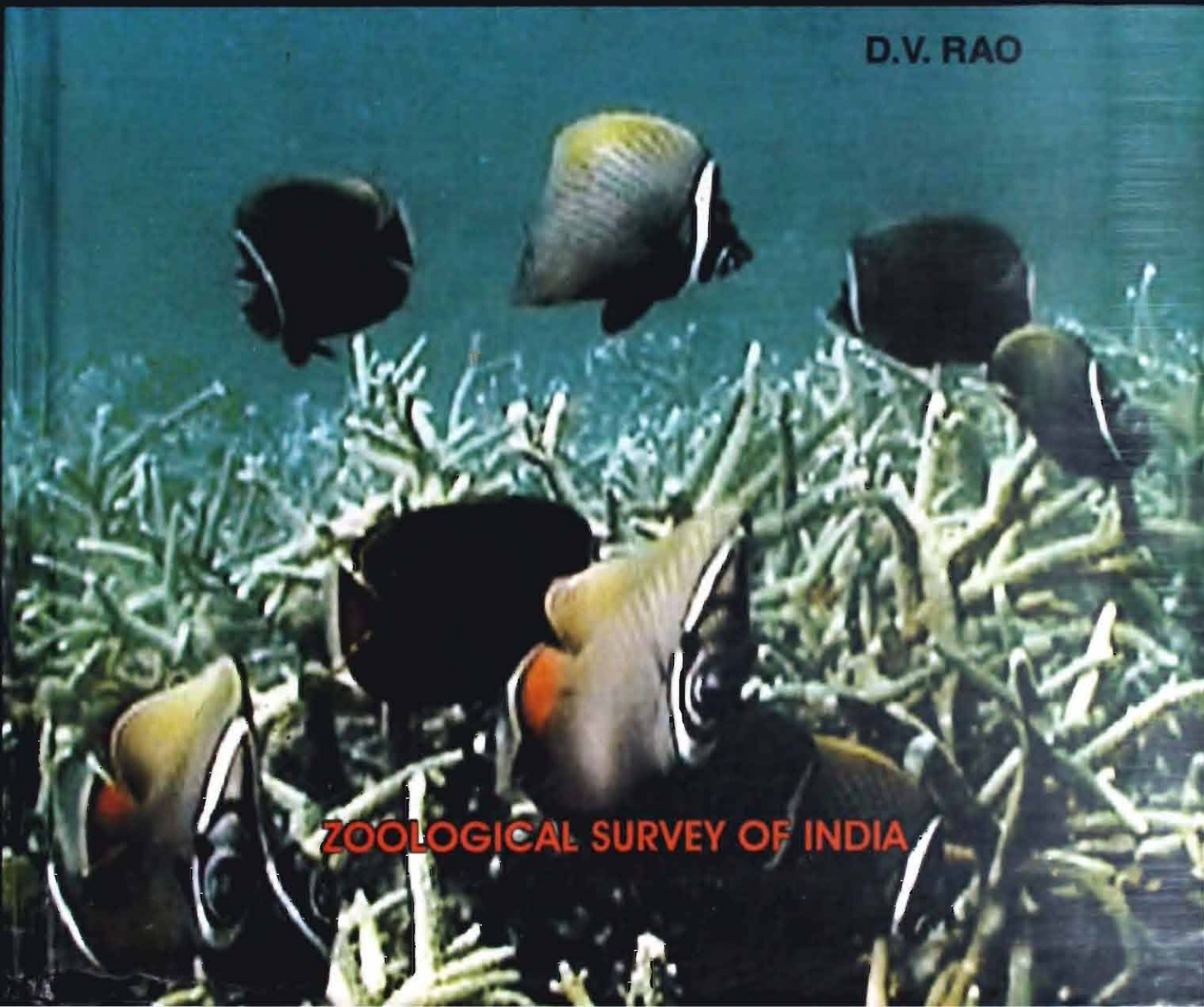


GUIDE TO **reef
fishes**

OF ANDAMAN AND NICOBAR ISLANDS

D.V. RAO



ZOOLOGICAL SURVEY OF INDIA



GUIDE TO
REEF FISHES
OF ANDAMAN AND NICOBAR ISLANDS

D. V. RAO

Zoological Survey of India, Andaman & Nicobar Regional Station, Haddo, Port Blair-744102

Edited by the Director, Zoological Survey of India, Kolkata



Zoological Survey of India
Kolkata

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FOREWORD

Coral reef systems and the biological resources they support are not only critical to the subsistence and livelihood of the local communities dependent on these systems, but also essential to the economic wealth of many nations in the world. Coral reefs are biological wonders with incredibly intricate and complex interlinkages of life forms; its fragile fabric easily gets disturbed when one key component of the system is destroyed or removed. But, unfortunately, in many parts of the world, the coral reefs are in crisis, with the coral life on them already in peril or in the phase of decline.

There has been a growing concern, in the recent years, over the status of reefs for the sustenance and survival of living corals associated with them. As a result, there is an increasing awareness, now-a-days, of the need for coral reef conservation and management through research and monitoring programmes at the national and international levels.

Over-fishing for subsistence livelihood of the people as well as over-exploitation of resources for commerce, coral mining, ever-increasing pollution, etc., coupled with the climatic adversities of coral bleaching, associated with the 'El Nino'/Southern Oscillation, of 1998, have resulted in the depletion of coral cover in many parts of Southeast Asia. However, fortunately, the coral reef system associated with the Andaman and Nicobar Islands of our country remained unaffected and isolated from these despoiling processes.

The Andaman and Nicobar Islands are well known for biodiversity richness particularly its reef systems which shelter rich and diverse faunal resources, like molluscs, crabs and lobsters, and, especially fishes, supporting the livelihood of the people, as well providing permanent employment to the traditional fisherman. But, we are at a loss that there is dearth of adequate information of these resources, including the harvestable reef fishery potential, *vis-a-vis* their distribution in the islands' reef systems. Therefore, the need for the studies on these potential resources, their sustainable use and various threats posed to them, is amply clear and imperative.

It is appreciable in this context that this volume, illustrated with line drawing and photographs of the fish fauna concerned, including brief notes on their ecology and the reef fishery potential, pertaining to these island systems, will serve as a valuable field guide not only to the students, teachers and researchers in the allied field, but also to the reef watchers and managers engaged in the conservation and management of the reef systems of the Andaman and Nicobar Islands.

Dr. J.R.B. Alfred

Director

Zoological Survey of India

November, 2003
Kolkata

PREFACE

The marine ecosystem of the Andaman and Nicobar Islands offers a varied and complex animal life of which the colourful coral reefs constitute the most fragile and interesting faunal element as elsewhere in the Indo-Pacific Reefs. The fascinating '*underwater coral gardens*' of these Islands comprise more than 200 species of corals and several hundreds of associated faunal components. Majority of these coral reefs are of fringing type occurring close to the shore. These are most productive natural ecosystems supporting rich fish resources in addition to other fascinating multicoloured fauna. In recent years, scores of stunning and exciting colourful fishes are being discovered in the Indo-Pacific Reefs. Many excellent publications are available on the reef fishes of Indo-Pacific and Caribbean Reefs. Unfortunately, no such publication is available on the reef fishes of the Andaman and Nicobar Islands. Prompted by this lacuna, a study on the reef fishes of these islands was undertaken. Intensive surveys all along the length and breadth of the archipelago facilitated in the preparation of this guide on the reef fishes of these islands. The main aim is to present a comprehensive account of the great diversity of reef fishes of the Andaman and Nicobar Islands.

This illustrated volume, it is hoped, with line drawings as well as colour photographs and brief notes on ecology, shall serve as a valuable field guide to ichthyologists, reef-watchers, conservationists etc.

From the conservation point of view, fish particularly of the reef ecosystem command no less attention than the members of other faunal groups. The indiscriminate destruction of the coral reefs results in loss of habitat for a variety of animals including the fishes. Only recently, corals and a few inhabitants of the reefs are included in the Schedules of the Wildlife (Protection) Act, 1972; only some sharks found a place in them. The present book brings out the rich diversity of fishes in the reef ecosystem, stressing the need for protection of the reefs.

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*Dedicated to
my beloved parents*



*Little fish have bigger fish
Behind their backs to bite 'em
And big fish have bigger fish
And so ad infinitum*

Jonathan Swift (MISQUOTED)



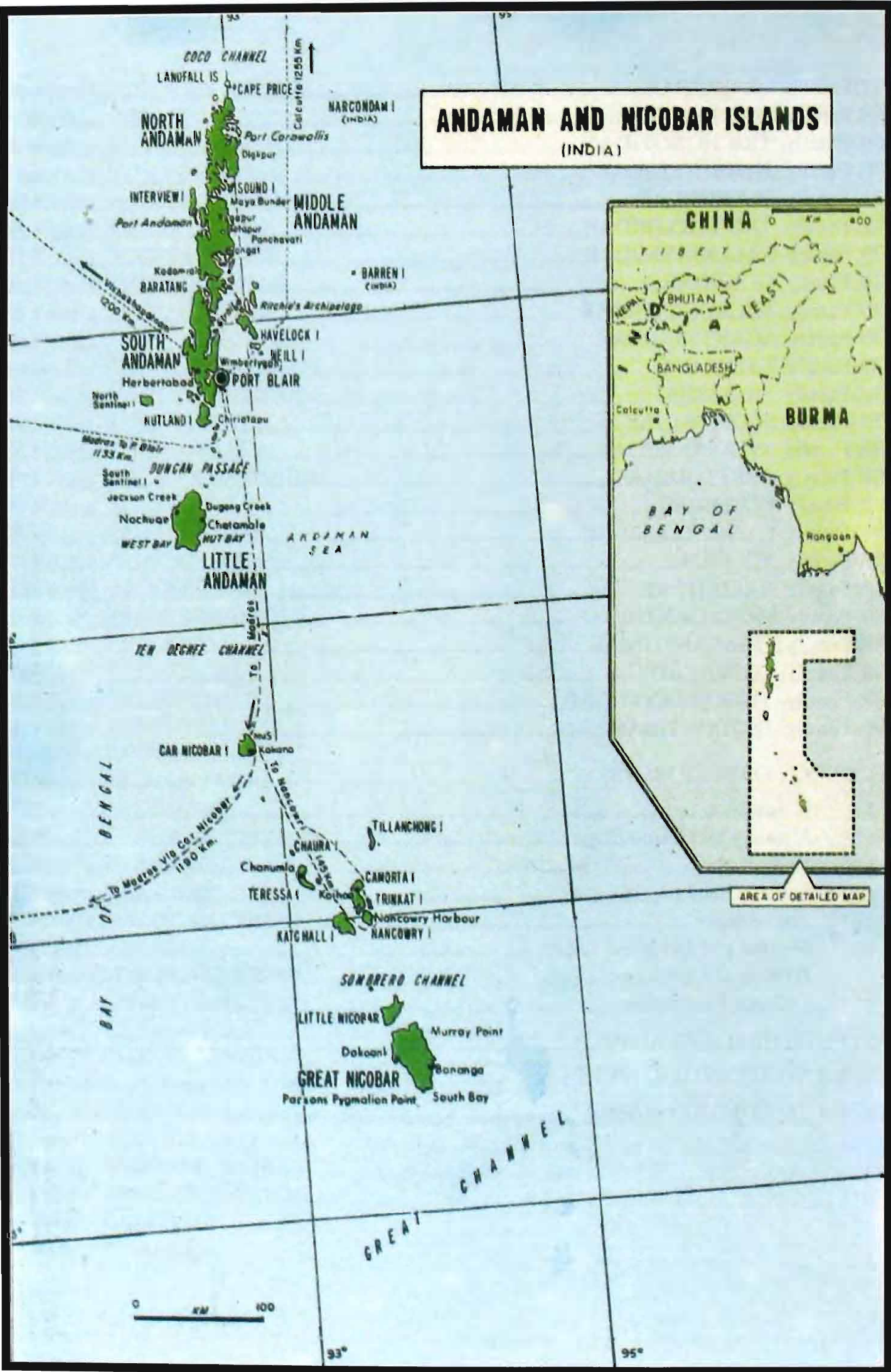
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ANDAMAN AND NICOBAR ISLANDS (INDIA)



INTRODUCTION

The Andaman and Nicobar Islands comprise an arcuate chain of more than 350 major islands in addition to a number of islets and rock outcrops in the Bay of Bengal lying between latitudes 06° and 14° N and longitudes 92° and 94° E. The islands are spread in a linear distance of about 1120 km and constitute the summits of the submarine range of hills connecting the Arakan Yoma of Myamnar with the Achin Head in southeast of Sumatra. The Andaman Island and Nicobar Islands are distinctly separated by the wide Ten Degree channel which is about 150 km wide and 400 fathoms deep. The total land area is about 8249 sq. km. with a coastline of 1962 km. The coastline is very wavy with many long, narrow creeks, lagoons and bays supporting sandy, rocky and muddy beaches and mangroves. In addition, the extensive coastline of these islands supporting richest coral formations, repute the Andaman and Nicobar Islands as a coral paradise. The majority of the reefs are of fringing type, occurring close to the shore often extending to long distances while some coral banks are also reported far from the shore on the west coast of Andaman Islands.

The fringing reefs of these islands with more than 200 species of stony corals, large number of species of soft corals, gorgonians, whip corals offer a wide variety of habitats include lagoons, reef slopes, reef flats with heavy surf breaks, silt-sand, sand-rubble, weed and coralline algal beds. Each of these habitats support a rich resource of fishes in the sea, in addition to a fascinating array of multi-coloured organisms. Coral reefs provide the fish, crustaceans, molluscs and echinoderms on which coastal people in many countries depend for their food or to make a living. Fish generally make up at least 35 to 45% of the diet of the local people.

Usually coastal people depend on the hundreds of edible fish species that live around shallow near shore reefs and lagoons. The fish fauna consists of more than 1200 species of which over 240 species are food fishes while another 250 species or so are of ornamental nature. Some of the most popular ornamental reef fishes are butterflyfishes, angelfishes, surgeonfishes, wrasses, moorishidols, squirrelfishes, damsels, triggerfishes, boxfishes etc.

The regions around New Guinea, the Philippines and the Indonesia collectively have a greatest number of marine plants and animals in the world and are rich Biodiversity centres. Due to proximity to this region, the A & N Archipelago also has an extremely rich marine fauna and flora. Many animal groups associated with the reefs of these islands are to be explored and documented. For some of the well-known groups such as corals, echinoderms, molluscs and fishes, our knowledge and studies have reached a level to justify the production of guides and handbooks on these animals. More than a decade of exploration of these islands for ichthyological studies prompted the author to prepare a field guide on the reef fishes of these islands.

SCOPE AND OBJECT OF THE GUIDE

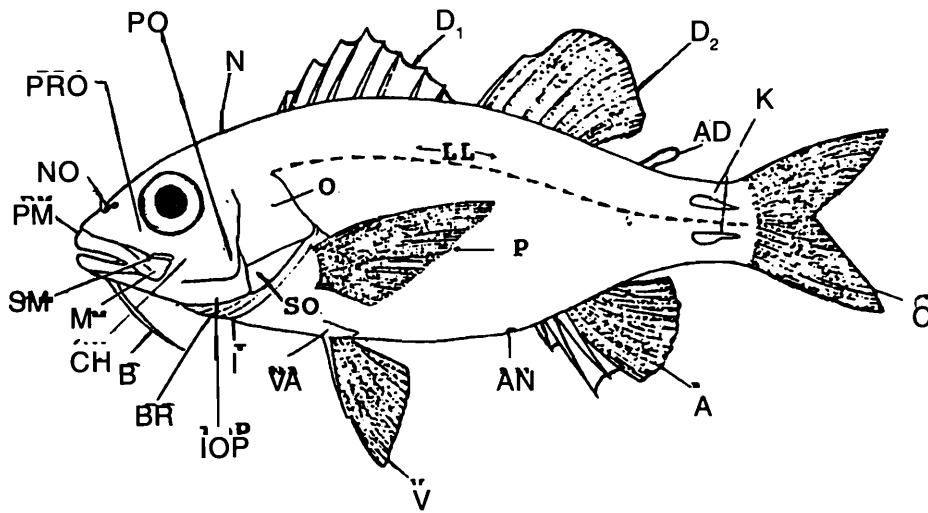
Illustrated field guides to the Coral Reef Fishes of Indo-West Pacific, Great Barrier Reef, Indian Ocean, Maldives, Japanese Archipelago, Caribbean Sea etc. have been published. Although the marine waters around these islands are known to support a rich variety of fish species, surprisingly, no comprehensive guide is available to identify the common reef fishes encountered in and around the reefs of the Andaman & Nicobar Islands. Thus an illustrated field guide to the reef fishes of this area has been a long felt need and hence the present work is mainly designed to fill up this gap. This will enable the amateur naturalists, fishery scientists, reef managers and tourists when snorkeling or diving to recognise the common reef fishes of these islands. Moreover, keeping coral reef fishes in home aquarium has become a fascinating hobby in recent years and is hoped that this guide will fulfill the needs of aquarists as well as dealers of ornamental fishes, to correctly identify majority of the reef fishes for aquarium use.

The present guide is aimed to provide identification of about 705 species of reef fishes belonging to 90 families, usually encountered on the reefs of A & N Islands. These include not only the fishes that exclusively live on or around coral reefs but also the fishes that may be encountered in different habitats adjacent to the reefs such as sand-silt, sand-coral rubble, sea grass and algal beds. Many species are excluded because they are either rare, very deep dwelling, or small. Most of the fish covered are common, though several of the less common and even some rare species are included because they are particularly fascinating or attractive. Most of the reef fishes found around these islands are widely distributed in the Indo-Pacific region, and hence this Handbook shall also be useful for the identification of reef fishes from regions other than the A & N Archipelago.

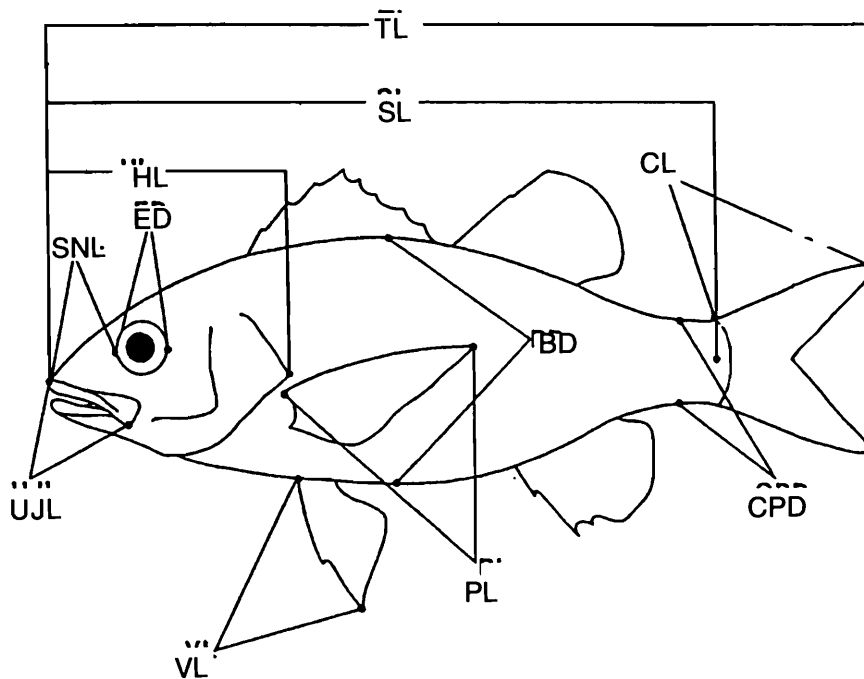
HOW TO USE THE FIELD GUIDE

The classification and systematic sequences adopted by different ichthyologists vary considerably and the system followed in this book is that used by Smith and Heemstra (Smith's Sea Fishes, 1986). The identification keys given are a simple illustrated aid to the representative species of the families, and keys to genera and species are those used in scientific works. With a little practice and patience, the keys to the species level can be used as they are based on the meristic and morphometric characters that cannot be seen without handling the specimen.

For each family a general description and habits that apply to the group as a whole is given. Within each family the species account presented alphabetically by scientific name, their common English name with identification characters involve body shapes, colour pattern and geographical distribution (in general terms like Indo-Pacific and Indo-West Pacific) that can be readily used by a non-specialist. Other details like number of spines and rays in fins, lateral line scale counts are also included. Food habits, habitat preferences, an approximate maximum length attained by each species is also given, whenever such information is



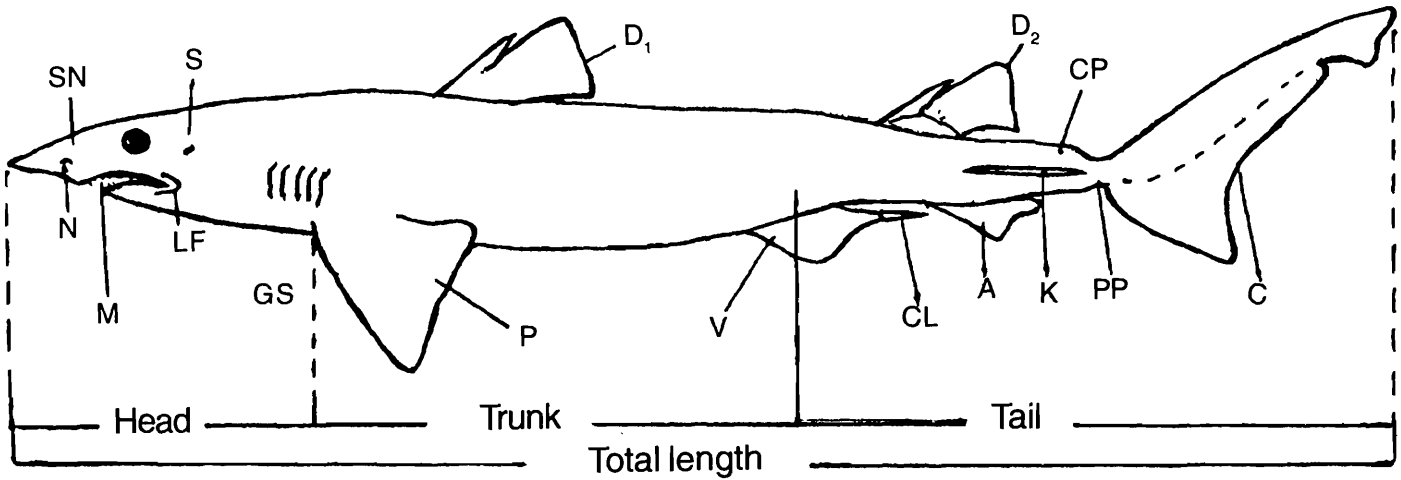
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|----------------|--------------------|----------------|-------------------|-----|------------------------|
| A | Anal fin | D ₂ | Second dorsal fin | O | Opercle |
| AD | Adipose fin | I | Isthmus | P | Pectoral |
| AN | Anus (Vent) | IOP | Interopercle | PM | Premaxilla |
| BA | Barbel | K | Keels | PO | Preopercle |
| BR | Branchiostgal rays | LL | Lateral line | PRO | Preorbital |
| C | Caudal fin | M | Maxilla | SM | Supramaxilla |
| CH | Cheek | N | Nape | SO | Subopercle |
| D ₁ | First dorsal fin | NO | Nostrils | V | Ventral fin |
| | | | | VA | Ventral axillary scale |



- | | | | | | |
|-----|-----------------------|-----|-----------------|----|------------------|
| BD | Body depth | HL | Head length | TL | Total length |
| CL | Caudal fin length | PL | Pectoral length | ML | Maxillary length |
| CPD | Caudal peduncle depth | SL | Standard length | VL | Ventral length |
| ED | Eye diameter | SNL | Snout Length | | |

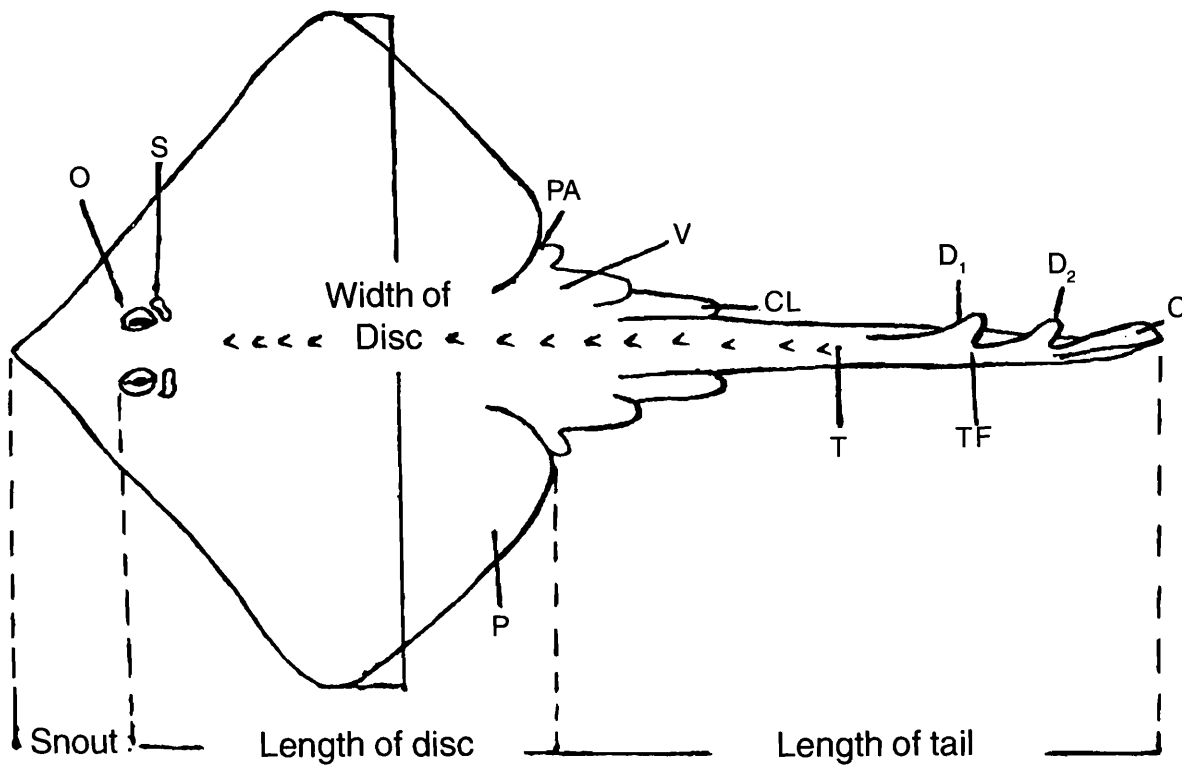
Fig. 1. External features and measurements of a bony fish

EXTERNAL FEATURES OF FISHES



- | | | |
|-------------------------------|----------------|------------------|
| A Anal fin | GS Gill slits | P Pectoral fin |
| C Caudal fin | K Keels | SN Snout |
| CL Clasper | LF Labial fold | S Spiracle |
| D ₁ 1st dorsal fin | M Mouth | V Ventral fin |
| D ₂ 2nd dorsal fin | N Nostril | PP Precaudal pit |

Fig. 2. External features and measurements of a shark



- | | | |
|-------------------------------|------------------|---------------|
| C Caudal fin | O Orbit | T Tail |
| CL Clasper | P Pectoral fin | TF Tail fold |
| D ₁ 1st dorsal fin | PA Pectoral axil | V Ventral fin |
| D ₂ 2nd dorsal fin | S Spiracle | |

Fig. 3. External features and measurements of a skate

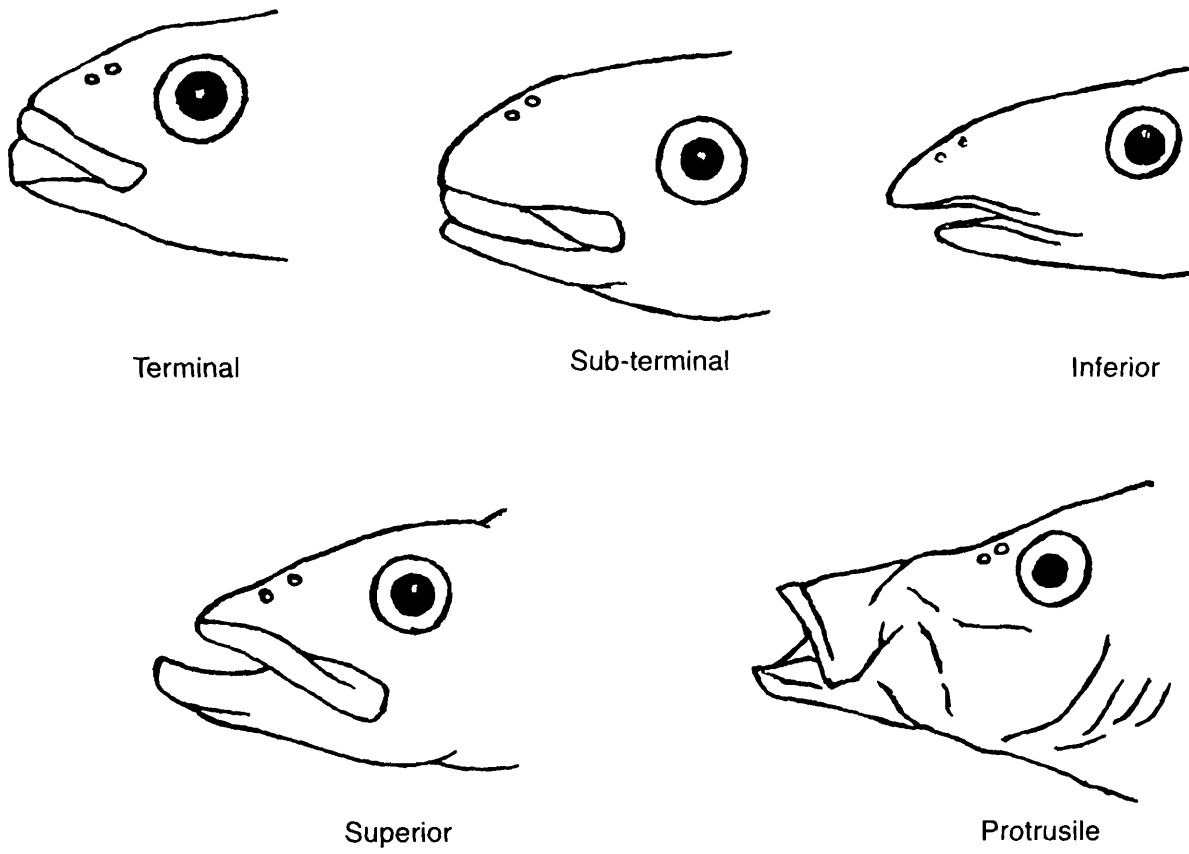


Fig. 4. Types of mouth position

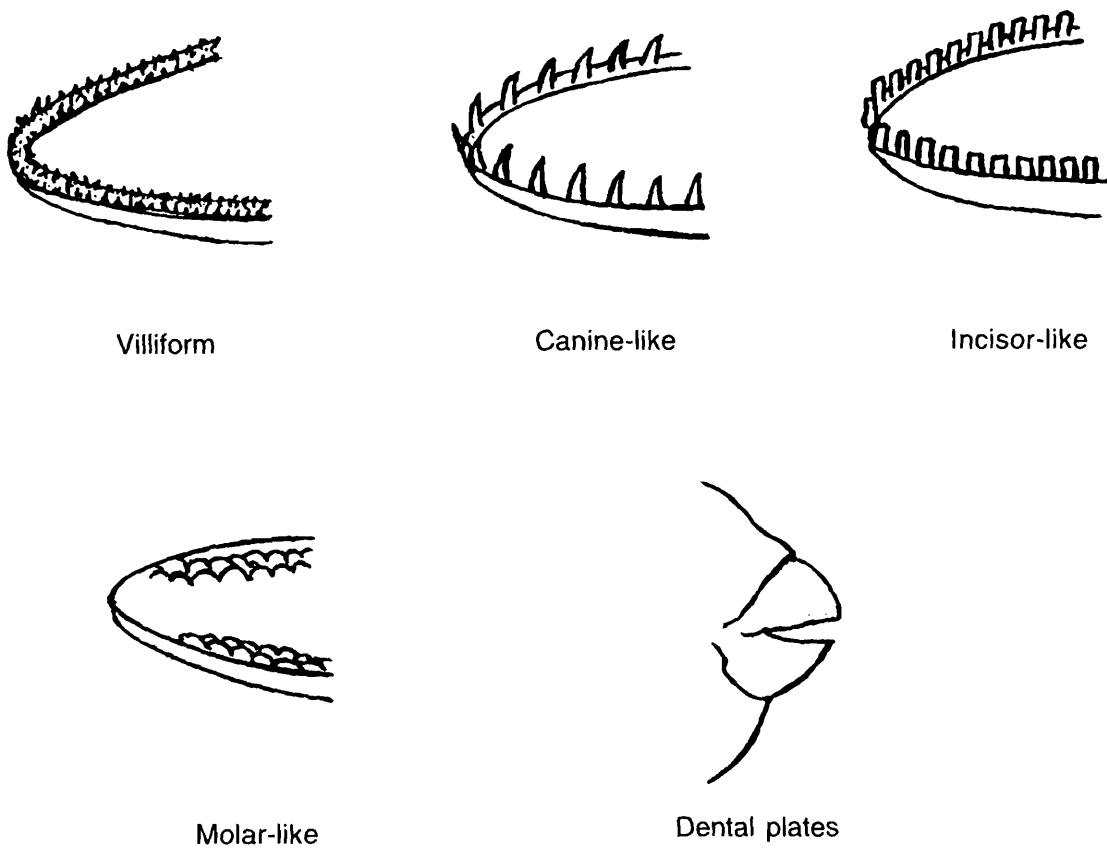
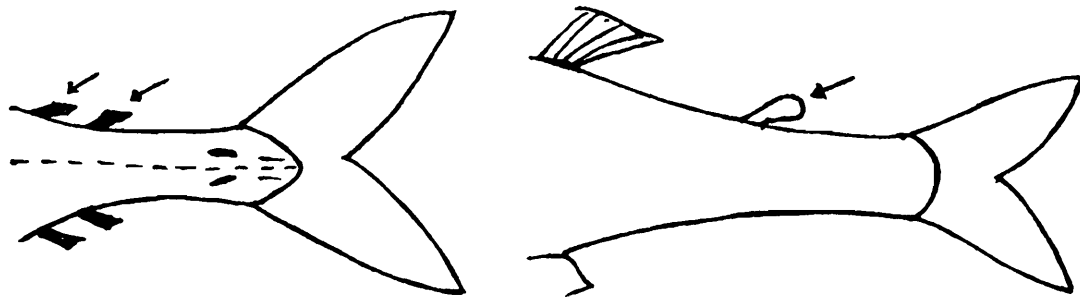
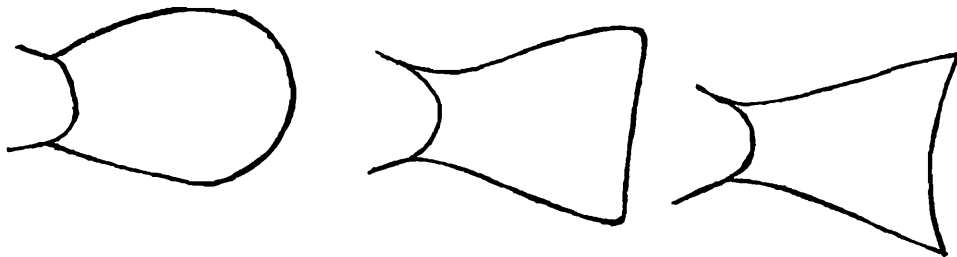


Fig. 5. Teeth pattern



Finlets

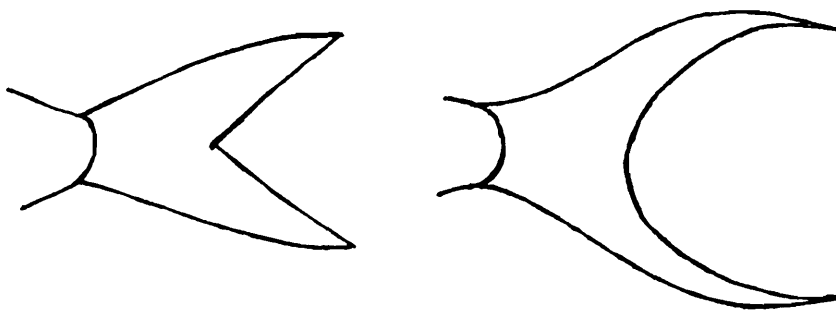
Adipose fin



Rounded

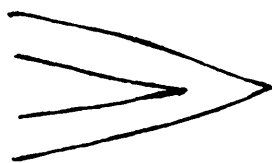
Truncatel

Emarginate

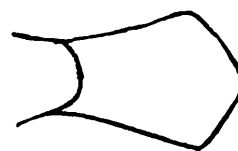


Forked

Lunate



Pointed



Rhomboid

Fig. 6. Types of caudal fin

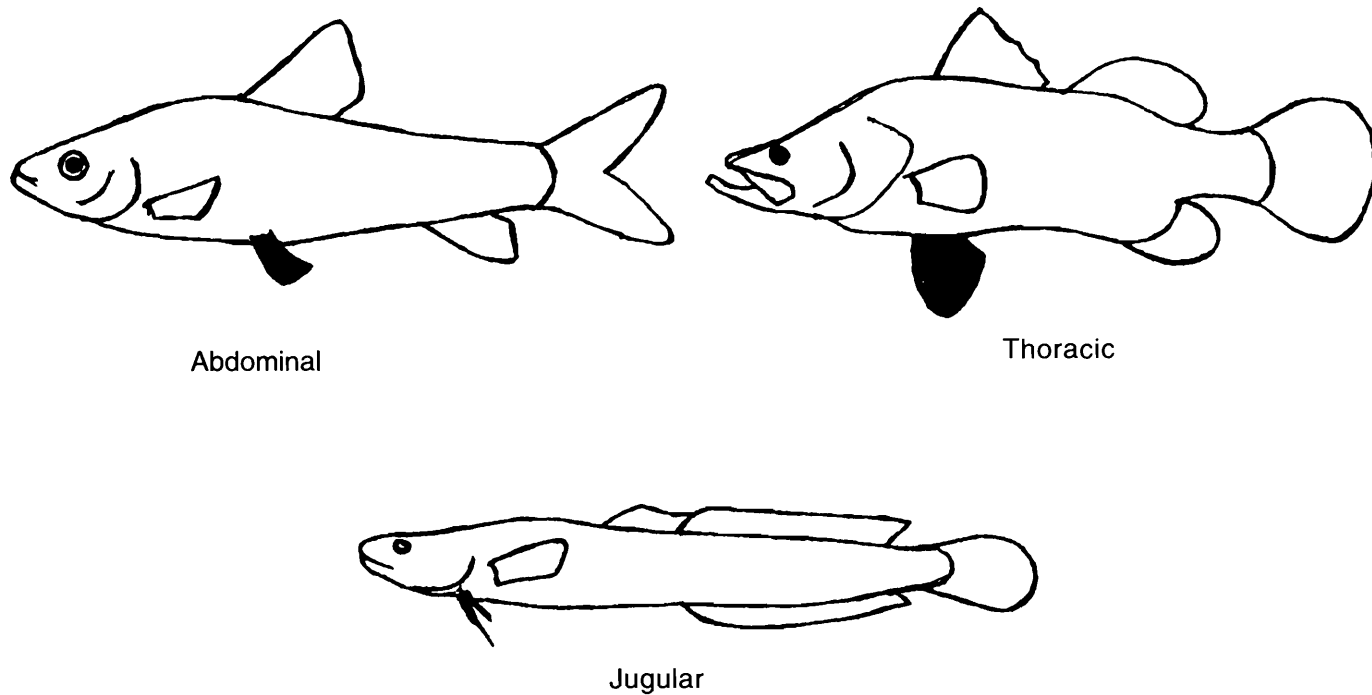


Fig. 7. Position of ventral fin

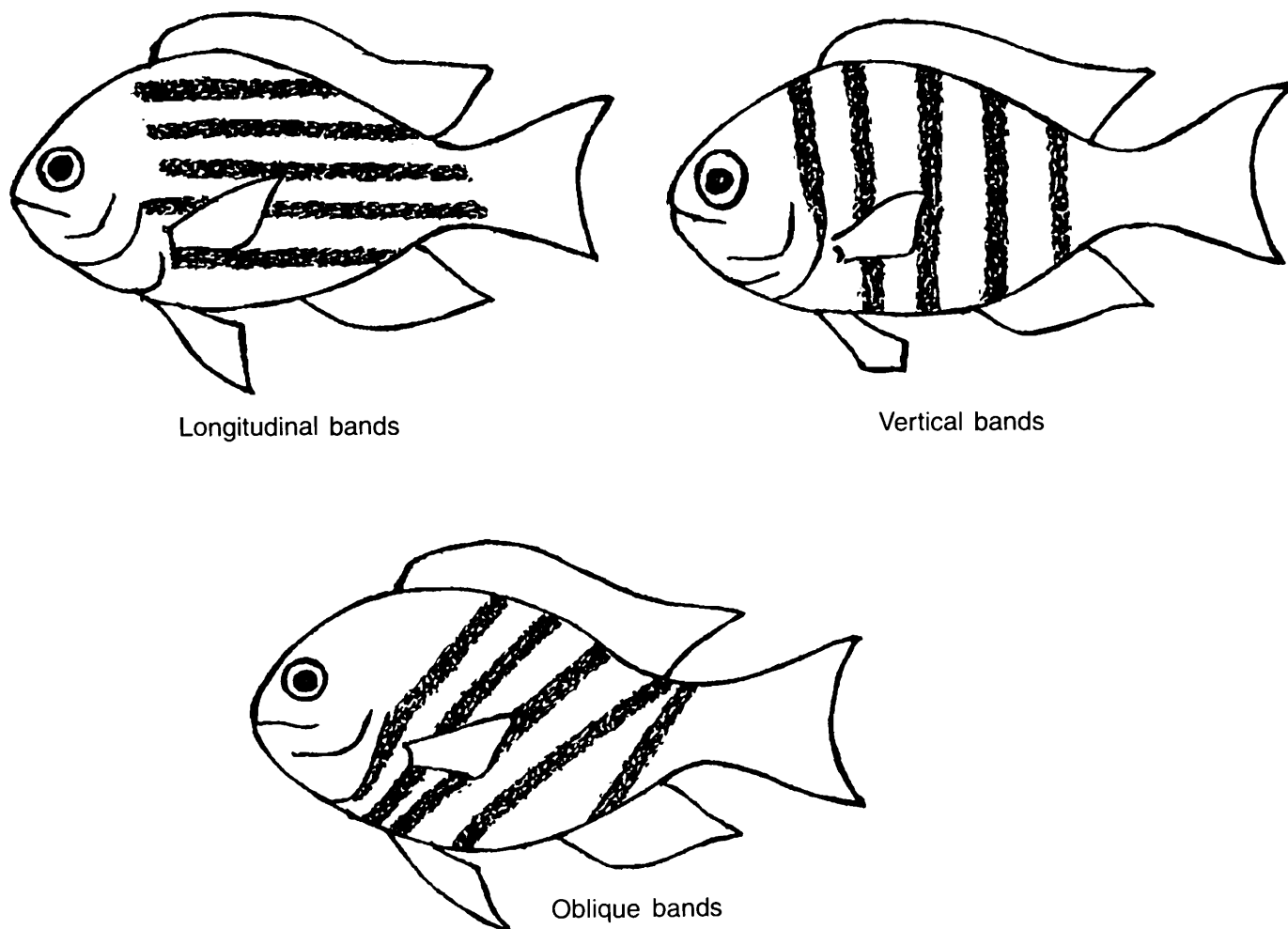


Fig. 8. Direction and terminology of bands

available. This information is derived in part from the literature besides the observations made by the author. As far as possible colour photographs are provided for many species in order to facilitate an easy identification. Since this book is largely intended for the use of non-specialists, technical jargon has been kept to the minimum and the basic technical terms that could not be avoided are defined in the glossary as such terms are necessary to describe a fish effectively and precisely. The external features of a typical bony and cartilaginous fish, position of mouth and teeth pattern, different types of caudal fin, position of ventral fins, direction and terminology of the colour stripes of the fish, are provided with simple line diagrams.

With a little practice in using this guide, one can easily learn to identify most of the common fish species found around reefs of these islands. In fact, more than 700 species are illustrated in this Field Guide to make a quick and reliable identification. In the first attempt, if one cannot place a fish in its appropriate order or family, follow the illustrated key to the families comprising typical body shapes of the fishes in the families. Having found the family and an illustration that looks like your specimen observed in the field, run through the descriptions and compare with figures until you are able to identify the species. In case of doubt refer the species key, go back to the plates, and try again. Always read the general information given for each family, as it contains information applicable to all or most members of the group and which may not be repeated under the species description. Many reasonably common and well-known shore species find a place in this book; in case if not found, consult literature that is more specialised or experts in the field. This guide is primarily designed for use in the field and hence hoped that it would find its place in your boat, field bag, and diving-gear box or in your pocket whenever you go for snorkeling, diving or field study.

A WORD TO THE UNDERWATER EXPLORERS

Observing underwater life on the reefs and the thrill cannot be compared with any type of experience gained on the earth. Although SCUBA diving is the most exciting and thrilled experience, most of the brilliantly coloured reef fishes can be seen at their best near the surface with the help of mask and snorkel that are affordable by any common man. The snorkeling requires no experience, no expensive equipment involves, no risks and can be enjoyed by anyone. It is advisable to have a companion while snorkeling to get help in case of any untoward incident or accident. One should be careful and avoid touching of hydrozoan corals and jellyfishes which can cause painful wounds. One should not touch anything with bare hands and keep one's feet away from the bottom as much as possible because many poisonous and venomous creatures are capable of inflicting severe wounds and most of them are invisible and difficult to notice when lying on the bottom. Always wear stout and tough footwear when walking on the reef. Walking or standing on live corals may damage the corals and it should be totally avoided. Stay in one place for a long time instead of swimming constantly over the bottom in search of fish. Do not make rapid movements, splash or thump

waters while snorkeling. Once the fish are disturbed, they hide or desert the area. Always observe leisurely, move in a casual way and enjoy the graceful movements, stunning colour patterns and behaviour of the fishes on the reefs. Since the colour patterns of many fishes resemble their surroundings, carefully examine the bottom; else, you will miss these cryptic creatures. As many fishes live in crevices of rocks and corals, do not forget to keep an eye around these areas.

ABBREVIATIONS AND SYMBOLS

D Dorsal fin

A - Anal fin

P Pectoral fin

V Ventral fin (Pelvic fin)

Above letters followed by Arabic numerals = number of rays.

Above letters followed by Roman numerals in capitals = number of fin spines.

A plus mark (+) between Roman and Arabic numerals means that the first and second dorsal fns are separate.

A coma (,) between Roman and Arabic numerals means that the fin is continuous.

LI Number of scales along lateral line.

Ls Number of scales along horizontal series.

Nomenclature

Scientific names of all fishes is composed of two latinized words which are italicized (binomial system). The first word is the name of the genus or group of related species to which the fish belongs always begins with an initial capital; the second name, always with a lower case initial, is the name of the species. For example : a butterflyfish named *Chaetodon auriga*, where *Chaetodon* is generic name and *auriga* is its specific name. One or more species may be included in that genus. Names of persons following the scientific name (binomial formula) not in italics are the names of the authors who described the species first and the year is the year of its publication. When the author's name is in parentheses, it means that the species was originally placed in a genus other than the one in which it appears in this work. The author's name should be written in full except in few cases such as Linnaeus (as L.) and Fabricius (Fabri.) according to the International Code. Although scientific names are often difficult to pronounce and are subject to change, the scientific name for each species is a codeword understood by all zoologists worldwide. In addition, studies often reveal that two or more named species from different or same areas are actually the same

species; in such cases, the oldest scientific name has priority. The genera are grouped into families with names that end in “**idae**” and families are also grouped into orders with names ending in “**iformes**”

COLLECTION AND PHOTOGRAPHY OF FISH

Once one develops love and interest to observe the fishes in their habitats, slowly one becomes more interested in identifying fishes and may need to collect wider variety of species for detailed studies. One can collect more types of fishes by using a variety of hooks, baits, nets, traps, etc. and by fishing in different reef habitats. Operating big nets or cast nets on reefs may damage the corals; always prefer hand nets and spears. Using dynamites and poisons create havoc. Some fishes are attracted to light suspended at the side of your boat during night; capture them with dip nets. Another convenient way to collect a variety of fish species is to collect samples from fishermen’s catches. One can also learn to identify fishes by making regular visits to fish markets. Always split open the stomachs of the fish samples and examine its contents. If the fish is a large carnivore, identifiable fishes will often be found. This will not only help in understanding the feeding habits of the species but also add to ones list of fishes of that area.

Preserving Specimens

The stunning colours of the fishes fade away rapidly after death. However, one can slower down the process by keeping the specimens out of sunlight and avoiding keeping in ice. The collected fish may be gutted and frozen immediately for later study. There is no technique available to preserve the natural colours of fish for longer periods. For scientific study, preserve the specimens in 10% formalin solution diluted from full strength formalin i.e. 45-50% formaldehyde. After few days, transfer the specimens to 75% ethyl alcohol and airtight the jars. A label written with waterproof ink on rag paper / waterproof paper with details of capture data such as date, locality, type of gear, habitat, name of collector etc. should keep along with the specimen.

Fish photography

Photograph of a fish you collect is useful for identification and helps in understanding their colour pattern as the photographs record colours that fade rapidly after the death of a fish. Photography should be made soon after the specimen collected. Photographing small fishes often requires special lenses. Specimen should be prepared for photography in a simple way. Lay the fish on its side on any suitable cardboard and erect the dorsal, anal and pelvic fins and stretch the caudal fin and pinned-out the fish. Refer to the text figure to see how to pin the fins in an erect position using rust proof pins. By using a fine-bristle brush, apply full strength formalin on the stretched fins. Remove the pins after five minutes and the fins will be remain erect permanently. Then keep the specimen on a suitable background colour

sheet. Clean any liquid present on the specimen with blotting or tissue paper to avoid glare and surface reflections. Keep a ruler or any other object of known dimensions next to the fish so that the length of the fish can be calculated later from the print. Do not use direct sun light for photography. Keep the specimen in low shaded light and photograph the fish. Do not discourage if you cannot get sharp photographs, experience make you perfect. Underwater videography or still photography is difficult and needs very expertise and patience. Now-a-days best underwater video photography equipment is available, amateurs can handle easily and become perfect with experience. Keep a record of the specimens and frames while taking photographs. Refer the articles by J.E. Randall (1961) and A. R. Emery and R. Winterbottom (1980) for photography techniques.

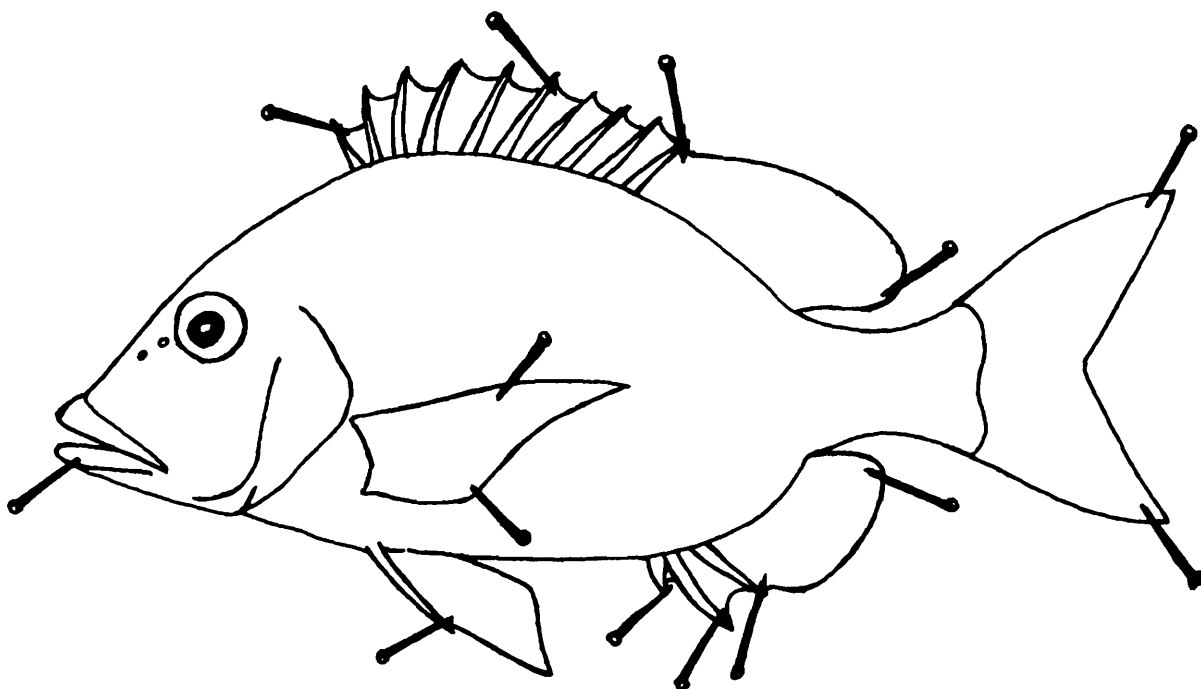


Fig. 9. A pinned out specimen

GLOSSARY

Abdomen : the belly or lower surface of a fish.

Abdominal : on or pertaining to belly.

Acute : sharp, pointed.

Adipose eyelid : fatty transparent tissue that partially covers eye of some fishes (ex. *Mugil*).

Adipose fin : a fleshy fin without rays or spines located between dorsal and caudal fins.

Anal fin : the median, unpaired fin located on ventral side of body just behind anus.

Anterior : towards head end of fish.

Antrose : directed forward or turned anteriorly.

Anus : the external opening of intestine or vent.

Asymmetrical : without symmetry.

Auxiliary scales : small scales superimposed on surface of large scales.

Axil : area where a paired fin is attached to body or inner base of pectoral fin.

Axillary scale : elongated scale or group of scales at base of pectoral or ventral fins of some fishes.

Bar : a vertical band of colour.

Barbels : fleshy elongated tentacles, generally found under chin.

Basal : at or near base.

Benthic : living close to or on bottom.

Bifurcate : divided into two parts; bifid, forked.

Bilobate : having two lobes.

Blind side : the light coloured underside of fish, which lacks eyes (flatfishes).

Branched rays : a soft fin ray that is split into two or more parts distally.

Branchial : pertaining to gills.

Canine : conical pointed tooth, usually larger than surrounding teeth.

Carapace : a hard shell or box encasing body.

Carnivorous : feeding on animals.

Cartilage : soft and flexible skeletal tissue.

Caudal fin : the fin at the rear of fish; tail fin.

Caudal peduncle : narrow part of body between rear end of anal fin base to base of caudal fin.

Caudal pits : small depressions on either side of caudal peduncle.

Cephalopod : a group of molluscs, including octopus and squids.

Cheek : area between eye and edge of pre-opercle bone.

Chromatophores : pigment cells present in skin.

Ciguatera poisoning : a type of poisoning from eating coral reef fishes.

Cirri : small, slender, filamentous skin appendages.

Compressed : flattened from side to side.

Concave : curved inward.

Confluent : joined together.

Continuous : unbroken; refers to dorsal fin in which spinous part is joined to soft part, without notch.

Convex : curved outward.

Cornet : small horn-like structure on head.

Corselet : a densely scaled area behind pectoral fins found in tuna-like fishes.

Crenulated : having margin shaped into small rounded scallops or wavy.

Crescentic : shaped like crescent or half-moon shape.

Ctenoid : a scale with minute teeth or spines on rear margin.

Cutaneous : pertaining to skin.

Cutaneous folds : skin folds.

Cycloid : thin, flexible scale with smooth surface.

Deciduous (scale) : easily shed.

Denticles : small tooth-like structures.

Depressed : flattened from dorso-ventrally.

Dermal papilla : fleshy skin projections.

Dermal : pertaining to skin.

Dichromatic : of two different colour forms.

Dimorphic : having two forms.

Distal : farthest from point of attachment.

Diurnal : those active during daytime.

Dorsal : pertaining to back.

Dorsum : the upper surface of head or body.

Edentate : without teeth.

Emarginate : with a slightly concave margin.

Embedded : scales buried or covered by skin.

Erectile : capable of being raised.

Esca : the terminal lure or bait on angling apparatus (illicium) of anglerfishes.

Falcate : sickle-shaped.

Filamentous : thread-like; refers to elongated fin rays.

Finlet : a small fin with one or two rays often following dorsal or anal fins.

Forked : distinct upper and lower lobe, separated by deep notch.

Fusiform : spindle-shaped; tapering at both ends.

Gill arch : the bony structure that supports the gill-filaments.

Gill filaments : the soft, red, fleshy part of gills.

Gill rakers : the bony projections along anterior edge of gill arches.

- Gill slits** : gill openings.
- Habitat** : the place where a species normally lives.
- Herbivorous** : feeding on plants.
- Hyaline** : transparent; devoid of colour.
- Illicium** : an isolated modified dorsal ray or spine used as a fishing lure by some fishes.
- Incised** : notched (fin membrane between spines).
- Incisor** : a tooth flattened at tip like chisel.
- Inferior** : the position of mouth when on the underside of head.
- Inter-dorsal** : between two dorsal fins.
- Interorbital** : the area between eyes, on top of head.
- Inter-spinous membrane** : the membrane between spines of fin.
- Isthmus** : the part of body that separates two gill chambers.
- Jugular** : pertaining to throat (refers to location of ventral fins).
- Juvenile** : young of fish.
- Keel** : a narrow or sharp ridge-like process; often located at base of caudal fin.
- Labial folds** : folds pertaining to lips.
- Labial furrows** : grooves around outer edges of lips.
- Lanceolate** : broad at base and tapering to point.
- Lateral line scales** : the scales on body that are perforated by sensory tubes, extending from head to base of caudal fin.
- Lateral** : at or towards side.
- Lunate** : crescent-shaped; refers to shape of caudal fin margin.
- Mandible** : lower jaw.
- Maxilla** : each half of upper jaw.
- Meristic** : countable characters (eg. fin rays, spines, gill rakers, etc.).
- Molar, molariform** : blunt, rounded teeth.
- Mucus** : a slimy substance secreted by skin of fishes.
- Naked** : smooth or scaleless.
- Nape** : back of head to dorsal fin.
- Nasal fossa** : cavity containing nasal organ.
- Nasal** : pertaining to nose or nostrils.
- Nictitating membrane** : movable inner eyelid of sharks.
- Nocturnal** : active at night.

Notched : indented

Nuchal : pertaining to nape.

Obtuse : broadly rounded, having a blunt end.

Occipital : upper rear part of head.

Ocellus : an eye-like spot, usually surrounded by a different colour ring.

Ocular : pertaining to eyes.

Omnivore : feeds on both plant and animal material.

Opercular : pertaining to operculum.

Orbit : the dermal or bony eye socket.

Orbital : pertaining to bones surrounds eyes.

Oviparous : producing eggs that develop and outside body of female.

Ovoviviparous : producing eggs that hatch within body of mother, without placental attachment.

Paired fins : the pectoral and pelvic (ventral) fins.

Palate : the roof of mouth.

Palatines : elongate bone on each side of palate.

Papilla : a small fleshy projection on skin.

Pectoral fins : the anterior paired fins.

Pectoral : pertaining to breast area.

Pelvic fins : paired ventral fins located below or behind pectoral fins.

Posterior : toward rear end of fish.

Postorbital : part of head behind eye.

Pre-caudal pit : a transverse or longitudinal notch on caudal peduncle just in front of caudal fin.

Prehensile : long coiled structure, adapted for holding.

Pre-maxilla : the anterior of upper jaw bones.

Pre-operculum : the front part of gill cover.

Pre-orbital : region before and below eye.

Procumbent : horizontal and pointing forward.

Produced : elongated or projecting.

Protractile : capable of forward extension; refers to mouth.

Ray : a flexible structure supporting the membrane.

Recurved : curved backward or inward.

Reticulate : net-like pattern.

Retrose : pointed or curved backwards.

Rostrum : beak or projecting snout.

Rudimentary : very weakly developed structure.

Scapular : midline of back.

Scute : a large shield-like scale, usually with a ridge or keel.

Serrate : bearing small saw-like spines.

Setiform : bristle-like.

Snout : part of head in front of eyes.

Soft dorsal : part of dorsal fin supported by flexible rays.

Spine : a rigid structure supporting membrane of a fin.

Spinous dorsal : anterior part of dorsal fin, supported by spines.

Spiracle : a respiratory opening behind eye in sharks and rays.

Sting : a long spine on tail in some skates and rays.

Striate : marked by lines or grooves.

Stripe : a horizontal colour band.

Submarginal : immediately inside margin.

Sub-ocular, sub-orbital : below eye.

Supra-maxilla : small bone along upper rear edge of maxilla.

Tail : the area behind anus of many fishes (not just caudal fin).

Terminal : anterior end of head (pertaining to mouth).

Thoracic : in region of chest.

Thorns : large denticles on surface of a ray or skate.

Trilobate : with three lobes or divisions in caudal fin.

Truncate : even margin, square-cut edge (refers to caudal fin).

Tubercle : a small hard protuberance.

Undulated : wavy lines or bars.

Vent : external opening of alimentary canal, anus.

Ventral : pertaining to lower surface.

Ventrals or ventral fins : paired pelvic fins.

Vermiculations : a pattern of fine, wavy, worm-like lines or spots.

Vestigial : small remnant of an organ.

Villiform : small fine teeth.

Viviparous : producing living young from within body of mother.

Vomer : a median bone in front of palate, often bears teeth.

ILLUSTRATED KEY TO FAMILIES

The following illustrations are outline drawings of typical members of the families found in this guide; for the detailed family and species description refer to page number in parenthesis.

1. **Hemiscyllidae** : Scales absent, skin covered with sharp denticles; no keels on caudal peduncle; a groove from each nostril to mouth; distinct nasal barbel present; spiracles are larger than eyes; no spines in dorsal fin. (p. 53)

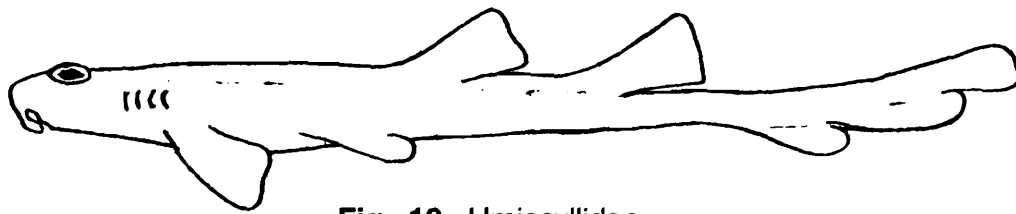


Fig. 10. Hemiscyllidae

2. **Carcharhinidae** : Scales absent; dorsal fin without spines; spiracles small or absent; nasal barbels absent; no grooves connecting nostrils and mouth; lower lobe of caudal fin large; last gill slit over pectoral base. (p. 56)

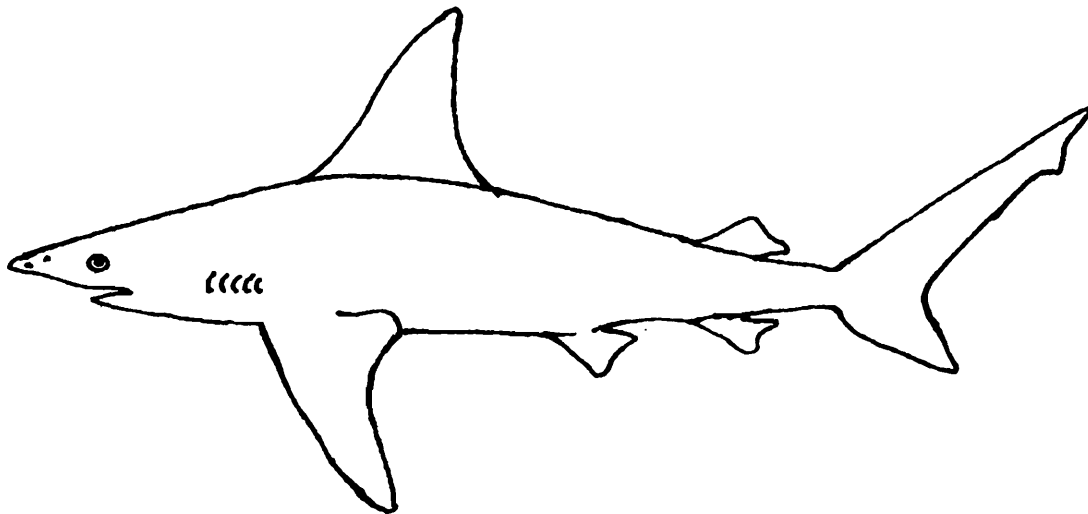


Fig. 11. Carcharhinidae

3. **Sphyrnidae** : Head flattened and greatly expanded laterally, eyes situated on ends of lateral expansions. (p. 64)

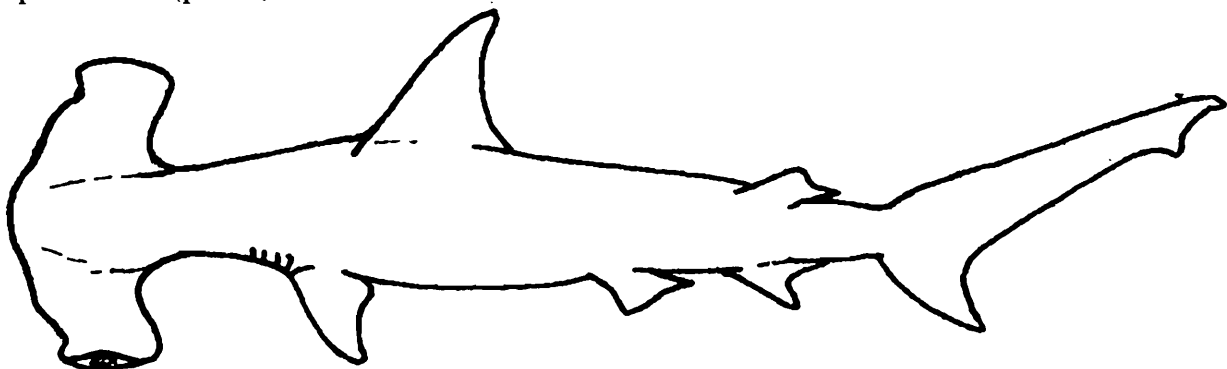


Fig. 12. Sphyrnidae

4. **Narkidae** : Nasal flaps form a narrow, long nasal curtain; mouth narrow, transverse; jaws with minute teeth; dorsal fin present or absent. (p. 67)

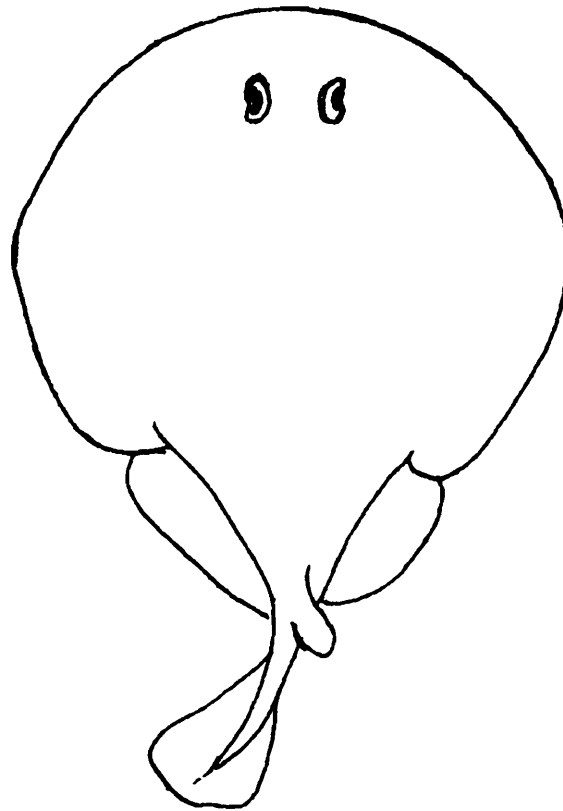


Fig. 13. Narkidae

5. **Rhinobatidae** : Flattened rays with two large dorsal fins; tail thick; front part of body much depressed; snout wedge-shaped or broadly rounded; gill slits ventral side; ventral fins free. (p. 68)

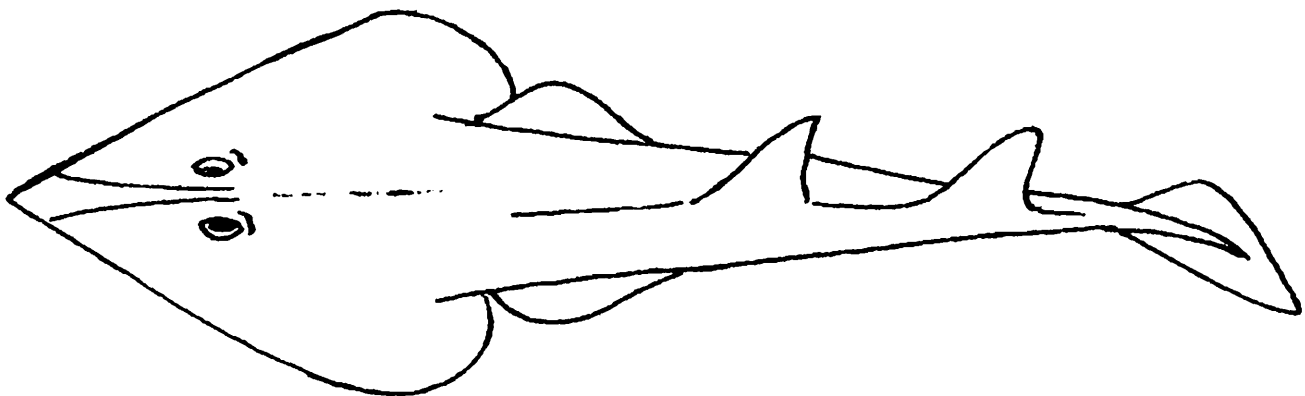


Fig. 14. Rhinobatidae

6. **Myliobatidae** : Body flattened and disc-like; head distinct from disc; mouth small, transverse; tail whip-like; no caudal fin; gill openings underside of disc; dorsal fin on tail base and sting close behind it. (p. 70)

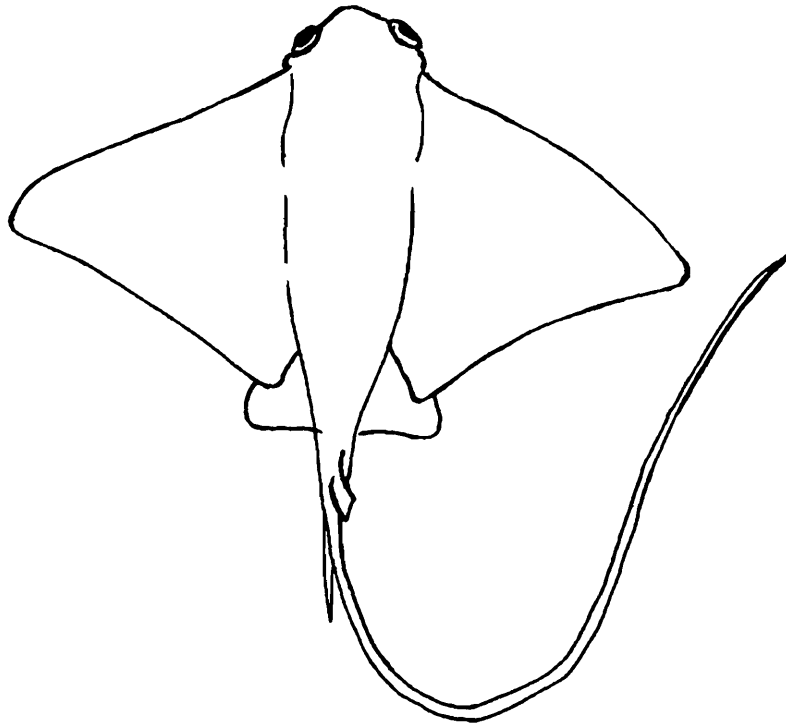


Fig. 15. Myliobatidae

7. **Dasyatidae** : Head flat, merged with body disc; disc rhomboidal to circular; no dorsal and caudal fin; tail slender, whip-like; one or two stings on tail; dorsal and ventral fin folds present or absent on tail. (p. 71)

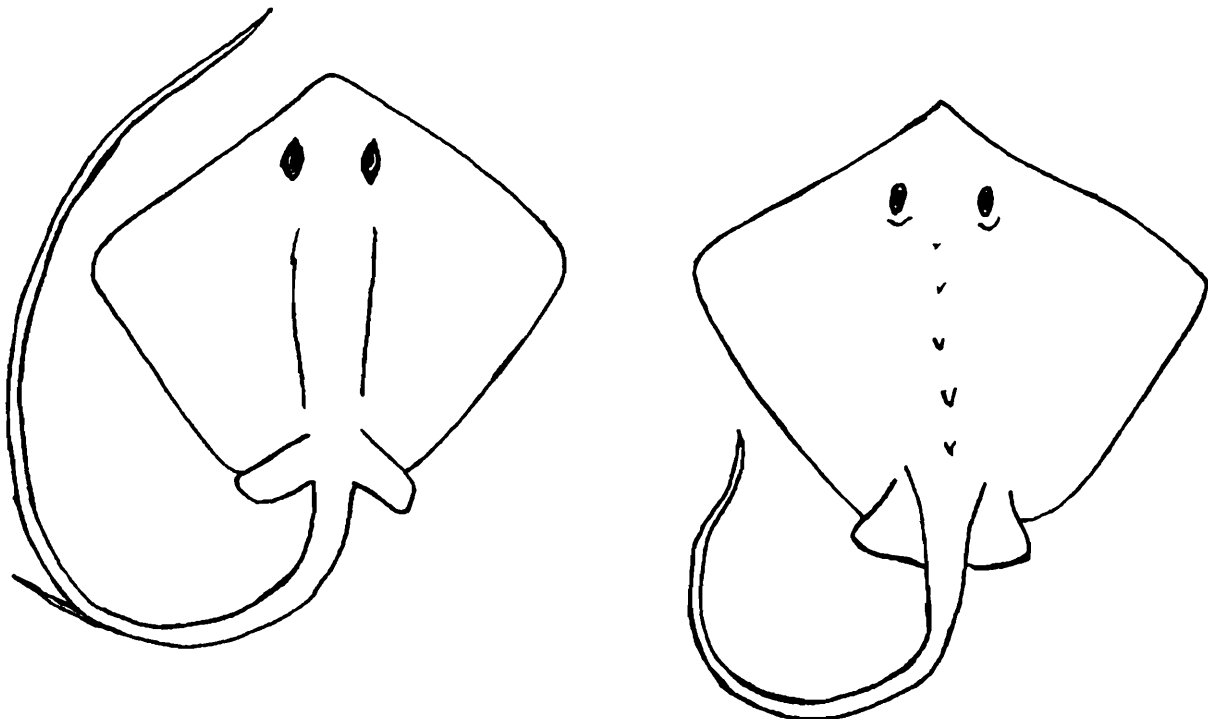


Fig. 16. Dasyatidae

8. **Congridae** : Body long, tail compressed; pectoral fins present; eyes and lips well developed; no long canines; no scales; lateral line prominent; median fins dark edged and continuous with tail. (p. 77)



Fig. 17. Congridae

9. **Muraenidae** : Body robust and slightly compressed; scaleless; canine teeth present; no pectoral fins; dorsal fin origin before gill openings; dorsal and anal fins continuous with caudal fin; no lateral line. Medium to very large; numerous species with great range of colours; commonly seen protruding from crevices. (p. 78)

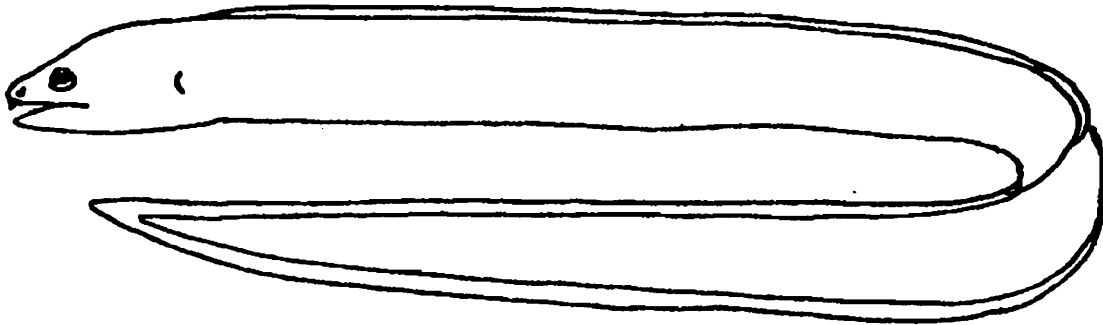


Fig. 18. Muraenidae

10. **Ophichthidae** : Body slender and rounded, tail pointed and spike-like; gill openings are small; lateral line present; pectoral fins present or rudimentary. (p. 86)

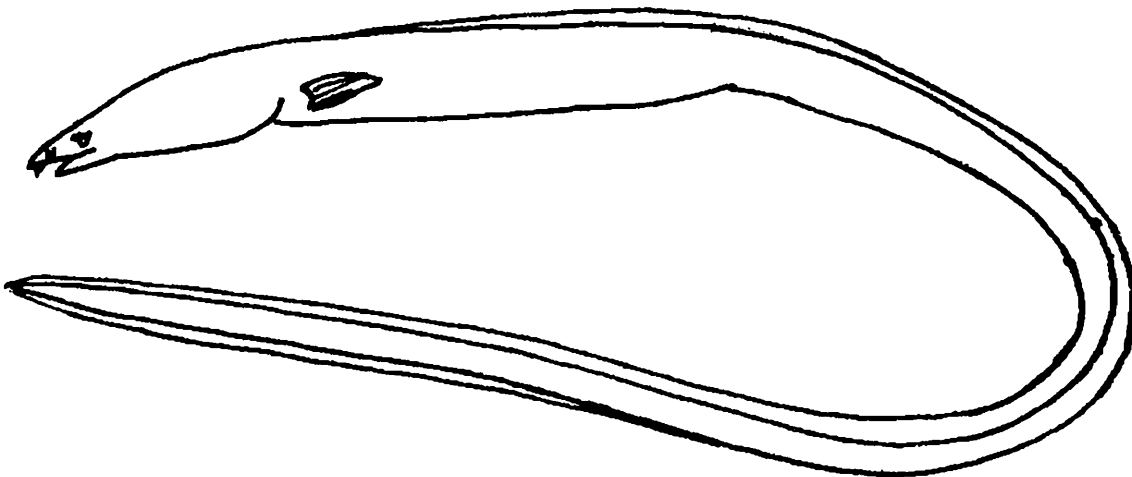


Fig. 19. Ophichthidae

11. **Clupeidae** : Small compressed fishes, belly with sharp scutes; dorsal fin single; no spines in fins; ventral fins abdominal; caudal fin deeply forked; scales deciduous; no lateral line. (p. 89)

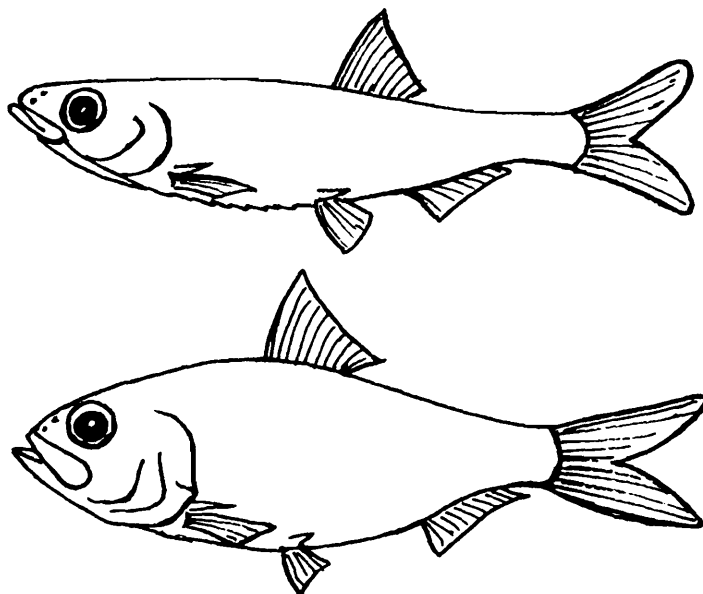


Fig. 20. Clupeidae

12. **Chanidae** : Body torpedo-shaped, slightly compressed; mouth terminal; eyes covered with thick transparent skin; head naked; dorsal fin origin over middle of body; dorsal and anal fin bases scaly; no spines in fins. (p. 91)

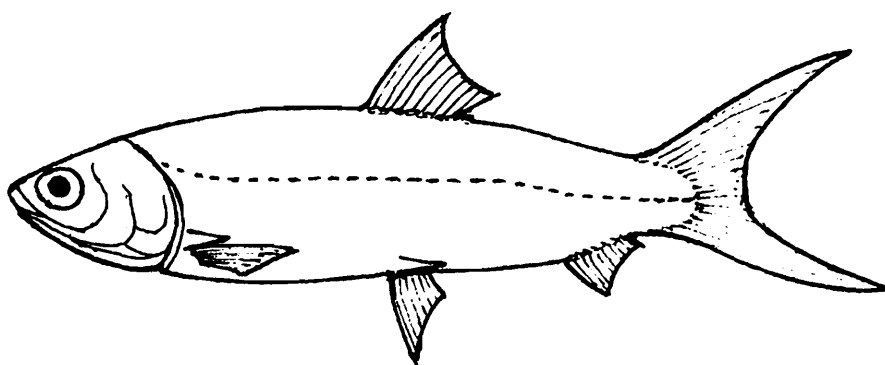


Fig. 21. Chanidae

13. **Plotosidae** : Body elongate; no scales; dorsal, anal and caudal fins continuous; fins with sharp spines; snout with four pairs of fleshy barbels. (p. 91)

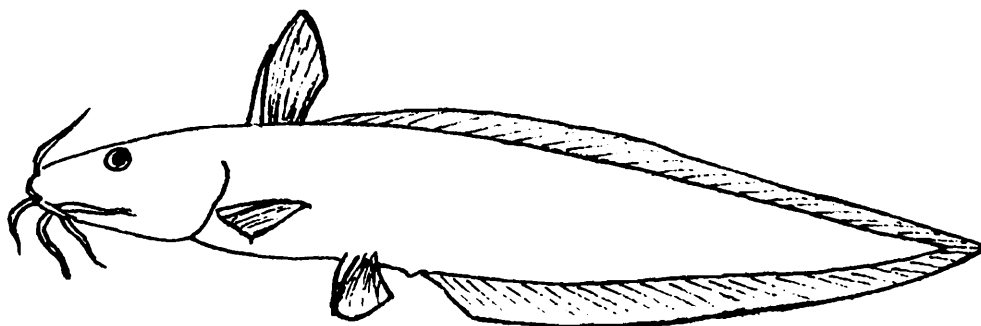


Fig. 22. Plotosidae

14. **Synodontidae** : Elongate and cylindrical, with lizard-like head; mouth large with canine teeth; body scales large; single dorsal fin; no fin spines; small adipose fin near tail present; most are brownish and blotched. (p. 93)

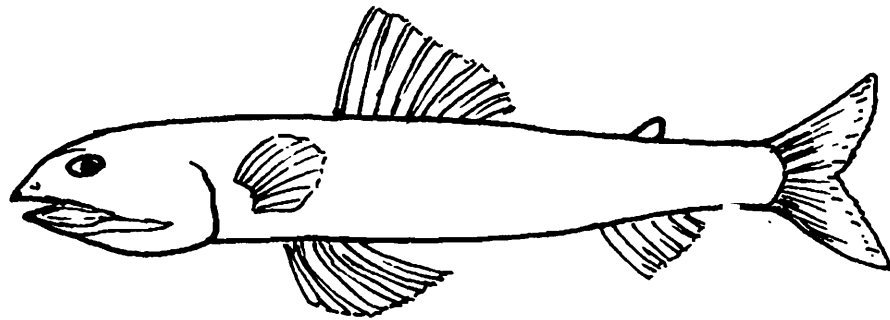


Fig. 23. Synodontidae

15. **Ophidiidae** : Body elongate and tapered; dorsal and anal fins long confluent with caudal fin; tail pointed; ventral fins located underside of head, thread-like. (p. 97)

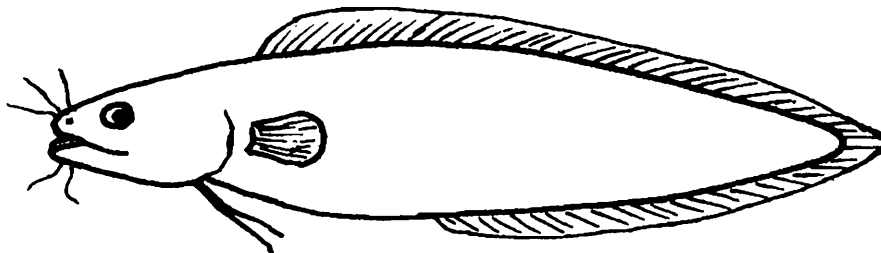


Fig. 24. Ophidiidae

16. **Carapidae** : Eel-like, compressed or cylindrical, tapering to a long slender tail; pectoral fins present; ventral fins absent; dorsal, anal and caudal fins confluent. (p. 97)

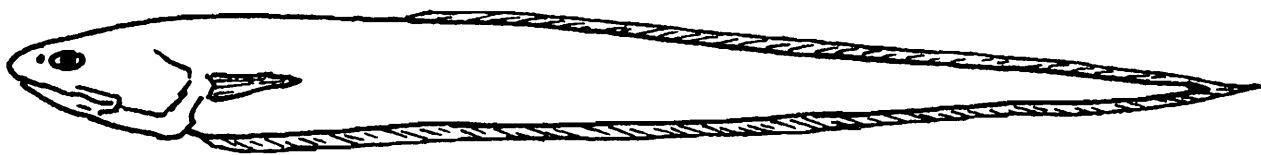


Fig. 25. Carapidae

17. **Bythitidae** : Body elongate; single dorsal fin; dorsal and anal fins joining at caudal fin; ventral fin filamentous and thoracic; scales present or absent. (p. 98)

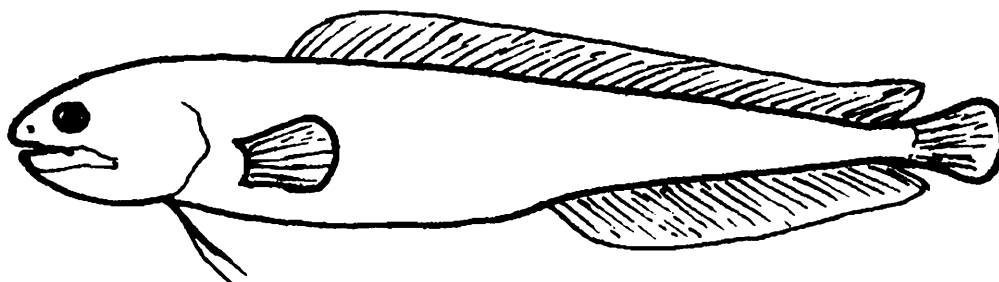


Fig. 26. Bythitidae

18. **Antennariidae** : Body thick, globular, with prickly or warty skin; scales absent; pectoral fins arm-like, located just behind gill openings; mouth large and oblique; first dorsal fin spine modified into a long 'illicium' (p. 99)

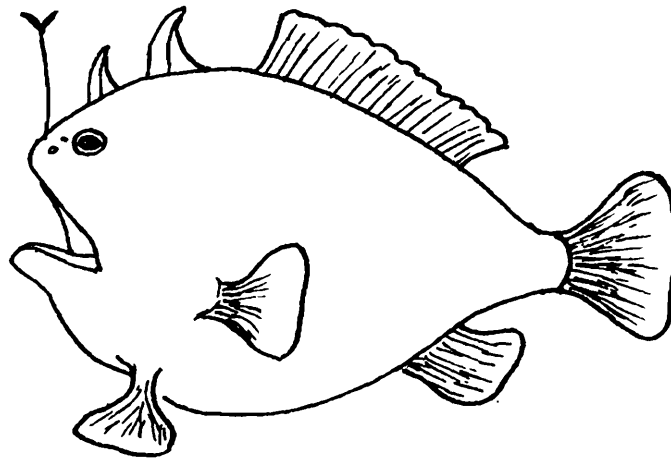


Fig. 27. Antennariidae

19. **Atherinidae** : Body slightly elongate; mouth small; two dorsal fins; spines in fins; eyes large; no lateral line; ventral fins abdominal; scales present; silvery with mid-lateral stripe. (p. 101)

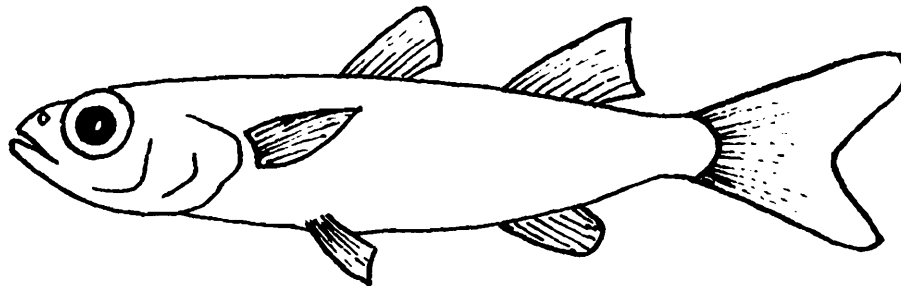


Fig. 28. Atherinidae

20. **Belonidae** : Body long, nearly rounded; jaws long and toothed, formed into a pointed beak; no spines in fins; ventral fins abdominal; dorsal and anal fins placed far behind body; scales small; medium to large; often found in dispersed schools, just below surface. (p. 102)

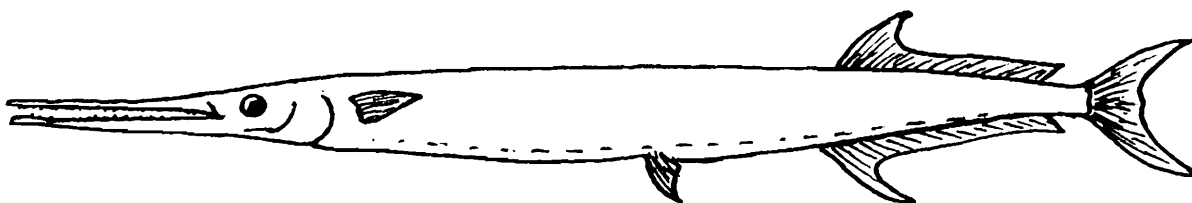


Fig. 29. Belonidae

21. **Hemiramphidae** : Body elongate, laterally compressed or round; lower jaw long, upper jaw much shorter; dorsal and anal fins far back; no spines in fins; pectoral fins long; lateral line along ventral margin of body; Small to medium sized; cruise just below the surface. (p. 103)

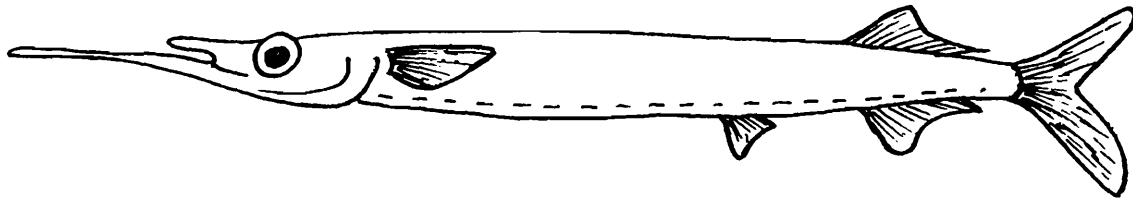


Fig. 30. Hemiramphidae

22. **Exocoetidae** : Body sub-cylindrical, flattened ventrally; mouth small; pectoral fins long and wing-like; ventral fins also large; no spines in fins; caudal fin deeply forked; lateral line along ventral margin of body. (p. 105)

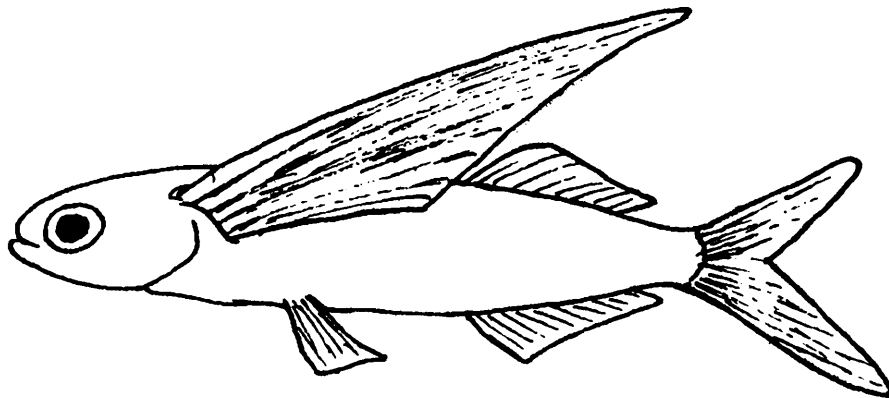


Fig. 31. Exocoetidae

23. **Monocentridae** : Body resembles pinecone or pineapple; small plump fishes; scales enlarged to form a solid rough armour; two dorsal fins; no anal fin spines; ventral fin with one huge spine. (p. 107)

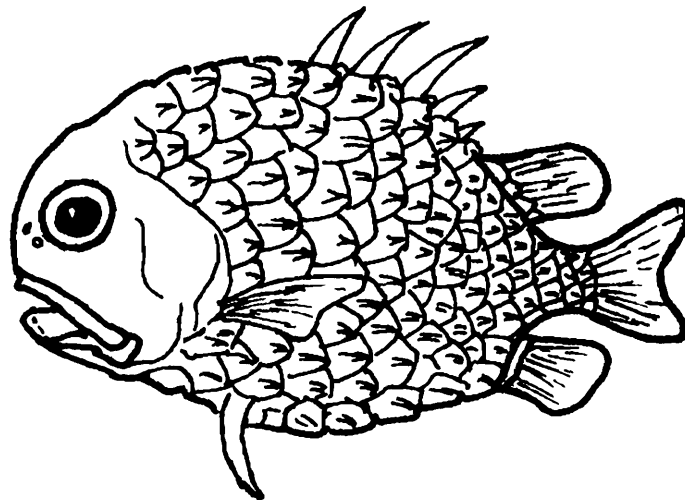


Fig. 32. Monocentridae

24. **Holocentridae** : Oblong to ovate; mouth moderate; eyes large; scale large and strongly ctenoid; head grooved and ridged; fins with sharp spines; opercular spines strong; caudal fin forked; body silvery and red. Small fishes; nocturnal; during day seen hiding in crevices and caves (p. 108).

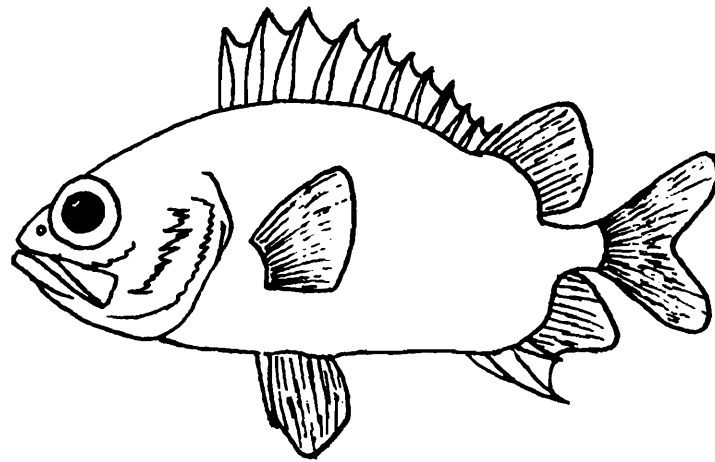


Fig. 33. Holocentridae

25. **Pegasidae** : Head and body depressed; scales fused into a bony armour; nasal bones enlarged into a long rostrum projecting forward; mouth toothless; pectoral fins large and horizontal in position. (p. 115)

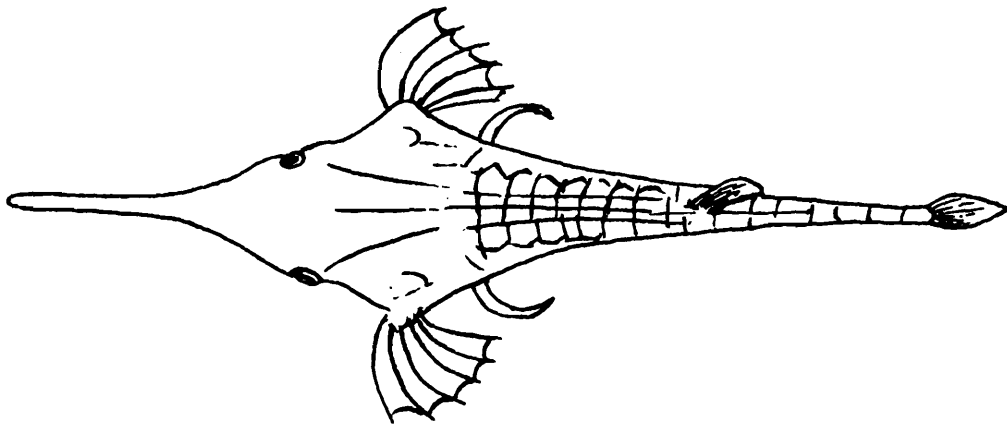


Fig. 34. Pegasidae

26. **Fistulariidae** : Body elongate, slightly depressed; snout long and tubular; mouth small; no fin spines; caudal fin forked, middle rays greatly prolonged; scales absent. (p. 117)

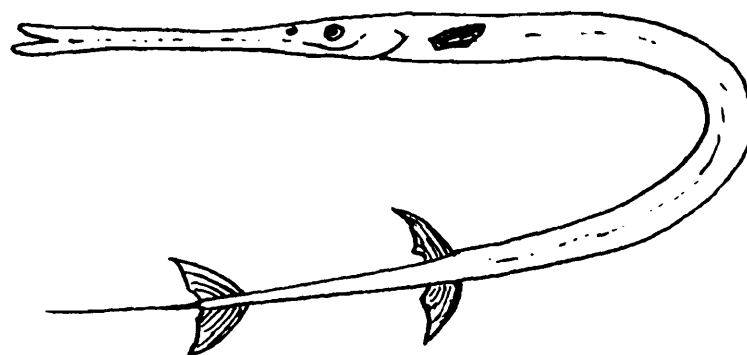


Fig. 35. Fistulariidae

27. **Syngnathidae** : Body slender, elongate and encased in bony rings; snout tubular; no ventral fins; tail often prehensile; single dorsal fin; males have a brood pouch on abdomen. Mostly small; variously coloured to match the background. (p. 117)

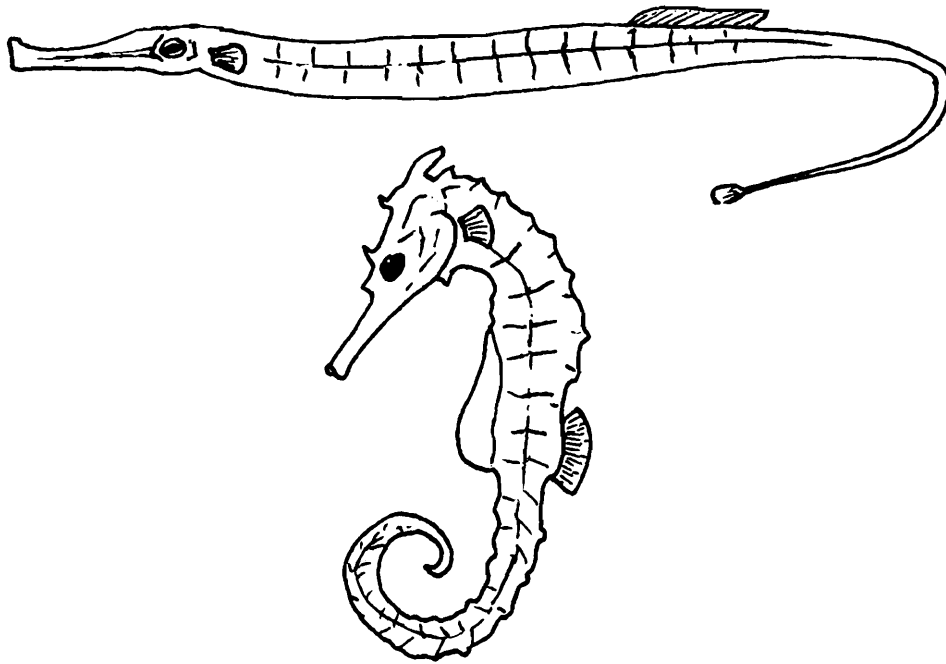


Fig. 36. Syngnathidae

28. **Solenostomidae** : Body compressed, covered with ridged bony plates; snout long and compressed; ventral fins enlarged. Mostly small; closely related to pipefishes; hide among sea weeds. (p. 124)

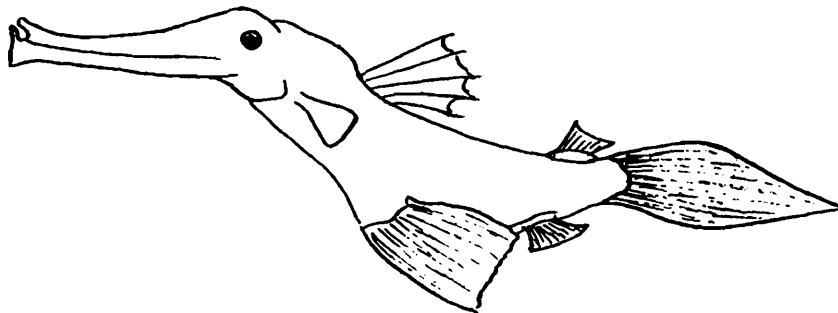


Fig. 37. Solenostomidae

29. **Centriscidae** : Body elongate, extremely compressed and razor-like, encased by tin transparent bony plates; ventral edge sharp; snout tube-like, mouth small; rear end of body twisted ventrally; caudal fin displaced ventrally. (p. 125)

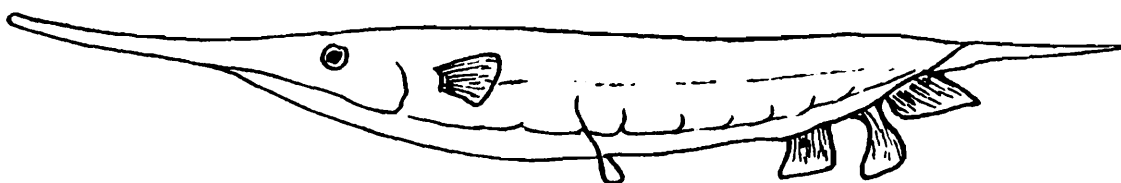


Fig. 38. Centriscidae

30. **Scorpaenidae** : Body robust; head large, spiny and ridged; eyes moderate to large; single dorsal fin and strongly notched; fns with strong, sharp spines; lateral line present; caudal fin rounded; pectoral fins wedge-shaped. Small to medium with venomous spines. Most are camouflaged; some are conspicuous. (p. 127)

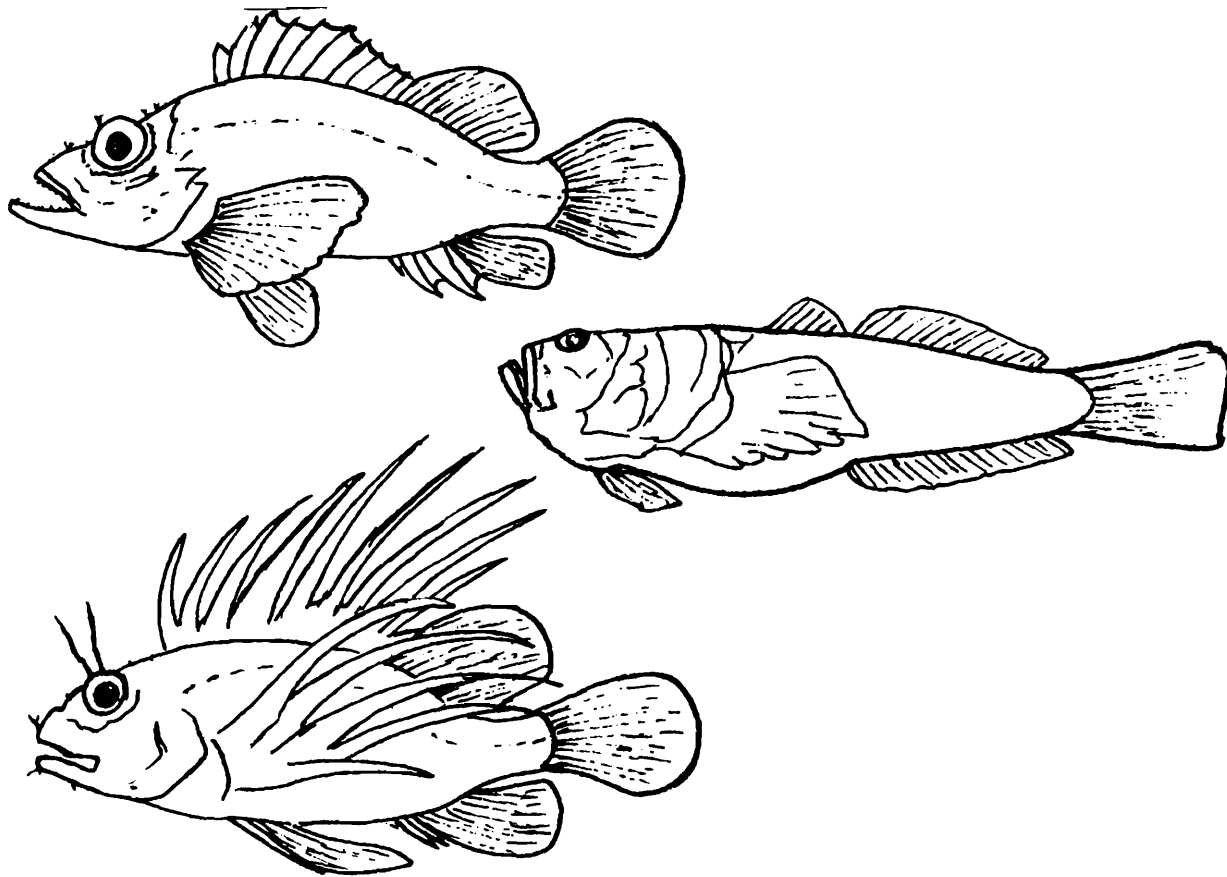


Fig. 39. Scorpaenidae

31. **Tetraorogidae** : Moderate-sized fishes; body covered with deeply embedded scales; dorsal fin originates on head before or above eye; sides of head and operculum with spines; Most are camouflaged. (p. 136)

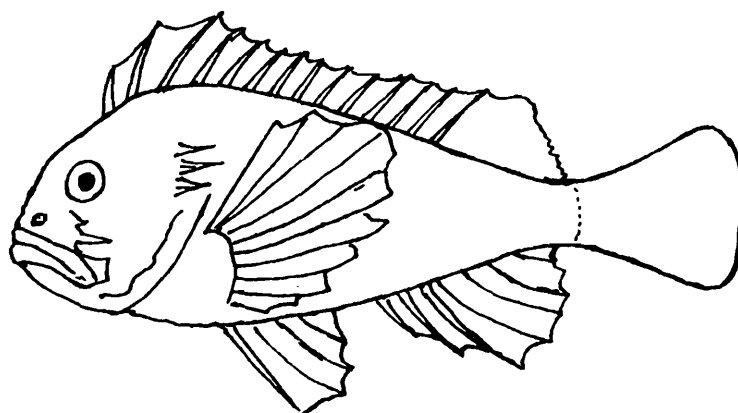


Fig. 40. Tetraorogidae

32. **Synanceiidae** : Body robust; scales not apparent; mouth oblique; head and body with warts; pectoral fins large, fan-like; fin spines enveloped in thick skin. Medium in size; fully camouflaged. (p. 139)

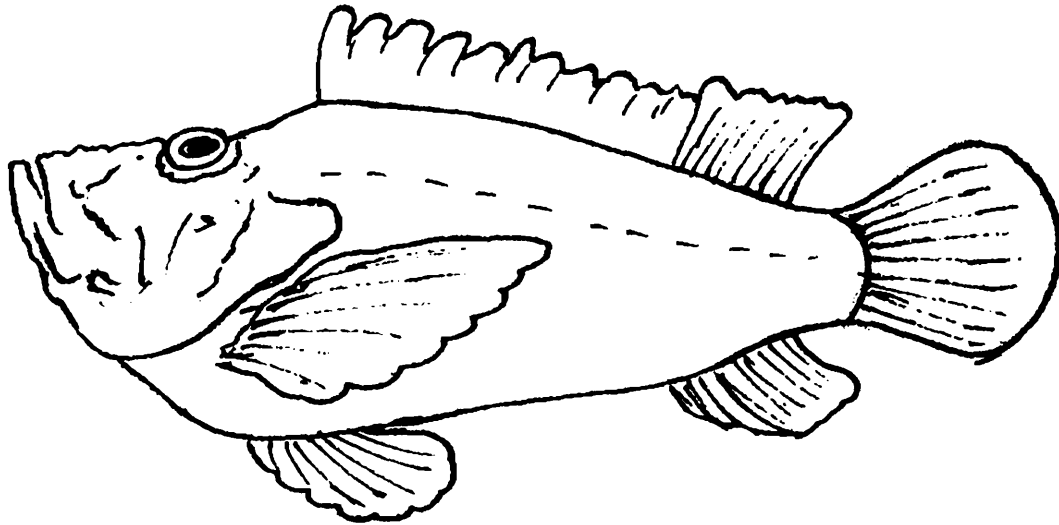


Fig. 41. Synanceiidae

33. **Caracanthidae** : Small fishes; body oval; head with small spinules; ventral fins rudimentary; dorsal fin continuous; pectoral fins small; caudal fin rounded. (p. 142)

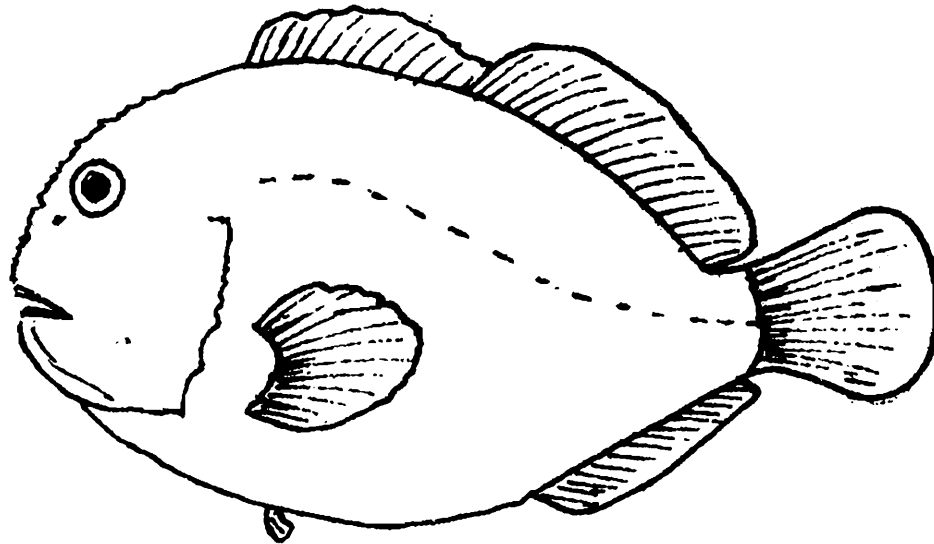


Fig. 42. Caracanthidae

34. **Platycephalidae** : Head depressed; mouth large, lower jaw longer; bony ridges of head with spines and serrations; two separated dorsal fins; ventral fins thoracic. (p. 143)

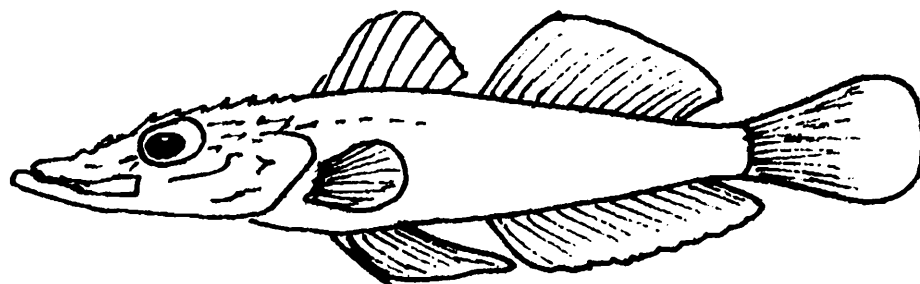


Fig. 43. Platycephalidae

35. **Dactylopteridae** : Body squarish, tapering posteriorly; head blunt, large and bony; pre-opercular spine very long; mouth inferior and small; pectoral fins very large, fan-like. (p. 146)

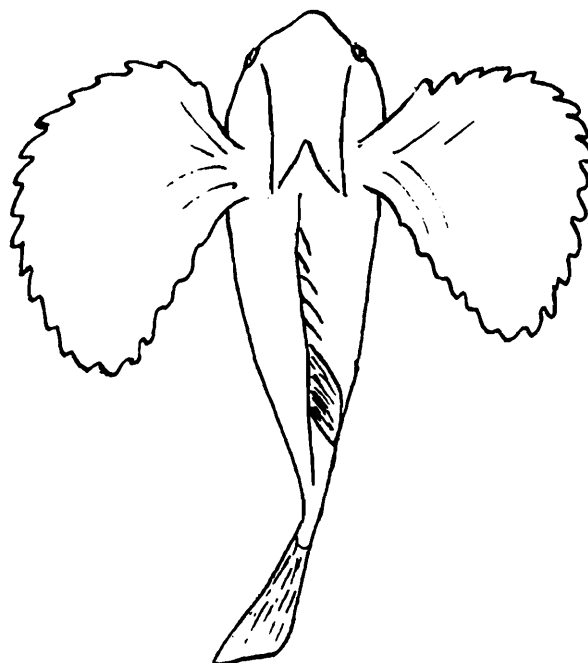


Fig. 44. Dactylopteridae

36. **Kuhliidae** : Small fishes; opercle with two flat spines; single dorsal but deeply notched at end of spinous portion; silvery, tail with black bands. (p. 147)

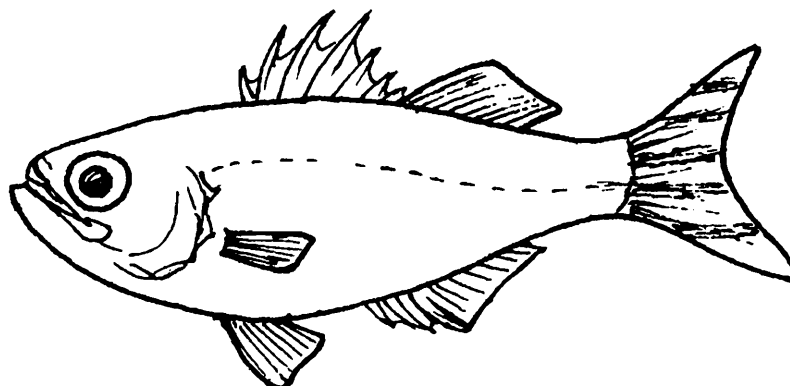


Fig. 45. Kuhliidae

37. **Serranidae** : Body robust and elongate; scales small or embedded; mouth large, with small canines in front of jaws; operculum with three flat spines or with small spines; single dorsal fin, divided or continuous but deeply notched at spinous portion; pectorals rounded; fins scaly; lateral line complete; caudal fin round or emarginate. (p. 148)

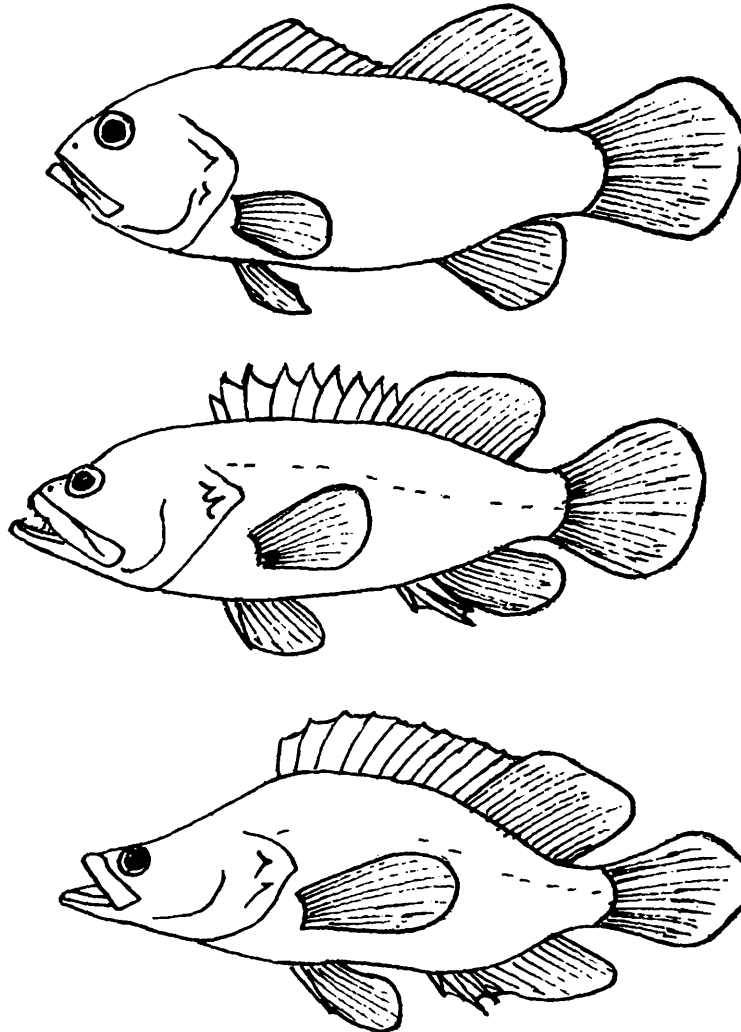


Fig. 46. Serranidae

38. **Pseudochromidae** : Small fishes; body slightly elongate; lateral line incomplete or interrupted; single dorsal fin and elevated; usually one ray of ventral fin produced; scales large. (p. 175)

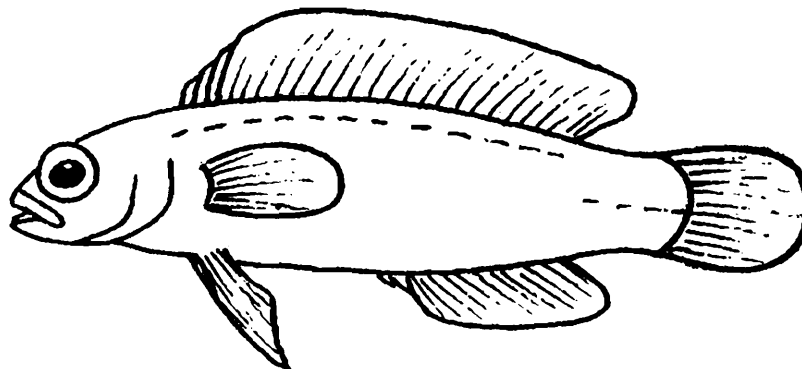


Fig. 47. Pseudochromidae

39. **Plesiopidae** : Small fishes; opercle without spines; lateral line interrupted; dorsal fin continuous, membrane deeply incised; scales large; ventral fins elongated; caudal fin round; all fin spine sharp. (p. 177)

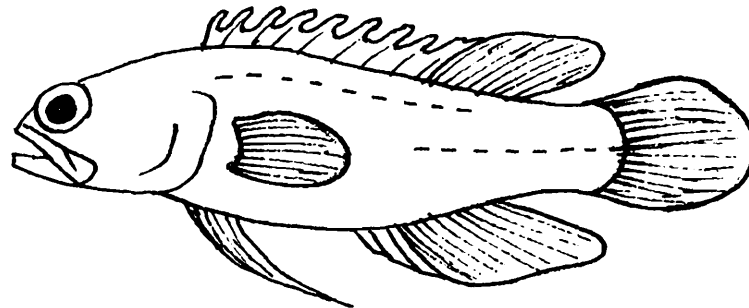


Fig. 48. Plesiopidae

40. **Teraponidae** : Moderate-sized fishes; preopercle serrate; operculum with two strong spines; dorsal fin continuous and deeply notched end of spinous part; no canines in jaws; lateral line complete; caudal fin forked; silvery with black bands. (p. 179)

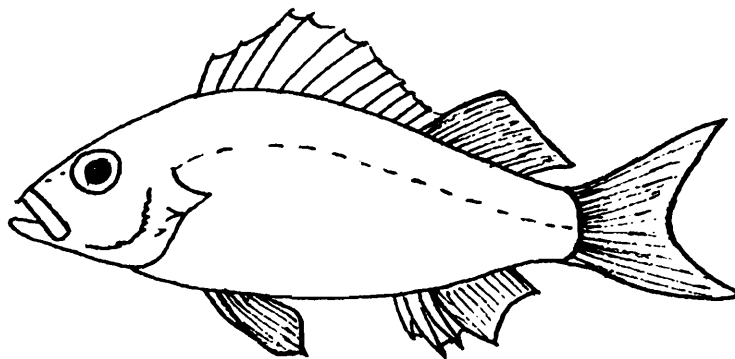


Fig. 49. Teraponidae

41. **Priacanthidae** : Moderate-sized fishes, compressed; mouth oblique, no canines; scales small; eyes very large; dorsal, anal and caudal fins very large; pectoral fin shorter; single continuous dorsal fin; caudal fin truncate; bright silvery-red. Nocturnal, hidden under coral canopies during day time. (p. 181)

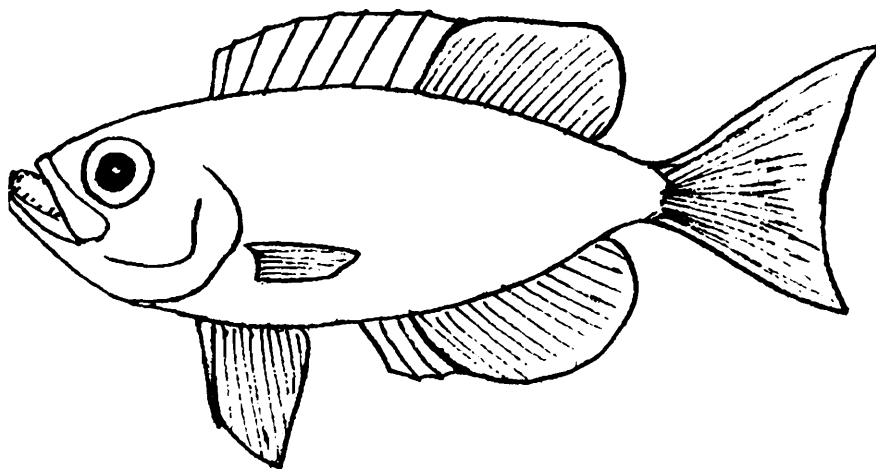


Fig. 50. Priacanthidae

42. **Apogonidae** : Eyes large; scales large; mouth large and oblique; opercular spine present; two separate dorsal fins. Small brightly coloured and striped pattern fishes, often occur in huge schools of mixed species. (p. 183)

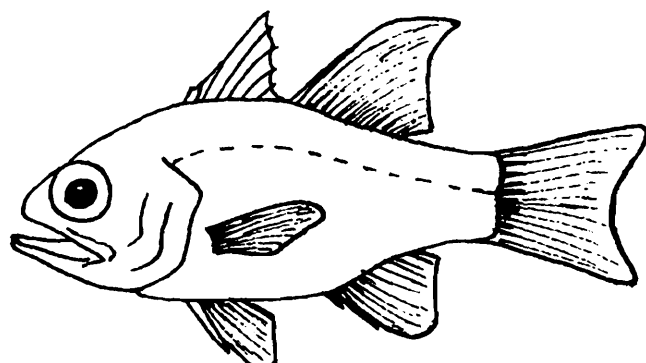


Fig. 51. Apogonidae

43. **Haemulidae** : Moderate-sized fishes; body robust; mouth small, lips thick; no canines; head scaly; body scales moderate; preopercle serrate; operculum with indistinct point posteriorly; lateral line parallel to dorsal profile; second anal spine stout and long; caudal fin emarginate. (p. 197)

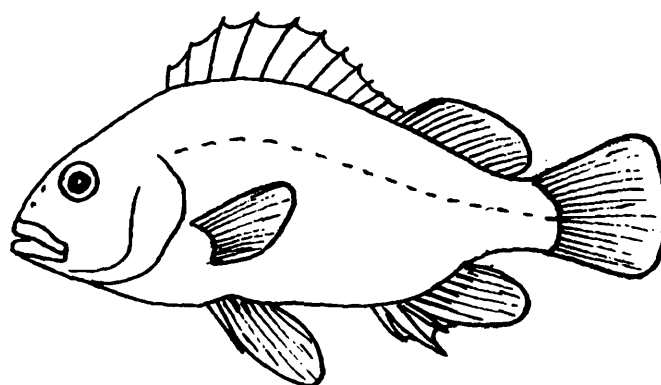


Fig. 52. Haemulidae

44. **Lutjanidae** : Small to large sized fishes; body slightly deep; jaws with sharp canines (absent in *Aphareus*); pre-maxilla with a broad based mid-lateral process; operculum with one or two distinct points posteriorly; single dorsal fin; fin spines well-developed; dorsal and anal fins scaleless; scales ctenoid; caudal fin forked or truncate. (p. 202)

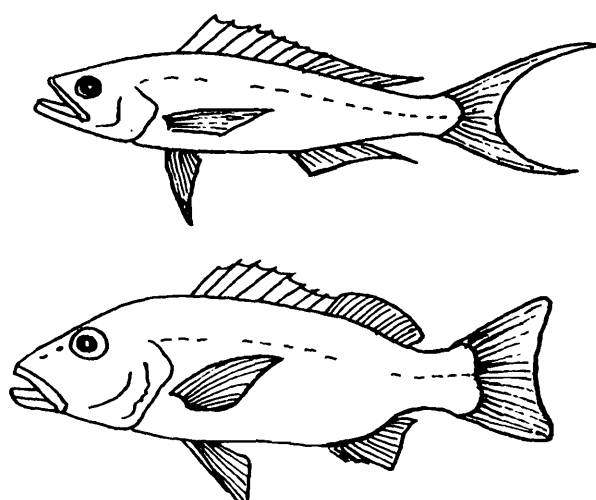


Fig. 53. Lutjanidae

45. **Caesionidae** : Moderate sized; body slender and fusiform; mouth small, upper jaw protrusile; upper edge of pre-maxilla with 1 or 2 bony processes; maxilla scaleless; single dorsal fin; caudal fin forked. (p. 221)

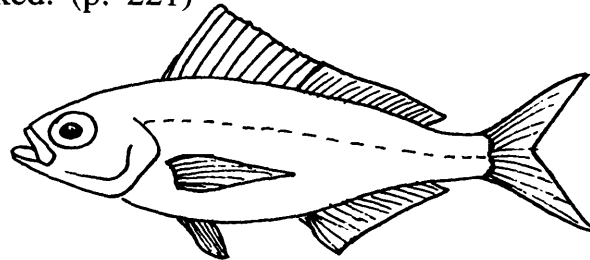


Fig. 54. Caesionidae

46. **Lethrinidae** : Body deep and compressed; mouth terminal, lips thick; jaws with stout canines; cheek and maxilla scaleless; dorsal fin single, continuous; preopercle smooth; no mid-lateral process on pre-maxilla; caudal fin emarginate to slightly forked; silvery grey. (p. 229)

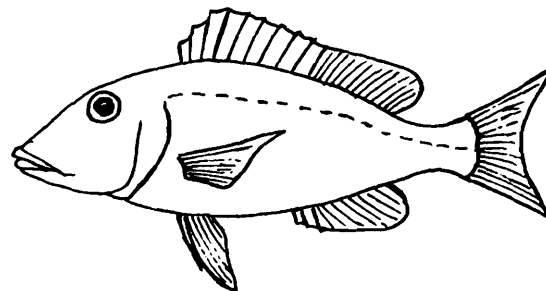


Fig. 55. Lethrinidae

47. **Nemipteridae** : Moderately small fishes; body oblong to elongate; pre-maxilla with a low mid-lateral process; single dorsal fin, continuous; dorsal and anal fins in a shallow groove; scales ctenoid; caudal fin with forked or emarginate, often upper lobe with filament; brilliantly coloured. (p. 242)

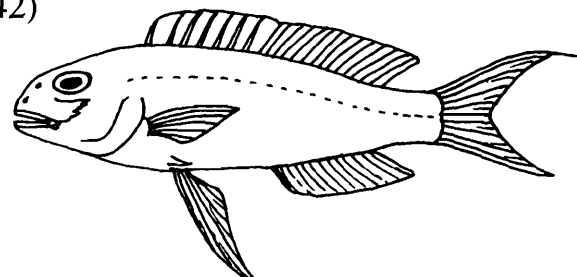


Fig. 56. Nemipteridae

48. **Kyphosidae** : Moderately deep and ovate; head small; head and body with small ctenoid scales; single dorsal fin; dorsal and anal fins with small scales; maxilla scaly; pectoral and ventral fins small; caudal fin emarginate; silvery grey. (p. 251)

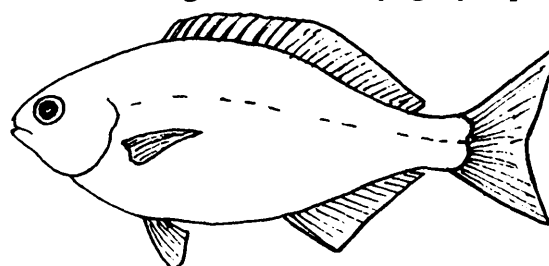


Fig. 57. Kyphosidae

49. **Drepanidae** : Body very deep, strongly compressed; mouth small and protractile maxilla distally exposed; spinous dorsal can be differentiated from soft portion by a deep notch; pectoral fin long and falcate; caudal fin rounded; body silvery. (p. 253)

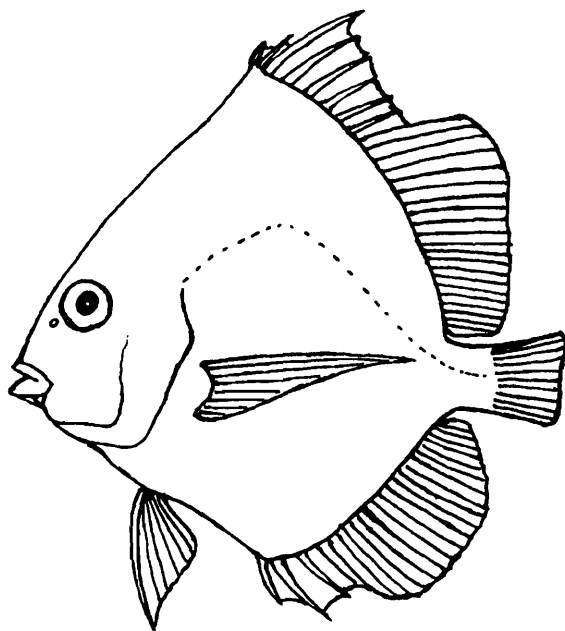


Fig. 58. Drepanidae

50. **Ephippidae** : Body very deep, circular and compressed; head short; mouth small and terminal; preopercle smooth; dorsal fin single and continuous; dorsal and anal fins scaly; dorsal and anal fin extremely elongate in juveniles. (p. 254)

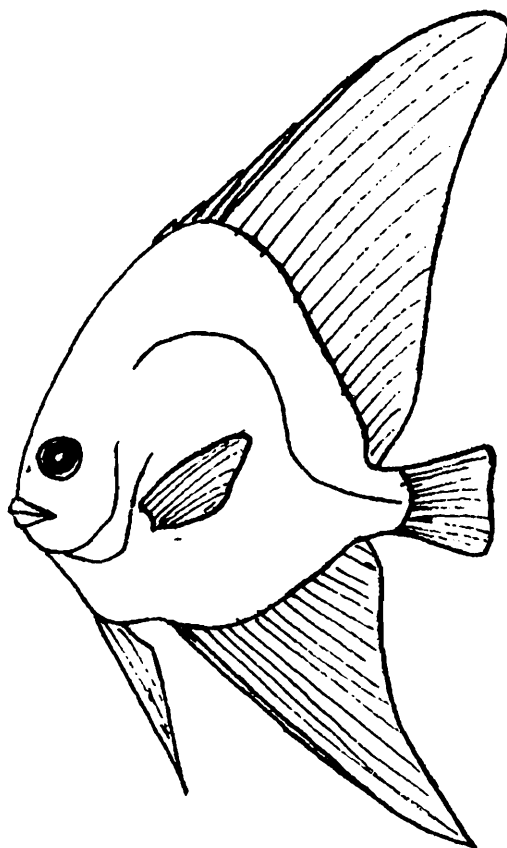


Fig. 59. Ephippidae

51. **Monodactylidae** : Body deep and compressed; maxilla scaly; single dorsal fin; ventral fins rudimentary or absent; scales small, ctenoid, deciduous, extending onto head and median fins. (p. 257)

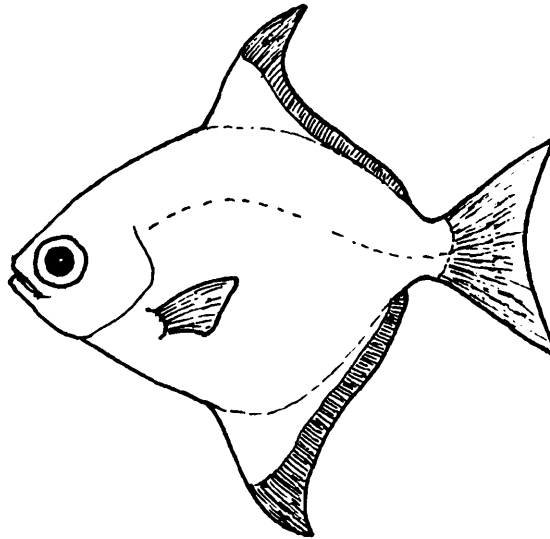


Fig. 60. Monodactylidae

52. **Gerreidae** : Body slender, compressed; mouth very protrusile; eyes large; scales ctenoid, large and deciduous; single dorsal fin, slightly notched; dorsal and anal fin folds into a scaly sheath; caudal fin forked; silvery. (p. 258)

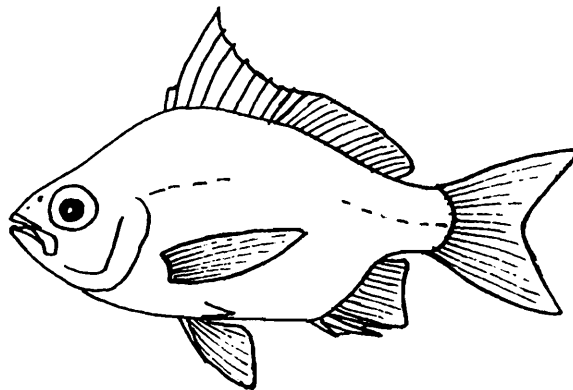


Fig. 61. Gerreidae

53. **Mullidae** : Identified by a pair of long barbels on chin; body oblong; mouth small and protrusile; small flat spine on opercle; two dorsal fins well separated; caudal fin forked; red, brown or yellowish and usually striped. (p. 260)

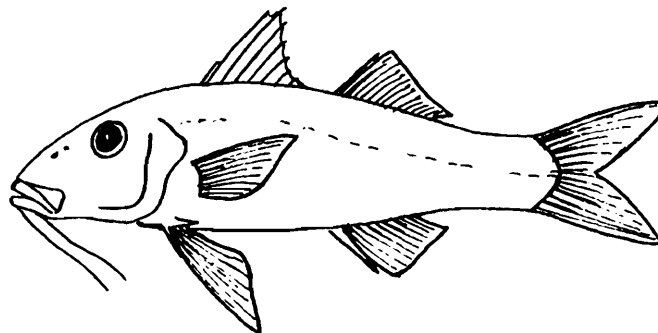


Fig. 62. Mullidae

54. **Malacanthidae** : Body oblong, slightly compressed; opercle with a strong spine; jaws with small canines; dorsal and anal fins very long; scales small and ctenoid; caudal fin truncate. (p. 267)

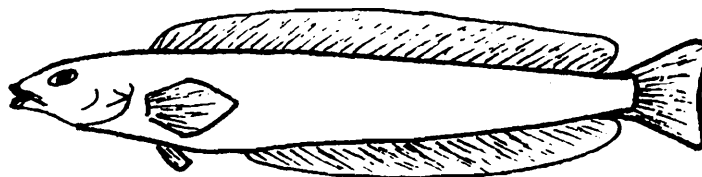


Fig. 63. Malacanthidae

55. **Menidae** : Body extremely compressed; breast sharp; scales minute; mouth protrusible; no dorsal fin spines; anal fin base very long; caudal fin forked; first two pelvic fin rays elongated. (p. 268)

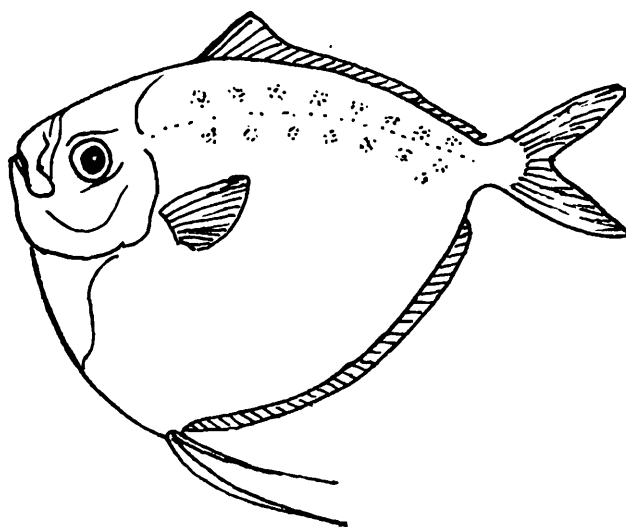


Fig. 64. Menidae

56. **Pomacanthidae** : Body compressed and deep; corner of opercle with strong, long spine; scales strongly ctenoid with ridges ending in sharp points; dorsal fin single, unnotched; soft portions of dorsal and anal fins elevated; caudal fin rounded; brightly coloured. (p. 270)

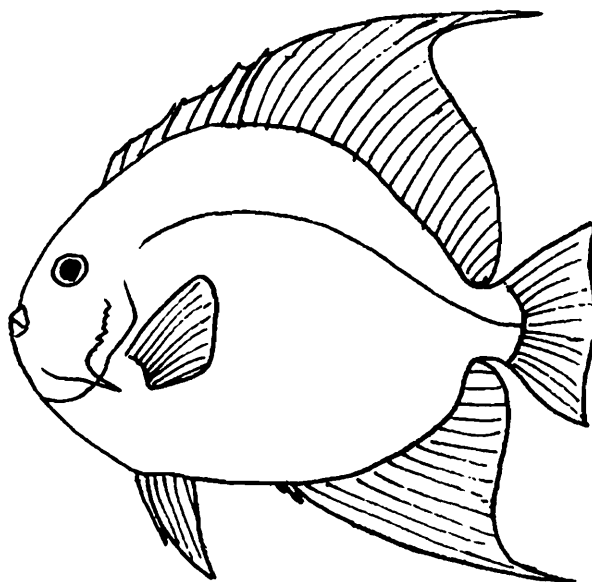


Fig. 65. Pomacanthidae

57. **Chaetodontidae** : Body deep and compressed, disc-like; mouth small; snout short and slightly produced; preopercle smooth, no spine at corner; single dorsal fin; dorsal and anal fins scaly; caudal fin truncate or rounded. (p. 277)

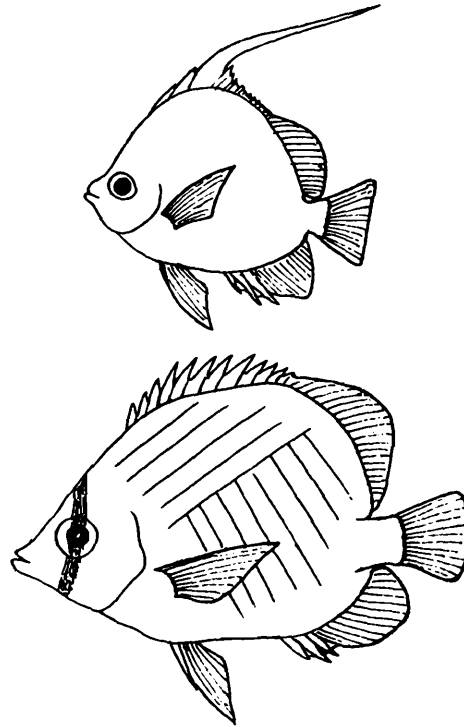


Fig. 66. Chaetodontidae

58. **Carangidae** : Body streamlined, deep and compressed; tail base slender; opercle and preopercle smooth; scales small, cycloid; dorsal fin notched; fin spines embedded in groove; dorsal and anal finlets present or absent; caudal fin deeply forked; posterior part of lateral line scales modified into scutes. Small to large, silvery and very swift predators. (p. 301)

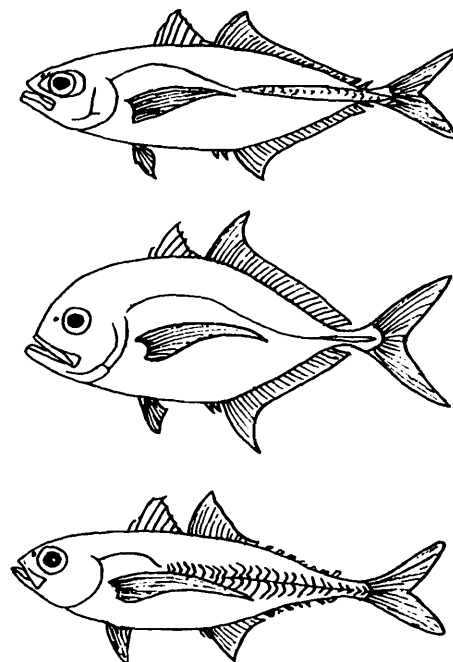


Fig. 67. Carangidae

59. **Coryphaenidae** : Body compressed; head profile vertical; scales small, cycloid; dorsal fin single, long, originates at nape and extended to caudal fin; no finlets; ventral fin well developed; caudal fin forked. (p. 318)

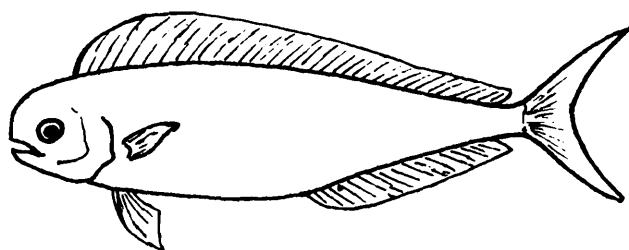


Fig. 68. Corephaenidae

60. **Rachycentridae** : Body elongate, sub-cylindrical; head depressed; mouth large; dorsal fin spines very low; soft dorsal and anal fin very long; scales minute; caudal fin rounded to lunate. (p. 319)

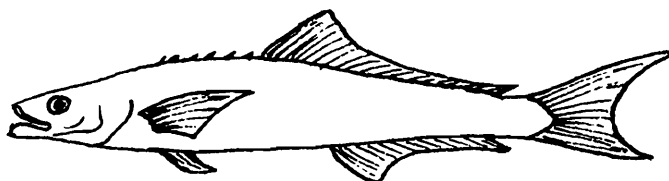


Fig. 69. Rachycentridae

61. **Echeneidae** : Body elongate and slender; head flat, with sucking disc on top; mouth superior; no fin spines; caudal fin rounded to emarginate. (p. 320)

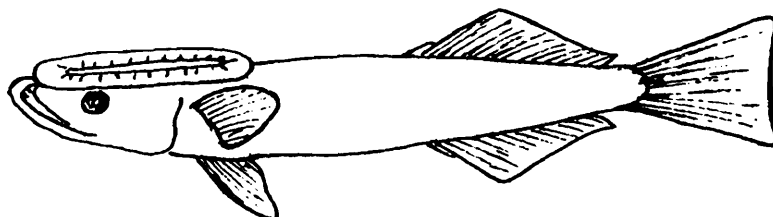


Fig. 70. Echeneidae

62. **Cirrhitidae** : Small-sized fishes; nostrils with fringe of cirri; no spines on head; preopercle smooth; single dorsal fin, notched; tips of dorsal fin spines with cirri; lower pectoral fin rays unbranched and enlarged, membranes deeply incised; caudal fin truncate to slightly rounded. (p. 321)

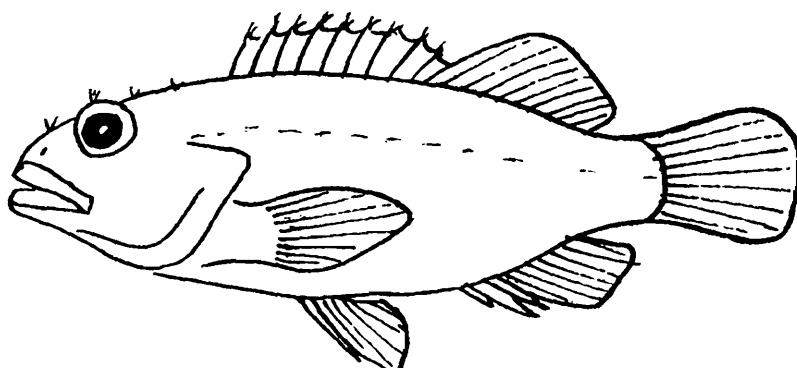


Fig. 71. Cirrhitidae

63. **Pempheridae** : Body compressed and moderately deep; tail tapering; caudal peduncle slender; mouth very oblique; eyes very large; dorsal fin short and unnotched; anal fin base long; caudal fin truncate; coppery sliver. (p. 324)

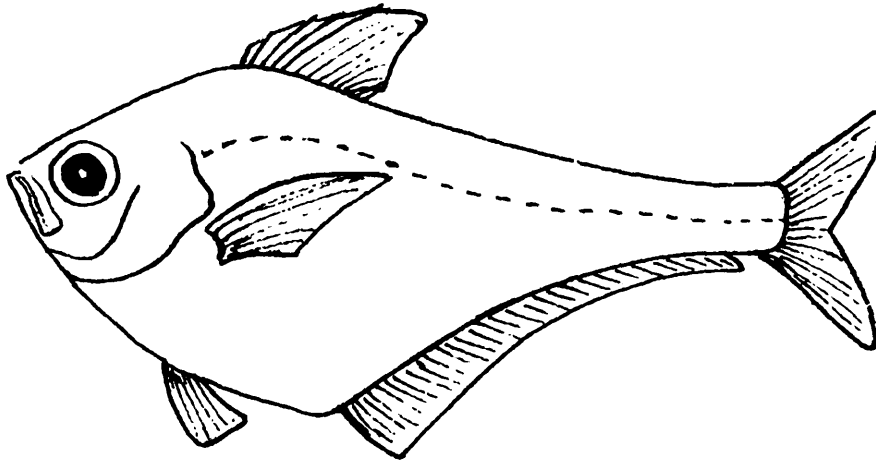


Fig. 72. Pempheridae

64. **Pomacentridae** : Small to very small, body elongate to orbicular; single dorsal fin, spinous part longer than soft part; scales ctenoid, extending onto fins; lateral line interrupted; caudal fin emarginate to forked; brightly coloured fishes. (p. 326)

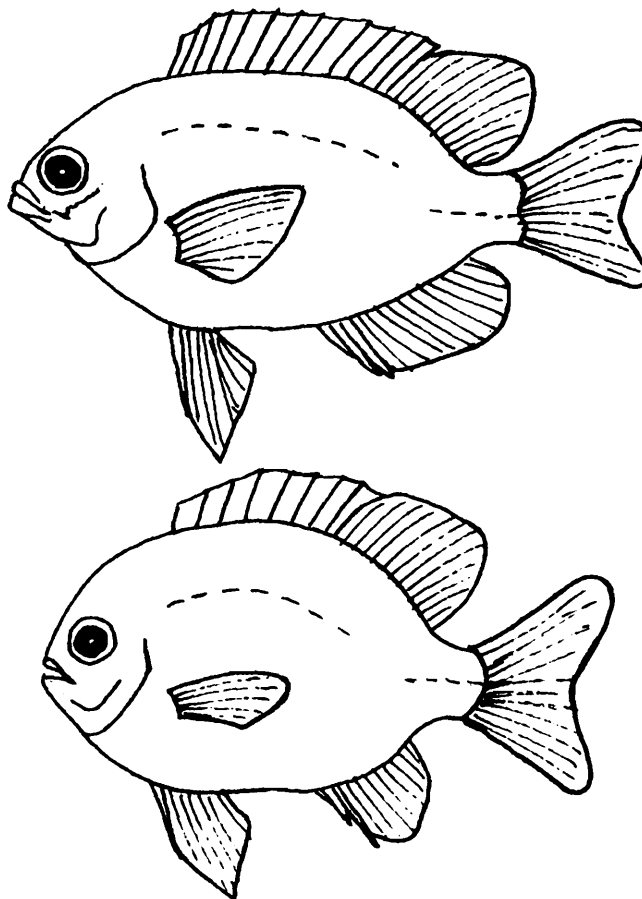


Fig. 73. Pomacentridae

65. **Labridae** : Small to moderate sized fishes; greatly varied in appearance; slender to deep bodied; snout short to long; lips fleshy; mouth slightly to strongly protrusile; canine teeth well developed; scales cycloid, head scaled; dorsal fin single, continuous; caudal fin rounded or truncate to lunate. (p. 353)

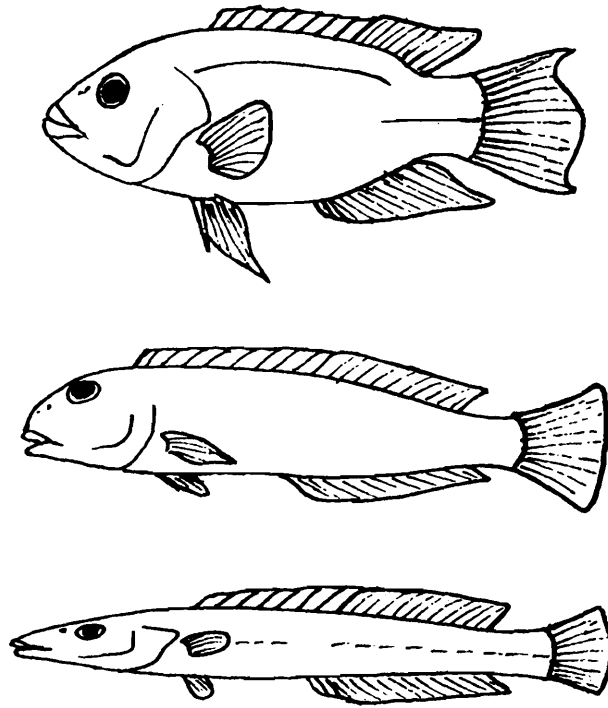


Fig. 74. Labridae

66. **Scaridae** : Medium to large sized fishes; mouth small; scales very large, cycloid; teeth fused into a blunt beak; snout bluntly rounded; single dorsal fin, unnotched; fin spines slender and flexible; caudal fin rounded to emarginate; dark coloured fishes. (p. 390)

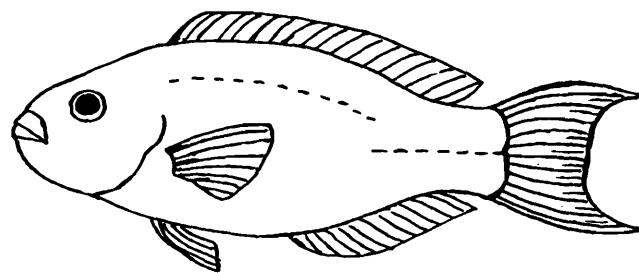


Fig. 75. Scaridae

67. **Mugilidae** : Body slightly elongate; head depressed; mouth small; small teeth present or absent; scales large, ctenoid; head and body scaled; no lateral line; two distinct dorsal fins, caudal fin forked or emarginate; silvery grey. (p. 401)

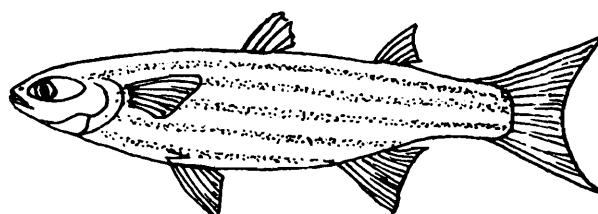


Fig. 76. Mugilidae

68. **Sphyraenidae** : Medium very large. Elongate and cylindrical anteriorly; snout pointed, lower jaw projecting; teeth large and sharp; lateral line present; two dorsal fins, widely separated; scales small, cycloid; caudal fin forked; body silvery. (p. 403)

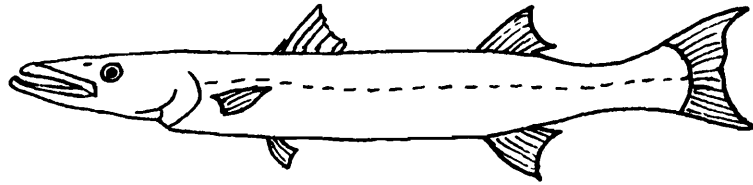


Fig. 77. Sphyraenidae

69. **Trichonotidae** : Body extremely elongate and slender; mouth large; lower jaw projecting; small teeth on jaws; scales cycloid, large; lateral line present; single dorsal fin, inserted over pectoral base and ends at caudal fin; anal fin elongate; caudal fin rounded. (p. 406)

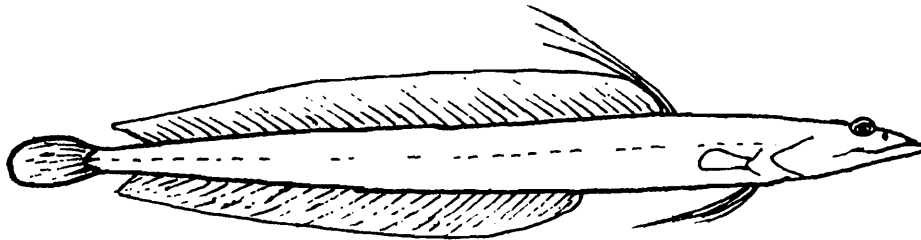


Fig. 78. Trichonotidae

70. **Pinguipedidae** : Body elongate and slightly compressed; mouth protractile; lower jaw projecting; single dorsal fin, notched; opercle with stout spine; scales small, ctenoid; lateral line complete; caudal fin rounded or emarginate. (p. 407)

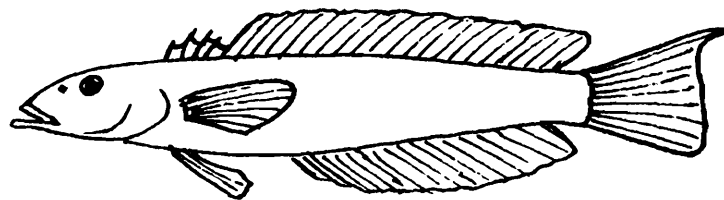


Fig. 79. Pinguipedidae

71. **Blenniidae** : Small to very small fishes, body elongate, scaleless; mouth inferior; head blunt with cirri, tentacles or fleshy crest; single dorsal fin, sometimes notched; fin spines flexible; ventral fins much reduced; caudal fin rounded; variable colour pattern with blotches and dashes or spots. (p. 410)

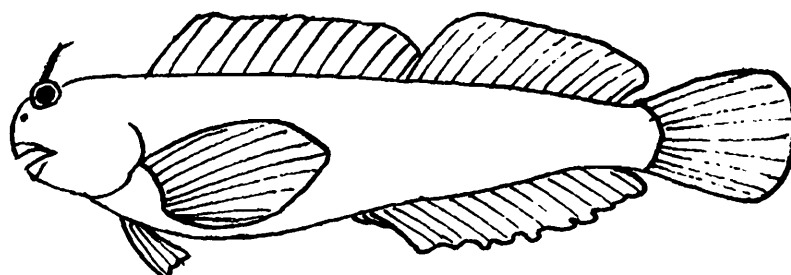


Fig. 80. Blenniidae

72. **Tripterygiidae** : Small fishes; dorsal fin trilobed; scales ctenoid, covering head and body; pectoral fins large; ventral fins filamentous; cryptically coloured. (p. 421)

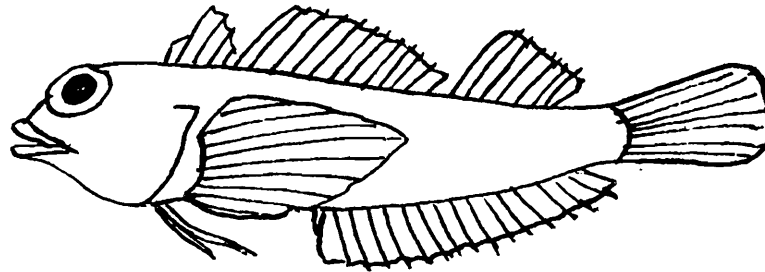


Fig. 81. Tripterygiidae

73. **Callionymidae** : Small elongated fishes; no scales; head broad and flattened; eyes slightly dorsal in position; upper jaw protrusile; preopercle with stout spine; two separate dorsal fins; ventral fins large, placed ahead of pectorals. (p. 422)

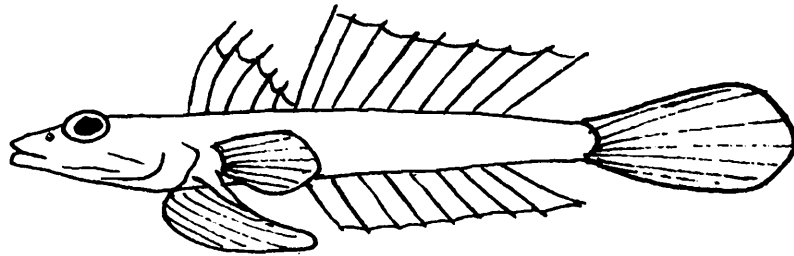


Fig. 82. Callionymidae

74. **Gobiidae** : Small to vary small fishes; body slightly elongate; head large and blunt, with pores and canals or absent; mouth large; lateral line absent; scales cycloid, ctenoid or absent; two dorsal fins, sometimes single; fin spines flexible; ventral fins separate or united to form a disc; lateral line absent; caudal fin rounded. (p. 425)

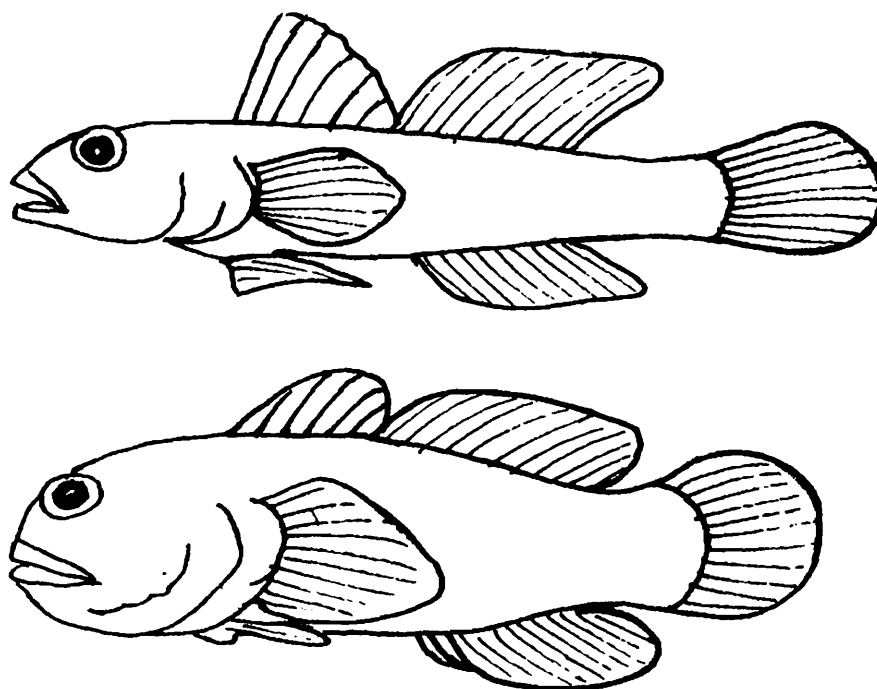


Fig. 83. Gobiidae

75. **Microdesmidae** : Body elongate, extremely elongate in some species; mouth oblique; lower jaw projecting; scales cycloid and small; no lateral line; dorsal fin continuous or divided; fin spines flexible; caudal fin rounded or truncate. (p. 437)

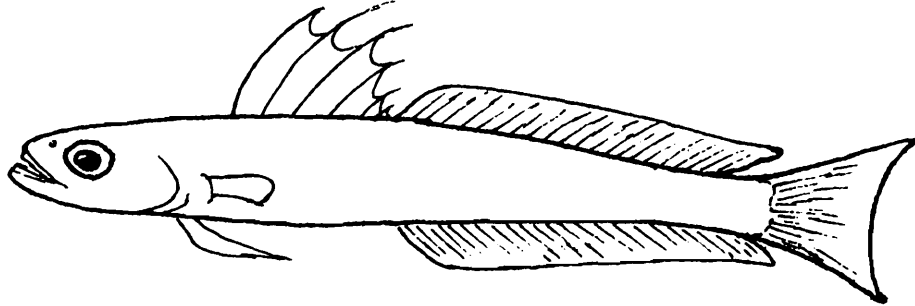


Fig. 84. Microdesmidae

76. **Acanthuridae** : Small to moderate; body ovate to oblong, compressed; mouth small; sides of caudal peduncle with keel like plates or one or more sharp spines folded in a groove; scales minute, ctenoid; some fishes with horn-like rostral projection on forehead (*Naso*); dorsal fin continuous, unnotched; caudal fin emarginate or lunate. (p. 440)

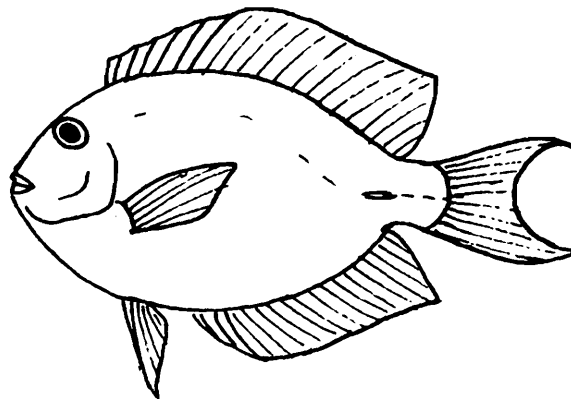


Fig. 85. Acanthuridae

77. **Zanclidae** : Body deep, compressed; snout long and pointed; dorsal fin single, continuous, anterior dorsal fin spines extremely long and filamentous; bony projections in front of eyes; no spines on sides of caudal peduncle. (p. 453)

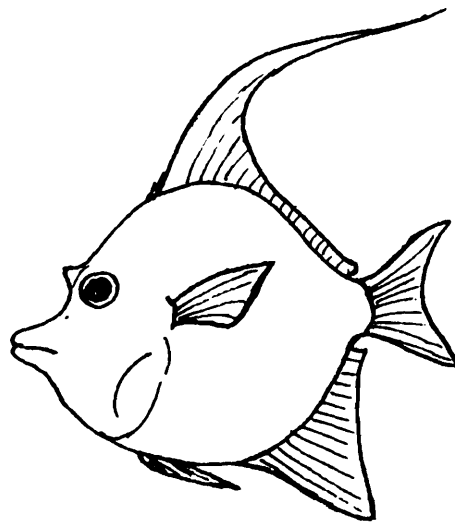


Fig. 86. Zanclidae

78. **Siganidae** : Small to moderate, ovate, compressed; caudal peduncle very narrow; mouth small, upper lip broader than lower; scales minute, cycloid, not visible; ventral fin with an inner and outer spine separated by three soft rays; caudal fin truncate to forked. (p. 454)

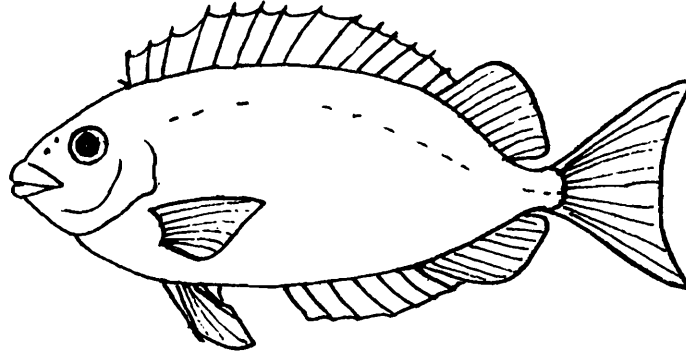


Fig. 87. Siganidae

79. **Scombridae** : Body streamlined, caudal peduncle slender; two keels on each side of caudal peduncle; two dorsal fins, folded into grooves; finlets behind second dorsal and anal fins; scales very small and cycloid; caudal fin forked or lunate. (p. 464)

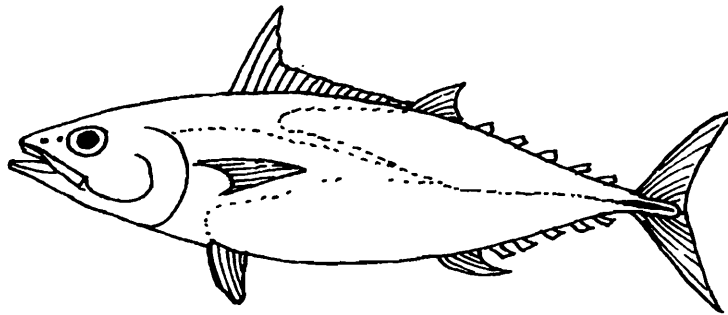


Fig. 88. Scombridae

80. **Istiophoridae** : Body streamlined; upper jaw elongate, forms a spear-like bill; two dorsal fins; first dorsal fin base longer, very high, sail-like in some; ventral fins very narrow, folding into a groove on belly; two keels on sides of caudal peduncle; caudal fin lunate. (p. 470)

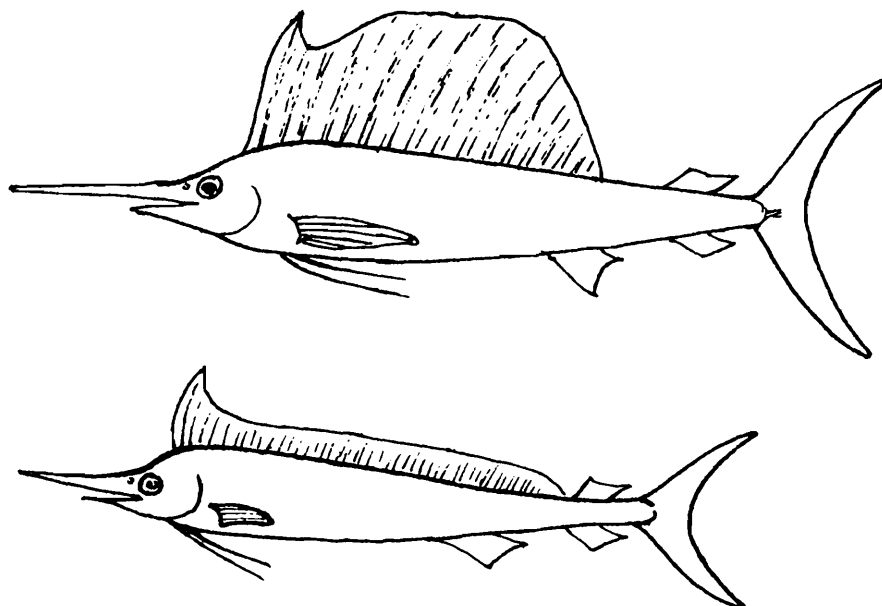


Fig. 89. Istiophoridae

81. **Psettodidae** : Body very flattened, both eyes on same side, either left or right side of head; dorsal, anal and pelvic fins with one or more spines; dorsal fin origin behind eyes; scales ctenoid; lateral line on both sides of body; caudal fin rounded. (p. 472)

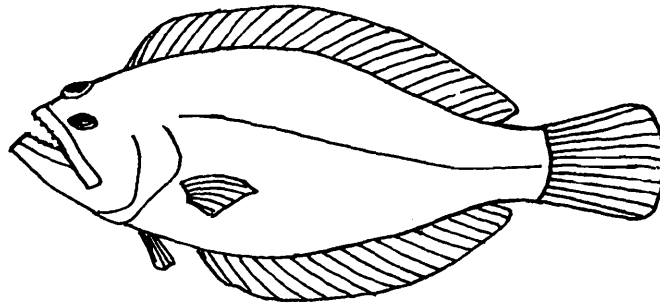


Fig. 90. Psettodidae

82. **Bothidae** : Body flat and leaf-like; eyes on left side of head; dorsal fin origin above or anterior to eye; no spines in fins; dorsal and anal fins separated from caudal fin; anus on blind side; caudal fin rounded. (p. 473)

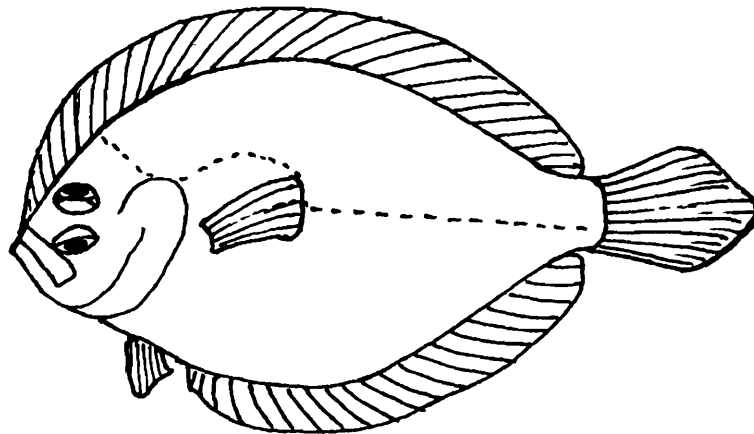


Fig. 91. Bothidae

83. **Cynoglosidae** : Body flat and oval; eyes on left side of head; mouth small, curved and twisted to eye side; snout projects beyond mouth; lateral line absent in many species; no pectoral fins; ventral fin present only on eyed side; dorsal and caudal fins joined to caudal fin. Brownish with bars, blind side pale. (p. 475)

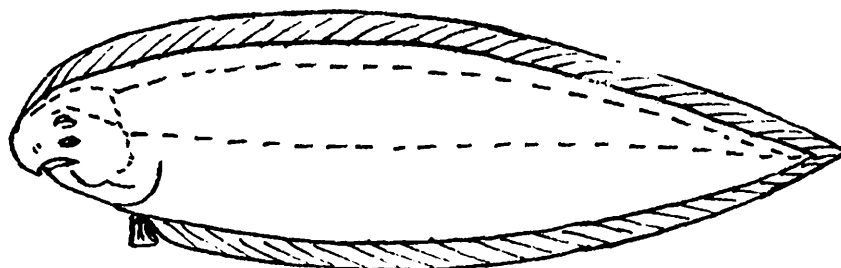


Fig. 92. Cynoglosidae

84. **Soleidae** Body flat; eyes on right side of head; eyes very small; dorsal fin origin above or before eyes; no fin spines present; pectoral fins present or absent. (p. 477)

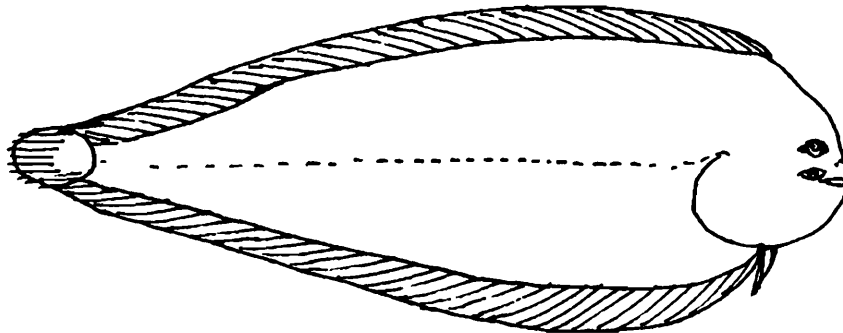


Fig. 93. Soleidae

85. **Balistidae** : Body relatively deep, compressed, oval; mouth small; teeth chisel-like; scales large, rough and plate-like; ventral fins rudiment, form into a small spinous nob; two separate dorsal fins; first dorsal fin spine strong; no spines in anal fin; some with rows of curved spines on posterior sides of body; caudal fin rounded or emarginate. (p. 481)

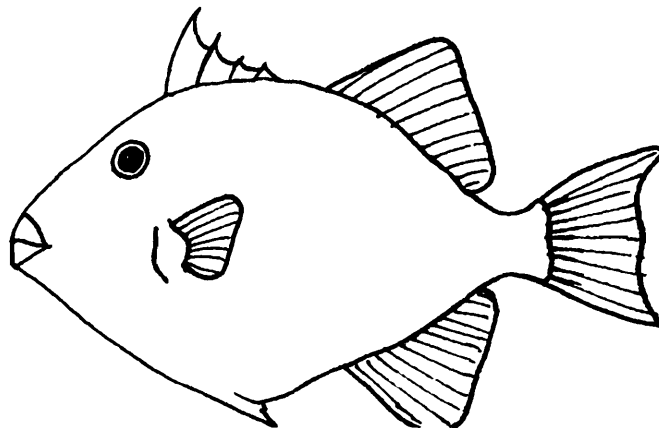


Fig. 94. Balistidae

86. **Monacanthidae** : Small to medium sized; body compressed, deep, oval to orbiculate; snout pointed, mouth small; scales small, each scale with microscopic spinules, some with small skin flaps; two dorsal fins, first dorsal spine prominent; ventral fins rudiment; sides of caudal peduncle naked, but often with patch of small spines. (p. 494)

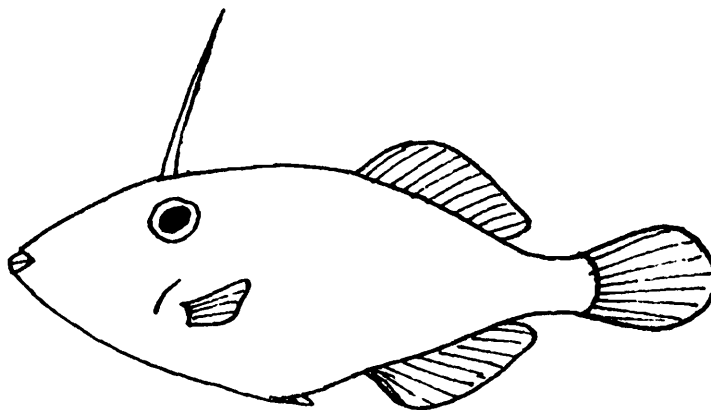


Fig. 95. Monacanthidae

87. **Triacanthidae** : Small fishes; body strongly compressed; caudal peduncle slender; scales very small and rough; two separate dorsal fins, 1st dorsal spine long and strong; no spines in anal fin; ventral fin reduced to a single stout spine; caudal fin forked. (p. 501)

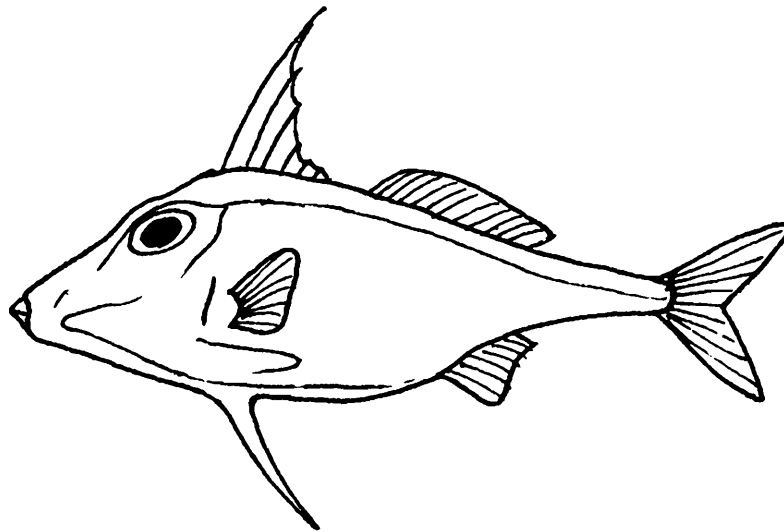


Fig. 96. Triacanthidae

88. **Ostraciidae** : Small and sluggish; body robust, encased in hard bony armour of hexagonal plates; single dorsal fin; mouth inferior, lips fleshy; no fin spines; no ventral fins; dorsal and anal fins posterior in position. (p. 503)

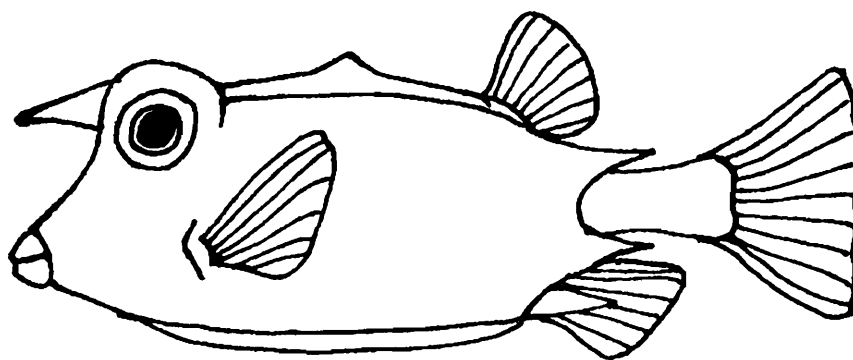


Fig. 97. Ostraciidae

89. **Tetraodontidae** : Small to medium-sized; body slightly elongate and heavy; skin tough and naked or with spines or prickles; dental plates beak-like, with median suture; no spines in fins; dorsal and anal fins posterior in position; no ventral fins; able to inflate body by swallowing water or air. (p. 507)

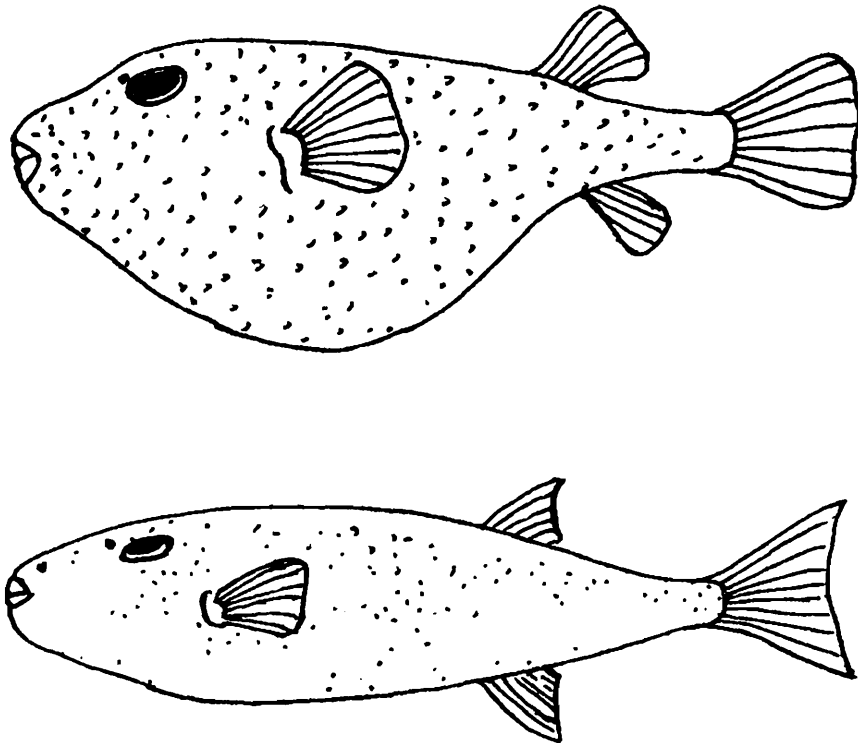


Fig. 98. Tetraodontidae

90. **Diodontidae** : Small sluggish fishes. Body globular and inflatable; scales modified into strong long spines; dorsal and anal fins posterior in position and rounded; no fin spines; no ventral fins; teeth fused into a single beak-like late; caudal fin rounded. (p. 516)

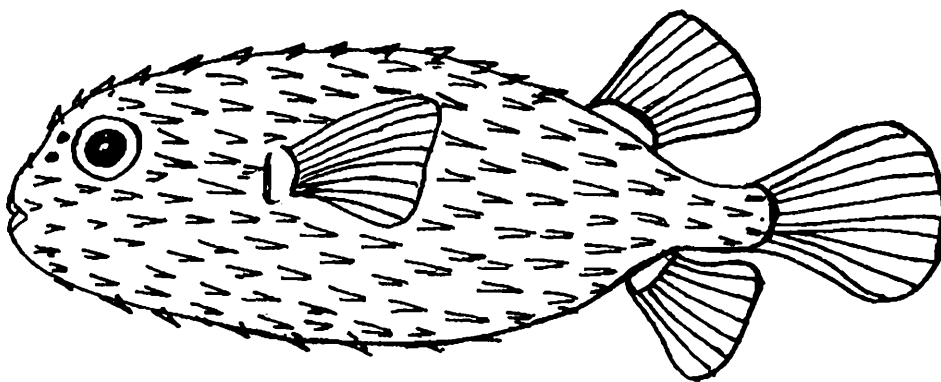


Fig. 99. Diodontidae



a) Aerial View of Chinque Island



b) Northern most point of Island chain (Landfall Island)



c) Southern most point of Island Chain (Indira Point, Great Nicobar)

d) View of extensive reef around islands



e) View of shallow reef



f) Intertidal reef flat



g) Extensive intertidal reef flat



h) Reef flat close to the shore



i) View of underwater reef



j) View of underwater corals

Class **CHONDRICHTHYES**
 Subclass **ELASMOBRANCHII (Sharks and Rays)**
 Order **ORECTOLOBIFORMES**
 Family **HEMISCYLLIIDAE**
Cat Sharks, Bamboosharks

Small distinctive and flattened sharks. Mouth small, situated well in front of eyes; nostrils with distinct barbels and continuous with mouth; upper and lower labial furrows present; no nictitating lower eyelid; five small gill-slits, the last two behind origin of pectoral fin; teeth small and compressed; spiracles present; teeth multi-cuspidate, in many functional rows; first dorsal fin posteriorly placed; anal fin sometimes appearing to be part of the lower caudal lobe; no pre-caudal pits. Sharks are very sluggish and bottom living. Many species strikingly marked.

Key to species

- 1a. Lower lip grooves continuous across chin; spiracles under eye; caudal fin shorter than body without head 2 (Genus *Chiloscyllium*)
- 1b. Lower lip grooves separate, not continuous across chin; spiracles behind eye; caudal fin longer than body without head; body yellowish brown with dark spots; young with distinct barred pattern*Stegostoma fasciatum*
- 2a. Three median dermal ridges on back of body; 11 or 12 dark brown transverse bands on body, each band with pale spots *C. indicum*
- 2b. One median dermal ridge on back of body; colour pattern not as in 2a3
- 3a. Body pale brown; juveniles with 10-12 dark crossbars; no spots on bands; two large dark spots in dorsal fins *C. griseum*
- 3b. Body grey; young with dark transverse bands and occasional spots ...*C. punctatum*

1. *Chiloscyllium griseum* Muller & Henle, 1838
Blackbanded Catshark

Body slender, mouth slightly rounded; fins small; a dermal ridge along mid back of body but no lateral ridges. Body pale brown; young with 10-12 transverse bands on back; two

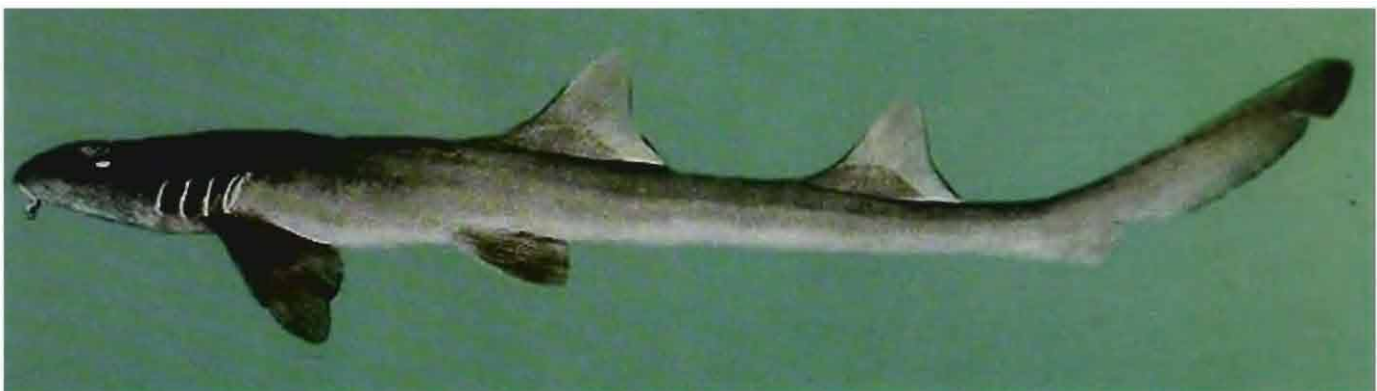


Fig. 100. *Chiloscyllium griseum*

large black blotches on dorsal fins. Attains 80 cm. Very sluggish fish, inhabits shallow sandy bottoms near reefs. Not uncommon. Good aquarium pets. Indo-West Pacific.

2. *Chiloscyllium indicum* (Gmelin, 1789)

Slender Bamboo Shark

Body slender; mouth well in front of eyes; a lateral ridge present on each side of trunk; dorsal fins situated far behind posterior on tail; pre-caudal tail slender and elongated; anal fin long and low, just anterior to caudal fin; first dorsal fin origin opposite end of pelvic fin base; dorsal fins without projecting free rear tips. Body light brown, with numerous dark brown or blackish spots and dashes arranged in transverse bands. Attains 65 cm in length. Found in inshore bottom areas on reefs. Not uncommon. Feeds on small crustaceans and fishes. Oviparous. Harmless. Indo-West Pacific.

3. *Chiloscyllium punctatum* Muller & Henle, 1838

Brownbanded Bamboo Shark

Body and tail moderately slender; snout rounded; no lateral ridges on trunk; dorsal fin large and angular, with projecting free rear tips; first dorsal fin origin over anterior halves of pelvic fin bases; anal fin origin somewhat behind free rear tip of second dorsal. Adults light brown, but young with dark transverse bands and spots. Attains about 100 cm. Inhabit coral reefs and inshore tide pools. Feeds on small fish and crustaceans. Oviparous. Very tenacious of life, can survive out of water for a long period. Harmless shark. Indo-Pacific.



Fig. 101. *Chiloscyllium punctatum*

4. *Stegostoma fasciatum* (Hermann, 1783)**Leopard Shark, Zebra Shark**

Body cylindrical and elongate, with long tail; head broadly conical and slightly flattened; snout rounded; gill slits small; nostrils with short pointed barbels; mouth large and sub-terminal; first dorsal larger than second dorsal and anal fins; a prominent dorsal ridge present; pectoral fins very large and rounded; caudal fin extremely long, without a ventral lobe. Body yellowish-brown, with scattered dark brown spots; young sharks dark brown with distinctive narrow yellow barred pattern and spots. Attains 2-3 m in length. Found on or adjacent to coral reefs on sandy bottom. Not uncommon. Sluggish and slow swimming fish. Feeds on molluscs, crustaceans and small fishes. Oviparous. Harmless shark. Tropical Indo-West Pacific.



Fig. 102. *Stegostoma fasciatum*

Order **CARCHARHINIFORMES**Family **CARCHARHINIDAE****Requiem Sharks or Whaler Sharks**

One of the largest and the best known sharks. The nictitating membrane well developed; spiracles present or absent; first dorsal fin base shorter than upper caudal fin lobe, its origin anterior to pelvic fins; anal fin separated from caudal fin; caudal fin without distinct lower lobe; nasal barbels absent; nasal grooves not connecting mouth and nostrils; five gill slits, the last slit behind or over pectoral fin origin. These sharks are very active and strong swimmers; size varies between 55 cm to 550 cm; the tiger shark is the largest shark with a maximum size of at least 7.2 m. All sharks are viviparous except tiger shark which is ovoviviparous. Most of these sharks are harmless but a few species of whaler sharks are dangerous and aggressive, known to attack man. They are voracious predators, feed mainly on a variety of fishes, rays, squids, octopuses, cuttlefish, crustaceans, molluscs, turtles, sea snakes and even sea mammals.

Key to species

- 1a. Dermal ridge or keel on each side of caudal peduncle; outer lip folds long, reaching forward to below eye; body and fins with dark variegated spots or vertical bars, fading with growth..... ***Galeocerdo cuvier***
- 1b. Dermal ridge or keel absent on caudal peduncle; outer lip folds short, not reaching to below eye 2
- 2a. Second dorsal half as high as first dorsal; spiracles present ***Triaenodon obesus***
- 2b. Second dorsal less than half as high as first dorsal; spiracles usually absent, if present invisible 3
- 3a. Second dorsal origin about over anal axil or over posterior 5th of anal-fin base; no interdorsal ridge; teeth mainly smooth..... 4
- 3b. Second dorsal origin nearer to a vertical line at anal origin than to vertical at axil; upper teeth serrate; interdorsal ridge present or absent 7 (Genus ***Carcharhinus***)
- 4a. Dorsal margin of caudal fin irregular or rippled ***Scoliodon laticaudus***
- 4b. Dorsal margin of caudal fin uniformly smooth..... 5
- 5a. Hind edge of orbit with a distinct notch; length of upper + lower lip folds less than nostril length; first dorsal and caudal fin with dark trailing edges ***Loxodon macrorhinus***
- 5b. Hind edge of orbit without notch; length of upper + lower lip folds equal to or greater than nostril length; no trailing edges or dark markings on fins 6 (Genus ***Rhizoprionodon***)
- 6a. Upper labial furrow short or absent; usually shorter than lower labial furrow ***R. oligolinx***
- 6b. Upper labial furrow longer, rarely shorter than lower labial furrow ***R. acutus***

- 7a. First dorsal and pectoral fins with broad distally rounded tips; free rear tip of anal fin nearly reaches lower caudal fin origin; fins mottled with white; black saddle on caudal peduncle in juveniles *C. longimanus*
- 7b. First dorsal and pectoral fins with narrow distinctly pointed or rounded tips; free rear tip of anal fin not reaching lower caudal fin origin; fins not mottled with white; no saddle on caudal peduncle in juveniles 8
- 8a. Second dorsal fin with a conspicuous black tip; other fins without markings 9
- 8b. Second dorsal fin plain, dusky or black tipped; but other fins also with black markings if black tipped 10
- 9a. First dorsal and pectoral fins falcate *C. sealei*
- 9b. First dorsal and pectoral fins triangular *C. dussumieri*
- 10a. Caudal fin with conspicuous wide black trailing edge; first dorsal fin without any dark markings *C. amblyrhynchos*
- 10b. Caudal fin without black trailing edge or if so, first dorsal also has dark markings 11
- 11a. Interdorsal ridge absent 12
- 11b. Interdorsal ridge present 13
- 12a. Body pale lemon brown; all fins with dark tips *C. melanopterus*
- 12b. Body brownish grey; all fins except anal fin, with dark tips *C. limbatus*
- 13a. First dorsal, pectoral, ventral and caudal fins with white tips and trailing edges *C. albimarginatus*
- 13b. Second dorsal, pectoral and lower caudal fin lobe with black tips; first dorsal with thin black trailing edge near apex; anal fin plain *C. sorrah*

5. *Carcharhinus albimarginatus* (Ruppell, 1837)
Silvertip Shark

Body cylindrical; snout moderately long and broadly rounded; caudal pits present; interdorsal ridge present; origin of first dorsal fin over or slightly anterior to inner pectoral fin



Fig. 103. *Carcharhinus albimarginatus*

corner, the fin is obtusely pointed; second dorsal fin origin slightly behind anal fin origin. Body dark grey on dorsal side, shading to white ventrally; first dorsal, pectoral, ventral and caudal fins with distinct white tips and trailing edges. Attains 290 cm. Usually inhabit on outer reef slopes. Very common shark. Feeds on other fishes. Viviparous; occasionally aggressive. Widely distributed in Indo-Pacific region.

6. *Carcharhinus amblyrhynchos* (Bleeker, 1856)
Blacktail Reefshark or Grey Reefshark

Body cylindrical and narrow; snout slightly long and pointed; no inter-dorsal ridge; first dorsal fin moderate-sized, falcate; pectoral fins long and narrow. Body grey above, shading to white below; a broad black trailing edge on caudal fin; first dorsal fin with distinct white tip and trailing edge; second dorsal and anal fin tips dusky. Attains 170 cm. Feeds on fish. Found in deep waters of outer reef regions and juveniles found in shallow inshore waters. Not uncommon. Viviparous. Aggressive towards skin-divers. Indo-West Pacific.



Fig. 104. *Carcharhinus amblyrhynchos*

7. *Carcharhinus dussumieri* (Muller & Henle, 1839)
Whitecheek Shark

Body moderately elongate; snout slightly long and pointed; inter-dorsal ridge very low; first dorsal fin origin over posterior half of pectoral and its tip sharply rounded to pointed;



Fig. 105. *Carcharhinus dussumieri*

second dorsal fin origin slightly behind anal fin origin; upper caudal fin lobe not much elongate. Body grey, white below; tip of second dorsal fin conspicuously black; other fins without any markings. Attains 100 cm. Found on outer reef slopes in moderate depths. Common shark. Mainly feeds on small fishes, crustaceans and cephalopods. Viviparous. Harmless shark. Indo-Pacific.

8. *Carcharhinus limbatus* (Muller & Henle, 1839)
Black-tip Shark

Body fusiform and moderately slender; snout long, its tip narrowly rounded; first dorsal fin with narrowly rounded apex; pectoral fins falcate. Body grey or ashy blue on back, belly white; pelvic fin tips black. Attains 200 cm. Oceanic but found close to outer reef areas in search of food. Feeds on fish, crustaceans. Not aggressive. Commercially important shark. Distributed in all tropical Oceans.



Fig. 106. *Carcharhinus limbatus*

9. *Carcharhinus longimanus* (Poey, 1861)
Oceanic Whitetip Shark

Body slightly stout; snout short and broadly rounded; first dorsal fin very large with broadly rounded apex; pectoral fins are very long with broadly rounded wide tips. Body dark-grey with a slight bronze hue on dorsal surface, belly whitish; tips of dorsal, pectoral and caudal fins mottled white; ventral and anal fin tips dark black. Attains 300 cm. Oceanic but occasionally found over outer reef areas. Common shark. Very easy to distinguish the shark. Reported to be dangerous to man. Commercially important fish. Cosmopolitan distribution.



Fig. 107. *Carcharhinus longimanus*

10. *Carcharhinus melanopterus* (Quoy & Gaimard, 1824)**Blacktip Reef Shark**

Body almost cylindrical; snout moderately short and rounded; inter-dorsal ridge absent; first dorsal fin falcate, its origin slightly posterior to inner rear corner of pectoral fin; second dorsal fin origin over origin of anal fin; upper caudal fin lobe slightly longer. Body lemon-brown above, light below; all fins distinctly black tipped. Viviparous. Attains about 170 cm or above. Found in shallow coral reef areas. Common shark. Feeds on small fish, a scavenger of coral reef areas. Usually harmless, can be aggressive. Indo-West and Central Pacific.

Fig. 108. *Carcharhinus melanopterus*11. *Carcharhinus sealei* (Pietschmann, 1913)**Blackspot Shark**

Snout moderately long and rounded; inter-dorsal ridge almost reduced or absent; first dorsal fin moderate in size and falcate, its apex pointed. Body grey above, shading to white below; a conspicuous black tip covering more than half of second dorsal fin; other fins plain. Attains about 95 cm. Found on outer reef areas above 40 m depth. Not common. Feeds on small fishes and squids. Viviparous. Harmless shark. Indo-West Pacific.

Fig. 109. *Carcharhinus sealei*

12. *Carcharhinus sorrah* (Valenciennes, 1839)
Spot-tail Shark

Body cylindrical and stout; snout slightly long and pointed; inter-dorsal ridge present; first dorsal moderate sized, falcate, its tip pointed; second dorsal origin distinctly posterior to anal fin origin; upper caudal lobe elongate. Body grey, white ventrally; tips of second dorsal, lower caudal lobe and pectorals black; a thin dark tip and trailing edge on first dorsal fin. Attains 150-160 cm. Found in coral reef areas in moderate depths. Very common shark. Feeds on fishes and cephalopods. Viviparous. Not known to be dangerous. Indo-West Pacific.

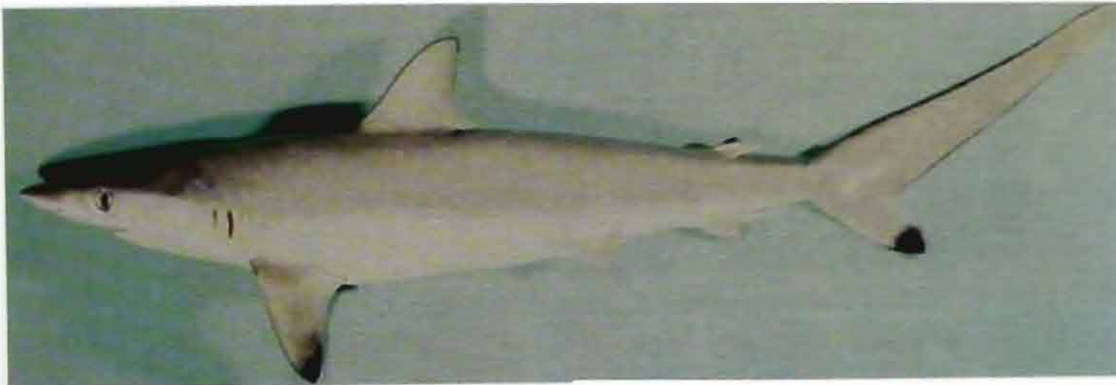


Fig. 110. *Carcharhinus sorrah*

13. *Galeocerdo cuvier* (Peron & Le Sueur, 1822)
Tiger Shark

Body fusiform; head, thorax and abdomen stout, posterior part of body attenuate; caudal peduncle with low lateral keel; snout round and broadly rounded; spiracles narrow slits, behind eyes; inter-dorsal ridge present; lip folds long, reaching forward to below level of eye; origin of first dorsal over pectoral fin axil or its inner edge; first dorsal fin moderate, its apex pointed. Body grey, paler below, with variegated spots or vertical bands on upper half of body and fins, fading with growth; juveniles with prominent "tiger" stripes which fade in adults. Attains 7 to 9 m. Found in outer reefs and offshore waters near surface. Not uncommon. Feeds on sharks, rays, fishes, crustaceans, gastropods, sea birds, turtles and marine mammals. Viviparous. Extremely dangerous shark, attacks divers and swimmers. All tropical Oceans.



Fig. 111. *Galeocerdo cuvier*

14. *Loxodon macrorhinus* Muller & Henle, 1839
Sliteye Shark

Moderate sized shark. Body slender; head long, rather pointed and slightly depressed; labial furrow in upper jaw poorly developed; spiracles minute or indiscernible, precaudal pits present; second dorsal fin origin over anal axil. Body grey dorsally, fading to white ventrally; first dorsal and caudal fins with black trailing edges. Attains 100 cm. Found on sand and mud bottoms of outer reef areas from 7 to 80 m depth. Not uncommon. Feeds on fish and crustaceans. Viviparous. Harmless. Indo-Pacific.



Fig. 112. *Loxodon macrorhinus*

15. *Rhizoprionodon acutus* (Ruppell, 1837)
Milk Shark

Body slender and fusiform; snout long and pointed; labial folds well developed; no spiracles or inter-dorsal ridge; second dorsal fin origin over posterior third of anal fin base; pre-caudal pits present; no keels on caudal peduncle. Body grey, belly white; all fins dark; snout milky-white when viewed from below. Attains over 100 cm. Found in inshore reef areas from shallow to 50 m depth, near the surface and bottom. Common shark. Feeds on fish, crustaceans and squids. Viviparous. Harmless. Eastern Atlantic and Indo-West Pacific.



Fig. 113. *Rhizoprionodon acutus*

16. *Rhizoprionodon oligolinx* Springer, 1964
Grey Shark

Body slender and fusiform; snout pointed and long; upper labial folds poorly developed; origin of first dorsal over inner corner of pectoral fin, origin of second dorsal slightly before end of anal fin base. Body grey, fading to white towards ventral side; belly whitish; fins light yellow;

upper caudal fin lobe dusky. Attains 50-60 cm in length. Found in shallow inshore reef areas. Not uncommon. Feeds on small fish and crustaceans. Viviparous. Harmless. Indo-Pacific.



Fig. 114. *Rhizoprionodon oligolinx*

17. *Scoliodon laticaudus* (Muller & Henle, 1838)
Spadenose Shark

Body slender and fusiform; head flat and spade shaped; snout very depressed; spiracles absent; upper labial furrow poorly developed; no inter-dorsal ridge; pre-caudal pits present; dorsal margin of caudal fin irregular or rippled; anal fin origin anterior to second dorsal origin. Body pale greyish brown above, paler on sides and belly; fins darker than body. Attains 59-70 cm. Found in inshore reef areas. Common shark. Forms large schools. Feeds on small fishes. Viviparous. Indo-West Pacific.

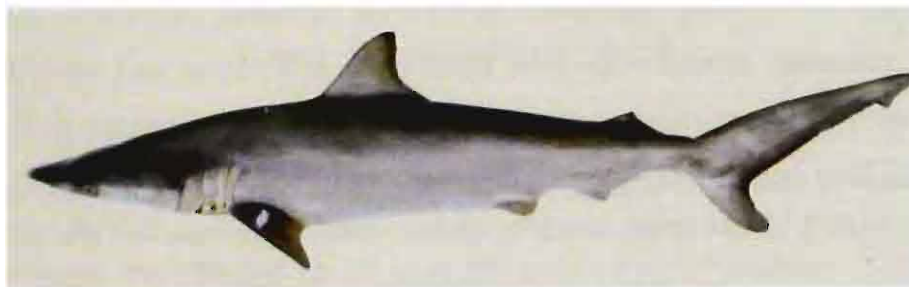


Fig. 115. *Scoliodon laticaudus*

18. *Triaenodon obesus* (Ruppell, 1837)
Whitetip Reef Shark

Body elongate; head flat and depressed; snout short and blunt; mouth wide, its lip folds minute; no inter-dorsal ridge; second dorsal and anal fins equal in size; no lateral keels; pre-



Fig. 116. *Triaenodon obesus*

caudal pits present. Body greyish brown above, creamy ventrally; tips of upper caudal lobe and first dorsal fin distinctly white. Attains 150 cm. Found on or around reefs in shallow waters; sluggish, enter holes and reef crevices. Common shark. Viviparous. Feeds on small fish, crustaceans and molluscs. Harmless but occasionally aggressive to man when disturbed. Widespread in Indo-Pacific.

Family SPHYRNIDAE

Hammerhead Sharks

Body shape similar to that of whaler sharks but the head is flattened and expanded laterally like hammer with eyes on the ends. No spiracles; no inter-dorsal ridge; first dorsal fin very high and pointed; second dorsal and anal fins small and far behind; caudal fin strongly asymmetrical with well defined sub-terminal notch and small lobe; pre-caudal pits present. Widely distributed in tropical and temperate seas. Some larger species have been responsible for attacks on humans. Fins are commercially important.

Key to species

- 1a. Head with long lateral extension from each side; eyes and nostrils widely separated
..... *Eusphyra blochii*
- 1b. Head with moderate lateral extension from each side; eyes and nostrils close together
..... 2 (Genus *Sphyrna*)
- 2a. Prenarial grooves absent or slightly developed; teeth strongly serrated; second dorsal fin very high, with a short inner margin; pelvic fins high and falcate *S. mokarran*
- 2b. Prenarial grooves strongly developed; teeth weakly serrated; second dorsal fin low, with a long inner margin; pelvic fins low, not falcate 3
- 3a. Front margin of head with a distinct median indentation; anal fin base longer than 2nd dorsal fin base *S. lewini*
- 3b. No median indentation; anal fin base as large as 2nd dorsal fin base *S. zygaena*

19. *Eusphyra blochii* (Cuvier, 1817)

Winghead Shark

Body elongate and laterally compressed; head hammer-shaped, extremely wide; eyes and nostrils widely separated; first dorsal fin moderately large and erect, its outer posterior margin concave; free rear tip of second dorsal nearly reaching caudal fin; base of second dorsal fin longer than second dorsal fin. Body brownish grey above, shading to white below. Attains about 150 cm. Found on outer reef areas. Feeds on small fishes and squids. Viviparous. Not aggressive to man unless provoked. Indo-West Pacific.

20. *Sphyrna lewini* (Griffith & Smith, 1834)
Scalloped Hammerhead Shark

Body elongated and laterally compressed; lateral extensions of head narrow and blade like; anterior margin of head broadly convex, with a distinct median indentation and another prominent notch laterally near end. Body brownish-grey, shading to white ventrally; ventral side of pectoral fin tips black. Attains 400 cm. Offshore species but occasionally found over reefs in search of food. Most common hammerhead shark. Adults are considered to be dangerous to man. Circumtropical.



Fig. 117. *Sphyrna lewini*

21. *Sphyrna mokarran* (Ruppell, 1837)
Great Hammerhead Shark

Body compressed head hammer-shaped; anterior margin of head nearly straight and wavy; eyes and nostrils close together; dorsal fin high, highly falcate; pelvic and anal fins deeply falcate. Body greyish-brown dorsally, pale ventrally. Attains 350 cm. Coastal and semi-oceanic, frequently encountered over reefs. Distributed in all tropical waters of the world.

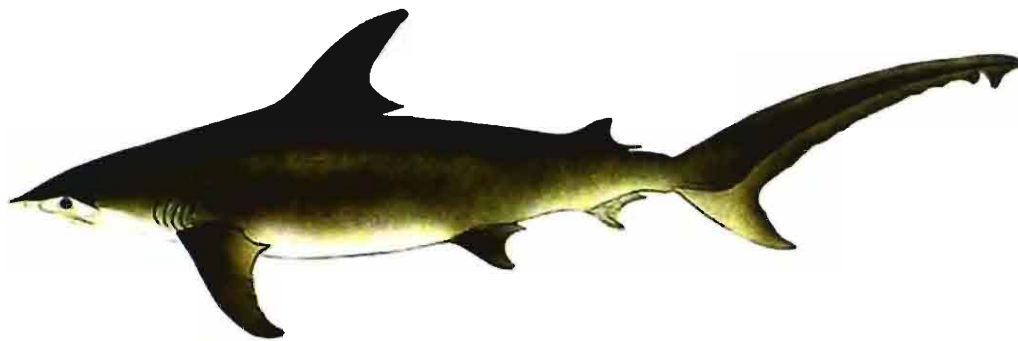


Fig. 118. *Sphyrna mokarran*

22. *Sphyrna zygaena* (Linnaeus, 1758)
Roundhead Hammerhead Shark

Body laterally compressed, anterior margin of head rounded; tip of snout rounded, without any concavity; second dorsal fin low, its inner margin long and posterior margin shallowly

concave. Body olive to brownish-grey dorsally, fading to white ventrally; tip of ventral side of pectoral fins pale black. Attains 160-180 cm. Semi-oceanic form, occasionally found close to outer reef areas. Feeds on small fish and crustaceans. Circumtropical.

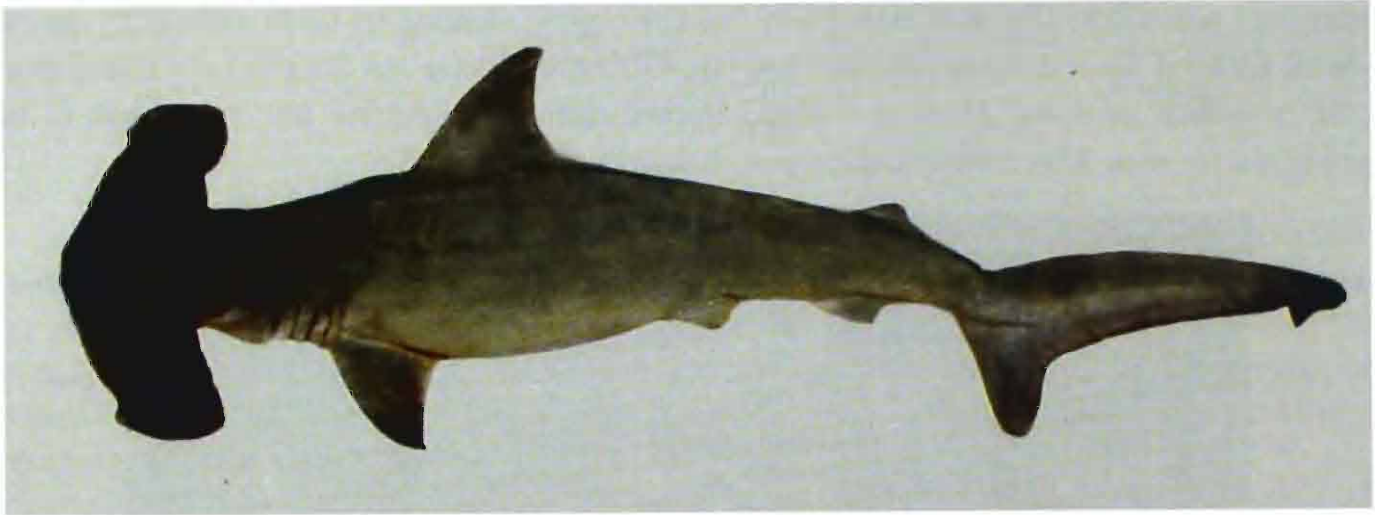


Fig. 119. *Sphyrna zygaena*

Order **TORPEDINIFORMES**Family **NARKIDAE****Numbfishes**

Small to moderate sized fishes. Head, body and pectoral fins form a rounded disc, with two large kidney-shaped electric organs on either side of head. Nasal flap form a narrow, long nasal curtain; mouth narrow and transverse; five pairs of gill openings on underside of disc; jaws with minute cuspidate teeth; dorsal fins present or absent; tail short and strong, caudal fin large. Propulsion of the body by movements of tail and caudal fin. The electric organs are used to stun fish prey and also to scare enemies. Very sluggish; occurs in sandy or muddy bottom.

23. *Narke* sp.**Numbray**

Body disc-like, with soft and loose skin; eyes very small; margin of spiracles with small tentacles; rostrum narrow; tail short and strong; caudal fin large; no dorsal fins. Body dark brown above, white below. Oviparous. Attains 10 to 80 cm or more. Feeds on small fishes and crustaceans. Bottom dwelling; found on sandy and silt reefs. They can jolt the unwary swimmers. Indo-West Pacific.

**Fig. 120.** *Narke* sp.

Order **RAJIFORMES**
 Family **RHINOBATIDAE**
Guitarfishes

Body elongate and shark-like; head and anterior part of body much depressed; gill openings ventrally under pectoral fins; snout wedge-shaped or broadly rounded; tail stout; two large dorsal fins; caudal fin with an expanded upper lobe. Usually found on soft sand or mud bottoms, close to shores. Feeds on benthic invertebrates and small fishes. Considered harmless. Flesh is of good quality but has no commercial value.

Key to species

- 1a. Caudal fin conspicuously bilobed; origin of first dorsal fin above pelvic fin base; posterior margin of pectoral fins anterior to origin of pelvic fins2
- 1b. Caudal fin not bilobed; origin of first dorsal fin posterior to hind tip of pelvic fins; posterior margin of pectoral fins extend rear ward as far from origin of pelvic fins*Rhinobatos granulatus*
- 2a. Snout elongate; margin of spiracles with two cutaneous folds; mouth slightly undulated, with a median projection of lower jaw with corresponding depression in upper jaw *Rhynchobatus djiddensis*
- 2b. Snout broad and rounded; no spiracular folds; mouth deeply undulated, with three forward projections on lower jaw correspondingly with three indentations of upper jaw *Rhina ancylostoma*

24. *Rhina ancylostoma* Schneider, 1801
Bowmouth Guitarfish

Head and snout depressed, broadly rounded, sharply delimited from pectorals; eyes separated from spiracles; mouth strongly undulated; rear margin of spiracles without dermal folds; heavy ridges with enlarged denticles on back, over eyes, spiracles and on scapular region;



Fig. 121. *Rhina ancylostoma*

first dorsal fin triangular, its origin anterior to base of pelvic fins; upper caudal fin lobe longer and narrower than lower lobe. Body brownish-grey above, whitish below; numerous small white spots dorsally on body, fins and tail; black spots on head and shoulders. Attains about 240 cm. Found in inshore reef areas, on sandy bottom. Not uncommon. Feeds on small fish, crustaceans and molluscs. Ovoviviparous; harmless fish. Indo-West Pacific.

25. *Rhinobatos granulatus* Cuvier, 1829
Granulated Guitarfish

Body depressed, disc passing gradually into tail; tail depressed and robust anteriorly; snout triangularly pointed and narrow; rostral ridges close together for greater part of length; spiracles small; back coarsely tuberculated; no anal fin; a row of strong thorns on mid-line of back. Body brownish above, rostral region buff brown, abdomen whitish; dorsal and caudal fins grey. Attains 140 cm. Found in shallow reef areas, on sandy or muddy bottoms. Not uncommon. Feeds on small fish and crustaceans. Ovoviviparous. Harmless. Indo-Pacific.



Fig. 122. *Rhinobatos granulatus*

26. *Rhynchobatus djiddensis* (Forsskal, 1775)
White-spotted Guitarfish

Disc larger than wide; snout long and pointed; first dorsal fin triangular, inserted above base of pelvic fins; eyes larger and immediately anterior to spiracles; rows of small thorns or denticles over eyes and spiracles, on back and scapular region. Body olive-grey above, with numerous white spots extending up to second dorsal fin; dark spots on inter-orbital; pectoral region with a pair of prominent black spots ringed with small white spots, belly white. Juveniles have a conspicuous black blotch on tip of snout. Attains 140-160 cm. Found occasionally near outer reef areas. Flesh is tasty; liver oil is much esteemed.



Fig. 123. *Rhynchobatus djiddensis*

Order **MYLIOBATIFORMES**Family **MYLIOBATIDAE****Eaglerays and Devilrays**

Head, body and pectoral fins from a strongly angular disc; head and snout strongly protrude from disc; disc with a triangular wing-like flaps; pair of large protruding flaps in front of mouth in Devilrays; tail whip-like, longer than disc; mouth with several fleshy papillae; nasal curtains fringed; five pairs of gill openings on underside of disc; a moderate sized dorsal fin on tail base, a venomous sting behind it; no caudal fin or fin folds. Strong swimmers, fly like a bird through the water with their strong pectorals. Less dangerous than true stingrays; they can crush fingers or toes of divers with their powerful jaws.

27. *Aetobatus narinari* (Euphrasen, 1790)**Spotted Eagleray**

Disc strongly angular; a fleshy suborbital lobe or 'snout' projecting anteriorly from lower surface of head; one row of tooth plates in each jaw; nasal curtain deeply notched; tail cylindrical, whip-like; dorsal fin inserted posterior to base of pelvic fins; two serrated spines behind dorsal fin; tip of pectoral fins acutely pointed, falcate; skin smooth. Disc bluish-black with numerous scattered white spots or rings, ventral surface white; tail black. Attains up to 4 m. Found around inshore reef areas. Common ray. Feeds on bivalves, crustaceans and worms. Ovoviviparous. Extremely agile and powerful fish often leap high into the air. Atlantic, Indian and Pacific Oceans.



Fig. 124. *Aetobatus narinari*

28. *Manta birostris* (Walbaum, 1792)**Mantaray or Devilray**

Disc rhomboid, much wider than long; head broad and depressed, projecting with a pair of paddle-like extensions; mouth terminal; spiracles small; tail slender and whip-like, no spine on tail; surface of disc with small denticles. Greenish-brown to black above, underside white; sometimes white patches on shoulders. Attains a width of more than 6-7m. Found in outer reef areas. Feeds on plankton. Ovoviviparous. Harmless ray. Very powerful swimmers. They 'fly' slowly and gracefully through the water like a bird. Circumtropical distribution.

Family DASYATIDAE

Sting Rays

Head, body, and pectoral fins forming a rounded or angular pectoral disc, about 1-2 times as wide as long; snout narrowly angular or rounded; head not distinguishable from rest of disc; five pairs of gill openings on underside of disc; tail moderately to very long, slender and whip-like; a strong venomous sting on dorsal surface of tail; dorsal and ventral fin folds present or absent. Usually found on sand or mud bottoms in coastal areas. Few species found in the vicinity of coral reef areas. Several human fatalities have been reported due to injuries caused by the sting in many parts of the world. One should be cautious when wading on sandy bottoms. Immersion of wounded part in hot water for 30-60 minutes shall relieve the pain.

Key to species

- 1a. Disc about twice as wide as long; tail half or less in disc *Gymnura poecilura*
- 1b. Disc 0.9 to 1.3 times disc length; tail 0.9 to 3.0 times disc length 2
- 2a. No fin-folds on tail; tail base narrow, not depressed 3 (Genus *Himantura*)
- 2b. Ventral fin-fold on tail, sometimes a dorsal fold present; tail base broad and depressed 4
- 3a. Dorsal side of disc with conspicuous pattern of white or yellow lines on dark background forming a reticulated pattern; tail length over twice disc length; snout tip not acutely pointed *H. uranak*
- 3b. Snout tip acutely pointed; tail length about twice disc length; dorsal surface of disc light brown without any markings *H. gerrardi*
- 4a. Ventral fin-fold reaching tail tip; disc circular or oval 5 (Genus *Taeniura*)
- 4b. Ventral fin-fold not reaching tail tip; disc rhomboidal 6
- 5a. Disc oval, longer than wide; back brownish yellow, with bright blue spots *T. lymma*
- 5b. Disc circular, about as wide as long; back with black spots and blotches *T. meyeri*
- 6a. Ventral fin-fold high and prominent; teeth with high hexagonal crowns; tail black *Hypolophus sephen*
- 6b. Ventral fin-fold height less than tail height; teeth with low sub-oval or rhomboidal crowns; tail not black 7 (Genus *Dasyatis*)

- 7a. Disc scattered with prominent, sharp stellate denticles; tail covered with sharp thorn-like denticles; no dorsal fold on tail; snout slightly pointed; no spots or ocelli on back; no bands on tail *D. thetidis*
- 7b. Disc and tail relatively smooth; snout gently rounded; small dorsal fin fold on tail; scattered black spots and blue ocelli on back; tail with black and white bands
..... *D. kuhlii*

29. *Dasyatis kuhlii* Muller & Henle, 1841

Bluespotted Stingray or Kuhl's Stingray

Disc kite-shaped, wider than long; dorsal surface naked, only few mid-dorsal denticles; snout gently rounded and short; tail as long as disc, with upper and lower cutaneous folds; a pair of sharp stings on upper surface of middle part of tail. Disc pale brown above with small bright ocelli with blue centers and scattered black spots; underside of disc white; tail with black and white bands from behind sting. Ovoviviparous. Attains 70 cm. Found on sandy areas adjacent to reefs. Very common Ray. Feeds on a variety of small invertebrates and fish. Tail sting causes extremely dangerous wounds. Indo-West Pacific.



Fig. 125. *Dasyatis kuhlii*

30. *Dasyatis thetidis* Ogilby, 1899

Spiny Stingray

One of the largest stingrays. Body disc-like, snout broadly angular; disc slightly wider than long; tail longer than disc length; surface of disc with scattered sharp denticles and a mid-dorsal row of large thorns from nape to sting; no dorsal fold on tail; tail covered with sharp denticles and a strong serrated spine on its dorsal surface. Disc dark grey-black, light below. No markings or spots on body. Attains 3-4 m. Found around coral reef areas in

shallow to 200 m depth. Not common. Ovoviviparous. Sting causes severe wounds. Indo-West Pacific.



Fig. 126. *Dasyatis thetidis*

31. *Gymnura poecilura* (Shaw, 1804)
Longtailed Butterfly Ray

Very large-sized stingrays. Disc rhomboid and broad; snout broadly obtuse with a slight projection; tail whip-like, without folds or spines; dorsal, anal and caudal fins absent. Dorsal surface of disc brown; tail white with broad black rings. Attains 35-70 cm. disc length. Found in shallow waters adjacent to reefs. Not common. Indo-West Pacific.



Fig. 127. *Gymnura poecilura*

32. *Himantura gerrardi* (Gray, 1851)
Sharpnose Stingray

Disc wider than long; tail longer than disc length; snout forming widely obtuse angle; midline of back with three enlarged tubercles; disc naked; tail whip-like without cutaneous

fold, a strong spine on its dorsal surface. Disc light-brown above, whitish below; tail with numerous transverse bands of dark and light brown. Attains 200 cm. Found in shallow reef areas. Feeds on crustaceans, molluscs and small fishes. Ovoviviparous. Sting causes painful wounds. Indo-West Pacific.



Fig. 128. *Himantura gerrardi*

33. *Himantura uranak* (Forsskal, 1775)

Honeycomb Stingray

Disc rhomboidal, slightly wider than long; tail longer than disc length; surface of the disc almost naked; skin smooth, only mid-dorsal row of denticles extending onto tail base; snout



Fig. 129. *Himantura uranak*

angular, with a sharp point; mouth long and undulated; no cutaneous folds on tail. Disc brown to black with white to yellow lines forming a reticulated pattern, underside of disc white; tail striped brown and white in juveniles. Attains 5 m or above. Found on sandy bottoms near reefs from shallow to 25 m depth. Feeds on small bivalves, crustaceans and worms. Ovoviviparous. Stings causes fatal wounds. Indo-West Pacific.

34. *Hypolophus sephen* (Forsskal, 1775)
Feathertail Stingray

Disc somewhat quadrangular; mouth undulated with four papillae; tail depressed, with broad feather-like lower cutaneous fold which extends more than half way to its tip; a strong serrated spine on second quarter of tail; dorsal surface of disc granular with three flattened tubercles arranged in a vertical row centrally. Disc dark-grey, gradually paler towards sides; ventral side white; caudal fold and filamentous part of tail black. Attains over 200 cm. Found in shallow sandy coastal and coral rubble areas. Feeds on crustaceans, molluscs, worms and small fish. Ovoviviparous. Sting causes dangerous wounds. Indo-Pacific.



Fig. 130. *Hypolophus sephen*

35. *Taeniura lymma* (Forsskal, 1775)
Bluespotted Ribbontail Ray

Disc rounded to oval, head not distinct from it; tail long, compressed and ribbon-like, with 1 or 2 serrated spines in middle; mouth small and curved; eyes prominent; a vertical cutaneous fold extends from below origin of anterior spine to tip of tail; no dorsal, anal and caudal fins. Dorsal surface of disc covered with small stellate denticles. Disc blue-grey above, with scattered numerous blue spots and blotches; tail with blue lateral stripes. Attains possibly 2.5 m. Found on sandy reef areas and caves or under coral ledges. Feeds on

invertebrates and small fish. Ovoviviparous. Sting venomous and cause dangerous wounds. Indo-West Pacific.



Fig. 131. *Taeniura lymma*

36. *Taeniura meyeri* Muller & Henle, 1814

Black-blotched Stingray

Disc almost rounded; snout rounded; dorsal and caudal fins absent; tail stout, with a large sharp spine on dorsal surface; a conspicuous ventral cutaneous fold on tail; dorsal surface of disc rough. Surface of disc grey, mottled with black spots and blotches of irregular size; ventral fold of tail black. Attains 140 cm. Found on sandy cays adjacent to coral reefs. Occasionally encountered. Indo-Pacific.



Fig. 132. *Taeniura meyeri*

Class **OSTEICHTHYES**
 Order **ANGUILLIFORMES**
 Family **CONGRIDAE**
Conger Eels

Typical eel-shaped long body; tail compressed and very narrow; dorsal and anal fins continuous around tail; mouth small, slightly inferior; teeth small; dorsal fin origin over, before or behind pectoral fin base; lateral line prominent, usually continuing on to head as pores; no scales on body. Benthic forms found in inshore to deep waters; often found in sandy areas of reef regions. Some are nocturnal, feed on fishes and crustaceans and some eels feed exclusively plankton.

Key to species

- 1a. Body depth 38-55 in total length; origin of dorsal fin just in front of pectoral fin; colour white with small numerous black spots on body; a large black blotch on anterior part of body *Heteroconger hassi*
- 1b. Body depth 64-86 in total length; origin of dorsal fin just behind pectoral fin; colour grey with brownish speckling *Gorgasia maculata*

37. *Gorgasia maculata* (Klausewitz & Eibl-Eibesfeldt, 1959)
Speckled Gardeneel

Body slender, narrow and cylindrical; origin of dorsal fin just behind pectoral fin; pectoral fins small; dorsal and anal fins very narrow. Colour pale grey with brownish speckling. Attains 40 cm. Found on clean sandy areas near reefs in large colonies, usually burrows in sand. Uncommon. Feeds on plankton picked from passing currents. Indo-West Pacific.



Fig. 133. *Gorgasia maculata*

38. *Heteroconger hassi* (Klausewitz & Eibl-Eibesfeldt, 1959)
Spotted Gardeneel

Body, very slender and cylindrical, median fins very narrow; origin of dorsal fin just in front of pectoral fins; pectorals very small; tail pointed. Body white with numerous small black spots; a small black blotch near pectoral region and another black blotch on anterior part of body. Attains 30-40 cm. Found on sandy and coral rubble areas of reefs. Uncommon. Feeds on plankton. Indo-West Pacific.



Fig. 134. *Heteroconger hassi*

Family MURAENIDAE

Moray eels are characterised by an elongate, compressed snake-like body and large mouth; no scales on body; tail compressed; most of species have long, sharp canine teeth; pectoral fins absent; dorsal fin origin usually before gill opening; median fins continuous around tail; posterior nostrils either a slit or tubular before eyes; gill opening a small round aperture on sides of body; colour pattern variable including plain, freckled, spotted or striped. Some species are active at night. Moray eels are capable of inflicting painful wounds; usually they are not apt to bite unless provoked. In some cases, the mature males change to females in later stages of life.

Key to species

- 1a. Dorsal and anal fins short, skin covered ridges on end of tail, well behind anus; teeth needle-like and pointed 2
- 1b. Dorsal and anal fins not short, skin covered but distinct, beginning ahead of gill opening and just at anus level respectively; teeth either pointed, blunt or chisel like.. 4
- 2a. Tail about 3 in TL; body with small and large blotches..... *Scuticaria tigrina*
- 2b. Tail about 2 or less in TL; body plain or mottled but not spotted 3 (Genus *Uropterygius*)

- 3a. Body uniform brown; tip of tail yellow *U. concolor*
- 3b. Body yellowish brown, finely mottled dark *U. marmoratus*
- 4a. Some teeth in jaws molariform or granular, no canine teeth 5
- 4b. Teeth not molariform, some canine teeth present 6 (Genus *Gymnothorax*)
- 5a. Teeth broadly conical, become blunt with age; body cream coloured with two rows of 25 to 30 brownish blotches *Echidna nebulosa*
- 5b. Teeth molariform; body blackish brown with narrow yellowish vertical bars
..... *Gymnomuraena zebra*
- 6a. Body with 16 to 21 dark bars, these bars encircling body posterior to anus; dark spot at corner of mouth *G. ruppelliae*
- 6b. Body variously mottled or with brown spots or blotches 7
- 7a. Gill opening in a brown or black patch 8
- 7b. Gill openings not in a black patch 9
- 8a. Light yellowish densely mottled with dark brown; margin of fins greenish yellow ...
..... *G. flavimarginatus*
- 8b. Light brown with large irregular dark brown spots *G. javanicus*
- 9a. Body with round or irregular black spots or dotted and speckled 10
- 9b. Body with close-set large blotches and small spots; pale yellowish interspaces forming reticulum *G. undulatus*
- 10a. Body with large roundish close-set black spots *G. favagineus*
- 10b. Body colour pattern not as in 10a 11
- 11a. Body grey, closely speckled with irregular dark markings *G. picta*
- 11b. Body grey or brown with dots or speckled 12
- 12a. Grey with scattered round to irregular black spots *G. fimbriatus*
- 12b. Brown minutely speckled and dotted *G. thyrsoides*

39. *Echidna nebulosa* (Ahl, 1789)
Starry or Cloudy Moray

Body slender; teeth broadly conical, uniserial on jaws; origin of dorsal fin slightly anterior to level of gill opening. Body yellowish white with 26-30 brownish black vertically reticulated

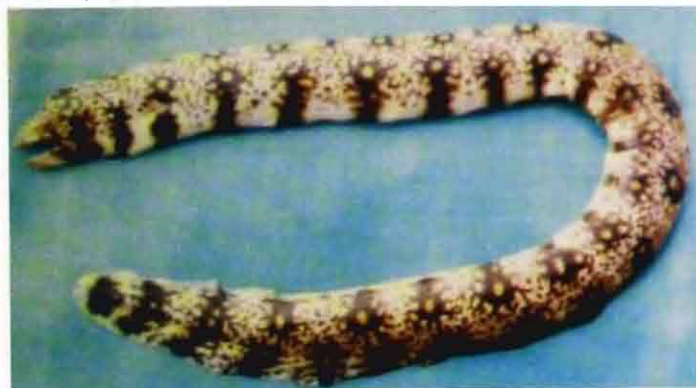


Fig. 135. *Echidna nebulosa*

or star-shaped blotches, with one or more pale centres and broken blackish lines and spots; numerous black spots between blotches; the blotches extending onto dorsal and anal fins. Attains 75 cm. One of the commonest species found on reef flats and under rocks in shallow waters. Feeds on small crabs. Good aquarium pet. Indo-Pacific.

40. *Gymnomuraena zebra* (Shaw, 1797)
Zebra Moray

Body moderately stout; cleft of mouth reaching far behind eye; two rows of molariform teeth on lower jaw, and as a continuous patch on upper jaw; dorsal fin origin over gill opening. Body deep orangish-brown, with numerous narrow yellowish vertical bars. Attains 150 cm. Found in shallow coral reefs and rocky areas. Feeds on crabs and other small crustaceans. Good aquarium pet. Indo-Pacific.



Fig. 136. *Gymnomuraena zebra*

41. *Gymnothorax favagineus* Bloch & Schneider, 1801
Blackspotted Moray

Body stout, elongated and snake-like; a row of long conical teeth on inter-maxilla. Body pale brown to yellow with close set numerous large round black blotches, pattern continuing



Fig. 137. *Gymnothorax favagineus*

on to edges of mouth. One of the largest moray eels, attains 200 cm. Found in coral reef areas, under coral ledges and in crevices. Feeds on crustaceans and small fish. Indo-Pacific.

42. *Gymnothorax fimbriatus* Bennett, 1832
Darkspotted Moray

Body narrow and snake-like; eyes small; single row of canines on inter-maxilla; two pairs of large canines at front of lower jaw. Body grey, with scattered round to irregular black spots extending onto fins. Attains 80 cm. Found in inshore reef areas under stones and coral rubble. Common eel. Feeds on small invertebrates and fish. Indo-Pacific.



Fig. 138. *Gymnothorax fimbriatus*

43. *Gymnothorax flavimarginatus* (Ruppell, 1830)
Yellowmargin Moray

Body stout and snake-like; teeth small, uniserial on vomer; dorsal fin origin nearer to gill opening. Body yellowish brown with densely mottled dark brown; anterior part of head purplish grey; edges of median fins yellowish green; gill openings in a black blotch. Attains 140 cm. Found in shallow coral reefs, coral rubble and weedy areas. Common species. Feeds on crustaceans. Indo-Pacific.



Fig. 139. *Gymnothorax flavimarginatus*

44. *Gymnothorax javanicus* (Bleeker, 1859)
Giant Moray

Body deep and robust; two or three large canines in a single row on inter-maxilla; anterior nostrils in a tube; mouth can be completely shut; dorsal fin moderately high. Colour light brown, with large irregular black spots in two to three irregular rows; small spots on fins; gill opening in a black blotch; corner of mouth dark. Largest moray eel attains more than 200 cm. Found on a variety of reef habitats from shallow to 30 m depth. Common eel. Feeds on crustaceans and small fish. Very dangerous eel. Indo-Pacific.



Fig. 140. *Gymnothorax javanicus*

45. *Gymnothorax picta* (Ahl, 1789)
Peppered Moray

Body slightly stout and deep; tail equal to body length; teeth in jaws short and uniserial. Colour white, speckled with black dots, the dots often grouped to form large diffuse spots. Juveniles with relatively large black spots arranged in three longitudinal rows. Attains at least 10 cm. Found on shallow reef areas. Common eel. Feeds on crustaceans and small fish. Indo-Pacific.



Fig. 141. *Gymnothorax picta*

46. *Gymnothorax ruppelliae* (McClelland, 1844)
Banded Moray

Body moderately slender; anterior nostrils tubular; uniserial sharp teeth on jaws; dorsal fin origin slightly before gill opening. Body pale greyish-brown with 16-20 black rings as wide as pale interspaces, these rings encircling body posteriorly to anus and several not meeting ventrally on trunk; a dark spot at corner of mouth. Attains 50-70 cm. Found in shallow reef areas around coral rubble and weeds. Nocturnal. Uncommon. Feeds on small invertebrates. Indo-West Pacific.



Fig. 142. *Gymnothorax ruppelliae*

47. *Gymnothorax thyrsoideus* (Richardson, 1845)
Greyface Moray

Body robust, tail equal to body length; teeth conical, no canine-like teeth. Colour light yellowish-brown, mottled with small dark spots; gill opening in a small dark spot, anterior part of head purplish grey. Attains 40-60 cm. Found on reef areas and under rocks. Uncommon. Indo-West Pacific.



Fig. 143. *Gymnothorax thyrsoideus*

48. *Gymnothorax undulatus* (Lacepede, 1803)**Mottled or Leopard Moray**

Body robust and elongate. Uniserial sharp teeth in jaws; lower jaw slightly hooked; dorsal fin origin ahead of gill opening. Colour light yellow to brown with large close-set irregular dark brown blotches and spots, the narrow pale inter-spaces forming a very irregular reticulum; top of head light yellowish-green; in juveniles blotches merge to form irregular bars posteriorly. Attains at least 100 cm. One of the common moray eels found in coral rock crevices. Feeds on invertebrates and small fish; actively hunt at night. Very aggressive eel. Indo-Pacific.



Fig. 144. *Gymnothorax undulatus*

49. *Scuticaria tigrina* (Lesson, 1828)**Tiger Reef-eel**

Body slender; snout rounded; teeth small and sharp in two rows; tail end pointed. Colour yellowish-brown, with numerous small and large round yellow edged black spots and blotches; snout and jaws speckled with black. Attains 100 cm or above. Found in coral reef areas and rock crevices. Uncommon. Indo-Pacific.



Fig. 145. *Scuticaria tigrina*

50. *Uropterygius concolor* (Ruppell, 1838)
Brown Moray

Small eels. Body slender and snake-like; teeth slender; dorsal and anal fins restricted to rear end of tail. Body uniform drab brown; tip of tail yellow. Attains 30 cm. Feeds on crustaceans. Found in shallow exposed rock and reef areas. Uncommon. Indo-West Pacific.



Fig. 146. *Uropterygius concolor*

51. *Uropterygius marmoratus* (Lacepede, 1803)
Marbled Moray

Body slender; jaws with three rows of small teeth; dorsal and anal fins restricted to rear end of tail. Colour yellow to brown, densely mottled with roundish dark brown and blackish spots of about eye size; anus dark blue. Attains 40-50 cm. Very common eel, found in exposed coral reef and rocky areas. Wriggles into reef holes with tail. Feeds on crustaceans. Indo-Pacific.

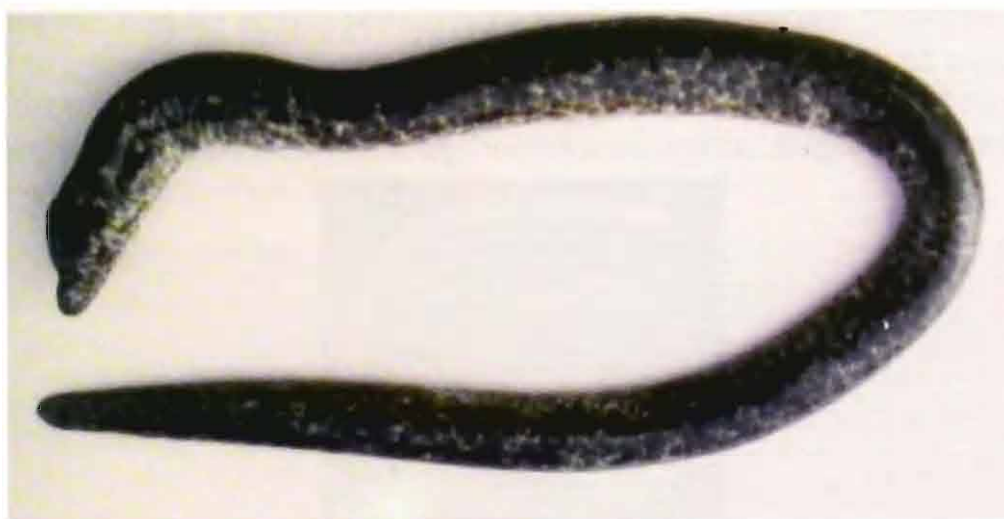


Fig. 147. *Uropterygius marmoratus*

Family OPHICHTHIDAE
Snake Eels

Body snake-like and scaleless, posterior part of body compressed; pectoral fins present or absent; dorsal fin origin from mid-trunk to rear tail region; median fins end before caudal tip or continuous around caudal; gill openings constricted; lateral line complete. Usually sand and mud burrowing forms. No commercial significance.

Key to species

- 1a. Pectoral fins absent; dorsal, anal and caudal fins confluent; caudal rays conspicuous; tail tip flexible 2 (Genus *Muraenichthys*)
- 1b. Pectorals present; dorsal and anal fins not confluent; tip of tail free, finless hard point 3
- 2a. Origin of dorsal nearer to gill openings than to anus; body olive on back, lighter below *M. macropterus*
- 2b. Origin of dorsal fin somewhat behind or before anus; body yellowish brown *M. schultzei*
- 3a. Upper lip fringed; origin dorsal above gill openings; body olive brown, light below *Cirrhimuraena playfairii*
- 3b. Upper lip not fringed; origin of dorsal fin before or behind gill opening 4
- 4a. Dorsal fin origin well before gill opening; teeth molariform or granular 5 (Genus *Myrichthys*)
- 4b. Dorsal fin origin behind gill opening; teeth conical and sharp; body with 25 to 30 black saddles which meet below only on tail *Leiuranus semicinctus*
- 5a. Anal fin ends well before end of dorsal fin; dark rings circling head and body *M. colubrinus*
- 5b. Anal and dorsal fins end a short distance from tail tip; longitudinal series of large and small round to oval black spots on body *M. maculosus*

52. *Cirrhimuraena playfairii* (Gunther, 1870)

Fringelip Snakeel

Body moderately elongate, compressed behind; pectoral fins small; upper lip with a fringe



Fig. 148. *Cirrhimuraena playfairii*

of cirri; dorsal fin origin on nape. Colour greenish-brown, lighter below. Attains 25-30 cm. Found in clean sandy areas on reefs. Uncommon; occasionally bite. Indo-Pacific.

53. *Leiuranus semicinctus* (Lay & Bennett, 1839)

Culverin or Halfbanded Snakeeel

Slender and snake-like; snout pointed, a groove on underside of snout; front nostrils tubular; no cirri on lips; gill openings vertical; pectoral fins small; dorsal and anal fins very narrow; caudal tip a hard fin less point. Colour white to yellowish with 25-30 black saddles, those on tail only form complete rings. Attains 60 cm. Found under coral rocks and burrows in sand. Common eel; feeds on small crabs, shrimps and fish. Indo-Pacific.

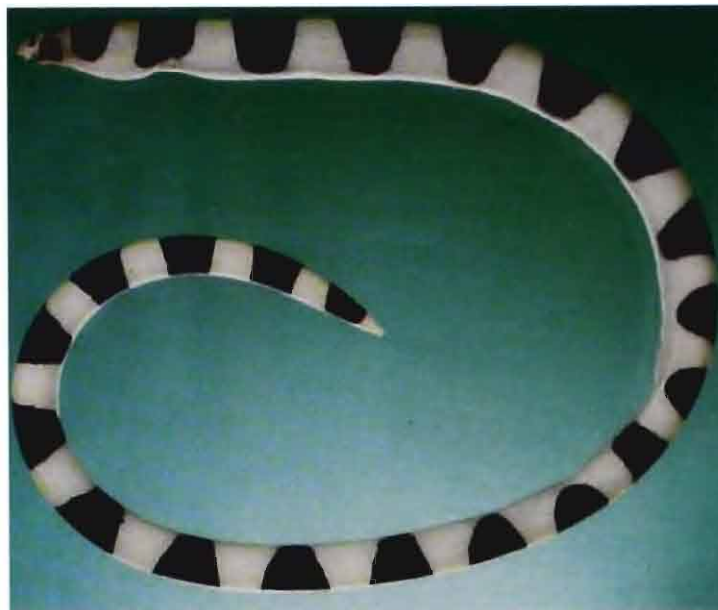


Fig. 149. *Leiuranus semicinctus*

54. *Muraenichthys macropterus* Bleeker, 1857

Slender Snake Eel

Body elongate, slender and cylindrical; cleft of mouth reaching beyond eye; dorsal fin origin nearer to gill opening than anus; caudal fin confluent with dorsal and anal fins; pectoral fins absent; tip of tail flexible. Colour pale greenish-yellow, light below. Attains 15-20 cm. Found in shallow sandy reef areas. Not easy to encounter. Uncommon; feeds on small shrimps and crabs. Indo-West Pacific.

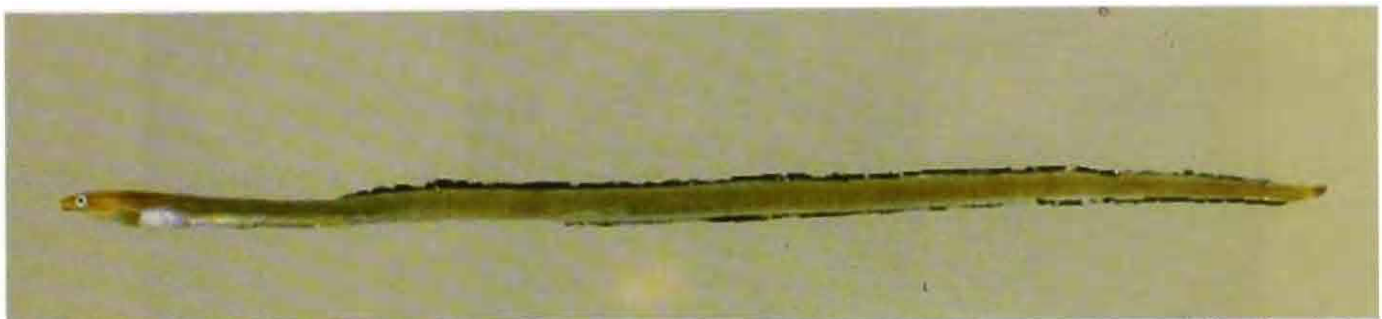


Fig. 150. *Muraenichthys macropterus*

55. *Muraenichthys schultzei* Bleeker, 1857**Slender White Wormeel**

Body elongate and cylindrical and worm-like; eyes very small, caudal fin confluent with dorsal and anal; corner of mouth well behind eyes; no pectoral fins. Body light olive-green above, lighter below. Attains 50 cm. Found in sandy areas on reefs. Not easy to encounter. Uncommon. Central Indo-West Pacific.

56. *Myrichthys colubrinus* (Boddaert, 1781)**Ringed Snakeeel**

Small and worm-like slender bodied; snout projecting beyond lower jaw; teeth blunt; dorsal fin origin on nape; pectoral fins rudimentary; tip of tail very stiff and pointed. Colour whitish-yellow, with 28-31 narrow black rings encircling head and body; black spots may develop between rings in adults. Attains 80-90 cm. Common eel found in shallow coral reef and coral rubble areas. Feeds on small crustaceans and worms. Very easy to detect on the reefs. Indo-Pacific.



Fig. 151. *Myrichthys colubrinus*

57. *Myrichthys maculosus* (Cuvier, 1816)**Spotted Snakeeel**

Body very slender, snake-like; dorsal fin origin on nape; teeth small and blunt; tip of tail very pointed. Body yellowish-white with conspicuous large to small oval black spots, the spots extending onto fins. Attains 50-60 cm. Found on sand and weedy areas of reefs. Uncommon. Indo-Pacific.



Fig. 152. *Myrichthys maculosus*

Order **CLUPEIFORMES**

Family **CLUPEIDAE**

Sardines

Small, to moderate sized silvery fishes, easily recognised by their keeled abdomen; mouth almost terminal; snout rarely projecting in front of mouth; teeth minute or absent; single dorsal fin located over middle of body; anal fin small; caudal fin forked; fins without spines. Found in inshore shallow waters, often forming large packed schools. Feed on crustaceans and zooplankton. Very important component in the fisheries, constitutes about half of the worlds' total fish catch. These fish are heavily preyed upon by many large fishes like tunas, carangids, etc. Few species found around reefs.

Key to species

- 1a. Dorsal fin rays 11-13; anal fin rays 10-11; pectoral rays 11-13; a yellow stripe on body at eye level *Spratelloides delicatulus*
- 1b. Dorsal rays 17-20; anal rays 17-19; pectoral rays 15-16; prominent dark streaks on caudal fin base *Herklotsichthys quadrimaculatus*

58. *Herklotsichthys quadrimaculatus* (Ruppell, 1837)

Blueline Herring or Fourspot Herring

Body fairly compressed, belly sharp with a row of keeled scutes; scales toothed posteriorly; upper jaw round in front; rear edge of gill opening with two fleshy projections; top of head with 4-6 striae on each side; lower part of operculum smooth. Silvery blue-green above and silvery ventrally; a yellowish blue mid-lateral band on sides and two orange-yellow spots behind gill opening. Attains 12-14 cm. Found near reef areas in large schools; common pelagic fish. Many of the larger reef fishes feed on these fishes. Commercially important food fish. Indo-Pacific.

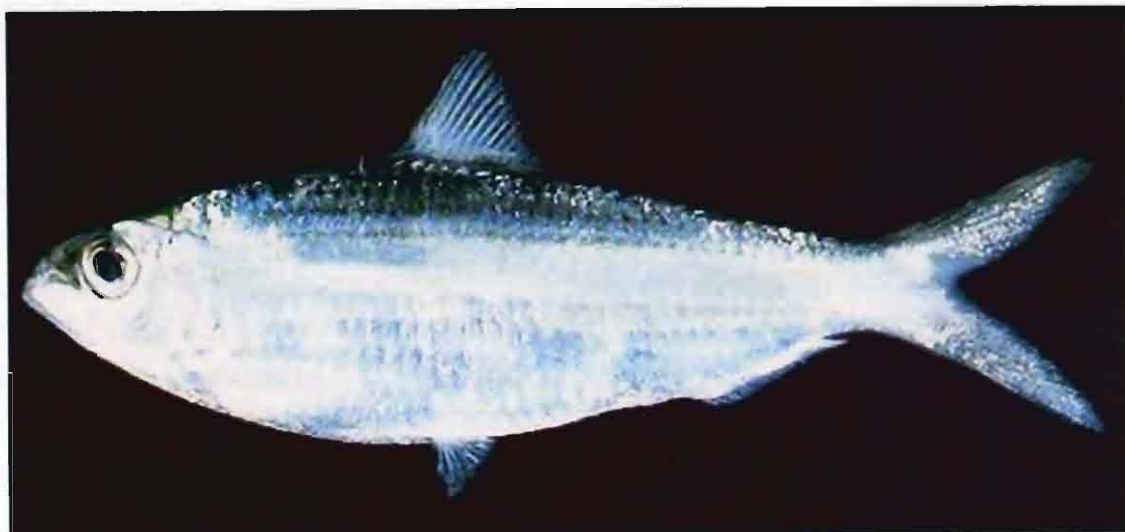


Fig. 153. *Herklotsichthys quadrimaculatus*

59. *Spratelloides delicatulus* (Bennett, 1831)

Bluebaked Sprat or Round Herring

Body fusiform, not much compressed; belly rounded; no scutes on belly; ventral fin base under last half of dorsal fin; upper jaw deep. Back of body blue, lower sides silvery. Attains 7-8 cm. Found in coastal and reef areas. Common pelagic fish; feeds on crustaceans and plankton. Good food fish but has less fishery value; used as tuna bait. Indo-Pacific.



Fig. 154. *Spratelloides delicatulus*

Order **GONORHYNCHIFORMES**Family **CHANIDAE****Milkfishes**

Body elongate and slightly compressed; mouth small; thick adipose layer covering eye; body scales small and cycloid; dorsal and anal fins bases with scaly sheath; base of pectoral and ventral fins with axillary scales; no spines in fins; caudal fin deeply forked. Commercially important fishes.

60. *Chanos chanos* (Forsskal, 1775)**Milkfish**

D. 13-17; A. 9-11; P. 15-17; V. 10-12. Body torpedo-shaped; mouth small without teeth; eyes covered with thick adipose layer; caudal fin deeply forked; dorsal fin falcate. Body bluish-green on back silvery on sides; dorsal, anal and caudal fin margins dusky. Attains 170-180 cm. Often found in small schools close to reefs in shallow waters. Important food fish; an ideal species for fish farming. Indo-Pacific.



Fig. 155. *Chanos chanos*

Order **SILURIFORMES**Family **PLOTOSIDAE****Eel Catfishes**

Body slender and eel-like, tapering posteriorly; no scales on body; four pairs of barbels around mouth; first dorsal fin short with serrated strong spine; pectoral fin situated behind head, with a sharp serrated spine on its anterior edge; both the dorsal and pectoral spines are venomous cause severe painful wounds. These fishes are constant menace to the unwary fishermen, anglers and divers.

Key to species

- 1a. Body reddish brown with 2 or 3 pale stripes; maxillary barbels extending behind eyes
 *Plotosus lineatus*
- 1b. Body pale brown without any stripes; maxillary barbels extending to or beyond opercular
 margin *P. canius*

61. *Plotosus canius* Hamilton, 1822

Canine Eel Catfish

Body elongate and depressed, mouth transverse; lips thick and fleshy; four pairs of barbels around mouth, nasal barbel extending beyond eye; dorsal fin with 130-140 rays and anal fin with 106-130 rays; caudal fin pointed, confluent with dorsal and anal fins. Body and dorsal side of head dark olive green; ventral side dirty cream; barbels and fins dark grey. Attains 50 cm. Found near coastal and inshore reef areas. Very common catfish. Feeds on benthic invertebrates and small fish. Food fish but has less fishery value. Indo-West Pacific.

62. *Plotosus lineatus* (Thunberg, 1787)

Striped Catfish

Body eel-like, mouth with thick lips; four pairs of barbels, the nasal barbels not extending beyond eye; first dorsal fin small with pungent spine, second dorsal with 90-100 rays; anal fin with 60-80 rays; caudal fin bluntly pointed and confluent with dorsal and anal. Body brownish black above, whitish below; 2-3 horizontal yellowish white stripes on sides; edges of pelvic fins black. Attains 30 cm. Found in coastal and inshore reefs near sand-rubble areas and tide pools. Feeds on a variety of small invertebrates and fish. One of the most common dangerous fish found on reefs. Death often reported elsewhere due to wounds caused by the venomous spines. Food fish but has less fishery value. Indo-West Pacific.



Fig. 156. *Plotosus lineatus*

Order **AULOPIFORMES**

Family **SYNODONTIDAE**

Lizard Fishes

Body fusiform, slender and cylindrical; head slightly depressed and lizard-like; anterior nostrils with dermal papilla; mouth large with numerous slender sharp teeth; no spines in fins; single dorsal fin; small adipose dorsal fin present; anal fin located at rear quarter of the body; pelvic fins large, located below or in front of dorsal fin; scales cycloid, large and deciduous; caudal fin forked. Usually found on sedimentary bottom and reef areas, able to bury themselves in sand or mud. Voracious carnivores. Most of their time is spent perching on the bottom with the body at a slight angle, propped up on the pelvic fins. Edible fish but the flesh is of poor quality.

Key to species

- 1a. Ventral rays 8; primary caudal rays without scales; palatine teeth in single band on each side 2
- 1b. Vantral rays 9; procurrent and primary caudal rays with scales; palatine teeth in double band 3 (Genus *Saurida*)
- 2a. Head not depressed; anal fin base longer than dorsal fin base; procurrent caudal rays with scales *Trachinocephalus myops*
- 2b. Head depressed; anal fin base shorter than dorsal base; procurrent and primary caudal rays without scales *Synodus variegates*
- 3a. Dorsal rays 9-11; prominent dark blotches on dorso-lateral part of body; no dark spots along the upper edge of caudal fin *S. gracilis*
- 3b. Dorsal rays 11 or above; colour not as in 3b 4
- 4a. Lateral line scales 48-50; a series of dark spots along front edge of dorsal and upper edge of caudal fin *S. undosquamis*
- 4b. Lateral line scales above 55; no spots along the dorsal and caudal fin edges *S. tumbil*

63. *Saurida gracilis* (Quoy & Gaimard, 1824)

Slender Lizardfish

D.10-11; A. 9; P. 12-13; V. 9; Ll. 48-51. Body fusiform; anterior nostril flap large; auxillary scale of pectoral fin short; procurrent and primary caudal rays with scales. Body brownish-yellow above, silvery ventrally with prominent diffuse blackish blotches dorsally and laterally on posterior half of body; all fins with spots and stripes; no dark spots along

the upper edge of the caudal in. Attains 20-30 cm. Found bury themselves in sand and silt areas of the reefs. Common. Feeds on small fish and shrimps. Indo-West Pacific.

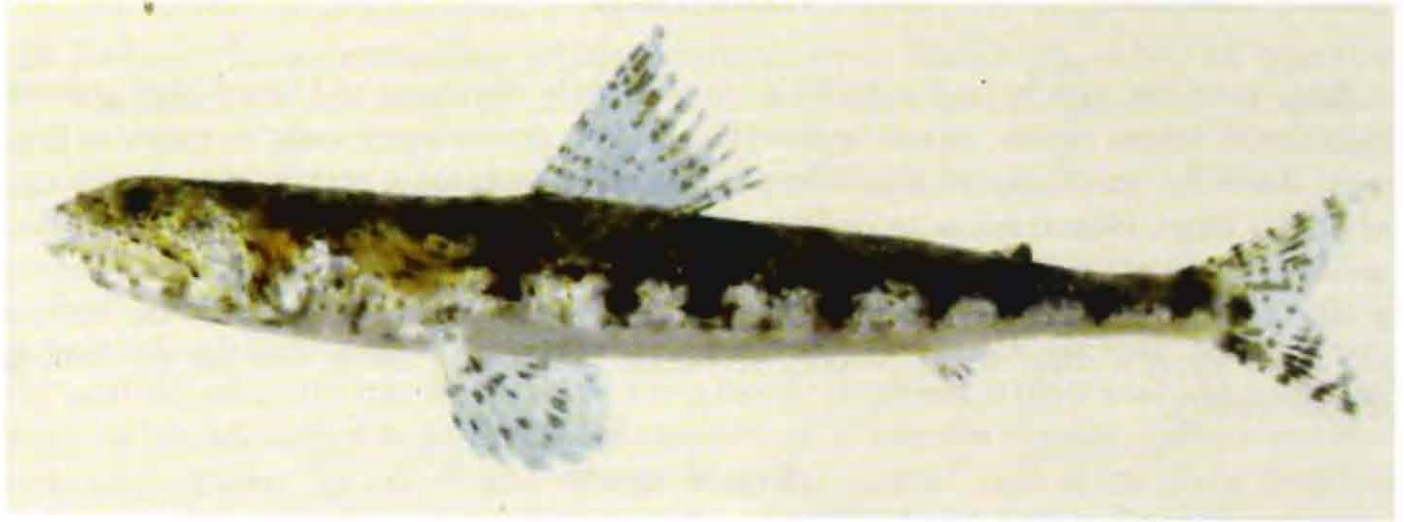


Fig. 157. *Saurida gracilis*

64. *Saurida tumbil* (Bloch, 1795)

Greater Lizardfish

D. 13; A. 10; P. 14; V. 9; Ll. 58. Mouth large, teeth several rows in jaws; pectoral fin reaching to level of pelvic fins; auxillary scale of pectoral fin long and pointed; small adipose dorsal fin present. Body brownish above, lower sides and belly white; mottled with faint dark cross bands on back; stomach region white; no spots on dorsal and caudal fin margins. Attains 45 cm. Found around coral reef areas and open flats. Common. Feeds on crustaceans and small fish. Edible fish. Indo-West Pacific.



Fig. 158. *Saurida tumbil*

65. *Saurida undosquamis* (Richardson, 1848)
Brushtooth Lizardfish

D. 12-13; A. 9-11; P. 14; V. 9; Ll. 48-50. Body fusiform, several rows of slender, pointed teeth in both jaws; pectoral fin extending beyond ventral fin base; small adipose dorsal fin present. Brownish grey above, lighter below; a series of fairly distinct 8-9 blotches along lateral line; dark spots along front edge of dorsal and front edge of caudal fin; stomach black. Attains 45-50 cm. Found on reefs and sandy bottom in shallow areas. Common. Feeds on fish and crustaceans. Good food fish. Indo-West Pacific.



Fig. 159. *Saurida undosquamis*

66. *Synodus variegatus* (Lacepede, 1803)
Variegated Lizardfish

D. 12-13; A. 9-10; P. 11-12; V. 8; Ll. 58-61. Body slightly depressed; head lizard-like; no scales on cheek behind mouth; anterior nostril with short dermal flap; procurrent and primary caudal rays without scales. Colour light greenish-white with a series of 8-9 dark brown to red saddle-like blotches; a broad mid-lateral dark stripe linking lateral row of blotches; head with dark spots; jaws barred red; dorsal, pectoral and caudal fins barred. Attains 25-28 cm. Found around reefs in shallow waters. Uncommon. Feeds on small fish and crustaceans. Food fish. Indo-Pacific.



Fig. 160. *Synodus variegatus*

67. *Trachinocephalus myops* (Forster, 1801)
Painted Lizardfish or Bluntnose Lizardfish

D. 11-12; A. 16; P. 11-12; V. 8; Ll. 55-56. Body elongate and moderately compressed; head not strongly depressed; inter-orbital region strongly concave, snout very short, close to anterior end of upper jaw; anal fin base distinctly longer than dorsal fin base; small adipose fin present behind dorsal fin; inner pelvic fin rays longer than outer rays. Greenish brown above, belly silvery, with alternate dark edged pale blue and yellow stripes; an oblique black spot at upper end of the gill opening; all fins pale yellow. Attains 30 cm. Found in shallow sandy bottom near reefs. Uncommon. Feeds on small sand dwelling crustaceans and fish. Edible fish. Indo-Pacific.



Fig. 161. *Trachinocephalus myops*

Order **OPHIDIIFORMES**Family **OPHIDIIDAE****Brotulas**

Body elongate and compressed, more or less eel-like; dorsal and anal fins low and long based, joined to caudal fin; supra-maxilla present, lateral line present; barbels present or absent; ventral fins absent or with 1 or 2 slender filamentous rays, no spines in fins; scales small and cycloid. Generally few species encountered on reefs.

68. *Brotula multibarbata* Temminck & Schlegel, 1846**Bearded Brotula**

D. 118-123; A. 89-100; P. 22; V. 2. Body eel-like, small barbels present on chin and snout; dorsal and caudal fins confluent with caudal. Body dusky brown; dorsal and anal fins with black narrow sub-marginal band. Egg layers. Attains 60 cm. Found in crevices and caves of the reefs. Rarely seen during daytime. Feeds on crabs and small fish. Indo-West Pacific.

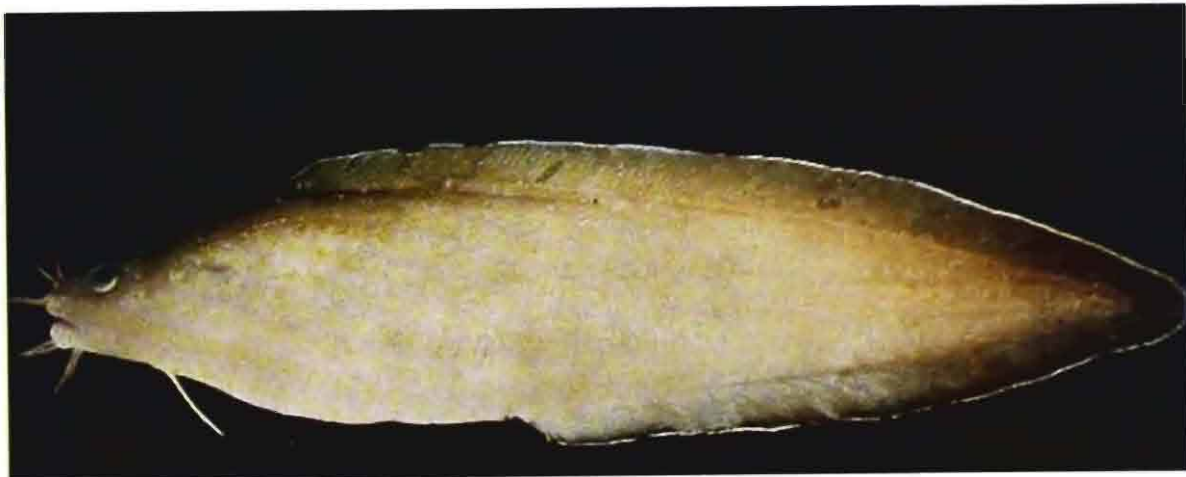


Fig. 162. *Brotula multibarbata*

Family **CARAPIDAE****Pearlfishes**

Body oblong, eel-like or cylindrical and transparent; posterior part of the body tapering, tail very slender; mouth small; fine teeth on jaws and palate; dorsal and anal fins continuous with caudal; no scales on the body. Many species live within the body cavity of starfishes, sea cucumbers and mollusks.

69. *Carapus homei* (Richardson, 1844)**Silver Pearlfish**

Body eel-like, tapering to a long slender tail; small canines at front of upper jaw; dorsal fin very low, longer than anal fin; pectoral rays 19; no pelvic fins; dorsal and anal fins confluent with caudal fin. Body translucent, a silvery spot between eye and maxilla. Attains

14-17 cm. Found in shallow reef areas. Lives in the coelom of sea cucumber *Stichopus* sp. Indo-West Pacific.

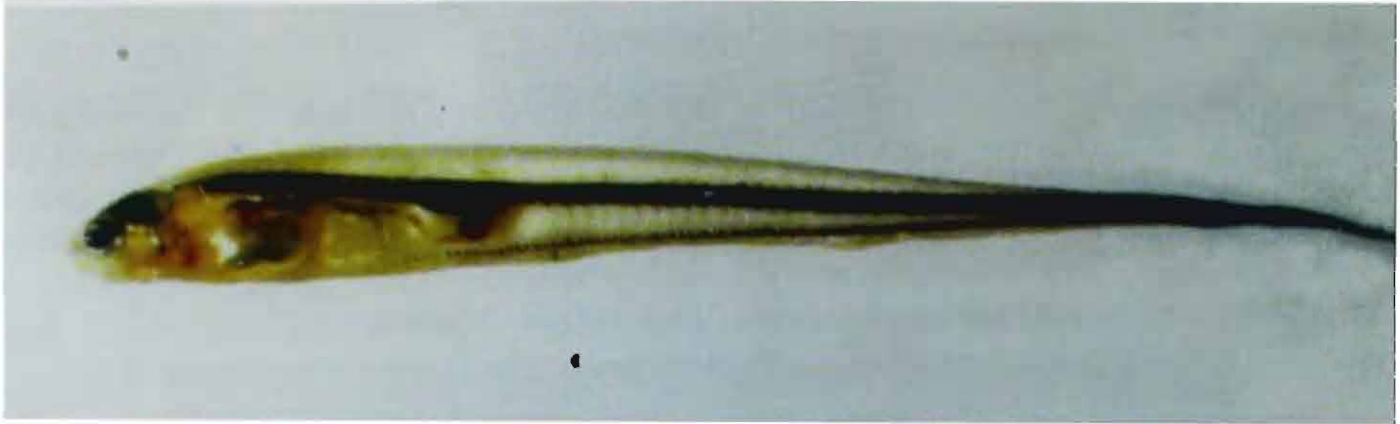


Fig. 163. *Carapus homei*

Family BYTHITIDAE

Cusk Eels

Body elongate and slender; single dorsal and anal fins with long bases, continuous with or reached to adjoining caudal fin; pelvic fin with single filamentous ray; small cycloid scales on the body; usually a strong opercular spine present; eyes very small. Cryptic species. They bear their young.

70. *Dinematichthys* sp.
Yellow Cuskeel

D. 83-85; A. 64-66; P. 21-23; V.1. Very small fishes. Body and sides of head with scales; small opercular spine present; no barbels; caudal fin separate from dorsal and anal fins; dorsal fin origin above middle of pectoral; anal fin origin close to mid-length of body; ventral fin ray filamentous. Body brilliant yellowish-orange. Attains 6-8 cm. Found in deep cracks and crevices of coral reefs; difficult to encounter due to cryptic nature. Feed on small crabs and fish. Indo-West Pacific.



Fig. 164. *Dinematichthys* sp.

Order **LOPHIIFORMES**
 Family **ANTENNARIIDAE**
Anglerfishes

Body stout, globose and slightly compressed; eyes very small; mouth large and oblique, with numerous small villiform teeth. First dorsal spine modified into a slender 'illicium' anteriorly on top of head. The illicium forms a movable 'fishing rod' tipped with a lure called 'esca'; second and third spines are free from soft dorsal; soft dorsal covered with thick skin; pectoral fin base elongate and limb-like; skin spinulose or naked, usually numerous filaments or flaps present. Colour pattern highly variable, usually yellow, red, or orange with bars, spots or streaks. They are masters of camouflage and easily blend with their surroundings. They can engulf prey longer than their body size as their abdomen can expand enormously.

Key to species

- 1a. Skin spinulose (rough); pectoral base broadly connected to body 2 (Genus *Antennarius*)
- 1b. Skin smooth, with membranous filaments and flaps; pectoral with narrow limb-like base *Histrio histrio*
- 2a. Esca a small spherical bulb; 2nd dorsal spine not connected to head membrane; dorsal and anal fins joined to caudal *A. coccineus*
- 2b. Esca a small tuft of appendages; second dorsal spine connected to head by thick spiny skin; dorsal and anal separate from caudal *A. commersoni*

71. *Antennarius coccineus* (Lesson, 1831)
Freckled Anglerfish

D. I+I+I, 12; A. 7; P. 10; V. 5. Body slightly elongate and globular; first dorsal spine as long as second spine; esca globular and whitish; second dorsal spine not joined to head by membrane; dorsal and anal fins joined to caudal fin base; no distinct caudal peduncle; head and body with coetaneous filaments. Colour variable, usually yellow, red or tan with black spots, the spots more on cheek and opercular region; a dark spot at base of posterior dorsal



Fig. 165. *Antennarius coccineus*

rays. Attains 10-13 cm. Found on shallow reefs and rocky areas among weeds. Common. Good aquarium pet. Feed on fish and crustaceans. Indo-Pacific.

72. *Antennarius commersoni* (Latreille, 1804)

Big Anglerfish

D. I+I+I, 12; A. 8; P. 10; V. 6. Body globular and stout; first dorsal spine longer than second dorsal spine, joined to head by a thick spinulose skin; esca is a small tuft of filamented appendage; caudal peduncle distinct. Colour light brownish yellow with scattered small dark spots; dark basi-dorsal and basi-anal spots present; tip of pectoral and pelvic fin rays white. Attains 30-35 cm. Found in shallow weedy reef and coral rubble areas. Uncommon. Feed on fish and small crustaceans. Good aquarium pet. Indo-West Pacific.



Fig. 166. *Antennarius commersoni*

73. *Histrio histrio* (Linnaeus, 1758)

Sargassum Fish

D. I+I+I, 12; A. 7; P. 10; V. 5. Body slightly stout and globular; skin smooth with membranous flaps; first dorsal spine slender with a bulbous tip; two dermal cirri on mid-dorsal line of snout just in front of base of illicium; pectoral fin with narrow limb-like base; caudal peduncle distinct. Colour yellowish-grey with irregular blackish bands on head, body and fins; belly uniform yellow; small white spots scattered on body and fins. Attains 7-9 cm. Associated with floating *Sargassum* seaweeds on reefs. Common. Good aquarium pet. Indo-Pacific.



Fig. 167. *Histrio histrio*

Order **ATHERINIFORMES**

Family **ATHERINIDAE**

Silversides

Body slightly elongate and somewhat compressed; mouth small to moderate; teeth present or absent; two widely separated dorsal fins, first dorsal fin spinous; ventral fin abdominal; pectoral fins inserted high on body; scales moderately large, cycloid; lateral line absent. Small silvery coloured fishes. Usually found in large schools. Feed on small invertebrates. No much commercial value. Many other fish feed on them. Common baitfish.

Key to species

- 1a. Midlateral scale count 34 to 37; midlateral band less than one scale width; dentary with tubercles at posterior end *Atherinomorus duodecimalis*
- 1b. Midlateral scale count 40-44; dentary flat; midlateral band 1 to 1½ scale width *A. lacunosus*

74. *Atherinomorus duodecimalis* (Valenciennes, 1835)

Tropical Silverside

D. V-VII/1, 9-11; A. I, 12-13; P. 14-16; V. I, 5. Body sub-cylindrical and laterally compressed. Head and eyes moderately large; dentary with a distinct small tubercle at its posterior end and sloping backwards and upturned. Body grey; head and base of fins silvery; a mid-lateral silvery stripe present is less than in scale width; rows of dark spots present below the stripe; all fins dusky. Attains 9-10 cm. Found in shallow coastal waters and over shallow reefs. Bait fish. Indo-West Pacific.

75. *Atherinomorus lacunosus* (Forster, 1801)

Broad Banded Silverside

D. V-VII, 8-11; A. I, 12-17; P. 14-16; V. I, 5. Body sub-cylindrical; head and eyes large; dentary small and gently sloping upwards; posterior edges of opercle with distinct notch above angle. Body blue-green or grey; sides and cheek silvery and iridescent; mid-lateral stripe silvery or black, more than one scale width; upper half of body heavily speckled with chromatophores; fins dusky. Attains 12-14 cm. Found in inshore waters and over shallow reefs. Bait fish. Indo-West Pacific.



Fig. 168. *Atherinomorus lacunosus*

Order **CYPRINODONTIFORMES**Family **BELONIDAE****Needlefishes**

Body elongate and sub-cylindrical, slightly compressed laterally; upper and lower jaws extended into a long beak. Teeth moderate and needle-like; dorsal and anal fins posterior in position; no spines in fins; pelvic fins abdominal in position; caudal fin forked or emarginated; nasal organ a pit with protruding tentacle; lateral line beginning from throat and running along ventral margin of body; scales cycloid and easily shed. Pelagic fish. When they frightened leap from water with great speed. At the time of leaping they may cause fatal injuries.

Key to species

- 1a. Caudal peduncle without lateral keels; caudal fin rounded or emarginated; dorsal rays below 16; bluish black blotch on base of caudal fin *Strongylura strongylura*
- 1b. Caudal peduncle with small black lateral keels; caudal fin deeply forked; dorsal rays more than 20; no black blotch on base of caudal fin *Tylosurus crocodiles*

76. *Strongylura strongylura* van Hasselt, 1823**Roundtail Needlefish**

D. 14; A. 16; P. 11; V. 6. Body sub-cylindrical and posterior part laterally compressed; caudal fin slightly rounded. Body light greenish above, whitish ventrally; a silvery stripe laterally on the body; all fins yellowish with greenish tinge; a bluish-black blotch on the base of caudal. Attains 50-56 cm. Found in shallow open waters and adjacent to the reefs. Common. Feed on small fish. Indo-West Pacific.

Fig. 169. *Strongylura strongylura*77. *Tylosurus crocodilus crocodilus* (Peron & Lesueur, 1821)**Crocodile Neadlefish**

D. 22-24; A. 19-21; P. 14; V. 6. Body cylindrical, lateral line forms a keel on caudal peduncle; caudal fin forked, its lower lobe much longer than upper lobe. Body dark bluish-

green above, sides silvery and whitish ventrally; a dark blue stripe on middle of sides; caudal peduncle keel black. Attains 80 to 100 cm. Found in shallow coastal and reef areas. Common. Edible fish. Indo-Pacific and Atlantic.

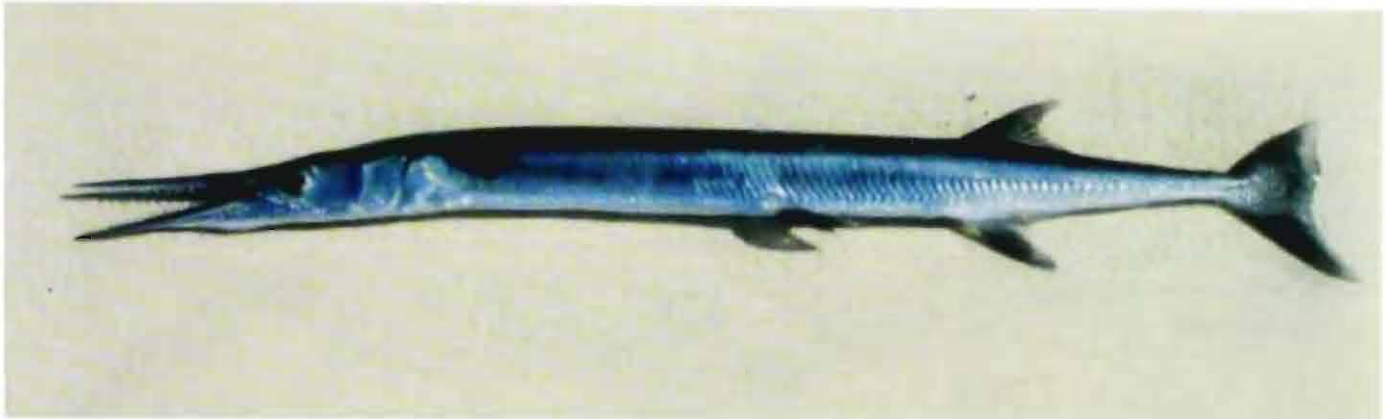


Fig. 170. *Tylosurus crocodilus crocodilus*

Family HEMIRAMPHIDAE

Halfbeaks

Body elongate, slender and almost rounded or laterally compressed; upper jaw short and triangular; lower jaw prolonged into a large beak; dorsal and anal fins posterior in position; no spines in fins; ventral fins abdominal in position; lateral line along the ventral margin of body; scales large and deciduous; caudal fin forked or emarginated, lower lobe greatly longer than upper lobe. Epipelagic, some species inhabit shallow reefs and even freshwater. Usually herbivorous but some species are carnivorous or omnivorous. Frequently found in schools; sometimes leap out from the water.

Key to species

- 1a. No preorbital ridge; upper jaw scaleless; tip of lower jaw reddish *Hemiramphus far*
- 1b. Predorsal ridge present; upper jaw covered with scales; tip of lower jaw not reddish *Hyporamphus dussumieri*

78. *Hemiramphus far* (Forsskal, 1775)

Barred Halfbeak or Striped Halfbeak

D. 13-15; A. 11-12; P, 12; V. 6. Body slender and elongate. Caudal fin forked, lower lobe longer than upper lobe. Colour greenish-blue above, silvery on sides and below, with 4-8 prominent blotches on sides above lateral line level; lower jaw dark, its tip reddish; a silvery

stripe with blue upper margin on sides of body. Attains 35-40 cm. Found in the areas of rich submerged vegetation near reefs. Feeds on small fish and crustaceans. Food fish. Indo-West Pacific.

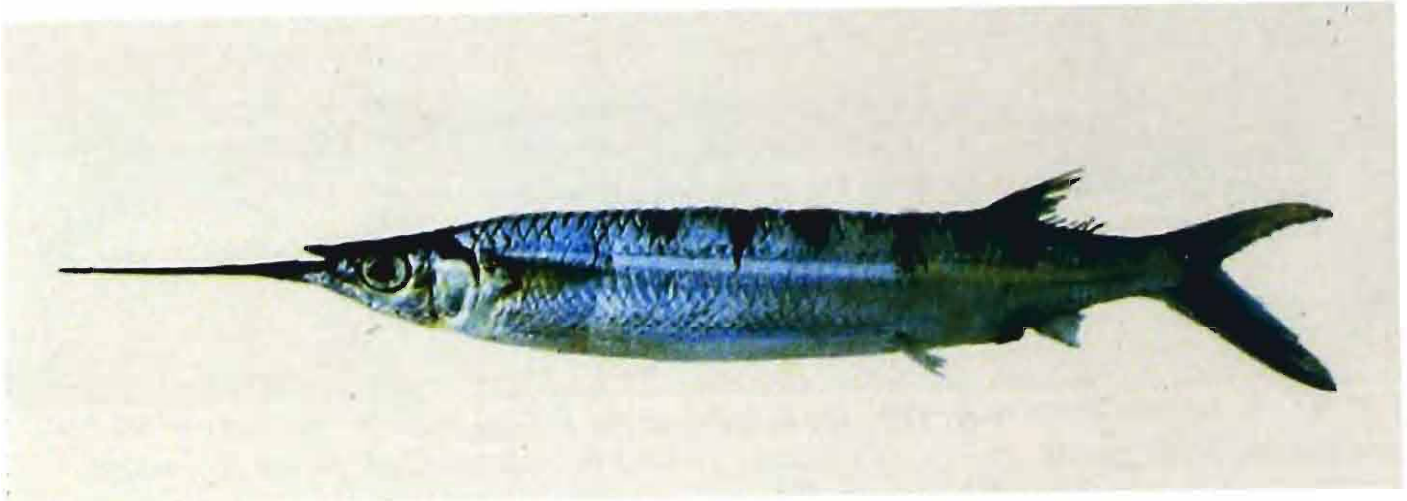


Fig. 171. *Hemiramphus far*

79. *Hyporhamphus dussumieri* (Valenciennes, 1847)

Dussumier's Garfish

D. 15; A. 15; P. 11; V. 6. Body slightly cylindrical; upper jaw short and triangular; pelvic fins located far behind body. Colour greenish above, silvery below; scales of back and upper sides with dark-brown spots; lateral band bluish-silvery bordered black above; dorsal and caudal fins dusky; tip of beak red. Attains 25-30 cm. Found in shallow inshore waters, creeks and occasionally near reefs. Very common fish. Feeds on small fish and crustaceans. Indo-West Pacific.



Fig. 172. *Hyporhamphus dussumieri*

Family EXOCOETIDAE

Flying Fishes

Body elongate, broadly cylindrical and slightly laterally compressed; flattened ventrally. Snout blunt and mouth small; jaws short, upper jaw rounded; teeth present or absent; single dorsal fin; no spines in fins; pectoral fins very long extending beyond dorsal fin origin; caudal fin forked, usually lower lobe longer than upper lobe; lateral line runs along ventral margin of body; scales cycloid, easily detached. They quickly leap out from water and gliding for a long distance, up to 150-200 m with their outstretched pectoral fins. Inhabitants of open sea, but often seen close to the outer reef areas. Feeds on planktonic animals and crustaceans. Edible fishes but have no much commercial importance.

Key to species

- 1a. No palatine teeth; predorsal scales 28-30 *Cypselurus furcatus*
- 1b. Palatine tooth patch long and club-shaped; predorsal scales 24-26 *C. oligolepis*

80. *Cypselurus furcatus* (Mitchell, 1815)

Spotfin Flyingfish

D. 12; A. 9; P. 15; V. 6. Body elongates and thick, laterally flattened. Colour dark iridescent blue dorsally, silvery white ventrally; pectoral fins dark with pale margin, central portion crossed by pale stripe; dorsal fin colourless, caudal fin dusky. Attains 25-30 cm. Found in off shore waters, but occasionally encountered on outer reefs. Wide spread in Indo-Central Pacific and Atlantic.

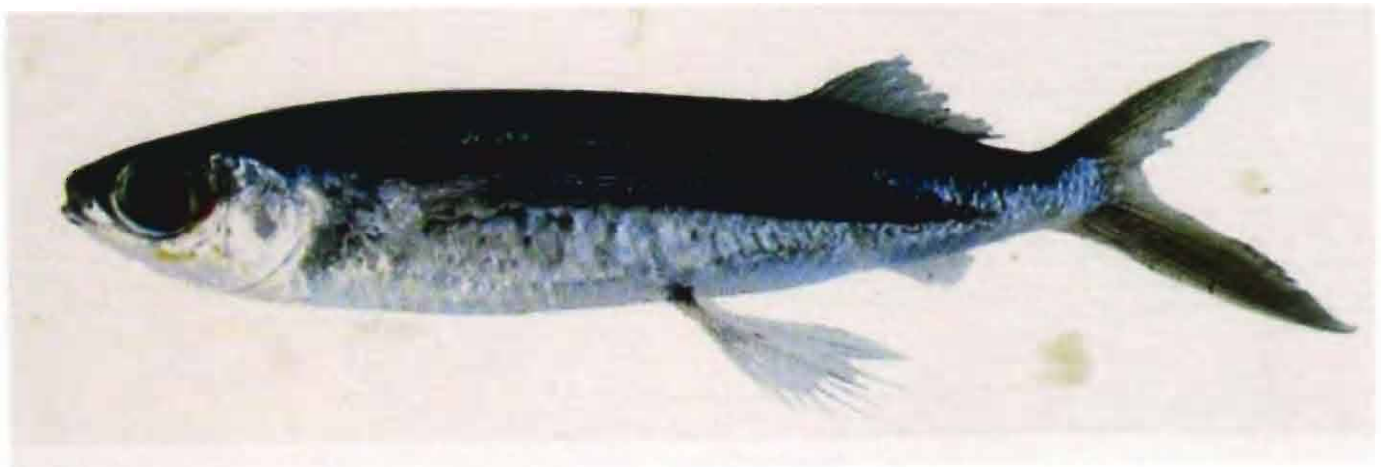


Fig. 173. *Cypselurus furcatus*

81. *Cypselurus oligolepis* (Bleeker, 1866)

Bleeker's Flyingfish

D. 11-13; A. 8-9; P. 5; V. 6. Body fairly robust. Colour bluish-brown above, silvery white below; pectoral fin black, tip hyaline; dorsal fin hyaline, anterior two rays dusky; caudal fin

dusky. Attains 25-30 cm. Found in off shore waters, occasionally encountered on outer reefs. Wide spread in Indo-West Pacific.



Fig. 174. *Cypselurus oligolepis*

Order **BERYCIFORMES**
Family **MONOCENTRIDAE**
Pinecone Fishes

Small plump fishes; body covered with thick plate-like enlarged scales to form solid rough armour; two separate dorsal fins, no inter-spinous membrane; no spines in anal fin; light producing organs present on the sides of lower jaw, light is produced due to presence of luminescent bacteria; ventral fin with one huge and strong spine and 3-4 rudimentary rays.

82. *Monocentris japonicus* (Houttuyn, 1782)

Pinecone Fish

D. V-IV, 11-12; A. 9-11; P. 14; V. I, 3. Body deep and plump; entire body except caudal peduncle covered with armour formed by immovable thick scales with sharp edges and spines; head rough without scales; dorsal fin spines stout; caudal fin slightly rounded. Body light yellow with conspicuous black scale margins forming a network pattern; luminescent organs in two black spots located on sides of lower jaw. Attains 15-16 cm. Found near rocky or reef habitats in slightly deep waters Occasionally encountered. Very interesting ornamental fish, especially watching at night. Indo-West Pacific.



Fig. 175. *Monocentris japonicus*

Family HOLOCENTRIDAE
Squirrelfishes or Soldier Fishes

Body oblong to ovate, slightly compressed; eyes are very large; mouth moderate sized; strong teeth present in jaw. Head bones rigid or grooved and some bones are with spines; a strong pre-opercular spine present in some species; margin of sub-orbital and operculum with spinules; scales strongly ctenoid; dorsal fin divided or continuous and deeply notched between spinous and rayed portions; caudal fin forked, caudal peduncle slender. Usually body red or partially reddish-silvery. Found on coral and rocky bottoms; shallow to moderate depths. Nocturnal, hide in caves during day and come out at night to feed on large zooplankters, benthic crustaceans and small fish. Many species are good aquarium pets.

Key to species

- 1a. Preopercular corner with a stout spine; dorsal spines 11; anal fin rays 8-10.....3
- 1b. No spine at corner of preopercle; dorsal spines 10; anal fin rays 11-14
..... 2 (Genus *Myripristis*)
- 2a. Inner pectoral axil naked except one or two scales on lower half; caudal fin lobes, outer border of soft dorsal and anal fins broadly black *M. adusta*
- 2b. Inner pectoral axil with numerous small scales; no black markings on fins; body silvery pink with scale edges red *M. murdjan*
- 3a. Last dorsal spine much closer to first soft ray than to penultimate spine; lower jaw strongly projecting; large reddish black spot on first three dorsal fin membranes
..... *Neoniphon smmara*
- 3b. Last dorsal spine about equidistant from penultimate spine and first soft ray; both jaws equal 4 (Genus *Sargocentron*)
- 4a. Scales above lateral line to base of middle dorsal spines 3½; lower jaw slightly projecting; spinous dorsal fin uniformly dark red without any markings; large dark red spot on preopercle behind eye *S. spiniferum*
- 4b. Scales above lateral line to base middle dorsal spines 2 ½; lower jaw not projecting; colour not as in 4a 5
- 5a. Lateral line scales 33-39 6
- 5b. Lateral line scales 38-50 8
- 6a. Margin of nasal fossa with one or more spinules; prominent black spot at base of soft dorsal, anal and caudal fins; axil of pectoral black *S. melanospilos*

- 6b. Margin of nasal fossa usually without spinules; no black spots in fins; colour not as in 6a 7
- 7a. Oblique rows of scales on cheek 4; dark pigment on ventral fins, mainly on first ray *S. praslin*
- 7b. Oblique rows of scales on cheek 5; dark pigment of ventral fin confined to tips of second to fifth rays and distal margin of fin *S. rubrum*
- 8a. Lateral line scales 38-43; preopercular spine usually more than 2/3rd of eye diameter; prominent silvery white spot on peduncle at dorsal base or rear part of body; caudal peduncle silvery white *S. caudimaculatum*
- 8b. Lateral line scales 41-55; preopercular spine shorter than 2/3rd of eye diameter; colour not as in 8a 9
- 9a. Interorbital width greater than snout length; body scales finely dotted with black; outer part of spinous dorsal fin broadly red with a white spot below on each membrane *S. punctatissimum*
- 9b. Interorbital width shorter than snout length; colour not as in 9a 10
- 10a. Spinous dorsal reddish black with a longitudinal white band along front half of fin *S. diadema*
- 10b. Spinous dorsal fin red with white spot in each interspinous membrane in the middle *S. ittodai*

83. *Myripristis adusta* (Bleeker, 1853)
Shadowfin Soldierfish

D. XI, 14; A. IV, 14; P. 15; V. I, 7; Ll. 29. Body moderately elongates and compressed; caudal peduncle slender. Pre-opercular spines are absent. Colour pale pink; axil pectoral fin, edges of scales on dorsal surface of the body and opercular margin black; spinous dorsal dusky, distal part black; elevated parts of soft dorsal, anal and lobes of caudal fin broadly



Fig. 176. *Myripristis adusta*

bordered by black; opercular membrane dark brown. Largest species of the genus attains 30-35 cm. Found in sheltered reef areas. Common. Indo-Pacific.

84. *Myripristis murdjan* (Forsskal, 1775)
Blotcheye Soldierfish

D. XI, 13-15; A. IV, 11-12; P. 14-15; V. I, 7; Ll. 29-31. Body compressed; small scales on inner side of pectoral fin base; lower jaw slightly projecting. Colour silvery red; edges of scales dark; upper opercular membrane black; axil of pectoral fin black; opercular membrane, elevated parts of soft dorsal, anal and upper and lower margin of caudal fin lobes dark red, the leading edges with white stripe. Attains 25-30 cm. Found in shallow coral reef areas. Feeds on crustaceans. Common. Indo-West Pacific.



Fig. 177. *Myripristis murdjan*

85. *Neoniphon sammara* (Forsskal, 1775)
Softfin Squirrelfish

D. XI, 11-12; A. IV, 8; P. 13-14; V. I, 7; Ll. 41-42. Body moderately slender and elongates; snout pointed, lower jaw strongly pointed; dorsal and anal fin spines very strong and long. Colour pinkish-silvery, silvery below with a dark reddish black spot on each scale; a light reddish stripe along lateral line scales; a reddish stripe along lateral line scales; a large reddish black spot on first three dorsal membranes; anterior soft rays of dorsal, anal and outer margin of lobes reddish. Attains 25-30 cm. Found in shallow protected coral reef areas. Not uncommon. Indo-Pacific.



Fig. 178. *Neoniphon sammara*

86. *Sargocentron caudimaculatum* (Ruppell, 1838)
Tailspot Squirrelfish

D. XI, 13-15; A. IV, 9; P. 14; V. I, 7; Ll. 42. Body robust, head pointed; dorsal profile of head nearly straight; caudal peduncle slender and elongate; strong pre-opercular spine present. Head and dorso-lateral part of body red, the edges of scales silvery; posterior third of body and ventro-lateral side silvery-white with light red shade; outer part of the dorsal membrane dark red; silvery white spot anteriorly on caudal peduncle. Attains 21-25 cm. Found in shallow coral reef areas. Common. Indo-Pacific.



Fig. 179. *Sargocentron caudimaculatum*

87. *Sargocentron diadema* (Lacepede, 1802)
Crown Squirrelfish

D. XI, 12-14; A. IV, 8-10; P. 13-15; V. I, 7. Body slender and slightly compressed; pre-opercular spine sharp and long; caudal fin forked. Body with alternating broad red and narrow white stripes; dorsal fin reddish black with a more or less distinct longitudinal white band along the front half of the fin, membrane tips white; all fins light red. Attains 15 cm. Found in shallow sheltered reef areas. Very common reef fish. Nocturnal. Good aquarium pet. Indo-Pacific.



Fig. 180. *Sargocentron diadema*

88. *Sargocentron ittodai* (Jordan & Fowler, 1902)
Samurai Squirrelfish

D. XI, 13; A. IV, 8; P. 15; V. I, 7; Ll. 46-47. Body slender and slightly compressed; a sharp pre-opercular spine present. Colour light reddish-silvery with red and silvery-white stripes along

scale rows; spinous dorsal fin bright red with white tips; a series of white spots on inter-spinous membrane in lower part of fin; all other fins white; inner surface of pectoral fin with black spot. Attains 17 cm. Found in coral reef areas. Uncommon. Indo-West Pacific.



Fig. 181. *Sargocentron ittodai*

89. *Sargocentron melanospilos* (Bleeker, 1858)
Blackspot Squirrelfish

D. IX, 12-14; A. IV, 9-10; P. 14; V. I, 7. Body slender, pre-opercular spine strong and sharp; front of upper lip slightly thickened; caudal fin forked. Body with alternate orange red and narrow brassy to silvery white; large black spot at base of soft dorsal, anal, caudal fin and at axil of pectoral fin; spinous dorsal fin red with white tips and each membrane with square white spot. Attains 20-25 cm. Found around rich coral reef areas. Usually hide in crevices and under ledges. Not uncommon. Good aquarium pet. Feeds on crustaceans. Indo-West Pacific.



Fig. 182. *Sargocentron melanospilos*

90. *Sargocentron praslin* (Lacepede, 1801)
Darkstriped Squirrelfish

D. IX, 13; A. IV, 9; P. 13; V. I, 7; Ll. 34-36. Body slightly robust and compressed; caudal peduncle is narrow and long; upper edge of pre-orbital with laterally projecting spine situated below the edge of orbit; pre-opercular spine strong and pointed. Colour silvery-white with

longitudinal brownish-red stripes; tips of spinous dorsal fin membrane white, below a dark red sub-marginal band followed by a whitish zone and dark red zone at base of fin; dark brown blotch at base of soft dorsal. Attains 15-18 cm. Found in protected shallow coral reef areas. Common, good aquarium fish. Indo-West Pacific.

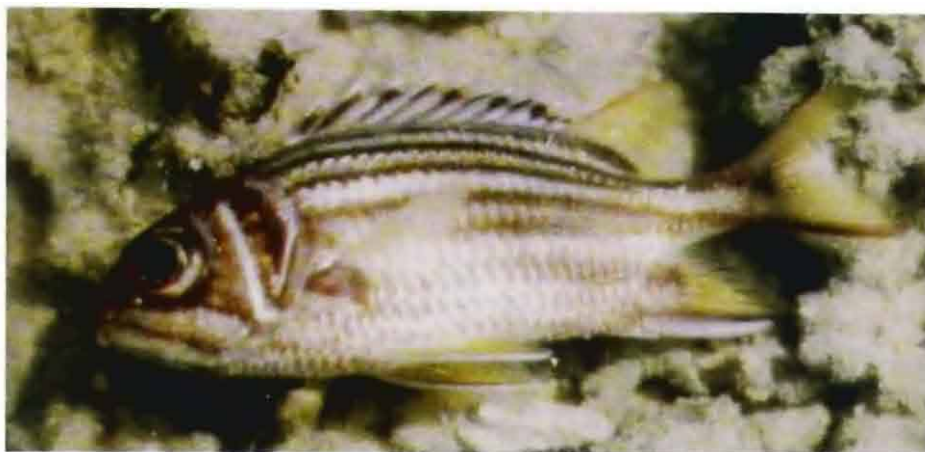


Fig. 183. *Sargocentron praslin*

91. *Sargocentron punctatissimum* (Cuvier, 1829)

Speckled Squirrelfish

D. XI, 12-14; A. IV, 9; P. 14-16; V. I, 7. Body slender and slightly compressed; eyes large; caudal fin forked. Body silvery red, iridescent blue on dorsal side; scales finely dotted with black; dorsal fin silvery white with a bright reddish outer part; fins whitish. Attains 15 cm. Found in shallow coral reef and rocky shores exposed to wave action. Uncommon. Indo-Pacific.



Fig. 184. *Sargocentron punctatissimum*

92. *Sargocentron rubrum* (Forsskal, 1775)

Redcoat Squirrelfish

D. XI, 13; A. IV, 8; P. 14; V. I, 7; Ll. 36. Body robust and compressed. Lower jaw slightly projecting; a large laterally projecting spine below front edge of orbit; nasal fossa without spinules; pre-opercular spine long and strong. Body with alternating brownish red

and silvery white stripes; spinous dorsal red with white tipped spines and a whitish blotch in the middle of each membrane, except the first membrane; dark pigment on pelvic fins extended to 2nd to 6th ray; upper and lower margin of caudal fin dark. Attains 15-20 cm. Found in shallow rocky and reef areas. Not uncommon. Indo-West Pacific.



Fig. 185. *Sargocentron rubrum*

93. *Sargocentron spiniferum* (Forsskal, 1775)

Saber Squirrelfish

D. XI, 14-15; A. IV, 9-10; P. 14-16; V. I, 7; Ll. 41- 45. Body compressed, and moderately deep; eyes large; pre-opercular spine very long; spinous dorsal fin membrane not incised between the spines; caudal peduncle is narrow and long. Colour reddish, edges of scales silvery white; spinous dorsal fin crimson; other fins orange-yellow; an oblong crimson colour spot on preopercle behind eye; axil of pectoral fin with crimson blotch. Largest species, attains 40-45 cm. Found in caves and sheltered coral reefs. Very common fish. Emerge at night to feed on crabs and other crustaceans. Indo-Pacific.



Fig. 186. *Sargocentron spiniferum*

Order SYNGNATHIFORMES

Family PEGASIDAE

Seamoths

Usually oddly shaped, superficially resemble the pipefishes. Body broad, depressed and armored with bony plates; mouth small and toothless; tail small and flexible; nasal bone enlarged and forming rostrum, overhung on mouth; opercle and preopercular bones fused into a bony plate; gill openings narrow; ventral fins abdominal in position, with one small spine and 1 or 2 rays; pectoral fins very large and fan-like, horizontal in position. Small nocturnal fishes, found in shallow weedy areas on reefs.

Key to species

- 1a. Tail rings 8; two deep grooves behind head; rostrum rounded in front
*Eurypegasmus draconis*
- 1b. Tail rings 12; no grooves behind head; rostrum sword-like with short retrose spines
*Pegasus volitans*

94. *Eurypegasmus draconis* (Linnaeus, 1766)

Short Dragonfish

D. 5; A. 5; P. 10; V. I, 2. Body broad and depressed; tail short with few spines at end of each plate; head and body rings fused; rostrum small and disc like, rounded in front; pectoral fins very broad and fan-like. Colour brownish with scattered dark spots. Attains 8-10 cm. Found in shallow weedy areas on reefs. Uncommon. Indo-West Pacific.

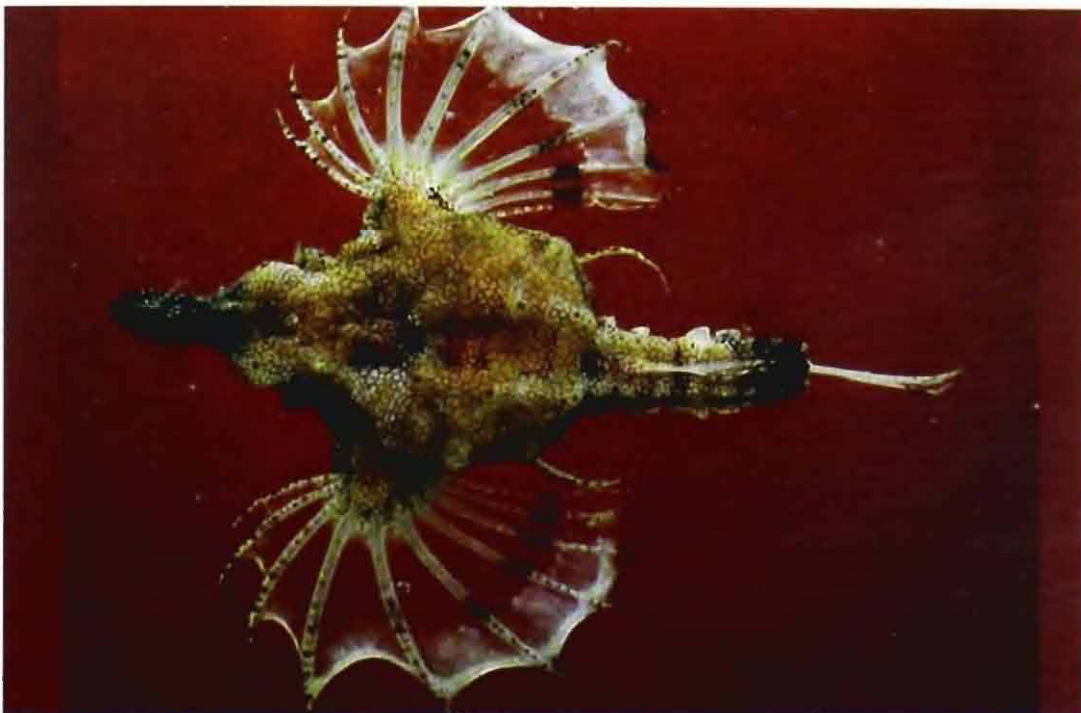


Fig. 187. *Eurypegasmus draconis*

95. *Pegasus volitans* Linnaeus, 1758**Short Tailed Seamoth**

D. 5; A. 5; P. 11; V. I, 2. Body encased in bony rings, fused on head and trunk; rear part of tail rings with sharp spine at each end of the plate; rostrum long and sword-like with short retrose spines; mouth toothless. Body brownish with dark cross bands and spots; dorsal and pectoral fins with large dark spots; eyes blue. Attains 15-17 cm. Found in coral-rubble and weedy areas of reefs. Uncommon. Indo-West Pacific.



Fig. 188. *Pegasus volitans*

Family FISTULARIIDAE

Flutemouths

Body extremely elongate and depressed; snout prolonged and tubular with an oblique mouth at its end; no scales on body, skin smooth; single dorsal fin situated over anal fin; no spines in fins; caudal fin forked, middle two rays produced into elongate filaments; lateral line well developed. Feed by sucking small fish and invertebrates. Commonly found in shallow reef areas and in deep-waters.

96. *Fistularia commersonii* Ruppell, 1838**Smooth Flutefish**

D. 15-17; A. 14-15; P. 14; V. 6. Body elongate, snout prolonged and tube-like; skin smooth and naked; no bony plates along mid-line of body; caudal fin forked with long central rays. Body greenish above, silvery laterally, whitish ventrally; two bluish-green lines along the lateral sides of the body; median fins light pink. Attains 140-150 cm. Often encountered over reefs and seagrass beds. Indo-Pacific.

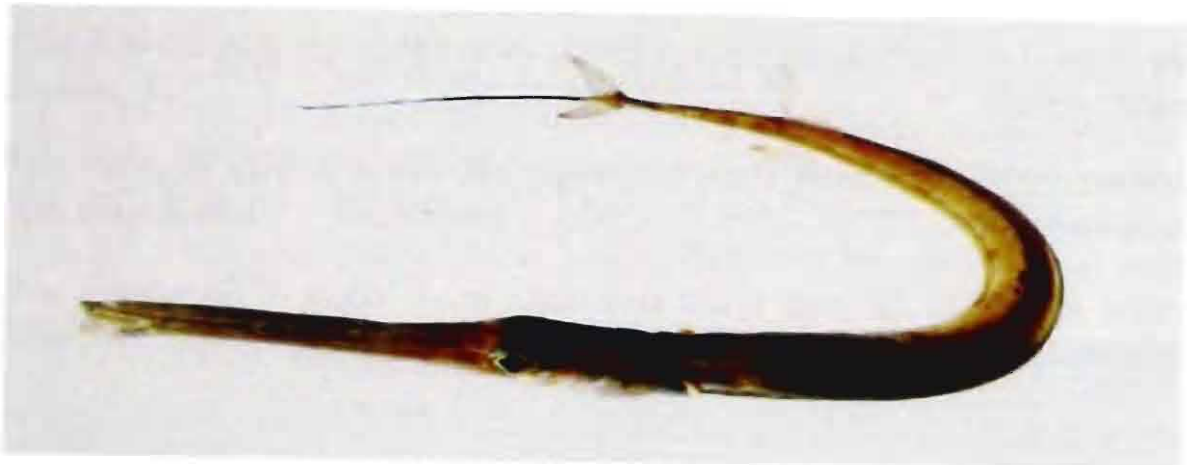


Fig. 189. *Fistularia commersonii*

Family SYNGNATHIDAE

Pipefishes and Seahorses

Body very slender and elongate; armored by ringed dermal plates; snout tube-like; mouth small and terminal; no spines in fins; no pelvic fins; small dorsal and anal fins present; caudal fin present or absent; tail often prehensile; trunk and tail with superior and inferior ridges. Sexually dimorphic; males carry eggs in a pouch under trunk or tail till hatching. Most of the species remain in crevices. Many species are popular aquarium exhibits.

Key to species

- 1a. Superior trunk and tail ridges discontinuous 2
- 1b. Superior trunk and tail ridges continuous 8
- 2a. Inferior trunk and tail ridges continuous; diffuse brown bars on sides; throat with 2 to 3 black cross bars *Corythoichthys haematopterus*
- 2b. Inferior trunk and tail ridges discontinuous; colour not as in 2a 3
- 3a. Caudal fin absent, tail prehensile 4 (Genus *Hippocampus*)
- 3b. Caudal fin present; tail not prehensile 6
- 4a. Body rings with long spines *H. histrix*
- 4b. Body rings without long rings 5
- 5a. Body rings 11 + 33-37; dorsal fin rays 15-18; snout length more than 2.0 in head length, equal to post orbital length; coronet low, distally bifid *H. kuda*
- 5b. Body rings 11 + 38-42; dorsal fin rays 19-21; snout length less than 2.0 in head length; coronet obsolete *H. trimaculatus*
- 6a. Pectoral rays 10 to 15; male brood area under tail; edges of body rings not ending in a backward spine *Halicampus mataafae*
- 6b. Pectoral rays 19 to 23; male brood area under trunk; edges of body rings ending in a backward spine 7 (Genus *Doryramphus*)
- 7a. Body with distinct reddish-black cross bands *D. dactyliophorus*
- 7b. Body with bluish mid-lateral stripe; no cross bands on body *D. excisus*
- 8a. Caudal fin absent; tail prehensile; lateral trunk ridge end near superior tail ridge
..... *Syngnathoides biaculeatus*
- 8b. Caudal fin present; tail not prehensile; lateral trunk ridge continuous with inferior tail ridge 9
- 9a. Tail shorter than trunk; most part of dorsal fin situated on trunk; body yellowish with 3 rows of dark edged bluish-white spots on trunk rings; a black stripe through eye
..... *Choeroichthys sculptus*
- 9b. Tail longer than trunk; most part of the dorsal fin situated on tail; body brown with 10-11 small white blotched dorso-laterally *Phoxocampus tetrophthalmus*

97. *Choeroichthys sculptus* (Gunther, 1870)**Sculptured Pipefish**

D. 32; A. 4; P. 21; C. 10. Body rings 10-20, tail rings 21-24. Body rather short and stout; snout short slightly upturned; keels on snout smooth; small caudal fin present. Colour brownish yellow with three rows of dark edged bluish white spots on trunk rings; a dark stripe through eye and black spots on lower part of head; caudal fin brownish. Attains 8 to 9 cm. Found on coral reefs in shallow waters. Indo-Pacific.

Fig. 190. *Choeroichthys sculptus*98. *Corythoichthys haematopterus* (Bleeker, 1851)**Banded Pipefish**

D. 26-30; A. 4; P. 17. Body rings 17, tail rings 32-36. Body narrow and long; dorsal profile of head strongly convex in front of eye; snout without median lateral ridge; operculum with serrated keel; caudal fin rounded; anal fin rudimentary. Colour overall white with diffuse brown bars and wavy stripes on sides; narrow black stripes on head; throat with 2-3 black cross bars. Attains 14-15 cm. Found on shallow coral reef areas. Indo-West Pacific.

Fig. 191. *Corythoichthys haematopterus*99. *Doryramphus dactyliophorus* (Bleeker, 1853)**Ringed Pipefish**

D. 22-24; A. 4; P. 20-21. Body rings 16-18, tail rings 18-22. Body elongate, slender and heptagonal; edges of trunk and tail rings ending on a large backward spine; snout very long with three longitudinal low ridges dorsally; caudal fin rounded. Colour yellow with distinct reddish black bands on the snout and body; caudal fin reddish with white margin. Attains

18 cm. Eggs attached to abdomen without any pouch. Found in crevices and caves on coral reef areas. Aquarium fish. Indo-Pacific.

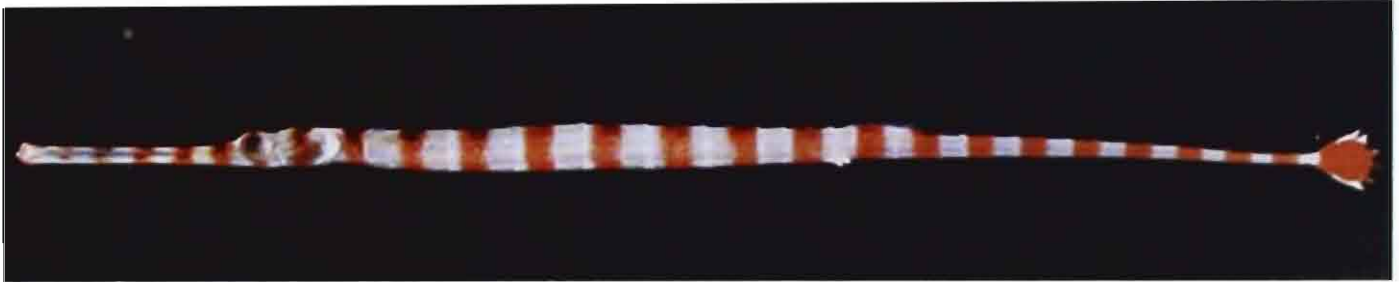


Fig. 192. *Doryramphus dactyliophorus*

100. *Doryramphus excisus excisus* Kaup, 1856

Bluestripe Pipefish

D. 23-29; A. 4; P. 20. Body rings 17-19, tail rings 14-16. Body slender, snout long with serrated median ridge dorsally and granulated ridge on either side; ridges on each body ring with spine posteriorly; caudal fin fan-like and rounded. Colour bright orange with bluish mid-lateral stripe from tip of snout to tail; caudal fin bluish black with orange tinge. Attains 7 to 8 cm. Found in reef crevices and in sheltered areas. Aquarium fish. Indo-Pacific.

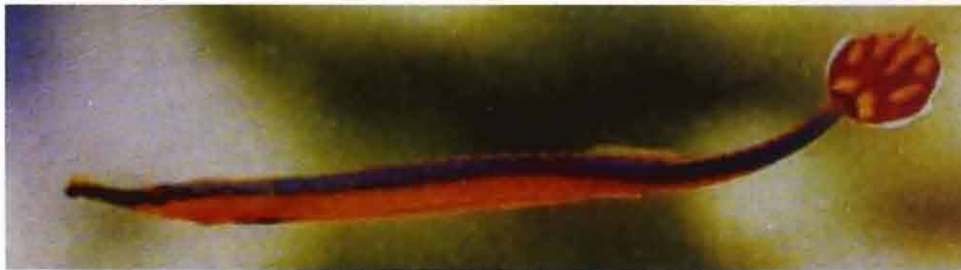


Fig. 193. *Doryramphus excisus excisus*

101. *Halicampus mataafae* (Jordan & Seale, 1906)

Brown Pipefish

D. 22-26; A. 3; P. 12. Body rings 15, tail rings 34-36. Body slender, tail long; trunk heptagonal and tail tetragonal. Snout short having a median crest with 3-4 spine-like elevations; dermal flaps present behind eye and nape. Colour brownish with irregular diffuse pale bars on head, back and tail. Attains 10-12cm. Found in shallow reef areas. Indo-West Pacific.

102. *Hippocampus histrix* Kaup, 1856

Thorny Seahorse

D. 17-19; A. 4; P. 17-18. Body rings 11, tail rings 33-34. Body very hard encased in bony rings; tail prehensile; no caudal fin; snout long and tubular; pointed long spines above eyes and slender long spines at intersections of body rings and ridges. Dorsal and pectoral fins small. Body reddish brown with dark transverse lines, pale spots and narrow vermiculations.

Brood pouch located under the tail of male. Attains 12-15 cm. Found in sea grass and seaweed areas of the reefs. Good aquarium fish. Indo-West Pacific.



Fig. 194. *Hippocampus histrix*

103. *Hippocampus kuda* Bleeker, 1852
Yellow Seahorse or Spotted Seahorse

D. 16-18; A. 4; P. 16. Body rings 11, tail rings 34-37, no spines but tubercles on rings; snout moderately long and tubular; a low crown like structure called cornet



Fig. 195. *Hippocampus kuda*

present on top of head is divided distally; caudal fin absent; tail prehensile. Colour dark brown with scattered dark spots and cross bands on tail, some times white spots present on body. Attains 25-30 cm. Brood pouch located under tail of males. Found among seaweeds near reef areas. Aquarium fish. Indo-Pacific.

104. *Hippocampus trimaculatus* Leach, 1814

Longnose Seahorse

D. 19-21; A. 4; P. 20-21. Body rings 11, tail rings 38-40; no spines on body rings; snout long and narrow; cornet or crown on head obsolete; supra orbital spine large. Body brownish black. Attains 20-25. Found in shallow weedy areas of reefs. Popular aquarium fish. Indo-West Pacific.



105. *Phoxocampus tetrophthalmus* (Bleeker, 1858)

Rock Pipefish

D. 20-21; A. 3; P. 12-13. Body rings 16, tail rings 30. Body stout and short; opercular ridges with complete keel; posterior tail rings with sharp edges increasing in height posteriorly, ending in a sharp tooth. Colour dark brown with 10-11 small white

blotches dorso-laterally. Attains 20-25 cm. Found in shallow rocky and reef areas. Indo-West Pacific.

106. *Syngnathoides biaculeatus* (Bloch, 1785)

Alligator Pipefish

D. 35-50; A. 4; P. 23. Body rings 14-17, tail rings 45-54. Body long and robust; trunk compressed dorso-ventrally, broadest near middle of trunk; a pair of small branched barbels at chin; caudal fin absent, tail prehensile; small dermal flaps on head and body. Colour greenish brown above yellowish below. Brood area under trunk without pouch. Attains 20-28 cm. Found among floating *Sargassum* seaweeds and algal beds near reefs. Good aquarium fish. Indo-West Pacific.



Fig. 197. *Syngnathoides biaculeatus*

Family SOLENOSTOMIDAE

Ghost Pipefishes

Body very short and compressed, encased in bony plates; snout long, compressed and tubular with terminal mouth; two separated dorsal fins; soft dorsal and anal fins small and located opposite; caudal and ventral fins very long. Pelvic fins of females fused to form an egg pouch. They are masters of camouflage; body shape and colour blend in effectively with seaweeds.

Key to species

- 1a. Caudal peduncle as long as deep; membrane of caudal beginning very nearer to second dorsal and anal fins *Solenostomus cyanopterus*
- 1b. Caudal peduncle longer than height; membrane of caudal beginning at a distance from second dorsal and anal fins *Solenostomus paradoxus*

107. *Solenostomus cyanopterus* Bleeker, 1854**Ghost Pipefish**

D. V, 18; A. 18; P. 26; V. 7. Body short and very compressed, encased in bony plates; body and snout with scattered dermal appendages; a small barbel present at tip of lower jaw; caudal peduncle depth greater than its length; membrane of caudal beginning very close to 2nd dorsal and anal fins. Body reddish green with scattered black and white spots between 1st and 3rd dorsal spines, the upper part of fin with scattered black spots; caudal fin brownish with small black spots; other fins whitish. Attains 15 cm. Found in weedy areas of the reefs. Very fascinating aquarium pets. Indo-Pacific.



Fig. 198. *Solenostomus cyanopterus*

108. *Solenostomus paradoxus* (Pallas, 1770)**Harlequin Ghostpipefish**

D. V, 22; A. 2; P. 24; V. 7. Body narrow and unusual; caudal peduncle slender; the membrane of the caudal fin beginning at a distance from 2nd dorsal and anal fins; head and

body with small dermal appendages. Body light brownish-green with scattered small black spots; membrane between 1st and 3rd spines with black blotches; caudal fin dusky. Attains 10-12 cm. Found in weedy areas and some times among the branches of Seafans (gorgonians). Very interesting aquarium fish. Indo-West Pacific.



Fig. 199. *Solenostomus paradoxus*

Family CENTRISCIDAE

Razorfishes or Shrimpfishes

Body extremely compressed and elongate; ventral edge very sharp and razor-like; body encased in thin transparent bony plates; rear end of body twisted ventrally so that the dorsal fin is in caudal position and the caudal fin displaced to ventrally; snout elongate and tubular; mouth small and toothless. They swim in small schools, like marching of soldiers, in a vertical position with its snout pointing downwards.

Key to species

- 1a. First dorsal spine with movable segment at its end *Aeoliscus strigatus*
- 1b. First dorsal spine without movable segment at its end..... *Centriscus scutatus*

109. *Aeoliscus strigatus* (Gunther, 1861)

Razorfish

D. III, 9-10; A. 11-13; P. 12; V. 4. Body extremely compressed with sharp ventral edge; mouth toothless; first dorsal spine with movable segment at its end. Body yellowish-brown



Fig. 200. *Aeoliscus strigatus*

with a black stripe extended from snout to base of caudal fin. Attains 10-13 cm. Found in small schools around coral reefs in shallow waters. Often take refuge among the spines of sea urchin *Diadema* sp. or coral branches. Popular and interesting aquarium fish. Common. Indo-West Pacific.

110. *Centriscus scutatus* Linnaeus, 1758

Gutter's Knife Fish

D. III, 10; A. 11; P. 12; V. 4. Body thin and blade-like; inter-orbital space has a groove continued to the crown of head; dorsal spine without movable segment at its end; sutures of lateral plates serrated. Body silvery with a faint narrow black lateral streak. Attains 10 to 15 cm. Found in small schools near reef and weedy areas. Common. Popular aquarium fish. Indo-West Pacific.



Fig. 201. *Centriscus scutatus*

Order **SCORPAENIFORMES**

Family **SCORPAENIDAE**

Scorpion Fishes

Moderate sized fishes. Body shape varies, head with ridges and spines; opercle and pre-opercle with spines; many species are scaled; dermal flaps, cirri and ocular tentacles well developed on head and body; dorsal fin single, deeply notched between spinous and soft portions or both separated; pectoral fin rounded or square-cut. Fin spines sharp and venomous; glandular tissue located at base of spines produces poison. Wounds from spines cause unbelievable agony. Bottom living fishes; occur in a variety of habitats and depths from shallow tide pools to oceanic depths. Dwell in caves, crevices, under stones. Nocturnal. Carnivorous, actively feeds on crustaceans and small fish.

Key to species

- 1a. Dorsal spines not longer than body depth; pectoral fins not long; body brown with dark and light mottling; prominent black spot on upper edge of operculum surrounded by white area *Scorpaenodes guamensis*
- 1b. Dorsal spines longer than body depth; pectorals long and fan-like; colour not as in 1a. 2
- 2b. Dorsal spines less than body depth; pectorals short and wedge-shaped or rounded 7
- 2a. All pectoral rays branched 3 (Genus *Pterois*)
- 2b. Few pectoral rays branched 6 (Genus *Dendrochirus*)
- 3a. Scales cycloid; dorsal spines 13; pectoral rays 12-14 4
- 3b. Scales ctenoid; dorsal spines 12; pectoral rays 16-17 5
- 4a. Interspinous membrane of pectoral fin broad and feather-like; dorsal, caudal and anal fins with small dark spots *P. volitans*
- 4b. Interspinous membrane of pectoral fin broad but not feather-like; dorsal, caudal and anal fins without dark spots *P. russellii*
- 5a. Tentacles above eye, banded with dark; numerous dark bars on body; thin diagonal bars on caudal peduncle; median fins spotted *P. antennata*
- 5b. Tentacles above eye are not banded; five dark bars on body bordered by white; broad horizontal stripe on caudal peduncle; median fins not spotted *P. radiata*
- 6a. Middorsal spines longer than body depth; a 'T'-shaped mark on sides of caudal peduncle *D. zebra*
- 6b. Middorsal spines about equal to or slightly shorter than body depth; no 'T'-shaped mark on sides of caudal peduncle *D. brachypterus*

- 7a. Rear lachrymal spine strongly hooked forward; scales cycloid; head spines well developed
.....*Scorpaena picta*
- 7b. Rear lachrymal spine not strongly hooked forward; scales ctenoid8
- 8a. Palatine teeth present; upper pectoral rays divided and lower rays simple or all simple
.....*Sebastapistes strongia*
- 8b. Palatine teeth absent; upper pectoral rays divided and lower rays simple
..... 9 (Genus *Scorpaenopsis*)
- 9a. Body high behind head; humpbacked; pectoral rays usually 17; inside of pectoral fin
with large dark spot and broad sub-marginal dark band *S. gibbosa*
- 9b. Body arched, no notable hump; pectoral rays usually 17-20; no dark spot on inside of
pectoral fin 10
- 10a. Pectoral rays usually 20; lateral scale series about 60; 1st dorsal spine short, 2nd spine
as long as 3rd spine and more than twice in 1st spine *S. oxycephala*
- 10b. Pectoral rays usually 17—18; lateral scale series 40-50; first three dorsal spines
increase in length evenly *S. venosa*

111. *Dendrochirus brachypterus* Cuvier, 1829

Dwarf Lionfish or Shortfin Turkeyfish

D. XIII, 8-9; A. III, 5; P. 18; V. I, 5. Body robust and slightly compressed; mid dorsal spines almost equal to body depth; dermal filaments present on snout, above eye and on opercular margin; small tentacles present above eye; pectoral fins long and fan-like, its membranes undivided and spines free at tips only. Colour reddish with broad dark bars on

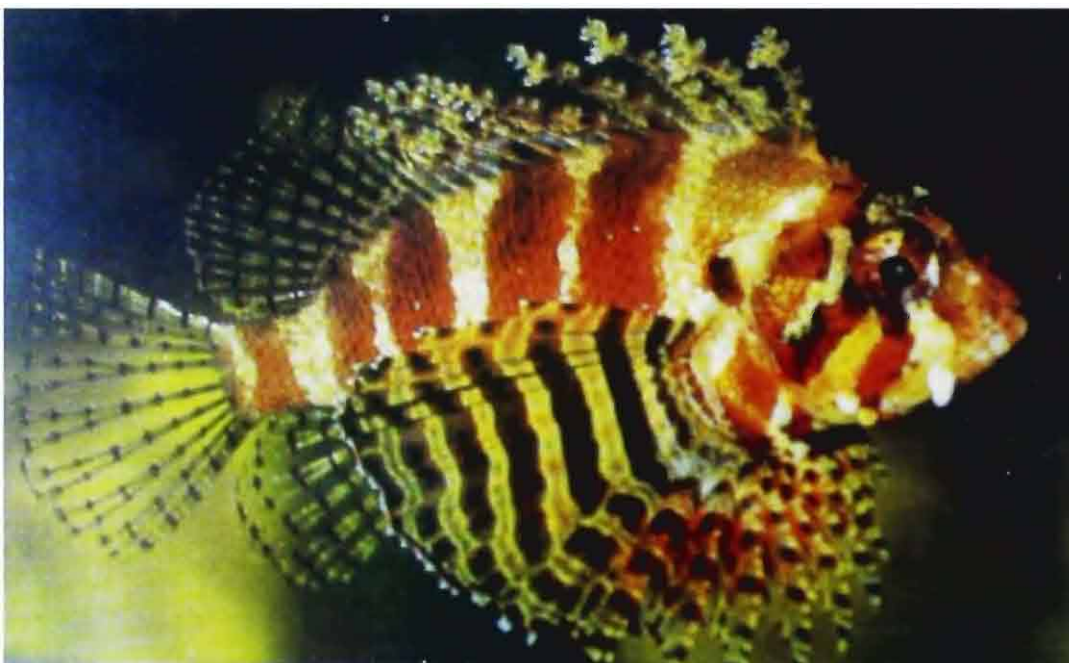


Fig. 202. *Dendrochirus brachypterus*

head and body; prominent dark bands on pectoral and pelvic fins; dorsal, anal and caudal fins with dark spots. Attains 10-15 cm. Found in sheltered coral reef areas. Common. A popular aquarium fish. Spines venomous. Indo-West Pacific.

112. *Dendrochirus zebra* (Cuvier, 1829)

Zebra Lionfish

D. XIII, 10-11; A. III, 6-7; P. 17; V. I, 5. Body robust and slightly compressed; long tentacles present above eyes; small spines present between nostrils; upper rays of pectoral fin simple, inter-spinous membranes undivided, free at tips only. Body reddish brown with alternating dark brown and narrow white bars, a T-shaped red band on caudal peduncle; all fins prominently dark spotted arranged in rows; a black blotch on lower edge of opercle; eye tentacles banded. Attains 15 to 20 cm. Found in shallow sheltered reef areas. Common. A popular aquarium fish. Spines are very dangerous. Indo-Pacific.



Fig. 203. *Dendrochirus zebra*

113. *Pterois antennata* Bloch, 1787

Raggedfin Firefish

D. XII, 11-12; A. III, 6; P. 16-17; V. I, 5. Body robust and compressed; scales ctenoid; tips of the pectoral fin rays long and filamentous; supra-orbital tentacles long having lateral flaps. Colour reddish brown with dark brown and narrow white bars on head and body; band from eye to angle of opercle is more prominent; caudal fin with thin diagonal bars; pectoral fins with large black blotches; dorsal, anal and caudal fins black spotted; supra-orbital tentacles with black cross bands. Attains 15 to 20 cm. Found in reef caves and

sheltered lagoons. Very common and popular aquarium pet. Dorsal fin spines extremely venomous. Indo-Pacific.



Fig. 204. *Pterois antennata*

114. *Pterois radiata* Cuvier, 1829

Radiant Firefish

D. XII, 11; A. III, 6; P. 16; V. I, 6. Scales on the body ctenoid; supra-ocular tentacle smooth without appendages or bars; dorsal and pectoral fin spines extremely long. Colour reddish brown with 5 or 6 broad dark bars on body, separated by thin white lines; a horizontal dark area on caudal peduncle. Attains 20 to 25 cm. Found around coral reef areas in shallow waters. Very graceful and most beautiful aquarium pet. Dorsal fin spines are venomous. Indo-Pacific.

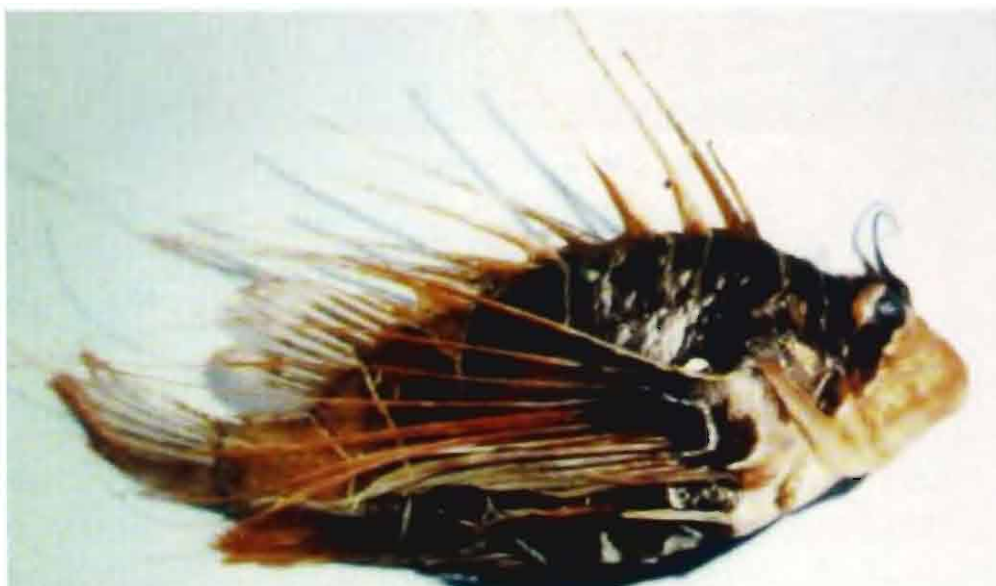


Fig. 205. *Pterois radiata*

115. *Pterois russelli* Bennett, 1831
Plaintail Firefish

D. XIII, 10-11; A. III, 6-7; P. 13; V. I, 5. Body slender and elongate, compressed; scales cycloid; no spines on bones below eye; supra-orbital with small tentacles; soft dorsal, anal and caudal fins long; pectoral rays not filamentous; caudal fin rounded. Colour reddish with thin dark bars on head and body; dorsal, anal and caudal fins without dark spots. Attains 24 to 28 cm. Found in shallow sheltered reef areas. Not uncommon. Beautiful aquarium fish. Dorsal fin spines extremely venomous. Indo-West Pacific.



Fig. 206. *Pterois russelli*

116. *Pterois volitans* (Linnaeus, 1758)
Red Firefish

D. XIII, 10-11; A. III, 6-7; P. 14; V. I, 5. Body slightly robust; snout, pre-orbital and pre-opercular margin with dermal filaments; supra-ocular tentacles long; pectoral fin rays free with broad feather-like membranes. Head and body reddish brown with numerous dark



Fig. 207. *Pterois volitans*

brown cross bars and narrow pale inter-spaces; dorsal, anal and caudal fins with black spots; ventral fins with small pearly spots and black markings; ocular tentacles without cross bands. Commonest and longest scorpion fish attains 30 to 35 cm. Found around coral reefs in shallow waters. Good aquarium pet. Indo-Pacific.

117. *Scorpaena picta* Cuvier, 1829
Painted Stingfish

Medium sized fish, body robust and compressed mid-laterally; head spines well developed; long denticulate supra-orbital tentacle and small filaments on lateral line present; upper rays of pectoral fin divided; scales cycloid. Colour brownish, marbled with brown; indistinct oblique bands and markings on dorsal and anal fins; base and center of caudal fin with dark band; pectoral and pelvic fins with indistinct bars or large spots. Attains 15-16 cm. Found around coral rubble areas. Uncommon. Indo-West Pacific.



Fig. 208. *Scorpaena picta*

118. *Scorpaenoides guamensis* (Quoy & Gaimard, 1824)
Guam Scorpionfish

D. XIII, 8-9; A. III, 4-5; P. 19; V. I, 5. Eyes projecting slightly above dorsal profile; spiny ridges on head present; nasal spine present; a few spines present in a row under eye;



Fig. 209. *Scorpaenoides guamensis*

opercular spine present; scales ctenoid; pectoral fin wedge-shaped; skin flaps present on body. Colour dark brown with dark and light mottling; fins with white and brown spots in rows; a prominent black spot on upper edge of operculum, surrounded by whitish area. Attains 10 to 12 cm. Found on shallow reef and rocky bottoms. Indo-West Pacific.

119. *Scorpaenopsis gibbosa* Bloch & Schneider, 1801

Humpback Scorpionfish

D. XII, 9; A. III, 5; P. 16-17; V. I, 5. Body high and hump-backed behind head; no palatine teeth; rear lachrymal spine not strongly hooked forward; head with ridges and spines; a deep groove behind eye; scales with numerous membranous flaps. Colour brownish, with a broad area from base of median dorsal spines and extends obliquely downwards to pectoral fins; a narrow dusky band from soft dorsal extend towards anal fin and another band on caudal peduncle; dorsal, anal and pectoral fins with dark mottling; ventral fin with a dark band in middle, its margin yellow. Attains 10 cm. Found under coral rubble. Common. Aquarium fish. Indo-Pacific.



Fig. 210. *Scorpaenopsis gibbosa* (Juvenile)

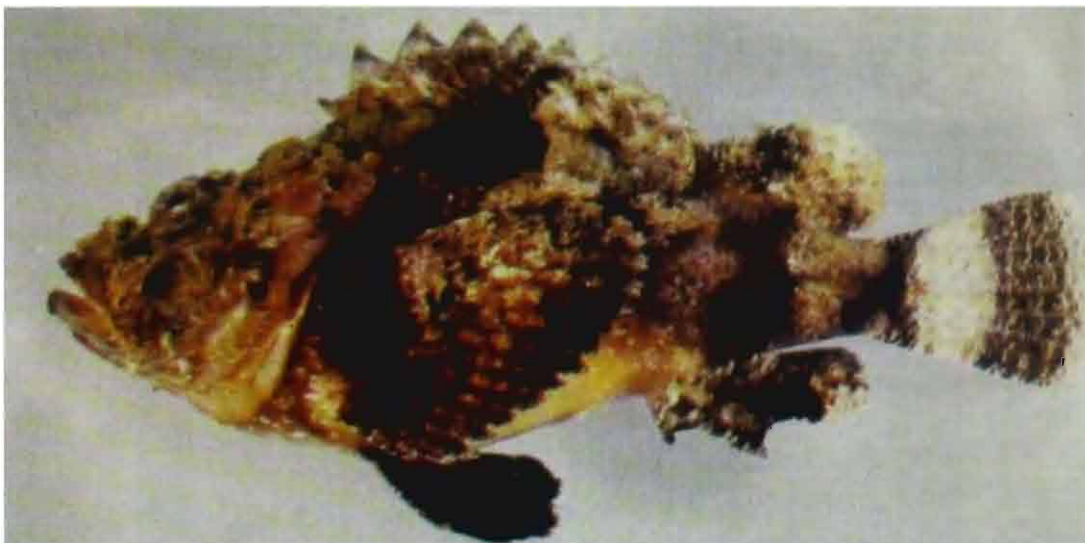


Fig. 211. *Scorpaenopsis gibbosa* (Adult)

120. *Scorpaenopsis oxycephalus* (Bleeker, 1849)**Mottled Scorpionfish**

D. XII, 9; A. III, 5; P. 16; V. I, 5. Body large and robust; villiform teeth in jaws; membranous flaps present on jaws, opercular region, on head and body; first three dorsal spines increases in length evenly; scales ctenoid; caudal fin rounded. Colour brownish green with strongly mottled pattern of dark brown and whitish blotches; all fins with dark spots arranged in rows. Attains 10-12 cm. Found in coral reef and rocky areas. Uncommon. Indo-West Pacific.

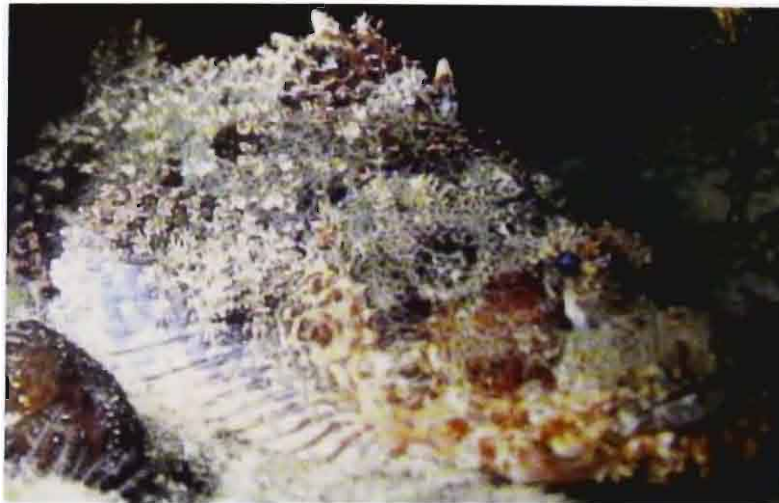


Fig. 212. *Scorpaenopsis oxycephalus*

121. *Scorpaenopsis venosa* (Cuvier, 1829)**Raggy Scorpionfish**

D. XII, 9; A. III, 5; P. 16-18; V. I, 5. Body robust; first three dorsal spines increasing in length evenly; palatine teeth absent; spiny ridges between eyes are straight, ending behind eyes; branched tentacles above eyes and skin flaps on head, body and fins. Body with strongly mottled pattern of dark brown and whitish blotches; fins with rows of spots. Attains 15 to 18 cm. Found under coral rubble and coral rocks in shallow waters. Uncommon. Indo-Pacific.



Fig. 213. *Scorpaenopsis venosa*

122. *Sebastapistes strongia* (Cuvier, 1829)**Barredchin Scorpionfish**

D. XII, 8-9; A. III, 5; P. 15-16; V. I, 5. Body robust; scales ctenoid, breast naked; pre-orbital with two spines; no flaps on body except a long tentacle above eye. Body reddish brown mottled with dark bars on lower jaw and a dark area at anterior most three dorsal spines; head and anterior part of body with yellowish spots. Attains 6-7 cm. Found on coral reef and rocky areas. Indo-West Pacific.

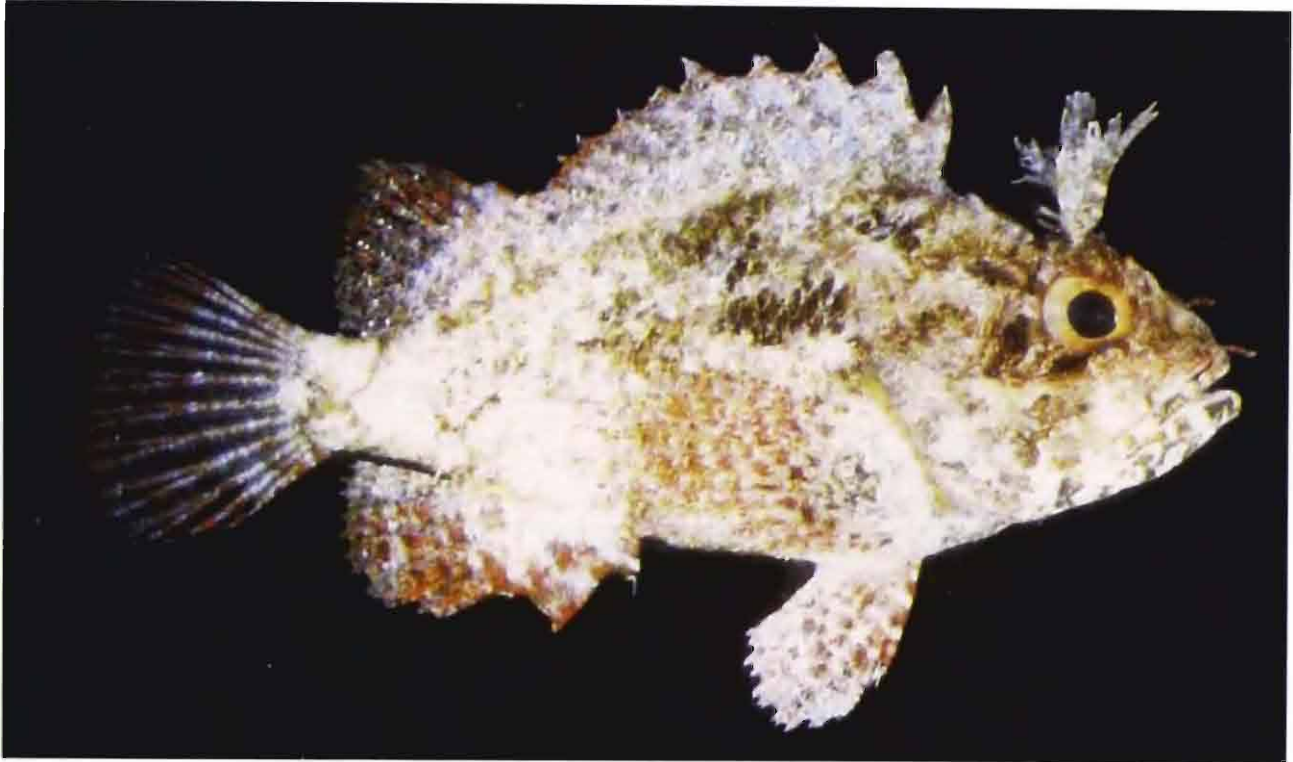


Fig. 214. *Sebastapistes strongia*

Family TETRAROGIDAE

Waspfishes

Closely related to the fishes of family Scorpaenidae. Benthic, small to moderate sized fishes; body naked or with small embedded scales; dorsal fin originates on head before or above eye; dorsal fin sail-like or at least spinous portion very large; 2 or 3 pairs of upper pharyngeal tooth plates. Fin spines of all species extremely venomous and dangerous. Usually found from shore to depths of 200 m or above.

Key to species

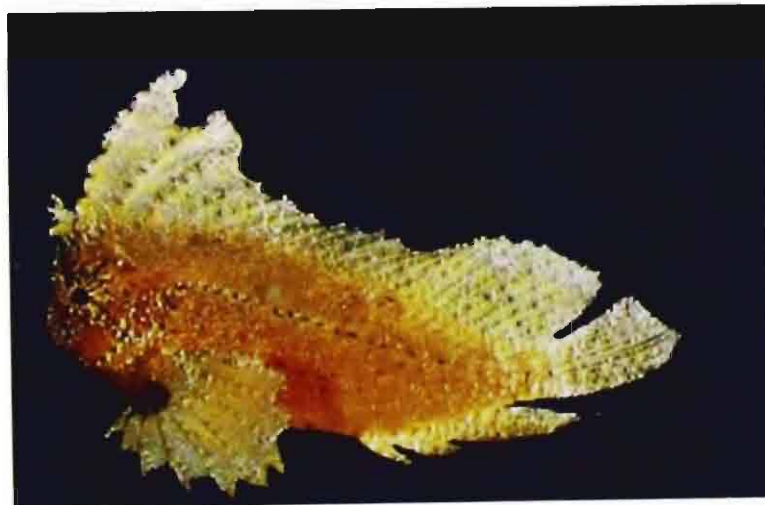
- 1a. First three dorsal spines remote from rest of the fin and connected by embrane; last dorsal and anal rays connected to caudal 2 (Genus *Vespicula*)
- 1b. Dorsal fin spines and rays normal; last dorsal and anal rays connected to caudal ... 3
- 2a. D. XIII, 7, and beginning above hind border of preopercle; V. I, 5. *V. depressiformis*
- 2b. D. XV, 4, and beginning behind eye; V. I, 4 *V. trachinoides*
- 3a. Dorsal fin spines 14 to 17; dorsal fin sail-like 4 (Genus *Ablabys*)
- 3b. Dorsal fin spines 13; dorsal fin slightly enlarged 5 (Genus *Tetraroge*)
- 4a. Dorsal spines 15; body reddish brown; edges of fins dark *A. macracanthus*
- 4b. Dorsal spines 17; body reddish brown with dark streaks *A. taenianotus*
- 5a. A pair of barbells on symphysis of lower jaw *T. barbata*
- 5b. No barbells on lower jaw symphysis *T. niger*

123. *Ablabys macracanthus* (Bleeker, 1852)**Waspfish**

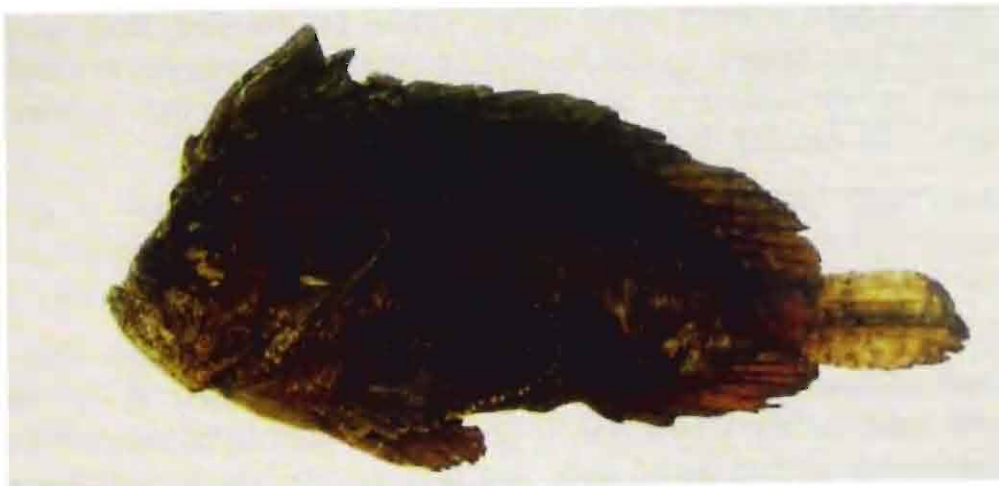
D. XV, 7-9; A. III, 7; P. 10; V. I, 5. Small fishes, body strongly compressed and covered with small embedded scales; eyes located high on head; pectoral and caudal fins rounded; origin of dorsal fin before eyes and sail-like; pectoral fins slightly longer and rounded. Colour reddish brown; edges of dorsal and anal fins dark. Attains 10 cm. Found on coral rubble bottom of reefs in shallow waters. Uncommon. Spines poisonous. Indo-West Pacific.

124. *Ablabys taenianotus* (Cuvier, 1829)**Waspfish**

D. XVII, 7-8; A. III, 5; P. 10-12; V. I, 5. Small fishes, body strongly compressed and covered with small embedded scales; eyes located high on head; pectoral and caudal fins rounded; origin of dorsal fin above eyes and sail-like; pectoral fins slightly longer and rounded. Colour reddish brown with irregular dark streaks on body and fins, a white stripe on front lower side of head. Attains 8 to 10 cm. Found on coral rubble bottom in shallow reef regions. Uncommon. Spines are poisonous. Feeds on crustaceans. Distributed from Andaman Islands to Japan.

Fig. 215. *Ablabys taenianotus*125. *Tetraroge barbata* (Cuvier, 1829)**Bearded Roguefish**

D. XIII, 7-8; A. III, 5; P. 12; V. I, 5. Small fishes with single long dorsal fin and a short anal fin; mouth large and oblique; ventral fin small and thoracic in position; two small barbels at anterior tip of jaws; pre-orbital spine long and directed backwards; origin of dorsal fin

Fig. 216. *Tetraroge barbata*

above middle of eye; skin naked. Colour dark brown with scattered small black spots; dorsal fin brown with narrow white border; caudal fin with light brown transverse band. Attains 10 cm. Found in inshore silt-sand, weed and coral rubble areas. Not uncommon. Very sluggish fish. Spines are poisonous. Indo-West Pacific.

126. *Tetraroge niger* (Cuvier, 1829)
Blotched Roughfish

D. XIII, 7; A. III, 5; P. 12; V. I, 5. Body small and slender; single dorsal fin, anal fin small; no barbels on lower jaw; anterior post-orbital spine short, the posterior one long; origin of dorsal above posterior part of eye; pectoral thoracic in position; skin covered with small papillae. Colour dark brown with irregular dark blotches; all fins with narrow white border and dark broad sub-marginal band, caudal fin white. Attains 10 to 12 cm. Found around weedy, coral rubble and silt areas on reefs. Uncommon. Fin spines poisonous. Indo-Pacific.



Fig. 217. *Tetraroge niger*

127. *Vespicula depressifrons* (Richardson, 1848)
Mottledfin Scorpionfish

D. XIII, 7; A. III, 5; P. 11; V. I, 5. Body compressed and covered with rudimentary scales; upper part of head without spiny ridges; caudal fin rounded. Body uniform brown; all fins mottled with light brown; caudal fin with indistinct dark transverse bands. Attains 10 to 12 cm. Found in silt-sand areas of reefs. Uncommon. Fin spines poisonous, wounds caused by spines very painful. Indo-West Pacific.

128. *Vespicula trachinoides* (Cuvier, 1829)
Brown Scorpionfish

D. XVI, 4; A. III, 4; P. 12; V. I, 4. Body compressed and covered with rudimentary scales; upper part of head without spiny ridges; caudal fin rounded. Body reddish brown; median fins with light narrow brown bands; pectoral fin with light brown spots. Attains 7 to 9 cm. Found in silt-sand areas of reefs. Uncommon. Fin spines poisonous. Indo-West Pacific.

Family SYNANCEIIDAE

Stonefishes

Small to moderate fishes; no scales on body, except along lateral line; skin covered with numerous warts, cirri and tentacles; head large, covered with large lumps or warts and skin glands; mouth terminal or superior and oblique; eyes directed upwards; pectoral fins large, lower most rays free or not; dorsal fin single and continuous; anal fin with 2 or 3 strong spines. Spines of fins very poisonous. Carnivores, feeds on small fish and crustaceans. Stonefishes are among the most dreaded marine creatures of the sea. Venom glands containing neuro-toxins located at bases of dorsal fin. They spend most of their time concealed in mud, sand, weeds and coral rubble and usually will not move unless they are disturbed. Wading on coral reefs must be done with the utmost care.

Key to species

- 1a. Dorsal fin spines 12 to 13; head may be with warts and deep pits; no spines on head; no detached pectoral rays 2
- 1b. Dorsal fin spines above 13; head normal with bony ridges and spines; head, body and spines with skinny flaps; lower pectoral rays detached *Inimicus didactylus*
- 2a. D. XIII, 6-7; head large and monstrous with warts and deep pits 3 (Genus *Synanceia*)
- 2b. D. XII, 12; head normal without warts and deep pits; preorbital with two spines *Trachicephalus uranoscopus*
- 3a. A deep saddle-like depression behind eyes which are elevated; interorbital space higher than the eyes; a large deep groove below eye *S. horrida*
- 3b. A deep; pit on each side behind eyes, separated by an elevated bony area; interorbital space concave; a small deep groove below eye *S. verrucosa*

129. *Inimicus didactylus* (Pallas, 1769)

Demon Stinger

D. XVII, 7; A. II, 10; P. 10+2; V. I, 5. Small fishes; head depressed and deeply concave in profile has a raised knob on snout; no spines on head; dorsal fin origin between first spine of superior post-orbital ridge; its membrane deeply incised behind the 4th spine; first three dorsal spines forming a separate crest; last ray of dorsal and anal fins connected to caudal peduncle; head, lateral line and fins with dermal papillae. Body brown with variegated light and dark brown; head whitish; a black blotch between 2nd and 3rd dorsal spine membrane; soft dorsal with broad dark terminal border; edge of anal fin dark; distal part of ventral fin reddish; caudal with a basal and sub-terminal dark

band. Attains 15 to 20 cm. Found on coral rubble and mud bottom. Uncommon. Spines extremely venomous. Indo-West Pacific.



Fig. 218. *Inimicus didactylus*

130. *Synanceia horrida* (Linnaeus, 1766)

Estuarine Stonefish

D. XIII, 6; A. III, 6; P. 15-16; V. I, 5. Body heavy and globular covered with warts; mouth directed upwards; a bony ridge present above and in between eyes; pectoral fins very large and fan-like. Body overall light brown, occasionally with light mottling. Attains 30 cm. Found under rocks and muddy areas of mangroves close to reefs. Not uncommon. Lie motionless in mud. Wounds caused by spines are excruciatingly painful and can result in death or loss of wounded limb. Coasts of India to China.



Fig. 219. *Synanceia horrida*

131. *Synanceia verrucosa* Bloch & Schneider, 1801

Reef Stonefish

D. XIII, 7; A. III, 6; P. 19; V. I, 5. Body globular, covered with warts; mouth directed upwards; eyes far behind on head and with deep groove between them; a pit present below

eye; pectoral fins very large and fan-like. Body grey with red and orange patches. Attains 25 to 30 cm. Found under rocks and coral ledges. Common. Lie motionless and looking like a piece of wood or coral rock. Wounds caused by spines are excruciatingly painful and can result in death or damage of wounded limb. Indo-West Pacific.



Fig. 220. *Synanceia verrucosa*

132. *Trachicephalus uranoscopus* (Bloch & Schneider, 1801)

Stargazer

D. XII, 12; A. 14; P. 14; V. I, 5. Body slightly elongate and compressed; head flattened with bony ridges; eyes small and directed upwards; pre-orbital with two spines; no scales on body; caudal fin rounded. Body light brown, pectoral fins dark brown with small white spots; other fins brown, tip of rays white; caudal fin with white spots. Attains 6 to 8 cm. Found in muddy areas under coral blocks and rubble in shallow waters. Uncommon. Dorsal fin spines very venomous. Indo-West Pacific.

Family CARACANTHIDAE

Coral Crouchers or Velvetfishes

Small fishes, body oval shaped; single dorsal fin with notch at spinous portion; ventral fins very small; body and scales covered with small papillae; scales present along lateral line and base of dorsal fin; pre-opercle with 5 or 6 spines.

133. *Caracanthus unipinna* (Gray, 1831)**Coral Croucher**

D. VIII, 13; A. II, 11-12; P. 13-15; V, I, 3. Body oval in shape, covered with small papillae; pre-orbital spine with one knob; dorsal fin continuous, not deeply notched at soft portion; ventral fins very small. Body uniform brown, bluish brown on back. Attains 5 to 6 cm. Live among the branches of *Acropora* and *Pocillopora* corals with their pectoral fins tightly wedged themselves between coral branches. Very common but difficult to detect. Indo-Pacific.



Fig. 221. *Caracanthus unipinna*

Family PLATYCEPHALIDAE

Flatheads

Body elongate and cylindrical, head depressed, with ridges and spines; mouth large, lower jaw projecting; small sharp teeth in jaws, canine teeth present or absent; two well separated dorsal fins; first dorsal spine small, scarcely connected to second spine; ventral fins widely separated and thoracic in position; gill opening wide; scales ctenoid; lateral line complete. Distinguished by their flattened head shape. Benthic fishes; not true coral fishes, but found on mud or sand bottoms near coral reef regions in shallow to moderate depths. Feeds mainly on small crabs, prawns and fishes.

Key to species

- 1a. Lateral line scales 72-79; teeth on vomer in one transverse patch; dorsal rays 13; caudal fin with two horizontal black stripes *Platycephalus indicus*
- 1b. Lateral line scales 35-55; teeth on vomer in two patches; dorsal rays 11-12 2
- 2a. Lateral line scales 35-37 *Onigocia oligolepis*
- 2b. Lateral line scales 52-54 3
- 3a. Anterior 5 lateral line scales spiny 4
- 3b. Anterior 18 lateral line scales spiny *Sorsogona tuberculata*
- 4a. Body ridge crossing cheek below with 3 spines; no tentacle on eye *Cociella crocodila*
- 4b. Body ridge crossing cheek below eye with more than 3 spines; a small tentacle on eye *Eurycephalus carbunculus*

134. *Cociella crocodila* (Tilesius, 1812)

Crocodile Flathead

D. I+VII, 11; A. 11; P. 19-20; V. I, 5. Head moderately depressed; two short spines between anterior nostrils; supra-orbital ridge serrated posteriorly; superior-post orbital ridge



Fig. 222. *Cociella crocodila*

with two spines; two opercular spines present; anterior three lateral line scales with spines. Colour brownish with many small dark spots on upper side of body, back with four cross bands; spinous dorsal with a broad black band near edge; all fins dusky. Attains 40 to 50 cm. Found under coral stones and on sand silt bottom. Uncommon. Indo-West pacific.

135. *Eurycephalus carbunculus* (Valenciennes, 1833)

Sandflathead

D. I+VIII, 11; A. 12; P. 18; V. I, 5. Head depressed, snout long and pointed; a sharp spine in front of eye; small tentacle above eye; anterior five lateral line scales spiny; sub-orbital ridge serrated. Body light brown, white below; irregular dark brown bands on head and body; a dark brown blotch below eye; outer half of dorsal fins with irregular spots; pectoral, ventral and caudal fins with a row of dark spots. Attains 20 to 25 cm. Found on sandy areas near reefs. Uncommon. Indo-West Pacific.

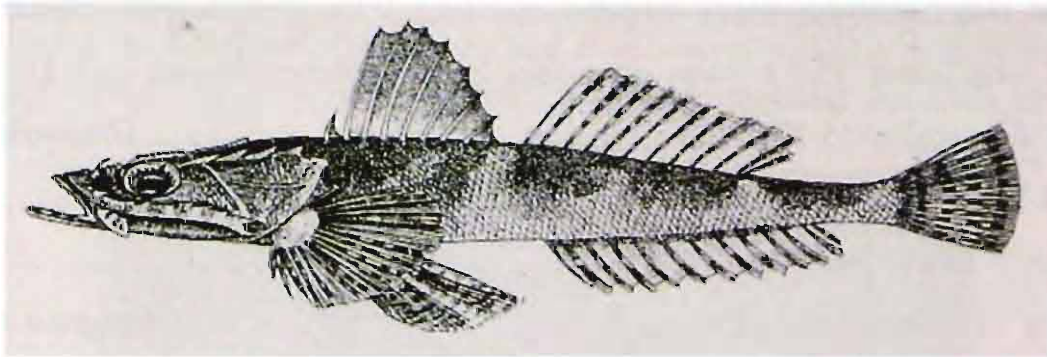


Fig. 223. *Eurycephalus carbunculus*

136. *Onigocia oligolepis* (Regan, 1908)

Dwarf Flathead

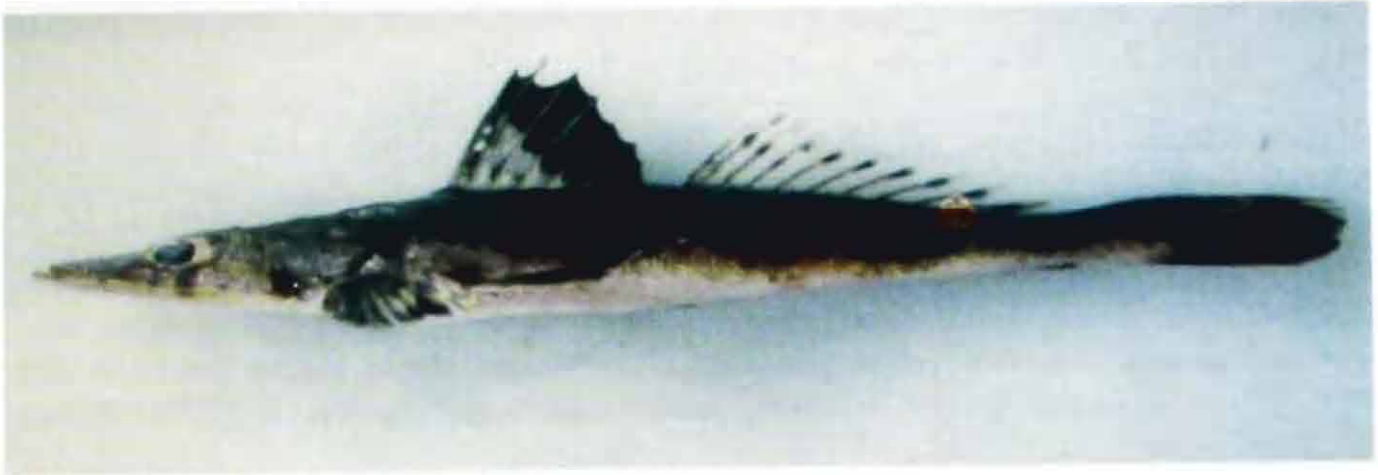
D. I+VIII, 11; A. 11; P. 22; V. I, 5. Small fishes; supra orbital ridge spiny; few anterior lateral line scales spiny. Body light brown above, whitish below; back and sides with dark cross bands; head with white and brown mottling and a distinct brown bar through eye; fins brown with light mottling; a prominent black blotch on ventral fin. Attains 10 to 12 cm. Found on sand and coral rubble bottom in shallow waters. Uncommon. Indo-West Pacific.



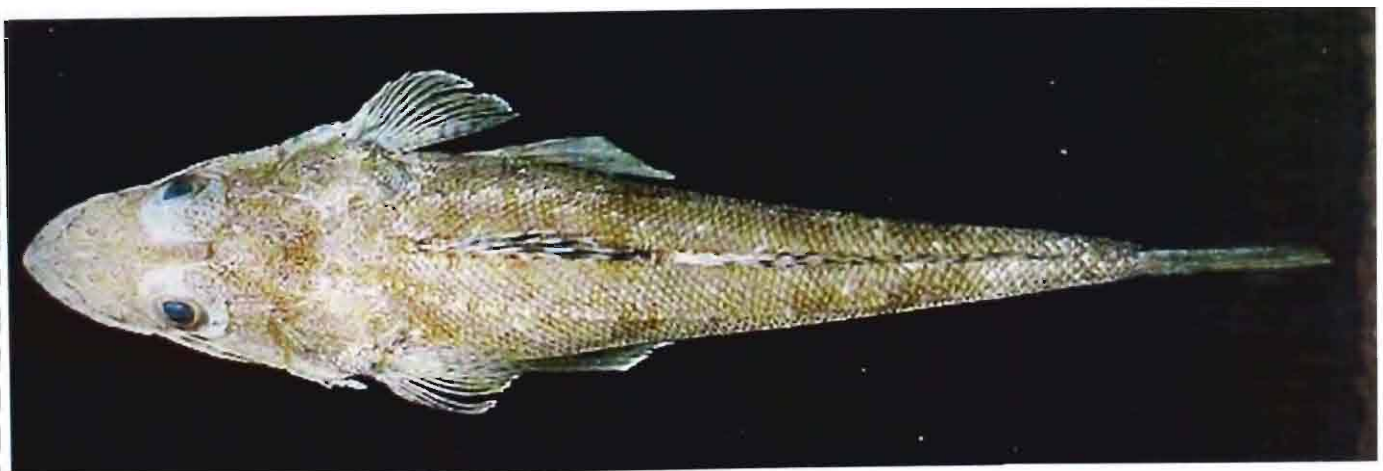
Fig. 224. *Onigocia oligolepis*

137. *Platycephalus indicus* (Linnaeus, 1758)**Bartailed Flathead**

D. I+VIII+I, 13; A. 13; P. 18-19; V. I, 5. Large sized fishes. Body very depressed, mouth large; head with bony ridges; a small pre-opercular and two pre-ocular spines present. Body greyish above, whitish below; caudal fin with two horizontal black stripes; first dorsal fin black; pectoral and pelvic fins spotted. Attains 100 cm. Found in shallow sandy areas near reefs. Common. Good food fish. Indo-West Pacific.

Fig. 225. *Platycephalus indicus*138. *Sorsogona tuberculata* (Cuvier, 1829)**Tuberculated Flathead**

D. VIII+11; A. 11; P. 20; V. I, 5. Medium sized fishes; body moderately elongate and compressed; head depressed; inter-orbital space concave; head ridged and spiny; supra-ocular rim and opercular ridge serrated; three strong spines on anterior orbital rim; anterior 18 lateral line scales with spines; caudal fin rounded. Body brown above, whitish below with dark mottling and indistinct vertical bands; spinous dorsal black, other fins spotted. Attains 20 to 25 cm. Found on sand, coral rubble bottoms adjacent to reefs. Uncommon. Indo-West Pacific.

Fig. 226. *Sorsogona tuberculata*

Family DACTYLOPTERIDAE

Helmet Gurnards

Body almost squarish and heavily armored with sharp spines on head and cheek; pectoral fins large wing-like; caudal region tapering; head large and blunt in front, encased in heavy armor with stiff spines and keels; a bony ridge across the cheek; pre-opercular spine very large; mouth large and inferior; scales on body scute-like and sharply keeled; two dorsal fins, the first spine very long; anal fin very short without spines; pelvic fins thoracic in position. Benthic fishes, spend much of their time on bottom. Even though they have large pectoral fins, they cannot fly or glide out of water.

139. *Dactyloptena orientalis* (Cuvier, 1829)

Helmet Gurnard

D. I+I+V, 6-8; A. 6-7; P. 30-33; V. I, 5. First two dorsal spines free, the first spine very long and situated behind head. Body greenish blue with orange edged dark spots on head, back and pectoral fins; four yellow cross bands on tail; pelvic fins golden yellow. Attains 30 to 35 cm. Found on bottom near reefs. Uncommon. Aquarium fish. Indo-West Pacific.



Fig. 227. *Dactyloptena orientalis*

Order **PERCIFORMES**

Family **KUHLIIDAE**

Flagtails

Small sized perch-like fishes. Body oblong; eyes slightly large; body scales ctenoid; opercle with two small spines; dorsal fin notched; fin spines strong; dorsal and anal fin bases with scaly sheath; caudal fin forked or emarginated. Nocturnal in habit, feeds on crustaceans. Occasionally taken commercially, generally used as a baitfish.

Key to species

- 1a. Caudal fin with 5 dark oblique stripes; gill rakers 23 to 25 on 1st arch; lateral line scales 48 to 56 *Kuhlia mugil*
- 1b. Caudal fin without dark stripes; gill rakers 17 to 19 on 1st arch; lateral line scales 38 to *Kuhlia rupestris*

140. *Kuhlia mugil* (Forster, 1801)

Barred Flagtail

D. X, 9-11; A. III, 9-11; P. 14; V. I, 5; Ll. 48-56. Body slightly ovate and elongate; caudal fin forked. Body silvery-blue; fins light yellow; five black bands on caudal fin. Attains 20 cm. Found in large numbers around coral reefs and brackish coastal waters. Common. Daytime take shelter in protected reef areas and in caves. Food fish but do not have any commercial importance. Good aquarium fish. Indo-Pacific.



Fig. 228. *Kuhlia mugil*

141. *Kuhlia rupestris* (Lacepede, 1802)

Rock Flagtail

D. X, 10-12; A. III, 9-10; P. 13-14; V. I, 5; Ll. 38-44. Body ovate; caudal fin slightly emarginated. Colour silvery, sometimes each scale with a large dusky spot. Attains 40 cm.

Found close to the reef areas and shallow coastal waters. Common. No commercial importance but used as a baitfish. Indo-Pacific.



Fig. 229. *Kuhlia rupestris*

Family SERRANIDAE
Anthias and Groupers

Body moderately elongate, somewhat compressed; mouth large and oblique; lower jaw usually protruding; maxilla exposed; teeth small and slender, most species have canine teeth at the front of the jaws; opercle with three flat spines; end of pre-opercle serrate; dorsal fin single and continuous, in some species dorsal fin deeply notched between spinous and soft portions; last ventral fin ray broadly joined to abdomen by a membrane; pectoral fins lie below or slightly in front of the base of the pectoral fins; dorsal, anal and caudal fins scaly; caudal fin rounded or emarginated. Carnivorous fishes, feeds on crustaceans and small fishes. Females change their sex to males at later stages in life. Most of the fishes rapidly change their colour pattern with slight disturbance. Few species are implicated in ciguatera poisoning. Skin of some species with a thick coat of viscid mucous containing toxin '*grammistin*', which dissuades predators. Many species are good food fishes and commercially important.

Key to species

- 1a. Dorsal fin divided or deeply notched; a small fleshy flap on chin present or absent 2
- 1b. Dorsal fin not deeply notched; no fleshy flap on chin 3
- 2a. D. IX, 12; anal fin spines 3; scales ctenoid and mainly embedded; nasal organ with lamellae arranged in a circle; no fleshy flap on chin; body deep blue with an yellow band from snout to caudal *Aulacocephalus temmincki*

- 2b. D. VII, 13-14; anal spines 2; scales cycloid, often embedded; nasal organ vertically elongate, lamellae horizontal; small fleshy flap on chin; body brownish with yellow stripes *Grammistes sexlineatus*
- 3a. D. VIII, 10-12; ventral margin of preopercle with 3 strong antrose spines
..... 4 (Genus *Plectropomus*)
- 3b. D. IX-XI, 12-21; ventral margin of preopercle without large antrose spines 5
- 4a. Caudal fin truncate; head and body with numerous large round dark edged blue spots; no spots on ventral fins *P. areolatus*
- 4b. Caudal fin emarginate; head and body with numerous small vertically elongate dark edged blue spots; blue spots on ventral fins *P. pessuliferus*
- 5a. Dorsal fin spines 10; dorsal profile of head strongly concave; anterior part of head very small; posterior nostril vertical slit *Cromileptes altivelis*
- 5b. Dorsal fin spines 9 or 11; dorsal profile of head not concave; posterior nostril round or ovate 6
- 6a. Caudal fin lunate; 1 or 2 large curved canine teeth on lower jaw; posterior part of dorsal and anal fins prolonged 7 (Genus *Variola*)
- 6b. Caudal fin emarginate to rounded; no large canine teeth on lower jaw; posterior part of dorsal and anal fins not prolonged 8
- 7a. Caudal fin with a white line posteriorly, preceded by a black submarginal line; dorsal, anal and pectoral fins without distinct yellow posterior borders; ventral fins not reaching anus *V. albimarginatus*
- 7b. Caudal, dorsal, anal and pectoral fins with broad yellow posterior margin; ventral fins reaching beyond anus *V. louti*
- 8a. Body elongate and markedly compressed; palatine teeth absent; head and body with numerous orange-red spots and 4 longitudinal whitish streaks
..... *Anyperodon leucogrammicus*
- 8b. Most species not elongate, body not compressed; palatine teeth present; colour not as in 8a 9
- 9a. Body very deep, the depth 2.1 to 2.4 in SL; dorsal fin spines 9; 5th or 6th pectoral ray longest; lip grooves and area under maxilla, inside of mouth deep orange
..... *Aethaloperca rogaa*
- 9b. Body not deep, the depth 2.3 to 3.7 in SL; dorsal fin spines 9 or 11; colour not as in 9a 10

- 10a. Dorsal spines 9; maxilla with a distinct ventrally projecting knob posteriorly 11 (Genus *Cephalopholis*)
- 10b. Dorsal spines 11; maxilla without any projecting knob posteriorly 19 (Genus *Epinephelus*)
- 11a. Soft rays of anal 8; scales on abdomen ctenoid; ground colour of body brown to dark brown 12
- 11b. Soft rays of anal 9; scales on abdomen cycloid; ground colour red or reddish yellow 15
- 12a. Small dark spots or dark edged pale spots on head and body 13
- 12b. No small dark spots or dark edged pale spots on head and body 14
- 13a. Soft rays of dorsal usually 15; dark edged blue spots present only on head and anterior body; no large pale spots on body; pectoral fin dark brown *C. microprion*
- 13b. Soft rays of dorsal usually 16; dark edged blue spots present on head, body and basally on median fins; no large pale spots on body; pectoral fin with a blackish margin and broad orange submarginal zone *C. cyanostigma*
- 14a. Pectoral fins short; brownish with narrow blue stripes on head, body and fins; no white margin on median fins *C. formosa*
- 14b. Pectoral fins slightly longer; brown without blue stripes on body, head or fins; body with 8 or 9 slightly irregular dark brown bars; head with dark brown radiating from eye; bluish white margin posteriorly on caudal fin and on soft portions of dorsal and anal fins *C. boenak*
- 15a. Soft rays of dorsal 16 or 17; auxiliary scales present on body; dark brown with dark edged blue spots on head, body and fins *C. argus*
- 15b. Soft rays of dorsal 14 or 15; auxiliary scales not present; colour not as in 15 a. 16
- 16a. Body relatively deep, depth 2.3 to 2.75 in SL; lateral line scales 66-80; reddish brown to red with scattered small whitish blotches *C. sonnerati*
- 16b. Body not deep, depth 2.6 to 3.5 in SL; lateral line scales 46-68; colour not as in 16a. 17
- 17a. Lateral line scales 54-68; caudal fin blackish anterodorsally, the corners broadly red; pectoral fins blackish *C. urodeta*
- 17b. Lateral line scales 45-56; colour not as in 17a. 18

- 18a. A dark brown saddle-like spot anterodorsally on caudal peduncle, followed by a second small spot; a diagonal dark streak posteriorly on caudal fin *C. leopardus*
- 18b. Numerous dark-edged blue spots on head, body and fins; distal edge of caudal fin and soft parts of dorsal and anal fins with narrow blue margin and black submarginal line *C. miniata*
- 19a. Caudal fin emarginate to truncate 20
- 19b. Caudal fin rounded 24
- 20a. Membrane of spinous dorsal fin not incised 21
- 20b. Membrane of spinous dorsal fin incised 22
- 21a. Gill rakers elongate, not rudimentary; 12-16+20-23; dorsal rays 17-19; purplish to grey with yellowish brown dots on head and slightly wavy longitudinal brown lines on upper three-fourths of body *E. undulosus*
- 21b. Gill rakers not elongate and rudiments often present, 6-11+13-18; dorsal rays 17; body deep blue without black spots, the caudal peduncle and fins bright yellow *E. flavocaeruleus*
- 22a. Caudal fin truncate to slightly rounded; head, body, dorsal fin and upper third of caudal fin with small orange-yellow spots; lower two-thirds of caudal fin dark purplish grey *E. bleekeri*
- 22b. Caudal fin slightly emarginate; head, body and fins with small yellow to dark brown spots; caudal fin entirely spotted 23
- 23a. Dorsal soft rays 16; outer margin of anal fin rounded to slightly angular; gill rakers on lower limb 15 *E. areolatus*
- 23b. Dorsal soft rays 15; outer margin of anal fin angular; gill rakers on lower limb usually 16-17 *E. chlorostigma*
- 24a. Lateral line scales with branched tubules; eyes small, 8 to 9 in head length; young usually yellow with three broad black bars on body and irregular broad black bands on head *E. lanceolatus*
- 24b. Lateral line scales with a single tubule; eye not small, about 7 I head length; colour not as in 24a 25
- 25a. Numerous reddish black spots on head and body 26
- 25b. No distinct reddish black spots on head and body; may be small dark dots or spots on body 39

- 26a. Lateral line scales 46-53 27
- 26b. Lateral line scales 55-74 32
- 27a. Scales on body cycloid 28
- 27b. Scales on body ctenoid 29
- 28a. Dorsal rays usually 17; dark spots present on pectoral fins, progressively small distally.
..... *E. faveatus*
- 28b. Dorsal rays usually 16; dark orange brown spots on head, body and fins
..... *E. macrospilos*
- 29a. Dark spots on body diagonally elongate and more numerous posteriorly; dark spots
on head scattered *E. longispinis*
- 29b. Dark spots on body not diagonally elongate and not more numerous posteriorly; dark
spots on head close-set 30
- 30a. Pectoral fins relatively long, 11.2-1.6 in head; 2 oblique dark brown bands on thorax
..... *E. quoyanus*
- 30b. Pectoral fins not long, 1.4-2.0 in head; no oblique dark brown bands on thorax ...
..... 31
- 31a. Spots on head and body small; spots on fins much larger than those on head and body;
maxilla not reaching a vertical at rear edge of orbit *E. miliaris*
- 31b. Spots on head and body not small; a few dark brown spots on body usually joined
to form short oblique bands; spots on fins smaller than those on head and body;
maxilla reaching or extending posterior to vertical at rear edge of orbit *E. merra*
- 32a. Most spots on body polygonal and close-set; only narrow pale lines separating individual
spots; scales ctenoid 33
- 32b. Most spots on body round or oblong and well separated; scales ctenoid or cycloid
..... 35
- 33a. Dorsal soft rays 16; polygonal dark spots on body merging on sides of spots; a large
yellow brown blotch behind eye and elongate spot on opercle *E. hexagonatus*
- 33b. Dorsal soft rays 15; polygonal dark spots on body fully separated by a net work of
pale lines; no large yellow brown spot behind eye or on opercle 34
- 34a. A large black blotch on back at rear of spinous portion of dorsal fin; small dark spots
at front of upper lip in 2 irregular horizontal rows *E. melanostigma*

- 34b. Three or 4 large black lotches along base of dorsal fin; small dark spots at front of upper lip in 3 or 4 irregular horizontal rows *E. spilotoceps*
- 35a. Dorsal soft rays 14; gill rakers 28-31; light yellowish brown with large irregular brown spots on head and body; a saddle like black spot on caudal peduncle, and numerous small close-set dark spots on head, body and fns *E. fuscoguttatus*
- 35b. Dorsal soft rays 15 or 16; colour not as in 35a 36
- 36a. Dorsal soft rays 16; posterior nostril elongate and narrow; widely scattered black spots on head, body and fns; 3 blackish blotches on back at base of posterior half of dorsal fin *E. corallicola*
- 36b. Dorsal soft rays 15; nostrils sub-equal or posterior nostril enlarged and not vertically elongate; colour not as in 36a 37
- 37a. Lateral line scales 54-65, anterior scales with branched tubules; body with 5 slightly oblique dark bars which bifurcate ventrally 38
- 37b. Lateral line scales 62-74, none with branched tubules; head, body and fins with orange-red to dark brown spots; faint oblique dark bars sometimes present; a large black blotch present at base of last 4 dorsal spines *E. tauvina*
- 38a. Spots on head and body black and small; scattered small spots present on head and body; pectoral rays usually 19 *E. malabaricus*
- 38b. Spots on head and body brownish orange to reddish brown and moderate in size; no small pale spots on head and body; pectoral rays usually 20 *E. coioides*
- 39a. Membranes of interspinous portion of dorsal fin slightly or not incised; body dark brown, often with large irregular pale blotches; 1 or 2 dark streaks on cheek and operculum, lowermost from lower edge of eye to above corner of preopercle
..... *E. erythrurus*
- 39b. Membranes of interspinous portion of dorsal fin incised; colour not as in 39a ... 40
- 40a. Outer triangular part of each membrane of spinous portion of dorsal fin black; edge of orbit narrowly black; 5 faint dark bars usually present on body *E. fasciatus*
- 40b. Outer triangular part of each membrane of spinous portion of dorsal fin not black; rim of orbit not black; dark bars present or absent on body 41
- 41a. Dark bars on body often divided or partially divided by a vertical whitish band or a series of whitish spots; small black spots on caudal fin and soft portions of dorsal and anal fins *E. sexfasciatus*
- 41b. Body without dark bars 42

- 42a. Dorsal soft rays usually 16; pectoral rays 18; body with numerous small whitish spots and scattered large whitish blotches on postorbital head, body and dorsal fin; a series of dark blotches on back *E. coeruleopunctatus*
- 42b. Dorsal soft rays usually 15; pectoral rays 16; small whitish spots tend to coalesce to form irregular longitudinal bands; paired fins without whitish spots *E. ongus*

Subfamily ANTHIINAE

142. *Pseudanthias squamipinnis* Peters, 1855 Scalefin Anthias

D. X, 15-18; A. III, 6-7; P. 16-18; V. I, 5. Small fishes. Body moderately narrow; auxiliary scales present; margin of sub-opercle and inter-opercle serrate; dorsal and anal fins scaled; 3rd dorsal spine greatly elongated in adult females; caudal fin lunate, lobes of males prolonged; pelvic fins of males extending well beyond margin of anal fin. Colour orange yellow with yellow spot on each scale; a broad light pink band edged grey from eye to base of pectoral fin. Attains 15 cm. Found around shallow thick coral reef areas. Common aquarium fish. Indo-West Pacific.



Fig. 230. *Pseudanthias squamipinnis*

Subfamily EPINEPHELINAE

143. *Aethaloperca rogaea* (Forsskal, 1775) Redmouth Rockcod

D. XI, 16-18; A. III, 9; P. 17-18; V. I, 5. Body robust and deep. Dorsal profile of head straight to eye becoming convex on nape; lower jaw projecting; origin of dorsal over opercle; ventro-posterior corner of maxilla with a bony protuberance; ventral fin reaching beyond anus; caudal fin truncate. Body dark brown with a white bar on abdomen; outer part of

spinous dorsal brownish-red; maxillary groove and mouth orange-red. Juveniles usually with a broad white margin on caudal fin and a narrow margin on soft portion of dorsal fin. Attains 60 cm. Found around coral caves. Mainly feeds on small fishes. Good food fish. Indo-West Pacific.



Fig. 231. *Aethaloperca rogaa*

144. *Anyperodon leucogrammicus* (Valenciennes, 1828)

White-Lined Rockcod

D. XI, 15-16; A. III, 8-9; P. 17; V. I, 5. Body elongate and compressed; head pointed, lower jaw projecting; posterior nostril vertically elongate; a pair of small canine teeth in jaws; inter-spinous membrane of dorsal fin distinctly incised; pectoral fins bluntly rounded; caudal fin rounded. Colour brownish-grey with numerous orange-red spots on head, body and dorsal fin; four longitudinal whitish streaks on head and body. Juveniles with alternating stripes of orange-yellow and blue; a blue edged black spot at base of caudal fin and in dorsal fin. Attains 50 cm. Found around protected reef areas. Very common rock cod. Good food fish. Indo-West Pacific.



Fig. 232. *Anyperodon leucogrammicus*

145. *Aulacocephalus temmincki* Bleeker, 1854**Goldribbon Soapfish**

D. IX, 12; A. III, 9; P. 14-16; V. I, 5. Body oblong; snout pointed; lower jaw projecting; mouth large; scales on body ctenoid and not embedded; pre-opercle strongly serrated; caudal fin rounded to slightly rhomboid. Colour deep blue, ventral side pale; a bright yellow dorsal stripe along dorsal surface from tip of snout through eye to end of caudal peduncle; fins pale blue. Attains 25 to 30 cm. Found in rocky reef areas from shallow to deep waters. Good aquarium fish. Indo-West Pacific.

Fig. 233. *Aulacocephalus temmincki*146. *Cephalopholis argus* Bloch & Schneider, 1801**Peacock Grouper**

D. IX, 15-17; A. III, 9; P. 17-18; V. I, 5. Auxiliary scales present on body; snout and maxilla scaled; a pair of moderate canines anteriorly in jaws; dorsal fin spines slender; pelvic fins short; caudal fin rounded. Colour dark brown with numerous small black edged blue spots on body, head and fins; 5-6 pale blue bars on posterior half of body; margin of median and pectoral fins narrowly white. Attains 35 to 40 cm. Found in shallow reef areas. Very common grouper. Feeds on fishes. Good food fish but implicated in ciguatera poisoning. Indo-Pacific.

Fig. 234. *Cephalopholis argus*

147. *Cephalopholis boenak* (Bloch, 1790)
Chocolate Hind

D. IX, 15-16; A. III, 8; P. 15-16; V. I, 5. Maxilla naked; snout scaled; ventral margin of pre-opercle smooth. Colour brown with 8 or 9 irregular brown bars that are gradually broader ventrally; a blackish brown spot between upper and middle opercular spines; dark brown bands radiating from eye; fins dark brown; margin of median fins white; inside of mouth light orange. Attains 20 to 25 cm. Found in protected shallow silt-sand reef areas. Very common grouper. Good food fish. Indo-West Pacific.



Fig. 235. *Cephalopholis boenak*

148. *Cephalopholis cyanostigma* (Valenciennes, 1828)
Bluespotted Hind

D. IX, 15-16; A. III, 8; P. 16-17; V. I, 5. Body moderately slender; lower jaw strongly projecting; maxillary reaching beyond hind border of eye; snout and maxilla scaled. Colour brownish-red with numerous small black edged blue spots on head, body and fins; outer part of pectoral fin without spots; margin of dorsal and anal fins white; pale brownish spots tending to form irregular bars on body. Attains 30 to 35 cm. Found around shallow reef areas near grass beds and algal beds. Feed on crustaceans and small fish. Very common grouper. Good food fish. Indo-West Pacific.



Fig. 236. *Cephalopholis cyanostigma*

149. *Cephalopholis formosa* (Shaw & Nodder, 1812)
Bluelined Hind

D. IX, 15-16; A. III, 8; P. 16-18; V. I, 5. Snout scaled, maxilla partially scaled. Colour dark yellowish brown with wavy longitudinal dark blue lines on head, body and fins; snout, lips and ventral part of head with scattered small blue spots; membrane between upper opercular spines dark brown. Attains 30 to 35 cm. Found in shallow silt and dead coral reef areas. Very common grouper. Indo-West Pacific.



Fig. 237. *Cephalopholis formosa*

150. *Cephalopholis leopardus* (Lacepede, 1802)
Leopard Hind

D. IX, 13-15; A. III, 9-10; P. 16-18; V. I, 5. Small sized fishes, body moderately deep; head large; maxilla naked; ventral margin of pre-opercle fleshy and crenulate. Colour reddish brown, shading to white ventrally, with numerous reddish orange spots, which are more conspicuous on ventral side. A large saddle like dark brown spot on caudal peduncle and a smaller one behind it; a dark brown spot on upper opercular region; an oblique reddish black streak on upper outer part of the caudal fin, some times a less distinct streak on lower part may present; distal part of pectoral fins yellow. One of the smallest species of the groupers attains 17 to 20 cm. Found in shallow reef caves. Very secretive fish. Mostly feeds on small crustaceans. Indo-Pacific.



Fig. 238. *Cephalopholis leopardus*

151. *Cephalopholis microprion* (Bleeker, 1852)**Dothead Hind**

D. IX, 15; A. III, 8; P. 16; V. I, 5. Snout anterior to nostrils and maxilla naked; ventral margin of pre-opercle fleshy. Colour dark brown with six dark bars, bars may be present or absent; head and anterior part of body with small dark-edged blue spots; median fins dark, margin grey-blue. Attains 20 cm. Found around silty reef areas. Indo-West Pacific.



Fig. 239. *Cephalopholis microprion*

152. *Cephalopholis miniata* (Forsskal, 1775)**Coral Hind**

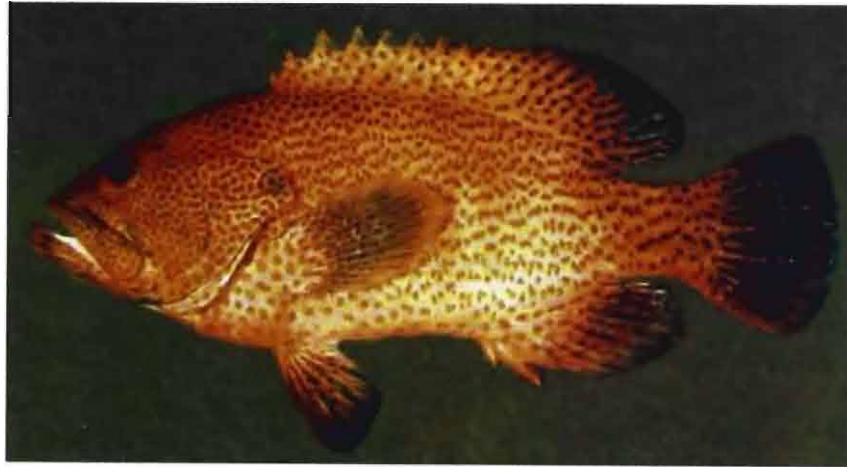
D. IX, 15; A. III, 8-9; P. 18; V. I, 5. Snout naked; maxillary partially scaled; ventral margin of pre-opercle smooth. Colour reddish-brown with bright blue spots on head, body and on median fins extending on to maxillary and lips; paired fins orange yellow. Often assuming a disruptive colour pattern of irregular oblique olivaceous bars. Attains 40 cm. Found around open coral reef areas in shallow waters. Very common grouper. Feeds mainly on fishes. Indo-West Pacific.



Fig. 240. *Cephalopholis miniata*

153. *Cephalopholis sonnerati* (Valenciennes, 1828)**Tomato Grouper**

D. IX, 15-16; A. III, 9; P. 18-19; V. I, 5. Nape prominently convex; snout scaled; median fins fleshy at their bases; ventral margin of preopercle serrate; opercular spines very flat. Colour orange red with scattered small white blotches on body and fins; head reddish brown with numerous close-set orange-red spots; fins darker than body; margin of median fins white. Attains 50 to 55 cm. Found in coral reef areas. Very common grouper. Feeds on small fish and crustaceans. Widespread in Indo-Pacific.

Fig. 241. *Cephalopholis sonnerati*154. *Cephalopholis urodeta* (Forster, 1844)**Darkfin Hind or Flagtail Hind**

D. IX, 14-15; A. III, 9; P. 17-18; V. I, 5. Small fishes; maxilla scaled; ventral margin of preopercle fleshy. Colour reddish brown and darker posteriorly, with 6 broad irregular dark bars on body; a pair of dark spots at front of lower lip; soft dorsal and body; head and nape with small numerous close-set orange-red spots anal fin with orange-red sub-marginal bands; caudal fin reddish brown with small pale blotches. Attains 20-25 cm. Found around shallow outer reef areas and in lagoons. Very common grouper. Mainly feeds on fish. Indo-Pacific.

Fig. 242. *Cephalopholis urodeta*

155. *Cromileptes altivelis* (Valenciennes, 1828)
Humpback Grouper or Panther Fish

D. X, 18-19; A. III, 10; P. 18; V. I, 5. Body moderately deep and compressed; dorsal profile of head very concave and straight to above posterior half of orbit and then rising steeply to origin of dorsal fin; eyes very small; caudal and pectoral fins rounded. Colour greenish brown with scattered round black spots on head, body and fins. Attains 60 cm. Found in shallow silty reef areas and reef slopes. Highly esteemed as a food fish. Very common grouper. Juveniles are popular aquarium fishes. Indo-West Pacific.

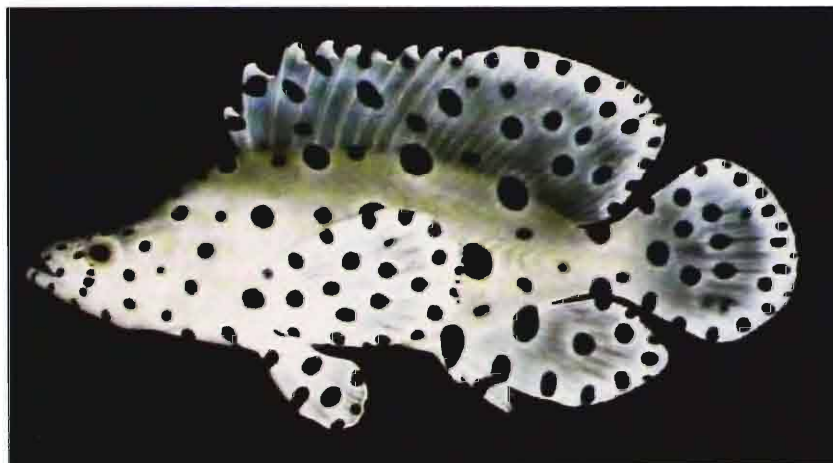


Fig. 243. *Cromileptes altivelis*

156. *Epinephelus areolatus* (Forsskal, 1775)
Areolate Grouper

D. XI, 15-16; A. III, 8; P. 17-18; V. I, 5. Body moderately elongate and compressed; auxiliary scales present on body; maxilla with small scales; dorsal fin spines slender, its membrane incised; caudal fin emarginated. Colour whitish with numerous close-set round to polygonal yellowish brown spots on head, body and fins; spots on pectoral fins small and confined to rays; posterior margin of caudal fin narrowly white. Attains 35 to 40 cm. Found on silty bottom around dead coral patches and sea grass areas. Very common grouper. Good Food fish. Indo-West Pacific.



Fig. 244. *Epinephelus areolatus*

157. *Epinephelus bleekeri* (Vaillant 1878)**Bleeker's Grouper**

D. XI, 16-18; A. III, 8; P. 18-19; V. I, 5. Body moderately deep; scales ctenoid; auxiliary scales present; caudal fin truncate. Colour brownish to purplish-grey with numerous orange-yellow spots on head, body, dorsal fin and upper third of caudal fin; lower thirds of caudal fin dark grey; pectoral fins light grey; a dark streak at upper end of maxillary groove. Attains 60 to 75 cm. Found on rocky areas near reefs. Very common grouper. Good food fish. Indo-West Pacific.



Fig. 245. *Epinephelus bleekeri*

158. *Epinephelus coeruleopunctatus* (Bloch, 1790)**White-spotted Grouper**

D. XI, 15-16; A. III, 8; P. 17-18; V. I, 5. Dorsal profile of head nearly straight; spinous dorsal membrane incised; caudal and pectoral fins rounded. Colour brownish; posterior head region, body and dorsal fin with scattered large whitish spots, some spots form pale mottling; dorsal, caudal and pectoral fins with narrow white margin; upper edge of maxillary groove black; juveniles with scattered white spots. Attains 60 to 70 cm. Found near shallow sheltered and rocky areas. Juveniles found in tide pools. Very common grouper. Good food fish. Indo-West Pacific



Fig. 246. *Epinephelus coeruleopunctatus*

159. *Epinephelus chlorostigma* (Valenciennes, 1828)
Brownspeckled Grouper

D. XI, 17-18; A. III, 8; P. 17-18; V. I, 5. Body moderately deep; scales ctenoid; auxiliary scales present on body; dorsal profile of head to nape straight; lower jaw strongly protruding; inter-spinous membranes of dorsal fin moderately incised; caudal fin emarginate to truncate. Colour whitish, densely spotted with small dark brown spots on head, body and fins; ventral part of body pale without spots; spots on pectoral fin confined to rays; posterior margin of caudal fin white. Attains 60 to 70 cm. Found around coral and rocky reefs. Very common grouper. Feeds on small crabs and reef fishes. Excellent food fish. Indo-Pacific.



Fig. 247. *Epinephelus chlorostigma*

160. *Epinephelus coioides* (Hamilton, 1822)
Orangespeckled Grouper

D. XI, 14-16; A. III, 8; P. 19-20; V. I, 5. Body elongate and not strongly compressed; inter-orbital space slightly convex; caudal fin rounded. Colour light brown, whitish ventrolaterally, head and body with numerous brownish orange spots; five slightly oblique brown bars on head and body which bifurcate ventrally, first four bars extending basally into the dorsal fin; large brown blotches on head; fins whitish to dusky with brown spots. Attains 100 cm. Found in turbid reef areas. Not uncommon. Feeds on small crabs and fish. Good food fish. Indo-West Pacific.



Fig. 248. *Epinephelus coioides*

161. *Epinephelus corallicola* (Valenciennes, 1828)**Coral Grouper**

D. XI, 15-16; A. III, 8; P. 18-20; V. I, 5. Body moderately deep and slightly compressed; dorsal profile of head almost straight; inter-orbital space flat; caudal fin rounded. Colour brownish to greenish grey with scattered black spots on head, body and fins; three dusky blotches at base of posterior dorsal fin; a saddle-like dusky blotch on caudal peduncle; a black streak at upper edge of maxillary groove. Attains 35 to 40 cm. Found on silty reef areas. Not uncommon. Good food fish. Eastern Indian Ocean to West Pacific.

162. *Epinephelus erythrurus* (Valenciennes, 1828)**Cloudy Grouper**

D. IX, 16; A. III, 8; P. 18; V. I, 5. Head pointed, dorsal profile nearly straight; inter-orbital space almost flat; spinous dorsal fin membranes slightly incised; caudal fin rounded. Colour olive to reddish brown with large irregular whitish patches appears like a narrow irregular reticulum on background; two dark streaks across cheek and operculum; a dark streak at upper edge of maxillary groove; median and ventral fins mottled. Attains 35 to 40 cm. Found on muddy areas near reefs. Indo-West Pacific.

163. *Epinephelus fasciatus* (Forsskal, 1775)**Black-tip Grouper**

D. IX, 16; A. III, 8; P. 18-19; V. I, 5. Body moderately deep; spinous dorsal fin membrane incised; caudal fin slightly rounded. Colour yellowish red with five broad dark orange-red bars on body; dorsal part of head and nape dark reddish brown; rim of orbit black; fins reddish; outer triangular part of inter-spinous membrane of dorsal fin black. Attains 25 to 30 cm. Found on coral reefs and rocky bottom. Very common grouper. Feeds on a variety of crustaceans and small fish. Indo-Pacific.



Fig. 249. *Epinephelus fasciatus*

164. *Epinephelus faveatus* (Valenciennes, 1828)**Indian Grouper**

D. XI, 16-18; A. III, 8; P. 17-18; V. I, 5. Body slightly compressed; dorsal profile of head convex; spinous dorsal fin membranes incised; caudal fin rounded. Colour whitish with numerous close-set round to brown spots of different sizes on head, body and fins; narrow black streak on upper edge of maxillary groove; margin of caudal fin light yellow. Attains 25 to 30 cm. Found in shallow muddy areas near reefs. Not common. Food fish. Coasts of India to Indonesia.



Fig. 250. *Epinephelus faveatus*

165. *Epinephelus flavocaeruleus* (Lacepede, 1802)**Blue-and-yellow Grouper**

D. XI, 16; A. III, 8; P. 18; V. I, 5. Body moderately deep; inter-orbital space convex; mouth strongly oblique; membranes of spinous dorsal not incised; caudal fin slightly emarginate or truncate. Colour deep blue, anterior part of head, caudal peduncle and all fins yellow; dorsal, anal and ventral fins blue basally; corners of caudal fin black; pelvic fins broadly tipped with black. Attains 60 to 80 cm. Found around shallow reef areas. Very common grouper. Feeds on a variety of crustaceans, fish and cephalopods. Indian Ocean.



Fig. 251. *Epinephelus flavocaeruleus*

166. *Epinephelus fuscoguttatus* (Forsskal, 1775)
Brown Marbled Grouper

D. XI, 14-15; A. III, 8; P. 18-19; V. I, 5. Body oblong and laterally compressed; dorsal profile of head indented at inter-orbital region and distinctly convex from there to dorsal profile; inter-orbital space flat; spinous dorsal membranes incised; caudal fin rounded. Colour light yellowish brown with irregular brown blotches of variable size on head and body; blotches along back are dark; a black saddle-like spot on caudal peduncle; head, body and fins with numerous close-set small brown spots. Attains 80 to 90 cm. and weights 10-11 kg. Found around coral reef and rocky areas. Not uncommon. Feeds on crustaceans, cephalopods and fish. Good food fish but large sized fishes are implicated in ciguatera fish poisoning. Indo-Pacific.



Fig. 252. *Epinephelus fuscoguttatus*

167. *Epinephelus hexagonatus* (Forster, 1801)
Star-spotted Grouper

D. XI, 15-16; A. III, 8; P. 18-19; V. I, 5. Body slender and elongate; inter-orbital space flat; dorsal fin membranes incised; caudal fin rounded. Head and body with round to polygonal brown spots and tend to merge on their sides, a small triangular white spot at each angular corner separates these spots; groups of dark spots forming a series of five blotches along back; a large yellowish brown spot behind eye; all fins dark spotted. Attains 30 cm. Found in outer reef areas in shallow waters. Not uncommon. Feeds on small crustaceans and fish. Indo-Pacific.



Fig. 253. *Epinephelus hexagonatus*

168. *Epinephelus lanceolatus* (Bloch, 1790)**Giant Grouper**

D. XI, 15; A. III, 8; P. 19; V. I, 5. Body thick and very deep. Small scales on maxilla and snout; dorsal fin spines short; caudal fin rounded. Colour yellowish brown with vaguely mottled; all fins with black spots and blotches. The largest reef fishes attains up to 270 cm and weights of 400 kg. Found in reef and rocky areas. Very common grouper. Feeds on spiny lobsters, mud crabs and fishes. Important commercial food fish. Occasionally attacks divers and swimmers. Indo-Pacific.

169. *Epinephelus longispinis* (Kner, 1864)**Longspine Grouper**

D. XI, 16-17; A. III, 8; P. 18-19; V. I, 5. Body elongate, inter-spinous membrane of dorsal fin incised; caudal fin rounded. Colour light brown with small-scattered dark spots on head and anterior part of the body. Diagonally elongated dark brown spots, more crowded posteriorly and on caudal peduncle; dorsal, pectoral and caudal fins with scattered dark brown spots; margin of soft dorsal and caudal fin with a row of large black spots. Attains 40 to 45 cm. Found on coral reefs and rocky areas. Not uncommon. Feeds on crustaceans and small fish. Good food fish. Indian Ocean.



Fig. 254. *Epinephelus longispinis*

170. *Epinephelus macrospilos* (Bleeker, 1855)**Snubnose Grouper**

D. XI, 15-17; A. III, 8; P. 18-19; P. I, 5. Body robust; dorsal profile of head with an angularity above anterior edge of orbit; inter-orbital space almost flat; lower jaw strongly projecting; caudal fin rounded. Colour pale brown to whitish with round to polygonal dark brown spots on head and body, except ventrally; edge of maxillary groove with dark streak; all fins except pectoral yellowish with scattered large black spots, pectoral fins ducky with a few black spots basally; margin of fins narrowly whitish. Attains 35 to 45 cm. Found in outer reef areas. Very common grouper. Feeds primarily on crustaceans. Indo-Pacific.

171. *Epinephelus malabaricus* (Bloch & Schneider, 1801)**Malabar Grouper**

D. XI, 14-15; A. III, P. 18-19; V. I, 5. Body moderately elongate and deep, not much compressed; lower jaw slightly projecting; eyes relatively small; caudal fin rounded. Colour

light yellowish to brown with slightly oblique five dark brown bands on body; head and body with numerous small black spots and blotches; a dark streak present at upper edge of maxillary groove; fins with scattered black spots. Attains 60 to 70 cm. Found on protected reef areas in shallow waters. Very common grouper. Good food fish. Indo-West Pacific.



Fig. 255. *Epinephelus malabaricus*

172. *Epinephelus melanostigma* Schultz, 1953

Black Spot Grouper

D. XI, 14-15; A. III, 8; P. 17-18; V. I, 5. Body elongate and moderately deep; spinous dorsal fin membranes incised; pectoral fins fleshy and short; caudal fin rounded. Colour whitish with close-set dark orangish brown polygonal spots, spots on head progressively smaller anteriorly; spots on ventral side of head and belly isolated and rounded; a large black blotch on back between base of 8th dorsal spine and 1st ray extending onto dorsal fin; all fins densely spotted; median and pectoral fins with narrow margin. Attains 25 to 30 cm. Found on coral reefs in shallow areas. Uncommon. Indo-Pacific.



Fig. 256. *Epinephelus melanostigma*

173. *Epinephelus merra* Bloch, 1793

Dwarf Spotted Grouper

D. XI, 15-16; A. III, 8; P. 16-17; V. I, 5. Body moderately elongate and less compressed. Caudal fin rounded. Colour light brown with close-set round to hexagonal dark brown spots; spots on head progressively smaller anteriorly; few spots on body join together to form short

bands; spots on ventral side of body more widely separated; all fins with dark brown spots. Attains 25 to 30 cm. Common fish, found in shallow reef and rocky areas, lagoons and bays. Indo-Pacific.



Fig. 257. *Epinephelus merra*

174. *Epinephelus miliaris* (Valenciennes, 1830)

Netfin Grouper

D. XI, 16-17; A. III, 8; P. 17-18; V. I, 5. Body moderately deep and slightly compressed; dorsal fin spines slender. Colour whitish with numerous small close-set polygonal brownish yellow spots on head and body; five dark irregular diagonal bars on body; spinous and basal part of soft portion of dorsal fin with small spots; outer part of all fins with large black spots. Attains 30 to 40 cm. Found in shallow lagoons on reefs. Uncommon. Indo-West Pacific.

175. *Epinephelus ongus* (Bloch, 1790)

Specklefin Grouper

D. XI, 14-16; A. III, 8; P. 15-17; V. I, 5. Body slightly compressed; upper margin of opercle strongly arched; caudal fin rounded. Colour brown with numerous small white spots on body may form into irregular cross or narrow stripes, especially posteriorly; dorsal side of head finely dotted with white behind eye; upper edge of maxillary groove black; median fins grayish brown with white spots; soft dorsal, anal and posterior edge of caudal fin with narrow white margin and a black sub-marginal band; pectoral and ventral fins grey. Attains 25 to 30 cm. Found in shallow reef areas and rocky substratum. Not uncommon. Very cryptic in its habits. Good food fish and commercially important. Indo-Pacific.



Fig. 258. *Epinephelus ongus*

176. *Epinephelus quoyanus* (Valenciennes, 1830)**Longfin Grouper**

D. XI, 16-17; A. III, 8; P. 17-18; V. I, 5. Dorsal profile of head convex; snout short; inter-orbital space flat; caudal fin rounded. Colour whitish with numerous large hexagonal to roundish brown to black spots on head and body; spots on head progressively smaller anteriorly; two irregular oblique brown bands on thorax and a pair of transverse pale blotches are on isthmus; dorsal and caudal fins with large brown spots; anal and pectoral fins with smaller and more scattered dark spots; base of pectoral fins with large semi-circular dark brown spot, rest of fin with indistinct small dark spots; tips of spinous dorsal fin membranes pale yellow. Attains 30 to 35 cm. Found on inshore silty reefs near coastal areas. Uncommon. Indo-West Pacific.

Fig. 259. *Epinephelus quoyanus*177. *Epinephelus sexfasciatus* (Valenciennes, 1828)**Sixbar Rockcod**

D. XI, 14-15; A. III, 8; P. 18-19; V. I, 5. Head slightly pointed; body scales ctenoid; corner of preopercle with 2 to 4 spines; caudal fin rounded. Body white with six slightly diagonal dark bars on the sides, first on the nape; soft part of dorsal and anal and caudal fin with black spots. Attains 25 cm. Found on silty sand bottoms of the reefs. Very common and good food fish. Indo-Malayan region.

Fig. 260. *Epinephelus sexfasciatus*

178. *Epinephelus spilotoceps* Schultz, 1953**Four-Saddle Grouper**

D. XI, 14-15; A. III, 8; P. 17-18; V. I, 5. Head pointed; a shallow distinct notch at posterior margin of pre-opercle; spinous dorsal fin membrane incised; caudal fin rounded. Colour whitish with numerous dark brown spots on head, body and fins; the spots on dorsal side of body polygonal and close-set with pale inter-spaces forming a fine reticulum; spots on ventral side of body more separated and roundish; a large dark brown blotch at base of last dorsal spines; two similar small blotches at the base of soft dorsal and another small blotch dorsally on caudal peduncle; tips of inter-spinous dorsal fin membranes yellowish white with sub-marginal black spots. Attains 25 to 30 cm. Common shallow coral reef fish. Indo-Pacific.

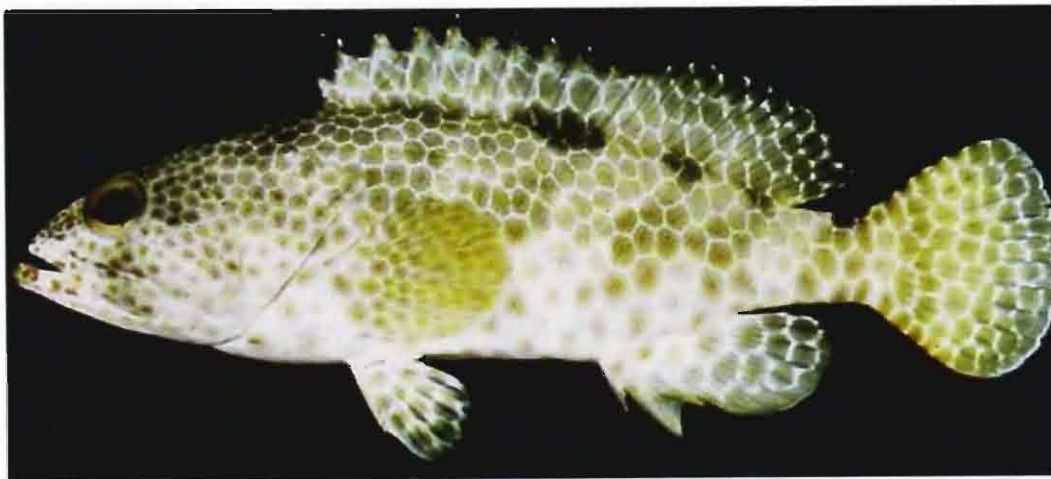


Fig. 261. *Epinephelus spilotoceps*

179. *Epinephelus tauvina* (Forsskal, 1775)**Greasy Grouper**

D. XI, 14-15; A. III, 8; P. 18-19; V. I, 5. Body elongate; mouth very large; caudal fin rounded. Colour greenish grey dorsally and whitish ventrally; numerous round orange-red to brownish spots on head, body and fins; five faint diagonal dark bars on body. Attains 50 to 60 cm. Found on outer reef areas. Not uncommon. Indo-Pacific.

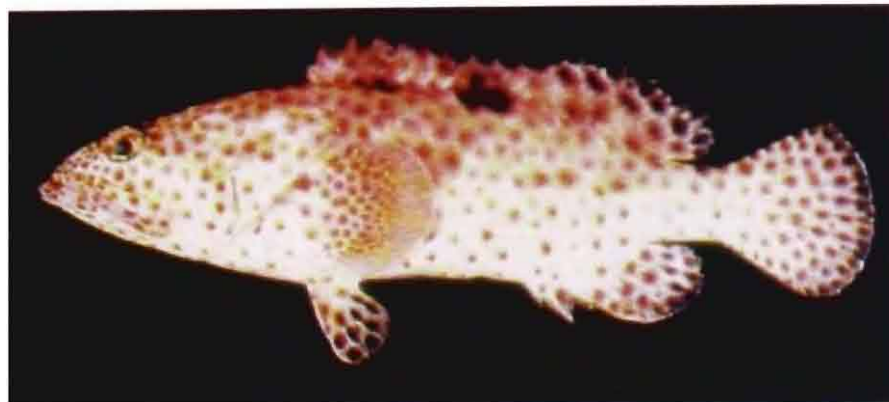


Fig. 262. *Epinephelus tauvina*

180. *Epinephelus undulosus* (Quoy & Gaimard, 1824)**Wavy-lined Grouper**

D. XI, 17-19; A. III, 8; P. 18; V. I, 5. Body moderately deep; spinous dorsal fin membranes not incised; caudal fin truncate. Colour brownish grey with yellowish brown spots on head and slightly wavy longitudinal brown lines on body; edge on spinous dorsal fin narrowly black; all fins except pectoral dark distally. Attains 60 to 70cm. Found in deep coastal waters near reefs. Not uncommon. Feeds on fish, crustaceans and tunicates. Indo-West Pacific.

Fig. 263. *Epinephelus undulosus*181. *Grammistes sexlineatus* (Thunberg, 1792)**Sixline Soapfish**

D. VII, 13; A. II, 9; P. 16-17; V. I, 5. Dorsal fin deeply notched between spinous and rayed portion; pre-opercle with 3 or 4 broad based spines; very small fleshy flap on chin; scales cycloid and embedded in skin; caudal fin rounded. Colour dark brown with 5 or 6 yellowish stripes; all fins pale. Attains 20 to 25 cm. Found around reefs in shallow waters. Very cryptic fish hide during daytime. Feeds on benthic crustaceans and small fish. Good aquarium fish. Indo-West Pacific.

Fig. 264. *Grammistes sexlineatus*

182. *Plectropomus areolatus* (Ruppell, 1830)**Squaretile Coralgroup**

D. VIII, 11; A. III, 8; P. 16; V. I, 5. Body elongates; a pair of very large canine teeth anteriorly in jaws; lower jaw projecting; caudal fin truncates to slightly emarginated. Colour greenish grey to brownish red with numerous round to slightly oblong dark edged blue spots; pelvic fins dark brown to blackish; dorsal, anal, caudal and pectoral fins with dark edged blue spots; caudal fin with white margin. Attains 60 to 70 cm. Found in reef areas. Common grouper. Indo-West Pacific.

Fig. 265. *Plectropomus areolatus*183. *Plectropomus pessuliferus* (Fowler, 1904)**Roving Coralgroup**

D. VIII, 11; A. III, 8; P. 16; V. I, 5. Dorsal fin spines small and slender; caudal fin emarginate. Body orange-red with numerous small dark edged blue spots on head, body and fins; spots present at base of pectorals; few spots on sides of body are vertically elongate and some on head diagonally elongate; few spots on thorax and abdomen; caudal fin margin narrowly whitish. Attains 50 to 60 cm. Found around coral reefs. Very common grouper. Good food fish. Indo-West Pacific.

Fig. 266. *Plectropomus pessuliferus*

184. *Variola albimarginata* Baissac, 1952
Lyretail Grouper

D. IX, 14; A. III, 8; P. 17-18; V. I, 5. Body moderately elongate and narrow; no auxiliary scales on body; dorsal fin spines short, the membrane not incised; last rays of dorsal and anal fins elongate; caudal fin strongly lunate. Body with irregular horizontal alternate red bands and narrow yellow lines. The red bands with pale blue spots; head orangish yellow with small pale blue to pinkish spots edged in red; median fins yellowish red with small red-edged pale blue spots; paired fins yellow; few pale blue spots at base of pectoral fin; a broad dusky band in caudal fin. Attains 40 to 50 cm. Found in coral reef areas. Not uncommon. Indo-West Pacific.



Fig. 267. *Variola albimarginata*

185. *Variola louti* (Forsskal, 1775)
Coronation Grouper

D. IX, 14; A. III, 8; P. 18; V. I, 5. Dorsal profile of head smoothly convex; spinous dorsal fin membrane not incised; no auxiliary scales on body; posterior part of dorsal and anal fins prolonged; caudal fin strongly lunate. Body orange-red with numerous small irregular spots and dashes of pale blue on head, body and median fins; pectoral and median fins are with broad yellow margin. Attains 70 to 80 cm. Found around coral reef areas. Very common grouper. Indo-Pacific.

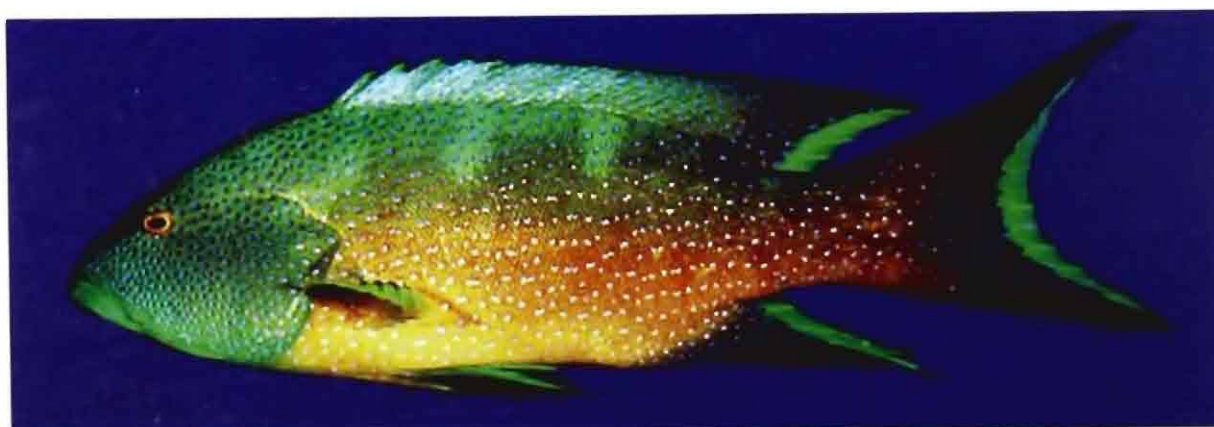


Fig. 268. *Variola louti*

Family PSEUDOCROMIDAE

Dottybacks

Small, often brilliantly coloured fishes. Fairly elongate; scales on body small, posterior body scales ctenoid, rest of them are cycloid; jaws with small, sharp conical teeth; single dorsal fin; lateral line in two parts; caudal fin rounded; ventral fin with one spine and 3 to 4 rays. Most of the fishes are found in coral reef areas. The colour pattern is very much variable within species. Sex reversal is common phenomenon. Popular aquarium fishes.

Key to species

- 1a. Anal fin rays 16 to 19; two oblique blue bands across corner of caudal; another from dorsal base to snout and one from lower jaw to opercle *P. dutoiti*
- 1b. Anal fin rays 13 to 15; no bands on body 2
- 2a. Dorsal rays 25 to 28; uniform brownish yellow with longitudinal rows of black spots *P. fuscus*
- 2b. Dorsal rays 2 to 26; colour not as in 2a 3
- 3a. Dorsal rays 22 to 23; male purplish, head and breast yellow; female brown, caudal fin red basally *P. cyanotaenia*
- 3b. Dorsal rays 24 to 26; body uniform brown; dorsal and caudal fins yellow *P. xanthochir*

186. *Pseudochromis cyanotaenia* Bleeker, 1857

Blue-barred Dottyback

D. III, 22; A. III, 13; P. 18; V. I, 5. Body slightly elongate and compressed; snout acute; dorsal fin spines weak. Females brownish above and lighter on lower half of head and sides; dorsal and anal fins purplish brown; caudal fin red basally and yellow on outer portion; eight



Fig. 269. *Pseudochromis cyanotaenia*

small transverse metallic blue lines on sides of body. Males purple; breast, belly, sides of head and dorsal fin yellow; other fins light purple. Attains 5 to 6 cm. Found in sheltered rock pools and under coral ledges. Common dottyback. Feeds on small benthic invertebrates. Good aquarium fish. Indo-West Pacific.

187. *Pseudochromis dutoiti* Smith, 1955

Dutoiti Dottyback

D. III, 28-32; A. III, 16-19; P. 17; V. I, 4. Small fishes. Dorsal fin single and continuous, spines slender; caudal fin truncated. Head and body greenish, shading to red on caudal peduncle and fin; a blue band from dorsal to base of snout and from snout to pectoral fin base; margin of opercle blue; eyes red; paired fins orange; dorsal and anal fins black with narrow blue margin; caudal fin red with oblique blue sub-marginal bar in each lobe. Attains 8 to 10 cm. Found around rocks and corals in shallow waters. Very common dottyback. Beautiful aquarium fish. Indian Ocean.



Fig. 270. *Pseudochromis dutoiti*

188. *Pseudochromis fuscus* Muller & Troschel, 1849

Brown Dottyback

D. III, 25-27; A. III, 13-14; P. 17-20; V. I, 4. Body moderately elongate and compressed; pelvic fins long; caudal fin rounded. Colour brownish with longitudinal rows of small blue spots. The other phase light yellowish brown. Attains 8 to 9 cm. Found in shallow reef areas. Indo-West Pacific.



Fig. 271. *Pseudochromis fuscus*

189. *Pseudochromis xanthochir* Bleeker, 1855

Yellowfin Dottyback

D. III, 24-25; A. III, 14; P. 18; V. I, 4. Body compressed, caudal fin rounded; upper part of operculum with a flap. Body uniform brownish; dorsal and anal fins yellow; pectoral, ventral and caudal fins pinkish. Attains 6 cm. Found in tide pools and lagoons in shallow waters near coral reefs. Very common fish. Indo-West Pacific.



Fig. 272. *Pseudochromis xanthochir*

Family PLESIOPIDAE

Longfins

Fishes small and cryptic. Body oblong and slightly compressed; upper jaw slightly protrusive. Dorsal fin single; scales small to moderate, ctenoid; cheek and operculum scaly; pre-opercle smooth; opercle without spines; lateral line interrupted; dorsal and anal fins with basal scaly sheath and soft portions of fins may be prolonged posteriorly; pelvic fins long; caudal fin rounded.

Key to species

- 1a. No dark spot or stripes behind eye; large ocellated black spot on gill cover; body and fins with small whitish spots *Plesiops corallicola*
- 1b. Two dark spots or stripes behind eye; no spot on gill cover; colour not as in 1a 2
- 2a. Sides of body scales with blackish blue spots; two dark stripes behind eye; tips of dorsal fin spines orange red; orangish red sub-marginal band in caudal fin
..... *P. coeruleolineatus*
- 2b. Sides of body with 6 to 8 dark bands; two small black spots behind eye; caudal fin with crescentic yellow bands *P. oxycephalus*

190. *Plesiops coeruleolineatus* Ruppell, 1835
Red-tipped Longfin

D. XI, 7-8; A. III, 8; P. 21; V. I, 4. Body oblong and compressed; head large and rounded; scales large; soft dorsal and anal fins pointed; lower pectoral rays free; caudal fin rounded. Body blackish brown; sides of each scale with blackish blue spot; two dark stripes behind eye; tips of dorsal fin spines orange-red; caudal fin with light orange-red sub-marginal band and a blue line in dorsal and anal fins. Attains 8 cm. Found in fissures and caves of the reefs and under rocks in tide pools. Feeds on small crustaceans, worms and fish. Aquarium fish. Indo-West Pacific.



Fig. 273. *Plesiops coeruleolineatus*

191. *Plesiops corallicola* Bleeker, 1853
Blue-spotted Longfin

D. XI, 7; A. III, 8; P. 20; V. I, 4. Body oblong and compressed; soft dorsal and anal fins pointed; lower pectoral rays free; caudal fin rounded. Colour dark bluish black with lighter cross bars on sides; body and fins with small whitish spots; large ocellated dark spot on gill cover. Attains 8 to 10 cm. Found under coral rubble and stones in tide pools. Feeds on small crustaceans, copepods, gastropods and worms. Aquarium fish. Indo-West Pacific.



Fig. 274. *Plesiops corallicola*

192. *Plesiops oxycephalus* Bleeker, 1855

Dusky Longfin

D. XII, 7; A. III, 9; P. 20; V. I, 4. Body slightly oblong and compressed; caudal fin rounded. Body uniformly dark dusky brown with irregular mottling or sometimes sides of body with 6 to 8 dark bands; preopercle and lower part of operculum orangish; two small black spots at posterior border of eye; caudal fin with crescentic yellow bands. Attains 6 to 8 cm. Found under coral rocks in lagoons. Not common. Indo-West Pacific.



Fig. 275. *Plesiops oxycephalus*

Family TERAPONIDAE

Thornfishes or Grunters

Body oblong to ovate and slightly compressed; eyes large; body covered with ctenoid scales; snout, inter-orbital and lower jaw scaleless; operculum with two strong spines; dorsal and anal fins with scaly sheath at base; no canine teeth; lateral line continuous. Usually found in brackish and mangrove areas but occasionally encountered near reef areas close to shores.

Key to species

- 1a. Lateral line scales 60 to 69; dorsal fin not notched; sides of body with 4 to 6 narrow horizontal lines; a black blotch behind head *Pelates quadrilineatus*
- 1b. Lateral line scales 69; dorsal fin notched before last spine sides of body with 3 to 4 curved stripes; no blotch behind head *Terapon jarbua*

193. *Terapon jarbua* (Forsskal, 1775)

Crescent-Grunter

D. XI-XII, 9-11; A. III, 8-10; P. 13-14; V. I, 5; Ll. 68-92. Body ovate and slightly compressed; mouth slightly oblique; opercular spines strong and long; caudal fin emarginate.

Body silvery or silvery-grey above, silvery-white below with 3 or 4 curved dark brown or black bars; spinous dorsal fin with large black blotch; caudal fin with black stripes. Attains 32 cm. Found in inshore waters and mangroves, but frequently encountered near silty-sand reef areas. Common. Good food as well as aquarium fish. Indo-West Pacific.



Fig. 276. *Terapon jarbua*

194. *Pelates quadrilineatus* (Bloch, 1790)

Fourlined Terapon

D. XII-XIII, 9-11; A. III, 9-10; P. 14-16; V. I, 5. Body moderately deep and compressed; opercular spine small and fairly strong; dorsal fin not deeply incised; caudal fin emarginated. Body silvery with five horizontal black stripes on sides; a broad black blotch behind head below dorsal origin present or absent; spinous dorsal fin with black blotch; anal fin light yellow with dark edges; caudal, pectoral and ventral fns light yellow. Attains 20 cm. Found in coastal waters occasionally encountered in silty reef areas. Good food fish. Indo-West Pacific.



Fig. 277. *Pelates quadrilineatus*

Family PRIACANTHIDAE

Bigeyes or Bull's Eyes

Body deep and slightly compressed; mouth large and oblique; eyes large; upper jaw slightly protrusive; no canines in the jaws. Pre-opercular spine present; scales ctenoid; head, lower jaw and maxilla scaled; lateral line single; dorsal fin single and continuous; last dorsal spines longest; pelvic fins large and joined to abdomen by membrane; caudal fin truncate, its margin concave or convex. Nocturnal fishes feeds on larvae of shrimps, crabs, polychaetes, fish and small cephalopods.

Key to species

- 1a. Body depth 1.9 to 2.1 in SL; lateral line scales 36 to 38; caudal fin truncate; body with 3 or 4 narrow vertical bars *Pristigenys nipponia*
- 1b. Body depth 2.3 to 2.9 in SL; lateral line scales 54 to 73; caudal fin emarginate or slightly rounded; no vertical bars on body 2 (Genus *Priacanthus*)
- 2a. Obsolete spine at corner of preopercle; ventral fin reaching beyond anal fin; gill rakers 17 to 22; body pinkish-silvery with red blotches *P. blochii*
- 2b. Preopercle spine distinct; gill rakers 24 to 26; colour coppery red *P. hamrur*

195. *Priacanthus blochii* Bleeker, 1853

Bloch's Bigeye

D. X, 12-13; A. III, 13-14; P. 17-18; V. I, 5. Body compressed; mouth oblique; eyes very large; obsolete spine at corner of pre-opercle; pelvic fins reaching beyond anal fin origin; last dorsal spines longest; caudal fin slightly rounded. Colour pinkish silvery with red blotches; all fins light pinkish except pelvic fins dusky red. Attains 30 to 35 cm. Found in deep waters around coral reefs. Not uncommon. Good food fish. Indo-West Pacific.



Fig. 278. *Priacanthus blochii*

196. *Priacanthus hamrur* (Forsskal, 1775)
Crescent-tail Bigeye

D. X, 14; A. III, 15; P. 18; V. I, 5. Body compressed; caudal peduncle narrow; mouth oblique and protractile; pre-orbital serrated; pre-opercle with distinct spine; caudal fin emarginate; pectoral fins shorter than pelvic fins. Body copper-red, whitish below; median and ventral fins dusky red; black spot at base of first three ventral rays. These fish able to change their colour pattern quickly to blotched red and silver. Attains 40 to 45 cm. Found around reef slopes in deep waters. Very common fish. Good food and ornamental fishes. Indo-Pacific.



Fig. 279. *Priacanthus hamrur*

197. *Pristigenys nipponia* (Cuvier, 1829)
Japanese Bigeye

D. X, 11-12; A. III, 10-11; P. 18; V. I, 5. Body ovoid; mouth oblique; eyes large; middle dorsal spines longest; scales on body large; pelvic fins short; caudal fin truncate. Body colour deep scarlet with 3 or 4 narrow pale vertical bars; dorsal and anal fin margin narrowly black; pelvic fins dark red and blackish distally. Attains 25 cm. Found in reef areas. Uncommon. No fishery importance. Good Aquarium fish. Indo-West Pacific.



Fig. 280. *Pristigenys nipponia*

Family APOGONIDAE

Cardinalfishes

Small, colourful shallow water fishes. Body oblong and compressed; eyes large; mouth large and slightly oblique, lower jaw protruding. Two well separated dorsal fins, the first with 6 to 8 spines, anal fin with two spines; scales on the body moderate to large sized; sharp teeth on jaws, vomer and palatines; opercular bones smooth or serrated; sharp opercular spine present; lateral line single some times interrupted; caudal fin emarginated or rounded. Large numbers of species are coral reef fishes. Found in a variety of habitats from sandy lagoons, caves, crevices and branches of corals, weedy bottoms and turbid to mangrove areas. Seen in solitary, in pairs or in small aggregations. Nocturnal fishes. Oral brooding is the common feature in these fishes. Usually feed on zooplankton and small benthic invertebrates. No economic importance. Consumed by native tribes only. Most of the species are favorite aquarium fishes.

Key to species

- 1a. Dorsal spines 6; A. II, 8-18 2
- 1b. Dorsal spines 6-7; A. II, 8-11 7
- 2a. Longest procurrent caudal ray spiny; preopercle edge serrated; palatine teeth present; dark vertical bar from origin of first dorsal to anus *Sphaeramia orbicularis*
- 2b. Longest procurrent rays segmented; colour not as in 2a 3
- 3a. Preopercle edge smooth; A. II, 12-13; scales cycloid and deciduous; large canines absent; body transparent pink *Rhabdamia gracilis*
- 3b. Preopercle edge serrate; scales ctenoid; A. II, 8-18; large canine teeth present or absent 4
- 4a. Canine teeth and supramaxilla absent; vertical reddish orange lines on sides; large diffuse black spot at base of caudal fin *Archamia fucata*
- 4b. Canine teeth and supramaxilla present; sides with black or brownish stripes; black spot present or absent at caudal fin base 5 (Genus *Chilodipterus*)
- 5a. Five narrow black stripes along the side of body; base of caudal fin yellow with a black spot at base *C. quinquelineatus*
- 5b. Eight to 10 dark reddish brown stripes along the side of body; base of caudal fin not yellow, no black spot at base 6
- 6a. Eight to nine stripes along sides of body; caudal fin base dark; caudal fin lobes dark brown; upper part of 1st dorsal fin black *C. arabicus*

- 6b. Eight to ten stripes along sides of body; all fins hyaline *C. macrodon*
- 7a. Lateral line incomplete; preopercle edge smooth; palatine teeth absent; ocellated black spot on opercle *Fowleria punctulata*
- 7b. Lateral line complete; preopercle edge serrate or smooth; palatine teeth present or absent; no ocellated spot on opercle 8
- 8a. Preopercle edge smooth; palatine teeth absent; supramaxilla present; caudal fin rounded 9 (Genus *Apogonichthys*)
- 8b. Preopercle edge serrate; palatine teeth present; supramaxilla absent; caudal fin emarginated 10 (Genus *Apogon*)
- 9a. Distinct round black ocellus on 1st dorsal; long narrow flap on front of nostrils *A. ocellatus*
- 9b. No ocellus on 1st dorsal; short flap on front of nostrils *A. perdix*
- 10a. Dorsal fin spines 6 11
- 10b. Dorsal fin spines 7 16
- 11a. Preopercular ridge, preorbital and orbital rim serrated; body with dark transverse bands *A. trimaculatus*
- 11b. Preopercular ridge and preorbital smooth 12
- 12a. A black spot on caudal peduncle present 13
- 12b. No black spot on caudal peduncle; body uniform yellowish brown *A. coccineus*
- 13a. Body brownish with large black spot on caudal peduncle *A. hyalosoma*
- 13b. A small black spot on caudal peduncle 14
- 14a. Gillrakers 15; a broad black stripe on head through eye *A. sangiensis*
- 14b. Gillrakers 22-29; colour not as in 14a. 15
- 15a. A narrow line from opercle to caudal base *A. lateralis*
- 15b. Body semitransparent; a dark stripe from snout to rear margin of eye *A. fragilis*
- 16a. Preopercle ridge serrated; suborbital with spines; dark stripe from snout to caudal. 17
- 16b. Preopercle ridge smooth; suborbitals without spines 18

- 17a. A blackish lateral stripe along body narrowing towards caudal; black spot on caudal centred on lateral line *A. fraenatus*
- 17b. Brownish lateral stripe along body same width; black spot on caudal peduncle above lateral line; scale margins dusky *A. kallopterus*
- 18a. No horizontal stripes on body; caudal spot or band present or absent 19
- 18b. Two or more horizontal stripes or lines along sides of body; caudal spot present 21
- 19a. A black band around caudal peduncle at caudal base; no diagonal strip on cheek *A. aureus*
- 19b. A dark saddle on upper half of caudal fin base; diagonal black stripe on cheek 20
- 20a. A wide brown stripe across cheek *A. savayensis*
- 20b. A narrow stripe across cheek *A. guamensis*
- 21a. Body bluish silvery with 6 orange yellow stripes; no caudal spot *A. cyanosoma*
- 21b. Body stripes brown to black; caudal spot usually present or absent 22
- 22a. Three to five dark stripes on body; stripes extend well onto the caudal fin 23
- 22b. Five to six stripes on body; stripes not extend on to caudal fin 24
- 23a. Three stripes on body; mid stripe extends to end of caudal fin *A. fasciatus*
- 23b. Four to five stripes on body; stripes extend to basal half of caudal fin *A. novemfasciatus*
- 24a. Five stripes on body; 3rd stripe incomplete; mid stripe ending in a distinct black spot *A. cookii*
- 24b. Five to six stripes on body; all stripes complete; no black spot on caudal *A. endekataenia*

198. *Apogon aureus* (Lacepede, 1802)

Ringtailed Cardinalfish

D. VII+I, 9; A. II, 8; P. 14; V. I, 5; Ll. 29. Body laterally compressed and slightly deep; dorsal and ventral profiles arched; mouth oblique. Head slightly dusky and body light golden yellow; a wide dark band encircling caudal peduncle; a bright blue stripe from snout to lower

part of eye and another from snout over maxillary. Attains 10 to 12 cm. Found around coral reef areas in small groups. Not uncommon. Good aquarium fish. Widespread in Indo-Pacific.

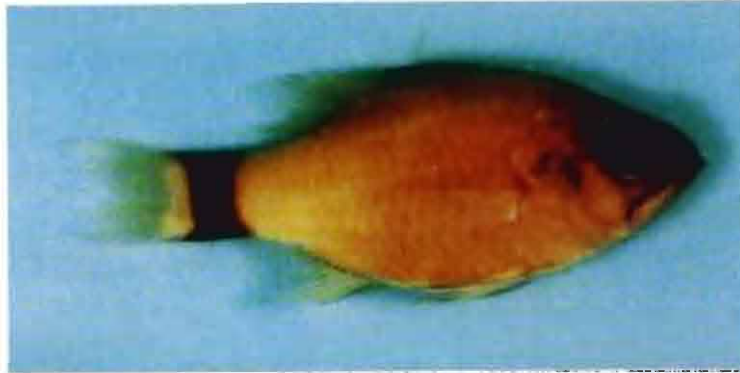


Fig. 281. *Apogon aureus*

199. *Apogon coccineus* Ruppell, 1838
Ruby Cardinalfish

D. VI+I, 9; A. II, 8; P. 13-14; V. I, 5; Ll. 26. Very small fishes; mouth sub-terminal; ventral edge of pre-opercle poorly ossified; caudal peduncle narrow and longer; caudal fin forked. Body transparent red. Attains 5 to 6 cm. Found in crevices of reefs and under coral rubble. Indo-West Pacific.



Fig. 282. *Apogon coccineus*

200. *Apogon cookii* Macleay, 1881
Blackbanded Cardinalfish

D. VII+I, 9; A. II, 8; P. 15; V. I, 5; Ll. 27-28. Pre-orbital ridge smooth; sub-orbital without spine; caudal fin forked. Body whitish with 5 to 6 dark brown bands, the 3rd stripe



Fig. 283. *Apogon cookii*

originating at upper rear corner of eye is incomplete and the 4th mid-lateral stripe ending in a distinct black spot at caudal base; a black basal stripe on 2nd dorsal. The 1st dorsal and pelvic fins dusky. Attains 8 to 10 cm. Found in shallow reef areas, under rubble and rocks. Good aquarium fish. Indo-West Pacific.

201. *Apogon cyanosoma* Bleeker, 1853
Goldenstriped Cardinalfish

D. VII+I, 9; A. II, 8; P. 14; V. I, 5; Ll. 27. Maxillary reaching below middle of eye; pre-orbital, orbital and pre-opercular ridge smooth. Body silvery white with six orange yellow stripes, the 3rd post ocular stripe reaching under origin of 2nd dorsal; all fins hyaline; snout dusky. Very small fishes, attains 7 to 8 cm. Very common species, found around coral reefs and rocky areas in large aggregations; often seen among spines of sea urchins. Good aquarium fish. Indo-West Pacific.



Fig. 284. *Apogon cyanosoma*

202. *Apogon endekataenia* Bleeker, 1852
Banded Cardinalfish

D. VII+I, 9; A. II, 8; P. 14-15; V. I, 5; Ll. 25. Body moderately narrow and elongate. Hind margin of pre-opercle serrate; pelvic fins slightly shorter than pectoral fins. Body brownish above and yellowish below with six dark brown longitudinal stripes; 1st dorsal and pelvic fins dusky; 2nd dorsal and anal fins pale with dark basal stripe; base of pectoral fin brownish. Attains 10 to 12 cm. Found under coral rubble, tide pools and outer reef areas. Not uncommon. Good aquarium fish. Indo-West Pacific.



Fig. 285. *Apogon endekataenia*

203. *Apogon fasciatus* (White, 1790)**Broad Band Cardinalfish**

D. VII+I, 9; A. II, 8; P. 15-16; V. I, 5; Ll. 26. Eyes small; upper profile of body somewhat arched; mouth oblique; maxillary reaching below posterior half of eye; orbital rim very smooth; pre-orbital and pre-opercular ridge smooth; caudal fin truncate, lobes slightly rounded. Body yellowish-brown, lighter below with silvery reflections; two longitudinal dark stripes on sides of body, the first from snout along back towards upper edge of caudal base, and second band through eye, over opercle to the end of median caudal rays. Anterior part of first dorsal fin dusky; soft dorsal and anal fins with sub-basal dark brownish band; upper and lower rays of caudal fin dusky. Attains 8 to 10 cm. Found in sand and weedy areas near reefs. Not uncommon. Indo-West Pacific.

Fig. 286. *Apogon fasciatus*204. *Apogon fraenatus* Valenciennes, 1832**Spur-Cheek Cardinalfish**

D. VII+I, 9; A. II, 8; P. 13-14; V. I, 5; Ll. 26-27. Pre-opercle and sub-orbital serrated. Body pale brown with a dark black stripe through eye and ends with black spot at center of caudal fin base; upper and lower margin of caudal fin dusky; anterior spinous dorsal membrane dark. Very small fishes, attains 5 cm. Found under stones and crevices of coral reefs. Frequently encountered. Indo-West Pacific.

Fig. 287. *Apogon fraenatus*

205. *Apogon fragilis* Smith, 1961
Fragile Cardinalfish

D. VI+I, 9; A. II, 9; P. 14; V. I, 5; Ll. 23-24. Eye moderately large. Body semitransparent, silvery on sides; few small blue spots on operculum and behind pectoral fins; a small black spot at base of caudal fin; all fins transparent. Very small fishes, attains 5 cm. Found in large schools around coral reefs and reef crevices. Common cardinal fish. Indo-Pacific.



Fig. 288. *Apogon fragilis*

206. *Apogon guamensis* Valenciennes, 1832
Guam Cardinalfish or Pearl Cardinalfish

D. VII+I, 9; A. II, 8; P. 13; V. I, 5; Ll. 24-26. Small fishes body slightly deep. Sub-orbital without spines; pre-opercular ridge smooth. Body coppery white, lighter below with dark saddle on upper half of caudal peduncle rays; a narrow oblique dark stripe from eye to angle of pre-opercle; light vertical bars on body laterally may present; anterior half of spinous dorsal fin blackish. Attains 10 cm. Found under coral stones and in tide-pools. Uncommon. Indo-West Pacific.



Fig. 289. *Apogon guamensis*

207. *Apogon hyalosoma* Bleeker, 1852
Blotched Cardinalfish

D. VI+I, 9; A. II, 8; P. 14; V. I, 5; Ll. 26-27. Dorsal profile arched with a concavity at nape; mouth oblique; hind and lower border of pre-operculum poorly serrated; pre-opercular ridge and pre-orbital rim smooth. Body yellowish above, lighter below; a large round black blotch at base of caudal; a black spot at the end of anal fin base and 2nd dorsal fin; a dusky spot on operculum; fin membrane between 2nd and 3rd dorsal spines blackish; 2nd dorsal, anal and caudal fins slightly dusky. Attains 12 to 15 cm. Found around rocks and coral blocks in shallow waters. Common. Good aquarium fish. Indo-West Pacific.



Fig. 290. *Apogon hyalosoma*

208. *Apogon kallopterus* Bleeker, 1856
Iridescent Cardinalfish

D. VII+I, 9; A. II, 8; P. 13; V. I, 5; Ll. 28. Slender bodied fishes; sub-orbital bones spiny. Body light reddish-brown with dusky scale margins; a wide dark brown mid-lateral stripe from tip of snout through eye to upper caudal base; a large black spot at base of caudal fin; all fins transparent. Attains 12 to 15 cm. Found in coral reef areas. Common. Good aquarium fish. Indo-Pacific.



Fig. 291. *Apogon kallopterus*

209. *Apogon lateralis* Valenciennes, 1832**Humpback Cardinalfish**

D. VII+I, 9; A. II, 8; P. 14; V. I, 5; Ll. 23. Dorsal side of head is very high, forming a hump above eyes. Head dusky blue, dorsal side of head olive; sides of body silvery pink, pale silvery below; a narrow blackish line from eye to upper angle of operculum and extends up to caudal peduncle; a small black spot at base of tail; diffuse orange yellow spots on cheek; fins light pinkish. Attains 8 to 9 cm. Found in weedy and coral rubble shallow areas. Uncommon. Indo-Pacific.



Fig. 292. *Apogon lateralis*

210. *Apogon novemfasciatus* Cuvier, 1828**Nine-banded Cardinalfish**

D. VII+I, 9; A. II, 8; P. 14; V. I, 5; Ll. 27. Small fishes. Trunk rounded; head rather short and snout pointed. Body whitish with nine blackish brown longitudinal stripes; mid-body stripe irregular in width and extends to caudal fin edge; no ocellus at base of caudal fin. Attains 7 cm. Very common in around branched coral thickets and tide pools. Good aquarium pet. Indo-Pacific.



Fig. 293. *Apogon novemfasciatus*

211. *Apogon sangiensis* Bleeker, 1857
Sangi Cardinalfish or Barcheeked Cardinalfish

D. VI+I, 9; A. II, 8; P. 13-14; V. I, 5; Ll. 24. Body light greyish brown, breast and lower half of head whitish with a broad blackish stripe on head through eye; a small black spot at base of caudal fin and another small black spot on back between dorsal fins; front edge of first dorsal black. Very small fishes, attains 6 to 8 cm. Found in sandy lagoons and around coral heads where waters are clear. Not uncommon. Indo-West Pacific.



Fig. 294. *Apogon sangiensis*

212. *Apogon savayensis* Gunther, 1872
Samoa Cardinalfish

D. VII+I, 9; A. II, 8; P. 13; V. I, 5. Ll. 28. Small sized fishes. Body coppery or slightly silvery; a dark saddle on upper half of caudal peduncle; a black wedge shaped streak from eye to corner of preopercle. Attains 10 cm. Found around rich branched corals in shallow waters. Very common cardinal fish. Indo-West Pacific.



Fig. 295. *Apogon savayensis*

213. *Apogon trimaculatus* Cuvier, 1828
Threespot Cardinalfish

D. VI+I, 9; A. II, 8; P.14-15; V. I, 5; Ll. 26-27. Body slightly robust, caudal peduncle narrow and elongate; dorsal profile sloping gently from dorsal to snout; mouth oblique; pre-opercular ridge denticulate; pre-orbital smooth; caudal fin feebly incised, lobes rounded. Body reddish brown, lighter below; a dark brown transverse band from origin of first dorsal to half way to pelvic fins, a second one on caudal peduncle; a dark spot at end of anal fin base; a dark streak from hind border of eye to angle of pre-operculum; dorsal and caudal fins dusky. Attains 12 to 15 cm. Found in rich coral reef areas. Uncommon. Good aquarium fish. Indo-West Pacific.



Fig. 296. *Apogon trimaculatus*

214. *Apogonichthys ocellatus* (Weber, 1913)
Ocellated Cardinalfish

D. VII+I, 9; A. II, 8; P. 14; V. I, 5; Ll. 24. Small fishes. Dorsal profile convex, sloping in an almost straight line from dorsal to snout; head smooth; orbital rim rough; anterior nostril with long flap; all fins rounded. Body brownish, cheek bar from eye to lower margin of pre-opercle edge black, another band from eye to superior angle of operculum; a black ocellus equal to eye diameter on the first dorsal between 4th and 7th spines; all fins brown; pectoral fin with dark spots. Attains 5 to 6 cm. Found in shallow rocky and reef pools. Uncommon. Indo-West Pacific.

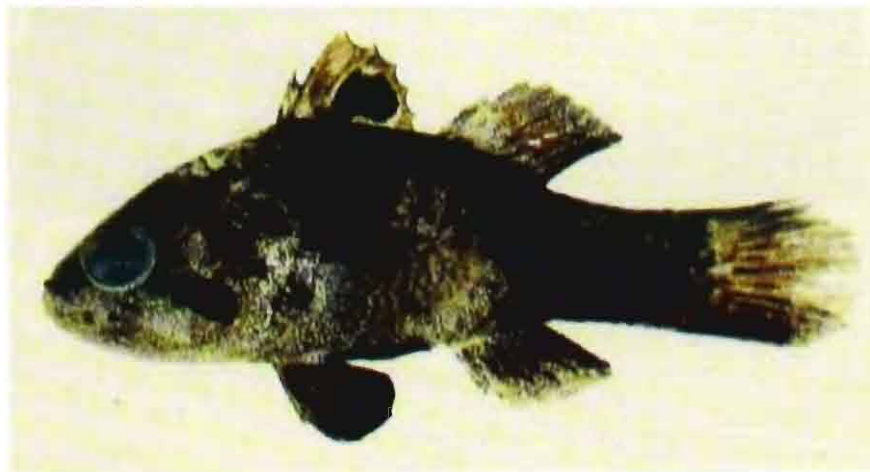


Fig. 297. *Apogonichthys ocellatus*

215. *Apogonichthys perdix* Bleeker, 1854
Speckled Cardinalfish

D. VII+I, 9; A. II, 8; P. 14; V. I, 5. Ll. 25. Pre-opercular ridge smooth; caudal fin rounded; the flap on front nostril small. Body olive brown with small spots and streaks; a dark narrow line from eye to origin of lateral line; a dark stripe from eye to angle of pre-opercle present. Very small fishes, attains 5 cm. Found in sheltered reef areas. Uncommon. Indo-West Pacific.



Fig. 298. *Apogonichthys perdix*

216. *Archamia fucata* (Cantor, 1849)
Redbarred Cardinalfish

D. VII+I, 8; A. II, 15-16; P. 14; V. I, 5. Ll. 28. Body slightly robust. Pre-opercle ridge smooth, its edge serrated. Body light reddish yellow with narrow faint orange vertical lines on sides; dark spots on cheek, opercle and sides of body; an oblique brown bar below eye; a diffuse black spot at base of caudal fin. Attains 8 cm. Found in small schools around branched corals and weedy rubble areas. Occasionally encountered. Indo-Pacific.



Fig. 299. *Archamia fucata*

217. *Cheilodipterus arabicus* Gmelin, 1789
Tiger Cardinalfish

D. VI+I, 9; A. II, 8; P. 13; V. I, 5; Ll. 28. Body slender and low; large canine teeth present in jaws; pre-opercle serrated; caudal fin slightly forked. Body whitish with 8 or 9 dark reddish

brown stripes broader than pale inter-spaces; caudal base dark, upper and lower margin of caudal fin lobes dark brown; upper part of first dorsal fin black. Attains 20 cm. Found around coral reef and rocky areas. Frequently encountered. Good aquarium fish. Indo-Pacific.

218. *Cheilodipterus macrodon* (Lacepede, 1802)
Tenlined Cardinalfish

D. VI+I, 9; A. II, 8; P. 13-14; V. I, 5; Ll. 28. Body fairly elongates; canine teeth very large. Body white with 8 to 10 dark reddish brown stripes broader than pale inter-spaces; all fins hyaline. Attains 20 to 22 cm. Found in sheltered reef areas and reef caves. Common. Good aquarium fish. Indo-Pacific.



Fig. 300. *Cheilodipterus macrodon*

219. *Cheilodipterus quinquelineatus* Cuvier, 1828
Fivelined Cardinalfish or Sharptooth Cardinalfish

D. VI+I, 9; A. II, 8; P. 12-13; V. I, 5; Ll. 26-27. Body narrow and elongate, snout slightly pointed; sharp canine teeth on both jaws. Body whitish with five black longitudinal stripes narrower than inter-spaces; first dorsal spines black; base of caudal fin light yellow with a black spot at base of middle rays; upper and lower margins of caudal fin dusky. Attains 10 to 12 cm. Found in rocky and reef caves and under coral ledges. Frequently encountered. Good aquarium fish. Indo-Pacific.



Fig. 301. *Cheilodipterus quinquelineatus*

220. *Fowleria punctulata* (Ruppell, 1838)
Peppered Cardinalfish

D. VII+I, 9; A. II, 8; P. 14; V. I, 5; Ll. 12. Caudal peduncle broad and long; snout projecting; anterior nostrils with long tube; pre-opercle edge smooth; caudal fin rounded. Body over all brownish; small black spots on sides, arranged in longitudinal rows; an ocellated black spot on opercle. Small fishes, attains 5 to 6 cm. Found on coral rubble bottom of the reefs. Uncommon. Indo-West Pacific.



Fig. 302. *Fowleria punctulata*

221. *Rhabdamia gracilis* (Bleeker, 1856)
Slender Cardinalfish

D. VI+I, 9; A. II, 12-13; P. 13; V. I, 5; Ll. 23-24. Body slender; caudal fin forked. Body and fins translucent white; head and abdomen silvery; a small black spot posteriorly on caudal peduncle. Very small sized fishes, attains 6 cm. Found in large aggregations around coral heads in shallow waters. Indo-West Pacific.



Fig. 303. *Rhabdamia gracilis*

222. *Sphaeramia orbicularis* (Cuvier, 1828)
Coral Cardinalfish

D. VI+I, 9; A. II, 9; P. 12; V. I, 5; Ll. 26. Body much elevated; dorsal profile rising steeply from snout to dorsal fin; mouth oblique; pre-operculum serrated; lateral rays of caudal fin spine-

like. Body pale; an oblique black band runs from origin of first dorsal ray to anus; caudal base with small indistinct black spots arranged in semi-circle; longitudinal scale rows of head and body marked by black spots; pelvic fins dark. Attains 10 cm. Found in small schools around shallow reef areas. Frequently encountered. Good ornamental fish. Indo-West Pacific.



Fig. 304. *Sphaeramia orbicularis*

Family HAEMULIDAE
Sweetlips or Grunts

Small to moderate sized fishes; body oblong and compressed; head profile strongly convex; mouth terminal, lips thick. Chin with pores anteriorly; no canine teeth in jaws; preopercle serrate; maxilla hidden when mouth is closed; opercle with one indistinct spine, pointing posteriorly; dorsal fin continuous; anal fin short; second anal spine usually stout and long; caudal fin truncate or emarginate. They make grunting sounds by grinding their pharyngeal teeth. With increasing growth the colour pattern of many fishes changes. Small sized fishes are very colourful and beautiful aquarium objects. Usually nocturnal. Daytime take shelter in protected reef areas. Omnivorous. Large sized fishes are excellent food fishes.

Key to species

- 1a. Dorsal spines 9-10, second spine longest; outer teeth in jaws not enlarged; silvery grey with dark spots on dorso-lateral sides *Diagramma pictum*
- 1b. Dorsal spines 11-14; second spine not longest; outer teeth in jaws enlarged; body usually with distinct bars 2 (Genus *Plectorhinchus*)
- 2a. Dorsal spines 12 3
- 2b. Dorsal spines 13 or 14 4
- 3a. Lateral line scales about 55; body silvery red; opercular membrane blackish or orange red *P. schotaf*
- 3b. Lateral line scales about 60; body white with numerous brown spots extend onto fins; juveniles brown with large dark-edged white spot *P. chaetodonoides*

- 4a. D. XIV, 15-16; dorsal fin deeply notched; lips greatly swollen; body uniformly dark, no cross bars or stripes 5
- 4b. D. XIII, 17-22; lips moderate body light or yellow with stripes or wavy lines and spots *P. gibbosus*
- 5a. Dorsal rays 20-22; wavy lines along cheek and opercle; orange spots on body *P. flavomaculatus*
- 5b. Dorsal rays 17-20; no wavy lines along sides of head 6
- 6a. Lateral line scales 80-86; body light yellow with dark stripes on sides, the stripes continuous round front of head *P. orientalis*
- 6b. Lateral line scales 53-56; body white with 4 dark brown stripes on upper side; the stripes not continuous round front of head fins yellow *P. diagrammus*

223. *Diagramma pictum* (Thunberg, 1792)

Painted Sweetlip

D. IX-X, 22-24; A. III, 6-7; P. 16-17; V. I, 5; Ll. 65. Scales on body very small; dorsal fin not notched; second dorsal spine longest; caudal fin rounded, becoming truncate with growth; caudal peduncle slender. Colour uniform silvery grey with black spots on dorso-lateral side and scattered spots on caudal fin. Juveniles colourful with alternating black and white stripes; head and belly yellowish; stripes break up into spots. Attains 90 to 100 cm. Found around coral reef areas in small numbers or solitary. Juveniles found in weedy and silt areas. Adults are excellent food fishes and economically important. Juveniles are common aquarium pets. Indo-West Pacific.

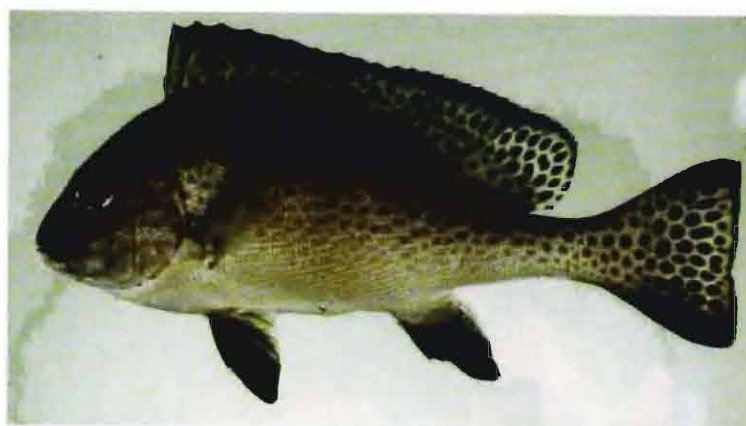


Fig. 305. *Diagramma pictum*

224. *Plectorhinchus chaetodonoides* Lacepede, 1801

Spotted Sweetlip

D. XI-XII, 18; A. III, 8; P. 17; V. I, 5. Body robust; lips thick; dorsal fin deeply notched between spinous and soft portions; caudal fin emarginated. Body greyish white with scattered

numerous black spots on body, dorsal, anal and caudal fins; ventral side of body and head without spots; pectoral and pelvic fins dusky. Juveniles brownish with large dark-edged white spots. Attains 60 cm. Found in outer reef areas. Juveniles are found around branched coral thickets and protected lagoons. Beautiful aquarium fishes. Indo-West Pacific.

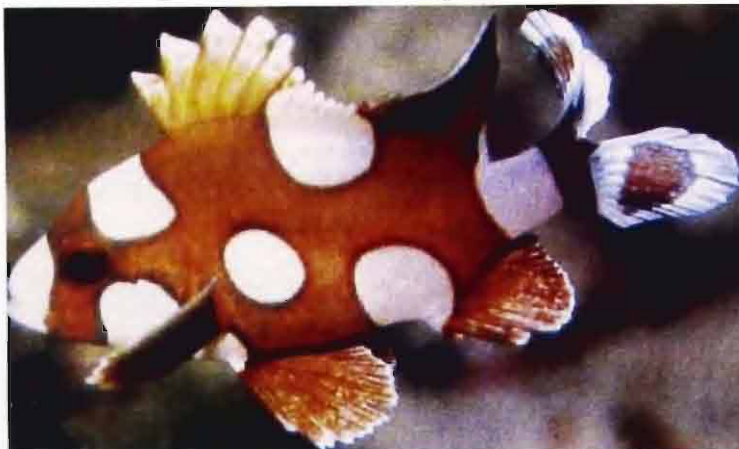


Fig. 306. *Plectorhinchus chaetodonoides* (Young)



Fig. 307. *Plectorhinchus chaetodonoides* (Adult)

225. *Plectorhinchus diagrammus* (Linnaeus, 1758)
Striped Sweetlip

D. XII-XIII, 19-20; A. III, 7-8; P. 17-18; V. I, 5. Ll. 52-55. Body slightly robust; caudal fin emarginate. Body white with dark brown longitudinal stripes on upper sides and six stripes on head; dorsal, caudal and anal fins yellow with large black spots; a large black spot at upper



Fig. 308. *Plectorhinchus diagrammus*

part of pectoral fin base; upper lip yellowish. Juveniles dark brown with two yellowish white longitudinal stripes on sides. Attains 35 to 40 cm. Found around rocky and coral reef areas. Not uncommon. Good food fish. Juveniles aquarium pets. Indo-West Pacific.

226. *Plectorhinchus flavomaculatus* (Cuvier, 1830)
Gold-spotted Sweetlip

D. XIII, 20-22; A. III, 7; P. 17; V. I, 5. Caudal fin emarginate; dorsal fin not notched; lips thick and fleshy. Colour grey with small orange spots on body, dorsal and caudal fin; head with narrow orange and grey-blue lines. Attains 40 cm. Found around outer reef areas. Not uncommon. Good food fish. Indo-Pacific.



Fig. 309. *Plectorhinchus flavomaculatus*

227. *Plectorhinchus gibbosus* (Lacepede, 1802)
Blubber-lip Bream or Brown Sweetlip

D. XIV, 15-16; A. III, 7; P. 17; V. I, 5. Body deep; dorsal fin deeply notched; upper lip more thick and spongy; dorsal fin spines more strong, the 4th and 5th longest; caudal fin slightly longer. Body dark grey or reddish grey; margin of cheek and gill cover black; all fins dark brown. Attains 60 to 70 cm. Found around reef slopes in deeper waters. Excellent food fish, common in commercial catches. Indo-West Pacific.



Fig. 310. *Plectorhinchus gibbosus*

228. *Plectorhinchus orientalis* (Bloch, 1793)
Oriental Sweetlip

D. XIII, 18; A. III, 7; P. 18; V. I, 5. Body slightly deep; hind border of pre-opercle serrated; caudal fin truncated. Body yellow with several dark brown stripes on sides of body, continuous around front of head; dorsal fin with black blotches; pectoral fin yellow with a dark blotch at its base. Attains 55 to 60 cm. Found around coral reef areas and inshore rocky bottoms. Good food fish; juveniles are common aquarium pets. Indo-West Pacific.



Fig. 311. *Plectorhinchus orientalis*

229. *Plectorhinchus schotaf* (Forsskal, 1775)
Grey Sweetlip

D. XII, 18-20; A. III, 7; P. 16-17; V. I, 5. Body oblong and compressed; lower jaw shorter, lips swollen; caudal fin emarginate. Body dusky to silvery-grey; margin of opercle red. Young similar to adults but sometimes with faint blue lines below eye and on sides of body. Attains 40 to 60 cm. Found in reef areas. Uncommon. Food fish but has minor fishery value in the Islands. Indo-West Pacific.



Fig. 312. *Plectorhinchus schotaf*

Family LUTJANIDAE
Snappers or Seaperches

Body oblong or elongate, rather compressed; mouth moderately large; jaws with canines; pre-opercle usually serrate; scales ctenoid; cheek and operculum scaly; single dorsal fin, some times deeply incised; pelvic auxillary scale process well developed; caudal fin truncate or deeply forked. Most of the snappers found in shallow to moderate depths in vicinity of coral reefs. Some species reach 100 to 120 cm and many are excellent food fishes, and also important component of commercial catches; few species proved to be ciguatoxic. Carnivorous fish, usually feed at night on a variety of invertebrates but prey heavily on other reef fishes.

Key to species

- 1a. Base of dorsal and anal fins entirely scaleless2
- 1b. Base of dorsal and anal fins, particularly soft portions, with scales6
- 2a. Pectoral fins short, about equal to snout length; a distinct groove in front of eye
 *Aprion virescens*
- 2b. Pectoral fins longer than snout length; no groove in front of eye.....3
- 3a. Vomerine teeth absent; lower jaw protruding; minute teeth in jaws; no enlarged canines;
 interorbital space flattened..... 4 (Genus *Aphareus*)
- 3b. Vomerine teeth present; jaws equal; canine teeth present in jaws; interorbital space
 strongly arched 9 (Genus *Paracaesio*)
- 4a. Gill rakers on first arch 5 or 6+ 16 to .18 *A. furcatus*
- 4b. Gill rakers on first arch 6 to 9+ 30 to 34 *A. rutilans*
- 5a. Back blue to purplish brown without an extensive yellow are *P. sordidus*
- 5b. Back with a broad yellow area from forehead to caudal fin base *P. xanthurus*
- 6a. Gill rakers long and slender, more than 50 on lower arm of first gill arch.....
 *Macolor niger*
- 6b. Gill rakers shorter, less than 25 on lower arm of first arch7
- 7a. No enlarged canines in jaws; upper and lower profile of head equally rounded; eyes set
 towards middle of head; longitudinal scale rows below lateral line sloping towards in
 posterior direction*Pinjalo pinjalo*

- 7b. Enlarged canines in jaws; upper and lower profile of head unequal, upper profile rounded to steeply sloped; eyes closer to upper profile of head; longitudinal scale rows below lateral line usually horizontal 8 (Genus *Lutjanus*)
- 8a. Preorbital space very narrow, 9.2 to 16.3 in head; body slender, usually 3.0 or more in SL; dorsal fin spines usually 11, soft rays 12 2
- 8b. Preorbital space wider, 3.3 to 8.9 in head; body deeper, 2.1 to 3.1 in SL; dorsal fin spines 10 to 12, soft rays 13 3
- 2a. Tongue smooth without teeth; a dark band from snout to caudal fin base and two pearly spots below dorsal fin *L. biguttatus*
- 2b. Tongue with a patch of fine granular teeth; a broad yellow stripe along middle of side to caudal base and narrow yellow lines along with longitudinal scale rows
..... *L. Lutjanus*
- 3a. Body pale with series of 4 to 8 longitudinal stripes on sides 4
- 3b. Colour not as in 3a 6
- 4a. Dorsal spines 10 5
- 4b. Dorsal spines 11 or 12; total gill rakers 26 or 28; sides of body with 4 bright blue stripes *L. bengalensis*
- 5a. Scale rows on cheek 5 or 6; four stripes on sides of body; belly whitish, frequently with thin grey lines; upper pectoral rays darkish *L. kasmira*
- 5b. Scale rows on cheek 10 or 11; five stripes on sides of body; belly not whitish and without thin grey lines; upper pectoral rays pale *L. quinquelineatus*
- 6a. Longitudinal scale rows above lateral line obliquely positioned 7
- 6b. Longitudinal scale rows above lateral line horizontal or some rows rising obliquely from below middle part of dorsal fin 23
- 7a. Vomerine tooth patch triangular or diamond shaped with a median posterior extension 8
- 7b. Vomerine tooth patch crescentic to triangular without a posterior extension 12
- 8a. Dorsal rays 15; anal rays 9; axil of pectoral fin with distinct black spot on upper portion; 8 or 9 orange or yellow stripes on sides of body *L. carponotatus*
- 8b. Dorsal rays 13 or 14; anal rays 8; axil of pectoral fin without black spot; colour not as in 8a 9

- 9a. Usually a large black spot present on upper side; juveniles with an ocellated spot and/or a series of 4 to 7 dark stripes on sides 10
- 9b. Black spot absent; narrow yellowish longitudinal lines on sides 11
- 10a. Soft dorsal rays 14; a wide gap between temporal scale bands of each side; black spot on upper side situated mainly above lateral line *L. russelli*
- 10b. Soft dorsal rays 13; a little or no gap between temporal scale bands of each side; black spot on upper side situated mainly below lateral line or bisected by it
..... *L. fluviflamma*
- 11a. Transverse scale rows on cheek usually 7 to 10; mid-lateral stripe usually broad and darker than other stripes on sides *L. vitta*
- 11b. Transverse scale rows on cheek usually 6 or 7; mid-lateral stripe not broader or darker than other stripes, all stripes yellowish *L. madras*
- 12a. Total gill rakers on 1st arch 25 to 30; caudal fin distinctly forked with rounded lobes; body deep red to grey, fins red or dark brown to blackish *L. gibbus*
- 12b. Total gill rakers on 1st arch 14 to 23; caudal fin not distinctly forked, lobes not rounded; colour not as in 12a 13
- 13a. D. XI, 16; anal rays 10; three dark brown to red transverse bars on body, indistinct in large adults *L. sebae*
- 13b. D. X-XI, 12-16; anal rays 8 or 9; colour not as in 13a 14
- 14a. Preopercular notch well developed 15
- 14b. Preopercular notch indistinct or absent 17
- 15a. Soft dorsal rays 15 or 16; body relatively deep, 2.1 to 2.4 in SL; lips thick in large adults; head with numerous wavy lines *L. rivulatus*
- 15b. Soft dorsal rays 13 or 14; body usually slender 2.3 to 2.8 in SL; lips not thick in large adults; colour not as in 15a. 16
- 16a. Caudal fin distal third of dorsal fin blackish with a narrow white border
..... *L. fulvus*
- 16b. Caudal fin yellow or grey basally and yellow distally without narrow white border; dorsal fin not darker *L. bouton*
- 17a. A series of 5 dark stripes on white background and 2 or 3 upper three stripes crossed by dark vertical bars forming a net work of squares; a large black spot at base of caudal fin *L. decussatus*

- 17b. Colour pattern not as in 17a..... 18
- 18a. Nostrils set in prominent groove; tongue with a patch of granular teeth; dark brown on upper back, grading to light brown ventrally; dorsal and caudal fins dusky; outer portions of anal and ventral fins blackish..... *L. bohar*
- 18b. Nostrils not set in grooves; tongue smooth or with a patch of granular teeth; colour not as in 18a..... 19
- 19a. Caudal fin with a distinctive crescentic black marking, remainder of body and fins yellowish tan with a silvery sheen on lower sides *L. lunulatus*
- 19b. Caudal fin without any black marking; colour not as in 19a 20
- 20a. A patch of fine granular teeth on tongue; a black spot on upper side at level of lateral line below soft dorsal fin; body pink or light yellow*L. monostigma*
- 20b. Tongue smooth; black spot on upper side of body absent 21
- 21a. Dorsal spines 10; anal rays 8; grey-brown, pink ventrally; caudal and dorsal fins dusky brown or black with a narrow white border posteriorly*L. lemniscatus*
- 21b. Dorsal spines 11; anal rays 9; colour largely reddish brown 22
- 22a. Mouth relatively small; some longitudinal scale rows below lateral line slanting obliquely in posterior direction towards dorsal profile; head profile convex....*L. erythropterus*
- 22b. Mouth larger; longitudinal scale rows below lateral line horizontal; head profile slightly concave or straight.....*L. malabaricus*
- 23a. Vomerine tooth patch triangular with median posterior extension; a prominent black spot bisected by lateral line below posterior part of spinous dorsal fin
..... *L. ehrenbergii*
- 23b. Vmerine tooth patch crescentic to triangular without a median extension; black spot on back preset or absent..... *L. argentimaculatus*

230. *Aphareus furca* (Lacepede, 1801)

Smalltoothed Jobfish

D. X, 10-11; A. III, 8; P. 15-16; V. I, 5; Ll. 65-74. Body elongate and fusiform; compressed; lower jaw protruding; pectoral fin very long reaching anal fin; last rays of



Fig. 313. *Aphareus furca*

dorsal and anal fin elongate; caudal fin forked. Body purplish brown, blue-grey on sides; silvery sheen on head and lower sides; edge of opercle black; fins whitish. Attains 35 to 40 cm. Found around outer reef areas. Excellent food fish. Indo-Pacific.

231. *Aphareus rutilans* Cuvier, 1830
Rusty Jobfish

D. X, 11; A. III, 8; P. 15-16; V. I, 5; Ll. 70-73. Body fusiform and compressed; lower jaw protruding; interorbital space flattened; roof of mouth toothless. Body blue-grey; all fins yellowish to red except ventral and anal fins whitish; margin of maxilla black. Attains 50 to 70 cm. Found around reefs and rocky bottom of deep waters. Good food fish. Indo-Pacific.



Fig. 314. *Aphareus rutilans*

232. *Aprion virescens* Valenciennes, 1830
Green Jobfish

D. X, 11; A. III, 8; P. 17; V. I, 5; Ll. 49. Body fusiform; a groove present on snout below nostrils; two strong canines in jaws; pectoral fin short; caudal fin deeply forked. Body overall bluish-grey, fins hyaline. Attains 60 to 100 cm. Found around coral reefs and outer reef areas. Preys mainly on reef fishes. Excellent food fish. Indo-Pacific.



Fig. 315. *Aprion virescens*

233. *Lutjanus argentimaculatus* (Forsskal, 1775)
Mangrove Red Snapper

D. X, 13-14; A. III, 8; P. 16-17; V. I, 5; Ll. 46. Body moderately deep; snout pointed; caudal fin emarginate. Body greenish-brown, belly silvery; scales with a dark centers and

white margin; median fins with reddish hue; pectoral and ventral fins dark brown. Juveniles with eight whitish bars on sides and 1 or 2 blue lines across cheek. Attains 80 to 90 cm. Found in reef areas in deep waters. Common. Juveniles and young found in mangrove areas. Good food fish. Indo-West Pacific.



Fig. 316. *Lutjanus argentimaculatus*

234. *Lutjanus bengalensis* (Bloch, 1790)

Bengal Snapper

D. X, 12-14; A. III, 8; P. 16-17; V. I, 5. Body fusiform and slender; snout pointed; caudal fin emarginate. Body yellowish, belly white; sides of body with four bright blue stripes; fins light yellow. Attains 25 to 30 cm. Found around coral reefs in shallow waters; form small aggregations. Frequently encountered. Good food fish. Indian Ocean.



Fig. 317. *Lutjanus bengalensis*

235. *Lutjanus biguttatus* (Valenciennes, 1830)

Two-spot Banded Snapper

D. X, 12; A. III, 8; P. 15-16; V. I, 5; Ll. 52-54. Body fusiform and very slender; snout profile low; caudal fin truncate. Body dark brown, lower sides and belly yellowish; broad white stripe from below eye to base of caudal fin; two white spots on upper back, one below spinous dorsal and the other below middle of soft dorsal. Attains 15 to 20 cm. Found near

shallow coral reef areas. Very common lutjanid. Food fish but has no commercial value. Indo-Australian Archipelago.



Fig. 318. *Lutjanus biguttatus*

236. *Lutjanus bohar* (Forsskal, 1775)

Twin Spot Snapper

D. X, 13; A. III, 8; P. 16-17; V. I, 5; Ll. 48-49. Body moderately deep; dorsal profile of head rounded; snout somewhat pointed; nostrils in deep groove; caudal fin slightly emarginate. Colour reddish brown above, lower sides and belly reddish; all fins dusky except pectoral; pectoral fin pink, dorsal edge of fin dark. Young ones with two silvery white spots on back; upper and lower margin of caudal lobes black. Attains 60 to 70 cm. Found around coral reef areas and protected lagoons. Frequently encountered. Good food fish. Indo-West Pacific.



Fig. 319. *Lutjanus bohar*

237. *Lutjanus bouton* (Lacepede, 1802)

Moluccan Snapper

D. X-XII, 13-14; A. III, 8; P. 16-17; V. I, 5. Body moderately deep, snout pointed; eyes very large; caudal fin emarginate. Body reddish but belly and under side of head white or

silvery-white; a series of 10 to 12 faint yellow stripes on sides; all fins yellowish. Attains 20 to 25 cm. Found around coral reefs in schools. Uncommon. Good food fish. Indo-West Pacific.



Fig. 320. *Lutjanus bouton*

238. *Lutjanus carponotatus* (Richardson 1842)

Spanish Flag Snapper

D. X, 14-16; A, III, 9; P. 15-17; V. I, 5. Body moderately deep, snout slightly pointed; dorsal profile of head steeply sloped; caudal fin emarginate. Body blue grey or brownish, lower sides and belly whitish; 8 or 9 orange yellow stripes on sides; fins yellowish; pectoral fin with a distinct black spot at base of upper rays and in axil. Attains 30 to 35 cm. Found around sheltered coral reef areas, lagoons and outer reefs. Food fish but has no commercial importance. Indo-West Pacific.



Fig. 321. *Lutjanus carponotatus*

239. *Lutjanus decussatus* (Cuvier, 1828)

Checkered Snapper

D. X, 13-14; A. III, 8; P. 16-17; V. I, 5; Ll. 51-52. Body moderately deep; dorsal profile of snout moderately sloped; caudal fin emarginate. Body whitish silvery with five dark brown bars, upper three stripes crossed by dark vertical bars forming a net work of light and dark squares; a large black spot on caudal fin base; dorsal and caudal fins dusky red, other fins yellowish white. Attains 25 to 30 cm. Found around shallow coral reef areas.

Common reef fish, sometimes form small schools. Good food as well as aquarium fish. Indo-West Pacific.



Fig. 322. *Lutjanus decussatus*

240. *Lutjanus ehrenbergii* (Peters, 1869)
Blackspot Snapper

D. X, 13; A. III, 8; P. 16; V. I, 5; Ll. 46. Body slender; dorsal profile moderately sloped; caudal fin slightly emarginate. Body dark brown, lower sides and belly whitish silvery; four narrow yellow stripes on sides below lateral line; a large black spot on back below posterior part of spinous dorsal fin. Attains 30 to 35 cm. Found in shallow coral reef areas and creeks. Uncommon. Good food fish. Indo-West Pacific.



Fig. 323. *Lutjanus ehrenbergii*

241. *Lutjanus erythropterus* Bloch, 1790
Crimson Snapper

D. X, 12-14; A. III, 8; P. 16-17; V. I, 5; Ll. 49. Body moderately deep; dorsal profile of head sloped; caudal fin emarginate. Body pinkish and fins light pinkish. Juveniles light pink with a



Fig. 324. *Lutjanus erythropterus*

broad oblique black band from mouth to dorsal fin origin and a large round black spot at base of caudal fin; narrow red stripe along scale rows. Attains 40 to 50 cm. Found around coral reef areas in shallow waters. Not uncommon. Excellent food fish. Indo-West Pacific.

242. *Lutjanus fulviflamma* (Forsskal, 1775)
Blackspot Snapper

D. X, 12-14; A. III, 8; P. 15-16; V. I, 5. Ll. 48-49. Body slender and dorsal profile of head moderately sloped; caudal fin slightly emarginate. Body dark brown on head and back, light brown on sides; belly yellowish; sides of body below lateral line with yellow stripes; an elongate black spot at level of lateral line below base of soft dorsal fin; all fins yellowish. Attains 30 to 35 cm. Found around coral reef and rubble areas. Uncommon. Good food fish but has no commercial value. Indo-West Pacific.



Fig. 325. *Lutjanus fulviflamma*

243. *Lutjanus fulvus* (Schneider, 1801)
Blacktail Snapper

D. X, 14; A. III, 8; P. 16; V. I, 5; Ll. 51. Dorsal profile of head steeply sloped; caudal fin slightly emarginate. Body brownish yellow with a series of narrow yellowish horizontal lines on sides below lateral line level. Anterior part of head brownish, under side of head and belly whitish; dorsal fin brownish with a black band near margin, more broader on soft dorsal; caudal fin black; margin of dorsal and caudal fins white. Attains 30 to 40 cm. Found around inshore coral reef areas. Common food fish. Indo-Pacific.



Fig. 326. *Lutjanus fulvus*

244. *Lutjanus gibbus* (Forsskal, 1775)**Humpback Red Snapper**

D. X, 13-14; A. III, 8; P. 16-17; V. I, 5; Ll. 58-59. Dorsal profile of head steeply sloped and concave; posterior part of dorsal and anal fins pointed; caudal fin forked. Body reddish, more dark on back and silvery-red below; eye and base of pectoral and its axil orange; fins reddish brown; soft dorsal, anal and caudal fins margin white. Attains 40 to 50 cm. Found around coral reef areas below 5 m depth. Some times form large aggregations. Most common snapper. Good food fish. Indo-West Pacific.

Fig. 327. *Lutjanus gibbus*245. *Lutjanus johnii* (Bloch, 1792)**Jonh's Snapper**

D. X, 14; A. III, 8; P. 16; V. I, 5. Dorsal profile of head deeply sloped. Caudal fin truncate. Body yellow with silvery sheen, silvery white on belly; center of each scale with reddish brown spots giving an appearance of series of horizontal lines; a round black spot longer than eye above lateral line situated below the anterior soft dorsal rays. Attains 60 to 70 cm. Found in reef areas, juveniles in mangrove areas. Indo-West Pacific.

Fig. 328. *Lutjanus johnii*

246. *Lutjanus kasmira* (Forsskal, 1775)**Bluestripe Snapper**

D. X, 14; A. III, 8; P. 15-16; V. I, 5; Ll. 49-50. Body moderately deep; dorsal profile of head steeply sloped; caudal fin emarginate. Body yellow, under side and belly white; four bright black edged blue stripes along side of head and body; all fins yellow; a large black spot on lateral line below anterior soft dorsal rays. Attains 25 to 35 cm. Found around coral reefs and shallow lagoons. Very common reef fish. Good food fish. Indo-Pacific.



Fig. 329. *Lutjanus kasmira*

247. *Lutjanus lemniscatus* (Valenciennes, 1828)**Yellow Streaked Snapper**

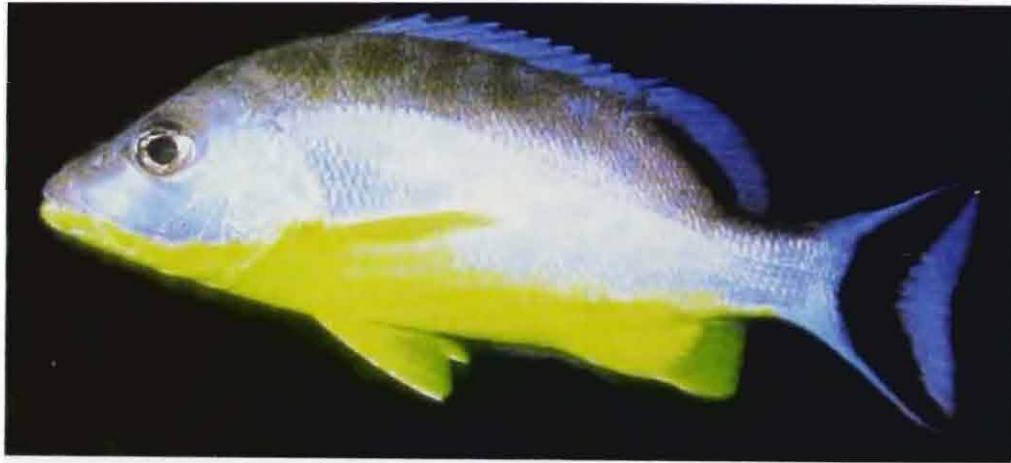
D. X, 13; A. III, 8; P. 16; V. I, 5; Ll. 56. Posterior ends of dorsal and anal fins rounded; caudal fin emarginate. Body dusky brown, sides reddish brown; under side of head and belly white; dorsal and caudal fins brownish black with narrow white margin; other fins white. Juveniles with a black horizontal band from snout to tip of caudal fin base. Attains 50 to 60 cm. Found near off shore reef areas, and juveniles near silt-coral rubble areas. Commercially important species. Indo-West Pacific.



Fig. 330. *Lutjanus lemniscatus*

248. *Lutjanus lunulatus* (Park, 1797)**Lunartail Snapper**

D. X, 13-14; A. III, 8-9; P. 16; V. I, 5; Ll. 49. Body moderately deep; caudal fin emarginate. Back and upper sides of body brownish red, ventral side of head and body yellowish white; dorsal fin light red; other fins light yellow; caudal fin with broad crescent black band. Attains 25 to 30 cm. Found in reef areas in deep waters. Occasionally found in small groups. Not uncommon. Good food fish. Indo-West Pacific.

Fig. 331. *Lutjanus lunulatus*249. *Lutjanus lutjanus* Bloch, 1790**Bigeye Snapper**

D.D. X-XII, 12; A. III, 8; P. 16-17; V. I, 5. Body slender and fusiform; dorsal profile of head gently sloped; preopercular notch and knob poorly developed; scale rows on back rising obliquely above lateral line; caudal fin truncate or slightly emarginate. Back golden brown, sides silvery-white; a broad yellowish stripe from eye to caudal fin base; over half of body with a series of yellow horizontal lines along scale rows; fins pale yellow. Attains 30 cm. Found around off shore coral reef areas. Frequently seen in large schools. Feeds on crustaceans and small fish. Good food fish. Indo-West Pacific.

Fig. 332. *Lutjanus lutjanus*

250. *Lutjanus madras* (Valenciennes, 1831)**Indian Snapper**

D. X, 13; A. III, 8; P. 16; V. I, 5; Ll. 53-55. Body fusiform and slender; dorsal profile of head gently sloped; caudal fin truncate. Body brownish above, sides whitish with fine yellow horizontal lines along scale rows; brownish oblique lines above lateral line; pelvic fins whitish, other fins yellow. Attains 30 cm. Found around reefs and rocky bottom below 3 m depth. Common commercial fish. Indo-West Pacific.



Fig. 333. *Lutjanus madras*

251. *Lutjanus malabaricus* Bloch & Schneider, 1801**Malabar Red Snapper**

D. XI, 14; A. III, 8; P. 16; V. I, 5; Ll. 58. Dorsal profile of head steeply sloped. Body reddish orange, lighter on lower sides; all fins reddish. Juveniles with a broad oblique black band from upper jaw to origin of dorsal fin; a prominent black band across caudal peduncle with white anterior border; narrow reddish lines on body. Attains 90 to 100 cm. Excellent food fish. Very common and commercially important fish. Indo-West Pacific.



Fig. 334. *Lutjanus malabaricus*

252. *Lutjanus monostigma* (Cuvier, 1828)**One-spot Snapper**

D. X, 13; A. III, 10-11; P. 8-9; V. I, 5. Body slightly slender; dorsal profile of head gently sloped; caudal fin emarginate. Body yellowish with dusky scale margins; grey on upper back and head; a narrow black spot on back below the level of soft dorsal; all fins yellowish. Attains 50 to 60 cm. Found in sheltered reef areas. Uncommon. Good food fish. Indo-Pacific.

Fig. 335. *Lutjanus monostigma*253. *Lutjanus quinquelineatus* (Bloch, 1790)**Fivelined Snapper**

D. X, 13-14; A. III, 8; P. 16; V. I, 5. Body deep, dorsal profile of head deeply sloped. Body bright yellow, upper part of head brownish; five blue stripes on sides; all fins yellow; a round black blotch on lateral line below the level of anterior soft dorsal fin. Attains 35 cm. Found around outer reef and sheltered lagoons. Not uncommon. Good food fish. Indo-West Pacific.

Fig. 336. *Lutjanus quinquelineatus*

254. *Lutjanus rivulatus* (Cuvier, 1828)**Blubberlip Snapper**

D. X, 15; A. III, 8; P. 17; V. I, 5; Ll. 48. Body very deep; dorsal profile of head steeply sloped; posterior profile of anal fin pointed; caudal fin truncate. Body reddish brown, each scale with one or two bluish spots; head with fine wavy lines; lips whitish; all fins yellow with dusky markings; caudal fin greyish with yellow margin. Attains 30 to 35 cm. Found in shallow inshore reef areas. Uncommon. Excellent food fish. Indo-Pacific.



Fig. 337. *Lutjanus rivulatus*

255. *Lutjanus russellii* (Bleeker, 1849)**Russell's Snapper**

D. X, 14; A. III, 8; P. 16; V. I, 5; Ll. 48-50. Body moderately deep; caudal fin truncate. Body brownish yellow, lower sides and belly yellowish white; 6 or 7 narrow golden horizontal stripes on sides; a black blotch below anterior dorsal rays; all fins yellowish; caudal fin dusky. Attains 40 cm. Found in inshore reef areas. Common commercially important species. Indo-West Pacific.



Fig. 338. *Lutjanus russellii*

256. *Lutjanus sebae* (Cuvier, 1816)
Emperor Red Snapper

D. XI, 15; A. III, 10; P. 17; V. I, 5. Body very deep; dorsal profile of head steeply sloped; posterior part of dorsal and anal fins distinctly pointed; caudal fin slightly forked. Body overall reddish or pink. Juveniles and small adults pink with a dark red band from snout through eye to dorsal origin, second band from middle of spinous dorsal to pectoral fin and third band from base of last spine running obliquely to lower edge of caudal fin. Attains 90 to 100 cm. Found near coral reef areas and sand flats. Not uncommon. Commercially important species. Indo-Pacific.



Fig. 339. *Lutjanus sebae*

257. *Lutjanus vitta* (Quoy & Gaimard, 1824)
Brownstripe Snapper

D. X, 12; A. III, 8; P. 16; V. I, 5; Ll. 55. Body relatively slender; dorsal profile of head moderately sloped; caudal fin emarginate. Body brown, lower sides and belly whitish; narrow longitudinal lines along scale rows on sides; a dark brown stripe from eye to upper half of caudal peduncle; all fins yellow, except pelvic fins. Attains 35 to 40 cm. Found around coral reefs in small groups. Good food fish. Indo-West Pacific.



Fig. 340. *Lutjanus vitta*

258. *Macolor niger* (Forsskal, 1775)**Black and White Snapper**

D. X, 14; A. III, 11; P. 17-18; V. I, 5. Body relatively deep; head profile convex; pectoral fins long, reaching to level of anus; caudal fin emarginate. Colour uniform black; iris yellowish. Juveniles black on upper side and white below with a black bar through eye; pectoral fins black; a black stripe from pectoral origin to lower caudal lobe. Attains 40 to 60 cm. Found in coral reef areas. Uncommon. Usually seen solitary. Indo-Pacific.

Fig. 341. *Macolor niger*259. *Paracaesio sordida* Abe & Shinohare, 1962**Blue Snapper**

D. X, 9-10; A. III, 8; P. 16-17; V. I, 5; Ll. 69-72. Body fusiform; eye large; snout short; pectoral fins long reaching anus; caudal fin deeply forked. Body dark purplish brown, lower sides and belly whitish; dorsal and caudal fins brownish; other fins whitish. Attains 35 to 40 cm. Found on rocky bottom near reefs in deep waters. Uncommon. Good food fish. Indo-Pacific.

Fig. 342. *Paracaesio sordida*

260. *Paracaesio xanthurus* (Bleeker, 1869)**Yellowtail Snapper**

D. X; 10; A. III, 8; P. 16; V. I, 5; Ll. 70-72. Body moderately deep; pectoral fins long reaching anus; caudal fin deeply forked. Body overall blue, whitish ventrally; a bright yellow area on back from forehead to base of caudal fin; dorsal and caudal fins yellow. Attains 35 to 40 cm. Found on rocky and coral reef areas in large schools. Good food fish. Indo-West Pacific.



Fig. 343. *Paracaesio xanthurus*

261. *Pinjalo pinjalo* (Bleeker, 1850)**Pinjalo**

D. XI, 14; A. III, 10; P. 18; V. I, 5; Ll. 47-52. Body moderately deep; dorsal profile of head high; snout short and pointed; mouth small; caudal fin emarginate. Body pink or reddish, whitish or silvery on lower sides and belly; pelvic and caudal fins yellowish. Attains 40 to 50 cm. Inhabits reefs and rocky bottoms. Uncommon. Good food fish. Indo-West Pacific.



Fig. 344. *Pinjalo pinjalo*

Family CAESIONIDAE

Fusiliser

Medium to large sized fishes. Body fusiform and moderately compressed; eye moderately large; mouth small and highly protrusible; scales on body small and weakly ctenoid, easily shed; scales present on dorsal and anal fins; single dorsal fin; caudal fin deeply forked. Primarily reef inhabitants and mid-water schooling planktivorous fishes. Snappers, groupers, jacks and tunas actively prey upon these fishes. Good food fishes but commercially not much important. Used as an important baitfishes for tuna fishing.

Key to species

- 1a. Postmaxillary process simple; posterior end of maxilla blunt 2 (Genus *Caesio*)
- 1b. Postmaxillary process two; posterior end of maxilla tapered 7
- 2a. Anal fin usually with 3 spines and 11 rays 3
- 2a. Anal fin usually with 3 spines and 12 rays 4
- 3a. Dorsal fin with 10 spines and 15 rays; supratemporal band of scales confluent at dorsal mid-line; tips of caudal fin without blackish markings *C. cuning*
- 3b. Dorsal fin with 10 spines and 14 rays; supratemporal band of scales interrupted at dorsal mid-line; tips of caudal fin lobes with black blotches *C. lunaris*
- 4a. Lateral line scales 51-61; scale rows on spinous portion of dorsal fin usually oblique; caudal fin yellow in life, each lobe with black margins 5
- 4b. Lateral line scales 57-67; scale rows on spinous portion of dorsal fin usually horizontal; caudal fin not yellow, each lobe with a median blackish streak or black botch 6
- 5a. Body yellow dorsally, and blue on sides, the demarcation horizontal from interorbital space across upper third of body; predorsal and supratemporal region not much darker *C. xanthonota*
- 5b. Body yellow dorsally, blue on sides, the demarcation colour oblique from slightly anterior to origin of dorsal fin; pre and supratemporal region dark *C. teres*
- 6a. A single yellow longitudinal stripe above lateral line; caudal fin lobes with distinct blackish streak, tips not darker *C. caerulea*
- 6b. Four to 6 longitudinal yellow stripes on sides; caudal fin lobes without distinct blackish streak, tips with a prominent black blotch *C. varilineata*
- 7a. Dorsal and anal fin scaled; premaxillary with small conical teeth 8 (Genus *Pterocaesio*)

- 7b. Dorsal and anal fins scaleless; premaxilla toothless 12
- 8a. Dorsal fin with 11 or 12 spines and 19-22 rays; each caudal lobe with black streak *P. tile*
- 8b. Dorsal fin with 10 or 11 spines (usually 11) and 14 to 16 rays; tip of caudal lobes with a black blotch 9
- 9a. Dorsal peduncular scale rows usually 11; pectoral rays 17 to 20; scales above lateral line to dorsal fin origin usually 8 or 9; sides of body with or without stripes 10
- 9b. Dorsal peduncular scale rows usually 12 or 13; pectoral rays 21 to 24; scale rows above lateral line 9 to 11; sides of body with one or more stripes or large yellow blotch 11
- 10a. Body dark red to greenish-blue; no stripes on body; snout yellow; tips of caudal fin lobes dark red to black *P. pisang*
- 10b. Upper part of body light blue to brownish, lower sides whitish- pink; bright yellow band below lateral line; a light yellow stripe along mid-dorsal line; tips of caudal lobes black *P. chrysozona*
- 11a. Pectoral rays 22-24 (frequently 3); 2 thin yellow stripes on sides, lower stripe covering the lateral line most of its length; tip of caudal fin lobes largely black *P. marri*
- 11b. Pectoral rays 20-22 (frequently 21); single thin yellow stripe on sides covering lateral line; tips of caudal fin lobes narrowly black *P. tessellata*
- 12a. Dorsal fin with 10 or 11 spines and 14 to 16 rays, fin not deeply notched; anal fin with 11 to 13 rays; pectoral rays 20 to 22; scale rows from origin of lateral line to origin of dorsal fin 7 to 9; a narrow yellow stripe along the lateral line; tip of caudal lobes black *Gymnocaesio gymnoptera*
- 12b. Dorsal fin with 14 spines and 8 to 11 rays, fin deeply notched; anal fin with 9 or 10 rays; pectoral fin rays 16 to 19; scale rows from origin of lateral line to origin of dorsal fin 9 to 11; three stripes; three narrow stripes on the sides of body; tip of caudal lobes not black *Dipterygonotus balteatus*

262. *Caesio caerulea* Lacepede, 1801

Blue-and-Gold Fusilier

D. X, 15; A. III, 12; P. 20-22; V. I, 5; Ll. 57-65. Body moderately deep, fusiform and compressed. Body bluish, lower sides whitish with an yellow stripe above lateral line bordered by a narrow white stripe above and below it; dorsal fin light blue with a black distal border; caudal lobes with a black median streak; axil of pectoral fin black; pectoral, pelvic and anal

fins white. Attains 30 to 35 cm. Found around coral reefs. Common. Good food fish. Indo-West Pacific.



Fig. 345. *Caesio caerulaurea*

263. *Caesio cuning* (Bloch, 1791)

Redbelly-Yellowtail Fusilier

D. X, 15; A. III, 11; P. 18-19; V. I, 5; Ll. 45-51. Body fairly deep and compressed. Caudal fin forked. Upper body greyish blue, lower sides and belly white or light pinkish; caudal fin, upper caudal peduncle and posterior portion of back yellow; pectoral, pelvic and anal fins white to pink; dorsal fin yellow posteriorly; axil of pectoral fin black. Attains 40 to 50 cm. Abundant, found in reef areas and tolerant of murky waters. Good food fish. Indo-West Pacific.



Fig. 346. *Caesio cuning*

264. *Caesio lunaris* Cuvier, 1830

Lunar Fusilier

D. X, 14; A. III, 11; P. 19-20; V. I, 5; Ll. 45-53. Body fairly deep, fusiform and compressed. Caudal fin forked. Body bluish, belly paler; tips of caudal lobes, axil and upper

lobes of pectoral fin black; dorsal and caudal fins blue; pectoral, pelvic and anal fins white. Attains 35 to 40 cm. Found in reef areas near coastal waters. Uncommon. Indo-West Pacific.



Fig. 347. *Caesio lunaris*

265. *Caesio teres* Seale, 1906

Blueback Fusilier

D. X, 15; A. III, 12; P. 20-22; V. I, 5; Ll. 51-61. Body moderately deep and fusiform; caudal fin forked. Colour bright blue, posterior upper part of body, caudal peduncle and caudal fin bright yellow; dorsal fin bluish and distal part yellowish; pectoral, pelvic and anal fins white; axil of pectoral fin black. Attains 40 cm. Found around reef areas in shallow areas. Uncommon. Indo-Pacific.



Fig. 348. *Caesio teres*

266. *Caesio varilineata* Carpenter, 1987

Lined Fusilier

D. X, 15-16; A. III, 12; P. 20-22; V. I, 5; Ll. 58-65. Body fusiform and moderately compressed; caudal fin forked. Body bluish, lower sides white to light blue; 3 to 6 longitudinal yellow stripes on side; tips of caudal fin lobes with a black blotch; pectoral, ventral and anal

fins white; axil of pectoral fin black; dorsal fin light blue with black margin. Attains 35 cm. Found around coral reefs in large groups. Not uncommon. Food fish. Indian Ocean, from East Africa to Indonesia.

267. *Caesio xanthonota* Bleeker, 1853

Yellowback Fusilier

D. X, 15; A. III, 12; P. 20-22; V. I, 5; Ll. 52-59. Body moderately deep and fusiform; caudal fin truncate. Upper third of body and caudal fin bright yellow, middle third blue, lower third white; dorsal fin yellow; pectoral, pelvic and anal fins white. Attains 35 to 40 cm. Found around coral reef areas. Common. Food fish. Indo-West Pacific.



Fig. 349. *Caesio xanthonota*

268. *Dipterygnotus balteatus* (Valenciennes, 1830)

Mottled Fusilier

D. XIV, 8-11; A. III, 9-10; P. 16-19; V. I, 5; Ll. 68-80. Body slender, fusiform and moderately compressed. Dorsal fin deeply notched between spinous and soft portions; dorsal and anal fins without scales. Upper side of body brownish, lower side whitish; a thin tan colour stripe from orbit to caudal fin present; all fins light pink. Attains 14 cm. Adults found near shores, juveniles around reef areas. Not uncommon. Important baitfish. Indo-West Pacific.

269. *Gymnocaesio gymnoptera* (Bleeker, 1856)

Slender Fusilier

D. X, 15; A. III, 12; P. 20-22; V. I, 5; Ll. 64-74. Body slender, elongate and moderately compressed. Dorsal fin continuous; dorsal and anal fins without scales; caudal fin forked. Body bluish green, silvery white ventrally; centers of scales lighter; an yellow brown stripe running along lateral line; pectoral, pelvic, dorsal and anal fins white; caudal fin dusky, tips of lobes black. Attains 15 cm. Found around reefs in large midwater aggregations. Common but has minor fishery importance. Indo-West Pacific.

270. *Pterocaesio chrysozona* (Cuvier, 1830)**Goldband Fusilier**

D. X, 15; A. III, 12; P. 17-20; V. I, 5; Ll. 64-69. Body fusiform, elongate and compressed. Single dorsal fin; dorsal and anal fins scaled; caudal fin forked. Body light blue to brownish, lower sides white to pinkish; a bright yellow band below lateral line from orbit to base of caudal fin; a less conspicuous yellow stripe along dorsal midline; fins white to light pinkish; tips of caudal fin lobes black; axil of pectoral fin black. Attains 20 cm. Found around coral reef areas in large schools. Frequently found in fish catches, good food fish. Indo-West Pacific.



Fig. 350. *Pterocaesio chrysozona*

271. *Pterocaesio marri* Schultz, 1953**Marr's Fusilier**

D. X, 15; A. III, 12; P. 22-24; V. I, 5; Ll. 70-74. Body fusiform and compressed; caudal fin forked. Body bluish green dorsally, white ventrally; two longitudinal stripes, upper running along dorsal profile ending on caudal peduncle and the other along lateral line; margin of dorsal fin dusky; all fins white to light pink; axil of pectoral fin and tips of caudal lobes black. Attains 30 cm. Found around coral reefs in small schools. Common fusilier. Food fish. Indo-West Pacific.



Fig. 351. *Pterocaesio marri*

272. *Pterocaesio pisang* (Bleeker, 1853)**Banana Fusilier**

D. X, 15; A. III, 12; P. 18-20; V. I, 5; Ll. 63-71. Body fusiform and elongate. Single dorsal fin; dorsal and anal fins scaled; caudal fin forked. Body dark red to silvery above, pale ventrally; no stripes or bands on sides of the body; axil of pectoral fin black; tips of caudal fin lobes dark red to black. Attains 20 cm. Found around coral reefs. Common food fish. Indo-West Pacific.

Fig. 352. *Pterocaesio pisang*273. *Pterocaesio tessellata* Carpenter, 1987**One-stripe Fusilier**

D. X, 15; A. III, 12; P. 20-22; V. I, 5; Ll. 69-74. Body fusiform and moderately compressed. Caudal fin forked. Body light bluish green, lower part whitish to light pink; a yellow longitudinal stripe along lateral line; pectoral, pelvic and anal fins white to light pinkish; dorsal fin light bluish green; caudal fin dusky, tips of lobes black; axil of pectoral fin black. Attains 20 to 23 cm. Found around coral reefs in large groups. Common in fish catches, good food fish. Eastern Indian Ocean to West Pacific.

Fig. 353. *Pterocaesio tessellata*274. *Pterocaesio tile* (Cuvier, 1830)**Dark-banded Fusilier**

D. XI-XII, 19-22; A. III, 13; P. 22-24; V. I, 5; Ll. 69-76. Body fusiform and compressed. Dorsal and anal fins scaled; caudal fin forked. Upper part of body bluish, lower third of body white to pinkish; a narrow black stripe along lateral line; dorsal fin light bluish green; each

lobe of caudal fin with black streak; pectoral, pelvic and anal fins white; axil of pectoral fin black. Attains 25 to 30 cm. Found around coral reef areas in small schools. Uncommon. Food fish. Indo-Pacific.



Fig. 354. *Pterocaesio tile*

Family LETHRINIDAE
Emperor or Large-eye Breams

Perch like fishes; mouth small to moderate and terminal; lips soft and fleshy; jaws strong and large, upper jaw protrusible; canine teeth present in both jaws; single dorsal fin; caudal fin emarginate or forked. Body scales small and finely ctenoid. They are bottom feeding carnivorous fishes, feed on gastropods, crustaceans, polychaetes, etc. and occasionally on other fish species. Found primarily on or near reefs and prefer sand or rubble substrate. Usually found solitary or schooling. Many species spend daytime sheltering in coral crevices and among coral thickets. They are capable of rapidly changing to mottled or reticulated colour pattern. They are relatively long-lived fishes. Very important component of the commercial fish catches; good food fishes.

Key to species

- 1a. Cheek naked; dorsal fin rays 9; anal fin rays 8 2 (Genus *Lethrinus*)
- 1b. Cheek with 4 to 6 vertical rows of scales; dorsal fin rays 10; anal fin rays 9 or 10 16
- 2a. Inner surface of pectoral fin base without scales or with few scales covering less than ½ the inner base of the fin 3
- 2b. Inner surface of pectoral fin base covered with scales 8
- 3a. Body slender, depth 3.4 –3.9 in SL; transverse scale rows below lateral line 13—14 *L. variegatus*
- 3b. Body depth 2.9—3.3 in SL; transverse scale rows below lateral line 15–17 4
- 4a. Snout without lip 1.3 – 1.4 in cheek height; 4th dorsal spine longest; dark streaks radiating from eye on snout; inner surface of pectoral fin base never red *L. microdon*
- 4b. Snout without lip below 1.3 in cheek height; 3rd dorsal spine longest; no dark streaks radiating from eye; inner base of pectoral fin sometimes red 5
- 5a. Membrane between inner rays of ventral fin densely covered with melanophores 6
- 5b. Membrane between inner rays of ventral fin without dense cover of melanophores. 7
- 6a. Interorbital area distinctly convex; 9-11 scales in supratemporal patch; lips reddish *L. amboinensis*
- 6b. Interorbital area distinctly concave; 5-8 scales in supratemporal patch; lips yellowish *L. xanthochilus*

- 7a. A prominent hump in front of eye, snout profile distinctly concave; a bright red triangular blotch above pectoral base; lips and opercular edge red ***L. conchyliatus***
- 7b. No prominent hump in front of eye; snout profile straight or slightly concave; no red blotch above pectoral base; lips and upper edge of opercle red... ***L. rubrioperculatus***
- 8a. A large black blotch below lateral line and centered on the posterior tip of pectoral fin ***L. harak***
- 8b. No dark blotch below lateral line 9
- 9a. Longitudinal scale rows between lateral line and base of middle dorsal spines $4\frac{1}{2}$ 10
- 9b. Longitudinal scale rows between lateral line and base of middle dorsal spines $5\frac{1}{2}$ 12
- 10a. Dorsal profile of snout nearly straight; 4 or 5 scales in supratemporal patch; the 1st and 2nd dorsal rays usually longest ***L. mahasena***
- 10b. Dorsal profile of snout distinctly or slightly concave; 5 to 9 scales in supratemporal patch; the 3rd, 4th or 5th anal rays usually longest 11
- 11a. Lateral teeth in jaws usually with distinct molars; lateral line scales 44 – 46; body depth 2.3 to 2.6 in SL; a broad light streak from eye to tip of snout; lips and base of pectoral fin red ***L. erythropterus***
- 11b. Lateral line scales 47 or 48; body depth 2.5 to 2.7 in SL; small orange spots on cheek; lips and base of pectoral fin not red ***L. erythracanthus***
- 12a. Outer surface of maxilla smooth without ridge or knob; head 0.8 to 0.9 in body depth; head profile around eye distinctly convex; edge of preopercle and opercle red; 4-6 orange stripes on sides of body ***L. ornatus***
- 12b. Outer surface of maxilla with ridge or knob; head length 0.9 to 1.1 in body depth; head profile near eye slightly concave or straight; stripes on sides of body present or absent 13
- 13a. Scale rows in lower series around caudal peduncle 13-14; lateral teeth distinct molars; eye very close to dorsal profile; head profile near eye slightly convex ***L. borbnicus***
- 13b. Scale rows in lower series around caudal peduncle 15; lateral teeth in jaws either rounded, simple molars or with tubercles; eye not close to dorsal profile; head profile near eye straight or slightly concave 14
- 14a. Melanophores present on membranes of inner rays of ventral fin; 16-17 scale rows

- from origin of anal fin to lateral line; blue spots and lines radiating from eye o snout *L. nebulosus*
- 14b. Melanophores absent on membrane of ventral fin; 15 or 16 scale rows between origin of anal fin and lateral line; no blue spots or lines radiating from eye 15
- 15a. Surface of maxilla smooth or with ridge; lateral teeth in jaws rounded; molars with tubercles or simple; snout profile straight; edge of opercle and sometimes base of pectoral fin red *L. lentjan*
- 15b. Surface of maxilla with a knob; lateral teeth in jaws rounded; snout profile concave; edge of opercle and pectoral fin base never red *L. obsoletus*
- 16a. Usually 9 soft rays in anal fin; maxilla with denticulate ridge 17
- 16b. Usually 10 soft rays in anal fin; maxilla smooth without denticulate ridge 18 (Genus *Gymnocranius*)
- 17a. Sides of with rounded, flat molars preceded by a patch of small teeth and an anterior series of canine teeth; head profile in front of eye strongly convex; inner surface of pectoral fin base scaled; no longitudinal stripes on body *Monotaxis grandoculis*
- 17b. Each jaw with a narrow band of villiform teeth and a series of conical teeth; head profile in front of eye straight; inner surface of pectoral fin base scaleless; yellow longitudinal stripes on body *Gnathodentex aureolineatus*
- 18a. Caudal fin deeply forked, the median rays shorter than eye diameter; lower edge of eye intersected by line from top of snout to middle of caudal fin *Gymnocranius elongatus*
- 18b. Caudal fin moderately forked, the median rays equal to or longer than eye diameter; lower edge of eye above the line from tip of snout to middle of caudal fin 19
- 19a. Body depth less than 2.2 in SL; no blue spots or wavy lines on cheek; irregular dark bars on sides of body and dark subopercular bar *Gymnocranius griseus*
- 19b. Body depth above 2.3 in SL; wavy blue lines on snout and cheek; no dark bar on opercle *Gymnocranius grandoculis*

275. *Gnathodentex aureolineatus* (Lacepede, 1802)

Striped Large-eye Bream

D. X, 10; A. III, 8-9; P. 15; V. I, 5; Ll. 68-74. Body oblong; dorsal profile of head moderately sloped; eyes relatively large; inner surface of pectoral fin axil scaleless; caudal fin strongly forked; upper part of body dark brown with narrow silvery stripes along each

horizontal scale row; remainder of head and body silver to grey; 4 or 5 brownish orange stripes on lower side of body; a prominent golden-yellow blotch below posterior part of dorsal fin; an yellow orange spot at upper base of pectoral fin. Attains 25 to 30 cm. Found on coral reefs in aggregations in shallow waters. Common. Good food fish. Indo-West Pacific.



Fig. 355. *Gnathodentex aureolineatus*

276. *Gymnocranius elongatus* Senta, 1973

Forktail Large-eye Bream

D. X, 10; A. III, 10; P. 14; V. I, 5; Ll. 46-48. Body oblong; head profile evenly rounded; snout slightly pointed; eyes large; mouth small; caudal fin deeply forked, tips pointed. Body silvery with eight transverse brown bars on sides, first crossing through eye; all fins orange yellow; caudal margin and tips deep red. Attains 30 to 35 cm. Inhabits outer reef areas in deep waters. Indo-West Pacific.

277. *Gymnocranius grandoculis* (Valenciennes, 1830)

Blue-lined Large-eye Bream

D. X, 10; A. III, 10; P. 14; V. I, 5. Body oblong; head profile moderately steep; mouth small; caudal fin forked. Body silvery with thin brown scale margins; anterior half of head brown;



Fig. 356. *Gymnocranius grandoculis*

narrow undulating longitudinal lines on cheek and sides of snout; all fins light orange; caudal fin grey-brown; a narrow brown bar across base of pectoral fins. Attains 60 to 70 cm. Found on rocky bottoms of outer reef areas. Uncommon. Good food fish. Indo-West Pacific.

278. *Gymnocranius griseus* (Temminck & Schlegel, 1843)

Grey Large-eye Bream

D. X, 10; A. III, 10; P. 14; V. I, 5; Ll. 46-48. Body oblong; dorsal and ventral profiles of head evenly convex; eyes relatively large; mouth small; caudal fin moderately forked. Body silvery with 5 to 8 narrow diffuse dark bars on sides; fins yellowish some times diffuse mottling on dorsal, caudal and anal fins. Attains 60 to 70 cm. Found in coastal reef regions. Uncommon. Coasts of India to Southern Japan.

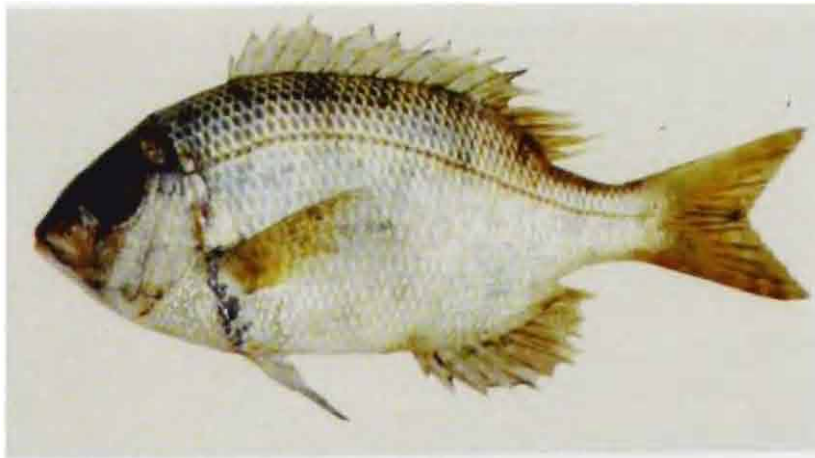


Fig. 357. *Gymnocranius griseus*

279. *Lethrinus amboinensis* Bleeker, 1854

Ambon Emperor

D. X, 9; A. III, 8; P. 13; V. I, 5; Ll. 47-48. Body slightly elongate; snout moderately long; eyes situated close to dorsal profile; inner surface of pectoral fin without scales. Body yellowish with scattered indistinct dark blotches; head light brown with indistinct streaks;



Fig. 358. *Lethrinus amboinensis*

lips reddish; pectoral axil orangish; outer edges of pectoral fin yellow; pelvic and anal fins light yellowish; dorsal and caudal fins mottled brown. Attains 60 to 70 cm. Found in coral reef areas in deep waters. Good food fish. Indo-West Pacific.

280. *Lethrinus borbonicus* Valenciennes, 1830

Snubnose Emperor

D. X, 9; A. III, 8; P. 13; V. I, 5. Body moderately deep; dorsal profile of head slightly convex; snout short and blunt; eyes situated close to dorsal profile; caudal fin forked. Body dark grey, centers of scales lighter; whitish on lower sides; head brownish; pectoral and pelvic fins white; dorsal and anal fins mottled white with reddish edge; caudal fin with indistinct reddish bands. Attains 40 cm. Found around sandy areas near reefs. Uncommon. Feeds on echinoderms, crustaceans and mollusks. Good food fish. Indian Ocean.



Fig. 359. *Lethrinus borbonicus*

281. *Lethrinus conchylia* (Smith, 1959)

Redaxil Emperor

D. X, 9; A. III, 8; P. 13; V. I, 5. Body slightly elongates; dorsal profile of head near eye convex; caudal fin moderately forked. Body and head brownish, lighter ventrally; lips, base



Fig. 360. *Lethrinus conchylia*

of pectoral fin and opercular edge red; fins ornagish with mottling. Attains 50 to 60 cm. Found around deep reef areas. Uncommon. Feeds on crustaceans and fish. Indian Ocean.

282. *Lethrinus erythracanthus* Valenciennes, 1830

Orange-spotted Emperor

D. X, 9; A. III, 8; P. 13; V. I, 5. Body moderately deep; snout short; inner surface of pectoral fin densely scaled; caudal fin slightly forked, lobes rounded. Body dark grey with small indistinct scattered light and dark spots; head brown with small orange spots on cheeks; pectoral and pelvic fins white to light orange; dorsal and anal fins mottled orange; caudal fin orange. Attains 50 to 60 cm. Found around lagoons, channels and outer reef areas at moderate depths. Feeds on echinoderms, crustaceans and mollusks. Indo-West Pacific.



Fig. 361. *Lethrinus erythracanthus*

283. *Lethrinus erythropterus* Valenciennes, 1830

Longfin Emperor

D. X, 9; A. III, 8; P. 13; V. I, 5. Body fairly deep; dorsal profile of head near eye distinctly convex; snout short; inner surface of pectoral fin densely scaled, caudal fin forked, lobes rounded. Head and body brownish red, lighter ventrally; sometimes two light bars on caudal peduncle; a broad streak from eye to tip of snout, lips and pectoral fin base red; all fins reddish. Attains 40 to 50 cm. Found around coral reefs and sandy areas. Usually found in small groups. Feeds on echinoderms, crustaceans and mollusks. Indo-West Pacific.

284. *Lethrinus harak* (Forsskal, 1775)

Thumbprint Emperor

D. X, 9; A. III, 8; P. 13; V. I, 5; Ll. 46-47. Body moderately deep; dorsal profile near eye slightly convex; eye close to dorsal profile; snout short and blunt; caudal fin forked. Body olive or grey above, shading to silvery white below; a large black spot broadly edged in yellow on side below lateral line; pectoral, pelvic, dorsal and anal fins pinkish white; caudal fin reddish. Attains 25 to 30 cm. Found in shallow sandy, coral rubble, seagrass, mangrove

areas of the reefs. Feeds on polychaetes, echinoderms, molluscs and small fish. Common food fish. Indo-West Pacific.



Fig. 362. *Lethrinus harak*

285. *Lethrinus lentjan* (Lacepede, 1802)

Pink Ear Emperor

D. X, 9; A. III, 8; P. 13; V. I, 5. Body moderately deep; dorsal profile of head straight; snout short; caudal fin truncate. Body greenish, shading to white below; scale centers on upper side white; posterior margin of opercle and base of pectoral fin red; pectoral fin white or yellowish; pelvic and anal fins white to light orange; dorsal fin white and orange mottled with reddish margin; caudal fin mottled orange. Attains 30 to 40 cm. Found in sandy bottom and coral reef areas in moderate depths. Good food fish. Indo-West Pacific.



Fig. 363. *Lethrinus lentjan*

286. *Lethrinus mahsena* (Forsskal, 1775)

Sky Emperor

D. X, 9; A. III, 8; P. 13; V. I, 5. Body relatively deep; snout short; eye situated close to dorsal profile; caudal fin forked, lobe ends slightly rounded. Head purplish grey; red blotch on nape; body yellowish, lighter ventrally with 9 or 10 brown bars; a red bar at base of

pectoral fin; base and tips of pelvic fins red; membranes of dorsal fin red; anal fin whitish; caudal fin light reddish. Attains 50 to 60 cm. Found around coral reefs, weed and sandy areas in deep waters. Common commercial fish. Feeds on echinoderms, crustaceans and fishes. Good food fish. Indian Ocean.



Fig. 364. *Lethrinus mahsena*

287. *Lethrinus microdon* Valenciennes, 1830

Smalltooth Emperor

D. X, 9; A. III, 8; P. 13; V. I, 5. Body elongates; dorsal profile of head straight; snout moderately long; caudal fin moderately forked. Body bluish grey with scattered irregular dark blotches on sides; three dark streaks radiating from eye; fins pale or orangish. Attains 50 to 60 cm. Found on sandy areas near reefs. Not uncommon. Feeds on crustaceans, cephalopods, and polychaetes. Indo-West Pacific.



Fig. 365. *Lethrinus microdon*

288. *Lethrinus nebulosus* (Forsskal, 1775)

Spangled Emperor

D. X, 9; A. III, 8; P. 13; V. I, 5. Body moderately deep; dorsal profile of head near eye straight; snout moderately long; caudal fin forked. Body yellowish, lighter below; centers of

scales with light blue spot; three blue streaks or series of blue spots radiating from eye; fins whitish; edge of dorsal fin red; pelvic fin dusky. Attains 70 cm. Found near coral reef areas, sea grass beds, lagoons, and mangrove areas in small schools. Not uncommon. Feeds mainly on echinoderms, crustaceans and mollusks. Good food fish. Indo-West Pacific.



Fig. 366. *Lethrinus nebulosus*

289. *Lethrinus obsoletus* (Forsskal, 1775)
Orange-striped Emperor

D. X, 9; A. III, 8; P. 13; V. I, 5. Body moderately deep; eyes relatively large and situated close to the dorsal surface; Caudal fin broadly emarginated. Colour light olive to brownish, lighter below; centers of scales lighter than ground colour; an orange yellow stripe on the sides of body at the level of pectoral fin base; posterior edge of operculum dark brown; fins whitish. Attains 30 to 40 cm. Found around sea grass beds, lagoons, sand and coral rubble beds in shallow waters. Uncommon. Feeds on crustaceans, molluscs and echinoderms. Good food fish. Indo-West Pacific.



Fig. 367. *Lethrinus obsoletus*

290. *Lethrinus ornatus* Valenciennes, 1830**Ornate Emperor**

D. X, 9; A. III, 8; P. 13; V. I, 5. Body relatively deep; dorsal profile near eye convex; eye situated close to dorsal profile; caudal fin forked. Body dusky, lighter below; sides of body with 4 to 6 orange stripes; edge of operculum and pre-operculum bright red; head brownish; pectoral fin orange; pelvic, anal and dorsal fin whitish; edge of dorsal and caudal fin reddish. Attains 40 cm. Found around reefs. Not uncommon. Indo-West Pacific.



Fig. 368. *Lethrinus ornatus*

291. *Lethrinus rubrioperculatus* Sato, 1978**Spotcheck Emperor**

D. X, 9; A. III, 8; P. 13; V. I, 5. Body slightly elongated. Caudal fin forked. Body olive-grey with irregular scattered black blotches; lips red; a red spot on upper edge of operculum; other fins pale pinkish. Attains 30 cm. Found on sand and coral rubble areas of outer reefs. Uncommon. Food fish. Indo-West Pacific.



Fig. 369. *Lethrinus rubrioperculatus*

292. *Lethrinus variegatus* Valenciennes, 1830**Slender Emperor**

D. X, 9; A. III, 8; P. 13; V. I, 5. Body slender; caudal fin slightly forked. Body brownish; lighter ventrally, with scattered irregular spots; a dark band across interorbital space; dorsal, anal, pectoral and pelvic fins light; caudal fin light and dark striped. Attains 20 cm. Found sandy and weedy areas near coral reefs. Not uncommon. Feeds on small benthic invertebrates. Indo-West Pacific.



Fig. 370. *Lethrinus variegatus*

293. *Lethrinus xanthochilus* Klunzinger, 1870**Yellowlip Emperor**

D. X, 9; A. III, 8; P. 13; V. I, 5. Body moderately elongate; caudal fin forked. Body yellowish grey with scattered irregular spots; lips yellowish; a red spot at upper base of pectoral fin; fins grey and mottled, edges of dorsal and caudal fin reddish. Attains 50 cm. Found around sea grass, sand and coral rubble areas adjacent to reefs in shallow waters. Not uncommon. Indo-West Pacific.



Fig. 371. *Lethrinus xanthochilus*

294. *Monotaxis grandoculis* (Forsskal, 1775)
Humpnose Big-eye Bream

D. X, 10; A. III, 9; P. 14; V. I, 5. Body oblong; head profile strongly convex in front of eye, snout sloping steeply; hind margin of opercle finely serrated; caudal fin forked. Body bluish-grey, whitish ventrally; lips yellow; area around eye yellow or pink; fin membranes light orange; base of upper pectoral rays and inner axil black; margins of caudal fin black. Attains 40 to 50 cm. Very common and usually found solitary, but occasionally in aggregations around coral reef areas. Indo-Pacific.



Fig. 372. *Monotaxis grandoculis*

Family NEMIPTERIDAE

Threadfin Breams or Monoclebreams

Small to moderate sized fishes. Body oblong to elongate and slightly compressed; mouth terminal; a strong backward directed spine below eye present in species of *Scolopsis*. Teeth in jaws small, canines present or absent; a medium sized axillary scale present above each pelvic fin; dorsal fin continuous; caudal fin forked or emarginated, the upper lobe often with a filament; scales on body large, ctenoid and deciduous. Common inhabitants of shallow reef areas. Occur in solitary or in small groups. Brightly coloured fishes. Feeds on benthic invertebrates like polychaetes, prawns, crab, isopods, ostracods and copepods, etc. Most species are good food fishes but commercially not significant.

Key to species

- 1a. Suborbital with a distinct backwardly directed spine below eye; no canine teeth in jaws 2 (Genus *Scolopsis*)
- 1b. Suborbital spine absent; small canines anteriorly in jaws 10 (Genus *Nemipterus*)
- 2b. Lateral line scales 36 to 40; three and half scale rows between lateral line and median dorsal spines; body scales with silvery spots; no bands on body; Juveniles with a black mid-lateral stripe *S. margaritifer*
- 2b. Lateral line scales more than 40; two and half to four and half scale rows between lateral line and median dorsal spines; body with bands or stripes 3
- 3a. Four and half to five scales between lateral line and median dorsal spines; upper caudal fin lobe prolonged; a distinct broad lateral stripe present *S. monogramma*
- 3b. Three and half scale rows between lateral line and median dorsal spines; caudal fin lobes not prolonged; colour not as in 3a 4
- 4a. Maxillary with a denticulated ridge; a silvery stripe on back below dorsal fin *S. ciliatus*
- 4b. Maxillary smooth, without denticulated ridge 5
- 5a. Scales on head beginning between anterior part of eyes, at some distance behind nostrils 6
- 5b. Scales on head beginning before eyes, reaching to anterior nostrils; a curved white band with a black margin from mouth to middle of dorsal fin base; spinous dorsal fin bright yellow *S. bilineatus*
- 6a. Lateral line with 49 to 51 scales 7
- 6b. Lateral line with 44 to 46 scales 8

- 7a. Head pointed, its profile straight from nape to snout; a yellowish band from eye to base of caudal and bluish band between eyes *S. personatus*
- 7b. Head blunt, its profile convex; body with oblique blue and yellow vertical lines; pectoral base with red spot *S. taeniopterus*
- 8a. Maxilla reaching to below front border of eye 9
- 8b. Maxilla reaching to below nostrils; a broad silvery band below lateral line; anterior part of band crossed by a pair of short oblique brown streaks; posterior part of operculum with black spot *S. xenochrous*
- 9a. Three yellowish white bands parallel with the lateral line; anterior part of each body scale below lateral line with black spot *S. ghanam*
- 9b. Upper sides with two creamy white stripes and several broad blackish bars with pale spaces between them *S. lineatus*
- 10a. Upper lobe of caudal fin prolonged into a filament 11
- 10b. Upper lobe of caudal fin without filament 15
- 11a. First and second dorsal spines close together and forming a single long filament; sides of body with yellow stripes; a yellow spot at origin of lateral line *N. luteus*
- 11b. Dorsal spines normal, colour not as in 11a 12
- 12a. Canines anteriorly in both jaws 13
- 12b. Canine teeth anteriorly I upper jaw only 14
- 13a. Soft dorsal and anal fins rounded behind; both the caudal fin lobes produced into filamentous; light pinkish red to brown above, silvery below; tips of caudal fin dark *N. zysron*
- 13b. Soft dorsal and anal fins pointed behind; upper caudal fin lobe filamentous; body and fins light reddish; tips of caudal fin not dark *N. nemurus*
- 14a. Anal fin with several irregular longitudinal yellow streaks; shoulder spot and caudal filament yellow *N. japonicus*
- 14b. Anal fin with two yellow streaks; shoulder spot and caudal filament rosy red *N. mesoprion*
- 15a. Dorsal fin spines very slender and much longer than soft rays; interspinous membrane distinctly and deeply incised; upper part of body with saddle-like blotches; reddish brown spot at anterior end of lateral line *N. peronii*

- 15b. Dorsal fin spines more or less sub-equal with soft rays; interspinous membrane entire or only slightly emarginate 16
- 16a. Two main bright yellow bands on sides of body; a blue spot on opercle; anal fin milky white *N. bipunctatus*
- 16b. Five to seven yellow streaks along sides of body; dorsal and anal fins each with a basal yellow streak *N. hexodon*

295. *Nemipterus bipunctatus* (Valenciennes, 1830)

Bleeker's Threadfin Bream

D. X, 9; A. III, 7; P. 16; V. I, 5. Body slender and slightly compressed. Interspinous membrane of dorsal fin emarginated; no filamentous rays in fins. Body light reddish above, silvery below with narrow yellow bands; a bluish spot on operculum; all fins light red. Attains 20 cm. Not true reef dwellers but occasionally found on sandy bottom near reef areas. Uncommon. Indo-West Pacific.



Fig. 373. *Nemipterus bipunctatus*

296. *Nemipterus hexodon* (Quoy & Gaimard, 1824)

Red Spot Threadfin Bream

D. X, 9; A. III, 7; P. 16-18; V. I, 5. Body slightly compressed; mouth small; interspinous membrane slightly emarginate; caudal fin slightly forked, upper lobe pointed in young and blunt



Fig. 374. *Nemipterus hexodon*

in adults. Body light rosy with 6 or 7 yellow longitudinal stripes along sides of body; a bright reddish yellow spot below origin of lateral line; dorsal fin rosy with yellow margin and greenish yellow and blue bands; pectoral fins pale rosy; pelvic fins hyaline; anal fin milky white. Attains 15 to 20 cm. Found around coastal waters on bottom. Not true reef dwellers but occasionally found close to reefs. Not uncommon. Good food fish. Indo-West Pacific.

297. *Nemipterus japonicus* (Bloch, 1791)

Japanese Threadfin Bream

D. X, 9; A. III, 7; P. 17; V. I, 5. Body slightly compressed. Canines present in upper jaw only; caudal fin forked, its upper lobe prolonged into a filament. Body light rosy above, silvery below; eight bright yellowish orange bands along sides; dorsal fin rosy with yellow band along base; anal fin milky white; caudal fin rosy, its upper lobe and filament yellow. Attains 20 to 25 cm. Not true reef dwellers but occasionally found near reef areas. Common bream. Good food fish. Indo-West Pacific.



Fig. 375. *Nemipterus japonicus*

298. *Nemipterus luteus* (Schneider, 1801)

Doublewhip Treadfin Bream

D. X, 9; A. III, 7; P. 16; V. I, 5. Body slender and slightly compressed; upper jaw with canines; dorsal fin spines flexible, 1st and 2nd spines fused together and forming a single long filament; upper caudal fin lobe prolonged into a filament. Body rosy above, silvery below with yellow stripes below lateral line; fins light pink. Attains 15 to 20 cm. Not true reef dwellers but occasionally found near reef areas. Uncommon. Indo-West Pacific.

299. *Nemipterus mesoprion* (Bleeker, 1853)

Redfilament Threadfin Bream

D. X, 9; A. III, 7; P. 16-18; V. I, 5. Body slender; no canines in lower jaw; caudal fin forked, its upper lobe prolonged into a short filament. Body rosy, silvery below; head with yellow streaks radiating from eye to below nostrils and to middle of upper jaw. Two broad yellow streaks along sides of body; a red spot below origin of lateral line; dorsal fin margin yellow with a median yellow longitudinal band; anal fin pinkish; caudal fin reddish. Attains

20 to 25 cm. Not true reef dwellers but occasionally found near reefs. Not uncommon. Indo-West Pacific.



Fig. 376. *Nemipterus mesoprion*

300. *Nemipterus zysron* (Bleeker, 1853)
Coral Bream

D. X, 9; A. III, 7; P. 16; V. I, 5. Body slender and elongate; curved canines in both the jaws; caudal fin forked, upper lobe filamentous. Body reddish brown, lower sides yellowish silvery; two yellowish bands on anterior head region, one from nostril to eye and the other from upper lip to lower margin of eye; dorsal fin yellow; caudal fin light pink, its filament yellow; base of anal fin with yellow spots. Attains 15 to 20 cm. Not true reef dwellers but occasionally found on sandy bottom near reefs. Uncommon. Indo-West Pacific.



Fig. 377. *Nemipterus zysron*

301. *Nemipterus nemurus* (Bleeker, 1857)
Whiptail Coralbream

D. X, 9; A. III, 7; P. 10; V. I, 5. Body moderately slender and compressed; caudal fin deeply forked, both lobes produced into filaments. Body brownish with two longitudinal

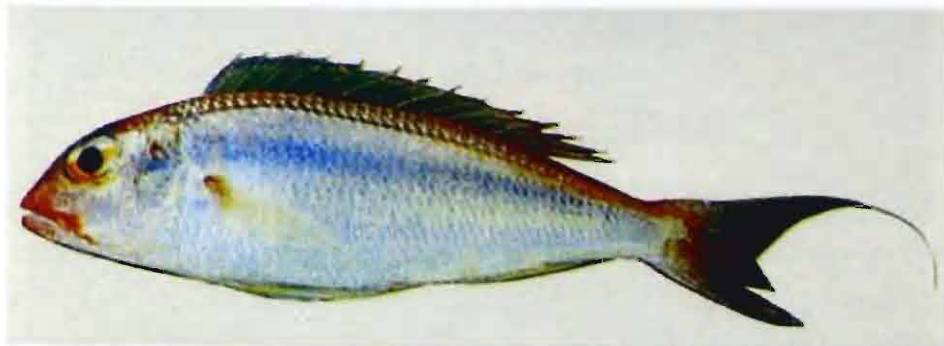


Fig. 378. *Nemipterus nemurus*

yellow bands; all fins yellow except caudal fin purplish. Attains 50 to 60 cm. Not true reef dwellers but occasionally found near reefs. Uncommon. Indo-West Pacific.

302. *Nemipterus peronii* (Valenciennes, 1830)
Notched Threadfin Bream

D. X, 9; A. III, 7; P. 16; V. I, 5. Body slender; canine teeth present only in upper jaw; dorsal fin spines flexible, much longer than rays, interspinous membrane deeply notched; pectoral fin short; no filaments in fins; caudal fin deeply forked. Body rosy above, silvery below; head reddish; fins light yellow; caudal fin rosy. Attains 20 to 25 cm. Not true reef dwellers but occasionally found on sandy bottom near reefs. Not uncommon. Indo-West Pacific.



Fig. 379. *Nemipterus peronii*

303. *Scolopsis bilineatus* (Bloch, 1793)
Bridled Monocle Bream

D. X, 9; A. III, 7; P. 17; V. I, 5. Body elongates and moderately compressed; eyes large; snout slightly pointed. Body dusky on dorsal side of head and body, silvery white on sides and below. A prominent white curved band with a black margin from mouth to middle of dorsal fin base; a pair of short white stripes above eye; spinous dorsal fin bright yellow; white mark on soft dorsal fin extending onto back; anal fin black anteriorly. Juvenile with black and yellow stripes on upper half of body. Attains 20 to 25 cm. Found in shallow reef areas. Common. Good aquarium fish. Indo-West Pacific.



Fig. 380. *Scolopsis bilineatus*

304. *Scolopsis ciliatus* (Lacepede, 1802)**Monocle Bream**

D. X, 9; A. III, 7; P. 16; V. I, 5. Body moderately elongate; a short backwardly directed, pointed spine below eye; first ray of pelvic fin produced into a short thread-like filament; caudal fin slightly forked. Brown above on head and body, silvery on sides and belly; a broad silvery-white band on dorsal side of body, narrowing posteriorly; tip of snout black; all fins dusky but pelvic fin hyaline. Attains 20 to 25 cm. Not uncommon. Indo-West Pacific.



Fig. 381. *Scolopsis ciliatus*

305. *Scolopsis ghanam* (Forsskal, 1775)**Paleband Monocle Bream**

D. X, 9; A. III, 7; P. 16; V. I, 5. Body moderately slender; caudal fin forked. Colour silvery grey with numerous black or dark brown spots on sides; the spots above lateral line forming 2 or 3 longitudinal stripes; a pearly white band from below eye to upper base of pectoral; all fins bluish grey. Attains 20 to 25 cm. Found adjacent to reefs in shallow waters. Indian Ocean.



Fig. 382. *Scolopsis ghanam*

306. *Scolopsis lineatus* Quoy & Gaimard, 1824**Lined Monocle Bream**

D. X, 9-10; A. III, 7-8; P. 15-16; V. I, 5. Body slender, eyes large. Sides of upper half of body with two narrow creamy stripes and broad black bars with pale spaces between them; lower half of body silvery white. Attains 20 cm. Found around sand or rubble areas of the reefs in shallow waters. Very common bream. Food fish but has no much commercial value. Indo-West Pacific.



Fig. 383. *Scolopsis lineatus*

307. *Scolopsis margaritifer* (Cuvier, 1830)**Pearly Monocle Bream**

D. X, 9; A. III, 7; P. 16; V. I, 5. Body moderately deep and slender; suborbital spine long and reaching below hind border of pupil; caudal fin forked. Body greyish brown on back, silvery white below; scales on upper side with white vertical streaks, middle scales on sides



Fig. 384. *Scolopsis margaritifer*

with yellow centers; all fins bluish-grey. Juveniles white with a black mid-lateral stripe from snout through eye to caudal fin base, another band from head to base of dorsal fin. Attains 25 to 28 cm. Found around shallow reef areas. Feeds on small crustaceans molluscs and fishes. Common. Indo-West Pacific.

308. *Scolopsis monogramma* (Cuvier, 1830)

Monocel Bream

D. X, 9; A. III, 7; P. 18; V. I, 5. Upper lobe of caudal fin with a long filament. Body pale tan with a series of slanting dotted lines on middle sides of body or sometimes form a solid stripe; caudal fin with a broad yellow sub-marginal and blue border; interorbital with blue lines. Attains 30 cm. Found on sandy bottom of the reefs. Common bream. Feeds on small crustaceans molluscs and fishes. Food fish but has no commercial value. Andaman Sea to New Caledonia.



Fig. 385. *Scolopsis monogramma*

309. *Scolopsis personatus* (Cuvier, 1830)

Yellowlined Monocle Bream

D. X, 9; A. III, 7; P. 17-18; V. I, 5. Body slender; sub-orbital with strong spine. Body greyish brown above, silvery below with a wide yellowish band from eye to base of caudal fin; all fins light blue, except caudal fin yellow. Attains 20 cm. Found on sandy or muddy bottom near reefs. Feeds on small crustaceans molluscs and fishes. Indo-West Pacific.

310. *Scolopsis taeniopterus* (Cuvier, 1830)

Lattice Monocle Bream

D. X, 9; A. III, 7; P. 16-17; V. I, 5. Body relatively deep; dorsal profile steeply curved; eyes fairly large; snout long; suborbital with strong spine; lower limb of preopercle naked; ventral fins long, reaching to or beyond level of anus. Body dark on upper side, whitish below; a broad brownish longitudinal stripe below lateral line; narrow blue stripe joining eyes

just behind nostrils; a blue stripe from middle of upper lip to lower edge of eye; upper part of pectoral-fin base with a reddish-orange spot; dorsal fin light yellow; caudal fin yellow, blue along posterior margin and lower edge; other fins hyaline. Attains 20 to 25 cm. Found on sandy bottom near reefs. Swims in small groups. Feeds on small crustaceans molluscs and fishes. Rated as a good food fish. Indo-West Pacific.

311. *Scolopsis xenochrous* Gunther, 1872

Spotted Monocle Bream

D. X, 9; A. III, 7; P. 16-18; V. I, 5. Body moderately deep; caudal fin forked. Body olive brown with a narrow bluish line below dorsal base; sides of body with olive spots and a large yellowish white blotch; an oblique white bar with black edges above pectoral; fins pinkish; tail yellow, lobe tips red. Attains 20 cm. Found near coral reefs in deep waters. Feeds on small crustaceans molluscs and fishes. Not uncommon. Indian Ocean.

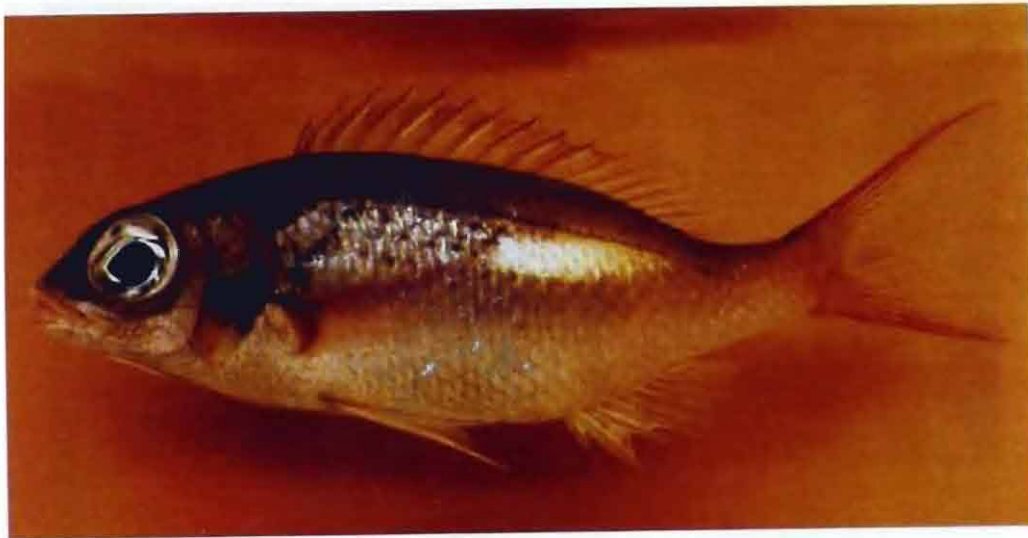


Fig. 386. *Scolopsis xenochrous*

Family KYPHOSIDAE

Seachubs or Rudderfish

Moderate sized fishes. Body oval and compressed, head small; snout blunt, mouth small, horizontal and terminal in position; maxilla scaly. Jaws with single row of fixed incisor-like teeth with long roots; dorsal fin single and continuous, depressible in a sheath, sometimes slightly notched between spinous and soft portions; preopercle weakly serrate; caudal fin emarginate to forked; scales ctenoid covering head, body and fins; 1 or 2 blunt opercular spines. Found in shallow rock and reef areas in small schools. Omnivores. Feeds on algae and small invertebrates. Edible fishes but not highly esteemed, commercially less valued fishes.

Key to species

- 1a. Dorsal fin rays 12; anal fin rays 11; soft portion of dorsal fin distinctly elevated; lateral line scales more than 60 *Kyphosus cinerascens*
 1b. Dorsal fin rays 14; anal fin rays 13; soft portion of dorsal fin not elevated; lateral line scales 53 to 55 *K. vaigiensis*

312. *Kyphosus cinerascens* (Forsskal, 1775) **Blue Chub or Topsail Drummer**

D. XI, 12; A. III, 11-12; P. 17-18; V. I, 5. Body moderately deep with distinct bulge above nostrils; soft portion of dorsal fin is high than spinous portion. Body silvery-grey, dark above; scales with yellow centers; a silvery band below eye; all fins dusky. Attains 40 to 45 cm. Found around rocks and weedy areas adjacent to reefs. Common species. Indo-West Pacific.



Fig. 387. *Kyphosus cinerascens*

313. *Kyphosus vaigiensis* (Quoy & Gaimard, 1825) **Brassy Chub or Long Finned Rudder**

D. XI, 13-15; A. III, 12-13; P. 18-20; V. I, 5. Body ovoid, dorsal and ventral profiles equally convex; mouth terminal; caudal fin forked; soft dorsal not elevated. Body silvery grey



Fig. 388. *Kyphosus vaigiensis*

with narrow brilliant bronzy stripes along scale rows on sides of body; a narrow yellowish grey band along lower edge of eye to snout; other fins dark brown; pectoral orange. Attains 50 to 60 cm. Found around reefs. Not uncommon. Indo-West Pacific.

Family DREPANIDAE

Sicklrfishes

Body very deep and strongly compressed; mouth very small and protractile; teeth small and setiform; pectoral fins falcate, longer than head; maxilla distally exposed; caudal fin rounded; scales extending onto dorsal and anal fins; lateral line strongly arched.

314. *Drepane punctata* (Linnaeus, 1758)

Spotted Drepane

D. IX, 20-22; A. III, 18-19; P. 18; V. I, 5; Ll. 47-48. Body and head deep; strongly compressed; mouth protrusive; a fringe of 4 to 10 short cirri on chin in young; dorsal fin deeply notched; pectoral fin long and pointed, reaching to base of caudal fin. Silvery grey with 6 to 10 vertical bands of small black spots on upper half of body.; a large orange spot above base of pectoral fin. Attains 40 to 50 cm. Found on reefs and shallow coastal areas. Common. Feeds on bottom living invertebrates. Supports a seasonal fishery in many areas. Indo-West Pacific.



Fig. 389. *Drepane punctata*

Family EPHIPPIDAE

Batfishes

Body very deep and compressed; head small; scales ctenoid or cycloid, extend onto top of head; mouth small and terminal, weakly or not protractile; teeth in jaws brush-like; pectoral fins falcate or rounded; dorsal fin continuous; young fishes have extremely long and elevated dorsal and anal fins which become shorter as they mature; caudal fin emarginated or rounded. Found in shallow weedy, seagrass and coral areas. Small specimens are popular aquarium pets and much in demand. Species more associated with coral reefs.

Key to species

- 1a. Spinous dorsal fin not confluent with soft portion; spines of dorsal fin increasing in length posteriorly 2 (Genus *Platax*)
- 1b. Spinous dorsal fin separated from soft portion by deep notch; spines not increasing in length; 4 to 5 vertical black bands on body *Ehippus orbis*
- 2a. Snout convex; chin with 5 mandibular pores each sides; snout not protruding; body with two black bars, one at the level of pectoral fin not extending on to ventral fin *P. orbicularis*
- 2b. Snout concave before eye and protruding; chin with 3 to 4 mandibular pores each side; body with two black bars, one at the level of pectoral fin extending on to ventral fin *P. pinnatus*

315. *Ehippus orbis* (Bloch, 1787)**Spadefish**

D. X, 19-20; A. III, 15-16. Body strongly compressed and deep; head short and its upper profile steep; mouth very small and terminal; pectoral fins small and rounded; caudal fin



Fig. 390. *Ehippus orbis*

emarginate. Body silvery with 4 or 5 vertical black bands from dorsal fins to belly; margin of dorsal, anal, ventral and caudal fins dusky black. Attains 40 to 45 cm. Found in shallow coastal waters adjacent to reefs. Common. Good food fish, contributes a small fishery in islands. Indo-West Pacific.

316. *Platax orbicularis* (Forsskal, 1775)

Orbicular Batfish

D. V, 34; A. III, 26-38; P. 18; V. I, 5. Body orbicular; snout convex; dorsal and anal fins broad, in juveniles fins very enormous. Body brownish yellow with a vertical black bar through eye and another at the level of pectoral fin; dorsal and anal fins with black margin; caudal fin hyaline. Body of juveniles leaf-like, dorsal and anal fins enormous and reddish brown to brownish yellow with a narrow brown bar through eye. Attains 40 to 50 cm. Found on sandy bottom near coral reefs. Young solitary but adults found in groups. Common species. Good food fish. Young are excellent aquarium pets. Indo-West Pacific.



Fig. 391. *Platax orbicularis* (Young)

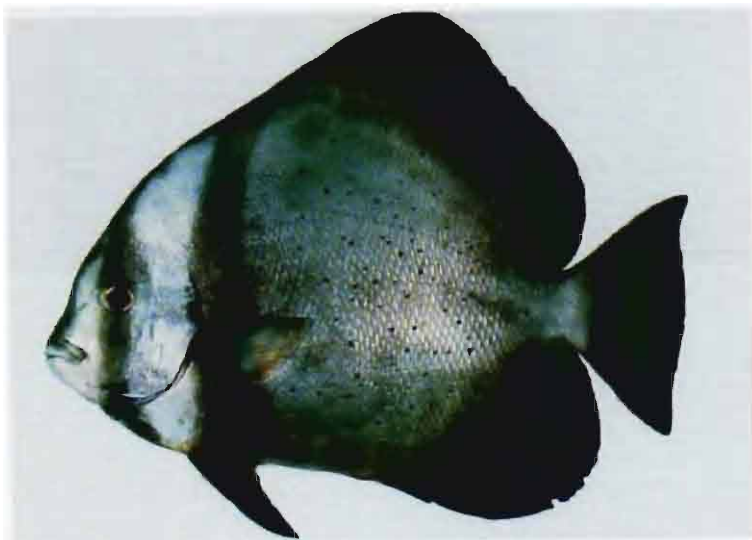


Fig. 392. *Platax orbicularis* (Adult)

317. *Platax pinnatus* (Linnaeus, 1758)**Pinnate or Dusky Batfish**

D. V, 35-37; A. III, 26-28; P. 18; V. I, 5. Body deep and compressed; mouth profile pointed; snout protruding and concave before eyes; dorsal and anal fins much elongated. Body silvery grey with dark vertical black bars: one through eye, the other at level of pectoral extending onto pelvic fin; pectoral fin black basally, yellow distally; pelvic fins black. Juveniles black with greatly elevated dorsal and anal fins found floating on their sides and mimics flatworms and nudibranchs; body and fins outlined in orange. Attains 30 to 35 cm. Found in weedy areas near reefs. Common species. Juveniles are beautiful aquarium pets. Indo-West Pacific.



Fig. 393. *Platax pinnatus*

Family MONODACTYLIDAE

Moonies or Batfishes

Body deep and slightly compressed; mouth small; body scales small, deciduous extending onto median fins and head; dorsal and anal fin spines reduced; pelvic fins absent or vestigial; upper jaw slightly protrusive. Found in large shoals in mangrove and shallow reef areas.

318. *Monodactylus argenteus* (Linnaeus, 1758)**Silver Batfish**

D. VII-VIII, 28; A. III, 28-30; P. 16; Ll. 54-56. Body deep and compressed; mouth terminal; scales on body deciduous and extending onto head and median fins; lobes of dorsal and anal fins prolonged; ventral fins rudimentary. Juveniles silvery with two curved dark stripes across head, the first through eye and the second from nape through base of pectoral to before anal fin; anterior lobes of dorsal and anal fins dusky; all fins pale. Adults silvery, anterior lobes of dorsal and anal fin dusky. Attains 25 cm. Found in sandy areas near reefs and coastal waters. Flesh very soft and good food fish. Favourite aquarium pets since it does well in captivity. Indo-West Pacific.



Fig. 394. *Monodactylus argenteus*

Family GERREIDAE

Silver Beddies

Small to moderate sized fishes. Body compressed and oblong; mouth greatly protrusive, pointed downwards when protracted; scales on body are large and cycloid; cheek and operculum scaly; base of dorsal and anal fins sheathed by a row of scales; dorsal fin single; pectoral fin long and pointed; caudal fin deeply forked. Most of the species are live in shallow coastal mud or sandy bottom, few species found in sandy areas near coral reefs. Feeds on polychaetes and small crustaceans. Having minor fishery value.

Key to species

- 1a. Body more deep; second dorsal fin spine very long; lateral line scales 44-46; a series of 8-10 vertical series of spots on sides of body *Gerres filamentosus*
- 1b. Body slender; second dorsal fin spine not long; lateral line scales below 40; no spots on sides of body *G. oyena*

319. *Gerres filamentosus* Cuvier, 1829

Threadfin Bidy

D. IX, 10; A. III, 7; P. 16; V. I, 5; Ll. 44-46. Body oblong, moderately compressed and deep; mouth small; second dorsal spine long and filamentous. Body silvery, sides with 8 to 10 vertical series of ovoid bluish spots. Attains 30 to 35 cm. Found in large numbers in tidal creeks and adjacent to sandy areas of the reefs. Good food fish. Indo-West Pacific.



Fig. 395. *Gerres filamentosus*

320. *Gerres oyena* (Forsskal, 1775)**Slender Spine Pursemouth**

D. IX, 10; A. III, 7; P. 15-16; V. I, 5; Ll. 35-41. Body oblong and slightly compressed; anterior part of dorsal fin elevated. Body olive above, silvery grey below with a series of faint paired spots arranged in rows on sides; margin of dorsal and caudal fins dusky. Attains 30 to 35 cm. Found in shallow coastal waters adjacent to reefs. Good food fish. Indo-West Pacific.



Fig. 396. *Gerres oyena*

Family MULLIDAE

Goatfishes

Body oblong and moderately compressed with two long un-branched barbels on chin. Mouth small and protractile; scales on body large and ctenoid. Eyes situated near dorsal profile; small flat spine on opercle; spinous and soft dorsal fins widely separated; pectoral fins small; pelvic fins inserted below the level of pectoral fins; scaly axillary process present at base of ventral fins; caudal fin forked. Bottom dwelling fishes; found around muddy, weedy, sand and coral reef areas. Carnivores, feed on polychaetes, crustaceans, brittle stars, molluscs and small fishes. Important component of fish catches.

Key to species

- 1a. Teeth on vomer and palatines; no spines on opercular margins; dark stripes on both the dorsal fins present, but never on anal fin..... 2 (Genus *Upeneus*)
- 1b. No teeth on vomer and palatines; a small spine on opercular margin; no stripes on fins, if present, always on second dorsal and anal fins but on first dorsal 4
- 2a. Five to seven vertical scale rows along space between dorsal fins; 12 vertical scale rows along upper part of caudal peduncle; dorsal fins with grey or black horizontal stripes; upper caudal fin lobe with more stripes than lower lobe 3
- 2b. Four vertical scale rows along space between dorsal fins; 10 vertical scale rows along upper caudal peduncle; dorsal fins with red or brown horizontal stripes; lower caudal fin lobe with more stripes than upper lobe *U. tragula*
- 3a. No cross bars on caudal fin; 2 lemon yellow bands on sides *U. sulphureus*
- 3b. Caudal fin with cross bars on both lobes; three deep bronze longitudinal bands above lateral line and 2 yellow bands below lateral line *U. vittatus*
- 4a. Five scale rows between dorsal fins; 12 vertical scale rows along upper part of caudal peduncle; no marks on any fins; a golden yellow stripe from eye to caudal base 5 (Genus *Mulloidichthys*)
- 4b. Two to four scale rows between dorsal fins; 8 to 9 vertical scale rows along upper part of caudal peduncle; stripes always present on second dorsal and anal fins; no yellow stripes on body 6 (Genus *Parupeneus*)
- 5a. A black spot above posterior part of pectoral fins; fins hyaline *M. flavolineatus*
- 5b. No black spot above posterior part of pectoral fin; dorsal, anal and caudal fins yellow *M. vanicolensis*
- 6a. Second dorsal spine rigid 7

- 6b. Second dorsal spine flexible, not sharp 8
- 7a. Body with 2 or 3 blackish vertical bars; often a black saddle on caudal peduncle present *P. bifasciatus*
- 7b. No vertical rows on body; a broad dark brown band from hind margin of eye to end of second dorsal; a dark blotch at mid-point of caudal peduncle *P. macronema*
- 8a. Caudal peduncle with lateral black blotch 9
- 8b. Caudal peduncle without lateral blotch 10
- 9a. A large elongate yellow blotch centered on lateral line *P. indicus*
- 9b. No yellow blotch on lateral line but a dark brown to ed stripe from snout to end of second dorsal fin *P. barberinus*
- 10a. Large, oblong golden yellow saddle-like sot on caudal peduncle; barbels on chin very long extending to or beyond head *P. cyclostomus*
- 10b. No golden yellow saddle on caudal peduncle; barbels not long 11
- 11a. Dorsal profile of head strongly and evenly convex; a bright red spot beneath mid base of first dorsal fin below lateral line level *P. heptacanthus*
- 11b. Dorsal profile of head straight; a large black spot on lateral line beneath rear of 1st dorsal fin, behind this a large white spot followed by a dark area; 2nd dorsal fin blackish *P. pleurostigma*

321. *Mulloidichthys flavolineatus* (Lacepede, 1801)
Yellowstripe Goatfish

D. VII+I, 8; A. I, 6; P. 18; V. I, 5; Ll. 34-38. Body slender, elongate and compressed; snout rounded above; caudal fin forked. Body silvery white with bright yellow longitudinal



Fig. 397. *Mulloidichthys flavolineatus*

stripe from eye to caudal fin base; small dark blotch below first dorsal; all fins yellow. Attains 30 to 35. Found around coral reef areas in aggregations. Good food fish. Indo-West Pacific.

322. *Mulloidichthys vanicolensis* (Valenciennes, 1831)

Flame Goatfish

D. VII+I, 8; A. I, 6; P. 16-17; V. I, 5; Ll. 36-42. Body slender, elongate and moderately deep; caudal fin forked. Body reddish orange on back and whitish on sides and belly; a yellow longitudinal band on sides; no dark spot on body; fins light yellowish. Attains 30 cm. Found on shallow mud and sand bottom adjacent to coral reefs. Not uncommon. Food fish. Indo-West Pacific.



Fig. 398. *Mulloidichthys vanicolensis*

323. *Parupeneus barberinus* (Linnaeus, 1801)

Dash-dot Goatfish

D. VIII+I, 8; A. I, 6; P. 16-18; V. I, 5; Ll. 28. Body deep; spinous dorsal fin elevated. Colour dusky tan, sides and below white; a reddish black stripe from snout through eye to upper caudal peduncle; a large black spot at caudal base. Attains 40 to 45 cm. Found on sandy-rubble bottom near reefs. Frequently encountered. Food fish. Indo-Pacific.



Fig. 399. *Parupeneus barberinus*

324. *Parupeneus bifasciatus* (Lacepede, 1801)**Doublebar Goatfish**

D. VIII+I, 8; A. I, 6; P. 16-18; V. I, 5; Ll. 29-30. Body moderately deep; dorsal profile of head slightly concave; caudal fin forked. Body light reddish yellow above, white below; two dark bars dorsally on body, one beneath each dorsal fin; a dark patch on snout covering eye; all fins reddish. Attains 30 to 35 cm. Found around coral reef areas. Indo-Pacific.



Fig. 400. *Parupeneus bifasciatus*

325. *Parupeneus cyclostomus* (Lacepede, 1801)**Goldsaddle Goatfish**

D. VIII+I, 8; A. I, 6; P. 15-16; V. I, 5. Body slender; caudal fin forked. Two colour phases, one phase dark yellowish grey with blue markings on scales and a broad yellow spot on caudal peduncle, the other phase totally yellow with a bright yellow caudal spot. Attains 40 cm. Found in shallow reef areas. Common goatfish. Feeds heavily on small fish. Good aquarium pets. Indo-Pacific.



Fig. 401. *Parupeneus cyclostomus*

326. *Parupeneus heptacanthus* (Lacepede, 1802)**Red Spot Goatfish**

D. VIII+I, 8; A. I, 6; P. 16-17; V. I, 5; Ll. 28-29. Body slightly deep and slender; dorsal profile of head evenly convex; chin barbels long. Body yellowish on back and each scale with

a pale blue spot; silvery white on sides of body and ventrally; a small reddish spot below lateral line at the level of first dorsal. Attains 25 to 28 cm. Found on silt-sand and grass beds adjacent to reefs. Uncommon. Indo-West Pacific.



Fig. 402. *Parupeneus heptacanthus*

327. *Parupeneus indicus* (Shaw, 1803)

Indian Goatfish

D. VIII+I, 8; A. I, 6; P. 15-16; V. I, 5. Body slender; barbels on chin small. Body light brownish white above, silvery white below; a horizontally elongate yellow spot on middle of back centered on lateral line; a black spot posteriorly on caudal peduncle; upper part of head with light blue lines; fins hyaline. Attains 40 to 45 cm. Found on sandy bottom and weedy areas near reefs. Common species. Indo-West Pacific.



Fig. 403. *Parupeneus indicus*

328. *Parupeneus macronema* (Lacepede, 1801)

Band-dot Goatfish

D. VIII+I, 8; A. I, 6; P. 18; V. I, 5. Body slender and compressed; barbels long; last ray of second dorsal elongate and extending to margin of caudal peduncle. Body dark red above, sides and belly whitish; a broad black horizontal stripe from snout through eye to level of

end of second dorsal fin; large black spot on caudal peduncle; soft dorsal with black basal band. Attains 30 to 35 cm. Found near reef areas in shallow waters. Uncommon. Indian Ocean.



Fig. 404. *Parupeneus macronema*

329. *Parupeneus pleurostigma* (Bennett, 1831)

Blackspot Goatfish

D. VIII+I, 8; A. I, 6; P. 17-19; V. I, 5. Body relatively deep; upper profile of head straight; last dorsal and anal rays longer; caudal fin forked. Body pinkish above, lighter below with a black blotch on lateral line beneath the rear of first dorsal fin, behind this a large oval white spot; base of second dorsal fin broadly black. Attains 30 cm. Found on sandy rubble bottom adjacent to coral reefs. Frequently encountered. Indo-West Pacific.



Fig. 405. *Parupeneus pleurostigma*

330. *Upeneus sulphureus* Cuvier, 1829

Yellow Goatfish

D. VIII+I, 8; A. I, 7; P. 16; V. I, 5. Small fishes, body slender; barbels thin and long; caudal fin forked. Body greyish bronze, head reddish, lower sides and belly whitish yellow; two yellowish horizontal stripes on sides; tip of first dorsal fin black; no bars on caudal and

anal fins. Attains 20 cm. Found on sand and mud areas near reefs in aggregations. Common species. Indo-West Pacific.



Fig. 406. *Upeneus sulphureus*

331. *Upeneus tragula* Richardson, 1846

Freckled or Blackstripe Goatfish

D. VIII+I, 8; A. I, 6; P. 13-14; V. I, 5. Dorsal side of body and head brown with reddish patches and ventral side light. A brownish black horizontal stripe from snout to base of caudal fin; ventral side of body with large reddish blotches; barbels yellow; a large reddish area on outer part of first dorsal fin; caudal fin lobes with brown cross bars. Attains 20 cm. Found on silt-sand areas adjacent to reefs. Common species. Indo-West Pacific.



Fig. 407. *Upeneus tragula*

332. *Upeneus vittatus* (Forsskal, 1775)

Yellowbanded Goatfish

D. VIII+I, 8; A. I, 6; P. 15-16; V. I, 5; Ll. 34-36. Body deep and compressed; barbels small. Body light grey on back, sides and belly yellowish; three yellow bands on sides; spinous dorsal with two black bands, the tip black; soft dorsal with three bars; caudal fin

lobes with dark black bars. Attains 25 cm. Found on silt-sand areas adjacent shallow reefs. Common species. Indo-West Pacific.



Fig. 408. *Upeneus vittatus*

Family MALACANTHIDAE
Sandtail Fishes

Small fishes. Body elongate and cylindrical or somewhat compressed; dorsal and anal fins long and undivided; a prominent opercular spine present; mouth terminal; lips fleshy; jaws with canine and villiform teeth; scales on body small and ctenoid; Caudal fin emarginate or truncate. Usually found on sandy or rubble bottom and on outer reef slopes; take refuge in burrows.

Key to species

- 1a. Dorsal fin rays 43-47; anal fin rays less than 40 *Malacanthus latovittatus*
- 1b. Dorsal fin rays above 50; anal fin rays above 45 *M. brevirostris*

333. *Malacanthus brevirostris* Guichenot, 1848
Flagtail Fish

D. I-IV, 52-60; A. I, 46-52; P. 15-17; V. I, 5; Ll. 145-180. Body long and slender; head small; caudal fin truncate. Body light bluish grey; yellowish above eyes; two black stripes on caudal fin. Attains 25 to 30 cm. Found on sand-rubble bottom of reefs in pairs. Live in burrows or under rocks. Good aquarium fish. Indo-Pacific.



Fig. 409. *Malacanthus brevirostris*

334. *Malacanthus latovittatus* (Lacepede, 1801)**Blue Sandtail Fish**

D. III-IV, 43-47; A. I, 37-40; P. 16-17; V. I, 5; Ll. 120-130. Body long and slender; head slightly depressed; lips thick; caudal fin truncate. Head and anterior part of body blue, whitish posteriorly; a broad mid-lateral stripe on body extending onto caudal fin; all fins light blue; dorsal fin margin yellow. Juveniles bluish-white with a conspicuous black stripe extends to front of head. Attains 35 to 40 cm. Found around sandy and coral rubble areas of reefs in shallow waters. Juveniles good aquarium fishes. Indo-West Pacific.



Fig. 410. *Malacanthus latovittatus*

Family MENIDAE

Moonfishes

Body extremely compressed and disc like with sharp breast; scales minute, deciduous; mouth strongly protrusile; jaws with villiform teeth, no teeth on vomer or palatines; single dorsal fin, dorsal fin spines lost with age; anal fin rays very short; caudal fin forked. Monotypic genus.

335. *Mene maculata* (Bloch & Schneider, 1801)**Moonfish**

D. III, 40-44; A. 30-33; P. 15; V. I, 5. Body very compressed and disc-like, breast very sharp; mouth protruding upwards; ventral profile of body highly convex; scales very small and barely visible; first two ventral rays fused and elongated. Body dark blue above, silvery white below; two or three rows of dark spots above and below lateral line; dorsal, caudal and pectoral fins dusky; pectoral and anal fins hyaline. Attains 20

cm. Found in deep waters around coral reef areas, frequents costal waters and estuaries. Nowhere abundant. Good food fish. Indo-Pacific.



Fig. 411. *Mene maculata*

Family POMACANTHIDAE

Angelfishes

Body deep and compressed; ovoid to sub-rhomboid; mouth small with bristle-like teeth; serrated pre-opercle with strong spine at its angle; lateral line runs parallel to dorsal profile and is inconspicuous. No scaly process at base of pelvic fins; scales extending onto median fins, each scale ending in sharp point; single un-notched dorsal fin. Found around coral reefs in aggregation or solitary. Sedentary fishes. Usually feeds on benthic invertebrates and sponges. Species of *Centropyge* exclusively feeds on algae and detritus. Most beautiful and graceful fishes with brilliant colour patterns. All species are excellent aquarium fishes.

Key to species

- 1a. Scales small or moderate and not in regular series; dorsal or anal or both usually produced 2 (Genus *Pomacanthus*)
- 1b. Scales large and in regular rows; dorsal and anal fins not produced5
- 2a. Body with longitudinal or more or less oblique stripes on sides3
- 2b. Body with vertical stripes, dotted or uniformly dull4
- 3a. Dorsal spines 14; 15 to 25 slightly oblique purplish blue and yellow stripes; a broad black bar at pectoral level and blue edged black bar through eye *P. imperator*
- 3b. Dorsal spines 13; 6 strongly oblique curved stripes on sides of body; a blue ring at shoulder region *P. annularis*
- 4a. Longitudinal scale series from upper edge of gill opening to base of caudal fin 65 to 75; dorsal and anal fins produced as a filament; numerous black spots on body and median fins *P. semicirculatus*
- 4b. Longitudinal scale series from upper edge of gill opening to base of caudal fin 46 to 52; dorsal and anal fins not produced; a black spot at near of dorsal fin; a yellow mask encompassing eyes; scales on sides of body bluish with yellow edges
..... *P. xanthometapon*
- 5a. Interoperculum large; caudal fin lobes filamentous; three black stripes on sides; ventral fin of male black, female white *Genicanthus lamarck*
- 5b. Interoperculum small; caudal fin lobes not filamentous; colour not as in 5a6
- 6a. Interorbital width greater than eye; preorbital with spines; body with alternating dark-edged bluish white and orange stripes *Pygoplites diacanthus*
- 6b. Interorbital width equal to or less than eye; preorbital without spines; colour not as in 6a 7 (Genus *Centropyge*)

- 7a. Anterior part of body yellow, posterior part deep blue; caudal fin yellow; a blue bar above eye *C. bicolor*
- 7b. Body colour not as in 7a; caudal fin dark 8
- 8a. Body yellowish orange with dark purplish blue lines; median fins with a bright blue margin *C. bispinosus*
- 8b. Body uniform light brown and gradually blackish on posterior part, scale centers whitish; edge of gill opening and pectoral fin base orangish *C. vroliki*

336. *Centropyge bicolor* (Bloch, 1787)

Bicolor Angelfish

D. XIV-XV, 15; A. III, 17-18; P. 18; V. I, 5. Body not much deep. Caudal fin truncate. Head and anterior part of body yellow, a blue bar above eye, rest of body, dorsal and anal fins deep blue; caudal and ventral fins yellow; opercular spine blue. Attains 12 to 14 cm. Found on shallow protected reef slopes. Uncommon. Very beautiful ornamental fish. Feeds on small invertebrates. Indo-West Pacific.



Fig. 412. *Centropyge bicolor*

337. *Centropyge bispinosus* (Gunther, 1860)

Two-spined Angelfish

D. XIV, 16-17; A. III, 18-19; P. 16-18; V. I, 5. Body slightly deep; caudal fin rounded. Middle part of body broadly reddish orange with dark purplish blue lines; head, dorsal, anal and caudal fins and their adjacent body purplish-blue; pectoral fin yellow, ventral fins orange-

yellow. Attains 10 cm. Found on outer reef slopes. Good aquarium fish. Uncommon. Feeds on small invertebrates. Indo-West Pacific.



Fig. 413. *Centropyge bispinosus*

338. *Centropyge vrolikii* (Bleeker, 1835)
Pearl-Scaled Angelfish

D. XIV, 15-16; A. III, 16-17; P. 16-18; V. I, 5. Body slightly deep; caudal fin emarginated. Body light brown, scale centers white and becoming blackish posterior part of body and fins;



Fig. 414. *Centropyge vrolikii*

edge of gill opening and pectoral base are ornagish; soft dorsal, anal and caudal fin margins narrowly blue. Attains 10 to 12 cm. Found on shallow sheltered reefs. Uncommon. Good aquarium fish. Feeds on small invertebrates. Indo-West Pacific.

339. *Genicanthus lamarck* (Lacepede, 1802)

Lamarck's Angelfish

D. XV, 15-16; A. III, 17; P. 16-18; V. I, 5. Body ovate, caudal fin lobes filamentous. Males white with three black stripes on sides; a broad sub-marginal black band in dorsal fin; caudal fin with black spots; ventral fin black. Females similar to males but ventral fins white and with black bands on upper and lower lobes of caudal fin. Attains 20 cm. Found on rich shallow coral reef areas. Rarely encountered. Feeds on small benthic invertebrates. Indo-West Pacific.



Fig. 415. *Genicanthus lamarck* (Female)



Fig. 416. *Genicanthus lamarck* (Male)

340. *Pomacanthus annularis* (Bloch, 1787)
Bluering Angelfish

D. XIII, 20-21; A. III, 20; P. 19; V. I, 5; Ll. 69. Body compressed; rostro-dorsal profile straight to nape; preopercle spine strong. Body yellowish brown with seven brilliant blue curved lines radiating from pectoral fin to soft dorsal fin; two blue horizontal lines on opercle, the superior one crossing eye and the inferior one below it. Base of pectoral with transverse lines; blue ring above opercle margin near lateral line; caudal and pectoral fins yellow; pelvic fins grey. Attains 30 to 35 cm. Found around reef slopes. Frequently encountered species. Good aquarium pet. Indo-West Pacific.



Fig. 417. *Pomacanthus annularis*

341. *Pomacanthus imperator* (Bloch, 1787)
Emperor Angelfish

D. XIV, 19-20; A. III, 18-20; P. 19; V. I, 5; Ll. 78. Body discoid and strongly compressed. Pre-opercular spine longer; soft dorsal acutely produced. Body purplish blue with narrow yellow stripes; snout and cheek bluish white; a curved blue-edged black bar through eye with

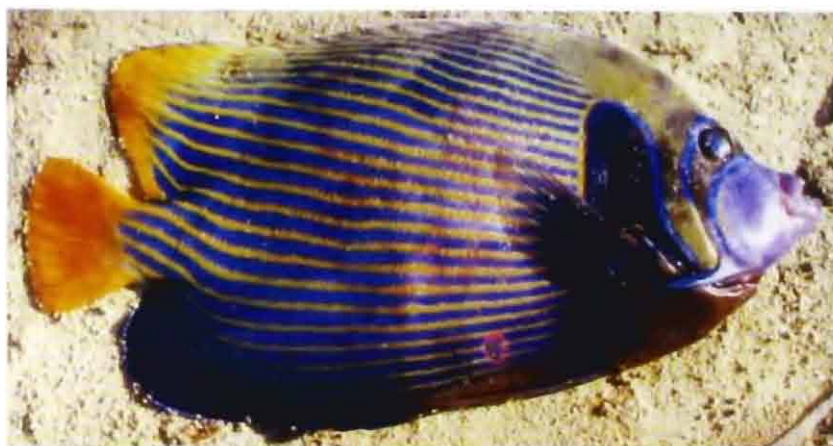


Fig. 418. *Pomacanthus imperator*

a greenish yellow bar just behind that, confluent with yellow on forehead; a broad black bar at the level of pectoral fin. Juveniles black with a white ring posteriorly on sides surrounded by partial, circles of blue and white; head with blue and white lines. Attains 50 to 60 cm. Found near caves and coral ledges. Juveniles found in tide pools and rock pools. Frequently encountered species. Good aquarium pet. Indo-West Pacific.

342. *Pomacanthus semicirculatus* (Cuvier, 1831)
Semicircular Angelfish

D. XIII, 20-23; A. III, 18-20; P. 20; V. I, 5; Ll. 66-68. Body moderately deep and compressed; rostro-dorsal profile obliquely ascending with slight concavity on snout; spine at pre-operculum is very long; soft dorsal and anal fins are acute and prolonged as a filament; anterior and posterior third of body brownish, middle portion yellowish grey; edges of pre-operculum, operculum and all fins except pectorals with blue margin; numerous bluish spots on body and fins. Juveniles black with alternate blue and white bars on head, body and caudal fin, bars more curved posteriorly. Attains 35 to 40 cm. Found around coral reefs, juveniles in tide pools. Frequently encountered species. Good aquarium pet. Indo-West Pacific.



Fig. 419. *Pomacanthus semicirculatus* (Juvenile)



Fig. 420. *Pomacanthus semicirculatus* (Adult)

343. *Pomacanthus xanthometapon* (Bleeker, 1853)
Yellowmask Angelfish

D. XIII-XIV, 16-17; A. III, 16-18; P. 19-20; V. I, 5; Ll. 46-52. Body deep and ovoid; snout slightly projecting; Dorsal and anal fins high and rounded; caudal fin rounded. Body scales blue, edges yellowish white; upper back of body and dorsal fin white; breast, pectoral fins and rear upper part of dorsal fin yellow; a bluish black spot at rear base of dorsal fin; an yellow broad mask covering eyes; head below eye blue with irregular yellow spots. Juveniles black with 18 to 20 narrow blue and white bars on sides. Attains 35 cm. Found around thick sheltered coral reef areas. Frequently encountered species. Good aquarium pet. Indo-West Pacific.



Fig. 421. *Pomacanthus xanthometapon*

344. *Pygoplites diacanthus* (Boddaert, 1772)
Regal Angelfish

D. XIII-XIV, 18-22; A. III, 18-19; P. 16; V. I, 5. Body oblong and compressed; rostro-dorsal profile ascending obliquely; snout long and pointed. Body with alternating brilliant dark



Fig. 422. *Pygoplites diacanthus*

edged bluish white and orange stripes which become narrow and angled backward in dorsal fin; posterior part of dorsal fin dark with blue spots; anal fin yellowish orange with blue stripes; caudal, pectoral and pelvic fins yellow; snout yellow. Juveniles have a large ocellated dark spot at basal part of soft dorsal fin. Attains 25 cm. Usually found solitary around rich coral reef areas. Beautiful and highly prized aquarium pet. Indo-West Pacific.

Family CHAETODONTIDAE

Butterfly Fishes

Body deep, ovate and strongly compressed; mouth small and protractile; teeth long, slender and bristle-like; preopercle without spine at angle; dorsal fin continuous; dorsal and anal fin covered with scales; caudal fin slightly rounded or emarginated; scales ctenoid. All species are associated with coral reefs and are well known for their stunning colour pattern and graceful swimming movements. Found in shallow to great depths but most of the species found less than 18-20 m depth. Usually solitary or in pairs, occasionally in small schools or large aggregations. Feed on a variety of invertebrates and algae. Some species exclusively feed on coral polyps. Few species of *Hemitaurichthys* feed on zooplankton. Most of the juveniles and few adult species show cleaning behavior and pick up parasites of other fishes. Many species are strongly territorial. Butterflyfishes fall prey to many other reef fishes like tunas, groupers, snappers, scorpionfishes, moray eels, etc. Throughout the world these fishes are very popular and highly prized aquarium pets.

Key to species

- 1a. Lateral line incomplete, ending near last rays of dorsal fin 9
- 1b. Lateral line complete, ending at base of caudal fin 2
- 2a. Fourth dorsal spine elongate to filamentous; supra orbital with spines or horns; nape with hump or strong bony projection 3 (Genus *Heniochus*)
- 2b. Fourth dorsal spine normal or slightly elongate; no horns on supraorbital 6
- 3a. Dark band on body includes pectoral and ventral fins and first three spines of dorsal fin 4
- 3b. Dark band on body includes pectoral and ventral fins can include one or more dorsal spines; the bands merge at central part of body; entire body from ventral fins to end of anal fin uniformly dark *H. varius*
- 4a. Dark band passes through eye extends below to edge of interopercle; a black band encircling snout *H. singularis*
- 4b. Dark band passes through eye does not continue to edge of interopercle; no black band around snout 5

- 5a. Second black band on body ending on posterior half of anal fin *H. acuminatus*
- 5b. Second black band on body ending on farther forward on posterior half of anal fin
..... *H. diphreutes*
- 6a. Dorsal spines 12; lateral line scales more than 65; pectoral fins elongate and falcate;
snout tubular or not; blackish spot at anal fin just below base of caudal; no bars on
body 7
- 6b. Dorsal spines 9; lateral line scales less than 60; pectoral fins not elongate, rounded;
snout tubular; ocellated black spot at base of soft dorsal fin; three orange bars on body
..... *Chelmon rostratus*
- 7a. Snout not elongate and tubular; middle of body broadly white; dorsal fin, below soft
anal fin and behind head yellow; head dark brown *Hemitaurichthys polylepis*
- 7b. Snout elongate and tubular; colour not as in 7a 8 (Genus *Forcipiger*)
- 8a. Dorsal fin spines 12; snout long, 1.6 to 2.0 in body depth *F. flavissimus*
- 8b. Dorsal fin spines 11; snout very long, 1.1 to 1.5 in body depth *F. longirostris*
- 9a. Anal fin with 4 to 5 spines; lateral line moderately arched; commencement of gape of
mouth level with lower border of eye; yellowish with an elongate blue lateral spot;
ocellated black spot on caudal peduncle *C. plebeius*
- 9b. Anal fin with 3 spines; lateral line more or less arched or strongly ascending;
commencement of gape of mouth level with or above or below lower border of eye;
colour not as in 9a 10
- 10a. Body rounded to almost circular or deep and rounded 11
- 10b. Body oval to elongate-oval 15
- 11a. Body deep and rounded; body with alternating cream coloured and grey-brown to
purplish chevron-shaped narrow bars on sides; a boomerang-shaped light marking on
caudal fin and a vertical light stripe near edge *C. triangulum*
- 11b. Body rounded to almost circular; colour not as in 11a 12
- 12a. No stripes on body, except eye band; body yellowish white; a large black spot below
dorsal fin; a black band around caudal peduncle *C. unimaculatus*
- 12b. Body with stripes; ground colour uniform 13
- 13a. Eight dark vertical stripes on head and body, crossing dorsal and anal fins, usually in
pairs *C. octofasciatus*

- 13b. Six to several curved or diagonal stripes on body 14
- 14a. Dorsal fin rays 23 to 24; body bluish white with several curved and looping black stripes *C. meyeri*
- 14b. Dorsal fin rays 26 to 28; whitish with six diagonal dark bordered wider orange stripes crossing body *C. ornatissimus*
- 15a. Body elongate-oval; snout short, pointed or bluntly rounded 16
- 15b. Body ovate; snout moderately long and pointed 17
- 16a. Body scales large, rhomboidal, rows following chevron-like pattern; posterior edges of dorsal and anal fins vertical; no black bands at base of dorsal and anal fins; two third of basal caudal fin dark black *C. trifascialis*
- 16b. Body scales not large, rounded, rows in normal pattern; posterior edges of dorsal anal fins rounded; snout blunt; black bands at base of dorsal and anal fins; a black band across middle of caudal fin *C. trifasciatus*
- 17a. Soft portion of dorsal fin prolonged in to a filament 18
- 17b. No prolonged dorsal rays 20
- 18a. A large black area posteriorly on back and soft dorsal fin; a short narrow black bar through eye *C. ephippium*
- 18b. Prominent black band through eye; colour pattern not as in 18a 19
- 19a. Body with a pattern of chevron shaped markings; a large black spot on soft dorsal fin *C. auriga*
- 19b. Body with horizontal rows of small black spots; black bands along bases of or through middle of rayed dorsal and anal fins *C. semeion*
- 20a. Band passing through eye is black 22
- 20b. Band passing through eye is orange-yellow with black edges 21
- 21a. Black mark on nape enclosed in white border; posterior portion of body brick red from tip of last two dorsal spines to 8th anal fin ray; chevron shaped blackish stripes on body; submarginal brick red band in caudal fin *C. xanthurus*
- 21b. Black mark on nape without white border; 7 or 8 purplish-grey bars on upper half of body, lower half with rows of purplish grey spots; a dark bar through middle of caudal fin *C. punctatofasciatus*
- 22a. Body with rows of spots or without spots or with colouration in scale centers 23

- 22b. Body with vertical or oblique bands or narrow lines 27
- 23a. No dark bar in caudal fin 24
- 23b. A dark bar through middle of caudal fin 25
- 24a. Body and fins pale yellow with oblique to horizontal rows of small dark spots on body
..... *C. citrinellus*
- 24b. Body yellowish brown with two broad whitish bars behind eye and middle of body;
ventral fins black *C. kleinii*
- 25a. Body uniform yellow with dark scale edges; a dark submarginal band in dorsal fin
..... *C. rafflesi*
- 25b. Body brownish-red or pale; no dark submarginal band in dorsal fin 26
- 26a. Many small dark spots on body, dorsal and anal fins; a dusky band around caudal
peduncle *C. guttatissimus*
- 26b. Each body scale with light colour; no dusky band around caudal peduncle; broad black
head band bordered posteriorly by a white band and anteriorly by white stripe
..... *C. collare*
- 27a. Body with oblique narrow black lines or reddish brown bands 28
- 27b. Body with narrow vertical or diagonal lines 29
- 28a. Body with oblique black lines; anterior part of head and fins yellow; a black blotch
over anal spines *C. melannotus*
- 28b. Body golden yellow, brownish on upper half of sides with oblique reddish bands; large
dark triangle-shaped mark on anterior dorsal side of body; a black band from upper
part of head to middle of dorsal spines *C. lunula*
- 29a. Two triangular black saddles dorsally on body, not reaching below mid-point of body;
narrow vertical lines on sides *C. falcula*
- 29b. Colour not as in 29a 30
- 30a. White with vertical lines on body; a black band extends from posterior dorsal spines
to anal fin rays including caudal, peduncle; dorsal and anal fins yellow
..... *C. lineolatus*
- 30b. No vertical lines on body but six diagonal lines from head to spinous dorsal and 11
to 12 lines at right angle from previous lines towards anal fin; colour not as in 30a
..... 31
- 31a. Dorsal, anal and caudal peduncle and adjacent areas black *C. decussatus*
- 31b. A black band from spinous dorsal fin to caudal peduncle and extending into anal fin
..... *C. vagabundus*

345. *Chaetodon auriga* Forsskal, 1775
Threadfin Butterflyfish

D. XIII, 22-23; A. III, 19-21; P. 14-16; V. I, 5. Body slightly oval, caudal fin rounded; anterior dorsal rays prolonged into a filament. Body silvery blue with a pattern of chevron markings on sides; posterior part of body yellow with a large black spot on soft dorsal fin; a black band through eye; caudal and posterior anal fins yellow. Attains 20 cm. Found around shallow rich coral reefs areas. Common and found abundant. Feeds on algae, worms and coral polyps. Good aquarium pet. Indo-West Pacific.



Fig. 423. *Chaetodon auriga*

346. *Chaetodon citrinellus* Cuvier, 1831
Citron Butterflyfish

D. XIV, 20-22; A. III, 16-17; P. 13-14; V. I, 5. Body slightly deep and compressed; caudal fin slightly rounded. Head, body and fins pale yellowish with slightly oblique to horizontal rows of black spots; a black band through eye to nape. Attains 10 cm. Found on shallow exposed reef areas and reef flats. Uncommon. Feeds on small benthic invertebrates, algae and sometimes prey on coral polyps. Good aquarium pet. Indo-Pacific.

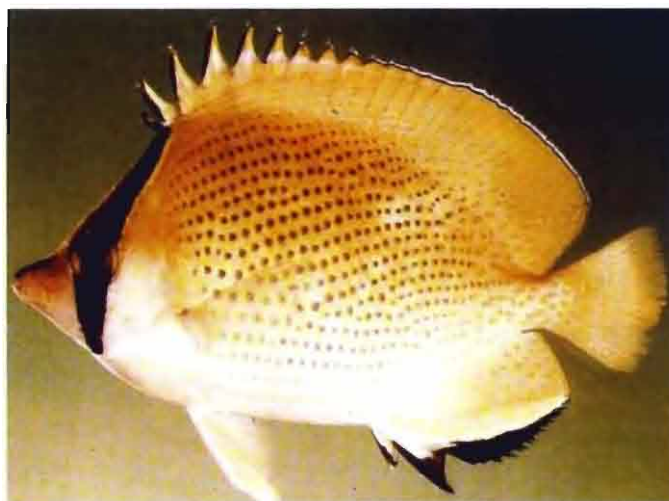


Fig. 424. *Chaetodon citrinellus*

347. *Chaetodon collare* Bloch, 1787**Red-tailed Butterflyfish**

D. XII, 25-26; A. III, 20-22; P. 16; V. I, 5. Body slightly ovate and compressed. Colour brownish to olive, each scale with pale center; snout to post orbital part of head black; a broad white band from nape through opercular margin bordering eye to isthmus and another band around snout before eye; ventral side of snout white; dorsal fin reddish brown; margin of soft dorsal white; ventral fin blackish; caudal fin scarlet basally with a cross band in middle, distal part of fin white. Attains 15 cm. Found around coral reef areas in shallow waters. Not uncommon. Feeds on worms, small crustaceans and polyps. Indo-West Pacific.

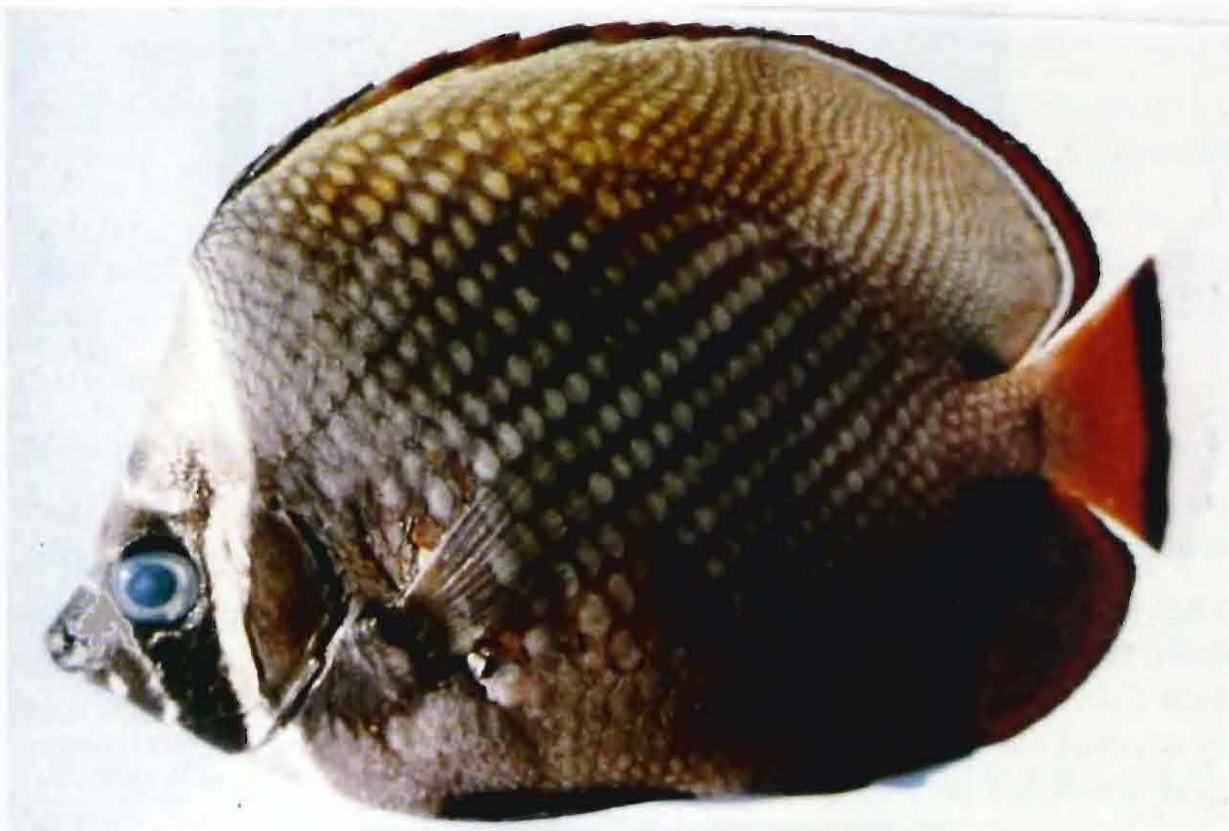


Fig. 425. *Chaetodon collare*

348. *Chaetodon decussatus* Cuvier, 1829**Black-finned Vagabond**

D. XIII, 24-25; A. III, 20; P. 15; V. I, 5. Body compressed and deep. Dorsal and anal fins with blunt angle. Colour whitish with six diagonal lines extending from upper posterior part of head to base of dorsal spines; 11 or 12 similar lines at right angle from previous lines towards anal fin; dorsal, anal, and caudal peduncle and its adjacent areas black; anal fin with yellow stripes; a dark bar through middle of caudal fin; a black band through eye connected at nape; tips of dorsal spines white. Attains 15 to 20 cm. Very common on shallow protected

reefs. Feeds on coral polyps, worms and crustacean and algae. Favourite aquarium pet. India to Thailand.

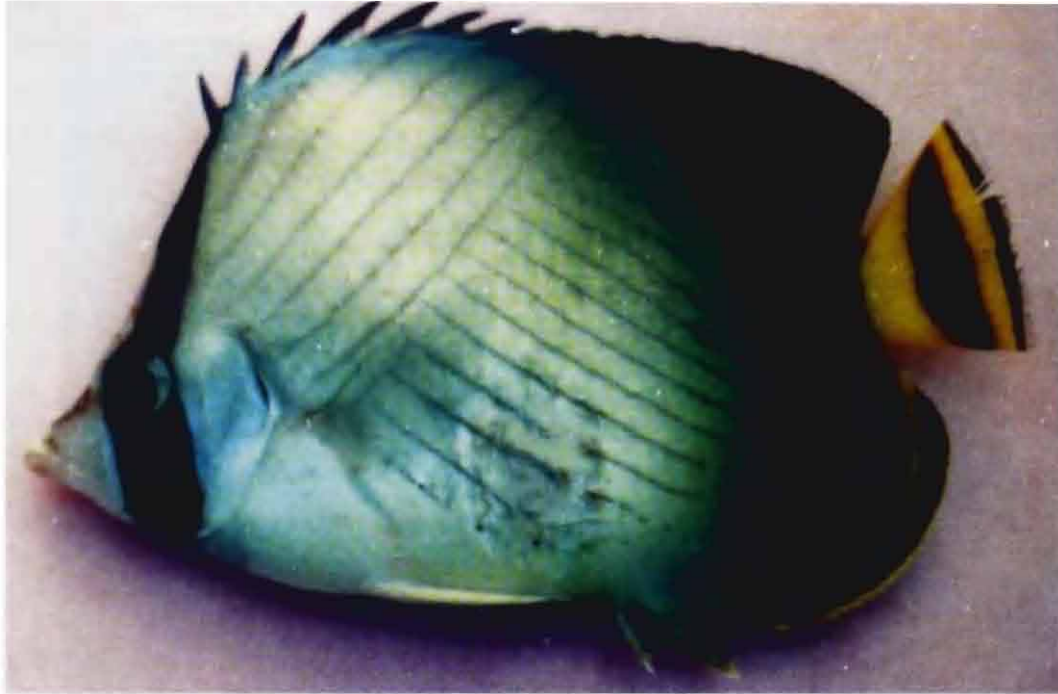


Fig. 426. *Chaetodon decussatus*

349. *Chaetodon ephippium* Cuvier, 1831

Saddled Butterflyfish

D. XII-XIV, 22-24; A. III, 20-22; P. 15-16; V. I, 5. Body deep, snout slightly produced; anterior few rays of dorsal fin extended into a filament. Body yellowish grey



Fig. 427. *Chaetodon ephippium*

with a large black area posteriorly on back and dorsal fin, and broadly bordered below by white; lower sides of body with wavy narrow blue lines; a small black bar through eye but faded away with age; a vertical dusky line between base of dorsal fin and pectoral base; snout and under side of head yellow; upper and lower edges of caudal fin yellowish. Attains 22 cm. Found in shallow protected reef areas in pairs. Feeds on small benthic invertebrates, sponges, corals and algae. One of the most beautiful and very popular aquarium fishes. Indo-Pacific.

350. *Chaetodon falcata* Bloch, 1795

Sickle Butterflyfish

D. XII-XIII, 24-25; A. III, 20-22; P. 15-16; V. I, 5. Body yellow, slightly lighter below with two triangular black blotches dorsally; a broad black band from nape through eye to isthmus; several vertical narrow black lines on body; black band around caudal peduncle; dorsal, anal and caudal fins yellow with sub-marginal black band; pectoral and pelvic fins pale yellow. Attains 20 cm. Found around rich coral reef areas in shallow waters. Not uncommon. Feeds on small invertebrates, algae and coral polyps. Good aquarium pet. Indo-West Pacific.



Fig. 428. *Chaetodon falcata*

351. *Chaetodon guttatissimus* Bennett, 1833

Peppered Butterflyfish

D. XIII, 22; A. III, 16; P. 14; V. I, 5. Body pale to whitish with small dark spots arranged in rows, spots extending onto dorsal and anal fins; a dark band around caudal peduncle; a black band from nape through eye to lower opercular margin; black vertical bar at middle

of caudal fin; margin of dorsal and anal fins light yellow. Attains 10 to 15 cm. Found on outer reef slopes. Uncommon. Feeds on invertebrates and coral polyps. Good aquarium pet. Indian Ocean.



Fig. 429. *Chaetodon guttatissimus*

352. *Chaetodon kleinii* Bloch, 1790

Kleini's Butterflyfish or Whitespotted Butterflyfish

D. XIII-XIV, 20-23; A. III, 17-20; P. 13-14; V. I, 5. Body discoid and compressed. Anterior half of body white and posterior half yellowish brown; a brown bar across anterior whitish area; centers of each scale with large pale spot; a black bar through eye; upper dorsal side of body and dorsal fin bluish; soft dorsal, anal and caudal fins yellow; pelvic fins and tip of snout black. Attains 10 to 14 cm. Found around outer coral reef areas. Not uncommon. Mainly feeds on soft corals and other invertebrates. Indo-West Pacific.



Fig. 430. *Chaetodon kleinii*

353. *Chaetodon lineolatus* Cuvier, 1831
Lined Butterflyfish

D. XII, 25-28; A. III, 21-22; P. 16; V. I, 5. Snout long and narrow; rostro-dorsal profile deeply concave above eye; dorsal and ventral profiles equally convex. Body white with black elliptical marking along base of soft dorsal fin and extending across caudal peduncle to posterior anal rays; a series of 18 to 20 vertical black lines across sides; a prominent black band through eye and partially interrupted on front above eye; median fins bright yellow; two reddish longitudinal lines on soft dorsal and anal fins and transverse lines on caudal peduncle. Largest species of the family, attains 30 cm. Found in reef areas in pairs. Frequently encountered. Feeds on coral polyps and anemones. Beautiful aquarium pet. Indo-Pacific.



Fig. 431. *Chaetodon lineolatus*

354. *Chaetodon lunula* (Lacepede, 1802)
Red Striped Butterflyfish

D. XII-XII, 22-24; A. III, 17-19; P. 15-17; V. I, 5. Dorsal profile of head concave. Body yellow becoming brown on upper half of sides; series of oblique reddish brown bands on sides of body; a curved broad yellow edged black band from upper edge of gill opening to base of middle dorsal spines; a wide black bar through eye with a white bar behind it; a large



Fig. 432. *Chaetodon lunula*

black spot across caudal peduncle; caudal fin with sub-marginal black band. Attains 20 cm. Found around coral reef areas in shallow waters. Frequently encountered. Feeds on nudibranchs, tubeworms, coral polyps, benthic invertebrates and algae. Beautiful aquarium pet. Indo-Pacific.

355. *Chaetodon melannotus* Bloch & Schneider, 1801

Blackback Butterflyfish

D. XII, 18-20; A. III, 16-18; P. 14-15; V. I, 5. Body ovoid and compressed. Colour whitish; anterior half of head, dorsal, anal, pelvic fins and anterior caudal fin bright yellow; numerous oblique lines on sides; upper back dark black; a dark blotch above anal spines; a broken black ring around caudal peduncle; outer half of caudal fin hyaline. Attains 15 cm. Found in rich coral reef areas. Uncommon. Feeds on coral polyps. Good aquarium pet. Indo-West Pacific.



Fig. 433. *Chaetodon melannotus*

356. *Chaetodon meyeri* Bloch & Schneider, 1801

Meyer's Butterflyfish

D. XII, 23-24; A. III, 18-20; P. 16-17; V. I, 5. Body bluish white, upper sides of head grey with curved to oblique black bands on sides; yellow edged black bars on snout through eye and across operculum; median fins yellowish with sub-marginal black bands; pectoral

and pelvic fins yellow. Attains 15 to 18 cm. Found in rich coral reef areas in pairs. Frequently encountered. Feeds on coral polyps. Beautiful aquarium pet. Indo-Pacific.



Fig. 434. *Chaetodon meyeri*

357. *Chaetodon octofasciatus* Bloch, 1787
Eight-striped Butterflyfish

D. XII, 17-20; A. III, 16-17; P. 12-14; V. I, 5. Body high and compressed. Colour overall white with 7 or 8 vertical black bars extending from dorsal edge to ventral edge of body; a black ring around caudal fin; pelvic and anal fin edge yellow; pectoral and caudal fins hyaline. Attains 10 cm. Found in shallow turbid waters near reefs in small groups or in pairs and can tolerate low salinities. Not uncommon. Feeds on small invertebrates. Good aquarium pet. Indo-West Pacific.



Fig. 435. *Chaetodon octofasciatus*

358. *Chaetodon ornatissimus* Cuvier, 1831
Ornate Butterflyfish

D. XII, 25-28; A. III, 20-22; P. 15-16; V. I, 5. Body deep and compressed. Overall whitish with slightly wider and oblique orange brown bands on sides; light yellow edged black bars on snout, through eye and on operculum; dorsal and anal fins yellowish with narrow submarginal black band; caudal fin with marginal and submarginal black band; ventral fin yellowish. Attains 18 cm. Found in sheltered reefs and caves of rich coral areas in shallow waters. Uncommon. Mainly feeds on coral polyps and small worms. Beautiful aquarium pet. Sri Lanka to West Pacific.



Fig. 436. *Chaetodon ornatissimus*

359. *Chaetodon xanthurus* Ahl, 1923
Netted Butterflyfish

D. XII-XIV, 20-22; A. III, 16-18; P. 14; V. I, 5. Body oval and disc-like; snout pointed; fin spines stout and pointed; caudal fin emarginated. Body white; a horse shoe shaped black



Fig. 437. *Chaetodon xanthurus*

mark on nape completely enclosed in white border; eye band orange and not connected above; posterior part of body brick red extended from last two dorsal fin spines to posterior edge of anal fin; caudal fin with brick-red sub-marginal band; sides of body with chevron markings. Attains 12 cm. Found around rich coral reef areas. Infrequently seen in our area. Good aquarium pet. Indian Ocean.

360. *Chaetodon plebeius* Cuvier, 1831

Blue Spot Butterflyfish

D. XIII-XIV, 16-18; A. IV, 14-16; P. 15. Body ovoid and compressed. Colour light yellow with narrow dark lines along longitudinal scale rows; an elongate blue patch on upper side of body and a black spot on caudal base; a blue edged black bar through eye; all fins yellow. Sometimes blue lateral patch absent. Attains 10 to 13 cm. Found in shallow coral reef areas. Very frequently encountered. Feeds on coral polyps. Good aquarium pet. Indo-West Pacific.



Fig. 438. *Chaetodon plebeius*

361. *Chaetodon punctatofasciatus* Cuvier, 1831

Spotbanded Butterflyfish

D. XIII, 22-25; A. III, 17-18; P. 14; V. I, 5. Body oval and compressed. Colour yellow dorsally and gradually shading to white ventrally; 7 or 8 purplish black bands made up of spots on upper half and the lower half with dark grey spots; dark edged yellow bar through eye; a black spot on forehead; caudal peduncle and anterior part of caudal fin orangish; rest of the caudal fin white with submarginal black band. Attains 10 cm. Found on reef slopes

in pairs. Infrequently seen in our area. Feeds on coral polyps, algae and small invertebrates. Good aquarium pet. Indian Ocean.



Fig. 439. *Chaetodon punctatofasciatus*

362. *Chaetodon rafflesii* Bennett, 1830

Latticed Butterflyfish

D. XII-XIII, 22-23; A. III, 18-20; P. 14-15; V. I, 5. Body deep and compressed. Bright yellow with dark scale edges forming a lattice-pattern; a broad black bar through eye; rear part of dorsal with broad sub-marginal black band; a spindle shaped black band in middle of caudal fin; nape light blue before black bar. Attains 14 cm. Occurs in pairs or solitary in sheltered reef lagoons. Not uncommon. Feeds on worms, coral polyps and anemones. Beautiful aquarium pet. Sri Lanka to West Pacific.



Fig. 440. *Chaetodon rafflesii*

363. *Chaetodon semeion* Bleeker, 1855
Dotted Butterflyfish

D. XIV, 23-26; A. III, 19-21; P. 15; V. I, 5. Body compressed and deep; dorsal and anal fins are rounded, first few rays of dorsal fin produced into a filament. Body yellow to orange-yellow with small black spots form horizontal rows across body; a broad black band along the bases of dorsal and anal fins; a black band through eye joined at nape; inter-orbital area blue; each caudal fin ray with dark line; ventral fins yellow. Attains 20 cm. Found on outer reef areas in pairs. Uncommon. Beautiful aquarium pet. Indo-West Pacific.

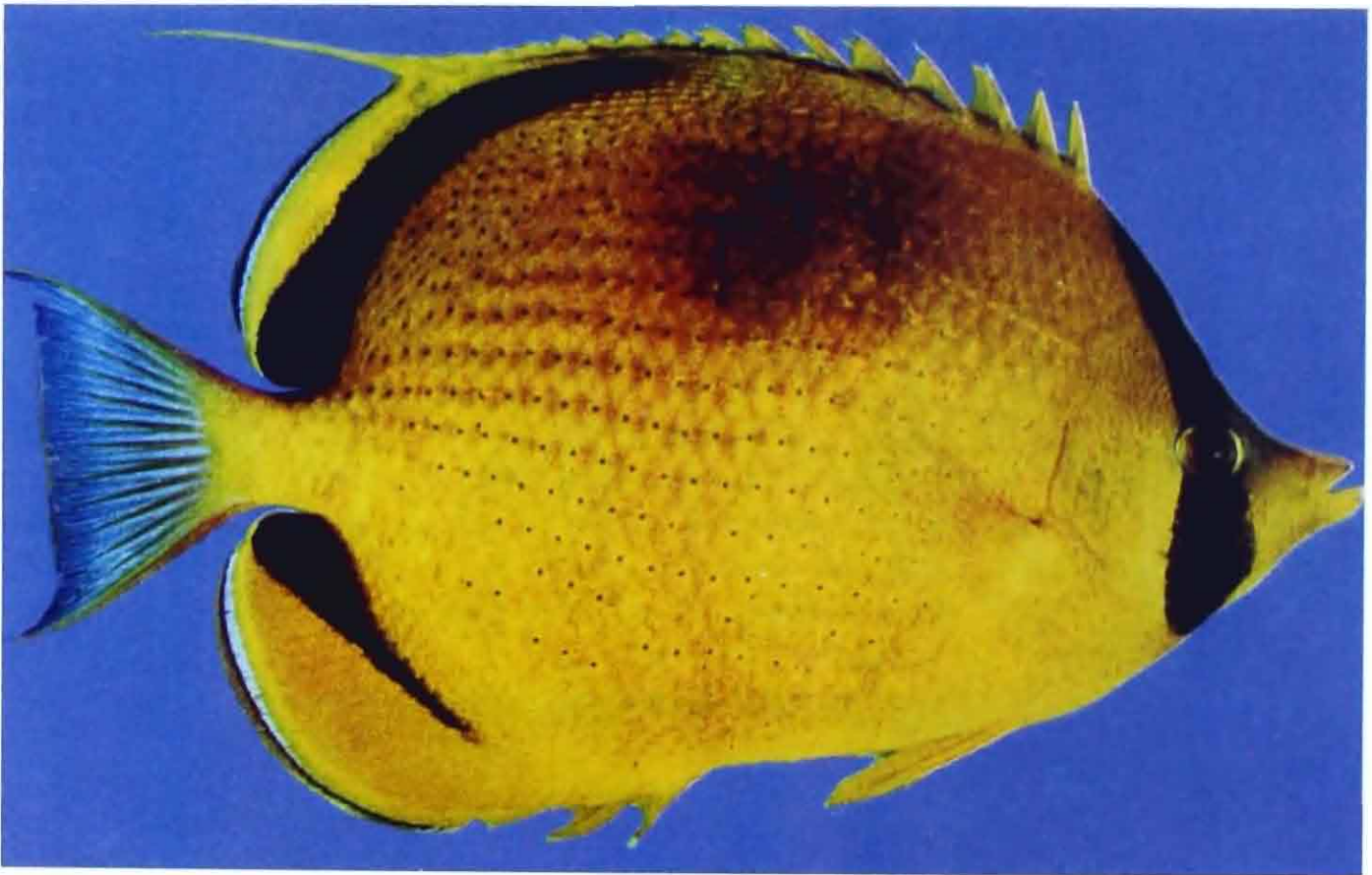


Fig. 441. *Chaetodon semeion*

364. *Chaetodon triangulum* Cuvier, 1831
Triangle Butterflyfish

D. XI-XII, 24-27; A. III, 20-22; P. 13-14; V. I, 5. Body triangular in shape and compressed; snout short and prominent. Body purplish brown with narrow cream coloured angularly bent bars on sides; three dark bars on head; a dark purplish bar with pale edge across caudal fin; edge of soft dorsal black; ventral fins light yellow. Attains 15 cm. Found in large groups around coral reefs, coral rubble and rocky reef areas in

shallow waters. Very frequently encountered. Feeds on coral polyps. Good aquarium pet. Indian Ocean.



Fig. 442. *Chaetodon triangulum*

365. *Chaetodon trifascialis* Quoy & Gaimard, 1825
Cheveroned Butterfly Fish

D. XIII, 15-16; A. III, IV-V, 13-15; P. 14; V. I, 5. Body slightly narrow. Colour whitish with narrow chevron markings on sides; a black bar through eye to nape;



Fig. 443. *Chaetodon trifascialis*

caudal fin blackish, margin with narrowly yellow; margin of dorsal fin light yellow. Attains 15 to 18 cm. Found in rich coral reef areas. Very common. Feeds exclusively on coral polyps and mucus, one of the obligatory living coral reef residents. Good aquarium pet. Indo-Pacific.

366. *Chaetodon trifasciatus* Mungo Park, 1797

Redfin or Oval Butterflyfish

D. XIII-XIV, 21-23; A. III, 18-20; P. 14-15; V. I, 5. Body oval in shape. Colour golden orange with slightly oblique narrow purplish stripes on sides; a broad yellow edged black bar through eye; snout black; a narrow bluish black curved stripe along pre-opercular margin; a broad reddish stripe in soft portion of dorsal and anal fins; pectoral and pelvic fins white; yellow edged black bar across middle of caudal fin. Attains 15 cm. Found around protected coral reef areas. Most common reef fish. Feeds on polyps. Beautiful aquarium pet. Indo-Pacific.

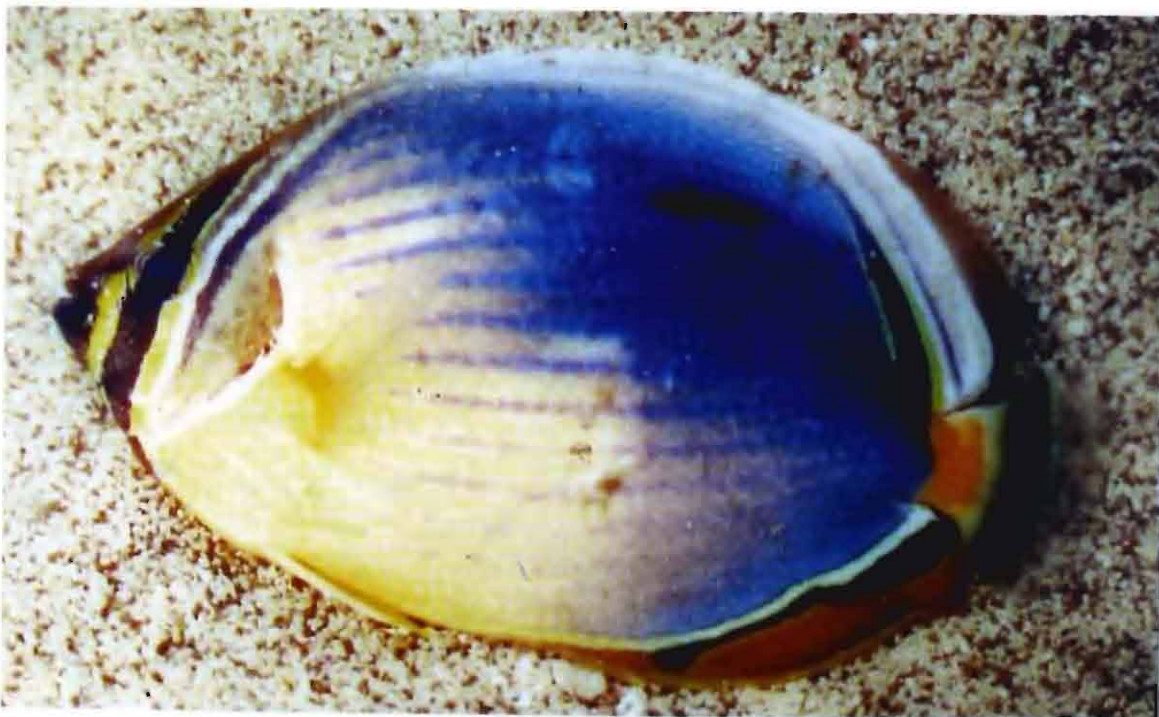


Fig. 444. *Chaetodon trifasciatus*

367. *Chaetodon unimaculatus* Bloch, 1787

Teardrop Butterflyfish

D. XIII, 21-23; A. III, 18-19; P. 14-15; V. I, 5. Body compressed, snout robust. Body, dorsal, anal and pectoral fins yellowish; a black bar through eye; margin of dorsal and anal fins narrowly black and crossing caudal peduncle; a large black spot on back. Attains 18 cm. Found on outer reef areas and reef slopes in pairs. Very rare butterflyfish.

Feeds on coral polyps, soft corals, worms, sponges and algae. Good aquarium pet. Indo-West Pacific.

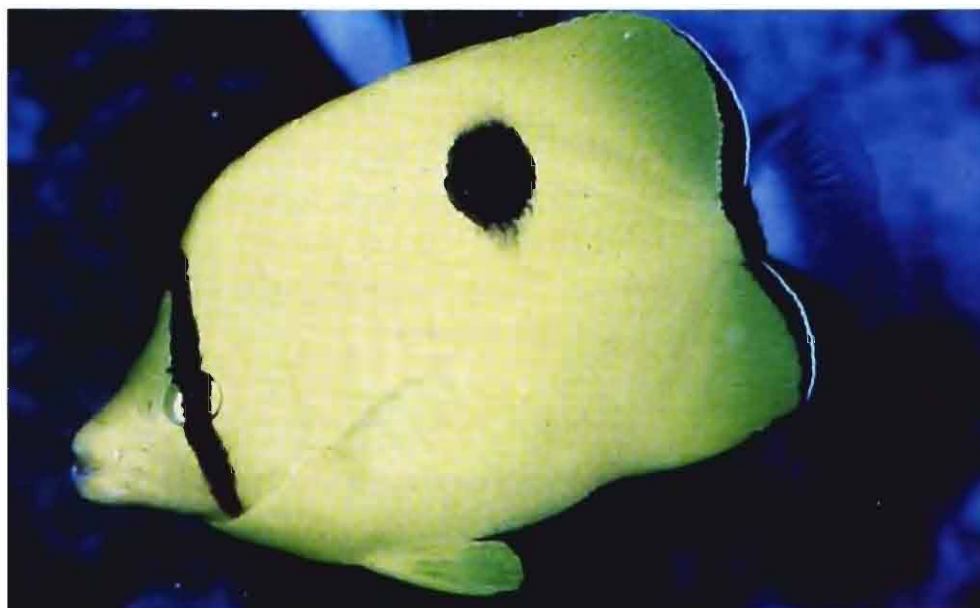


Fig. 445. *Chaetodon unimaculatus*

368. *Chaetodon vagabundus* Linnaeus, 1758

Vagabond Butterflyfish

D. XIII, 24-26; A. III, 20-21; P. 15-16; V. I, 5. Snout short, dorsal and anal fins with blunt angle. Body orange yellow with narrow slightly oblique purplish stripes; broad yellow edged black bands at the base of dorsal and anal fins and across middle of caudal fin; a reddish transverse line on caudal fin; an yellow edged black bar through eye; snout black; paired fins yellow. Attains 20 cm. Found around thick coral reef areas. Common butterflyfish. Feeds on coral polyps and small invertebrates. Good aquarium pet. Indo-Pacific.

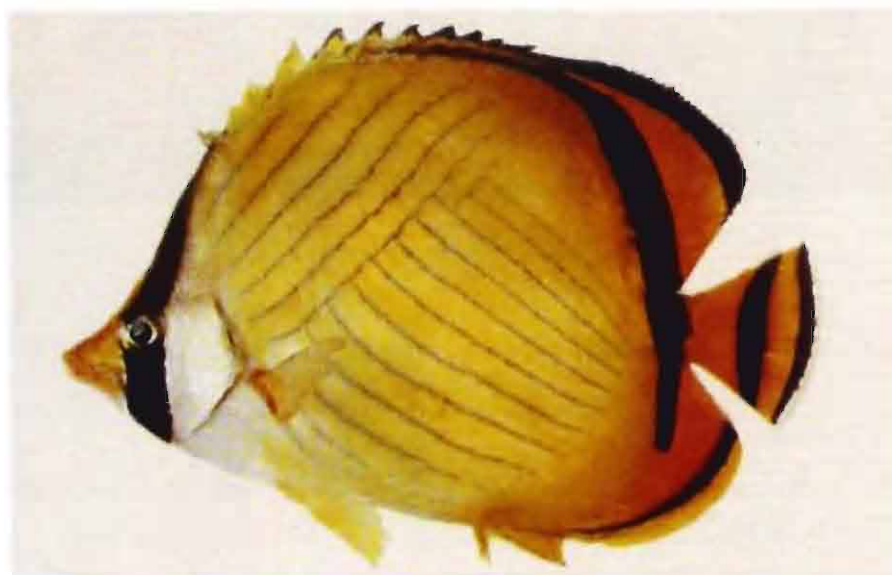


Fig. 446. *Chaetodon vagabundus*

369. *Chelmon rostratus* (Linnaeus, 1758)**Beaked Butterflyfish**

D. IX, 28-30; A. III, 19-20; P. 14-15; V. I, 5. Body deep and snout extremely long and pointed; dorsal and anal fins much elevated. Body white with three broad yellowish orange vertical bars on sides; a narrow black edged orange bar through eye; base of caudal fin with a narrow blue edged brown bar; an ocellated large black spot at base of soft dorsal fin; soft dorsal, anal and ventral fins yellowish. Attains 20 cm. Found in sheltered, shallow turbid waters of reefs. Occasionally encountered. Feeds on small invertebrates. Beautiful aquarium fish. Andaman Sea to Australia and Ryukyu Islands.

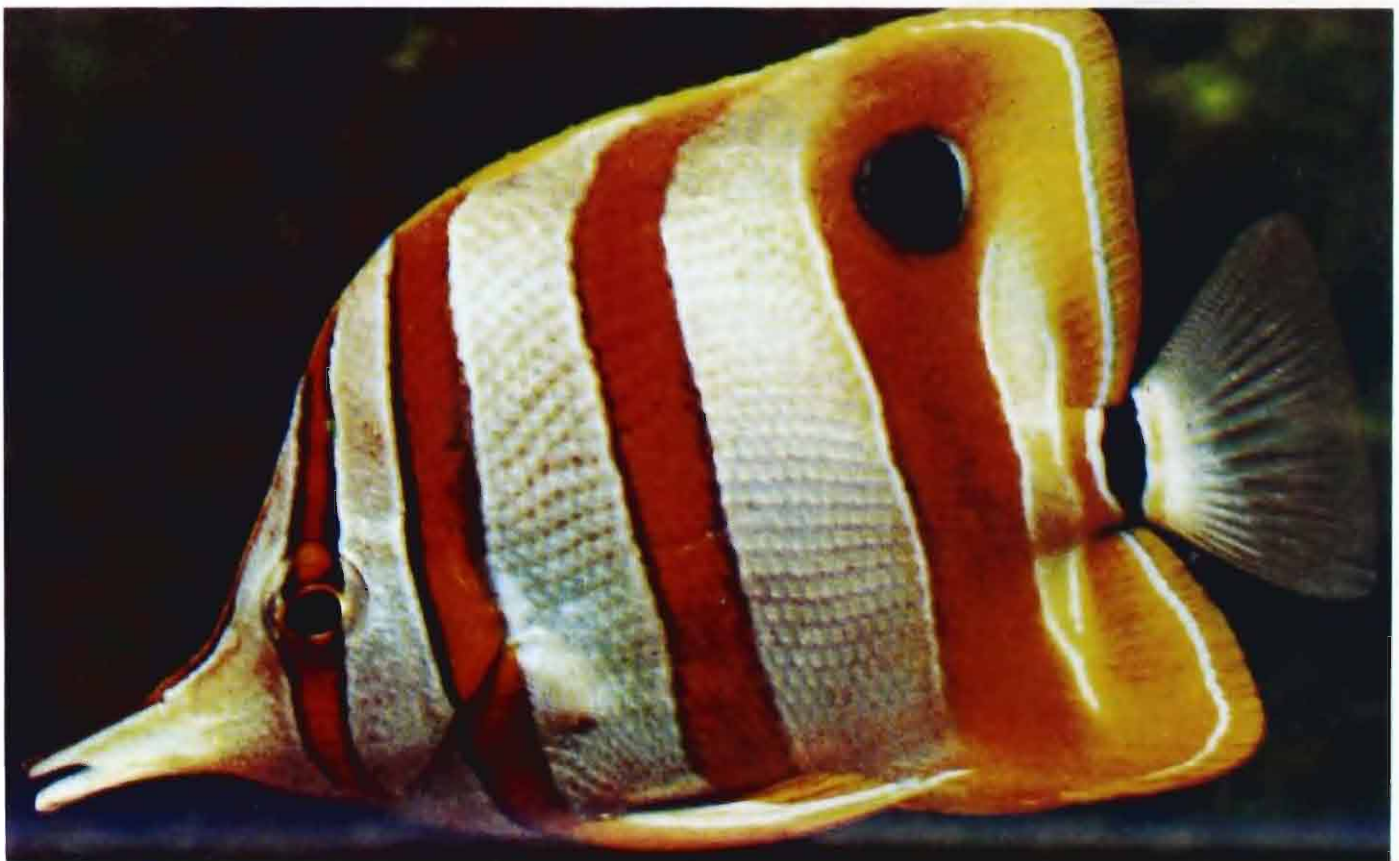


Fig. 447. *Chelmon rostratus*

370. *Forcipiger flavissimus* Jordan & McGregor, 1898**Forceps Butterflyfish**

D. XII, 23-24; A. III, 17-18; P. 15; V. I, 5. Body squarish and compressed; snout very long and tubular; Body, dorsal fin, pectoral and pelvic fins bright yellow; upper half of head and nape up to pectoral base black; ventral part of head and snout pale bluish white; caudal fin hyaline; a black blotch at posterior end of anal fin rays. Attains 20 cm. Found in and

around reef caves and sheltered areas of reef slopes. Not uncommon. Feeds on small invertebrates. Beautiful and popular aquarium pet. Indo-Pacific.



Fig. 448. *Forcipiger flavissimus*

371. *Forcipiger longirostris* (Broussonet, 1782)

Longnose Butterflyfish

D. XI, 24-27; A. III, 17-20; P. 14-15; V. I, 5. Body squarish and compressed; snout extremely longer and tubular; Body, dorsal fin, pectoral and pelvic fins bright yellow; upper half of head and nape up to pectoral base black; ventral part of head and snout pale bluish white; rows of small black spots on chest; caudal fin hyaline; a black blotch at posterior end of anal fin rays. Attains 20 cm. Found on outer reef slopes. Not uncommon. Feeds on tentacles of polychaetes, pedicellaria of sea urchins, tube feet of starfishes, hydroids and small crustaceans. A beautiful and popular aquarium fish. Indo-West Pacific.



Fig. 449. *Forcipiger longirostris*

372. *Hemitaurichthys polylepis* (Bleeker, 1857)
Shy Butterflyfish

D. XII, 23-26; A. III, 20; P. 16-18; V. I, 5. Body compressed and deep. Colour white with a triangular deep yellow area behind head; head dark brown; entire dorsal fin and small portion below soft dorsal and anal fin yellow; caudal fin and peduncle white; pectoral and ventral fins white. No black band across eye. Attains 15 to 18 cm. Found in large numbers in outer reef slopes in deeper waters. Not uncommon in the islands. Mostly feeds on plankton. Good aquarium pet. Indo-West Pacific.



Fig. 450. *Hemitaurichthys polylepis*

373. *Heniochus acuminatus* (Linnaeus, 1758)
Longfin Bannerfish

D. XI, 24-26; A. III, 17-18; p. 15-18; V. I, 5. The 4th dorsal spine and its membrane greatly prolonged; short stout spine in front of each eye. Body pearly white with broad oblique black bands on sides, the first continuous with black pelvic fins and the second band ending on posterior half of anal fin; soft dorsal and caudal fins yellow; a black bar connecting eyes; dorsal filament white. Attains 20 to 25 cm. Found in reef areas in pairs or solitary. Most common and found abundant. Feeds on zooplankton and benthic invertebrates. Very popular aquarium pet. Indo-West Pacific.



Fig. 451. *Heniochus acuminatus*

374. *Heniochus diphreutes* Jordan, 1903
Schooling Bannerfish

D. XII, 23-24; A. III, 12-18; P. 18; V. I, 5. Body compressed and elevated, sub-rhomboidal, under side of head more rounded; no spines in front of eyes; front of dorsal fin extended as a long filament. Body white with broad oblique black bands on sides, the first band extended from first three dorsal spines to belly and the second band from posterior dorsal spine to posterior half of anal fin; soft dorsal and caudal fins yellow; ventral fin black; a black bar above eye; ventral edge of anal fin black. Attains 20 cm. Found in coral reef areas on bottom in small schools. Not rare. Feeds on zooplankton and benthic invertebrates. Good aquarium pet. Indo-West Pacific.



Fig. 452. *Heniochus diphreutes*

375. *Heniochus singularius* Smith & Radcliffe, 1911
Singular Bannerfish

D. XI-XII, 25-26; A. III, 18; P. 16-17; V. I, 5. The 4th dorsal spine prolonged into a stout filament; a pair of bony black knobs on forehead. Body silvery white with three broad black bands, more diffuse due to pale centers, the second band continues with black pelvic fins; dorsal and caudal fins yellow; an isolated black band encircling snout; lips white. Attains 20 cm. Found near reef slopes in pairs or solitary. Not uncommon. Good aquarium pet. Indo-West Pacific.



Fig. 453. *Heniochus singularius*

376. *Heniochus varius* (Cuvier, 1829)**Humphead Bannerfish**

D. X-XI, 22-24; A. III, 17-18; P. 14-15; V. I, 5. Body compressed and strongly elevated; a notch on forehead with bony protuberance; a curved sharp horn above eye; 4th dorsal spine prolonged and strong without a filamentous part, its membrane broad. Body dark brown to black with a narrow white bar from upper nape through gill cover to thorax and the second oblique white bar from rear spinous dorsal fin to caudal peduncle; snout, ventral and anal fins black; caudal fin and soft dorsal paler; pectoral fins yellowish brown. Attains 15 to 18 cm. Found around thick coral reefs and sheltered areas. Frequently encountered. Very common aquarium fish. Indo-West Pacific.



Fig. 454. *Heniochus varius*

Family CARANGIDAE

Jacks or Trevallies

Body compressed, elongate and fusiform to deep; caudal peduncle rather slender; head keeled dorsally; mouth moderate. Teeth in jaws feeble; two dorsal fins; two anterior spines of anal fin separated from the rest of fin; in some species fin lets present behind anal and dorsal fins. Caudal fin forked; scales small and ctenoid, those on the straight part of lateral line often modified as enlarged and thickened spiny scutes; caudal fin strong and forked. Carnivores and voracious predators, feed on a variety of fishes. Occurring in large schools. They have wide size ranges, some species reaching large size. Mid-water swimmers, not strictly reef fishes but most of the species found around outer reef areas and reef slopes. All carangids are good food and important commercial fishes.

Key to species

- 1a. Posterior straight part of lateral line with scutes; pectoral long and falcate 2
- 1b. No scutes on lateral line; pectoral usually shorter than head 22
- 2a. Finlets 8 to 9 behind dorsal and anal fins; straight part lateral line with strong and very large scutes *Megalaspis cordyla*
- 2b. No finlets behind fins; scutes not very large 3
- 3a. Body superficially naked; scales minute and embedded in skin; 1st dorsal spine not connected by membrane; dorsal and anal fin lobes extremely long and filamentous, especially in juveniles 4 (Genus *Alectis*)
- 3b. Body wit small scales, not embedded in skin; dorsal spine connected by membrane; fins normal, as long as body depth 5
- 4a. Gillrakers short and stout, 30 to 35 on first arch; profile of head and nape angular *A. indicus*
- 4b. Gillrakers long and fairly strong, 18 to 22 on first arch; profile of head and nape broadly rounded *A. ciliaris*
- 5a. No teeth in upper jaw 6
- 5b. Teeth present in both jaws 7
- 6a. Single series of minute teeth in lower jaw; lateral line with 24 to 35 weak scutes; 1st dorsal fin connected to 2nd dorsal fin by membrane *Selaroides leptolepis*
- 6b. No teeth in jaws; lateral line scutes 17 to 25; 1st dorsal fin not connected to 2nd dorsal fin by membrane *Gnathanodon speciosus*

- 7a. Adipose eyelid completely covering eye except for a vertical slit; last ray of dorsal and anal fins finlet-like, but not separate from fins *Atule mate*
- 7b. Adipose eyelid covering posterior half of eye; last ray of dorsal and anal fins not finlet like 8
- 8a. Shoulder girdle with deep furrow, below a large fleshy papillae 9 (Genus *Selar*)
- 8b. No furrow on lower part of gill opening 10
- 9a. Lateral line becoming straight below origin of soft dorsal fin with 44 to 47 scutes; a broad golden yellow band from eye to caudal peduncle *S. boops*
- 9b. Lateral line becoming straight below middle of soft dorsal fin with 32 to 38 scutes; no lateral band on sides of body *S. crumenophthalmus*
- 10a. Both jaws with a single row of comb-like teeth; adipose eyelid well developed
..... 11 (Genus *Alepes*)
- 10b. Dentition not as above; adipose eyelid, if present, variously developed 12
- 11a. Lateral line moderately arched anteriorly to below 4th to 6th dorsal ray; ventral profile of body more convex than its dorsal profile *A. kleinii*
- 11b. Lateral line strongly arched anteriorly below 2nd to 4th dorsal ray; dorsal and ventral profile of body evenly convex *A. djedaba*
- 12a. Upper jaw with moderate to strong canine teeth in outer series and a band of fine teeth in inner series; scutes prominent; breast rarely entirely naked 13 (Genus *Caranx*)
- 12b. Both jaws with a band of villiform teeth, outer row may be slightly enlarged; scutes weakly developed; breast usually naked, rarely fully scaled
..... 15 (Genus *Carangoides*)
- 13a. Breast completely scaled; upper jaw extending to front of or posterior border of eye 14
- 13b. Breast naked ventrally, with small patch of scales in front of ventral fins; upper jaw extending to below or middle of eye *C. carangus*
- 14a. Anal fin rays 17 to 20; lateral line moderately arched; upper half of head and body with blue-black spots; dorsal fin lobe without white tip; margin of opercle without black spot *C. melampygus*
- 14b. Anal fin rays 14 to 16; lateral line strongly arched; no blue-back spots on body; dorsal fin lobe with white tip; black spot on margin of opercle *C. sexfasciatus*

- 15a. Naked area of breast separate from naked base of pectoral by a broad band of scales 16
- 15b. Naked area of breast joins the naked base of pectorals 17
- 16a. Dorsal fin rays 25 to 34; anal fin rays 21 to 26; dorsal profile of snout angular ...
..... *C. fulvoguttatus*
- 16b. Dorsal fin rays 20 to 23; anal fin rays 16 to 20; dorsal profile of snout broadly rounded
..... *C. caeruleopinnatus*
- 17a. Naked area of breast extending anteriorly above pectoral fin base nearly to lateral line
origin as a triangular patch; dorsal fin rays 20 to 23; anal fin rays 17 or 18 18
- 17b. Naked area of breast not extending anteriorly above pectoral fin base 19
- 18a. Total number of gillrakers on 1st arch 32 to 38 *C. malabaricus*
- 18b. Total number of gillrakers on 1st arch 26 to 31 *C. talamparoides*
- 19a. Anal fin rays 23 to 26; dorsal fin rays 27 to 30 *C. gymnostethus*
- 19b. Anal fin rays 23; dorsal fin rays less than 20 20
- 20a. Dorsal fin lobe distinctly larger than head; dorsal profile of head gently sloped; dorsal
and anal fin rays not filamentous *C. chrysophrys*
- 20b. Dorsal fin lobe not distinctly larger than head; dorsal profile of head distinctly very
steep; dorsal and anal fin rays filamentous 21
- 21a. Gillrakers on first arch 20 to 27; a distinct bulge in interorbital region
..... *C. hedlandensis*
- 21b. Gillrakers on first arch 30 to 37; no bulge in interorbital region *C. armatus*
- 22a. Second dorsal and anal fin bases about equal in length; no caudal peduncle groove
..... 23
- 22b. Second dorsal fin base much longer than anal fin base; caudal peduncle groove present
dorsally and ventrally 27
- 23a. Body slender, finlets present; fins not strongly falcate; scales elongate or needle like
..... 24 (Genus *Scomberoides*)
- 23b. Body relatively deep; no finlets; fins not strongly falcate; scales normal, oval shaped
..... 26 (Genus *Trachinotus*)
- 24a. Dorsal fin lobe uniformly pigmented; maxilla extends well beyond eye; gillrakers 8 to
15; scales below lateral line in mid body region oval; large oval blotches above or
touching lateral line *S. commersonianus*

- 24b. Dorsal fin lobe abruptly and heavily pigmented; gillrakers 21 to 27; scales below lateral line in mid body region lanceolate or needle-like; maxilla extends to or slightly beyond rear margin of eye 25
- 25a. Scales below lateral line lanceolate; maxilla extends slightly beyond rear margin of eye; double series of 6 to 8 roundish blotches above and below lateral line *S. lysan*
- 25b. Scales below lateral line slender and needle-like; maxilla not extend beyond rear margin of eye; vertically oblong blotches along lateral line *S. tol*
- 26a. Dorsal fin lobe shorter than anal fin lobe; dorsal fin rays 21 to 25; 2 to 5 lateral spots on body *T. baillonii*
- 26b. Dorsal fin lobe much longer than anal fin lobe; dorsal fin rays 18 to 20; no lateral spots on body *T. blochii*
- 27a. Single 2-rayed finlet behind end of dorsal and anal fins; maxilla reaches before eye *Elagatis bipinnulatus*
- 27b. No finlets behind fins; maxilla reaches below eye 28
- 28a. Maxilla broadly rounded; gillrakers 4 to 10, knob-like and mostly rudiment; snout less than twice eye diameter *Seriolina nigrofasciata*
- 28b. Maxilla truncate; gillrakers 11 to 29, mostly well developed; snout twice eye diameter *Seriola rivoliana*

377. *Alectis ciliaris* (Bloch, 1788)

Threadfinned Trevally

D. VII+I, 19-22; A. II+I, 16-18. Body strongly compressed and deep; head elevated, snout rather short, chin prominent; anterior dorsal and anal fin rays extremely long and



Fig. 455. *Alectis ciliaris*

filamentous in young; scales smooth and embedded in skin. Body silvery; a dark small spot on upper side of opercle; outer edge of pectoral fin dusky, rest of the fins pale. Attains 125 to 130 cm. Found in coastal waters near reefs. Common. Feeds on crustaceans and fish. Juveniles are interesting aquarium pets. Frequently found in commercial catches. Distributed in all tropical seas.

378. *Alectis indicus* (Ruppell, 1830)
Indian Threadfin Trevally

D. VI+I, 18-20; A. II+I, 18-19. Body strongly compressed and deep; head profile almost vertical with a distinct hump above eye; pectoral fins large and falcate; anterior dorsal and anal fin rays extremely long in young. Body dark blue above, silvery white below; a dusky spot on upper edge of operculum. Juveniles with dark cross bars on sides. Attains 40 cm. Found in coastal waters and adjacent to reef areas, form large schools. Frequently found in commercial catches. Indo-West Pacific.

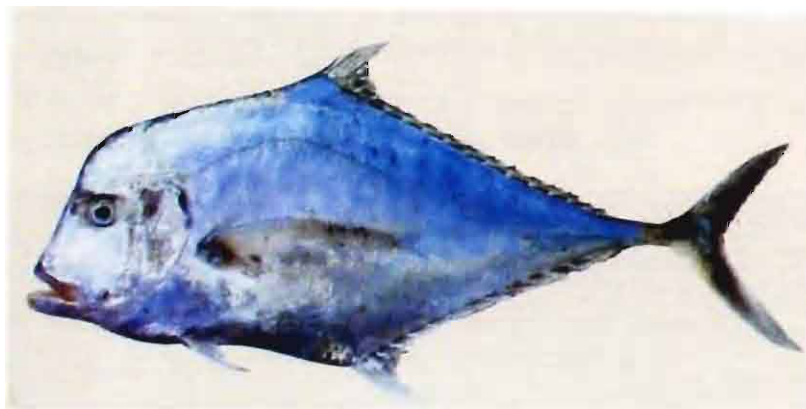


Fig. 456. *Alectis indicus*

379. *Alepes djedaba* (Forsskal, 1775)
Shrimp Scad

D. VIII+I, 23-24; A. II+I, 18-20. Body oblong and compressed; dorsal and ventral profiles equally convex; jaws nearly equal; adipose eyelid well developed on posterior half of



Fig. 457. *Alepes djedaba*

eye only; lateral line with 42 to 46 scutes. Greyish green above, silvery below with distinct black blotch on upper edge of opercle bordered above by a small white spot; fins pale yellow; upper lobe of caudal fin dusky distally. Attains 25 cm. Found in coastal and around reefs in large schools. Frequently found in commercial catches. Feeds on crustaceans, cephalopods and small fish. Indian Ocean.

380. *Alepes kleinni* (Bloch, 1793)

Goggled Eye Scad

D. VIII+I, 26; A. II+I, 19; P. 21; V. I, 5. Body ovate, tapering posteriorly; ventral profile of body more convex than dorsal profile; adipose eye lid on posterior half of eye only; pectoral fins falcate and longer; 41 scutes on lateral line. Body greenish silvery with light yellow reflections; a black spot on upper end of opercle; anterior dorsal fin spines black; a black spot on upper opercle. Attains 20 to 25 cm. Found in shallow coastal waters near reefs. Frequently found in commercial catches. Indo-Pacific.

381. *Atule mate* (Cuvier, 1833)

Yellowtail Scad

D. VII+I, 23-29; A. II+I, 20; P. 22-23; V. I, 5. Body oblong and compressed; lower jaw prominent; adipose eye lid well developed, covering the eye except for a small vertical slit; last dorsal and anal fin rays fin let like; 45 to 48 strong scutes on lateral line. Body olive green dorsally, shading to white ventrally; 9 to 19 grey bands wider than pale inter-spaces present dorso-laterally; a black spot on opercle; dorsal and caudal fins yellowish; anal fin pale; pectoral and ventral fins white. Attains 25 to 30 cm. Found in shallow coastal waters and reef areas in schools. Feeds on crustaceans and cephalopods. Good food fish and very common in commercial fish catches. Indo-West Pacific.

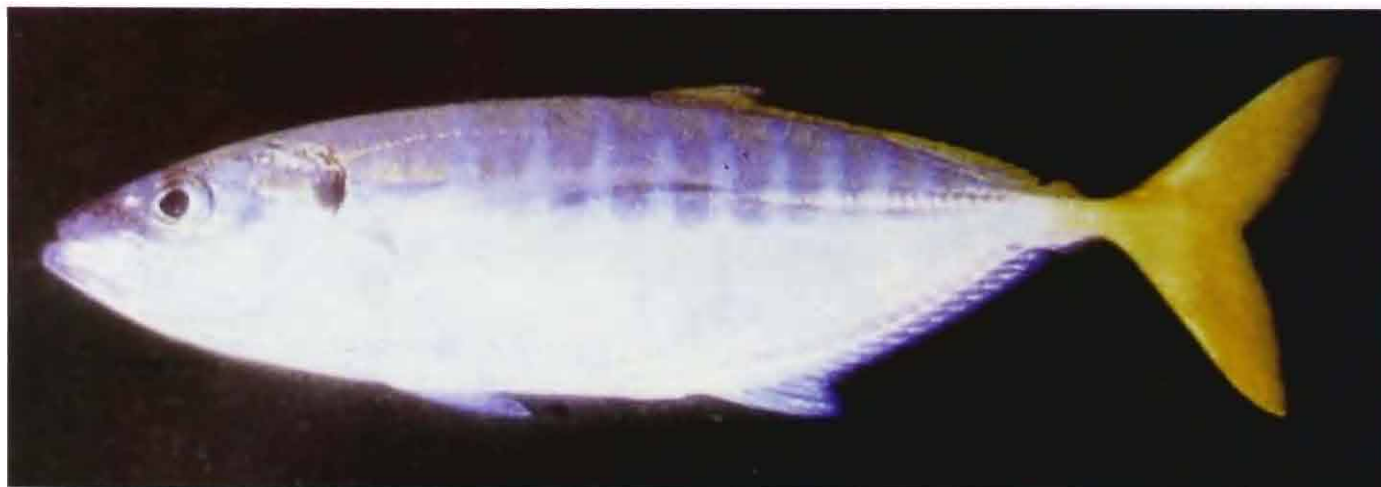


Fig. 458. *Atule mate*

382. *Carangoides armatus* (Ruppell, 1830)**Longfin Trevally**

D. VIII+I, 19-22; A. II+I, 16-18. Body oval and strongly compressed and dorsal profile concave; adipose eye lids feebly developed; 22 to 24 scutes on lateral line; area above pectoral fin base completely scaled; soft dorsal fin lobe falcate and long. Body bluish-grey dorsally, silvery below; black spot on opercular margin; ventral fin pale to blackish. Attains 25 to 30 cm. Found around coastal waters, coral and rocky reefs. Feeds on small crustaceans and fish. Good food fish and very common in commercial fish catches. Indo-Pacific.

383. *Carangoides caeruleopinnatus* (Ruppell, 1830)**Bluefin Kingfish**

D. VII+I, 23; A. II+I, 19; P. 20; V. I, 5. Body sub-ovate, eyes small; breast naked up to behind pectoral fin origin and laterally up to pectoral base; lateral line with 30 scutes; pectoral fin falcate. Body bluish above, silvery below; a black spot present on operculum; tips of median fins dusky. Juveniles with six vertical dark bands on sides of body. Attains 30 to 35 cm. Found in deep reef areas and coastal waters. Good food fish and very common in commercial fish catches. Indo-Pacific.



Fig. 459. *Carangoides caeruleopinnatus*

384. *Carangoides chrysophrys* (Cuvier, 1833)**Longnose Trevally**

D. VII+I, 18-20; A. II+I, 14-17. Body ovoid and compressed; head profile smoothly convex at nape; pectoral fins long and falcate; 17 to 26 feeble scutes on lateral line; breast naked to behind pelvic origin and laterally up to pectoral base. Body silvery, greenish above;

a small black opercular spot present; fins pale. Attains 50 to 60 cm. Found around coastal and reef areas. Uncommon in fish catches. Indo-West Pacific.



Fig. 460. *Carangoides chrysophrys*

385. *Carangoides fulvoguttatus* (Forsskal, 1775)
Yellowspotted Trevally

D. VIII+I, 25-30; A. II+I, 22-26. Body elongate and compressed; lateral line scutes 15 to 21; breast naked to behind pelvic origin, extending uninterrupted to pectoral base. Body blue green above, silvery below with many brassy spots on sides. Attains 80 to 90 cm. Prefers rocky and coral reef areas. Feeds on small invertebrates and fish. Good food fish and frequently found in commercial fish catches. Indo-Pacific.

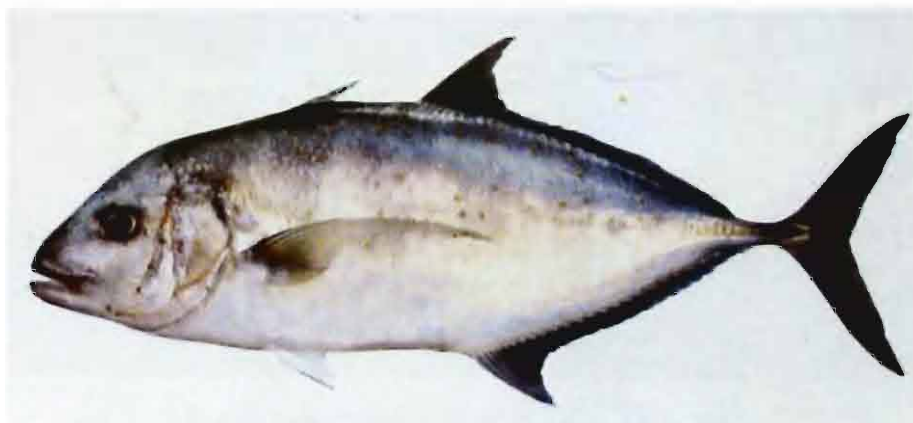


Fig. 461. *Carangoides fulvoguttatus*

386. *Carangoides gymnostethus* (Cuvier, 1833)
Brown Spotted Trevally

D. VIII+I, 28-32; A. II+I, 24-26. Body rather elongate and compressed; lateral line with 20 to 31 scutes; breast naked to behind pelvic origin and laterally to pectoral base. Body olive

green above, silvery below; few brown spots present mid-laterally; inconspicuous dusky opercular spot present. Attains 80 to 90 cm. Found around reef areas in deep waters. Adults usually solitary. Feeds on small fins and invertebrates. Occasionally encountered. Indo-West Pacific.

387. *Carangoides hedlandensis* (Whitley, 1934)

Bump-nose Trevally

D. VIII+I, 12; A, II+I, 16; P. 20; V. I, 5. Head profile extremely steep with a distinct bulge in interorbital region; lateral line with 22 scutes; soft dorsal fin lobe longer; anterior soft rays of dorsal and anal fins strongly elevated and produced. Body greenish blue above, silvery grey below; a black blotch on upper opercular margin; ventral fins blackish; caudal fin yellow. Attains 30 cm. Found in coastal and adjacent reef areas. Good food fish and very common in commercial fish catches. Indo-West Pacific.



Fig. 462. *Carangoides hedlandensis*

388. *Carangoides malabaricus* (Bloch & Schneider, 1801)

Malabar Trevally

D. VIII+I, 22; A. II+I, 18; P. 18; V. I, 5. Body oblong; dorsal profile strongly concave; lower jaw prominent; 19 to 32 scutes on lateral line. Body silvery, bluish grey above; a black blotch present on operculum; fins pale yellow; caudal fin yellowish green. Attains 25 cm.

Found around coastal rocky and coral reef areas in schools. Good food fish and very common in commercial fish catches. Indo-West Pacific.



Fig. 463. *Carangoides malabaricus*

389. *Carangoides talamparoides* Bleeker, 1852

White Tongued Trevally

D. VIII+I, 20-23; A. II+I, 17-19. Body slightly oblong and compressed; naked area of breast extending above pectoral fin base; lateral line scutes weak, 21 to 32. Body silvery blue on back, silvery white below; a black spot on operculum; tongue white; caudal fin dusky yellow, margin black. Attains 30 cm. Found around inshore reef areas. Good food fish and frequently found in commercial fish catches. Indo-West Pacific.

390. *Caranx ignobilis* (Forsskal, 1775)

Giant Trevally

D. VIII+I, 18-21; A. II+I, 15-17. Body deep and strongly compressed and robust; head profile steep and strongly curved above eyes; ventral profile from lower jaw to anal fin base straight; lateral line with 28 to 30 scutes. Body silvery grey above, paler below; no dark spot

at upper end of opercle; fins dusky. Attains 130 to 140 cm. Found around reef areas. Good food fish and very common in commercial fish catches. Indo-West Pacific.



Fig. 464. *Caranx ignobilis*

391. *Caranx melampygus* Cuvier, 1833

Bluefin Trevally

D. VII+I, 23; A, II+I, 19-20. Body oblong, head profile fairly steep; breast completely scaled; 36 to 39 scutes on lateral line. Body greenish blue with small blue-black spots on upper back and sides; silvery white on lower sides; lobes of dorsal and anal fins electric blue; pectoral fins light yellow. Attains 90 to 100 cm. Found in reef areas. Feeds primarily on fish. Good food fish and very common in commercial fish catches. Indo-West Pacific.



Fig. 465. *Caranx melampygus*

392. *Caranx sexfasciatus* Quoy & Gaimard, 1825
Big-eye Trevally

D. VIII+I, 20-21; A. II+I, 15-16. Body oblong; upper and lower profiles equal, nape elevated; 32 to 34 strong scutes on lateral line; breast completely scaled. Body blue green above, silvery below; a small, black spot on upper edge of opercle; tips of soft dorsal and anal fins white; caudal fin yellowish. Attains 70 to 75 cm. Found in coastal waters near reefs. Feeds on fish and crustaceans. Good food fish and very common in commercial fish catches. Indo-Pacific.



Fig. 466. *Caranx sexfasciatus*

393. *Elagatis bipinnulatus* (Quoy & Gaimard, 1825)
Rainbow Runner

D. VI+I, 26+2; A. I+I, 20+2. Body elongate and fusiform; eyes with narrow adipose lid; no lateral line scutes; two rayed fin let present at the end of dorsal and anal fins; caudal peduncle groove present dorsally and ventrally. Body dark olive blue above, white below; two narrow bluish white stripes along side with a broad yellow stripe between them; all fins light yellow. Attains 100 to 120 cm. Found in coastal waters near reefs. Feeds on small invertebrates and fish. Good food fish but not common in commercial fish catches. Indo-West Pacific.



Fig. 467. *Elagatis bipinnulatus*

394. *Gnathanodon speciosus* (Forsskal, 1775)
Golden Trevally

D. VII+I, 18-20; A. II+I, 15-17. Body deep and compressed; head profile steep; lips thick and fleshy; breast completely scaled. Body yellowish silvery with 8 to 10 black bars, alternating broad and narrow; all fins yellow; tips of caudal fin black. Larger fishes are paler

with black patches and faint cross bars on sides. Attains 100 cm. Found around reef slopes in large numbers. Good food fish and frequently found in commercial fish catches. Young specimens are good aquarium pets. Indo-Pacific.



Fig. 468. *Gnathanodon speciosus*

395. *Megalaspis cordyla* (Linnaeus, 1758)

Torpedo Scad

D. VIII+I, 10+8-9 finlets; A. II+I, 8+9-10 fin lets; P. 22; V. I, 5. Body torpedo shaped; adipose eyelids well developed; breast naked; lateral line with 54 to 56 strong and large scutes; caudal peduncle very slender. Body green above, silvery below; prominent black spot on upper edge of operculum; all fins light yellow. Attains 70 to 80 cm. Found near reef areas in school. Feeds on small crustaceans and fish. Good food fish, not common in commercial fish catches. Indo-Pacific.



Fig. 469. *Megalaspis cordyla*

396. *Scomberoides commersonianus* Lacepede, 1801

Talang Queenfish

D. VI-VII+I, 20-21; A. II+I, 18-19; P. 18; V. I, 5. Body compressed with blunt snout and depression over eyes; upper jaw extending well beyond eye; no scutes on body; pectoral fins small, not falcate. Body dusky green above, silvery below with 6 to 9 large oval blotches

intersecting lateral line; pectoral fins pale with a dusky blotch ventrally; ventral fins white. Attains 100 to 110 cm. Frequents reefs in small schools. Feeds on fish, cephalopods and other pelagic organisms. Good food fish and common in commercial fish catches. Indo-West Pacific.

397. *Scomberoides lysan* (Forsskal, 1775)

Double Spotted Queenfish

D. VI-VII+I, 21; A. II+I, 19-21; P. 20; V. I, 5. Body compressed and elongate; upper jaw long; no scutes on body; pectoral fin short and not falcate. Body grey green above, silvery white below; double series of 6 to 8 dusky roundish blotches above and below lateral line; distal half of dorsal fin lobe dark; anal fin with a small dusky blotch on anterior part. Attains 50 to 60 cm. Found in coastal waters near reefs. Feeds on small fish. Good food fish and very common in commercial fish catches. Indo-West Pacific.



Fig. 470. *Scomberoides lysan*

398. *Scomberoides tol* (Cuvier, 1832)

Needle Scaled Queenfish

D. VII+I, 20; A. II+I, 18; P. 17; V. I, 5. Dorsal profile of body more convex than ventral profile; lower jaw long; no scutes on body. Body bluish above, silvery below with 5 to 8



Fig. 471. *Scomberoides tol*

vertically oblong black blotches on sides, the anterior 3 or 4 blotches intersect lateral line; distal half of dorsal fin pigmented; caudal fin dusky. Attains 60 cm. Found in small schools in shallow coastal waters adjacent to reefs. Good food fish and rarely found in commercial fish catches. Indo-West Pacific.

399. *Selar boops* (Cuvier, 1833)

Ox-eye Scad

D. VIII+I, 24; A. II+I, 21; P. 19; V. I, 5. Body oblong and moderately compressed; eyes large; adipose eyelids well developed; lateral line with 44 or 45 scutes. Body dark blue above, silvery gold on sides and below; a distinct broad golden band from eye to caudal fin base; a black spot on operculum. Attains 25 cm. Found near reef and rocky areas. Feeds on fish, planktonic and benthic invertebrates. Good food fish and common in commercial fish catches. Indo-Pacific.

400. *Selar crumenophthalmus* (Bloch, 1793)

Big-eye Scad

D. VIII+I, 25-26; A. II+I, 21-22; P. 19; V. I, 5. Body oblong and moderately compressed; eyes large, eyelids well developed covering entire eye except a centered slit; lateral line with 33 or 34 scutes. Body metallic blue above, shading to white below; operculum with a large black spot; fins pale green; caudal fin lobes dusky. Attains 25 to 30 cm. Feeds on benthic invertebrates. Found in shallow coastal areas near reefs. Good food fish and very common in commercial fish catches. All tropical and subtropical waters.

401. *Selaroides leptolepis* (Cuvier, 1833)

Yellow Stripe Scad

D. VIII+I, 24-25; A. II+I, 20; P. 15; V. I, 5. Body oblong and compressed, the upper and lower profiles equally concave. Eyes large with a broad posterior adipose eyelid; pectoral fin falcate; 25 to 33 scutes on lateral line. Body dark blue green above, silvery below; a golden yellow band from eye to caudal fin; a distinct dusky spot on operculum; fins light yellow. Attains 20 cm. Found in schools on soft bottom of the reefs. Good food fish and common in commercial fish catches. Indo-Pacific.

402. *Seriola rivoliana* Valenciennes, 1833

Almaco Jack or Longfin Yellowtail

D. VII+I, 27-32; A. II+I, 18-22. Body fairly elongate and compressed; dorsal profile of body evenly convex; eyes small; no scutes on lateral line; spinous dorsal fin low; no fin lets behind dorsal and anal fins; caudal peduncular grooves present dorsally and ventrally; caudal fin forked; anal fin base distinctly shorter than dorsal fin base. Body bluish green above, sides

and belly lighter; a dark bar present from eye to dorsal fin origin; a faint amber colour stripe along mid-side of body; all fins dark except pelvic fin white ventrally. Attains 60 to 70 cm. Found on outer reef areas. Good food fish but not common in commercial catches. Circumtropical distribution.



Fig. 472. *Seriola rivoliana*

403. *Seriolina nigrofasciata* (Ruppell, 1829)

Black Banded Trevally

D. VII+I, 34; A. II+I, 16. Body oblong and moderately compressed; head profile steep in front of eye; snout blunt; anal fin base distinctly shorter than dorsal fin base; pectoral fin falcate; breast scaled; no scutes on body; caudal peduncle grooves present. Body bluish grey to black above, silvery grey below with 5 or 6 dark oblique bands on upper half of body;



Fig. 473. *Seriolina nigrofasciata*

spinous dorsal black; soft dorsal and anal fins dusky brown, tips white; caudal and pelvic fins yellow. Attains 60 to 70 cm. Found near offshore reefs. Solitary species. Feeds on fish, prawns and cephalopods. Good food fish and frequently found in commercial fish catches. Indo-Pacific.

404. *Trachinotus baillonii* (Lacepede, 1801)

Black Spotted Dart

D. VI+I, 20-22; A. II+I, 20-21; P. 18; V. I, 5. Body sub-ovate and strongly compressed; snout blunt; dorsal fin spines very small; anterior rays of dorsal, anal and caudal fin rays very long. Body grey to silvery blue above, silvery white below; sides with 3 to 5 round black spots in longitudinal row on lateral line; dorsal, anal and caudal fins dusky, lobes dark. Attains 50 cm. Found on sandy bottom adjacent to reefs. Good food fish and very common in commercial fish catches. Indo-West Pacific.

405. *Trachinotus blochii* (Lacepede, 1801)

Snubnosed Dart

D. VI+I, 19; A. II+I, 16; P. 18; V. I, 5. Body deep and compressed; head profile smoothly rounded, snout blunt; dorsal, anal and caudal fins falcate; pectoral fins short. Body silvery, paler below; dorsal and anal fins yellow, lobes dark. Attains 80 to 90 cm. Found in coastal waters, rocky and reef areas. Feeds on molluscs and fish. Good food fish and common in commercial fish catches. Indo-Pacific.



Fig. 474. *Trachinotus blochii*

Family CORYPHAENIDAE

Dolphinfishes

Characterised by moderately elongate and compressed body; anterior snout profile vertical; scales small and cycloid; dorsal fin single, extended from nape to end of caudal peduncle; caudal fin deeply forked; no scutes or finlets on body; adult males with a bony crest on forehead; no spines in fins; ventral fin thoracic in position and fitting into a groove on body; caudal fin deeply forked. Oceanic pelagic fish, solitary, occasionally found in shoals. Very important sporting fish.

406. *Coryphaena hippurus* Linnaeus, 1758

Dolphin Fish

D. 58-65; A. 25-30; P. 18-20; V. 5. Body elongate and compressed; snout profile vertical; caudal fin forked. Colour brilliant metallic blue on back, shading to light golden yellow ventrally; a row of dark blue green spots scattered on sides of body; dorsal fin deep blue-green; anal, ventral and caudal fin yellow. Attains 200 cm, and weighs 35 to 40 kg. Oceanic, occasionally encountered near outer reef areas. Not common. Feeds on fish and squids. All tropical and sub-tropical seas.



Fig. 475. *Coryphaena hippurus*

Family RACHYCENTRIDAE

Cobias

Body elongate and sub-cylindrical, head broad and depressed; mouth large with bands of fine teeth in jaws, on palate and tongue; eyes small; scales minute, embedded in thick skin; two dorsal fins, first with free spines and depressible into a groove; anal fin long; caudal fin lunate.

407. *Rachycentron canadus* (Linnaeus, 1766)

Black Kingfish

D. VIII+I, 35-38; A. III, 24; P. 21-23. Head broad and depressed; caudal fin lunate, upper lobe longer. Body dark-brown with two narrow silvery bands on sides, belly yellowish; outer edge of caudal fin white. Attains 150 to 200 cm. Found around vicinity of coral reefs, solitary species. Occasionally encountered. Feeds on crustaceans. Flesh is tasty. Wide spread in all warm Oceans.

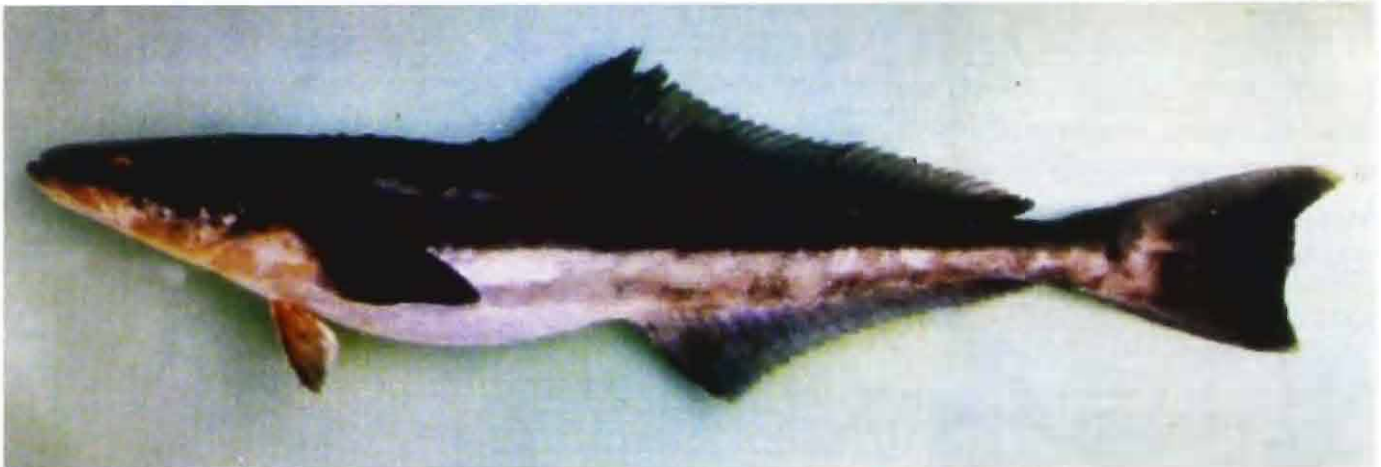


Fig. 476. *Rachycentron canadus*

Family ECHENEIDAE
Remoras or Suckerfishes

Body slender, elongate and sub-cylindrical; head flattened and bearing a laminated adhesive disc is a modified first dorsal fin; dorsal and anal fin bases long and similar in shape; caudal fin rounded; no spines in fins. They attach themselves to sharks, skates, other big fishes, turtles, cetaceans, etc. with the help of adhesive disc. They feed on scraps that result from the feeding activities of the hosts and feed on parasitic crustaceans attached to the hosts.

Key to species

- 1a. Body long and slender; laminae on disc (sucker) 21 to 28; dorsal fin rays 34 to 42, anal rays 32 to 35 *Echeneis naucrates*
- 1b. Body more robust; laminae on disc (sucker) 14 to 27; dorsal fin rays 22 to 26, anal rays 22 to 24 *Remora remora*

408. *Echeneis naucrates* Linnaeus, 1758

Slender Suckerfish

D. 34-40; A. 32-38; P.22-24. Body slender and elongate; caudal peduncle very long and narrow; lower jaw projecting; caudal fin slightly rounded. Body grey with white edged black stripe extended from tip of lower jaw, through eye to caudal fin; all fins light brown. Attains 80 to 90 cm. Found around coral reef areas and reef slopes. Frequently encountered. Attached to a variety of hosts from sharks to turtles. Circumtropical distribution.



Fig. 477. *Echeneis naucrates*

409. *Remora remora* (Linnaeus, 1758)

Remora

D. 22-26; A. 22-24; P.26-30. Body rather short; eyes small; sucking disc distinct and large; pectoral fins short and rounded; caudal fin emarginate. Body uniformly brownish-grey. Attains 50 to 60 cm. Found around coral reefs. Not uncommon. Mostly attached to sharks, tunas etc. Indo-Pacific.

Family CIRRHITIDAE

Hawkfishes

Fishes small to moderate sized and elongated to oblong; lower pectoral fin rays unbranched and their membranes deeply incised; dorsal fin continuous and notched between spinous and soft portions; one or more cirri projecting from inter-spinous membrane near tips of dorsal spines; a fringe of cirri on hind edge of anterior nostril; small canine teeth in both jaws. Usually solitary found in wave washed areas perching on coral branches or rocky bottom. Carnivorous, feeds on small fish and crustaceans.

Key to species

- 1a. Snout elongate, about 2 in head; body slender *Oxycirrhites typus*
- 1b. Snout not elongate, about 3.5 in head; body not slender 2
- 2a. Scales above lateral line to base of dorsal spines 5; each dorsal fin spine tip with a single cirrus *Paracirrhites forsteri*
- 2b. Scales above lateral line to base of dorsal spines 3 to 4; a tuft of cirri from membrane near tip of each dorsal fin spine 3
- 3a. Four scale rows above lateral line; 12 rows of scales on cheek; spinous dorsal fin membrane not deeply incised; first dorsal fin ray not produced into a filament
..... *Cirrhites pinnulatus*
- 3b. Three scale rows above lateral line; 4 rows of scales on cheek; spinous dorsal fin membrane moderately incised; first dorsal fin ray produced into a filament
..... *Cirrhitichthys aprinus*

410. *Cirrhitichthys aprinus* (Cuvier, 1829)

Threadfin Hawkfish

D. X, 12; A. III, 6; P. 14; V. I, 5. Body elongate and moderately deep; eyes close to dorsal profile of head; end of each dorsal fin spine membrane with a tuft of cirri; caudal fin



Fig. 478. *Cirrhitichthys aprinus*

truncate. Body with large reddish brown blotches; a pale edged black spot on upper part of operculum; head with five narrow diagonal reddish brown bars below eye. Attains 12 cm. Found around shallow rocky reef areas, always rest on bottom. Not common. Good aquarium pet. Indo-West Pacific.

411. *Cirrhitus pinnulatus* (Forster, 1801)

Marbled Hawkfish

D. X, 11; A. III, 6; P.13-14; V. I, 5. Body elongate and moderately deep; eyes close to dorsal profile of head; end of each dorsal fin spine membrane with a tuft of cirri; caudal fin truncate. Body light brown, paler below; three rows of large white or slightly rounded blotches about the size of eye and numerous small dark brown to reddish spots scattered over body; head with orange spots or irregular short lines; dorsal and anal fins with small reddish spots. Attains 25 to 28 cm. Found in inshore reefs exposed to wave action. Frequently encountered. Feeds on crustaceans, small fish, sea urchins and brittle stars. Indo-Pacific.



Fig. 479. *Cirrhitus pinnulatus*

412. *Oxycirrhites typus* Bleeker, 1857

Longnose Hawkfish

D. X, 13; A. III, 7; P. 14; V. I, 5. Body slender and elongate, snout extremely long; tip of each dorsal fin spine with cirri; caudal fin truncate. Body light reddish white with vertical

and horizontal dark red bands forming a mesh pattern; caudal and dorsal fin with red spots. Attains 10 cm. Found perched on gorgonians (seafans). Not common. Very good aquarium pet. Feeds on small crustaceans. Indo-Pacific.

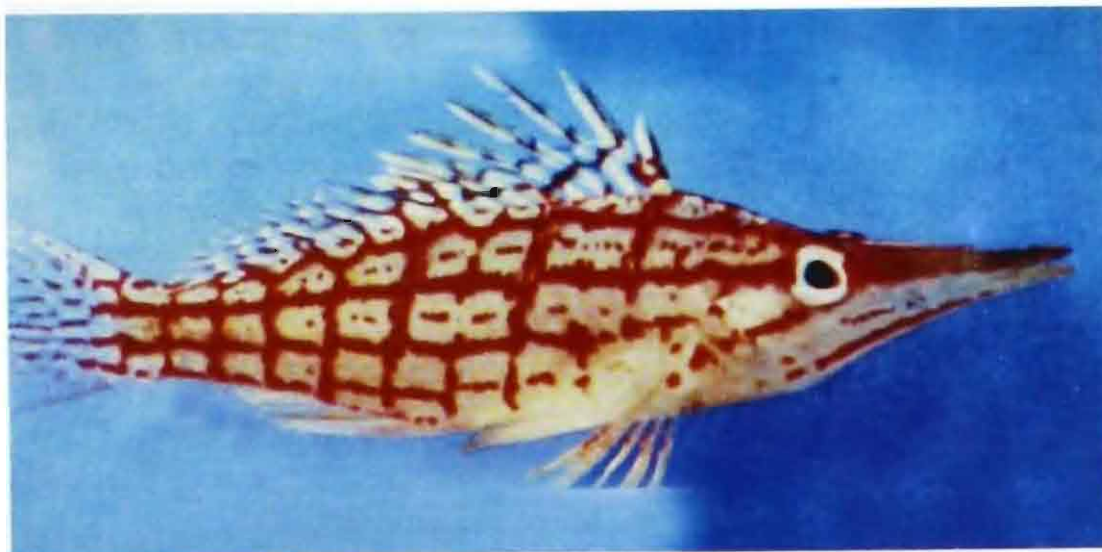


Fig. 480. *Oxycirrhites typus*

413. *Paracirrhites forsteri* (Schneider, 1801)

Blacksided Hawkfish

D. X, 12; A. II, 6-7; P. 14-15; V. I, 5. Body slightly robust; caudal fin truncate or slightly rounded. Colour yellowish-brown on back, a broad black band on posterior upper side of body, extending on to base of caudal fin; broad pale yellow stripe laterally on body and another one along base of dorsal fin; head dark grey with small red spots. Attains 20 cm. Found on live coral beds. Feeds on fish and shrimps. Good aquarium pet. Indo-Pacific.



Fig. 481. *Paracirrhites forsteri*

Family PEMPHERIDAE
Sweepers

Body elongate, oval or slightly oblong, tail strongly tapering; caudal peduncle very slender; mouth oblique; lower jaw projecting; eyes large; body scales small, cycloid or ctenoid; dorsal fin un-notched and short; caudal fin truncated or slightly forked; pectoral fins with short axillary process. They are very cryptic and nocturnal, hide in caves by day and come out at night for feeding. Feeds on zooplankton. Form huge schools in reef areas.

Key to species

- 1a. No forward-directed teeth in lower jaw *P. vanicolensis*
 1b. Anterior teeth of lower jaw directed outwards 2
 2a. Interorbital space slightly convex to flattened; pectoral fins without a blackish basal spot
 *P. moluca*
 2b. Interorbital space strongly convex; pectoral fins with a blackish basal spot
 *P. oualensis*

414. *Pempheris moluca* Cuvier, 1829

Moluccan Sweeper

D. VI, 9; A. III, 40-42; P. 17-18; V. I, 5. Body slightly deep and compressed; inter-orbital space slightly flattened; caudal fin slightly emarginated. Colour silvery, brownish on back and coppery on flanks; pectoral fin base with a black patch; ventral fins reddish. Attains 20 cm. Found around rocky shores and coral reef areas in shallow waters. Common. Food fish but do not have any commercial value. Central Indo-Pacific.



Fig. 482. *Pempheris moluca*

415. *Pempheris oualensis* Cuvier, 1831
Copper Sweeper

D. VI, 8-10; A. III, 38-42; P. 16-17; V. I, 5; Ll. 60-72. Body elongate oval and slightly compressed; mouth oblique; eyes very large; caudal fin slightly forked. Body dark brown, shading to coppery on sides and ventrally; tip and edge of dorsal fin black; caudal fin dusky posteriorly; a dark bar at base of pectoral fin. Attains 20 cm. Found around sheltered coral reef areas in large aggregations. Food fish but not commercially important. Good aquarium pet. Indo-West Pacific.



Fig. 483. *Pempheris oualensis*

416. *Pempheris vanicolensis* Cuvier, 1831
Vanikaro-Sweeper

D. VI, 9; A. III, 39-42; P. 18; V. I, 5; Ll. 62-73. Body compressed, deep at anterior end; caudal peduncle very narrow; caudal fin emarginate. Body coppery brown, silvery on sides and ventrally; dorsal fin tip black; dorsal and anal fins with dusky margins; pectoral fins light yellow; ventral fins orangish. Attains 20 cm. Found around rocky and coral reef areas in shallow waters. Common. Not quite important as food fish but good ornamental fish. Indo-West Pacific.



Fig. 484. *Pempheris vanicolensis*

Family POMACENTRIDAE
Damselfishes or Sergeantfishes

Damselfishes are most common and abundant coral reef fishes in terms of species and number of individuals. Their body usually compressed, ovoid to orbicular with a single continuous dorsal fin, base of spinous portion longer than soft portion; scales ctenoid, extending onto basal part of dorsal and anal fins; caudal fin emarginate to forked or lunate; head scaled; lateral line interrupted; mouth small, slightly retractile; snout blunt and short; teeth conical or compressed, uniserial or in more rows. Body colouration highly variable ranging from drab hues of brown-grey and black to brilliant combination of orange, red, blue and yellow. Their habitat preference, behaviour and feeding habits are extremely varied. They are very much territorial. The clown fishes always found in close association with sea anemones. They exude a mucous substance, which protects them from stings of the anemone. Feeds on a variety of animal and plant material. Few species are food fishes but most of the species regarded as popular aquarium pets.

Key to species

- 1a. Opercle, subopercle and interopercle with spines or radiating serrae 2
- 1b. Opercle, subopercle and interopercle with finely serrated smooth 10
- 2a. Suborbital with two long spines, directed backward..... *Premnas biaculeatus*
- 2b. Suborbital without spines, only with denticulation 3 (Genus *Amphiprion*)
- 3a. Two or three bars on body, middle bar may be saddle-like 4
- 3b. One bar present on body or may be entirely absent 7
- 4a. Predorsal scales extending to a level well behind rear of orbits; body orange with 3 white bars, edged with black; mid body bar has forward projection *A. ocellaris*
- 4b. Predorsal scales extending about to the level of rear of orbit or ahead of this point; colour not as in 4a 5
- 5a. Body depth less than 2.1 in SL; body brown to black with three complete white bars; ventral part of head; caudal fin and pectoral fins yellow *A. clarckii*
- 5b. Body depth more than 2.1 in SL; colour not as in 5a 6
- 6a. Caudal fin uniformly pale; two complete bars present on body *A. sebae*
- 6b. Caudal fin uniformly pale; two saddle-like or complete bars on body covers greater part of the dorsal fin *A. polymnus*
- 7a. Depth of body less than 2.1 in SL 8

- 7b. Depth of body greater than 2.1 in SL 9
- 8a. Predorsal scales not extending beyond front of orbits; head band present; body uniformly brownish black *A. frenatus*
- 8b. Predorsal scales extending beyond front of orbits; no bands on body; body reddish with a broad blackish blotch postero-dorsally *A. ephippium*
- 9a. Head bar present; body orange pink with a distinct narrow white mid-dorsal stripe from interorbital space along dorsal base to upper caudal rays *A. perideraion*
- 9b. Head bar absent; body orange with light tan fins and a pale mid-dorsal band *A. akallopisos*
- 10a. Dorsal spines 12 11
- 10b. Dorsal spines 13 to 14 18
- 11a. Suborbital and preopercle smooth 12 (Genus *Plectroglyphidodon*)
- 11b. Suborbital and preopercle serrated 13
- 12a. Gillrakers 16-17 lateral line scales 21 to 22; body brown with a black bar at posterior end; caudal peduncle and fin white *P. dickii*
- 12b. Gillrakers 21-25 lateral line scales 17 to 18; body brown with scattered blue spots and blue markings on head; caudal fin tan *P. lacrymatus*
- 13a. Body depth 1.4 to 1.7 in SL; body orbicular 14 (Genus *Dascyllus*)
- 13b. Body depth 1.7 to 2.2 in SL; body slightly elongate 17 (Genus *Stegastes*)
- 14a. Body with one to three black bars 15
- 14b. Body without black bars 16
- 15a. Body white with three black bars; caudal fin white *D. aruanus*
- 15b. Body whitish or pale tan with a black bar at level of pectoral base; caudal fin tan or dusky *D. reticulatus*
- 16a. Body charcoal colour with black scale margins; juveniles with a white spot on fore head and on upper side of body *D. trimaculatus*
- 16b. Body brown with dark scale margins; a black blotch at upper base of pectoral fin; lips blackish *D. marginatus*
- 17a. Distance from mouth to eye is greater; a blackish area below soft dorsal fin *S. lividus*

- 17b. Distance from mouth to eye is narrow; a black spot at base of last dorsal rays; lavender markings present on head and anterior region of anal fin..... *S. nigricans*
- 18a. Gillrakers 60 to 85; preopercle and suborbital smooth; body overall dark brown.....
..... *Hemiglyphidodon plagiometopon*
- 18b. Gillrakers below 35; preopercle and suborbital smooth or serrated; colour not as in 18a 19
- 19a. Lips swollen, with many furrows; body brown, becoming darker posteriorly; scale margins black *Cheiloprion labiatus*
- 19b. Lips normal, colour not as in 19a..... 20
- 20a. Preopercle and suborbital serrated or finely denticulated 21
- 20b. Preopercle and suborbital smooth 27
- 21a. Scales on head reaching to between eyes; caudal fin lobes, 7th dorsal ray and 8th anal ray filamentous; body white with black bars *Amblypomacentrus breviceps*
- 21b. Scales on head reaching to front border of eyes or before nostrils; fins not filamentous; colour not as in 21a..... 22
- 22a. Scales on head reaching to before nostrils 23 (Genus *Pomacentrus*)
- 22b. Scales on head reaching to front border of eye..... 26 (Genus *Dischistodus*)
- 23a. Body yellowish brown; a broad nuchal band ending near opercle; a second band beginning on dorsal between 7th to 13th dorsal spines; all fins yellow .. *P. bifasciatus*
- 23b. No bands on body, colour not as in 23a 24
- 24a. An ocellus or black spot present on body 25
- 24b. No ocellus or black spot on body; body uniform bright yellow; a small black spot at upper base of pectoral fin *P. moluccensis*
- 25a. Body dark brown with darker scale edges; a large black sots on upper caudal peduncle *P. tripunctatus*
- 25b. Body light yellow; small dark spot at upper end of opercle and another at upper base of pectoral fin; an ocellus in soft dorsal *P. amboinensis*
- 26a. Gillrakers 33 to 35; body white with two black saddles below dorsal fin and the third on top of head *D. perspicillatus*
- 26b. Gillrakers 29 to 32; body golden brown anteriorly, whitish posteriorly; a diffuse brown saddle below soft dorsal; axil of pectoral fin black *D. prosopotaenia*

- 27a. Upper and lower edge of caudal base with 2 to 3 projecting spiniform rays; teeth usually conical in 2 or more rows 28 (Genus *Chromis*)
- 27b. Upper and lower edge of caudal base without projecting spiniform rays; teeth usually conical to flattened in 1 or 2 rows 31
- 28a. Depth 2.0 to 2.1 in SL; lateral line scales 15 to 16; body light green to blue 29
- 28b. Depth 1.8 to 2.0 in SL; lateral line scales 14 to 17; brown to brownish black .. 30
- 29a. Pectoral fin axil black *C. atripectoralis*
- 29b. Pectoral fin axil not black *C. viridis*
- 30a. Spinous dorsal fin not incised; body dark yellowish grey; dark brown streak along caudal fin lobes *C. ternatensis*
- 30b. Spinous dorsal fin incised; caudal fin lobes ending in two filaments; body dark brown to black; caudal peduncle and fin white; black spot at pectoral base
..... *C. margaritifer*
- 31a. Caudal fin deeply emarginate; posterior tips of caudal, anal and dorsal fins filamentous; body dark brown; caudal peduncle and fin yellow *Neopomacentrus azysron*
- 31b. Caudal fin forked or emarginate; posterior tips of caudal, anal and dorsal fins not filamentous; colour not as in 31a 32
- 32a. Lateral line scales 19 to 23 or above 33 (Genus *Abudefduf*)
- 32b. Lateral line scales less than 19 37
- 33a. Caudal fin lobes rounded 34
- 33b. Caudal fin lobes pointed or moderately pointed 35
- 34a. Sides of body with 6 to 7 narrow black bars *A. bengalensis*
- 34b. Sides of body with 6 to 7 dark wider grey bars; a black spot at top of caudal fin base *A. sordidus*
- 35a. Body white with 5 black bars; back yellowish *A. vaigiensis*
- 35b. Body with 5 to 7 black bars; back not yellowish 36
- 36a. Body whitish with 6 to 7 black bars *A. septemfasciatus*
- 36b. Body brownish with 4 to 5 faint dark bars; a black blotch at origin of lateral line .
..... *A. notatus*

- 37a. Body depth more than 2 in SL 38 (Genus *Chrysiptera*)
- 37b. Body depth less than 2 in SL 42
- 38a. White bar in middle of body 39
- 38b. No white bar on body 40
- 39a. Gillrakers 23 to 25; one white bar in the middle of the body; juveniles with an ocellus at base middle dorsal rays and black spot at last dorsal rays *C. biocellatus*
- 39b. Gillrakers 19 to 21; two white bars on body and a yellow bar on gill cover *C. leucopoma*
- 40a. Gillrakers 17 to 19; body and fins yellow; a broad black stripe from snout through upper edge of eye to soft part of dorsal fin *C. caeruleolineata*
- 40b. Gillrakers 21 to 24; colour not as in 40a 41
- 41a. Body brownish, slightly darker on posterior half; pectoral fins yellow; a black spot at base of posterior dorsal rays *C. unimaculatus*
- 41b. Body light grey; juveniles bluish with brilliant blue stripe above eye *C. glauca*
- 42a. Body depth 1.5 to 1.7 in SL; gillrakers 24 to 30 43 (Genus *Amblyglyphidodon*)
- 42b. Body depth 1.7 to 2.0 in SL; gillrakers 19 to 26 44 (Genus *Neoglyphidodon*)
- 43a. Body overall bright yellow, white on lower sides *A. aureus*
- 43b. Body silvery grey; dorsal, anal and caudal fin margins dark; base of pectoral black *A. leucogaster*
- 44a. Body overall jet black; juveniles white with yellow on upper part of head and body; anal and ventral fins blue *N. melas*
- 44b. Body brownish except caudal peduncle, caudal fin and posterior dorsal and anal fins yellow; dark bar below eye; juveniles yellow with two prominent black stripes on sides *N. nigroris*

417. *Abudefduf bengalensis* (Bloch, 1787)

Bengal Sergeant Major or Narrow Banded Sergeant

D. XIII, 14-15; A. I, 13-14; P. 16-18; V. I, 5. Body orbicular and compressed; caudal fin forked with rounded lobes. Body light grey with six black bars on sides much narrower

than interspaces; fins yellowish grey; pectorals with black basal spot. Attains 16 to 18 cm. Found around coral reef areas and reef slopes in shallow waters. Feeds on algae and small invertebrates. Locally consumed by few people. Indo-West Pacific.



Fig. 485. *Abudehdud bengalensis*

418. *Abudehdud notatus* (Day, 1870)

Broad Banded Sergeant

D. XIII, 13-14; A. II, 13-14; P. 18; V. I,5. Medium sized fishes. Body compressed. Colour dark brown with five narrow white bands on side; caudal fin light yellow; pectoral fins with a black basal spot; other fins dusky; small blue spots on scales; a small black spot at beginning of lateral line. Attains 10 to 12 cm. Feeds on small worms, crustaceans and algae. Found around rocky reef areas exposed to wave action. Young often found in tide pools. Wide spread in Indo-West Pacific.



Fig. 486. *Abudehdud notatus*

419. *Abudefduf septemfasciatus* (Cuvier, 1830)
Seven Banded Sergeant

D. XIII, 12-13; A. II, 11-12; P. 18-20; V. I, 5. Margin of opercle smooth; caudal fin forked, lobes rounded. Body light yellowish white with seven dark grey bands on side; soft dorsal, anal and caudal fins dusky; pectoral fins yellowish with basal triangular black spot. Attains 20 to 22 cm. Found in shallow rock pools and coral reef areas. Very common. Have food and ornamental value. Wide spread in Indo-Pacific.



Fig. 487. *Abudefduf septemfasciatus*

420. *Abudefduf sordidus* (Forsskal, 1775)
Blackspot Sergeant

D. XIII, 14-15; A. II, 14-15; P. 17-18; V. I, 5. Body compressed and slightly oblong. Caudal fin forked with slightly rounded lobes. Colour yellowish white, lighter below; five to six dark grey bars on sides of body; a black spot at upper side of caudal fin base; all fins dusky. Attains 20 to 22 cm. Feeds on small worms, crustaceans and algae. Found in pairs or in small groups around shallow rocky and reef areas exposed to wave action. Frequently encountered. Good food fish and aquarium pet. Indo-Pacific.



Fig. 488. *Abudefduf sordidus*

421. *Abudefduf vaigiensis* (Quoy & Gaimard, 1825)
Yellowback Sergeant

D. XII, 12-14; A. II, 12-13; P. 18-20; V. I, 5. Colour bluish-white with five black bars on sides; bright yellow on back; all fins dusky. Attains 12 to 15 m. Found in shallow coral reef areas, often congregate in enormous shoals. Food fish and good aquarium pet. Indo-West Pacific.



Fig. 489. *Abudefduf vaigiensis*

422. *Amblyglyphidodon aureus* (Cuvier, 1830)
Golden Damsel

D. XIII, 12-15; A. II, 14-15; P. 16-18; V. I, 5. Body deep and compressed. Easily distinguished by its bright yellow colour body, sometimes fading to white on lower side; all fins yellow. Attains 10 to 12 cm. Found on reef slopes in fairly deep waters. Common damsel. Good aquarium pet. Eastern Indian Ocean to Western Pacific.

423. *Amblyglyphidodon leucogaster* (Bleeker, 1847)
Whitebelly Damsel

D. XIII, 12-13; A. II, 13-124; P. 16-18; V. I, 5. Body silvery grey with dark scale margins; dorsal, caudal and anal fin margins dark, upper pectoral base with black spot.



Fig. 490. *Amblyglyphidodon leucogaster*

Attains 10 to 12 cm. Found in shallow to moderate depths in coral reef areas. Frequently encountered. Feeds on worms, crustaceans. Indo-West Pacific.

424. *Amblypomacentrus breviceps* (Schlegel & Muller, 1839)

Blackbanded Damsel

D. XIII, 10-11; A. II, 11-12; P. 16; V. I, 5. Caudal fin forked, lobes pointed. Body white with three broad black bars which are not completely encircle body, the 1st from nape to eye and extends to isthmus, 2nd from origin of dorsal fin to lateral line level and the 3rd from posterior dorsal rays to mid-lateral line; longitudinal rows of blue spots on side of body and caudal fin; spinous dorsal fin dusky. Attains 6 to 8 cm. Found on sandy bottoms of reefs in shallow to moderate depths. Not uncommon. Indo-West Pacific.

425. *Amphiprion akallopisos* Bleeker, 1853

Whitebacked Clownfish

D. IX, 18-20; A. II, 12-14; P. 16; V. I, 5. Caudal fin slightly rounded. Body brownish yellow with a narrow white median band from above eyes to base of dorsal fin and extends to upper rays of caudal fin; all fins light yellow. Attains 8 to 10 cm. Found in coral reef areas, commensal with sea anemones. A popular and highly priced aquarium fish. Tropical Indian Ocean.



Fig. 491. *Amphiprion akallopisos*

426. *Amphiprion clarkii* (Bennett, 1830)

Clark's Clownfish

D. X-XII, 14-16; A. II, 12-14; P. 19-20; V. I, 5. Body dark brown, snout and thorax yellowish; three broad white bands on body, the 3rd band on caudal peduncle; dorsal and anal

fins dark brown; caudal, pectoral and ventral fins yellow. Attains 10 to 14 cm. Feeds on benthic algae and zooplankton. Found in shallow coral reef areas, commensal with sea anemones. A popular and highly priced aquarium fish. Indo-Pacific.



Fig. 492. *Amphiprion clarkii*

427. *Amphiprion ephippium* (Bloch, 1790)
Blackbacked Clown

D. XI, 15-16; A. II, 12-14; P. 16-18; V. I, 5. Body and fins bright orange-red or tomato red; a large black blotch on sides below soft dorsal extending onto anal fin base. Attains 10 to 12 cm. Found in coral reef areas, commensal with sea anemones. Popular aquarium fish. Andaman Islands to Malay Archipelago.



Fig. 493. *Amphiprion ephippium*

428. *Amphiprion frenatus* Brevoort, 1856
Bridled Clown

D. X-XI, 15-18; A. II, 15-17; P. 18-20; V. I, 5. Caudal fin rounded. Body dark brownish red with a black lateral blotch, often absent; a broad white band on head; all fins light orange yellow. Young have two or three white bands, which disappear with age. Attains 12 cm. Found in coral reef areas, associated with sea anemones. Feeds on algae, small fish and zooplankton. Popular aquarium fish. Indo-West Pacific.

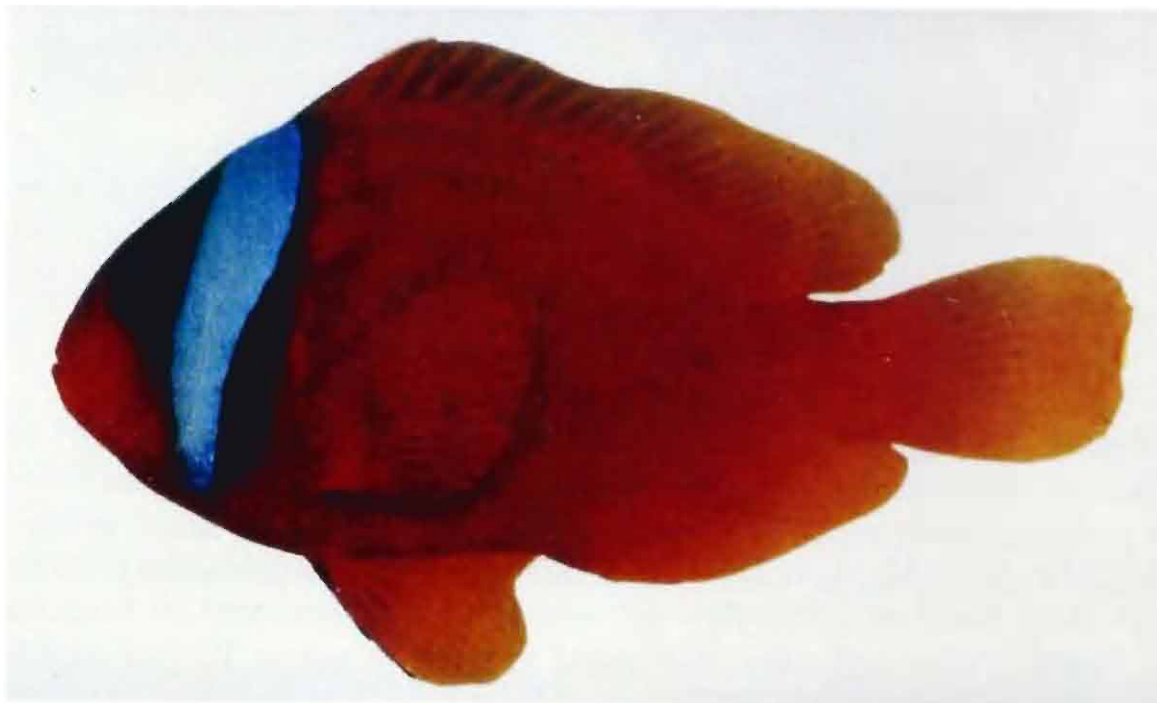


Fig. 494. *Amphiprion frenatus*

429. *Amphiprion ocellaris* (Cuvier, 1830)
Orange Clown

D. X-XI, 14-16; A. II, 11-12; P. 16-18; V. I, 5. Body orange with three white bars narrowly edged with black, the mid-body bar has a distinct projection; all fins with black



Fig. 495. *Amphiprion ocellaris*

margin. Attains 8 cm. Feeds on algae and crustaceans. Found in shallow coral reef areas, associated with sea anemones. The most common clown. Very popular aquarium fish. Indian Ocean.

430. *Amphiprion perideraion* Bleeker, 1855

Pink Anemonefish

D. IX-X, 16-17; A. II, 12; P. 16-18. Body more elongate. Body orange with a distinct narrow white bar on postorbital head and another white bar mid-dorsally on head. Attains 10 cm. Found near outer reef slopes below 3 to 20 m depth range, associated with sea anemone *Heteractis* sp. never move far from the host. Not common. Good aquarium pet. Indo-West Pacific.



Fig. 496. *Amphiprion perideraion*

431. *Amphiprion polymnus* (Linnaeus, 1758)

White Saddled Anemonefish

D. X-XI, 4-15; A. II, 12-13; P. 18. Body ovate, caudal fin slightly rounded to emarginate. Body and fins dark brown, breast and snout bright yellowish orange; a broad pale bar on sides of head touching the eye, the bar of each side joining mid-dorsally; another pale bar

between last dorsal spines and middle of soft dorsal rays extends up to lateral line or may extend to anus; caudal fin with dark arrow-shaped mark. Attains 9 to 10 cm. Found associated with sand dwelling sea anemones in sheltered lagoons on reefs. Not uncommon. Good aquarium pet. Indo-West Pacific.



Fig. 497. *Amphiprion polymnus*

432. *Amphiprion sebae* Bleeker, 1853

Yellow-tailed Clownfish

D. XI, 15; A. II, 13; P. 18-19; V. I, 5. Body ovate, caudal fin emarginate. Body dark brown with two milky white cross bands, the first band on sides of head and the other band from base of soft dorsal to anus; posterior end of caudal peduncle and caudal fin light yellow. Attains 9 to 10 cm. Found on reef slopes, associated with anemones. Not uncommon. Good aquarium pet. Indian Ocean.

433. *Cheiloprion labiatus* (Day, 1877)

Biglip Damsel

D. XIII, 13-14; A. II, 12-13; P. 16-17; V. I, 5. Lips swollen and curled back slightly. Body overall brown, darker posteriorly and pale on chin and breast; scale margins narrowly blackish; sometimes small blue spots on head and back; fins dark. Juveniles with blue stripe extending from snout to base of dorsal fin and a black spot on anterior soft dorsal. Attains

8 cm. Feeds on small crustaceans and *Acropora* coral polyps. Found in shallow coral reef areas where branching *Acropora* corals are dominant. Indo-West Pacific.

434. *Chromis atripectoralis* Welander & Schultz, 1951
Blackaxil Chromis

D. XII, 9-10; A. II, 10; P. 18-20; V. I, 5. Body pale green to light blue; axil of pectoral fin black. Attains 8 to 10 cm. Found around branching corals in large aggregations. Common reef associated fish. Feeds on zooplankton and algae. Popular aquarium pet. Indo-West Pacific.



Fig. 498. *Chromis atripectoralis*

435. *Chromis margaritifer* Fowler, 1946
Bicolor Chromis

D. XII, 12; A. II, 12; P. 16; V. I, 5. Body slightly robust and compressed.; eyes large; caudal fin forked, the lobes ending in two filaments. Body dark brown to black, caudal peduncle and

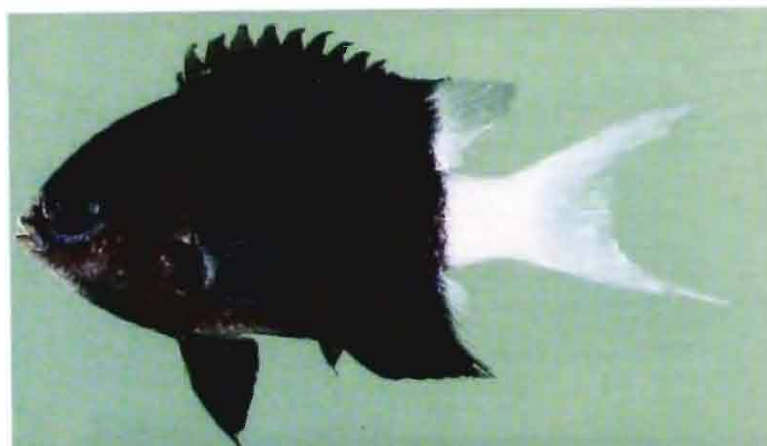


Fig. 499. *Chromis margaritifer*

caudal fin white; a dark black spot at base of pectoral fin base. Attains 8 cm. Found in sheltered shallow reef areas. Not uncommon. Good aquarium pet. Indo-West Pacific.

436. *Chromis ternatensis* (Bleeker, 1853)

Ternate Chromis

D. XII-XIII, 10-12; A. II, 10-12; P. 16-18; V. I, 5. Caudal fin forked; membranes of spinous portion of dorsal fin not incised. Body dark yellowish grey; centers of scales with light blue iridescence; dorsal side of head with light yellow wash; each caudal lobe margin with brown streak. Attains 8 to 10 cm. Found in large feeding aggregations around coral reef areas in shallow waters. Not uncommon. Indo-West Pacific.



Fig. 500. *Chromis ternatensis*

437. *Chromis viridis* (Cuvier, 1830)

Blue-green Chromis

D. XII, 9-10; A. II, 9-10; P. 18; V. I, 5; Ll.16. Body pale blue to light green; all fins light blue. Attains 9 to 10 cm. Found in large aggregations in shallow reef regions where *Acropora* corals are dominant. Feeds on zooplankton. Common aquarium pet. Indo-West Pacific.



Fig. 501. *Chromis viridis*

438. *Chrysiptera biocellata* (Quoy & Gaimard, 1825)
Twospot Damsel

D. XIII, 12-14; A. II, 13-14; P. 17-18; V. I, 5. Body yellowish brown with a white bar on middle sides. Juveniles with blue edged black spot behind last dorsal rays and a small white edged black spot behind last dorsal rays; caudal fin, tips of anal fin yellowish brown. Attains 8 to 10 cm. Found in coral rubble areas and lagoons. Common damsel. Indo-West Pacific.



Fig. 502. *Chrysiptera biocellata*

439. *Chrysiptera caeruleolineatus* (Allen, 1973)
Blueline Damsel

D. XIII, 12; A. II, 14; P.18; V. I, 5. Small sized fishes. Body and fins dark yellowish with a dark broad blue stripe from snout to below soft part of dorsal fin. Attains 6 cm. Found around shallow to moderate depths of reef slopes.



Fig. 503. *Chrysiptera caeruleolineatus*

440. *Chrysiptera glauca* (Cuvier, 1830)
Grey Damsel

D. XIII, 12-14; A. II, 12-13; P. 16-18; V. I, 5. Body and fns light bluish grey, no markings on body. Juveniles with narrow brilliant blue stripe from snout to dorsal fin. Attains 7 to 8 cm. Found in shallow coral reef areas. Not frequently encountered. Indo-West Pacific.



Fig. 504. *Chrysiptera glauca*

441. *Chrysiptera leucopoma* (Cuvier, 1830)
Blueribbon Damsel

D. XIII, 12-13; A. I, 11-12; P. 18-19; V. I, 5. Caudal fin is emarginate. Two Colour varieties: one bright yellow with blue band from above eye to upper caudal peduncle, dorsal fin with two black blotches; the other variety is dark brown with two white bars on body and a yellow bar on gill cover; dorsal, anal and ventral fins dark; a black blotch at base of posterior rays of dorsal fin; caudal fin brown basally and creamy white distally. Attains 8 cm. Found around surge areas of reefs in large numbers. Frequently encountered. Indo-West Pacific.



Fig. 505. *Chrysiptera leucopoma* (Dark Phase)



Fig. 506. *Chrysiptera leucopoma* (Yellow Phase)

442. *Chrysiptera unimaculata* (Cuvier, 1830)**Onespot Damsel**

D. XIII, 13; A. II, 12-13; P. 18; V. I, 5. Body brownish with a small black spot at base of posterior end of dorsal fin extending onto rays; upper opercular edge with orange spots; pectoral fins yellow; dorsal, anal and caudal fins dark brown. Attains 7 cm. Found in shallow reef areas exposed to wave action. Very common damsel. Indo-West Pacific.



Fig. 507. *Chrysiptera unimaculata*

443. *Dascyllus aruanus* (Linnaeus, 1758)**Zebra Humbug**

D. XII, 11-12; A. II, 12-13; P. 18-19; V. I, 5. Small sized fishes. Body white with three transverse black bars; dorsal and anal fins dusky; distal part of posterior rays light; edge of spinous dorsal fin dark. Attains 8 cm. Feeds on algae and small benthic animals. Found in small dense schools around branching corals in shallow areas. Very frequently encountered; popular aquarium fish. Indo-West Pacific.



Fig. 508. *Dascyllus aruanus*

444. *Dascyllus marginatus* (Ruppell, 1829)**Redsea Humbug**

D. XII, 15-16; A. II, 13-14; P. 18-20; V. I, 5. Caudal fin emarginate. Body dark brown; scales with dark hind border; a black blotch at base of pectoral fin; lips black; ventral and soft portion of anal fin dark. Attains 12 cm. Feeds on algae and small invertebrates and fish eggs. Found around branched corals in shallow waters. Not uncommon. Good aquarium pet. Indo-Pacific.



Fig. 509. *Dascyllus marginatus*

445. *Dascyllus reticulatus* (Richardson, 1846)**Reticulated Dascyllus**

D. XII, 15-16; A. II, 12-14; P. 19-20. Caudal fin emarginate. Body whitish to pale tan with a black bar at level of pectoral fin base and a second more diffuse bar at posterior end



Fig. 510. *Dascyllus reticulatus*

of body. Attains 8 to 9 cm. Found around rich coral reef areas from shallow to deep waters. Not uncommon. Good aquarium pet. From Indian Ocean to Samoa.

446. *Dascyllus trimaculatus* (Ruppell, 1829)
Threespot Dascyllus or Whitespot Dascyllus

D. XII, 12-14; A. II, 14-15; P. 20-21; V. I, 5. Caudal fin slightly emarginated. Body charcoal black; a white spot on forehead and another on upper side of body; white spots usually lost in adult specimens; all fins dusky. Attains 14 cm. Feeds on small invertebrates and algae. Found around reef areas in small groups. Young individuals sometimes associated with sea anemones. Frequently encountered. Popular ornamental fish. Indo-West Pacific.



Fig. 511. *Dascyllus trimaculatus*

447. *Dischistodus perspicillatus* (Cuvier, 1830)
White Damsel

D. XIII, 14; A. II, 14-15; P. 17-18; V. I, 5; Ll. 17+8. Body white with two black blotches below dorsal fin and third blotch across the nape; all fins bluish white; anus dark brown; upper part of pectoral axil black. Attains 15 to 20 cm. Feeds on small invertebrates. Found on sandy bottoms of inshore reefs. Uncommon. Indo-West Pacific.



Fig. 512. *Dischistodus perspicillatus*

448. *Dischistodus prosopotaenia* (Bleeker, 1852)**Honey-head Damsel**

D. XIII, 14-14-15; A. II, 4-15; P. 17; V. I, 5. Anterior part of body light golden yellow and posterior part white; a diffuse brown saddle below soft portion of dorsal fin; light blue dots on scales; pectoral axil black. Attains 15-18 cm. Found around rich coral reef areas in shallow waters. Not uncommon damsel. Andaman Sea to Australia.

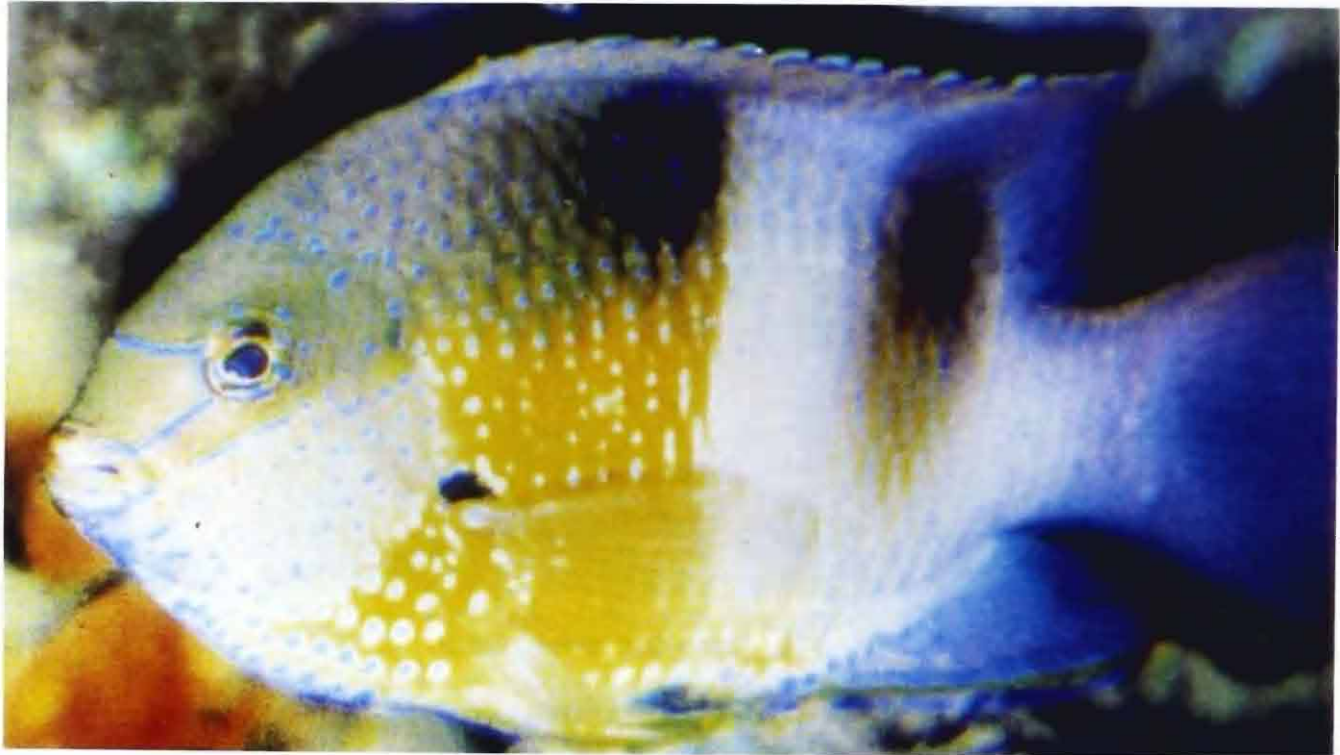


Fig. 513. *Dischistodus prosopotaenia*

449. *Hemiglyphidodon plagiometopon* (Bleeker, 1852)**Brown Damsel**

D. XIII, 14-15; A. II, 14-15; P. 16; V. I, 5. Easily distinguishable by its overall dark brown body; dorsal, anal and base of pectoral fins dark brown. Attains 15 to 20 cm. Found in reef lagoons and under coral heads. Common damsel. Andaman Sea to Australia.

450. *Neoglyphidodon melas* (Cuvier, 1830)**Black Damsel**

D. XIII, 14-16; A. II, 14-15; P. 15-19; V. I, 5; Ll. 16-17. Caudal fin lobes rounded; margin of preopercle and sub-orbital smooth. Colour uniform metallic black. Juveniles quite distinct, colour white with yellow on upper part of head, body and dorsal fin; upper and lower margins of caudal fin yellow. Attains 15 cm. Solitary species. Found in shallow coral

reef areas. Not uncommon. Feeds on small invertebrates and soft corals. Juveniles good aquarium pets. Widely distributed in Indo-West Pacific.

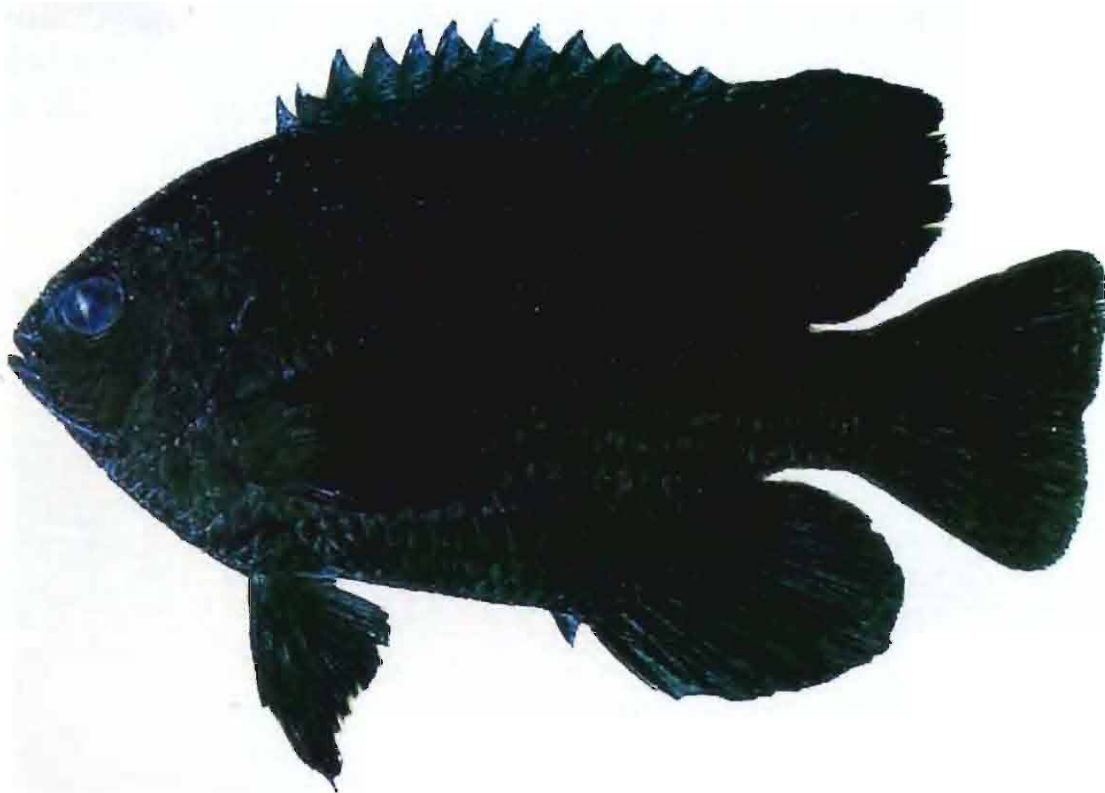


Fig. 514. *Neoglyphidodon melas* (Adult)



Fig. 515. *Neoglyphidodon melas* (Young)

451. *Neoglyphidodon nigroris* (Cuvier, 1830)**Yellowfin Damsel**

D. XIII, 14-16; A. II, 13-15; P. 17-18; V. I, 5; Ll. 17-18+8. Body ovate. Colour brown; caudal peduncle, caudal fin, posterior dorsal and anal fins yellow; a dark bar below eye; edges of opercular bones dark brown. Juveniles yellowish with conspicuous black stripes on sides; upper pectoral axil black. Attains 12 cm. Found in lagoons and along reef edges. Uncommon. Adults as well as juveniles good aquarium pets. Widely distributed from Andaman Islands to Ryukyu Islands.



Fig. 516. *Neoglyphidodon nigroris*

452. *Neopomacentrus azysron* (Bleeker, 1877)**Yellowtail Damsel**

D. XIII, 12; A. II, 11; P. 18-19; P. I, 5. Small fishes. Margin of sub-orbital and preopercle smooth; caudal fin deeply forked, upper lobe slightly elongate; anterior soft rays of dorsal and anal fins elongate and filamentous. Body brownish with blue vertical streaks on scales; caudal and rear part of dorsal and anal fins yellow; base of pectoral fins black and a black spot on shoulder. Attains 8 cm. Found around clean waters near reef slopes. Most common damsels. Indo-West Pacific.

453. *Plectroglyphidodon dickii* (Lienard, 1839)**Dick's Damsel**

D. XII, 18; A. II, 14-16; P. 19; V. I, 5. Margins of sub-orbital and preopercle smooth; caudal fin forked. Body brownish yellow with narrow brown scale outlines; a broad black

bar across posterior part of body; caudal peduncle and fin white; pectoral fins yellow. Attains 10 cm. Found in shallow rich coral reef areas waters. Common. Indo-West Pacific.



Fig. 517. *Plectroglyphidodon dickii*

**454. *Plectroglyphidodon lacrymatus* (Quoy & Gaimard, 1825)
Jewel Damsel**

D. XII, 18-19; A. II, 13-14; P. 18-20; V. I, 5. Caudal fin slightly emarginate. Body brown with scattered small blue spots, head with light blue or lavender spots or markings; caudal fin light brown. Attains 10 cm. Found around shallow protected coral reef areas. Very common damsel. Good aquarium pet. Indo-Pacific.



Fig. 518. *Plectroglyphidodon lacrymatus*

455. *Pomacentrus amboinensis* Bleeker, 1868
Ambon Damsel

D. XIII, 14-16; A. II, 14-16; P. 17; V. I, 5; I. 17-18+8. Body light yellow to grayish yellow; edges of scales dark; a small dark blue spot at upper edge of gill opening and another spot at upper pectoral base; light bluish pink blotches on head. Juveniles with a black ocellus on middle of the soft dorsal fin. Attains 10 cm. Found in coral reef areas up to 30 m depth. Not uncommon. From Andaman Islands to Australia and Ryukyu Islands.



Fig. 519. *Pomacentrus amboinensis*

456. *Pomacentrus moluccensis* Bleeker, 1853
Lemon Damsel

D. XIII, 13-15; A. II, 14-15; P. 16-17; V. I, 5; I. 15-18. Margin of pre-opercle and sub-orbital serrated; caudal fin lobes rounded, Body bright yellow; a small black spot on upper pectoral base. Attains 7 to 8 cm. Found in shallow rich coral reef areas. Uncommon. Popular aquarium pet. From Andaman Islands to Ryukyu Islands.



Fig. 520. *Pomacentrus moluccensis*

457. *Pomacentrus tripunctatus* Cuvier, 1830**Threespot Damsel**

D. XIII, 13-14; A. II, 14-15; P. 16-18; V. I, 5; Ll. 17+8. Soft dorsal fin slightly pointed. Body brownish, edges of scales dark; a large black spot on upper caudal peduncle; all fins dusky. Attains 12 cm. Found in shallow coral reefs and rubble areas. Uncommon. Indo-West Pacific.

458. *Premnas biaculeatus* (Bloch, 1790)**Spine-cheek Anemonefish**

D. X-XI, 16-18; A. II, 13-14; P. 16-18; V. I, 5; Ll. 39-54. Lips slightly thick; all fins broadly rounded; pre-orbital and sub-orbital with strong long spin. Body and fins reddish brown with three chalky white transverse bars on body, the 1st bar on head, the 2nd at middle of body and the 3rd bar on caudal peduncle may sometimes absent. Attains 15 cm. Found in shallow lagoons of reefs, associated with sea anemones. Frequently encountered. Very popular aquarium fish. Indo-West Pacific.



Fig. 521. *Premnas biaculeatus*

459. *Stegastes lividus* (Forster, 1801)**Bluntnose Damsel**

D. XII, 15-16; A. II, 13; P. 18-20; V. I, 5; l. 27. Body light brown; a dark spot at base of posterior dorsal rays; dorsal and anal fins brown basally; ventral fins grey; pectoral fins pale. Attains 15 cm. Found in small colonies around coral heads and lagoons. Very common and aggressive damsel. Feeds on algae. Indo-West Pacific.

460. *Stegastes nigricans* (Lacepede, 1802)**Dusky Damsel**

D. XII, 14-16; A. II, 12-14; P. 18-20; V. I, 5. Body overall brown; a black spot at base of last dorsal rays; light lavender dots and lines on head. Attains 10 to 14 cm. Found around

dead coral areas and inshore reefs in shallow waters. Very common damsel. Indo-West Pacific.



Fig. 522. *Stegastes nigricans*

Family LABRIDAE

Wrasses

Considered one of the very large families and most diverse in size and form. Body shape varies from elongate to oblong and slightly to strongly compressed; snout short to long; mouth usually terminal, more or less protractile; lips often thick and fleshy; teeth in jaws conical, usually some strong canines present anteriorly; dorsal fin single and continuous; scales on body large and cycloid. Most species are brightly and complexly coloured, some being subject to startling changes of pattern and colour with advancing age. Juveniles differ in colour from adults. Many species exhibit sexual dichromatism and sex reversal. Dentition is specially adapted for crushing mollusks and crustaceans, but are partially herbivorous. Many species are solitary or may be found in pairs; diurnal, during night asleep half buried in sand or in rock or coral crevices or wrapped in seaweeds. Some species grow to a large size are good food fishes and some are excellent aquarium pets. Few wrasses build nests in seaweed, but majority of wrasses lay large number of pelagic eggs. Many species found in shallow coral reefs or rocky reefs and few species over open sandy areas.

Key to Species

- 1a. Posterior margin of preopercle serrate 2
- 1b. Posterior margin of preopercle smooth 6
- 2a. Dorsal fin spines 13, rays 6 to 8; anal fin rays 8 to 10; dorsal and anal fin bases without broad sheath of scales 3 (Genus *Choerodon*)
- 2b. Dorsal fin spines 12, rays 10 to 13; anal fin rays 11 to 13; dorsal and anal fin bases with broad sheath of scales 4 (Genus *Bodianus*)
- 3a. A large black area on back; a wedge shaped white blotch on mid side of body below lateral line and white saddle on caudal peduncle *C. anchorago*
- 3b. Posterior part of body orange yellow; no black area on back and no white saddle on caudal region; opercular edge blue; bluish lines radiating from eye *C. robustus*
- 4a. A broad diagonal black band from spinous dorsal fin to pectoral axil; head and body anterior to black band purplish brown to black; no black spots in fins
..... *B. mesothorax*
- 4b. Colour not as in 4a 5
- 5a. Anterior part of body reddish brown, soft dorsal, anal and base of pectoral fin with large black spot *B. axillaris*
- 5b. Head purplish brown, shading to light yellow on body; pelvic fin and soft portion of anal fin with large black spot *B. diana*

- 6a. Lateral line complete 15
- 6b. Lateral line interrupted 7
- 7a. Lateral line with 48 to 68 + 15 to 2 scales; dorsal profile of head steep 8 Genus *Cymolutes*)
- 7b. Lateral line with 13 to 22 + 5 to 9 scales; dorsal profile of head straight or convex 9
- 8a. Body light greenish dorsally with 14 to 18 narrow dark brown bars on body posterior to pectoral fins; a diagonal black streak above base of pectoral fins *C. torquatus*
- 8b. Body olive-green dorsally, with faint orange-yellow stripe from upper end of gill opening and passing posteriorly; a black line in first membrane of dorsal fin *C. praetextatus*
- 9a. Mouth extremely protractile; lower jaw long, extending to behind gill membrane *Epibulus insidiator*
- 9b. Mouth not very protractile; lower jaw not long, not extending beyond front edge of eye 10
- 10a. Dorsal with IX spines and 12 rays; anal fin with 12 to 14 rays; dorsal profile of snout very steep almost vertical; head naked except small scales behind eye; front of head ending in a fleshy keel *Xyrichtys pentadactylus*
- 10b. Dorsal with IX-X spines and 8-11 rays; anal fin with 8 to 9 rays; profile of snout nearly straight or convex; cheek and postorbital head covered with scales 11
- 11a. Scaly sheath at base of dorsal and anal fins well developed; lower jaw not projecting; dorsal and anal fins angular posteriorly 12 (Genus *Cheilinus*)
- 11b. Scaly sheath at base of dorsal and anal fins low; lower jaw slightly projecting *Oxycheilinus digrammus*
- 12a. D. X, 9; body dark olive with small pale spots and head with orange-red spots *C. chlorourus*
- 12b. D. IX, 9-11; colour not as in 12a 13
- 13a. A hump on forehead; body greenish yellow with vertical green markings on scales; head with orangish and bluish-green reticulations *C. undulatus*
- 13b. No hump on forehead; colour not as in 13a 14
- 14a. Caudal fin trilobed; colour olivaceous with a vertical red line on each scale; head and chest with numerous red spots *C. trilobatus*

- 14b. Caudal fin emarginate; body blackish with narrow whitish bars; a broad orange-red zone on rear of head; caudal fin with transverse blackish bar, its posterior margin broadly black *C. fasciatus*
- 15a. Lateral line slopes gradually from upper end of gill opening to mid base of caudal; gill membranes not joined to isthmus 16
- 15b. Lateral line abruptly directed downward below rear of dorsal fin to midlateral part on caudal peduncle; gill membranes joined to isthmus 17
- 16a. D. XI, 12; A. III, 14; Ll. 32; body not elongate, mouth not tubular; spatulate incisiform teeth anteriorly in each jaw forming a beak-like structure .. *Pseudodax moluccanus*
- 16b. D. IX, 13; A. III, 11-12; Ll. 45-49; body very elongate; mouth tubular; front teeth in jaws caniniform *Cheilio inermis*
- 17a. Dorsal fin with 8 spines 18
- 17b. Dorsal fin with 9 spines 25
- 18a. Snout very long and tubular; two pairs of canines anteriorly in jaws *Gomphosus caeruleus*
- 18b. Snout not long and tubular; one pair of canines anteriorly in upper jaw and 1 or 2 pairs in lower jaw 19 (Genus *Thalassoma*)
- 19a. Body with a series of narrow or broad black bars 20
- 19b. Body without a series of black bars 21
- 20a. Body with six wedge shaped dark bars, progressively shorter posteriorly; broad pink bands radiating from eye *T. hardwicke*
- 20b. Body with 3-4 broad dark bars, the first on upper half of head; no pink bands radiating from eye; caudal fin lunate in adults *T. janseni*
- 21a. Head yellow with narrow blue bands; the long semicircular band on cheek is more prominent; an yellow bar from dorsal fin passing beneath pectoral fin to abdomen *T. herbraicum*
- 21b. Colour not as in 21a 22
- 22a. Caudal fin truncate in initial phase, lunate in terminal males 23
- 22b. Caudal fin truncate in terminal males 24
- 23a. Gillrakers 18-20; pectoral rays usually 15; pectoral fin blue with a broad elongate pink band in upper part *T. lunre*

- 23b. Gillrakers 20-23; Pectoral rays usually 16; pectoral fin yellow, black distally with a broad submarginal blue band *T. lutescens*
- 24a. Head rose-pink with four bluish green bands radiating from eye; a long semicircular blue green band on cheek; reddish pink band in each lobe of caudal fin
..... *T. quinquevittatum*
- 24b. Head blue green with broad irregular pink bands; a large 'Y'- shaped pink band at and below pectoral base; caudal fin blue with pink markings in lobes *T. purpureum*
- 25a. Preopercular margin covered by scales; top of head scaled to nostrils and lower part of head scaled anterior to eye; lips thick and fleshy, formed a tube when closed; caudal fin strongly rounded; broad yellow bar in pectoral region
..... *Labrichthys unilineatus*
- 25b. Preopercular margin not covered by scales; scales on head not extending anterior to eye; caudal fin emarginate or slightly rounded; colour not as in 25a 26
- 26a. Lower lip distinctly bilobed, the two lobes separated by a 'U' shaped notch
..... 27 (Genus *Labroides*)
- 26b. Lower lip not distinctly bilobed 28
- 27a. Lateral line scales 52-54; adults light blue with a black stripe; juveniles black with narrow bright blue stripe dorsally *L. dimidiatus*
- 27b. Lateral line scales 28; posterior part of body and caudal of adults pale yellow with black crescent in hind part of fin; juveniles black with yellow stripes dorsally
..... *L. bicolor*
- 28a. Lateral line scales 91-118; body olive to brown with dark brown bars; a blackish spot on opercular membrane; caudal fin with a large whitish crescentic area posteriorly
..... *Hologymnosus annulatus*
- 28b. Lateral line 25-86; colour not as in 28a 29
- 29a. A pair of forward-projecting incisiform teeth anteriorly in each jaw; remaining jaw teeth minute or absent 30 (Genus *Anampses*)
- 29b. Canine teeth at front of jaws; distinct canine teeth along sides of jaws; often canine teeth present at corner of mouth 31
- 30a. Lateral line scales 27; Initial phase brown with a dark-edged blue spots on each scale; blue lines radiating from eye; terminal male olive-green with vertical blue line on each scale; head with irregular dark-edged blue bands *A. caeruleopunctatus*

- 30b. Lateral line scales 26; Initial phase dark brown with small white spots on head, body and dorsal and anal fins; caudal fin bright yellow; terminal males dark brown with a dark-edged blue spot on each scale; caudal fin light orange with dark edged blue spots and white posterior crescent *A. meleagrides*
- 31a. Lateral line scales 49-86 32 (Genus *Coris*)
- 31b. Lateral line scales 25-29 33
- 32a. Lateral line scales 61-66; a bump on forehead of males; pectoral rays 14; greenish with 1 or 2 pale green bars on sides; anterior part of body with red spots; juveniles white with small black spots on anterior part of body and head; two large semicircular orange-red spots on back *C. aygula*
- 32b. Lateral line scales 70-80; no bump on forehead; body dark green with brilliant blue spots, more posteriorly; head with green bands; caudal fin yellow; juveniles red with three black edged white spots dorsally on body *C. gaimard*
- 33a. No canine teeth at front of jaws; scales on chest as long as those of rest of body 34 (Genus *Stethojulis*)
- 33b. Canine teeth at front of jaws; scales on chest distinctly smaller than those of rest of body 36
- 34a. Pectoral rays 15; one full length narrow blue stripe on upper side of body and one midlaterally on anterior half of body; a small black spot on opercular flap *S. strigiventer*
- 34b. Pectoral rays 12-13; Colour not as in 34a 35
- 35a. Gillrakers 19-23; Initial phase yellowish brown, bluish white below with black dots; these two zones separated by a blackish streak; terminal phase yellowish-grey on upper half of body, white below; these two zones separated by blue line; bright orange-red spot at pectoral base; a blue line from top of head to along base of dorsal fin *S. interrupts*
- 35b. Gillrakers 25-28; Initial phase upper half of body greenish grey white dots; terminal phase green on upper two thirds of body, orange yellow on anterior part of body; 4 dark edged blue lines on head and body, one line ending below pectoral fin base; dorsal fin bright red *S. trilineata*
- 36a. Lips very hick and fleshy, lower lip split at center; body depth 2.4 to 2.7 in SL 37 (Genus *Hemigymnus*)
- 36b. Lips not thick and fleshy; lower lip not split at center; body depth 2.3 to 5.6 in SL 38

- 37a. Body black with 5 narrow white bars; gillrakers 22 to 24 *H. fasciatus*
- 37b. Body pale anteriorly, blackish behind; a line between origin of dorsal and anal fins; gillrakers 26 to 29 *H. melapterus*
- 38a. Posterior free margin of preopercle short, not reaching the level of lower edge of eye; lower pharyngeal plate with a huge posterior molar flanked by 1 to 3 small teeth and preceded by 4 to 9 small teeth *Macropharyngodon meleagris*
- 38b. Posterior free margin of preopercle not short, reaching the above level of lower edge of eye; lower pharyngeal plate with one or more large molars flanked on each side by 8 or more small teeth and preceded by 10 or more small teeth
..... 39 (Genus *Halichoeres*)
- 39a. A small patch of scales on upper part of opercle 40
- 39b. No scales on opercle 41
- 40a. A vertical band of small scales behind or below eye; no dark stripe on body; a series of square black edged white spots along scale rows; yellow spot at 4th and 5th dorsal fin spine followed by a large black spot *Halichoeres hortulanus*
- 40b. No band of scales behind or below eye; a dark stripe from eye to upper base of caudal; no yellow or black spot at base of dorsal fin *H. scapularis*
- 41a. Dorsal and anal with a low scaly sheath with few rows of scales; head pointed; dorsal spines feeble; canines moderate 42
- 41b. Dorsal and anal without scaly sheath; dorsal spines not much feeble; head less pointed 45
- 42a. Caudal fin light without any bands, but sometimes with ocelli at upper base of caudal fin; dorsal fin spots present; body bright yellow *H. chrysus*
- 42b. Caudal fin dark with light edges or light with dark band; ocelli present or absent in fins; colour not as in 42a 43
- 43a. Caudal fin 4 crescentic vertical bars posteriorly, diffuse in median part; no ocelli at base of dorsal or caudal; dorsal and anal fins with longitudinal bars
..... *H. melanurus*
- 43b. Caudal fin light with broad vertical dark median or subterminal band 44
- 44a. A dark band on caudal, sprinkled with small light ocelli; dorsal and anal fins dark with light ocelli; basal half of pectoral fin deep violet *H. marginatus*

- 44b. Dorsal fin light with a dark ocellus between 1st and 2nd spines and between 1st to 5th ray *H. notopsis*
- 45a. Anterior dorsal spines longer than posterior ones; 1st and 2nd spines divergent 46
- 45b. Anterior dorsal spines shorter than posterior ones, the fin gradually increasing in height 47
- 46a. Body with two distinct longitudinal bands on back and upper part of sides; caudal fin uniform yellow or with faint transverse markings *H. bicolor*
- 46b. Body with dark blotches on sides; caudal brownish, spotted paler; edges of fins broadly whitish..... *H. nigrescens*
- 47a. A black spot, blotch or dark ocellus between anterior dorsal spines 48
- 47b. No black blotch or ocellus between anterior dorsal spines 49
- 48a. A boomerang shaped salmon pink mark on cheek *H. nebulosus*
- 48b. A horizontal salmon pink mark on cheek *H. margaritaceus*
- 49a. A dark blotch or dark ocellus on soft dorsal fin; sides of body with dark blotches *H. timorensis*
- 49b. No black blotch or dark ocellus on soft dorsal fin; no botches on sides of body 50
- 50a. Body dark, each scale with a light center forming longitudinal rows of light round spots; dorsal and anal fins with light dark edged ocellus *H. argus*
- 50b. Body without rows of light spots; colour uniform greenish with a pink spot in center of each scale; females with black dot on each scale; a narrow black bar at each pectoral fin base *H. chloropterus*

461. *Anampses caeruleopunctatus* Ruppell, 1829

Bluespotted Wrasse

D. IX, 12; A. III, 12; P. 12-13; V. I, 5. Both jaws with a pair of anterior chisel edged incisors; caudal fin round to truncate and round in juveniles. Initial phases olive-brown with dark edged blue spots on body and fins; narrow blue bands on head radiating from eye; terminal phase olive-green with blue vertical line on each scale; a broad light green band on body below middle of spinous dorsal fin; fins reddish with blue bands, middle part of dorsal

fin with blue spots; irregular dark edged blue bands on head. Attains 30 cm. Found in shallow rocky reef areas. Not uncommon. Feeds on small invertebrates. Indo-Pacific.



Fig. 523. *Anampses caeruleopunctatus*

462. *Anampses meleagrides* Valenciennes, 1840
Spotted Wrasse

D. IX, 12; A. III, 12; P. 12-13; V. I, 5. Body slender and head pointed; caudal fin truncate or emarginate. Females dark brown with a small white spot on each scale of head, body and fins; caudal fin bright yellow. Males dark reddish brown with a faint blue line on scales of sides of body; head and thorax with irregular blue lines; caudal fin dark with a white posterior crescent. Attains 15 to 20 cm. Found around protected shallow reef areas. Common wrasse and can be easily detected in the habitat. Females are beautiful and favourite aquarium pets. Feeds on small invertebrates. Indo-West Pacific.

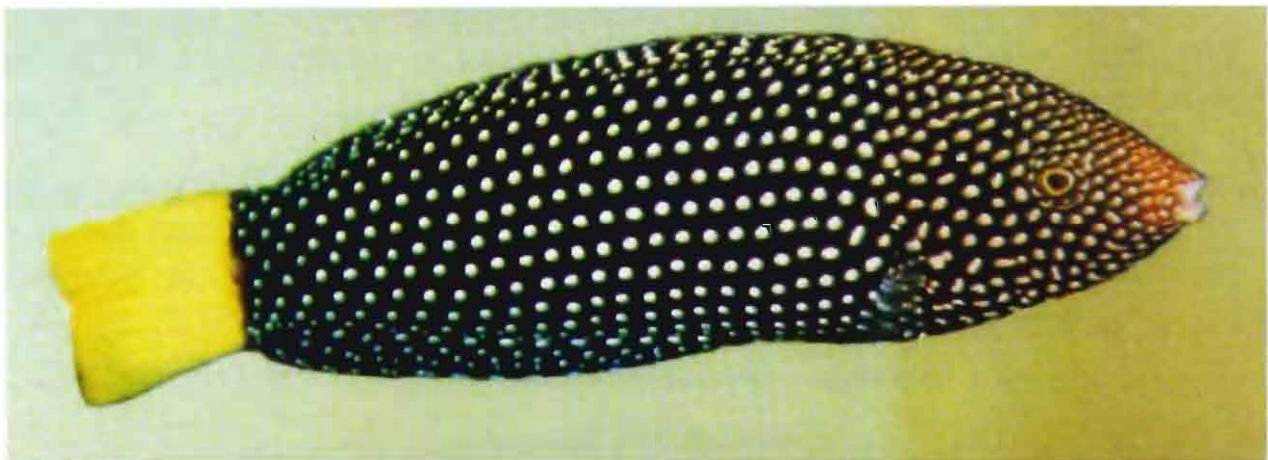


Fig. 524. *Anampses meleagrides*

463. *Bodianus axillaris* (Bennett, 1832)
Blackaxil Hogfish

D. XII, 10-11; A. III, 12; P. 15-16; V. I, 5. Head pointed; base of dorsal and anal fins with broad scaly sheath; caudal fin slightly rounded to truncate. Anterior part of body dark

brown and posterior part light brown, caudal peduncle and caudal fin yellowish; eyes reddish; base of pectoral fin with large black blotch; anterior part of spinous dorsal, soft dorsal and anal fins with black blotch. Juveniles black with two rows of white blotches along dorsal and ventral sides; snout whitish. Attains 15 to 20 cm. Found in shallow reef areas. Uncommon. Good ornamental fish. Feeds on small invertebrates. Indo-West Pacific.



Fig. 525. *Bodianus axillaris*

464. *Bodianus diana* (Lacepede, 1801)

Diana's Hogfish

D. XII, 10; A. III, 10; P. 15-16; V. I, 5. Snout pointed; base of dorsal and anal fins with broad scaly sheath; caudal fin slightly rounded to truncate. Body dull yellowish red, head reddish to purplish brown; scales margins brown; scales on posterior part of dorsal side with black spots; 3 to 4 pale yellow spots dorsally on back; fins orange-red; a black spot at base of caudal fin; a large black spot at soft anal fin base and another small black spot at rear end base; ventral fins with large black spots. Juveniles overall reddish brown with small white spots and blotches in rows; large black spots in fins. Attains 20 to 23 cm. Found in sheltered reef areas in shallow to medium depths. Not common. Good aquarium pet. Indo-West Pacific.

465. *Bodianus mesothorax* (Bloch & Schneider, 1801)

Splitlevel Hogfish

D. XII, 9-11; A. III, 11-12; P. 15-16; V. I, 5. Head pointed; base of dorsal and anal fins with broad scaly sheath; caudal fin slightly rounded to truncate. Anterior part of body with a diagonal black band from spinous dorsal fin to pectoral fin axil; posterior part of body whitish with narrow orange-yellow stripes along scale rows; head and body anterior to the band purplish brown, a black streak across cheek; all fins light yellow except anterior part of dorsal black; a large black spot at pectoral base. Attains 20 cm. Found around rich coral

reef areas in shallow waters in pairs or solitary. A common wrasse on the reefs and it is easy to detect in its habitat. Diurnal species. Good ornamental fish. Feeds on mollusks and crustaceans Indo-West Pacific.



Fig. 526. *Bodianus mesothorax*

466. *Cheilinus chlorourus* (Bloch, 1791)

Floral Wrasse

D. X, 9; A. III, 8; P. 12; V. I, 5. Caudal fin of females rounded but adult males with upper and lower rays much produced; dorsal profile of snout straight, lower jaw slightly projecting. Body greenish brown to orange with numerous white and pinkish spots; small



Fig. 527. *Cheilinus chlorourus* (Adult)

orange spots on head; median and ventral fins with white spots and patches; a black spot basally on first two dorsal fin membranes. Attains 35 cm. Found in sheltered weedy areas of reef areas. Very common wrasse. Indo-Pacific.



Fig. 528. *Cheilinus chlorourus* (Juvenile)

467. *Cheilinus fasciatus* (Bloch, 1791)

Redbreasted Wrasse

D. IX, 10; A. III, 8; P. 12; V. I, 5. Dorsal profile of head convex; dorsal and anal fins with scaly sheath and their posterior rays elongated; caudal fin slightly rounded to truncate with slightly elongate pointed lobes. Body whitish with six broad black transverse bands on sides; lower side of head and belly yellowish-orange; narrow white streaks radiating from eye and



Fig. 529. *Cheilinus fasciatus*

breaking into spots below; dark brown spots on upper part of operculum and on sides; a black streak at base of pectoral fin; caudal fin yellowish white with dark basal and marginal bands; pectoral fins yellowish. Attains 35 cm. Found in sheltered reef areas. Feeds on invertebrates and other fish. Common and locally consumed. Good ornamental fish. Indo-Pacific.

468. *Cheilinus trilobatus* Lacepede, 1801

Tripletail Wrasse

D. IX, 10; A. III, 8; P. 12; V. I, 5. Dorsal profile of head straight above eye; lower jaw slightly projecting; caudal fin rounded, upper and lower rays slightly projecting in adults. Body light olivaceous brown with vertical orange-red spots and lines on head and body; pale blue lines on each scale; in small fishes three dark spots on posterior part of body mid-laterally; caudal fin dusky. Attains 40 cm. Found along reef slopes in shallow waters. Feeds on small crustaceans, mollusks and small fish. Good food fish. Indo-Pacific.



Fig. 530. *Cheilinus trilobatus*

469. *Cheilinus undulates* Ruppell, 1835

Giant or Humphead Wrasse

D. IX, 10; A. III, 8; P. 12; V. I, 5. Dorsal profile of head straight to eye then becoming convex; lips thick and fleshy; adults develop a large fleshy hump on forehead; caudal fin rounded. Body olive-green with vertical dark lines on scales; head with two black lines extending upwards from eye and another two lines diagonally downward on snout from eye; median fins yellowish with oblique green bars and spots; posterior margin of caudal fin pale yellow. Attains 210 cm, largest of all the wrasses and weighing up to 190 kg. Found in outer

reef areas in small groups. Feeds on molluscs, sea urchins, crustaceans and small fish. Most common wrasse. Very important commercial food fish. Indo-Pacific.



Fig. 531. *Cheilinus undulatus*

470. *Cheilo inermis* (Forsskal, 1775)

Cigar Wrasse

D. IX, 9; A. III, 12; P. 12-13; V. I, 5. Body elongate and compressed; head pointed and naked, lips with double inner fold; caudal fin slightly rhomboidal. Body colour variable; may be light green, yellow, brown or brownish yellow with a mid lateral narrow broken black stripe; a dark spot on sides behind pectorals; caudal fin brownish; other fins hyaline. Attains 45 cm. Very common fish, found in heavy weedy areas and around coral reefs. Ornamental fish. Feeds on molluscs, crustaceans and sea urchins. Indo-Pacific.



Fig. 532. *Cheilo inermis*

471. *Choerodon anchorago* (Bloch, 1791)

Anchor Tuskfish

D. XIII, 7; A. III, 9; P. 15-16; V. I, 5. Body deep, dorsal profile of snout deep and nearly straight; two pairs of stout canines in each jaw; caudal fin truncate to slightly rounded. Head

and anterior part of body brown with orange-red dots; lower part of body dusky white, ventral part of head abruptly white; a large black area on back; a wedge-shaped white blotch on mid side of body below lateral line and a white saddle on caudal peduncle; dorsal fin brownish; other fins yellowish white; base of pectorals light brown. Attains 35 cm. Feeds on mollusks and other small invertebrates. Found in a variety of habitats of reefs from shallow coral reefs to sea grass beds. Common wrasse. Good food fish and locally consumed. Sri Lanka to West Pacific.



Fig. 533. *Choerodon anchorago*

472. *Choerodon robustus* (Gunther, 1862)

Robust Wrasse

D. XI-XII, 8-9; A. III, 10; P. 18-19; V I, 5. Body deep and robust, dorsal profile of snout very steep, posterior portions of dorsal and anal fins pointed, outer canines turned outwards. Lateral teeth fused into a blunt bony ridge, caudal fin truncate. Body greenish grey on back,



Fig. 534. *Choerodon robustus*

lower part of head and belly light blue, posterior upper part of body orange-yellow; caudal fin light reddish brown; upper half of spinous and soft dorsal yellow; anal fin light grey with yellow spots; opercular edge blue; bluish lines radiating before eye. Attains 30 cm. Found in outer reef slopes at depths 8 to 15 m. Uncommon. Good food fish. Feeds on crustaceans and molluscs, often overturns large coral rocks to feed upon the animals beneath. Indo-West Pacific.

473. *Coris aygula* Lacepede, 1801

Clown Coris

D. IX, 12; A. III, 12; P. 14; V. I, 5. Body deep and elongated; males with a large hump on forehead; caudal fin slightly rounded in females, truncate with filamentous rays in males; ventral fins very long in males. Males bluish green with one or two broad pale green in the middle of body. Females with a whitish bar in front of anal fin origin, body anterior to the bar light yellow green with small dark brown spots, posterior part of body dark greenish, scales dark edged. Juveniles whitish with small black spots anteriorly and two large semicircular orange-red spots on back with black ocellated spot on each in dorsal fin; caudal fin with black sub-marginal bands. Attains 60 to 65 cm. Found around outer reef areas and reef slopes in deep waters. Not common. Juveniles very beautiful aquarium pets. Indo-Pacific.

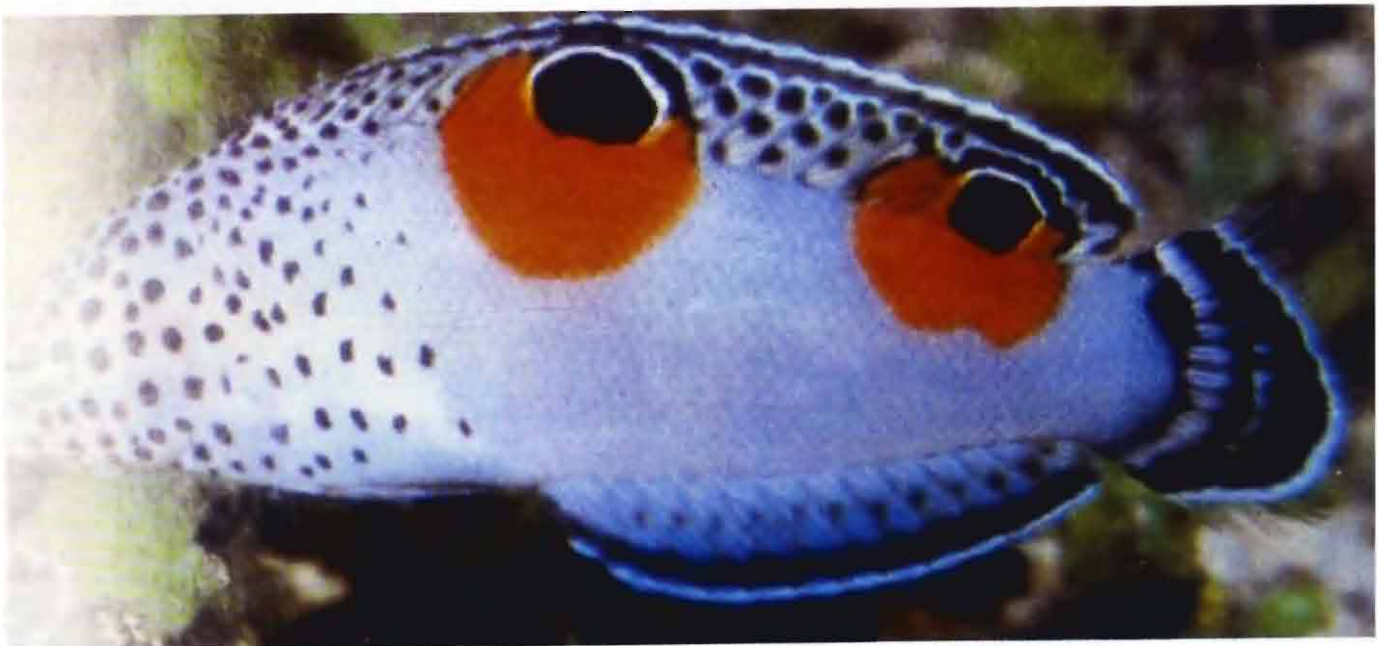


Fig. 535. *Coris aygula* (Young)

474. *Coris gaimard* (Quoy & Gaimard, 1824)

Tomato Wrasse or Yellowtail Coris

D. IX, 12; A. III, 12; P. 13; V. I, 5. Body slender; caudal fin rounded. Body dark greenish with small blue spots, more on posteriorly; head light brown with green bands; caudal fin

bright yellow. Juveniles red with three large black-edged white spots dorsally on body and two similar small spots on head; a curved black band along the base of caudal fin. Attains 40 cm. Found around reefs in deeper waters. Juveniles often seen in shallow rock and reef pools. Often lie on their sides on the bottom to rest. Very common and can be easily encountered. Juveniles are favourite aquarium fishes. Indo-West Pacific.



Fig. 536. *Coris gaimard* (Young)



Fig. 537. *Coris gaimard* (Adult)

475. *Cymolutes praetextatus* (Quoy & Gaimard, 1834)

Knifefish

D. IX, 12; A. III, 12; P. 12; V. I, 5. Body elongate and compressed, snout much curved, eyes situated nearer to the dorsal profile; pair of long slender canines at front of jaws. Body light greenish dorsally, whitish ventrally; 15 to 16 narrow dark brown bars on body extending from posterior to pectoral fin to caudal peduncle; cheek with three diagonal bluish lines; a diagonal black streak above pectoral fin; dorsal fin pinkish with blue spots. Attains 15 cm.

Found on sandy bottoms near coral reef areas. Dive into the sand quickly when disturbed. Not uncommon. Indo-Pacific.



Fig. 538. *Cymolutes praetextatus*

476. *Cymolutes torquatus* (Valenciennes, 1840)

Collared Knifefish

D. IX, 12-13; A. II, 12; P. 12; V. I, 5. Body elongate and compressed, snout much curved, eyes situated nearer to the dorsal profile; pair of long slender canines at front of jaws; caudal fin slightly rounded. Bodylight greenish dorsally, whitish ventrally, with 14 to 18 narrow dark brown bars on body posterior to pectoral fin; a diagonal black line anteriorly at base of pectoral fin and three diagonal blue lines on cheek and gill cover. Attains 10 to 12 cm. Found on sandy bottoms near coral reefs. Dive into sand quickly when disturbed. Not uncommon. Indo-Pacific.

477. *Diproctacanthus xanthurus* (Bleeker, 1856)

Yellowtail Tubelip

D. IX, 9-10; A. II, 9-10; P. 12-13; V. I, 5. Small sized fishes. Body slender and elongate; lips fleshy and forming a tube when mouth closed; caudal fin truncate. Body light greenish



Fig. 539. *Diproctacanthus xanthurus*

white; two broad black stripes on sides of body, one stripe along mid-lateral and the other stripe on back of body; caudal fin bright yellow. Attains 9 cm. Found in shallow coral reef lagoons. Not uncommon. Good aquarium object. Feeds on coral polyps, but the juveniles are cleaners, feeds on parasites of other fishes. Indo-West Pacific.

478. *Epibulus insidiator* (Pallas, 1770)

Slingjaw Wrasse

D. IX, 10; A. III, 8-9; P. 12; V I, 5. Mouth oblique, jaws are highly protractile, lower jaw extending posterior to lower edge of opercle; posterior rays of dorsal and anal fins prolonged; caudal fin truncate, lobes prolonged. Males dark brown with dark green edges on scales; head pale green, broad yellow bar on sides at tip of pectoral fin; all fins dark brown, a small black blotch on anterior dorsal fin spines. Females found in two colour phases either completely brown or yellow. Attains 30 cm. Found in coral reef areas. Common but not found in abundant. Good aquarium pets. Feeds on crustaceans and small fish. Indo-Pacific.



Fig. 540. *Epibulus insidiator*

479. *Gomphosus caeruleus* Lacepede, 1801

Bird Wrasse

D. VIII, 13; A. III, 11-12; P. 15-16; V. I, 5. Snout elongated and tubular; caudal fin emarginate. Males deep blue-green with red vertical line on each scale; outer part of dorsal, anal and posterior part of caudal fin blue-green. Immature males and females brownish yellow with a black spot on each scale; elongate blackish spots on head and behind eye; caudal fin black with white margin. Attains 28 to 30 cm. Found in coral reef areas, rests in crevices of rocks and corals at night. It is a graceful and active

wrasse on reefs. Common and popular ornamental fish. Feeds on small invertebrates. Indo-West Pacific.



Fig. 541. *Gomphosus caeruleus* (Dark Phase)

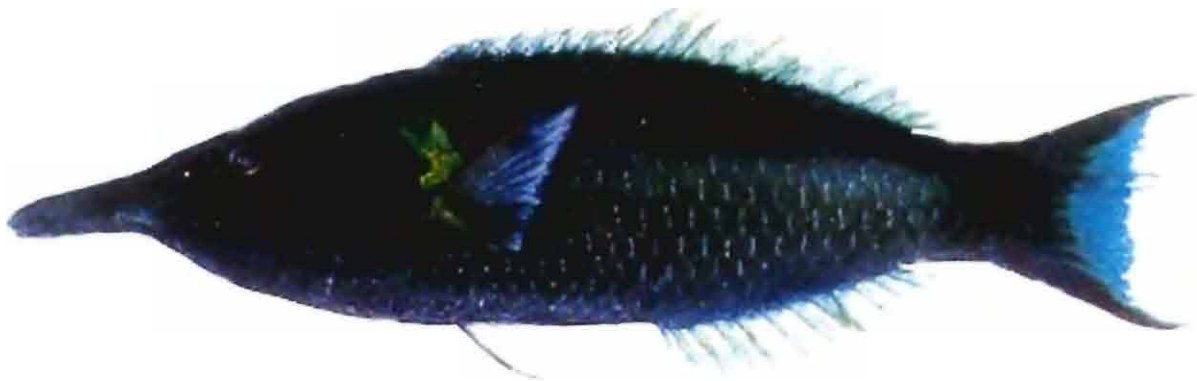


Fig. 542. *Gomphosus caeruleus* (Green Phase)

480. *Halichoeres argus* (Bloch & Schneider, 1801)

Redspotted Wrasse

D. IX, 11; A. III, 11-12; P. 14; V. I, 5. The dorsal and anal fins have no scaly sheath. Body dark green, scales with a red spot with blue or dark center forming longitudinal rows



Fig. 543. *Halichoeres argus*

which are interrupted by four to five patches of lighter scales near back; a dark red band from upper lip to eye and another from chin to below eye; a black stripe on median line of snout, bifurcating before inter-orbital space and dissolved into blotches behind eye; a vertical dark bar behind eye; dorsal and anal fins dark brown with a row of dark-ringed red ocelli; caudal fin yellowish with red ocelli and posterior portion dark. Attains 12 cm. Found in protected coral reef areas and rock pools. Common and found fairly abundant. Good aquarium pet. Indo-West Pacific.

481. *Halichoeres bicolor* (Bloch & Schneider, 1801)

Blackbanded Wrasse

D. IX, 11-12; A. III, 11; P. 14; V. I, 5. Body olive-green, belly white, a mid-dorsal dark brown band from snout to caudal and another dark brown band from snout through eye to middle of caudal base interrupted by red opercular spot and ended with a black spot; broad dark blue vertical bands alternating with green stripes behind eye; small black spot at axil of pectoral base; dorsal, anal and caudal fins with dark reticulations. Attains 10 cm. Found in shallow coral reef and weedy areas. Occasionally encountered. Indo-West Pacific.

482. *Halichoeres chloropterus* (Bloch, 1791)

Green Wrasse

D. IX, 10-11; A. III, 10-11; P. 13-15; V. I, 5. Body slightly deep and caudal fin emarginate. Females pale green on back, gradually shading to white ventrally; a black dot on each scale of back and side and dark purplish chevron-shaped lines on abdomen; very narrow black bar on pectoral-fin base. Males light green with irregular violet bands on head and anterior part



Fig. 544. *Halichoeres chloropterus* (Female)

of body; middle and posterior body scale centers with a pink spot; a large blackish area between spinous and soft portions of dorsal fin. Attains 15 to 18 cm. Found around protected shallow coral reefs and coral rubble to silt-sand areas of reefs. Not common. Indo-Pacific.

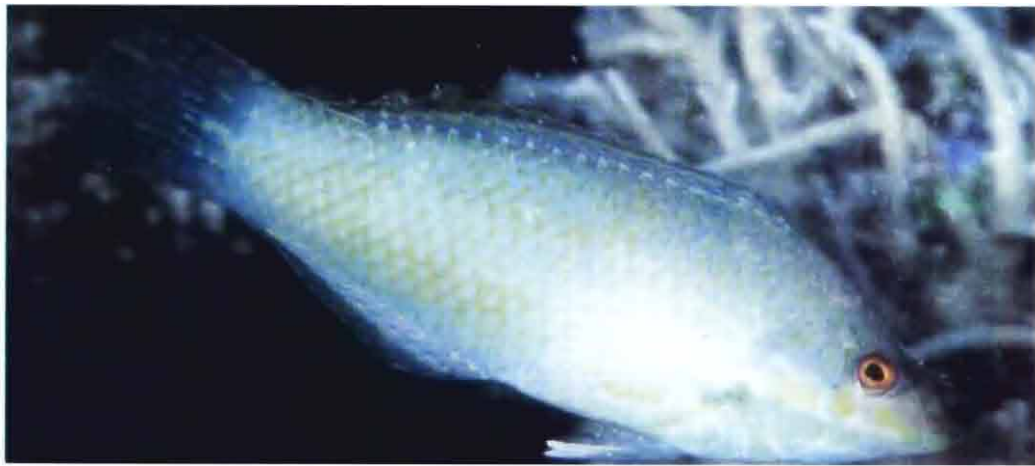


Fig. 545. *Halichoeres chloropterus* (Male)

483. *Halichoeres chrysus* Randall, 1981
Golden Wrasse

D. IX, 12; A. III, 11-12; P. 13-14; V. I, 5. Body moderately elongate, caudal fin emarginate. Females bright yellow, dorsal and anal fins yellowish, a small black spot at front of dorsal fin and another in middle of the fin, a small black spot on posterior upper half of caudal peduncle. Males also similar to females but have light orange and greenish yellow stripes on body and fins, no black spots on fins. Attains 20 cm. Found in coral reef areas of shallow to moderate depths. Uncommon. A popular ornamental fish. Indo-West Pacific.

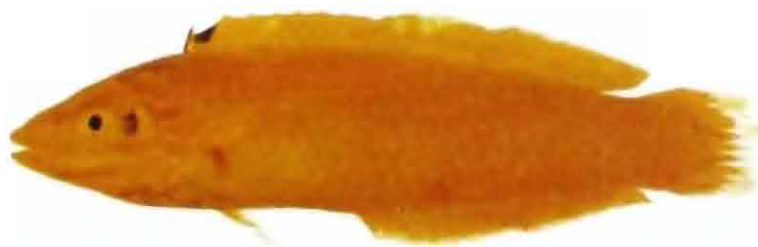


Fig. 546. *Halichoeres chrysus*

484. *Halichoeres hortulanus* (Linnaeus, 1801)
Checkerboard Wrasse

D. IX, 10-11; A. II, 11; P. 14; V. I, 5. Body with longitudinal series of square black edged white spots along scale rows; an yellow spot on back at base of 4th and 5th dorsal spines followed by a black blotch; a second small spot in middle of base of soft dorsal fin; head greenish-yellow with irregular orange-pink bands; dorsal and caudal fins yellowish; axil of

pectoral with a small black spot. Juveniles white with large black blotches on body and a yellow edged black spot in the middle of dorsal fin. Attains 25 cm. Found on coral reefs in shallow areas. Very common reef fish. Popular aquarium pet. Feeds on invertebrates and algae. Indo-Pacific.



Fig. 547. *Halichoeres hortulanus*

485. *Halichoeres margaritaceus* (Valenciennes, 1839)

Pinkbelly Wrasse

D. IX, 11; A. III, 11; P. 13; V. I, 5. Body olivaceous green on back, pale ventrally with whitish blotches and a large pink area on abdomen; edges of body scales dark brown; a black spot on opercular flap and a smaller one behind eye, another at front of dorsal fin and a large one rimmed in yellow in middle of the fin; blue edged dark streaks radiating from front and behind eye, a pink band below eye; anal and dorsal fins with oblique red bars; caudal fin light yellow with brown vertical bars. Attains 12 cm. Common in shallow coral reef and rocky areas. Indo-West Pacific.



Fig. 548. *Halichoeres margaritaceus*

486. *Halichoeres marginatus* Ruppell, 1835**Dusky Wrasse**

D. IX, 13-14; A. III, 12-13; P. 14-15; V. I, 5. Initial phase dark brown with brown lines along scale rows, a small yellow edged black spot anteriorly and a large one in middle of the dorsal fin. Terminal phase greenish brown with deep purplish blue lines along centers of scale rows on the upper part of body; a blue edged green spot on each scale forming a longitudinal lines on the lower side of the body; head with irregular bluish oblique bands; caudal fin with green crescent at base followed by a broad blue edged orange red crescent area containing blue spots in the middle and outer margin of fin yellow with a blue sub marginal band; basal half of pectoral black, distal half white. Attains 15 to 16 cm. Found around coral boulders and weedy areas of reefs in shallow waters. Very common wrasse. Good aquarium pet. Indo-Pacific.



Fig. 549. *Halichoeres marginatus*

487. *Halichoeres melanurus* (Bleeker, 1851)**Tailspot Wrasse**

D. IX, 12; A. III, 11-12; P. 14; V. I, 5. Females greenish yellow, lighter below with eleven yellowish white longitudinal bands from eye to caudal peduncle; dorsal fin yellowish with three reddish bands; a black white edged ocellus between 1st and 3rd rays and much smaller ocellus between 1st and 2nd spines, large blue edged ocellus on upper part of caudal peduncle; anal fin with three reddish bands; caudal fin yellowish. Males blue-green with orange stripes and three to five narrow blue green bars on upper side; head with salmon pink bands; caudal fin blue with curved orange-red bands; a large yellow

spot at pectoral-fin base and a small black spot at upper base. Attains 10 cm. Found around dead coral and weedy areas of reefs. Not uncommon. Indo-West Pacific.



Fig. 550. *Halichoeres melanurus* (Male)



Fig. 551. *Halichoeres melanurus* (Female)

488. *Halichoeres nebulosus* (Valenciennes, 1839)

Nebulous Wrasse

D. IX, 11; A. III, 11; P. 14; V. I, 5. Body olivaceous green with large irregular interconnected dark bars; a patch of red area on abdomen; a wide V-shaped pink mark on cheek, its



Fig. 552. *Halichoeres nebulosus*

posterior end angles downwards; broken pink marks on snout and head; a large black spot on opercle; caudal fin yellowish green with irregular narrow vertical brown bars. Attains 13 cm. Found in inshore and weedy areas near reefs. Not uncommon. Indo-West Pacific.

489. *Halichoeres nigrescens* (Bloch & Schneider, 1801)

Saddled Wrasse

D. IX, 12; A. III, 12; P. 14; V. I, 5. Body covered with large scales; lips thick; dorsal and anal fins with scaly sheath. Body reddish brown, paler below; chin and lower part of head pink; body scales with purplish centers forming irregular interrupted bands and diffuse dark saddles on upper side; a bluish band from eye to snout, another band from end of maxillary to below eye; a bluish area on opercle; dorsal fin dusky purple with dark ocellus between 5th and 6th spines and two rows of yellowish white spots on soft dorsal; anal fin yellowish with basal row of white spots; a dark triangular blotch superiorly at base of pectorals; caudal fin purplish with irregular yellow spots, outer margin broadly yellowish. Attains 16 cm. Found on coral reef areas in shallow waters. Uncommon. Indo-West Pacific.

490. *Halichoeres scapularis* Bennett, 1832

Zigzag Wrasse

D. IX, 1-12; A. III, 11; P. 14; V. I, 5. Body brownish yellow on back white below with a black zigzag stripe from eye to caudal peduncle; an yellow stripe on snout; scales on body with light vertical pink lines; head with irregular light pink bands. Attains 20 cm. Found in bays, lagoons, coral rubble and sand bottom, associated with seaweeds. Very common and widespread. Indo-West Pacific.



Fig. 553. *Halichoeres scapularis*

491. *Halichoeres timorensis* (Bleeker, 1852)

Spotted Wrasse

D. IX, 11; A. III, 10-11; P. 11; V. I, 5. Caudal fin slightly rounded. Body greenish blue, light yellowish below; a broken dark cross-band below middle of dorsal fin; light purple

markings on snout and sides of head; 4 or 5 purple red streaks on anterior part of body; body scales with purple-red center; a dark blotch on caudal peduncle; dorsal fin light green with oblique red cross bands and a large black blotch in middle of the fin; caudal fin light pinkish with red spots in irregular vertical rows. Attains 10 cm. Found in shallow coral reef areas adjacent to shore. Not rare. Good ornamental fish. Indo-West Pacific.

492. *Hemigymnus fasciatus* (Bloch, 1792)

Barred Thicklip Wrasse

D. IX, 11; A. III, 11; P. 14; V. I, 5. Lips very thick; a pair of protruding canine teeth in jaws; caudal fin almost truncate. Body whitish with five broad black bars; head yellowish green with irregular blue edged pink to orange bands; pectoral fin base black; caudal black to yellowish. Attains 50 cm. Found in protected coral reef areas. Very rapid swimmers. Not uncommon. Feeds on sea urchins, molluscs and other small invertebrates. Good food fish. Indo-West Pacific.



Fig. 554. *Hemigymnus fasciatus*

493. *Hemigymnus melapterus* (Bloch, 1791)

Thicklipped Wrasse

D. IX, 11; A. III, 11; P. 14; V. I, 5. Lips very thick; caudal fin slightly rounded; head and anterior part of body greenish white, shading posterior to black due to black edged



Fig. 555. *Hemigymnus melapterus*

scales; upper part of head with irregular blue edged pink bands; caudal peduncle and caudal fin light yellow. Head and anterior part of body of juveniles greyish white with dusky markings, posterior part of body blackish, shading to yellow on caudal peduncle and fin. Attains 50 to 60 cm. Found on sandy bottoms near coral reefs. Common wrasse. Good food fish. Favourite aquarium pet. Feeds on invertebrates. Indo-West Pacific.

494. *Hologymnosus annulatus* (Lacepede, 1801)

Ring Wrasse

D. IX, 12; A. III, 12; P. 13; V. I, 5. Body slender and elongate with emarginate caudal fin. Initial phase olive-brown with 18 to 19 dark brown bars; a blue spot on opercular membrane; posterior margin of caudal fin with a broad crescent area. Terminal phase green, blue-green ventrally with light red bars; head purplish with broad irregular blue-green bands; caudal fin blue with a broad green crescent posteriorly. Attains 40 cm. Found in shallow coral reef areas. Uncommon. Feeds on small fishes and crustaceans. Good aquarium pet. Indo-Pacific.

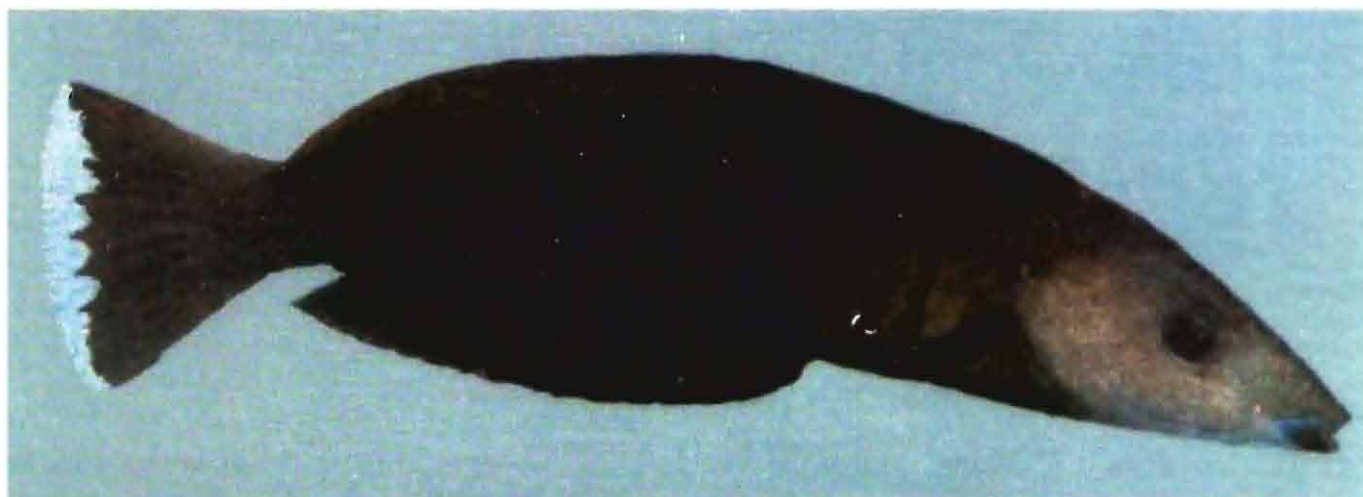


Fig. 556. *Hologymnosus annulatus*

495. *Labrichthys unilineatus* (Guichenot, 1847)

Tubelip Wrasse

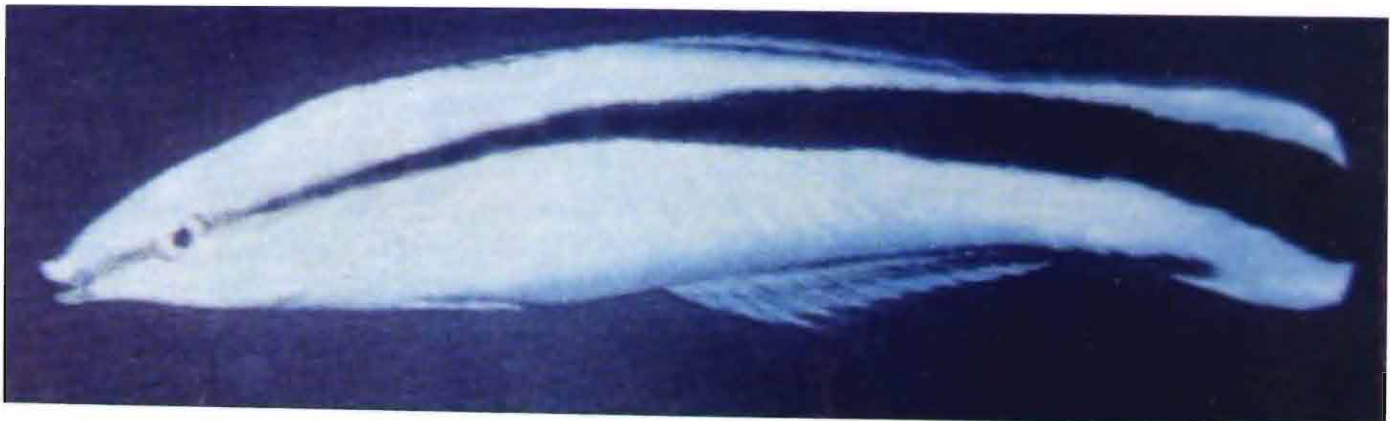
D. IX, 11; A. III, 10; P. 14; V. I, 5. Body slightly elongate; lips fleshy and thick form a tube when mouth closed; upper jaw with two pairs of incurved canine teeth anteriorly; caudal fin rounded; ventral fins of males very elongated. Males dark with blue longitudinal narrow lines on body, females light yellowish brown with a light blue yellow line along scale centers; a broad yellow bar in pectoral region and a blue reticulated lines present on head in both males and females. Juveniles dark brown with a prominent bluish white stripe on sides and another narrow stripe along ventral margin. Attains 16 cm. Found in sheltered coral reef areas in shallow waters. Feeds on coral polyps. Not uncommon. Indo-West Pacific.

496. *Labroides bicolor* Fowler & Bean, 1928**Bicolour Cleanerwrasse**

D. IX, 11; A. III, 10; P. 13; V. I, 5. Lips very thick, lower lip strongly bi-lobed; caudal fin slightly rounded. Males with a dark blue head; anterior part of body dark black becoming yellowish posterior; caudal fin with a sub-marginal black crescent, Females blackish with a black lateral stripe anteriorly, white to yellowish posterior; a black sub-marginal line in caudal fin. Attains 12 cm. Found in tide pools and coral reef areas in shallow waters. Common. Always move with other fishes. Feeds on crustacean ectoparasites and mucus of other fishes. Very interesting aquarium pets. Indo-West Pacific.

Fig. 557. *Labroides bicolor*497. *Labroides dimidiatus* (Valenciennes, 1839)**Cleaner Wrasse**

D. IX, 10-11; A. III, 10; P. 13; V. I, 5. Lips thick, lower lobe bi-lobed; caudal fin truncate. Body light blue, pale yellowish ventrally; a black stripe from tip of snout through eye to end of caudal fin broadening posteriorly. Attains 10 cm. Found in shallow reef areas. Feeds on food particles, parasites from the teeth, mouth, gills and body of other fishes and algae. Establish “cleaning” stations on the reefs and attend the cleaning services of the hosts. They are able to change their sex. Good aquarium pets. Indo-Pacific.

Fig. 558. *Labroides dimidiatus*

498. *Macropharyngodon meleagris* (Valenciennes, 1839)

Blackspotted Wrasse

D. IX, 11; A. III, 11; P. 13; V. I, 5. Body high and well compressed; caudal fin rounded. Males dull orange-red with a black and blue edged green spot on each scale of body and short bands and green spots on head; a black and few yellow spots in shoulder region. Females yellowish with numerous large irregular black spots on head, body and fins; snout with irregular red bands; caudal fin pale violet with interrupted transverse narrow brownish red bands. Attains 15 cm. Found on sandy bottom near reef areas. Uncommon. Feeds on small invertebrates and algae. It is a popular and beautiful aquarium fish. Indo-West Pacific.



Fig. 559. *Macropharyngodon meleagris*

499. *Novaculichthys taeniourus* (Lacepede, 1801)

Rockmover Wrasse

D. IX, 12; A. III, 12; P. 13; V. I, 5. Body moderately compressed; head naked; front of jaws with a pair of large curved canine teeth; first two dorsal spines flexible and



Fig. 560. *Novaculichthys taeniourus*

slightly long; caudal fin rounded. Body dark brown with a white vertical spot on each scale; abdomen light reddish; pectoral fin base with a blue edged curved black band; head grey with irregular black bands radiating posteriorly from eye; two black spots on anterior part of dorsal fin; caudal fin dark brownish black with a broad white bar at base. Attains 25 to 30 cm. Found around shallow coral reef areas. They overturn large rocks to feed on small mollusks, crabs, worms, brittle stars hide beneath. Very popular aquarium pet. Indo-Pacific.

500. *Oxychelinius diagrammus* (Lacepede, 1801)

Cheeklined Wrasse

D. IX, 10; A. III, 8; P. 12; V. I, 5. Body moderately elongate; dorsal profile of head nearly straight; lower jaw slightly projecting; dorsal and anal fins with low scaly sheath; pelvic fins short. Body olivaceous grey with light orange to red bar or spot on each scale; head greenish grey with irregular orange lines on upper part and a series of eight to nine diagonal reddish brown lines on lower cheek; dorsal and anal fins brownish; caudal fin greenish, outer margin dark brown; sometimes a large lateral dark brown stripe on body. Attains 30 cm. Found in reef caves and protected coral reef areas. Very common wrasse. Good food fish. Indo-West Pacific.



Fig. 561. *Oxychelinius diagrammus*

501. *Pseudodax moluccanus* (Valenciennes, 1840)

Chiseltooth Wrasse

D. IX, 12; A. III, 14; P. 14-15; V. I, 5. Head pointed; a pair of large spatulate incisiform teeth anteriorly in jaws; caudal fin rounded. Body dark grey; body scales with a reddish brown spot; orange red on nape; margin of upper lip yellow, a blue streak above the lip; teeth blue in colour; caudal fin black with a light yellow bar at base; dorsal and anal fins light orange-brown. Juveniles strikingly differing from adults, body dark brown with bright blue stripe along dorsal and ventral sides; caudal fin black with light bluish bar at base.

Attains 25 cm. Found in shallow rich coral reef areas. Uncommon. Wide spread in Indo-Pacific.



Fig. 562. *Pseudodax moluccanus*

502. *Stethojulis interrupta* (Bleeker, 1851)

Ribbon Wrasse

D. IX, 1; A. III, 11; P. 12; V. I, 5. Body slender, caudal fin emarginate. Initial phase brownish yellow with light bluish dots and lines on back, white below with black dots. Terminal phase yellowish grey on upper half of body and whitish green below, the two zones separated by a blue line extended from base of pectoral fin to caudal peduncle; a bright orange-red spot above base of pectoral fin; a blue line from top of head along base of dorsal fin and two blue lines passing on sides of head. Attains 10 to 12 cm. Found in weedy areas of reefs in shallow waters. Uncommon. Indo-West Pacific.



Fig. 563. *Stethojulis interrupta*

503. *Stethojulis strigiventer* (Bennett, 1832)

Silverstreak Belly Wrasse

D. IX, 11; A. III, 11; P. 14-15; V. I, 5. Initial phase greenish dorsally with white longitudinal lines, whitish ventrally with dark lines; blue edged dark spot at base of caudal

fin; caudal fin bluish white. Terminal phase greenish to yellowish brown dorsally, white ventrally with four blue lines from head along base of dorsal fin, from snout through eye to middle of caudal fin, from upper lip to edge of pectoral fin, edge of gill opening to middle of body; small black spot at upper edge of operculum. Attains 15 cm. Found in weedy areas and sand bottoms around coral reefs. Very common wrasse. Feeds on small invertebrates and algae. Indo-West Pacific.



Fig. 564. *Stethojulis strigiventer* (Female)



Fig. 565. *Stethojulis strigiventer* (Male)

504. *Stethojulis trilineata* (Bloch & Schneider, 1801)

Threeribbon Wrasse

D. IX, 11; A. III, 11; P. 12-13; V. I, 5. Body bluish green, paler below with four distinct light bluish bands bordered with white on sides, extends along base of dorsal, from snout



Fig. 566. *Stethojulis trilineata* (Male)

to across eye to base of caudal, from upper lip through lower border of eye to head end and from corner of mouth to base of caudal; caudal fin light yellow; fins white. Attains 12 cm. Found around exposed reefs and reef slopes. Not uncommon. Indo-West Pacific.



Fig. 567. *Stethojulis trilineata* (Female)

505. *Thalassoma hardwicke* (Bennett, 1828)

Sixbar Wrasse

D. VIII, 12-13; A. III, 11; P. 16; V. I, 5. Caudal fin emarginate. Initial phase light green with six wedge-shaped dark reddish black bars dorsally on back which are progressively smaller posteriorly. Terminal phase green dorsally, light blue ventrally; the six bars are very black; a pink mid-lateral narrow stripe on body; pink bands on head. Attains 20 cm. A common shallow water reef fish found around branched corals. Good aquarium pet. Indo-Pacific.



Fig. 568. *Thalassoma hardwicke*

506. *Thalassoma herbraicum* (Lacepede, 1801)

Goldbar Wrasse

D. VIII, 13; A. III, 11; P. 14-15; V. I, 5. Caudal fin truncate to lunate. Initial phase blackish with two longitudinal rows of large diffuse yellowish spots and a yellow bar from base of spinous dorsal fin to belly; chest with two diagonal blue lines and pectoral base with black and blue line; head yellowish with two long curved and three short blue bands on cheek; caudal fin yellowish with diffuse black bar at base. Terminal phase with light and

bluish vertical lines on middle part of body; a bright yellow band from front of dorsal fin to abdomen bordered by bluish bars; caudal fin light yellow, its base with broad dark bluish bar; head yellow. Attains 20 cm. Found in shallow reef areas where branching corals are more. Very common. Good aquarium pet. Wide spread in Indian Ocean.

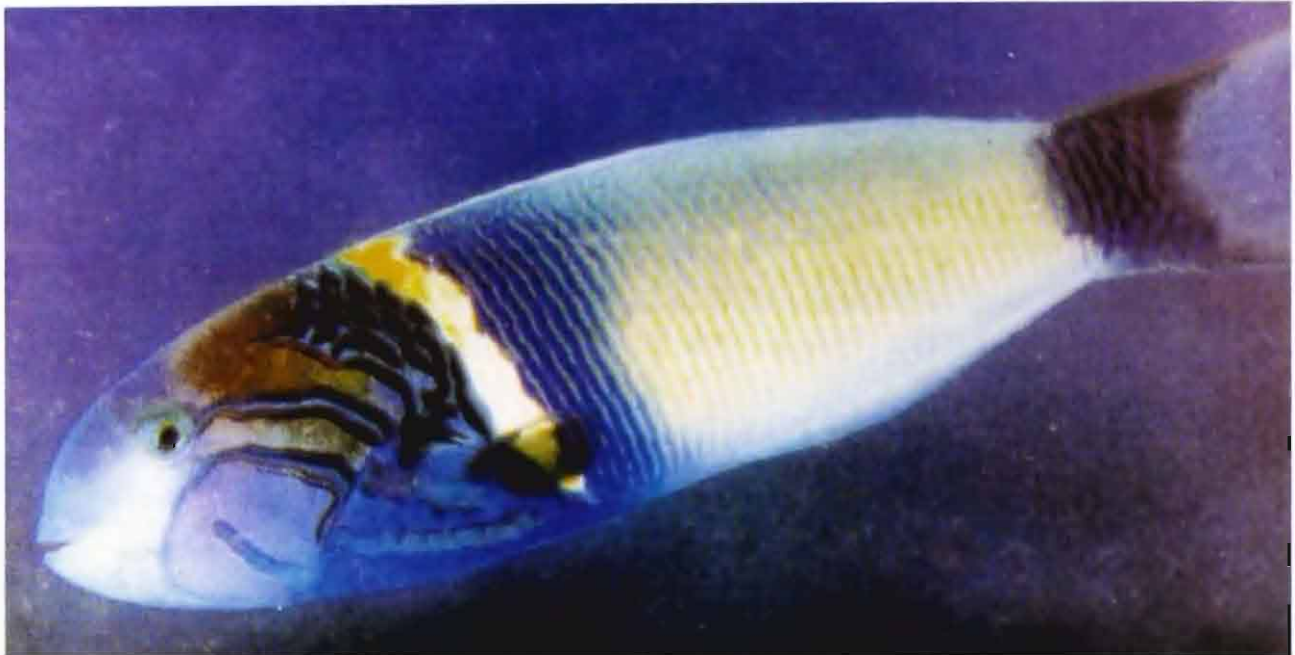


Fig. 569. *Thalassoma herbraicum*

507. *Thalassoma jansonii* (Bleeker, 1856)

Jansen's Wrasse

D. VIII, 13; A. III, 11; P. 15-16; V. I, 5. Caudal fin truncate in young and lunate in adults. Body yellowish white with five to six wide black vertical bands on back extending onto sides and covering most part of dorsal and anal fins; head dark above; caudal base light yellow. Attains 20 cm. Very common wrasse. Found on coral reefs in shallow waters. Popular ornamental fish. Indo-Pacific.



Fig. 570. *Thalassoma jansonii*

508. *Thalassoma lunare* (Linnaeus, 1758)**Moon Wrasse**

D. VIII, 13; A. III, 11; P. 15; V. I, 5. Caudal fin lunate in adults and truncate in young. Body green with vertical red to purplish lines on each scale; head with many pinkish bands; pectoral fin blue with large pink band in central part; caudal fin yellow, the lobes with blue edged pink band; dorsal and anal fins with blue and pink bands. Attains 25 cm. Found in shallow reef areas. Very common wrasse. Feeds on small fish and benthic invertebrates. Popular ornamental fish. Indo-Pacific.



Fig. 571. *Thalassoma lunare*

509. *Thalassoma lutescens* (Lay & Bennett, 1839)**Sunset Wrasse**

D. VIII, 13; A. III, 11; P. 15-16; V. I, 5. Caudal fin lunate with prolonged lobes. Head and anterior part of body pinkish with narrow curved green bands, followed by blue and gradually shading to greenish yellow; caudal fin yellow with a blue edged pink band in each lobe; pectoral fin greenish yellow and black distally with broad bluish submarginal band; dorsal and anal fins greenish yellow with a narrow pink basal band. Initial phase yellowish

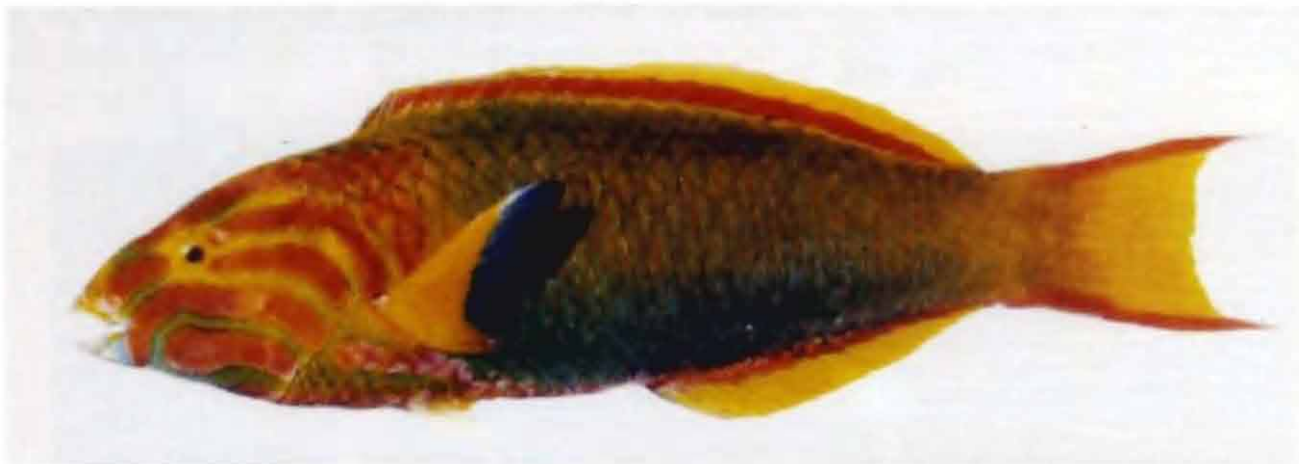


Fig. 572. *Thalassoma lutescens* (Male)

green with orange red vertical lines on body and light red bands on head. Attains 23 cm. Found in rich coral reef areas of fairly deep waters. Uncommon. Feeds on benthic invertebrates. Popular aquarium pet. Indo-Pacific.



Fig. 573. *Thalassoma lutescens* (Female)

510. *Thalassoma purpureum* (Forsskal, 1775)

Surge Wrasse

D. VIII, 13; A. III, 11; P. 16-17; V. I, 5. Slightly deep-bodied fish, caudal fin truncate. Body green with two longitudinal series of vertically elongate, close set green spots separated by red stripes; head with narrow short stripes and small spots; a vertical line in front of eye with a branch to front of snout; irregular broad pink band extending diagonally downward from eye to pectoral base; all fins light greenish blue. Attains 40 cm. Found in rocky and reef areas exposed to wave action. Not uncommon. Very active fish, feeds on sea urchins, brittle stars, crabs and small fish. Good aquarium fish. Indo-Pacific.



Fig. 574. *Thalassoma purpureum* (Male)



Fig. 575. *Thalassoma purpureum* (Female)

511. *Thalassoma quinquevittatum* (Lay & Bennett, 1839)**Fivestripe Wrasse**

D. VIII, 13; III, 11; P. 16-17; V. I, 5. Caudal fin truncate with slightly prolonged lobes. Upper part of body with green and rose-pink stripes, chest and anterior part of abdomen with two oblique rosy red bands alternating with bluish green bands; head with alternate bands of red and green; caudal fin lobes with pinkish band. Attains 16 cm. Found in very shallow reef areas. Not uncommon. Feeds on a variety of invertebrates and fishes. Good aquarium fish. Indo-Pacific.

Fig. 576. *Thalassoma quinquevittatum*512. *Xyrichthys pentadactylus* (Linnaeus, 1758)**Fivefinger Wrasse**

D. IX, 12; A. III, 12; P. 12; V I, 5. Body strongly compressed, profile from snout to before eye nearly vertical; anterior part of each jaw with pair of strong canines; dorsal fin originating little behind above eye; anterior two dorsal fin spines long and flexible. Body light reddish brown with dark blotch between lateral line and dorsal tip of pectoral fin; a round red spot behind eye; a row of five oval reddish yellow spots along anterior lateral line scales; dorsal fin reddish orange with oblique bars; anal fin orange with two longitudinal lines; caudal fin dark brown. Attains 25 cm. Found on sandy bottom near reefs, sea grass and algae. Dive into sand quickly when disturbed. Common species. Feeds on molluscs and crustaceans. Good aquarium pet. Indo-West Pacific.

Fig. 577. *Xyrichthys pentadactylus*

Family SCARIDAE

Parrotfishes

All parrotfishes brightly coloured. Body oblong to moderately elongate; snout bluntly rounded; mouth small, terminal; dorsal fin un-notched; body scales large and cycloid; teeth fused to form beak-like plates, one or two canines on posterior to dental plates; caudal fin lunate or emarginate. Juveniles differ from adult fishes in colour pattern; frequently undergo sex change; most of adult forms exhibit sexual dichromatism, initial female phases quite different from terminal male phases. All are herbivorous, but few larger fishes frequently scrap coral blocks. Parrotfishes abundant on rocky, sea grass and coral reef areas. Usually they sleep at night in small caves or beneath the coral heads, some sleep in mucus envelop secrete around themselves. Most of the parrotfishes are food fishes but some are considered poisonous at certain times of the year. Most of the parrotfishes are beautiful aquarium pets.

Key to species

- 1a. Single row of scales on cheek; pectoral rays 13 2
- 1b. Two to four rows of scales on cheek; pectoral rays 13 to 17 3
- 2a. Teeth fused to form dental plates; lower jaw plate overlapping upper when mouth closed; body depth 2.9 to 3.8 in SL; mottled olive to brown, dull yellow ventrally *Leptoscarus vaigiensis*
- 2b. Outer teeth separate, incisiform, not fused; teeth of upper jaw overlapping lower when mouth closed; depth 2.2 to 3.1 in SL; grey to reddish brown with fine whitish markings on body scales *Calotomus spinidens*
- 3a. Caudal fin emarginate; head and body green, orange streak at corner of mouth; a narrow pink circle around eye *Chlorurus enneacanthus*
- 3b. Cheek scales 2 to 4; colour not as in 3a 4 (Genus *Scarus*)
- 4a. Dorsal profile of head rising steeply from mouth to level of eye; no rudimentary lateral row of teeth on upper pharyngeal bones; caudal fin lunate; greenish dorsally, salmon pink wash on sides; pale blue ventrally; lip margins blue-green; initial phase reddish brown, light ventrally with black spots and lines on scales *S. rubroviolaceous*
- 4b. Snout not shaped as in 4a; a row of rudimentary teeth laterally on each upper pharyngeal bone; colour not as in 4a 5
- 5a. Pectoral fin rays 16 or 17; scale rows on cheek 3; dorsal profile of initial phase strongly convex, in terminal males very step from mouth to level of eye; Initial phase red; terminal males green, scale edges pink or orange; dorsal side of head greenish; dental plates blue-green; caudal fin with blue-green crescent *S. gibbus*

- 5b. Pectoral fin rays 13 to 15; scale rows on cheek 2 or 3; dorsal profile of head and colour not as in 5a 6
- 6a. Median predorsal scales usually 4; cheek scales in 2 or 3 rows 7
- 6b. Median predorsal scales usually 5 to 7; cheek scales in 3 rows 10
- 7a. Lips cover half or more of dental plates; 2 or 3 rows of scales on cheek 8
- 7b. Lips cover less than half of dental plates; 2 rows of scales on cheek; caudal fin slightly rounded or slightly emarginate; initial phase dark brown, red around mouth; all fins reddish brown; sides of body with two rows of whitish spots; terminal males green, scale edges salmon pink; cheek and caudal green with salmon pink streaks.....
..... *S. sordidus*
- 8a. Scale rows on cheek 2; predorsal scales 4; initial phase reddish brown; snout paler; small black spot at upper pectoral base; terminal males greenish yellow, scale edges salmon pink; dorsal part of head grey with blue-green bands *S. psittacus*
- 8b. Scale rows on cheek 3; predorsal scales 6 to 7; colour not as in 8a 9
- 9a. Teeth green or blue; head yellowish green; dark edged narrow creamy bands along lips; creamy bands on snout; anal fin with narrow greenish basal band; caudal fin greenish with white submarginal band in each lobe *S. prasiognathos*
- 9b. Teeth yellowish; head purple or reddish brown with anastomosing dark edged yellow bands on snout, sides and under part of head; caudal reddish with dark lobes.....
..... *S. rivulatus*
- 10a. Median predorsal scales usually 7; pectoral rays 14 11
- 10b. Median predorsal scales usually 5 or 6; pectoral rays 14 to 16 12
- 11a. Dental plates blue green; initial phase reddish brown, head with dull green bands; sides of body scales with brown spots and short lines; terminal male dark green, scale edges dark reddish; head with green bands; penultimate anal ray prolonged in males
..... *S. niger*
- 11b. Dental plates white; initial phase yellow to light reddish with 5 dark brown stripes on sides of body; terminal males green, upper two-third of body and dorsal side of head scales with orange vermiculations; lower half of head with salmon pink markings and bands; penultimate anal ray not prolonged in males *S. frenatus*
- 12a. Median predorsal scales usually 5; pectoral rays 14; initial phase brown with three whitish stripes on abdomen; terminal males green, edges of scales salmon pink; head with small pink spots and bands; a black sots at base of 4th dorsal spin
..... *S. globiceps*

- 12b. Median predorsal scales usually 6; pectoral rays 14 to 16; colour not as in 12a.....
..... 13
- 13a. Pectoral fin rays 14; no canine teeth on dental plates; scales in 3rd row on cheek 1 to 4; initial phase yellowish with 4 dark grey bars or blotches; terminal males green, edges of scales salmon pink except anterior part with dark grey; blue-green band on both lips *S. scaber*
- 13b. Pectoral fin rays 15-16; 1 to 3 canine teeth on side of upper dental plate; 3rd row of scales on cheek usually 1 or 2 scales; initial phase yellow, the centers of scales blue; often with 5 blue bars on sides body; scales light green, edged with pink; 2 blue transverse bands on chin; the upper half of pectoral fin blue *S. ghobban*

513. *Calotomus spinidens* (Quoy & Gaimard, 1824)

Spinytooth Parrotfish

D. IX, 10; A. III, 9; P. 13; V. I, 5; Ll. 24-25; pre-dorsal scales 4. Lips almost covering the dental plates; caudal fin rounded. Initial phase mottled greenish brown, some times with faint barred stripes, edges of caudal fin with dusky spots. Terminal phase light reddish blue with light orange spots on body, head blue-green with short orange-pink bands and spots radiating from eye which is the characteristic feature of the species, a black bar at pectoral fin base, all fins bluish green. Attains 20 cm. Found in sea grass beds and adjacent to reefs. Not uncommon. Indo-Pacific.



Fig. 578. *Calotomus spinidens*

514. *Cetoscarus bicolor* (Ruppell, 1829)

Bicolor Parrotfish

D. IX, 10-11; A. III, 9; P. 14; V. I, 5. Median pre-dorsal scales 5-7; 3 rows of scales on cheek; outer surface of dental plates nodular; no canine teeth on dental plates; lips

covering almost the dental plates; caudal fin emarginate. Initial phase reddish brown, yellowish on back, sides of body scales rimmed and spotted with black; terminal phase green, edges of scales pink, head and anterior part of body with pinkish spots. Juveniles white with a broad orange band covering head except snout and chin, an orange-edged black spot in dorsal fin, central part of caudal fin orangish. Attains about 70 cm. Found around shallow coral reef areas. Common parrot fish. Juveniles are aquarium pets. Indo-Pacific.



Fig. 579. *Cetoscarus bicolor* (Adult)



Fig. 580. *Cetoscarus bicolor* (Young)

515. *Chlorurus enneacanthus* (Lacepede, 1802)

Captain Parrotfish

D. IX, 10; A. III, 9; P. 14-15; V. I, 5; pre-dorsal scales are 4. Caudal fin truncate to emarginate. Head and body green, rear part of the body scales narrowly pinkish; dental plates

greenish; caudal fin violet with blue upper and lower margins. Attains 40 cm. Found in shallow lagoons and bays of protected reefs. Uncommon. Indian Ocean.



Fig. 581. *Chlorurus enneacanthus*

516. *Leptoscarus vaigiensis* (Quoy & Gaimard, 1824)

Marbled Parrotfish

D. IX, 10; A. III, 9; P. 13; V. I, 5. Teeth fused to form dental plates; lower jaw plate overlapping upper jaw mouth closed; caudal fin rounded. Body dark mottled olive, shaded to light yellowish ventrally; an oblique creamy band on chin and another vertical band below eye; fins yellow; males with small blue spots on head, body and caudal fin. Attains 30 cm. Found on algal or sea grass beds close to reefs. Feeds on benthic algae. Indo-West Pacific.



Fig. 582. *Leptoscarus vaigiensis*

517. *Scarus frenatus* Lacepede, 1802**Bridled Parrotfish**

D. IX, 10; A. III, 9; P. 14; V. I, 5; Ll. 18+8; pre-dorsal scales 6 or 7. Caudal fin emarginate, its lobes are pointed. Initial phase brownish yellow with six dark brown stripes on sides of body along scale rows; fins light red. Attains 45 cm. Found around shallow to outer reef areas. Not uncommon. Indo-Pacific.

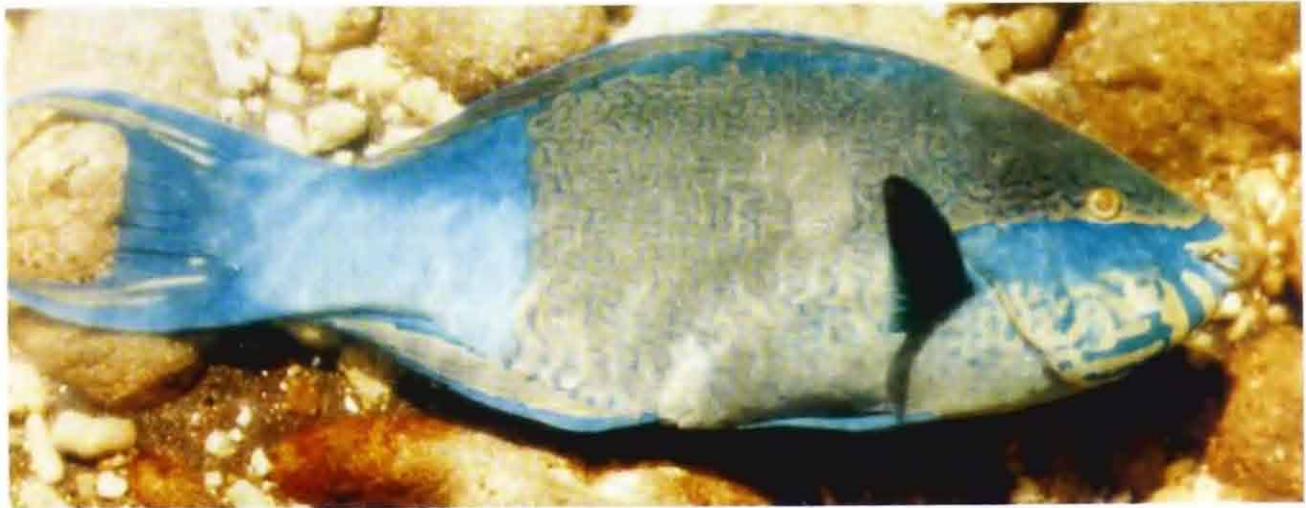


Fig. 583. *Scarus frenatus*

518. *Scarus ghobban* Forsskal, 1775**Bluebarred Parrotfish**

D. IX, 10; A. III, 9; P. 15; V. I, 5; Ll. 18+7; pre-dorsal scales are 6. Caudal fin lunate. Initial phase light orange yellow, paler ventrally; scale centers bluish; often five irregular bluish bars present on body; fins yellowish. Terminal phase greenish; scales narrowly edged with reddish orange; sides and ventral part of head pinkish; three narrow green bands



Fig. 584. *Scarus ghobban* (Female)

extending from eye posteriorly and two transverse bands on chin; dorsal and anal fins orange red, the base and margin with blue band; caudal fin bluish green with orange band in lobes; upper half of pectoral fin bluish. Attains 70 cm. Found in bays and shallow reef areas. Common parrotfish. Beautiful aquarium pet. Indo-Pacific.



Fig. 585. *Scarus ghobban* (Male)

519. *Scarus gibbus* Ruppell, 1829

Humphead Parrotfish

D. IX, 10; A. III, 9; P. 15-16; V. I, 5; pre-dorsal scales 3-4. Body robust; dental plates broadly exposed; large specimens with canine in upper dental plate; snout profile very steep; adult males with slightly humped forehead; caudal fin truncate, lobes greatly prolonged in adults. Two colour forms: one variety greenish and the other brownish; greenish stripe or a row of dots from corner of mouth to pectoral base. Attains 60 to 70 cm. Found around sheltered coral reef areas. Uncommon. Indo-Pacific.

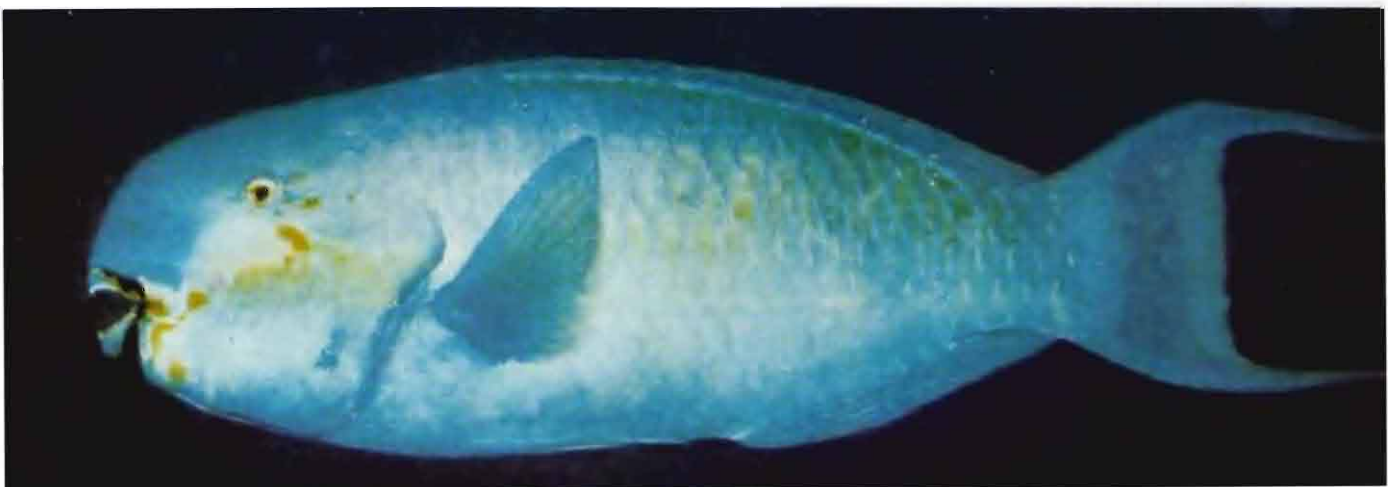


Fig. 586. *Scarus gibbus*

520. *Scarus globiceps* Valenciennes, 1840
Roundhead Parrotfish

D. IX, 10; III, 9; P. 14; V. I, 5. Head is prominently rounded; lips almost covering dental plates; caudal fin slightly rounded. Initial phase greyish brown with three white stripes on abdomen; terminal phase green, edges of scales with orange bar; green edged orange bar from snout through eye to end of opercle; a blackish spot at base of 4th dorsal spine; a dark bar at base of pectoral fin; caudal fin green with submarginal orange band in each lobe. Attains 27 cm. Found in outer reef areas in fairly deep waters. Common parrotfish. Scrape algae grown on coral rocks. Indo-Pacific.



Fig. 587. *Scarus globiceps*

521. *Scarus niger* Forsskal, 1775
Dusky Parrotfish

D. IX, 10; A. III, 9; P. 14; V. I, 5; pre-dorsal scales 6-7. Caudal fin slightly rounded, lobes prolonged in larger fishes. Body reddish brown, the centers of body scales dark green with small dark spots, except over thorax and abdomen; dental plates blue-green; lips with blue-green bands and another band from corner of mouth to eye; each caudal lobe with blue edged orange band. Attains 35 cm. Found around thick coral reef areas. Very common. Indo-Pacific.



Fig. 588. *Scarus niger*

522. *Scarus prasiognathos* Valenciennes, 1840**Greencheek Parrotfish**

D. IX, 10; A. III, 9; P. 15; V. I, 5; Ll. 24. More than half of dental plates covered by lips; caudal fin truncate, lobes elongate. Initial phase dark reddish brown; scale centers with small white spots on anterior part of body. Terminal phase bluish green, abdomen lighter; lower side of head below eye bright green; a broad green band from eye to snout; tip of head pale creamy; dorsal fin membrane yellow, spines and rays green and edge of fin green; anal fin green with a pale yellow band in middle; caudal fin green with broad yellow sub-marginal band along lobes; pectoral fin dark blue. Attains 50 cm. Found in outer reef areas and reef slopes. Indo-West Pacific.

Fig. 589. *Scarus prasiognathos*523. *Scarus psittacus* Forsskal, 1775**Dark Spot Parrotfish**

D. IX, 10; A. III, 9; P. 14; V. I, 5; Ll. 23-25; pre-dorsal scales 4. Caudal fin emarginate. Dental plates white. Body brownish, scales on sides of body darker; dorsal fin brown with

Fig. 590. *Scarus psittacus*

black spot on membrane between 1st and 2nd spines; anal fin brown with pale margin; pectoral fin hyaline; a dark spot at base of upper pectoral rays. Attains 20 cm. Found in coral reef areas where weed cover is more. Not uncommon. Indo-West Pacific.

524. *Scarus rivulatus* Valenciennes, 1840

Surf Parrotfish

D. IX, 10; A. III, 9; P. 13-15; V. I, 5; pre-dorsal scales 6 or 7. Caudal fin almost truncate; dental plates pale and fully covered by lips. Body green with salmon to light pink bar on each scale; head light orange with irregular blue-green lines and spots forming a reticulum on chin and snout; cheek yellowish orange; pectoral fin light yellow with greenish margin; dorsal fin yellowish green; caudal and anal fins bluish green. Attains 40 cm. Found on shallow reef flats. Not uncommon. Indo-West Pacific.

525. *Scarus rubroviolaceus* Bleeker, 1847

Ember Parrotfish

D. IX, 10; A. III, 9; P. 14-16; V. I, 5; pre-dorsal scales 6 or 7. Dorsal profile of head rising steeply from mouth to level of eye; caudal fin strongly lunate, lobes much elongate; dental plates blue-green. Initial phase reddish brown shading to light red ventrally; body scales with black spots and irregular lines; fins reddish. Terminal phase greenish blue, the scale edges narrowly pinkish; upper lip with a pink band, above this another broad band; lower lip and chin with two blue bands and a pink band in between; median fins bluish with pink band in the middle; caudal bluish with dark sub-marginal pink band in lobes. Attains 60 cm. Found on outer coral reef areas and reef slopes. Frequently encountered. Indo-Pacific.



Fig. 591. *Scarus rubroviolaceus*

526. *Scarus scaber* Valenciennes, 1840**Fivesaddle Parrotfish**

D. IX, 10; A. III, 9; P. 12-13; V. I, 5; Ll. 24-25; pre-dorsal scales 6 or 7. Caudal fin truncate, lobes slightly extended. Body yellowish on upper part with four grey blotches, the antero-dorsal blotch on head is larger and darker; lower part of body light yellow to pinkish shade; fins light reddish grey. Attains 35 cm. Found in shallow protected coral reef areas. Uncommon. Indian Ocean.

Fig. 592. *Scarus scaber*527. *Scarus sordidus* (Forsskal, 1775)**Bullethead Parrotfish**

D. IX, 10; A. III, 9; P. 14-16; V. I, 5; pre-dorsal scales 4. Dental plates not covered by lips; caudal fin truncate to slightly rounded; front of head strongly rounded. Initial phase dark brown, becoming red around mouth and lower part of chin; dorsal side of head and upper anterior part of body white. Terminal phase green, the edges of scales salmon pink except caudal peduncle, abdomen and thorax pale with indistinct salmon stripes; upper side of body light yellow; snout bordered by blue-green bands; dental plates blue-green. Attains 40 cm. Most common parrotfish found in all types of reef habitats. Indo-Pacific.

Family MUGILIDAE

Mulletts

Body moderately elongate and slightly compressed; head broad and depressed; snout blunt; mouth small inferior or terminal; eyes usually partly covered by adipose eye lid; no lateral line; two widely separated dorsal fins; first dorsal fin with 4 spines; body scales fairly large; axillary scales present below 1st dorsal fin and above pectoral and ventral fins; caudal fin forked or emarginated. Body usually silvery. Detritus feeders, also feed on algae, plankton and fish eggs. Most of the species found in estuaries and muddy coastal waters but few species found adjacent to reef areas. Commercially important and excellent food fishes and easily cultivable fishes.

Key to species

- 1a. Lower third of upper lip bearing enlarged papillae or crenulations
..... *Crenimugil crenilabis*
- 1b. Lower lip without papillae or crenulations 2 (Genus *Liza*)
- 2a. Preorbital notched anteriorly, edge not serrated; anal fin rays 8; adipose eyelids vestigial
..... *L. vaigiensis*
- 2b. Preorbital unnotched, edge strongly serrated; anal fin rays 9; adipose eyelids partially
covering iris *L. melinoptera*

528. *Crenimugil crenilabis* (Forsskal, 1775)

Wartylipped Mullet

D. IV+I, 8; A. III, 9; P. 16-17; V. I, 5. Scales cycloid; no adipose eyelid; upper lip with prominent papillae; elongate axillary scale present above pectoral fin base. Dorsal side of body silvery grey to green and silvery below; pectoral fin with purplish axillary spot. Attains



Fig. 593. *Crenimugil crenilabis*

40 cm. Very important food fish. Found in shallow sandy lagoons, reef flats and creeks. Indo-Pacific.

529. *Liza melinoptera* (Valenciennes, 1836)

Giantscale Mullet

D. IV+I, 8; A. III, 8-9; P. 15; V. I, 5. Adipose eyelid covers one third of iris; no teeth in lower jaw; pectoral axillary scale absent. Body greenish brown above, silvery below; all fins dusky. Attains 30 cm. Commercially important fishes. Found around coastal waters, creeks and adjacent to reefs. Indo-West Pacific.



Fig. 594. *Liza melinoptera*

530. *Liza vaigiensis* (Quoy & Gaimard, 1825)

Squaretail Mullet

D. IV+I, 8; A. III, 8-9; P. 15-16; V. I, 5. Adipose eyelids vestigial; upper lip with ciliated teeth; 2nd dorsal and anal fins with scaly sheath; no pectoral axillary scale; caudal fin emarginated. Dorsal side of body light olive and sides silvery; dusky streaks along upper scale rows; all fins dusky except pectoral fin black. Attains 60 cm. Commercially very important food fishes. Found in large schools adjacent to shallow reef and coastal waters. Indo-West Pacific.



Fig. 595. *Liza vaigiensis*

Family SPHYRAENIDAE
Barracudas

Body slightly compressed and elongated; head large, snout long and pointed; mouth large and horizontal, lower jaw projecting; large fang-like teeth in both the jaws, one or two strong sharp canines near tip of lower jaw; lateral line well developed; two dorsal fins, well separated; ventral fins abdominal in position; caudal fin forked. Many species found in small schools near reefs. They grow large size; excellent food fishes but large sized fishes are implicated in ciguatera poisoning. Predatory fishes.

Key to species

- 1a. First gill arch with platelets, each bearing many small spines small spines; no gill rakers on 1st arch; a prominent dusky blotch at inner base of pectoral fin *Sphyraena forsteri*
- 1b. First gill arch without spiny platelets; 1 or 2 gill rakers or none on first arch 2
- 2a. Gill rakers present on first arch 3
- 2b. Gill rakers absent on first arch 4
- 3a. Pectoral fin reaches past origin of first dorsal fin; inside of mouth orange-yellow *S. obtusata*
- 3b. Pectoral fin does not reach to origin of dorsal fin; interior of mouth white *S. flavicauda*
- 4a. Lateral line does less than 100; sides of body with inky blotches *S. barracuda*
- 4b. Lateral line pores 130 to 140; sides of body with vertical dusky cross bars arranged in a serpentine pattern *S. jello*

531. *Sphyraena barracuda* (Walbaum, 1792)
Great Barracuda

D. V+I, 9; A. II, 9; P. 11-14; V. I, 5. Ll. 70-84. Body elongate, snout pointed and long; caudal fin bilobed. Body green to steel blue above, silvery below; sides above lateral line with



Fig. 596. *Sphyraena barracuda*

a series of 18 to 20 light cross bars angled downwards; lower side of body with irregular black blotches; median fins dusky. Attains 160 cm and weighs 35 to 40 kg. Found around outer reef areas and open sea. The flesh is excellent. Sometimes attack divers. Widespread in Indo-Pacific.

532. *Sphyraena flavicauda* Ruppell, 1838

Yellowtail Barracuda

D. V+I, 9; A. II, 8-9; P. 13-14; V. I, 5; Ll. 82-90. Body elongate and slightly compressed; head large, tip of lower jaw blunt. Body iridescent dark green above and silvery below; a brown stripe from tip of snout through eye to caudal peduncle base; dorsal fins dark blue green, anal and ventral fins white; pectoral fins pale with dusky axillary patch; caudal fin dusky yellow. Attains 35 cm. Good food fish. Found in reef areas in large schools. Indo-Pacific.



Fig. 597. *Sphyraena flavicauda*

533. *Sphyraena forsteri* Cuvier, 1829

Blackspot Barracuda

D. V+I, 8; A. II, 8; P. 12-13; V. I, 5. Eyes large. No cross bands on body; colour greenish grey dorsally, silvery on sides and belly; a black blotch at base of pectoral fin; dorsal and anal fins dusky, the tips white. Attains 60 cm. Commercially important food fish. Found in small schools around coral reefs and reef slopes. Frequently encountered. Indo-Pacific.

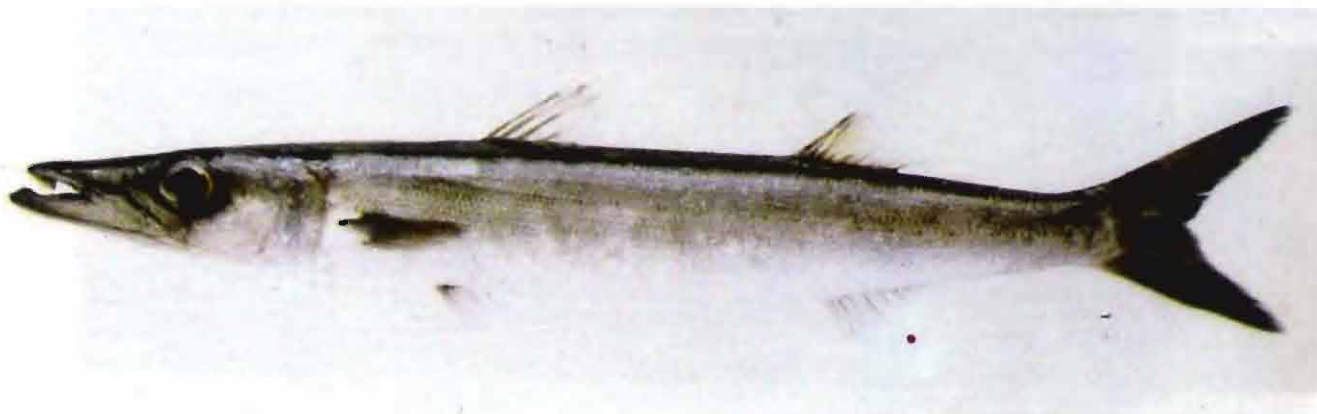


Fig. 598. *Sphyraena forsteri*

534. *Sphyraena jello* Cuvier, 1829**Pickhandle Barracuda**

D. V+I, 9; A. II, 8; P. 12-13; V. I, 5. No fleshy tip at the end of lower jaw; caudal fin trilobed. Body purplish above, silvery below with 15 to 20 vertical dark bars extend onto the lateral line; caudal fin light yellow. Attains 130 cm. Good food fish. Found in outer reef areas. Frequently encountered. Indo-West Pacific.

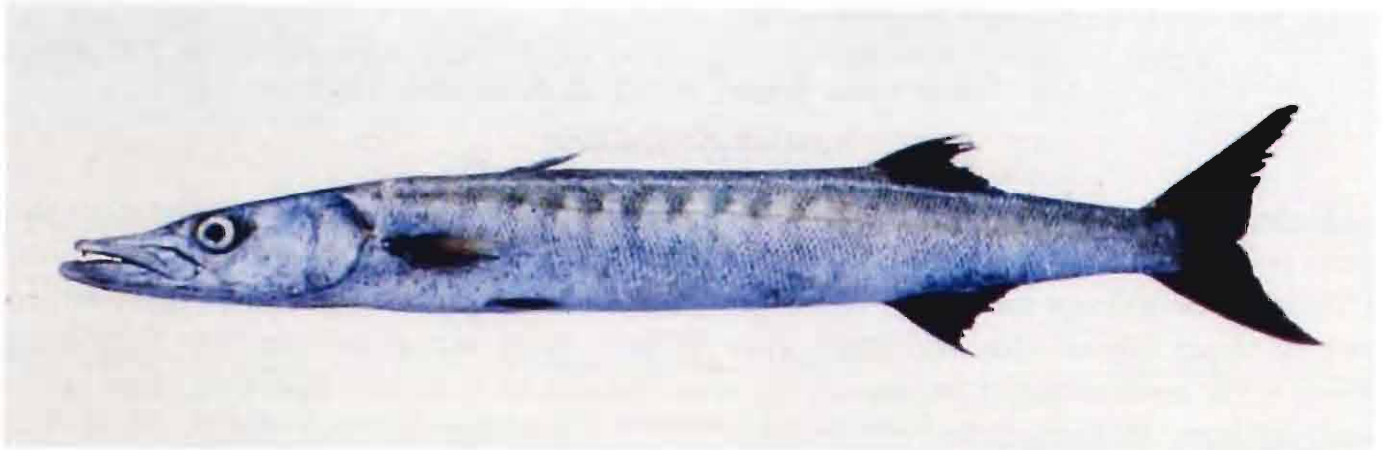


Fig. 599. *Sphyraena jello*

535. *Sphyraena obtusata* Cuvier, 1829**Orangemouth Barracuda**

D. V+I, 9; A. II, 9; P. 14-15; V. I, 5. Body slightly compressed and elongate; head large. Body grey-green above silvery below; inside of mouth orange yellow; first dorsal fin dusky, second dorsal, pectoral, anal and caudal fins yellow, ventral fin white. Attains 150 cm. Found in outer reef areas in shallow waters. Not uncommon. Good food fish. Indo-West Pacific.



Fig. 600. *Sphyraena obtusata*

Family TRICHONOTIDAE

Sand-Divers

Sand-divers are small group of fishes. Body elongate, compressed and slender; lower jaw projecting; mouth large and terminal, teeth small and sharp; body scales large and cycloid; dorsal and anal fins elongate; first few rays of dorsal fin elongate and filamentous in males; caudal fin rounded. When disturbed quickly dart into sand for protection and shelter. Found on clean sandy bottoms adjacent to coral reefs.

536. *Trichonotus setiger* Bloch & Schneider, 1801

Spotted Sand-Diver

D. V-VII, 38-40; A. I, 35-36; P. 12-15; V. I, 5; Ll. 53-55. Body very narrow and elongate; snout pointed; caudal fin rounded. Females whitish with two longitudinal rows of blue spots; a black spot at anterior part of dorsal fin, all fins hyaline. Males whitish with 10 or 11 brown bars on upper side of body and small spots on back; body, dorsal and anal fins with small bluish white spots arranged in longitudinal rows. Attains 12 to 15 cm. Found on clean sandy areas adjacent to reefs. Indo-West Pacific.



Fig. 601. *Trichonotus setiger*

Family PINGUIPEDIDAE
Sand Smelts or Sand Perches

A small family of small to moderate sized fishes. Characterised by slightly elongate, small compressed body; mouth terminal and protractile; lips somewhat thickened; eyes large, located more towards dorsal profile; curved canines at front of jaws; one stout spine on opercle; pre-opercle edge smooth, broadly rounded; caudal fin rounded or emarginated, usually upper lobe prolonged in some species; lateral line complete; scales ctenoid. Usually found in sand and coral rubble bottom near coral reef areas. They inflict painful wounds with the opercular and dorsal spines. All are carnivorous fishes, feeds on benthic invertebrates and small fishes.

Key to species

- 1a. Lateral line scales 70 to 78 *Parapercis tetracanthus*
- 1b. Lateral line scales 48 to 64 2
- 2a. Front of lower jaw with 6 canines in outer row 3
- 2b. Front of lower jaw with 8 to 9 canines in outer row 4
- 3a. Second and third dorsal spines small; body greenish dorsally with 9 or 10 vertically elongate reddish brown spots with black centers on lower side; ocellated black spot on gill cover *P. clathrata*
- 3b. Third and 4th dorsal spines longest; body grey, speckled with ark brown; 9 dusky bars on sides; black spots on caudal fin *P. xanthozona*
- 4a. Lateral line scales 58 to 61; a black blotch covers most part of the caudal fin; large elliptical whitish spots alongside of body *P. hexophtalma*
- 4b. Lateral line scales 48 to 52; caudal fin with black spots only; series of large vertically elongate dark brown spots covering ventral half of body *P. cylindrica*

537. *Parapercis clathrata* Ogilby, 1910

Latticed Sandperch

D. IV-V, 20-21; A. I, 17; P. 17-18; V. I, 5; Ll. 55-58. Front of lower jaw with six canines. Body greenish brown above with a row of small dark blotches, shading to white below with



Fig. 602. *Parapercis clathrata*

a series of nine vertically elongate reddish brown spots with black centers; an ocellated black spot above gill opening; head and lower jaw with reddish blotches; caudal fin black with a broad yellow middle zone and scattered black spots. Attains 20 cm. Found on shallow coral rubble and coral reef areas. Frequently encountered. Good aquarium pets. Indo-West Pacific.

538. *Parapercis cylindrica* (Bloch, 1792)

Sharpnose Sandperch

D. V, 21; A. I, 17; P. 14-15; V. I, 5; Ll. 48-52. Caudal fin rounded. Body yellowish brown, shading to white ventrally; a series of 9 or 10 black elongate cross-bars on ventro-lateral side of body; two series of narrow dark brown blotches form a double band from behind eye to middle part of body; scattered black spots on dorsal, anal and caudal fins; caudal fin yellowish. Attains 10 to 15 cm. Found in shallow reef areas where substratum is silty-sand. Uncommon. Indo-West Pacific.



Fig. 603. *Parapercis cylindrica*

539. *Parapercis hexophtalma* (Cuvier, 1829)

Blacktail Sandsmelt

D. V, 19-21; A. I, 16-17; P. 17; V. I, 5; Ll. 59-62. Front of lower jaw with eight canine teeth. Body light green above, speckled with brown on sides and ventrally; a series of large



Fig. 604. *Parapercis hexophtalma*

elliptical whitish spots encircling small black spots along sides of body; ventral side of body with a row of small black spots rimmed with yellow; head with small dark brown spots; a broad black blotch on caudal fin. Attains 25 cm. Found on coral rubble and sandy areas near protected coral reefs. Not uncommon. Indo-West Pacific.

540. *Parapercis tetracanthus* (Lacepede, 1802)

Banded Sandsmelt

D. 21; A. I, 17; P. 18; V. I, 5; Ll. 70-72. Caudal fin slightly rounded to truncate. Body yellowish brown above creamy white below; two narrow brown bands from head to caudal and 8 or 9 broad black transverse bands connecting the longitudinal bands; an ocellus on scapular region; dorsal with three rows of longitudinal dark brown spots; caudal fin with black spots. Attains 25 cm. Found on sandy bottom near reefs. Not uncommon. Indo-West Pacific.



Fig. 605. *Parapercis tetracanthus*

541. *Parapercis xanthozona* (Bleeker, 1849)

Yellowbar Sandsmelt

D. V, 18-21; A. I, 17-18; P. 16-17; V. I, 5; Ll. 58-59. Caudal fins lightly rounded, the upper corner slightly prolonged. Body yellowish brown with mid-lateral white stripe extending to end of caudal fin, above this stripe speckled with dark brown and below with 8 or 9 dusky bars; head with dark spots, three black blotches on each side of upper lip; dorsal and caudal fins with black spots; an orange yellow bar at base of pectoral fin. Attains 20 cm. Found in bays of protected reef areas.

Family BLENNIIDAE

Blennies or Rock Skippers

The family consists of large number of small sized fishes. Body oblong and compressed; no scales on body; teeth in jaws in single row, lower jaw often with canines; head smooth or with simple or branched cirri and crest on head; dorsal fin single, often spinous portion separated by a notch; caudal fin free or confluent with last ray of dorsal and anal fin; ventral fins inserted before pectorals; caudal fin rounded; all fin spines flexible; lateral line complete or reduced. Many species of blennies found in shallow waters among corals, rocks, tide pools and weeds. They able to crawl over mud and rocks during low tide in search of food. Some are herbivorous and some carnivorous. They have drab colours with which they easily blend with their environment, but few brightly coloured. Sexes differently coloured in many species and males develop a crest on head. Usually males guard eggs.

542. *Andamia heteroptera* (Bleeker, 1857)**Lined Blenny**

D. XIV, 19-20; A. II, 20; P. 24; V. I, 3. Snout evenly rounded; eyes project from dorsal outline; lips crenulated; no notch in dorsal fin; last ray of dorsal free from caudal fin. Males dark above lighter below with numerous irregular vermiculate lines; sides of head and snout with rounded and elongate dark spots; dorsal fin black, a narrow silvery line along edge; distal part of caudal and anal fins black. Females head and body chocolate brown, throat and ventral surface lighter; base of pectoral and upper third of other fins spotted; caudal fin rays dark brown. Attains 15 cm. Found under rocks near reefs. Indo-West Pacific.



Fig. 606. *Andamia heteroptera*

543. *Aspidontus taeniatus taeniatus* Quoy & Gaimard, 1834**Mimic Blenny**

D. X-XII, 26-28; A. II, 26-28; P. 14-15; V. I, 3. Body moderately elongate; snout conical, mouth ventral in position; large recurved canine on each side of lower jaw; 4 small cirri on chin; caudal fin slightly rounded. Closely resembles cleaner wrasse *Labroides dimidiatus* and mimics its colour pattern. Body bluish, whitish anteriorly with a black stripe from snout to edge of caudal fin, the stripe gradually broader posteriorly. Attains 10 cm. Found in coral reef areas, move along with other fishes and bite off fins and scales. Frequently encountered. Very interesting aquarium pet. Indo-Pacific.

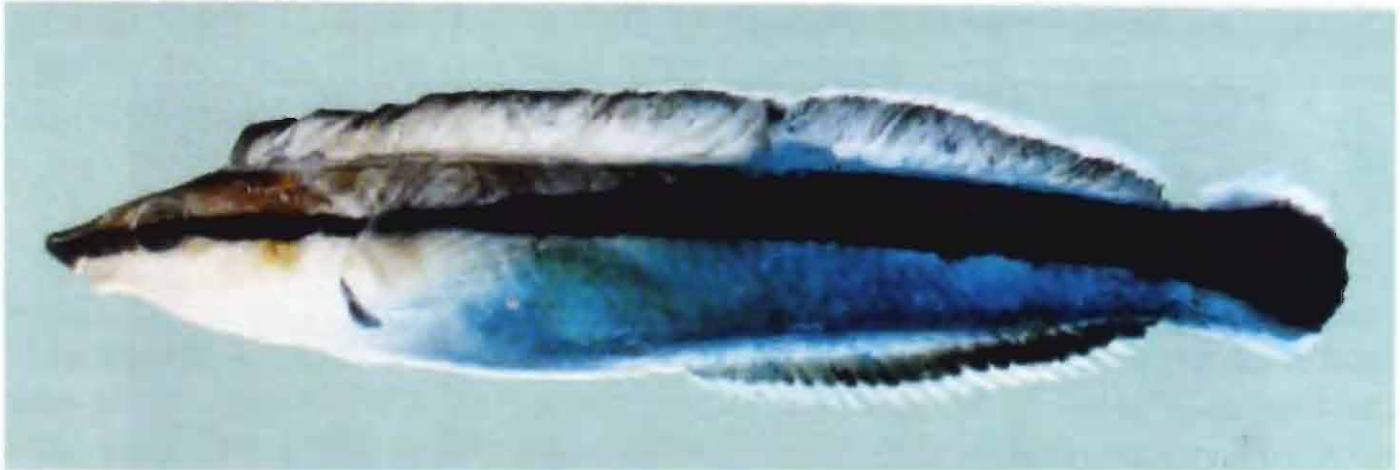


Fig. 607. *Aspidontus taeniatus taeniatus*

544. *Astrosalarias fuscus fuscus* (Ruppell, 1838)**Browncoral Blenny**

D. XI, 20-21; A. II, 19; P. 16; V. I, 2. No crest on head; upper lip crenulated, lower lip smooth; dorsal fin un-notched. Head and body chocolate brown, lower sides lighter; upper



Fig. 608. *Astrosalarias fuscus fuscus*

half of pectoral base with black spot; pectoral and caudal fins light yellow. Attains 15 cm. Usually found in rich coral reef areas. Indo-Pacific.

545. *Blenniella bilitonensis* (Bleeker, 1858)

Banded Rockskipper

D. XIII, 19-20; A. 1, 20-21; P. 14; V. I, 3-4. Crest on head present in males only; lips smooth; dorsal fin notched. Body light brown with dark vertical bands on middle side of body; lower side of body with white dashes edged with black; upper corner of opercle with blue-black spot; two narrow white dashes behind eye; dorsal fin with dark wavy lines; pectoral fin with small black spots on mid rays. Attains 13 cm. Found in tide pools. Indo-West Pacific.



Fig. 609. *Blenniella bilitonensis*

546. *Blenniella cyanostigma* (Bleeker, 1849)

Blackspot Rockskipper

D. XIII, 20; A. II, 21-22; P. 14; V. I, 3. Pointed canine teeth on both jaws; dorsal fin with distinct notch. Head dark brown, lower sides creamy; a dark streak across snout and



Fig. 610. *Blenniella cyanostigma*

upper lip; upper corner of operculum with black spot; white specks on lower part of cheek and base of pectorals; nine vertical bands on sides of body, posterior part of body with black ringed white spots; dorsal fin with white lines; caudal fin with two dark bars and spots. Attains 12 cm. Found in rocky reef areas. Indo-West Pacific.

547. *Blenniella leopardus* (Fowler, 1904)

Whitedotted Blenny

D. XIII, 20; A, II, 20; P. 14; V. I, 3. Very low crest on head; lips smooth. Body brown, ventral side silvery white; two black edged silvery bars on sides of body with white dots; numerous white centered black spots on head; outer third of dorsal with three rows of oval spots between rays; caudal fin with white dots arranged in horizontal lines. Attains 13 cm. Found around coral rubble and weedy areas. Uncommon. Indian Ocean.

548. *Blenniella periophthalmus* (Valenciennes, 1836)

Bullethead Rockskipper

D. XIII, 19-20; A. II, 20-21; P. 14; V. I, 3. Males with crest on head; upper lip crenulated; a canine tooth present on each side of lower jaw; the cirrus over eye very slender; dorsal fin notched. Males pale green with 8 dark brown bars along sides of body arranged like cross-bar of H, each containing one or more horizontal small dark-edged pale blue spots; spinous dorsal with dark spots, soft dorsal with dusky lines. Females similar to males but less distinctly marked, except spotting on caudal peduncle; body with fine dark specks. Attains 14 cm. Found in calm rocky shores of lagoons and outer reef areas, always stay near a small hole in the reef to take shelter immediately. A common rock skipper. Wide spread in Indo-West Pacific.

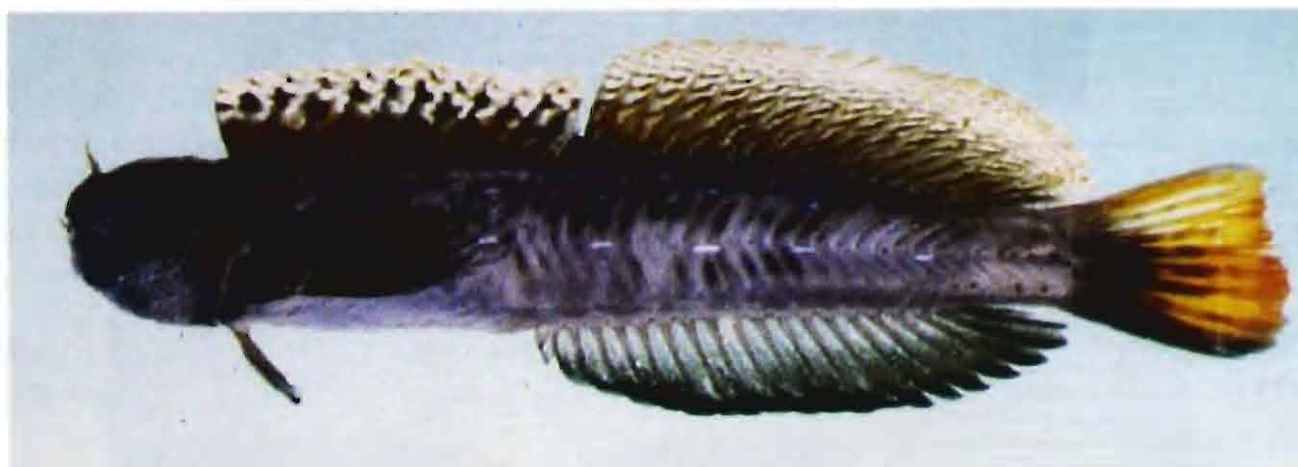


Fig. 611. *Blenniella periophthalmus*

549. *Ecsenius bicolor* (Day, 1888)

Bicolour Blenny

D. XII, 16-18; A. II, 20; P. 14; V. I, 3. A single canine tooth on each side of lower jaw; anterior nostrils with cirrus. Head and anterior part of body dark bluish grey and posterior

half of body bright orange-yellow; posterior lower part of eye with narrow orange stripe; lower part of anterior dorsal rays black. Attains 10 cm. Found on rocky and coral reef bottom in shallow waters. Uncommon. Good aquarium object. Indo-West Pacific.



Fig. 612. *Ecsenius bicolor*

550. *Ecsenius lineatus* Klausewitz, 1962
Blotched Blenny

D. XII, 16-18; A. II, 18-20; P. 12-13; V. I, 3. Mouth inferior; dorsal fin notched. Body yellowish above, lower sides paler; several black blotches arranged in a row from eye to caudal; head with yellow stripes. Attains 9 cm. Found on coral reef areas in shallow waters. Indo-West Pacific.



Fig. 613. *Ecsenius lineatus*

551. *Ecsenius midas* Starck, 1969
Midas Blenny

D. XIII, 18-20; A. II, 20-22; P. 13; V. I, 3. Body slightly elongate, head rounded anteriorly; anterior nostrils with cirrus; caudal fin deeply emarginated. Body orange-yellow,



Fig. 614. *Ecsenius midas*

lower sides light dirty blue. Attains 10 cm. Found in coral reef areas. Not uncommon. Feeds on Zooplankton. Indo-West Pacific.

552. *Enchelyurus kraussi* (Klunzinger, 1871)

Krauss's Blenny

D. VIII, 22-24; A. II, 20-22; P. 14-16; V. I, 2. Head bluntly rounded anteriorly, no cirri and crest; small strong canines in lower jaw; dorsal and anal fins united broadly to caudal; caudal fin rounded; ventral fin rays filamentous. Body and fins overall dark brown but head lighter yellow; cheek with diagonal dark stripes or elongate spots; dorsal fin light yellowish brown with a black spot at front. Attains 5 cm. Found beneath coral rocks of intertidal zone. Common blenny. Indo-West Pacific.



Fig. 615. *Enchelyurus kraussi*

553. *Entomacrodus striatus* (Valenciennes, 1836)

Blackspotted Rockskipper

D. XIII, 15-17; A. II, 16-18; P. 13-14; V. I, 4. No crest in both male and females; upper lip crenulated; last dorsal attached to caudal peduncle by a membrane. Body pale yellow with numerous small black dark spots form into irregular large blotches on upper side; upper lip dusky; dorsal and caudal fins with dark spots arranged in oblique rows. Attains 9 cm. Found in protected lagoons, outer reef and rocky areas. Indo-West Pacific.



Fig. 616. *Entomacrodus striatus*

554. *Istiblennius dussumieri* (Valenciennes, 1836)**Dussumier's Rockskipper**

D. XIII, 21-22; A. II, 22-24; P. 14; V. I, 3. Margin of lips smooth, crest on head present in males only. Body with six pairs of dusky to dark reddish bands; head with small orange spots and irregular lines; margin of soft dorsal and anal fins dusky; dark spots distally between first two dorsal spines. Attains 12 cm. Found on coral rubble and mangrove areas. Not uncommon. Indo-Pacific.



Fig. 617. *Istiblennius dussumieri*

555. *Istiblennius edentulus* (Schneider & Forster, 1801)**Rippled Rockskipper**

D. XIII, 20-21; A. II, 21-22; P. 14; V. I, 3. Males with crest on head; lips smooth; no canines in jaws; last dorsal fin membrane reaching onto first caudal ray. Body of males grey with 5 or 6 pairs of bands on sides, vertical orange lines in interspaces; pale blue edged spot behind eye; diagonal pale stripes in dorsal fin. Females dusky, but paler ventrally; posterior bands on body broken into spots; dorsal fin with orange spots. Attains 16 cm. Found on coral rubble and rocky shores. Not uncommon. Widely distributed in Indo-Pacific.



Fig. 618. *Istiblennius edentulus*

556. *Istiblennius lineatus* (Valenciennes, 1836)**Lined Rockskipper**

D. XII-XIII, 21-22; A. II, 23-25; P. 14; V. I, 3. Upper lip crenulated, lower lip smooth; no canine teeth; crest on head well developed. Body pale brownish, lighter below; sides of body with 6 narrow black longitudinal lines breaking up into short lines and spots on caudal peduncle; faint dusky bars on body; head with wavy stripes and spots; six pairs of dark brown spots along base of dorsal fin; anal fin without stripes or dots. Attains 14 cm. Found in intertidal reef and rocky areas. Very common. Indo-Pacific.



Fig. 619. *Istiblennius lineatus*

557. *Parenchelyurus hepburni* (Synder, 1908)**Hepburn's Blenny**

D. XI-XII, 20; A. II, 20-22; P. 14; V. I, 2. Small sized fishes. Head bluntly rounded anteriorly; caudal fin rounded. Body, dorsal and anal fins black. Males with small blue spots on body and fins. Attains 4 cm. Found beneath the coral rocks in shallow waters. Frequently encountered. Indo-West Pacific.

558. *Petroscirtes breviceps* (Valenciennes, 1836)**Sabertooth Blenny**

D. X-XI, 19-21; A. II, 18-20; P. 15; V. I, 3. The canines on the lower jaw long and pointed. Body light brown with a broad dark brown stripe from snout through eye to caudal



Fig. 620. *Petroscirtes breviceps*

peduncle, another dark stripe along dorsal fin rays. Attains 8 cm. Found in weedy areas near coral rocks. Not uncommon. Indo-West Pacific.

559. *Petroscirtes mitratus* Ruppell, 1830
Highfin Fang Blenny

D. X-XI, 15-16; A. II, 14-16; P. 15-16; V. I, 3. Lower jaw with large canines; small skinny tentacles behind eye, on opercle, at nape and chin; first three dorsal spines longer than others and separated by a small notch from the rest of the fin; last dorsal and anal rays joined to caudal peduncle by a membrane. Body brownish white, speckled and mottled; 5 or 6 indistinct dark blotches on upper side of body containing dark edged white spots; dorsal and anal fins speckled; caudal and pectoral fins hyaline. Attains 6 to 7 cm. Found in seaweeds near dead coral patches. Common blenny. Indo-West Pacific.



Fig. 621. *Petroscirtes mitratus*

560. *Plagiotremus rhinorhynchos* (Bleeker, 1852)
Bluestriped Fang Flenny

D. XI, 32-36; A. II, 30-32; P. 11-13; V. I, 3. Body slender and elongate; snout conical, mouth inferior; ventral fins very small; caudal fin emarginate. Two colour phases: yellowish brown with two narrow blue stripes arising from tip of snout, one from above eye and the

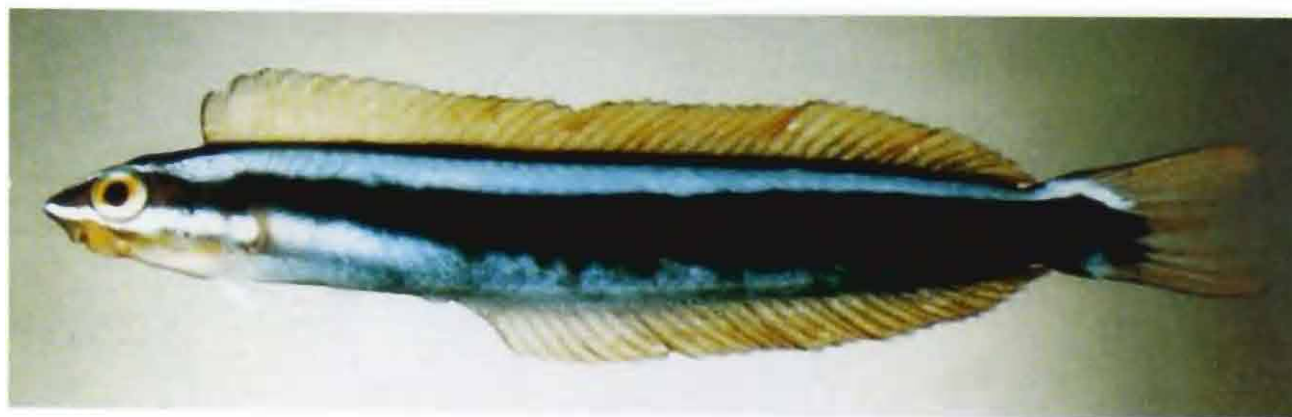


Fig. 622. *Plagiotremus rhinorhynchos*

other from below eye to base of caudal; dorsal and anal fins light yellow. Other phase dark brown with two broad blue stripes resembles the cleaner wrasse *Labroides dimidiatus*; median fins yellow. Attains 10 to 12 cm. Found in rich coral reef areas. Frequently encountered. Feeds on dermal tissues, mucous and scales of other fishes. Indo-Pacific.

561. *Plagiotremus tapeinosoma* (Bleeker, 1857)

Piano Fangblenny

D. VII-IX, 34-38; A. II, 28-32; P. 11-12; V. I, 3. Body slender and elongate; snout conical, mouth inferior; caudal fin slightly emarginate; ventral fins small but in males prolonged. Body bluish white; a black bar from snout passing through upper part of eye and ending in a narrow streak in middle of caudal fin, on body the stripe containing a series of vertically elongate black spots; back, above the stripe pale brown with a pale yellow line; lower part of head orange-yellow. Attains 12 cm. Found in coral reef areas. Not uncommon. Feeds on scales, mucous and skin tissues of other fishes. Indo-Pacific.



Fig. 623. *Plagiotremus tapeinosoma*

562. *Rhabdoblennius snowi* (Fowler, 1928)

Barredchin Blenny

D. XII, 18; A. II, 20; P. 14; V. I, 3. Snout and lips projecting beyond level of forehead; single long and slender canine on either side of labial teeth. Dorsal side of head and body



Fig. 624. *Rhabdoblennius snowi*

tan with irregular oblong vertical blotches on sides; a light narrow band extends from preopercle to throat; cheek and upper lip dark brown; a dark oval spot on opercle; five spots around posterior border of eye; three diagonal pale blue lines on head; a dark patch at base of middle caudal rays, lower third of caudal fin dark. Attains 8 to 9 cm. Found on rocky and outer reef areas. Common blenny. Indo-West Pacific.

563. *Salarias fasciatus* (Bloch, 1786)

Jewelled Rockskipper

D. XII, 18-20; A. II, 20-21; P. 14; V. I, 3. No crest on head in both sexes; dorsal fin not notched; lip margins smooth. Body olivaceous to light brown with numerous pale spots; dark streaks on anterior part of body and sides with faint dusky bands; dark edged bright blue spots on upper posterior part of body. Attains 14 cm. Found around shallow reef areas where algal growth is high. Common. Indo-West Pacific.

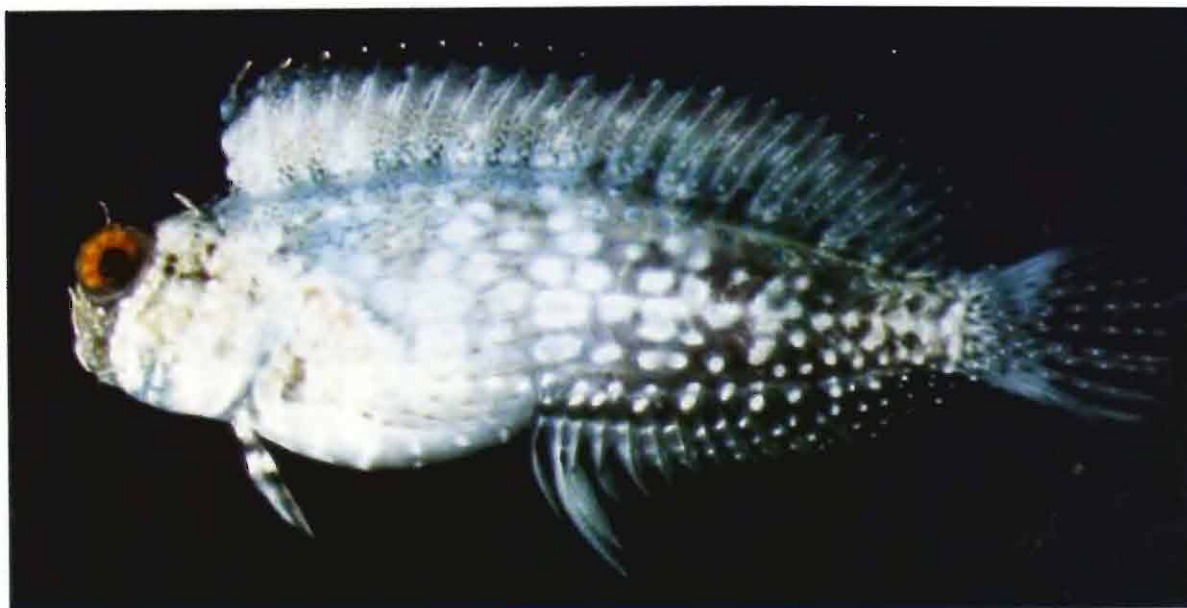


Fig. 625. *Salarias fasciatus*

564. *Xiphasia setifer* Swainson, 1839

Snake Blenny

D. XIII-XIV, 108-118; A. II, 112-119; P. 13; V. I, 3. Body extremely elongate and eel-like; a huge curved canine in front of lower jaw; dorsal fin originated slightly anterior to front edge of eye; dorsal and anal fins confluent with caudal fin; caudal fin rhomboid. Body light brownish yellow with 26 to 27 brown bars extending onto dorsal fin; a black spot distally between 5th and 6th and another diffuse elongate blotch between 10th and 14th dorsal rays; anal fin light yellow, dusky distally. Attains 40 cm. Found on sandy and coral rubble areas. Common blenny but difficult to encounter. Indo-West Pacific.

Family TRIPTERYGIIDAE

Triplefins

As they are very inconspicuous benthic reef inhabitants, studies on this group much neglected. Few species are reported from Andaman Islands. Small sized fishes. Dorsal fin in three parts, first two fins are spinous; ventral fin with one spine and two rays; jaws with conical teeth; body scales ctenoid; orbital tentacles present; lateral line incomplete. Many species are cryptic and is difficult to detect them in their habitats. Most of the species found in Indo-Pacific region. Found in weedy, coral rubble or on reefs in shallow waters. Usually feed on small invertebrates and algae.

Key to species

- 1a. Lateral line scales above 30; scales present on nape; orbital tentacles present; body yellowish with 7 irregular brown cross bands; 1st and 2nd dorsal and caudal fins dark at base..... *Enneapterygius fasciatus*
- 1b. Lateral line scales below 20; no scales on nape; no orbital tentacles; colour not as in 1a..... 2 (Genus *Helcogramma*)
- 2a. Upper 8 pectoral rays divided; space between anterior half of 2nd dorsal with scales; body reddish brown with dark punctulations*H. gymnauchen*
- 2b. Upper 9 to 10 pectoral rays divided; space below 2nd dorsal scaly; reddish brown with irregular spots and flecks; 5 double dark cross bars on sides; upper lip blackish.....
..... *H. trigloides*

565. *Enneapterygius fasciatus* (Weber, 1909)

Banded Triplefin

D. IV+XII+7-8; A. I, 18; P. 16; V. I, 2. Mouth oblique; caudal fin emarginate. Body light yellow with 7 irregular brown cross bands; head with reddish-brown bands and freckled; spinous dorsal fins dark at base, soft dorsal with there oblique reddish-brown bands; base of caudal fin dark. Attains 3 to 4 cm. Found on reefs. Extremely difficult to encounter. Indo-West Pacific.

566. *Helcogramma gymnauchen* (Weber, 1909)

Red-finned Triplefin

D. III+XII+9-10; A. I, 16-18; P. 15-16; V. 2. Mouth oblique, snout conical; caudal fin emarginate. Body white with irregular red bars and circles on sides; snout black; dorsal fins with broad red bands; other fins hyaline. Attains 4 cm. Found on coral rubble and reef areas. Not uncommon. Indo-Pacific.

567. *Helcogramma trigloides* Bleeker, 1858
Redspot Triplefin

D. III+XIII+10; A. I, 18-19; P. 15-16; V. I, 2. Mouth slightly oblique; anterior nostril with bilobed tentacle; caudal fin slightly rounded. Body pink, lower part of head with black dots extending onto base of pectorals; four dusky bars on sides of body; a red spot on first dorsal fin. Attains 4 to 5 cm. Inhabits coral stones and crevices where surf action is heavy. Indo-West Pacific.

Family CALLIONYMIDAE

Dragonets

Body elongate, head depressed and tail compressed; mouth small and protractile; preopercle with a stout spine; no scales on body; spinous and rayed dorsal fins separated, the spines very weak, no spines in anal fin; dorsal and anal fins very high; ventral fins widely separated and inserted before pectoral fins. Bottom dwelling fishes, found on mud, sand, weedy or coral rubble areas, spend much of the day buried in sand and hide. Feeds on small benthic invertebrates.

Key to species

- 1a. Last ray of ventral not connected by membrane to base of pectoral; opercle with a large pointed flap *Eleutherochir opercularis*
- 1b. Last ray of ventral connected by membrane to base of pectoral; opercle without a free flap 2
- 2a. Head and body much depressed; preopercular process with a spine at its base, directed forwards; snout equal to or longer than eye diameter; gill opening dorsal; soft dorsal fin rays unbranched 3 (Genus *Callionymus*)
- 2b. Body more or less cylindrical; preopercular process without spine; snout shorter than eye diameter; gill opening sublateral; soft dorsal fin rays branched 3 (Genus *Synchiropus*)
- 3a. Caudal fin pointed and very; 1st and 2nd dorsal spines close together and not detached from rest of the fin; smooth area behind eyes flanked by two conical ridged tubercles *C. japonicus*
- 3b. Caudal fin rounded in males, the middle two rays filamentous; 1st dorsal fin spine detached from rest of the fin; smooth area behind eyes with rugose area covered by a skin on each side *C. filamentosus*
- 4a. Preopercular spine with a single spinule on dorsal surface; whitish with irregular red blotches; 1st dorsal fin black with pale outer edge *S. stellatus*
- 4b. Preopercular spine with 2 to 5 spinules on dorsal surface; body orange brown with broad curved green bands, spots and dashes *S. splendidus*

568. *Callionymus filamentosus* Valenciennes, 1837**Blotchfin Dragonet**

D. I+III+9; A. 9; P. 18-20; V. I, 5. Interorbital space with bony ridge; preopercle spine straight with 4 to 6 barbs along its inner side; eyes close together situated near dorsal profile of head; caudal fin rounded; in males first dorsal fin spine become a long free filament and central caudal rays produced. Body light reddish brown with dark ringed spots on sides; fins spotted with dark brown; a black blotch on 3rd membrane of spinous dorsal; soft dorsal with a series of dark spots on rays. Attains 10 cm. Found on sandy bottom near reefs. Indo-West Pacific.

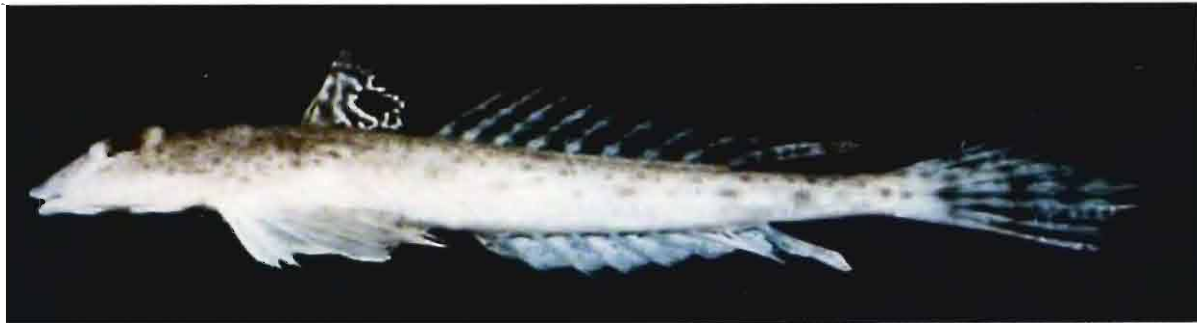


Fig. 626. *Callionymus filamentosus*

569. *Callionymus japonicus* Houttuyn, 1782**Longtail Dragonet**

D. IV, 9; A. 8; P. 16-19; V. I, 5. Body strongly compressed; mouth horizontal; interorbital region with a pair of bony tubercles; pre-opercular spine straight with 6 to 12 barbs along its inner side; first and second dorsal spines elongate and filamentous in males; caudal fin very long and pointed. Body yellowish brown above, lighter below with numerous light brown and white spots and lines, the brown spots forming distinct rows along sides; first dorsal dusky with oblique white narrow bars and a large black spot at upper posterior part

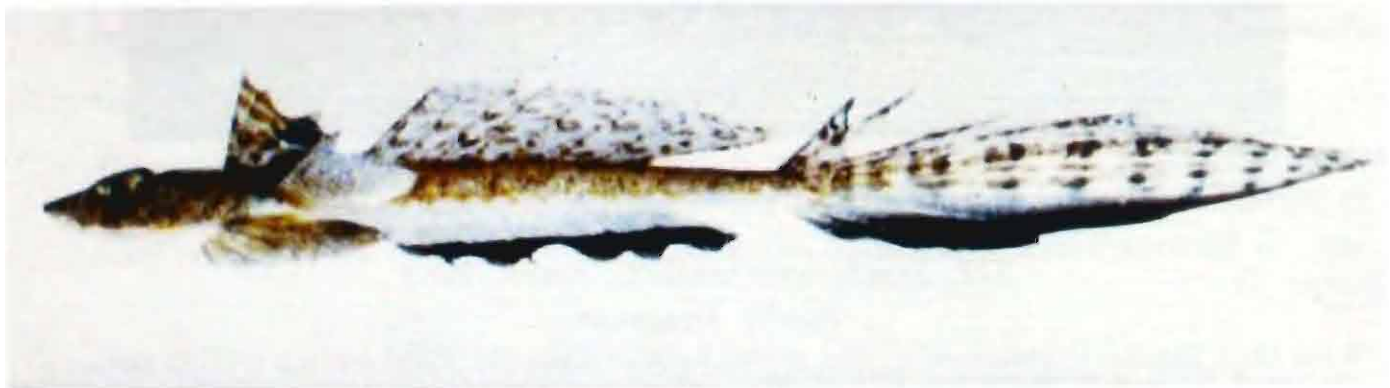


Fig. 627. *Callionymus japonicus*

of fin; second dorsal fin light yellow to hyaline with three longitudinal rows of dark spots; anal fin white at base and dark brown distally; caudal fin light yellowish brown with a dark lower border, upper half with large dark spots in transverse rows; pectoral fins hyaline; ventral fins white with light brown sots. Attains 20 to 22 cm. excluding caudal fin. Found in shallow to deeper waters of coral rubble and sandy bottom of reefs. Uncommon. Indo-Pacific.

570. *Eleutherochir opercularis* (Valenciennes, 1837)

Spotted Dragonet

D. IV, 9; A. 9; P. 22-24; V. I, 5. Head and body slightly depressed; preopercle spine curved with 3 to 5 spines along its upper border; caudal fin truncate. Body dark grey, belly white; nape and back with black spots; first dorsal black, second dorsal with black spots; anal and caudal fins dusky; ventral fins black. Attains 9 cm. Found in muddy and coral rubble areas. Indian Ocean from Andaman Islands to Philippines.

571. *Synchiropus splendidus* (Herre, 1927)

Mandarinfish

D. IV, 8-9; A. 6-8; P. 28-34; V. I, 5. Head flattened; eyes large; snout small; dorsal surface of pre-opercular spine with spinules; caudal fin slightly rounded. Body orangish brown with greenish broad elongate spots and curved bands; blue markings on head; margins of fins blue. Attains 5 to 6 cm. Found on coral reefs. Uncommon. Most beautiful aquarium fish. Indo-West Pacific.

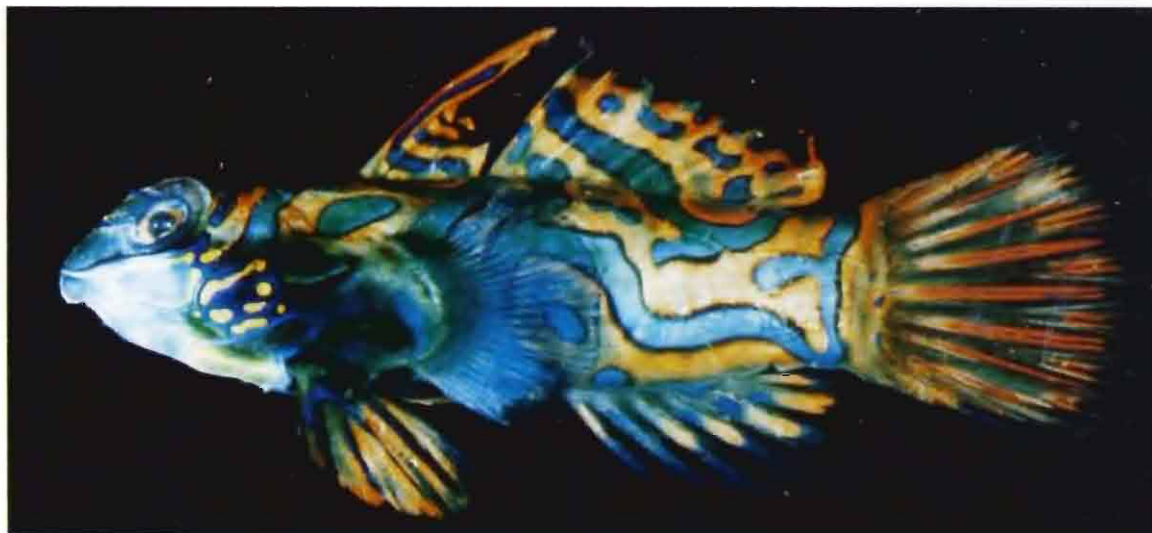


Fig. 628. *Synchiropus splendidus*

572. *Synchiropus stellatus* Smith, 1963

Starry Dragonet

D. IV, 8-9; A. 8-9; P. 20-24; V. I, 5. Head flattened, eyes large; pre-opercular spine with single spinule; caudal fin slightly rounded. First dorsal fin of males elevated. Body whitish

with irregular blotches and most of them are star shaped; fins with reddish spots arranged in rows; first dorsal fin black with pale edge. Attains 5 to 6 cm. Found on live coral beds in shallow waters. Not uncommon. Indo-West Pacific.

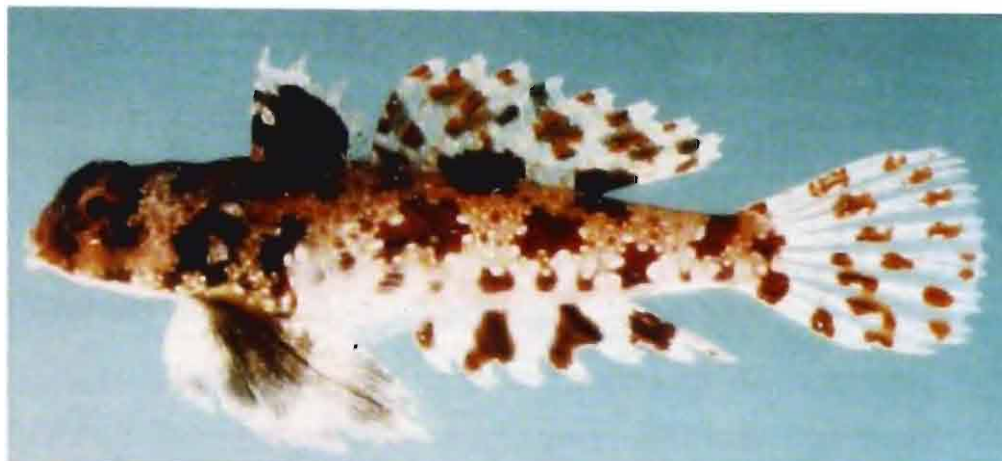


Fig. 629. *Synchiropus stellatus*

Family GOBIIDAE

Gobies

Largest family of marine fishes in the world. Fishes are small and elongate; body naked; head with mucus canals and open pores; barbels on head present or absent; usually with two dorsal fins; dorsal fin spines flexible; ventral fins separated, partly connected or united to form a disc; jaws with small conical teeth in several rows in jaws. Most of the gobies are bottom dwellers found in marine or estuarine habitats. Reef associated blennies live among branches of corals, crevices of coral rocks or coral rubble areas. Carnivorous, feed on small invertebrates and small fish. Some brilliantly coloured and are good aquarium pets. Due to their small size, gobies are not used for consumption. Many species poorly known from this region. Only better known and common species found on and close to reefs included here.

Key to species

- 1a. Body naked; ventral fins separated 2 (Genus *Gobiodon*)
- 1b. Body completely scaled; ventral fins fused or separated 4
- 2a. Three to four canine teeth on each side of lower jaw; dorsal fins equal; gill opening not extends below to before lower rays of pectoral fin;; bright yellow with vertical blue lines on head, one across base of pectoral fin; a blue spot above pectoral fin base..
..... *G. citrinus*
- 2b. One or two canine teeth on each side of lower jaw; first dorsal fin lower than second; gill opening extends below to before lower rays of pectoral fin or not; colour not as in 2a 3

- 3a. Lime green with violet bars on head; stripes, broken lines and spots on sides of body *C. histrio*
- 3b. Orangish black; head and anterior part of body with transverse bluish lines *G. quinquestrigatus*
- 4a. Barbels present on ventral surface of head 5
- 4b. No barbels on head 7
- 5a. Head rounded; opercle and cheek with scales; no horizontal folds on chin; large black spot dorsally on caudal fin and lower margin of fin black *Parachaeturichthys polynema*
- 5b. Head depressed; no scales on cheek and opercle; a horizontal fold on chin 6 (Genus *Gobiopsis*)
- 6a. Anterior and posterior temporal pores present; pectoral fin rays 20 or above; nasal pore anterior to posterior nostril *G. woodsi*
- 6b. Temporal pores absent; pectoral fin rays below 20; nasal pore behind posterior nostril *G. quinquecincta*
- 7a. Eyes elevated, without eyelid and deep sockets; dorsal fin with 11 to 17 spines; pectoral base elongate; mottled with dark brown with short silvery vertical lines and spots ... *Periophthalmus argenteolineatus*
- 7b. Eyes not elevated, no eyelids and deep sockets; dorsal fin with spines 6; pectoral fin base short 8
- 8a. First spine of 1st and 2nd dorsal fins stiff and thickened; preopercle with 1 to 3 flat spines 9 (Genus *Oplopomus*)
- 8b. All dorsal fin spines thin and flexible 10
- 9a. Cheek and opercle naked; 4th and 5th spine of 1st dorsal filiform; head and body with numerous small pale blue and orange spots; brownish blotches on sides of body ... *O. oplopomus*
- 9b. Cheek and opercle scaled; no spine or ray in dorsal fins filiform; sides of body with blackish pearl-like spots; base of anal fins and posterior part of caudal fin violet; base of caudal fin with 3 large blackish spots *O. caninoides*
- 10a. Preopercle with 1 to 9 spines; body black with numerous light spots and short vertical bars dorsally *Asterropteryx semipunctatus*
- 10b. Preopercle without spines 11
- 11a. Cheek with vertical prominent flaps; caudal fin lunate; reddish green with 3 to 4 indistinct transverse stripes *Callogobius hasseltii*

- 11b. Cheek without raised flaps; colour not as in 11a 12
- 12a. Cheek with large scales; upper jaw teeth directed medially; anterior interorbital pore pointed; reddish green; a prominent large black spot at middle base of caudal fin ..
.....*Acentrogobius baliurus*
- 12b. Cheek naked; teeth at sides of jaws vertical or directed posteriorly; colour not as in 12a 13
- 13a. Ventral fins thick, with fleshy lobes at tips of spines 14
- 13b. Ventral fins thin, without fleshy lobes 15
- 14a. Upper pectoral rays free, silk-like; chin with transverse or curved mental frenum; cheek bulbous; brownish with black mottlings and blue dots.....
..... *Bathygobius fuscus*
- 14b. Upper pectoral rays not free; chin without a mental frenum; head rounded; ventral surface with numerous small bumps; head and nape with numerous bristles; head reddish orange with bluish spots, rest of body and fins black
.....*Paragobiodon echinocephalus*
- 15a. Head pores absent; small size fishes, not greater than 50 mm; reddish brown; 7 or 8 pale dark edged bars on head and anterior part of body*Priolepis semidoliatus*
- 15b. Head pores present; colour not as in 15a 16
- 16a. Ventral completely separate; white with two pale red stripes connected by narrow red bars on sides; small blue spots on cheek and opercle *Valenciennesa sexguttata*
- 16b. Ventral partly or completely connected 17
- 17a. Gill opening extending to below rear margin of preopercle; head with blue spots; body with irregular cross bars*Mahidolia mystacina*
- 17b. Gill opening restricted to pectoral base or slightly below; colour not as in 17a.
..... 18
- 18a. Dorsal fin rays 13 to 15; upper gill arch with finger-like projections; 10 to 15 short vertical papillae rows under eye; operculum dorsally with several scales
..... 19 (Genus *Amblygobius*)
- 18b. Dorsal fin rays 7 to 15; upper gill arch without finger-like projections; 4 to 6 long vertical papillae rows under eye; operculum dorsally with one scale or naked 20
- 19a. Lateral line scales above 70; predorsal scales 40; body with 2 to 3 longitudinal bands; no dark spot above pectoral base *A. bynoensis*

- 19b. Lateral line scales below 55; predorsal scales 30; body with transverse bands; a distinct black spot above pectoral base *A. albimaculatus*
- 20a. Mouth small almost horizontal; snout broadly rounded; predorsal scales 6 to 9, reaching eyes 21 (Genus *Istigobius*)
- 20b. Mouth small to large, oblique; snout gently or steeply sloping; predorsal scales up to 20 22
- 21a. Upper pectoral rays free, silk-like; no enlarged curved tooth laterally in lower jaw; predorsal scales 9 to 12; body laterally with rectangular black longitudinal spots
..... *I. ornatus*
- 21b. Upper pectoral rays not free; an enlarged tooth laterally in outer row of lower jaw; predorsal scales 8; body laterally with golden transverse bands *I. goldmanni*
- 22a. Predorsal naked; head naked; out-wardly curved elongate tooth at each side of lower jaw; upper head and body with irregular large black spots; mid-lateral body with 3 large black spots *Yongeichthys criniger*
- 22b. Predorsal scaled; head scaled; rudimentary teeth at each side of lower jaw; sides of body with 7 to 8 diffuse transverse stripes *Exyrias puntang*

573. *Acentrogobius baliurus* (Valenciennes, 1837)

Threespotted Goby

D. VI+I, 10; A. I, 9; P. 17; V. I, 5; Ls. 28. Small fishes. Body reddish green above, greenish below; 3 dark spots laterally on body; fins yellowish; dark brown spot at base of caudal fin. Attains 5 to 6 cm. Very common goby found on sandy bottoms of reefs.

574. *Amblygobius albimaculatus* (Ruppell, 1830)

Butterfly Goby

D. VI+I, 14-15; A. I, 13-14; P. 19-21; V. I, 5; LS. 48-52. Small sized fishes. Middle spine of first dorsal fin long; posteriorly pointing canine teeth on lateral side of lower jaw; snout



Fig. 630. *Amblygobius albimaculatus*

overhangs upper lip; body scales ctenoid. Body light green above, yellowish below; head reddish, nape and head with a row of violet edged yellow spots; five transverse dark bands on sides of body; a brown spot above pectoral fin base; caudal fin*with a black spot on upper base and small black spots at upper and lower sides; dorsal fin orange to red; other fins light yellow. Attains 12 cm. Found on sandy bottoms of coral reef areas in shallow waters. Indo-West Pacific.

575. *Amblygobius bynoensis* (Richardson, 1844)

Banded Goby

D. VI+I, 14-15; A. I, 12-13; P. 20-21; V. I, 5; Ls. 45-50. Body olive with two lateral longitudinal dark bands, the upper one from snout through eye and the lower one from pectoral base to base of caudal peduncle ending in a black spot; 10 to 12 dark cross-bands on body not reaching belly; two oblique red stripes on lower part of head and few red spots on sides of head; dorsal fin with broad yellow submarginal band and red vermiculations; other fins yellowish green. Attains 10 cm. Found on sandy bottoms adjacent to reefs. From Andaman Islands to Australia.



Fig. 631. *Amblygobius bynoensis*

576. *Asterropteryx semipunctatus* Ruppell, 1830

Starry Goby

D. VI+I, 10-11; A. I, 9-10; P. 17-18; V. I, 5; Ls. 23-24. Snout blunt; pre-operculum with short spine; ventral fins not connected; 3rd dorsal spine filamentous; caudal fin rounded. Body brown or bright dark olive-green, brilliant blue spots on mid-side of body and head in

horizontal rows; small dark saddles dorsally; anal fin with blue dots. Attains 5 to 6 cm. Found on sandy rubble, dead coral and silt bottoms in shallow waters. Indo-Pacific.



Fig. 632. *Asterropteryx semipunctatus*

577. *Bathygobius fuscus* (Ruppell, 1830)

Duskyfrill Goby

D. VI+I, -10; A. I, 8-9; P. 17-18; V. I, 5; Ls. 30-33. Head slightly rounded; lips thick. Body dusky; bluish white spots scattered on head and body; sides of body with faint blotches extending ventrally; dorsal and caudal fins dark with dusky markings; pectoral and anal fins light without spots. Attains 10 cm. Found in creeks, tide pools and rocky shores, rests motionless for long periods on bottom. Indo-Pacific.



Fig. 633. *Bathygobius fuscus*

578. *Callogobius hasseltii* (Bleeker, 1851)

Blackspot Goby

D. VI+I, 10; A. I, 8; P. 18; V. I, 5; Ls. 23-28. Small fishes. Lower jaw prominent; head with small papillae; tips of pectoral fin reaching beyond origin of anal fin; caudal fin lanceolate.

Body reddish green above, lighter below with three indistinct transverse bands; all fins yellow and with transverse stripes except caudal fin; small black spot on upper part of caudal fin. Attains 6 cm. Found on coral reefs and tide pools in shallow waters. Indo-West Pacific.

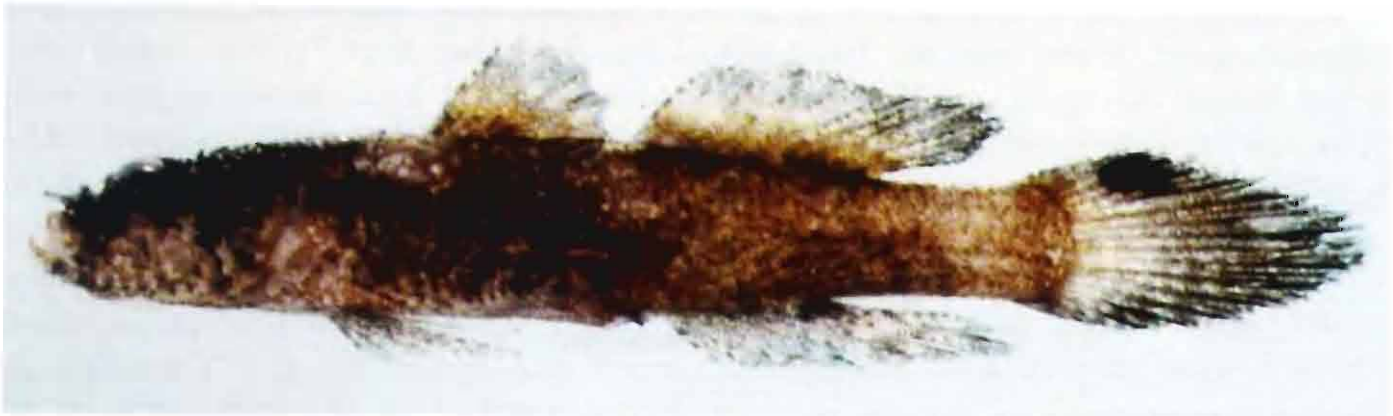


Fig. 634. *Callogobius hasseltii*

579. *Exyrias puntang* (Bleeker, 1851)

Stripefinned Goby

D. VI+I, 10; A. I, 9-10; P. 17-18; V. I, 5; Ls. 30-32. Body elongate, mouth inferior; pectoral fins united into a cup-like disc; anterior dorsal spines filamentous. Body dark brown, light ventrally; small red spots on antero-dorsal side of body and small silvery white spots on posterior part of body; dorsal fin with alternating purple and yellow stripes; anal fin yellow, blackish medially with two red stripes; dusky spot on pectoral fin; ventral fin blackish. Attains 13 cm. Found in creeks, along sandy fringe of coral bommies. Indo-West Pacific.

580. *Gobiodon citrinus* (Ruppell, 1838)

Yellow Coralgoby

D. VI+I, 10; A. I, 8-9; P. 18-20; V. I, 5. No scales on body, skin granular; lips thin; ventral fins small; front of first dorsal fin elevated. Body and fins yellow with two vertical blue lines below eye; one blue line from nape to edge of opercle and another blue line across pectoral fin base; a small blue spot above pectoral base. Attains 5 to 6 cm. Good aquarium object. Found among live-branched corals in small groups. Indo-West Pacific.



Fig. 635. *Gobiodon citrinus*

581. *Gobiodon histrio* (Valenciennes, 1837)**Barred Coralgoby**

D. VI+I, 10; A. I, 9; P. 21; V. I, 5. No scales on body; caudal fin rounded. Body yellowish green, lower sides and basal part of fins light blue; 6 to 7 violet stripes, some stripes broken into spots on sides; sides of head with 4 to 5 broad brown to light violet bands; all fins light green. Attains 3 to 4 cm. Found among branches of live *Acropora* corals. Indo-West Pacific.

582. *Gobiodon quinquesrigatus* (Valenciennes, 1837)**Fivebar Coralgoby**

D. VI+I, 10-11; A. I, 8-9; P. 19; V. I, 5. Small fishes. Head rounded; caudal fin rounded; no scales on body; lips thick. Body and fins reddish black; head reddish with five bright blue vertical stripes. Body colour much variable. Some may be uniform reddish brown or grey. Attains 5 cm. Found among branched corals. Good aquarium pets. Indo-West Pacific.

583. *Gobiopsis quinquecincta* (Smith, 1931)**Saddled Goby**

D. VI+I, 10; A. I, 8; P. 15-18; V. I, 5; Ls. 32-34. Small fishes. Head broad and depressed; ventral fins fused to form a disc; 4 to 5 barbels on anterior cheek tuft. Body white with a dark broad head band behind eyes descends laterally to the lower preopercle; four wide saddles on trunk slightly descending to lower sides; base of caudal fin with dark bar. Attains 6 to 7 cm. Found on sandy bottom near coral rubble. Indo-West Pacific.



Fig. 636. *Gobiopsis quinquecincta*

584. *Gobiopsis woodsi* Lachner & Mc Kinney, 1978**Mottled Goby**

D. VI+I, 10; A. I, 9; P. 20; V. I, 5; Ls. 36. Head broad and depressed. 4 to 5 barbels on anterior cheek tuft. Body mottled with white and dark brown markings dorsally and laterally; ventral side of head and belly light; base of caudal fin with irregular spot; base of pectoral fin

with large whitish areas; soft dorsal with five brownish cross bars; anal fin mottled light and brown. Attains 5 to 6 cm. Found on sandy bottom near coral rubble. Indian Ocean.

585. *Istigobius goldmanni* Bleeker, 1852

Blackspotted Goby

D. VI+I, 10; A. I, 9; P. 17-18; V. I, 5; Ls. 27-30. Body moderately elongate, anterior part cylindrical while posterior part compressed; lips thick. Body olivaceous and lighter below; numerous black spots on dorsum; dusky bars on abdomen; a prominent black line on cheek; a row of black blotches basally on first dorsal fin membrane; second dorsal with three rows of black spots; anal fin with a row of black spots; caudal fin with small scattered black spots; ventral fins dusky. Attains 6 to 8 cm. Found around coral reefs on sandy bottom. Indo-West Pacific.

586. *Istigobius ornatus* (Ruppell, 1830)

Ornate Goby

D. VI+I, 10; A. I, 9; P. 18-19; V. I, 5; Ls. 29-30. Body pale greyish yellow with three rows of small white spots; mid side of body with 7 to 8 rectangular black spots; two narrow brown longitudinal lines dorsally on body; ventro-lateral side with eight large black spots in horizontal line; dorsal and caudal fin with small black spots. Attains 9 to 10 cm. Found on coral rubble areas. Indo-West Pacific.



Fig. 637. *Istigobius ornatus*

587. *Mahidolia mystacina* (Valenciennes, 1837)

Coral Goby

D. VI+I, 10; A. I, 9; P. 16; V. I, 5; Ls. 39. Head compressed, mouth large; no scales on head; posterior rays of dorsal and anal fins prolonged, reaching caudal fin; ventral fins fused to form a cup. Body light yellowish brown with 6 to 8 slightly oblique cross bars; head with small blue spots; tip of first dorsal black; pectoral fin dark; anal, caudal and ventral fins

light yellow; anal fin margin with pale band. Attains 6 to 8 cm. Found on coral rubble areas near reefs. Indo-West Pacific.

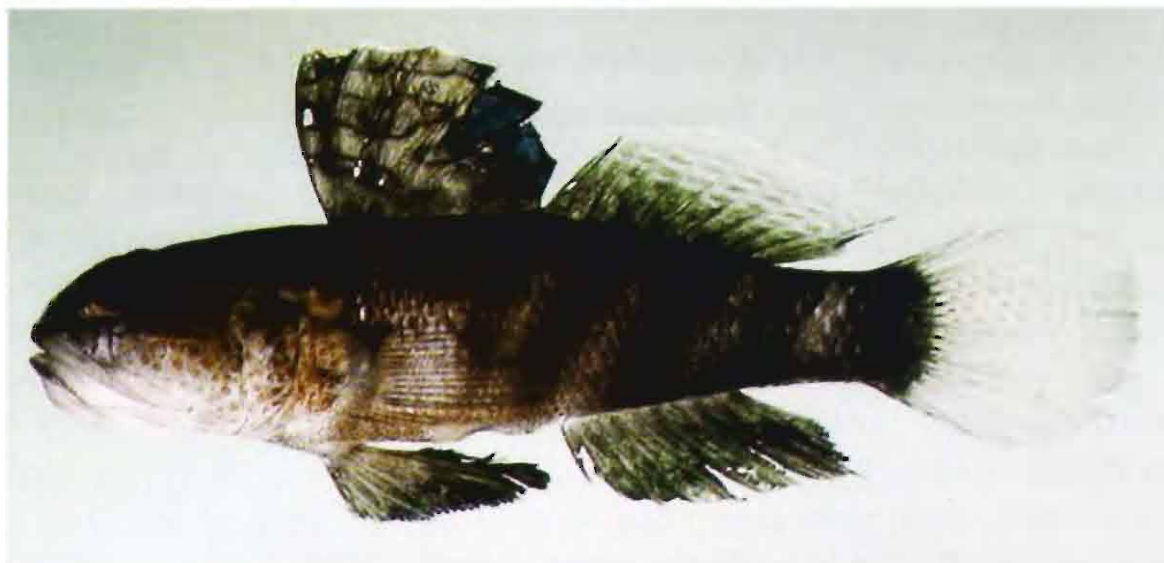


Fig. 638. *Mahidolia mystacina*

588. *Oplopomus caninoides* (Bleeker, 1852)

Pearl Goby

D. VI+I, 10; A. I, 10; P. 17-19; V. I, 5; Ls. 29-30. Preopercle with 1 or 2 flat spines; first ray of 1st and 2nd dorsal fins pungent. Body reddish brown with pearl-like spots on lateral sides; dorsal and caudal fins with row of dark spots. Attains 9 to 10 cm. Found on sandy areas and coral rubble. Indo-West Pacific.

589. *Oplopomus oplopomus* (Valenciennes, 1837)

Spinecheek Goby

D. VI+I, 10; A. I, 10; P. 18-19; V. I, 5; Ls. 24-26. Preopercle with two flat spines; first spine of first dorsal fin stiff and the 4th and 5th spines longest. Body white with a row of 4 or 5 brownish blotches along mid-lateral side and a row of small blotches along back side; head and body with numerous small pale blue and orange spots; elongate blue streaks on cheek; mid rays of caudal fin with orange streaks. Attains 8 to 10 cm. Found in sandy and coral rubble areas. Indo-West Pacific.

590. *Parachaeturichthys polynema* (Bleeker, 1853)

Taileyed Goby

D. VI+I, 10-11; A. I, 9-10; P. 20; V. I, 5; Ls. 25-29. Numerous barbels on ventral side of head; caudal fin longer than head. Body greenish above, lighter below; upper base of

caudal fin with a large black spot surrounded by yellow; all fins dusky. Attains 15 cm. Found on coral rubble and bays in shallow waters. Indo-West Pacific.



Fig. 639. *Parachaeturichthys polynema*

591. *Paragobiodon echinocephalus* (Ruppell, 1830)
Redhead Goby

D. VI+I, 9; A. I, 9; P. 20-22; V. I, 5. Body oval, scaled and compressed; no scales on head and nape but with numerous bristles; caudal fin rounded; pectoral fins large and rounded. Body and fins black to brownish, head reddish orange with small bluish spots. Attains 3 to 4 cm. Found among live-branched corals. Not uncommon. Indo-West Pacific.

592. *Priolepis semidoliatus* (Valenciennes, 1837)
Girdled Goby

D. VI+I, 8; A. I, 7; P. 16-17; V. I, 5; Ls. 27-28. Very small sized fishes. Head broad, lower jaw prominent; anterior part of body up to first dorsal fin naked; ventral fins united. Body light reddish brown with 7 to 8 pale cross bars edged with dark brown on head and anterior part of body; fins uniform light orange yellow. Attains 6 cm. Found under coral stones in reef areas. Indo-Pacific.



Fig. 640. *Priolepis semidoliatus*

593. *Valenciennesa sexguttata* Valenciennes, 1837
Blue-cheeked Sleeper

D. VI+I, 12; A. I, 12; P. 20; V. I, 5; Ls. 88-89. Body slightly elongate; dorsal fin separated; caudal fin obtuse. Body yellowish-white, light ventrally; 7 to 9 blue spots on sides

of head; all fins light yellow; first dorsal fin with small violet spots; inner side of mouth black. Attains 9 to 10 cm. Found on coral rubble or muddy bottom of the reefs. Common. Indo-West Pacific.



Fig. 641. *Valenciennea sexguttata*

594. *Yongeichthys criniger* (Valenciennes, 1837)

Shadow Goby

D. VI+I, 9; A. I, 9; P. 18-19; V. I, 5; Ls. 28-30. Body scales large and ctenoid; head naked; enlarged curved tooth on each side of lower jaw; second spine of first dorsal fin prolonged; caudal fin obtuse. Body orange-green above, lighter below; head and body with irregular large black spots; a mid-lateral row of three large blackish spots on sides of body, the last spot at base of caudal fin; dorsal and caudal fins with irregular black spots. Attains 10 to 12 cm. Found on silt-sand areas of the reef flats and creeks. Indo-West Pacific.

Family MICRODESMIDAE

Dartfishes

Body slender and very elongate; mouth oblique; scales cycloid, small and embedded; lower jaw protruding; lateral line absent; dorsal fin divided; fin spines flexible; caudal fin emarginate. Inhabits sand or mud bottom, when disturbed immediately take refuge in burrows. Some species found around reefs and adjacent areas. Zooplankton feeders.

Key to species

- 1a. Caudal fin slightly rounded with 2 to 6 long trailing filaments *Ptereleotris hanae*
- 1b. Caudal fin emarginated, no filaments 2
- 2a. Dorsal rays 29 to 33; anal rays 27 to 30; corners of caudal fin rounded; horizontally elongate dusky black spot in caudal fin *P. heteropterus*
- 2b. Dorsal rays 23 to 29; anal rays 23 to 27; corner of caudal fin not rounded; no black spot in caudal fin 3
- 3a. Anterior part of dorsal and anal fins elevated; second dorsal and anal fins blackish; caudal fin white, the lobes broadly reddish black *P. evides*
- 3b. Dorsal and anal fins not elevated; fins whitish; two pale orange lines posteriorly on sides of body; blue edged black bar on lower half of pectoral fin *P. microlepis*

595. *Ptereleotris evides* (Jordan & Hubbs, 1925)

Tow-tone Dartfish

D. VI-I, 23-25; A. I, 22-25; P. 2-24; V. I, 4. Body elongate and slender; chin without barbels; anterior part of second dorsal and anal fins elevated; caudal fin elongate. Body light



Fig. 642. *Ptereleotris evides*

bluish-grey, gradually shading black to posteriorly; blue spots and lines on operculum; second dorsal and anal fins bluish black, margins thick black; caudal fin white, lobes broadly blackish red. Attains 12 cm. Found in pairs around shallow coral reef areas. Not uncommon. Good aquarium pet. Indo-Pacific.

596. *Ptereleotris hanae* (Jordan & Snyder, 1901)

Threadfin Dartfish

D. VI-I, 24-26; A. I, 23-25; P. 21-23; I, 4. Body slender and elongate; lower jaw projecting; chin with small median barbels; scales small, head and nape naked; caudal fin truncated; upper and lower rays produced into filaments. Colour light blue, lower side with a broad dark blue band contains light pink narrow band. Attains 10 cm. Found on coral rubble or sand bottom of reefs in shallow waters. Not uncommon. Good aquarium fish. Indo-West Pacific.

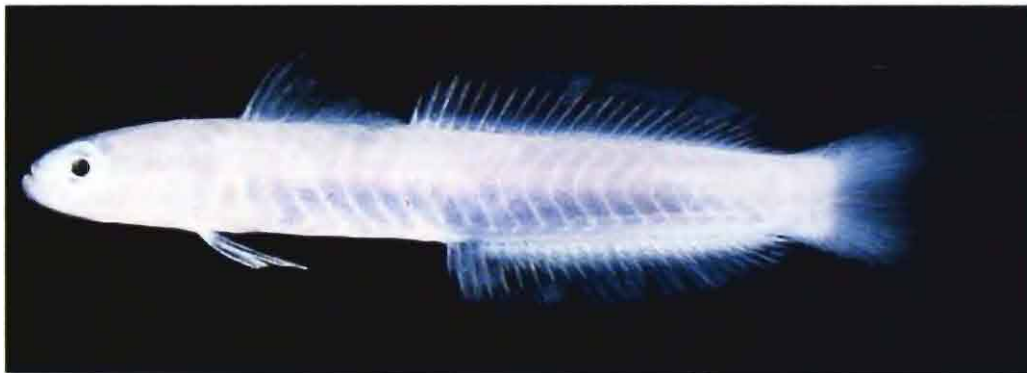


Fig. 643. *Ptereleotris hanae*

597. *Ptereleotris heteroptera* (Bleeker, 1855)

Spot-tailed Dartfish

D. VI-I, 29-33; A. I, 28-30; P. 21-24; V. I, 4. Body elongate and slightly compressed; no barbels on chin; mouth oblique; caudal fin emarginate. Body and fins bluish; caudal fin light yellow with a broad black blotch in middle; a narrow pink bar at base of pectoral fin. Attains 10 to 11 cm. Found on coral rubble or sand bottoms of reefs in moderately deep waters. Uncommon. Good aquarium fish.



Fig. 644. *Ptereleotris heteroptera*

598. *Ptereleotris microlepis* Bleeker, 1856**Pale Dartfish**

D. VI-I, 25; A. I, 24-26; P. 22-24; V. I, 4. Body elongate and compressed; no barbels on chin; head and median part of head naked; caudal fin slightly emarginate. Body bluish-green above, pearly red ventrally; two faint orange lines on posterior side of body; lower half of pectoral fin base with blue edged narrow black bar; snout and cheek with narrow blue lines. Attains 10 cm. Found on sand and coral reef areas. Not uncommon. Good aquarium pet. Indo-Pacific.



Fig. 645. *Ptereleotris microlepis*

Family ACANTHURIDAE

Surgeon Fishes

One of the most common fishes found on reefs. Body ovate to oblong and compressed; dorsal profile of head steep; eyes high on head; teeth in jaws spatulate with denticulated edges or slender, numerous with expanded incurved tips; no teeth on palate; sides of body with a sharp scalpel-like spine which folds into a groove; dorsal fin continuous; scales very small, ctenoid. Generally found in small schools. Benthic algal feeders, but some detritus feeders and few species feeds on zooplankton also. They forage during daytime and take shelter at night in caves or reef crevices. Edible fishes, larger species have some economic value. They are inhabitants of shallow rocky and coral reefs. They can inflict painful wounds with the scalpel-like caudal spine if handled carelessly.

Key to species

- 1a. One or two immovable bony plates often keeled on sides of caudal peduncle 2 (Genus *Naso*)
- 1b. Single sharp erective antrose spine on sides of caudal peduncle present or absent.... 7
- 2a. Forehead without any horn or protuberance; peduncular plates and keels bright orange; *N. lituratus*
- 2b. Forehead with or without protuberance or horn; colour of peduncular plates not as in 2a 3
- 3a. Forehead with tapering horn 4
- 3b. Forehead without any horn like structure 6
- 4a. Horn extending more than half a head length in front of mouth; caudal fin truncate or slightly rounded, with or without filamentous lobes; caudal peduncular plates and spines not blue 5
- 4b. Horn extending up to the level of eye but not up to front of mouth; caudal fin truncate with filamentous lobes; peduncular plates and spines blue *N. unicornis*
- 5a. Adults with a long tapering bony horn as much as head length in front of mouth; keel on caudal peduncle knife-like; some times caudal fin with filament from each corner; body brownish with dark markings; caudal fin with white posterior border *N. annulatus*
- 5b. Adults with a broad based bony horn extending more than ½ of head length in front of head; keels on caudal peduncle moderately developed; no filaments from caudal fin; body olivaceous brown with vertical lines and dark spots on sides; caudal fin whitish *N. brevirostris*

- 6a. Adults with a prominent convexity on forehead at level of lower edge of eye; caudal fin of adults with a long filament at each corner; dorsal fin elevated; body brown with vertical blue lines *N. vlamingii*
- 6b. Dorsal and ventral profiles of head equally convex; caudal fin corners without filaments; body bluish grey dorsally and shading ventrally to yellowish; tongue black
..... *N. hexacanthus*
- 7a. Dorsal fin with 4-5 spines and 19-20 rays, anal fin rays 19-20; body brilliant blue with a large black area on upper part of body *Paracanthurus hepatus*
- 7b. Dorsal fin with 4-9 spines and 22-33 rays, anal fin rays 19-26; colour not as in 7a 8
- 8a. Dorsal and anal fins very elevated; snout pointed 9 (Genus *Zebrasoma*)
- 8b. Dorsal and anal fins not elevated; snout not pointed 10
- 9a. Dorsal and anal fins very elevated; body with alternating broad dark brown and narrow white bars *Z. veliferum*
- 9b. Dorsal and anal fins not much elevated; body dark yellowish brown with longitudinal narrow blue lines and spots on nape, head and chest *Z. scopas*
- 10a. Teeth fixed, denticulate on both margins 11 (Genus *Acanthurus*)
- 10b. Teeth flexible, slender with incurved tips; body dark brown with blue longitudinal lines; orange-yellow dots on head and nape *Ctenochaetus striatus*
- 11a. Body pale with vertical black bars; caudal truncate or slightly emarginated; caudal spine small *A. triostegus*
- 11b. Body not pale and no black bars; caudal fin emarginated or lunate; caudal spine not very small 12
- 12a. Caudal fin emarginated; body bright blue, chest crossed by a broad white band; head black; caudal fin black and white *A. leucosternon*
- 12b. Caudal fin strongly lunate; body colour not as in 12a 13
- 13a. Dorsal profile of head convex; body uniformly dark brown without any bands or lines 14
- 13b. Dorsal profile of head slightly convex or not; body with irregular or straight lines or bands 15
- 14a. Body dark brown, a horizontal black band passing posteriorly from upper end of gill opening; caudal fin brown with a white bar across base *A. nigricauda*

- 14b. Body olive brown; axil of pectoral fin with a large dark brown spot; caudal fin white *A. thompsoni*
- 15a. Body with blue or brownish irregular longitudinal lines 16
- 15b. Body with blue stripes edged in black alternating with yellow stripes *A. lineatus*
- 16a. Ground colour of body grey or brown; caudal spine black 17
- 16b. Ground colour of body yellowish brown with irregular longitudinal blue lines; caudal spine white *A. dussumieri*
- 17a. Body dark brown with slightly wavy blue lines on head and body *A. mata*
- 17b. Body purplish grey or light blue grey with highly irregular dark grey lines *A. xanthopterus*

599. *Acanthurus dussumieri* Valenciennes, 1835

Eyestripe Surgeon

D. IX, 25-26; A. III, 24-25; P. 17; V. I, 5. Body slightly deep, forehead strongly convex; sides of caudal peduncle with sharp and large spine; caudal fin lunate. Body yellowish brown with narrow irregular longitudinal blue lines; head with blue spots and lines; opercular membrane black; interorbital space with a broad yellow band; caudal spine black; dorsal and anal fins yellow, margin and base with blue band; caudal fin blue with small black spots and its base yellow; upper half of pectoral fin yellow. Attains 50 cm. Found on reef slopes in deeper waters. Uncommon. Feeds on zooplankton. Good aquarium object. Indo-Pacific.



Fig. 646. *Acanthurus dussumieri*

600. *Acanthurus leucosternon* Bennett, 1833**Powder-blue Surgeon**

D. IX, 28-29; A. III, 24-28; P. 15-16; V. I, 5. Body almost ovate; dorsal profile of snout concave; caudal fin emarginate. Body bright blue, chest crossed by broad white band; head black; dorsal fin yellowish, margin white; caudal peduncle and peduncular spine yellow; caudal fin black with broad crescent white patch in middle; pectoral fins yellow; anal and ventral fins grey, its edges white. Attains 20 to 25 cm. One of the beautiful coral reef fishes found on outer reef areas and reef slopes. Usually found in pairs or sometimes seen in large aggregations. Common species. A popular aquarium fish. Indian Ocean.



Fig. 647. *Acanthurus leucosternon*

601. *Acanthurus lineatus* (Linnaeus, 1758)**Bluestriped Surgeon**

D. IX, 27-29; A. III, 25-27; P. 16; V. I, 5. Body slightly oblong; caudal spine long; caudal fin is lunate. Upper three fourths of head and body with alternate black edged blue and yellow



Fig. 648. *Acanthurus lineatus*

bands, lower fourth of body light lavender colour; dorsal and anal fins dark blue; caudal fin bluish with a broad black area at base; pectoral fins hyaline; ventral fins yellowish orange. Attains 35 cm. Found in turbulent outer reef areas in small groups. Common, found abundant. Very active and agile fish. Food fish. Its caudal spine venomous and inflicts painful wounds. Good aquarium pet. Indo-Pacific.

602. *Acanthurus mata* Cuvier, 1829
Elongate Surgeon

D. IX, 24-26; A. III, 23-24; P. 16; V. I, 5. Body elongate and slightly deep; dorsal profile of head gradually sloping to snout; mouth small; caudal fin lunate. Dark brown with narrow longitudinal blue lines on head and body; a yellow area behind eye, two yellow bands radiating anteriorly from eye. Capable of change its colour to overall pale blue. Attains 50 cm. Found in reef areas where waters are turbid. Occasionally found in schools. Common species. Feeds on zooplankton. Indo-Pacific.



Fig. 649. *Acanthurus mata*

603. *Acanthurus nigricauda* Duncker & Mohr, 1929
Blackstreak Surgeon

D. IX, 25-28; A. III, 24-26; P. 16-17; V. I, 5. Body ovate and slightly deep; dorsal profile of head convex; caudal spine sharp and long; caudal fin strongly lunate. Body, head and fins



Fig. 650. *Acanthurus nigricauda*

dark brown with a horizontal black band passing posteriorly from upper end of operculum; a lanceolate black line extending along caudal spine; base of caudal fin with white bar; outer part of pectoral fin pale. Attains 35 to 40 cm. Found on sandy bottom near coral reefs and protected reefs. Not uncommon. Indo-Pacific.

604. *Acanthurus thompsoni* (Fowler, 1923)

Thompson's Surgeon

D. IX, 23-25; A. III, 23-25; P. 17; V. I,5. Body slightly elongate and compressed; mouth small, snout short; dorsal profile of head smoothly convex; caudal fin lunate. Body uniform chocolate brown; caudal fin white. Capable of rapidly changes its colour to light bluish grey. Attains 25 cm. Found on outer reef areas. Uncommon. Feeds on zooplankton. Good aquarium pet. Indo-Pacific.

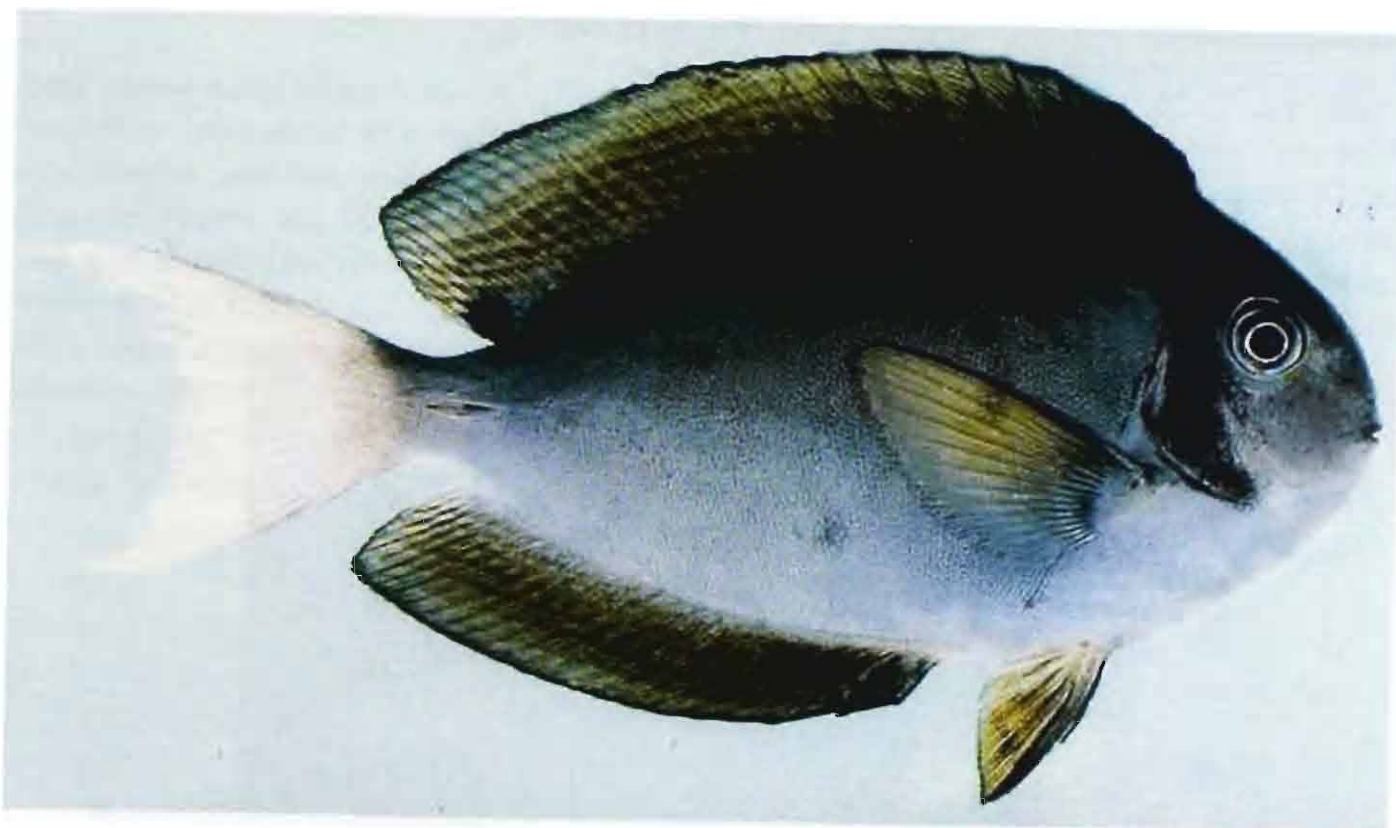


Fig. 651. *Acanthurus nigricauda*

605. *Acanthurus triostegus* (Linnaeus, 1758)

Convict Surgeon

D. IX, 22-24; A. III, 20-22; P. 14-16; V. I, 5. Body ovate; caudal fin emarginate; caudal spine small. Colour light greenish grey with six narrow black bars on head and body. Attains

25 cm. Found around inshore reef areas and tide pools. Food fish. Very common and found abundant. Occasionally seen in large aggregations. Feeds on algae. Indo-Pacific.



Fig. 652. *Acanthurus triostegus*

606. *Acanthurus xanthopterus* Valenciennes, 1835
Yellowfin Surgeon

D. IX, 25-26; A. III, 23-24; P. 16; V. I, 5. Caudal fin lunate; caudal spine small. Body blue grey with irregular dark grey lines on body; a dull yellow area behind and in front of eye; caudal fin bluish grey; dorsal and anal fins with alternate yellow and blue stripes; outer third of pectoral yellow. The largest of the surgeonfishes, attains 50 cm. Found on sandy areas adjacent to reefs and in protected bays and lagoons. Common and found abundant. Good food fish. Indo-Pacific.



Fig. 653. *Acanthurus xanthopterus*

607. *Ctenochaetus striatus* (Quoy & Gaimard, 1825)
Lined Bristletooth Surgeon

D. VIII, 29-30; A. III, 25-26; P. 16-17; V. I, 5. Body slightly ovate; teeth movable and comb-like; caudal fin lunate. Body dark brown with numerous narrow blue longitudinal lines;

head with small orange red dots dorsally; dorsal and anal fins with 4 or 5 narrow dark bluish bands; a small black spot at upper base of dorsal fin base may disappear with growth. Attains 25 cm. Found around all types of reef habitats. Most common, found abundant. Food fish. Indo-Pacific.



Fig. 654. *Ctenochaetus striatus*

608. *Naso annulatus* (Quoy & Gaimard, 1825)

Whitemargin Unicornfish

D. V, 28; A. II, 28; P. 17-18; V. I, 3. Body oblong and slightly deep; adults with a large, almost equal to head length, pointed bony horn in front of eye; two caudal peduncular plates with a sharp knife-like keel; caudal fin truncate, each corner of fin with a filament. Body olivaceous brown with dark markings. Capable of changing colour rapidly to light bluish grey; margin of caudal fin white with a sub-marginal black band. Attains 25 to 30 cm. Found in small schools in fairly deep waters on reef slopes. Good food fish. Indo-Pacific.



Fig. 655. *Naso annulatus*

609. *Naso brevirostris* (Valenciennes, 1835)**Spotted Unicornfish**

D. VI, 28-29; A. II, 27-29; P. 16-17; V. I, 3. Body oblong and very long; a broad based long tapering horn on forehead; the snout profile between horn and upper lip very short and vertical; caudal keels sharp; caudal fin truncate. Body olivaceous brown to bluish grey; adults with dark lines on horn and short irregular vertical lines on sides of body; sub-adults with small dark spots on head and body; caudal fin whitish. Attains 50 cm. Found around outer reef areas. Sometimes found in large schools. Common species. Good food fish. Feeds on zooplankton. Indo-Pacific.



Fig. 656. *Naso brevirostris*

610. *Naso hexacanthus* (Bleeker, 1855)**Blacktongue Unicorn**

D. VI, 26-28; A. II, 28-30; P. 17-18; V. I, 3. Body slightly deep and long; dorsal and anal profiles of head equally convex; no horn on head; two caudal peduncular plates



Fig. 657. *Naso hexacanthus*

with large knife-like keel; caudal fin truncate. Body bluish-grey to dark olive grey dorsally and sides, shading to yellow ventrally; tongue black; caudal fin blue shading to green posteriorly; dorsal and anal fins are brownish yellow with light blue longitudinal lines. Attains 60 to 70 cm. Found on outer reef slopes in moderate depth zones and some times in small schools. Uncommon. Actively feed on zooplankton during daytime. Indo-Pacific.

611. *Naso lituratus* (Forsterr, 1801)

Orangespine Unicorn Fish

D. VI, 28-30; A. II, 28-30; P. 15-16; V. I, 3. Body ovate; dorsal profile of head nearly straight. Teeth incisor-like and smooth; caudal fin emarginate, the lobes filamentous in males; caudal peduncular plates two with sharp keel. Body yellowish brown, front of snout black; a narrow curved yellow band below eye to mouth; peduncular plates deep orange yellow; a light orange yellow area behind eye; lips orange yellow; dorsal fin orange yellow with a black band basally; ventral fins yellow; anal fin yellow with an orange sub-marginal band; caudal fin brownish with a black band. Attains 40 cm. Found in outer reef areas. Common species. Young ones good aquarium pets. Food fish. Feeds on algae. Indo-Pacific.

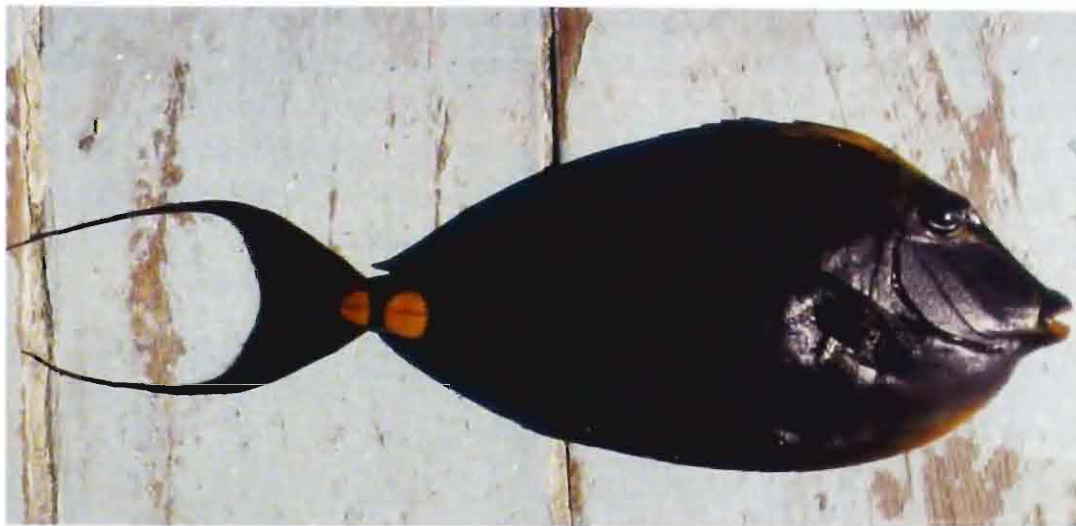


Fig. 658. *Naso lituratus*

612. *Naso unicornis* (Forsskal, 1775)

Blue-spine Unicorn Fish

D. VI, 27-29; A. II, 25-30; P. 17-18; V. I, 3. Dorsal profile of snout straight; a sharp bony horn in front of eye; caudal fin truncate, the lobes produced; two pairs of bony plates with knife-like spines on caudal peduncle. Body light olivaceous green and light yellowish below; lips and peduncular plates blue; dorsal and anal fins yellowish with narrow blue

longitudinal lines. Attains 70 cm. Found in shallow rocky shores and coral reefs. Not uncommon. Good food fish. Feeds on benthic algae. Indo-Pacific.



Fig. 659. *Naso unicornis*

613. *Naso vlamingii* (Valenciennes, 1835)

Vlaming's Unicorn Fish

D. VI, 27; A. II, 28-29; P. 17-18; V. I, 3. Body very oblong and long; dorsal profile of head smooth with a hump, a prominent convexity on forehead; bony plates on caudal peduncle with sharp keel; caudal fin truncate, each corner with a long filament. Body yellowish brown with irregular vertical blue lines on sides of body and small blue spots above and below; head with broad blue band extending anteriorly from eye; lips and caudal fin filaments blue. Attains 55 cm. Found on outer reef areas in moderately deep waters. Common species. Good food fish. Usually feeds on zooplankton. Indo-Pacific.



Fig. 660. *Naso vlamingii*

614. *Paracanthurus hepatus* (Linnaeus, 1766)**Flag-tail Surgeon**

D. IX, 20; A. III, 18; P. 16; V. I, 5. Body slightly ovate, caudal fin truncated; caudal spine folding into a shallow groove; dorsal and anal fin spines stout. Body and head bright blue with a black band from eye passing along the dorsal fin and back, gradually broadening at caudal peduncle and take a narrow forward extension up to above pectoral; a bright yellow triangle with its apex at caudal spine extending to end of caudal fin; upper and lower margins of caudal fin black; distal half of pectoral fin yellow; dorsal and anal fins blue, edges black. Attains 30 cm. Found around rich coral reef areas. Its occurrence is rare. Beautiful ornamental fish. The dorsal and anal spines venomous. Indo-Pacific.

Fig. 661. *Paracanthurus hepatus*615. *Zebrasoma scopas* (Cuvier, 1829)**Brushtail Tang**

D. V, 23-24; A. III, 29-20; P. 14-15; V. I, 5. Body deep; snout pointed, a sharp spine on side of caudal peduncle depressible into groove; a patch of brush-like setae on side of body

Fig. 662. *Zebrasoma scopas*

anterior to caudal spine; dorsal and anal fins elevated; caudal fin slightly rounded. Body dark yellowish brown with small blue dots on head and body, these dots join into longitudinal lines on body; the sheath of caudal spine white. Attains 20 cm. Found on shallow reef areas in pairs or small groups. Common species. Good ornamental fish. Feeds on benthic algae. Indo-Pacific.

616. *Zebrasoma veliferum* (Bloch, 1795)
Sailfin Tang

D. IV, 28-30; A. III, 22-23; P. 15-16; V. I, 5. Body ovate, snout is produced; teeth flat and wide; caudal peduncle compressed; dorsal and anal fins highly elevated; no caudal peduncular depressions. Body white with a broad brown bars containing yellowish lines; the last bar black and covers caudal peduncle; head whitish with yellow dots and vertical lines; a black bar through eye; dorsal and anal fins dark brown with broadly curving alternate dark brown and yellow bands; caudal fin light brown with yellow spots. Juveniles yellow with black and white bars, caudal fin white. Attains 40 cm. Found in shallow sheltered reef areas. Common species. Beautiful and popular ornamental fish particularly the juveniles. Indo-Pacific.



Fig. 663. *Zebrasoma veliferum* (Adult)



Fig. 664. *Zebrasoma veliferum* (Juvenile)



Fig. 665. *Zebrasoma veliferum* (Young)

Family ZANCLIDAE

Moorish Idols

A single species representing the family and closely related to surgeonfishes. Body strongly compressed, disc-like, scales on body minute and rough; no caudal peduncular spines; dorsal and anal fins much elevated; the third dorsal spine extremely long and filamentous; a bony projection developed in front of each eye. Omnivorous fish. Found in shallow to deep waters around reefs.

617. *Zanclus cornutus* (Linnaeus, 1831)**Moorish Idol**

D. VI, 41-42; A. III, 3-36. Pl. 18; V. I, 5. Body discoid; snout pointed and produced; mouth small; teeth bristle-like; third dorsal spine elongated and filamentous; short horns in front of eyes. Anterior part of body white and posterior part yellowish with two broad black bars, one from nape to thorax and abdomen and the other across posterior part of body extending onto dorsal and anal fins; a black edged orange yellow saddle on snout; caudal fin black, posterior margin white; ventral fins white. Attains 60 cm. Found on coral reefs in clean waters. Common species and can easily be encountered. Feeds on benthic animals like sponges, small crustaceans, worms, etc. and algae. Very popular and beautiful ornamental fish. Indo-Pacific.



Fig. 666. *Zanclus cornutus*

Family SIGANIDAE

Rabbitfishes

Rabbitfishes unique among fishes in possessing pelvic fins with two strong spines and three rays. Usually body compressed, moderately deep and covered with small, cycloid scales; mouth small, terminal and not protractile; dorsal fin single, spinous part of the fin preceded by an embedded, procumbent spine; jaws with a row of small incisiform teeth; caudal peduncle very narrow, caudal fin emarginate or forked. All fin spines venomous with a pair of anterolateral grooves containing venomous glands. Most of the fishes herbivorous feed on sea grasses and weeds. Schooling fishes, found in large numbers around shallow coral reefs, weedy, rocky and estuarine flats. They change their colour pattern quickly when frightened. Regarded as good food fishes. Highly preferred fishes for aquaculture because of their rapid growth and herbivorous nature.

Key to species

- 1a. Snout strongly tubulate; thorax white to very light brown *Siganus magnificus*
- 1b. Snout not tubulate, but pointed or blunt 2
- 2a. A line projects through anterior and posterior nostrils passing through lower third of posterior margin of eye, head and sides of trunk with small blue ocelli on yellow background *S. corallinus*
- 2b. A line projects through anterior and posterior nostrils passing above mid-point of posterior margin of eye; colouration not as in 2a 3
- 3a. Mid-line of thorax scaleless between pelvic ridges; dorsal and anal spines slender or slightly stout 4
- 3b. Mid-line of thorax with scales between pelvic ridges; dorsal and anal spines strong. 7
- 4a. Soft parts of dorsal and anal fins tall, 3rd ray of dorsal fin longer than distance from anterior nostril to posterior extremity of orbit; caudal fin truncate or slightly emarginate; head and body marked with blue to cream labyrinthine lines on light to grey background; a prominent narrow whitish bar at base of caudal fin *S. spinus*
- 4b. Soft parts of dorsal and anal fins short, 3rd ray of dorsal fin shorter than distance from anterior nostril to posterior extremity of orbit; colour not as in 4a 5
- 5a. Caudal fin strongly forked; median caudal ray shorter than outer spine of pelvic fin; last anal spine very short, less than half length of longest anal fin spine *S. argenteus*

- 5b. Caudal fin forked, emarginate in young; median caudal ray longer than outer spine of pelvic fin; last anal spine short, but not less than half length of longest anal fin spine 6
- 6a. About 100 to 200 pearly blue spots on sides of head and body; 2 or 3 rows of spots between lateral line and base of anterior half of dorsal fin; spots below lateral line mostly ovoid or rod shaped *S. canaliculatus*
- 6b. Several hundred pearly spots on sides of head and body; 4 to 6 rows of spots between lateral line and base of anterior half of dorsal fin; spots below lateral line round and rod shaped *S. fuscescens*
- 7a. Body slender, the greatest depth of body 2.3 to 2.6 in SL; prominent black spots above and adjacent to orbit; body with numerous close-set, small dark orange-yellow spots on light yellow background *S. puelloides*
- 7b. Body deep, the greatest depth of body 1.8 to 2.3 in SL; no prominent black spots near orbit; colour pattern not as in 7a 8
- 8a. Scale rows between lateral line and base of 2nd to 4th dorsal spines more than 29; distance between bony orbit and upper lip less than half diameter of orbit *S. javus*
- 8b. Scale rows between lateral line and base of 2nd to 4th dorsal spine less than 29; distance between bony orbit and upper lip greater than half diameter on orbit 9
- 9a. A diagonal dark ocular band from chin to nape, another band running parallel to it from base of ventral fin to base of dorsal fin; many blue spots of pinhole size on sides of body *S. virgatus*
- 9b. No dark band on head and anterior body 10
- 10a. Head and body completely covered with dark spots, caudal fin deeply forked, emarginate in young; caudal fin conspicuously marked with large spots *S. stellatus*
- 10b. Head and body not completely covered with spots, vermiculations also present; caudal fin emarginate to slightly forked 11
- 11a. A large yellow spot below rear base of soft dorsal fin; sides of body with orange spots, close packed on nape to form a honey-comb pattern *S. guttatus*
- 11b. No yellow spot below base of soft dorsal fin; head and body covered with vermiculating lines on brown background; caudal fin with dark spots *S. vermiculatus*

618. *Siganus magnificus* (Burgess, 1977)
Foxface Rabbitfish

D. XII, 10; A. VII, 9; P. 16-17; V. II, 3. Body ovate, dorsal and ventral profiles of head concave; caudal fin truncate. Head and anterior part of body white with a broad diagonal black band from tip of snout through eye to origin of dorsal fin, rest of body light yellow; a narrow white band mid-dorsally from nape to snout which separates ocular bands; dorsal fin spines light yellow, its membrane light crimson and base of fin rays white, the distal third crimson; anal fin spines white, its membrane orange yellow, basal half of rays white and distal half orange yellow; caudal and pectoral fins orange yellow; ventral fins white. Attains 15 cm. Good aquarium pet. Found in pairs on coral reefs. Feed on benthic algae. Distributed from Andaman Islands to Thailand.



Fig. 667. *Siganus magnificus*

619. *Siganus argenteus* (Quoy & Gaimard, 1825)
Forktail Rabbitfish

D. XIII, 10; A. VII, 9; P. 18-19; V. II, 3. Body ovate and elongate; caudal fin forked. Body deep blue above, fading to silvery on belly; sides of body covered by small yellow spots



Fig. 668. *Siganus argenteus*

and short bars often fused on lower part to form undulating stripes; dorsal and caudal fins silvery. When fish is frightened or at rest the colour pattern becomes mottled with dark and light brown, outer rays of caudal fin barred with dusky and other fins except pectoral become mottled; often a prominent white saddle appear on caudal peduncle. Attains 25 to 30 cm. The most common and abundant fish found around outer reefs, but the juveniles found on reef flats. Good food fish. Indo-Pacific.

620. *Siganus canaliculatus* (Park, 1797)

Pearlspot Rabbitfish

D. XIII, 10; A. VII, 9; P. 16-17; V. II, 3. Body rather elongate; dorsal fin spines slender and pungent; caudal fin forked. Body silvery grey above and silvery below; nape and upper surface of head olive green; head and body with pearly white round or ovoid spots, some are elongate; a dark patch below origin of lateral line; soft dorsal and anal fins slightly dusky. Attains 25 cm. Found around reef slopes in shallow areas and coastal waters. Indo-West Pacific.



Fig. 669. *Siganus canaliculatus*

621. *Siganus corallinus* (Valenciennes, 1835)

Coral Rabbitfish

D. XIII, 10; A. VII, 9; P. 16-17, V. I, 5. Body deep and ovate, caudal fin deeply forked, dorsal and ventral profiles concave. Body, head and fins orange yellow; head and body with small pale blue spots edged with dark blue; a triangular dark patch diagonally behind eye. Attains 25 cm. Found in pairs on coral reef areas. Juveniles in

small schools in shallow reefs and sea grass beds. Feeds on benthic algae. Good aquarium pet. Indo-West Pacific.



Fig. 670. *Siganus corallinus*

622. *Siganus fuscescens* (Houttuyn, 1782)

Spotted Rabbitfish

D. XIII, 10; A. VII, 9; P. 15-17; V. II, 3. Fin spines slender and pungent. Caudal fin forked. Body olive green above, silvery below; head and body covered with pearly blue spots except on snout; spots on head and lateral line rounded, on lower side slightly elongate; sometimes a small dark patch below origin of lateral line; spinous part of anal fin, dorsal fin



Fig. 671. *Siganus fuscescens*

and pelvic fins brownish; soft dorsal and caudal fin dusky; pectoral fin hyaline. Attains 25 cm. Found in shallow waters on reef flats and reef lagoons. Good food fish. Andaman Islands to Japan and Australia.

623. *Siganus guttatus* (Bloch, 1787)
Yellowspotted Rabbitfish

D. XIII, 10; A. VII, 9; P. 16; V. II, 3. Dorsal fin spines stout and pungent; caudal fin emarginate in juveniles and forked in adults. Body dusky blue above, silvery below with large round golden yellow spots on body except on thorax and belly; a bright yellow spot on back adjacent to last dorsal fin rays; head with vermiculated yellow lines. Attains 35 cm. Found around reef slopes in shallow waters to brackish areas. Feeds on benthic algae. From Andaman Islands to Japan.



Fig. 672. *Siganus guttatus*

624. *Siganus javus* (Linnaeus, 1766)
Java Rabbitfish

D. XIII, 10; A. VII, 9; P. 17-18; V. II, 3. Dorsal fin spines slender; anal fin spines stout; caudal fin emarginate. Body bluish white above, light below with numerous blue spots on



Fig. 673. *Siganus javus*

head, nape and upper half of body; ventral part of body with narrow irregular bluish grey wavy stripes form a reticulum; dorsal and anal fins yellow; caudal fin dusky with a large black patch in middle. Attains 50 cm. Found in small groups from brackish waters to coastal reef areas. Good food fish. Indo-West Pacific.

625. *Siganus puelloides* Woodland & Randall, 1979

Spotted Rabbitfish

D. XIII, 10; A. VII, 9; P. 16; V. II, 3. Fin spines stout and pointed; caudal fin forked. Body pale blue above, silvery below; sides of body and head covered with brownish yellow spots, the spots larger than interspaces; a dark brown patch around eye; 4 or 5 black spots above eye; dark brown band under chin reached margin of upper lip; dorsal fin spines and rays yellow; anal fin spines silvery white, rays yellow; caudal and pectoral fins yellow. Attains 25 cm. Found around rocky and coral reef areas. Feeds on sponges and benthic algae. Distributed in Indian Ocean from Maldives to Thailand.



Fig. 674. *Siganus puelloides*

626. *Siganus spinus* (Linnaeus, 1758)

Spiny Rabbitfish

D. XIII, 10; A. VII, 9; P. 17; V. II, 3. Body moderately elongate; caudal fin truncate. Colour whitish with labyrinth of narrow brown bands on head and body; fins mottled with

dark brown. Attains 23 cm. Found in outer reef areas in small numbers. Graze on algae. Indo-West Pacific.



Fig. 675. *Siganus spinus*

627. *Siganus stellatus* (Forsskal, 1775)

Starspotted Rabbitfish

D. XIII, 10; A. VII, 9; P. 16-17; V. II, 3. Dorsal fin spines stout but not pungent; caudal fin forked, its upper lobe slightly rounded. Body light greenish to yellow with chocolate brown spots on head and body extending onto caudal fin and soft portions of dorsal and anal fins; a black patch above gill opening; dorsal and anal fins dusky, its margins pale. Attains 30 cm. Found on coral reefs in shallow waters. Good food fish. Indo-West Pacific.

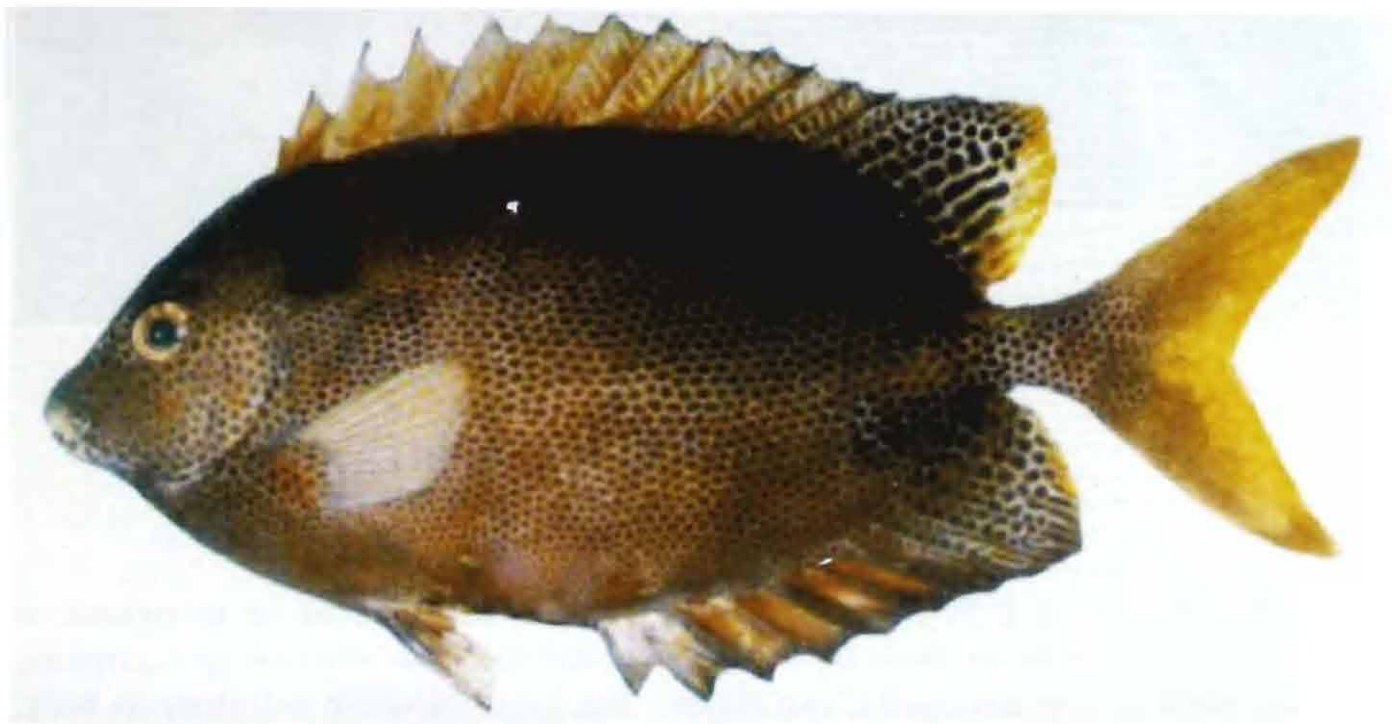


Fig. 676. *Siganus stellatus*

628. *Siganus vermiculatus* (Valenciennes, 1835)**Vermiculate Rabbitfish**

D. XIII, 10; A. VII, 9; P. 15-16; V. II, 3. Body moderately deep and ovate; dorsal profile of snout steep; fin spines stout; caudal fin emarginate. Body bluish white with irregular vermiculate dark brown bands on body except ventrally spotted with brown; head with narrow brown bands; caudal fin with small brown spots; a row of brown spots above base of soft dorsal fin; dorsal and anal fins dusky; iris golden yellow. Attains 40 cm. Found in murky waters adjacent to shallow reefs and mangrove areas. Very good food fish, important component in commercial catches. An ideal fish for aquaculture. Indo-West Pacific.



Fig. 677. *Siganus vermiculatus*

629. *Siganus virgatus* (Valenciennes, 1838)**Barred Rabbitfish**

D. XIII, 10; A. VII, 9; P. 16-17; V. II, 3. Fin spines stout; caudal fin emarginate in juveniles and forked in adults. Body brownish above, whitish below with blue spots covering upper two thirds of side and cheeks; two oblique blue edged brownish red bands on body, one from nape to chin, the other from base of anterior dorsal spines to base of pectoral fin, spotted blue within the bands; inter-orbital and snout with alternating blue and yellow lines;

dorsal and anal fins hyaline with orange tint; caudal fin orangish. Attains 25 cm. Found in pairs on coral reefs to murky coastal waters. Indo-West Pacific.



Fig. 678. *Siganus virgatus*

Family SCOMBRIDAE

Tunans and Mackerels

Small to moderate pelagic fishes, usually found in large schools. Body elongate and fusiform, slightly compressed in some species; snout pointed; beautifully streamlined fishes with slender caudal peduncle; mouth large, teeth strong or weak; no canines; first dorsal fin depressible into a groove; finlets present behind dorsal and anal fins; caudal fin deeply forked; two small keels on each side of caudal peduncle and a large keel in between in many species; body covered with small scales or restricted to a corselet behind head and around pectorals. Scombrids well-known commercially important fishes and very good food fishes throughout their range. Some occur in coastal waters and others Oceanic. Carnivorous fishes. Feeds on fishes, squids and crustaceans, some species feed on plankton.

Key to species

- 1a. Two oblique keels near end of caudal fin; 5 dorsal and 5 anal finlets; two horizontal rows of spots on back 2 (Genus *Rastrelliger*)
- 1b. Two small keels with an additional lateral keel on either side of caudal peduncle; dorsal and anal finlets more than 5; no horizontal rows of spots 4
- 2a. Gillrakers 20 to 25 on lower arm of first arch *R. faughni*
- 2b. Gillrakers 30 to 48 on lower arm of first arch, very long and feather-like and visible when mouth is opened 3
- 3a. Body depth at margin of gill opening about 4.0 in SL; head equal to or more than greatest body depth; dark longitudinal stripes on upper half of body *R. kanagurta*
- 3b. Body depth at margin of gill opening less than 4.0 in SL; head less than greatest body depth; dark longitudinal stripes on upper half of body present or absent
..... *R. brachysoma*
- 4a. Corselet (scales around front part of body) of scales obscure 5
- 4b. Corselet well defined (with enlarged scales) 6
- 5a. Two lateral lines, one underneath the dorsal fin and another runs along ventral surface; interpelvic process single; 11 to 12 spines in dorsal fin
..... *Grammatorcynus bicarinatus*
- 5b. Single upper lateral line only; interpelvic process usually two; 14 to 22 spines in dorsal fin; numerous vertical wavy lines on sides of body
..... *Scomberomorus commerson*
- 6a. No lateral cartilaginous ridges on tongue 7

- 6b. Two longitudinal cartilaginous ridges on tongue 8
- 7a. Body with prominent stripes or spots; two patches of teeth on tongue; swim bladder well developed *Gymnosarda unicolor*
- 7b. Five to ten narrow, dark longitudinal stripes on upper part of body; no teeth on tongue; swim bladder absent *Sarda orientalis*
- 8a. Two dorsal fins widely separated, the space between them equal to base of first dorsal; no black spots between pectoral and pelvic fin bases 9 (Genus *Auxis*)
- 8b. Two dorsal fins continuous or barely separated by a narrow interspace equal to eye diameter; black spots often present between pectoral and pelvic fin bases *Euthynnus affinis*
- 9a. Corselet of scales short, tapering abruptly behind first dorsal fin; pectoral fins extending to scaleless area above corselet; dark stripes on back oblique to nearly horizontal *A. thazard*
- 9b. Corselet of scales long, continuing as a wide band to behind first dorsal fin; pectoral fins not extending to scaleless area above corselet; dark stripes on back vertical *A. rochei*

630. *Auxis rochei* (Rasso, 1810)

Corseletted Mackerel

D. X+13+8 finlets; A. 13+7 finlets; P. 23; V. I, 5. Body robust and elongate; two dorsal fins, widely separated; body naked except for corselet which is well developed along lateral line; inter-pelvic process single; caudal peduncle slender with a strong central keel on each side between two small keels. Body bluish, deep purple or black on head; belly silvery; fifteen fairly broad sub-vertical bars above lateral line; pectoral and ventral fins purple, their inner side black. Attains 45 cm. Commercially important fish. Found in outer reef areas and Oceanic waters. Epipelagic, form large schools. Indo-West Pacific.



Fig. 679. *Auxis rochei*

631. *Auxis thazard* (Lacepede, 1800)
Frigate Mackerel

D. XI+12+8 finlets; A. 13+7 finlets; P. 23-24; V. I, 5. Body elongate and streamlined; inter-pelvic process long; corselet of scales short reaching abruptly along lateral line. Body bluish, purplish black on head; horizontal to oblique wavy lines in scale-less area above lateral line; belly silvery; inner side of pectoral and ventral fins black. Attains 55 cm. Found in outer reef areas and Oceanic waters. Commercially important species. Good food fish. Distributed in all tropical and subtropical Seas.



Fig. 680. *Auxis thazard*

632. *Euthynnus affinis* (Cantor, 1849)
Eastern-little Tunny

D. XIV+12+8 finlets; A. 13+7 finlets; P. 27; V. I, 5. Body robust and fusiform; dorsal fins two, narrowly separated; inter-pelvic process bifid. Body bluish black on back, lower sides and belly silvery; a complicated striped pattern on back; dark spots between pectoral and ventral fins; ventral fins blue black. Attains 100 cm. Common commercially important fish. Found in outer reef areas and Oceanic waters. Epipelagic. Tropical Indo-Pacific.



Fig. 681. *Euthynnus affinis*

633. *Grammatorcynus bicarinatus* (Quoy & Gaimard, 1825)
Shark Mackerel

D. XII+11+7 finlets; A. 11+6 finlets; P. 24; V I, 5. Body more spindle shaped; no corselet; inter-pelvic process single; two lateral lines; two small keels and another one between them on either side of caudal peduncle. Body silvery blue, lighter ventrally. Attains 125 cm. Found in coastal waters adjacent to reefs. Indo-Pacific.

634. *Gymnosarda unicolor* (Ruppell, 1836)
Dogtooth Tuna

D. XIII-XV+12-13+6-7 finlets; A. 13+6 finlets; P. 25-27; V. I, 5. Body fusiform; snout pointed; dorsal fins closely set; lateral line single, curved over pectoral fin and wavy posteriorly; caudal peduncle with two small keels. Body dark blue on back and sides, silvery on belly; anterior edge of dorsal fin dark, other fns greenish blue. Attains 120 cm. Common commercially important fish. Found around outer reef areas. Indo-West Pacific.



Fig. 682. *Gymnosarda unicolor*

635. *Rastrelliger brachysoma* (Bleeker, 1851)
Shortbodied Mackerel

D. VIII-IX+12+5 inlets; A. 12+5 finlets. Body deep and moderately compressed; gillrakers very long and visible when mouth opened; two dorsal fins, widely separated. Body bluish



Fig. 683. *Rastrelliger brachysoma*

green above, belly silvery with yellowish tinge; 1 or 2 rows of dark spots on back; spinous dorsal yellowish with black edge; pectoral and ventral fins dusky, other fins yellowish; a dark blotch behind pectoral fin base. Attains 30 cm. Common, commercially important fish. Found around coastal waters and reefs in large schools. Distributed from Andaman Islands to Fiji.

636. *Rastrelliger faughni* Matsuai, 1967
Faughn's Mackerel

D. IX+12+5 finlets; A. 12+5 finlets; P. 21; V. I, 5. Body fusiform; two well separated dorsal fins. Body bluish green above, silvery below; two rows of black spots on back below dorsal fin base from origin of first dorsal to caudal peduncle; a small black blotch behind pectoral base; outer margin of dorsal and pectoral fins dark. Attains 35 cm. Commercially important fish. Found around coastal and adjacent to coral reefs. Pelagic fish. East coast of India to the Philippines.

637. *Rastrelliger kanagurta* (Cuvier, 1816)
Indian Mackerel

D. IX+12+5 finlets; A. 12+5 finlets; P. 19; V. I, 5. Body fusiform; gillrakers long and visible when mouth opened; two dorsal fins widely separated. Body blue green above, sides silvery with golden tint; narrow dark longitudinal bands on upper part of body; two rows of small dark spots on upper back; a black spot near lower margin of pectoral fin; dorsal fin yellowish with black tips; caudal and pectoral fins yellowish; ventral fin dusky. Attains 35 cm. Commercially important pelagic fish. Found in coastal waters adjacent to reefs in small schools. Indo-Pacific.



Fig. 684. *Rastrelliger kanagurta*

638. *Sarda orientalis* (Temminck & Schlegel 1844)
Striped Bonito

D. XVII-XIX+15-16+7-8 finlets; A. 13-16+6-7 finlets; P. 23-25; V. I, 5. Body fusiform and slender; covered with small scales posterior to corselet; caudal peduncle with prominent

keels; two dorsal fins almost close together; pectoral fins short. Back and upper sides of body steel blue with 5 to 11 dark bluish slightly oblique stripes on back; lower side and belly silvery; first dorsal fin black. Attains 100 cm. Found around coastal waters adjacent to coral reefs. Commercially important epi-pelagic fish. Indo-Pacific.



Fig. 685. *Sarda orientalis*

639. *Scomberomorus commerson* (Lacepede, 1800)

Narrowbarred Spanishmackerel

D. XV-XVII+14-19+8-10 finlets; A. 14-18+8-10 finlets. Body elongate and strongly compressed; two dorsal fins close together; lateral line with a prominent downward bent at second dorsal; caudal fin deeply lunate. Back of body iridescent blue grey, sides below lateral line silvery with blue reflections and vertical wavy narrow grey bars. Attains 200 cm. Found around coastal waters and reef areas in small schools. Common, commercially important fish. Indo-West Pacific.

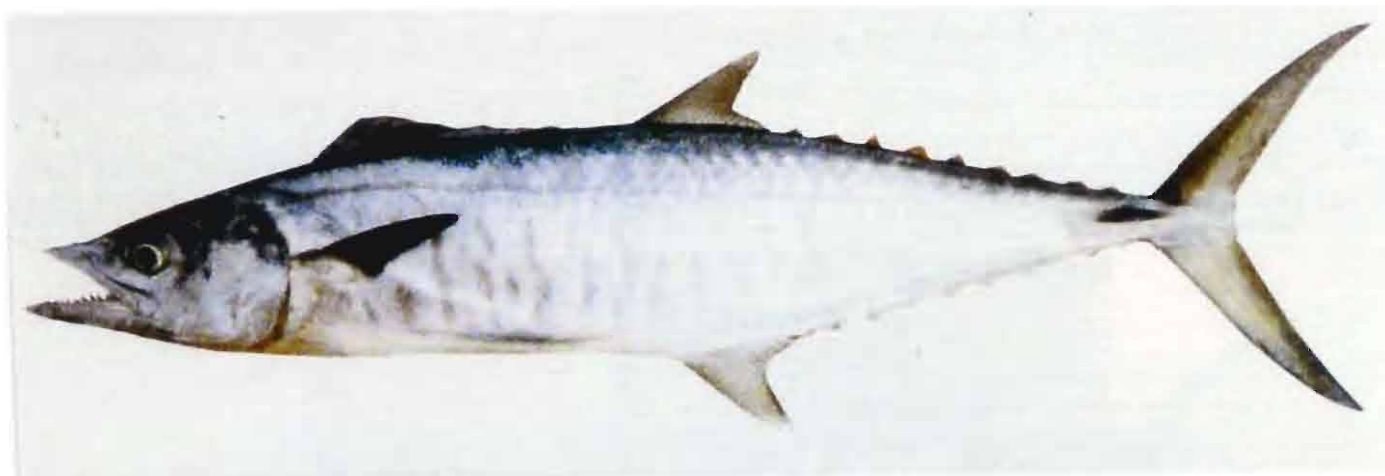


Fig. 686. *Scomberomorus commerson*

Family ISTIOPHORIDAE
Sailfishes and Marlins

Body elongate, robust and slightly compressed; upper jaw and snout prolonged into a long spear; both jaws with rasp-like teeth; two dorsal fins, close together, the first much longer than the second; anal fins two, the second much smaller than the first; first dorsal and anal fins can be folded into grooves; ventral fins elongate consists of 3 rays; caudal fin large, strong and strongly forked; caudal peduncle with two keels on either side; body covered with narrow, pointed embedded scales. Inhabitants of open waters, epipelagic, swim very fast; voracious predators, feeds on fish and cephalopods. Well known game fishes. Commercially important and provide excellent food. Rich vitamin-A contains in liver oils of the fish.

Key to species

- 1a. First dorsal fin extremely high and sail-like with anterior rays markedly shorter than middle rays; pelvic fin rays very long; pale vertical bars on sides of body
..... *Istiophorus platypterus*
- 1b. First dorsal fin slightly higher and not sail-like; usually anterior rays higher than middle rays; pelvic fins not much elongate 2
- 2a. Height of anterior part of first dorsal fin as high as body depth; body strongly compressed; spear (snout) short *Tetrapturus audax*
- 2b. Height of anterior part of first dorsal fin lower than body depth; body not well compressed; spear (snout) longer *Makaira mazara*

640. *Istiophorus platypterus* (Shaw & Nodder, 1791)

Pacific Sailfish

D. 39-48+6-8; A. 8-15+5-7; P. 10-20; V. I, 2. Body elongate and compressed; snout long, lower jaw slender and pointed; first dorsal fin extremely high, long-based and sail-like; caudal



Fig. 687. *Istiophorus platypterus*

fin deeply forked. Body dark blue dorsally, fading to silvery white ventrally with 18 to 20 rows of vertical bars, each formed of many small blue spots; dorsal fin membrane blue-black with small black spots; other fins cobalt blue. Attains 250 to 300 cm. Found in open waters, occasionally encountered on outer reef areas. Not common. Good game fish. Tropical Indian and Pacific Oceans.

641. *Makaira mazara* (Jordan & Snyder, 1901)

Indo-pacific Blue-marllin

D. 40-44+6-7; A. 13-14+6-7; P. 20-23; V. I, 2. Body robust and slightly compressed; anterior part of dorsal fin not much elevated, remainder of fin very low; ventral fins filamentous; caudal fin deeply forked. Body steel blue dorsally, fading to silvery-white ventrally with a series of 14 or 15 narrow bars on sides; first dorsal dark blue. Attains 40 cm. Found in open waters but occasionally encountered on outer reef areas. Good food and game fish. Indo-Pacific.



Fig. 688. *Makaira mazara*

642. *Tetrapturus audax* (Philippi, 1887)

Striped Marlin

D. 38-42+5-6; A. 13-18+5-6; P. 18-22; V. I, 2. Body elongate and compressed; anterior dorsal fin rays elevated into triangular peak, rest of fin very low; ventral fins slender; caudal fin deeply forked. Body blue black dorsally, fading to white ventrally; sides of body with 12 to 14 pale blue vertical stripes; first dorsal dark blue, other fins dark brown. Attains 200 cm. Found in open waters but occasionally encountered close to outer reef areas. Good game as well as food fish. Indo-Pacific.



Fig. 689. *Tetrapturus audax*

Order **PLEURONECTIFORMES**Family **PSETTODIDAE****Halibuts**

Body extremely flat and oval; dorsal fin originate well behind eye, its anterior rays spinous; both eyes situate on left side of body; mouth large, with large strong teeth; body scales ctenoid; lateral line developed on both sides of body. Bottom dwellers. Most of the time found lying on bottom undetected.

643. *Psettodes erumei* Bloch, 1801)

Indian Halibut

D. 54; A. 37; P. 16; V. I, 6. Body oval and flat; upper eye close to the dorsal edge of the body; lateral line developed on both sides of body; dorsal fin origin well behind eyes. Body dark brown with faint four black bars; blind-side white to light brown. Attains 60 cm. Found on mud and sand bottoms adjacent to reefs and costal areas. Common, commercially important fish. Indo-West Pacific.



Fig. 690. *Psettodes erumei*

Family BOTHIDAE

Flounders

Body flat and eyes on side of head; mouth protractile; dorsal and anal fins not confluent with caudal fin; no fin spines; pectoral and ventral fins present; dorsal fin originates above or in front of lower eye. Few species commercially important. Inhabits soft bottom areas from shallow to deep Oceans. Few species found around coral reefs. Their colour pattern almost blends with surroundings and difficult to detect them, capable of rapidly changing colour pattern. Carnivorous fishes, feed on benthic animals.

Key to species

- 1a. Pelvic fin base of eye side equal to that of blind side; lateral line equally developed on both sides 2 (Genus *Pseudorhombus*)
- 1b. Pelvic fin base of eye side much longer than that of blind side; lateral line developed only on ocular side of body *Bothus pantherinus*
- 2a. Teeth strong, canine teeth present anteriorly; 6 to 13 teeth on blind side of lower jaw; a distinct large blotch on anterior end of straight part of lateral line *P. arsius*
- 2b. Teeth small; 23 to 32 teeth on blind side of lower jaw; large distinct blotches along straight part of lateral line *P. elevatus*

644. *Bothus pantherinus* (Ruppell, 1830)

Leopard Flounder

D. 86-92; A. 67-72; P. 9-10. Body oval and flat; eyes on left side of head; pectoral fin of eyed side prolonged and extending to tip of tail; small spines on snout and edge of eye.



Fig. 691. *Bothus pantherinus*

Body brownish on ocular side with numerous dark spots, blotches and rings extending onto fins; a distinct blotch on middle of lateral line; pectorals with cross bands. Attains 30 cm. Found on sandy bottom near coral rubble and coastal waters. Indo-Pacific.

645. *Pseudorhombus arsius* (Hamilton-Buchnan, 1822)

Largetoothed Flounder

D. 74-76; A. 58-61; P. 11-12. Body oval and compressed; both eyes on left side. Body light brown with dark spots and rings on eye side; a large dark spot at junction of straight and curved parts of lateral line and two smaller ones on lateral line at posterior part of body and near anterior end of caudal fin; median fins with scattered dark spots. Attains 35 cm. Found on sand bottoms near coral rubble and muddy coastal waters. Indo-West Pacific.

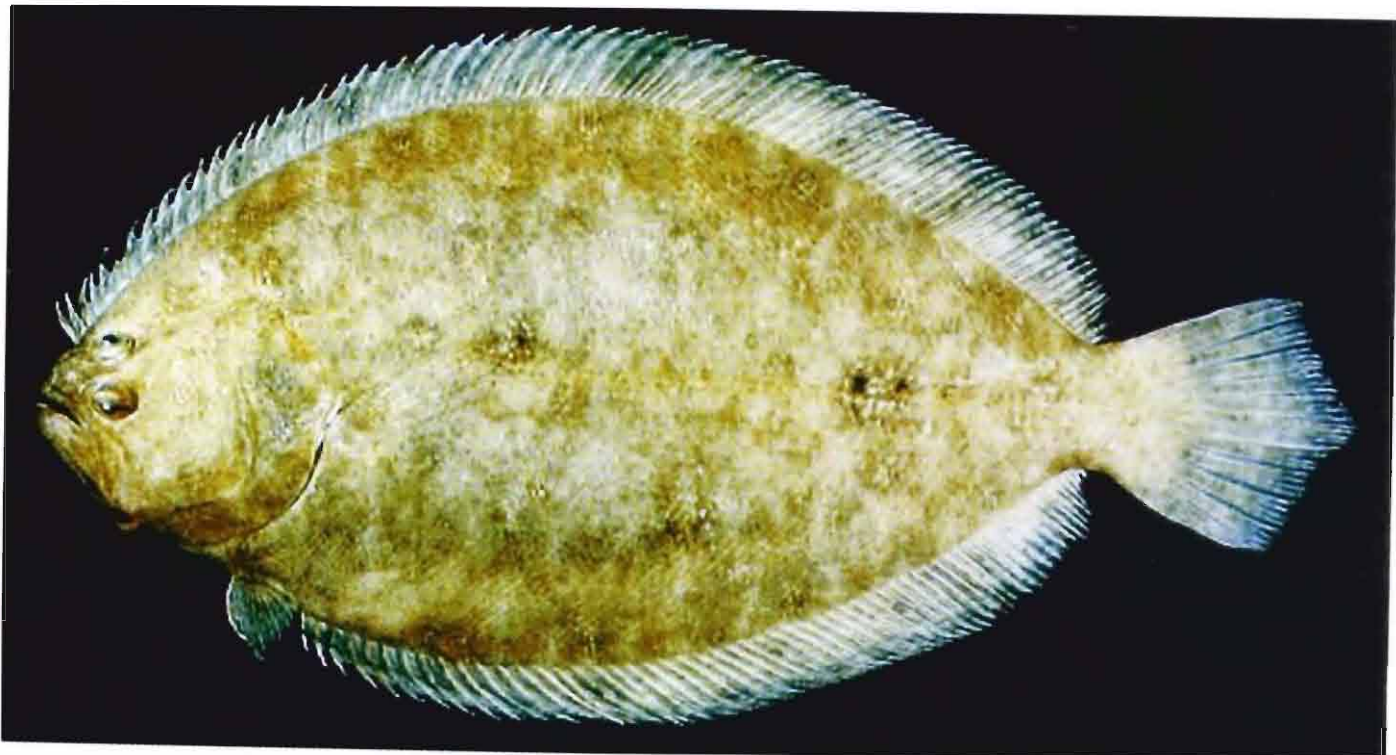


Fig. 692. *Pseudorhombus arsius*

646. *Pseudorhombus elevatus* (Ogilby, 1912)

Deep Flounder

D. 69-70; A. 53-58; P. 10-11. Body oval and flat. Body pale brown with faint blotches arranged in five longitudinal rows; large dark blotch at junction of straight and curved parts of lateral line and two smaller ones on posterior part of lateral line; median fins with small dark spots. Attains 30 cm. Found on sand and mud bottoms near reefs and coastal waters. Indo-West Pacific.

Family CYNOGLOSSIDAE

Tongue Soles

Body flat and tongue shaped with eyes on left side of head; lips sometimes fringed; rostral hook present below mouth; dorsal fin origin at or in front of eye; dorsal and anal fins confluent with caudal fin; pectoral fins absent; only left ventral fin present. Inhabits sand and mud bottoms.

Key to species

- 1a. Lips smooth, not fringed; rostral hook moderately long, extending to the level of lower eye *Cynoglossus lida*
- 1b. Lips with a row of fringed tentacles; rostral hook long and extending beyond lower eye *Paraplagusia bilineata*

647. *Cynoglossus lida* (Bleeker, 1851)

Shoulderspot Tonguesole

D. 102-108; A. 75-85; V. 4. Body flat and elongate; snout broadly rounded; rostral hook rather long; two lateral lines on ocular side. Body brown and speckled with black; fins dusky; blind-side whitish. Attains 30 cm. Found on sandy rubble bottoms near reefs and coastal waters. Indo-West Pacific.

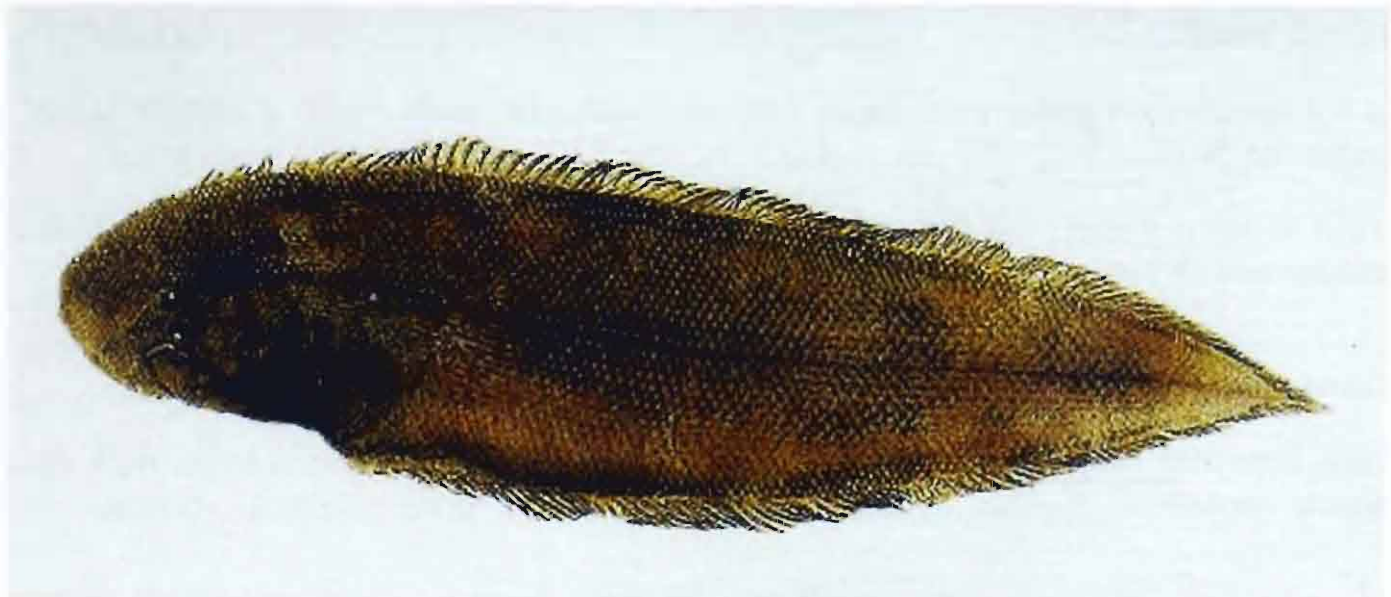


Fig. 693. *Cynoglossus lida*

648. *Paraplagusia bilineata* (Bloch, 1787)**Doublelined Tonguesole**

D. 110-112; A. 82-86; V. 4. Body flat and elongate; snout obtusely pointed; rostral hook long and extending beyond lower eye; lips with a row of fringed tentacles; only left ventral fin present; two lateral lines, no lateral lines on blind side. Body tan marbled with wavy anastomosing lines enclosing pale patches. Attains 25 cm. Found on sandy bottom near shallow reef areas. Indo-West Pacific.



Fig. 694. *Paraplagusia bilineata*

Family SOLEIDAE

Soles

Small flat fishes; both eyes on right side of head; margin of preopercle not free; mouth small, slightly inferior; dorsal fin origin above or before eyes; dorsal and anal fins confluent with caudal fin; no spines in fins; lateral line single. Usually found on sand and mud bottoms in shallow waters. Not commercially important but good food fishes.

Key to species

- 1a. Snout forming a distinct hook; base of dorsal and anal fins with ocelli consisting of two dark rings surrounded by two light areas.....*Heteromycteris oculus*
- 1b. Snout not forming a distinct hook; colour not as in 1a..... 2
- 2a. Caudal fin separate from dorsal and anal fins 3
- 2b. Caudal fin confluent with dorsal and anal fins 6
- 3a. Pectoral fins well developed 4
- 3b. Pectoral fins absent 5 (Genus *Pardachirus*)
- 4a. Ocular nostril prolonged into a long tube; body with numerous wavy cross bands...
..... *Soleichthys heterorhinus*
- 4b. Ocular nostril in a short tube; body brown with dark spots and specks; pectoral fin blackish *Solea bleekeri*
- 5a. D. 66-68; A. 50-55; body with numerous dark edged white spots, each surrounded by one or more dark markings *P. pavoninus*
- 5b. D. 92-98; A. 62-64; body pale with small black dots and light brown ring-like marks *P. marmoratus*
- 6a. First ray of dorsal fin enlarged and free; body brown with 12 to 13 dark brown bands extending on to vertical fins *Aesopia cornuta*
- 6b. First ray of dorsal fin not modified; eyes with small tentacles; 10 to 11 dark cross bands on body, extending on to vertical fins *Zebrias quagga*

649. *Aesopia cornuta* Kaup, 1858

Horned Sole

D. 69-79; A. 57-68; P. 11-14. Body oblong and compressed; scales smooth; first dorsal ray swollen, prolonged and with dermal villi; caudal fin completely confluent with dorsal and

anal fins. Body grey to brownish with 13 to 16 dark brown transverse bands extending onto fins; caudal fin dark brown. Attains 15 to 20 cm. Found on sand and coral rubble bottom of reefs. Not uncommon. Indo-West Pacific.



Fig. 695. *Aesopia cornuta*

650. *Heteromycteris oculus* (Alcock, 1889)

Ocellated Sole

D. 90-98; A. 62-64; V. 5. Body oval and very flat; eyes situated on right side of head; mouth strongly curved; snout hook-like; anterior nostrils of blind side fringed; dorsal fin beginning on hook of snout just below upper eye. Body brownish with irregular dark spots; eight ocelli consisting of two crescentic dark rings surrounded by light area at base of dorsal and anal fins; pectoral and caudal fins with black spots. Attains 15 cm. Found on sand and coral rubble bottom near reefs. Indo-West Pacific.

651. *Pardachirus marmoratus* (Lacepede, 1802)

Speckled Sole

D. 92-98; A. 62-64; V. 5. Body oval and compressed; both eyes situated on right side of head; snout slightly hooked; no pectoral fins. Body pale with small black dots and light brown ring-like marks. Attains 25 cm. Found on sand and coral rubble bottom of reefs.

Common. Very difficult to detect as they blend effectively with habitat and conceal in sand. Indian Ocean.

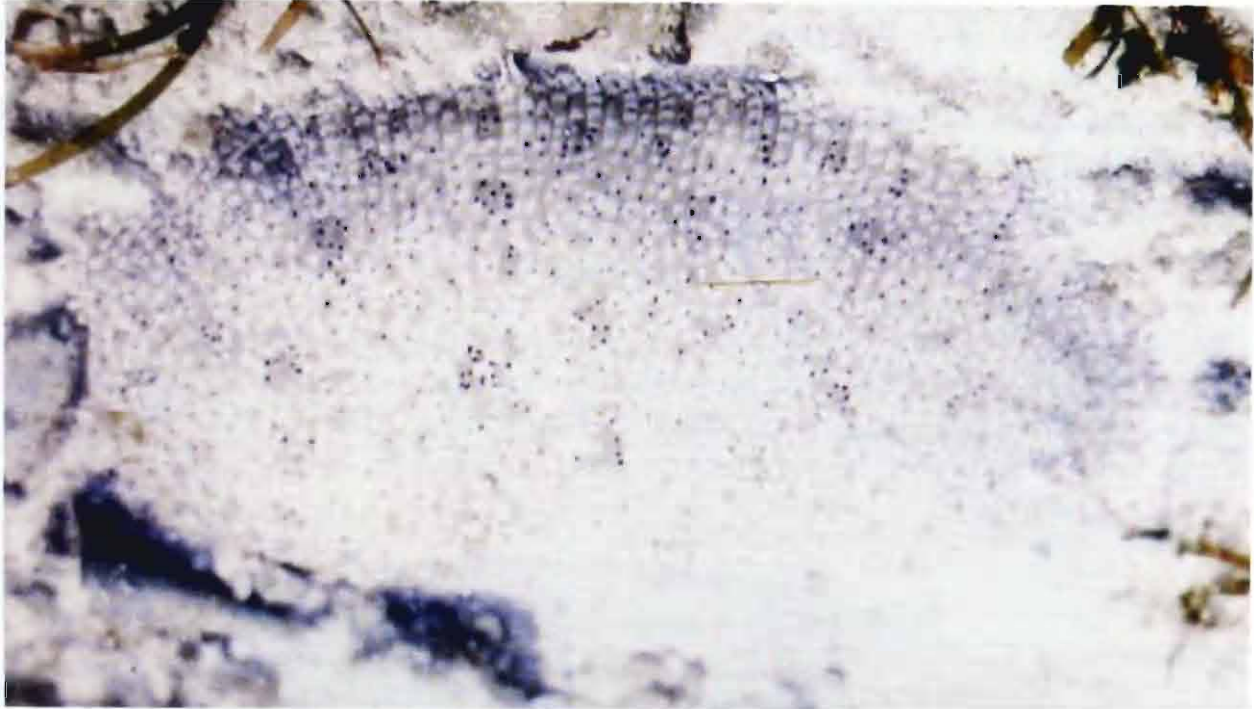


Fig. 696. *Pardachirus marmoratus*

652. *Pardachirus pavoninus* (Lacepede, 1802)

Peacock Sole

D. 63-68; A. 50-5; V. 5. Body very flat and ovate; eyes situated on right side of head; no pectoral fins; dorsal and anal fins separate from caudal fin. Body pale brown; head, body and fins with blackish dots and ring-like dark brown marks. Attains 25 cm. Found on coral rubble and sand bottoms near reefs in shallow waters. Indo-West Pacific.



Fig. 697. *Pardachirus pavoninus*

653. *Solea bleekeri* Boulenger, 1898**Sole**

D. 60-63; A. 43-46; V. 5. Body ovate and flat; snout slightly hooked; mouth inferior; basal half of dorsal and anal fins joined to caudal fin base. Body brown with dark spots and specks; pectoral fin of ocular side blackish; other fins brownish. Attains 20 cm. Found in shallow sandy reefs areas. Indian Ocean.

654. *Soleichthys heterorhinos* Bleeker, 1856**Tiger Sole**

D. 92-98; A. 77-85; P. 6-8. Body oval and compressed; snout projecting beyond edge of dorsal; ocular nostril prolonged into a long tube. Body yellowish brown with numerous wavy cross bands; fins with light margin and black sub-marginally. Attains 15 cm. Found on coral rubble and sand bottom of reefs in shallow waters. Common. Indo-Pacific.

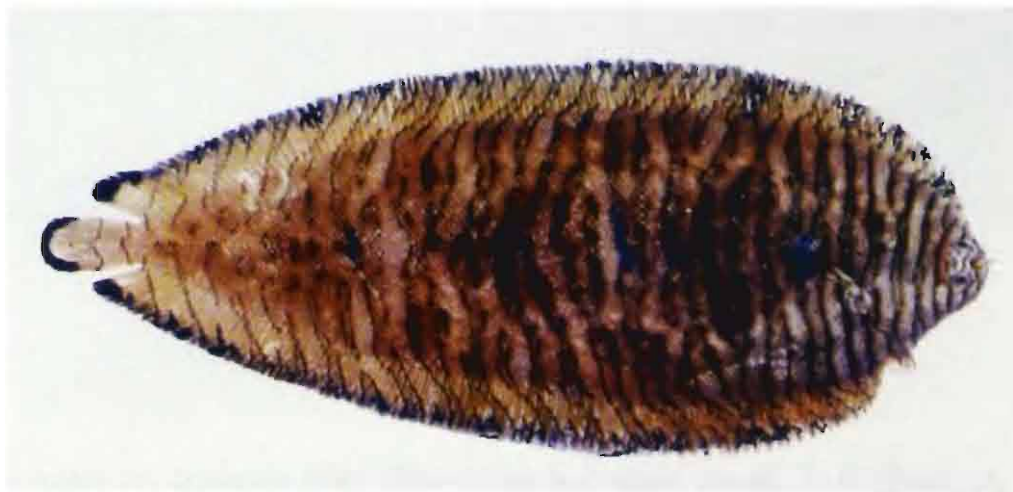


Fig. 698. *Soleichthys heterorhinos*

655. *Zebrias quagga* (Kaup, 1958)**Quagga Sole**

D. 65-67; A. 56-58; V. 5. Body flat and slightly elongate; mouth curved; dorsal and anal fins confluent with caudal fin; right pectoral fin falciform, upper rays longer. Body brown with 10 or 11 cross bars, broader than interspaces and extending onto dorsal and anal fins; caudal fin irregularly marked with yellow-white and black; blind side yellowish white. Attains 20 cm. Food fish. Found on coral rubble and sand bottoms. Indo-West Pacific.



Fig. 699. *Zebrias quagga*

Order **TETRAODONTIFORMES**

Family **BALISTIDAE**

Triggerfishes

Very colourful and curious fishes. Body deep and compressed, covered with rough plate-like scales in a series; snout long and tapering, mouth small; 1st dorsal spine strong and stout which can be locked in an erect position by the small 2nd spine; ventral fin rudimentary; gill opening a short slit above and in front of pectoral fin base; teeth chisel-like and close-set; some species have a rows of sharp curved spines on posterior side of body. Usually solitary. When they frightened, immediately hide in reef holes and inside they lock themselves by erecting first dorsal spine. Feeds on a variety of food items from zooplankton to crabs, mollusks, echinoderms and benthic algae. All species are interesting aquarium objects.

Key to species

- 1a. Cheeks naked anteriorly, but with naked longitudinal grooves 2 (Genus *Pseudobalistes*)
- 1b. Cheeks usually scaly; no naked areas or longitudinal grooves 3
- 2a. No spines on caudal peduncle; soft dorsal and anal fins elevated *P. fuscus*
- 2b. Caudal peduncle with 5 or 6 longitudinal rows of small; soft dorsal and anal fins rounded, not elevated *P. flavimarginatus*
- 3a. Teeth red, the upper two lateral canines long and fang-like; caudal fin lunate, the lobes greatly produced *Odonus niger*
- 3b. Teeth white; canine not long and fang-like 4
- 4a. A distinct groove below nostrils and before eye 5
- 4b. No groove before eye 13
- 5a. Caudal peduncle depressed, much longer and wider than deep *Abalistes stellatus*
- 5b. Caudal peduncle normal, not much longer and wider than deep 6
- 6a. Caudal peduncle without spines, enlarged tubercles or longitudinal ridges *Canthidermis maculatus*
- 6b. Caudal peduncle and posterior part of body scales with spines, elongate tubercles or ridges 7
- 7a. Anterior portions of soft dorsal and anal fins higher; anterior teeth even and incisor-like 8 (Genus *Melichthys*)

- 7b. Anterior portions of soft dorsal and anal fins almost uniform, not higher; teeth notched 9
- 8a. Soft dorsal and anal fins pale with prominent black edges; caudal fin pale with narrow black line distally on upper and lower margins *M. vidua*
- 8b. Soft dorsal and anal fins black with prominent white line along its base; caudal fin mostly black *M. indicus*
- 9a. Spines or tubercles of caudal peduncle scales extend well forward on body; caudal fin truncate or slightly emarginated 10 (Genus *Sufflamen*)
- 9b. Spines or tubercles of caudal peduncle scales do not extend anteriorly beyond rear part of 2nd dorsal fin; caudal fin rounded 12 (Genus *Balistoides*)
- 10a. Two dark vertical curved bands before pectoral base *S. bursa*
- 10b. No dark vertical curved bands before pectoral base 11
- 11a. Caudal fin uniformly dark; a line from corner of mouth to down and back, and another line around chin *S. fraenatus*
- 11b. Caudal fin dark with upper and lower margins white, a broad white band distally ..
..... *S. chrysopterus*
- 12a. Cheek covered with scales; body scales small; lateral scale series above 38; ventral side of body with large rounded white blotches *B. conspicillum*
- 12b. Naked longitudinal groove behind corner of mouth; body scales large; lateral scale series 29 to 32; no white blotches on ventral side of body *B. viridescens*
- 13a. Third dorsal spine moderate; distinctly visible in lateral view; numerous curved yellow-orange bands on body *Balistapus undulatus*
- 13b. Third dorsal spine minute, not clearly visible above dorsal edge of body; no such orange yellow bands on body 14 (Genus *Rhinecanthus*)
- 14a. Three longitudinal rows of small antrose spines on caudal peduncle 15
- 14b. Four or five longitudinal rows of antrose spines on caudal peduncle
..... *R. rectangulus*
- 15a. Upper two rows of spines on caudal peduncle longer than lower row
..... *R. aculeatus*
- 15b. Lower two rows of spines on caudal peduncle longer than the upper row; very large black patch on lower side of body *R. verrucosus*

656. *Abalistes stellatus* Anonymus, 1798)

Starry Triggerfish

D. III+26-27; A. 24-25; P. 15. Body robust and compressed; a groove present in front of eye; mouth terminal; caudal peduncle slender and depressed; caudal fin double emarginate. Body greenish brown above, silvery white ventrally with small pale blue or yellow spots dorsally; three whitish blotches on back. Attains 55 to 60 cm. Found on sand-silt or mud bottoms adjacent to reefs. Not a common species. Feeds on algae and small invertebrates. Indo-West Pacific.



Fig. 700. *Abalistes stellatus*

657. *Balistapus undulatus* (Mungo Park, 1797)

Orange Striped Triggerfish

D. III+25-27; A. 20-24; P. 12-13. Body compressed, covered with strong rough plate-like scales; no groove before eye; mouth terminal; two rows of sharp antrorse spines on



Fig. 701. *Balistapus undulatus*

caudal peduncle; caudal fin slightly rounded to emarginate. Body dark green with diagonal curved orange lines on posterior head and body; diagonal orange and blue stripes around mouth to below pectoral fin; a black area around caudal peduncular spines; caudal fin bright orange; rays of dorsal and anal fins light orangish. Attains 30 cm. Found around reef areas in shallow waters. Hide inside crevices and under coral heads. Very common reef fish. Feeds on algae, sea urchins, crustaceans, mollusks, polychaetes, sponges, live corals, etc. Popular ornamental fish. Indo-Pacific.

658. *Balistoides conspicillum* (Bloch & Schneider, 1801)

Clown Triggerfish

D. III+25-26; A. 1-22; P. 14-15. Body ovate and compressed; deep groove before eye below nostrils; three rows of short forward curved spines on posterior part of body; dorsal and anal fins not elevated; caudal fin rounded. Body black with large round white blotches on ventral half; a patch of yellow network on back below dorsal fin; a broad light yellowish white band on snout below front of eye; lips and area around mouth light orange yellow and edged posteriorly by a narrow black line and white sub-marginal line; caudal fin black with a broad white band in middle. Attains 40 to 50 cm. Found in outer reef areas. Its occurrence is very rare. Feeds on small invertebrates. Very beautiful and spectacular ornamental fish. Indo-West Pacific.



Fig. 702. *Balistoides conspicillum*

659. *Balistoides viridescens* (Bloch & Schneider, 1801)

Titan Triggerfish

D. III+24-26; A. 24; P. 14. Body deep and compressed; a deep groove before eye; scales large and tuberculated; small forward curved spines in four rows on sides of caudal peduncle;

soft dorsal and anal fins slightly elevated; caudal fin slightly rounded. Body yellowish, paler posteriorly, the centers of scales broadly brown; a broad black zone with yellow spots extending from dorsal part of head to pectoral base; a broad black band above mouth to cheek; soft dorsal, anal and caudal fins with broad black borders at base and margin. Largest of the trigger fishes, attains 70 to 80 cm. Found around coral reef areas in shallow waters. Very common triggerfish. Feeds on echinoderms, crustaceans, molluscs, polychaetes and live corals. Indo-Pacific.



Fig. 703. *Balistoides viridescens*

660. *Canthidermis maculatus* (Bloch, 1786)

Rough Triggerfish

D. III+24-25; A. 21-22; P. 14. Dorsal and ventral profiles of body equally concave; a deep groove in front of eye below nostrils; no spines in peduncular region; dorsal and anal

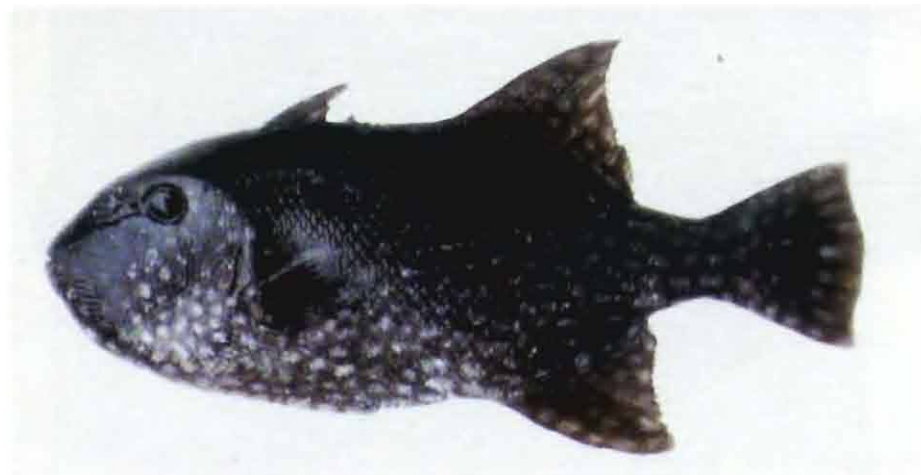


Fig. 704. *Canthidermis maculatus* (Adult)

fns angular; caudal fin double emarginate. Body dark bluish brown with elongated white spots, more on ventral side; fins dark with grey spots. Attains 40 to 50 cm. Found around reef areas and juveniles in intertidal rock pools. Uncommon fish. Feeds on small invertebrates. Indo-Pacific.



Fig. 705. *Canthidermis maculatus* (Young)

661. *Melichthys indicus* Randall & Klausewitz, 1973

Indian Triggerfish

D. III+32-35; A. 27-30; P. 15-16. Body compressed and dorsal and ventral profiles equally concave; mouth supraterminal; a shallow oblique groove on cheek; rear part of body scales with poorly developed ridges; caudal fin slightly rounded to emarginate. Body dark brown to black, groove on cheek violet; soft dorsal and anal fins black with white line along base; caudal fin black. Attains 20 to 25 cm. Found on outer reef areas. Common triggerfish. Popular ornamental fish. Feeds on small invertebrates. Indian Ocean.



Fig. 706. *Melichthys indicus*

662. *Melichthys vidua* (Richardson, 1845)**Pinktail Triggerfish**

D. III+32-35; A. 28-30; P. 14-15. Body compressed; dorsal and ventral profiles equally concave; mouth supraterminal; a deep groove in front of eye; anterior part of soft dorsal anal and fins strongly elevated; no spiny ridges on peduncular region; caudal fin truncate. Body dark brown to black; basal part of caudal fin white, outer part light pinkish; soft dorsal and anal fins white with a black border; pectoral fin yellow. Attains 30 cm Found around rich coral reef areas under ledges and caves. Common triggerfish. Good aquarium fish. Feeds on small benthic invertebrates, algae and detritus. Indo-Pacific.

Fig. 707. *Melichthys vidua*663. *Odonus niger* (Ruppell, 1836)**Redtooth Triggerfish**

D. III+34-35; A. 28-30; P. 14-15. Body compressed; mouth upturned, the chin protruding; the two upper teeth visible when mouth closed; deep groove before eye below nostrils; seven

Fig. 708. *Odonus niger*

rows of small spines on posterior part of body; anterior part of dorsal and anal fins elevated; caudal fin lunate, lobes prolonged. Body bluish black, the teeth red; dorsal, anal and posterior margin of caudal fin margins blue. Attains 40 cm. Found on outer reef slopes. Frequently encountered. Good aquarium fish. Feeds on zooplankton and other small invertebrates. Indo-Pacific,

664. *Pseudobalistes flavimarginatus* (Ruppell, 1829)

Yellowface Triggerfish

D. III+24-26; A. 22-23; P. 15. Mouth terminal; a deep groove before eye under nostrils; caudal peduncle with 5 or 6 rows of small spines; soft dorsal and anal fins rounded; caudal fin emarginate. Body light greyish yellow, the scale centers dark grey; anterior and ventral part of head orange-yellow; margin of dorsal, anal and caudal fins orange-yellow. Attains 60 cm. Found in sheltered sandy reef areas. Very common triggerfish. Feeds on invertebrates. Indo-Pacific.



Fig. 709. *Pseudobalistes flavimarginatus*

665. *Pseudobalistes fuscus* (Bloch & Schneider, 1801)

Yellow-spotted Triggerfish

D. III+26-27; A. 22-24; P. 15. Body compressed and slightly deep; a deep groove in front of eye; shallow horizontal grooves on lower cheek; no scales around mouth; caudal peduncle without spines; anterior part of soft dorsal and anal fins elevated; caudal fin emarginate, lobes prolonged in adults. Body deep blue with small yellow spots joined to form irregular small bands; margin of soft dorsal, anal and caudal fins light blue. Attains 50 cm. Found in all types

of reef habitats in shallow sheltered waters. Not uncommon. Popular ornamental fish. Feeds on invertebrates. Indo-West Pacific.



Fig. 710. *Pseudobalistes fuscus*

666. *Rhinecanthus aculeatus* (Linnaeus, 1758)
Blackbar Triggerfish

D.III+24-26; A. 21-22; P. 12-13. Body compressed, dorsal and ventral profiles of head almost straight; mouth terminal; no deep groove before eye; three rows of forward-curving spines on caudal peduncle; caudal fin rounded. Body white with a large blackish area on sides containing four diagonal bluish-white bands from mid-side to anal fin base; four blue lines across inter-orbital and three from eye to pectoral fin base; an orange yellow area around mouth; an yellow band from mouth to below pectoral base; caudal peduncular spines and anus black. Attains 25 to 30 cm. Found in sandy reef lagoons. Common triggerfish. Popular ornamental fish. Feeds on algae, detritus and small invertebrates. Indo-Pacific.



Fig. 711. *Rhinecanthus aculeatus*

667. *Rhinecanthus rectangulus* (Bloch & Schneider, 1801)**Wedgetailed Triggerfish**

D. III+23-24; A. 20-21; P. 14. Body compressed, dorsal and ventral profiles of head almost straight; mouth terminal; no deep groove before eye; four rows of forward-curving spines on caudal peduncle; caudal fin rounded. Body brown above; head and belly bluish white; a broad diagonal black band from eye through pectoral base to anal fin base; four narrow blue bands with dark inter-spaces crossing inter-orbital; a wedge shaped black area posteriorly on body covering caudal peduncle, its edge golden yellow and preceded by a parallel golden-yellow band; pectoral base with red bar. Attains 25 to 30 cm. Found on outer reef areas. Common triggerfish. Good aquarium pet. Feeds on algae, detritus and small invertebrates. Indo-Pacific.



Fig. 712. *Rhinecanthus rectangulus*

668. *Rhinecanthus verrucosus* (Linnaeus, 1758)**Blackpatch Triggerfish**

D. III+23-25; A. 21-23; P. 13-14. Body compressed, dorsal and ventral profiles of head almost straight; mouth terminal; no deep groove before eye; three rows of forward-curving spines on caudal peduncle; caudal fin slightly rounded. Body greyish brown dorsally, white ventrally with a large black patch on lower side above anus; a broad brownish band with four bluish lines across inter-orbital space, continuing with three blue lines to pectoral base; a red line from mouth to lower pectoral fin base. Attains 20 to 22 cm. Found in shallow

silt-sand areas of reefs. Rarely encountered. Feeds on algae and benthic invertebrates. Good aquarium pet. Indo-West Pacific.



Fig. 713. *Rhinecanthus verrucosus*

669. *Sufflamen bursa* (Bloch & Schneider, 1801)

Scimitar Triggerfish

D. III+28-30; A. 25-27; P. 13-14. Body compressed; dorsal and ventral profiles of head almost straight; mouth terminal; a deep groove before eye below nostrils; series of longitudinal rows of small ridges on posterior third of body along scale rows; caudal fin slightly rounded. Body greyish dorsally and pale below, a narrow white line extended from above upper lip

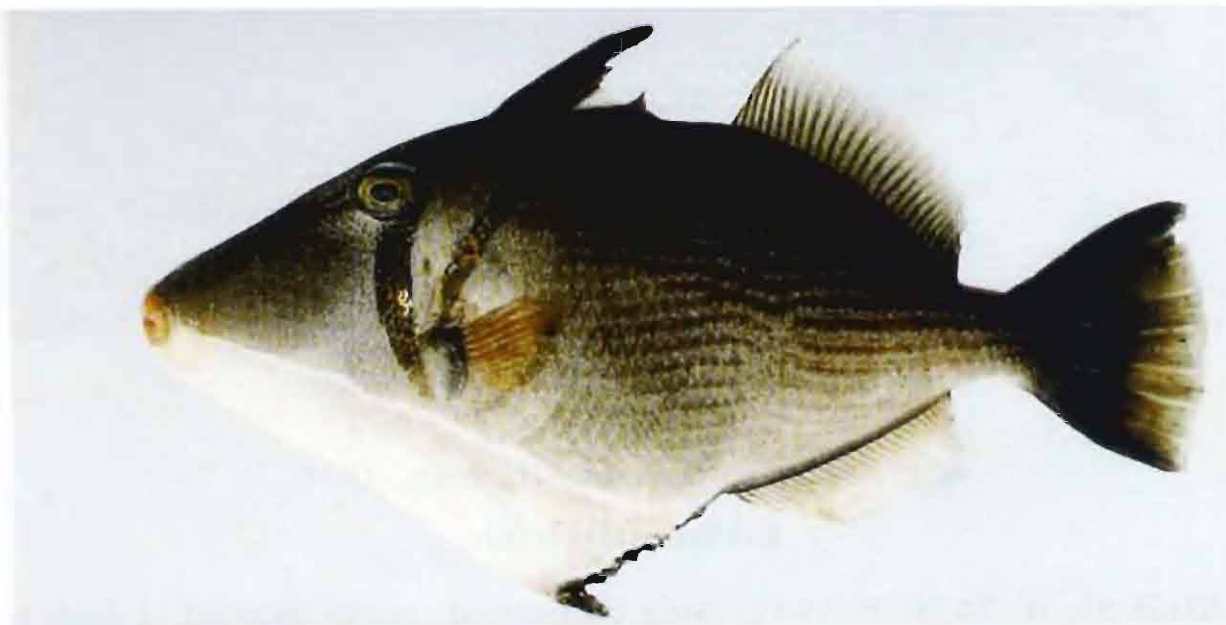


Fig. 714. *Sufflamen bursa*

to origin of anal fin; a semicircular yellowish brown band from pectoral base through posterior part of eye, another slightly oblique band dorsally from top of pectoral base; edge of pelvic flap black. Attains 22 cm. Found around shallow sheltered reef areas near sandy bottom. Uncommon. Feeds on benthic invertebrates and algae. Good aquarium object. Indo-Pacific.

670. *Sufflamen chrysopterus* (Bloch & Schneider, 1801)

Flagtail Triggerfish

D. III+26-28; A. 24-26; P. 12-14. Body compressed; mouth terminal; a deep groove before eye below nostrils; longitudinal rows of small spines on posterior third of body; caudal fin truncate with acute corners. Body dark brown with an yellow streak from lower edge of eye to pectoral base; lower part of head and abdomen purplish; caudal fin yellowish brown with broad white posterior border and narrow upper and lower margins. Attains 25 to 30 cm. Found in sheltered lagoons. Not uncommon. Popular ornamental fish. Feeds on small invertebrates. Indo-West Pacific.



Fig. 715. *Sufflamen chrysopterus*

671. *Sufflamen fraenatus* (Latreille, 1804)

Bridled Triggerfish

D. III+28-31; A. 24-26; P. 14-16. Body compressed; mouth terminal; a deep groove before eye below nostrils; longitudinal rows of small spines on the posterior third of body;

anterior part of soft dorsal and anal fins slightly elevated; caudal fin truncate. Body light brown with a narrow light yellow band under lip. Attains 30 to 35 cm. Found in shallow to deep waters around reefs. Uncommon. Feeds on echinoderms molluscs, crustaceans, tunicates and small fish. Indo-Pacific.

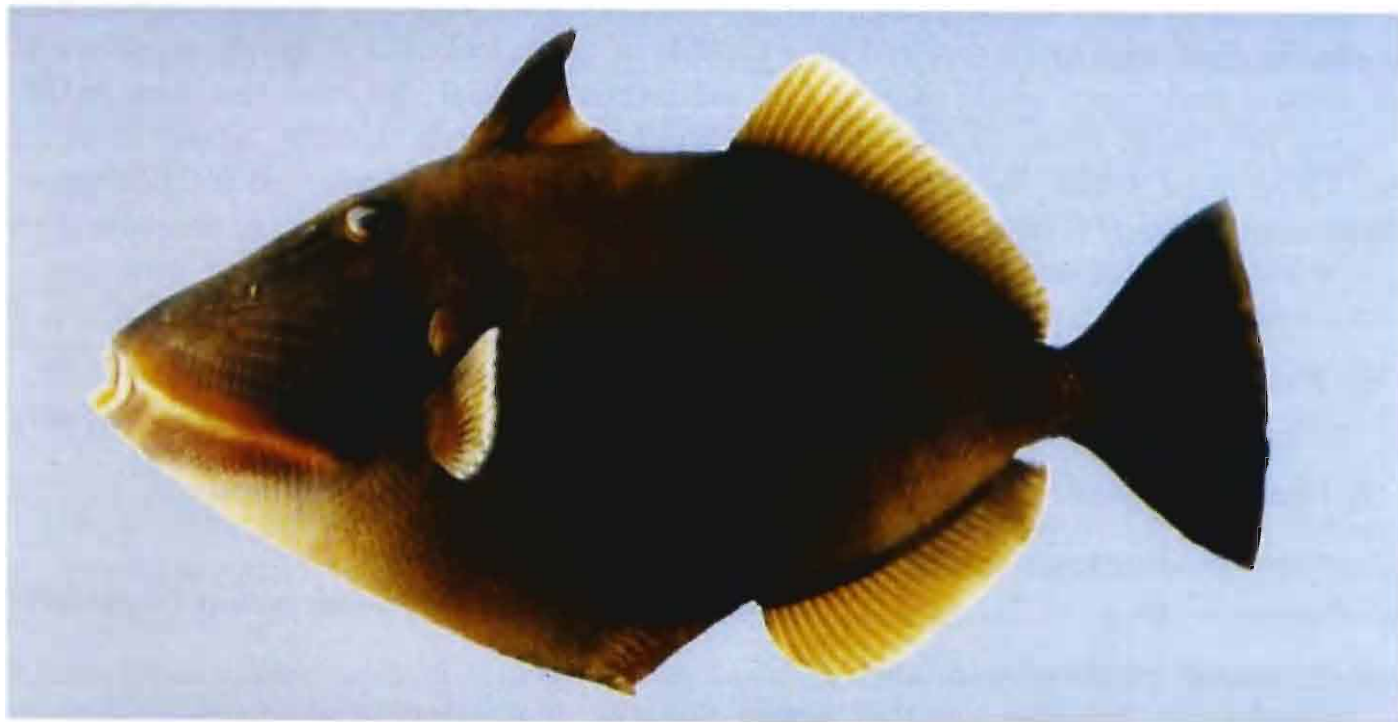


Fig. 716. *Sufflamen fraenatus*

Family MONACANTHIDAE
Leatherjackets or Filefishes

Small to moderate sized sluggish fishes; body deep and highly compressed; skin smooth to rough; mouth small and terminal, teeth pointed, not fused together; first dorsal with two spines, the first spine prominent and long capable of being locked in a upright position and the second spine very small; ventral fins rudimentary; dorsal and anal fins long based. Pectoral fins small. Found in shallow weedy and coral reef areas. Usually attains 20 to 25 cm. Large sized fishes are considered as good food fishes but some species poisonous. Herbivorous fishes.

Key to species

- 1a. Body extremely elongate; a fleshy barbel on chin; pelvic spine absent.....
 *Anacanthus barbatus*
- 1b. Body not elongate; no fleshy barbel on chin; pelvic present or rudiment2
- 2a. Snout produced into a slender tube, turning upwards at mouth.....
 *Oxymonacanthus longirostris*
- 2b. Snout not produced into tube3
- 3a. Soft dorsal and anal fins each with 41 or more rays..... 4 (Genus *Aluterus*)
- 3b. Soft dorsal and anal fins each with less than 39 rays5
- 4a. Ventral profile of head concave; caudal fin longer than snout and rounded; caudal peduncle deeper than long; sides of body with longitudinal blue lines and dashes.....
 *A. scriptus*
- 4b. Ventral profile of head bulbous; caudal fin shorter than snout and emarginate; caudal peduncle longer than deep; no blue lines or dashes on body.....*A. monoceros*
- 5a. Ventral rudiment fixed6
- 5b. Ventral rudiment movably articulated with pelvis7
- 6a. A patch of numerous long spines or tooth-brush like bristles on sides of body between soft dorsal and anal fins; body dark brown with incomplete black bars on middle ...
*Amanses scopas*
- 6b. No spines or brush-like bristles on sides of body, but a large brush-like patch of setae on sides of caudal peduncle; body bluish grey with close-set orange-brown spots....
 *Cantherhines pardalis*
- 7a. Ventral rudiment large, with prominent barbs; first dorsal spine strong with large barbs; no produced fin rays in dorsal or caudal fin; body bright orange
 *Pervagor melanocephalus*

- 7b. Ventral rudiment moderate, with small barbs; upper caudal rays produced or not; colour not as in 7a 8
- 8a. Margin of ventral flap slightly convex; rudiment not extending prominently beyond flap; Dorsal spine with barbs only on posterior edge; caudal peduncle with 4 to 6 retrose spines; ventral flap greatly developed; filamentous extension from upper corner of caudal fin *Monacanthus chinensis*
- 8b. Margi of ventral flap straight to concave; ventral rudiment extending prominently beyond flap 9 (Genus *Paramonacanthus*)
- 9a. Body elongate; height 3.0 in SL; dorsal and anal fins concave; first dorsal spine origin above posterior half of eye; upper caudal fin ray produced into a bifid filament *C. japonicuss*
- 9b. Body not elongate; height 2.0 to 2.5 in SL; dorsal and anal fins slightly convex; first dorsal spine origin above hind border of eye; no filamentous extension from caudal fin 10
- 10a. Dorsal spine with a row of strong antrose barbs; skin of body and tail with scattered long, fringed filaments; caudal peduncle without spines or bristles; body uniform brown *M. nematophorus*
- 10b. Dorsal spine without strong antrose barbs; skin of body and tail without fringed filaments; body brownish with blotches; caudal peduncle with two cross bands *P. choirocephalus*

672. *Aluterus monoceros* (Linnaeus, 1758)
Unicorn Leatherjacket

D. II+48-51; A. 47-51; P. 14. Large sized fishes, body highly compressed; snout profile slightly convex; caudal fin emarginate. Body grey with numerous brown spots on upper side; dorsal and anal fins light yellowish, caudal fin light brown. Attains 70 to 75 cm. Found in shallow protected weed and reef areas. Feeds on a variety of benthic fauna. Good aquarium fish. Uncommon, difficult to notice the fish. Distributed in all tropical and sub-tropical Seas.

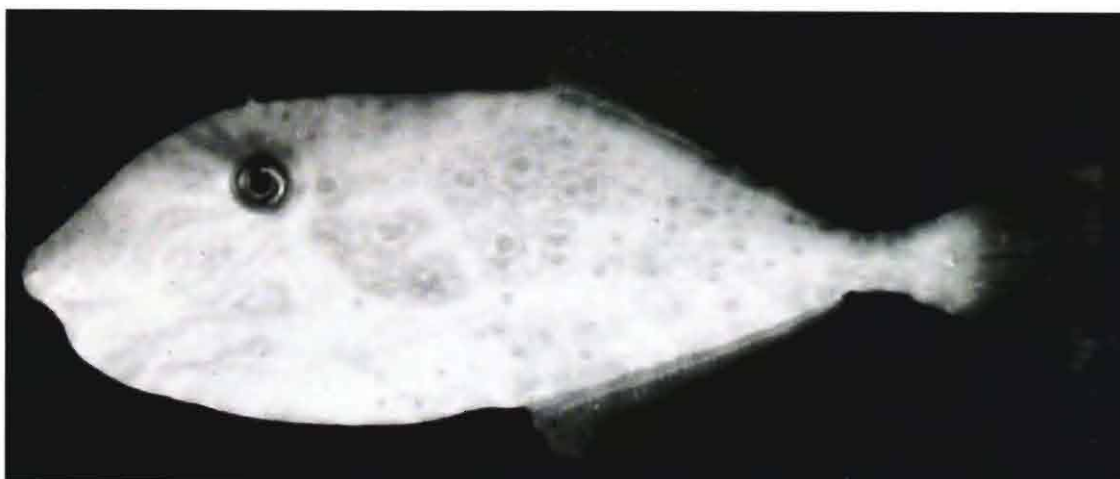


Fig. 717. *Aluterus monoceros*

673. *Aluterus scriptus* (Osbeck, 1765)
Scribbled Leatherjacket

D. II+45-46; A. 48-52; P. 14-15. Body elongate and compressed; snout long and mouth small and upturned; first dorsal spine originates over eye; caudal fin long and rounded, the edge rugged. Body olive-brown with irregular blue spots, short lines and small black spots; dorsal and anal fins light yellow; caudal fin light blue. Attains 70 to 80 cm. Found in lagoons and outer reef areas in moderately deep waters. Very common reef fish. Good aquarium fish. Feeds on a variety of benthic animals, algae and sea grasses. Distributed in all tropical and sub-tropical Seas.



Fig. 718. *Aluterus scriptus*

674. *Amanses scopas* (Cuvier, 1829)
Brush-Sided Leatherjacket

D. II+26-28; A. 22-24; P. 13. Body deep and compressed; snout short, dorsal profile straight; first dorsal spine strong and situated over eye; a patch of posteriorly directed spines in front of caudal peduncle; caudal fin slightly rounded. Body dark brown with incomplete black bars on middle side of body; caudal fin dark black; other fins light yellowish. Attains 20 cm. Found in sheltered reef areas under caves and ledges. Uncommon. Good aquarium fish. Feeds on small invertebrates.



Fig. 719. *Amanses scopas*

675. *Anacanthus barbatus* (Gray, 1830)**Tapefish**

D. I+48-50; A. 56-58; P. 8-10. Body compressed and extremely elongate; snout long and pointed, mouth dorsal in position; a long fleshy barbel on chin; gill opening a horizontal slit located posterior below front border of eye; dorsal fin spine very slender and weak; pelvic flap and spine absent. Males have skinny flap from throat to vent. Caudal fin lanceolate. Body dark brown; fins yellowish; tail with six dark transverse bands. Attains 30 cm. Common on coral reefs, mud banks and mangrove areas. Feeds on small benthic organisms. Indo-West Pacific.

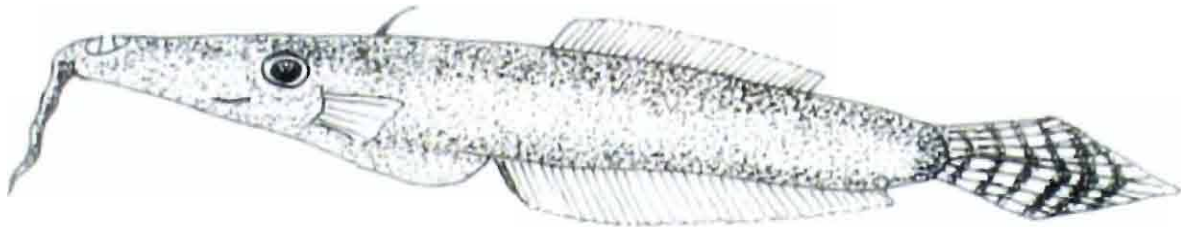


Fig. 720. *Anacanthus barbatus*

676. *Cantherhines pardalis* (Ruppell, 1837)**Honeycomb Filefish**

D. II+34-36; A. 29-31; P. 13-14. Body compressed and dorsal profile of snout slightly concave; males with brush-like setae on sides of caudal peduncle. Colour bluish grey to greenish with light reticulations on sides of body producing a honeycomb pattern; faint narrow brownish lines on head; a small white spot on upper edge of caudal peduncle; dorsal and anal fins light orangish-yellow. Attains 15 to 20 cm. Found on outer reef areas. Feeds on algae, molluscs, sea urchins, sponges, etc. Good aquarium fish. Indo-West Pacific.



Fig. 721. *Cantherhines pardalis*

677. *Monacanthus chinensis* (Osbeck, 1765)**Fan-bellied Leatherjacket**

D. II+28-30; A. 28-30; P. 12. Body compressed and very deep; dorsal profile of snout concave; pelvic flap large and fan-like; upper margin of caudal fin with filamentous extension. Body tan with large irregular brown mottling; brown stripes radiating from eye; small blue spots on head. Attains 35 cm. Found in lagoons and sheltered reef areas. Uncommon. Very beautiful ornamental fish. Indo-West Pacific.



Fig. 722. *Monacanthus chinensis*

678. *Oxymonacanthus longirostris* (Bloch & Schneider, 1801)**Beaked Leatherjacket**

D. II+32-34; A. 30-31; P. 11-12. Body elongate and snout relatively long, mouth slightly upturned; dorsal and ventral profiles of body concave; ventral fin rudiment; scales with backwardly



Fig. 723. *Oxymonacanthus longirostris*

directed spinules. Body bluish green with numerous small orange spots, snout with three yellowish orange bands; caudal fin with small black blotch posteriorly. Small fishes, attains 8 to 9 cm. Feeds on coral polyps. Often found in pairs among branched corals. Beautiful ornamental fish. Most common species found in rich coral reef areas. Indo-West Pacific.

679. *Paramonacanthus choirocephalus* Bleeker, 1852

Pig-faced Filefish

D. II+ 28-30; A. 27-30; P. 12. Body compressed, dorsal profile of snout slightly concave; mouth terminal; caudal fin rounded; first dorsal spine originating over posterior half of eye, or slightly behind eye; dorsal spine with rough anterior surface and two rows of barbs behind. Body brownish with an indistinct two dark bands, first from rear of soft dorsal fin to pectoral fin, second from caudal fin base to ventral flap; two transverse bands on caudal. Attains 25 cm. Found in protected shallow reef areas. Uncommon. Indian Ocean.

680. *Paramonacanthus japonicus* (Tilesius, 1865)

Filefish

D. II+26-30; A. 26-30; P. 11. Very small fishes, body compressed, profile of snout slightly concave, mouth terminal; scales small and rough; ventral fin spine granulated; second dorsal ray elongate and filamentous; caudal fin round, the upper most ray produced into a bifid filament in males. Body brown, large dark blotches below second dorsal fin and a small dark saddle on caudal peduncle; caudal fin with two distinct cross bands. Attains 8 to 9 cm. Found in protected shallow reef areas. Uncommon. Indo-West Pacific.

681. *Paramonacanthus nematophorus* (Gunther, 1870)

Velvet Leatherjacket

D. II+ 26; A. 27; P. 11. Body slightly oval and highly compressed; dorsal profile of snout slightly concave; skin velvety with long fringed filaments. No spines or bristles on caudal peduncle. Body uniform brown; caudal fin with two indistinct dusky bars; all other fins hyaline. Attains 10 to 15 cm. Found on coral reef areas in slightly deeper waters. Uncommon. Indian Ocean.

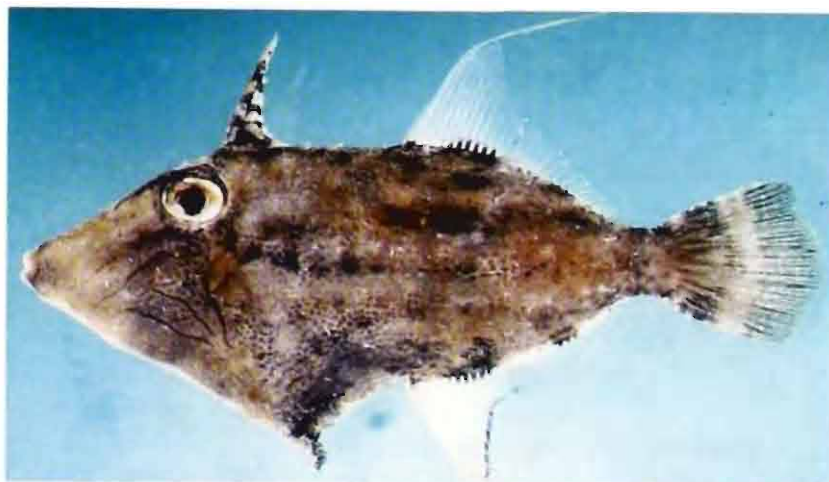


Fig. 724. *Paramonacanthus nematophorus*

682. *Pervagor melanocephalus* (Bleeker, 1853)**Black-headed Leatherjacket**

D. II+30-32; A. 27-29; P. 12. Body compressed; first dorsal spine origin over eye, lateral edges with a row of large backwardly directed barbs; caudal fin rounded. Body bright orange, head and nape dark brown; soft dorsal and anal fin light yellow, caudal fin orange with narrow dark vertical sub-marginal bands. Attains 10 cm. Found around rich coral reef areas and lagoons in shallow waters. Uncommon. Good aquarium object. Indo-West Pacific.



Fig. 725. *Pervagor melanocephalus*

Family TRIACANTHIDAE

Tripod Fishes

Body compressed, snout pointed, skin with rough minute scales; caudal peduncle very slender; 1st dorsal fin with five spines, the 1st spine long and prominent; 2nd dorsal with 22 to 26 rays; ventral fin of only one strong spine; caudal fin deeply forked.

Key to species

- 1a. Second dorsal spine more than half length of first spine; scales with several transverse ridges..... *Pseudotriacanthus strigilifer*
- 1b. Second dorsal spine less than half length of first dorsal spine; scales with a prominent spinules on ridge; membrane between anterior two spines of first dorsal fin dark
..... *T. biaculeatus*

683. *Pseudotriacanthus srigillifer* (Cantor, 1850)

Tripodfish

D. V+I, 22-23; A. 17-18; P. 13-14; V. I. Snout elongate; first dorsal spine strong and longer; lateral line conspicuous; caudal peduncle tapering towards base; caudal fin forked. Body silvery brown above, lighter below; yellowish blotches on dorso-lateral side of body; fins light yellow; edges of 1st and 2nd dorsal spines and its membranes dusky. Attains 40 to 55 cm. Dorsal and ventral spines venomous. Ornamental fish. Feeds on a variety of benthic animals. Found around coral reefs in shallow protected areas. Indo-West Pacific.



Fig. 726. *Pseudotriacanthus srigillifer*

684. *Triacanthus biaculeatus* (Bloch, 1786)

Black-finned Tripodfish

D. V+23; A. 21; P. 13-14; V. I. Body oblong and compressed; snout slightly concave; caudal peduncle depressed. Body silvery brown on snout and back, white below; membrane

between first and second dorsal spines black; dorsal, anal and pectoral fins light yellow; caudal fin yellowish orange. Attains 30 cm. Dorsal and ventral spines venomous. Ornamental fish. Feeds on a variety of benthic animals. Found in sandy protected reef areas. Indo-West Pacific.



Fig. 727. *Triacanthus biaculeatus*

Family OSTRACIIDAE

Boxfishes

Very interesting and fascinating fishes. Body enclosed in a tough carapace of polygonal plates with gaps for mouth, gill opening, anus, caudal peduncle and fins; surface is rough due to presence of small tubercles; lips fleshy; mouth small, low on head; single row of teeth conical to incisiform with rounded tips; no spines in fins; pelvic fins absent. Usually slow swimmers found around rocky, coral reefs, sand and grass beds from shallow to moderate depths. Some species produce poisonous substance known as ‘Ostracitoxin’ when fish is under stress.

Key to species

- 1a. Carapace 4-angled; no ridge on dorsal mid-line 2
- 1b. Carapace with a ridge or spine on dorsal mid-line 4
- 2a. Snout not projecting; back gently convex; lateral and pelvic ridges rounded
 3 (Genus *Ostracion*)
- 2b. Snout bulbous, projects beyond mouth; back flat or slightly concave; lateral and pelvic
 ridges sharp *Rhynchostracion nasus*
- 3a. Body brownish or black with white spots on carapace, caudal peduncle and caudal fin
 *Ostracion meleagris*
- 3b. Body yellow to purplish brown with dark-edged pale blue or white spots on carapace
 and dark spots on caudal fin and peduncle *O. cubicus*
- 4a. Carapace 5-angled in adults; no spine on back horns or spines project forward before
 eyes; caudal fin large *Lactoria cornuta*
- 4b. Carapace 3-angled in adults; a strong spine on back; no large spines project forward
 before eyes; caudal fin moderate *Tetrasomus gibbosus*

685. *Lactoria cornuta* (Linnaeus, 1758)

Longhorn Cowfish

D. 8-9; A. 8-9; P. 10-11. Can be easily identified by a long and sharp horn-like projections from front of head and one from each side of posterior end of carapace; head and body encased in five angled carapace; dorsal profile of head nearly vertical; a feeble spine on mid-dorsal side; caudal fin very long and fan-like. Body yellowish grey to brown with pale blue spots on sides; all fins light yellow, caudal fin with scattered faint blue sots. Attains 40 to

45 cm. Found in weedy areas near reefs. Uncommon. Feeds on benthic invertebrates and algae. Good aquarium pet. Indo-Pacific.



Fig. 728. *Lactoria cornuta*

686. *Ostracion cubicus* Linnaeus, 1758

Yellow Boxfish

D. 8-9; A. 9; P. 10-11. Body encased in a rectangular box-like carapace; ridges and back gently rounded; no spines on carapace; body elongate with growth; a bump anteriorly on snout; caudal fin broad and rounded. Juveniles bright yellow with black spots. Adults brownish yellow with white spots edged in black. Attains 40 to 45 cm. Found in outer reef areas and reef slopes in moderate depths. Not uncommon. Feeds on a variety of invertebrates and algae. Popular ornamental fish. Indo-West Pacific.



Fig. 729. *Ostracion cubicus* (Adult)



Fig. 730. *Ostracion cubicus* (Young)

687. *Ostracion meleagris* Shaw, 1796
Whitespotted Boxfish

D. 9; A. 9; P. 10-11. Body encased in a rectangular box-like carapace; ridges and back gently rounded; no spines on carapace; a bump anteriorly on snout; caudal fin broad and rounded. Females dark brown with small white spots. Males bluish except dorsally dark brown; dorsal side of body with black spots while rest of body with dark-edged orange-yellow spots on sides. Attains 15 to 20 cm. Found in coral reef areas in shallow waters. Common boxfish. Popular ornamental fish. Feeds on benthic invertebrates and algae. Indo-Pacific.

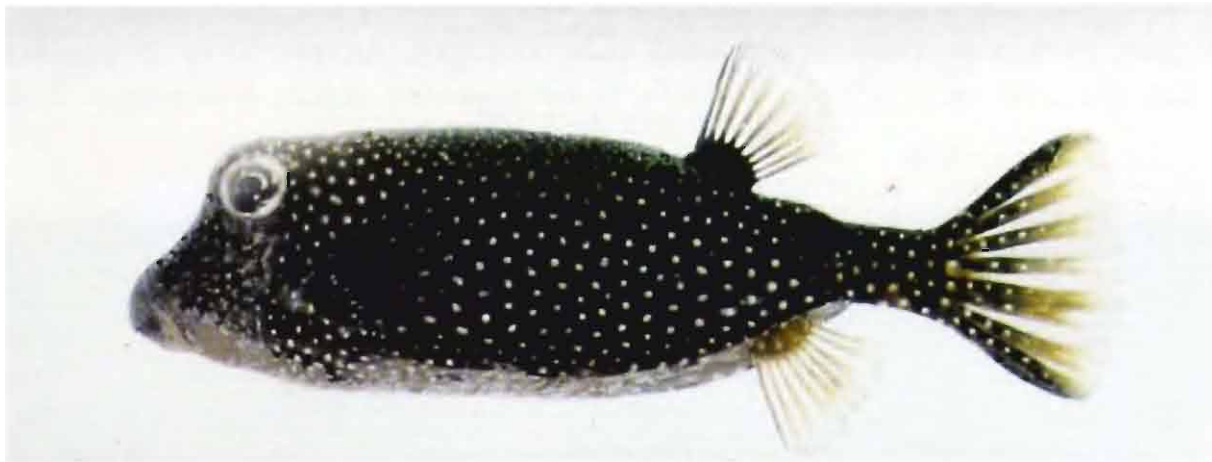


Fig. 731. *Ostracion meleagris*

688. *Rhynchostracion nasus* (Bloch, 1785)
Shortnose Boxfish

D. 9; A. 9; P. 11 Body encased in a pentagonal carapace; all surfaces are concave; upper lateral and mid-dorsal ridges sharp; front of snout with a small protuberance;



Fig. 732. *Rhynchostracion nasus*

interorbital deeply concave; caudal fin slightly emarginate. Body light brown to dark; small black spots on dorsal side of body and around caudal peduncle. Attains 25 cm. Found in reef and weedy areas. Uncommon. Good aquarium fish. Feeds on algae and invertebrates. Indo-West Pacific.

689. *Tetrosomus gibbosus* (Linnaeus, 1758)

Humpback Boxfish

D. 9; A. 9; P. 10-11. Body encased in a triangular carapace; three ridges sharp; median dorsal ridge strongly elevated in center of body and ended with large triangular spine; ventrolateral ridge and a small spine above eye; caudal fin slightly emarginate. Body brown to dark grey, each bony plate with a small pale blue spot. Attains 20 to 25 cm. Found in weedy and sea grass areas adjacent to reefs. Good aquarium object. Uncommon. Indo-West Pacific.

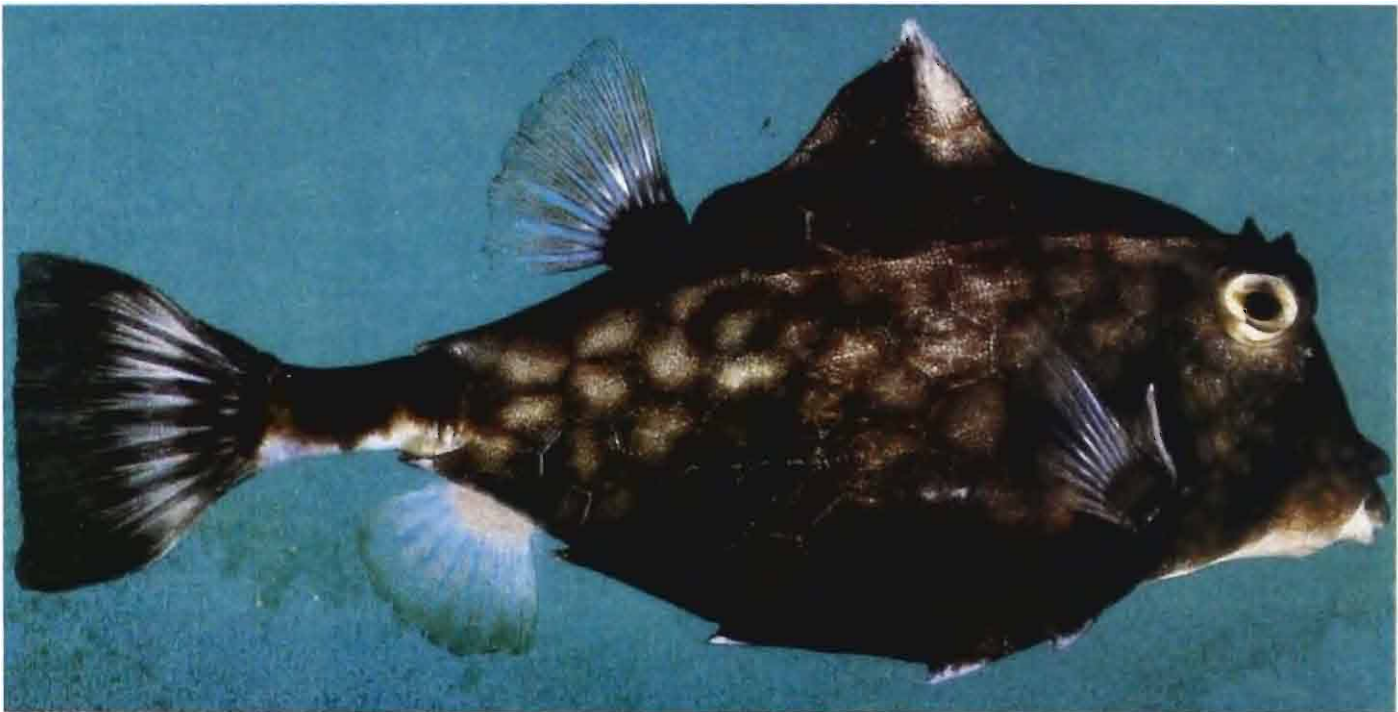


Fig. 733. *Tetrosomus gibbosus*

Family TETRAODONTIDAE

Puffers

Fairly large family of small to moderate sized fishes. Body short and robust with smooth tough, elastic skin or embedded spines; teeth fused into a beak-like dental plate with a median suture in each jaw; a single nostril on each side of snout; dorsal and anal fin situated posteriorly; ventral fins absent; no spines in fins; gill opening is a slit in front of pectoral fin base. Puffers capable of inflate body by swallowing air or water to form an almost spherical ball to deter predators. Known for producing lethal poison known as “tetraodontoxin” in their tissues. Causes severe illness when eaten the flesh. If skin and viscera carefully removed, flesh may be consumed without any ill effects.

Key to species

- 1a. Snout long; single inconspicuous nostril on each side of snout; body compressed
..... 2 (Genus *Canthigaster*)
- 1b. Snout short; nasal organ various, but not with a single inconspicuous nostril on each side; body heavy and broad 4
- 2a. Caudal fin with vertical lines or spots *C. solandri*
- 2b. Caudal fin without vertical lines or spots 3
- 3a. Upper part of head and body with 2 to 4 wide dark bars; no blue edged black spot at dorsal fin base *C. valentini*
- 3b. No dark bars on upper part of head and body; a blue edged black spot on dorsal fin base *C. bennetti*
- 4a. Nasal organs covered by a small sac with 2 nostrils; caudal peduncle depth ½ or less of peduncular length 5 (Genus *Lagocephalus*)
- 4b. Nasal organs not covered by a small sac with 2 nostrils; caudal peduncle depth more than ½ of peduncle length 7
- 5a. Spinules on dorsal surface body extend to or beyond dorsal fin origin 6
- 5b. Spinules on dorsal surface of body extend only about half way from interorbital region to dorsal fin origin *L. guentheri*
- 6a. Dorsal surface of head and body greenish with black spots; body elongate, its depth 4.5 to 4.9 in SL; spinules on back extend past dorsal fin almost to caudal fin
..... *L. scleratus*

- 6b. Dorsal surface of head and body without black spots; body not elongate, its depth 2.9 to 3.4 in SL; spinules on back from nostrils to dorsal fin *L. lunaris*
- 7a. Nasal organs in the form of a depression with slightly raised margin extended before and behind into a pair of elongate flaps, or cup shaped with front and rear edges produced into broadly rounded flaps; anal fin rays 8-9; back and sides with distinct white blotches *Chelonodon patoca*
- 7b. Nasal organs a bifid tentacle, the opposing surface of each tentacle with minute pits; anal fin rays 9-12; back and sides with or without blotches or bands
..... 8 (Genus *Arothron*)
- 8a. Caudal fin margins black; a dark blotch at base of pectoral fin; no other marks on body*A. immaculatus*
- 8b. Caudal fin margins not black; various markings on body; dark blotch at base of pectoral fin present or absent 9
- 9a. Anus in a black area 10
- 9b. Anus not in a black area 12
- 10a. Body with dark spots 11
- 10b. Body with narrow lines on back and a dark reticulated pattern below pectoral fin *A. mappa*
- 11a. Dorsal surface of body spotted; ventral side uniform, in juveniles with wide bands *A. stellatus*
- 11b. Entire body with irregularly spaced blotches *A. nigropunctatus*
- 12a. Cheek and snout, sides, back, caudal peduncle and fin with white spots; ventrolateral side with curved stripes *A. hispidus*
- 12b. Back, sides, caudal peduncle and fin with white spots; belly with longitudinal stripes ascending to cheeks and snout forming oblique lines *A. reticularis*

690. *Arothron hispidus* (Linnaeus, 1758)

Whitespotted Puffer

D. 10; A. 10; P. 18-19. Body heavy and broad; small spinules on head and body except on posterior caudal peduncle; caudal fin rounded. Body greyish green or brown with small white spots dorsally, shading to white ventrally with curved dark bars on sides of head and below pectoral fin. Attains 45 to 50 cm. Found in sheltered shallow reef areas. Very common puffer encountered on reefs. Flesh is poisonous. Feeds on algae, molluscs, sponges, corals,

anemones, crustaceans, and echinoderms including Crown-of-Thorns Starfish. Good ornamental fish. Indo-West Pacific.



Fig. 734. *Arothron hispidus*

691. *Arothron immaculatus* (Bloch & Schneider, 1801)

Blackedged Puffer

D. 9-10; A. 9-10; P. 16-17. Body heavy and broad; caudal fin rounded. Body brown above, lighter below; margin of caudal fin black, a dark blotch at pectoral fin base. Attains 30 cm. Found in rubble and weedy areas of reefs. Feeds on invertebrates. Flesh is poisonous. Indo-West Pacific.

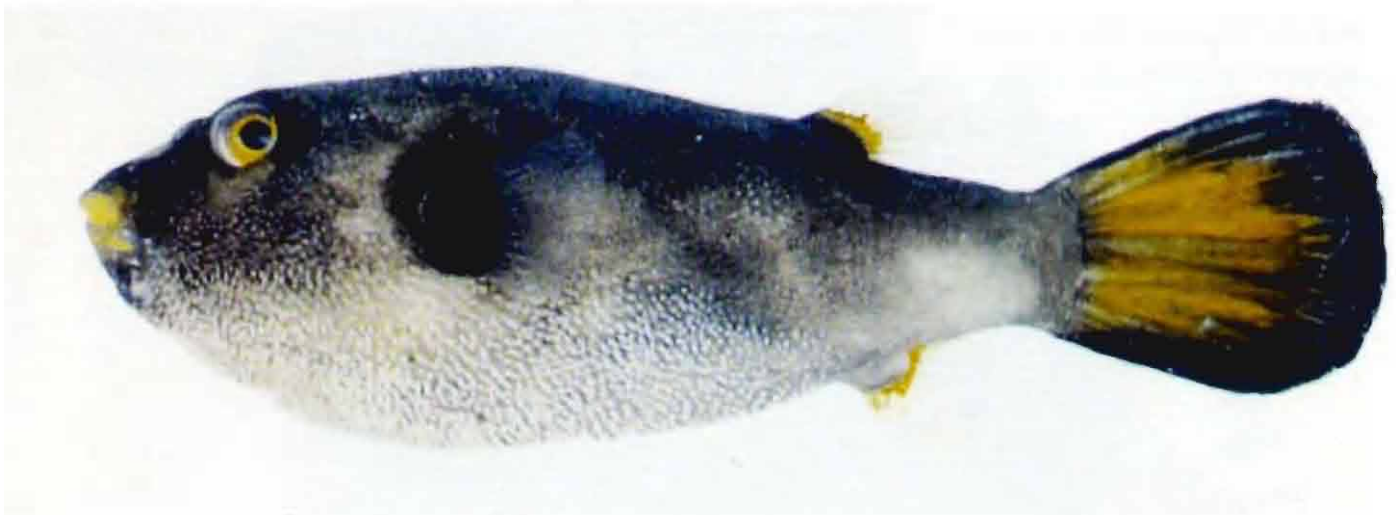


Fig. 735. *Arothron immaculatus*

692. *Arothron mappa* (Lesson, 1831)
Scribbled Puffer

D. 11-12; A. 11; P. 19. Body heavy and broad; small bifid tentacle before eye; head and body covered with small spinules except around mouth, base of fins and caudal peduncle; caudal peduncle depressed; caudal fin rounded. Body light yellowish grey with highly irregular black bands may forming a reticulum; a large black blotch around gill opening and pectoral fin base; lower third of body white with faint yellow reticulations and small irregular black blotches below pectoral fin; irregular black lines radiating from eye; area around anus black. Attains 50 cm. Found in shallow lagoons and sheltered coral reef areas. Not common. Feeds on small invertebrates and algae. Beautiful ornamental fish. Indo-West Pacific.



Fig. 736. *Arothron mappa*

693. *Arothron nigropunctatus* (Bloch & Schneider, 1801)
Blackspotted Puffer

D. 10-11; A. 10; P. 18-19. Body short and heavy; small spinules on body except on back, around mouth and sides of caudal peduncle; caudal fin slightly rounded to emarginate. Body brownish above pale ventrally with scattered small black spots of different sizes; snout and



Fig. 737. *Arothron nigropunctatus*

anus black. The other colour form brown dorsally, whitish to bright yellow ventrally with a transverse pale band dorsally on snout; small scattered black spots on dorsal side of body; dorsal fin dark brown with pale edges. Attains 22 to 25 cm. Found around rich protected coral reef areas. Very common puffers, beautiful and can be easily recognised underwater. Popular ornamental fish. Voracious feeder on live coral and coelenterates also feeds on sponges, small mollusks and algae. Flesh very poisonous. Indo-West Pacific.

694. *Arothron reticularis* (Bloch & Schneider, 1801)
Reticulated Puffer

D. 10-11; A. 10-11; P. 16-18. Body short and heavy; nostrils with two tentacles on each side; body covered with small spinules except around mouth; caudal fin rounded. Body brownish above, white ventrally; back, sides, caudal peduncle and caudal fin with white spots, sometimes fused to form reticulations; belly with dark longitudinal bands and ascending to cheeks and snout. Attains 35 to 40 cm. Found around coral reef areas. Very common puffer. Feeds on small invertebrates. Good aquarium pet. Indo-West Pacific.



Fig. 738. *Arothron reticularis*

695. *Arothron stellatus* (Bloch & Schneider, 1801)
Star Puffer

D. 10-12; A. 10-11; P. 17-19. Body short and heavy covered with small spinules on head and body except on top of snout, base of fins and caudal peduncle; caudal fin rounded.



Fig. 739. *Arothron stellatus* (Adult)

Colour white; dorsal side of head, body, dorsal and anal fins with small black spots; ventral part of body and head without spots; anus in black area. Attains 80 to 90 cm. Found around sheltered coral reef areas in shallow waters. Very common reef fish. Flesh very poisonous. Feeds on sponges, echinoderms, mollusks, corals, crustaceans and algae. Good aquarium fish. Indo-Pacific.



696. *Canthigaster bennetti* (Bleeker, 1854)

Bennett's Puffer

D. 9-10; A. 8-9; P. 15-16. Body short and robust, slightly compressed; snout relatively sharp and long; skin rough but no scales; teeth fused and forming a parrot-like beak; caudal fin truncate or slightly rounded. Upper half of body brownish yellow with small orange spots and scattered blue spots and small lines; lower half of body white with red, orange and pale blue spots; blue lines radiate from eye and behind mouth; a blue edged ocellus at base of dorsal fin; a bluish band from chin to anus. Attains 10 cm. Found in algal beds and sand-rubble areas and on protected reefs in shallow waters. Not uncommon, solitary and slow moving puffer. Feed on algae and small invertebrates. Very popular aquarium fish. Indo-Pacific.



Fig. 741. *Canthigaster bennetti*

697. *Canthigaster solandri* (Richardson, 1845)**Solander's Puffer**

D. 9-10; A. 8-9; P. 16-17. Body short and robust, slightly compressed; snout relatively sharp and long; skin rough but no scales; teeth fused, forming a parrot-like beak; caudal fin truncate or slightly rounded. Body orange brown, lighter on abdomen; numerous dark-edged pale blue spots on head, body and caudal fin; dark edged blue lines radiating from eye; a blue edged black spot at base of dorsal fin; dorsal, anal and pectoral fins light orangish yellow. Attains 10 to 12 cm. Found in shallow rocky and coral reef areas. Very common and popular aquarium fish. Feeds on algae and small invertebrates. Indo-Pacific.

Fig. 742. *Canthigaster solandri*698. *Canthigaster valentini* (Bleeker, 1853)**Black-saddled Toby**

D. 9; A. 9; P. 16. Body robust and slightly compressed; caudal fin truncate. Colour whitish with small yellowish brown spots except ventrally; a dark brown bar from behind eye across nape; and two bands on body, narrowing as they each upper abdomen; the fourth

Fig. 743. *Canthigaster valentini*

band board and short on caudal peduncle; blue lines radiating from eye posteriorly; caudal fin yellow, upper and lower edges black. Attains 8 cm. Found in shallow protected reef areas. Not uncommon. Good aquarium pet. Indo-Pacific.

699. *Chelonodon patoca* (Hamilton, 1822)

Marbled Puffer

D. 9-10; A. 8-10; P. 16-17. Body short a robust; nostrils in a pit with flaps; small spinules on back and abdomen; caudal fin rounded. Body dark brownish grey with large round to ovate white spots; ventral part whitish; a broad yellow streak on lower sides of body; three narrow dark bars on back. Attains 30 cm. Found in shallow coastal rocky areas adjacent to reefs. Very common puffer. Flesh very poisonous. Indo-West Pacific.



Fig. 744. *Chelonodon patoca*

700. *Lagocephalus guentheri* Miranda-Ribeiro, 1915

Rough Backed Blowfish

D. 12-13; A. 13; P. 16-18. Body and caudal peduncle slightly elongate, caudal peduncle compressed; caudal fin almost truncate. Body greenish black dorsally, sides silvery and belly white; dorsal fin dusky; caudal fin yellowish, margin dark and tip of lobes white; a dark narrow bands across dorsum just behind eyes and another band halfway to dorsal fin; caudal fin base



Fig. 745. *Lagocephalus guentheri*

with black blotch. Attains 75 to 80 cm. Found on sand-rubble bottom near reefs. Uncommon. Flesh highly poisonous. Indian Ocean, from east coast of Africa to Andaman Islands.

701. *Lagocephalus lunaris* (Bloch & Schneider, 1801)
Green Backed Blowfish

D. 11-13; A. 9-11; P. 18. Body and caudal peduncle slightly elongate; snout blunt, inter-orbital space flat; caudal fin emarginate. Body yellowish green above, silvery below; dorsal, pectoral and upper half of caudal fin white. Attains 45 to 55 cm. Found on sandy and rubble areas of reefs in shallow waters. Common puffer. Flesh and viscera highly poisonous. Indo-West Pacific.



Fig. 746. *Lagocephalus lunaris*

702. *Lagocephalus sceleratus* (Gemlin, 1789)
Silverstripe Puffer

D. 10-12; A. 8-11; P. 16-18. Body and caudal peduncle elongate and depressed; small spinules on body except around mouth and caudal peduncle; caudal fin truncate. Dorsal side of body brownish green with dark spots; a broad silvery band from mouth to middle of caudal peduncle; belly white; pectoral base and inside of gill opening black. Attains 80 cm. Found in shallow sand and rubble areas of reefs. Flesh highly poisonous. Feeds on small invertebrates. Indo-West Pacific.



Fig. 747. *Lagocephalus sceleratus*

Family DIODONTIDAE
Porcupine Fishes

Body rounded and inflatable like other puffers but covered by fixed or erectable spines; teeth fused into a beak-like dental plates without median suture; dorsal and anal fins rounded situated far back on body; pectoral fins broad; ventral fins absent; caudal fin rounded. When alarmed the pointed backwardly directed spines erected almost perpendicular to body by engulfing air or water into body and deterrent to a potential predator. Usually nocturnal hide in small caves or under coral ledges during day. Strong dental plates help to crush sea urchins, molluscan and crustacean shells. Flesh poisonous; they inflict severe bites and pointed spines cause lacerated wounds.

Key to species

- 1a. One or more spines on dorsal side of caudal peduncle; sides of body and fins with small black spots *Diodon hystrix*
 1b. No spines on caudal peduncle; body with large dorsal and lateral blotches 2
 2a. Small downward projection spine below front edge of eye; 17 to 22 spines from lower jaw to anus; no interorbital blotch *D. liturosus*
 2b. No spine below front edge of eye; 12 to 15 spines from lower jaw to anus; interorbital blotch present *D. holocanthus*

703. *Diodon holocanthus* Linnaeus, 1758
Balloon Porcupinefish

D. 14-15; A. 14; P. 22-24. Body globular covered with strong long spines, no spines on caudal peduncle; a small fleshy tentacle above eye; two small barbels on chin. Body uniform



Fig. 748. *Diodon holocanthus*

light brown, whitish ventrally; a series of black blotches across back and small scattered black spots between blotches; fins without spots. Attains 25 to 30 cm. Found on shallow reef areas. Nocturnal. Uncommon puffer. Good aquarium object. Feeds on crustaceans, molluscs, and echinoderms. Circumtropical distribution.

704. *Diodon hystrix* Linnaeus, 1758

Porcupinefish

D. 15-16; A. 14-16; P. 22-24. Body globular covered with strong long spines; two small spines on dorsal side of caudal peduncle; no barbels on chin. Body light olive to grey-brown dorsally with small black spots; ventral side white without spots; all fins light yellowish with black spots. Attains 65 to 70 cm. Found around rocky and coral reef areas. Common porcupine fish. Feeds on crustaceans, mollusks, and echinoderms. Body spines venomous. Good aquarium object. Circumtropical distribution.

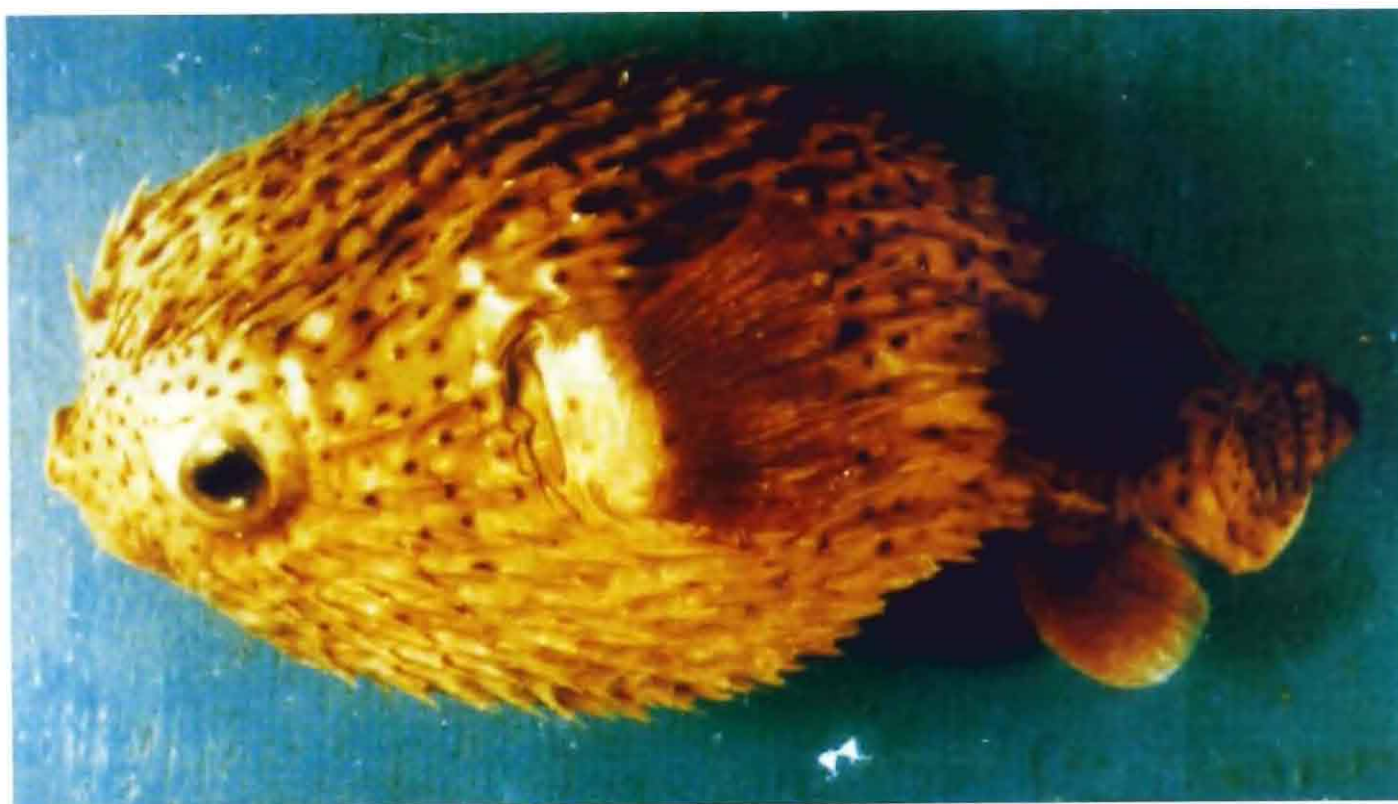


Fig. 749. *Diodon hystrix*

705. *Diodon liturosus* Shaw, 1804

Shortspined Porcupinefish

D. 14-15; A. 15-16; P. 22-24. Body globular, covered with strong short spines; no spines on caudal peduncle; small downward directed spine below front of eye; two small barbels on chin. Body brown with large white edged black blotches on back and sides, one above and passing through eye, others on rear of head, in front of gill opening, above pectoral fin,

middle of back and around base of dorsal fin; all fins light yellow. Attains 45 cm. Found on coral reef areas. Nocturnal, hides in caves and under ledges during day. Common porcupine fish. Feeds on crustaceans, molluscs, and echinoderms. All body spines are venomous. Good aquarium object. Indo-Pacific.

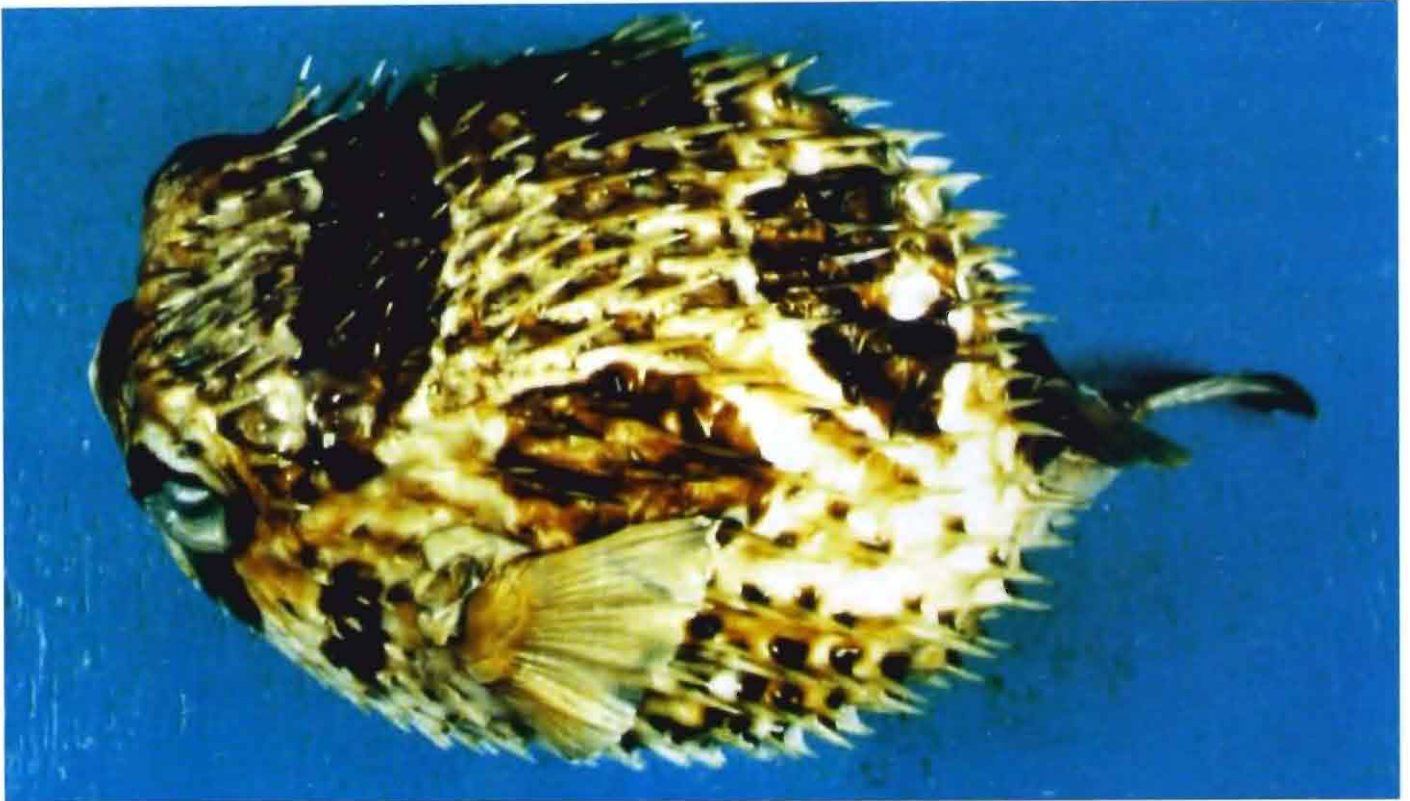


Fig. 750. *Diodon liturosus*

ECOLOGY OF REEF FISHES

The coral reefs provide a suitable shelter for all variety of fishes. The various body shapes, different colour patterns of fishes is due to variety of habitats include sand, silt, coral rubble, limestone reef flats with weds, dead coral formations, luxuriant soft and hard coral growth, etc. available on reefs. Many reef fishes show a highly specialised substrate preference. The habits and adaptations of these fish is extremely variable and directly depend on habitat diversity and availability of food and shelter on reefs. Colouration, mimicry and camouflage, feeding habits, territoriality, diurnal and nocturnal habits, etc of the fishes found around reefs are very interesting.

Colouration

The most amazing characteristic feature of reef fishes is having brilliant and stunning colour patterns. In many cases these colour patterns are associated with a number of factors like geography, stages of growth, sex, ecological conditions, behavioural pattern, etc. In many cases the colour pattern changes with growth from juvenile to adult stages as seen in many wrasses butterflyfishes, some groupers, snappers, sweetlips, coral breams, batfishes. The most striking juvenile-adult colour transformation offers some protection against predators is found in zebra shark *Stegostoma fasciatum*, coral bream *Scolopsis bilineatus*, angelfishes *Pomacanthus* sp., wrasses *Halichoeres* spp., sandtails *Malacanthus brevirostris*, parrot fishes *Scarus* sp. and groupers *Epinephelus ongus*, *Variola louti*, etc. Many species of juvenile damsels and butterflyfishes possess a dark ocellus or eye-spot on dorsal fin, in many cases it may gradually disappears with increasing growth, make the predators difficult to decide which end is forward especially in dim light. In some situations, this eye spot portion suddenly erect and startle the predators. The brilliant adult colour patterns of some butterflyfishes, angelfishes, damsels, etc. are species-specific and help them to form feeding assemblages on reefs. The dark-light colour pattern of fish such as *Dascyllus aruanus* and *Heniochus* sp. serves as a disruptive colouration and it makes the individuals very difficult to locate when they are sheltering among coral heads. Colour pattern of male and female is also different in many reef dwellers. It is clearly exemplified by extremely variable colour pattern in male and females of dottyback *Pseudochromis cyanotaenia*. This phenomenon is also found in fishes that have the habit of changing sex. They commence their adult life as functional females and able to transforms to a brightly coloured functional males at later stage. This type of colour change is frequently found with wrasses *Cheilinus diagrammus*, *C. trilobatus*, *Epibulus insidiator*, *Gomphosus caeruleus*, *Halichoeres scapularis*, *Stethojulis trilineata* and in many species of parrotfishes. The intensity of colours and their pattern are also influenced by many ecological factors like depth, time, turbidity of water, and type of substrate. Colour variation related depth is common in many species. It is more evident among groupers. Fishes found in sun-lit shallow reef areas are predominantly brown or grey whereas the same species living in deeper waters show dark or drab colouration. Colour changes related to turbidity and substratum usually are of short period. Many fishes such as flatfishes, flatheads, anglerfishes capable of changing colour pattern slow to rapidly enable

them to blend effectively with their surroundings and take full advantage in capturing prey as well as remaining unnoticed by predators. The colour patterns of some fishes temporarily change according to the behavioural mood. This is best seen in males of damselfishes, wrasses, gobies and parrotfishes during courtship and nest-guarding. The colours can be changed suddenly with increasing behavioural action.

Mimicry and Camouflage

The phenomenon of mimicry is very interesting and more predominant among coral reef fishes. It involves two or more species or different genera or families, resemble with one another either in colour pattern or body shape. Many species usually have certain adaptations to avoid predators like venomous spines, distasteful flesh, etc. Some other fish mimic fish colour pattern and shapes to avoid predators even though they are palatable. The young of snapper *Lutjanus bohar* mimics schooling damselfishes of the genus *Chromis*. Many predators ignore these damselfishes. By taking this advantage, the young snappers under '**chromis disguise**' freely feeds on these small fish. The juveniles of sweetlip *Plectorhinchus chaetodonoides* mimic toxic nudibranchs to avoid predators. The blenny *Aspidontus taeniatus* mimics cleaner-wrasse *Labroides* and uses its disguise to approach other fish and bite off small pieces of fins and scales. The young of batfishes *Platax pinnatus* mimic polyclad flatworms, while those of *P. orbicularis* mimic drifting dead leaves to avoid predators. To deceive predators, blennids *Ecsenius* and *Pteroscirtes* mimic the blenny *Meiacanthus* sp. which has venom gland associated with canines is usually avoided by many predators. The colour pattern and shape of number of reef fishes make them nearly invisible against surrounding reef habitats. The ghost pipefish *Solenostomus* sp. are masters of camouflage. Their body colouration and bizarre shape blend effectively with seaweeds. The anglerfish *Histro*, pipefish *Syngnathoides* blends well with *Sargassum* and other seaweeds making them difficult to detect. All the scorpion fishes exhibit variegated colour pattern, blend well with their surroundings, enable them to remain undetected by the prey as well as predators. The reef stonefish *Synanceia* is well camouflaged, often lies half-buried in sand or coral rubble and does not normally move unless disturbed. Many species like longfins *Plesiops* sp. living under stones and coral rubble rapidly change their colour pattern according to the substratum when disturbed.

Body shapes

Fishes living in different habitats of reefs exhibit a variety of body shapes such as compressed with disc-like bodies as in butterflyfishes, batfishes, angelfishes, moorishidols; streamlined as in snappers, groupers, jacks and triggers; depressed as in rays, skates and flatfishes; rounded or spherical as in puffers and porcupine fishes; box-shaped as in boxfishes; razor blade-like as in shrimpfishes; stone-like as in stonefishes; needle or leaf-like as in pipefishes; elongate and snake-like as in eels. However, majority of these reef fishes are ideally suited for swimming through narrow passages of reefs and rocks. Many fishes like eels, and hairtailed blenny *Xephasia* dwell in sandy areas. They easily burrow backward

through sand with their powerful pointed tail. The shrimpfishes *Aeoliscus* and *Centriscus* are extremely thin and swim vertically through narrow passages and coral branches with ease. The puffers and porcupine fishes have ability to inflate their body to a size several times greater than normal size to scare their enemies. The hard body of boxfishes is usually not considered a high priority food item by many predators.

Feeding habits

The coral reefs and their surroundings provide secure home for a large number of plant and animal communities are highly dependent on one another for food. Based on the feeding habits, reef fish community can be broadly classified into plankton, nekton and benthic feeders. These feeding habits, however, change during their growth from young to adult. The herbivorous fish found in large numbers are most efficient in terms of energy utilization in the reef environment can be broadly categorized into browsers and grazers. The browsers include mullets surgeonfishes, damselfishes, rabbitfishes, triggers and puffers bite off algal filaments with their sharp cutting teeth. While the grazers like gobies, surgeonfishes, blennies, parrotfishes and some triggers, crop the food close to the substrate and sometimes bite pieces of corals. Among carnivores, many of the predatory fishes like eels, damsels, lizardfishes, cardinalfishes, squirrelfishes, groupers, snappers, wrasses and other small fishes feed on a variety of invertebrates, zooplankton and small fishes. The jacks, sharks, moray eels, tunas, barracudas, etc. are larger carnivores of the reefs. Most of these carnivorous fish are amazingly opportunistic and feed on a variety of common foods available within their reach and catching limits. A small group of highly specialized predators like cleaner-wrasse *Labroides* exclusively feed on crustacean parasites of other fish and even they establish cleaning stations on reefs. Some reef fishes are omnivores feed on both plants and animals. Some species of butterflyfishes, leatherjackets, angelfishes and puffers exclusively feed on coral polyps. Usually no other animal prefers to feed on sponges but there are species like *Chaetodon ephippium*, moorish idols, boxfishes and some angelfishes feeds on sponges in addition to other food items. To avoid confrontation with other fish communities, many reef fishes strictly follow different feeding times but usually fish feed during daytime. Fish such as snappers, grunts, eels, squirrelfishes, etc. take shelter by day and move elsewhere to feed at night. Almost all fish in reef ecosystem fit into the food web one or other way so that there will be balanced prey-predator relationship.

Territoriality

The territorial behaviour is common among many of reef fishes. The territorial limits may be based on food supply, frequency of predators encountered, spawning patterns, requirement for shelter, etc. Most of the reef fishes are sedentary and strongly territorial. Many fish found in and around reefs also move over to large areas for feeding and breeding. On the reef, some home-range species roam about almost the same route every day and return to same place, while major bottom dwelling fish species usually restricted to a limited area defend

boundaries of their territory against encroaching members of the same species. Like wise, many of the butterfly fishes restricted to a relatively small area of the reef. During daytime, they roam widely within the confines of their home-range for foraging food. *Chaetodon triangulum* is highly territorial and can alone defend one or more large plate corals against invasion of same species as well as other butterfly fishes. The angelfishes (Pomacanthids) somewhat territorial and spend daylight hours near bottom in search of food. Some acanthurids and pomacentrids establish fixed feeding territories when young, but abandon them as they mature. Most of the damselfishes (Pomacentrids) scrupulously guard their boundaries centered on a large coral head against other algal feeding fishes. This nature of territoriality in reef fishes is, however, more pronounced during spawning periods. Some damselfishes such as species of *Chromis* are generally home ranging but become strongly territorial during spawning period. The surgeonfish *Acanthurus lineatus*, unlike other gregarious surgeonfishes, is solitary and guards its territory against intruders of the same species. Species that build nests for egg laying such as damsels, blennies, gobies, etc. are also strongly territorial.

Diurnal and Nocturnal habits

The diversity of reef associates, particularly the fishes, is generally quite high than in any other environment. The behaviour and often distribution vary within same species of the same family and group, enabling them to survive in their habitat. The reef fishes show an excellent behavioural pattern to avoid struggle for food and shelter on reef by adopting diurnal and nocturnal mode of life. All the diurnal fishes feed actively during day and withdraw into their hiding places at night, making the entire reef deserted. At night, many of the diurnal fish remain motionless. On the other hand, the nocturnal fishes become active after sunset. The diurnal and nocturnal behaviour of fishes is closely linked with the food organisms. Many worms and crustaceans hide during day and keep active at night, forming an important food items for nocturnal benthic feeders. Most of the diurnal fishes are benthic feeders such as damsels and fusiliers and large predators cruising along the reef edge. Usually plankton feeders are active both at night and day. The fish feeders actively feed during morning and evening changeover periods. There is a more or less orderly sequence of retirement at dusk among the diurnal fishes. Accordingly, wrasses are the first to disappear and smaller damselfishes, butterfly fishes, surgeons and rabbitfishes follow them. Parrotfishes are the last to retire and this sequence is more or less reversed at sunrise when the fishes emerge from their hiding places. Thus they co-ordinate and judiciously share the reef environment for their survival.

Biological Association

The reef community is known to involve in an interesting partnership between different species of fishes or between a fish and invertebrate organism. The common

example of commensalism is the relationship between suckerfish *Echeneis naucrates* and larger fishes such as sharks. The suckerfish attaches to host and benefits by saving its swimming energy and feed on scraps that result from feeding activity of host. The pearlfish *Carapus homei* takes shelter within body cavity of host holothurian *Stichopus*, causing no discernible damage. Small apogonids cluster among spines of sea urchins, presumably gaining protection. The shrimpfishes *Aeoliscus* and *Centriscus* seek shelter among spines of sea urchin as many of the predators avoid spinous sea urchins. An excellent symbiotic relationship is seen in the case of anemone fishes of the genus *Amphiprion* and *Premnas* that dwell among the deadly tentacles of sea anemone, while the anemone in turn is guarded against its predator by highly territorial nature of the sheltered fish. The fishes also keep the surface of anemone free from silt and debris. Another case of symbiotic relation ship is found between the wrasse *Labroides dimidiatus* and other members of reef community. This cleaner wrasse establish cleaning stations on the reefs and feed on external parasites and damaged tissues of other fishes, thus rendering inadvertently a beneficial health service to its host.

Defence Mechanism

Every fish on reef, except large sharks and rays, must evade predators that hunt them and try to escape dangers. To this effect, the protective devices they have developed are extremely varied from simple schooling and attacking strategies to high level toxicity. Many diverse groups like juvenile reef grazers, daytime resting groups like snappers, patrolling groups of large predators like jacks use simple predator-defense strategy and schooling behaviour. In the presence of predators, the schooling fish form a zigzag pattern or form 'vacuoles' around the predator and create 'confusion effect' so that they can escape from danger of eaten away by the predator. The schooling behaviour may also help in reducing the frequency of predator-prey encounters, the larger the school greater the advantage. Many of reef predator fish use attack strategies. Anglerfishes and some scorpion fishes lure other fish by using their luring apparatus. The lionfish, species of *Pterois*, slowly corner the prey and attacks, while the groupers, lizardfishes, bigeyes (Priacanthidae), etc. dart rapidly from their hiding places and seize the prey.

Toxicity is one of the most interesting strategies adopted by many reef fishes. It is postulated that the poisonous and venomous nature of fishes help them as a defense mechanism against predators. More than 500 species of marine fish are known to toxic or on ingestion prove poisonous to man. These fish inject venom into the threatening organism through the spines of dorsal, anal or pelvic fins. The long and pointed sting on dorsal surface of tail of stingrays is venomous and inflicts very painful wounds. The squirrelfish *Sargocentron* spp. and *Neonippon* possess a large venomous spine at the corner of opercle. Having venomous spines for defense mechanism is the characteristic feature of family Scorpaenidae. The lionfish *Pterois* spp. threaten intruders by expanding their extremely long venomous dorsal spines. The stonefish *Synanceia verrucosa* has

pungent spines with powerful venom apparatus cause painful wounds. A specialized venomous apparatus supports the strong anterior dorsal, anal and pectoral spines of catfish *Plotosus*. All the surgeonfishes have a sharp caudal spine with which they inflict slashes. *Acanthurus lineatus* is the only surgeon possessing a venomous caudal spine. The dorsal spines of rabbitfish are strong and capable of inflicting wounds. The soapfish *Grammistes sexlineatus* is well known for producing skin toxin **grammistin** that dissuades the predators. The boxfish *Ostracion* and *Lactoria*, under stress exude a distasteful skin toxin called **ostracitoxin**. These crinotoxins, however, are more common than venomous nature in reef fishes and are capable of ensuring adequate defense against their predators. Thus, the reef fishes play a variety of ecological roles for their survival on reefs and make the reefs a paradise on the earth.

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GUIDE TO

reef fishes



OF ANDAMAN AND NICOBAR ISLANDS

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The present Guide to Reef Fishes of Andaman and Nicobar Islands, like the earlier works, is the outcome of dedicated and sincere efforts during field studies for more than a decade in these islands. This is the first comprehensive publication on Indian Reef Fish Biodiversity dealing with more than 700 spectacular and colourful denizens. The book is designed to serve as a valuable field guide to amateurs, ichthyologists, reef-watchers, conservators etc.

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