



**THE FOURTH REGIONAL WORKSHOP ON SHARED STOCKS:  
RESEARCH AND MANAGEMENT  
IN THE SOUTH CHINA SEA**

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# Problems of Shared Fish Stock in Vietnam

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## 1. Introduction

The South China Sea (SCS) contains great biological resources, its richness is shown in absolute number of marine living species and large number of endemic species. For the countries bordering the SCS, the marine fisheries play very important role in the national welfare of each country not only in terms of animal protein sources but also in terms of socio-economic issues.

According to FAO figure, among 52 countries of the world which had catches more than 200,000 tonnes per year in 1997, 5 countries of the Southeast Asia region had catch of marine production exceeded more than 1 million tonnes/year, namely: Indonesia (3,649,200.0 tonnes), Thailand (2,912,203.0), Philippines (1,805,806.0), Malaysia (1,172,922.0) and Vietnam (1,066,000.0 tonnes). (INFOFISH, 1999).

The Vietnamese fisheries sector plays the fourth most important role in Vietnam's international trade based economy, following oil, agriculture productions and textile manufacture. The marine fish fauna was diverse with more than 2000 species belonging to over 700 genera and 200 families, of which around 70 % are demersal species and rest are pelagic ones.

The marine fisheries of Vietnam is considered as multi-species, multi-gears, small-scale and free access fisheries. Most of the fishing efforts is expected by relatively small vessels: nearly 98 % of fishing vessels having engine capacities less than 60 Hp. The major fishing gears included trawls, purse seine, gillnets, lift nets, long-line and hand-line. The technical specifications of various fishing gears used in Vietnam were described by Vinh C.T, and Long N. (1994).

Fisheries production of bottom trawls accounted for about 29.8 % of total production, then followed by purse seines - 26.4 %, gillnets- 18.0 %, Long-line and hand-line- 6.2 %, lift nets- 4.5 % and others- 15.1 %. (MOFi & DANIDA, 1998).

It has been reported that coastal pelagic and demersal resources have been over-exploited. This is because of concentration of fishing efforts in near-shore waters in past years. As a result, catch per unit of efforts (CPUE) has been decreased gradually. On the other hand the off-shore pelagic fisheries resources are still in the developing conditions due to sparse fishing activities. And part of them is referred to those transboundary stocks exploited by two or more countries bordering the South China Sea.

## 2. National fish resources surveys

The survey and research on marine fisheries resources in seawaters of Vietnam have been conducted for many years and are considered to have been started since the establishment of the Indo-China Institute of Oceanography in Nha Trang in 1923. During the time up to 1935, the Institute had conducted a lot of survey cruises by Trawler De Lanessan (1000 Hp) from the Tonkin Gulf to the Gulf of Thailand including Paracel and Spratly areas.

In 1959-1962, the joint Vietnam-Chinese study on demersal fish resources in the Tonkin Gulf and in 1960-1961 the joint Vietnam-Soviet integrated study on fish resources in the Tonkin Gulf and adjacent waters of the South China Sea including Paracel and Spratly areas have been carried out. Trawlers of 200-800 Hp were used.

During 1959-1961 period, in the South Vietnam there had been activities of NACA expedition under Scripps California Institute of Oceanography (USA) with participation of experts of the Saigon Fisheries Research Institute and of Thailand. From 1969-1973 with the assistance of FAO/UNDP the off-shore Fisheries Research Program in waters of South Vietnam had been conducted on board of trawler Kioshin Maru No52 (1000 Hp) and purse seiner Huu Nghi (600 Hp).

From 1977-1978, study on small pelagic fish resources in the Tonkin Gulf was conducted on board of R/V Bien Dong (1500 Hp). The acoustic survey with test fishing by bottom and pelagic trawls was carried out.

During 1978-1980, small pelagic resources study in waters of South Vietnam from Thuan Hai to Minh Hai provinces on board of R/V Bien Dong was conducted.

One of very comprehensive integrated study on fisheries resources between Vietnam and Soviet Union in seawaters of Vietnam during 1979-1988 was carried out. 33 research cruises on boards of series research vessels with engine capacity ranged from 800-3800 Hp was conducted. Bottom, pelagic trawls and long-line were used for study.

Study on marine pelagic fish resources in off-shore water of Vietnam has been re-started in period 1995-1997. With JICA assistance, surveys on boards of R/V Bien Dong using 5 different mesh-size gillnets were conducted.

With support of DANIDA, the project of Assessment of living marine resources in Vietnam (ALMRV) was carried out from 1996. Research cruise on board chartered commercial fishing trawler Ha Long 408-B (600 Hp) from depth 50-to 200 m was done and at the same time, fisheries statistic data collection activities were conducted at 11 major fish landings sites along the coastline.

In order to reduce fishing pressure on resources in coastal areas, Ministry of Fisheries of Vietnam intended to develop off-shore fisheries. In period from 1998-1999, study on fisheries resources in off-shore areas was conducted on boards of chartered commercial fishing vessels, pair trawlers were used in the Tonkin Gulf and Southeast of the South and gillnets and long-lines were used in off-shore central waters of Vietnam. These studies will be continued from year of 2000.

The Collaborative Study on Assessment and Management of marine resources in the Gulf of Thailand between Vietnam and Thailand was conducted in 1997-1998 on boards of R/V BIEN DONG (1500 Hp) of Vietnam equipped with gillnets and R/V Chulabhorn (2800 Hp) of Thailand equipped with bottom trawl and vertical bottom long-line.

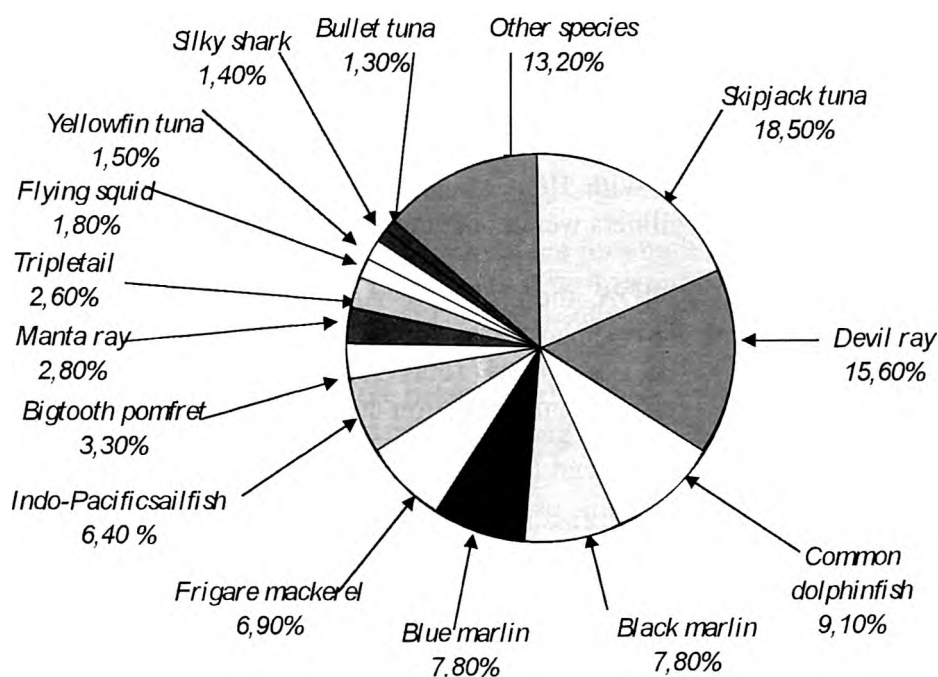
The SEAFDEC interdepartmental Collaborative Research Program on Fisheries Resources in the South China Sea, Area IV (Vietnamese waters ) was conducted on boards of M/V SEAFDEC and R/V BIEN DONG in 1999. Hydroacoustic method, long-line, squid jigging and gillnets were used .

Results of these research activities were described in different reports and publications. Based on existing data, the fisheries resources in off-shore waters of Vietnam which closely related to shared fish stock in the South China sea could be assessed as outlined below:

In off-shore waters, by gillnets of different mesh-size, 98 species belonged to 32 families have been identified, of which 96 fish species belonged to 30 families, 2 squids species belonged to two families ( Table 1 ). Besides, 3 species of sea turtles and 5 species of dolphin were also incidentally caught.

Catch rate of Skipjack tuna was highest ( 18.5 %), then followed by Devil ray ( 15.6 %), Common dolphin ( 9.1 %). Catch rate of Frigate mackerel accounted for 6.9 %), small-sized Yellowfin tuna ( 1.5 %), Bullet tuna ( 1.3 %), etc. ( Fig. 1 )

Among 98 species caught, catches of major 14 species comprised 86.8 % of the total catch by gillnet. Skipjack tuna was considered as the most important species of shared stock in the South China Sea.



**Fig. 1** Catch rate of major species in off-shore waters of Vietnam

### **3. Problems concerning shared fish stock with in country**

In seawaters of Vietnam, multispecies resources are found. There were more than 2000 fish species have been identified, of which around 70 % are demersal and making very complicated species composition in catches of bottom trawls.

Demersal fish species are less mobile than the pelagic species and being exploited mostly in national jurisdiction only, while most of pelagic species, especially oceanic pelagic are considered as migratory resources and often be exploited by other countries bordering the South China Sea. However, studies on definition of stocks which will be used as the basic unit for fisheries management in seawaters of Vietnam are still limited and there are lack of stock assessment data on group of species or species alone. In general , the oceanic pelagic resources in off-shore waters of Vietnam haven't been studied in details.

Due to characteristics of monsoon system, number of fish schools varies largely by season around the year , concentrating in rather larger schools during the Northeast monsoon period than during Southwest monsoon period. For all different periods, small fish schools dominated, medium size schools accounted for about 15 % and large schools only 0.8 % of total number of schools observed. For small pelagic species, occurrence frequency in seawaters with depth of 20-50m accounted for 56.4 %, 50-100m ( 25.7 %) and 100-200m (0.6 %).( MOFi & UNDP, 1992).

Shared stocks of oceanic pelagic fish species in off-shore waters of Vietnam are believed still under-exploited due to the lack of the appropriate fishing vessels and fishing technology, especially resources of tuna and tuna-like species. Application of advanced fishing technology and development of off-shore fishing fleets can increase the production of these shared stocks in seawaters of Vietnam.

The foreign illegal fishing is being happened in seawaters of Vietnam such as Chinese fishing vessels in the Tonkin Gulf. It is difficult to control these illegal fishing in recent years.

In general, lack of the research activities on shared stocks in seawaters of Vietnam has caused difficulties in fisheries management and policy-making procedures.

### **4. Fisheries management measures as practiced in Vietnam**

Overfishing in coastal waters, habitat degradation, destructive fishing methods, industrial and agricultural pollution, lack of data on off-shore fisheries resources and fisheries statistics systems, lack of fisheries law and legislation framework, etc. are major problems faced in fisheries management and strategies in Vietnam.

The Ministry of Fisheries of Vietnam recognized above-mentioned problems and defined main directions and measures as follows:

- To reduce fishing pressure on coastal resources by creating for fishermen another jobs and activities.

- To develop off-shore capture fisheries by building more powerful fishing boats and using advanced fishing technology. To push up research activities on off-shore fisheries resources.
- To develop aquaculture in all water bodies by sustainable technology and friendly with environments and natural ecosystems.
- To modernise fish processing subsector, pay attention on post harvest technology in order to increase value-added products and diversify fisheries products. To expand markets both domestic and oversea.
- To improve fisheries infrastructure, especially in major fish landing sites.
- To set up human's strategy, through training staffs, implementing awareness programs.
- To build up fisheries law , legislation framework, regulations and develop surveillance and enforcement measures.
- To follow the community-based management in fisheries, and
- To coolaborate closely with organizations and countries in the world and in the region.

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**Table 1** Species composition of catch by gillnet in off-shore waters of Vietnam.

<i>Ord.</i>	<i>Scientific name of Families and species</i>	<i>Common English name</i>	<i>Vietnamese name</i>
(1)	(2)	(3)	(4)
<b>I</b>	<b>ACANTHURIDAE</b>		<b>HỌ CÁ ĐUÔI GAI</b>
1	<i>Naso brevirostris</i> ( Valenciennes )	Spotted unicornfish	Cá Một sừng
<b>II</b>	<b>BELONIDAE</b>		<b>HỌ CÁ NHÓI</b>
2	<i>Ablennes hians</i> ( Valenciennes )	Flat needlefish	Cá Nhói vằn
3	<i>Tylosurus acus melanotus</i> ( Bleeker )	Blackfin needlefish	Cá Nhói vây lưng đen
<b>III</b>	<b>BRAMIDAE</b>		<b>HỌ CÁ VÈN BIỂN</b>
4	<i>Brama orcinii</i> Cuvier	Bigtooth pomfret	Cá Vèn biển
<b>IV</b>	<b>CARANGIDAE</b>		<b>HỌ CÁ KHẾ</b>
5	<i>Alectis ciliaris</i> ( Bloch )	Threadfin trevally	Cá ông lão mõm ngắn
6	<i>Atule mate</i> ( Cuvier )	Slender-scaled scad	Cá Ngân
7	<i>Carangoides ferdau</i> ( Forsskal )	Blue trevally	Cá Khế fecdo
8	<i>C. orthogrammus</i> ( Jordan et Gilbert )	Yellow-spotted crevalle	Cá Khế chấm vàng
9	<i>Decapterus maruadsi</i> ( Temminck et Schlegel )	Round scad	Cá Nục sò
10	<i>D. kurroides</i> Bleeker	Red-tail scad	Cá Nục đỏ đuôi
11	<i>D. macrosoma</i> Bleeker	Layang scad	Cá Nục thun
12	<i>Elagatis bipinnulata</i> (Quoy et Gaimard)	Rainbow runner	Cá Sọc mướp
13	<i>Megalaspis cordyla</i> ( Linnaeus )	Hard-tail scad	Cá Sòng gió
14	<i>Naucrates ductor</i> ( Linnaeus )	Pilot fish	Cá Thuyền
15	<i>Scomberoides lysan</i> ( Forsskal )	Double dotted queenfish	Cá Bè xước
16	<i>S. commersonianus</i> Lacepede	Talang queenfish	
17	<i>S. tol</i> ( Cuvier )	Leatherskin	Cá Bè sâu

		queenfish	
18	<i>Selar crumenophthamus</i> ( Bloch )	Bigeye scad	Cá Tráo
19	<i>Seriola rivoliana</i> Valenciennes	Almaco jack	Cá Cam
20	<i>Seriolina nigrofasciata</i> ( Ruppell )	Black band jack	Cá Cam vân
21	<i>Trachinotus bailloni</i> ( Lacapede )	Black-spotted dart	Cá Sông chấm đen
22	<i>Uraspis helvola</i> ( Forster )	Whitemouth kingfish	Cá Hiến
V	<b>CALLIONYMIDAE</b>		<b>HỌ CÁ ĐÀN LIA</b>
23	<i>Pseudocalliurichthys</i> sp.	Variegated dragonet	Cá Đàn lia
VI	<b>CARCHARHINIDAE</b>		<b>HỌ CÁ MẬP</b>
24	<i>Carcharinus brevipinna</i> ( Muller et Henle )	Spinner shark	Cá Mập gai
25	<i>C. falciformis</i> ( Bibron )	Silky shark	Cá Mập lụa
26	<i>C. sorrah</i> ( Valenciennes )	Spot-tail shark	Cá Mập Sô ra
27	<i>Galeocerdo cuvier</i> ( Perdo et Le Sueur )	Tiger shark	Cá Mập báo
28	<i>Prionace glauca</i> Linnaeus	Blue shark	Cá Mập xanh
29	<i>Pseudocarcharias kamoharai</i> ( Matsubara )	Crocodile shark	Cá Mập sấu
VII	<b>CHIROCENTRIDAE</b>		<b>HỌ CÁ RỪA</b>
30	<i>Chirocentrus dorab</i> ( Forsskal )	Wolf herring	Cá Rựa
VIII	<b>CORYPHAENIDAE</b>		<b>HỌ CÁ NỤC HEO</b>
31	<i>Coryphaena equiselis</i> Linnaeus	Pompano dolphinfish	Cá Nục heo
32	<i>C. hippurus</i> Linnaeus	Common dolphinfish	Cá Nục heo thường
IX	<b>DALATIIDAE</b>		<b>HỌ CÁ NHÁM</b>
33	<i>Isistius brasiliensis</i> (Quoy et Gaimard )	Black shark	Cá Nhám đen
X	<b>DIODONTIDAE</b>		<b>HỌ CÁ NÓC NHÍM</b>
34	<i>Diodon eydouxii</i> Brissout et Barneville	Porcurine fish	Cá Nóc nhím
35	<i>D. hystrix</i> Linnaeus	Porcurine fish	Cá Nóc nhím
36	<i>D. holocanthus</i> Linnaeus	Fleckled sucker	Cá Nóc nhím vân đen
XI	<b>ECHENEIDIDAE</b>		<b>HỌ CÁ ÉP</b>
37	<i>Echeneis naucrates</i> Linnaeus	Shark sucker	Cá Ép
38	<i>Remora remora</i> ( Linnaeus )	Remora	Cá Ép ngắn
39	<i>Remorina albescens</i> ( Temminck et Schlegel )	White remora	Cá Ép trắng



<b>XII</b>	<b>EXOCOETIDAE</b>		<b>HỌ CÁ CHUỒN</b>
40	<i>Cypselurus atrisignis</i> ( Jenkins )	Greater spotted flyingfish	Cá Chuồn cổ chấm
41	<i>C. cyanopterus</i> ( Valenciennes )	Margined flyingfish	Cá Chuồn vây xanh
42	<i>C. longibarbus</i> ( Parin )	Coast flyingfish	Cá Chuồn
43	<i>C. naresii</i> ( Grunther )	Uchida's flyingfish	Cá Chuồn Uchida
44	<i>C. poecilopterus</i> ( Valenciennes )	Yellowfin flyingfish	Cá Chuồn vây vàng
45	<i>C. sp.</i>	Flyingfish	Cá Chuồn sp.
46	<i>C. spilonopterus</i> ( Bleeker )	Flyingfish	Cá Chuồn cổ vây cáo
47	<i>C. unicolor</i> ( Valenciennes )	Bigeye flyingfish	Cá Chuồn mắt to
48	<i>Exocoetus volitant</i> Linnaeus	Cosmopolitan flyingfish	Cá Chuồn bay
49	<i>Paraexocoetus sp.</i>	Sailfin flyingfish	Cá Chuồn vây cờ
<b>XIII</b>	<b>GEMPYLIDAE</b>		<b>HỌ CÁ THU RẮN</b>
50	<i>Gempylus serpens</i> Cuvier	Snake mackerel	Cá Thu rắn
51	<i>Lepidocybium flavobrunneum</i> (Smith)	Escolar	Cá Thu mỡ
52	<i>Promethichthys prometheus</i> (Cuvier)	Snake-mackerel	Cá Thu hổ
53	<i>Ruventtus pretiosus</i> Cocco	Oil fish	Cá Ruvet
<b>XIV</b>	<b>ISTIOPHORIDAE</b>		<b>HỌ CÁ CỜ</b>
54	<i>Istiophorus platypterus</i> (Shaw etNodder)	Indo-Pacific sailfish	Cá Cờ phương đông
55	<i>Makaira indica</i> ( Cuvier )	Black marlin	Cá Cờ đen
56	<i>M. mazara</i> ( Jordan et Snyder )	Blue marlin	Cá Cờ xanh
57	<i>Tetrapterus audax</i> ( Philippi )	Striped marlin	Cá Cờ vạch
<b>XV</b>	<b>KYPHOSIDAE</b>		<b>HỌ CÁ DẦM</b>
58	<i>Kyphosus vaigiensis</i> (Quoy etGaimard)	Bass seachub	Cá Dầm
<b>XVI</b>	<b>LOBOTIDAE</b>		<b>HỌ CÁ KẼN</b>
59	<i>Lobotes surinamensis</i> ( Bloch )	Tripletail	Cá Rô biển
<b>XVII</b>	<b>MENIDAE</b>		<b>HỌ CÁ BÁNH LÁI</b>
60	<i>Mene maculata</i> ( Bloch et Schneider )	Moon fish	Cá Bánh lái
<b>XVIII</b>	<b>MOBULIDAE</b>		<b>HỌ CÁ Ó DỜI</b>
61	<i>Manta birostric</i> ( Donndoff )	Manta ray	Cá ó dời hai mõm
62	<i>Mobula japonica</i> ( Muller et Henle )	Devil ray	Cá ó dời Nhật bản
<b>XIX</b>	<b>MONACANTHIDAE</b>		

63	<i>Aluterus monoceros</i> ( Linnaeus )	Unicom leatherjacket	Cá bò một gai lưng
64	<i>A. scriptus</i> ( Osbeck )	Leatherjacket	Cá Bò giấy gai không đều
65	<i>Canthidermis maculata</i> ( Bloch )	Ocean triggerfish	Cá Bò chấm
XX	<b>MYCTOPHIDAE</b>		<b>HỌ CÁ ĐÈN LÔNG</b>
66	<i>Diaphus gigas</i> Gibert	Brightnose headlightfish	Cá Đèn lông mồm sáng
67	<i>D. watasei</i> Jordan et Starks	Latern fish	Cá Đèn lông
XXI	<b>NOMEIDAE</b>		<b>HỌ CÁ CHIM HAI VÂY</b>
68	<i>Arioma indica</i> ( Day )	Indian driftfish	Cá Chim ấn độ
69	<i>Cubiceps baxteri</i> McCulloch	Drift fish	
70	<i>C. pauciradiatus</i> Gunther	Chunky fathead	Cá Đầu mập
71	<i>C. squamiceps</i> ( Lloyd )	Fathead	Cá Đầu mập
72	<i>Nomeus gronovii</i> ( Gmelin )	Man-of-War fish	Cá Nhà binh
73	<i>Psenes arafurensis</i> Grunther	Eyebrowfish	Cá Lông mày
74	<i>P. cyanophrys</i> Valenciennes	Black driftfish	Cá Chim gai
75	<i>P. maculatus</i> Lutken	Blue eyebrowfish	Cá Lông mày xanh
XXII	<b>ORECTOLOBIDAE</b>		<b>HỌ CÁ NHÁM MÈO</b>
76	<i>Stegostoma fasciatum</i> (Hermann )	Zebra shark	Cá Nhám mèo
XXIII	<b>PRIACANTHIDAE</b>		<b>HỌ CÁ TRÁC</b>
77	<i>Priacanthus macracanthus</i> Cuvier	Large-spined bigeye	Cá Trác ngắn
XXIV	<b>RACHYCENTRIDAE</b>		<b>HỌ CÁ GIÒ</b>
78	<i>Rachicentron canadum</i> (Linnaeus )	King fish	Cá Giò
XXV	<b>SCOMBRIDAE</b>		<b>HỌ CÁ THU NGỪ</b>
79	<i>Acanthocybium solandri</i> ( Cuvier )	Wahoo	Cá Thu ngang
80	<i>Auxis rochei</i> ( Risso )	Bullet tuna	Cá Ngừ ổ
81	<i>A. thazard</i> ( Lacepede )	Frigate mackerel	Cá Ngừ chù
82	<i>Euthynnus affinis</i> ( Cantor )	Eastern little tuna	Cá Ngừ chấm
83	<i>Katsuwonus pelamis</i> ( Linnaeus )	Skipjack tuna	Cá Ngừ vằn
84	<i>Rasrelliger kanagurta</i> ( Cuvier )	Indian mackerel	Cá Bạc má
85	<i>Thunnus albacares</i> ( Bonnaterre )	Yellowfin tuna	Cá Ngừ vây vàng
86	<i>T. obesus</i> ( Lower )	Bigeye tuna	Cá Ngừ mắt to
87	<i>T. tonggol</i> ( Bleeker )	Longtail tuna	Cá Ngừ bò
88	<i>Sarda orientalis</i> (Temminck et Schlegel)	Striped bonito	Cá Ngừ sọc dưa

89	<i>Scomber australasicus</i> Cuvier	Blue mackerel	Cá Thu úc
90	<i>Scomberomorus commerson</i> Lacepede	Spanish mackerel	Cá Thu vạch
<b>XXVI</b>	<b>SPHYRNIDAE</b>		<b>HỌ CÁ NHÁM CÀO</b>
91	<i>Sphyrna lewini</i> (Griffith et Smith)	Hammerhead shark	Cá Nhám búa có rãnh
<b>XXVII</b>	<b>SYNODOTIDAE</b>		<b>HỌ CÁ MỐI</b>
92	<i>Saurida undosquamis</i> Richardson	True lizardfish	Cá Mối vạch
<b>XXVII I</b>	<b>TETRADONTIDAE</b>		<b>HỌ CÁ NÓC</b>
93	<i>Lagocephalus</i> sp.	White-tail blowfish	Cá Nóc đuôi trắng
94	<i>L. lagocephalus oceanicus</i> Jordan et Flower	Spotted blowfish	Cá Nóc chấm
<b>XXIX</b>	<b>THERAPONIDAE</b>		<b>HỌ CÁ CĂNG</b>
95	<i>Therapon jarbua</i> (Forsskal)	Jarbua terapon	Cá Ong
<b>XXX</b>	<b>XIPHIIDAE</b>		<b>HỌ CÁ MŨI KIẾM</b>
96	<i>Xiphias gladius</i> Linnaeus	Broadbill swordfish	Cá Mũi kiếm
<b>XXXI</b>	<b>OMMASTREPHIDAE</b>		<b>HỌ MỤC LỬA</b>
97	<i>Sthenoteuthis ovalaniensis</i> Lesson	Flying squid	Mục lửa
<b>XXXII</b>	<b>THYSANNOTEUTHIDAE</b>		<b>HỌ MỤC VÂY THOI</b>
98	<i>Thysanoteuthys rhombus</i> Troschel	Diamondback squid	Mục vây hình thoi