

A FIELD GUIDE TO
MARINE FOOD FISHES
of
ANDAMAN AND NICOBAR ISLANDS

P.T. RAJAN



ZOOLOGICAL SURVEY OF INDIA

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Zoological Survey of India

Andaman & Nicobar Regional Station, Haddo, Port Blair - 744102



Edited by the Director, Zoological Survey of India, Kolkata



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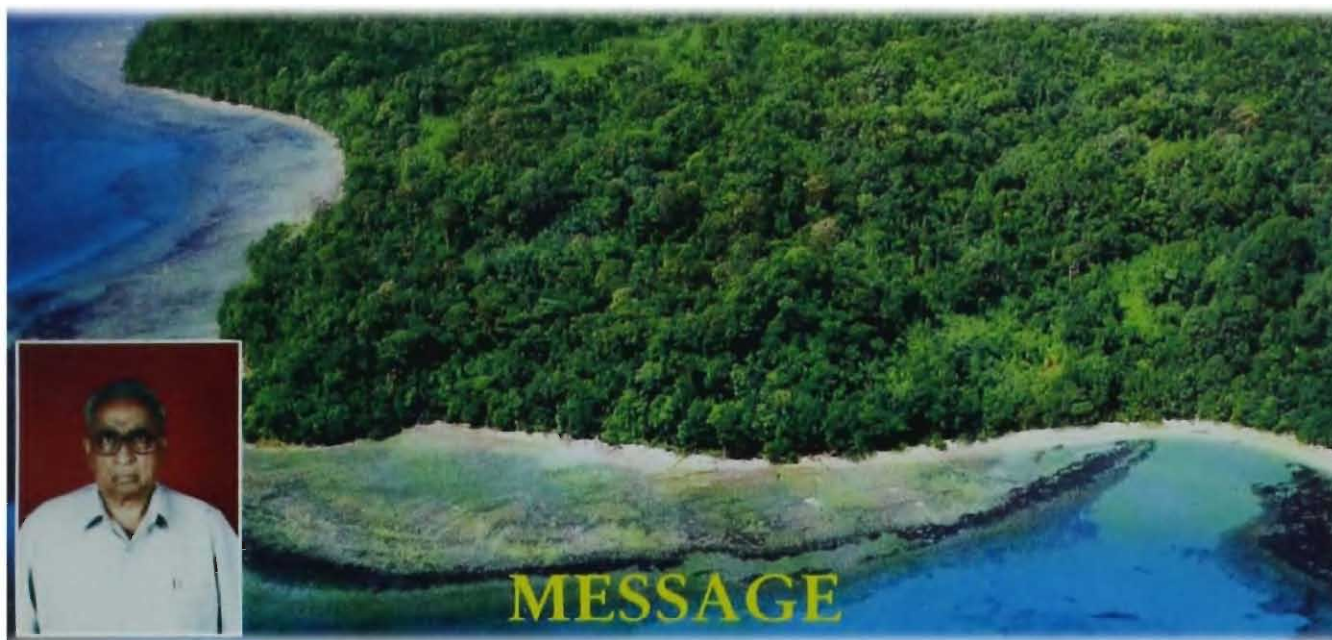
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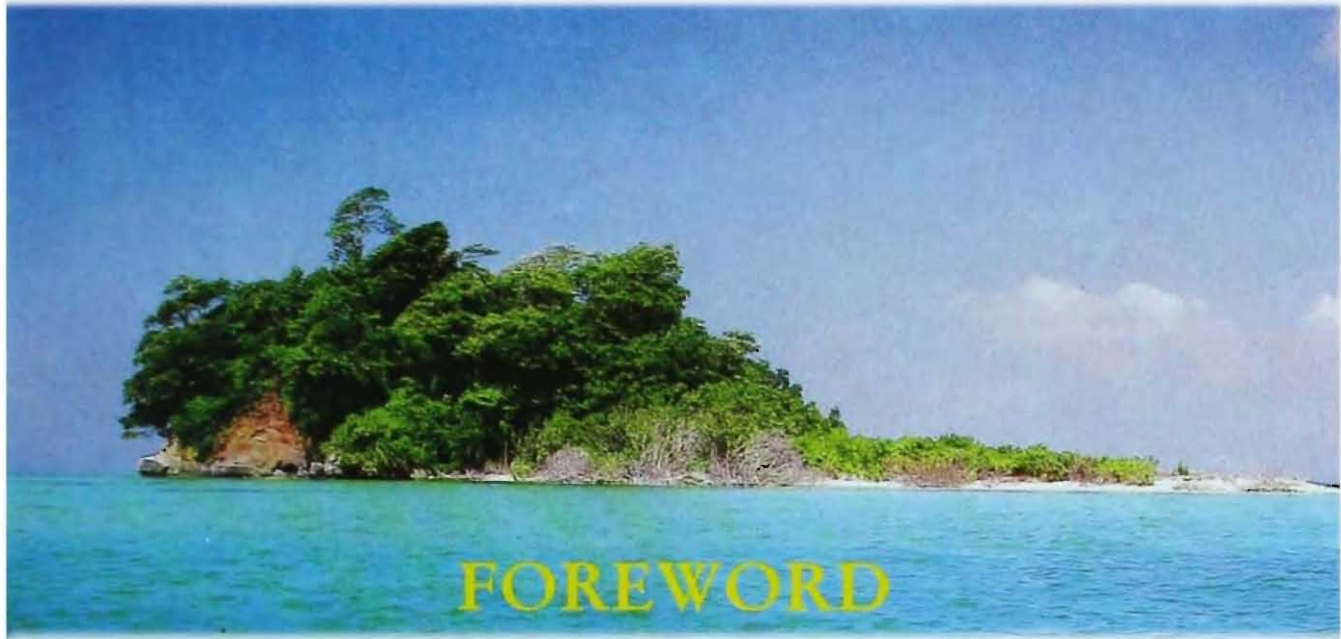
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The Andaman and Nicobar group comprising 572 islands, islets and rocks, are situated at a distance of more than 1200 km from the Indian mainland. The 1962-km long coast consists of coral reefs, rocky areas, mangroves and sandy beaches. Aboriginal people were the first reef users and had a close association with the reef. They developed a close cultural relationship with the marine environment and continue to live adjacent to it. With subsequent arrivals from the Indian mainland and consequent increase of population, use of the reef area has grown and intensified to include tourism, commercial fishing, scientific research, shipping and recreational pursuits such as boating, fishing and diving. These islands hold out enormous potential for development particularly with regard to tourism and fisheries. Today, marine resources are being shared by these two economic sectors. The past one decade have been marked an era of productivity in the field of agriculture, forestry, animal husbandry and fisheries. As a source of protein many of the oceans have been exploited up to the maximum and some of them are even overexploited. Exploited fish stocks call for meticulous conservation through limiting mesh sizes, declaration of fish sanctuaries, and other measures. A prerequisite for these, however, is the knowledge of the species composition of the fish stocks. The Andaman and Nicobar Administration are taking great interest in promoting the island's fishery. Lack of pertinent literature of Andaman and Nicobar fish species is an obstacle in this direction. The present book by Mr. P.T. Rajan of Zoological Survey of India is an impressive contribution to the knowledge of fishes of these islands providing baseline data for exploitation and proper management of the marine fish resources of these islands. Furthermore, the book is the outcome of more than a decade's labour and puts all emphasis on the detailed description of the morphological characters in order to facilitate proper identification of commercial fish species. He has done a commendable job. I congratulate him for this tedious task. I hope that the Zoological Survey of India will encourage and support many more such publication.

Port Blair
19.09.2001


(N. N. Jha)
Lieutenant Governor



Management of multispecies fisheries requires detailed analysis of the species composition of the landings as well as of scientific catches. In tropical waters, even taxonomists find it difficult to sort a catch consisting of dozens or more species, many of very similar appearance. It seems worthwhile to produce identification tools tailored to the more local needs of Andaman and Nicobar fishery. The present book facilitates the fieldwork of fishery biologists in these islands for easy identification of their commercial fish species thus creating the basis for an efficient fishery development. The author has worked for more than a decade on the fish collection leading to the production of the book. I congratulate Mr. P.T. Rajan for this attempt and wish him all success in his endeavor.

J.R.B. Alfred
Director
Zoological Survey of India



The present work is the result of consolidated information gathered since, 1990 from diverse habitats, and from the variety and variability one encounters in the fish market at Port Blair. The present work deals with 282 commercially important marine fish species of Andaman & Nicobar group of Islands. The book intend to serve the needs of those working in field as well as in laboratories, besides development of fishery biology in this Island. The author also feels that the present work will assist in resolving the difficulties of identification of this large group in the field and the baseline data together with pictorial illustration given in this book will assist one and all in the field of fishery biology.

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FORMAT OF THE BOOK

The families, genera and species are arranged according to their systematic position and their English names are mentioned. There is a great deal of confusion in local names. Often one name serves for a whole Genus, several genera, one family, or even several families of similar appearance. On the other hand, quite often several names are in use for the same species at different places.

A general description of the **BODY** of the fish is given including peculiarities of body surface, lateral line features and the morphometric measurements. For the **HEAD** features, such as spines, ridges, serrations, barbels, and relative length of jaws are mentioned. The **COLOUR** of fresh market specimens is described. The colour pattern itself is shown in the illustration. **FIN** ray counts are indicated in most cases. The number of rays in the spinous and soft portions of fins are separated by a +, e.g., D VII-VIII + 15-17 would mean the fin formula consists of spines in Roman capital numbers and rays by Arabic numbers for the number. Dorsal, anal, pectoral and ventral fins are symbolized by D, A, P and V respectively. **SCALES** are counted as pored scales on the lateral line, as scales along the midline of the body from the gill opening to the tail base; as transverse scales from the origin of the anal fin up to the lateral line, and as predorsal scales from the beginning of the scaly area on the forehead to the dorsal fin origin. The scales are distinguished as cycloid, i.e., evenly roundish, producing a smooth body surface, or ctenoid, i.e., with spiny hind edges, making the skin rough to the touch. The number of scutes is given when present. The number, shape, sizes and arrangement of **TEETH** on jaws, tongue and roof of the mouth (vomer and palatines) are given when important for identification purposes.

BODY MEASUREMENTS

Total length (TL) : Distance from tip of snout to tip of caudal fin.

Standard length (SL) : Distance from tip of snout to mid base of caudal fin.

Caudal fin length : Distance between base of caudal to tip of caudal fin.

Head length : Distance from snout to hind edge of gill opening.

Snout length : Distance from tip of snout to front margin of orbit.

Interorbital space : Least width of bony area between eyes.

Postorbital length : Distance from rear edge of eye to posterior tip of operculum.

Maxillary length : Distance from tip of snout to rear edge of maxillary.

Eye diameter : Distance between free orbital rims.

Body depth : Greatest vertical height of body.

Pectoral fin length : Distance from extreme base of upper most rays to Farthest tip of fin.

Ventral fin length : Distance from extreme base of upper most rays to Farthest tip of fin.

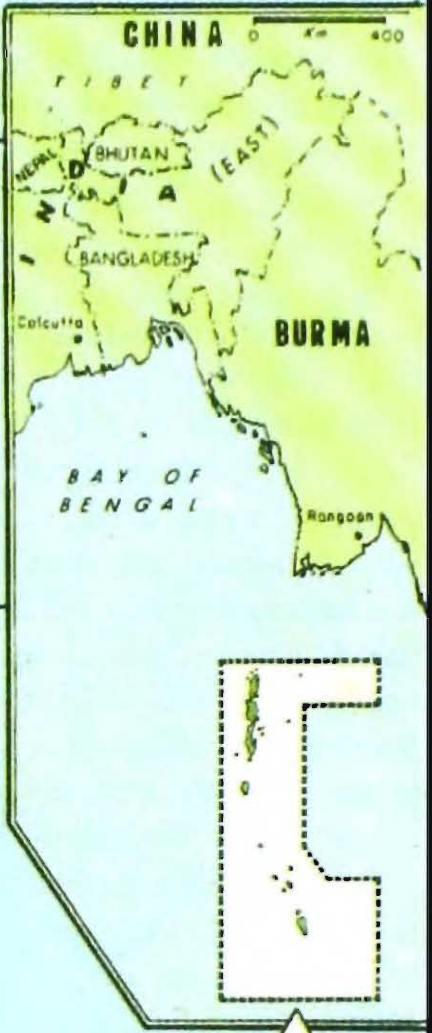
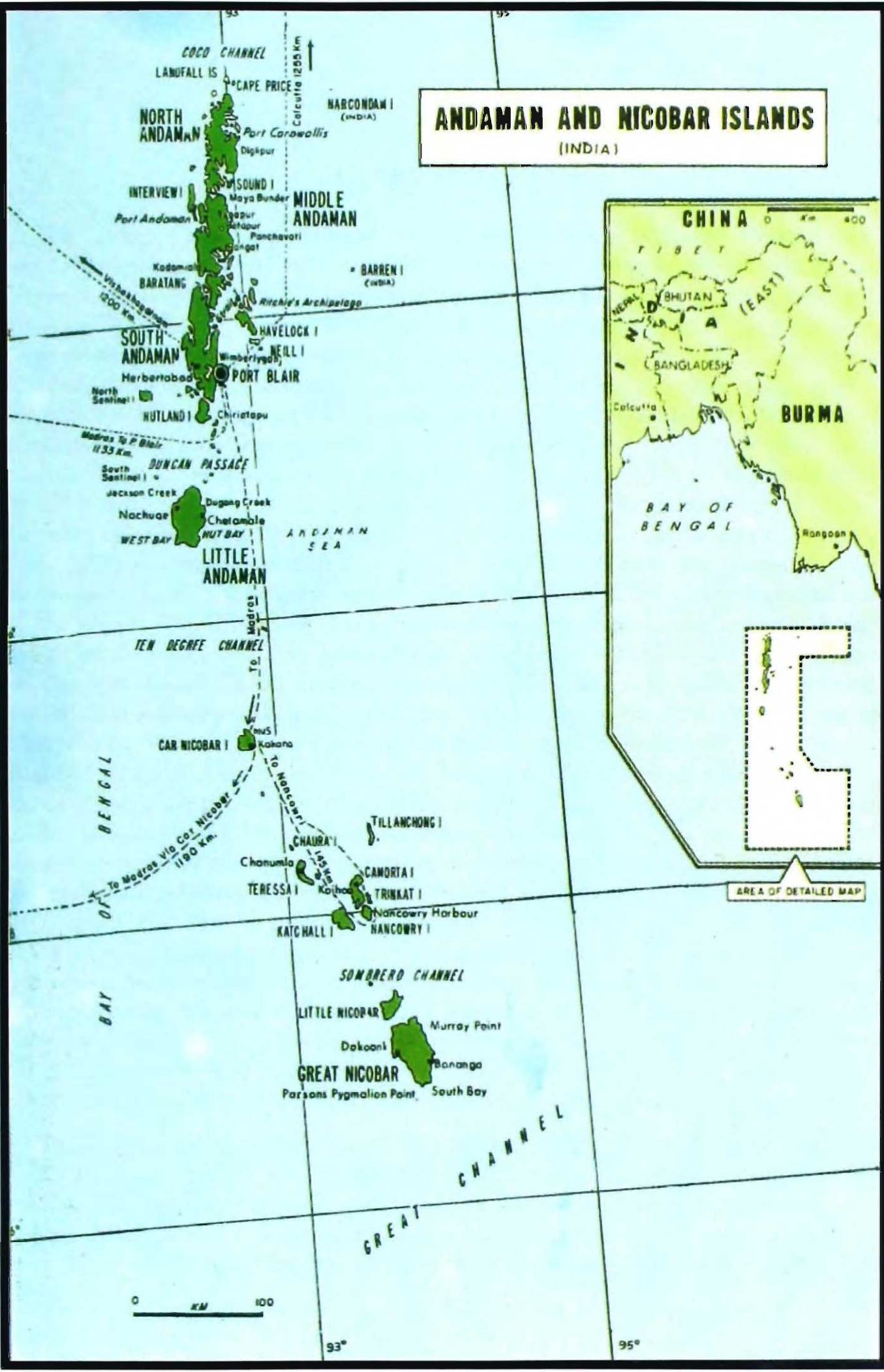
Disc length : Length from snout tip to farthest margin of pectoral fin.

Disc width : Widest dimension between pectoral fins.

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ANDAMAN AND NICOBAR ISLANDS (INDIA)



AREA OF DETAILED MAP

0 100 KM

93°

95°

INTRODUCTION

The Andaman and Nicobar Islands are situated in the Bay of Bengal between 6°45' and 13°45' N latitudes and 92°10' and 94°15' longitudes nearly in a crescent. The 10 degree channel separates the Andaman group and the Nicobar group, which is about 100 km wide. While in the extreme north lies Land fall island, that is only 37 km away from Coco islands of Myanmar (Burma), the southern most tip-Indira point in the Great Nicobar Islands is barely 147 km from Sumatra and Indonesia. The shelf topography of the islands is highly irregular. The upper surface of the shelf is marked by frequent rises supporting coral reefs and depressions known as passages and straits. The archipelago consists of about 348 islands having a total geographical area of 8249 sq. km. surrounded by coral reefs, rocky, sandy areas and mangrove swamps. The coastline of the Union Territory extends to 1962 km., which is ¼ th of mainland India. The Exclusive Economic Zone (EEZ) is about 0.6 million sq. km. The limited shelf areas are compensated by extension of marine habitats into numerous bays, creeks and inlets on the landward side of the islands. The islands are characterized by fringing reefs on the eastern side and barrier off the west coast. The coastline supports the corals, reef fishes and several groups of animals of commercial importance. From the fish and fisheries view point, the Andaman and Nicobar Islands are the most interesting and fascinating owing to the diversity of ichthyofauna occurring in the varied marine habitats, such as mangroves, creeks, rocky, extensive sandy beaches, muddy shores, coral reefs, etc. These reef resources are valuable source of high-grade protein and other organic products. They occupy a significant position in the socio-economic fabric of the Andaman and Nicobar Islands by providing the population not only the nutritious food but also income and employment opportunities. The region around these islands is the least studied for potential fisheries resources around the country. However, there has been evidence to reckon that marine fisheries are one of the important areas for the speedy economic development of the islands. The marine fisheries in Andaman and Nicobar islands classified into coastal or inshore fisheries and offshore fisheries. Until recently, sea fishing operations in these islands were restricted to a narrow coastal belt, the offshore and deep-sea regions left mostly unexplored. This was partly because of the non-mechanized nature of craft and tackle and partly because of lack of sufficient knowledge of the availability of lucrative catches in the offshore grounds.

There are 45 fishing villages and 57 fish landing centers. The resource potential has been estimated at 234500 tones of fish. Some 11000 people depend upon the fishery for their income. The major types of fishing crafts of the islands are plank built country craft ranging in size from 5.4 to 7.5 mtrs in length and motorized dugout canoe of 7.5 to 12 mtrs fitted with inboard motors (IBM) of 8 to 16 horse power. In addition, a few



Fish market, Junglighat, Andaman



Fish market, Bamboo flat, Andaman

mechanized boats were also operated. During 1996-97 to 2000-01, the number of country crafts operated in the islands was 1447, 1761, 1552 and 1640 respectively. During the same period 159, 1699, 233, 325 and 454 motorized crafts were also operated. The number of mechanized boats operated was 22, 9, 8, 11 and 18. Fish landing increased 12% from 22674 tones in 1991 to 25477 tones in 1996 with an estimated value of some 16.7 million US \$. Most fishers operate gillnets and hook and line. Less important are castnets, shore nets and anchor nets. 70% total production is sold fresh, 21% salted and dried and 9% is frozen. Sardines are most important in the catches (12%), followed by the perches (7%). The Andaman and Nicobar waters are qualitatively very rich in fish fauna. Over 1200 species are reported from these islands; about 300 species are commercially important food fishes. Fishermen sell their catch to the island families, tourist resorts, salt and dry and sell to exporters. The catch consists of mainly groupers (Serranidae), snappers (Lutjanidae), jacks (Carangidae), emperors (Lethrinidae), sweetlips (Haemulidae) and reef sharks.

In recent years, however, the use of reef resources has increased dramatically with the growth of the tourist industry, the development of new export markets for reef fishery products and the growth of the island population. But today reef fish are also exported chilled, frozen and also alive. Unlike earlier practice, fisheries are now targeted at particular species; for example the shark fishery, grouper and snapper fishery, sea cucumber fishery, lobster fishery and molluscan fishery.

Climate is typically tropical with annual rainfall of about 3000 mm and experiences an active south west monsoon from June-September and northeast monsoon from December-April. The atmospheric temperature varies from 18°C to 34°C and the coastal waters temperature varies from 27°C to 32°C and salinity fluctuates between 22 ppt and 32 ppt.

REEF RELATED FISHERIES

Reef fishery : Coastal communities including aboriginal tribes throughout these islands rely on reef fisheries. The fishery consists primarily of finfish, invertebrates (molluscs, crustaceans) and echinoderms. The finfish catch is very diverse and includes both piscivores such as groupers (Family : Serranidae), snappers (Family : Lutjanidae), jacks (Family : Carangidae) and herbivores such as rabbitfishes (Family : Siganidae), Parrotfish (Family : Scaridae), Surgeonfish (Family : Acanthuridae). Reef fishery also includes significant proportions of small pelagic (Family : Scombridae, Clupeidae, Carangidae and sharks) which move in and out of reef areas in search of food and protection. Invertebrates consist mainly of giant clams (*Tridacna* sp.) top shells (*Trochus* sp.) and other bivalves, Sea cucumber (Family : Holothurioidae) and spiny lobster (*Palinurus* sp.).

The reef shark fishery : The reef shark resource of the Andaman and Nicobar Islands is very valuable, bringing in revenue through fisheries. The Andaman Islands shark fishery has developed and diversified tremendously in the past 10-15 years. Gillnet, handline and longline are the gears to catch shark, which yields fins, meat and oil. The reef associated shark fishery is mainly based on the export of dried fins most often to South-east Asia. The meat is dried and the liver is used for extracting oil. Bottom-set gillnets are most commonly used to fish reef sharks. These nets were set every evening and hauled in the morning. The major species caught include the Black-tip reef shark (*Carcharhinus melanopterus*), Silvertip shark (*C. albimarginatus*), grey reef shark (*C. amblyrhynchos*), spot tail shark (*C. sorrah*), White tip reef shark (*Triaenodon obesus*); of these the blacktip reef shark is the more commonly caught species.

Grouper and Snapper fishery : In recent years, however the use of reef resources has increased dramatically with the growth of the tourist industry, the fishery products and the growth of the island population. Unlike earlier practice, fisheries are now targeted at particular species; for example the grouper and snapper fishery. Fishing for high valued species is a step forward towards rational exploitation of reef fish resources. Groupers and snappers are popular marine food fish of high market value in many parts of the world and a few are currently being exported in frozen form. Grouper forming on an average 5-8% of the reef fishes. About 43 species of groupers and 42 species of snappers have been recorded from these Islands.

Sea cucumber fishery : The processed body wall of sea cucumbers is commercially and popularly known as Beche-de-mer. Because of ban on commercial exploitation of sea cucumbers at Lakshadweep and Andaman & Nicobar Islands it is now restricted to Tamil Nadu coast of the peninsula. Of the 40 species of holothurians occurring in Andaman and Nicobar Islands, 12 to 15 species are useful in the sea cucumber industry but only half a dozen species are abundant with fishery potential. These are *Holothuria scabra*, *H. leulospilota*, *Bohadschia vitiensis*, *Actinopyga mauritiana*, *A. echinites*, *A. miliaris*, *Stichopus chloronotus* and *S. variegatus* species. Tribal of Nicobar Islands to supplement their main food consisting of fish and pig, utilizes sea cucumbers.

The lobster fishery : The major species contributing to the exploited fishery are the shallow water spiny lobsters *Panulirus homarus*, *P. ornatus*, *P. penicillatus*, *P. polyphagus*, *P. versicolor*, *P. longiceps*. The lobsters reported from the Andaman and Nicobar Islands include 3 species belonging to family Nephropsidae, 7 species of Eryonidae and 2 species of Palinuridae. Lobsters are commercially exploited for the tourist market and for export. Local consumption is limited. Status : At present there is no organized fishery for lobsters in these islands. Stray numbers of *P. homarus*, *P. ornatus* and *P. penicillatus* are caught along with the fishes and prawns in the bottom set gill nets operated by the fishermen. Lobsters are also collected mainly at night with lights walking on the reef flat.



Dry fish, Wright myo, Andaman



Dry fish (Shark), Wright myo, Andaman

Molluscan fishery : The seas around Andaman and Nicobar Islands are well known for their rich molluscan resources distributed along the coastal and offshore areas. The important among them are the top shell *Trochus niloticus*, turban shell *Turbo marmoratus*, pearl oyster *Pinctada margaritifera*, giant clams *Tridacna crocea*, *T. maxima*, *T. squamosa*, and *Hippopus hippurus*, green mussel *Perna viridis*, edible oysters *Crassostrea madrasensis* and *Saccostrea cucullata*, scorpion shell *Lambis chiragra* and *L. lambis*. The once famous Andaman shell fisheries for *Trochus* and *Turbo* have dwindled drastically in spite of regulation measures.

Fishing zones : The entire Andaman and Nicobar coastal waters have been demarcated into nine fishing zones for the purpose of commercial shell collection. Seven zones are in Andaman group and two zones are in Nicobar group of islands. As per A & N Islands shell fishing rules, 1978, licenses are issued for collection of shells on, payment of Rs. 15,000 and royalty on the amount for a period of two years for collection of shells in respective zones for a period of two years. The fishing season commences from the first day of October and expires on thirteenth day of April. Shell fishing is prohibited during the rest of the period. After each two consecutive fishing seasons, subsequent two years are completely closed for grant of shell fishing license. During the closed years shell fishing is completely prohibited in all zones. Quantity of shell collection from each zone in one season should not exceed 15 tones in weight. At the end of each collection trip, the licensee should return to the authorized port and should apply to the authorized officer for inspection and measurements of collected shells. *Trochus* shells that pass through 9 cm. ring are treated as under sized and are to be returned to the fishing ground in live condition. In the case of *Turbo*, specimens less than 5.5 cm. in diameter at operculum are considered undersized. The licensee is liable to be cancelled if undersized shells are more than 10 % of total catch. Each licensee is required to sell 25 % of the catch to the Director of Industries, Port Blair and another 25 % to the A & N Co-operative supply and marketing federation.

The shell craft industry in the islands is rapidly growing. Presently there are more than 30 shops at Port Blair dealing with crafts and curios made out of shells. The products include cleaned and polished shells and a variety of utility items like decorative lampshades, necklaces, buttons, and so many other innovative articles.

In order to safe guard and regulate the shell fisheries of the islands, three important Acts, namely Fisheries regulation 1938, Fishing rules 1939 and Andaman and Nicobar shell fishing rules 1978, have been promulgated by the island administration. It is particularly necessary to evolve suitable conservation measures for the two species, *Turbo marmoratus* and *Trochus niloticus*. The former species deserves 'endangered' status and full protection from exploitation. The enforcement of rules to the fullest extent has not been possible, due to the long interrupted coastline along numerous islands spread over a distance of 700 kms. Most islands being situated at fairly considerable distances from each other and inadequate manpower and transport facilities are the major constraints for effective management.

The Royalty Received on Shells

Year	Value (Rs.)
1994-95	14,705
1995-96	6,445
1996-97	82,505
1997-98	No Collection
1998-99	20,275

BLAST FISHING BY FOREIGN POACHERS

Blast fishing (or explosive fishing) is one of the most destructive anthropogenic threats to reefs. A hand made bomb is dropped in to coral areas, killing or stunning entire schools of reef fish and small pelagic, but also shatters the corals and destroys the habitat where the fish live, feed and breed. These fish can then be scooped up or gathered by free diving. Bombs are made with chemical fertilizers, such as ammonium / potassium nitrate. (NH_4NO_3 : KNO_3).

TYPES OF OPERATIONS

Foreign vessels of around 10–15 meter with a crew of some 10–15, fishing fringing reefs of uninhabited and remote islands. The Andaman and Nicobar Region shares maritime boundaries with Myanmar, Thailand and Indonesia. Generally poachers come from these countries to exploit the extensive wealth of sea resources. Coast guards have apprehended 136 boats and 1368 crew during the last one-decade i.e., from 1990 to August 2000. There has been a perceptible increase in incursion of Myanmar's poachers.

Foreign vessels seized and foreigners apprehended

	1995	1996	1997	1998	1999	2000 (up to May)
No. of boats	7	9	23	19	2	6
No. of dinghies	4	10	4	12	9	6
Total	11	19	27	31	11	12

Nationality	1994	1995	1996	1997	1998	1999	2000 (up to May)
Myanmarese	138	39	146	134	200	233	225
Thai	38	12	7	10	60		10
Sri Lanka		9	18	25	32	15	
Indonesian	18	8	3	42	6		4
Chinese	55						
Philippines			5				
Taiwan			1				
Total	249	68	180	211	298	248	239

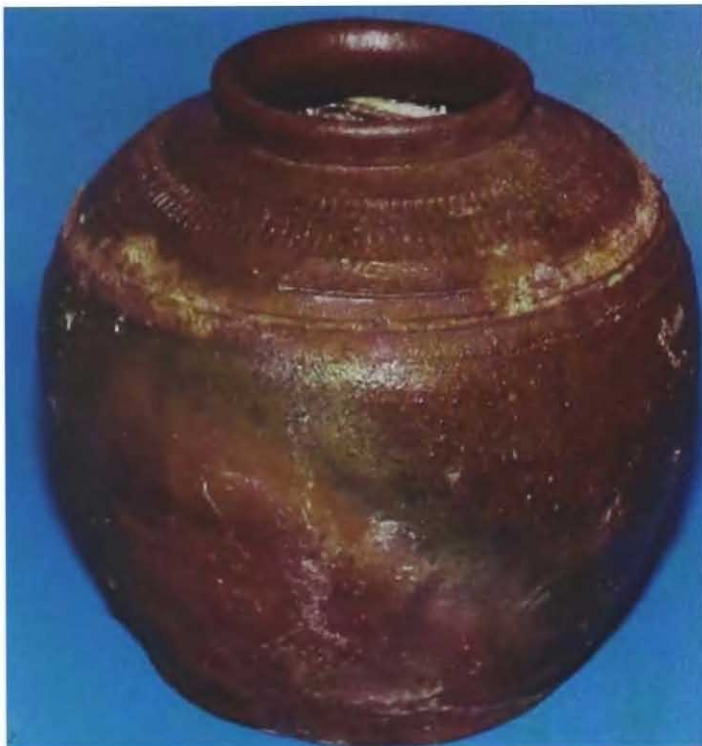
MANAGEMENT ISSUES

Coral reefs are very productive fisheries habitats. However, some harvesting techniques can reduce the reef's productivity. The following are the issues:

1. Reef blasting and destructive fishing techniques : poison and blast fishing vessels operate in remote and unpopulated islands of Andaman and Nicobar Islands by poachers from neighboring countries like Burma, Indonesia and Thailand. The explosion shatters the stony corals and kills fish and invertebrates in a large surrounding area. In poison fishing where cyanide is squirted on coral heads to stun and capture fish but killing coral heads in the process.
2. Physical damage caused during collection of shells : shell collector's cause damages to reefs particularly where coral boulders are break for clam shells. The main target species is *Tridacna squamosa* which is frequent found in areas of branching coral, damage can be caused to the reef habitat during collection of clams particularly those which grow embedded in massive and branching corals. Shallow intertidal reefs that are gleaned at low tide can be damaged by trampling, overturning of coral heads, and disturbance of the substrate.
3. One common problem associated with all these fisheries was inadequate monitoring of the fishery. Catch and effort data were not collected regularly in any of the fisheries. Limited management measures are in place for most of the fisheries.
4. In Andaman and Nicobar Islands there is hardly any intensive fishing at the reefs.



Apprehended vessels of foreign poachers (Junglighat Jetty, Andaman)



Blast fishing bombs

Clandestine fishing and processing by foreign poachers for sea cucumber, shells and other valuable reef organisms is seen as a serious problem.

5. Groupers are believed to be especially vulnerable to over exploitation both because of their protogynous reproduction system and their tendency to aggregate during spawning.

RECOMMENDATIONS

1. Aquaculture The commercially important shells like *Trochus*, *Turbo* and *Tridacna* have been subjected to over-exploitation and sea ranching is necessary either by hatchery breeding or transplantation of juveniles to depleted areas.
2. Imposing a system of limited entry in grouper capture.
3. It is recommended to collect fish statistic separately so that we know the contribution of reefs to fisheries with some accuracy.
4. Gear restriction.
5. Size restriction in grouper fishery.
6. Marine reserves may be the only practical way of maintaining stocks of more vulnerable species. (Sharks, Groupers).

MARINE FISHERIES

The marine fish fauna of these islands is still not thoroughly known and new species or new records for these areas are being discovered every now and then. Fishes are the most abundant, diverse and poorly known group of the vertebrates. In the second edition (1984) of his excellent book "Fishes of the world", Joseph Nelson estimates that there are some 21723 species of living fishes, out of which 60 % live in the sea. This represents about half of the entire known vertebrate fauna. The fishes of Andaman and Nicobar Islands constitute a large and important food resource, capable of sustaining considerable commercial development in the area. Fish are valuable sources of high grade protein and other organic products. They occupy a significant position in the socio economic fabric of the Andaman and Nicobar Islands by providing the population not only the nutritious food but also income and employment opportunities.

The fish has also, as a taxonomic group, generated unlimited curiosity of the naturalists and zoogeographers from the period as early as that of the great Aristotle. *Auslandische of Fische* by Bloch was published in 1785. Schneider continued his work in 1801. They dealt mainly with Indian forms. Later Lacepede wrote *Historie-des Poissons* (1793 - 1801). Cuvier and Valenciennes *Histoire Naturelle des Poissons*, published during 1828 - 1849, provided more impetus to the study of Ichthyology than any other work till then. Other notable contributions on fishes include McClelland (1839), Bleeker (1853), Blyth (1858 - 1866), Gunther (1859 - 1870) and Day (1888 - 1889). A comprehensive and authoritative account of fishes of the Indian region was published by Francis Day. Herre (1941) listed 490 species of fishes from these islands. In the present century, valuable contributions on fish systematic have been made by Weber and de Beaufort (1911 - 1938), Hora (1920 - 1959), Jordan (1923), Regan (1929), Herre (1939 - 1953), Nikoliskii (1962), Greenwood et al (1966), Misra (1962), Menon (1977), Jone (1961 - 1973), James (1967 - 1973), Jayram (1981), Silas (1982), Talwar (1984, 1990, 1995), Talwar and Jhingran (1991) and Rajan (2002).

India ranks seventh among the major fishing nations of the world and contributes about 45 % of the fish landings of the Indian Ocean. The Indian inshore fishes form a part of the Indo Pacific region. This region covers a vast expanse extending from East Africa and the Red Sea to Northern Australia, Southern Japan, the Hawaiian Islands and the Islands of Polynesia. The dispersal of marine forms largely depends upon oceanic temperature, salinity and currents, besides other factors, such as availability of expanses of deep waters, coastline configuration, submarine contours etc. The Andaman and Nicobar fish fauna is an assemblage of about 1200 species from the coastal and offshore waters, of which 282 species are economically significant food fishes belonging to 130 genera covering 62 families. The marine fisheries of these islands are of utmost national importance in augmenting the country's food resources and in fetching a considerable amount of foreign exchange through export of fishes in different forms to several countries. The

fisheries harvested at present are constituted by pelagic and demersal components, rich in varieties of fishes.

Oceans cover three quarters of the earth's surface and that fishes occupy every livable habitat in the sea : coral reefs, backwaters mangrove creeks, mud flats, rocky shores, kelp beds and ocean depths. The intertidal or littoral zone of the marine environment is delimited by the tidemarks of low and high water. On shore with a large tidal range the littoral zone is broad and provides a distinct habitat characterized by wide fluctuations in temperature and salinity. Non-commercial fishes like gobies, blennies and juveniles of commercial fishes are often found in tide pools, which thus serve as 'nursery areas' providing food and shelter to these vulnerable juvenils. Beyond the littoral region, the ocean is divided into benthic and pelagic realms. Fishes that live on or near the bottom populate the benthic habitat. The shallowest part of the benthic realm is the sub littoral or continental shelf zone, extending from the littoral zone out to a depth of 200 meters. High productivity and consequently dense population of fishes characterize the continental shelf zone. Typical species of this sub littoral zone are of groupers (Serranidae), croakers (Sciaenidae), stingrays (Dasyaidae), lizardfishes (Synodontidae), rabbit fishes (Siganidae), goatfishes (Mullidae) and flounders (Pleurotectidae). Beyond 200 meters the bottom usually drops more steeply and there are fewer non-commercial fishes in this zone than in the sub littoral zone.

The pelagic realm is divided into a neritic zone over the continental shelf and an oceanic zone beyond the continental shelf. The neritic zone is the most productive of all the marine habitats. Much of the fishery resources are harvested from this rich zone. Typical neritic fishes are the snappers (Lutjanidae), kingfishes (Carangidae), sardines (Clupeidae), anchovies (Engraulidae), mackerels (Scombridae), sea breams (Sparidae) and emperors (Lethrinidae). Typical oceanic fishes are the tunas (Scombridae), sail fish (Istiophoridae), dolphin fish (Coryphaenidae), sharks (Elasmobranchs) and flying fishes (Exocoetidae).

The marine fisheries in Andaman and Nicobar Islands are classified into (i) Coastal fisheries or inshore fisheries and (ii) offshore fisheries. Until recently, sea fishing operations in these islands were restricted to a narrow coastal belt, the offshore and deep-sea regions left mostly unexplored. This was partly because of the non-mechanized nature of craft and tackle and partly because of lack of sufficient knowledge of the availability of lucrative catches in the offshore grounds. It was, however, realized that production of fish could be augmented to a large extent from the seas with the help of powered fishing vessels, equipped with suitable mechanized gear and adequate cold storage facilities. Such vessels can reach the offshore fishing grounds, catch for long hours and return to base with large catches in fresh condition.

For harnessing these aquatic resources a scientific understanding of the fish species with respect to their morphological, biological and adaptive characters along with their natural distribution is imperative to back up their optimum exploitation.

Other than marine, the backwaters fisheries in the mangroves creeks form an important component of fisheries resources of these islands. Mangrove creeks and backwaters are the habitats that overlap littoral and sub littoral zones. The environment is characterized by considerable fluctuations in temperature, salinity and turbidity. Creeks are relatively productive regions and serve a valuable function as nursery areas for the young one of many sub littoral species. Many species of fishes move into mangroves at a particular stage in their life cycle, usually as juveniles. Some non-commercial fishes of the family Gobiidae spend their whole life in creeks and back waters, others are common in creeks but often found in the ocean too (e.g., mullet or mugilids). Commercial fishing in mangrove areas is often carried out using hand line, cast nets, bamboo traps and barrier nets. The catch consists mainly of snappers (Lutjanidae), herrings and sardines (Clupeidae), anchovies (Engraulidae), groupers (Serranidae), jacks (Carangidae), pony fishes Leiognathidae), grunts (Haemulidae), emperors (Lethrinidae), goat fishes (Mullidae), mullets (Mugilidae and rabbit fishes (Siganidae). The *Mugil* sp., *Liza* sp., *Lates calcarifer*, *Chanos chanos*, *Epinephelus coioides*, *E. fuscoguttatus*, *E. malabaricus*, *E. polystigma*, *Lutjanus argentimaculatus*, *Toxotes* sp. constitute the major commercially important species from the mangrove ecosystem.

Elasmobranches They are represented by sharks, rays and skates that form one of the important commercial fish faunas. The genera and species constituting the commercial Sharks, and rays from these islands are *Carcharhinus sorrah*, *C. seale*, *C. punctatum*, *Stegostoma fasciatum*, *Sphyrna lewini*, *Hypolophus sephen* and *Dasyatis kuhli*. Elasmobranches are caught almost round the year by different types of gear; the Shark on hook and line and in drift nets and majority of rays and skates in trawl nets, drift and bottom set gill nets and shore seines. Although they don't form very good food fishes, the elasmobranches are widely used as food either in fresh or in cured condition. Besides, they are used for making fish meal and fish manure.

Clupeiform fishes : They constitute a fairly good proportion of the marine fish catches all along the coasts of these islands. They are represented by the more common species, *Sardinella fimbriata*, *S. gibbosa*, *S. albella*, *S. melanura*, *S. sirm*, *Pellona ditchela*, *Ilisha melastoma*, *I. megaloptera*, *Herklotsichthys quadrimaculatus*. The common members of the family are *Anodontosoma chacunda* (Ham. Buch.) which are small fishes obtained in minor quantities on all coasts. The rainbow sardines *Dussumieria acuta* are common on all coasts but not abundant. The anchovies family Engraulidae include *Stolephorus commersonii*, *S. indicus*, *Thryssa hamiltonii*, *T. stirostris*, *T. mystax*, occurring in large quantities and are of considerable importance. Clupeiform fishes occur along the coasts of these islands and support good fishery. Boat seines, gill nets, shore seines and cast nets are the common types of gear in use in the clupeoid fishery.

In addition to the aforesaid families of the order Clupeiforms, a few other divisions include Megalopidae, Chanidae and Chirocentridae represented by *Megalops cyprinoides*. The milkfish *Chanos chanos* is occurring both in the inshore and offshore waters. Its culture can be practiced in these islands. The dorab or the wolf herring, *Chirocentrus dorab* and *C. nudus* Swainson are distributed on all coasts. Shore-seines and gill nets land the major catches.

Saurida tumbil, *S. undosquamis*, *S. gracilis*, *Synodus variegatus*, and *Trachinocephalus myops* are obtained in occasional catches all along the coast.

Catfishes : The marine catfishes belong to the two families, Plotosidae and Ariidae. The former includes *Plotosus lineatus* and *P. canius*. They inhabit the coastal waters and often enter the creeks. Family Ariidae includes a very large numbers of commercial species of which *Arius thalassinus*, *A. subrostratus* are common. They are caught by all types of gears, particularly hook and lines and are consumed in fresh or cured conditions.

Gar fishes and Half - Beaks : The common garfishes of the family Belonidae are *Tylosurus crocodilus*, *T. choram*, *Ablennes hians*, *Strongylura strongylura*. *Hemiramphus far*, *Hyporhamphus dussumieri*, *Rhynchorhamphus malabaricus* represent the half - beaks of the family Hemirhamphidae.

Flying fishes : These are represented in these islands by *Cypselurus spilopterus*, *C. furcatus*, *C. oligolepis* and are obtained along with other fish catches in small quantities all along the coast. These fish inhabit offshore waters 20 to 30 kilometers away from the shore.

Perches : Perches and perch like fishes belong to a large number of families with great many species under them. The following genera are common : *Ambassis* (Ambassidae); *Cephalopholis*, *Aethaloperca*, *Anyperodon*, *Epinephelus*, *Plectropomus*, *Variola*, *Alectis*, *Atule*, *Carangoides*, *Caranx*, *Decapterus*, *Elagatis*, *Gnathanodon*, *Scomberoides*, *Megalaspis*, *Trachinotus* (Carangidae); *Apharus*, *Aprion*, *Lutjanus*, *Paracaesio*, *Pinjalo*, *Pristipimoides* (Lutjanidae); *Caesio*, *Pterocaesio* (Caesionidae); *Gerres*, *Pentaprion* (Gerridae); *Pomadasys*, *Diagramma*, *Plectorhinchus* (Haemulidae); *Lethrinus* (Lethrinidae) and *Nemipterus* (Nemipteridae).

These fishes are abundant in coastal waters and more particularly around the coral reefs and in the rocky bottom of the sea even at considerable depths. They show a considerable variation in their size. Some species like *Epinephelus lanceolatus* commonly called as the giant grouper grow to about 3 m and few of the *Apogon* species do not even exceed 8 to 10 cm in length. The common methods to catch perches are hook and line, gill nets and seines.

Mullets : The goat fishes of the family Mullidae are small-sized fish often brightly coloured and represented by a large number of species of which *Upeneus moluccensis*, *U. sulphurus*, *U. vittatus*, *U. tragula*, *Parupeneus indicus*, *P. cyclostomus* are common on the coasts.

Polynemids : They are commonly known as thread fins and include important species like *Polynemus heptadactylus*, *P. plebeius*. They occur in all coastal waters on the continental shelf and frequent the backwaters and bays and support fisheries in these islands. The polynemids in general are classified as high-class table fishes. Different types of gears fish them, the most commonly used ones being seine nets, gill nets, long lines and hand lines which are all operated by the country crafts.

Sciaenids : The members of the family Sciaenidae are well represented by a large

number of species popularly known as the croakers, occurring in abundance on all the coasts. Some of the large species *Dendrophysa russelli*, *Pennahia macrophthalmus*, *Otolithes ruber*, *Nibea soldado*, *Johnius belangerii*, *J. macropterus* support important fisheries. A number of smaller species are low priced.

Ribbonfishes : Ribbonfishes of the family Trichiuridae represented in these islands by *Leptoracanthus savala* are important low priced food fishes landed in quantities at all the fishing centers on the coasts. They are caught in various types of fishing gears, but chiefly in seines and, to some extent, in gill nets, and by hook and line. The fish is marketed fresh or in cured condition.

Carangids and allied fishes : The trevllies, the horse mackerels and the queen fishes of the family Carangidae and the dolphin fishes of the family Coryphaenidae are a mixed assemblage of pelagic warm water fishes. Out of these, the horse mackerels are the most abundant. *Alectis indicus*, *A. ciliaris*, *Atule mate*, *Alepes djedaba*, *Carangoides caeruleopinnatus*, *C. fulvoguttatus*, *C. hedlandensis*, *C. malabaricus*, *C. oblongus*, *C. uii*, *C. humerosus*, *Caranx ignobilis*, *C. tille*, *Decapterus macrosoma*, *Elagatis bipinnulata*, *Gnathanodon speciosus*, *Scomberoides commersonianus*, *S. lysan*, *S. tol*, *Megalaspis cordyla*, *Selar crumenophthalmus*, *Selaroides leptolepis*, *Seriolina nigrofasciata*, *Trachinotus bailloni*, *T. blochii* are the common members of the family Carangidae. Family Coryphaenidae is represented only by *Coryphaena hippurus*.

Silver bellies : Silver bellies or pony fishes of the family Leiognathidae occur in the commercial catches along the coasts. They move in shoals in the inshore waters whence they enter the creeks. They are represented by genera, *Leiognathus*, *Gazza* and species *Leiognathus equulus*, *L. dussumieri*, *L. fasciatus*, *L. leucisus*, *L. longispinis*, *L. lineolatus*, *L. splendens* are important from the fishery point of view. Of all the silverbellies, *L. splendens* is widely distributed along the coasts of these islands. They are low-priced small fishes caught in quantities by shore seines, boat seines and trawl-nets and cured by sun drying. Silver bellies form a substantial fishery.

Lactarius : The white fish, *Lactarius lactarius* of the family Lactariidae is a small sized fish. It moves in shoals in inshore waters. *Lactarius* is consumed either fresh or in cured state.

Pomfrets : The pomfrets of the family Apolectidae are among the best table fishes. They are found in shoals in deeper waters usually away from the shores. The brown pomfret *Parastromateus niger* represents this group.

Mackerel : The Indian mackerels represented by *Rastrelliger kanagurta*, *R. faughni* and *R. brachysoma* of the family Scombridae are widely distributed on the coasts of these islands, contributing to fisheries of Andaman and Nicobar Islands. They are fishes of high delicacy. The chief gears in operation are the shore seines, gill nets and cast-nets. Mackerel is pelagic and the fishery is confined to the inshore region. It is consumed fresh or in cured condition. The schooling season of mackerel in the waters of these islands

coincides with southwest monsoon period, i.e. May – August. The shoreward movement of the mackerel shoals in fishery season is determined by abundance of the plankton food items in any particular region. These species are planktophagous and occupy neritic pelagic habitat.

Seer fishes : Seer fishes of the family Scombridae are represented by a few species. They are in general high priced quality fishes. Some of the species grow to over a meter in length. The barred Spanish mackerel *Scomberomorus commerson*, the streaked Spanish mackerel *S. lineolatus*, the spotted Spanish mackerel *S. guttatus* and wahoo *Acanthocybium solandri* are common species under the group. Mainly trolling traps them. They are consumed fresh or cured and the demand for them is very high, as they are considered the tastiest among the marine fishes

Tunnies and allied fishes : Among the scombroid fishes, the tunnies (Family : Scombridae), the sailfishes (Family : Istiophoridae) and the swordfishes (Family : Xiphiidae) are economically important food fishes, widely distributed in the waters of these islands. The frigate mackerels *Auxis thazard* and *Euthynnus affinis* are the dominant species amongst the tuna and tuna like fishes.

Nemipterids : The nemipterids are one of the most important economic groups of marine fishes in these islands. They are represented by genera *Nemipterus*, *Scolopsis* and *Parascolopsis* and species *Nemipterus bipunctatus*, *N. japonicus*, *N. mesoprion*, *N. nematophorus*, *N. nemurus*, *N. zysron*, *Scolopsis auratus*, *S. bilineatus*, *S. ciliatus*, *S. ghanam*, *S. vosmeri* and *Parascolopsis eriomma*. Species of the genus *Nemipterus* occur on mud and sand bottoms in coastal inshore as well offshore shelf waters. Species of the genus *Scolopsis* occur usually on coral reefs, or on sand or mud bottoms close to reefs. Nemipterids can be solitary or schooling. They are an important component of commercial and artisanal fisheries. Nemipterids are caught mainly by bottom trawls or by hand line. Other methods include longline, gillnets. They are popular food fishes and are marketed fresh or dry-salted.

Barracudas : The barracudas (family : Sphyraenidae) are represented in these islands by several species under the genus *Sphyraena* of which the more common ones are *Sphyraena jello* and *S. flavicauda*. These are caught by hook and line and trolling artificial lures.

Mulletts : The mulletts (family : Mugilidae) are represented by the genera *Mugil*, *Valamugil*, *Liza* and *Crenimugil*. The common species are *Mugil cephalus*, *Liza macrolepis*, *L. vaigiensis*, *L. parisa*. *M. cephalus* is the most common and widely distributed species of the mulletts in these islands. Besides serving as a delicious table fish, mulletts are important in that they are hardy fish and are best suited for fish farming. They are caught along the sea coast in the lagoons and mangrove creeks.

Soles : Soles and other flat-fishes are represented in these islands by genera as *Psettodes* (family : Psettodidae), *Bothus* (family : Bothidae), *Cynoglossus* (family : Cynoglossidae). *Psettodes erumei* known as Indian halibut occurs in small quantities in these islands. Most of the flatfishes are caught along with the miscellaneous catches.



Trawl fishing boat, Junglighat, Andaman



Trawl fishing boat in operation (Andaman)

FISHING CRAFTS AND GEAR USED IN ANDAMAN AND NICOBAR ISLANDS

A Coastal and reef fishery is the most important source of animal protein and plays a significant socio-economic role for coastal peoples. It constitutes 70 % of the total fishery. Reef fisheries are predominantly simple non-mechanized and non-technical gears. Fishing is carried out mostly by rural dwellers and provides the bulk of the animal protein. The villagers consume harvested 30 % marine resources and the 70 % are sold at local markets or to the exporters.

Fishing crafts : There were 2024 fishing crafts in these islands during 2000; out of this there are 18 mechanized boats, 454 motorized boats and 1552 non-mechanized boats. South Andaman has the maximum number of indigenous crafts and also the mechanized boats. Small wooden crafts of up to 35 LOA have been prepared. The hard wood locally known as Tanugpeinne, *Atrocarpus chaplasha* species is used for the construction of plant built crafts. There are three main and common types of crafts in these islands :

(1) Dugout canoe (2) Flat bottom and (3) Round bottom.

(1) **Dugout canoe :** The length of the crafts is 3 - 5 m. These are made out of *Melia dubia* and *Albizia* sp. woods. The main fishing method is gill netting with nets of mesh size 30 - 150 mm. Hand lining and long lining are the other methods used. Service life of dugout canoe is 7 - 8 years and its crew complement varies 1 - 5 members. Its range is generally upto 10 - 25 km from the shore and it is operated mainly during the day. Dugout canoes are found mostly in North, and Middle Andaman and Great Nicobar. Tribal of Nicobar Islands use outrigger in the canoes.

(2) **Plank-built canoes :** These crafts are different from the dugout. These are built with the help of different planks. This craft have flat bottom, long and narrow shaped raised bow and long balance towards, locally known as dinghy. Mostly operated in North and South Andaman and also in Great Nicobar.

(3) **Flat bottoms :** Caravel built coal tar painted boats with small fore and aft deck, the deck and ship is wider and a bit lower than fore and aft decks. The keel is absent and the depth amid ship is less, giving a depression of gradual decrease at the center of the hull. The length of the craft is 15 - 20 feet. It is not suitable for monsoon period due to poor stability. For the purpose of caulking, a paste prepared by mixing the Dhoop (resin of a tree) with kerosene oil is applied over the caulked layers of commonly available sutly (a thread of the material of gunny bag) or meson cloth, filled in between the seams.

(4) **Round bottom :** Round bottom type is showing a very good performance even during monsoon period. The LOA ranges from 15 - 25 feet. Central deck is generally in line with fore and aft deck. Mostly constructed by private parties at an approximate cost of Rs. one lakh per craft. Paints and method of caulking is same as used for flat bottom crafts.



Fishing boats of ancient design (Havelock Id., Andaman)



Fish catch (Bambooflat, Andaman)

It is found that operation of smaller boats is more economical as most of the boats are used for gill netting and line fishing in the inshore area and there is very little scope for bottom trawling. The department of fisheries is having a program to procure and supply outboard engine / inboard engine fitted boats of 20 - 25 feet size to bonafide fishermen, tribal and the trainees coming out from the fishermen training center at 60% subsidy basis.

GEAR : In Andaman and Nicobar Islands, the following types of nets are used :

1. Drift Gill net
2. Shore seine net
3. Anchor net
4. Cast net

1. Drift Gill net : Drift gill nets are widely used and operated all over the island. They are locally known as Nylon jaal. The nets consist of rectangular pieces of webbing to the upper side of, which is attached head rope, which bears floats. The footrope is absent and as such the sinkers are directly attached to the meshes.

Average length of the net is 325 m

Average stretched mesh size 4.5 - 6.5 cm

Average depth of net is 4.5 m

Material used is Nylon No. 2, 4, 8 & 9

The specification of drift gill nets generally used are given below :

1. Head rope length : 181 m
2. Depth of net (breast line) : 2.7 m
3. Meshes in depth : 80
4. Mesh size : 3.5 cm
5. Mesh size of selvage : 4 cm
6. Foot rope absent
7. Sinkers mainly stones are attached to main webbing : more than 100 nos.
8. Weight of each sinkers : 200 - 250 gm
9. Total no. of floats : 95 - 100 (a + b type)
10. Distance between two sinkers : 2 m
11. Number of 'a' type floats : 55 nos.
12. Number of 'b' type floats : 40 nos.
13. Circumference of float : 130 - 150 cm
14. Distance between two floats : 2 m



Purse seinenet (Rutland, Andaman)



Shore seinenet (Katchall Id., Nicobar)

This net is used and operated mainly at South Andaman and also at Great Nicobar Islands. Main fishes caught are Mulletts, Sardines, Tunas and Mackerels.

Types and specifications of Drift Gill Net

Type	Length (m)	Depth (m)	Stretched Mesh size (cm)	Material	Main Catches
Mullet nylon net	335	3.5	3	Nylon no. 4 & 2	Mulletts
Sardine nylon net	305	3.5	4	Nylon no. 1	Sardine
Mackerel nylon net	335	5.5	4-5	Nylon no.1 & 2	Mackerel
Seer fish nylon net	419	15.5	14	Nylon no. 8 & 9	Seer fish

(2) **Shore seine net** : Shore seine net is operated mostly at South Andaman and Little Andaman. It is commonly known as 'Maha jaal' and is more or less similar to the Bar jaal of mainland. The net is operated during the time of retreating tide. The net consists of a number of rectangular pieces of webbing attached to each other without any bag formation. The net is broadest at the center having a depth of 6 m. and is tapering on both the sides. The sides have depth of 1.50 m. Rope is attached to both the sides with birdies, which in turn are attached to a rod and then to the top rope. A group on shore holds one end of the net while a plank built craft goes on shooting the net in a semicircular manner and returns to the shore with other end. The net is then pulled to the shore by two groups of fishermen holding the two ends.

(3) **Anchor net / lunger jaal** : It is most advanced type of traditional net. It consists of a bag tapering into cod and wings tapering towards the free end. The mouth is kept open by fixing floats on the upper end and sinkers on the lower part, a large float is provided at the cod end. The net is operated from small crafts at the time of retreating tide. The flow of current makes the mouth open and the cod end is lifted upward. While shooting the cod end is released first and the anchors at the end. It is set prior to the start of the flow and hauled in after the stop in flow.

(4) **Cast net** : It is the most common gear used by regular as well as occasional fishermen in Andaman and Nicobar islands. It is locally called as 'Haat jaal' A single fisherman in shallow inshore waters operates it by hand. These are circular nets and as the name implies are cast or thrown. The net is thrown at a shoal of small fishes (Sardines / Anchovies / Mulletts) supposed to be present, surrounds the fish and fixes them to the bottom, a line attached to the upper rows above the periphery of the net enables the net to be retrieved together the fish. The length of the purse line 10 to 25 ft. number of leads sinkers 600 / 2000 meshes. Average catch / day / fisherman is 5 kg.



Cast net (Chattam jetty, Andaman)



Setline for shark fishing (Andaman)

Types and specifications of Cast Nets

Type	Material	Depth	Stretched (Cm) size (cm)	No. mesh at top	No. Meshes at bottom	Material Meshes	Shape	Weight (Kg)
Ancho-vies net (Small size)	Nylon no. 0 & 1/2	500	½ or less	80	2000 To 2500	Lead	Cylin-drical	9
Ancho-vies net (Big size)	„	„	1	„	1000	„	„	5
Sardine net	„	„	2	„	1500	„	„	6
Mullet net	No. 2	400	2.5	40	600	„	„	4

HOOK AND LINE

a) **Hand line** : The fishermen go about 2 to 6 km away from the shore in a small craft. After baiting their hooks with hermit crabs and other small fishes, the line is thrown into the sea and one end is held firmly. The free end is attached to swivel, which is connected by a steel wire to the hook. When a fish is hooked the fisherman pull ups the line and removes the fish.

b) **Setline** : Two or three hooks in one line having a sinker at the end are used with the indicator of wood over which the line is wrapped before setting. As the bait is taken by the fish the indicator moves and on seeing this fisherman gives a jerk to the line for proper hooking. Mostly nylon lines 110 and 120 number with hook trade of 5 to 12 is used. The inter hook distance is 1 to 2 ft. Mainly catches perches, sharks and catfishes.

Active gear used by fisherman

Gear	Description/use	Pros	Cons
Cast net	Diameter when spread, 2 to 3cm. Commercial, 10mm mesh. Thrown onto water by one person.	Good for confined areas and shallow waters. Easy to use.	Require skills and training; easily snagged only for small fish, prawn; operators vary in efficiency.
Purse seine	Mesh size 3mm. Need boats. Encircle school and drag.	Samples pelagic	Selective; difficult to operate. Either use with on attractant of target schools.
Beach seine	On accreting banks at edge of mainstream; 30 to 100m in length with a pocket; 3 to 25 mm mesh. Set in semicircle and pull to shore.	Quantitative; less selective than most gears. Relatively easy to use.	Labour intensive

Passive gear used by fisherman

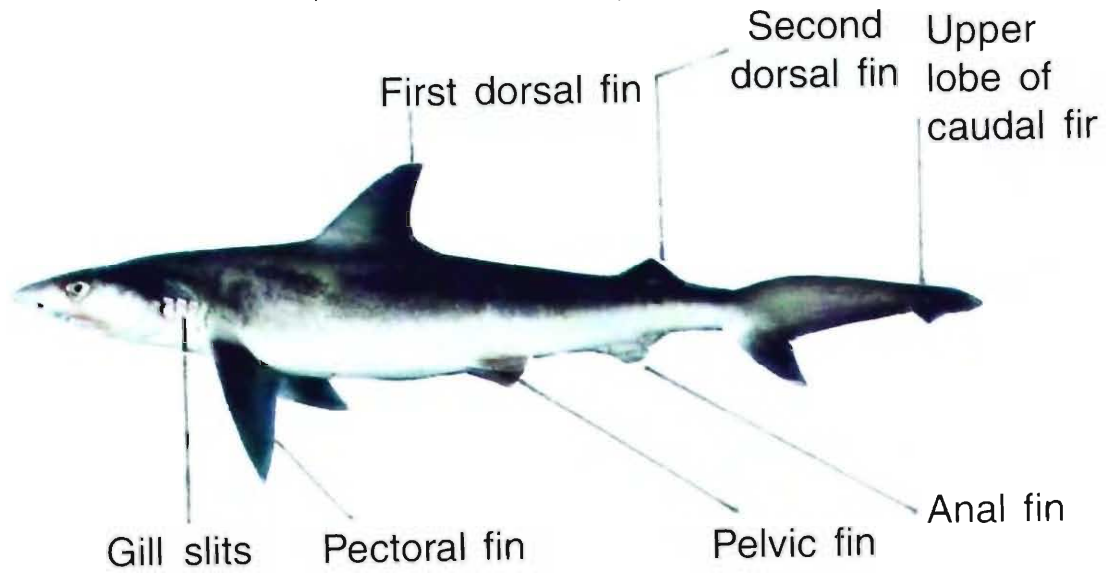
Gear	Description/use	Pros	Cons
Long line	Lines of hooks attached to a long rope line; layed out from boat.	Catches larger fish	Not quantitative, selective.
Barrier net/ Stake net	Set on mud flats; commercial fishery; closes known area.	Absolute values; easy to use.	Time consuming; labour intensive.
Gill net- fish only	Open areas; various mesh sizes. In deeper waters set one on the surface and one on the bottom.	Easy to use.	Relative abundance only.

PEAK SEASON OF FIN FISHERY RESOURCES IN A & N ISLANDS

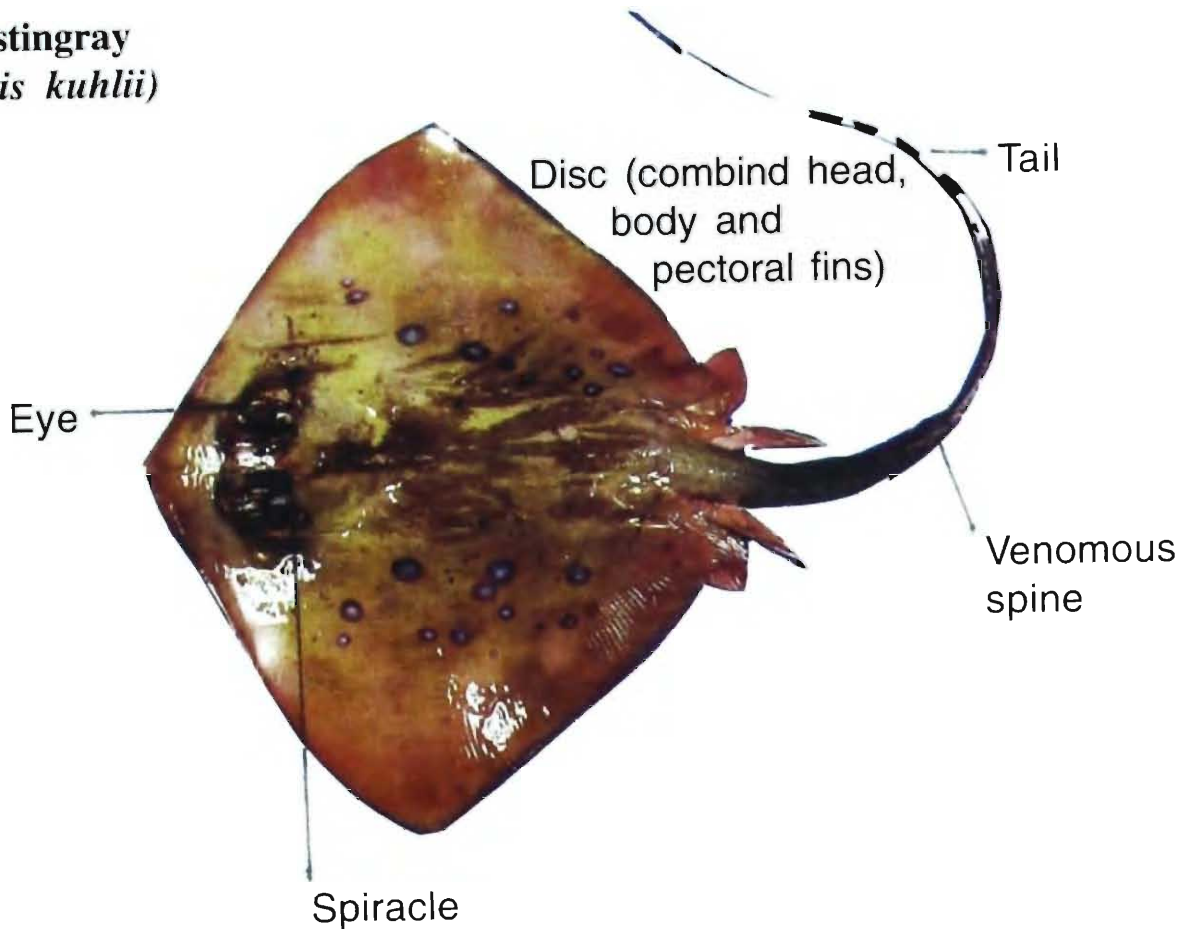
Resources	Peak Season
Sharks <i>Carcharhinus</i> sp.	September to May
Rays and Skates <i>Dasyatis</i> sp.	December to May
Sardines <i>Sardinella</i> , <i>Dussumieria</i> , <i>Anadontosoma</i> sp.	July to December

Resources	Peak Season
Trevallies <i>Carangoides, Caranx, Megalopsis, Elagatis,</i> <i>Decapterus, Selar</i> sp	July to December
Meckerals <i>Rastralliger</i> sp	March to June and September to December
Anchovies <i>Stolephorus</i> sp	June to November
Scombrids <i>Scomberomorus</i> sp.	March to August
Barracuda <i>Spyraena</i> sp.	July to September
Tuna <i>Thunnus, Euthynnus</i> sp.	December to January
Perches <i>Epinephelus, Plectropomus, Lutjanus,</i> <i>Lethrinus, Polydactylus, Pomadasys</i> sp.	August to November
Silver bellies <i>Leiognathus, Gazza</i> sp.	June to December
Croakers <i>Johnius, Otolothus</i> sp.	July to December
Goatfish <i>Parupeneus, Upeneus</i> sp	July to December
Threadfin breams <i>Nemipterus, Scolopsis</i> sp.	July to December
Lizardfish <i>Saurida, Synodus</i> sp.	July to December
Mulletts <i>Mugil, Liza, Valamugil</i> sp.	July to December

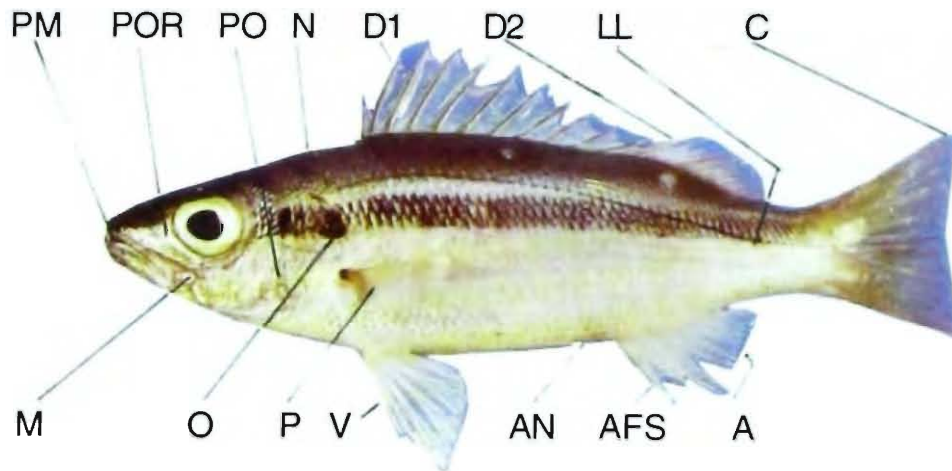
External features of fishes
Cartilaginous fishes (Sharks and Rays)
Black spot shark
(*Carcharhinus sealei*)



Kuhl's stingray
(*Dasyatis kuhlii*)

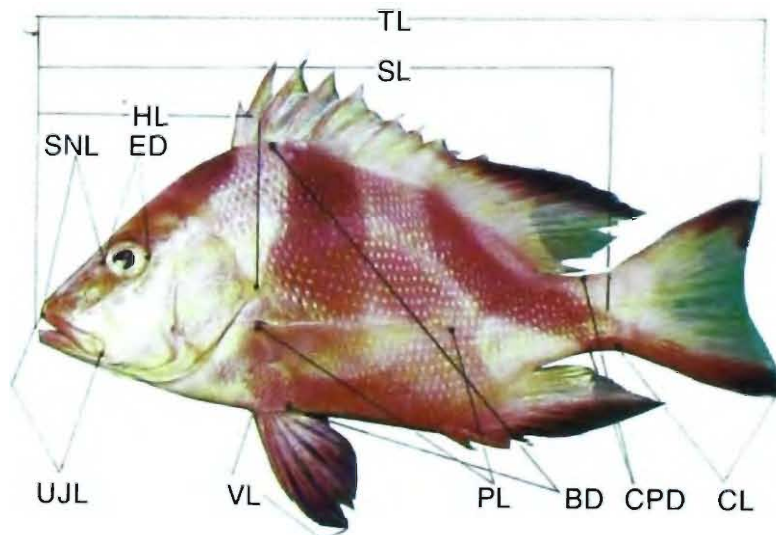


Bony fishes
Two-spot banded Snapper
(Lutjanus biguttatus)



- | | | | | | |
|-----|-------------------|----|--|-----|-----------------------|
| A | anal fin | D1 | 1st dorsal fin (generally spinous) | O | opercle |
| AFS | anal fin spine | D2 | 2nd dorsal fin (generally with single spine in front of soft rays) | P | pectoral fin |
| AN | anus (vent) | LL | lateral line | PM | premaxilla |
| C | caudal (tail) fin | M | maxilla | PO | preopercle |
| | | N | nape | POR | preorbital |
| | | | | V | pelvics (ventral) fin |

MEASUREMENTS OF A FISH



- | | | | | | |
|-----|---------------------------|----|---------------------|-----|-----------------------------|
| CD | body depth | HL | head length | SNL | snout length |
| CL | caudal fin length | PL | pectoral fin length | TL | total length |
| CPD | caudal peduncle depth | SL | standard length | UJL | upper jaw length |
| ED | eye orbit diameter length | | | VL | pelvic (ventral) fin length |

Types of Mouth



Terminal



Sub-terminal



Inferior



Superior



Protrusile

Head of goat fish



Barbel

Head of a goatfish (Mullidae) and shows the pair of barbels on the chin. These are moved over the bottom or thrust into the sediment during feeding to assist the fish in finding its food.

Scutes Caudal fin

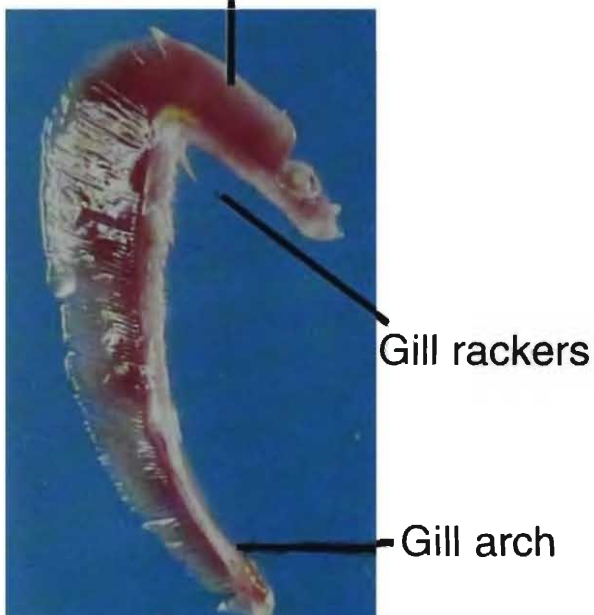


Keel

Gill filaments

Tail of trevally

Tail of the trevally (Carangidae) which has a falcate caudal fin; this shape is often found on fishes capable of swimming very rapidly. Because of the stress placed on the narrow caudal peduncle, fishes such as jacks and tunas usually reinforce it with scutes and/or keels.



Gills of fishes

Gills the respiratory organs of fishes. The gill arch is the structural part. Gaseous exchange takes places in the gill filaments and the gill rakers keep food items from passing out of the gill opening along with expired water.

Position of Ventral fins



Abdominal



Jugular



Thoracic



Position of Adipose fin



Position of finlets

Types of Caudal fin



Rounded



Truncate



Emarginate



Lunate



Forked



Rhomboid



Pointed

Direction and Terminology of Bands



Longitudinal bands



Vertical bands



Oblique bands

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PICTORIAL GUIDE AND KEY TO FAMILIES

The following illustrations are photographs of typical members of all the families contained in the book. Scientific family names and key characters are given with the page reference for the family description in parentheses.

HEMISCYLLIDAE : A groove from each nostril to mouth; nasal barbel distinct; last 2 gill slits close together. (P. 67)



STEGOSTOMATIDAE : lower lip grooves separate, not continuous across chin; spiracle behind eye; caudal longer than body less head. (P. 68)



ALOPIIDAE : length of upper caudal lobe about half or more of total length. (P. 69)



LAMNIDAE : Teeth large, with 1 or 2 functional series in rows of 24 - 30 in each jaw; 1st gill slits widely separated. (P. 70)



CARCHARHINIDAE : Fifth gill opening over behind origin of pectoral fin; caudal fin with distinct lower lobe; 2nd dorsal fin base shorter than 1st dorsal base. (P. 71)



SPHYRNIDAE : Head hammer-shaped (flattened in front and greatly expanded laterally). (P. 74)



DASYATIDAE : Head and snout not distinct, fused with disc; eyes and spiracles on top of head; no dorsal and caudal fins; tail with strong pointed spine. (P. 75)



CLUPEIDAE : Snout usually not projecting in front of lower jaw; maxilla not reaching past eye; scutes along belly in most cases present; no spines in fins; no lateral line; caudal deeply forked. (P. 77)



ENGRAULIDAE : Snout projecting in front of lower jaw; maxilla reaching well past eye; scutes present along belly. (P. 83)



CHIROCENTRIDAE : Elongate, highly compressed; no scutes along belly; jaws with distinct canines; dorsal fin origin over anal fin origin, well behind midpoint of body + head; caudal fin deeply forked. (P. 86)



MEGALOPIDAE : Mouth terminal; lateral line present; no scutes along belly; median gular bone between dentary bones present; upper jaw reaching well past eye; anal fin base much longer than dorsal fin base. (P. 87)



CHANIDAE : Mouth terminal; maxilla short, not reaching beyond eye center; lower jaw with symphyseal tubercles; no gular plate; dorsal fin over middle of body; no teeth in mouth; pectoral fin base horizontal. (P. 88)



ARIIDAE : Paired barbels; strong bony shield on head; dorsal fin short with strong serrated spine; caudal fin forked, separate from dorsal adipose fin and anal fins; pectorals very low-set. (P. 89)



PLOTOSIDAE : Caudal fin continuous with the long soft-rayed second dorsal and anal fins; no scales; 4 pairs of barbels. (P. 90)



SYNODONTIDAE : Body cylindrical no spines in the fins; adipose dorsal present; head usually lizard-like; teeth on jaws distinct; needle-like or lanceolate which are visible when mouth closed; tongue also with teeth; gill rakers rudimentary or minute and spine-like. (P. 91)



EXOCOETIDAE : Jaws not elongated or projecting forward from snout; pectoral fins extremely large, longer than head. (P. 94)



HEMIRAMPHIDAE : Lower jaw elongated into toothless beak; upper jaw triangular, projecting forward from snout; pectoral fins shorter than head measured from tip of upper jaw. (P. 96)



BELONIDAE : Both jaws elongated; paired fins not enlarged; rostral bones joined by sutures; scales small; no fin spines; bones green. (P. 98)



ATHERINIDAE : Body not much compressed, without a ventral keel, the greatest depth some distance behind head; head length equals or exceeds body depth; anal fins with 11 to 17 soft-rays. (P. 101)



HOLOCENTRIDAE : Scales large; bones of head serrated and spiny; dorsal fin long with 10-13 strong spines; spinous portion longer than soft portion. (P. 102)



PLATYCEPHALIDAE : Head encased in bony armour with numerous spines and ridges and very depressed; pelvic fins posterior to pectoral fin base; no anal fin spines. (P. 105)



CENTROPOMIDAE : Often concave at nape; mouth moderate or large; teeth small; posterior border of preoperculum serrated or with two ridges, serrated or spiny below; caudal fin rounded. (P. 106)



AMBASSIDAE : Preoperculum with double edge; 6 branchiostegal rays; caudal fin forked. (P. 107)



SERRANIDAE : Maxilla tip broad, usually exposed; large mouth with canines; preopercular edge serrated; three flat spines on operculum; no ventral axillary scale; vomer with teeth; no molars or incisiform teeth; pectorals rounded; caudal fin never forked. (P. 108)



TERAPONIDAE : Preoperculum sharply serrated; opercle with 2 spines; maxilla not reaching past middle of eye; jaw teeth in villiform bands, outer enlarged. (P. 125)



PRIACANTHIDAE : Mouth large and oblique; eyes very large; upper edge of preopercle free from head; no axillary scales; maxilla and lower jaw scaly; ventrals large, joined to body by a membrane. (P. 127)



SILLAGINIDAE : Operculum with a small sharp spine; mouth small, terminal; maxilla covered by preorbital; fine teeth in bands on jaws and vomer; two separate dorsal, the base of second twice first. (P. 128)



LACTARIIDAE : Mouth large, oblique with two sharp canines in each jaw; scales large, cycloid, easily shed; anal fin base longer than 2nd dorsal base. (P. 129)



ECHENEIDAE : Head flattened with laminated sucking oval-shaped disc. (P 130)



CARANGIDAE : Body varying from deep rhomboid to slender and elongate; scales small; gill membrane separate, not joined to isthmus; opercular bones smooth; caudal fin deeply forked; scutes usually present along straight portion of lateral line. (P. 131)



CORYPHAENIDAE : Body compressed; scales small, cycloid; bands of small teeth on jaws, vomer, palatines and tongue; dorsal and anal fins very long, almost to caudal fin; dorsal origin on nape; adults with bony crest on forehead. (P. 145)



MENIDAE : Body extremely compressed, disc like, breast sharp; scales minute; mouth protrusive; no spines in dorsal and anal fins; first two ventral rays elongated. (P. 146)



LEIOGNATHIDAE : Body compressed; mouth small, extremely protractile; scales small; gill membranes united with isthmus. (P. 147)



LUTJANIDAE : Anterior part of head scale less; maxilla broadest posteriorly; preoperculum usually serrate; premaxilla with a broad-based midlateral process; dorsal usually single. (P. 152)



BRAMIDAE : Scales moderate to large; cheeks, operculum and maxilla scaly; dorsal fin long, its base equal to or longer than anal fin base; dorsal rays 30-60; dorsal and anal spines not clearly differentiated from the soft-rays. (P. 151)



CAESIONIDAE : Upper jaw protrusive; maxilla naked; premaxilla with 1 to 2 finger-like midlateral processes; ventral axillary scale well developed. (P. 167)



NEMIPTERIDAE : Premaxilla with a low mid lateral process; maxilla mostly covered by preorbital when mouth is closed; cheek with 3 or more rows of scales; anal with 3 spines and 6 to 11 soft rays; upper caudal lobe often with a filament; colour extremely variable. (P. 173)



LOBOTIDAE : Scales moderate, ctenoid, covering head except preorbital region and jaws; jaws with bands of small slender teeth; vomer, palatines and tongue toothless; preopercle coarsely serrate; gill membranes narrowly united, free from isthmus; dorsal and anal extended backward. (P. 179)



GERREIDAE : Mouth strongly protractile; pointing downward; head and body entirely scaled; gill membranes separate, free of isthmus. (P. 180)



HAEMULIDAE : Head scaled; chin with two pores anteriorly and a median groove or six pores and no groove; roof of mouth toothless. (P. 183)



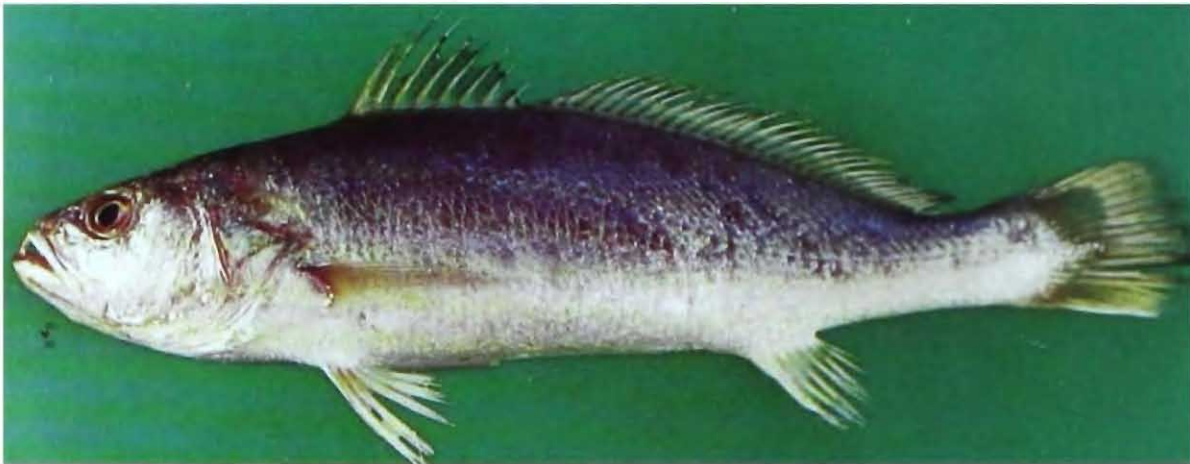
LETHRINIDAE : Preoperculum without serrated hind edge and entirely scale less; upper jaw protrusive; lips thick and fleshy; no teeth on roof of mouth; gill rakers mostly reduced, knob like; single dorsal fin. (P. 188)



SPARIDAE : Dorsal fin high, first ray sometimes prolonged; preopercle smooth; rear end of premaxilla grooved to receive tip of maxilla; vomer and palatines edentate; body scales large. (P. 193)



SCIAENIDAE : Lateral line scales extending to end of caudal fin; two anal spines; no teeth on vomer or palatines. (P. 194)



MULLIDAE : Under side of head flat; two barbels on chin; mouth protrusive; two widely separated dorsal fin. (P. 199)



MONODACTYLIDAE : Anterior rays of soft dorsal and anal fins elongated and sickle-shape; ventral rudimentary or absent in adults; body deep. (P. 205)



PEMPHERIDAE : Body compressed; snout naked, rest of head, maxilla and lower jaw scaly; gill membranes separate, free of isthmus; dorsal fin short, its base shorter than anal fin base. (P. 206)



TOXOTIDAE : Dorsal fin inserted in posterior half of body and above anal fin; soft dorsal base shorter than soft anal base. (P. 207)



KYPHOSIDAE : Body smoothly oval; small soft scales on head, body and fins; maxilla scaly; jaws with an outer row of fixed incisors with long curved roots; gill membrane separate. (P. 208)



DREPANIDAE : Body very strongly compressed; mouth small, terminal, protractile; forming downward pointing tube, with bands of setiform teeth; deep notch between spinous and soft dorsal portions; gill membranes joined to isthmus. (P. 209)



EPHIPPIDAE : Body orbicular and greatly compressed, especially in juveniles; preopercle smooth; jaws with bands of flattened, tricuspid teeth; gill membranes joined to isthmus; anal fin with 3 spines; no pelvic axillary process. (P. 211)



SCATOPHAGIDAE : Scales minute, covering head and body, extending onto median fins; jaws with bands of minute, slender, tricuspid, movable teeth; gill membranes united; anal fin with 4 spines; pelvic axillary process present. (P. 213)



MUGILIDAE : Broad flattened head; mouth small, terminal or inferior; no lateral line; teeth villiform or absent; two short dorsal; dorsal with 4 spines; pectoral set high. (P. 214)



SPHYRAENIDAE : Snout long; mouth large; lower jaw projecting beyond upper; strong canines; two widely separated dorsal, with 5 spines; lateral line well developed. (P. 218)



POLYNEMIDAE : Conical snout projecting beyond large mouth; adipose eyelid well developed; lower part of pectoral fin with filamentous rays; lateral line extending onto caudal. (P. 220)



PINGUIPEDIDAE : Sub cylindrical; scales small, extending onto head; ventral in advance of pectorals; opercle with a stout spine posteriorly. (P. 222)



ACANTHURIDAE : Body compressed; scales minute; one spine or one to three bony plates at caudal peduncle; scales minute; sometimes horn above snout (*Naso*). (P. 223)



SIGANIDAE : Ventral with a proximal spine, a distal spine and three branched soft rays between. (P. 227)



TRICHIURIDAE : Body ribbon like; strong teeth in jaws, at front fang like; ventral reduced to a scale like spine or absent; single dorsal fin; anal and caudal fins absent or reduced; no scales. (P. 232)



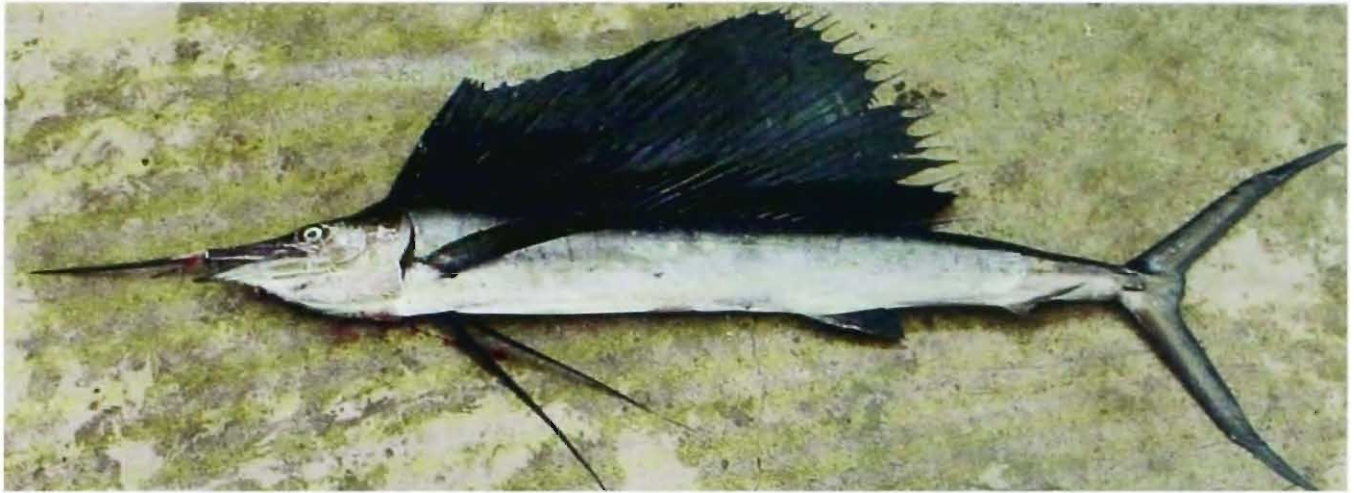
SCOMBRIDAE : Body spindle-shaped; isolated finlets behind dorsal and anal fins; dorsal fins separated; 2 or 3 keels on each side of caudal peduncle. (P. 233)



XIPHIIDAE : Upper jaw elongated, forming a flat, bony sword; juveniles with continuous long based dorsal; adults with short, high first dorsal well separate from tiny second dorsal; ventral absent; caudal peduncle of adults with a single keel on each side; teeth and scales absent in adults. (P. 239)



ISTIOPHORIDAE : Upper jaw elongated, forming a rounded, bony, spear like bill; first dorsal base longer than height of fin; ventral slender filaments folding into a groove on belly; 2 keels on each side at base of caudal; body with small elongate scales. (P. 240)



PSETTODIDAE : Flat, upper eye close to dorsal edge; dorsal, anal and ventral fins with one or more spines; dorsal well behind eyes with first rays. (P. 241)



DESCRIPTION AND PLATES

Family HEMISCYLLIDAE

Bamboo sharks

These are generally small, slender sharks characterized by the presence of both nasoral and perinasal grooves, short nasal barbels, a small transverse mouth, dorsolateral eyes and a large spiracle below the eye. These sharks are commonly found in the intertidal zone and in shore rock or coral reefs. They are generally under 100 cm in length and are considered to be harmless. The family contains two genera and 11 species. One genus, *chiloscyllium*, with four species in Indian waters, confined to inshore waters.

1. *Chiloscyllium punctatum* Muller & Henle. **Brownbanded Bamboo shark** : Body and tail moderately slender, snout rounded, no lateral ridges or trunk; dorsal fins large and angular, with free rear tips; first dorsal fin origin over anterior halves of pelvic bases, colour light brown in adults, but young with transverse bands and a few dark spots. Attains 100 cm. caught mainly with longlines and gillnets. A common in shore bottom shark found on coral reefs, often in tide pools. Indo West Pacific. Taken in inshore fisheries and utilized for human food.



Chiloscyllium punctatum, 910 mm TL.

Family STEGOSTOMATIDAE

Zebra shark

Body somewhat cylindrical with prominent ridges on sides. Head broadly conical slightly flattened. Nostrils with short pointed barbels. The Zebra shark is a sluggish, slow swimming fish and is generally considered to be harmless. This family comprises a single monotypic genus in the Indian region.

2. *Stegostoma fasciatum* (Hermann). Zebra shark : Body cylindrical with prominent ridges on sides; snout rounded; nostrils with short pointed barbels; first dorsal larger than second, with origin well ahead of pelvic origins; pectoral fins rather large, broad and rounded; anal fin about half as long as the entire shark. Colour pattern of dark saddles in young, changing dark spots in adults. Attains more than 300 cm.caught in gillnets and longlines. An inshore shark, found near the bottom on coral reefs. Indo – West Pacific. Quite common, but not particularly abundant. It is used for fishmeal; oil and the fins are dried for the oriental shark fin trade.



Stegostoma fasciatum, 790 mm TL.

Family ALOPIIDAE

Thresher sharks

These sharks are easily distinguished by their extremely elongate upper caudal lobe, about half total length; minute second dorsal and fins; nostrils separate from mouth and a relatively large eye; teeth are compressed and blade - like; distinct upper precaudal pit. The family contains three species. They are oceanic dwellers, occurring in all temperate and tropical seas. A single genus with three species recognized; two species in the Indian region.

3. *Alopias vulpinus* (Bonnaterre). **Thresher shark** : Body slender with thin caudal fin greatly enlarged; dorsal profile of head convex, and forehead moderately convex in lateral view; eyes moderately large; snout relatively short, conical and pointed; no grooves on head above gills; labial furrows present, teeth small, over 29 rows in either jaw. Pectoral fins falcate and narrow - tipped terminal lobe of caudal fin moderately large. Primarily an oceanic, epipelagic shark. Attains 550 cm. Caught in the oceanic long line fisheries. Also fished with anchored bottom and surface gillnets. Circumglobal in warm seas. Of minor fishery value. The meat is consumed as fresh and dried salted; the fins are valuable for shark - fin soup, the hid is useable for leather and the liver oil can be processed for vitamins.



Alopias vulpinus, 1400 mm TL.

Family LAMNIDAE

Mackerel sharks

This family is distributed in all temperate and tropical seas. They are generally large sized sharks of spindle - shaped body, pointed snout; a slender, keeled caudle peduncle, lunate caudal fin and sharp teeth, long gill slits; long pectoral fins and high first dorsal fins, small second dorsal and lunate caudal fins. Three genera with five species; only *Isurus oxyrinchus* has been reported in Indian region.

4. *Isurus oxyrinchus* Rafinesque. **Shortfin mako** : Body moderately slender; long and pointed; teeth smooth edged, long and slender at front of jaws, blade - like and triangular posterior, a large first dorsal fin and very small second dorsal and fins; pectoral fin relatively long and narrow; strong lateral keel on each side of caudal peduncle; caudal fin crescent - shaped. Colour dark blue to nearly white on ventral parts .An oceanic, as well as coastal species, usually in surface waters. Attains nearly 400 cm. Caught with longlines, and probably also with gillnets and on hook and line. Circumglobal in tropical and temperate seas. The meat is utilized fresh and dried - salted for human consumption; the oil is extracted for vitamins; the fins used for shark fin soup.



Isurus oxyrinchus, 2460 mm TL.

Family CARCHARHINIDAE
Requiem Sharks

The requiem sharks are one of the largest and best known families of sharks. They are active strong swimmers that occur singly or in small to large groups. Small to large-sized sharks. Head with five 5 gill-slits. Eyes with a small well developed nictitating membrane within lower lid. Two dorsal fins without spines. Anal fin present. Caudal fin strongly asymmetrical, with a well-marked sub terminal notch and a short lower lobe. They are voracious predators and feed on a wide variety of organisms. The large carcharhinids are dangerous to people.

Certainly the most important shark families for fisheries in these islands. Mainly used for fishmeal, except for the liver from which oil is extracted. The fins are dried and exported for the oriental shark fin soup market. Juveniles are marketed fresh. Longlines and hand lines catch them, gillnet, also caught in trawls. Small to large size, some species more than 600 cm. These fish are employed as food and portions of them; especially the fins are largely exported from these islands. The fins are divided as 'white' and 'black' according to their value. The white consist exclusively of the dorsal fins, which are on both sides of a uniform light colour, and are expected to yield more gelatin than the other fins. The pectoral, ventral and anal fins are called black fins and supposed to yield a comparatively small quantity of gelatine. Here sharks are netted, the nets being a quarter of a mile or more in length, constructed of strong twine and having a 6 inch mesh; floats of thermacol or plastic buoyance are affixed along the upper line, while the lower of the net is weighted by stones. These nets are sunk in deep water and well out to sea, where they remain until the following day. The fins of the sharks are removed and dried in the sun. Strips of flesh are also salted as food and the livers boiled down for oils they contain. Worldwide, there are 48 species in 12 genera; ten genera with 26 species in the Indian region.

5. *Carcharhinus albimarginatus* (Ruppell). **Silvertip shark** : Body cylindrical; snout moderately long and broadly rounded; inter dorsal ridge present; origin of first dorsal fin over or slightly anterior to inner pectoral corner; apex of first dorsal obtusely pointed to acute; origin of second dorsal over or slightly behind origin of anal fin. Colour grey, darker on back and shading to white ventrally; distinctive white tips or margins on first dorsal, caudal and pectoral fins. Common on outer reef slopes. Attains 300 cm caught with gillnets and line gear. Tropical Indo-Pacific. Important object of fisheries because of fine meat, oil and fins.



Carcharhinus albimarginatus, 1800 mm TL.

6. *Carcharhinus macloiti* (Muller & Henle). **Maclot's Shark** : Body slender and fusiform; snout very long and narrow; labial folds short; first dorsal fin with a pointed apex, its inner margin elongated; second dorsal fin very low; pectoral fins falcate; no dermal ridge between dorsal fins. Colour back greyish, belly whitish; outer half of first dorsal fin dark, caudal fin dark in its posterior half. Attains 60 cm. caught mainly with longlines and gillnets. Pakistan, India, Srilanka, the East Indies and Melanesia. This species is fairly common in the catches of the coasts of these islands.



Carcharhinus macloiti, 510 mm TL.

7. *Carcharhinus sealei* (Pietschmann). **Blackspot shark** : Snout moderately long and rounded; interdorsal ridge reduced or absent; origin of first dorsal fin about over or slightly behind inner pectoral corner; first dorsal falcate, its apex pointed; origin of second dorsal slightly to noticeably behind anal fin origin. Body grey, shading to whitish ventrally; a conspicuous black or dusky tip present on second dorsal fin, but other fins with pale posterior edges and no dark markings. Caught mainly with longlines and gillnets. A strong swimmer and occurs mainly over the continental shelf.



Carcharhinus sealei, 1760 mm TL.

8. *Carcharhinus sorrah* Muller and Henle. **Spottail shark** : Body relatively slender; snout short and moderately broad; labial folds rudimentary; upper and lower teeth symmetrical and similar, with oblique and narrow serrated cusps; pectoral fins falcate; a large dermal ridge present between dorsal fins. Colour dark grey, black on back, belly whitish; conspicuous black tips on pectorals, second dorsal and lower caudal lobe. Attains 160 cm Caught with gillnets and longlines. A rather common shark, inhabiting the continental shelf. Tropical Indo West Pacific. One of the shark most commonly seen in the commercial catches of these coasts.



Carcharhinus sorrah, 1350 mm TL.

Family SPHYRNIDAE

Hammerhead Sharks

The hammer shaped extensions of the head easily recognizes hammerhead sharks. Medium to large- sized sharks. Body elongate and moderately slender. Two dorsal fins, the first high and pointed. Caudal fin strongly asymmetrical, with a well-marked sub terminal notch and a small but well defined lobe. They range in maximum size from about 140 to 600 cm. Some of the larger species have been responsible for attacks on humans. Mainly in surface water, the adults of most species are semi-oceanic while the young are found close inshore. Species of this family are abundant in these islands and sustain rather important fisheries. They are used mainly for extracting oil, which seems to have a high content of vitamin A. The family is distributed worldwide in tropical and temperate seas. There are nine species under two genera; all except one belong to the genus *Sphyrna*; both genera with four species in the Indian region.

9. *Sphyrna lewini* (Cuiver, Griffith & Smith). **Scalloped hammerhead shark** : A large hammerhead shark with broad, narrow-blade lateral extensions on the head; first dorsal fin moderately large and erect; free rear tip of second dorsal fin nearly reaching caudal fin; base of anal fin noticeably large than that of second dorsal fin. Body brownish grey, shading to white ventrally; undersides of pectoral fins tipped with black. Attains 420 cm. Caught with gillnets and longlines. An offshore and semi-oceanic species, often encountered in inshore waters. Worldwide in tropical and warm temperate seas. The most common hammerhead in these islands. They are used mainly for extracting oil, which seems to have a high content of vitamin A.



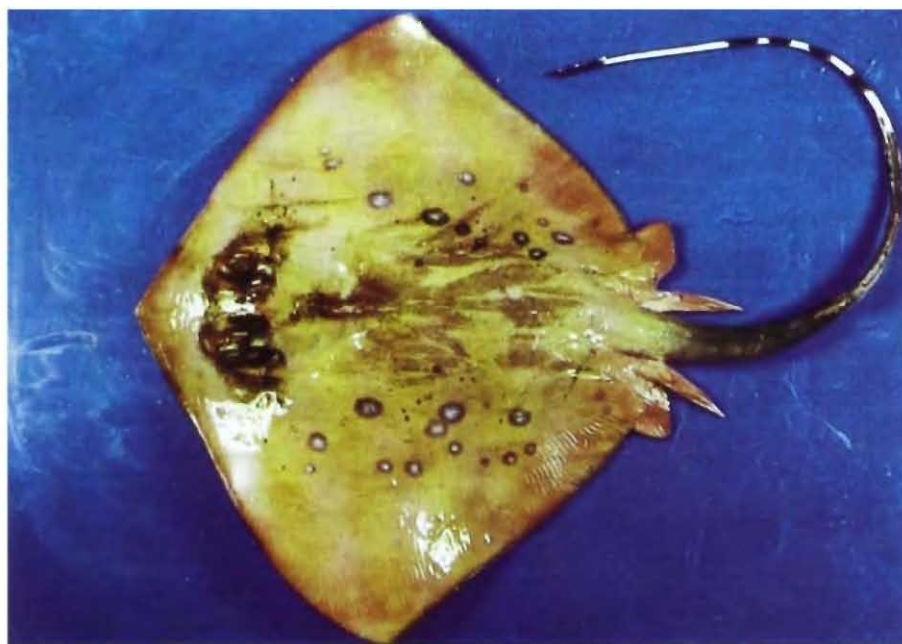
Sphyrna lewini, 2500 mm TL.

Family DASYATIDAE

Stingrays

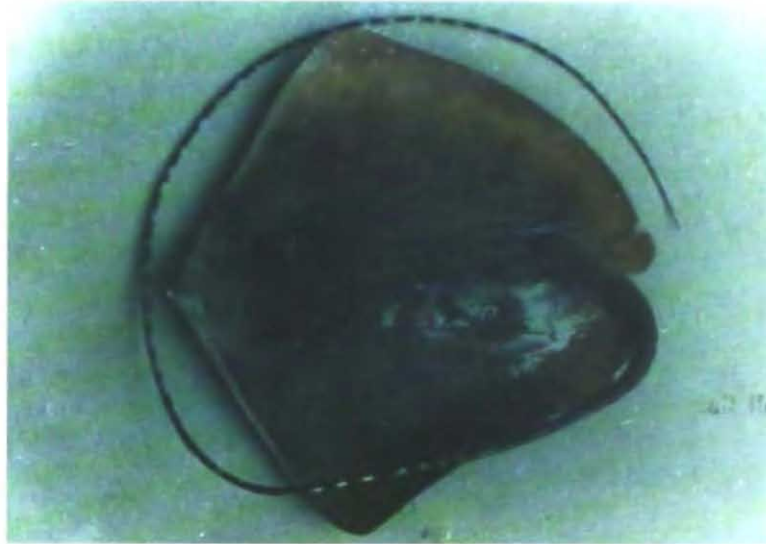
These rays are characterized by an angular to rounded disc that is usually 1-2 times as wide as its length. The head is not separated or distinguished from the rest of the disc. There are five pairs of gill opening on the underside of the disc. The jaws have small blunt or cuspidate teeth. The tail is moderately slender to very slender and whip-like, usually with a large venomous spine on its dorsal surface. Most species are found in coastal waters. The tail spine is extremely dangerous and capable of delivering an excruciating wound. Locally consumed. About 10 genera and 90 species are known; seven genera with 26 species in Indian waters.

10. *Dasyatis kuhlii* (Muller & Henle). **Bluespotted Stingray** : Disc kite shaped; snout gently rounded; mouth undulated, with two buccal papillae on floor of mouth; tail about as long as or longer than disc, a pair of sharp spines on upper surface of middle part of tail. Color pale brown or grey with small reddish to black spots and larger bluish-white blotches; tail posterior to spine with black and white bands. Attains to 70 cm. Caught with lines. Frequently seen resting or swimming in sandy areas adjacent to reefs. Tropical Indo West Pacific. One of the most important of the rays in these islands, being frequently seen in the commercial catches.



Dasyatis kuhlii

11. *Himantura gerrardi* (Gray). **Sharpnose stingray** : Snout tip acutely pointed; disc slightly wider than long, mostly naked, with a mid-dorsal band of small flattened denticles in adults, extending onto tail base; tail length about twice disc; oral papillae 4. Colour light brown above, white below, numerous transverse bands of dark and light brown on tail. Attains 2 m. A common inshore stingray. Eastern cape to Natal and Mozambique; widespread in Indian Ocean and Western Pacific from Zanzibar, the Red Sea, India, Ceylon east to Indonesia, Japan, Philippines and Australia.



Himantura gerrardi

12. *Hypolophus sephen* (Forsskal). **Feathertail stingray** : Tooth rows about 20 in each row. Disc slightly wider than long, covered with small denticles in adults but partly or entirely naked in young; tail less than twice disc length. Colour disc dark brown or black above, white below; tail black, no conspicuous markings. Attains 3 m. South Africa and the Red Sea to Indonesia, Philippines, Australia, Micronesia and Melanesia.



Hypolophus sephen

Family CLUPEIDAE

Clupeoids are generally small silvery fishes that are easily recognized by their keel of scutes along the belly, and small, often poorly toothed mouths. Herrings and their relatives are of major importance of fisheries; they constitute about half of the worlds catch of fishes. Body fusiform, sub cylindrical or strongly compressed, maxilla not reaching past eye; teeth minute or absent; fins without spines; no lateral line. A valuable commercial fishery in Andaman and Nicobar islands. Pelagic, mainly inshore fishes, often-forming large and densely packed shoals, feeding on planktons. These fishes are very important as prey for larger fishes, particularly trevellies and tunas. They are caught by seines, trawls, gillnets, cast nets and, beach seines. Some 180 clupeid fishes of the world are described and placed in 56 genera. Of these, 33 species belonging to 14 genera have been reported from Indian waters.

13. *Anodontostoma chacunda* (Hamilton - Buchanan). **Chacundar gizzard-shard** : Body deep, almost oval, compressed; belly little rounded with scutes; mouth inferior; gill rakers on first arch about $\frac{1}{2}$ length of gill filaments; last ray of dorsal fin not filamentous. Body silvery, with a dark spot on shoulder. Attains 17 cm Fishing gear: caught with seines, shallow trawls and cast nets. Pelagic, in inshore waters. Pakistan, India, Srilanka, Thailand to Indonesia. Taken commercially in small quantities. Marketed mostly fresh and cured.



Anodontostoma chacunda, 155 mm, SL.

14. *Dussumieria acuta* Valenciennes. **Rainbow sardine** : Body elongate, moderately compressed; belly rounded, without scutes; snout pointed; scales thin and deciduous. Body iridescent blue - green on back, flanks golden fading to silvery. Attains 20 cm caught with seines, gillnets and shallow water trawls. Pelagic, in inshore waters. Widespread in Indo Pacific. Contributes a minor fishery in Andaman Islands. Taken commercially in small quantities. Marketed mostly fresh and cured.



Dussumieria acuta, 145 mm, SL.

15. *Herklotsichthys quadrimaculatus* (Ruppell). **Blueline herring** : Body fairly compressed; belly sharp, with row of keeled scutes; top of head with about 4 - 7 striae on each side; mouth terminal. Body blue green, flanks silvery with two orange spots behind gill opening and a blue midlateral band. Attains 14 cm Caught mainly with seines and trawls. Pelagic, in shallow waters. Widespread in Indo Pacific. Taken commercially, an important clupeiod in these islands. It also constitutes a minor fishery. Marketed mostly fresh and cured.



Herklotsichthys quadrimaculatus, 115 mm, SL.

16. *Ilisha megaloptera* (Swainson). **Bigeye ilisha** : Body much compressed, fairly deep; belly strongly keeled; teeth uniserial in both jaws; pelvic fins small, no axillary scale; swim bladder extending into muscles above anterior part of anal fin, with a single tube. Body dark grey, flanks silvery; margin of anal fin black; pectoral fins black tipped. Attains 28 cm Caught with seines, gillnets, lift nets and trawls. Pelagic in coastal waters. Pakistan, India, Srilanka to Indonesia. Taken commercially in small quantities. Marketed mostly fresh and cured.



Ilisha megaloptera, 185 mm, ST.

17. *Ilisha melastoma* (Schneider). **Indian ilisha** : Body strongly compressed; belly with strongly keeled scutes; lower jaw prominent; teeth minute, in a single series in jaws; pelvic fins very small, with no axillary scale; swim bladder extending into muscle above anterior part of anal fin by two extension. Attains 13 cm. Caught with seines, lift nets and trawls in shallow waters. Laccadive Sea, India, Srilanka. Taken commercially in small quantities. Marketed mostly fresh and cured.



Ilisha melastoma, 100 mm, SL.

18. *Pellona ditchela* Valenciennes. **Indian pellona** : Body fairly deep and compressed; belly with strongly keeled scutes; eye very large, lower jaw projecting; toothed hypo maxilla present in upper jaw; ventral fins slightly in advance of dorsal fin origin. Color back brown, flanks silvery. Attains 16 cm caught with seines, liftnets and trawls in shallow waters. Usually found in shallow coastal waters but sometimes abundant in creeks. Widespread in Indo Pacific. Taken commercially in small quantities. It constitutes minor fisheries. Marketed fresh and cured.



Pellona ditchela, 120 mm, SL.

19. *Sardinella albella* (Valenciennes). **White sardine** : Body fusiform and compressed; belly sharp with 17–18 pre pelvic and 12–14 post pelvic keeled scutes; gillrakers 40 to 65 on lower arm of first arch; dorsal fin origin slightly before midpoint of body; anal fin lying far behind dorsal fin; ventral fin below anterior part of dorsal fin base. Attains 10 cm. Caught with seines, gillnets and trawls in shallow waters. A schooling species, usually in coastal waters. Indo Pacific. This sardine is not abundant, occurs in small quantities along the coast of these islands.



Sardinella albella, 90 mm, SL.

20. *Sardinella fimbriata* (Valenciennes). **Fringescale sardine** : Body fusiform, compressed; belly sharp, with keeled scutes; scales cycloid, thin, and deciduous. Color back blue green, the flanks silvery. Attain 18 cm. caught with seines, gillnets and trawls in shallow waters. Pelagic, in shallow coastal waters. Indo Pacific. Commercially important species. Marketed fresh as well as dry salted.



Sardinella fimbriata, 110 mm, SL.

21. *Sardinella gibbosa* (Bleeker). **Goldstripe sardine** : Body fusiform, slightly compressed; belly with sharp keel of scutes; scales cycloid, thin, and deciduous. Back blue green; a thin yellow gold line along flank, silvery below; hind margin of caudal dusky. Attains 17 cm. Caught with seines and trawls. A pelagic schooling species, found in coastal waters. Widespread throughout Indo Pacific. Common in the commercial catches, forming a major fishery. Marketed fresh as well as dry salted.



Sardinella gibbosa, 125 mm, SL.

22. *Sardinella melanura* (Cuvier). **Blacktip sardine** : Body fusiform, slightly compressed; belly strongly keeled, with sharp pointed scutes; scales cycloid, thin, deciduous. Body blue - green above, flanks silvery; tips of caudal fin black. Attains 12 cm caught with seines, gillnets and trawls a coastal pelagic species, forming schools. Indo - West pacific the species forming schools but never abundant. Minor fishery importance in these Islands. Marketed mostly fresh and cured.



Sardinella melanura, 105 mm, SL.

23. *Sardinella sirm* (Walbaum). **Spotted sardine** : Body sub cylindrical; belly rounded; maxilla reaching to vertical from anterior margin of eye; dorsal fin origin a little before midpoint of body; anal fin base short and lying far behind dorsal fin base; ventral fins below anterior part of dorsal fin base; scutes not strongly keeled, 16 to 18 preentral; 42 to 45 scales along midline and 11 to 12 transverse scales; 38 to 42 gill rakers on lower limb. Body blue-green above and silvery on flanks, with 10 to 20 golden spots on flanks turning black or disappearing after death. Attains 23 cm. Caught with seines, gillnets and trawls in shallow waters schooling species, usually in coastal waters. Indo West Pacific. This clupeiod contributes a minor fishery along the coast of these islands.



Sardinella sirm, 120 mm, SL.

Family ENGRAULIDAE

Anchovies

Body sub cylindrical or compressed; snout prominent, projecting in front of lower jaw; mouth inferior; maxilla reaching past eye; teeth minute; fins without spines; scales cycloid, deciduous; no lateral line; small fishes; pale brown with silvery flanks; some species with silvery midlateral band along flanks. Pelagic, mainly inshore fishes; often forming dense shoals. Several genera and numerous species, represented in all warm seas. Caught mainly with gillnets, seines and trawls. Most species are caught in mixed catches and are mainly used for fishmeal. Some 139 anchovy species are presently recognized, placed in 16 genera; five genera with 35 species are reported from Indian waters.

24. *Stolephorus commersonii* Lacepede. **Commerson's anchovy** : Body fusiform, cylindrical; belly rounded 2 - 4 needle like scutes between pectoral and pelvic fins; snout prominent, rather pointed; maxilla long, its tip pointed; pelvic fin tip reaching beyond dorsal fin origin. A silvery stripe along flanks; a double pigment line on back before dorsal fin. Attains 10 cm. Caught with seines, gillnets and cast nets. Pelagic, in coastal waters. Indo-Pacific. Taken commercially in small quantities. Contributes a minor fishery. Marketed mostly fresh and cured and is a food fish of moderate value.



Stolephorus commersonii, 52 mm, SL.

25. *Stolephorus indicus* (Van Hasselt). **Indian anchovy** : Body sub cylindrical; belly rounded with usually 3–5 needle-like scutes before ventral fin; tip of upper jaw bluntly pointed, reaching only to front margin of preopercle. Body pale cream, a silvery stripe down flanks. Attains 15 cm a coastal pelagic species. Distribution : Indo–Pacific. Both fresh and dried used for the production of fishmeal.



Stolephorus indicus, 110 mm, SL.

26. *Thryssa hamiltonii* (Gray). **Hamilton's thryssa** : Body fusiform and compressed; belly keeled; snout prominent, bluntly rounded; maxilla short; tip of snout above level of eye center; anal fin origin just behind last dorsal ray. Body brown, flanks silvery; dark median bands or lines above. Attains 20 cm. Caught with seines, gillnets and trawls in shallow waters. Pelagic in coastal waters, also in creeks. Indo–West Pacific. Taken commercially in small quantities. A Common anchovy on the coast of these islands. Marketed mostly fresh and cured.



Thryssa hamiltonii, 115 mm, SL.

27. *Thryssa mystax* (Schneider). **Moustached thryssa** : Body fusiform, compressed; belly keeled; snout prominent, bluntly rounded; maxilla long, reaching to, or almost to first pectoral ray; mouth nearly horizontal. Body at back brown, flanks silvery. Attains 15 cm. caught with seines, gillnets and trawls in shallow waters. Pelagic in coastal waters, also in creeks. Pakistan, India, Srilanka, and the East Indies. This species is the common and most important element of the anchovies, which form an important fishery along the coast of these islands. Marketed mostly fresh and cured.



Thryssa mystax, 95 mm, SL.

28. *Thryssa setirostris* (Broussonet). **Longjaw thryssa** : Body fusiform and compressed; belly keeled; snout bluntly rounded; maxilla very long. Body at back brown, flanks silvery. Attains 15 cm. Caught with seines, gillnets and trawls in shallow waters. Pelagic in coastal waters also in creeks. Indo Pacific. Taken commercially in small quantities. Marketed mostly fresh and cured.



Thryssa setirostris, 120 mm, SL.

Family CHIROCENTRIDAE (Wolfherring)

Body elongate and highly compressed; belly without scutes; two large canines at front of upper jaw, pointing forwards; smaller canines behind them and in lower jaw; fins without spines; pelvic fins very small and about midway between pectoral base and anal fin origin; scales small, cycloid, usually shed; lateral line absent; caudal fin deeply forked. Pelagic inshore fishes, carnivorous; they are caught by gillnet, seines and shallow traps. Marketed fresh and salted-dried. One genus with two species recognized, both in the Indian region.

29. *Chirocentrus dorab* (Forsskal). **Dorab wolfherring** : Body elongate, strongly compressed; belly without scutes; mouth large; canine teeth in both jaws, two canine teeth at front of upper jaw, pointing forwards; pectoral length equal to distance from gill opening to about eye center; pelvic fins very small; scales small, deciduous. Body at back with bands of green and blue, shading through brassy gold to silvery on flanks; tip of dorsal and front of anal black. Attains 100cm. Caught with gillnets, seines and trawls in shallow waters Pelagic, inshore species. Widespread in Indo Pacific. This species contributes a minor fishery in these islands. Marketed fresh or salted-dried. Flesh delicate but very bony.



Chirocentrus dorab, 460 mm, SL.

30. *Chirocentrus nudus* Swainson. **Whitefin wolfherring** : Body elongate and strongly compressed; belly without scutes; mouth large; two large canines behind them and in lower jaw; pectoral length equal to distance from gill opening to mid snout; pelvic fins small; scales very small, easily shed. Colour back bluish-green, flanks silvery; dorsal and anal fins colourless. Attains 100 cm. Caught with gillnets, seines and trawls in shallow waters. Pelagic, inshore species. Indo Pacific. This species contributes a minor fishery in these islands. Marketed fresh or salted-dried. Flesh delicate but very bony.



Chirocentrus nudus, 520 mm, SL.

Family MEGALOPIDAE

Tarpons

Moderately deep bodied, fusiform fishes, resembling herrings but possessing a lateral line and lacking scutes along belly. A single dorsal fin with unbranched soft rays, last ray filamentous. Anal fin origin set a little behind last dorsal ray. Bony gular plate between arms of lower jaw. Pseudobranch (gill like structure on inner face of gill cover) absent. Scales large. Mouth small, toothless; epibranchial organs present; no fin spines; well developed scaly axillary process at base of pectoral and pelvic fins; eye covered with skin. This family comprises a single genus with two species; one species in the Indian region.

31. *Megalops cyprinoides* (Broussonet). Indo-Pacific Tarpon : Moderately deep bodied, fusiform fishes and lacking scutes along belly; mouth superior, upper jaw reaching almost to hind border of eye, lower jaw projecting slightly; single dorsal fin, the last ray a long filament; anal fin origin behind base of last dorsal ray; scales; lateral line present. Body blue-green on back and silvery on flanks. Attains 50 cm. A coastal pelagic species, ascending rivers. Taken commercially along the coasts of these islands.



Megalops cyprinoides, 380 mm, Sl.

Family CHANIDAE

Milkfish

Body elongate, moderately compressed; scales cycloid; head naked; mouth small; teeth absent; eye covered by skin; dorsal and anal fins with basal scaly sheath; large axillary scales above pectoral and pelvic fins; no fin spines. This family comprises a monotypic genus and one species; recognized in the Indian region.

32. *Chanos chanos* (Forsskal). **Milkfish** : Body torpedo shaped; no scutes along belly; mouth small, without teeth; eye greater than snout and interorbital; scales small, cycloid; head naked; caudal fin deeply forked. Body brilliant silvery, darker dorsally; caudal and anal margins dusky. Attains 180 cm. Caught with set nets, dragnets and on hook and line. This is a coastal species, entering mangrove swamps and fresh waters. Tropical Indo West Pacific. It is occasionally caught and sold fresh, flesh esteemed.



Chanos chanos, 370 mm, SL.

Family ARIIDAE (Sea catfishes)

Medium to large fishes; body elongate; snout and head rounded to depressed; teeth in jaws fine or granular; one pair of maxillary and two pairs of mandibular barbels; head rounded to depressed; some strong bony plates on head and near dorsal fin origin; a serrated spine in front of first dorsal and in each pectoral fin; adipose dorsal fin present. Dangerous fishes, as the hard fin spines that are covered by venomous mucus, inflict painful lacerated wounds. These fishes inhabit marine, brackish and fresh water of warm - temperate and tropical continental coasts. About 20 genera with about 120 species; six genera with 23 species in the Indian region.

33. *Arius subrostratus* Valenciennes. **Shovelnose Seacatfish** : Body elongate; head depressed, snout long and spatulate; three pairs of barbels around mouth, all shorter than the head; teeth villiform in one small patch on each side; dorsal fin spine strong; tip of dorsal fin often produced into a long filament in juveniles. Colour body silvery grey on back, lighter below. Attains 30 cm. caught with gillnets, bamboo-stake traps and with line gear. Lives close to the coast, in marine as well as in backwaters. Pakistan, India and Srilanka. Common in the commercial catches. Usually marketed fresh, but also dry salted.



Arius subrostratus, 220 mm, SL.

34. *Arius thalassinus* (Ruppell). **Giant marinecatfish** : Body elongate and robust; snout obtuse; mouth sub terminal; three pairs of barbels around mouth; head shield weakly striated and granulated, its surface smooth; teeth in jaws villiform, fine teeth on palate in three patches; dorsal fin with a long pungent spine; pectoral spine strong; adipose dorsal fin small. Colour reddish - brown above, densely pigmented, body with a bronze or silvery lusture with transverse iridescent cross-bands; all fins dark terminally. Caught with gillnets, with hand lines, long lines and on hook and line. A marine species often found in brackish waters. Widespread in the Indo Pacific region. This species may occur in large quantities and their flesh is said to be good. They are usually marketed fresh.



Arius thalassinus, 580 mm, SL.

Family PLOTOSIDAE (Eel catfishes)

These fishes have a slender, tapering eel like body. There are usually four pairs of barbels around the mouth. First dorsal fin short with a stiff spine anteriorly, second dorsal fin continuous with the caudal and anal fins. The pectoral fin is situated just behind the head and has a sharp stiff spine on its anterior edge. Both dorsal and pectoral fin spines are venomous and usually serrate and may inflict painful wounds. Gregarious in habitats. Plotosids are confined to the Indo Pacific region. There are about 8 genera and approximately 40 species; one genus with three species in the Indian region.

35. *Plotosus canius* Hamilton Buchanan. **Canine Catfish-eel** : Body elongate; head moderately large, its profile straight from tip of snout to dorsal fin; mouth transverse; barbels four pairs; maxillary barbels extend to the pectoral fin base; eyes small; large vermiform papillae on gill arches and gill filaments. Colour generally dark olive-green overhead and body; barbels and fins grey, first dorsal and pectoral fins darker. Attains 41 cm. Caught with seines, traps and on hook and line. Found in coastal waters, including mangrove creeks and backwaters. Indo Australian Archipelago to Philippine Islands.



Plotosus canius, 350 mm, TL.

36. *Plotosus lineatus* (Thunberg). **Striped catfish-eel** : Body elongate, eel like; dendritic organ present; four barbels around mouth; gill rakers 8 on upper and 20 - 22 on lower limb; caudal fin bluntly pointed, confluent with dorsal and anal fins. Body brown to black, shading to white on ventral surface, with two narrow white stripes on side. Attains 30 cm Caught with bottom trawls, seines, and traps and on hook and line. Found in coastal waters, including reef areas, tidal pools and mangrove areas. Juveniles are frequently encountered in tightly packed groups that swarm across the reef. Tropical Indo West Pacific. Do not form the object of a special fishery and some fishermen dread handling them. The flesh is said to be delicate in taste.



Plotosus lineatus, 125 mm, TL.

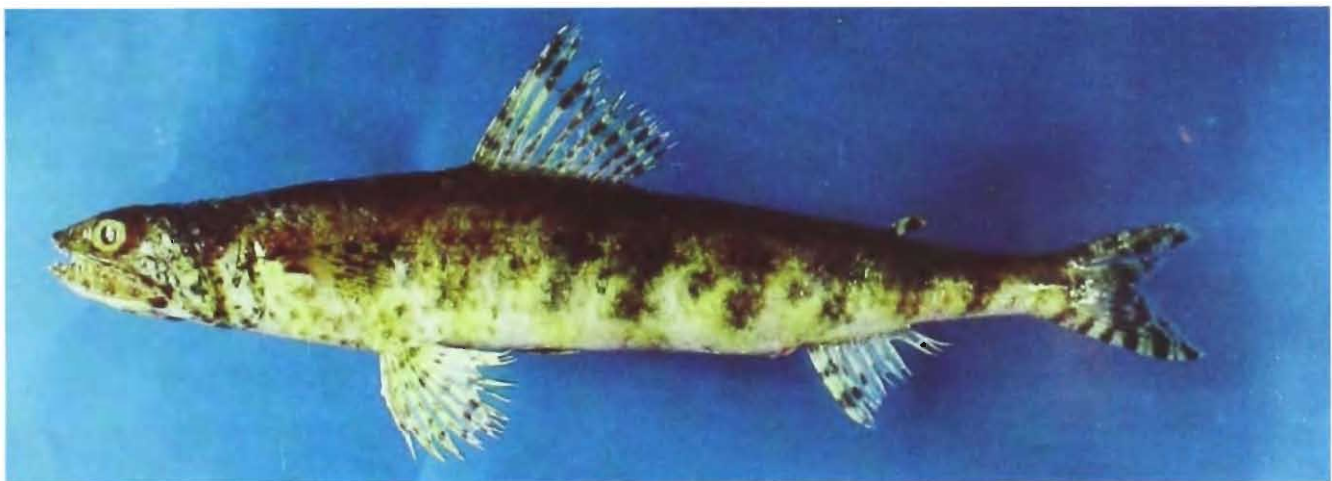
Family SYNODONTIDAE

Lizardfish's

Lizardfish's have a reptile like head with a large mouth and numerous slender sharp teeth; even the tongue has inward-directed teeth. Body fusiform; mouth large, with caniniform teeth along margins of both jaws; 2 or 4 groups of palatine teeth; no spines; pelvic fins with 8 or 9 rays; adipose dorsal fin small; caudal fin forked. They are bottom dwelling fishes, found around coral reefs and on open flats. There are 4 genera and 50 species; three genera with 18 species in the Indian region.

37. *Saurida gracilis* (Quoy and Gaimard). **Slender lizardfish** : Body elongate and cylindrical; mouth large; teeth in jaws in several series; teeth on tongue minute; pectoral reaches line from dorsal origin to ventral fin origin. Colour brownish-yellow above, silvery below; prominent dark blotches on dorso lateral part of body; no dark spots along upper edge of caudal. Attains 20 cm. Caught with seines and bottom trawls. Indo

West Pacific. This species is most abundant. Taken commercially only occasionally. It is marketed fresh or used for fishmeal.



Saurida gracilis, 180 mm, SL.

38. *Surida tumbil* (Bloch). **Greater lizardfish** : Body elongate and cylindrical; mouth large; teeth in jaws in several rows; pectoral fin reaching to level of pelvic fin base. Colour back and upper sides brownish, lower sides and belly white, mottled, with traces of faint darker cross bars on back; no spots on fins. Attains 40 cm. Caught with seines and bottom trawls. Lives over muddy bottoms. Tropical Indo West Pacific. Common in the commercial catches. It is marketed fresh or used for fishmeal.



Saurida tumbil, 215 mm, SL.

39. *Saurida undosquamis* (Richardson). **Brushtooth lizardfish** : Body elongate and cylindrical; mouth large; several rows of slender, pointed teeth in both jaws; pectoral fin reaches line from dorsal origin to ventral fin origin. Body brown-grey, lighter below, with a series of 8-10 dark blotches along lateral line; a series of dark spots along front edge of dorsal and upper edge of caudal fin. Attains 50 cm. Caught with seines and bottom trawls. Lives over muddy bottoms. Indo West Pacific. Taken commercially in small quantities. Marketed fresh or used for fishmeal.



Saurida undosquamis, 210 mm, SL.

40. *Synodus variegatus* Lacepede. **Variegated lizardfish** : Body elongate and cylindrical; mouth large; anterior nostril flap extends well past nostril margin when depressed anteriorly; pectoral reaches line from dorsal origin to ventral fin origin; no scales on cheek behind mouth. Body brownish-yellow, with a series of 8-9 dark brown saddle-like blotches. Attains 20 cm. Caught with seines and bottom trawls. Usually associated with coral reefs. Indo-West Pacific. Common in the commercial trawl catches. Marketed fresh or used for fishmeal.



Synodus variegatus, 180 mm, SL.

41. *Trachinocephalus myops* (Forster). **Bluntnose lizardfish** : Body elongate and moderately compressed; snout shorter than eye diameter; mouth larger with small close-set teeth; palatine teeth in a single band on each side; pectoral reaches line from dorsal origin to ventral origin. Head and back greenish-brown upper flanks with faint blue-green and yellow irregular longitudinal stripes; lower flanks and belly silvery. Attains 40 cm. Caught with seines and bottom trawls. Found in coastal waters over muddy bottoms. Tropical waters; along East coast to Knysna and in the Atlantic south to Luderitz, Namibia.



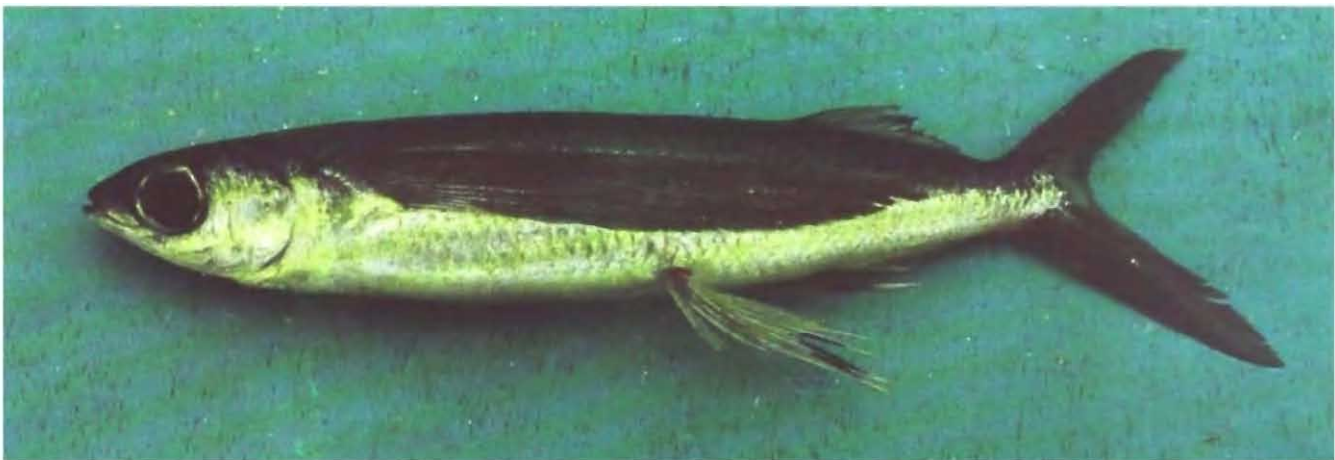
Trachinocephalus myops, 220 mm, SL.

Family EXOCOETIDAE

Flying fishes

Flying fishes are aptly named for their habit of emerging quickly from the water and gliding for long distances with their outstretched fins. Elongate fishes, their bodies broadly cylindrical, flattened ventrally in some species. Snout blunt; mouth small; jaw teeth absent or very small. No spines in fins; pectoral fins high on sides, striking long, always extending beyond dorsal fin origin. Lower lobe of caudal fin much longer. Flying fishes are primarily inhabitants of the open seas, but are often close to the outer edge of coral reefs over deep water. Important fisheries for flying fishes can be developed in these islands. The flesh is said to be excellent and highly nutritious. The family includes 8 genera and at least 60 species; five genera with twelve species in the Indian region.

42. *Cypselurus furcatus* (Mitchell). **Spotfin flying fish** : Body elongate, thick, somewhat flattened ventrally; pectoral fins large, reaching well beyond anal fin origin. Colour on back iridescent blue, belly silvery; dorsal fin not pigmented; pectoral fins greyish with a pale margin, the central portion crossed by a pale transverse stripe; pelvic fins without spots. Attains 30 cm. Caught with gillnets and dip nets. Pelagic in surface waters of the open ocean, capable of leaping out of water and gliding for long distance above the surface. Mostly Indian Ocean, also in Atlantic and Pacific Oceans.



Cypselurus furcatus, 240 mm, SL.

43. *Cypselurus oligolepis* (Bleeker). **Largescale flying fish** : Body elongate, thick, somewhat flattened ventrally; pelvic fins large, reaching well beyond anal fin origin. Body bluish brown above, silvery below; dorsal fin greyish; pectoral fins greyish-brown, their lower portion and hinder tip colourless; pelvic fins without spots. Attains 17 cm. Caught with shore seines and dip nets. Pelagic in surface waters of inshore areas. Indo West Pacific.



Cypselurus oligolepis, 140 mm, SL.

44. *Cypselurus spilopterus* (Valenciennes). **Indianspotted flying fish** : Body fairly robust, moderately compressed; teeth simple, in a few row in both jaws; a few teeth on each side of palatines; pectoral fins extending to posterior part of dorsal fin or further; pelvic fins longer than head length. Body black-bluish, silvery below; pectoral fins with numerous black spots; caudal fin dusky. Attains 28 cm. caught with gill nets and dip nets. Inhabits surface waters of open oceans. India and East Indies. Common on the coasts of these islands and is one of the large sized flying fishes of Indian waters.



Cypselurus spilopterus, 215 mm, SL.

Family HEMIRAMPHIDAE

Halfbeaks

The halfbeaks are elongate slender fishes that characteristically have the lower jaw extended into a long beak (except in few species). The upper jaw is short and triangular in shape. There are no spines in the fins. The dorsal and anal fins are posteriorly located with their bases about opposite one another. The pelvic fins are abdominal in position. The pectoral fins are high on the sides and of variable length. The caudal fin usually forked or emarginated. Most halfbeaks are marine and epipelagic, frequently occurring in schools. They are to leap and skitter at the surface. Caught with seines and pelagic trawls. These species are not of great commercial value but they are regularly found in markets. The flesh is said to be excellent quality. The family includes 12 genera and about 80 species; seven genera with 21 species in the Indian region.

45. *Hemiramphus far* (Forsskal). **Blackbarred halfbeak** : Body elongate and slender; upper jaw is short and triangular in shape, lower jaw extended into a long beak; caudal fin deeply forked, lower lobe longer than upper lobe. Body greenish-bluish on back and silvery on sides, with 4-6 dark vertical bars on sides. Attains 35 cm. caught with seines, pelagic trawls and dip nets. Indo-West Pacific. Not of great commercial value but are regularly found in local markets. The flesh is considered good eating.



Hemiramphus far, 250 mm, SL.

46. *Hyporhamphus dussumieri* (Valenciennes). **Dussumier's halfbeak** : Body elongate, almost cylindrical; upper jaw short, triangular; lower jaw about as long as head; pectoral fins short; caudal fin forked, lower lobe slightly longer than upper lobe. Body olive to bluish on back, silvery on sides. Attains 28 cm. caught with seines, pelagic trawls and dip nets. live near the surface, frequently occurring in schools. Indo West Pacific. Common in the catches.



Hyporhamphus dussumieri, 240 mm, SL.

47. *Rhynchorhamphus malabaricus* Collette. **Longbilled halfbeak** : Body cylindrical; nasal papilla fimbriate; upper jaw domed shaped, much longer than broad; caudal fin deeply forked, its lower lobe much longer than upper. Body greenish above silvery below, with a silvery stripe on sides of body. Attains 26 cm. caught mainly with shore-seine. Pelagic in surface waters of inshore areas. India and Srilanka of minor fishery importance.



Rhynchorhamphus malabaricus, 230 mm, SL.

Family BELONIDAE

Needlefishes

The needlefishes have very slender bodies and extremely elongate jaws with numerous needle like teeth. The fins lack spines. The dorsal and anal fins are posterior in position and the pelvic occur toward the end of the abdomen and contain six rays. Both upper and lower jaws extended into long beaks. The lateral line is low on the body, and the scales are small. They occur in marine as well as brackish waters. They are pelagic and able to leap out of the water and skitter on the surface. They are caught with lines and by trolling. Most species are found frequently in markets. The bones of some species are green and the flesh may be greenish, but this does not affect the edibility of these fishes. There are about 10 genera, with a total of 32 species; five genera with ten species in the Indian region.

48. *Ablennes hians* (Valenciennes). **Flat needlefish** : Body elongate and slender, greatly compressed laterally; upper and lower jaws greatly elongate and studded with small, sharp teeth; anterior part of dorsal and anal fins with falcate lobes; lateral keels absent on caudal peduncle; caudal fin deeply forked, the lower lobe much longer than upper. Color on back bluish green, sides and belly silvery, with 12-14 prominent dark vertical bars on sides of body. Attains 120 cm. Caught with lines and by trolling. Pelagic in marine as well as brackish waters. A worldwide species of tropical and temperate seas. Taken commercially only occasionally in the coast of these islands.



Ablennes hians, 525 mm, SL.

49. *Strongylura leiura* (Bleeker). **Banded needlefish** : Body slender and sub cylindrical; head large; both jaws long in adults; teeth sharp and needle like; caudal fin emarginate; lateral keel absent on caudal peduncle. Attains 90 cm. Caught with lines and by trolling. Pelagic in marine as well as brackish waters. Indo West Pacific. Taken commercially in small quantities.



Strongylura leiura, 310 mm, SL.

50. *Strongylura strongylura* (Van Hasselt). **Spottail needlefish** : Body elongate; upper and lower jaws greatly elongate and studded with sharp teeth; origin of dorsal fin above 4th ray of anal fin; caudal fin emarginate; no lateral keel on caudal peduncle. Body bluish-green above, silvery below, with a prominent black spot at base of caudal fin. Attains 40 cm. Caught with lines and trolling. Pelagic in marine as well as brackish waters. Indo - Pacific. Of minor fishery importance.



Strongylura strongylura, 305 mm, SL.

51. *Tylosurus choram* (Ruppell). **Ruppell's needlefish** : Body elongate, sub cylindrical; upper and lower jaws greatly elongated and studded with sharp teeth; teeth more or less straight; caudal fin forked; lateral line forming a narrow keel on caudal peduncle. Body bluish-green above, silvery below, with a silvery stripe along the sides. Attains 110 cm. Caught with lines and by trolling. Pelagic in marine waters. Taken commercially only occasionally.



Tylosurus choram, 625 mm, SL.

52. *Tylosurus crocodilus* (Person and Le Sueur). **Crocodile needlefish** : Body elongate and slender; upper and lower jaws greatly elongated and studded with sharp teeth; lower lobe of caudal fin much longer than upper lobe; prominent raised black keel on base of caudal fin. Body dark bluish-green above, silvery below; a dark blue stripe on middle of sides. Attains 130 cm. Caught with lines and trolling. Live at the surface. Tropical waters of Atlantic and Indo Pacific. Taken commercially in small quantities.



Tylosurus crocodilus, 850 mm, SL.

Family ATHERINIDAE

Silversides

Silversides are small schooling fishes, usually found inshore and sometimes over reefs. The body is elongate and somewhat compressed. Mouth small to moderate, never extending past vertical through middle of pupil. They have two dorsal fins, the first consisting of a few slender spines. The pelvic fins, which have one spine and five rays, are usually abdominal in position. There is no lateral line. They have a broad silvery stripe on the side. Of no great commercial value, but important as bait and forage fish for commercial species. About 29 genera with over 120 species around the world; three genera with six species in the Indian region.

53. *Atherinomorus lacunosus* (Forster). **Robust silverside** : Body robust; teeth in jaws small, villiform; dentary gently sloping upwards and backwards but never elevated posteriorly; caudal fin forked. Body greenish- grey on back, the scale edges dusky; a silvery stripe on the side, its upper edge with an iridescent blue line. Attains 13 cm. Caught with seines and gillnets. An inshore schooling species. Indo Pacific. Commercially taken in these islands.



Atherinomorus lacunosus, 105 mm, SL.

Family HOLOCENTRIDAE

Squirrelfish's

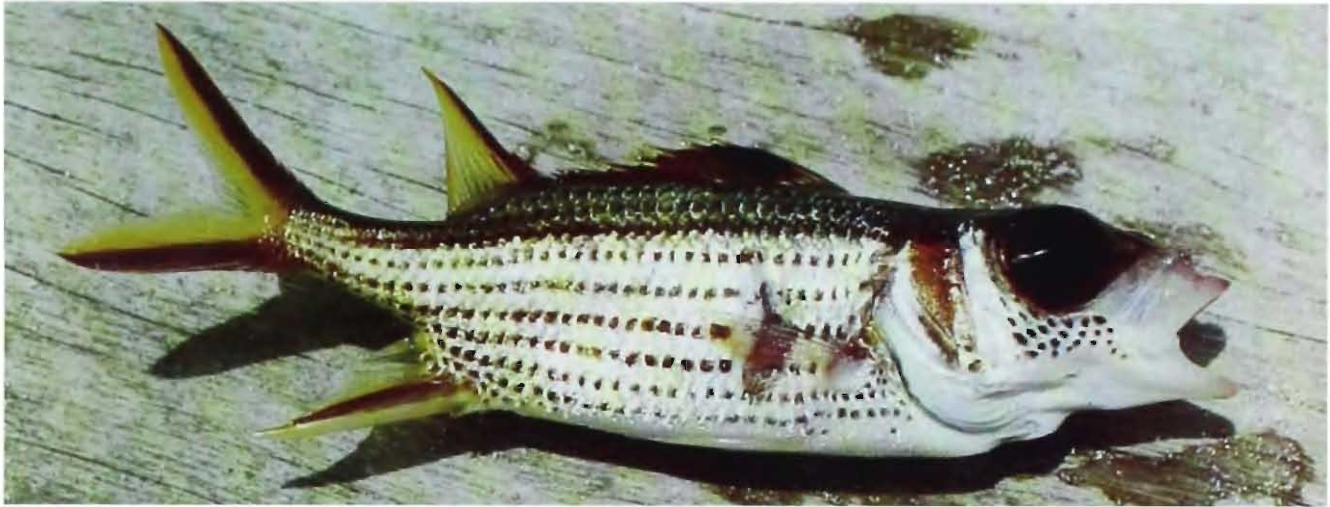
The fishes of this family are found on coral reefs or rocky bottom. They are very spiny, have large eyes and most are red. Body oblong to ovate, moderately compressed. The mouth is moderately large but the teeth are small. The caudal fin is forked. Tend to hide in caves during the day. The larger species of the family are good food fishes. Only occasionally caught in artisanal fisheries. Probably taken in gillnets and on hook and line. Eight genera with about 61 species; four genera with 19 species in the Indian region.

54. *Myripristis hexagona* (Lacepede). **Doubletooth soldierfish** : Body moderately deep; posterior edge of nasal fossa smooth or with a few small serrae; lower jaw prominently projecting; two pair of tooth patches, one above the other, at front of lower jaw outside the gape; vomerine teeth in a broad V shaped patch; numerous small scales on inner pectoral axil. Body light red to yellowish, the scale edges red; black of opercula membrane extending to or nearly to level of upper pectoral base; fins red, the leading edges white. Attains 20 cm. East Africa to Samoa.



Myripristis Hexagona, 120 mm, SL.

55. *Neoniphon sammara* (Forsskal). **Spotfin squirrelfish** : Body moderately elongate and compressed; lower jaw strongly projecting; two spines on the opercle; penultimate dorsal spine shortest. Colour pinkish silvery dorsally, silvery ventrally, with a dark red to black spot on each scale and large reddish stripe along lateral line; a large reddish black spot on first three dorsal fin membranes. Attains 30 cm. A common species of shallow protected reefs. Indo Pacific.



Neoniphon sammara, 210 mm, SL.

56. *Sargocentron caudimaculatum* (Ruppell). **Tailspot squirrelfish** : Body compressed; dorsal profile of head nearly straight; premaxillary groove not reaching or just reaching a vertical at front edge of eye; edge of nasal foss often with one or more spinules; preopercular spine about equal to eye diameter. Body red without stripes, the edges of the scales narrowly silver; a prominent silvery white spot behind rear base of dorsal fin. Attains 21 cm. probably taken in gillnets and on hook and line. Usually found in shallow waters and coral reefs or on rocky bottoms. Indo Pacific. Only occasionally caught in artisanal fisheries.



Sargocentron caudimaculatum, 180 mm, SL.

57. *Sargocentron rubrum* (Forsskal). **Redcoat soldierfish** : Body compressed; first sub orbital bone with a short lateral spine; nasal foss usually without spinules; preopercular spines above two- thirds eye diameter. Body with alternating brownish red and silvery white stripes of about equal width, the third and fourth and the fifth and red stripes converging posteriorly; spinous dorsal fin red with white tipped spines and a quadrangular whitish blotch on each membrane except the first. Attains 27 cm. Red Sea and East Africa to the Western Pacific.



Sargocentron rubrum, 195 mm, SL.

58. *Sargocentron spiniferum* (Forsskal). **Saber squirrelfish** : Body deep; dorsal profile of head nearly straight; lower jaw projecting when mouth closed; preopercular spine of adults longer than eye diameter; spinous dorsal membranes not incised. Body red, the edges of the scales silvery white; a large vertically elongate crimson spot on head behind eye; spinous portion of dorsal fin solid red. Attains 54 cm, the largest of the squirrelfish's. Indo Pacific.



Sargocentron spiniferum, 410 mm, SL.

Family PLATYCEPHALIDAE

Flatheads

As the common name suggests, their flattened head shape distinguishes these fishes. The flatheads have elongate, strongly depressed bodies. Mouth large, lower jaw, vomer and palatines, some times with canines. Flatheads have two dorsal fins. Bony ridges of head usually bearing spines or serrations. Lateral line complete. They are bottom – dwelling and occur primarily in the Indo-Pacific region. These fishes are seldom noticed due to their protective colouration and habit of burying themselves in the sand. Caught with bottom trawls. These species are only accidentally caught. Although quiet frequent in the catches, they are never in large quantities. Many species are excellent food fishes. Approximately 12 genera with a total of 60 species; eight genera 12 species described from India.

59. *Platycephalus indicus* (Linnaeus). **Indian flathead** : Body much compressed; ridges on head smooth; a single small preocular spine; two preopercular spines; vomerine teeth in a single patch; caudal fin truncate. Colour light olivaceous to light brown dorsally with numerous small blackish spots, white ventrally; caudal fin white and yellow with two or three black stripes. Attains 100 cm. Caught with bottom trawls. Bottom living fish, found in very shallow water on muddy, sandy shores or in mangrove areas. Central tropical Indo Pacific. This species are only accidentally caught. Although quite frequent in the catches, never in large quantities.



Platycephalus indicus, 670 mm, SL.

Family CENTROPOMIDAE

Seaperches

Body elongate or oblong, slightly compressed. Mouth large; teeth small, conical in jaws and on roof of mouth. Opercula with a single well-developed spine. Lower edge of peropercle serrated. Dorsal fin deeply notched into two fins. Caudal fin rounded. The barramundi is a popular table fish that inhabits coastal, mangrove and brackish waters. It does not occur in clear offshore reef areas. Caught mainly with bottom trawls, hand lines and bottom gillnets. Four genera with 18 species; two genera with two species in the Indian region.

60. *Lates calcarifer* (Bloch). Giant seaperch : Body elongate and compressed, with a deep caudal peduncle; head pointed, with concave dorsal profile becoming convex in front of dorsal fin; operculum with a small spine and with a serrated flap above beginning of lateral line; lower border of preoperculum serrated; mouth large; teeth villiform in jaws; tongue toothed; pectoral fins short and rounded; caudal fin rounded; scales large; dorsal and anal fins with a scaly sheath. Color : two phases, either olive brown above with silver sides and belly (usually juveniles) or green blue above and silvery below; no spots or bars present on fins or body. Attains 200 cm. Caught with hand lines and gillnets. Found in coastal waters and backwaters, mangrove areas. Indo Pacific. This is one of the most important food fishes of these islands. Marketed fresh.



Lates calcarifer, 480 mm, SL.

Family AMBASSIDAE

Glassfishes

Body oblong compressed. Dorsal fin deeply divided before last spine. Mouth fairly large. Operculum with a single, poorly developed spine. Caudal fin forked. Small, translucent, silvery fishes of shallow tropical waters throughout the Indo - Pacific region; common in brackish waters. Not of commercial importance, but useful as bait. Nine genera with about 41 species; four genera with 17 species in the Indian region.

61. *Ambassis commersoni* Cuvier. **Commerson's glassfish** : Body oblong and laterally compressed; supraorbital ridge smooth, terminating posteriorly in a single backwardly directed spine; mouth large and oblique; fine teeth in jaws. Body silvery with purplish reflections and bright silvery lateral band; membranes between 2nd and 3rd dorsal spines dusky. Attains 8 cm. Caught with seines, cast net in coastal water and mangrove areas. Indo Pacific. This species is fairly common along the coast of these islands.



Ambassis commersoni, 50 mm, SL.

Family SERRANIDAE

Subfamily Epinephelinae

Rockcods or Groupers

Body oblong to moderately elongate; mouth large, oblique; the lower jaw usually protruding; maxilla fully exposed on cheek when mouth closed; supramaxilla present; inner teeth on jaws depressible; no teeth on tongue; dorsal fin undivided, with 7–11 spines and 10–21 soft rays; anal fin with 7–10 soft rays; caudal fin emarginate to rounded (except in lunate in *Variola*) with 15 branched rays; soft dorsal, caudal and anal fins scaly. The Epinephelinae (rock cods or groupers) are generally demersal fishes of tropical and subtropical seas, ranging from shallow coastal waters to moderate depths. Some species prefer sea grass beds and mud or sandy bottoms, but most are fishes of coral reefs and rocky bottoms. Most of the rock cods appear to protogynous hermaphrodites, beginning life as females and then later changing sex to spawn as males. About 21 genera with some 170 species; nine genera with about 50 species in Indian waters.

62. *Aethaloperca rogaa* (Forsskal). **Redmouth grouper** : Body deep and compressed; mouth large; dorsal profile of head straight to eye, becoming convex on nape; 2–4 rows of teeth at side of lower jaw; palatine teeth present; pelvic fin long, reaching beyond anus. Body dark brown, inside of mouth and gill cavity scarlet. Caught with hook and lines and gill nets. Inhabits coral reef areas. Red Sea and Western Indian Ocean. Not common in the catches. Marketed fresh.



Aethaloperca rogaa, 400 mm, SL.

63. *Anyperodon leucogrammicus* (Valenciennes). **Slender grouper** : Body elongate and compressed; head pointed; mouth large and protractile; pair of canine teeth anteriorly in jaws; vomer toothed, no teeth on palatines. Body greenish to brownish grey with numerous orange-red spots on head, body, dorsal fin and basally on caudal fin; 4 longitudinal whitish streaks usually present on head and body. Caught with hook and lines and gill nets. Inhabits coral reef often found on protected than exposed reefs. Tropical Indo West Pacific. Excellent food fish. Marketed usually fresh.



Anyperodon leucogrammicus, 580 mm, SL.

64. *Cephalopholis argus* Bloch and Schneider. **Peacock grouper** : A small sized grouper with a stout body; mouth oblique, the lower jaw strongly projecting; teeth on midside of lower jaw of adults in 5 or 6 rows; pelvic fin short, not reaching anus; caudal fin rounded. Body dark brown with numerous small black edged blue spots on body, head and fins; usually 5-6 pale bars often present on posterior half of body; posterior margin of median, caudal and pectoral fins narrowly whitish. Caught with hook and line and gill nets. Inhabits shallow coral reefs and rocky areas. It is more often found on exposed than protected reefs. Indo Pacific. Excellent food fish. Usually marketed fresh.



Cephalopholis argus, 450 mm, SL.

65. *Cephalopholis boenak* (Bloch). **Chocolate grouper** : A small sized grouper with a stout body; mouth oblique; teeth fine, in bands in jaws with a pair of canine teeth anteriorly in jaws; minute teeth on vomer and palatines; pelvic fins usually not reaching anus; caudal fin rounded. Body brown with 8-9 slightly irregular reddish brown bars on body; fins dark brown; distal margin of caudal fin bluish white; inside of the mouth orange-red. Caught with hook and line and gill nets. Usually found on dead reefs in protected waters. Indo-West Pacific. Taken commercially on the coasts of these islands. Marketed mostly fresh.



Cephalopholis boenak

66. *Cephalopholis formosa* (Shaw and Nodder). **Bluelined grouper** : A small sized grouper with a stout body; mouth oblique, the lower jaw projecting; teeth in narrow bands in jaws with a pair of canines in front of each jaw; maxilla reaching posterior to orbit; pelvic fin just reaching anus; caudal fin rounded. Body dark Yellowish brown with slightly irregular narrow blue stripes on head, body and fins. Caught with hook and line and gill nets. Inhabits shallow waters of sheltered dead or silty reefs. Indo-West Pacific. Excellent food fish. Usually marketed fresh.



Cephalopholis formosa, 210 mm, SL.

67. *Cephalopholis miniata* (Forsskal). **Coral grouper** : A small grouper with a stout body; mouth oblique, the lower jaw projecting; teeth in narrow bands in jaws, with a pair of canines in front of each jaw; maxilla extending to posterior margin of eye or slightly beyond; pelvic fin not reaching anus. Body orange-red to reddish brown with numerous bright blue spots on head, body and median fins. Caught with hook and line and gill nets. Inhabits well developed coral reefs in clear water, more often on exposed than protected reefs. Indo West Pacific. Taken commercially in these islands. Excellent food fish. Marketed mostly fresh.



Cephalopholis miniata, 260 mm, SL.

68. *Cephalopholis sonnerati* (Valenciennes). **Tomato grouper** : A small sized grouper with a stout body; mouth oblique, the lower jaw projecting; teeth villiform in broad bands, with a pair of canines at symphysis of each jaw; small teeth on vomer and palatines; teeth absent on tongue; pelvic fins usually reaching or extending beyond anus; caudal fin rounded. Body orange-red to reddish brown, often with scattered small whitish blotches; head purplish to reddish brown with numerous close-set orange-red spots; pelvic fins often blackish distally. Caught with hook and line and gill nets. Inhabits coral reef areas. Tropical Indo West Pacific. Excellent food fish. Taken commercially in these islands. Marketed fresh.



Cephalopholis sonnerati, 170 mm, SL.

69. *Cephalopholis urodeta* (Forster). **Darkfin grouper** : A small sized grouper with a stout body; mouth oblique, the lower jaw projecting; maxilla extending well beyond posterior edge of eye; pelvic fins usually not reaching anus; caudal fin rounded. Body reddish brown; head and nape with numerous small close set orange spots; caudal fin dark reddish brown with numerous small pale blotches. Caught with hook and line and gill nets. Inhabits shallow water coral reef, usually found in outer reef areas. Indo Pacific. Occasionally seen in Markets. Usually marketed fresh.



Cephalopholis urodeta, 135 mm, SL.

70. *Epinephelus areolatus* (Forsskal). **Areolate grouper** : Body moderately elongate and compressed; interorbital space slightly convex; teeth on midside of lower jaw in two rows; caudal fin slightly emarginate to truncate; pectoral fins usually reaching anus. Body whitish with numerous close-set roundish to polygonal brown to yellowish spots on head, body and fins; spots in dorsal fin 2-4 rows; a distinct narrow white border posteriorly on caudal fin. Caught with hook and line and gill nets. Found in somewhat turbid water in sea grass beds or silty sand bottoms around isolated small rock outcrops, dead coral or soft coral. Indo West Pacific. Excellent food fish. Commercially important fish. Usually marketed fresh.



Epinephelus areolatus, 430 mm, SL.

71. *Epinephelus bleekeri* (Vaillant & Bocourt). **Bleeker's Grouper** : Body elongate; interorbital space slightly convex to nearly flat; operculum with a straight upper border and three flat spines; midside of the lower jaw with two rows of teeth, canines at front of jaws; caudal fin truncate. Body brownish to purplish gray with numerous small orange-yellow spots on head, body, dorsal fin and upper half of caudal fin; lower half of caudal fin and outer edge of anal fin purple-brown. Caught with hook and line and gill nets. Found in rocky bottoms and reef areas. Mauritius, Persian Gulf, India, Sri Lanka, Philippines, Thailand, Taiwan and China. Excellent food fish, fetching medium prices in local market. Usually marketed fresh.



Epinephelus bleekeri, 230 mm, SL.

72. *Epinephelus caeruleopunctatus* (Bloch). **Whitespotted grouper** : Body moderately elongate; head pointed, the dorsal profile nearly straight; 3–5 rows of teeth at side of lower jaw; opercular flap acute, the upper edge only slightly convex; pelvic fins short, the tips not approaching anus; caudal fin rounded. Body brownish gray, the body, posterior head and dorsal fin with scattered large whitish spots and numerous small pale spots; a series of indistinct dark blotches on back at base of dorsal fin and one on caudal peduncle; a broad black streak on upper edge of maxillary groove. Caught with hook and line and gill nets. Inhabits coral reef areas. Indo West Pacific. Excellent food fish. Common in the catches of these islands. Usually marketed fresh.



Epinephelus caeruleopunctatus, 580 mm, SL.

73. *Epinephelus chlorostigma* (Valenciennes). **Brownspeckled grouper** : Body elongate and laterally compressed; front of head pointed, the lower jaw strongly protruding; dorsal profile of head to nape straight; scales on flanks ctenoid with auxiliary scales; lower jaw with two rows of teeth at the sides; caudal fin slightly emarginate to truncate. Body whitish densely spotted with small dark brown spots on head, body and fins; rear edge of caudal fin usually with a narrow white margin. Caught with hook and line and gillnets. Inhabits shallow and deep waters of coral and rocky areas. Wide spread in the central tropical Indo West Pacific. Taken commercially. Excellent food fish. Usually marketed fresh.



Epinephelus chlorostigma, 510 mm, SL.

74. *Epinephelus coioides* (Hamilton). **Orangespeckled grouper** : Body elongate and not very compressed; interorbital space usually slightly convex; the maxilla extending to rear edge of eye; teeth on midside of lower jaw in 2 rows; pelvic fins not reaching anus; caudal fin rounded. Body light greyish-brown dorsally, shading to whitish on side and ventrally, with numerous brownish orange spots on head and body; 5 slightly diagonal grayish brown bars on head and body which bifurcate ventrally. Caught with hook and line and gill nets. Inhabits rocky and coral reef areas. It is often found in brackish areas. Indo West pacific. It is an important commercial fish. Usually marketed fresh.



Epinephelus coioides, 350 mm, SL.

75. *Epinephelus erythrurus* (Valenciennes). **Cloudy grouper** : Body moderately elongate; head pointed, the dorsal profile nearly straight; interorbital space flat to slightly convex; teeth on midside of lower jaw in 2 or 4 rows; pelvic fin short, not reaching anus; caudal fin rounded. Body olive to reddish brown usually with large and small pale spots on body, most of which are horizontally elliptical and often irregular; head with 2 dark bands across cheek and operculum; a dark streak at upper edge of maxillary groove. Caught with hook and line and gill nets. Inhabits coastal waters, mainly occur on muddy substrate. Indian Ocean. Excellent food fish. Usually marketed fresh.



Epinephelus erythrurus, 230 mm, SL.

76. *Epinephelus fasciatus* (Forsskal). **Blacktip grouper** : Body oblong and somewhat robust; interorbital space usually flat; midside of lower jaw with 2-4 rows of teeth; pelvic fins not reaching or just reaching anus; caudal fin slightly to moderately rounded. Body pale yellowish red with 5 red bands on body; margin of spinous dorsal fin black. Caught with hook and line and gill nets a common species of coral reefs and rocky bottom. Tropical Indo Pacific. Excellent food fish. Minor importance to fisheries. Usually marketed fresh.



Epinephelus fasciatus, 220 mm, SL.

77. *Epinephelus flavocaeruleus* (Lacepede). **Blue Yellow grouper** : Body moderately deep and compressed; interorbital space strongly convex; mouth strongly oblique; midside of lower jaw with 2 rows of teeth; pelvic fin not reaching anus; caudal fin truncate to slightly emarginate. Small adults deep blue, becoming yellow on lips, caudal peduncle and fins, large adults may lose the yellow coloration and become overall deep blue. Caught with hook and line and gill nets. Occurs in coral reef areas and on rocky bottoms. Indian Ocean. Excellent food fish. Usually marketed fresh.



Epinephelus flavocaeruleus, 310 mm SL.

78. *Epinephelus fuscoguttatus* (Forsskal). **Brownmarbled grouper** : Body moderately deep; dorsal head profile with an indentation above rear edge of eye; interorbital area flat; teeth on side of lower jaw in 3 rows; pelvic fin not approaching anus; caudal fin rounded. Body light yellowish brown with irregular blotches of variable size on head and body; a black saddle like spot on caudal peduncle; head, body and fins with numerous close - set small dark brown spots. Caught with hook and line and gill nets. Inhabits coral reefs and rocky substrata. Central Indo Pacific. Excellent food fish. Taken commercially in these islands. Usually marketed fresh.



Epinephelus fuscoguttatus, 325 mm, SL.

79. *Epinephelus lanceolatus* (Bloch). **Giant grouper** : Body robust and deep in large individuals; interorbital space flat to slightly convex; maxilla extending posterior to rear edge of eye; small canine teeth at front of jaws; pelvic fins short, not approaching anus; caudal fin rounded. Juveniles and sub-adults irregularly barred and mottled with dark brown and yellow, the fins yellowish with dark brown spots; adults dark greyish brown, mottled with pale; the fins with numerous small black spots. Caught with hook and line and gill nets. Inhabits coral reef areas and estuaries. Tropical Indo Pacific. Excellent food fish. Commercially important fish. Usually marketed fresh.



Epinephelus lanceolatus, 590 mm, SL.

80. *Epinephelus longispinis* (Kner). **Longspine grouper** : Body moderately elongate; interorbital space flat to slightly convex; 2 rows of teeth on midside of lower jaw; pelvic fins not reaching anus; caudal fin slightly rounded. Head and body pale brown with dark reddish brown spots that are round and well separated on head and front part of body, but become crowded and elongated to form short oblique streaks on rear part of body and peduncle. Caught with hook and line and gill nets. Generally occurs on coral reefs or rocky substrata. Indian Ocean from the Transkei to Indonesia. Excellent food fish. Marketed usually fresh.



Epinephelus longispinis, 510 mm, SL.

81. *Epinephelus macrospilos* (Bleeker). **Snubnose grouper** : Body moderately thick; dorsal profile of head with an angularity above anterior edge of orbit, giving a sub nose effect; snout short; interorbital space flat or slightly concave; teeth on midside of lower jaw in 2 rows; pelvic fins not reaching anus; caudal fin rounded. Large round to polygonal brown to dark brown spots on head and body; a narrow dark brown streak at upper edge of maxillary groove; fin yellowish with black spots, except pectoral fins without black spots or with only a few basally. Caught with hook and line and gill nets. Inhabits around coral reefs. Eastern Indian Ocean and Western Pacific. Excellent food fish. Usually marketed fresh.



Epinephelus macrospilos, 245 mm, SL.

82. *Epinephelus malabaricus* (Bloch and Schneider). **Malabar grouper** : Body moderately elongate and not very compressed; eye relatively small; interorbital space usually slightly convex; maxilla extending posterior to a vertical at rear edge of orbit; 2 rows of teeth on midside of lower jaw in sub adults, increasing to 4-5 rows in large adults; pelvic fins not approaching anus; caudal fin rounded. Body light greyish to yellowish brown with 5 slightly oblique broad dark brown bars on body which tend to bifurcate ventrally and may contain pale areas; head and body with numerous small well separated black spots and scattered larger pale spots and blotches; a dark streak usually present at upper edge of maxillary groove; fins with scattered small black spots. Caught with hook and line and gill nets. Occurs on protected reefs and creeks. Tropical Indo West Pacific. Excellent food fish. Fairly common in the commercial catches. Usually marketed fresh.



Epinephelus malabaricus, 480 mm, SL.

83. *Epinephelus merra* Bloch. Dwarfspotted grouper : A fairly small grouper; interorbital space flat to slightly convex; maxilla reaches past eye; 2 rows of teeth on midside of lower jaw; pelvic fins usually not reaching anus; caudal fin rounded. Body whitish to light brown with numerous close-set round to hexagonal dark brown spots, a few spots joined to form diagonal dark bands; spots on head progressively smaller anteriorly; black spots on pectorals, small throughout and largely confined to rays. Caught with hook and line and gill nets. Inhabits shallow water usually found around coral knolls in protected waters such as lagoons or bays. Tropical and sub-tropical Indo Pacific. Excellent food fish. Very common in the commercial catches. Usually marketed fresh.



Epinephelus merra, 220 mm, SL.

84. *Epinephelus ongus* (Bloch). Specklefin grouper : Body oblong and laterally compressed; interorbital space flat to slightly convex; 2-4 rows of teeth on midside of lower jaw; pelvic fins short, not reaching anus; caudal fin rounded. Body brown with numerous small white spots on body which tend to form irregular horizontal rows and may coalesce into narrow stripes; a prominent black streak at upper edge of maxillary groove; median fins grayish brown, finely spotted with white; the soft portions of the dorsal, anal and the posterior edge of the caudal with a narrow white margin and a blackish sub marginal band. Caught with hook and line and gill nets. It is a shallow water species of coral reefs and rocky substrata. Western Indian Ocean to Western Pacific. Excellent food fish. Usually marketed fresh.



Epinephelus ongus, 270 mm, SL.

85. *Epinephelus polyphekadion* (Bleeker). **Camouflage grouper** : Body moderately deep; dorsal head profile smoothly convex; interorbital area flat; anterior nostrils sub equal to posterior; flank scales ctenoid, with auxiliary scales; maxilla reaches well past eye; 2 or 3 rows of teeth at side of lower jaw; pelvic fins not reaching anus; caudal fin rounded. Head, body and fins brownish, covered with small dark spots (smaller than pupil) head and body with more or less distinct, dark blotches; a prominent black saddle like spot dorsally on caudal peduncle; all fins with numerous small dark brown spots, those on pectoral fins very small and mainly on rays. Caught mainly on hook and line and gill nets. This species is usually found in clear water on coral reefs, both in lagoons & outer reef areas. Indo Pacific. Commercially important in these Islands. Marketed mostly fresh.



Epinephelus polyphekadion, 480 mm, SL.

86. *Epinephelus polystigma* (Bleeker). **Whitedotted grouper** : Body moderately elongate; dorsal profile of head to above preopercle nearly straight; snout short; interorbital space flat to slightly convex; maxilla extending posterior to a vertical at rear edge of orbit; teeth in jaws very small; caudal fin rounded; pelvic fins of adults not reaching anus. Adults dark brown, the head, body and all fins except the pelvic with white dots; soft portions of dorsal and anal fins and posterior caudal and pectoral fins with a narrow orange-red margin. Caught on hook and line and with gill net. It is generally found in sheltered bays & creeks. Indonesia, Papua New Guinea, Solomon Ids. Philippines. Excellent food fish. Usually marketed fresh.



Epinephelus polystigma, 355 mm, SL.

87. *Epinephelus radiatus* (Day). **Obliquebanded Grouper** : Body compressed; head large; interorbital space nearly flat; two rows of teeth on midside of lower jaw; caudal fin slightly or moderately rounded. Body pale greyish brown to yellowish brown with five irregular oblique dark edged brown bands with scattered small dark brown spots and pale blotches; fins pale except for extensions of bands and associated spots into dorsal fin and small dark brown spots and irregular lines basally in caudal fin. Attains 70 cm. Deep dwelling species in rocky areas. Indo West Pacific.



Epinephelus radiatus, 425 mm, SL.

88. *Epinephelus tauvina* (Forsskal). **Greasy grouper** : Body elongate; maxilla reaches well past eye; 3–5 rows of teeth at side of lower jaw; upper margin of operculum moderately convex, the opercular flap pointed; caudal fin rounded. Body greyish to pale brown dorsally, shading to whitish ventrally, with numerous roundish orange-red to dark red-brown; five faint, oblique dark bars may be visible on body; blackish blotch usually present at base of last four dorsal spines and extending into fin; dark spots on soft dorsal, caudal and anal fin. Caught with hand lines and long lines, traps and gill nets. Mainly found in coral reef areas. Widespread in the tropical Indo Pacific. Excellent food fish. Usually marketed fresh.



Epinephelus tauvina, 600 mm, SL.

89. *Epinephelus undulosus* (Quoy and Gaimard). **Wavylined grouper** : Body moderately deep and compressed; interorbital space convex; 2 rows of teeth on midside of lower jaw; pelvic fins reaching anus; caudal fin truncate to slightly emarginate. Body purplish to brownish gray with yellowish brown dots on head and slightly wavy longitudinal yellowish brown lines on body (lines usually lost on large adults); spinous dorsal fin narrowly blackish. Caught with hook and line. Inhabits coral reef and rocky areas. Indo West Pacific. Excellent food fish. Usually marketed fresh.



Epinephelus undulosus, 310 mm, SL.

90. *Plectropomus areolatus* (Ruppell). **Squaretail coraltrout** : Body elongate; interorbital space flat except at edge of orbit where rounded; a pair of canine teeth at front of both jaws; side of lower jaw with two enlarged canine teeth; opercle with three flat spines; pelvic fins short; caudal fin truncate to slightly emarginate. Body brownish-red with numerous round to slightly oblong dark edged blue spots on head, body and fins; pectoral fins with small dark edged blue spots; pelvic fins with a few small dark-edged blue spots on the base of ventral surface. Attains 750 mm; common between 200 600 mm. Caught with hook and line and gill nets; found in coral reef areas. Indo Pacific. Excellent food fish. Usually marketed fresh and exported in frozen form.



Plectropomus areolatus, 650 mm, SL.

91. *Plectropomus maculatus* (Bloch). **Spotted coraltrout** : Body elongate; interorbital space flat except at edge of orbit where rounded; a pair of stout canine teeth at front of both jaws; side of lower jaw with 2 enlarged canine teeth; opercle with 3 flat spines; pelvic fin short; caudal fin emarginate. Body orange-red with dark-edged blue spots on head, body and median fins; usually a single blue spots dorsally on pectoral fin base and another in axil; no blue spots on pelvic fins; a narrow whitish margin posteriorly on caudal fin. Caught with hook and line and gill nets. Inhabits in coral reef areas. Excellent food fish. Usually marketed fresh.



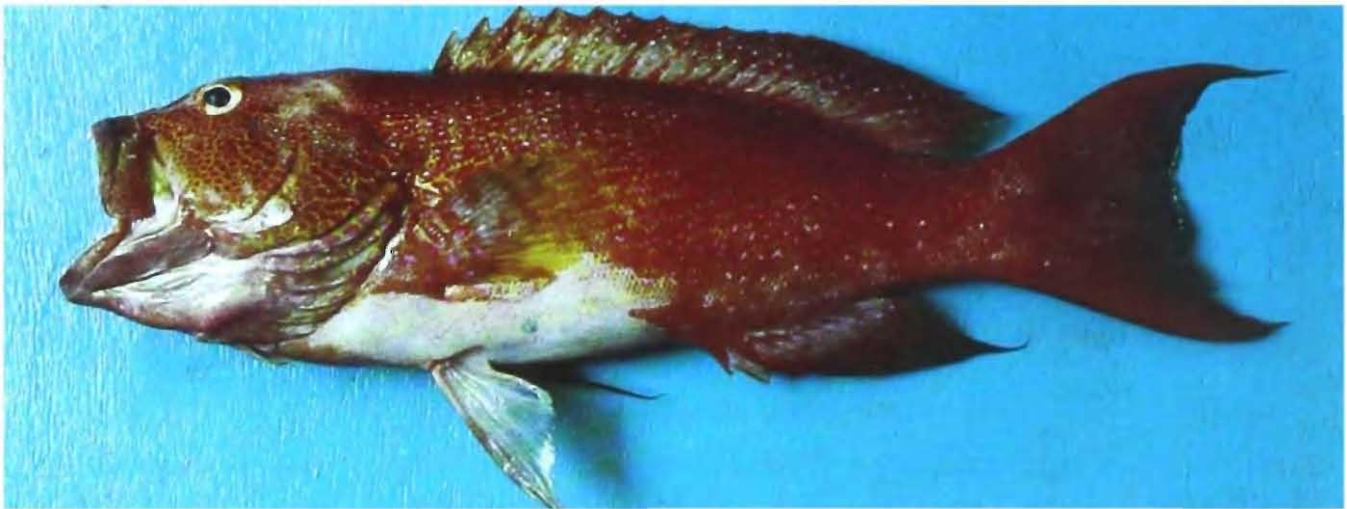
Plectropomus maculatus, 610 mm, SL.

92. *Plectropomus pessuliferus* (Fowler). **Roving coraltrout** : Body elongate; interorbital space flat except at edge of orbit where rounded; a pair of stout canine teeth at front of both jaws; side of lower jaw with 2 enlarged canine teeth; opercle with 3 flat spines; pelvic fin short; caudal fin emarginate. Body brown to orange-red with numerous small dark-edged blue spots on head, body and fins; some spots on side of body of adults vertically elongate, and some on head diagonally elongate. Caught with hook and line. Found in coral reef areas. Indo Pacific. Excellent food fish, usually marketed fresh.



Plectropomus pessuliferus, 610 mm, SL.

93. *Variola albimarginata* Baissac. **Yellow-edge Lyretail** : Body elongate; interorbital space slightly convex; 1–2 large canine teeth on midside of lower jaw, in addition to band of villiform teeth and anterior pair of canines; pelvic fin usually not reaching anus; caudal fin lunate. Body with irregular horizontal to oblique red bands alternating with narrower yellow lines, the red bands containing small irregular pink spots; head orange-yellow with numerous small pale blue to pink spots; caudal fin with a narrow hyaline margin centro posteriorly. Caught with hook and line and gill nets. Found in coral reef areas. Indo–West Pacific. Excellent food fish. Usually marketed fresh.



Variola albimarginata, 430 mm, SL.

Family TERAPONIDAE

Grunters

These are small, generalized percoid fishes with an oblong to ovate shape and somewhat compressed body. The opercle has two spines. Dorsal fin continuous, more or less deeply notched in front of soft-rayed part. Caudal fin truncate to shallowly forked. Jaws with villiform teeth in bands, with outer teeth enlarged; no canines. The lateral line is complete and extends a short distance onto the caudal fin. Species of this family inhabit inshore waters and some are common in brackish water. They are likely to be caught with many types of inshore artisanal fishing gear, including gillnets, hook and line, hand lines and bottom trawls. They are good food fishes and they are rather common in the catches. None of these species, however, is important enough to support a special fishery. The family contains 15 genera and 37 species and is confined to the Indo Pacific region; two genera with four species in the Indian region.

94. *Pelates quadrilineatus* (Bloch). **Fourlined terapon** : Body well compressed; preoperculum serrated; upper jaw well advanced of eye; lower opercular spine not extending beyond edge of opercular membrane; last two dorsal spines sub equal; second and third anal spines sub equal and shorter than anal soft ray; caudal fin slightly emarginate. Silvery grey dorsally, silvery white ventrally, with four to six dark brown stripes on body; a large dusky blotch usually present anteriorly on body above gill opening. Attains 20 cm. Caught with gillnets, hand lines and in bottom trawls. Occurs in inshore waters, often in backwaters. Indo Pacific.



Pelates quadrilineatus, 152 mm, SL.

95. *Terapon jarbua* (Forsskal). **Jarbua terapon** : A small species; body deep, somewhat compressed; upper jaw extending to below middle of eye; preorbital finely serrated; preoperculum serrated; opercles has two strong and pointed spines; caudal fin emarginate. Silvery white with three upward curved stripes on sides; spinous dorsal fin with large black blotch; several black stripes on caudal fin. Attains 32 cm. Caught with all types of inshore fishing gear, including gillnets, hand lines and bottom trawls. Found in inshore waters and mangrove areas. Indo Pacific. Good food fishes and is rather common in the catches.



Terapon jarbua, 235 mm, SL.

96. *Terapon theraps* Cuvier. **Largescale terapon** : A small species; body deep, compressed; upper jaw extending to below anterior third of eye; lower opercular spine extending posterior to opercular membrane; penultimate dorsal spine longest, but shorter than longest anal soft ray; caudal fin slightly forked. Silvery grey dorsally, shading to silvery white on sides and ventrally, with four broad dusky to blackish stripes; a large black spot on outer part of dorsal fin between third and sixth spines; caudal fin five blackish stripes, the upper at tip of lobe. Attains 30 cm. Caught with all types of inshore fishing gear, including gillnets, hand lines and bottom trawls. Found in inshore areas, often found in mangrove areas. Indo Pacific.



Terapon theraps, 135 mm, SL.

Family PRIACANTHIDAE

Big eyes

They have a relatively deep and compressed body. Eyes are large; very oblique mouth with strongly projecting lower jaw; small conical teeth in a narrow band in jaws. Pectoral fins small; pelvic fins large, which are joined to the abdomen by a membrane; caudal fin truncate or lunate. They are all or partly red. Big eyes are found near the bottom in rocky areas or reefs of tropical and temperate regions. The species of the family are of minor fishery value being caught in the trawl catches. The family contains three genera and about 12 species; all three genera with five species in the Indian region.

97. *Heteropriacanthus cruenatatus* (Lacepede). **Glass bigeye** : Body deep and compressed; mouth oblique; lower jaw strongly projecting; border of preopercle broadly scale less; a flat spine at corner of preopercle extending nearly to edge of operculum; pelvic fins not very long; caudal fin truncate, slightly rounded. Colour variable, silvery pink, mottled red, or solid red. Attains 32 cm. Caught with gillnets and hand lines. Inhabits shallow reefs. Circumglobal in tropical and subtropical seas.



Heteropriacanthus cruenatatus, 250 mm, SL.

98. *Priacanthus hamrur* (Forsskal). **Duskyfin bigeye** : Body ovoid, strongly compressed; eyes large; normally short blunt spine at angle of preoperculum, disappearing with age; pectoral fins shorter than pelvic spine; pelvic fins long, reaching end of spinous portion of anal fin; caudal fin emarginate. Colour usually uniform red to deep red with dark margins of otherwise dusky caudal, anal and ventral fins; black spot at base of ventral fins. Attains 40 cm Indo Pacific



Priacanthus hamrur, 270 mm, SL.

Family SILLAGINIDAE

Silver sillago

Rather elongate cylindrical body with fairly small scales. Small mouth with fine teeth in bands in jaws and on vomer; none on palatines; two dorsal fins. Caudal fin emarginate. Shallow water species of the tropical Indo West Pacific; often found in creeks and brackish water. Caught with beach seines and hand lines. The flesh is said to be excellent. They form a small but important fishery in these islands. The family contains three genera and about 25 species; two genera with 10 species in the Indian region.

99. *Sillago sihama* (Forsskal). **Silver sillago** : Body cylindrical; snout pointed; upper profile of head slightly convex; preopercular margin serrated; eye about half snout; small, backwardly directed spine on operculum; teeth in a broad, villiform band; vomer toothed, but palatines and tongue toothless. Colour silvery, olive-gray above, and with indistinct, silvery-yellow mid-lateral band; soft dorsal with rows of darker spots. Attains 25 cm. Caught with beach seines and hand lines. Inhabits shallow sandy bottoms of shores and bays, also in creeks. Supports fishery along the coast of these islands and it is an important food fish of delicate flavour.



Sillago sihama, 150 mm, SL.

Family LACTARIIDAE

False trevally

Body oblong, strongly compressed. Upper and lower profiles similar. Mouth large, oblique and with two small, sharp canine teeth at front of each jaw. Two dorsal fins, the first spinous, the second with one spine and 20–22 soft rays. Caudal fin forked. Usually found in coastal waters in sandy bottoms. Caught mainly with bottom trawls and seines. A popular fish sold fresh or dried salted. One monotypic genus.

100. *Lactarius lactarius* (Schneider). False trevally : Body oval, strongly compressed; head large, oblique; prominent lower jaw; upper jaw reaches below hind half of pupil; teeth small in jaws with a pair of small, sharp, symphyseal canines at front of each jaw. Colour body silvery-gray with blue iridescence above and silvery white below; dusky spot on upper part of gill cover; fins all pale-yellow. Attains 40 cm Caught mainly with bottom trawls and seines. Inhabits sandy bottoms in coastal waters. Tropical Indo West Pacific. A popular fish sold fresh or dried salted.



Lactarius lactarius, 185 mm, SL.

Family ECHENEIDAE
Suckerfishes

The body is slender. Head flattened on top and bearing a laminated adhesive disc, which represents a modification of the spinous dorsal fin. The second dorsal and anal fins are similar in shape and opposite one another. Formed in shallow, coastal waters, often free swimming but will attach temporarily to a wide range of host such as sharks, rays, sea turtles, whales, dolphins and ships. Caught mainly with hand lines, but more often captured attached to the body of its host. Of little commercial interest, but sometimes taken in coastal fisheries along with other species, and sold in local markets; four genera with a total of eight species; all four genera with five species in Indian waters.

101. *Echenis naucrates* Linnaeus. Slender suckerfish : The body is slender; distinctive flat head with sucking disc of 21–27 transverse laminae; lower jaw projecting; caudal fin slightly rounded. Colour grey with a white-edged black stripe on side from tip of lower jaw through eye to caudal fin, this stripe broadest anteriorly on body. Attains 100 cm. Caught mainly with hand lines, but more often captured attached to the body of its host. Formed in shallow, coastal waters, often free swimming but will attach temporarily to a wide range of host such as sharks, rays, bony fishes, turtles, whales and dolphins. Of little commercial interest, but sometimes taken in coastal fisheries along with other species, and sold in local markets.



Echenis naucrates, 790 mm, SL.



Dorsal view of head to show sucker

Family CARANGIDAE

Trevallis

In carangidae the body shape ranging from elongate and fusiform to deep strongly compressed; eyes are lateral and scales usually small; lateral line arched in front and posteriorly covered often by shield like scutes; mouth moderate; caudal peduncle slender and caudal fin deeply forked; body shape and colour pattern of these fishes change so much with growth. The members of the family are generally silvery colour and exhibit a wide size range. The Giant trevally (*Caranx ignobilis*), which grows to 170 cm and may weigh over 35 kg. The jacks of travallies are a large family represented in all tropical and temperate seas. They are carnivorous fishes, usually occurring in schools and few found in the open sea, but the majority occurs in the vicinity of reefs. Most of the trevallies are highly esteemed as food fishes and therefore they are targeted by commercial fishermen and constitute of significant importance to the fisheries of these islands. About 25 genera with a total of 140 species; nineteen genera with 53 species in Indian waters.

102. *Alectis ciliaris* (Bloch): **Threadfin trevally** : Body strongly compressed and deep; profile of nape and head broadly rounded; teeth in villiform band in jaws; body superficially naked, scales minute and embedded; anterior dorsal and anal fin rays extremely long and filamentous in young and juveniles. Body silvery, with light metallic bluish tinge dorsally; small, diffuses, dark opercular spot in adults; pectoral fins outer edge dusky. Juveniles with 5 dark bands on body. Attains 130 cm. Caught with hook and line (adults), with beach seines (Juveniles). Found in shallow coastal waters. World wide in tropical marine waters. Marketed mostly fresh; flesh being highly appreciated.



Alectis ciliaris, 180 mm, SL.

103. *Alectis indicus* Ruppell. **Indian threadfish** : Body strongly compressed; head profile almost vertical, with a marked hump above eyes; teeth in villiform bands in jaws; body superficially naked, scales minute and embedded; lateral line strongly arched and armed with 6–10 weak scutes. Body mostly silvery, with dusky, green tinge dorsally; small diffuse, dark opercular spot; juveniles with 5–7 broad dark bands. Attains 150 cm. Taken on hook and line (adults), in beach seines (juveniles). Adults are in large schools, mainly in coastal waters. Indo–West Pacific. Marketed mostly fresh, commercially taken in these islands.



Alectis indicus, 250 mm, SL.

104. *Alepes djedaba* (Forsskal). **Shrimp Scad** : Body compressed and oblong; both jaws with a single row of numerous comb like teeth; adipose eyelid well developed only on rear half of eye; Caudal fin forked; lateral line strongly arched and 37–50 scutes. Body bluish above, silvery below, with a distinct dusky spot on upper edge of operculum; caudal yellowish. Attains 30 cm. Caught with hook and line gillnets. Common near inshore reefs, often in large schools. Tropical Indo–West Pacific. Taken commercially in these islands. Marketed mostly fresh, also dry salted.



Alepes djedaba, 210 mm, SL.

105. *Atule mate* (Cuvier). Yellowtail scad : An oblong and moderately compressed carangid; terminal dorsal and anal rays finlet like in large adults but joined basally to adjacent rays by inter-radial membranes; both jaws with single series of small, conspicuous teeth; upper jaw with 2 to 3 rows of small canines anteriorly; adipose eyelid completely covering eye except for a vertical slit centered on pupil; straight scutes. Body olive green dorsally, shading to white ventrally; black opercular spot; dorsal and caudal fins dusky greenish yellow. Attains 30 cm. A schooling species, found in shallow coastal waters. Caught in trawls, on hook and line and various types of artisanal gear. Widespread in Indo West Pacific eastward to Hawaiian Islands.



Atule mate, 195 mm, SL.

106. *Carangoides caeruleopinnatus* (Rupell). Coastal trevally : Body strongly compressed; nape becoming increasingly elevated with age; teeth in jaws in viliiform, outer row enlarged; pectoral fin falcate; breast naked to behind ventral origin and usually laterally to pectoral base; Soft dorsal lobe filamentous in juveniles; lateral line with 18–28 small scutes. Body bluish green above, silvery below; sides with numerous small yellow spots; small black opercular blotch; tips of fins dusky. Attains 40 cm. Caught with bottom trawls, on hook and line and in gillnets. Commonly found. East coast of Africa, Red sea, Durban northward and eastward to Japan and Australia, South West Coast of India. Taken commercially in these islands. Marketed mostly fresh.



Carangoides caeruleopinnatus, 295 mm, SL.

107. *Carangoides fulvoguttatus* (Forsskal). **Goldspotted Trevally** : Body compressed arched portion of lateral line slightly longer than straight part; adipose eyelids obsolete; mouth cleft level with or slightly below lower edge of eye; both jaws with bands of villiform teeth; tongue and roof of mouth toothed; caudal fin deeply forked. Body blue green above, silvery below, numerous small gold spots on sides Attains 100 cm. Indo Pacific.



Carangoides fulvoguttatus, 330 mm, SL.

108. *Carangoides hedlandensis* (Whitely). **Bumpnose trevally** : Body strongly compressed and very deep; adults with distinct bulge in interorbital region; teeth in jaws in narrow villiform bands; anterior soft rays of dorsal and anal fins strongly elevated and produced; breast naked to behind ventral origin and laterally to pectoral base; lateral line 18–27 weak scutes. Body greenish blue above, silvery below; blackish blotch on upper opercular margin; caudal yellowish. Caught with trawls, on hook and line and in gillnets. A coastal demersal species. Durban, Seychelles, eastward to Japan, Australia and Samoa, South and East Coast of India. This species is fairly common in the catches of these islands. Marketed mostly fresh.



Carangoides hedlandensis, 145 mm, SL.

109. *Carangoides humerosus* (Mc Culloch). **Epaulet trevally** : Body compressed, naked area of breast extending to but not above pectoral fin base; curved portion of lateral line gently arched and equal to or slightly longer than straight portion; scutes weak to moderate, 26 to 30; pectoral fins long and falcate, almost reaching junction of straight and curved parts of lateral line. Body green to bluish on back, silvery below; a large diffuse black spot on operculum; spinous dorsal fin black. Attains 25 cm. Indonesia, New Guinea and Northern Australia.



Carangoides humerosus, 210 mm, SL.

110. *Carangoids malabaricus* (Bloch). **Malabar trevally** : Body strongly compressed, head profile steep; teeth in jaws in villiform bands, the outer teeth some what enlarged; breast naked to behind ventral origin and laterally to pectoral base; soft dorsal lobes only slightly falcate, shorter than head; lateral line with 25 to 29 weak scutes. Body bluish green above, silvery below; small black opercular spot. Attains 28 cm. Caught in bottom trawls, on hook and line and with gillnets. A benthic, schooling species. Usually on rocky and coral reefs but also in shallow sandy bays. Tropical Indo West Pacific. This species common along the coastal waters of these islands. Marketed mostly fresh, flesh excellent.



Carangoides malabaricus, 230 mm, SL.

111. *Carangoides oblongus* Cuvier. **Coachwhip Kingfish** : Body compressed; breast naked to ventral origin, laterally naked area separated from naked pectoral base by broadband of scales; curved lateral line slightly shorter than straight lateral line. Body bluish-green above, silvery below; small dark blotches on back between bases of dorsal rays. Attains 45 cm. Most common over slightly deeper offshore reefs, large individuals usually solitary. Durban northward throughout Western Indian Ocean and from Japan to Australia and Eastward to the Fiji Islands.



Carangoides oblongus, 210 mm, SL.

112. *Carangoides uii* Wakiya. **Japanese trevally** : Body laterally compressed; lobe of second dorsal fin extremely elongate; breast naked ventrally to behind origin of pelvic fins; laterally naked base of pectoral fin; straight part of lateral line with 16 to 26 weak scutes. Body bluish grey above, silvery below; an indistinct, dark spot on opercle; spinous dorsal fin and lobe and margins of second dorsal fin dark. Attains 25 cm. Inhabits coastal waters of continental shelves. East Africa to Australia and Japan.



Carangoides uii, 125 mm, SL.

113. *Caranx ignobilis* (Forsskal). **Yellowfin trevally** : Body deep, slightly compressed and robust, head profile steep and strongly curved above eyes; pectoral fins falcate; breast naked ventrally, typically with a small patch of prepelvic scales; lateral line with 26–32 strong scutes. Adults mainly silvery grey to black above, usually paler below; no dark spot on upper end of opercle; fins grey to black. Attains 170 cm. Caught in bottom trawls, with hook and line and in gillnets. Abundant in all marine habitats. Tropical Indo–West Pacific. Taken commercially in these islands. Marketed mostly fresh.



Caranx ignobilis, 240 mm, SL.

114. *Caranx sexfasciatus* Quoy & Gaimard. **Bigeye trevally** : Body oblong and moderately compressed, its upper and lower profiles about equal; breast completely scaled; pectoral fins falcate, straight lateral line with 26–35 strong scutes. Adults iridescent blue-green above, shading to silvery white below; small blackish spot near upper end of opercle; Soft dorsal lobe with white tip; caudal fin dusky. Attains 78 cm. A reef associated species, but juveniles may occur in estuaries. Tropical Indo–Pacific. Taken commercially in these islands. Marketed mostly fresh.



Caranx sexfasciatus, 255 mm, SL.

115. *Caranx tille* Cuvier. **Tille trevally** : Body moderately compressed; lateral line becoming straight below 5th to 6th dorsal fin ray; upper jaw reaching to below posterior margin of eye; upper jaw with outer row of conical teeth and inner band of fine teeth; lower jaw with single row of conical teeth; fine teeth in roof of mouth; straight part of lateral line with 32 to 42 strong scutes; breast completely scaled. Adults dark olive green to bluish grey above, shading to silvery white below; a blackish spot, on upper part of opercle. Attains 80 cm. A coastal species preferring inshore waters. East Africa, Madagascar, Sri Lanka, Okinawa to Australia and Fiji.



Caranx tille, 350 mm, SL.

116. *Decapterus macrosoma* Bleeker. **Slender Scad** : Body fusiform and moderately compressed; rear end of upper jaw concave above, rounded and produced below; upper jaw without teeth; interorbital scales not extending forward beyond rear margin of pupil. Body metallic blue above, silvery below; caudal fin hyaline to dusky and caudal lobe dark distally; small black opercula spot. Attains 35 cm. A schooling species usually taken in trawl. Wide spread in Indo Pacific from Knysna northward also in tropical eastern Pacific.



Decapterus macrosoma, 140 mm, SL.

117. *Elagatis bipinnulata* (Quoy & Gaimard). **Rainbow runner** : Body cigar-shaped, with pointed head; mouth small; teeth in jaws in villiform bands; pectoral fins not falcate; anal base relatively short; breast scaled; lateral line, no scutes; caudal peduncle grooves present dorsally and ventrally; caudal fin forked. Body dark olive blue above, white below; two narrow blue stripes along sides, with a yellow stripe between them; fins with yellow tint. Attains 120 cm. Caught mainly on hook and line, also in gillnets, trawls and seines. A pelagic species, usually near the surface. Tropical Indo West Pacific. Taken commercially in small quantities. Marketed mostly fresh.



Elagatis bipinnulata, 500 mm, SL.

118. *Gnathanodon speciosus* (Forsskal). **Golden Trevally** : Body deep and compressed; adults without teeth; lips noticeably thick and flesh; breast completely scaled; pectoral fins falcate, longer than head; caudal fin deeply forked. Young and small adults bright yellow to silvery with 7–11 black bands, usually alternating broad and narrow; all fins yellow, with caudal tips black; adults with a few black blotches and bands on sides. Attains 110 cm. Caught mainly with gillnets. Found in coastal waters, including rocky reefs and deep lagoons. Tropical Indo Pacific. Taken commercially in these Islands. Marketed mostly fresh.



Gnathanodon speciosus, 300 mm, SL.

119. *Megalaspis cordyla* (Linnaeus). **Torpedo Scad** : Body elongate, torpedo shaped; adipose eyelid completely covering eye except for vertical slit centered on pupil; Straight lateral line with 52-58 very large scutes. Body bluish grey to green above, shading to silvery below; large, black opercular spot; fins dark. Attains 80 cm. Caught on hook and line, with beach seines and trawls. A pelagic, Schooling species. Tropical Indo West Pacific. Taken commercially in these islands. Marketed mostly fresh.



Megalaspis cordyla, 230 mm, SL.

120. *Scomberoides commersonianus* Lacepede. **Talang queenfish** : Body compressed and elongate; maxilla extends well beyond eye in adults; scales on mid body oval shaped; posterior soft dorsal and anal of semi detached finlets; lateral line slightly wavy anteriorly, scutes absent. Body dusky green above, silvery or golden yellow below; adults with 5 to 8 large oval blotches above or touching lateral line; first 2 may intersect lateral line; dorsal lobe dusky to dark and uniformly pigmented. Attains 120 cm. Caught on hook and line, with gillnets, seines and in trawls. Usually frequents reefs and offshore islands, swims in small schools. Widespread throughout Indian Ocean from Algoa Bay northward, also Taiwan to Australia. Taken commercially in small quantities. Marketed mostly fresh, also dry-salted.



Scomberoides commersonianus, 370 mm, SL.

121. *Scomberoides lysan* (Forsskal). **Doublespotted queenfish** : Body compressed and elongate; maxilla extends to on slightly beyond near margin of eye in adults; scales on mid body lanceolate; posterior soft dorsal and anal of semi-detached finlets; lateral line with undulate curve over pectoral fin, scutes absent. Body grey-green above, silvery white below; adults with double series of 6 to 8 dusky round blotches above and below lateral line; distal half of dorsal lobe abruptly and heavily pigmented. Attains 70 cm. Caught with gillnets, seines, on hook and line and in trawls. Found in shallow lagoons to offshore areas; forms small schools. Tropical Indo West Pacific. Taken commercially in small quantities. Marketed mostly fresh also dry salted.



Scomberoides lysan, 240 mm, SL.

122. *Scomberoides tol* (Cuvier). **Needlescaled queenfish** : Body elongate; snout pointed; maxilla extends to rear margin of pupil in adults; scales on mid body needlelike; posterior soft dorsal and anal of semi-detached finlets; no scutes. Body silvery, adults with 5 to 8 oval or vertically oblong black blotches, the first 4 to 5 of which intersect lateral line; distal half of dorsal lobe abruptly and heavily pigmented. Attains 60 cm. Caught with gillnets, seines, on hook and line and in trawls. A coastal species, usually found in small schools near the surface. Widespread through Indian Ocean from Natal northward; also Japan to Australia and eastward to Fiji Islands. Taken commercially in small quantities in these Islands. Marketed mostly fresh, also dry salted.



Scomberoides tol, 245 mm, SL.

123. *Selar crumenophthalmus* (Bloch). **Bigeye scad** : Body oblong and moderately compressed; adipose eyelid completely covering eye except a narrow slit on pupil; pectoral fins short and falcate; lateral line slightly curved anteriorly, becoming straight below middle of soft dorsal fin. Body metallic blue to bluish-green above, shading to white below; yellow stripe present from opercle margin to upper part of caudal peduncle; operculum with a black spot. Attains 30 cm. Caught on hook and line, with beach seines, trawls. Forms small to large schools in inshore waters and shallow reefs to 150 cm. Worldwide in tropical and subtropical waters. This species is very common in catches of these islands. Marketed fresh or dry salted.



Selar crumenophthalmus, 145 mm, SL.

124. *Selaroides leptolepis* (Cuvier). **Yellowstripe scad** : Body oblong and compressed; eye large; eyes with a narrow anterior and a broad posterior adipose eyelid; minute teeth in lower jaw, no teeth on upper jaw, vomer and palatines; pectoral fins falcate. Body dark blue-green above, shading to silvery below; a broad yellow stripe from eye to caudal fin; a black spot on operculum; fins yellowish. Attains 20 cm. Caught with seines and bottom trawls. A demersal species, sometimes forming large schools, usually on soft bottoms. Indo West Pacific This species contributes a good fishery in these islands. Marketed mostly fresh, also dry salted.



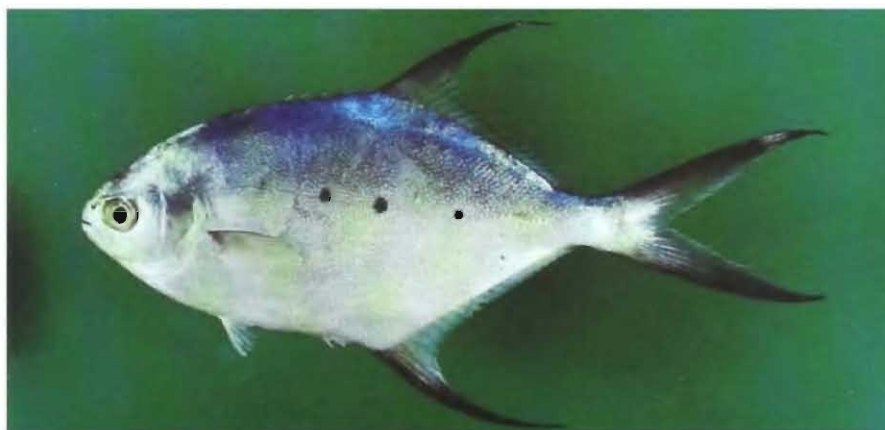
Selaroides leptolepis, 122 mm, SL.

125. *Seriolina nigrofasciata* (Ruppell). **Blackbanded trevally** : Body oblong and moderately compressed; head profile steep in front of eye; teeth in villiform bands in jaws; pectoral fins not falcate; no scutes on lateral line; caudal peduncle groove present dorsally and ventrally. Body bluish grey to black above, white to dusky below; spinous dorsal black. Young with 5–7 dark, oblique bands on upper body that fade with age. Attains 70 cm. Caught with seines, gillnets and on hook and line. A solitary species, mostly found around offshore reefs. Tropical and Sub-Tropical Indo-Pacific. Taken commercially, only occasionally in these islands. An excellent food fish. Marketed mostly fresh.



Seriolina nigrofasciata, 350 mm, SL.

126. *Trachinotus bailloni* (Lacepede). **Smallspotted pompano** : Body sub ovate and strong teeth in jaws, vomer and palatines; no teeth on tongue; pectoral fins short, not falcate; and fin lobe very long. Body silvery blue to grey above, silvery white below; sides with 1–5 small black spots in longitudinal row on or near lateral line (spots absent in smaller fishes smaller than 150 mm) Caudal, second dorsal and anal grey to black. Attains 50 cm. Caught with gillnets, hand lines and in bottom trawls. Inhabits coastal waters, along sandy beaches. Indo-West Pacific. Taken commercially in the catches of these islands. Marketed mostly fresh, also dry salted.



Trachinotus bailloni, 255 mm, SL.

127. *Trachinotus blochii* (Lacepede). Snubnose pompano : A deep bodied and compressed carangid; head profile smoothly rounded; snout blunt; teeth in jaws small, absent in adults; tongue toothless; spines very short in dorsal fin; pectoral fins short. Body generally silvery, paler below; large adults golden orange, especially lower half of body; anal fin dusky to dirty orange, lobe with a brownish anterior margin. Attains 70 cm. Caught with gillnets, trawls and hand lines. Occurs in shallow coastal waters, mainly around coral and rocky reefs. Indo West Pacific. Commercially taken in these Islands.



Trachinotus blochii, 200 mm, SL.

128. *Parastromateus niger* (Bloch). Black Pomfret : Body diamond shaped, fairly deep and compressed; teeth small in a single row in jaws, deciduous; dorsal and anal fins long, spines present only in young, specimens; minute ventral fin present in young, absent in adults; caudal fin forked. Body silvery grey to bluish brown, fins with dark edges; dark blotch on rear margin of opercle opposite pectoral fin, young with dark bands. Attains 55 cm. Caught gillnets, trawls and seines. A pelagic species often occurring in large schools generally over muddy bottoms. Indo West Pacific. An excellent food fish usually marketed fresh.



Parastromateus niger, 221 mm, SL.

Family CORYPHAENIDAE

Dolphin Fishes

Elongate compressed body with small cycloid scales; Frontal part of head with body crest making the forehead blunt which is more prominent in males; bands of teeth in jaws, vomer and palatines; dorsal fin originating on nape to almost to caudal fin with no finlets; pelvic fins thoracic, fitting into a groove on body; Caudal fin deeply forked; pelvic fins well developed. Only one genus with two species; both species in Indian waters.

129. *Coryphaena hippurus* Linnaeus. **Dolphinfish** : Body elongate and compressed; cleft of the mouth wide, oblique; bands of teeth on jaws, vomer and palatines; tooth patch on tongue small and oval; pectoral fin more than half of head length; caudal fin deeply forked; body with minute cycloid scales. Body back brilliant metallic blue; flanks silver, with golden sheen and one row of dark spots or golden blotches running beside dorsal fin and one, two or more on or below lateral line, some scattered irregularly; dorsal and anal fins black, the latter with a white edge. Attains 200 cm.



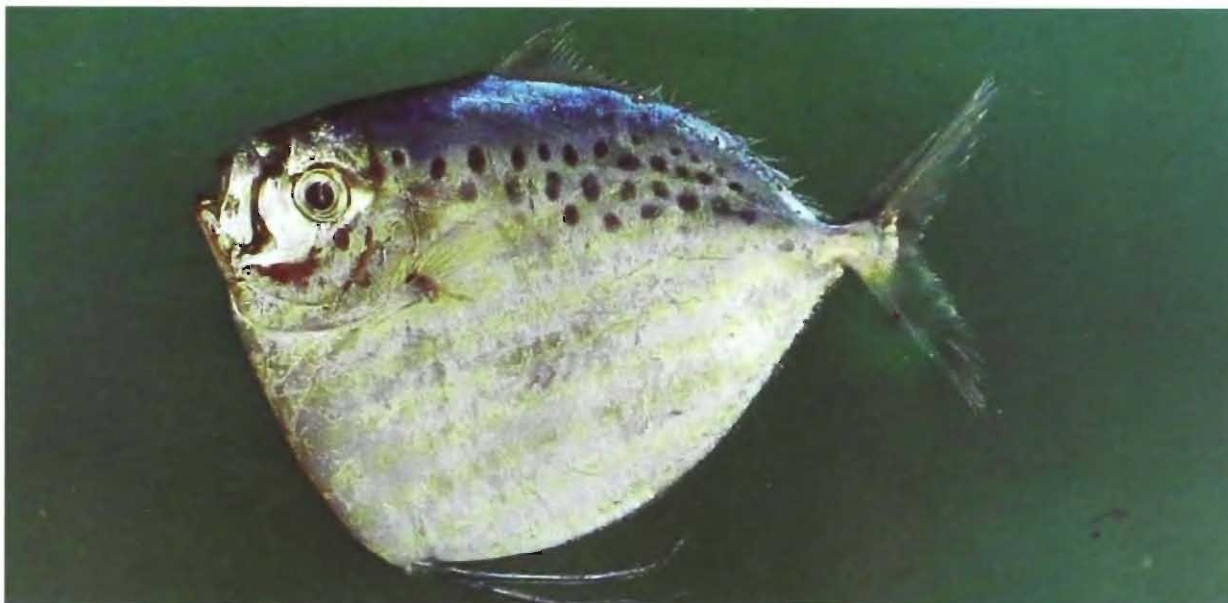
Coryphaena hippurus, 1250 mm, SL.

Family MENIDAE

Moonfishes

Body extremely compressed disc like with sharp breast; mouth protrusible; jaws with bands of villiform teeth, none on vomer or palatines one dorsal fin; anal fin base long; scales minute, barely visible; first 3 pelvic fin rays elongated. A single genus with one species.

130. *Mene maculata* (Bloch & Schneider). **Moon fish** : Body highly compressed and disc like; breast sharp; mouth protrudes upwards; teeth minute; caudal fin forked; anal fin base very long, the rays very short; 1st and 2nd 2 pelvic fins rays elongated; scales minute. Body with rows of dark spots immediately above and below lateral line. Taken with bottom trawls and beach seines. Inhabits deeper coastal waters, generally in shoals. Tropical Indo Pacific. Taken commercially in these Islands. It is usually marketed fresh.



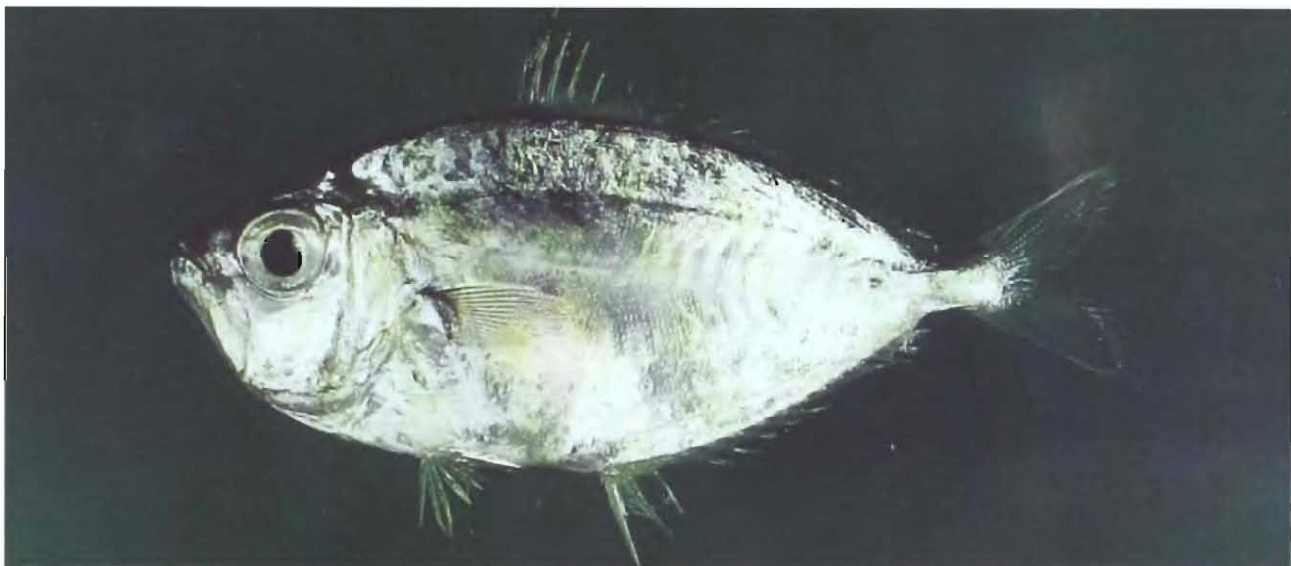
Mene maculata, 170 mm, SL.

Family LEIOGNATHIDAE

Ponyfish

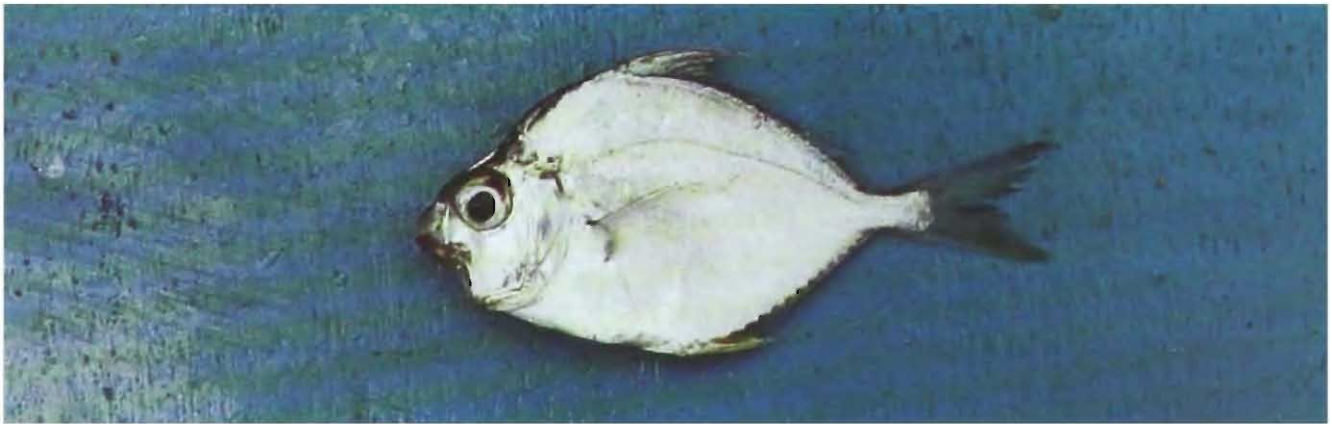
The silver-bellies or pony fish are covered with a minute scales and much compressed laterally; mouth very protractile, jaws with minute teeth but conical in *Gazza*; when caught fresh excluding mucus; upper surface of head with bony ridges. They are small fish inhabiting shallow coastal waters, moving in school mostly near the bottom where they feed. They often enter the backwaters and creeks. Fishes are minor commercial important; used as fish meal and also make excellent bait. Four genera and about 20 species; three genera and 15 species in Indian waters.

131. *Leiognathus dussumieri* (Valenciennes). **Dussumiers' Ponyfish** : Body oblong and moderately compressed; dorsal and ventral profiles of body equally convex; mouth small; pointing downwards when protracted; teeth small in a single row in both jaws; body with small scale, including breast, head naked. Body silvery, with faint wavy vertical lines on back; fins yellowish. Caught mainly with bottom trawls, shore seines and cast net. Inhabits sandy bottom areas near reef, at depths of 10 to 25 m. Madagascar, Pakistan, India, Sri Lanka, Celebes, Singapore and Philippines. One of the important species in the catches of these islands, marketed fresh and dry-salted.



Leiognathus dussumieri, 120 mm, SL.

132. *Leiognathus equula* (Forsskal). **Common ponyfish** : Body deep and compressed; mouth profile of head strongly arched; mouth small, protrudes downwards; lower edge of preopercle serrate; scales almost invisible especially on breast which appears naked; teeth small in a single row in both jaws. Body silvery sometimes with faint narrow bars on back and dark saddle on a caudal peduncle; pectoral axil dusky; anal yellowish. Caught mainly with bottom trawls, shore seines and cast net. Inhabits shallow waters down to depths of 40 m; enters brackish waters. Indo West Pacific. Common in the commercial catches of these islands, marketed fresh and dry salted.



Leiognathus equula, 145 mm, SL.

133. *Leiognathus fasciatus* (Lacepede). **Stripe ponyfish** : Body compressed and deep; dorsal profile of body more convex than its ventral profile; mouth small, protrudes downwards; teeth small in a single row in upper jaw, 2 or 3 rows in lower jaw; second spine of dorsal fin elongate and filiform; small scales on body and breast; head naked. Body silvery with dark vertical stripes on back; a dark blotch on caudal peduncle; pectoral fin axil yellowish. Caught mainly with bottom trawls, shore seines. Inhabits shallow waters down to depths of 30 m; predominantly near the bottom. Indo West Pacific. Fairly common in the commercial catches of these Islands, marketed fresh and dry salted.



Leiognathus fasciatus, 145 mm, SL.

134. *Leiognathus leuciscus* (Gunther). **Whipfin ponyfish** : Body compressed and elongate; dorsal profile of body equally convex to its ventral profile; mouth small protrudes downwards; teeth small in a single row in both jaws; the second spine of dorsal fin greatly elongate and filiform; scales on body small breast with scales; head naked. Body silvery with greenish vermicular pattern on back; margin of caudal fin yellow. Caught with bottom trawls, shore seines and gillnets. Inhabits shallow waters, predominantly near the bottom. Gulf of Thailand, Taiwan, Philippines and Australia Fairly common in the catches of these islands, marketed fresh and dry-salted.



Leiognathus leuciscus, 120 mm, SL.

135. *Leiognathus lineolatus* (Valenciennes). **Ornate ponyfish** : Body compressed and rather elongate; the dorsal and ventral profiles about equally convex; nape without a distinct notch; snout pointed; mouth pointing downward when protracted; head scales but conspicuous scales present on breast. Belly silvery, back greenish to brownish with relatively sparse grey; irregular vermiculations extending down to little below lateral line. Attains 9 cm. Caught mainly with bottom trawls, also in shore seines. Inhabits shallow waters, predominantly at the bottom. Indo West Pacific. Although this species are small, abundant in creeks; marketed fresh and dried salted together with other pony fishes; also used for fishmeal.



Leiognathus lineolatus, 145 mm, SL.

136. *Leiognathus longispinis* (Valenciennes). **Smithurst's ponyfish** : Body oval and compressed; dorsal profile of body more convex than its ventral profile; mouth small protrudes downwards; teeth small in a single row in both jaws; second spine of dorsal and anal fin elongate and villiform; small scales on body; head and breast naked. Body silvery with a 3 greenish yellow spots below lateral line; pectoral axil yellow. Caught with bottom trawls, shore seines and cast nets. Inhabits shallow waters down to depths of 30 m; predominantly near the bottom. India, Andaman Islands, New Guinea, Philippines and Australia. This species is fairly common in the commercial catches these Islands, marketed fresh and dry-salted.



Leiognathus longispinis, 115 mm, SL.

137. *Leiognathus splendens* (Cuvier). **Splendid ponyfish** : Body compressed and deep; anterior part of dorsal profile more strongly arched than anterior mouth pointing slightly downward when protracted; head scale less, but prominent scales present on breast. Belly silvery; back grayish silvery with faint, grey wavy vertical line above lateral line; scales of lateral line, bases of pectoral line; margins of dorsal and anal fins bright yellow; usually a black spot on upper third of spinous portion of dorsal fin. Attains 14 cm. Caught mainly with bottom trawls but also with shore seines. Inhabits shallow waters, found predominantly at the bottom in schools often entering backwaters. Indo West Pacific. Marketed fresh and dried salted together with other ponyfishes, also used for fishmeal.



Leiognathus splendens, 143 mm, SL.

Family BRAMIDAE

Sickle Pomfrets

Body compressed, deep or elongate. Single dorsal fin; caudal fin in juveniles rounded, becoming forked or lunate in adults; mouth oblique; maxilla scaly; juveniles with serrated preopercle becoming smooth in adults; snout, preopercle flange, margin of gill opening and mandible naked.

138. *Taractichthys steindachneri* (Doderlein). Sickle pomfret, Body and head compressed; dorsal falcate, originates behind head; most dorsal and anal rays branched; transverse caudal peduncle grooves well developed; scales on caudal peduncle abruptly larger than those on base of caudal; small, recurved, caniniform teeth in bands on jaws, teeth become smaller and bands narrow posteriorly to 1-2 series; vomer with 3 similar teeth, narrow bands on palatines. Colour gray with coppery reflections; pectoral black, distal part of pectoral and crescent border on caudal whitish. Attains over 60 cm. Indo-Pacific from Walvis Bay California to Zanzibar and south to False Bay. Six genera with 18 species; two genera with two species in the Indian waters.



Taractichthys steindachneri, 450 mm, SL.

Family LUTJANIDAE

Snappers

Body moderately elongate to deep and covered with ctenoid scales; snout, preorbital and lower jaw naked; mouth terminal; upper jaw usually moderately protractile (fixed in *Aphareus*), maxilla slips beneath preorbital when mouth closed; jaws with more or less distinct canines (absent in *Aphareus*); dorsal fin single or a shallow notch; caudal fin truncate to deeply forked. Snappers are active predators feeding mainly at night on fishes, crustaceans and cephalopods. Adults mostly bottom associated fishes occurring in warm sea throughout the world. This family composed of 17 genera and 103 species of which 9 genera and 42 species are known from Indian waters.

139. *Aphareus rutilans* Cuvier. **Rusty Jobfish** : Body elongate, fusiform and compressed; lower jaw protruding; maxilla extending to below middle of eye; teeth small; roof of mouth toothless; caudal fin deeply forked. Head and body red or pink dorsally, inside of mouth, gill chamber and gills shining silver; margin of maxilla black. Attains 80 cm. Caught mainly with hand lines and bottom long lines. Inhabits reef and rocky bottom areas. Tropical Indo Pacific. An important market fish of these islands. Marketed fresh.



Aphareus rutilans, 295 mm, SL.

140. *Etelis carbunculus* Cuvier. **Ruby snapper** : Bod relatively elongate; head small; eye large; interorbital space flat; lower jaw projecting; a single row of conical teeth in jaws, usually one or two pair of enlarged canines anteriorly; caudal fin forked. Colour mainly pink to red becoming white on lower sides and belly. Attains 80 cm. Caught mainly with bottom long lines and deep hand lines. Inhabits rocky bottom areas. Tropical Indo Pacific. An important food fish. Marketed mostly fresh.



Etelis carbunculus, 580 mm, SL.

141. *Aprion virescens* Valenciennes. **Green jobfish** : An elongate, robust fish with rounded body; a distinct groove in front of eye; teeth in both jaws in bands, with two strong, canines, anteriorly; vomerine tooth patch crescent shaped; pectoral fins short, equal to snout; caudal fin deeply forked. Body dark green to bluish or blue-grey. Attains 100 cm. Caught mainly with hand lines and bottom long lines. Inhabits inshore reef areas. Tropical Indo Pacific. Frequently seen in markets. Marketed mostly fresh, also dried and salted.



Aprion virescens, 545 mm, SL.

142. *Lutjanus argentimaculatus* (Forsskal). **Mangrove red snapper** : Body moderately deep; snout somewhat pointed; preopercular notch and knob poorly developed; vomerine teeth patch crescentic, without a medial posterior extension; tongue with a patch of granular teeth; posterior profile of dorsal and anal fins rounded; caudal fin emarginate to nearly truncate. Body deep red, paler on belly; each scale on sides of body usually with a silvery spot in the center. Attains 120 cm. Caught mainly with hand lines and gillnets. A coastal species, the juveniles and young adults found in mangrove areas. Indo West Pacific. An important market species of these Islands. Marketed fresh also dried, salted, flesh excellent.



Lutjanus argentimaculatus, 750 mm, SL.

143. *Lutjanus bengalensis* (Bloch). **Bengal snapper** : Body fusiform, slender to moderately deep, snout somewhat pointed; preopercular notch and knob well developed; Vomerine tooth patch crescentic, without a medial posterior extension; tongue smooth without teeth; caudal fin emarginate. Back and sides of the body yellowish; belly whitish; sides with a series of 4 bright blue stripes; fins yellow to whitish. Attains 30 cm. Caught mainly with hand lines, and gillnets. Mainly inhabits coral reef areas; sometimes around rocky areas. Northern Indian Ocean from Sumatra to East Africa and the Red Sea. Found in small quantities in markets of these islands. Marketed mostly fresh, flesh is of good quality.



Lutjanus bengalensis, 132 mm, SL.

144. *Lutjanus biguttatus* (Valenciennes). **Twospot banded snapper** : Body fusiform, very slender; snout profile low, sloping very gently; preopercular notch and knob poorly developed; vomerine tooth patch triangular with a medial posterior extension; tongue smooth with teeth; caudal fin truncate. Body dark brown, belly yellowish; a broad pearly white stripe from eye to base of caudal fin, two small white spots above lateral line, one below base of 7th dorsal spine and one below middle of soft part of dorsal fin. Attains 20 cm. Caught mainly with hand lines and gillnets. Inhabits coral reefs, sometime occurs in large schools. Indo Australian Archipelago. An important market fish in small quantities. Marketed mostly fresh.



Lutjanus biguttatus, 132 mm, SL.

145. *Lutjanus bohar* (Forsskal). **Twospot red snapper** : Body moderately deep, snout somewhat pointed; dorsal profile of head rounded; preopercular notch and knob moderately developed; vomerine tooth patch crescentic without a medial posterior extension; tongue with a patch of granular teeth; posterior profile of dorsal and anal fins rounded; caudal fin slightly emerginate. Body red or purplish red with darker horizontal stripes; fins dusky except pectoral fins pink with black dorsal edges. Attains 75 cm. Caught mainly with hand lines and gillnets. Inhabits coral reefs. Indo West Pacific. An important market fish. Marketed mostly fresh, also dried-salted.



Lutjanus bohar, 245 mm, SL.

146. *Lutjanus carponotatus* (Richardson). **Spanishflag snapper** : Body moderately deep; snout somewhat pointed; dorsal profile of head steeply sloped; preopercular notch and knob poorly developed; vomerine tooth patch triangular, with a medial posterior extension; tongue with a patch of granular teeth, posterior profile of dorsal and anal fins rounded; caudal fin emarginate. Back and upper sides of the body brownish, lower sides and belly white, a series of 8 or 9 orange strips on sides; fins yellowish. Attains 40 cm. Caught mainly with hand lines and gillnets. Inhabits coral reefs. Western Pacific and northeastern Indian Ocean. Occasionally seen in the markets. Marketed fresh.



Lutjanus carponotatus, 240 mm, SL.

147. *Lutjanus decussatus* (Cuvier). **Checkered snapper** : Body moderately deep; dorsal profile of head moderately sloped vomerine tooth patch crescentic, without a medial posterior extension; tongue with a patch of granular teeth; posterior profile of dorsal and anal fins rounded; caudal fin slightly emarginate. Body silvery with a checker-board pattern on upper half of sides, consisting of dark brown bars and stripes; lower half of sides with 2 dark brown stripes; a large black blotch on caudal fin base. Attains 30 cm. Caught mainly with hand lines and gillnets. Inhabits coral reefs. Commercially important species, regularly seen in the markets of these islands. Marketed mostly fresh.



Lutjanus decussatus, 200 mm, SL.

148. *Lutjanus erythropterus* Bloch. **Crimson snapper** : Body moderately deep; dorsal profile of head sloped; mouth relatively developed; vomerine tooth patch crescentic or triangular, without a medial posterior extension; tongue smooth, without teeth; posterior profile of dorsal and anal fins rounded; caudal fin emarginate. Body red, including fins. Attains 60 cm. Caught mainly with hand lines. Inhabits coral reefs. Indo West Pacific. An excellent food fish, seen in the markets of these islands but usually in small quantities. Marketed fresh or dried salted.



Lutjanus erythropterus, 450 mm, SL.

149. *Lutjanus fulviflamma* (Forsskal). **Blackspot snapper** : Body moderately deep to somewhat slender; dorsal profile of head moderately sloped; preopercular notch and knob poorly developed; vomerine tooth patch triangular, with a medial posterior extension; tongue with a patch of granular teeth; caudal fin truncate or emarginate. Body silvery with 6 or 7 yellow lines along scale rows; a prominent black spot on lateral line below anterior soft dorsal rays; fins yellowish. Attains 35 cm. Caught mainly with hand lines and gill nets. Inhabits coral reefs, rocky areas, also in mangrove estuaries and over muddy bottoms. Indo West Pacific. A small species, seen frequently in the markets of these islands. Marketed usually fresh.



Lutjanus fulviflamma, 250 mm, SL.

150. *Lutjanus fulvus* (Schneider). **Blacktail snapper** : Body robust; dorsal profile of head steeply sloped; preopercular notch and knob well developed; vomerine tooth patch crescentic, without a medial posterior extension; tongue smooth; without teeth; posterior profile of dorsal and anal fins rounded, caudal fin slightly emarginate. Back and sides of the body bronze with 6 distinct horizontal golden bands, and thinner ones between these; belly and underside of head whitish; soft dorsal and caudal dusky sub marginally with a distinct white edge; other fins yellow. Attains 40 cm. Caught mainly with hand lines and gill nets. Inhabits coral reefs. Indo Pacific. Commonly seen in markets. Marketed usually fresh.



Lutjanus fulvus, 215 mm, SL.

151. *Lutjanus gibbus* (Forsskal). **Humpback Red snapper** : Body relatively deep, dorsal profile of head steeply sloped; preopercular notch and knob well developed; vomerine tooth patch crescentic, without a media posterior extension; tongue smooth without teeth, posterior profile of dorsal and anal fins pointed; caudal fin distinctly forked with rounded lobes. Body generally grey to deep red grading to silvery below; eye and pectoral base and axil orange; median fins dusky red with narrow white margin. Attains 150 cm. Caught mainly with hand lines and gillnets. Mainly inhabits coral reefs and rocky areas. Indo West Pacific. Commonly seen in markets. Marketed fresh.



Lutjanus gibbus, 550 mm, SL.

152. *Lutjanus johnii* (Bloch). **John's snapper** : Body moderately deep; dorsal profile of head steeply shaped; preopercular notch and knob poorly developed, vomerine tooth patch crescentic, without a patch of granular teeth; posterior profile of dorsal and anal fins rounded; caudal fin truncate or slightly emarginate. Body silvery green or bronzed, with a distinct dark spot on each scale, giving an overall appearance of series of horizontal lines on side of body; a dark blotch often present, mainly above lateral line, below anterior soft dorsal rays. Attains 70 cm. Caught mainly with hand lines and gillnets. Inhabits in shallow coastal waters, including mangrove areas. Indo West Pacific. Frequently found in markets. Marketed fresh or dried-salted.



Lutjanus johnii, 250 mm, SL.

153. *Lutjanus kasmira* (Forsskal). **Bluebanded snapper** : Body moderately deep, dorsal profile of head steeply sloped; preopercular notch and knob well developed; vomerine tooth patch crescentic, without a medial posterior extension; tongue smooth, without teeth; posterior profile of dorsal and anal fins angular; caudal fin emarginate. Body bright yellow including fins; head and body white ventrally; 4 bright blue stripes on side; a large black spot sometimes present on lateral line below anterior soft dorsal rays. Attains 35 cm. Caught mainly with hand lines and gillnets. Found on coral and rocky reefs. Indo

Pacific. Frequently found in markets. It is one of the principal species in the fishery of these islands. Marketed usually fresh.



Lutjanus kasmira, 190 mm, SL.

154. *Lutjanus lunulatus* (Park). **Lunartail snapper** : Body moderately deep; dorsal profile of head steeply sloped; preopercular notch and knob poorly developed; vomerine tooth patch crescentic, without a medial posterior extension; tongue with a patch of granular teeth; posterior profile of dorsal and anal fins angular; caudal fin slightly emarginate. Body brown, whitish below; caudal fin with a broad, crescentic black band with the posterior portion of fin pink; pectoral, anal and pelvic fins yellow. Attains 35 cm. Caught mainly with handlines and gillnets. Inhabits coral reefs. Western Pacific and Northern Indian Ocean. Seen in the markets of these islands not frequently, marketed fresh.



Lutjanus lunulatus, 285 mm, SL.

155. *Lutjanus lutjanus* (Bloch). **Bigeye snapper** : Body fusiform slender; dorsal profile of head gently sloped; preopercular notch and knob poorly developed, vomerine tooth patch triangular, with a medial posterior extension; tongue with a patch of granular teeth; posterior profile of dorsal and anal fins angular; caudal fin truncate or slightly emarginate. Body silvery to bronzy with horizontal yellow to brown lines on flanks and similar lines running obliquely above lateral line; fins pale yellow to whitish. Attains 30 cm. Caught mainly with handlines. Inhabits coastal waters, including reef areas. Indo West Pacific. One of the common snapper found in the markets of these islands. Marketed mostly fresh.



Lutjanus lutjanus, 190 mm, SL.

156. *Lutjanus madras* (Valenciennes). **Indian snapper** : Body fusiform, somewhat slender; preopercular notch and knob poorly developed; vomerine tooth patch triangular with a medial posterior extension, tongue with a patch of granular teeth; posterior profile of dorsal and anal fins angular; caudal fin truncate or slightly emarginate. Upper back brownish, sides whitish with a series of fine yellow horizontal lines on lower half of body and similar brownish lines running obliquely above lateral line; fins yellow. Attains 30 cm. Caught mainly with handlines and gillnets. Inhabits coral and rocky reefs. Western Pacific and Indian Ocean. Common in the markets of these islands. Usually marketed fresh.



Lutjanus madras, 210 mm, SL.

157. *Lutjanus malabaricus* Schneider. **Malabar red snapper** : Body relatively deep; dorsal profile of head steeply sloped; preopercular notch and knob poorly developed; vomerine tooth patch crescentic without a medial posterior extension, tongue smooth, without teeth; caudal fin truncate. Back and sides of the body red, lighter on lower parts, fins reddish. Attains 100 cm. Caught mainly with hand lines. Inhabits both coastal and offshore reefs. Indo West Pacific. Found in the markets of these islands. Marketed fresh or dried-salted.



Lutjanus malabaricus, 650 mm, SL.

158. *Lutjanus monostigma* (Cuvier). **Onespot snapper** : Body moderately deep to somewhat slender; preopercular notch and knob poorly developed; vomerine tooth patch crescentic, without a medial posterior extension, tongue smooth, without teeth, caudal fin somewhat emarginate. Body generally grey to yellowish with dusky scale margins; black spot usually present on lateral line, below anterior dorsal rays; fins yellow. Attains 60 cm. Caught mainly with hand lines and gill nets. Inhabits coral reef areas. Indo Pacific. An important market fish of these islands. Marketed mostly fresh.



Lutjanus monostigma, 215 mm, SL.

159. *Lutjanus quinquelineatus* Bloch. **Fivelined snapper** : Body moderately deep; dorsal profile of head steeply sloped; preopercular notch and knob well developed; vomerine tooth patch crescentic, without a medial posterior extension; tongue smooth, without teeth, caudal fin slightly emarginate. Upper part of head brownish; sides and belly bright yellow, a series of 5 bright blue strips on sides; a round black spot present at level of lateral line, below anterior dorsal rays; fins yellow. Attains 35 cm. Caught mainly with hand lines and Inhabits coral reef areas. Indo Pacific. Commonly found in the markets of these islands. Marketed mostly fresh.



Lutjanus quinquelineatus, 175 mm, SL.

160. *Lutjanus rivulatus* (Cuvier). **Blubberlip snapper** : Body very deep; dorsal profile of head steeply sloped; preopercular notch and knob moderately developed; vomerine tooth patch crescentic, without a medial posterior extension; tongue smooth without teeth; posterior profile of dorsal fin rounded and of anal fin pointed; caudal fin truncate or slightly emarginate. Body generally olive-brown on back, silvery on sides; head with numerous wavy white or bluish bands; pearly blotch with black edge on lateral line below anterior dorsal rays; fins yellowish. Attains 65 cm. Caught with hand lines and gill nets. Found over coral and rocky reefs. Indo Pacific. Frequently found in the markets of these islands. Marketed mostly fresh.



Lutjanus rivulatus, 480 mm, SL.

161. *Lutjanus russelli* (Bleeker). **Russell's snapper** : Body moderately deep to somewhat slender; preopercular notch and knob poorly developed; vomerine tooth patch triangular, with a medial posterior extension; tongue with a patch of granular teeth; scales on top of head begin behind eyes; posterior profile of dorsal and anal fins rounded; caudal fin truncate or slightly emarginate. Body generally yellow-brown above grading to pinkish below; a black spot below anterior dorsal rays and mostly above lateral line; sides usually, with about 8 brownish bands, lower ones horizontal and upper ones rising obliquely to dorsal profile; fins yellow. Attains 40 cm. Caught with hand lines and gillnets. Inhabits rocky and coral reef areas. Indo West Pacific. A common market species of these islands. Marketed mostly fresh.



Lutjanus russelli, 215 mm, SL.

162. *Lutjanus sebae* (Cuvier). **Emperor red snapper** : Body very deep, dorsal profile of head steeply sloped; preopercular notch and knob moderately developed; vomerine tooth patch crescentic, without a medial posterior extension; tongue smooth' without teeth; posterior profile of dorsal and anal fins pointed; caudal fin somewhat emarginate. Body deep red in adults; juveniles and sub-adults pink with a dark red band from first dorsal spine through eye to tip of snout; a second band from middle of spinous part of dorsal fin to pelvic fin; and a third band from base of last dorsal spine running obliquely downward across caudal peduncle and along lower edge of caudal fin. Attains 100 cm. Caught with hand lines. Usually found on coral and rocky reefs. Juveniles sometimes found in mangrove estuaries. Indo West Pacific. Often found in the markets of these islands. Marketed mostly fresh, but also dried-salted.



Lutjanus sebae, 240 mm, SL.

163. *Lutjanus vitta* (Quoy & Gaimard). **Brownstripe red snapper** : Body moderately deep to relatively slender; dorsal profile of head moderately sloped; preopercular notch and knob poorly developed; vomerine tooth patch triangular with a medial posterior extension; tongue with a patch of granular teeth; posterior profile of dorsal and anal fins angular, caudal fin slightly emarginate or truncate. Upper sides and back brown, lower sides and belly whitish with narrow longitudinal brown lines on sides, those above lateral line oblique dark brown lines; a blackish stripe along middle of side from eye to upper half of caudal peduncle; fins yellow. Attains 40 cm. Caught mainly with hand lines. Inhabits rocky and coral reef area. Western Pacific and Eastern Indian Ocean. A common snapper frequently found in markets. Marketed mostly fresh.



Lutjanus vitta, 245 mm, SL.

164. *Paracaesio xanthurus* (Bleeker). **Yellowtail blue snapper** : Body moderately deep and fusiform; eye large, snout short; upper and lower jaws about equal; both jaws with an outer series of well developed canine teeth and an inner band of small villiform teeth; dorsal and anal fins scaleless; pectoral fins long, reaching level of anus; caudal fin deeply forked. Upper part of body and caudal yellow; head and rest of body blue. Attains 40 cm. Caught mainly with hand lines and bottom long lines. Occurs over rocky bottoms.



Paracaesio xanthurus, 240 mm, SL.

165. *Pinjalo lewisi* Randall, Allen & Anderson. **Slender pinjalo**, Body moderately deep; dorsal profile of head high; interorbital space convex; eye relatively large, with an adipose eye lid; snout short, mouth small; a single row of small, conical teeth in jaws, and an inner band of villiform teeth; caudal fin emarginate. Body pink or red on back, whitish on lower sides and belly; a white spot generally present on upper half of caudal peduncle; dorsal and caudal fins reddish, often with a narrow black margin; pelvic and anal fins pink. Attains 50 cm. Mainly taken with hand lines. Inhabits reefs and rocky bottom areas. Tropical western Pacific and Indian oceans. Caught in relatively small amounts. Marketed fresh.



Pinjalo lewisi, 370 mm, SL.

166. *Pinjalo pinjalo* (Bleeker). **Pinjalo snapper**, Body moderately deep; dorsal profile of head high; eye large; snout short and pointed; mouth small; a single row of small, conical teeth in jaws and an inner band of villiform teeth; caudal fin emarginate. Body pink or red, silvery on lower sides and belly; dorsal, anal, caudal and pelvic fins frequently with black margin; pelvic and anal fins yellowish. Attains 50 cm. Mainly caught by hand lines. Inhabits coral reefs and rocky areas. Indo West Pacific. An important market fish but caught in small amounts. Marketed mostly fresh.



Pinjalo pinjalo, 145 mm, SL.

Family Caesionidae

Fusilier fishes

Body oblong to fusiform, moderately compressed; mouth small and highly protractible, 1 or 2 distinct bony processes on premaxilla; teeth minute; caudal fin deeply forked. Fusiliers are found only in the tropical Indo Pacific, usually associated with coral reefs. They are a common catch component in these islands of minor fisheries importance. Four genera and 20 species are recognized; all the four genera and 11 species in the Indian waters. Juveniles of *Caesio*, *Pterocaesic*, *Gymnocaesio* and *Dipterygonotus* are commonly used as bait fishes.

167. *Caesio caerulaurea* Lacepede. **Blue and gold fusilier** : Body moderately deep, fusiform, elongate and moderately compressed; a single post maxillary process; small conical teeth in jaws, vomer and palatines; dorsal and anal and fins scaled; caudal fin forked. Upper body bluish, lower body white to pale bluish; a single yellow stripe bordered by white or light blue stripe, directly above the lateral line except on caudal peduncle; caudal lobes with a black median streak; axil of pectoral fin black. Caught by gill nets, trawls and hand lines. Inhabits coastal areas, primarily around coral reefs. Tropical Indo West Pacific. This species is common in markets. Marketed fresh.



Caesio caerulaurea, 145 mm, SL.

168. *Caesio cuning* (Bloch). **Redbelly yellowtail fusilier** : Body fairly deep and compressed; a single postmaxillary process; small conical teeth in jaws, vomer and palatines; dorsal and anal fins scaled; caudal fin forked. Upper body greyish blue, lower sides and belly white; caudal fin, upper caudal peduncle and posterior portion of back yellow; fins white except dorsal fin yellow and greyish blue. Caught mostly by gill nets, hand lines and trawls. Inhabit coastal areas, usually over rocky and coral reefs. Tropical Eastern Indian Ocean to Western Pacific. A moderately important food fish. Marketed mostly fresh.



Caesio cuning, 310 mm, SL.

169. *Caesio lunaris* Cuvier. **Lunar fusilier** : Body fairly deep, fusiform and moderately compressed; a single post maxillary process; small conical teeth in jaw, vomer and palatines; dorsal and anal fins scaled; caudal fin forked. Body bluish, belly paler than upper sides, tips of caudal lobes, axil and upper base of pectoral fin black. Caught mainly by gill nets and seines. Found in coastal areas, mainly on or near coral reefs. Indo West Pacific. Of minor importance to fisheries of these islands. Marketed mostly fresh.



Caesio lunaris, 280 mm, SL.

170. *Caesio xanthonota* Bleeker. **Yellowback fusilier** : Body moderately deep, fusiform and compressed; a single post maxillary process; small conical teeth in jaws, vomer and palatines; dorsal and anal fins scaled; caudal fin forked. Upper third of body and caudal fin bright yellow, middle third blue, lower third white; axil, upper base of pectoral fin black; all fins white, except dorsal fin yellow. Caught by gill nets and hand lines. Inhabits coastal areas, primarily around coral reefs. Indian Ocean. Of minor importance to fisheries of these islands. Marketed mostly fresh.



Caesio xanthonota, 150 mm, SL.

171. *Gymnocaesio gymnoptera* (Bleeker). **Slender fusilier** : Body slender, fusiform, elongate and moderately compressed; two post maxillary process; small conical teeth in jaws and vomer; palatines without teeth, dorsal and anal fin without scales; caudal fin forked. Body bluish green and silvery ventrally; a single yellow stripe on lateral line, below this a bright blue longitudinal band; axil of pectoral fin black; all fins white; caudal fin dusky, the tips of the lobes black. Caught by gillnets and seines. Inhabits coastal areas around coral reefs. Indo West Pacific. Mainly used as batfish of minor importance to fisheries. Marketed mostly fresh.



Gymnocaesio gymnoptera, 130 mm, SL.

172. *Pterocaesio chrysozona* (Cuvier). **Goldband fusilier** : Body fusiform, elongate and moderately compressed, two post maxillary processes; small conical teeth in jaws, vomer and palatines; dorsal and anal fins scaled; caudal fin forked. Upper body light blue to brownish, lower body white to pinkish, a bright yellow band below lateral line from behind eye to pectoral fin; tips of caudal lobes black. Inhabits around coral reefs in schools. Caught by gill nets and hand lines. Indo West Pacific. Mainly used as baitfish of minor importance to fisheries. Marketed mostly fresh.



Pterocaesio chrysozona, 145 mm, SL.

173. *Pterocesio marri* Schultz. **Marri's fusilier** : Body fusiform, elongate, and moderately compressed; two post maxillary process; small conical teeth in jaws; vomer and palatines without teeth; dorsal and anal fins scaled, caudal fin forked. Body blue-green dorsally, white ventrally; two longitudinal stripes laterally; fins white; axil of pectoral fin and tips of caudal lobes black. Caught by gillnets and hand lines. Inhabits around coral reefs in schools. Indo West Pacific. Mainly used as baitfish of minor importance to fisheries. Marketed fresh.



Pterocaesio marri, 135 mm, SL.

174. *Pterocaesio pisang* (Bleeker). **Banana fusilier** : Body fusiform, elongate and moderately compressed; two post maxillary processes; small conical teeth in jaws, vomer and palatines; dorsal and anal fins scaled; caudal fin forked. Body dark- red to silvery; axil of pectoral fin black; tips of caudal lobes dark red to black. Caught mostly by gill nets. Inhabits around coral reefs. Indo West Pacific. Mainly used as baitfish of minor importance to fisheries. Marketed fresh.



Pterocaesio pisang, 110 mm, SL.

175. *Pterocaesio tessellata* (Carpenter). **Onestripe fusilier** : Body fusiform, elongate and moderately compressed; two post maxillary process; small conical teeth in jaws and vomer, palatines without teeth, dorsal and anal fins scaled; caudal fin forked. Upper body light bluish green; lower part whitish to pink, a single yellow longitudinal stripe covering the lateral line for most of its length; axil of pectoral fin and tips of caudal lobes black. Caught by gill nets and hand lines. Inhabits coastal areas around coral reefs. Eastern Indian Ocean and Western Central Pacific. Mainly used as baitfish of minor importance to fisheries. Marketed mostly fresh.



Pterocaesio tessellata, 115 mm, SL.

176. *Pterocaesio tile* (Cuvier). **Darkbanded fusilier** : Body fusiform, elongate and compressed; two post maxillary processes; small conical teeth in jaws, vomer and palatines; dorsal and anal fins scaled; caudal fin forked. Upper body bluish green, lower body white to pinkish; a black stripe on lateral line, continuous with the upper black streak of caudal fin lobe; axil and upper base of pectoral fin black; caudal fin with a black streak within each lobe. Caught by gillnets and hand lines. Inhabits around coral reefs. Indo West Pacific. Mainly used as baitfish of minor importance to fisheries. Marketed mostly fresh.



Pterocaesio tile, 160 mm, SL.

Family NEMIPTERIDAE (Threadfin breams, monocle breams)

The nemipterids are brightly coloured fishes that are characterized by a slender to ovate body. Mouth small to moderate terminal; teeth in jaws small villiform in narrow bands; enlarged anterior scales ctenoid, covering body and most of head; sometimes with filament. Nemipterids are common in shallow tropical reef areas and offshore waters to 100 m. Wide spread in tropical Indo West Pacific. Most species are considered good eating. The family Nemipteridae contains about 4 genera and 40 species; all four genera with 28 species in Indian waters.

177. *Nemipterus bipunctatus* (Ehrenberg). **Delagoa threadfinbream** : Body slightly compressed; a broad band of villiform teeth in jaws; no filaments in fins; pelvic fin with the outer ray slightly prolonged. Body reddish above silvery with bright yellow bands on sides; dorsal fin margin orange upward slanting with a golden streak along its base. Attains 30 cm. Caught with bottom trawls and on line gear. Bottom living to 100 m depth. Widespread in tropical Indian Ocean and Persian Gulf, South to Delagoa Bay. This species constitutes a minor fishery on the coasts of these islands.



Nemipterus bipunctatus, 155 mm, SL.

178. *Nemipterus japonicus* (Bloch). **Japanese threadfinbream** : Body deeper than head; teeth in lower jaw fine, the outer row enlarged but no canines in front; caudal fin forked, its upper ray prolonged into a distinctive filament. Upper part of body rosy, below silvery; 9–11 yellow band on sides of the body; a yellow / orange blotch near origin of lateral line; dorsal fin rosy with yellow band; caudal fin rosy, its upper lobe and filament bright yellow. Attains 30 cm. Caught mainly in bottom trawls and on line gear. In coastal waters to about 60 m in depth in large schools. Indo West Pacific. It is the most common threadfin bream in the catches. Marketed mostly fresh.



Nemipterus japonicus, 250 mm, SL.

179. *Nemipterus nematophorus* (Bleeker). **Doublewhip threadfinbream** : Body slender, slightly compressed; 3 to 5 pair of small canines anteriorly in upper jaw; 2 to 5 scales rows before origin of dorsal fin; preopercle naked; dorsal fin with anterior pair of spinous rays close together, almost fused and produced into a long filament; pectoral and pelvic fins long; caudal fin forked, the upper lobe produced into a filament. Upper part of head and body pinkish, silvery white below; four longitudinal yellow lines along flanks below lateral line with a yellow stripe; filament of dorsal fin bright yellow, rest of fin rosy, anal fin hyaline with a single yellow stripe. Attains 20 cm. Taken by gillnets and bottom trawls. A benthic species occurs on sand or mud bottoms. Indo West Pacific. Appears occasionally in local markets. Marketed fresh. No major fishery exists.



Nemipterus nematophorus, 90 mm, SL.

180. *Nemipterus nemurus* (Bleeker). **Red Spine threadfinbream** : Body slightly compressed; head without spines; preoperculum feeble, minutely serrated posteriorly; teeth villiform in broad bands anteriorly in jaws, the outer row enlarged; caudal fin forked, the upper lobe prolonged into a filament; no filaments in other fins. Body pinkish above, silvery below with few yellow stripes. Attains 20 cm. Taken by handline and bottom trawl together with other species. A benthic species occurs on mud or sand bottoms. Indo

West Pacific, including the Philippines, Gulf of Thailand, South China Sea, Strait of Malacca, Indonesia. Appears in small numbers in local markets. No major fishery exists.



Nemipterus nemurus, 125 mm, SL.

181. *Nemipterus mesoprion* (Blecker). **Mauvelip threadfinbream** : Body slightly compressed; 4 to 5 pair of small-recurved canines anteriorly in upper jaw; preopercle naked; pectoral and pelvic fins long; caudal fin forked. Upper part of head and body pinkish, silvery white below; head with oblique golden yellow stripe; a golden stripe beneath lateral line; spinous dorsal fin with red margin. Attains 14 cm. Taken by hand line and bottom trawl, together with other species. A benthic species. Known from Southern Indonesia Gulf of Thailand.



Nemipterus mesoprion, 110 mm, SL.

182. *Nemipterus zyson* (Blecker). **Slender threadfin bream** : Small sized fish with a slender body; 3 or 4 pair of small recurved canines anteriorly in upper jaw; pectoral and pelvic fins short reaching just short or level of anus; caudal fin forked; upper lobe produced into a short filament. Upper part of body reddish, silvery below; sides below lateral line with indistinct yellow stripes along the middle of each scale row; yellow stripes in front of eye through nostrils and from upper lip to beneath eye; caudal fin pinkish; upper and lower lobes pale yellowish, filament yellow. Attains 18 cm. Taken by hand line and bottom trawl along with other species of *Nemipterus*. A benthic species found on sand bottoms near rocks. It swims in groups. Widespread in the Indo West Pacific. Appears in small numbers in local markets. No major fishery exists.



Nemipterus zyson, 125 mm, SL.

183. *Parascalopsis eriomma* (Jordan & Richardson). Rosydwarf monoclebreem : Body moderately deep; sub orbital with feeble spine, rear margin smooth; 3 scale rows between lateral line and first dorsal fin spine; 4 or 5 scale rows on check. Body silvery, somewhat darker on upper surface, with a broad yellow band along side. Attains 25 cm. Caught mainly with bottom trawls and on hook and line. Inhabits sandy and coral reef areas. Tropical Indo West Pacific. Of minor commercial significance in these islands, uncommon in the catches. Marketed mostly fresh.



Parascalopsis eriomma, 200 mm, SL.

184. *Scolopsis auratus* (Park). Yellowstripe monoclebreem : Body compressed; head scales reaching forward to or just behind level of anterior margin of antrose sub orbital spine; pelvic fins, long reaching or just beyond level of anus; caudal fin forked. Body silvery white, dusky blue on back, a broad golden-yellow mid-lateral stripe from behind eye to base of caudal fin; caudal fin golden yellow. Attains 20 cm. Caught mainly by hand line and bottom trawls. A benthic species, found close to reefs. Eastern Indian Ocean, including the Maldives, Sri Lanka, Southern Indonesia. Appears occasionally in small numbers in local markets. No major fishery exists.



Scolopsis auratus, 150 mm, SL.

185. *Scolopsis bilineatus* (Bloch). **Twolined monoclebream** : Body compressed, pre-orbital serrated and with one sharp backward directed spine under eye; operculum with one flat backward pointing spine; narrow bands of slender curved teeth in jaws; outer series enlarged; caudal fin forked. A prominent curved white band with a black margin from mouth to middle to dorsal fin base, and a pair of shorter white stripes above and behind eye; spiny part of dorsal fin bright yellow and a prominent white mark on soft part of dorsal fin extending onto back. Attains 23 cm. Caught mainly by hand line. Common on shallow reefs, sometimes in groups. Andaman Sea to Fiji; north to Japan. Appears occasionally in small numbers in local markets. No major fishery exists.



Scolopsis bilineatus, 170 mm, SL.

186. *Scolopsis ciliatus* (Lacepede). **Monocle bream** : Body moderately elongate; a short but snout backward - pointing spine just below eye; eyes moderately large, maxillary in both jaws, the outer series enlarged; caudal fin forked. Brown on upper parts of head and body, silvery on sides, a broad silvery band beneath spinous dorsal fin; about 6 rows of pale yellow spots on sides of body. Attains 25 cm. Caught with bottom trawls and on hook and line. Found on sandy and coral reef areas. Indo West Pacific. This species is fairly common in the commercial catches of these islands. Minor commercial value. Marketed mostly fresh.



Scolopsis ciliatus, 170 mm, SL.

187. *Scolopsis lineatus* Quoy and Gaimard. **Lined MonocleBream** : Body moderately elongate; eyes fairly large with a strong backward pointing spine below it; 3 ½ 4 scale rows between lateral line and dorsal fin base; caudal fin moderately forked. Upper side with a combination of two creamy white stripes and several broad blackish bars with pale spaces between them; lower sides white with silvery sheen. Attains 20 cm. Caught with bottom trawls and on hook and line. Inhabits sandy or rubble in the vicinity of shallow reefs. Western Indian Ocean, Red Sea and Persian Gulf. Uncommon in the catches. Marketed mostly fresh.



Scolopsis lineatus, 140 mm, SL.

188. *Scolopsis vosmeri* (Bloch). **Whitecheck monoclebreem** : Body deep and compressed, its dorsal profile very convex; mouth terminal jaws with numerous villiform teeth; eyes large, a stout flat backward pointing spine below eye; 4 scale rows between lateral line and first dorsal spine; caudal fin slightly forked. Body colour variable, usually reddish brown; broad vertical white bar from nape extending onto opercle; sometimes a horizontal white band below lateral line from gill cover to below middle of dorsal fin; body scales with dark spots. Attains 25 cm. Caught with bottom trawls and on hook and line. Inhabits coral reef areas. Tropical Indo West Pacific and Persian Gulf, South to Durban. This species is uncommon in the commercial catches of these Islands. Marketed mostly fresh.



Scolopsis vosmeri, 160 mm, SL.

Family LOBOTIDAE

Tripletails

Body oval to oblong, slightly compressed; scales moderate, ctenoid; upper jaw slightly protractible, jaws with outer row of short, closely set canines and an inner row of much smaller teeth; vomer, palatines and tongue toothless; single dorsal fin, without notch; caudal fin rounded. One genus with only 1 species.

189. *Lobotes surinamensis* (Bloch). **Triple tail** : Body compressed head dish-shaped' its upper profile concave; nostrils round, close together; soft dorsal, and caudal fin covered with scales. Body dark olive dorsally, silvery grey below; pectoral pale yellow; caudal with yellow margin. Attains 100 cm. Caught with beach seines, gill nets and on hook and lines.



Lobotes surinamensis, 450 mm, SL.

Family GERREIDAE

Silver-biddy

These are silvery, small to medium-sized fishes; body compressed, slender or deep; mouth very protractible, arching downward when protracted; teeth minute; scales large; dorsal fin more or less notched, with 9 or 10 spines and 9–11 rays; anal fin III, 7; bases of dorsal and anal fins sheathed by a row of scales. Overall colouration brilliant silver. Some species with upper sides marked with dusky spots, bars or stripes. Live in schools about sandy shallows areas of tidal creeks, lagoons, coral reefs and beaches. Flesh excellent occurring in all warm seas. Perhaps as many as 40 species; 8 genera, genus *Gerres* perhaps as many as 30 species; three genera and 10 species in the Indian region.

190. *Gerres abbreviatus* Bleeker. **Deepbody Silverbiddy** : Body deep and compressed; mouth small, strongly protractile; fine teeth in jaws. Body silvery with indistinct longitudinal lines along the scale-rows on dorsal part of body; dorsal fin with thin black margin. Taken with bottom trawls and seines. Lives near the bottom, to about 40 m depth in small schools. Indo-West Pacific. Taken commercially in the coasts of these islands. Marketed both fresh and dry salted.



Gerres abbreviatus, 210 mm, SL.

191. *Gerres filamentosus* Cuvier. **Whipfin Silverbidy** : Body oblong, moderately compressed and deep; mouth small, strongly protractible; fine teeth in jaws; second spine of dorsal fin greatly elongated into a filament. Body silvery with 8–10 vertical series of ovoid dusky spots on sides. Attains 25 cm. Caught with beach seines and bottom trawls. Lives in shallow coastal waters to about 50 m a depth, on sandy bottoms, but also in rocky and coralline areas. Indo Pacific. This species contributes an important fishery in these islands. Marketed mostly fresh and dried.



Gerres filamentosus, 140 mm, SL.

192. *Gerres oyena* (Forsskal). **Common Silverbidy** : Body oblong and compressed; mouth very protractile arching downward when protruded; fine teeth in jaws; pectoral reaching just above anus; head and body completely covered with scales. Body olive above to silvery below; 7 to 8 dusky bars on sides; caudal uniformly dusky. Attains 25 cm. Caught with bottom trawls and seines. Common on sandy beaches, also entering creeks. Indo Pacific. Common and are frequently caught in creeks often in large quantities. Sold both fresh and dried.



Gerres oyena, 125 mm, SL.

193. *Gerres poeti* Cuvier. **Strongspine Silverbidy** : Body oblong and compressed; mouth small, strongly protractile; fine teeth in jaws. Body silvery, dorsal fin with a black margin. Attains 20 m. Taken with beach seines. Common in creeks and coastal lagoons; forms small schools. Indo West Pacific. This species of minor fishery significance in these Islands.



Gerres poeti, 180 mm, SL.

194. *Pentaprion longimanus* (Cantor). **Longfin silverbidy** : A small and elongate species; mouth small, strongly protractile; small teeth in jaws; pectoral fins long and pointed, extending beyond origin of anal fin; scales easily shed. Body silvery, with a silvery stripe from eye to caudal fin. Attains 15 cm. Caught with seines and bottom trawls. Lives near the bottom, to about 70 m depth; forms large schools. India, Sri Lanka, through the East Indies, to the Philippines and Taiwan. Taken commercially in large quantities. Marketed mostly fresh.



Pentaprion longimanus, 110 mm, SL.

Family HAEMULIDAE

Sweetlips or Grunts

The sweetlips are a family of small to moderate sized fishes with fairly compressed body. Mouth small thicker lips, and the teeth in jaws are conical and small with none developed as canines. Roof of mouth toothless. Operculum with one indistinct spine. Dorsal fin single with strong spines and 12 to 26 soft rays. Pectoral fins long, first ray sometimes forming a short filament. Caudal fin truncate or emarginate or rounded in juveniles. Usually inhabiting shallow coastal waters. They occur in coral reef areas, as well as in muddy or weedy waters. Caught in bottom trawls, seine nets, with long lines, gillnets etc. several of the species belonging to this family are rather common in these islands. The flesh of the larger sweetlips is good eating. Marketed fresh, also dry-salted. The group contains about 18 genera and approximately 175 species; four genera with 17 species in the Indian region.

195. *Diagramma pictum* (Thunberg). **Painted Sweetlips** : Body oblong, compressed; mouth small, lips fleshy; jaws with a band of four to five rows of small teeth and an outer series of enlarged bones; six pores on chin, but no groove, pre-operculum finely serrated with larger serrae at angle; caudal fin emarginate. Adults mainly light silvery grey, white on belly; juveniles with conspicuous alternating black and white stripes and yellowish head and belly, stripes eventually break up into spots that disappear in adults. Attains 90 cm. Caught by hand lines, bottom long lines and trawls. More common in silty areas of reef. Indo West Pacific. This species constitute an important element of the commercial catches in these Islands.



Diagramma pictum, 170 mm, SL.

196. *Plectorhinchus chaetodonoides* Lacepede. **Many Spotted Sweetlips** : Body oblong and compressed; small mouth thicker lips; caudal fin truncate in young, slightly emarginate with age. Adults overall white covered with numerous brown spots that extend onto most fins. Attains 60 m. Cocos-Keeling Islands to Samoa.



Plectorhinchus chaetodonoides, 480 mm, SL.

197. *Plectorhinchus gibbosus* (Lacepede). **Bulbberlip sweetlips** : Body deep; lips of adults greatly enlarged; caudal fin truncate in young, slightly emarginate with age. Body mostly dark grey or brownish with darker scale margins; rear margins of cheek and gill cover black. Attains 60 cm. Indo Pacific.



Plectorhinchus gibbosus, 390 mm, SL.

198. *Plectorhinchus orientalis* (Bloch). **Oriental Sweetlips** : Body compressed pre-orbital finely serrated above, but not below; six pores on chin, but no groove; jaws with six rows of teeth anteriorly of which outer row is enlarged; caudal fin emarginate. Adults white with six dark brown stripes on body; dorsal, caudal and anal fins yellow with large black spots; a large black spot on upper portion of pectoral fin base. Attains 60 cm. Caught mainly by hand lines. Inhabits coral reef areas and inshore rocky bottoms. Indo Pacific.



Plectorhinchus orientalis, 350 mm, SL.

199. *Plectorhynchus schotaf* (Forsskal). **Grey Sweetlip** : Body oblong and compressed; snout profile convex; lips thin in young somewhat swollen with age; caudal fin truncate in young, slightly emarginate with age. Body dusky grey to almost silvery grey, usually darker with age; hind edge of pre-opercle with red line. Attains 80 cm. Caught by bottom hand lines. Inhabits coastal waters, near reefs. Indo West Pacific.



Plectorhinchus Schotaf, 610 mm, SL.

200. *Pomadasys argyreus* (Valenciennes). **Bluecheek Silvergrunt** : Body oblong and compressed; head blunt its upper profile convex; mouth small; maxilla reaching at most to below anterior margin of pupil. Body silvery, gill cover with a large blue black blotch usually present in juveniles, becoming indistinct in adults. Caught with bottom trawls, bottom long lines, hand lines and gillnets. Inhabits coastal waters. Pakistan, India, Sri Lanka, eastward extending to Philippines.



Pomadasys argyreus, 195 mm, SL.

201. *Pomadasys furcatum* (Bloch & Scheneider). **Grey grunt** : Small body; mouth small; lips rather thick; teeth in jaws in villiform bands, no canines; no teeth on roof of mouth; pre-opercle margin serrate; caudal fin truncate or slightly emarginate. Body silvery with grey longitudinal stripes along flanks. In juveniles the bands are bifurcated anteriorly; in adults, the bands are double lines. Attains 50 cm. Frequents sandy areas near rocks. Madagascar to Natal.



Pomadasys furcatum, 130 mm, SL.

202. *Pomadasys kakkan* (Cuvier). **Javelin grunt** : Body oblong and compressed; head blunt; mouth small, lips fairly thick; maxilla reaching to below nostrils; teeth in villiform bands, the outer series slightly enlarged. Body silvery, juveniles with lines joining bars; bars break up with growth to become obsolete in large specimens; round spots on basal half of dorsal membrane always present. Attains 45 cm. Found over mud or sand; enters backwaters. Caught by hook and line and gillnets. Indo Pacific. An excellent food fish. Marketed fresh also dry-salted.



Pomadasys kakkan, 280 mm, SL.

203. *Pomadasys maculatum* (Bloch). **Saddle grunt** : Body oblong and compressed; two pores and a median pit on chin; head blunt, its upper profile convex; upper jaw extending to front border eye; teeth small in narrow bands in both jaws, the outer series enlarged. Body silvery grey, incomplete cross bars on upper half of body. Attains 50 cm. Caught with bottom trawls and hand lines. Inhabits coastal waters.



Pomadasys maculatum, 165 mm, SL.

Family LETHRINIDAE

Emperors

The lethrinidae or emperors are tropical marine perciforms. These fishes are similar to the snappers in size and shape but generally lack bright colours, more often exhibiting various shades of grey. Mouth is terminal with relatively thick lips. Stout canine teeth at the front of the jaws and either conical or molariform teeth at the side of the jaws; there are no teeth on the roof of the mouth. Body with distinct weakly ctenoid scales. The dorsal fin is continuous without a notch and contains X spines and 9 to 10 soft rays; the anal fin has III spines and 8 to 10 soft rays; the caudal fin is emarginate to forked. Lethrinids are bottom feeding, carnivorous, coastal fishes, ranging primarily on or near reefs but they preferred habitat in sandy or rubble substrate. Emperors are an important component of commercial fisheries of these islands. These fishes are greatly esteemed as food fishes and the soft white flesh is of excellent quality. The family contains about 40 species in 5 genera; four genera with 19 species in the Indian region.

204. *Gymnocranius grandoculis* (Valenciennes). **Robinson's seabream** : Body oblong; forehead profile moderately steep; several scale rows on cheek; no molars in jaws; mouth relatively small. Body silvery, dark on back. Widely distributed in the Indian Ocean from east Africa and Red sea to southeastern Oceania. Inhabits continental shelf and offshore rocky bottoms. Caught mainly with long lines. Attains 80 cm. Occasionally seen in markets, mainly fresh.



Gymnocranius grandoculis, 440 mm, SL.

205. *Lethrinus conchyliaetus* (Smith). **Redaxil emperor** : Body fairly elongate; dorsal profile near eye convex; snout moderate; interorbital space convex; teeth in jaws, conical; outer surface of maxilla smooth. Body olive-green above, paler below; inner surface of pectoral fin brownish or grey, lighter ventrally; lips base and patch above base of pectoral fin, and edge of operculum red; fins orange, dusky or mottled. Caught mostly by hand lines, and trawls. Inhabits reefs down to 250 m. Indian Ocean, from Tanzania, Madagascar, chagos, Andaman and Indonesia. Taken commercially in these islands, marketed fresh.



Lethrinus conchyliaetus, 320 mm, SL.

206. *Lethrinus harak* (Forsskal). **Blackspot emperor** : Body moderately deep; snout short and blunt; lateral teeth in jaws of adults molars or rounded; posterior angle of operculum fully scaled. Olive green above, paler below; a large elliptical black spot with an orange rim near tip of pectoral fin; pectoral, pelvic dorsal and anal fin white to pinkish, caudal fin reddish. Caught mostly by shore seines, gillnets and hand lines. Inhabits shallow sandy, coral rubble, mangroves and sea grass areas inshore and adjacent to coral reefs. Indo West Pacific. Fairly common in the commercial catches of these Islands, marketed mostly fresh.



Lethrinus harak, 240 mm, SL.

207. *Lethrinus lentjan* (Lacepede). **Redspot emperor** : Body moderately deep; dorsal profile near eye nearly straight; snout moderately short. Inter-orbital space convex; canines small; lateral teeth jaws developed as molars in adults; inner surface of pectoral fin densely covered with scales; body olive green above; paler below; centers of scales on upper sides often white; posterior margin of opercle and base of pectoral fin red; fins yellowish; dorsal and caudal fins orange mottled. Caught primarily by hand lines; trawls, beach seines and gillnets. Found over sandy bottom in coastal areas and near coral reefs to depths of around 50 m. Indo West Pacific. An important fishery resource of these Islands, marketed mostly fresh.



Lethrinus lentjan, 320 mm, SL.

208. *Lethrinus microdon* Valenciennes. **Smalltooth emperor** : Body relatively elongate; dorsal profile near eye nearly straight; snout moderately long; interorbital space convex to flat; lateral teeth in jaws conical; outer surface of maxilla smooth; inner surface of pectoral fin densely covered with scales; posterior angle of operculum fully scaled. Body bluish-grey with three dark streaks radiating forward from eye; fins bright red, pelvic fins dusky. Caught mostly with hand lines, gillnets and trawls. Inhabits sandy areas near coral reefs to depths of around 80 m. Indo West Pacific. Taken commercially in these islands, an excellent food fish, marketed mostly fresh.



Lethrinus microdon, 325 mm, SL.

209. *Lethrinus olivaceus* Valenciennes. **Largeface emperor** : Body moderately elongate; dorsal profile near eye nearly straight; inter orbital space convex to flat; lateral teeth in jaws conical; outer surface of maxilla smooth; Body grey, lighter ventrally, often with scattered irregular dark blotches; snout with wavy dark streaks, upper jaw especially near corner of mouth sometimes edged behind with red. Attains 100 cm. Inhabits sandy coastal areas and reef slopes. Often occurs in large schools. Caught mostly with hand lines and traps, occasionally by trawls and gillnets. Widespread in the Indo West Pacific.



Lethrinus olivaceus, 300 mm, SL.

210. *Lethrinus orantus* Valenciennes. **Ornate emperor** : Body relatively deep; dorsal profile near eye convex; snout blunt, the upper profile steep; inter-orbital space convex; lateral teeth in jaws developed into strong molars; pectoral fins long and pointed; inner surface of pectoral fin densely covered with scales. Body pale green, lighter below, with 4-6 orange stripes; posterior edge of operculum and pre-operculum bright red; head yellowish brown; anal and paired fins yellow. Caught by hand lines, shore seines, and trawls. Inhabits sandy, sea grass beds and areas adjacent to reefs. Eastern Indian Ocean and Western Pacific. Taken commercially in these islands, marketed mostly fresh.



Lethrinus orantus, 245 mm, SL.

211. *Lethrinus xanthochilus* klunzinger. **Yellow lip emperor** : Body moderately elongate; dorsal profile near eye convex; interorbital space concave; lateral teeth in jaws conical, never rounded or molariform; outer surface of maxilla smooth; inner surface of pectoral fin without scales; posterior angle of operculum fully scaled or rarely with a naked patch. Body yellowish-grey with a scattered irregular dark spots; lips yellowish; a red spot at upper base of pectoral fin; dorsal and caudal fins orange with reddish margin; anal and paired fins paler. Caught mostly with hand lines and trawls. Inhabit shallow coastal waters around rocky, sea grass beds and coral reefs. Indo West Pacific. Taken commercially in these Islands.



Lethrinus xanthochilus, 280 mm, SL.

212. *Wattasia mossambica* (Smith). **Mozambique large-eye bream** : Body deep; head profile slightly convex; jaw teeth in a narrow; villiform band bordered by an outer series of conical teeth; caudal fin slightly forked with broadly rounded lobes. Body over all silvery-grey with yellowish suffusion; scale margins narrowly brownish; fins yellow. Attains 55 cm. Caught mainly with bottom long lines and bottom trawls. Inhabits the outer edge of the continental shelf. Indo West Pacific. Occasionally found in markets. Marketed fresh.



Wattasia mossambica, 310 mm, SL.

Family SPARIDAE

Seabreams

The sea breams are snapper like fishes with an oblong to ovate compressed body. Head large, often with steep upper profile. Mouth small; teeth conical or incisiform, molars present in some species; no teeth on roof of mouth. Dorsal fin with X to XIII spines and 8 to 14 soft rays; preopercle margin smooth; caudal fin forked to emarginate. The family is characterized by a groove in the outer end of the premaxilla, into which the maxilla fits. They occur in all temperate and tropical seas. Sea breams frequent a variety of habitat including brackish waters, bays, coastal reefs and deep waters of the continental shelf. Caught with bottom trawls, hand lines and gillnets. They are important food fish; the flesh is excellent and highly esteemed. Some species attain a great size. The young are often quite different from the adult in shape and markings with 29 genera in 4 sub families containing 100 species; six genera with eight species in the Indian region.

213. *Acanthopagrus berda* (Forsskal). **Picnic Seabream** : Body fairly deep and compressed; head large; four to six incisors in front of upper jaw, 6 to 8 on lower jaw, followed by 3 to 5 rows of molars; scales large, six rows of scales on preoperculum. Head, body and fins greyish-silver to black; anal fin yellowish, the membrane blackish basally. Attains 75 cm. Caught with bottom trawls, hand lines and gillnets. Inhabits sandy and backwaters. Indo West Pacific. This species is very common. The flesh is excellent and highly esteemed.



Acanthopagrus berda, 480 mm, SL.

Family SCIAENIDAE

Croaker

The sciaenids have elongate body, somewhat compressed; lateral line extends to end of caudal fin; jaws with rows of small, sharp, conical teeth; canines present in some species; no teeth on vomer, palatines or tongue; gas bladder well developed, carrot-shaped, hammer shaped with branching appendages; caudal fin truncate. These fishes are also called “drums” because they are able to produce a variety of sounds. They are distributed in warm coastal waters and estuaries and are of considerable economic importance. About 50 genera with about 210 species are recognized in this family; twenty genera with 40 species in the Indian region.

214. *Dendrophysa russelli* (Cuvier). Goatee Croaker : Body oblong; snout rounded and projecting slightly beyond tip of upper jaw; mouth inferior, a single barbel on chin; teeth in upper jaw a villose band, in lower jaw uniformly small; caudal fin rhomboid; gas bladder carrot shaped with 15 to 17 pairs of arborescent appendages, the first entering head. Body grey shading to white on belly; spinous dorsal fin dark other fins pale. Caught with bottom trawls and gillnets. Found in coastal waters to 50 m depth. India, Sri Lanka, through the East Indies to Kwangtung. Fairly common in the commercial catches of these islands, marketed fresh.



Dendrophysa russelli, 160 mm, SL.



Systematic view of gasbladder

Gillrakers on first arch

215. *Johnius belangerii* (Cuvier). **Belanger's croaker** : A medium sized fishes with a rounded snout and a small inferior mouth; no barbels on chin; teeth in villiform in both jaws; caudal fin rhomboid; gas bladder hammer-shaped with 11 to 15 pairs of appendages. Body dark grey, some times the pigment concentrated in short dark bars on back. Caught with bottom trawls and boat seines. Inhabits coastal waters to 40 m depth. Indo West Pacific. A common species in the commercial catches of these islands.



Johnius belangerii, 150 mm, SL.



Systematic view of gasbladder



Gillrakers on first arch

216. *Johnius macropterus* (Blecker). **Largefin croaker** : A small sized species with a rounded mouth slightly projecting snout; mental pores 5; a short stiff, blunt barbel behind the median pore; teeth villiform bands, the outer row of upper jaw slightly enlarged, teeth in lower jaw uniform; caudal fin rhomboid; gas bladder hammer shaped with 13 to 16 pairs of lateral appendages, the first branching in head. Colour back dark grey; flanks and belly whitish with silvery reflections, barbel and chin whitish; spinous dorsal fin darkish. Attains 25 cm. Caught with bottom trawls, gillnets, boat seines and shore seines. Inhabits coastal waters. Indo - West Pacific. Fairly common in the commercial catches on the coast of these islands.



Johnius macropterus, 190 mm, SL.

217 *Nibea soldado* (Lacepede). **Soldier Croaker** : Body fairly large, moderately compressed; mouth terminal; jaws meeting equally in front; teeth villiform, well differentiated in size in both jaws; snout with 3 very small rostral pores and 5 marginal well developed pores; pectoral fins short; caudal fin rhomboid. Body silvery with faint series of oblique stripes along scale-rows; border of soft part of dorsal fin dark. Gas bladder carrot shaped with 20 to 22 pairs of lateral appendages, the first long, entering the head and branching below the occipital region, the two last simple and parallel to tubular end of bladder, the rest arborescent without dorsal limb. Attains 30 cm. It is caught with bottom trawls, gillnets and boat seines. Inhabits coastal waters. Pakistan, India, Sri Lanka, Malay Peninsula, Gulf of Siam, Indonesia and Australia.

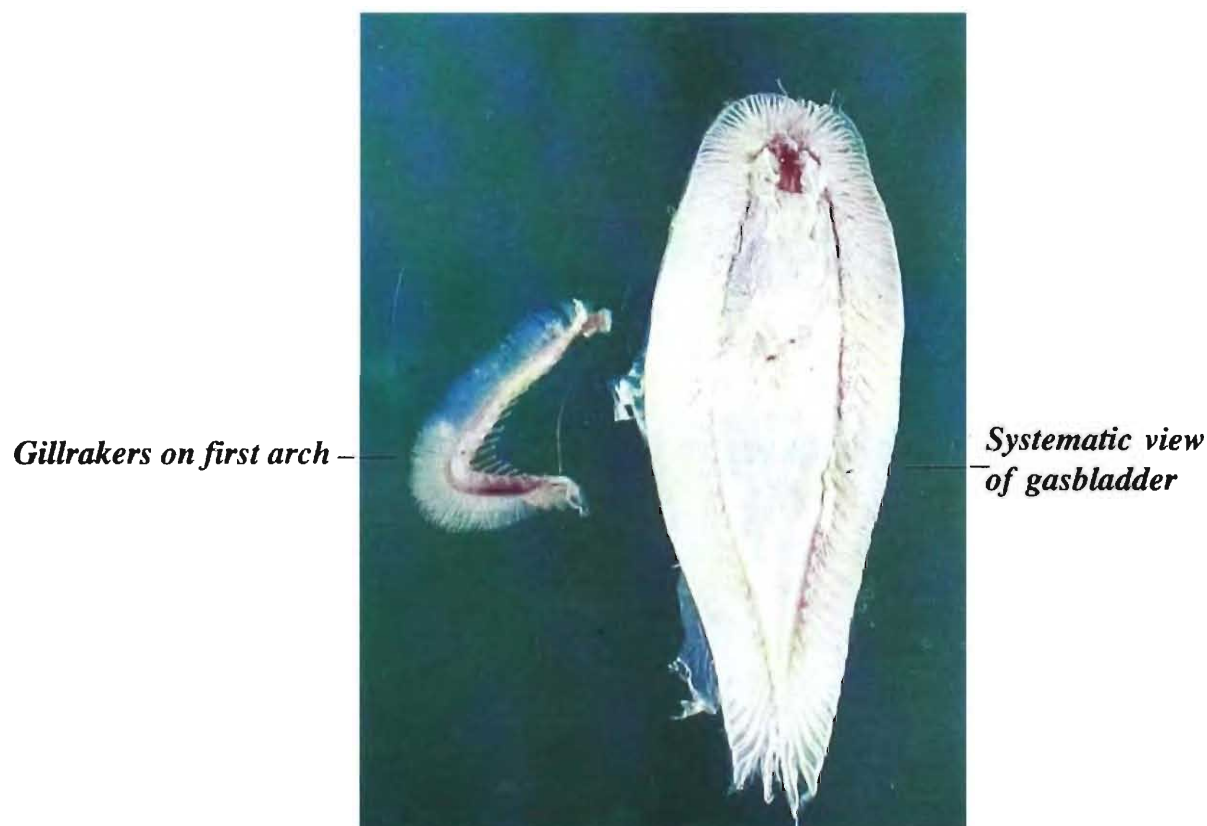


Nibea soldado, 165 mm, SL.

218. *Otolithes ruber* (Schneider). **Tigertooth croaker** : A slender species; mouth large and terminal, the lower jaw slightly projecting; teeth in two rows in upper jaw one pair of canine in each jaw; caudal fin rhomboid; gas bladder carrot-shaped with 32–35 pairs of appendages. Body silvery. Caught with bottom trawls, gillnets and hand lines. Inhabits coastal waters to 40 m. Indo–West Pacific. Common in the commercial catches of these islands. Marketed fresh.



Otolithes ruber, 235 mm, SL.



Gillrakers on first arch

Systematic view of gasbladder

219. *Pennahia macrophthalmus* (Bleeker). **Bigeye croaker** : A large species with a large terminal, oblique mouth; teeth well differentiated in size in both jaws, the outer upper teeth and lower inner series enlarged and spaced, but no outstanding canines. Body greyish on back, flanks and belly silvery, spinous dorsal fin dusky in upper half; a dusky diffused blotch on pectoral fin axil. Caught with bottom trawls and seine nets. Inhabits coastal waters to 60 m depth. Pakistan, India, through the East Indies to China. A common species in the catches and contributes a good fishery of these Islands.



Pennahia macrophthalmus, 210 mm, SL.

*Systematic view
of gasbladder*



Gillrakers on first arch

Family MULLIDAE

Goatfishes

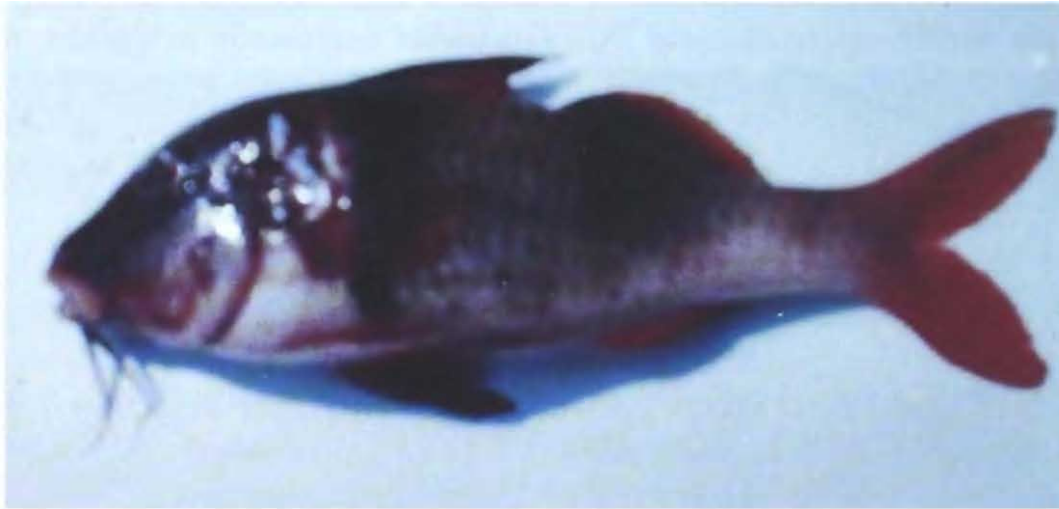
The pair of barbels on the chin readily distinguishes goatfishes. Body oblong, moderately compressed. Mouth rather small. Eyes situated near dorsal profile of head. Teeth in jaws in one or several series, villiform or conical. Scales large. Usually a small flat spine on opercle. Two widely separated dorsal fins. Goatfishes live mostly in shallow waters, on sandy or muddy bottoms or in coral reef areas. Their barbels are used to locate food organisms in the sediment. Pectoral fins short. Caudal fin forked. Important commercial fishes renowned for their delicious flesh. Six 6 genera worldwide and about 55 species; three genera with 20 species in Indian waters.

220. *Mulloidés flavolineatus* (Lacepede). **Yellowstripe goatfish** : Body oblong moderately compressed; teeth in jaws villiform; no teeth on vomer and palatines; five scales between 1st and 2nd dorsal fins. Body silvery white with bright yellow longitudinal band from eye to caudal; dark blotch on sides under middle of first dorsal fin. Attains 33 cm. Caught by gillnets and on hook and line. Found in shallow coastal waters, forming aggregations on coral reefs. Indo West Pacific and Red Sea. Taken commercially but not in abundant. Marketed mostly fresh.



Mulloidés flavolineatus, 250 mm, SL.

221. *Parupeneus bifasciatus* (Lacepede). **Doublebar goatfish** : Body deep; chin with two moderately long barbels; teeth in jaws in single row; 2 or 3 rows of scales between dorsal fins. Head and body purple yellow with two saddles on body. Found in shallow coastal water on in coral reef areas. Attains 30 cm. Caught by trawls, gillnets and on hook and line. Indo West Pacific south to Sodwana Bay. Taken commercially with other mullids. Not common, marketed mostly fresh.



Parupeneus bifasciatus, 210 mm, SL.

222. *Parupeneus heptacanthus* (Lacepede). **Redspot goatfish** : Body deep; mouth small; two barbels on chin; single series of snout and widely spaced teeth in both jaws; no teeth on vomer and palatines; 2 or 3 rows of scales between dorsal fins; third dorsal spine longest. Body usually golden on sides with faint longitudinal yellow band and lines of dots on scales; a small dark rectangular blotch below and behind first dorsal often visible on fresh specimens. Found in shallow coastal waters, in coral reef areas. Attains 28 cm. Caught with shore seines, gillnets and on hook and line. Indo West Pacific. Taken commercially, of minor value. Not common, marketed mostly fresh.



Parupeneus heptacanthus, 190 mm, SL.

223. *Parupeneus cyclostomus* (Lacepede). **Goldsaddle goatfish** : Body deep with two moderately long barbels; teeth in jaws in single row; 2 or 3 rows of scales between lines. Body red-bluish with a yellow saddle behind 2nd dorsal and often with blue streaks on head. A shallow water species, usually found on sandy bottoms and coral reef areas. Attains 48 cm. Caught with seines, gillnets and on hook and line. Indo West Pacific, Red Sea, Southwards to Durban. Taken commercially and of minor fishery importance, not common. Marketed mostly fresh.



Parupeneus cyclostomus, 310 mm, SL.

224. *Parupeneus indicus* (Shaw). **Indian goatfish** : Body deep; chin with two moderately long barbels, extend beyond preopercle; teeth in jaws in single row; 2 or 3 rows of scales between dorsal fins. Head and body purple; a large elongate yellow blotch, mostly above lateral line in between dorsal fins; a large black blotch on caudal peduncle. Attains 32 cm. Caught with shore seines, gillnet and on hook and line. Indo West Pacific to Port Alfred. Fairly common on the coasts of these islands. Marketed mostly fresh.



Parupeneus indicus, 255 mm, SL.

225. *Parupeneus macronema* (Lacepede). **Banddot goatfish** : Body deep chin with two long barbel; teeth in jaws in single row; 2 or 3 of scales between dorsal fins; last ray of dorsal extending beyond caudal peduncle. Adults reddish, a dark band from snout through eye reach up to the level of second dorsal fin end, dark blotch at midpoint of caudal peduncle. Inhabits mostly in shallow waters on sandy and in coral reef areas. Attains 35 cm. Caught mainly with seines, gillnets and on hook and line. Indian Ocean and Red Sea, South to Sodwana Bay. Taken commercially but abundant. Marketed mostly fresh.



Parupeneus macronema, 230 mm, SL.

226. *Upeneus moluccensis* (Bleeker). **Goldband goatfish** : Body elongate; chin with two stout, thin barbels; teeth in several rows in both jaws; 5 rows of scales between dorsal fins. Head and back brown-red, sides and belly white, a bright yellow band runs from anterior profile of head through eye above lateral line to caudal fin, caudal fin with 5 or 6 dusky cross bars on upper lobe. Lives in shallow coastal waters from 10 to 40 m depth. Attains 20 cm. Caught with shore seines, bottom trawls and on hook and line. Indo West Pacific. Taken commercially and of minor fishery value. Marketed mostly fresh.



Upeneus moluccensis, 155 mm, SL.

227. *Upeneus sulphurus* Cuvier. **Yellow goatfish** : Body compressed; chin with two thin, short barbels reaching to preopercular margin; no spine on operculum; narrow bands of very small teeth in both jaws and in roof of mouth. Head reddish, back olive-green, lower sides and belly yellow; two yellow bands along sides, the upper from eye to caudal peduncle and the lower from axil of pectoral fin to caudal peduncle; both dorsal fin white, with three horizontal stripes, tip of fin black; no marks on anal or caudal fins; barbels white. Attains 20 cm.



Upeneus sulphurus, 160 mm, SL.

228. *Upeneus tragula* Richardson. **Frikled goatfish** : Body elongate and slender; chin with two short thin barbels; teeth villiform in both jaws; 4 scale rows between space of dorsal fins. Head and back brownish, belly white; usually brown-blackish horizontal stripe from snout through eye to base of caudal fin; irregular dots and blotches on body; caudal fin with dark stripes; barbels yellow. Inhabits coastal waters, down to 40 m. Attains 20 cm. Caught with hand lines, shore seines and bottom trawls. Indo-West Pacific, south to Durban. This species is one of the most dominant species of the goatfish fishery of these Islands.



Upeneus tragula, 150 mm, SL.

229. *Upeneus vittatus* (Forsskal). **Yellowstriped goatfish** : Body elongate and rather robust; chin with two short barbels; teeth villiform in both jaws; 5 or 6 scale rows between space of dorsal fins. Head and body bronze, belly white; 4 golden line along sides; upper lobe of caudal fin with 4 or 5 dark stripes; lower lobe with 3 or 4 black stripes including a broad black stripe. Usually found in shallow turbid waters in schools from a few to 100 m depth. Attains 28 cm. Caught mainly with shore seines and bottom trawls. Indo West Pacific, Red Sea and Southward to East London. This species also constitutes an important element of the goatfish fishery from these Islands.



Upeneus vittatus, 200 mm, SL.

Family Monodactylidae

Moonfish

Body deep, compressed, covered with small deciduous scales extending onto median fins and head; dorsal and anal fin spines reduced, mostly covered by skin and scales at front margin of these fins; jaws with bands of tiny flattered or conical teeth; maxilla exposed; upper jaw slightly protrusive. Two genera with three species; one genus with two species in Indian waters.

230. *Monodactylus argenteus* (Linnaeus). **Silver-batfish** : Body compressed; eyes moderately large; mouth small and terminal; teeth in jaws flattened, tricuspid, the middle cusp much longer than the other two; pectoral fins short and rounded; caudal fin with concave margin. Adult's silvery with anterior lobes of dorsal and anal fins dusky. Common in the coastal waters during monsoon months. Attains 25 cm. Tropical Indo Pacific. It is low in importance as a food fish. Marketed fresh.



Monodactylus argenteus, 150 mm, SL.

Family PEMPHERIDAE
Sweepers

These fishes have moderately deep compressed bodies with a strongly tapering tail. Mouth large, terminal, oblique, the lower jaw projecting; upper jaw slightly protrusive, the maxilla is exposed on the cheek and does not reach beyond the pupil of the eye; very large eyes; the teeth are small with incurved tips, in bands in jaws, there are small teeth on the palatines and a V-shaped patch on the vomer. The dorsal fin is short and unnotched. The caudal fin is truncate to slightly forked. Pempherids are small to moderate sized fishes of shallow water. Most species occur in tropical regions. Common on coral reefs, they tend to form aggregations in caves by day. This family consists of only 2 genera and 23 species; both genera with four species in Indian waters.

231. *Pempheris adusta* (Bleeker). Dusky sweeper : Body elongates oval and compressed; mouth large, terminal, oblique, the lower jaw with narrow band of conical teeth; vomer and palatine toothed; dorsal fin single; pectoral fins pointed. Body and head coppery brown with silvery and brassy reflections; dorsal fin tip blackish; more or less distinct black blotch at base of pectoral. Attains 17 cm. Common on coral reefs. Indo West Pacific.



Pempheris adusta, 135 mm, SL.

232. *Pempheris vanicolensis* Cuvier. Vanikoro Sweeper : Body moderately deep compressed, with a strongly tapering tail, slender caudal peduncle; very large eyes; mouth oblique; lower jaw projecting; teeth in jaws small; forming a narrow setiform band; caudal fin slightly forked. Body brown darker above, silvery below; dorsal fin with dusky margins; pectoral fins yellow, pelvic fins orange. Attains 20 cm. fairly common in dense schools around rocky shores and coral reefs. Mauritius, Sri Lanka, the Andaman & Nicobar Islands, through the East Indies, to the Philippines and Australia.



Pempheris vanicolensis, 135 mm, SL.

Family TOXOTIDAE
Archerfishes

Body deep and laterally compressed. Head flat above and pointed. Mouth large, terminal and highly protractile. Eyes large. Dorsal fin inserted far back on body, with 4 to 5 strong spines and 12 to 14 rays; anal fin with 3 spines and 15 to 17 soft rays. Small fishes inhabiting marine coastal, brackish and fresh water of the Indo Australian region. The family comprises a single genus only with six species; three species in Indian waters.

233. *Toxotes chatareus* (Hamilton Buchanan). **Spotted archerfish** : Body oblong and compressed; head flattened on dorsal surface; mouth large, terminal and highly protractile; caudal fin truncate. Body grey to silvery with a series of 5 to 7 black blotches on upper side; dorsal and anal fins dusky to blackish. Attains 30 cm. Inhabits mangrove creeks. India, Sri Lanka, Burma, Malay Peninsula, Thailand, New Guinea and northern Australia.



Toxotes chatareus, 150 mm, SL.

234. *Toxotes jaculator* (Pallas). **Banded archerfish** : Body oblong and compressed; head flattened to dorsal surface. Body generally pale; with a series of 4 to 5 black blotches primarily on upper sides; dorsal and anal fins dusky to blackish. Attains 30 cm. Caught with traps, gillnets, and hook and line. Inhabits mangrove creeks. India, Burma, Thailand, Malay, New Hebrides and Solomon Islands. Common in the creeks and is of minor interest to fisheries.



Toxotes jaculator, 170 mm, SL.

Family KYPHOSIDAE

Drummers

The drummers are moderately deep-bodied compressed fishes with a small head and a small terminal mouth. Teeth are incisiform. The maxilla slips partially under the preorbital bone when the mouth is closed. The dorsal fin continuous, and the caudal fin is emarginate to forked. Moderate sized fishes of shallow water, found in rocky areas and reefs. These fishes are omnivorous, but feed mainly on benthic algae. They sometimes occur in small aggregations. Flesh not highly esteemed. Three genera with nine species; one genus with three species in Indian waters.

235. *Kyphosus vaigiensis* (Quoy & Gaimard). **Lowfinned drummer** : Body moderately deep, compressed; head and mouth small; teeth are incisiform; soft portion of dorsal fin not elevated, about the same height or lower than dorsal spines; caudal fin forked. Body silvery grey with narrow bronzy stripes on side. Attains 60 cm. Caught mainly with hand lines and nets. Found in shallow waters in small aggregations, feed mainly on benthic algae. Indo West Pacific. Taken commercially only occasionally in these islands.



Kyphosus vaigiensis, 480 mm, SL.

Family DREPANIDAE

Sicklefishes

Body oval and strongly compressed. Mouth very small, terminal and protrusive, forming a downward-pointing tube. Teeth small and setiform. Dorsal fin with VIII to IX spines and 19 to 22 soft rays. Anal fins with III spines and 17 to 19 soft rays. Pelvic fins well developed; pectoral fins long falcate. Lateral line strongly arched. Caudal fin rounded. Coastal species often entering brackish waters. A single genus with 2 or 3 species; two species in the Indian region.

236. *Drepane longimana* (Bloch and Scheider). **Banded sicklefish** : Body and head deep; strongly compressed; mouth protractile downwards forming a tube; some serrae at angle of preoperculum; bands of small; setiform teeth in jaws; teeth on tongue, but none in roof of the mouth; pectoral fins long and pointed, reaching to base of caudal fin; caudal fin rounded. Body silvery, dark on back with dotted dark vertical lines; fins brownish; dorsal, anal and ventral fins with dark margins. Attains 50 cm. Caught with bottom hand lines, and bottom trawls. A coastal species, often entering the backwaters. West and East Coast of Africa, the Red Seas to India to Japan, New Guinea and Samoa. A rather common species, its flesh is said to be of excellent quality. Marketed fresh.



Drepane longimana, 142 mm, SL.

237. *Drepane punctata* (Linnaeus). **Spotted sicklefish** : Body strongly compressed; mouth protractile into a downward directed tube; fringe of 4 to 6 short cirri ventrally on lower jaw (absent in adults); teeth setiform slender and crowded; pectoral fins long and pointed, reaching to base of caudal fin; caudal fin rounded. Body generally silvery with greenish tinge on upper half of body and large orange spot just above base of pectoral fin; 4 to 11 vertical bands of small black spots on upper half of body; margins of dorsal and caudal and ventral fins greyish-black. Attains 40 cm. Caught with hand lines and bottom trawls. A coastal species often entering backwaters. Indo West Pacific.



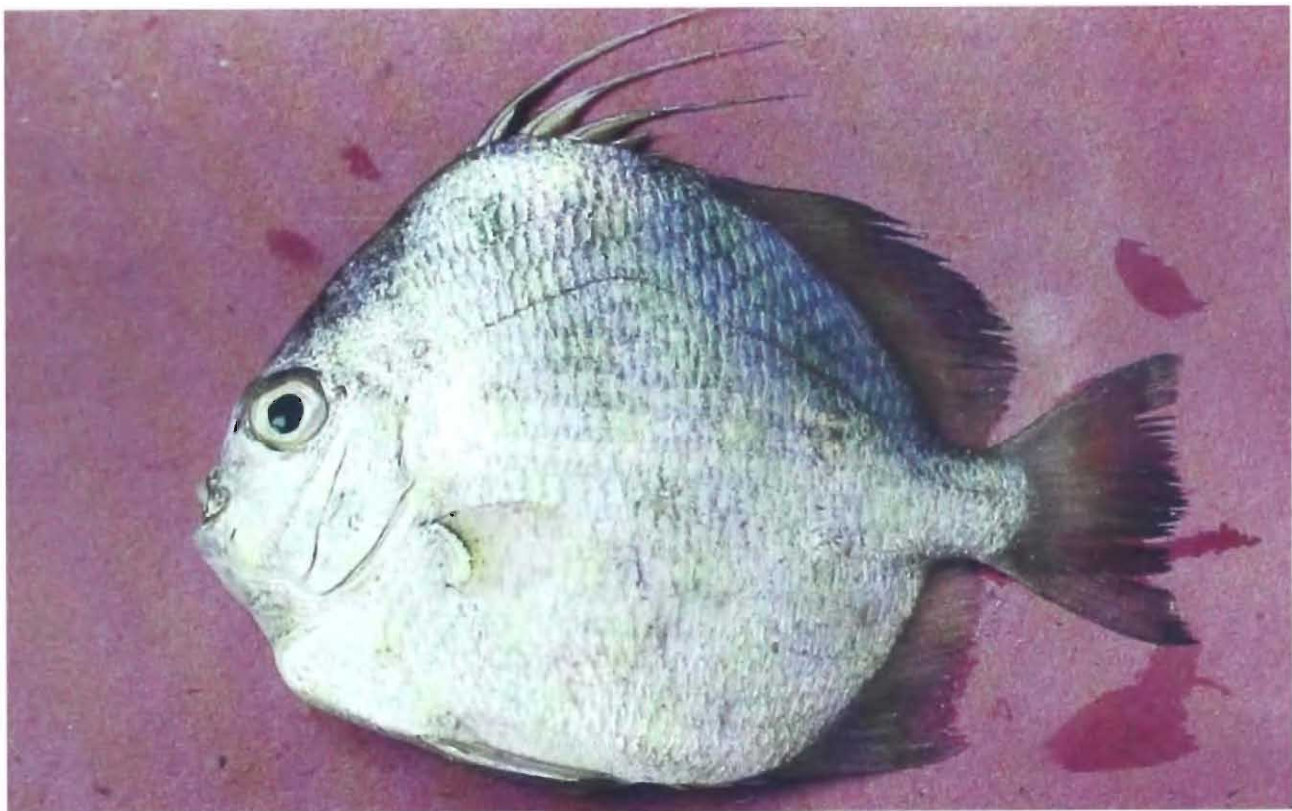
Drepane punctata, 115 mm, SL.

Family EPHIPPIDAE

Batfishes

These are distinctive fishes with deep nearly circular, compressed bodies. The mouth is small and terminally located. The teeth in the jaws are brush-like and often have tricuspid tips. The dorsal fin is continuous with V to IX spines and 19 to 40 rays; anal fin with III spines and 17 to 28 rays. The colour pattern is often silvery with dark bars. Batfishes occur on both sheltered and more offshore reefs. Worldwide the family contains 5 genera and about 17 species; three genera with five species in Indian waters.

238. *Ephippus orbis* (Bloch). **Spadefish** : Body strongly compressed, rounded in shape; mouth small, terminal not protractile; teeth in bands, setiform; no teeth on palate; pectoral fins short and rounded; body densely scaled. Body silvery with 4 or 5 vertical black bars on body from dorsal fins almost to belly. Attains 25 cm. Caught mainly with hand lines. Found in shallow water, common in creeks. Indo West Pacific. Contributes a small fishery in these islands. Marketed fresh.



Ephippus orbis, 220 mm, SL.

239. *Platax pinnatus* (Linnaeus). **Pinnate batfish** : Body compressed much elevated, adults orbiculate, but distinguished by protruding snout; mouth is small, terminal; teeth in jaws are brush like, tricuspid tips; pectoral fins short and rounded; pelvic fins well developed, the first soft ray extending to anal fin; caudal fin truncate. Body silvery grey or brownish with a black bar through eye and another at level of pectoral fin extending onto pelvic fin. Attains 30 cm. Associated with coral reefs. Indo Pacific. Of minor commercial significance in these islands.



Platax pinnatus, 250 mm, SL.

240. *Platax orbicularis* (Forsskal). **Orbicular batfish** : Body nearly circular and compressed; mouth small and terminal; teeth brush-like and have tricuspid tips; middle tooth cusp longer and stronger than lateral cusps; snout convex; chin with five mandibular pores each side; juveniles with elevated, but relatively broad, dorsal and anal fins; adults orbiculate; silvery grey with a black bar through eye and another on body at level of pectoral fin; dorsal and anal fins with a black margin; often small black spots scattered on side; small juveniles light reddish brown to brownish yellow with a narrow brown bar through eye. Juveniles seen inshore off sandy beaches and around boat moorings; larger fish are solitary or occur in small groups. Attains 50 cm. Indo West Pacific. Of minor commercial significance in these islands.



Platax orbicularis, 230 mm, SL.

Family SCATOPHAGIDAE

Spotted Scats

Body compressed, covered with minutes, ctenoid scales. Mouth small; jaws not protrusive, with bands of minute, slender, tricuspid, movable teeth; vomer and palatines edentate. Fins with strong spines that can produce a painful wound. Lateral line complete. Anal fin spines 4; Pelvic fins with 1 spine and 5 branched rays. Two genera with four species; one genus with two species in Indian waters.

241. *Scatophagus argus* (Linnaeus). **Spotted Scat** : Body quadrangular, strongly compressed; head profile rising steeply to nape; snout and interorbital space rounded; mouth small, with brush like teeth; dorsal fin deeply notched; caudal fin truncate in adults, rounded in juveniles. Body bluish or greenish-grey to dusky brown above, with numerous irregular large brown spots, which may extent onto soft dorsal fin, belly silvery. Attains 30 cm. Caught with gillnets. Inhabits mangrove creeks, backwaters, harbours, etc, usually occuring in schools. India, Sri Lanka, through the East Indies to Australia, the New Hebrides and Solomon Islands. A quiet common species especially in creeks. Marketed fresh.



Scatophagus argus, 200 mm, SL.

Family MUGILIDAE

Mulletts

Mulletts are silvery grey fishes with a small mouth, moderately elongates body; head depressed; blunt snout; teeth absent or minute; eyes often partly covered by adipose eyelid; two widely separated dorsal fins, the first of 4 spines; fairly large scales on body and head; no lateral line; preorbital serrate; caudal fin emarginate or weakly forked. Circumblobal fishes of commercial importance, inhabiting coastal marine waters, and in estuaries. Mulletts commonly form schools. They are important food fishes and fished commercially mostly with seine nets, floating gillnets and in mangrove swamps by stonewalled traps. Mulletts feed mostly on detritus and algae. Thirteen genera containing 70 species are known; seven genera with 15 species in the Indian region.

242. *Liza macrolepis* (Smith). **Largescale mullet** : Body elongate; head wide, flattened above; teeth feeble; palatines edentate, teeth on vomer and tongue; no adipose eyelids; pectoral folded forward reaches about in front of eye; pectoral axillary scales rudimentary; scales finely ctenoid; caudal fin slightly forked. Body dark greenish above, silvery on sides and belly; fins dusky along margins. Attains 35 cm. Caught with gillnets, cast nets, barrier nets, lift nets and beach seines. Inhabits shallow coastal waters, estuaries and backwaters, forming large schools. Indo West Pacific. It is one of the most important species of mullet in these Islands. It is appreciated as food and usually marketed fresh or dry-salted.



Liza macrolepis, 250 mm, SL.

243. *Liza parsia* (Hamilton - Buchanan). **Goldspot mullet** : Body slender; head moderately wide, flattened on top; lips thin, lower lip with high symphial knob; hind end of upper jaw reaching vertical between posterior nostril and anterior rim of eye; teeth labial, two rows of short teeth in upper lip, lower lip edentate; origin of first dorsal fin nearer to tip of snout than to caudal fin base; pectoral fin short axillary scale rudimentary or absent; caudal fin slightly forked. Body greenish brown above, flanks and belly white to silvery, a golden spot on upper portion of operculum; edge of dorsal fins dusky; caudal fin base yellowish. Caught with gillnets, cast nets and beach seines. A schooling species, found in shallow coastal waters including brackish waters. India, Sri Lanka and Pakistan. Important food fish and usually marketed fresh or dry salted.



Liza parsia, 280 mm, SL.

244. *Liza vaigiensis* (Quoy & Gaimard). **Squairetail mullet** : Body robust; head broad and flat; adipose eyelids vestigial; adults without teeth; tongue dentate; scales large, ctenoid, each with a short mucous canal; preorbital notched and denticulate; pectoral axillary scale rudimentary or absent; pectoral bent forward reaches front of eye; second dorsal and anal fin scaly; caudal fin slightly emarginate. Body light olive above, silvery on sides, pale yellow below; most fins dusky. Attains 60 cm. Caught mainly with cast nets, beach seines. A coastal species enters fresh water. Indo - West Pacific, south to Durbon. This species is common in the catches along the coasts of these islands. It is appreciated as food and usually marketed fresh or dry-salted.



Liza vaigiensis, 320 mm, SL.

245. *Mugil cephalus* Linnaeus. **Flathead mullet** : Body rather stout; head broad and flattened on top; adipose tissue covering most of eye; lips thin; preorbital moderately narrow; anterior and posterior edges serrate; several rows of teeth in upper lip. Colour olive green on back, silvery on sides. A coastal species, found in all warm and temperate seas and creeks. Caught with gill nets, cast nets, barrier nets and beach seines. Attains 70 cm.



Mugil cephalus, 380 mm, SL.

246. *Valamugil cunnesius* (Valenciennes). **Longfin gray mullet** : Body rather slender; head moderate; adipose eye lid well developed; maxilla exposed when mouth shut; minute teeth on lips; no teeth on palatines; tongue dentate; second dorsal fin origin vertical through end of anterior third of anal fin base. Body dark gray on back, silvery below; dark axillary spot on pectoral base. A schooling species, found in coastal waters and creeks. Forms large aggregations when spawning takes place. Caught with gill nets, cast nets, barrier nets and beach seines. Attains 40 cm. Indo Pacific.



Valamugil cunnesius, 310 mm, SL.

247. *Valamugil seheli* (Forsskal). **Bluespot mullet** : Body moderately elongate; head depressed; interorbital broad and scaly; adipose lid only around rim of eye; no teeth in lips or on palatines but vomer and tongue dentate. Colour back blue, flanks and belly silvery. Pectoral fins yellow, with dark blue spot at axil. Attains 50 cm. A schooling species, found in coastal waters and creeks. Caught with gill nets, barrier nets, cast nets and beach nets. Indo Pacific.



Valamugil seheli, 350 mm, SL.

Family SPHYRAENIDAE

Barracudas

Barracudas are large predators and voracious fishes. Body elongate, sub cylindrical, covered with small, cycloid scales. Head long and pointed; mouth large, jaws and palatines sharp flattened or conical teeth; lateral line straight; caudal fin forked. They are occurring in all tropical and temperate seas. They are commercially important and are excellent food fish of these islands. One genus and 20 species; ten species in Indian waters.

248. *Sphyraena flavicauda* Ruppell. Yellowtail barracuda : Body elongates and slightly compressed; pointed snout and protruding lower jaw; a pair of gill rakers on first arch; caudal fin forked. Body silvery with a pair of brown stripes on side, the first from tip of snout through eye and base of pectoral fin to caudal peduncle, a second fainter stripe from top of eye and continuing along lateral line to upper caudal peduncle, caudal fin and caudal peduncle yellow. Attains 35 cm. Caught with seines, bottom trawls and by trolling. Found in coastal waters, smaller individual occurring in schools. Indo Pacific. Of minor fishery importance.



Sphyraena flavicauda, 220 mm, SL.

249. *Sphyraena forsteri* Cuvier. **Bigeye barracuda** : Body slightly compressed; lower jaw projecting beyond upper; upper jaw about reaching to level of front eyes; a series of minute teeth and two sharp canines in front in upper jaw; palatines with a few sharp, flattened triangular teeth; gill rakers absent; eye large. Body greenish Grey dorsally, silvery on sides, with a blackish blotch behind base of pectoral fin; tip of second dorsal and anal fins white. Found near coral bommies and on outer reef slopes. Attains 65 cm. Indo Pacific. The species is caught in coastal waters. Of minor fishery importance, being taken occasionally on the coast of these islands.



Sphyraena forsteri, 380 mm, SL.

250. *Sphyraena obtusata* Cuvier. **Obtuse barracuda** : Body elongate, slightly compressed; lower jaw projecting beyond upper; upper jaw not reaching to level of front of eyes; edge of preoperculum triangular; a series of minute teeth in upper jaw and two sharp canines in front; teeth in lower jaw slender; palatines with a single row of a few sharp teeth followed by numerous minute teeth; gill rakers minute, two long rakers on first gill arch. Body light brown above, silvery below without distinct stripes; inside of mouth yellow; 1st dorsal fin dusky with yellow tinge; second dorsal and caudal fins yellow with dark margin; pectoral and anal fins yellow, ventral fins white. Found in outer reef areas. Caught by set net or gill net. Attains 35 cm. Indo Pacific.



Sphyraena obtusata, 210 mm, SL.

Family POLYNEMIDAE

Threadfins

These fishes have an elongate body, sub cylindrical, covered with small cycloid scales. Snout bluntly rounded and mouth ventral; jaws elongate, the lower considerably projecting; large, sharp, flattened on conical teeth of unequal size on jaws and palatines; usually one or two strong, sharp canines near tip of lower jaw. There are two separate dorsal fins and the pectoral fin is divided into an upper section with the rays attached to the fin membrane and a detached lower section with 3 to 7 free, thread-like rays. Threadfins are usually encountered near the coast over sandy or muddy bottoms or brackish mangrove creeks. They are used extensively as food in these islands, where nets usually take them, the largest species are commercially important. Seven genera with about 35 species are known from warmer waters; three genera with 12 species in Indian waters.

251. *Polydactylus heptadactylus* (Cuvier). **Sevenfinger threadfin** : Body oblong and somewhat compressed; mouth large, with small teeth in jaws, vomer and palatines; eyes large; free filamentous rays of 3rd to 5th are longest and extend usually to anal fin; caudal fin forked, with equal lobes. Body golden with distinctive dusky blotch on shoulder; pectoral fins almost black; other fins yellowish and blackish distally. Attains 80 cm. Caught with beach seines, gill nets and bottom trawls. Found in shallow coastal waters, over sandy or muddy bottoms. Pakistan, India, Sri Lanka, Burma and the East Indies. Occurs in large shoals in shallow coastal waters and creeks. The flesh is highly appreciated.



Polydactylus heptadactylus, 165 mm, SL.

252. *Polydactylus plebeius* (Broussonet). **Striped threadfin** : Body oblong and slightly compressed; snout projecting, mouth large with small teeth in jaws, vomer and palatines; eyes large; pectoral fin in two parts, upper part with all rays simple, lower part with 5 free filamentous rays, of which the upper 2 are the longest and reaching to or near tip of pelvic fin; caudal fin forked, with lobes equal. Body golden olive with a few narrow dusky stripes along scale-rows; pectoral fins black. Attains 45 cm. Indo West Pacific.



Polydactylus plebeius, 260 mm, SL.

Family PINGUIPEDIDAE

Sandperches

A moderately elongate, little compressed body characterizes the sand perches. Terminal protractile mouth with curved canine teeth in an outer row at front of jaws; teeth on vomer; a long dorsal fin with IV to VII spines and 20 to 24 rays; anal fin rays I, 14 to 22; lateral line complete; caudal fin rounded, truncate to emarginate. Small to moderate sized benthic fishes often found on sand and rubble areas near coral reefs. Four genera with about 60 species; one genus with six species in Indian waters.

253. *Parapercis hexophthalma* (Cuvier). **Speckled SandPerch** : Body elongate; snout projecting; eight canine teeth at front of lower jaw; palatine teeth absent; fourth dorsal spine longest. Body light greenish brown dorsally, speckled with brown, white ventrally; a series of large elliptical whitish spots along side of body with a blackish spot or group of small spots in center of each; lower side of body with a row of small black spots; caudal fin with a very large black blotch in center. Attains 20 cm. A shallow water species found on sand and rubble around protected reefs. Fiji and Western Pacific to East Africa and Red Sea.



Parapercis hexophthalma, 140 mm, SL.

Family ACANTHURIDAE

Surgeonfishes

The surgeonfishes are named for the sharp spine or spines they possess on the caudal peduncle. Deep compressed body with the eye high on the head and a long preorbital bone, a single unnotched dorsal fin with IV to IX spines and 19 to 33 rays, on anal fins with II or III spines and 18 to 28 rays; a small terminal mouth with a single row of close set teeth which may be spatulate with denticulate edges or numerous comb like with expanded incurved tips, no teeth on the palate. Caudal fin truncate or lunate. Most surgeonfishes occur in shallow tropical waters and graze on benthic algae. The surgeonfish family consists of nine genera with 72 species; five genera with 24 species in Indian waters.

254. *Acanthurus bleekeri* Gunther. **Blueline Surgeonfish** : Body compressed; mouth small; snout short; teeth small and numerous, 14 to 18 in upper and 16 to 24 in lower jaw; a single sharp, forward pointing erectile spine on each side of caudal peduncle which folds down into a horizontal groove; caudal fin lunate. Body dark brown with many wavy blue lines on head and body; yellow band from interorbital to posterior margin of gill cover. Attains 35 cm. Indo West Pacific. Of minor fishery significance in these islands.



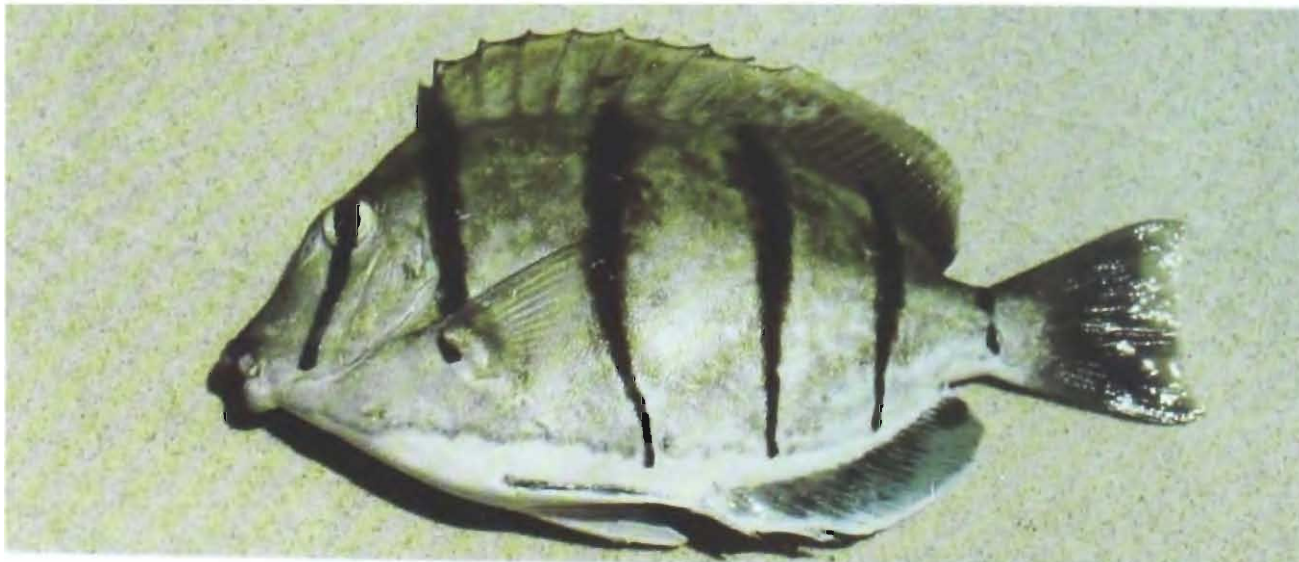
Acanthurus bleekeri, 280 mm, SL.

255. *Acanthurus lineatus* (Linnaeus). **Striped Surgeonfish** : Body compressed; caudal spine very long on each side of caudal peduncle, which folds down into a horizontal groove; caudal fin lunate. Upper three-fourths of head and body alternately banded with black-edged blue and yellow stripes; lower edged blue and yellow stripes; lower fourth lavender to pale blue. Attains 38 cm. Lives at the outer edge of reefs exposed to wave action. Indo Pacific.



Acanthurus lineatus, 300 mm, SL.

256. *Acanthurus triostegus* (Linnaeus). **Convict Surgeonfish** : Body compressed and deep; mouth small; teeth spatulate, close set, with denticulate edges; caudal spine small; caudal fin slightly emarginate. Body light greenish grey with six narrow black bars on head and body. Attains 25 cm. An inshore species. Indo Pacific. On minor fishery significance.



Acanthurus triostegus, 200 mm, SL.

257. *Acanthurus xanthopterus* Valenciennes. **Yellowfin Surgeonfish** : Body compressed; mouth small; teeth 12 to 18 in upper jaw and 14 to 21 in lower jaw; caudal spine relatively small; caudal fin lunate. Body purplish grey to brown; dorsal and anal fins with 4 to 5 dull yellow stripes, alternating with blue. Attains 55 cm. Occurs in habitats dominated by sand. Indo-Pacific. Minor fishery value in these islands.



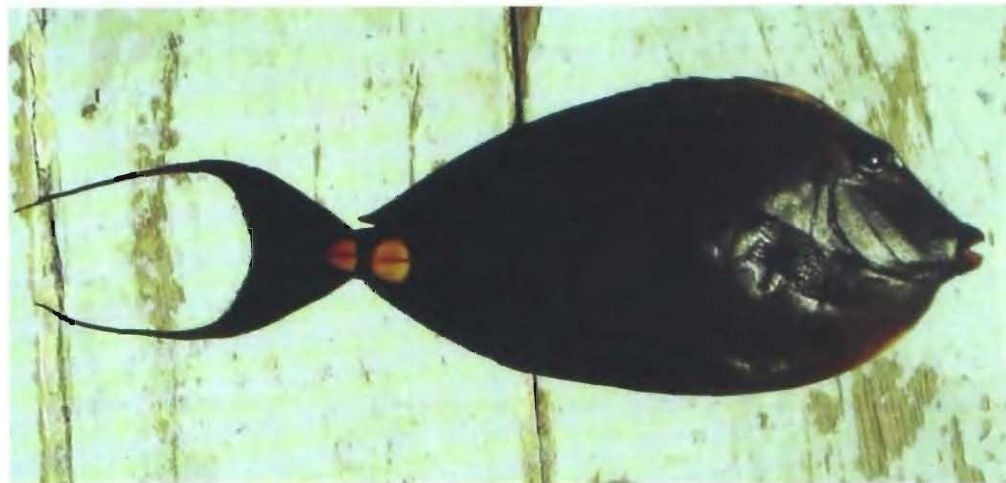
Acanthurus xanthopterus, 355 mm, SL.

258. *Ctenochaetus striatus* (Quoy & Gaimard). **Lined bristletooth** : Body compressed; mouth small; upper teeth 5 to 7 denticulations and lowers with 4; adults with as many as 45 upper and 53 lower teeth; caudal fin lunate. Body dark brown with numerous blue longitudinal lines; orange-yellow dots dorsally on head and nape; soft portions of dorsal and anal fins with about five narrow bluish stripes; a small black spot at rear base of dorsal fin. Attains 26 cm. One of the most abundant of surgeonfish's inhabits in reef habitats. Indo Pacific.



Ctenochaetus striatus, 210 mm, SL.

259. *Naso lituratus* (Forster). **Orangespine unicornfish** : Body compressed; teeth of adults incisiform, smooth edged with rounded ends, 30 to 35 in jaws; dorsal spines stout, the first strongest and longest; two peduncular plates, each with a large forward-curved knife like keel; caudal fin emarginate. Body greyish brown, the peduncular plates bright orange, a narrow curved yellow band from behind mouth to below eye; snout in front band black; a diffuse yellow area behind and above eye; lips orange-yellow; dorsal fin orange yellow with a black band Attains 45 cm. Indo Pacific.



Naso lituratus, 380 mm, SL.

260. *Naso vlamingii* (Valenciennes). **Valaming's unicornfish** : Body compressed; adults with a prominent convexity on fore head at level of lower edge of eye; two peduncular plates with knife-like pointed keel; dorsal fin elevated; caudal fin of adults truncate to slightly rounded with a long filament from each corner. Adults yellowish-brown with irregular vertical blue lines on side of body and small blue spots and broad blue band extending anteriorly from eye; lips blue; caudal fin with a yellow posterior border and blue filaments. Attains 55 cm. Inhabits in outer reef areas in open water near drop-offs. Indo Pacific.



Naso vlamingii, 450 mm, SL.

Family SIGNIDAE

Rabbit fishes

The body of siganid fishes is ovate and compressed with a narrow caudal peduncle. The mouth is small, somewhat ventral and not protractile, the upper lip is broader than the lower; the teeth are small, incisiform, bicuspid or tricuspid and in one row, Dorsal fin XIII. Spines and 10 soft rays and preceded by an embedded, procurement spine; anal spine VII, soft rays 9; pelvic fins with a spine at each end and three soft rays between. The spines are venomous, stab wounds very painful. Inhabits in shallow coastal waters, including mangroves, brackish waters and reef areas. Most reef dwelling species occur in schools, others in pairs or solitary, which range over sea grass and algal flats. Rabbitfishes, in general are regarded as good fishes, in spite of their not attaining large size. Some species have been considered for aquaculture because of their herbivorous food habits, rapid growth, and commercial value. There are two genera with about 28 species in the family, all from the Indo Pacific region; both genera with 14 species in Indian Seas.

261. *Siganus canaliculatus* (Park). **Whitespotted rabbitfish** : Body oval and compressed; snout somewhat convex; caudal fin slightly forked. Body greenish to yellowish, with small bluish white spots; spots on head pinhead size, larger on body, those on side and ventrally often horizontally elongate; a dark blotch present just behind upper end of gill opening. Attains 40 cm. Inhabits on algal and sea grass flats in schools; move with rising tide into the shallow to feed on benthic plants. Indo West Pacific.



Siganus canaliculatus, 210 mm, SL.

262. *Siganus guttatus* (Bloch). **Golden rabbitfish** : Body compressed; anterior nostril without flap; spines stout but pungent; caudal fin emarginate in small juveniles but becoming more forked with increasing size. Body dusky blue above to silvery below, with numerous large golden-brown blotches separated by a network of blue lines; head with oblique bluish lines; usually a large, pale yellow blotch below end of soft dorsal base; dorsal, anal and caudal fins with round brown spots. Attains 40 cm. Indo West Pacific.



Siganus guttatus, 270 mm, SL.

263. *Siganus javus* (Linnaeus). **Streaky rabbitfish** : Body compressed; dorsal profile of head straight, ventral fins shorter than pectoral fins; caudal fin truncate to slightly emarginate. Body bluish white with numerous dark bluish-grey stripes on ventral part of body, these becoming progressively more irregular until on dorsal half of body they form a reticulum, isolating spots or short irregular segments of bluish white; white spots on nape and dorsally on head very small. Attains 50 cm. Inhabits mainly in brackish areas and on coastal reefs in small groups. Persian Gulf to Philippines and northern Australia.



Siganus javus, 160 mm, SL.

264. *Siganus puelloides* Woodland and Randall. **Orangespotted Rabbitfish** : Body moderately deep and compressed; spines stout and pungent; caudal fin prominently forked. Body pale bluish above silvery white below, the side of head and body densely covered with brownish-yellow spots; very dark brown strap under chin, terminating at upper margin of upper lip. Attains 25 cm. Adults live in pairs around rock and coral reefs. Maldives, Similian and Andaman and Nicobar Islands.



Siganus puelloides, 190 mm, SL.

265. *Siganus spinus* (Linnaeus). **Spiny Rabbitfish** : Body moderately elongate and compressed; snout short; dorsal profile convex; caudal fin of juveniles emarginate, truncate in adults. Body whitish with a labyrinth of narrow brown bands overhead and body; fins translucent, mottled with dark brown. Attains 30 cm. Inhabits in shallow outer reef areas in small groups, where they graze on algae. French Polynesia to Andaman Sea.



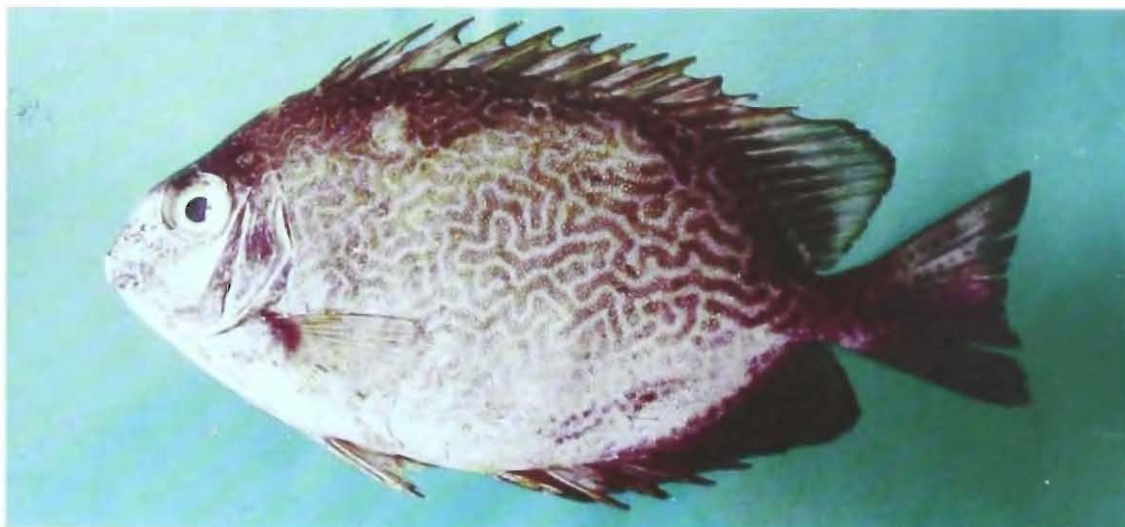
Siganus spinus, 210 mm, SL.

266. *Siganus stellatus* Forsskal. **Finespotted Rabbitfish** : Body compressed; dorsal profile of head nearly straight; spines stout, not pungent, except in juveniles; caudal fin emarginate in young, but deeply forked with increasing size. Body grayish green with head and body covered with chocolate brown spots. Attains 30 cm. Inhabits as pair on coral reefs. East coast of Africa to Andaman Sea.



Siganus stellatus, 220 mm, SL.

267. *Siganus vermiculatus* (Valenciennes). **Vermiculate rabbitfish** : Body moderately deep; dorsal profile of head steep and straight above mouth to in front of eye, then curving slightly to a more sloping straight section for rest of head; spines stout and blunt; caudal fin emarginate. Body bluish white with a very irregular vermiculate pattern of dark yellowish brown bands on body except ventrally where spotted with brown; head with a similar pattern but less marked, the bands narrower; caudal fin with small dark brown spots. Attains 45 cm. Occurs in shallow brackish areas, usually in small groups. Fiji and the Caroline Island to India. Highly esteemed as a food fish; a good candidate for aquaculture.



Siganus vermiculatus, 300 mm, SL.

268. *Siganus virgatus* Valenciennes. **Barred rabbitfish** : Body moderately deep; and compressed; dorsal profile of head slightly convex before eye; spines stout and fairly pungent; caudal fin emarginate in juveniles to moderately forked in adults. Body light blue dorsally and posteriorly, white ventrally; a brown band diagonally from nape to chin; another from base of 4th to 5th dorsal spines to base of pectoral fin; alternating blue and yellow lines across interorbital area and snout; ocular and shoulder bands are spotted with blue; side of the body also spotted with blue. Indo Malayan region.



Siganus virgatus, 215 mm, SL.

Family TRIVHURIDAE

Ribbon-fishes

Body extremely elongate and compressed; scales absent; mouth large, not protractile; canine teeth in jaws; minute teeth on palatines, none on vomer; dorsal fin continuous; pelvic fin reduced to scale like spine or absent; lateral line single. They are voracious predators, distributed in tropical and temperate seas; form shoals and sometimes enters the estuaries. Nine genera with about 17 species; five genera with nine species in Indian waters.

269. *Lepturacanthus savala* (Cuvier). **Small-headed ribbonfish** : Body very elongate and strongly compressed, ribbon like and tapering to a point; mouth large with fang-like teeth; anal fin reduced to a series of separate visible spines; pelvic and caudal fins absent. Body steely blue with metallic reflections. Mainly caught by trawls and seines. Bottom living as well as pelagic. Indo Pacific. Taken commercially in small quantities.



Lepturacanthus savala, 570 mm, SL.

Family SCOMBRIDAE

Tunas and Mackerels

Body elongate and fusiform, moderately compressed in some genera. Snout pointed; mouth rather large; teeth in jaws strong, moderate or weak; no true canines; palate and tongue may be toothed. Two dorsal fins, with finlets behind second dorsal and anal fins; caudal fin deeply forked with supporting caudal rays completely covering hypural plate. At least two small keels on each side of caudal peduncle, a larger keel in between in many species. Scombrids are swift, epipelagic predators; some species occur in coastal waters, others far offshore. The scombrids, or tunas, mackerels, as they are commonly known, are well known fishes that form the basis of valuable commercial fisheries in many regions. Many species form large school. Tuna fishery can be exploit from these waters. As there is no organized tuna fishery in Andaman & Nicobar Islands. Fifteen genera and 49 species are known; eleven genera with 23 species in Indian Seas.

270. *Acanthocybium solandi* (Cuvier). **Wahoo** : Body elongate and fusiform; snout and jaws elongate and beak-like; teeth compressed triangular and finely serrate; villiform teeth on vomer and palatines; body covered with small scales; caudal fin lunate. Body silvery blue above and pale below with many narrow vertical bars. Attains 210 cm. It is caught on hook and line by trolling. An epipelagic oceanic species. A worldwide species of tropical and subtropical waters in all three major oceans and the Mediterranean Sea. Occasionally caught by trolling. Marketed mostly fresh.



Acanthocybium solandi, 1600 mm, SL.

271. *Auxis thazard* (Lacepede). **Frigate tuna** : Body robust, slightly compressed; teeth small and conical; no teeth on vomer and palatines; body naked except for corselet, which is well developed and narrow in its posterior part (not more than 5 scales wide under second dorsal fin origin); a strong central keel on each side of caudal peduncle between two smaller keels. Body dark bluish; 15 or narrower, oblique to horizontal dark wavy lines in scale less area above lateral line. Attains 50 cm fork length. Caught mainly by trolling and gillnetting. An epipelagic, neritic as well as oceanic species. Tropical and subtropical waters of Indo-Pacific and Atlantic Oceans. This species seen in the commercial catches in small quantities. Marketed mostly fresh.



Auxis thazard, 300 mm, SL.

272. *Euthynnus affinis* (Cantor). **Eastern little tuna** : Body robust, elongate and fusiform; teeth small and conical; a patch of teeth present on vomer, elongate patches on palatines; caudal peduncle slender, with a prominent lateral keel between two smaller keels. Body dark bluish with wavy stripes on back; 2 or more dark spots between pectoral and ventral fins. Attains about 100 cm. Gillnetting and trolling are the major fishing techniques in use. An epipelagic, neritic and oceanic species. Tropical Indo West Pacific. This species is seen in the commercial catches in large quantities. Marketed mostly fresh.



Euthynnus affinis, 450 mm, SL.

273. *Gymnosarda unicolor* Ruppell. **Dogtooth tuna** : Body robust and fusiform; teeth large and conical; an elongate patch on palatines; a few small teeth on vomer, 2 patches of fine teeth on tongue; body naked behind corselet except for narrow band of scales along lateral line and dorsal bases, and the caudal keel area. Back and upper sides deep blue without any discernible pattern. Attains about 150 cm. Caught mainly by gillnets and on hook and line. Epipelagic, usually associated with coral reefs. Indo West Pacific. Commercially important species. Marketed mostly fresh. Seen occasionally in the catches.



Gymnosarda unicolor, 1100 mm, SL.

274. *Rastrelliger brachysoma* (Bleeker). **Short-bodied mackerel** : Body very deep; head equal to or less than the body depth; gill rakers very long; teeth minute, in a single series in both jaws; absent on vomer and palatines; scales small, ctenoid. Back of the body bluish green, belly silvery with a yellowish tinge; often 1 or 2 rows of dark spots on back; spinous dorsal fin yellowish with a black edge. Attains 30 cm. Caught with purse seines, floating gill nets, shore seines also on hook and line attracting large schools by shrimp. An epipelagic, neritic species lives in large schools. Andaman Sea, Indonesia, Thailand, Philippines and eastwards to Fiji islands. Marketed fresh, also dried salted. This species forms a fishery of local importance in these islands.



Rastrelliger brachysoma, 140 mm, SL.

275. *Rastrelliger faughni* Matsui. **Faughn's mackerel** : Body fusiform; head longer than body length; gill rakers very short; teeth in a single series, minute and pointed in both jaws; absent on vomer and palatines; scales small ctenoid. Body bluish-green, belly yellowish silvery. Two rows of black spots on back from origin of first dorsal fin to caudal peduncle. Attains 30 cm. Caught with purse seines, floating gillnets and shore seines. An epipelagic, neritic species found in large schools. Southeast Coast of India, Malaysia, Indonesia, Taiwan and Philippines. This species supports a minor fishery in Andaman Islands. Marketed fresh also dried salted.



Rastrelliger faughni, 220 mm, SL.

276. *Rastrelliger kanagurta* Cuvier. **Indian mackerel** : Body fusiform; head length longer than body depth; gill rakers very long; jaw teeth very small, conical and numerous; no teeth on vomer or palatines; swim bladder present; scales small, ctenoid. Back of the body blue-green, sides silver with golden tint, narrow dark longitudinal bands on upper part of body golden in fresh specimens; a black spot on body near lower margin of pectoral. Attains about 35 cm. Caught with purse seines, lift nets and floating gillnets. An epipelagic, neritic species, forms large schools. Wide spread in Indo West Pacific. This species supports a major fishery in these Islands. Marketed mostly fresh, also dried salted.



Rastrelliger kanagurta, 280 mm, SL.

277. *Scomberorus commerson* (Lacepede). **King mackerel** : Body elongate and strongly compressed; jaw teeth large, triangular and compressed; vomer and palatines with teeth; body covered with moderate size cycloid scales; no distinct corselet. Body iridescent blue grey on back, sides below lateral line silvery with bluish reflections, with large black blotches in juveniles which merge to form 20–50 wavy narrow grey bars in adults. Caught mainly with gill nets and by trolled hand lines. An epipelagic, nertic species. Widespread throughout Red Sea and Indo West Pacific. This fish is highly priced if sold fresh, considered the tastiest among marine fishes.



Scomberorus commerson, 880 mm, SL.

278. *Thunnus albacares* (Bonnaterre). **Yellowfin tuna** : Body fusiform, elongate and slightly compressed laterally; gill-rakers 26 to 34 on first arch; body with small scales; pectoral fins moderately long; caudal peduncle slender with a strong lateral keel between two smaller keels. Body metallic, dark blue on dorsal side and silvery white on belly; belly crossed by about 20 broken nearly vertical lines of light spots; dorsal and anal finlets bright yellow; finlets with narrow black border. Caught mainly with long lines and purse seines. An epipelagic oceanic species. Indo Pacific and Atlantic Oceans. These fishes are highly priced if sold fresh.



Thunnus albacares, 1200 mm, SL.

279. *Thunnus obesus* (Lowe). **Bigeye Tuna** : Body broad, fusiform and slightly compressed laterally; ventral margin of body curved; caudal portion short; head and eyes fairly large; gillrakers 25–30 on first arch; caudal peduncle slender with strong lateral keel between two smaller keels. Body black to greenish blue on dorsal side, silvery white on lower sides and belly; fins yellow, finlets bright yellow edged with black. Caught mainly with long line. A pelagic oceanic species. Indo-Pacific and Atlantic Oceans. Commercially important.



Thunnus obesus, 1320 mm, SL.

Family XIPHIIDAE

Body robust, slightly compressed; upper jaw and snout greatly elongated and sword-like; pelvic fins absent; caudal peduncle of adults with a single keel on each side. Teeth and scales absent in adults; one genus with only one species; found in open water of all oceans.

280. *Xiphias gladius* Linnaeus. **Sword Fish** : Body rounded and robust; snout long and sword-like in shape; eyes large; two widely separated dorsal fins, the first much larger than second; two separate anal fins; pectoral fins falcate, little rigid and situated low on body sides; pelvic fins absent; caudal peduncle with a large keel on each side and a deep notch on both the dorsal and ventral surfaces; lateral line scales absent in adults. Body brownish-black on dorsal side, light brown on ventral side; fins brown or blackish-brown. Caught with long lines. Epipelagic and oceanic species. Highly migratory, does not form school. World wide, in all tropical and temperate oceans. The flesh of this species is oily and tasty.



Xiphias gladius, 1250 mm, SL.

Family ISTOPHORIDAE

Sailfishes

This family contains the marlines, spearfishes and sailfishes. Sailfishes are primarily oceanic, epipelagic animals that inhabit tropical and temperate seas. They are active, voracious predators. The billfishes are also an important food resource. Body elongate, robust and more or less compressed; upper jaw and snout more or less produced, forming a bony, spear like bill; first dorsal fin base longer than height of fin; pelvic fins very narrow, folding into a groove on belly; two keels on each side of peduncle at base of caudal fin. Three genera with a total of nine species; all three genera with six species in Indian waters.

281. *Istiophorus platypterus* (Shaw & Nodder). **Indo-Pacific Sailfish** : Body elongate and fairly compressed, bill slender; two dorsal fins, the first dorsal fin very high, sail-like, with the middle rays longest; caudal fin deeply forked, caudal peduncle with double keels on each side. Body dark blue dorsally, light blue splattered with brown laterally and silvery white ventrally with about 20 rows of longitudinal stripes on sides; membrane of first dorsal fin dark blue with scattered small round black dots. Attains 360 cm. Caught mainly with long lines. Oceanic and highly migratory epipelagic. Circumglobal in tropical and temperate seas. Commercially important.



Istiophorus platypterus, 2500 mm, SL.

Family PSETTODIDAE

Indian Halibuts

Body oval and flat; eyes on right or left side of head; migrating eye on dorsal edge of head; mouth large with large strong teeth; maxilla extends well beyond hind edge of eye; preopercle margin distinct; dorsal fin origin well behind eyes, the anterior rays spinous; vomer, palatines and tongue with minute teeth. This family contains a single genus, of moderate-sized shallow dwelling benthic flat fishes. One genera with three species; only one species in the Indian region.

282. *Psettodes erumei* (Schneider). **Indian spinyhalibut** : Body oval and flat; both eyes on either left or right side, the upper eye very close to dorsal edge of body; mouth large with strong teeth; single long dorsal fin, its origin well posterior to eyes. Ocular side uniformly dark brown. Attains 60 cm. Caught mainly in bottom trawls and bottom gillnets. Lives on sandy muddy bottoms of the continental shelf. Indo West Pacific. This species is rather common and very often caught although never in very large quantities. Marketed fresh, an excellent food fish.



Psettodes erumei, 450 mm, SL.

GLOSSARY

A - symbol of anal fin

Adipose - fatty

Adipose fin - small unrayed fin lobe usually behind dorsal fin in some species

Anal - pertaining to the anus; abbreviation for anal fin

Anterior - pertaining to front portion

Antrose - forward-pointing

Apical - at the tip or apex

Arborescent - branched like a tree

Auxillary scales - small scales superimposed on or along margins of larger one

Axil - angle between paired fins and body

Axillary scale - scale in pectoral or ventral fin axil

Barbel - elongate fleshy tentacle on chin or front of upper jaw

Bicuspid - having two cusps or points

Bifid - split into two

Bifurcate - forked

Branchiae - gills

Branchial - pertaining to gills

Branchiostegals - bony rays supporting gill membranes behind lower jaw

Canines - elongate, conical teeth like those of dogs

Caniniform - having form of canine teeth

Caninoid - similar in form to canine teeth

Caudal - pertaining to tail; abbreviation for caudal fin

Ciliate - fringed with fine, hair like projection

Cirri - small simple barbels

Coalesced - grown together

Corselet - band of specialized scales encircling body in pectoral region

Crenulate - having edges slightly scalloped

Crescentic - crescent-shaped

Ctenoid - with a comb-like margin of small spines; scales with spiny hind edges

Cycloid - with smooth even borders; scales with spines along their hind margins

D - symbol for dorsal fin

Deciduous - easily shed or rubbed off with reference to scales

Dentate, Denticulate- with tooth-like projections

Denticle - small tooth-like structure

Depressed - flattened from top to bottom

Dimorphism - two different forms

Distal - remote from the point of attachment

Dorsal - pertaining to back; abbreviation for dorsal fin

Dorso-ventrally - pertaining to direction from back towards belly

Edentulous - without teeth

Emarginate - with hind margin slightly hollowed

Entire - with smooth margin

Erectile - capable of being raised or erected

Excised - with margin cut out or concave

Falcate, falciform - long, narrow and curved

Fimbriate - fringed at the border

Fork length - length measured from snout tip to deepest point of caudal fin fork

Furcate - forked

Fusiform - spindle-shaped

Gas bladder - sac filled with gas, beneath backbone

Gill arch - bony skeleton supporting gills

Gill opening - opening behind head connecting gill chamber to exterior

Gill rakers - series of bony projections along edge of gill arch

Gular plate - bony plate covering upper part of throat region

Hyaline - transparent, devoid of pigment

Incisiform - shaped like an incisor tooth

Incisor - laterally flattened tooth for cutting

Interdorsal - pertaining to space between dorsal fins

Intermaxilla - anterior bone in upper jaw, situated between maxillae; premaxilla

Inerorbital - pertaining to space on top of head between eyes

Isthmus - narrow fleshy ventral forward-projection of body separating gill openings on each side

Lanceolate - lance-shaped

Lateral - pertaining to, at or towards the side

Lateral line - series of tubes forming a raised line along side of body and having sensory function

Lobate - divide into lobes

Lunate - shaped like a crescent or moon

Mandible - bone or bones forming lower jaw

Mandibular - pertaining to lower jaw

Maxilla - principal bone of upper jaw

Maxillary - pertaining to upper jaw

Median - lying or running in axial plane; intermediate; middle

Mid-lateral - pertaining to middle of sides

Molar - blunt tooth adapted for grinding

Molariform - having the form a molar tooth

Morphological - pertaining of form and structures as distinct from function

Multifid - having many clefts or divisions

Nape - part of neck adjoining to skull

Nasal - pertaining to nostrils

Nuchal - pertaining to neck

Obsolete - disappearing or indistinct

Obtuse - having a blunt end, not pointed

Occipital - pertaining to back part of head or occipital bones

Occiput - back part of head or skull

Ocellus - eye-like spot with a marginal ring

Ocular - pertaining to eye

Opercular - pertaining to bones of gill cover

Operculum - principal posterior bone of gill cover

Orbicular - round or shield shaped

Orbit - the border around the eye

Orbital - pertaining to eye

Osseous - composed of or resembling bone

P - symbol for pectoral fin

Palatines - membrane bones on each side of roof of mouth

Paired fins - pectoral and ventral fins

Papilla - small fleshy projection, usually from skin

Pectoral - pertaining to breast

Peduncle - stalk or basal support of tail

Peripheral - retaining to external boundary or superficial part

Pharyngeal - pertaining to pharynx; bones behind gills in gullet

Pharynx - gullet or anterior part of alimentary canal following mouth cavity

Postero-dorsal - pertaining to upper posterior area

Postero-ventral - pertaining to lower posterior area

Postorbital - pertaining to region behind eye

Preopercular - pertaining to operculum

Preorbital - pertaining to region before eye

Procumbent - lying down and pointing forward

Protractile - capable of being drawn out or extended forward

Proximal - part nearest body or base of attachment

Pseudobranch - gill-like structure on inner surface of gill cover

Ray - flexible structure supporting membrane of fin

Reticulate - divided by veins into a network

Retrose - backward-pointing

Rhomboidal - diamond-shaped

Rostral - pertaining to snout

Rostrum - projecting snout or beak

Rudimentary - weakly developed

Scute - external horny or bony plate or sharply ridged scale

Serra - saw-like tooth or notch

Serrate - bearing saw-like teeth

Setiform - having form of bristles

Soft dorsal - portion of dorsal fin, which is supported by jointed or flexible rays

Spine - sharp projecting point; stiff unjointed fin ray

Spinous - composed of spines

Spinous dorsal - anterior portion of dorsal fin, which is supported by stiff unjointed spines

Spinule - small spine

Standard length - length measured from snout tip to last vertebral bone, which can be felt with fingertip

Stria - narrow band, streak, line, groove or canal

Striated - marked by narrow lines or grooves, usually parallel

Subcylindrical - nearly cylindrical

Subocular - pertaining to area beneath eye

Suboperculam - membrane bone beneath operculum forming part of hind border of gill cover

Supramaxilla - small supplemental bone lying along upper edge of maxilla

Supraoccipital - situated on top of back of head; large median bone forming part of skull

Supraorbital - pertaining to area above eye

Suture - line of junction of two parts immovably connected

Symphysial - pertaining to symphysis

Symphysis line of junction between two bones, particularly point of junction of the two halves of either jaw

Thoracic - pertaining to chest

Total length - length measured from snout tip to caudal fin tip

Transverse - crosswise; lying across or between

Tricuspid - having three cusps or points

Trilobate - having three lobes or divisions

Truncate - terminating abruptly or as if cut off square

Tubercle - small excrescence, usually hard

Tuberculate - resembling or having tubercles

Undulated - waved

Unpaired fins - dorsal, caudal and anal fins

V - symbol of ventral fin

Ventral - pertaining to abdominal or lower surface

Vermiculation - pattern of fine wavy worm-like lines or streaks of colour

Villiform - having the form or appearance of velvet; especially small slender teeth forming velvety bands

Vomer - bone forming front part of roof of mouth in nasal region

Vomerine - pertaining to vomer; especially teeth borne on this bone

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ERRATA

Page	Line	Printed as	Read as
Viii	16	college	colleague
14	29	Mullets	Goatfishes
29	Photo	Protusle	Protrusible
38	11	<i>cruentatus</i>	<i>cruenatatus</i>
39	8	<i>comberoides</i>	<i>Scomberoides</i>
42	11	<i>kaakam</i>	<i>kakkan</i>
77	Photo	<i>chakunda</i>	<i>chacunda</i>
82	3	<i>back</i>	<i>black</i>
86	22	<i>bet</i>	<i>but</i>
93	Photo	<i>variegatis</i>	<i>variegatus</i>
102	Photo	<i>Hexagona</i>	<i>hexagona</i>
104	9	<i>moth</i>	<i>mouth</i>
123	Photo	<i>Plectopomus</i>	<i>Plectropomus</i>
127	Photo	<i>crenatatus</i>	<i>cruenatatus</i>
132	Photo	<i>djedaba</i>	<i>djedaba</i>
135	8	<i>Carangoids</i>	<i>Carangoides</i>
139	Photo	<i>Gnathondon</i>	<i>Gnathanodon</i>
167	8	<i>Pterocaesic</i>	<i>Pterocaesio</i>
175	Photo	<i>zyson</i>	<i>zysron</i>
177	1	<i>Scolopsis</i>	<i>Scolopsis</i>
185	Photo	<i>Schotaf</i>	<i>schotaf</i>
196	Photo	<i>johnius</i>	<i>Johnius</i>
205	8	<i>Monodaatylus</i>	<i>Monodactylus</i>
206	Photo	<i>adjusta</i>	<i>adusta</i>
215	1 and Photo	<i>parsia</i>	<i>parisa</i>
227	1	SIGNIDAE	SIGANIDAE
232	1	TRIVHURIDAE	TRICHIURIDAE
235	Photo	<i>branchysoma</i>	<i>brachysoma</i>
237	1 and Photo	<i>Scomberorus</i>	<i>Scomberomorus</i>
240	1	ISTOPHORIDAE	ISTIOPHORIDAE



Born in 1958 in Andaman, P.T. Rajan displayed an early interest in the sea and fishes of these emerald islands. He received M.Sc. Zoology from the University of Himachal Pradesh in 1985. He is with the Zoological Survey of India, Port Blair since 1987. He is an Advanced Open Water Scuba Diver. He has published 45 scientific and semipopular articles mostly on fishes and other marine life. He is also the author of a guidebook on Grouper and Snapper fishes of Andaman and Nicobar Islands. Rajan also spends considerable time in the jungles of Andaman and Nicobar Islands conducting conservation surveys.

The present field guide of the Marine Food Fishes of Andaman and Nicobar Islands is the first beautifully illustrated volume on the diverse species. The family and species accounts are written to be understood by the layperson (a glossary is provided to explain scientific terms) but with enough and detail references to serve the need of professional biologists. The Field guide provides a much-needed inventory of this invaluable resource and forms the basis for future fisheries management.