

Fisheries Data Collection and Recent Fisheries Statistics in Thai Waters: A case of the Andaman Sea

Pavarot Noranarttragoon

Marine Fisheries Research and Development Division, Department of Fisheries, Thailand

Abstract

Marine Fisheries in Thailand can be categorized into two sectors, i.e., artisanal fishery and commercial fishery. The artisanal fishery is characterized by fishing operation using a fishing vessel which the size is less than 10 gross ton (GT) or without a fishing vessel. While, the commercial fishery means fishing operation using a fishing vessel which the size is equal or larger than 10 GT. In addition, fishing vessels operating trawls (i.e., pair trawl, otter board trawl, and beam trawl), purse seine, anchovy purse seine, and clam dredges (i.e., short-necked clam dredge, blood clam dredge, and other clam dredge) and fishing vessels equipped with an engine of more than 280 horse power are considered to be commercial fisheries. There are all together 22 types of fishing gears used in Thai waters. Beside eight commercial fishing gears, squid falling net, squid trap, octopus trap, fish trap, crab trap, krill push net, longline, handline, gill net, pomfret lift net, red frog crab lift net, anchovy falling net, and anchovy lift net are among them. Light luring vessel is also considered to be a type of fishing gear.

The Department of Fisheries is responsible for fisheries data collection. Basic fisheries statistics includes catch and effort by species, gears, months, fishing grounds, and sectors, i.e., artisanal and commercial fishery. This information is mainly used for development of marine fisheries management plan and scientific research.

For fisheries data collection for statistical purpose, the commercial vessels are divided into two groups. The first group is the fishing vessels which are required to notify the Port-in and Port-out Control Centers (PIPO) before going out to the sea and landing at fishing port, i.e., all vessels which the size is equal to or larger than 30 GT and vessels which the size is equal to or larger than 10 GT and operates trawls, purse seine, anchovy purse seine, anchovy falling net, and anchovy lift net. The second group is the fishing vessels which are not required to notify PIPO. For the first group, catch and effort are gathered from logbooks. For the second group, catch and effort data are collected by monthly stratified random sampling and logbook. In addition, catch and effort data of artisanal vessels are gathered by monthly sampling survey. Length of some economically important species and species composition data from both

artisanal and commercial vessels are also collected monthly for scientific research purpose and to supplement catch and effort statistical data.

The total catch in the Andaman Sea of Thailand during 2016 – 2018 was 393,064, 376,017, and 399,491 tons respectively with an average of 389,524 tons. Catch from artisanal sector contributed to an average of 17.47% of the total catch in the Andaman Sea. Catch from purse seine made up the highest catch with an average of 36.05% of the total catch followed by otter board trawl and pair trawl, 22.47% and 17.32% respectively. Shortfin scad and Japanese scad (*Decapterus* spp.), made up the highest composition of purse seine with an average of 9.48% of total purse seine catch followed by other Carangids, Indian mackerel (*Rastrelliger kanagurta*), and neritic tunas, 8.78%, 4.32%, and 3.37% respectively. In addition, total fishing effort of purse seiners was an average of 33,960 trips/year or 44,735 days/year.

1. Introduction

Prior to 2015, marine fisheries in Thailand was characterized by an open access fishery. Fishing right was widely open for those who wish to pursue a fishing career resulting in continuous increase in number of fishing vessels particularly during 1962 – 1991. Although, fishing licenses for trawls and anchovy fishing gear, i.e., anchovy purse seine, anchovy lift net, and anchovy falling net, had been limited since 1996 and 2000 respectively, fishing effort, e.g., number of fishing day, had not been controlled. Consequently, overfishing was occurred causing degradation of fisheries resources which could be observed by reduction of catch per unit effort (CPUE) and so-called growth overfishing.

In November 2015, three important documents related to fisheries management, i.e., the Royal Ordinance on Fisheries 2015, the Marine Fisheries Management Plan (FMP) 2015 – 2019, and the National Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported, and Unregulated Fishing (NPOA – IUU), have been approved by the Thai Cabinet. Fundamental of these documents is the transformation of Thai fisheries management scheme from the open access fishery to a limited access fishery. Their substantial principles are to establish a system of good governance in order to ensure sustainable use of fisheries resources as determined by the examination of best scientific evidence and to establish an approach to the issuance of fishing licenses in line with the fishing capacity and the maximum sustainable yield by using reference points as the basis for determination. It has been the most important change in the management of Thai marine fisheries.

Marine Fisheries in Thailand can be categorized into two sectors, i.e., artisanal fishery and commercial fishery. Based on the Royal Ordinance on Fisheries 2015, the artisanal

fishery is characterized by fishing operation using a fishing vessel which the size is less than 10 gross ton (GT) or without a fishing vessel. While, the commercial fishery means fishing operation using a fishing vessel which the size is equal or larger than 10 GT. In addition, fishing vessels operating trawls (i.e., pair trawl, otter board trawl, and beam trawl), purse seine, anchovy purse seine, and clam dredges (i.e., short-necked clam dredge, blood clam dredge, and other clam dredge) and fishing vessels equipped with an engine of more than 280 horse power are considered to be commercial fisheries. There are all together 22 types of fishing gears used in Thai waters. Beside eight commercial fishing gears, squid falling net, squid trap, octopus trap, fish trap, crab trap, krill push net, longline, handline, gill net, pomfret lift net, red frog crab lift net, anchovy falling net, and anchovy lift net are among them. Light luring vessel is also considered to be a type of fishing gear. Beam trawl, clam dredges, octopus trap, pomfret lift net, and anchovy lift net are not operated in the Andaman Sea; while, red frog crab lift net is found only in the Andaman Sea.

2. Fisheries data collection

The Department of Fisheries is responsible for fisheries data collection. Basic annual fisheries statistics includes catch and effort by species, gears, months, fishing grounds, and sectors, i.e., artisanal and commercial fishery. Sixty-two marine species/groups of species reported in annual statistical books (Table 1). Among these number, catch data of 38 fish species/groups of species including neritic tunas and oceanic tunas are reported, although zero catch of oceanic tunas is reported during the past years due to no Thai-flagged tuna fishing fleet. In addition, catch data of 13 crustacean species/groups of species, 4 squid and cuttlefish species/groups of species, 5 shellfish species/groups of species, and 2 other groups of species are reported. They are also reported by fishing gears and months.

Catch data are separated by fishing areas which are basically divided into fishing areas in and out Thai waters. There are 7 statistical fishing areas in Thai waters, 5 areas in the Gulf of Thailand and 2 areas in the Andaman Sea, and 5 statistical fishing areas out Thai waters, 2 in the Pacific Ocean and 3 in the Indian Oceans (Figure 1).

2.1 Commercial fishing vessel

Fisheries data collection from commercial fishing vessels are divided into two groups.

a) Fishing vessels required to notify the Port-in and Port-out Control Centers.

The vessels which the size is equal to or larger than 10 GT and operates trawls, purse seine, anchovy purse seine, anchovy falling net, and anchovy lift net are required to notify

the Port-in and Port-out Control Centers (PIPO) before going out to the sea and landing. In addition, the vessels which the size is equal to or larger than 30 GT and operate all types of fishing gear is also required to notify PIPO. There are 32 PIPOs, i.e., 24 PIPOs along the Gulf of Thailand coast and 8 PIPOs along the Andaman Sea coast. Catch and effort are gathered from logbooks which are designed specifically to types of fishing gear. These vessels are required to complete and submit the logbook every fishing trip.

b) Fishing vessels not required to notify the PIPOs.

The fishing vessels in this group include those which the size is less than 30 GT excluding those operating trawls, purse seine, anchovy purse seine, anchovy falling net, and anchovy lift net. Catch and effort data are collected by monthly stratified random sampling and logbook.

2.2 Artisanal fishing vessel

Catch and effort data of artisanal vessels are gathered by monthly sampling survey.

10%

Table 1 Species/group of species reported in annual catch statistical book

Reported species/ group of species	Species/Genus
Pelagic fish	
Short mackerel	<i>Rastrelliger brachysoma</i>
Indian mackerel	<i>Rastrelliger kanagurta</i>
Spanish mackerel	<i>Scomberomorus commerson</i> , <i>S. guttatus</i>
Wolf-herrings	<i>Chirocentrus dorab</i>
Longtail tuna	<i>Thunnus tonggol</i>
Kawakawa	<i>Euthynnus affinis</i>
Round scads	<i>Decapterus maruadsi</i> , <i>D. russelli</i> , <i>D. macrosoma</i> , etc.
Hardtail scad	<i>Megalaspis cordyla</i>
Trevallies	<i>Selaroides leptolepis</i> , <i>Atule mate</i> , <i>Alepes</i> spp., etc.
Big-eye scad	<i>Selar crumenophthalmus</i> , <i>S. boops</i>
Black banded kingfish	<i>Seriolina nigrofasciata</i>
Threadfin	<i>Eleutheronema</i> spp., <i>Leptomelanosoma</i> spp., <i>Polydactylus</i> spp., etc.
Sardines	<i>Sardinella gibbosa</i> , <i>S. albella</i> , <i>S. fimbriata</i> , etc.
Anchovies	<i>Encrasicholina heteroloba</i> , <i>E. punctifer</i> , <i>Stolephorus indicus</i> , etc.
Mullet	<i>Mugil</i> spp., <i>Ellochelon</i> spp., <i>Moolgarda</i> spp., etc.
Black pomfret	<i>Parastromateus niger</i>
Silver pomfret	<i>Pampus argenteus</i>
Barracudas	<i>Sphyraena jello</i> , <i>S. putnamae</i> , <i>S. obtusata</i> , etc.
Tunas	<i>Thunnus albacares</i> , <i>T. obesus</i> , <i>T. alalunga</i> , etc.
Demersal fish	
Croaker	<i>Otolithes</i> spp., <i>Nibea</i> spp., <i>Johnius</i> spp., etc.
Threadfin breams	<i>Nemipterus hexodon</i> , <i>N. bipunctatus</i> , <i>N. furcosus</i> , etc.

Reported species/ group of species	Species/Genus
Monocle breams	<i>Scolopsis taeniopterus</i> , <i>S. monogramma</i> , <i>S. affinis</i> , etc.
Lizard fish	<i>Saurida elongata</i> , <i>S. undosquamis</i> , <i>S. tumbil</i> , etc.
Hairtail	<i>Trichiurus lepturus</i> , <i>Tentoriceps cristatus</i>
Red snappers	<i>Lutjanus lutjanus</i> , <i>L. johnii</i> , <i>Pristipomoides multidens</i> , etc.
Sea bass	<i>Lates calcarifer</i>
Big-eyes	<i>Priacanthus tayenus</i> , <i>P. macracanthus</i> , <i>P. hamrur</i>
Sand whittings	<i>Sillago sihama</i> , <i>S. maculata</i> , <i>S. aeolus</i>
Catfish eel	<i>Plotosus lineatus</i> , <i>P. canius</i>
Sea catfish	<i>Arius</i> spp., <i>Netuma</i> spp., <i>Osteogeneiosus</i> spp., etc.
Rays	<i>Brevitrygon</i> spp., <i>Telatrygon</i> spp., <i>Dasyatis</i> spp., etc.
Sharks	<i>Carcharhinus</i> spp., <i>Chiloscyllium</i> spp., <i>Sphyrna</i> spp., etc.
Flatfish	<i>Cynoglossus</i> spp., <i>Pseudorhombus</i> spp.
Indian halibut	<i>Psettodes erumei</i>
Conger eel	<i>Congresox talabonoides</i>
Groupers	<i>Epinephelus</i> spp., <i>Cephalopholis</i> spp., <i>Plectropomus</i> spp., etc.
Other food fish	<i>Upeneus</i> spp., <i>Platycephalus</i> spp., <i>Gerres</i> spp., etc.
Trash fish	<i>Leiognathus</i> spp., <i>Secutor</i> spp., <i>Apogon</i> spp., etc.
Crustacean	
Banana prawn	<i>Fenneropenaeus merguensis</i>
Giant tiger prawn	<i>Penaeus monodon</i>
Green tiger shrimp	<i>Penaeus semisulcatus</i>
King prawn	<i>Penaeus latisulcatus</i> , <i>P. canaliculatus</i> , <i>P. japonicus</i>
School prawn	<i>Metapenaeus affinis</i> , <i>M. ensis</i> , <i>M. intermedius</i> , etc.
Other shrimps	<i>Metapenaeopsis</i> spp., <i>Trachysalambria</i> spp., <i>Solenocera</i> spp., etc.
Acetes	<i>Acetes</i> spp., <i>Lucifer</i> spp., <i>Acanthomysis</i> spp., etc.
Flathead Lobster	<i>Thenus orientalis</i> , <i>Thenus indicus</i>
Mantis shrimp	<i>Harpisquilla raphidea</i> , <i>H. harpex</i> , <i>Miyakella nepa</i> , etc.
Swimming crab	<i>Portunus pelagicus</i>
Mangrove crab	<i>Scylla serrata</i>
Red frog crab	<i>Ranina ranina</i>
Other crab	<i>Charybdis feriatus</i> , <i>Portunus sanguinolentus</i> , <i>C. natator</i> , etc.
Squid and cuttlefish	
Squid	<i>Uroteuthis duvaucelii</i> , <i>U. chinensis</i> , <i>Loliolus sumatrensis</i> , etc.
Cuttlefish	<i>Sepia pharaonis</i> , <i>S. recurvirostra</i> , <i>S. aculeata</i> , etc.
Bigfin reef squid	<i>Sepioteuthis lessoniana</i>
Octopus	<i>Amphioctopus aegina</i> , <i>A. neglectus</i> , <i>Callistoctopus luteus</i> , etc.
Shellfish	
Blood Cockle	<i>Tegillarca granosa</i>
Horse mussel	<i>Perna viridis</i>
Short necked clam	<i>Paratapes undulatus</i>
Scallop	<i>Amusium pleuronectes</i> , <i>Mimachlamys sanguinea</i>
Other shellfishes	<i>Babylonia areolata</i> , <i>Cymbiola nobilis</i> , <i>Melo melo</i> , etc.
Other	
Jellyfish	<i>Rhopilema</i> spp., <i>Aurelia</i> spp.
Others	<i>Holothuroidea</i> , seaweed, etc.

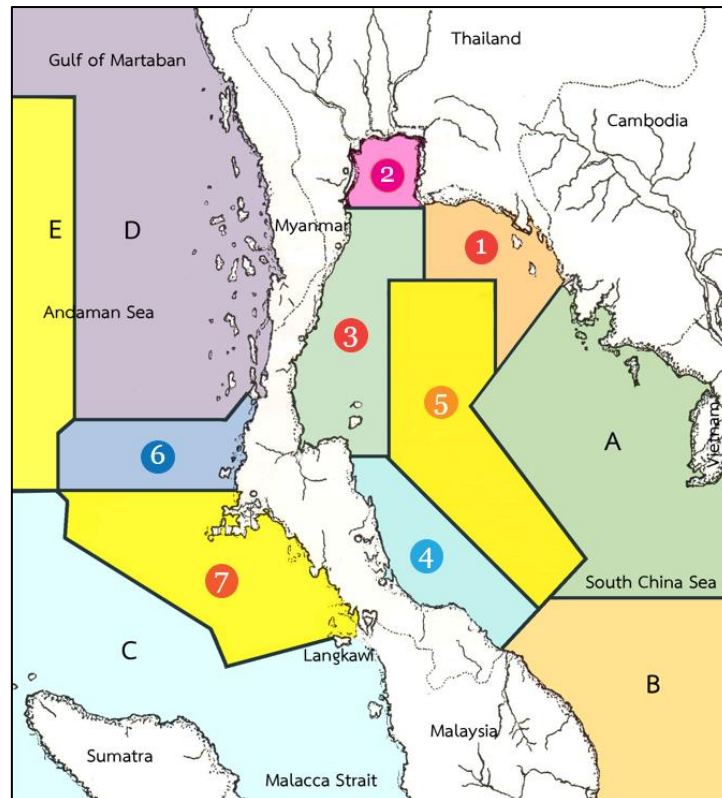


Figure 1 Statistical fishing areas. Area 1 – 7 are in Thai waters and Area A – D are out Thai waters

- | | |
|-------------------------------------|---|
| 1. Eastern Gulf of Thailand | 2. Inner Gulf of Thailand |
| 3. Northwestern Gulf of Thailand | 4. Southwestern Gulf of Thailand |
| 5. Central Gulf of Thailand | 6. Northern Andaman Sea |
| 7. Southern Andaman sea | A. South China Sea (Cambodia and Vietnam) |
| B. Other areas in the Pacific Ocean | C. Indian Ocean (Malaysia and Indonesia) |
| D. Myanmar | E. Other areas in the Indian Ocean |

Length of some economically important species and species composition data from both artisanal and commercial vessels are also collected monthly for scientific research purpose and to supplement catch and effort statistical data. There are at least 58 species of purse catch with length frequency data (Table 2).

3. Recent fisheries statistics

The total catch in the Andaman Sea of Thailand during 2016 – 2018 was 393,064, 376,017, and 399,491 tons respectively with an average of 389,524 tons (Figure 2). Catch from artisanal sector contributed to an average of 17.47% of the total catch in the Andaman Sea.

Catch from purse seine was the highest catch made up 34.11% of the total catch in 2018 followed by otter board trawl and pair trawl, 20.74% and 19.56% respectively (Figure 3).

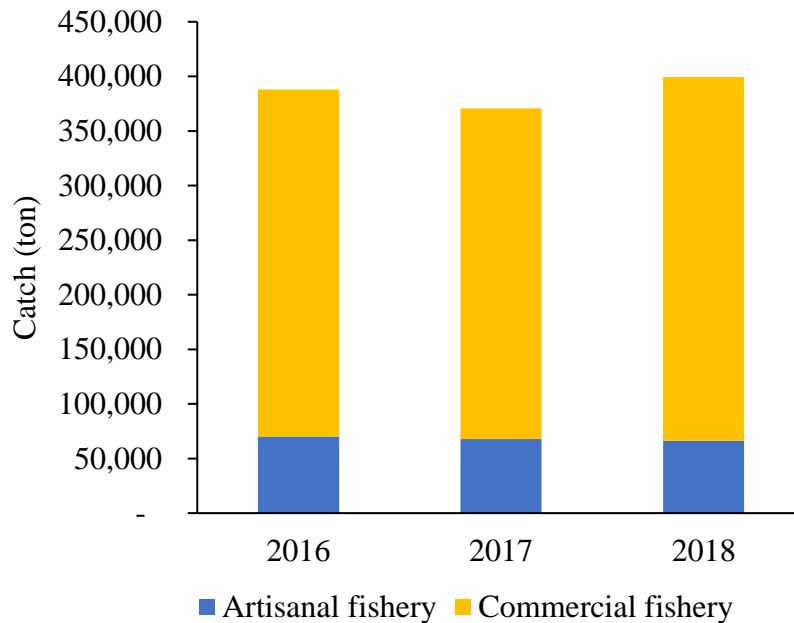


Figure 2 Total catch in the Andaman Sea of Thailand during 2016 – 2018

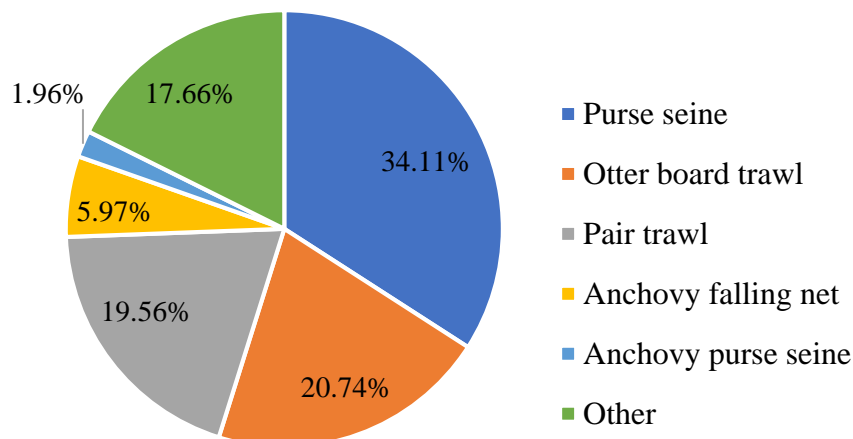


Figure 3 Proportion of catch in the Andaman sea of Thailand in 2018 by fishing gear

Round scads (*Decapterus* spp.) made up the highest composition of purse seine with 31.34% of total purse seine catch in 2018 followed by Indian mackerel (*Rastrelliger kanagurta*), big-eye scad (*Selar crumenophthalmus* and *S. boops*), and neritic tunas, 13.04%, 9.36%, and 11.14% respectively (Figure 4). Kawakawa was the highest composition of neritic

tuna accounted for 46.80% of neritic tuna catch in 2018 followed by longtail tuna and frigate tuna, 26.16% and 16.82% respectively (Figure 5). In addition, total fishing effort of purse seiners ranged from 33,036 to 35,364 trips/year or 42,216 to 48,904 days/year between 2016 and 2018 with an average of 33,960 trips/year or 44,735 days/year.

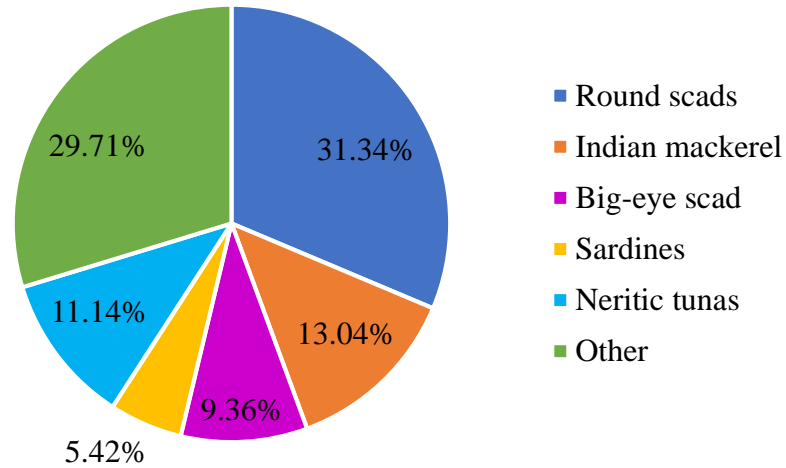


Figure 4 species composition of purse seine in the Andaman sea of Thailand in 2018

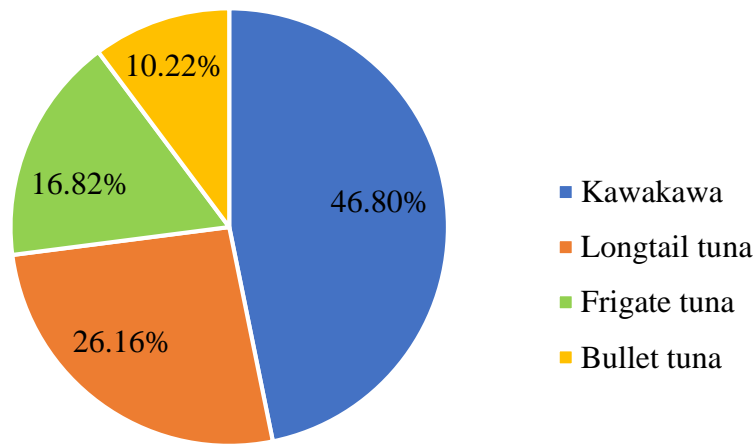


Figure 5 Composition of neritic tunas caught in the Andaman Sea of Thailand in 2018

Table 2 Selected species for length frequency data collection from purse seine operated in the Andaman Sea of Thailand

No	Species
1	<i>Alepes djedaba</i>
2	<i>Alepes melanoptera</i>
3	<i>Alepes vari</i>
4	<i>Aluterus monoceros</i>
5	<i>Amblygaster sirm</i>
6	<i>Atule mate</i>
7	<i>Auxis rochei</i>
8	<i>Auxis thazard</i>
9	<i>Carangoides</i> spp.
10	<i>Decapterus akaadsi</i>
11	<i>Decapterus macarellus</i>
12	<i>Decapterus macrosoma</i>
13	<i>Decapterus maruadsi</i>
14	<i>Decapterus</i> spp.
15	<i>Dussumieria acuta</i>
16	<i>Encrasicholina heteroloba</i>
17	<i>Encrasicholina punctifer</i>
18	<i>Euthynnus affinis</i>
19	<i>Gazza minuta</i>
20	<i>Ilisha megaloptera</i>
21	<i>Megalaspis cordyla</i>
22	<i>Nemipterus bipunctatus</i>
23	<i>Nemipterus nematophorus</i>
24	<i>Nemipterus nemurus</i>
25	<i>Nemipterus peronii</i>
26	<i>Parastromateus niger</i>
27	<i>Parupeneus heptacanthus</i>
28	<i>Priacanthus hamrur</i>
29	<i>Priacanthus macracanthus</i>
30	<i>Priacanthus tayenus</i>
31	<i>Rastrelliger brachysoma</i>
32	<i>Rastrelliger kanagurta</i>
33	<i>Rastrelliger faughni</i>
34	<i>Sardinella albella</i>
35	<i>Sardinella fimbriata</i>
36	<i>Sardinella gibbosa</i>

No	Species
37	<i>Saurida elongata</i>
38	<i>Saurida micropectoralis</i>
39	<i>Saurida tumbil</i>
40	<i>Saurida undosquamis</i>
41	<i>Scomberoides tol</i>
42	<i>Scomberomorus commerson</i>
43	<i>Scomberomorus guttatus</i>
44	<i>Selar boops</i>
45	<i>Selar crumenophthalmus</i>
46	<i>Selaroides leptolepis</i>
47	<i>Sepia pharaonis</i>
48	<i>Sepia recurvirostra</i>
49	<i>Sepioteuthis lessoniana</i>
50	<i>Stolephorus indicus</i>
51	<i>Thryssa spp.</i>
52	<i>Thunnus tonggol</i>
53	<i>Trachinocephalus myops</i>
54	<i>Upeneus asymmetricus</i>
55	<i>Upeneus japonicus</i>
56	<i>Upeneus sulphureus</i>
57	<i>Uroteuthis chinensis</i>
58	<i>Uroteuthis duvaucelii</i>
