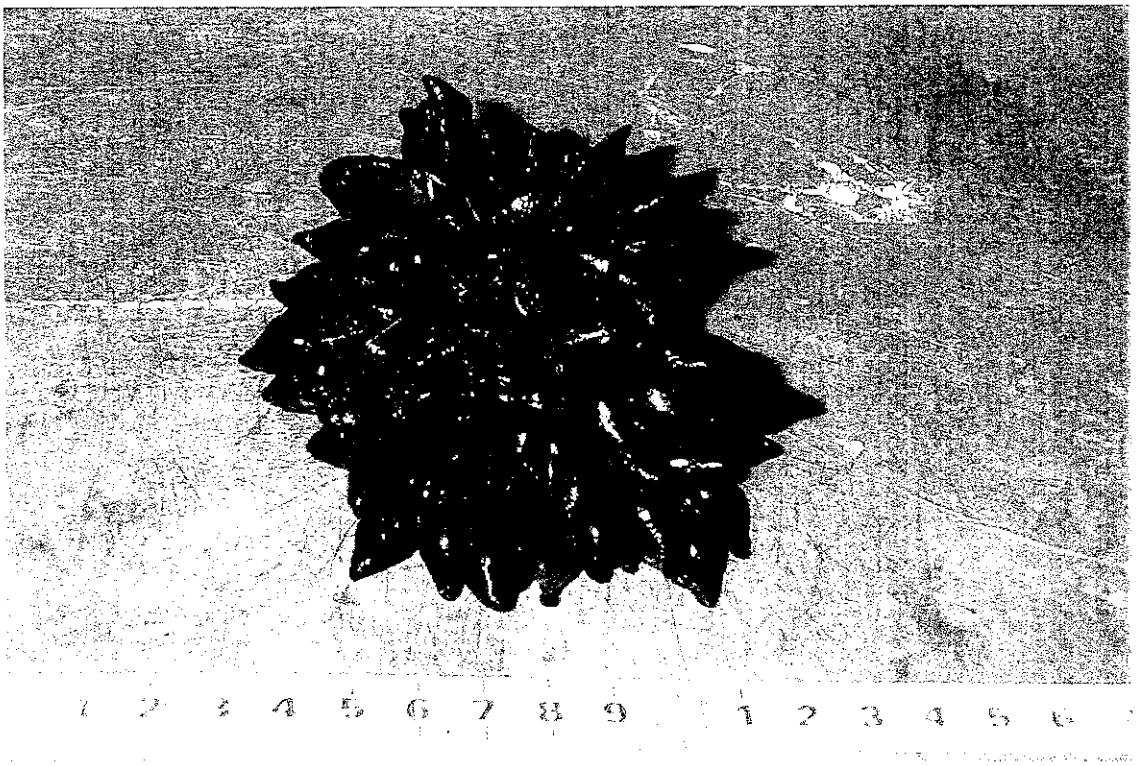
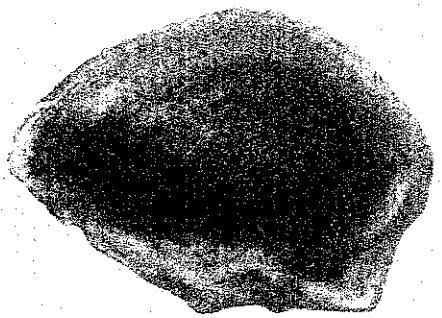
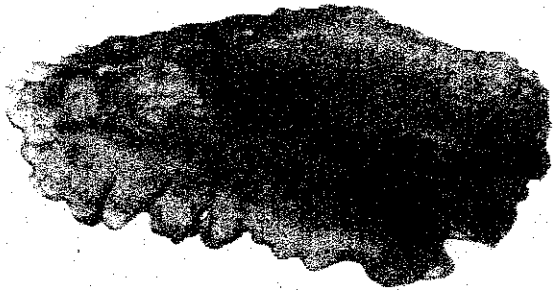


Plate 5-2-2-1　Cluster of Eggs (*Sepia officinalis*)

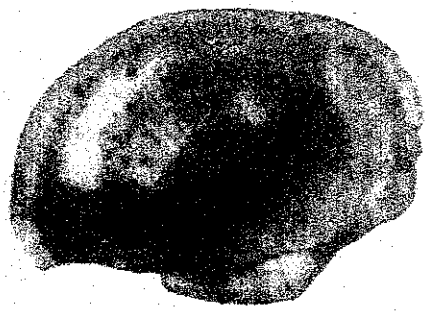
St. 04 Sparus caeruleostictus No. 02



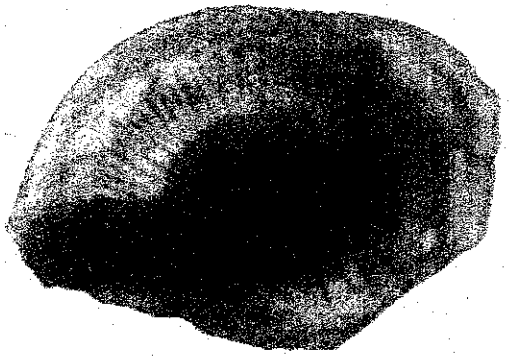
St. 09 Brachydeuterus auritus No. 05



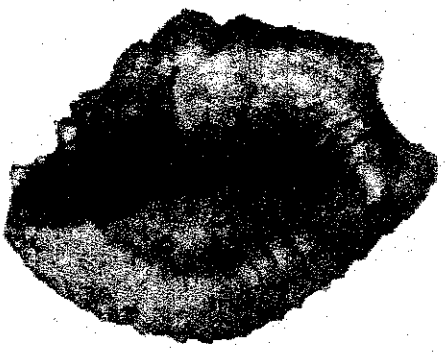
St. 35 Galeoides decadactylus No. 01



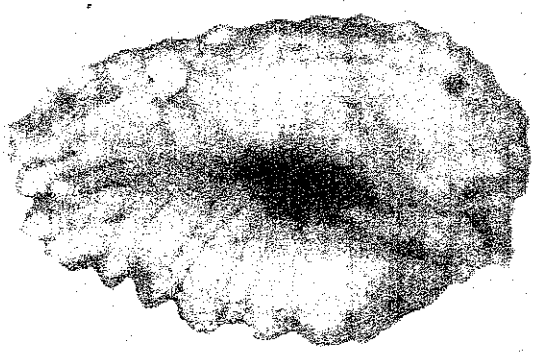
St. 09 Pomadasys incisus No. 02



St. 09 Pomadasys incisus No. 04



St. 07 Dentex canariensis No. 17



St. 38 Galeoides decadactylus No. 14

Plate 5-2-2-2 Sampes of otolith

5-2-3. Mesh Size Selectivity Tests

We obtained selectivity data of 10 evaluation target species from the results of the mesh selectivity tests that we carried out during our third and fifth field surveys (Table 5-2-3-1). However, we could not collect enough data to draw 60-mm and 70-mm mesh selectivity curves of *Pseudotolithus senegalensis*. Since the body length data of *Sepia officinalis* with 60-mm outer and inner nets do not overlap, we could draw no 60-mm selectivity curve of *Sepia officinalis*. Similarly, we could roughly draw 60-mm selectivity curves of *Galeoides decadactylus* and *Decapterus rhonchus* but no 70-mm selectivity curves of these species because data indicated dispersion in values. Figure 5-2-3-1 illustrates selectivity curves of nine evaluation target species except for *Pseudotolithus senegalensis*. Note that the 60-mm selectivity curve of *Pomadasys incisus* was plotted based on M1 data at the fifth field survey because Table 5-2-3-1 showed that data for 70% or lower were unknown and the M1 data obtained were fairly comprehensive. Described below are details of our survey results. Although selectivity curves obtained are not always symmetrical, the following 50% selection length is represented by the figure.

For 50% selection length of *Sparus caeruleostictus* in Sparidae, there is about 10 mm difference between the 60-mm mesh for 115 mm body length and the 70-mm mesh for 125 mm. The grade of the curve of the 70-mm mesh stands larger than that of the 60-mm mesh. For *Sparus caeruleostictus* with 135 mm or less in body length, the selectivity rate of the 70-mm mesh is lower than the 60-mm mesh (escape rate is higher). The grades of curves of both meshes overlap at the length of 135 mm or longer, where no difference is observed between their selectivity rates. All *Sparus caeruleostictus* with 165 mm or longer in length were caught with both meshes. With 60-mm and 70-mm mesh size, the length of *Sparus caeruleostictus* to be caught is about 95 mm. This species grows to 110 mm in length at one year old and 250 mm in length at 2 years old (Chapter 5-2-6). The present fishery targets yearling fishes of *Sparus caeruleostictus*; one-year-old fishes are put into complete recruitment. When the 70-mm mesh size regulation is applied, catch quantity of yearling to one-year-old *Sparus caeruleostictus* are expected to decrease considerably. Even in this case,

however, the problem remains unsolved that premature individuals of *Sparus caeruleostictus* are likely to be caught.

Dentex canariensis is also included in Sparidae. Its appearance is similar to *Sparus caeruleostictus*. About 100- to 120-mm long individuals of *Dentex canariensis* are subject to fishing with 60-mm and 70-mm meshes. About 195-mm long individuals of this species has 100% selection length. We estimate that 50% selection length is applicable to approx. 145-mm long individuals of *Dentex canariensis* with 60-mm mesh and approx. 155-mm long individuals with 70-mm mesh. Therefore, it seems attributable to insufficient data that the selectivity curve of 70-mm mesh is positioned over the selectivity curve of 60-mm mesh at around 145-mm long individuals in Figure 5-2-3-1 (70-mm mesh selectivity curve is supposed to be positioned under 60-mm mesh selectivity curve). By comparing 0% and 100% selection lengths with the body lengths of one- to two-year-old fishes (approx. 130 to 240 mm. see Chapter 5-2-6) whose body lengths were obtained from growth formulas, yearling fishes of *Dentex canariensis* are recruited like *Sparus caeruleostictus*. They are put into complete recruitment when reaching to one year old (Table 5-2-3-1). When the mesh is changed to 70-mm, catches of yearling to one-year-old *Dentex canariensis* are expected to decrease like *Sparus coeruleostictus*. However, the problem remains unsolved that premature individuals of *Dentex canariensis* are likely to be caught.

Pagellus bellottii is also included in Sparidae. Its appearance is slender and low in body height compared with the preceding two species. Its body length at first recruitment ranges from 85 mm with 60-mm mesh to 115 mm with 70-mm mesh. Compared with the preceding two species, the difference of recruitment body length is big, which stands at about 30 mm. *Pagellus bellottii* has 100% selection length at 195 mm for 60-mm and 70-mm meshes. Some 135- to 145-mm long individuals and 155- to 165-mm long individuals of *Pagellus bellottii* have 50% selection length at 60-mm mesh size and at 70-mm mesh size, respectively. By comparing the above-mentioned 0% and 100% selection lengths with the body lengths of one- to two-year-old fishes (approx. 100 to 150 mm. see Chapter 5-2-6) whose body length were obtained from growth formulas, we estimate that 60-mm mesh

(present fishing) makes yearling fishes into recruitment while 70-mm mesh makes one-year-old or older fishes into recruitment. It seems that two- to three-year-old fishes of *Pagellus bellottii* are put into complete recruitment. Since this species has a large gap between 60-mm and 70-mm mesh selectivity, the mesh control is likely to bring about greater effects on *Pagellus bellottii* compared with the preceding two species.

Brachydeuterus auritus (Pomadasyidae) is a small demersal fish. It is fishable when growing to about 135 mm in total length (Figure 5-2-2-1). Individuals of *Brachydeuterus auritus* have 0%, 50%, and 100% selection lengths for 60-mm mesh at 65 to 85 mm, 125 mm, and 175 mm, respectively. Similarly, it seems that individuals of *Brachydeuterus auritus* have 0%, 50%, and 100% selection lengths for 70-mm mesh at around 75 mm, 145 mm, and 195 mm, respectively. When judging from the lengths by ages obtained from the growth formula of this species, the present fishery makes yearling fishes into recruitment, and makes five-year-old fishes completely recruited. For the case of 70-mm mesh size, although the recruitment age is the same, it will take another one year to reach to 50% selection length. The mesh size regulation is expected to bring about good effects on *Brachydeuterus auritus* like *Pagellus bellottii*.

Pseudupeneus prayensis (Mullidae) is an important species which industrial fishing in Ghana exports to Europe. Judging from the body length composition (Figure 5-2-2-1) and the growth formula (see Chapter 5--2-6), most of the resources of this species seem to be one-year-old or so. From the selectivity curve in Figure 5-2-3-1, we estimate that yearling fishes are put into recruitment. Since one-year-old fishes fall into 100% selection length (210 mm), considerable fishing pressure seems to be put on this major resource. Since difference of selectivity curves is hardly observed between the 60-mm and the 70-mm mesh size, the mesh size regulation is unlikely to bring about good effects on this species.

Pomadasys incisus is, like *Brachydeuterus auritus*, included in Pomadasyidae. The main catch length ranges from 175 to 195 mm, which is longer than that of *B. auritus* (Table 5-2-3-1). The selectivity curves of this species hardly indicate any difference between 60-mm

and 70-mm mesh size. In other words, as soon as 145-mm long individuals are put into recruitment, 50% of them are likely to be caught, and 185-mm long individuals fall into 100% selection length. These results indicate that the mesh size regulation is likely to have no effect on this species. Judging from the growth formula of this species (see Chapter 5-2-6), it seems that about three-year-old fishes of this species are put into recruitment and that four-year-old fishes are put into complete recruitment.

No 70-mm selectivity curve of *Galeoides decadactylus* (Polynemidae) can be plotted due to insufficient data. However, we found 0% and 100% selection lengths for 60-mm mesh. In other words, about 145-mm long individuals (yearling) are put into recruitment and about 215-mm long individuals (one year old) are put into complete recruitment. In addition, Figure 5-2-2-1 indicates that the main members of one-year-old fishes are about 175 mm in length. Moreover, data of 70-mm inner net in Table 5-2-3-1 also indicate that main members of groups subject to 70-mm mesh are about 205 mm in length. Accordingly, we can estimate that both meshes are clearly different in selectivity.

No 70-mm selectivity curve of *Decapterus rhonchus* (Carangidae) is, like *Galeoides decadactylus,* cannot be plotted due to insufficient data. However, we found 0% and 100% selection lengths for the 60-mm mesh. More specifically, 0%, 50%, and 100% selection lengths for the 60-mm mesh are respectively found at around 65 mm, 135 mm, and 245 mm (Figure 5-2-3-1, Table 5-2-3-1). In this way, although no 70-mm selectivity curve of this species can be plotted, we found that large-sized meshes have certain effects on 175 mm or longer individuals in Table 5-2-3-1. Specifically, we found the selectivity rate of the 70-mm mesh was clearly lower the selectivity rate of the 60-mm mesh on the range mentioned above. We may draw a conclusion that mesh size regulation is applicable to this species for certain effects. The present fishery seems to target one-year-old fishes as the main catches based on the body length composition and the growth formula (see Chapter 5-2-6).

Since 60-mm selectivity curve of *Sepia officinalis* was unknown, we could not assess effects of mesh size regulation. We found that the 0% and 100% selection lengths (mantle length) of 70-mm mesh fell into 45

mm and 75 mm respectively (Figure 5-2-3-1). Based on these results and the growth formula of this species (see Chapter 5-2-6), we estimate that the present fishery makes yearling fishes into recruitment and completely recruited. As mentioned earlier, since many young individuals are found at deeper water in stable periods, mesh size regulation by large-scale trawler is unlikely to have good effects on this species.

We have hardly had data of *Pseudotolithus senegalensis*. We tried to collect such data at the fourth and fifth field surveys but could not collect sufficient data. In other words, we collected only five individuals of this species in 60-mm mesh selectivity test fishing at the fourth field survey. Because these individuals were caught with an internal net, it did not supplement the results of the third field survey. At the fifth field survey, we could catch only three individuals of this species in our 60-mm mesh selectivity test fishing.

From these results, we can make no quantitative evaluation of effects on these species when the mesh is changed from 60 mm to 70 mm. However, we can expect effects of mesh size regulation on *Sparus caeruleostictus*, *Dentex canariensis*, *Pagellus bellottii*, *Brachydeuterus auritus*, *Galeoides decadactylus*, and *Decapterus rhonchus*. Meanwhile *Pseudupeneus prayensis*, *Pomadasys incisus*, and *Sepia officinalis* are unlikely to have effects of mesh size regulation.

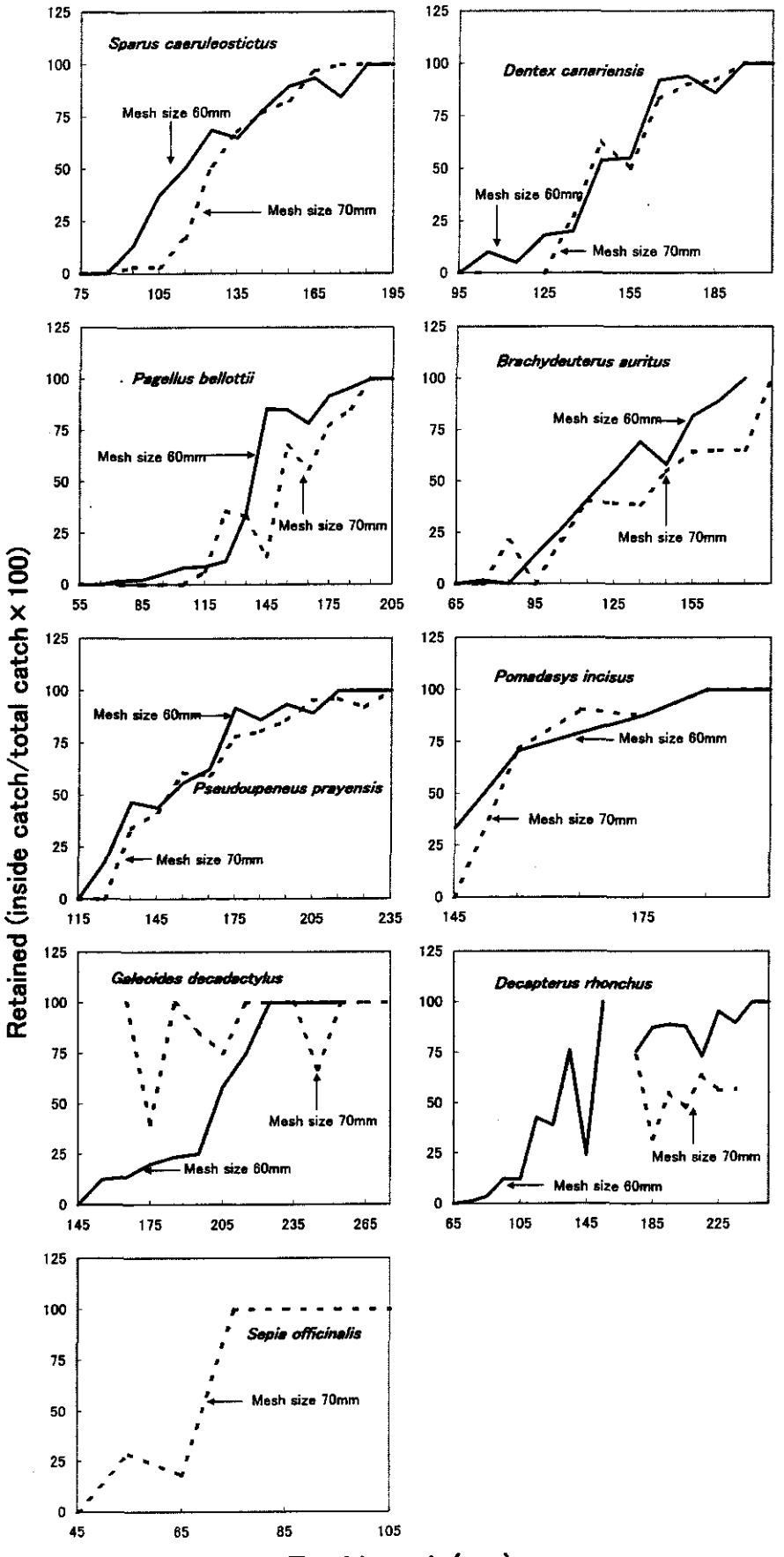


Fig. 5-2-3-1 Mesh selectivity curves by different mesh size of cod end for evaluation-target species.

Table 5-2-3-1(1) Results of mesh selectivity test

TL	*Sparus caeruleostictus*						*Dentex canariensis*						*Pagellus bellottii*						*Pseudotolithus senegalensis*						*Galeoides decadactylus*					
	60mm			70mm			60mm			70mm			60mm			70mm			60mm			70mm			60mm			70mm		
mm	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%
25																														
35																														
45																														
55														6	0															
65														39	0		2	0												
75		3	0		1	0		2	0				4	187	2		1	0												
85		14	0		21	0		12	0				6	249	2		1	0												
95	4	29	13	2	63	3		21	0		2	0	6	110	5											2	0			
105	26	44	38	1	32	3	2	19	10		3	0	10	110	8											5	0			
115	43	42	51	5	25	17	1	19	5	1	2	33	6	63	9	1	14	7								8	0			
125	64	29	69	11	10	52	6	27	18		2	0	4	31	11	10	19	36								7	0			
135	43	23	65	17	8	68	5	20	20	3	8	27	7	13	35	21	42	33								9	0			
145	40	11	78	24	7	77	15	13	54	5	3	63	18	3	85	8	49	14								3	0			
155	35	4	90	33	7	83	12	10	55	4	4	50	17	3	85	34	16	67							1	7	13			
165	29	2	94	32	1	97	12	1	92	10	2	83	15	4	78	21	16	56							3	19	14	1		100
175	11	2	84	29		100	16	1	94	9	1	90	22	2	92	55	16	77							5	20	20	2	3	40
185	20		100	19		100	12	2	86	12	1	92	22	1	96	55	9	85	1						4	13	24	1		100
195	14		100	19		100	12		100	3		100	24		100	31		100							1	3	25	6	1	86
205	19		100	9		100	5		100	4		100	10		100	13		100		1					7	5	58	12	4	75
215	13		100	8		100	5		100	3		100	7		100	8		100							6	2	75	7		100
225	10		100	4		100	4		100	2		100	17		100	3		100							3		100	2		100
235	8		100	4		100	2		100	5		100	12		100				1						3		100	1		100
245	7		100	5		100	3		100	6		100	5		100				2	1					5		100	2	1	67
255	12		100	3		100	1		100	1		100	5		100				1						4		100	3		100
265	2		100	1		100	5		100	3		100	7		100				1									3		100
275				2		100	5		100	3		100	10		100					1					2		100	2		100
285	5		100	2		100	5		100	1		100	5		100															
295	2		100	2		100	2		100	2		100	5		100				1	2								1		100
305				1		100	2		100	2		100							1											
315	5		100	2		100				1		100							1						1		100			
325	7		100	3		100				1		100																		
335	2		100	8		100				1		100	2		100				1											
345																														
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375																			1			1								
385																														
395																			3											
405																			1											
415																			3											
425																														
435																														
445																			1											

Table 5-2-3-1(2) Results of mesh selectivity test

TL	*Brachydeuterus auritus*						*Pomadasys incisus*						*Pseudoupeneus prayensis*						*Decapterus rhonchus*						*Sepia officinalis*					
	60mm			70mm			60mm			70mm			60mm			70mm			60mm			70mm			60mm			70mm		
mm	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%	in	out	%
25																													1	
35																										1				
45																										1			5	0
55																										2		2	5	29
65		133	0																	47	0					1		2	9	18
75	4	213	2											1	0				2	185	1				1			3		100
85		107	0																6	157	4							4		100
95	42	260	14		3	0													8	56	12				2			3		100
105	86	237	27	8	30	21							1		100				3	22	12				2			1		100
115	92	134	41	56	84	40								4	0		1	0	14	19	43				9					
125	112	93	55	69	107	39							2	8	18		2	0	14	22	39				11			1		
135	174	77	69	69	110	39							17	19	47	5	10	34	10	3	76				6			2		
145	77	55	58	32	27	54	7	2	76		1	0	20	26	44	14	19	42	1	3	24				7			1		
155	54	12	82	24	13	64	12	5	71	5	2	71	23	18	56	28	18	61	1		100				6					
165	20	3	89	27	30	47	56	13	81	19	2	90	32	19	62	26	18	59							8			1		
175	19		100	16	13	55	92	11	89	14	2	88	45	4	92	28	8	78	3	1	76	3	1	73	5			1		
185	7		100	7	6	54	71	3	96	12		100	37	6	86	25	6	81	28	4	87	5	10	32	2			4		
195				1		100	69		100	16		100	29	2	94	18	3	86	40	5	89	20	16	55	3			2		
205							67		100	9		100	17	2	89	21	1	95	29	4	88	39	42	48	4					
215							31		100	5		100	9		100	24	1	96	25	9	73	41	23	64	6			5		
225							36		100	5		100	7		100	23	2	92	20	1	95	22	17	56	1			3		
235							54	1	98	4		100	5		100	15		100	9	1	90	9	7	57						
245							15		100	1		100				11		100	6		100		2	0	4			1		
255							11		100							1		100	2		100				2					
265							6		100	1		100	2		100	4		100	3		100				3					
275																1		100	2		100				2					
285																									3					
295										1		100							1		100				1					
305																			1		100				3					
315																			3		100									
325																			4		100									
335																			1		100									
345																														
355																														
365																			1		100									
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385																			1		100									
395																			1		100									
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5-2-4. Sea Area Charts

During the marine surveys, marine area charts bearing isobaths, as estimated from water depths measured with a fish finder, were created (Fig. 5-2-4-1). For the sake of comparison, a marine area chart prepared from a commercially available chart created by England in the 1990s is shown in Fig. 5-2-4-2. A comparison between the two reveals that they differ from each other in isobath geometry. In particular, in sea areas where continental shelf edges represent steep slopes, the 100-meter isobaths are so complicated as to overlap with 75-meter isobaths, leaving questions as to the accuracy of 100-meter isobaths shown in the commercially available chart.

Seafloor information that had been obtained during the at-sea surveys is summarized below:

- In waters east of Accra, slopes are gentle down to depths of approx. 30 meters. Rocks scatter here and there on sandy terrains. There are also abrupt drops and rises measuring 5 to 6 meters. At depths of 50 meters and beyond, slopes become very steep and appear to be rocky. In-between rocks, mud appears to accumulate depending on the season.

- In waters from the vicinity of Accra to about longitude 00° 50' west, the undersea terrains are sandy at depths of 30 meters and less. Rocks are found in large numbers and the terrains are complex in shape. At depths of 60 meters and beyond, the proportion of slopes increases and projecting rocks come to be found in growing numbers. At depths of 75 meters and greater, mud appears to deposit in-between rocks depending on the season.

- In waters from approx. longitude 00° 50' west to the neighborhood of Sekondi, the largest continental shelf in the coast of Ghana extends and the seafloor is gently inclined as well. Although the deposits on the continental shelf are sand and mud, rocky terrains come to be found increasingly with increasing

depth. Farther away from the coast, seafloors are gently sloped as far as down to depths of approx. 120 meters in some areas whereas they became abruptly inclined from depths of approx. 80 meters in other areas. In particular, slopes in waters west of Cape Coast are studded with projecting rocks. In places, such rocks rise to heights of nearly 10 meters.

• In waters west of Sekondi, slopes at depths of 30 meters and shallower are steep and are predominantly rocky. At depths of 30 to 70 meters, slopes are relatively gentle and sediments are considered to be rock masses or sand soil. From depths of approx. 80 meters and deeper, slopes become steep.

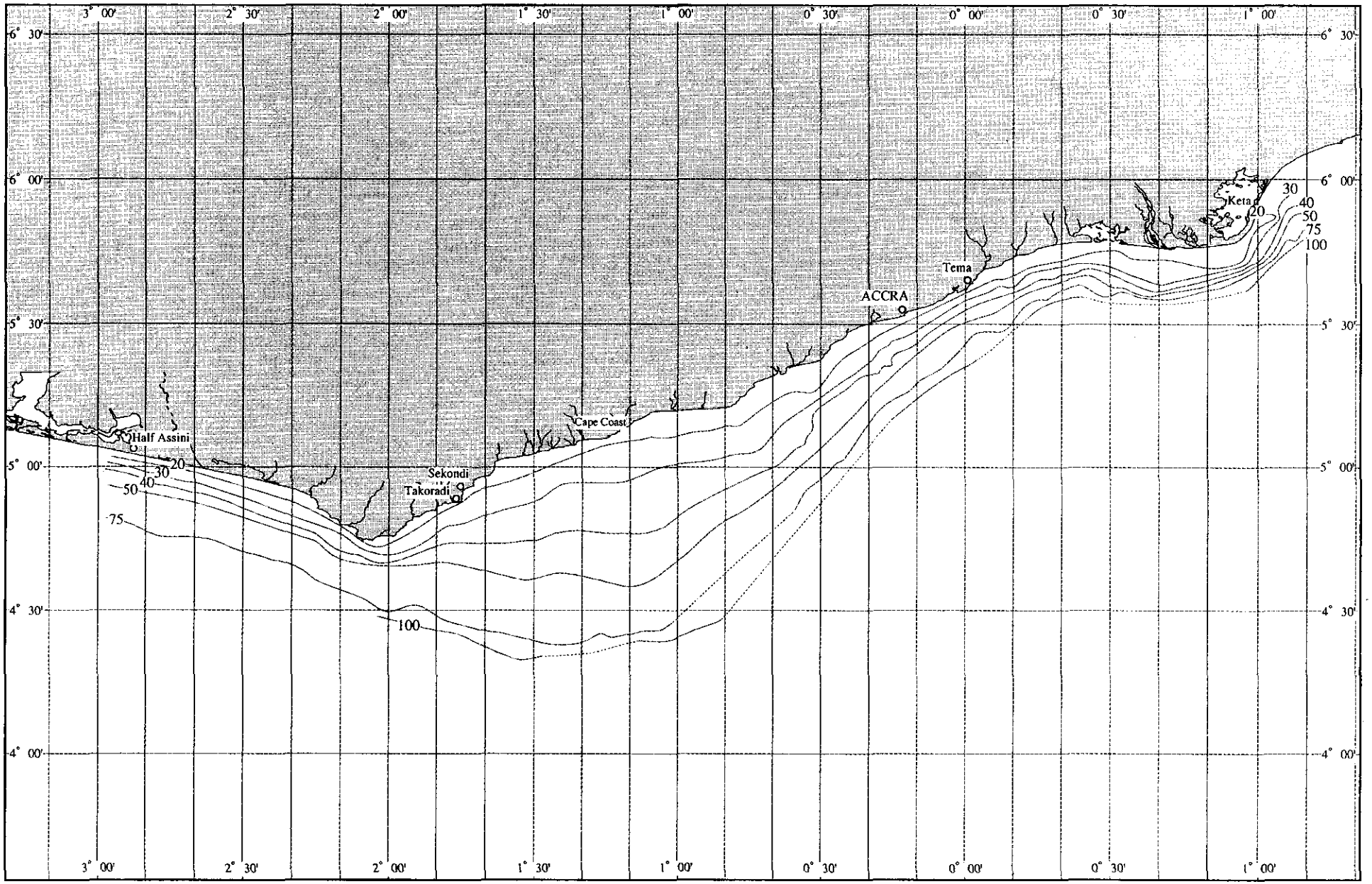

Figure 5-2-4-1 Iso-bath lines observed using echo sounder during present survey cruises

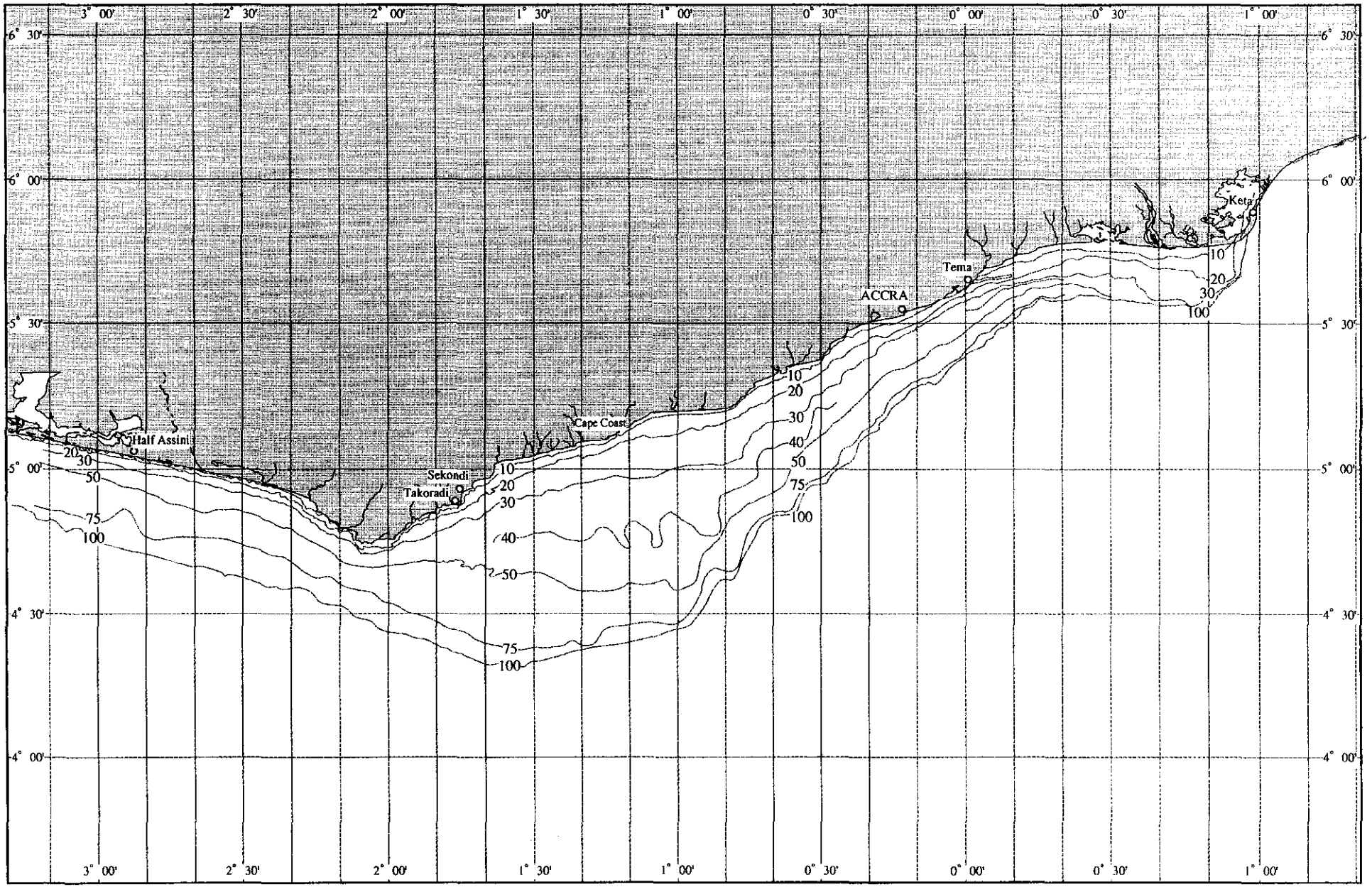

Figure 5-2-4-2 Iso-baths drawn from nautical chart on sale