

field guide to **Trawl Fish from
Temperate
Waters
of Australia**

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CSIRO
DIVISION OF FISHERIES RESEARCH

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PREFACE

The CSIRO Division of Fisheries Research undertook extensive trawling projects in the waters of south-eastern Australia, South Australia and southern Western Australia between 1975 and 1982. Very early in the research it became apparent that the identification of fishes occurring in this area was being hampered by the lack of a reliable guide or, for that matter, taxonomic revisions to species of the region. Consequently, the preparation of this *Field Guide* was initiated.

The past three years have seen a remarkable upsurge of interest in the taxonomy of temperate Australian fishes, primarily instigated by the forthcoming *Fishes of the South Coast* by J. G. Glover, M. F. Gomon and R. F. Kuitert and the recently published *Fishes of Tasmania* by P. R. Last, E. O. G. Scott and F. H. Talbot.

Through the generosity of Martin F. Gomon and Peter R. Last, drafts of the *Fishes of the South Coast* and *Fishes of Tasmania* were made available to the present authors. Preparation of these two works has encouraged taxonomists around the world to begin looking in detail at fish families of southern Australian waters, thereby bringing to light the paucity of information on most of our temperate fishes. In particular the taxonomic status of many species, such as the commercially important *Helicolenus percooides*, has recently been questioned. Indeed up to ten percent of the species occurring within the area have evaded recognition until recently e.g. *Coelorinchus* spp. and others have been misidentified because closely related species have not been adequately known. It is a popular fallacy that all our temperate fishes are well known and are being actively studied.

This *Field Guide* attempts to present up-to-date information to enable rapid identification of trawl fish species. However, since taxonomy is a dynamic science, many revisions of species groups are still in preparation, and no doubt further new species will be discovered or recognised. We adopted a loose-leaf format so that up-dates on species could be added when information becomes available.

J. Garrey H. Maxwell initiated the present work when he identified the need for a field guide that would provide a single, concise account of the temperate trawl fish of Australia. He developed a preliminary field guide (CSIRO Circular No. 8, 1980) from an informal list of common trawl fish sampled by CSIRO staff in temperate Australian waters. He then successfully applied for funding to the Fishery Industry Research Trust Account (FIRTA) to revise that field guide. With generous support from FIRTA, a two-year project was undertaken by Janice L. May to search and collate the scientific literature, fully revise the contents of the preliminary field guide, and compile information for each of the families and species included in the present work. In addition to the assistance provided by numerous colleagues, the following people contributed sections of manuscripts or valuable photographs:

Ken J. Graham (Division of Fisheries, N.S.W. Department of Agriculture) generously provided 65 of his own carefully produced slides and provided distributional information for eastern Australian species

John S. Gunn (CSIRO Division of Fisheries Research) wrote the species pages for the Carangidae

Peter J. McMillan (Fisheries Research Division, N.Z.) wrote descriptions of two species of macrourids and illustrated *Coryphaenoides serrulatus*, *C. subserrulatus* and *Coelorinchus matamua*

T. Nakabo (Kyoto University, Japan) wrote descriptions of two species of callionymids

John D. Stevens (CSIRO Division of Fisheries Research) compiled information on all 50 species of sharks and 22 shark families.

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Our thanks to: John Paxton for free access to the literature resources of the Department of Ichthyology, Australian Museum; Ian Munro for taxonomic advice, loan of literature and criticism of early drafts; and Margaret Titterton for assistance with literature and illustrations. To the people of the library, Joan Brown, Ruby Fell and especially Glenn Forbes, who never failed to locate the most obscure literature, our thanks.

We thank: Kerrie Hunt, who patiently reformatted the typesetting commands and for general advice; Anne Young and, especially, Julie Crawford, who entered the text onto computer files and deciphered and edited these files through several drafts; David Crooks and Neville Ridgeway for programming assistance; Alison Collins for assistance with the bibliography; Sharne Dunlop for drawing all the family illustrations and some of the explanatory figures; Jenny Riches for most of the explanatory figures and Brita Hansen for the remaining figures; and Thor Carter for preparing the plates for publication.

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Finally our sincere thanks to the following people who read drafts of particular groups or provided information or photographs, often from their own unpublished work:

M. G. Bradbury (San Francisco State University, San Francisco, U.S.A.)	Ogcocephalidae
J. H. Caruso (Audubon Park and Zoological Garden, New Orleans, U.S.A.)	Chaunacidae
P. H. J. Castle (Victoria University of Wellington, Wellington, N.Z.)	Congridae, Ophichthidae
D. Clarke (Western Australian Marine Research Laboratories, Waterman)	Ostraciidae

T. A. Clarke (University of Hawaii, Honolulu, U.S.A.)	Macrorhamphosidae
D. M. Cohen (National Marine and Fisheries Service, Seattle, U.S.A.)	Melanonidae
M. F. Gomon (Museum of Victoria, Melbourne)	Antennariidae, Ophidiidae, Macrorhamphosidae Triglidae, Percichthyidae, Arripidae, Sphyaenidae, Odacidae, Bothidae, Pleuronectidae
G. S. Hardy (National Museum of New Zealand, Wellington, N.Z.)	Chimaeridae, Callorhynchidae, Rhinochimaeridae, Pentacerotidae, Tetraodontidae
P. C. Heemstra (J.L.B. Smith Institute of Ichthyology, Grahamstown, South Africa)	Lophotidae, Trachipteridae, Regalecidae, Emmelichthyidae, Platycephalidae, Priacanthidae, Serranidae, Trachichthyidae
D. F. Hoese (Australian Museum, Sydney)	Squalidae, Scorpididae
B. Hutchins (Western Australian Museum, Perth)	Berycidae, Mullidae, Monacanthidae
G. James (Department of Agriculture and Fisheries, Wellington, N.Z.)	Oreosomatidae
L. Knapp (Smithsonian Institution, Washington, D.C., U.S.A.)	Platycephalidae
R. H. Kuitert (Museum of Victoria, Melbourne)	Platycephalidae, <i>Callanthias</i> , Mullidae, Mugiloididae, Ostraciidae
P. R. Last (CSIRO Division of Fisheries Research, Hobart)	Rhinobatidae, Torpedinidae, Rajidae, Dasyatididae, Urolophidae,

	Myliobatidae, Brachionichthyidae, Latrididae, Bothidae, Pleuronectidae
J. M. Leis (Australian Museum, Sydney)	Diodontidae
R. M. McDowall (Fisheries Research Division, Wellington, N.Z.)	Centrolophidae
M. McGrouther (Australian Museum, Sydney)	Hoplichthyidae
R. J. McKay (Queensland Museum, Brisbane)	Sillaginidae
P. J. McMillan (Department of Agriculture and Fisheries, Wellington, N.Z.)	Macrouridae, Merlucciidae
J. Marek (Western Australian Marine Research Laboratories, Waterman)	photographs
T. Nakabo (Kyoto University, Kyoto, Japan)	Callionymidae
J. S. Nelson (University of Alberta, Edmonton, Canada)	Psychrolutidae
C. D. Paulin (National Museum of New Zealand, Wellington, N.Z.)	Halosauridae, Moridae
J. R. Paxton (Australian Museum, Sydney)	mesopelagic families, Argentinidae
T. W. Pietsch (University of Washington, Seattle, U.S.A.)	Antennariidae
C. D. Roberts (Victoria University of Wellington, Wellington, N.Z.)	Serranidae, Percichthyidae
W. F. Smith-Vaniz (Academy of Natural Sciences, Philadelphia, U.S.A.)	Carangidae
C. A. Stanley (CSIRO Division of Fisheries Research, Hobart)	Arripidae
R. Strahan (National Photographic Index of Australian Wildlife, Australian Museum, Sydney)	Myxinidae
W. Starnes (Smithsonian Institution, Washington, D.C., U.S.A.)	Priacanthidae

INTRODUCTION

The *Field Guide* has been prepared primarily to enable fishermen, Department of Primary Industry observers and fisheries biologists accurately to identify trawl fishes at sea.

A second aim is to provide entry into the relevant taxonomic literature to encourage users to follow-up species that appear to be different from those described here. Such thoroughness, which includes collecting and recording of specimens, is necessary to provide proper identification and accurate information on fishes occurring in Australian waters.

Until recently it was only considered necessary to develop an understanding of the distribution and ecology of common or commercial fishes; however, although most species are of no direct commercial importance, they still play a vital role in the habitats and lives of commercial fishes. A more precise knowledge of the distribution and abundance of what are commonly known as "trash" species is necessary. This *Field Guide* therefore covers both commercial and non-commercial fishes in Australia's temperate zone, for even the most insignificant species may indirectly be of economic importance.

Accurate identification of trawl fishes by scientists on research vessels and observers on board commercial fishing vessels will provide valuable evidence of changes in species composition of catches. Such information gives an insight into species interaction, and is vital to our understanding of the effect of fishing pressure on a fish community, which in turn guides the choice of appropriate management strategies for the industry.

The *Field Guide* consists of two main parts: an illustrated guide to 135 families and a guide to 461 trawl species, 345 of which are illustrated. What constitutes a trawl fish is not easily defined, as many species may be trawled in some parts of their range but not in others. Trawl fish are here considered to be those species that are known to have been captured either by a demersal or pelagic trawl net at some time in their life cycle outside of estuaries or bays. Most mesopelagic species are still too poorly known (and rarely captured) to be considered here. They have, however, been included in the **Guide to Families** to enable preliminary identification.

For our purposes we have defined temperate waters of Australia as those waters south of 33°S, from approximately Sydney in the east to Perth in the west, including Tasmania.

HOW TO USE THIS FIELD GUIDE

With this guide, fish can be identified through two methods. A particularly distinctive fish may be identified by thumbing the pages until a photo of the fish in hand is found and then confirming this identification by carefully checking the description. Alternatively, a more systematic approach is to match the fish in hand (taking note in particular of the shape of the body and shape and position of the fins) to an illustration in the **Guide to Families**. If the specimen fits the description given on the opposite page, it probably does belong to the selected family. However, to be certain, similar families (usually on the same page) should also be considered. A more specific identification may then be made by turning to the species pages of the relevant family and checking the plate and description of each species.

Guide to Families

The guide to families provides a means of determining to which family a fish belongs. Families are separated into three main groupings: sharks and rays; ghost sharks and bony fishes; and mesopelagic fishes. Sometimes mesopelagic fishes are captured in demersal, as well as pelagic, trawl nets; these families are marked with an asterisk.

The guide to families consists of an outline drawing of a representative member of each family and a description. Families of *similar appearance* are grouped together on one page. On the opposite page a summary of important characters for each family is given. Characters are listed (as near as possible) in the same order in all family descriptions. This sometimes means that characters that are diagnostic for a particular family may not appear until the end of the description. However a consistent order of characters greatly facilitates comparisons between families, and a particular character may be located rapidly once the user is familiar with the format. Diagnostic or useful characters are often italicised.

Following each family name is a 3-digit (rarely 4) alphanumeric code, unique to a family, developed by the Department of Ichthyology of the Australian Museum. Entry in the guide to species may be made using this number, as *species belonging to the same family are grouped together and are arranged in numerical order of the family code*. The recognised common or vernacular name for each family is given in parenthesis after the family code.

Guide to Species – see example over page

This consists of individual species accounts, with one detailed species account given per page. *Within a family, species are arranged in alphabetical order of the scientific name.*

Main Common Name: the preferred name chosen because it is the most widely used, the most descriptive or is taxonomically consistent.

Scientific Name: the accepted scientific name of the species, consisting of two latinized words (printed in italics). Only the first, the generic name, begins with a capital. This is followed by authority and date, which is the name of the person (author) who presented the accepted specific name, and the year in which it was presented.

Family: the name of the family to which this species belongs and the page number on which the family is described. The family Trichiuridae is described on page 38.

Other Common Names: additional common names.

368

main common name
↓
Southern frostfish

generic name → **Lepidopus**
scientific name → *Lepidopus caudatus* (Euphrasen, 1788)
specific name → *caudatus*
authority & date → (Euphrasen, 1788)

Family: Trichiuridae p 38

Other Common Names: Ribbonfish.

Description: Caudal fin forked; lower hind margin of operculum rounded, barely reaching pectoral fin bases; *bony crest* on mid-dorsal surface of head confined to nape; interorbital not strongly convex, eyes almost touching dorsal surface; body elongate, *depth 10 to 18* in SL; ventral fins scale-like, inserted at least 1 eye diameter behind pectoral fin bases.
D IX,89-96; A 15-24 supporting rays; P 12; V 1,1.

diagnostic formulae →

colour → Body uniform silver; black blotch between second and third dorsal fin spines.

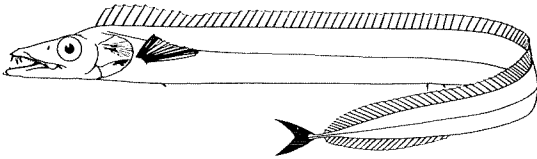
Size: To at least 200 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Mainly demersal, on the continental slope in depths from 300 to 600 m.

Note: The Australian hairtail (*Trichiurus lepturus*) also occurs in coastal waters but is unlikely to be trawled. It lacks both caudal and ventral fins and the lower hind margin of the operculum is concave and overlaps the pectoral fin bases.

References: Tucker (1956); Munro (1958g) as *L. lex* and Australian hairtail as *T. coxii* and *T. haumela*; Mikhaylin (1977).



Tucker (1956)
caption

initials & date
↓
J.L.M. 1985

species code number → 440002

Description: a listing of the most important morphological and meristic characters or combination of characters for this species, followed by diagnostic formulae and a brief description of colour. Note that colour *patterns* are often more important than the actual colours. Within a family, characters are listed in the same order for each species. Often parts of a body are expressed as a *proportion* of another part (eg. depth 10 to 18 in SL). This simply means that 10 to 18 body depths will fit into the standard length of the fish. This ratio can be determined by dividing the first measurement (ie. depth) into the second (ie. standard length). *Diagnostic formulae* are a shorthand method of listing standard fin ray, scales and gill raker counts. The capital letters are abbreviations for a fin (eg. D= dorsal fin) or a part of the body; spine counts are given in Roman numerals (eg. IX) and ray counts in Arabic numerals (eg. 89). Fin ray counts etc. are often described in full if they are especially important in distinguishing between species, but are repeated in the diagnostic formulae to facilitate comparisons between species.

Size: the maximum known length for this species.

Distribution: the known distribution of this species within Australian waters.

Habitat and Depth: primarily describes where this species is found in relation to the coast and the sea bed and gives the known depth range.

Note: where applicable the species treated is compared with similar or related species that have not been covered individually, and a means for distinguishing between the species is given.

References: the principal sources used in compiling the above information. Reliable information was often not available from the literature, but was obtained as a personal communication from an expert currently researching the species. Generic names are often abbreviated here (eg. *L. lex* where *L.* is shorthand for *Lepidopus*).

Caption beneath the Illustration: refers to the original source and date of publication of the illustration or, if not previously published, to the illustrator or photographer.

Initials and Date: the initials of the person responsible for the above information and the date the information was compiled.

Species Code Number: a 6-digit (rarely 7) alphanumeric code unique to a species. It is used by CSIRO and the Department of Primary Industry for coding fisheries data for computer analysis. The first 3 digits are the family code and the last 3 digits a species code within that family.

EXPLANATORY FIGURES

Fig. 1. External characters of a generalised bony fish.

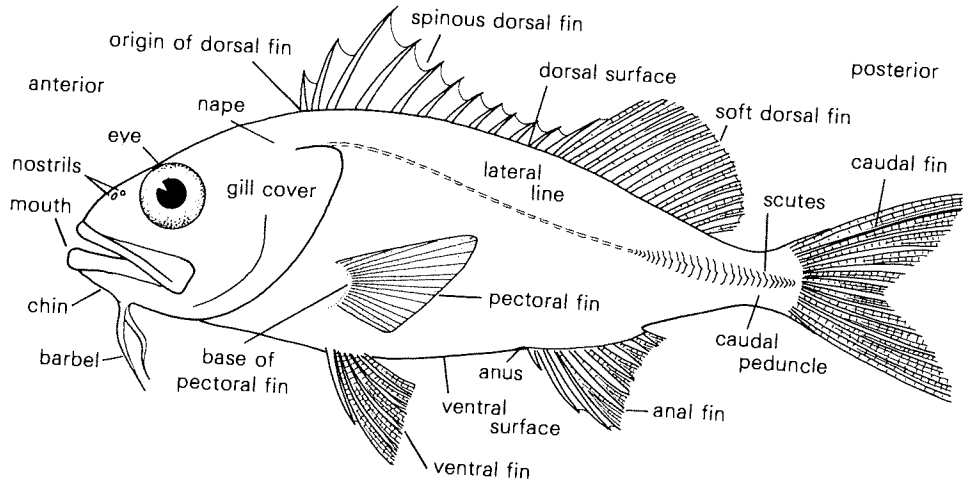


Fig. 2. Measurements of bony fish.

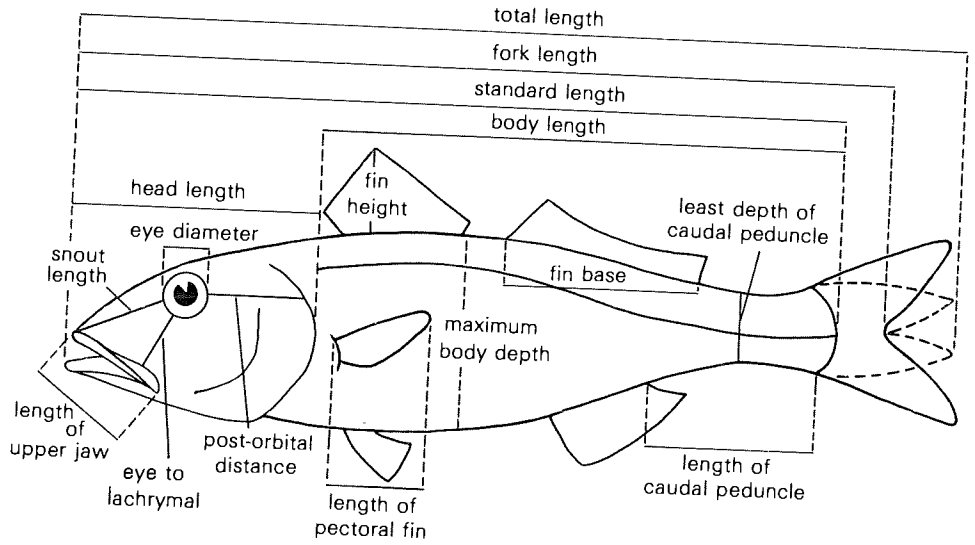


Fig. 3. Body widths.

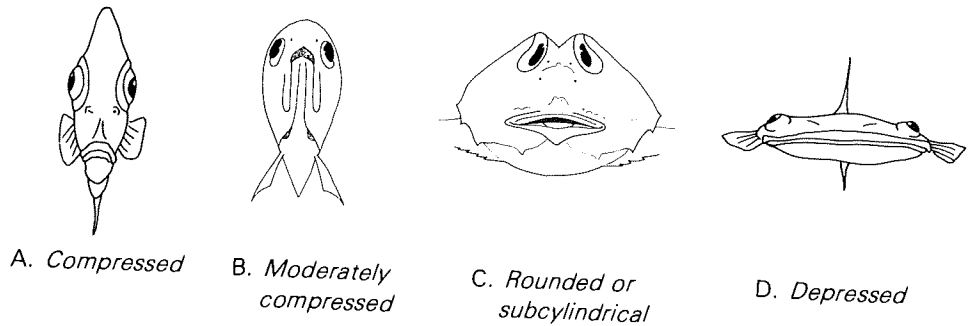


Fig. 4. Structures of the head.

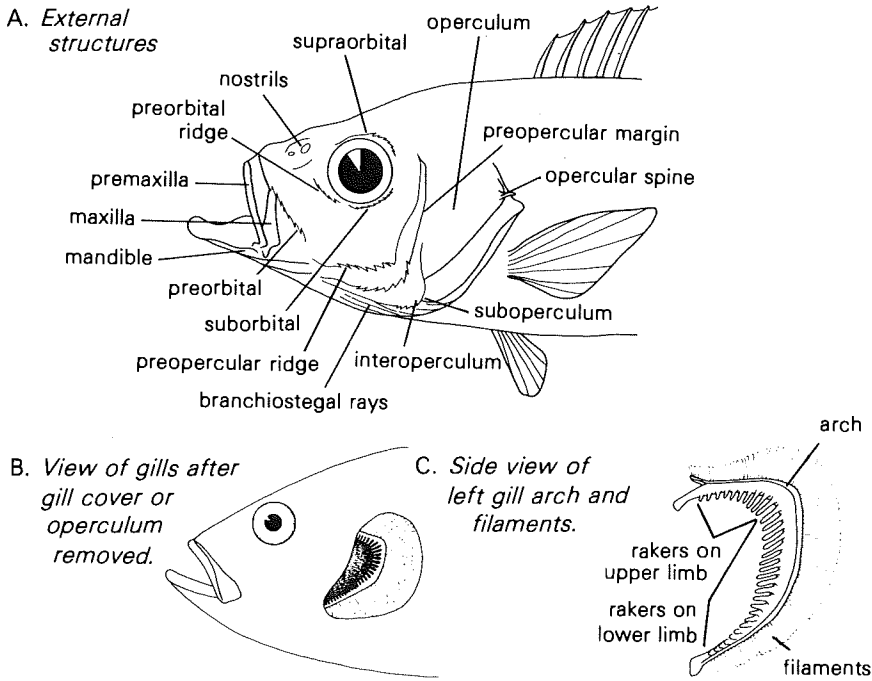


Fig. 5. Mouth and snout shapes.

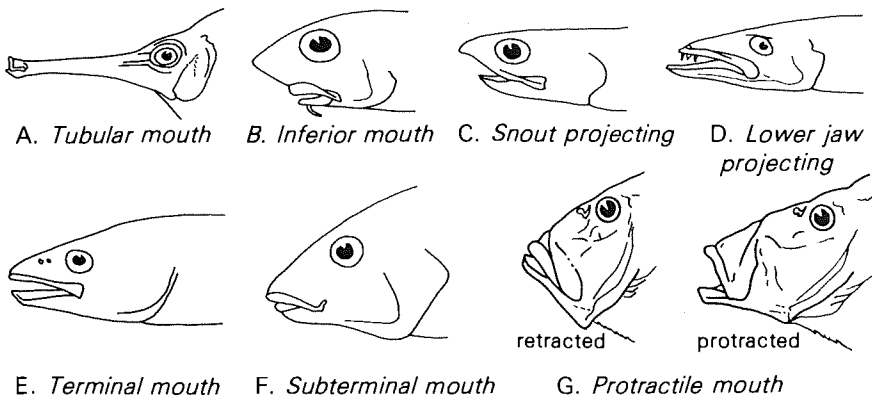


Fig. 6. Bones that bear teeth and common types of teeth.

A. Bones bearing teeth on roof of mouth.

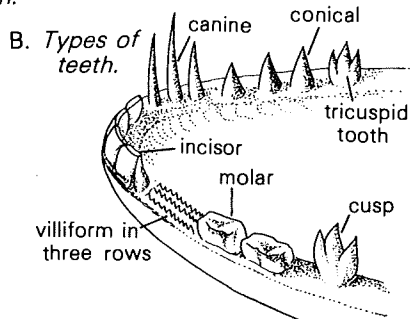
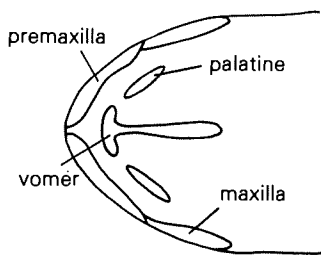


Fig. 7. Dorsal fins.

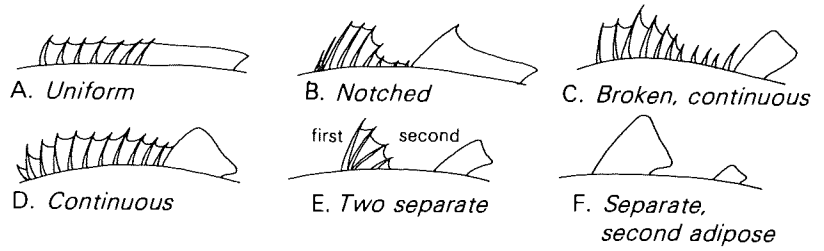


Fig. 8. Caudal fins.

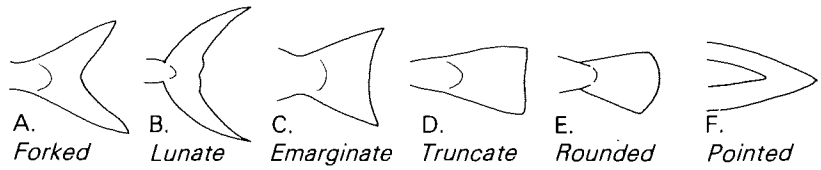


Fig. 9. Ventral fins.

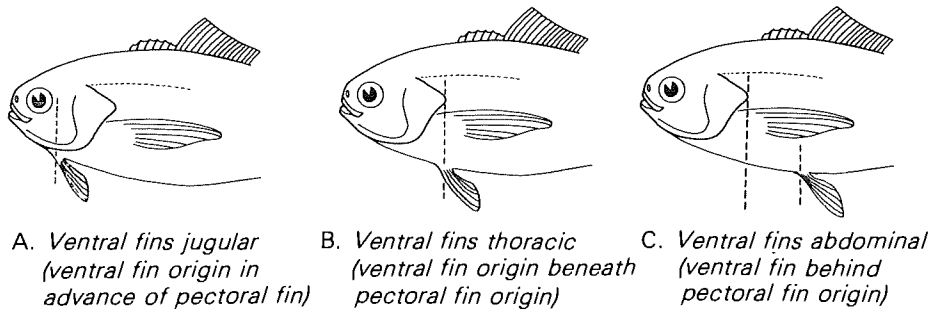


Fig. 10. Fin elements.

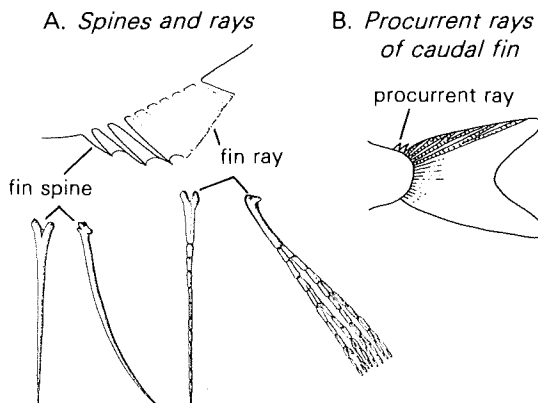


Fig. 11. Scales.

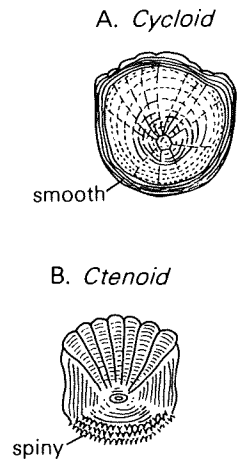


Fig. 13. External characters of sharks.

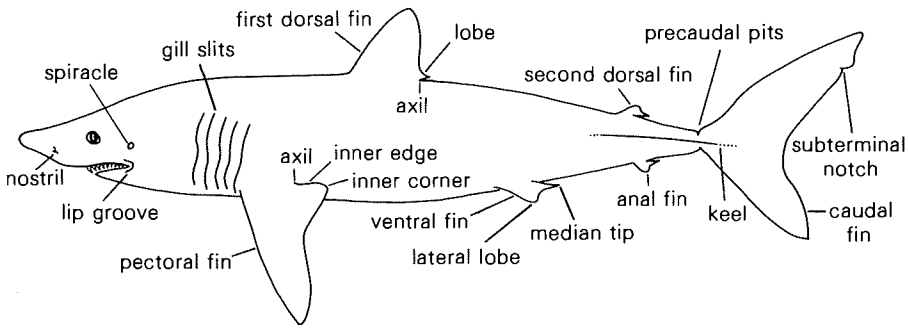


Fig. 14. Measurements of sharks.

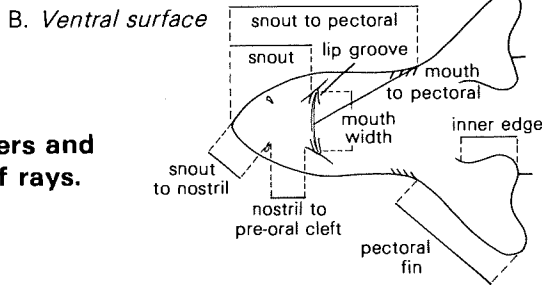
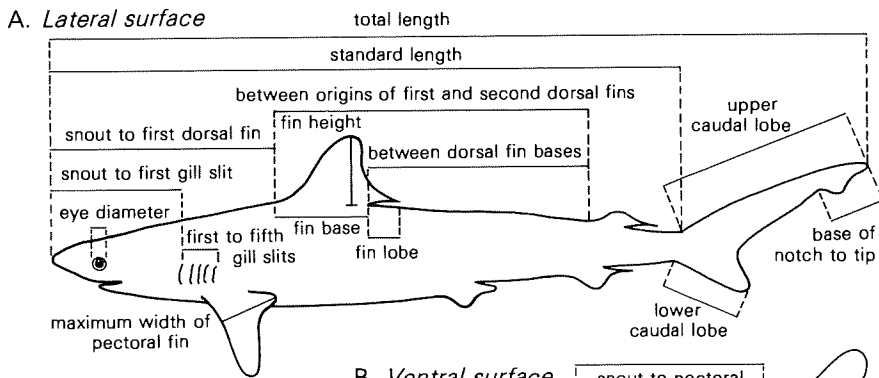
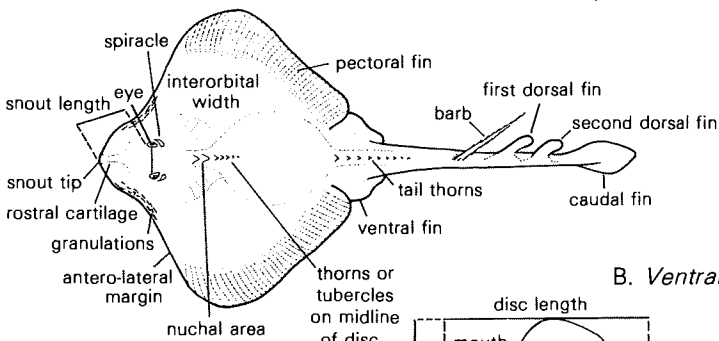
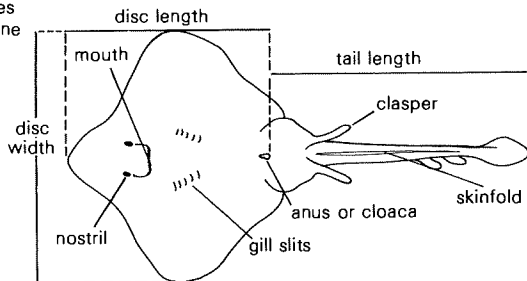


Fig. 15. External characters and measurements of rays.

A. Dorsal surface



B. Ventral surface



ABBREVIATIONS

SL: standard length; measured from the tip of the snout to the point of flexure of the caudal fin (Figs. 2, 14A)

TL: total length; measured from the tip of the snout to the tip of the caudal fin (Figs. 2, 14A)

FL: fork length; measured from the tip of the snout to the centre of the caudal fin fork (Fig. 2)

HL: head length; measured from the tip of the snout to the posterior gill opening (Fig. 2)

D (followed by number): number of spines and rays in the **dorsal** fin; the number of spines given in roman numerals and the number of rays in arabic numerals

A (followed by number): number of spines and rays in the **anal** fin; the number of spines given in roman numerals and the number of rays in arabic numerals

P (followed by number): number of rays in the **pectoral** fin

V (followed by number): number of spines and rays in the **ventral** fin; the number of spines given in roman numerals and the number of rays in arabic numerals

C (followed by number): number of rays in the **caudal** fin

L. Lat. (followed by number): number of scales in the **lateral line**; *see* Glossary (Fig. 1)

GR (followed by number): total number of **gill rakers** on the first gill arch; if the rakers on the upper and lower limbs are given separately then uppers are first (Figs. 4B, 4C)

LGR (followed by number): number of **gill rakers** on the lower limb of the first gill arch (Figs. 4B, 4C)

BR (followed by number): number of **branchiostegal rays**; *see* Glossary (Fig. 4A)

GLOSSARY

- abdomen:** the lower part of the body in front of the anus containing the digestive and reproductive organs
- accessory lateral line:** an additional lateral line, often running along the back above the main lateral line
- adipose:** fatty
- adipose fin:** a small, thick and fleshy fin without rays, situated behind the soft dorsal or anal fins (Fig. 7F)
- anal fin:** the unpaired fin on the ventral surface of the body behind the anus (Fig. 1)
- anterior:** pertaining to the front or head end
- antrose:** turned forward or upward
- anus:** external opening of the digestive system on the ventral surface of the body (Fig. 1)
- axil:** the angle formed at the point of attachment of the inner edge of a fin to the body (Fig. 13)
- axillary process:** a small, scale-like or fleshy projection at the axil of the pectoral or ventral fins
- barb:** a large, serrated, spike-like bony structure on the tail of some rays (Fig. 15A)
- barbel:** a thin, tentacle-like sensory structure on the head (Fig. 1)
- bathypelagic:** living above, and not associated with, the bottom of the ocean in depths of 1000 to 4000 metres.
- branchiostegal rays:** bony rays supporting the gill membranes behind the lower jaw (Fig. 4A)
- bucklers:** external bony shields often bearing spines
- canine tooth:** an enlarged tooth adapted for holding prey (Fig. 6B)
- caudal peduncle:** the hind end of the body between the termination of the base of the anal fin and the base of the caudal fin (Figs. 1 & 2)
- chest:** the front, lower portion of the body containing the heart
- claspers:** rod-like structures attached to the ventral fins in male sharks, rays and chimaeras for transferring sperm to the female (Fig. 15B)
- cloaca:** a common opening for digestive, urinary and reproductive tracts (Fig. 15B)
- compressed:** flattened from side to side (Fig. 3A)
- concave:** hollowed out
- continental shelf:** the shelf-like part of the seabed adjacent to the coast extending down to a depth of about 200 metres
- continental slope:** that part of the seabed extending down from the continental shelf to a depth of about 2000 metres
- convex:** curved outwards

coronal spines: paired spines on the dorsal midline of the head opposite the rear edge of the orbits

corselet: the large, thick scales encircling the forward portion of the body in some tunas

ctenoid scale: a scale with a spiny hind margin (Fig. 11B)

cusps: a projection on a tooth (Fig. 6B)

cycloid scale: a smooth rounded scale without spines on the hind margin (Fig. 11A)

deciduous scales: easily rubbed off

demersal: living on or near the bottom

dentary: bone forming anterior part of lower jaw

denticle: a small, tooth-like structure; a modified, disc-like scale with a projecting cusp, covering the body of sharks and rays

denticulate: with small, tooth-like projections

depressed: flattened from top to bottom (Fig. 3D)

diagonal rows: scale rows along the body just above the lateral line; counted from the upper corner of the operculum to the point of flexure of the caudal fin

dimorphic: existing in two forms, usually referring to differences between the sexes

disc: the depressed body of sharks and rays consisting of the head, the trunk and the enlarged pectoral fins (Fig. 15B)

dorsal: pertaining to the upper surface of the head or the body

family: one of the categories in animal classification containing one or more closely-related genera; the name always ending in *idae*

finlet: a small fin-like structure without rigid support, situated behind the dorsal and anal fins in some fishes

fusiform: spindle-shaped, tapering gradually at both ends

genus (pl. generic): one of the categories in animal classification containing one or more closely-related species

gill opening: the external opening of the gill chamber, situated on the side of the head, may be slit-like or pore-like, multiple or single

gill raker: a bony, tooth- or filament-like structure on the internal edge of the gill arch (Fig. 4C)

humeral: pertaining to the shoulder region

illicium: the first dorsal spine modified for luring prey, constituting the rod and bait in anglerfish

incisor: a flattened tooth adapted for cutting (Fig. 6B)

interorbital width: the shortest distance between the eyes

isthmus: the narrow, fleshy projection of the body below the head between the gill openings

keel: a fleshy or bony ridge

lateral: pertaining to the sides

lateral line: a row of sensory pores or pored scales in the skin along the side of the body; counted from its origin near the upper corner of the operculum to the point of flexure of the caudal fin (Fig. 1)

lateral series (of scales): scale rows along the body; used when the lateral line is absent, and counted from the upper corner of the operculum along the middle of the side to the point of flexure of the caudal fin

light organ: light producing areas usually lacking a lens

mandible: the lower jaw (Fig. 4A)

maxilla: paired bone forming the lateral margin of the upper jaw (Fig. 4A)

median: pertaining to the middle

mesopelagic: living in the open ocean in depths of between 200 and 1000 metres

molar: blunt and rounded grinding tooth (Fig. 6B)

nape: the region of the head above and behind the eyes (Fig. 1)

nasal flap: skin flap partially covering the nostril in sharks and rays

nasal organs: sensory structures for detecting smell; appearing externally as 1 or 2 pores or tubes on each half of snout

nictitating membrane: a transparent, inner eyelid

nostril: external opening of nasal organ (Figs. 1, 13, 15B)

nuchal: pertaining to the nape

oceanic: living in the open ocean

ocellus: an eye-like spot or ring

operculum: bony flap covering the gills (Figs. 4A, 4B)

orbit: bony cavity in the skull housing the eyeball

origin: the most anterior point of a fin base (Figs. 1, 13)

palatines: paired bones on the roof of the mouth, sometimes bearing teeth (Fig. 6A)

papilla: a small fleshy projection

pectoral: pertaining to the breast (Figs. 1, 13)

pelagic: free swimming in the sea, not associated with the bottom

pelvis: bones supporting the ventral fins; usually paired but sometimes fused together forming one median bone

photophore: light emitting organ or luminous spot, usually with a lens

posterior: pertaining to the hind or tail end

precaudal pit: a small groove on the caudal peduncle of sharks immediately preceding the caudal fin (Fig. 13)

premaxilla: paired bone that usually forms the front of the upper jaw (Fig. 4A)

pre-oral cleft: a deep groove extending anteriorly from the lateral border of the mouth (Fig. 14B)

procurrent ray: a small ray which is divided into two halves but not segmented (Fig. 10B)

protractile: capable of being extended forward

protrusible: a condition of the jaw in which the mouth projects forward as a tube when it is opened (Fig. 5G)

pyloric caeca: narrow, blind tubes attached to the stomach

ray: an element supporting a fin which is divided into two halves and segmented along its length; may be simple or branched (Fig. 10A)

rostral cartilage: a gristly structure supporting the snout (Fig. 15)

rostrum (*a. rostral*): a projecting snout

scute: a thickened, enlarged scale with a median ridge that usually terminates in a sharp point; in carangids specifically those scales that terminate in a very sharp point (Fig. 1)

serrate: saw-like

spatulate: broad and greatly flattened

species: the lowest principal category in animal classification; groups of actually or potentially interbreeding populations that are reproductively isolated from other groups

spine: a stiff element supporting a fin which is not divided into two halves and is unsegmented along its length (Fig. 10A)

spinous ray: a rigid ray (Fig. 10B)

spiracle: a respiratory opening behind the eye in sharks and rays (Figs. 13, 15)

suborbital: area beneath the eye; a bone beneath the eye (Fig. 4)

supramaxilla: a small supplemental bone lying along the upper edge of the maxilla

symphysis (*a. symphysial*): the line of junction of two bones, particularly that of the two halves of either jaw

tenaculum: clasping organ; probably used by the male to secure the female during mating

tubercles: projections on the surface of the skin

ventral: pertaining to the lower surface of the head or the body

ventral fins: paired fins situated on the ventral surface between the head and anus (Figs. 1, 9, 13, 15)

villiform teeth: small, slender teeth which form velvety bands (Fig. 6B)

vomer: a bone forming the front part of the roof of the mouth (Fig. 6A)

GUIDE TO FAMILIES

SHARKS and RAYS

Carcharhinidae 018 (whaler sharks): body typically "shark-like"; 2 dorsal fins, without spines, axil of first ahead of ventral fin origin; anal fin present; caudal fin not lunate, much shorter than half total body length; 5 gill slits, last over or behind pectoral fin origin; *nictitating lower eyelid well developed, internal*; precaudal pits well developed; nostrils not connected to mouth by grooves; intestine with scroll type valve. *Ref:* Bigelow & Schroeder (1948); Bass et al. (1973); Compagno (1979); Garrick (1982).

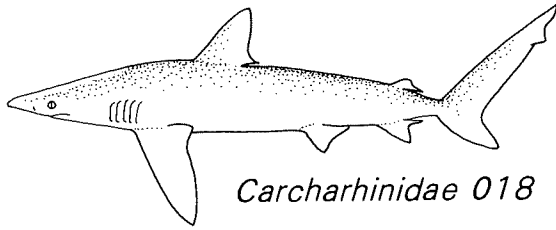
Lamnidae 010 (mackerel sharks): body typically "shark-like"; 2 dorsal fins, without spines, second minute compared to first and axil of first well ahead of ventral fin origin; anal fin minute; *caudal fin lunate*; caudal peduncle with well marked *lateral keels*; 5 gill slits, last ahead of and extending below pectoral fin origin; nictitating lower eyelid absent; precaudal pits present; teeth lanceolate or triangular and serrated; nostrils not connected to mouth by grooves. *Ref:* Bigelow & Schroeder (1948); Garrick (1967); Bass et al. (1975c).

Odontaspidae 008a (sand sharks, grey nurse-sharks): body typically "shark-like"; 2 *similar-sized* dorsal fins, without spines, first dorsal inserted posteriorly but axil ahead of ventral fin origin; anal fin present; caudal fin not lunate, much shorter than half total body length; caudal peduncle without obvious lateral keels; 5 gill slits, last ahead of pectoral fin origin; nictitating lower eyelid absent; upper (and sometimes lower) precaudal pit present; *teeth long and lanceolate*; nostrils not connected to mouth by grooves. *Ref:* Bass et al. (1975c).

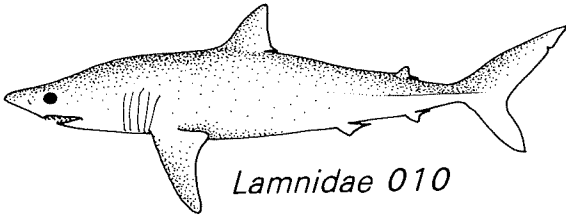
Alopiidae 012 (thresher sharks): body typically "shark-like"; 2 dorsal fins, without spines, second minute compared to first, axil of first ahead of ventral fin origin; anal fin minute; *caudal fin extremely long*, equal to about half of total body length and with distinct lower lobe; 5 gill slits, last 2 over pectoral fin base; nictitating lower eyelid absent; nostrils not connected to mouth by grooves. *Ref:* Bigelow & Schroeder (1948); Bass et al. (1975c); Compagno (1984).

Sphyrnidae 019 (hammerheads): as *Carcharhinidae* (018) except head expanded laterally forming dorso-ventrally flattened "hammer" with eyes at tips. *Ref:* Bass et al. (1975b).

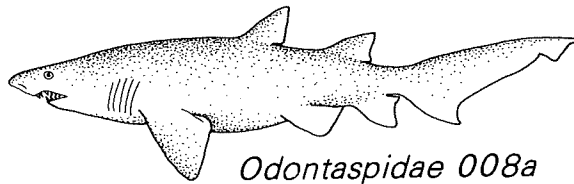
Cetorhinidae 011 (basking shark): body typically "shark-like"; 2 dorsal fins, without spines, axil of first well ahead of ventral fin origin; anal fin small; caudal fin lunate; caudal peduncle with well marked lateral keels; *5 very long gill slits* extending onto dorsal surface and almost united ventrally, last ahead of pectoral fin origin; mouth inferior, definite snout; teeth minute, numerous; gill rakers long and bristle-like; eye ahead of mouth corner. *Cetorhinus maximus*, the only species in the family, grows to 10 m in length; recorded from N.S.W., Vic., Tas., S.A. and southern W.A. *Ref:* Bass et al. (1975c).



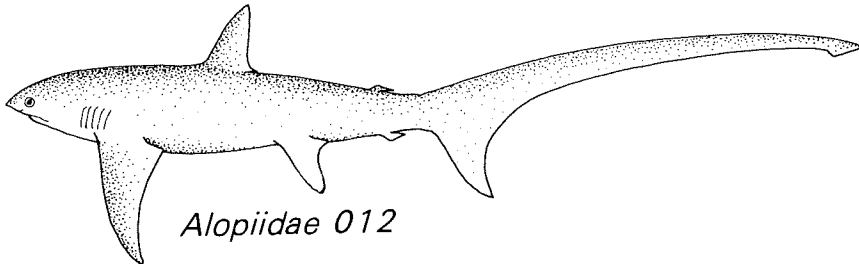
Carcharhinidae 018



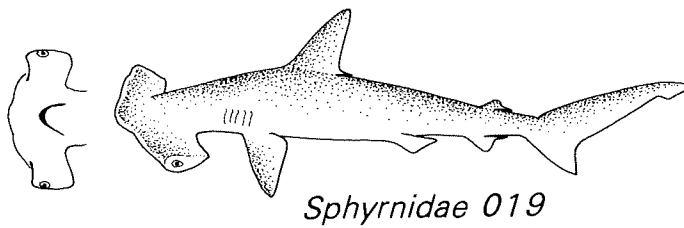
Lamnidae 010



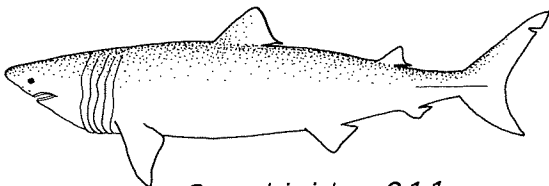
Odontaspidae 008a



Alopiidae 012



Sphyrnidae 019



Cetorhinidae 011

Rhincodontidae 014 (whale shark): body "shark-like"; 2 dorsal fins, without spines; anal fin present; caudal fin lunate; caudal peduncle with well marked lateral keels; 5 gill slits, last over middle of pectoral fin base; prominent, longitudinal *ridges* on dorsal and lateral surfaces of body; *mouth terminal*, snout very short; *teeth minute*; gill apparatus modified for filter-feeding; eye behind mouth corner; body brown with distinctive white markings. *Rhiniodon typus*, the only species in the family, is the largest living fish; recorded from N.S.W. and Vic. *Ref:* Whitley (1940a); Bass et al. (1975c).

Triakidae 017 (hound-sharks, smooth-hounds): similar to (and only recently separated from) Carcharhinidae (p 22) except as follows: precaudal pits absent; supraorbital crest present; teeth with strong basal ledges and grooves; intestine with corkscrew type valve. *Ref:* Compagno (1973a).

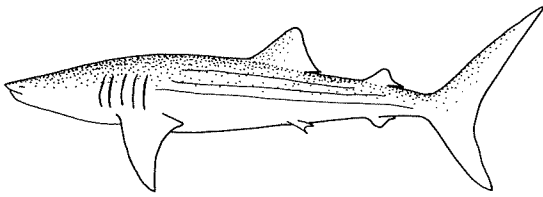
Hexanchidae 005 (six- and seven-gill sharks): body typically "shark-like"; *1 dorsal fin*; anal fin present; 6 or 7 gill slits, first of each side well separated ventrally; upper jaw teeth lanceolate, lower jaw teeth broad and comblike. *Ref:* Bass et al. (1975d).

Heterodontidae 007 (bullhead or Port Jackson sharks): body short and robust; 2 dorsal fins each with *strong spine*; *anal fin present*; head large and blunt, usually with prominent crests above eyes; mouth small and nearly terminal; anterior teeth small and pointed, posterior teeth molar-like. *Ref:* Bass et al. (1975d).

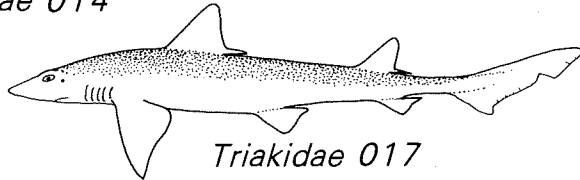
Squalidae 020 (dogfishes): body typically "shark-like", almost circular in cross-section and without lateral ridge between pectoral and ventral fins; 2 dorsal fins, each *usually preceded by strong spine* (N.B. if both fins without spines, teeth with 1 cusp); *anal fin absent*; 5 gill slits, last ahead of pectoral fin origin; teeth with 1 or several cusps, alike or dissimilar in both jaws; spiracles present. *Ref:* Bigelow & Schroeder (1957); Garrick (1960c); Bass et al. (1976).

Echinorhinidae 022 (bramble sharks): as Squalidae except as follows: thorn-like denticles on body; dorsal fins not preceded by spines and teeth with several cusps, alike in both jaws. *Ref:* Bigelow & Schroeder (1957); Bass et al. (1976).

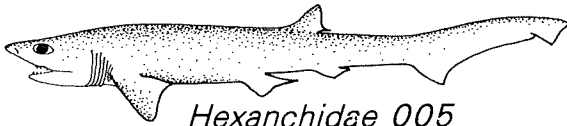
Oxynotidae 021 (prickly dogfishes): as Squalidae except as follows; body almost triangular in cross-section with noticeable ventro-lateral ridge between each pectoral and ventral fin. *Ref:* Garrick (1960b).



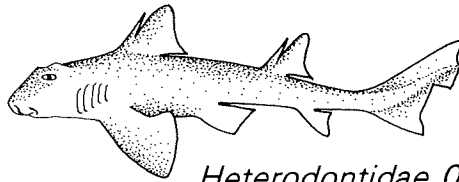
Rhincodontidae 014



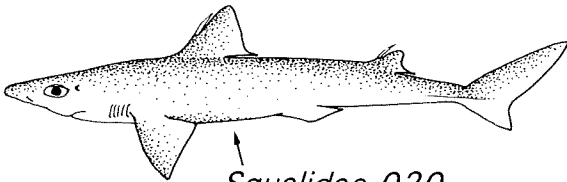
Triakidae 017



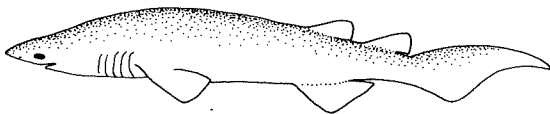
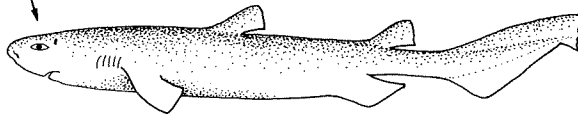
Hexanchidae 005



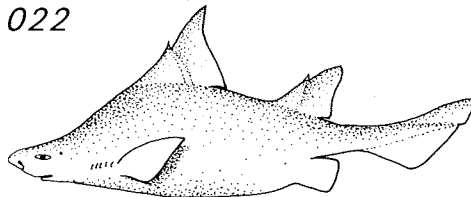
Heterodontidae 007



Squalidae 020



Echinorhinidae 022



Oxynotidae 021

Scyliorhinidae 015 (catsharks): body elongate and slightly depressed; 2 dorsal fins, without spines, axil of first *over or behind* ventral fin origin; anal fin present, origin ahead of second dorsal fin axil; 5 gill slits, last over or behind pectoral fin origin; mouth reaching beyond front of eye; nostril separate from or connected to mouth by grooves, if connected, nasal barbels absent; spiracles present. *Ref:* Bass et al. (1975a); Springer (1979).

Parascyllidae 013a (collared catsharks): body cylindrical or slightly depressed; 2 dorsal fins, without spines, axil of first behind ventrals; anal fin present, origin well ahead of second dorsal fin origin; 5 gill slits, last over or behind pectoral fin origin; mouth nearly terminal, not reaching to front of eye; nostrils joined to mouth by grooves; nasal barbels always present, longer than wide; spiracles minute. *Ref:* Compagno (1984).

Orectolobidae 013 (wobbegongs): as *Parascyllidae* but distinguished as follows: body considerably depressed; anal fin origin about opposite second dorsal fin axil; spiracles very large, larger than eyes; mouth and sides of head fringed with skin flaps. *Ref:* Regan (1908); Whitley (1940); Compagno (1984).

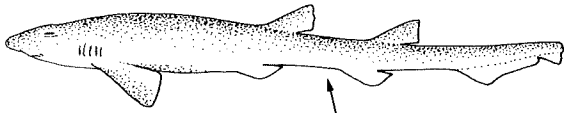
Brachaeluridae 013b (blind sharks): as *Parascyllidae* but distinguished as follows: anal fin origin about opposite second dorsal fin axil; spiracles very large, about equal to eyes or larger. One species (*Brachaelurus waddi*) reaching south to N.S.W. *Ref:* Regan (1908); Whitley (1940a).

Stegastomatidae 013c (zebra shark): as *Parascyllidae* but distinguished as follows: body with *prominent longitudinal ridges present along back and sides of trunk*; origin of first dorsal fin over ventral fin base; anal fin origin opposite second dorsal fin base or axil; spiracles large, about equal to eyes; *caudal fin elongate*, about half total body length. One species (*Stegastoma varium*) only occasionally reaching south as far as Sydney, N.S.W. *Ref:* Bass et al. (1975c).

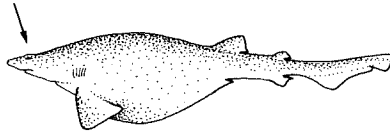
Pristiophoridae 023 (saw sharks): body elongate and slightly depressed; 2 dorsal fins; anal fin absent; *snout elongate and blade-like*, armed with 1 row of barbs of unequal size projecting laterally along each edge; 1 pair of long barbels on undersurface of snout; 5 to 6 gill slits on lateral surface of head. *Ref:* Bass et al. (1975d).

Mitsukurinidae 008b (goblin shark): body elongate and limp; *snout very long and flattened, dagger-like*; jaws extremely protrusible, with lanceolate teeth; 5 gill slits, filaments visible externally. *Mitsukurina owstoni* is the only species in the family; recorded from deepwater off N.S.W. and S.A. (doubtful). *Ref:* Bass et al. (1975c); Glover (1976); Stevens & Paxton (1985).

Chlamydoselachidae 006 (frill shark): body long and eel-like; 1 dorsal fin, inserted posteriorly; anal fin present; *6 gill slits, first of each side united ventrally across throat*; *mouth terminal without distinct snout*; teeth of upper and lower jaws similar. *Chlamydoselachus anguineus* is the only species in family; recorded from N.S.W. and Tas.. *Ref:* Bass et al (1975d); Bass (1979).



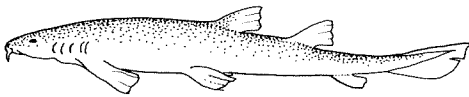
Scyliorhinidae 015



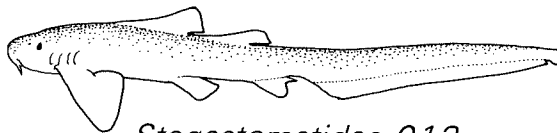
Parascyllidae 013a



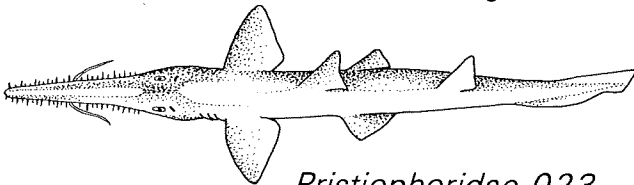
Orectolobidae 013



Brachaeluridae 013b



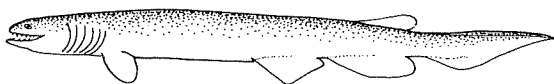
Stegastomatidae 013c



Pristiophoridae 023



Mitsukurinidae 008b



Chlamydoselachidae 006

Squatinae 024 (angel sharks): head, body and pectoral fins moderately depressed and "ray-like"; anal fin absent; *pectoral fins expanded but inner margins not fused to head at front and rear*; lower lobe of caudal fin longer than upper; 5 gill slits extend *laterally* onto sides of head; mouth terminal. *Ref:* Bigelow & Schroeder (1948); Bass et al. (1975d).

The next 6 families of Rays (027 to 039) share the following characters: head, body and pectoral fins moderate to strongly depressed; anterior margin of enlarged pectoral fins fused to head, forming angular to circular disc; mouth and gill slits on ventral surface; teeth pavement-like; anal fin absent.

Rhinobatidae 027 (fiddler rays, guitar fishes): disc subcircular or wedge-shaped; tail stout and shark-like, without large serrated barb; 2 dorsal fins, first behind ventral fins but nearer to them than tip of tail; caudal fin well developed, upper lobe prominent; upper surface of disc and tail with 1 row of small spines present along midline. *Ref:* Bigelow & Schroeder (1953).

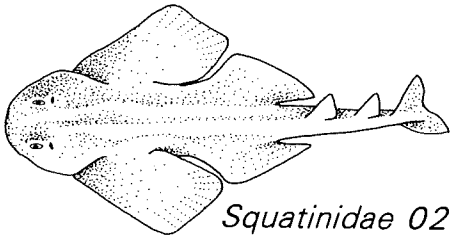
Torpedinidae 028 (electric rays): disc subcircular to elongate; disc soft, flabby and fleshy towards its margin; tail stout and long or extremely short, without large serrated barb; *2 dorsal fins*; caudal fin well developed; skin smooth, *without denticles or spines*; electric organs well developed (often visible through skin on ventral surface of head). *Ref:* Bigelow & Schroeder (1953); McKay (1966).

Rajidae 031 (skates): disc subcircular to quadrangular; tail slender, short and sharply marked off from disc, without large serrated barb; *2 small dorsal fins*, nearer to tip of tail than tips of ventral fins; caudal fin absent or reduced to low fold, usually on dorsal surface; ventral fins usually with deeply notched outer margins; upper surface of disc and tail with granulations or thorns, thorns often in row along midline; sexually dimorphic; (See NOTE under *Irolita waitii*). *Ref:* Whitley (1940a); Bigelow & Schroeder (1948); Garrick & Paul (1974); Stehmann & McEachran (1978).

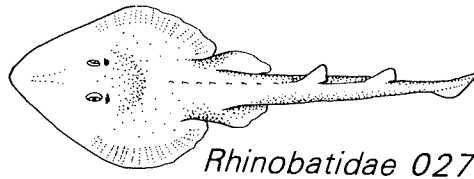
Urolophidae 038 (stingarees): disc subcircular to quadrangular; tail slender, sharply marked off from disc, bearing 1 or more large serrated barbs; 1 or 0 dorsal fins; *caudal fin* well developed; upper surface of disc and tail smooth or with prickles, thorns and tubercles. *Ref:* Bigelow & Schroeder (1953).

Myliobatidae 039 (eagle rays): disc wide and angular, *head elevated and distinct from disc*; eyes and spiracles on lateral surface of head; pectoral fins united below tip of snout forming undivided lobe; tail whip-like, sometimes with large, serrated barb; 1 small dorsal fin; no caudal fin; upper surface of disc naked or with tubercles around eye and along midline of back. *Ref:* Bigelow & Schroeder (1953); Wallace (1967); Stehmann & McEachran (1978).

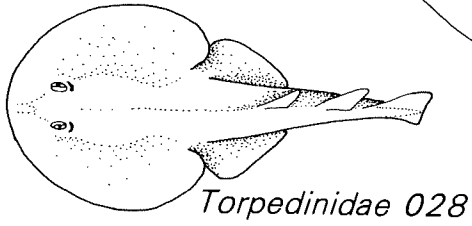
Dasyatidae 035 (stingrays): disc quadrangular to subcircular; *tail slender and long, whip-like in some*, bearing 1 or more large serrated barbs; *no dorsal fins*; *no caudal fin*; upper surface of disc and tail smooth or with prickles, thorns or tubercles. *Ref:* Bigelow & Schroeder (1953); Stehmann & McEachran (1978).



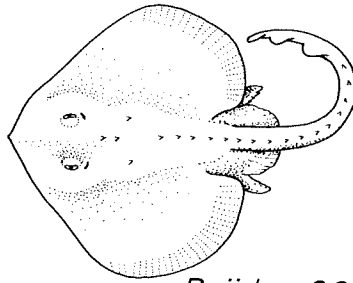
Squatinidae 024



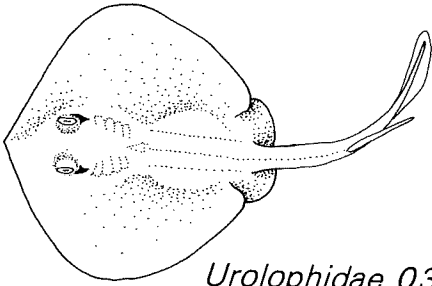
Rhinobatidae 027



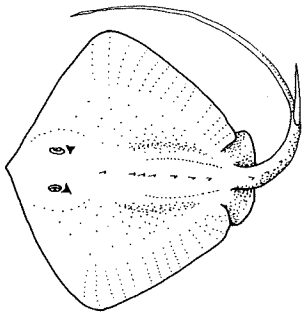
Torpedinidae 028



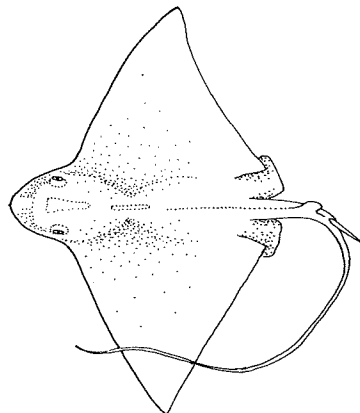
Rajidae 031



Urolophidae 038



Dasyatidae 035



Myliobatidae 039

GHOST SHARKS and BONY FISHES

Chimaeridae 042 (ghost sharks): body elongate, tapering rearward to slender tail; skin naked and slippery with mucus; 1 external gill opening low on each side close to base of pectoral fin; 2 dorsal fins, first triangular and preceded by strong erectile spine; anal fin *sometimes* separated from caudal fin by deep narrow notch, otherwise indistinguishable; caudal fin low, upper and lower lobes similar, and often with terminal filament; head large, *snout, short and conical*; mouth small, on lower surface of head; mature males with erectile club-shaped tenaculum on head; lateral line system well developed with many branches, especially on head. *Ref:* Fowler (1941); Bigelow & Schroeder (1953).

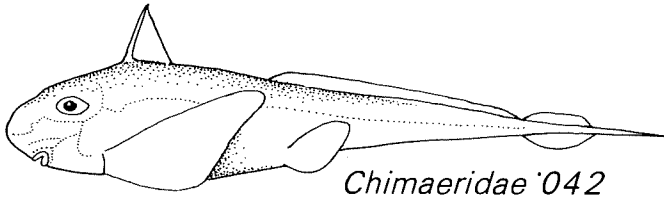
Callorhynchidae 043 (elephant fishes): as Chimaeridae except as follows: anal fin always separated from caudal fin by deep narrow notch; *caudal fin* with lower anterior lobe much wider than upper and *axis bent upwards*; head short, *snout* forming flexible trunk ending in *hoe-like process*. *Ref:* Fowler (1941); Bigelow & Schroeder (1953).

Rhinochimaeridae 044 (long-nosed ghost sharks): as Chimaeridae with long *pointed snout* (trunk), not hoe-like; *Ref:* Fowler (1941); Bigelow & Schroeder (1953).

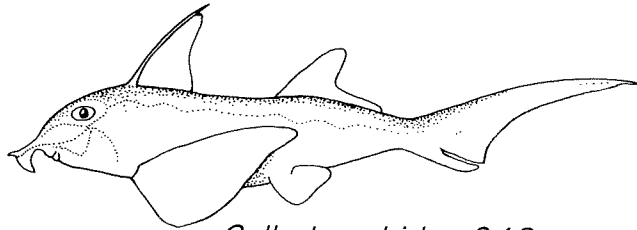
Myxinidae 004 (hagfish): body eel-like and flabby; skin naked and slippery with mucus; 1 to 16 external gill openings; no paired fins; dorsal fin absent (N.B. caudal fin extends onto dorsal surface); eyes degenerate; mouth small, subterminal containing 4 barbels and 4 comb-like rows of sharp horny teeth; large single nostril on tip of head surrounded by 4 barbels; numerous mucous pores along body. *Ref:* Adam & Strahan (1963).

Congridae 067 (conger eels): body elongate and robust, cylindrical anteriorly, compressed posteriorly; scales absent; gill opening slit-like, before and below pectoral fin; fins without spines; 1 long-based dorsal fin, origin over gill or pectoral region; dorsal and anal fins united to caudal fin; pectoral fins present; ventral fins absent; eye of moderate size, 1 to 3 in snout; snout conical, mouth large but not extending much beyond eye; jaws normal, teeth strong but no large canines; tongue conspicuous and free from floor of mouth; posterior nostril close to anterior margin of eye; seldom brightly coloured or conspicuously marked. *Ref:* Castle (1968); Smith (1971).

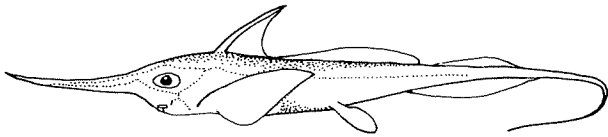
Ophichthidae 068 (snake eels and worm eels): body elongate and slender, compressed posteriorly; scales absent; gill opening slit-like; fins without spines; 1 long-based dorsal fin, origin variable; dorsal and anal fins united to caudal fin or caudal fin absent and tip of tail finless and stiffened; pectoral fins absent to well developed; ventral fins absent; mouth large, extending beyond eye; jaws normal, teeth minute to fang-like; tongue not free; posterior nostril usually within or piercing upper lip; branchiostegal rays numerous, overlapping along ventral midline. *Ref:* McCosker (1977).



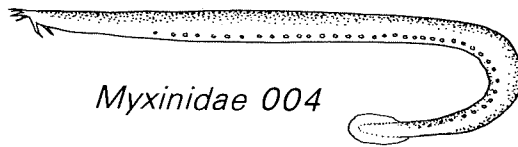
Chimaeridae 042



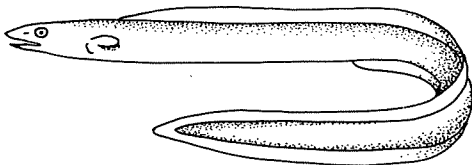
Callorhynchidae 043



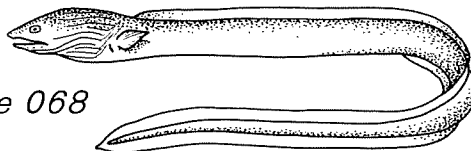
Rhinochimaeridae 044



Myxinidae 004



Congridae 067



Ophichthidae 068

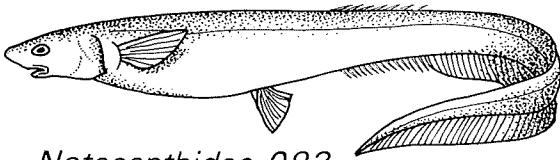
Notacanthidae 083 (spiny eels): body very elongate and moderately compressed with long tapering tail, covered with small scales; gill opening normal, with bony flap; *1 dorsal fin with 6 to 40 free spines and 1 ray*; anal fin long, extending to tip of tail, origin under dorsal fin base; no distinct caudal fin; ventral fins, united by membrane, abdominal and nearer to anus than head; snout rounded, deeper than wide, projecting beyond mouth; lateral line closer to dorsal than ventral profile. *Ref: McDowell (1973).*

Halosauridae 081 (halosaurs): body elongate and rounded with long tapering tail, covered with large, somewhat deciduous scales; gill opening normal, with bony flap; 1 high, short-based dorsal fin with 9 to 13 rays; anal fin long, extending to tip of tail, origin well behind dorsal fin base; no distinct caudal fin; ventral fins, united by membrane, abdominal and nearer head than vent; snout flattened, wider than deep, projecting conspicuously beyond mouth; lateral line enlarged and cavernous, close to ventral profile. *Ref: McDowell (1973).*

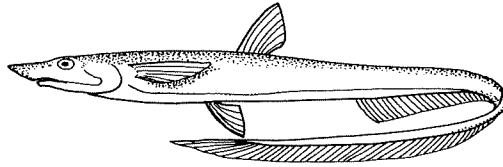
Lophotidae 270 (crestfishes): (N.B. these fish are delicate and specimens are often incomplete); body strongly compressed and ribbon-like; head and body covered with small deciduous scales but without tubercles; *dorsal fin* very long, *originating above or before tip of snout*; small anal fin near caudal fin; caudal fin *in line with* caudal peduncle; ventral fins small; mouth slightly protrusible; jaws with conical teeth; lateral line plates *smooth*; anus near posterior end of body; ink sac present (discharges into cloaca). *Ref: Walters & Fitch (1960).*

Trachipteridae 271 (ribbonfishes): as Lophotidae except as follows: body naked or with deciduous scales, adults covered with cartilaginous tubercles; *dorsal fin originating above or slightly behind eye*, first few rays elongate in young; no anal fin (rudimentary adipose fin in young); caudal fin either with large fan-like upper lobe set at *angle* to caudal peduncle or tail long and tapering with small caudal fin *in line with* axis of caudal peduncle; ventral fins elongate in young, absent in adult; upper jaw very protrusible; lateral line plates bear *spines*; anus in anterior half of body; no ink sac. (N.B. body and fin shape and length vary radically with growth.) *Ref: Walters & Fitch (1960); Heemstra & Kannemeyer (1984).*

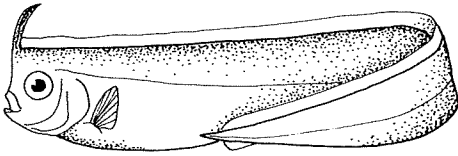
Regalecidae 272 (oarfishes): as Lophotidae except as follows: scales absent, skin covered with granules or tubercles; *dorsal fin originating distinctly behind tip of snout but before eye*, first few rays elongate and bright red; no anal fin; ventral fins elongate, slender with 1 to 5 rays; upper jaw very protrusible; jaws usually without teeth; anus in anterior third of body; no ink sac. *Ref: Walters & Fitch (1967).*



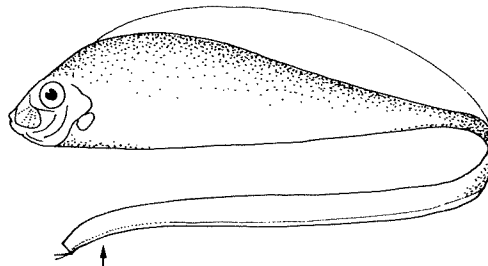
Notacanthidae 083



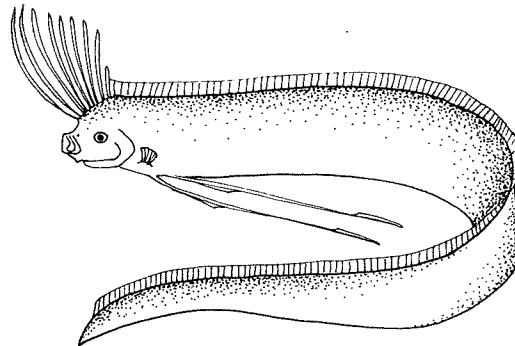
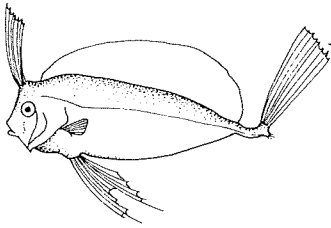
Halosauridae 081



Lophotidae 270



Trachipteridae 271



Regalecidae 272

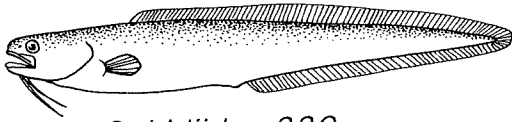
Ophidiidae 228 (lings, cuskeels, brotulas): body elongate with long tapering tail, covered with small scales and often mucus; gill opening normal, with bony flap; fins without spines; dorsal and anal fins long-based and often united with caudal fin; dorsal rays equal in length to or longer than opposing anal rays; ventral fins absent or, jugular, each with 1 to 2 rays; mouth large, terminal or inferior; jaws with small needle-like to granular teeth; supramaxilla present; 2 nostrils on each side of head, anterior nostril high on snout. *Ref:* Cohen & Nielsen (1978).

Merlucciidae 227 (hakes): body elongate and compressed, covered with scales; *either* with long tapering pointed tail and 2 dorsal fins, second dorsal fin and anal fin united with indistinct caudal fin *or* with cod-like tail and 2 dorsal fins, 1 anal fin and prominent truncate caudal fin; anal fin origin far behind second dorsal fin origin; pectoral fins, short-based and relatively high on sides, with 12 to 16 rays; ventral fins thoracic or jugular, with 7 to 9 rays; chin barbel absent; mouth large, terminal, lower jaw slightly projecting; jaws with long pointed teeth, vomer with teeth. *Ref:* Marshall (1966).

Macrouridae 232 (whiptails, rattails): body elongate and moderately compressed with long, tapering, pointed tail, covered with scales; usually 2 dorsal fins, first fin with first ray minute and second ray long and spinous; anal fin and second dorsal fin united at tip of tail, caudal fin absent; anal fin origin ahead or under second dorsal fin origin; pectoral fins short-based and relatively high on sides; ventral fins thoracic or jugular, with 5 to 17 rays; chin barbel usually present; eyes usually large; snout pointed to bluntly rounded, sometimes with scute-like scale at tip; mouth terminal or inferior; jaws with villiform or enlarged pointed teeth, no teeth on roof of mouth; black light organ often on midline of belly. *Ref:* Marshall (1973); Iwamoto (1981).

Moridae 224 (morid cods): body moderately elongate, slightly compressed and tapering to narrow caudal peduncle, covered with small cycloid scales; fins without spines; 2 to 3 dorsal fins, first with 1 to 14 rays; anal fin sometimes divided into 2 sections; *caudal fin* truncate or rounded and *always separate from dorsal and anal fins*; ventral fins thoracic, with 2 to 8 rays; chin barbel usually present; mouth large, terminal or inferior; jaws with small to large teeth, vomer with or without teeth. *Ref:* Marshall & Cohen (1973); Paulin (1983).

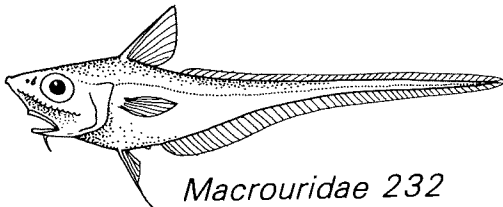
Melanonidae 224a (melanonids): body moderately elongate and compressed, covered with moderate-sized cycloid scales; *either* with long tapering tail and 1 dorsal fin, dorsal fin and anal fin united with indistinct caudal fin *or* with 2 dorsal fins (narrowly separated), anal fin divided into 2 sections and distinct caudal fin; pectoral fins short-based, with 10 to 20 rays; ventral fins thoracic or jugular, with 4 to 5 rays; chin barbel absent; mouth large, terminal; jaws with bands of villiform teeth, vomer and palatines with or without teeth. *Ref:* Gunther (1878); McCulloch (1926); Marshall & Cohen (1973).



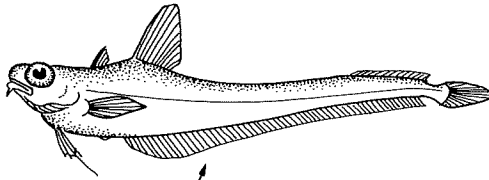
Ophidiidae 228



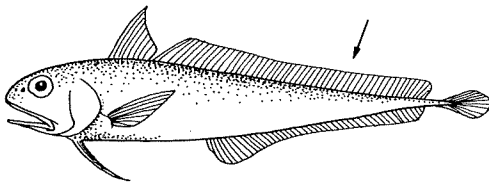
Merlucciidae 227



Macrouridae 232



Moridae 224



Melanonidae 224a

Syngnathidae 282 (pipefishes, seahorses): body elongate and encased in bony rings bearing 4 to 9 longitudinal ridges, without scales; 1 dorsal fin with 15 to 60 rays or absent; anal fin very small with 2 to 6 rays or absent; caudal fin rounded or absent; pectoral fins with 5 to 26 rays or absent; ventral fins absent; mouth small, at tip of long, tube-shaped snout; jaws without true teeth; gill opening very small; males incubate eggs in brood area under trunk or tail. *Ref:* Fritzsche (1980); Dawson (1982).

Fistulariidae 278 (flutemouths): body elongate and moderately depressed, naked or covered with prickles; dorsal and anal fins similar, opposite and set far back on body, each with 13 to 20 soft rays; caudal fin forked with middle rays produced into long filament; ventral fins (6 rays) small, abdominal; mouth small, at tip of long, tube-shaped snout. *Ref:* Fritzsche (1976).

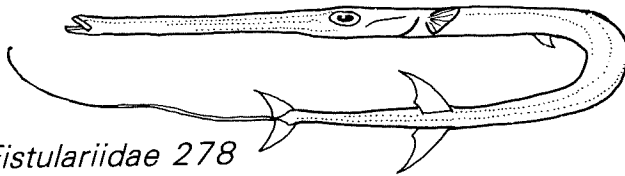
Scomberesocidae 236 (sauries): body elongate and moderately compressed, covered with very small scales; dorsal and anal fins, short-based without spines, and set far back on body; *5 to 7 separated finlets behind both dorsal and anal fins*; caudal fin deeply forked; ventral fins inserted about midlength of body; both jaws short or prolonged into slender *toothed* beak (lower jaw extending slightly beyond upper); teeth very small; lateral line near ventral profile. *Ref:* Hubbs & Wisner (1980).

Hemiramphidae 234 (garfish): body elongate and slightly compressed, covered with large, deciduous scales; dorsal and anal fins, short-based, without spines, and set far back on body; no separated finlets; caudal fin rounded, truncate or deeply forked; pectoral and ventral fins small, not wing-like, ventral inserted about midlength of body; lower jaw usually produced into *toothless beak*, *upper jaw much shorter*; maxilla and part of lower jaw opposing maxilla with small teeth; lateral line near ventral profile. *Ref:* Norman (1957); Collette (1974); Parin et al. (1980).

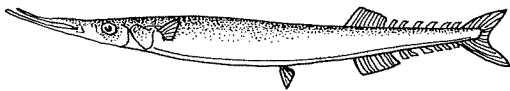
Gonorynchidae 141 (beaked salmons): body elongate and cylindrical, adults covered with small, spiny adherent scales; dorsal and anal fins, short-based, without spines, and set far back on body; caudal fin forked; pectoral fin inserted low on side, ventral fin inserted below dorsal fin, both with long scaly axillary flap; eyes large, covered with skin; snout conical, projecting beyond mouth; mouth inferior and protractile, with thick, fringed lips; jaws, vomer and palatines without teeth; barbel on underside of snout tip. *Ref:* Stead (1908b); Ogilby (1911a).



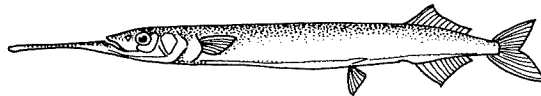
Syngnathidae 282



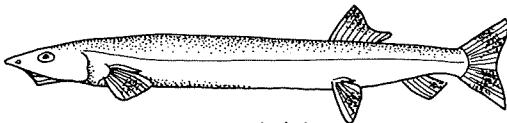
Fistulariidae 278



Scomberesocidae 236



Hemiramphidae 234



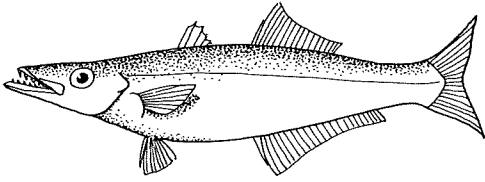
Gonorynchidae 141

Dinolestidae 327a (long-finned pikes): body elongate and moderately compressed, covered with moderate-sized deciduous scales; 2 dorsal fins, widely separated, first low with 4 to 5 spines, second *long-based* with 1 to 2 spines and 18 to 19 rays; anal fin, *long-based*, with 1 spine and 25 to 26 rays; caudal fin forked; ventral fins with 1 spine and 5 rays and axillary scale; snout long, mouth large, lower jaw projecting; jaws with *fang-like* teeth; vomer and palatines with teeth; lateral line extending onto caudal fin and forked; maxilla, snout, soft dorsal and anal fins with scales. *Ref:* Fraser (1971).

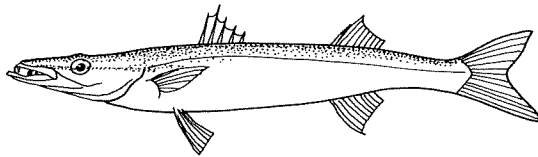
Sphyaenidae 382 (barracudas): body elongate and slightly compressed, covered with small, rather deciduous scales; 2 dorsal fins, widely separated, first with 5 strong spines, second short-based with 1 spine and 7 to 9 rays; anal fin, short-based, with 2 spines and 7 to 10 rays; caudal fin forked; ventral fins with 1 spine and 5 rays; snout long and pointed, mouth large, lower jaw projecting; jaws with fang-like teeth; palatines with strong canine teeth, vomer without teeth; maxilla, snout, soft dorsal and anal fins without scales. *Ref:* Williams (1959); de Sylva (1973).

Gempylidae 439 (snake mackerels, gemfishes): body elongate to oblong and compressed, with or without small scales; 2 dorsal fins, barely separated, first with 9 to 40 spines and much longer than second; 1 anal fin, similar to second dorsal; finlets often present behind second dorsal and anal fins; caudal fin well developed, forked; ventral fins absent, reduced to 1 spine or well developed with 1 spine and 2 to 5 rays; mouth large, upper jaw non-protrusible, lower jaw projecting; jaws with *fang-like* teeth; palatines with teeth; *maxilla not concealed by preorbital* when mouth closed. *Ref:* Matsubara & Iwai (1952); Parin & Bekker (1972).

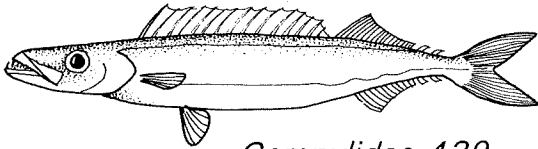
Trichiuridae 440 (cutlassfishes, hairtails): body very elongate, strongly compressed, without scales; extremely long dorsal fin, sometimes distinct notch between spines and rays; anal fin rays supporting membrane, reduced or absent; caudal fin small and forked or absent; ventral fin reduced to scale-like spine and 1 tiny ray or absent; mouth large, upper jaw non-protrusible, lower jaw projecting; jaws with strong teeth, *fang-like* at front of upper jaw; palatines with teeth; *maxilla concealed by preorbital* when mouth closed. *Ref:* Tucker (1956); Parin & Beckker (1972); Fischer & Whitehead (1974).



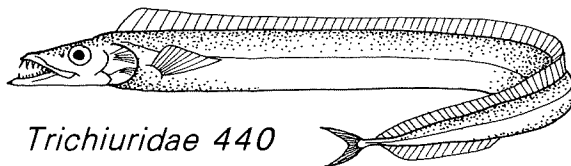
Dinolestidae 327a



Sphyraenidae 382



Gempylidae 439



Trichiuridae 440

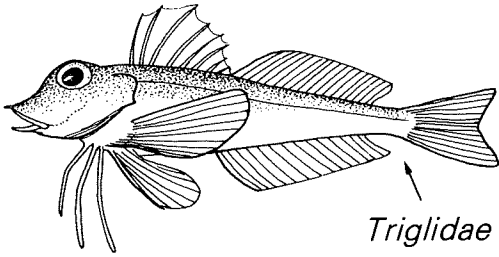
Triglidae 288 (gurnards, sea robins): body subcylindrical and tapering to narrow caudal peduncle, covered with scales or bony plates; *head large, encased in bony shield*; preorbital bones often produced forward beyond snout as spines or bony lobes; 2 dorsal fins, first with 7 to 11 spines, second with 12 to 22 rays; anal fin without spines, similar to second dorsal; caudal fin truncate, emarginate or forked; pectoral fins wing-like, long with 2 to 3 lowest rays thickened and detached; ventral fins thoracic with 1 spine and 5 rays; jaws and usually vomer and palatines with villiform teeth. *Ref:* Miller (1967, 1974); Richards & Saksena (1977); Heemstra (1982).

Hoplichthyidae 297 (ghost flatheads): body elongate and depressed, naked except for row of *spiny plates* along sides; head large and extremely depressed, much broader than deep, with strong spines and ridges; 2 dorsal fins, first with 5 to 6 spines, second long with about 14 to 15 rays; anal fin with about 16 to 18 rays, similar to second dorsal; caudal fin truncate to rhomboid; pectoral fins with 3 to 4 lowest rays thickened and *detached*; ventral fins thoracic, widely separated with 1 spine and 5 rays; mouth large, sometimes lower jaw slightly projecting; jaws, vomer and palatines with villiform teeth. *Ref:* Fowler (1938); Matsubara & Ochiai (1950a, 1950b); de Beaufort & Briggs (1962).

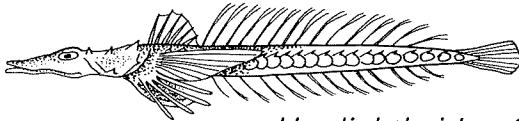
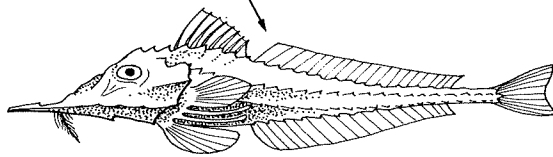
Platycephalidae 296 (flatheads): body elongate and moderately depressed, covered with scales; *head large and extremely depressed*, much broader than deep and usually with bony ridges and spines; 2 dorsal fins, first with 1 minute detached and 5 to 8 connected spines, second long with 11 to 14 rays; anal fin with 11 to 14 rays, similar to second dorsal; caudal fin truncate to rounded; pectoral fins without detached rays; ventral fins thoracic, widely separated with 1 spine and 5 rays; mouth large, lower jaw projecting; jaws, vomer and palatines with villiform teeth, canines sometimes present. *Ref:* Matsubara & Ochiai (1955); Schultz (1966).

Callionymidae 427 (dragonets): body elongate and depressed, without scales; 2 dorsal fins, first of 3 to 4 soft spines, second with 6 to 13 rays; anal fin with 4 to 13 rays; caudal fin with 10 rays, rounded to rhomboid; pectoral fins broad-based, with 17 to 30 rays; ventral fins thoracic with 1 spine and 5 rays, connected by membrane to base of pectoral fins; mouth small, both jaws usually protrusible downwards; jaws with bands of villiform teeth, vomer and palatines without teeth; *gill opening small, pore-like*, on dorsal surface of head; *preoperculum with strong backward-directed spine*. *Ref:* Nakabo (1982).

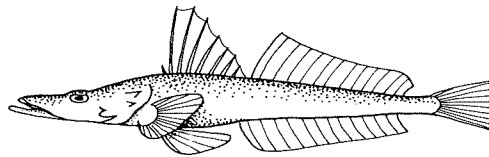
Argentinidae 097 (herring smelts): body elongate and angular to compressed, with large deciduous scales; dorsal fin short-based and *high*, with 10 to 13 rays, near midlength of body; adipose dorsal fin usually present; *anal fin short-based, with 9 to 17 rays*; caudal fin forked; pectoral fins with 7 to 22 rays, set low on side of body; ventral fins with 8 to 13 rays, inserted near midlength of body; eyes large, directed sideways; snout short and pointed, about equal to eye diameter; mouth small, upper jaw not extending to anterior border of eye; small teeth on vomer and palatines, present or absent on dentary and tongue; *Ref:* Cohen (1958, 1964).



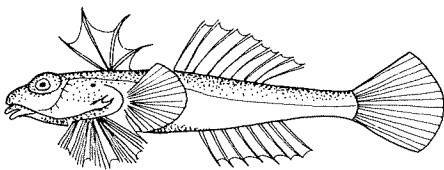
Triglidae 288



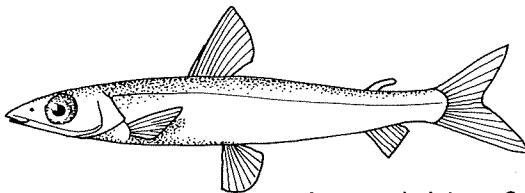
Hoplichthyidae 297



Platycephalidae 296



Callionymidae 427



Argentinidae 097

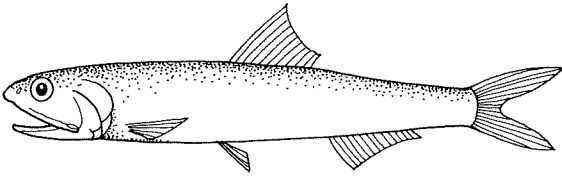
Engraulididae 086 (anchovies): body fusiform and subcylindrical to strongly compressed, with cycloid, usually deciduous scales; fins without spines; 1 short-based dorsal fin at midlength of body; anal fin short or long-based; caudal fin usually deeply forked; pectoral fins set low on side of body; ventral fins usually about midway between base of pectoral fin and anal fin origin; *snout strongly projecting*; mouth inferior, upper jaw *extending* well beyond eye; scutes sometimes present along belly; no lateral line. *Ref:* Whitehead (1974); Wongratana (1983).

Clupeidae 085 (herrings, sardines): body fusiform and subcylindrical to strongly compressed, with cycloid, usually deciduous scales; fins without spines; 1 short-based dorsal fin at midlength of body; anal fin usually short-based; caudal fin deeply forked; pectoral fins set low on side of body; ventral fins usually about midway between base of pectoral fin and anal fin origin; mouth usually terminal, upper jaw *not* extending beyond posterior border of eye; scutes usually present along belly; no lateral line. *Ref:* Whitehead (1974); Wongratana (1983).

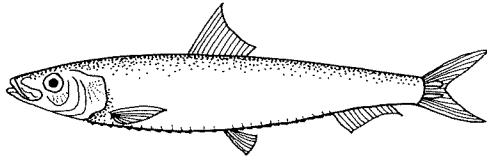
Chlorophthalmidae 120 (greeneyes): body elongate and subcylindrical, tapering to narrow caudal peduncle; head and body covered with large scales; 1 high, short-based dorsal fin with 9 to 13 rays, origin on anterior half of body; adipose dorsal fin well developed, inserted on posterior half of body; anal fin short-based with 7 to 11 rays; caudal fin deeply forked; pectoral fins with 15 to 17 rays; ventral fins with 8 to 9 rays, inserted slightly behind pectoral fin base; eyes large, directed dorso-laterally (bulging above dorsal profile), pupil keyhole-shaped; mouth of moderate size, upper jaw not extending beyond posterior border of eye; jaws, vomer and palatines with small needle-like, mostly depressible teeth, tongue without teeth. *Ref:* Mead (1966b).

Aulopidae 117 (sergeant bakers): body elongate, subcylindrical anteriorly, compressed posteriorly; head and body with large scales; 1 long-based dorsal fin with 14 to 21 rays, origin on anterior third of body; adipose dorsal fin well developed, inserted on posterior half of body; anal fin with 9 to 13 rays; caudal fin forked; pectoral fins with 11 to 14 rays; ventral fins with 8 to 9 rays, inserted slightly behind pectoral fin base; eye of moderate size, directed laterally, pupil round; mouth large, upper jaw extending to below middle or posterior half of eye; jaws, vomer, palatines and tongue with small, needle-like, mostly depressible teeth. *Ref:* Mead (1966a).

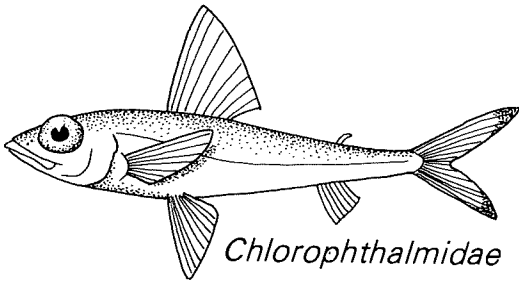
Mullidae 355 (goatfishes): body elongate and slightly compressed, covered with large scales; 2 widely separated dorsal fins, first with 6 to 8 spines, first spine often minute; 1 to 2 spines in anal fin; caudal fin deeply forked; ventral fins well developed, inserted slightly ahead of pectoral fin base, with scaly axillary process; *underside of head flat*; mouth subterminal; jaws with 1 or more rows of small teeth, vomer and palatines with or without teeth; *2 long barbels on chin*. *Ref:* Thomas (1969); Fischer & Whitehead (1974).



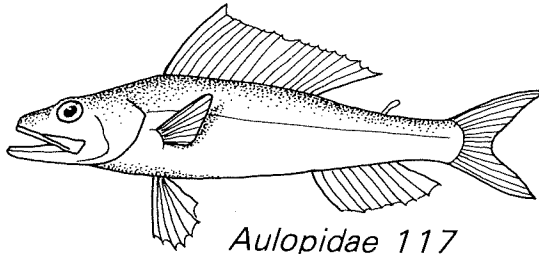
Engraulidae 086



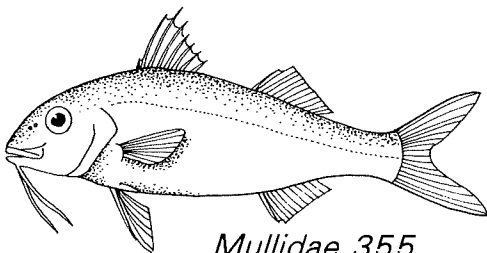
Clupeidae 085



Chlorophthalmidae 120



Aulopidae 117



Mullidae 355

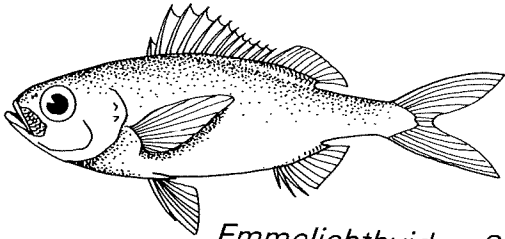
Emmelichthyidae 345 (rovers): body oblong to fusiform, subcylindrical to moderately compressed; body and most of head covered with ctenoid scales; dorsal fin continuous or divided into separate spinous and soft-rayed portions with 11 to 14 spines and 9 to 12 rays, longest spine longer than longest ray; anal fin with 3 spines and 9 to 11 soft rays; caudal fin forked; ventral fins with 1 spine and 5 rays, with axillary process and midventral scaly process between fins; upper jaw very protrusible, *maxilla tip broad, scaly* and not covered by preorbital bone when mouth closed; jaws, vomer and palatines without teeth or nearly so. *Ref:* Heemstra & Randall (1977).

Arripidae 344 (Australian salmons): body elongate-oval and moderately compressed, with moderate-sized ctenoid scales; 1 long-based dorsal fin, slightly notched, with 9 spines and 13 to 19 rays; anal fin much shorter than soft dorsal, with 3 spines and 10 rays; caudal fin deeply forked; ventral fins thoracic with 1 spine and 5 rays and scaly axillary process; preoperculum margin serrated; mouth large, terminal and moderately protractile; jaws, vomer and palatines with numerous rows of small, sharp teeth. *Ref:* Fowler (1933); Norman (1957).

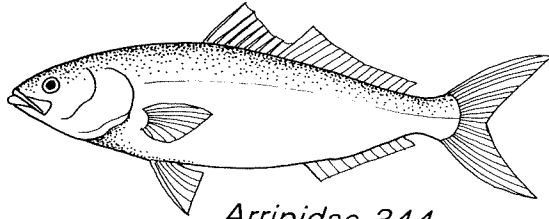
Pomatidae 334 (bluefishes): body oblong and compressed; body and head with small scales; 2 dorsal fins, first short-based with 7 to 9 weak spines, second with 1 spine and 13 to 28 rays; anal fin similar to second dorsal, with 1 to 3 minute spines and 12 to 27 rays; soft dorsal and anal fins covered with scales; no finlets behind dorsal or anal fins; caudal fin forked, but not deeply; ventral fins thoracic with 1 spine and 5 rays, without scaly axillary process; head large, mouth large and terminal, lower jaw projecting; jaws, vomer, palatines and tongue with teeth; preoperculum with membranous flap over suboperculum. *Ref:* McCoy (1889b); Norman (1957).

Mugilidae 381 (mulletts): body elongate and slightly compressed, with large to moderate-sized scales; *2 short-based dorsal fins*, first with 4 slender spines; anal fin, short-based, with 3 spines and 8 to 12 rays; caudal fin shallowly forked, emarginate or truncate; pectoral fins inserted high on side, sometimes with axillary scale; ventral fins inserted about midway between pectoral and first dorsal fin bases, sometimes with axillary scale; head broad and flattened on top, snout blunt; eye often partly covered by fatty tissue; mouth very small, terminal or inferior, upper jaw protactile; jaws with small, feeble teeth, or teeth absent; *no lateral line*. *Ref:* Schultz (1946); Thompson (1954, 1984).

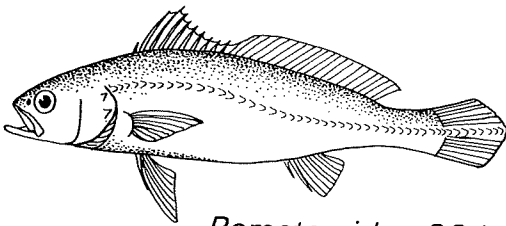
Sciaenidae 354 (croakers, jewfish): body elongate and moderately compressed, with small scales; 1 long-based dorsal fin, deeply notched before last spine, with 6 to 11 spines and 21 to 45 rays; anal fin with 2 spines and 5 to 13 rays; caudal fin rhomboid to truncate; ventral fins thoracic with 1 spine and 5 rays; snout round or bluntly pointed, covered with scales except at tip; snout and front of lower jaw often with conspicuous pores; mouth large and terminal or small and inferior; jaws with small conical teeth; *lateral line extending to tip of caudal fin*. *Ref:* Fischer & Whitehead (1974); Trewavas (1977).



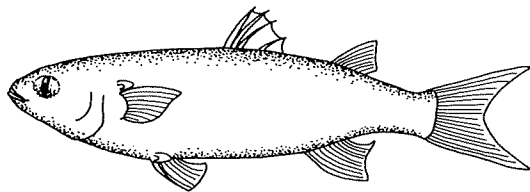
Emmelichthyidae 345



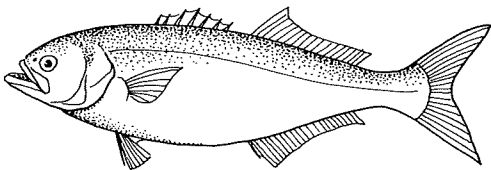
Arripidae 344



Pomatomidae 334



Mugilidae 381



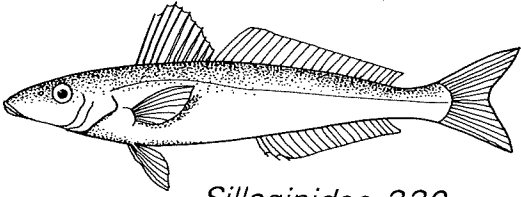
Sciaenidae 354

Sillaginidae 330 (Indo-Pacific whiting): body elongate, subcylindrical and tapering, with moderate-sized, adherent to deciduous scales; 2 dorsal fins (separate or united at base), first with 10 to 13 slender spines, second with 1 weak spine and 16 to 27 rays; anal fin long-based, with 2 weak spines and 14 to 26 rays; caudal fin truncate, emarginate or forked; ventral fins inserted slightly behind pectoral fin origin, with 1 spine and 5 rays; *head long, conical*; mouth *small*, terminal and moderately protractile; maxilla covered by preorbital when mouth closed; jaws and *vomer* with villiform teeth; operculum with 1 small sharp spine; lower half of preoperculum bent sharply inwards to meet that of other side; lateral line straight, extending onto caudal fin. *Ref.* McKay (1985).

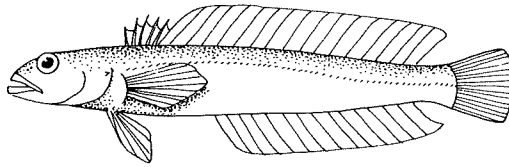
Mugiloididae 390 (grubfish): body elongate and *cylindrical*, covered with scales; 1 long-based dorsal fin with 4 to 5 spines and 19 to 23 branched rays, soft portion higher than spinous one; anal fin, long-based, with 1 simple ray and 19 to 23 branched rays; caudal fin truncate or slightly rounded; ventral fins inserted slightly ahead of pectoral fins, with 1 short spine and 5 rays; mouth terminal, with *thick* lips, upper jaw protractile; both jaws with row of hooked conical teeth and inner band of villiform teeth; lower jaw with outer row of canine teeth near symphysis; eyes directed dorso-laterally, *bulging* above dorsal profile; 1 sharp spine on upper corner of operculum. *Ref.* Cantwell (1964); Schultz (1968).

Odacidae 385 (rock whittings): body oblong to very elongate and slightly to moderately compressed, covered with large to moderate-sized scales; 1 long-based dorsal fin with 14 to 27 spines and 8 to 22 rays; anal fin with (usually) 2 to 3 spines and 7 to 14 rays; caudal fin slightly forked to rhomboid; ventral fins inserted below pectoral fins, with 1 spine and 4 rays (absent in *Siphonognathus argyrophanes*); snout long and pointed or short and rounded; mouth small, terminal and non-protractile; jaws with most teeth fused into *parrot-like beak*. *Ref.* Gunther (1862); Scott (1976); Gomon & Paxton (1985).

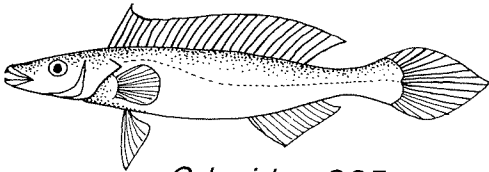
Scombridae 441 (tunas, mackerels): body fusiform, elongate to deep, rounded to moderately compressed, wholly or partly covered with scales; 2 dorsal fins, widely or scarcely separated, depressible into grooves; 1 short-based anal fin; *4 or more finlets* behind second dorsal and anal fins; caudal fin deeply forked to lunate; pectoral fins high on body; ventral fins inserted beneath pectoral fin base, with 1 spine and 5 rays; caudal peduncle slender with *2 to 3 keels*; snout pointed, premaxillae beak-like; mouth large with weak to strong teeth. *Ref.* Fraser-Brunner (1950); Collette & Chao (1975); Bannikov (1981); Collette & Nauen (1983).



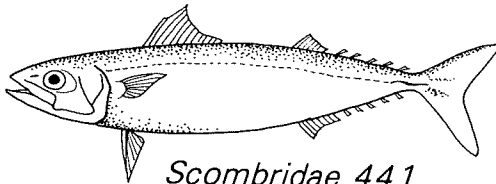
Sillaginidae 330



Mugiloididae 390



Odacidae 385



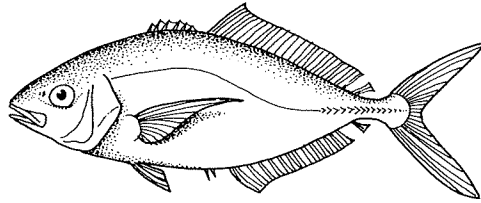
Scombridae 441

Carangidae 337 (trevallies, jacks): body elongate to deep, strongly to moderately compressed, with small cycloid scales; 2 dorsal fins, slightly separated, first short-based with 4 to 8 spines (spines embedded and invisible in large specimens of some species), depressible into groove, second long-based; anal fin long-based, similar to soft dorsal fin and usually preceded by 2 *detached spines* (spines embedded and invisible in large specimens of some species); finlets present or absent behind dorsal and anal fins; caudal fin deeply forked; ventral fins inserted beneath pectoral fin base, with 1 spine and 5 rays; caudal peduncle slender, usually without fleshy keels; posterior lateral line with or without scutes; mouth slightly protractile; jaw teeth (if present) small and villiform to large and conical in series, bands and rows; vomer, palatines and tongue with or without small villiform teeth. *Ref:* Weber & de Beaufort (1931); Suzuki (1962); Fischer & Whitehead (1974).

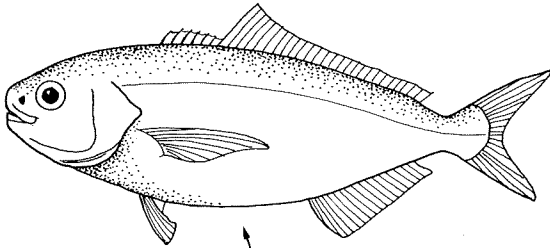
Centrolophidae 445 (trevallas, medusa-fishes): body slender to deep, moderately to strongly compressed, and with small cycloid, usually deciduous scales; 1 continuous dorsal or 2 fins, joined at base, rayed portion preceded by 6 to 9 short, stout spines or 0 to 5 weak spines grading into rays; usually 3 spines in anal fin; caudal fin emarginate or forked; caudal peduncle compressed with 1 fleshy mid-lateral keel or keels absent; *ventral fins* often very small and usually attached to abdomen by thin membrane, fin folding into shallow groove; *inflated snout and most of head naked*, usually with small pores; mouth extending to below or beyond eye, lower jaw slightly underslung; jaws with small conical teeth almost in single series; vomer and palatines without teeth; 7 branchiostegal rays. (N.B. many species exhibit dramatic changes in body depth and position and shape of fins with growth.) *Ref:* Haedrich (1967); Ahlstrom et al. (1976); McDowall (1982).

Nomeidae 446 (eyebrow fishes, cubeheads): as *Centrolophidae* except for: scales extremely deciduous; 2 dorsal fins, joined at base, first with 9 to 12 spines, longest spine at least as long as longest ray of second dorsal fin; 1 to 3 spines in anal fin; caudal peduncle compressed, without lateral keels; head with or without scales; *palatines and usually vomer with small teeth*; 6 branchiostegal rays. *Ref:* Haedrich (1967); Ahlstrom et al. (1976).

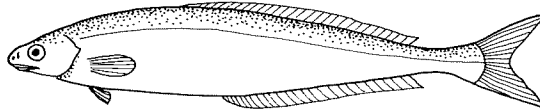
Tetragonuridae 449 (squaretails): as *Centrolophidae* except for: scales very adherent and ctenoid, with strong keels; 2 dorsal fins, not separated, first with 10 to 20 short spines, much shorter than rays, its base as long or longer than second; 1 spine in anal fin; *caudal peduncle, square in cross-section*, with 2 *lateral keels* on each side formed from modified scales; *vomer, palatines and usually tongue with small teeth*; 5 to 6 branchiostegal rays. *Ref:* Grey (1955); Haedrich (1967); Ahlstrom et al. (1976).



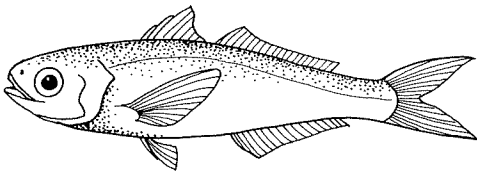
Carangidae 337



Centrolophidae 445



Nomeidae 446

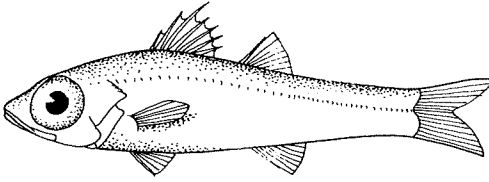


Tetragnuridae 449

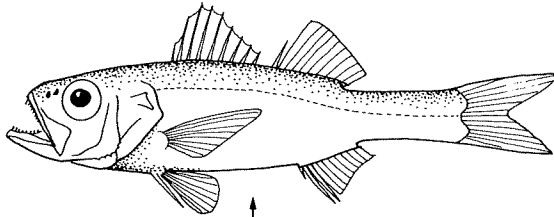
Apogonidae 327 (cardinalfishes): body short to moderately elongate and compressed, with small to large, adherent to deciduous scales; 2 short-based dorsal fins, first with 6 to 8 spines, second with 1 spine and 8 to 14 rays; *anal fin with 2 spines* and 8 to 18 rays; caudal fin forked to rounded; ventral fins with 1 spine and 5 rays, without axillary scale; mouth terminal; maxilla partially or completely hidden beneath preorbital; jaws with bands of villiform teeth and sometimes canines; vomer and palatines with or without teeth; angle of operculum with 1 to several poorly developed spines; preopercular margin smooth or serrated; lateral line present or absent. *Ref:* Fraser (1972); Mayer (1974).

Percichthyidae 311a (temperate basses): similar to both Serranidae and Apogonidae but differ primarily in bone structure. For species included here characters are as for Serranidae (p 52) but more specifically as follows: scales strongly to weakly ctenoid and adherent to deciduous; 1 long, notched dorsal fin with 11 to 13 spines and 11 to 13 rays or 2 short-based dorsal fins, first with 8 to 9 spines, second with 1 spine and 8 to 10 rays; anal fin with 2 to 3 spines and 6 to 10 rays; caudal fin forked, emarginate or truncate; lateral line continuous or interrupted; angle of operculum with 2 rounded spines. *Ref:* Gosline (1966); Fraser (1972).

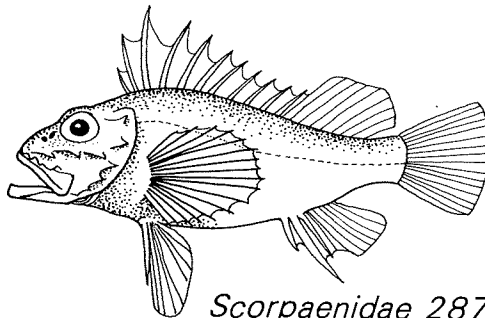
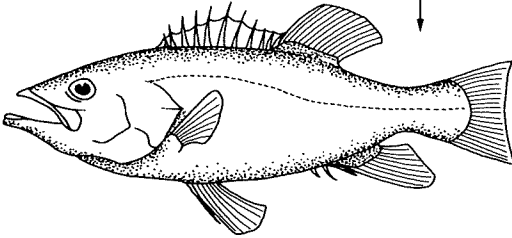
Scorpaenidae 287 (scorpionfishes, gurnard perches): body elongate-oval and moderately compressed, covered with scales or naked; *head large with spines and bony ridge crossing cheek below eye*; 1 long-based dorsal fin, often deeply notched with 11 to 17 spines and 7 to 13 rays; anal fin usually with 3 spines and 5 to 7 rays; caudal fin truncate or rounded, never forked; pectoral fins well developed, sometimes several of the lowest rays fleshy but only 1 if any detached; ventral fins thoracic with 1 spine and 5 rays; mouth terminal; jaws, vomer and sometimes palatines with villiform teeth. *Ref:* Matsubara (1943); Eschmeyer (1969); Paulin (1982).



Apogonidae 327



Percichthyidae 311a



Scorpaenidae 287

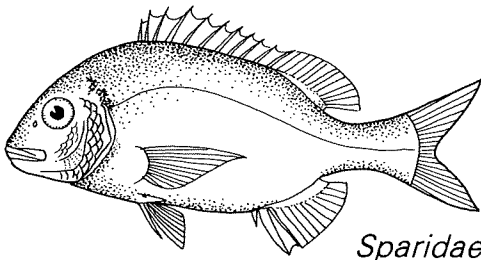
Sparidae 353 (breams): body elongate-oval to deep and compressed, covered with moderate-sized usually adherent scales; 1 dorsal fin, not notched, with 10 to 13 stout spines and 10 to 15 rays; anal fin with 3 spines and 8 to 12 rays; caudal fin forked or emarginate; pectoral fins long and pointed; ventral fins inserted below or just behind pectoral fin bases, with 1 spine and 5 rays and axillary scale; mouth small, upper jaw not reaching beyond eye centre; hind tip of premaxilla partially covering maxilla; jaws with conical or incisor-like teeth in front, rounded molar-like teeth behind; snout, suborbital and preopercular margin without scales; preopercular margin not serrated. *Ref:* Fowler (1933); Munro (1949).

Serranidae 311 (sea perches, sea basses): body elongate-oval and compressed, with small to moderate-sized, adherent scales; 1 long-based dorsal fin sometimes notched, with 2 to 15 spines and 10 to 30 rays; anal fin with 3 spines and 5 to 12 rays; caudal fin never deeply forked, peduncle usually deep; ventral fin with 1 spine and 5 rays, without conspicuous axillary scale; mouth terminal; maxilla tip broad and fully exposed or only partially hidden beneath suborbital bone; jaws with band of villiform teeth, and often small to moderate-sized canines; vomer and palatines with or without teeth; angle of operculum with 2 to 3 flat spines; preopercular margin serrated. *Ref:* Katayama (1960); Gosline (1966); Fischer & Whitehead (1974).

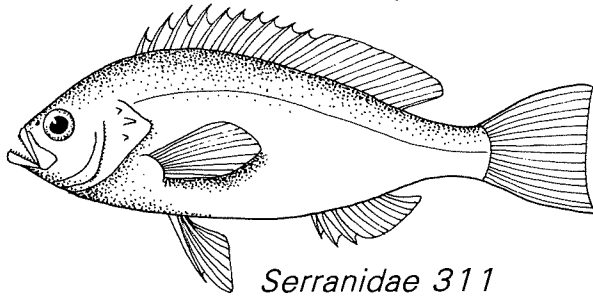
Labridae 384 (wrasses): body oblong to elongate-oval and compressed, covered with usually large cycloid scales; 1 long-based dorsal fin with 9 to 14 weak spines and 7 to 13 rays; anal fin with 3 spines and 10 to 12 rays; caudal fin truncate, rounded or lunate, peduncle usually deep; ventral fins thoracic with 1 spine and 5 rays; mouth terminal and protractile, lips fleshy; jaws usually with small conical teeth, often enlarged canines protruding anteriorly and sometimes posteriorly; vomer and palatines without teeth; cheeks and operculum usually with scales, preopercular flange often naked; preopercular margin serrated or smooth. *Ref:* de Beaufort (1940); Norman (1957); Russel (1980).

Cheilodactylidae 377 (morwongs): body oblong and moderately compressed with small to moderate-sized scales; 1 dorsal fin with 14 to 22 spines and 21 to 39 rays; anal fin with 3 spines and 7 to 19 rays; caudal fin forked; pectoral fins with 4 to 8 lowest rays *unbranched and thickened* and with 1 or more rays *elongate*; ventral fins inserted behind base of pectoral fin, with 1 spine and 5 rays; mouth small, terminal to subterminal and protractile, adults with fleshy lips; jaws with small teeth, vomer and palatines without teeth; preopercular margin not serrated. *Ref:* Allen & Heemstra (1976); Smith (1980); Randall (1983).

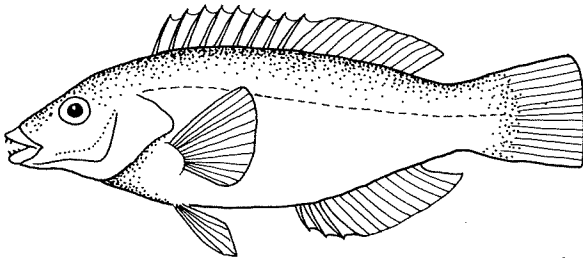
Latrididae 378 (trumpeters): body oblong and compressed, with small scales; 1 dorsal fin, deeply notched, with 14 to 23 spines and 23 to 40 rays; anal fin similar and opposite soft dorsal with 3 spines and 18 to 35 rays; caudal fin forked; ventral fins inserted behind base of pectoral fin, with 1 spine and 5 rays; mouth small, terminal and protractile; jaws with small conical teeth, vomer with or without teeth. *Ref:* Norman (1957).



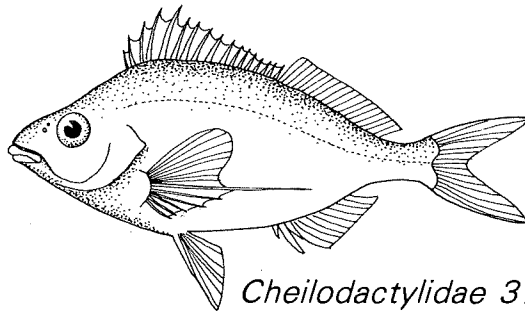
Sparidae 353



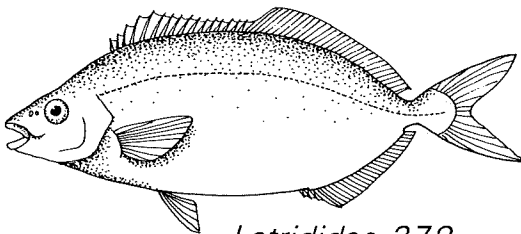
Serranidae 311



Labridae 384



Cheilodactylidae 377



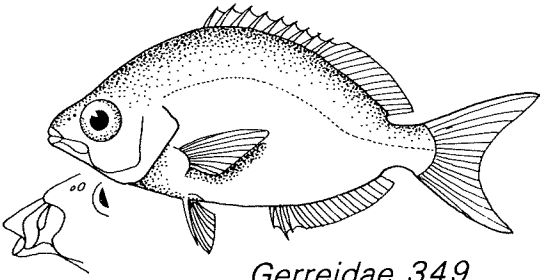
Latrididae 378

Gerreidae 349 (silverbellies): body elongate-oval and compressed; head and body covered with large, thin and deciduous to adherent scales; 1 long-based dorsal fin with 9 to 10 spines and 10 to 18 rays; anal fin with 2 to 6 spines and 7 to 18 rays; dorsal and anal fins with wide scaly sheaths at base; caudal fin forked; pectoral fins long and pointed; ventral fins with 1 spine and 5 rays and with or without long scale-like axillary process, inserted below to behind pectoral fin base; mouth small and extremely protrusible downwards; jaws with small teeth, vomer and palatines without teeth. *Ref:* Norman (1957); Fischer & Whitehead (1974).

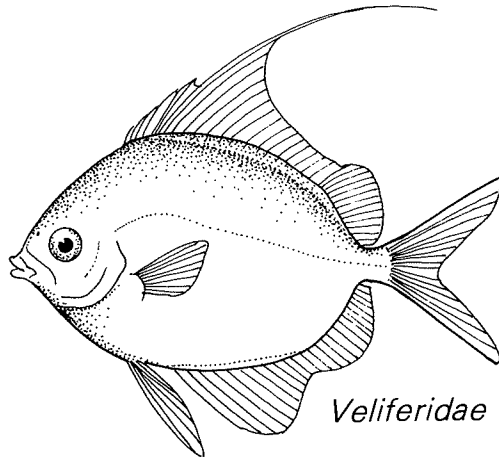
Veliferidae 269 (veilfins): body deep and strongly compressed; head and body covered with fine, deciduous scales; 1 long-based dorsal fin, elevated at least anteriorly, with 31 to 44 spinous and soft rays; anal fin long-based, with 25 to 36 spinous and soft rays; dorsal and anal fins with scaly sheaths at base; caudal fin deeply forked; *ventral fins long with 8 to 9 rays* and scaly axillary process, inserted below pectoral fin base; mouth small, highly protrusible; jaws, vomer and palatines without teeth; swimbladder extended far beyond anus. *Ref:* Smith (1951); Walters (1960).

Scorpididae 361 (sweeps): body deep to elongate-oval and compressed with small to moderate-sized, adherent scales; 1 dorsal fin with 9 to 12 spines and 20 to 28 rays; anal fin with 3 spines and 16 to 28 rays; soft dorsal and anal fins with scaly sheaths; caudal fin emarginate or forked; ventral fins with 1 spine and 5 rays and usually with scaly axillary process, inserted behind pectoral fin base; head small and mostly covered with scales; mouth small, terminal and horizontal; jaws with bands of villiform teeth, outer row slightly enlarged or teeth bristle-like; vomer and palatines usually with teeth; preoperculum serrated. *Ref:* Norman (1957); Steene (1978).

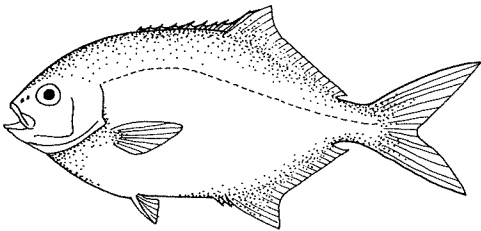
Bramidae 342 (pomfrets): body ovate and compressed, with small to moderate-sized, stout, *adherent* scales; 1 long-based dorsal fin often with anterior spines elevated or sail-like, anal fin similar but with shorter base; dorsal and anal fins with or without scales; caudal fin deeply forked to emarginate; pectoral fins long, falcate, reaching well beyond anal fin origin; ventral fins with 1 spine and 1 to 5 rays, inserted ahead of or below pectoral fin base; mouth large, oblique, lower jaw prominent; maxilla tip broad, scaly; jaws with fine teeth, vomer and palatines usually with teeth; young with spines or keels on scales and opercular and preopercular margins spiny. *Ref:* Mead 1972; Paulin (1981).



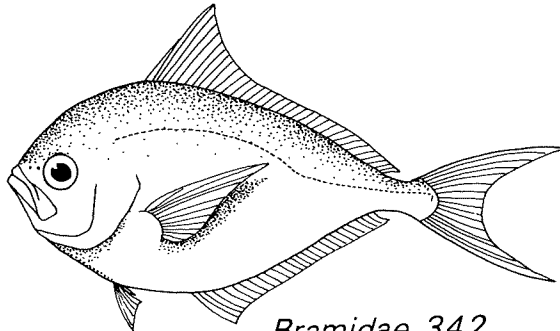
Gerreidae 349



Veliferidae 269



Scorpididae 361



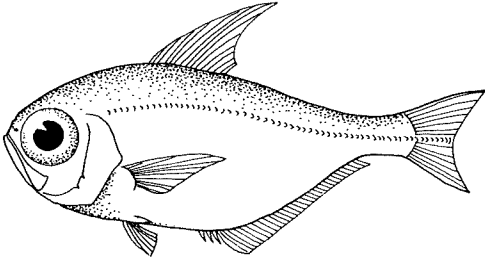
Bramidae 342

Pempheridae 357 (bullseyes, sweepers): body elongate-oval to oblong and strongly compressed, tapering to narrow caudal peduncle, with small adherent scales; 1 *short-based dorsal fin*, originating before midlength of body, with 4 to 7 graduated spines and 7 to 12 rays; *anal fin long-based*, with 2 to 3 spines and 17 to 45 rays; caudal fin forked; ventral fins moderately developed, with 1 spine and 5 rays and with or without scaly axillary process, inserted below pectoral fin base; eyes large, without adipose lid; mouth oblique, maxilla *not* reaching beyond centre of eye; jaws, vomer and palatines with small teeth; operculum thin, without spines or stout bony projections; preopercular margin serrated; lateral line continued onto caudal fin. *Ref:* Tominaga (1963, 1968); Jubb (1977).

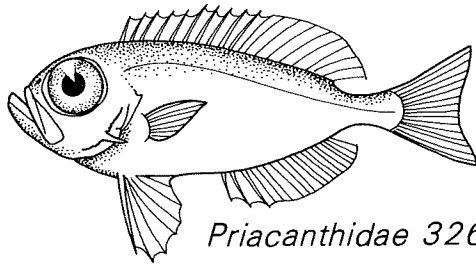
Priacanthidae 326 (bigeyes): body elongate-oval and strongly compressed, with strongly ctenoid adherent scales; 1 long-based dorsal fin of 10 spines and 11 to 15 rays; anal fin with 3 spines and 12 to 15 rays; caudal fin truncate, convex or concave; ventral fins large with 1 spine and 5 rays, without scaly axillary process, inserted ahead of pectoral fin base, inner ray *united* to belly by membrane; eyes large (about half head); mouth large and oblique, lower jaw *projecting*; maxilla exposed, scaly; jaws with 1 row or band of small conical teeth, vomer and palatines with minute teeth; *all fin spines and rays striated or covered with spinules*; lateral line not continued onto caudal fin. *Ref:* Fowler (1931); Caldwell (1962).

Trachichthyidae 255 (sawbellies, roughies, slimeheads): body deep to elongate and moderately compressed with small to large, deciduous to adherent scales; 1 dorsal fin with 3 to 10 spines and 8 to 18 rays; anal fin with 2 to 3 spines and 8 to 12 rays; caudal fin forked; ventral fins with 1 spine and *5 to 6 rays* inserted ahead of to slightly behind pectoral fin base; *head large with bony ridges and mucous channels covered with skin*; eyes large, equal to or greater than snout length; mouth large and oblique; jaws with bands of small, close-set teeth, palatines and usually vomer with teeth; *abdomen usually with median ridge of bony scutes or enlarged scales*. *Ref:* Woods & Sonoda (1973); Paulin (1979); Kotlyar (1980).

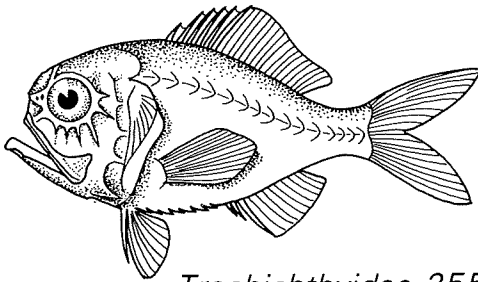
Berycidae 258 (redfish): body oval to elongate and compressed with small, adherent scales; 1 dorsal fin with 3 to 7 spines and 12 to 19 rays; anal fin with 3 to 4 spines and 12 to 30 rays; caudal fin forked; ventral fins with 1 spine and *7 to 12 rays*; head large to moderate-sized; eyes large, equal to or greater than snout length; mouth large and oblique; jaws with bands of small, close-set teeth, vomer and palatines with teeth; abdomen with weak, bony scutes or enlarged scales in some species. *Ref:* Woods & Sonoda (1973); Busakhin (1982).



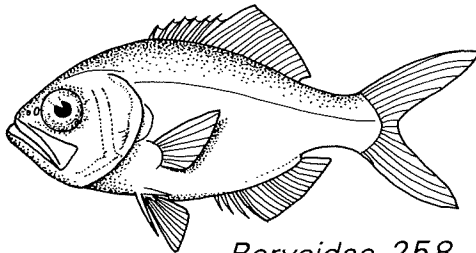
Pempheridae 357



Priacanthidae 326



Trachichthyidae 255

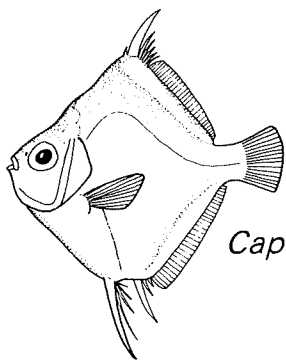


Berycidae 258

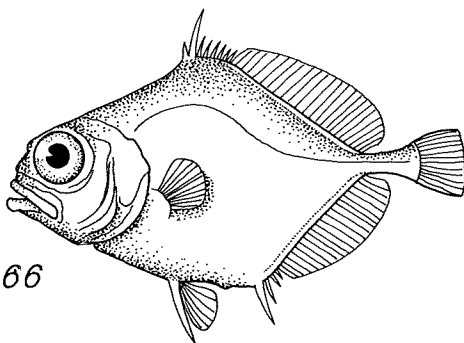
Caproidae 267 (boarfishes): body deep rhomboidal and strongly compressed, with small, strongly ctenoid scales; 1 dorsal fin with 7 to 9 spines and 26 to 38 rays; anal fin with 2 to 3 spines and 26 to 28 rays; caudal fin rounded to slightly emarginate; ventral fins with 1 large spine and 5 rays; dorsal surface of head bony; upper jaw very protrusible; *mouth small, barely extending to below anterior margin of eye*; jaws and sometimes vomer with small teeth; no bony plates or serrations on belly. *Ref:* Weber & de Beaufort (1929); Fraser-Brunner (1950b); Berry (1959).

Oreosomatidae 266 (oreos): body deep, depth distinctly greater than head length and strongly compressed with small, adherent to deciduous scales; 1 dorsal fin with 5 to 8, sometimes very robust, spines and 29 to 36 rays; anal fin long-based, with 2 to 4, sometimes very large, spines and 27 to 34 rays; caudal fin rounded or truncate; ventral fins with 1 spine and 5 to 7 rays; eye large; mouth oblique, protrusible, and of moderate size, upper jaw extending to below eye; jaws and sometimes vomer with small teeth; distance from eye to posterior end of lower jaw in adults *less* than eye diameter. *Ref:* McCulloch (1914b); Myers (1960); Heemstra (1980).

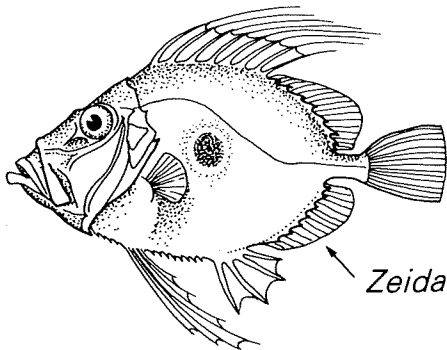
Zeidae 264 (dories): body deep, depth distinctly greater than head length and strongly compressed, with small or rudimentary scales or scales absent; 1 dorsal fin, deeply notched or 2 slightly separated fins with 6 to 10 spines and 22 to 38 rays; anal fin long-based, with 1 to 4 spines, spines sometimes very large and separated from rays, and 20 to 38 rays; caudal fin rounded or truncate; ventral fins thoracic, with 0 or 1 spine and 5 to 9 rays; eye moderate-sized to large; mouth oblique, greatly protrusible, and large, upper jaw extending to below eye; jaws, vomer and sometimes palatines with small teeth; distance from eye to posterior end of lower jaw *greater* than eye diameter; ventral midline of abdomen with or without scutes or bucklers. *Ref:* Heemstra (1980); Bray (1983).



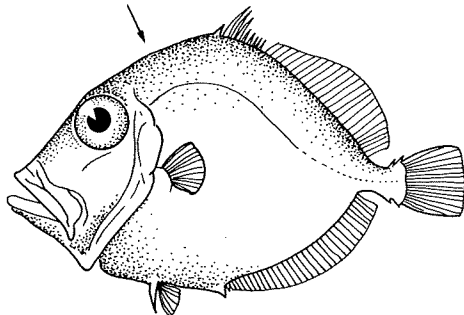
Caproidae 267



Oreosomatidae 266



Zeidae 264



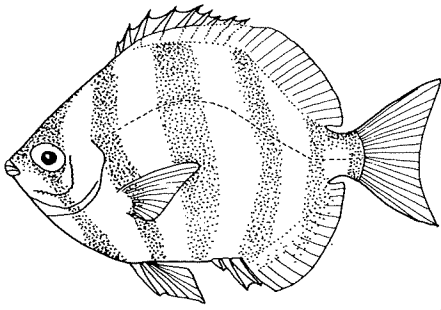
Scorpididae 361 (sweeps): body deep to elongate-oval and compressed with small to moderate-sized, adherent scales; 1 dorsal fin with 9 to 12 spines and 20 to 28 rays; anal fin with 3 spines and 16 to 28 rays; soft dorsal and anal fins with scaly sheaths; caudal fin emarginate or forked; ventral fins with 1 spine and 5 rays and usually with scaly axillary process, inserted behind pectoral fin base; head small and mostly covered with scales; *mouth small, terminal and horizontal*; jaws with bands of villiform teeth, outer row slightly enlarged or teeth bristle-like; vomer and palatines usually with teeth; preopercular margin serrated. *Ref:* Norman (1957); Steene (1978).

Oplegnathidae 369 (knifejaws): body short and deep to oblong and strongly compressed, with small adherent scales; 1 dorsal fin, not notched, with 11 to 12 spines and 11 to 22 rays; anal fin with 3 strong spines and 11 to 16 rays; caudal fin truncate to emarginate; ventral fins with 1 spine and 5 rays and scaly axillary process; head with scales except on snout, maxilla, mandible and above and behind eye; mouth small, terminal; *teeth fused to form parrot-like beak* in adults, incisor-like teeth in juveniles; preopercular margin serrated in juveniles, entire in adults. *Ref:* Waite (1900); Norman (1957).

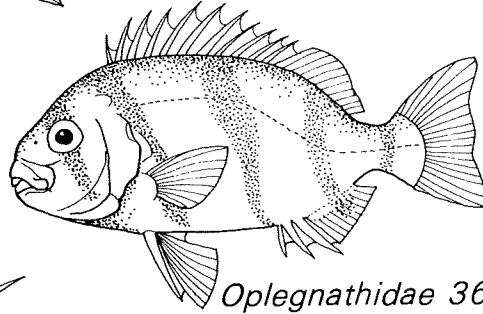
Enoplosidae 366 (old wife): body deep and strongly compressed with small scales; 2 dorsal fins in adults, with 9 spines and 14 to 15 rays, middle spines and anterior rays produced; 1 notched dorsal fin in juveniles; anal fin with 3 strong spines and 14 to 15 rays, anterior rays produced; caudal fin truncate to slightly emarginate; ventral fins large, with 1 strong spine and 5 rays; head without striated bony areas, covered with scales; mouth small, terminal and oblique; supramaxillae present; jaws, vomer and palatines with villiform teeth; *2 sharp spines on lower angle of preoperculum*. *Ref:* Fowler (1933); Norman (1957).

Chaetodontidae 365 (butterflyfishes): body usually deep, oval to subrhomboidal and strongly compressed, with small to large scales; 1 dorsal fin, continuous or with slight notch, with 6 to 16 spines and 15 to 30 soft rays; anal fin with 3 to 5 spines and 14 to 23 soft rays; soft dorsal and anal fins with scales almost to border; caudal fin rounded to emarginate; ventral fins with 1 strong spine and 5 rays and *scaly axillary process*; mouth small, terminal and protractile; jaws with rows or bands of *bristle-like teeth*, vomer and palatines without teeth; preoperculum *without* strong spine at angle. *Ref:* Burgess (1978); Steene (1978).

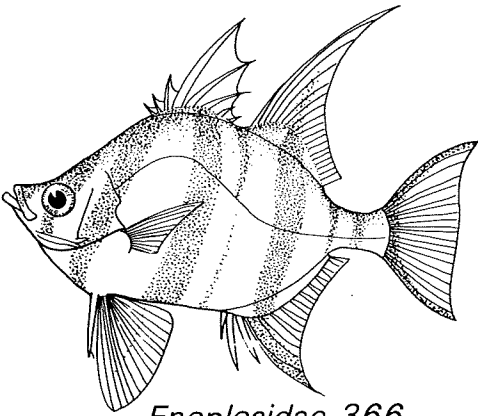
Pentacerotidae 367 (boarfishes, armourheads): body short and deep to oblong and strongly compressed, with small scales; 1 dorsal fin with 4 to 15 strong spines and 8 to 29 soft rays; anal fin with 2 to 6 strong spines and 6 to 17 rays; caudal fin truncate to deeply emarginate; ventral fins large, with 1 strong spine and 5 rays; head encased in usually exposed *striated bones*; mouth small, terminal; supramaxillae absent; jaws with bands of small teeth, vomer sometimes with teeth, none on palatines. *Ref:* Hardy (1983a).



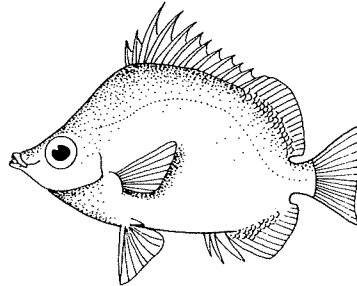
Scorpididae 361



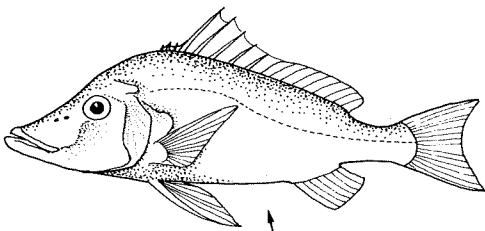
Oplegnathidae 369



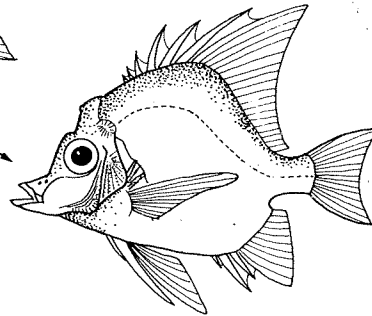
Enoplosidae 366



Chaetodontidae 365



Pentacerotidae 367



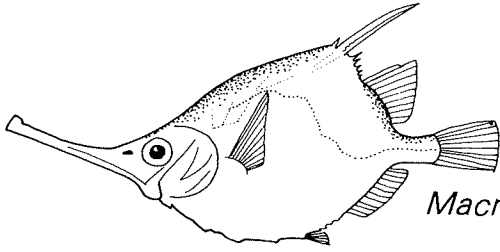
Macrorhamphosidae 279 (bellowsfishes, snipefishes): body oblong or elevated and strongly compressed, with small, rough scales and usually with some bony scutes and plates; 2 dorsal fins, first with 4 to 8 spines, second spine robust and much longer than others, second with 10 to 19 rays; anal fin with 16 to 21 rays; caudal fin truncate to emarginate; ventral fins small, with 1 spine and 2 to 5 rays, inserted well behind pectoral fin base; *mouth small, at tip of bony tube-shaped snout*; jaws and vomer without teeth. *Ref:* Weber & de Beaufort (1922); Mohr (1937).

Monacanthidae 465 (leatherjackets): body deep to rhomboidal and strongly compressed, covered with thick skin containing minute spiny scales; 2 dorsal fins, first consisting of *1 stout isolated spine* which may be locked upright by short second spine; soft dorsal and anal fins long-based and opposite; *ventral fins absent or reduced to bony rudiment located near tip of coalesced pelvis*; fins (except first dorsal) without spines and all rays except caudal fin simple; mouth small; each jaw with 1 row of 6 incisor-like teeth, upper jaw with inner row of 4 teeth; gill openings restricted, slit-like; sexually dimorphic. *Ref:* Fraser-Brunner (1941); Hutchins (1977); Matsuura (1979); Tyler (1980).

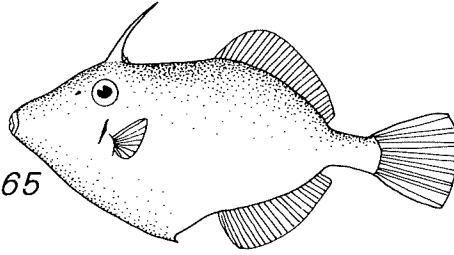
Ostraciidae 466 (boxfishes): body short and deep to elongate, and rounded to moderately compressed; head and most of body encased in *rigid armour composed of polygonal bony plates fused together*; dorsal and anal fin *not enclosed* by rigid carapace; 1 short-based dorsal fin, similar to and opposite anal fin; ventral fins absent; fins without spines; mouth small; each jaw with about 10 incisors; gill openings restricted, slit-like; sexually dimorphic. *Ref:* Fraser-Brunner (1935, 1941b); Fujii & Uyeno (1979); Tyler (1980); Winterbottom & Tyler (1983).

Tetraodontidae 467 (toadfish, puffers): body about as wide as deep and capable of inflation, naked or with small spines embedded in skin; 1 short-based dorsal fin, similar to and almost opposite anal fin; ventral fins absent; fins without spines; mouth small; teeth in each jaw fused into beak-like structure with distinct *seam at front*; gill openings restricted, slit-like. Most species are *poisonous* to eat. *Ref:* Fraser-Brunner (1943); Tyler (1980); Hardy (1983c).

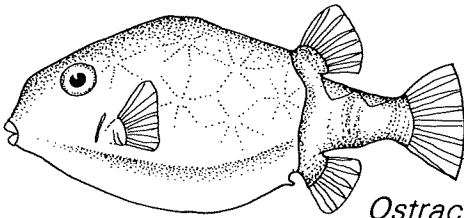
Diodontidae 469 (porcupine fishes): body short and rounded and capable of inflation, having *large spines* with embedded bases; 1 short-based dorsal fin, similar to and opposite anal fin; ventral fins absent; fins without spines; mouth small; teeth in each jaw fused into beak-like structure without seam at front; gill opening restricted, slit-like. Most species are *poisonous* to eat. *Ref:* Fraser-Brunner (1943); Leis (1978); Tyler (1980).



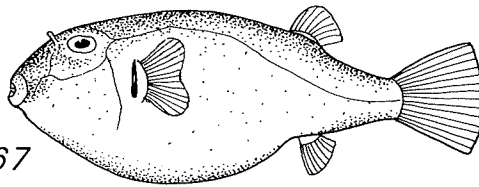
Macrorhamphosidae 279



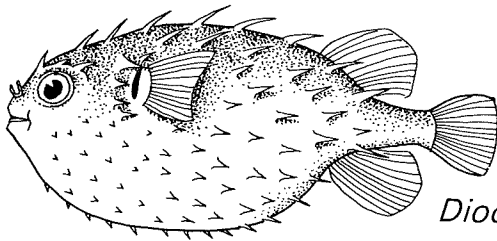
Monacanthidae 465



Ostraciidae 466



Tetraodontidae 467



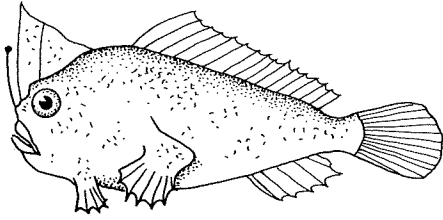
Diodontidae 469

Brachionichthyidae 209 (handfish): body elongate and compressed; true scales absent, skin loose and naked or with small spines or fleshy appendages; spinous dorsal fin with 3 spines, first on snout and modified into movable rod (illicium) with bait at tip; *second and third dorsal spines united by membrane*; soft dorsal fin long-based with 15 to 18 rays; anal fin with 9 to 10 rays; pectoral fins with elbow-like bend; ventral fins jugular, with 1 spine and 4 rays; mouth large, oblique; jaws with rows of villiform teeth, palatines without teeth; gill openings reduced to small pore, above and behind base of pectoral fin. *Ref:* Pietsch (1981); Last et al. (1983).

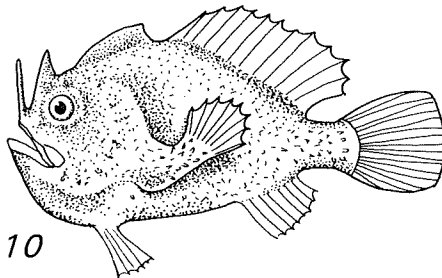
Antennariidae 210 (frogfishes, anglerfishes): body short, sac-like and moderately compressed; true scales absent, skin loose and naked or with small spines or fleshy appendages; spinous dorsal fin with 3 separate spines, first on snout and modified into movable rod (illicium), often with bait at tip; *third spine* greatly enlarged and often enveloped in thick skin but *not united by membrane to second*; soft dorsal fin long-based with 10 to 16 rays; anal fin short-based with 6 to 10 rays; pectoral fins leg-like and not attached by membrane to ventral fins; ventral fins jugular, with 1 spine and 5 rays; mouth large, oblique to vertical, lower jaw projecting; jaws and palatines with 2 to 4 rows of small, conical teeth; gill openings reduced to small pore below or behind bases of pectoral fins; lateral line often obscure, represented by series of pores. *Ref:* Schultz (1957); Pietsch (1981, 1984a).

Chaunacidae 211 (sea toads): body sac-like and slightly depressed; true scales absent, skin loose and with small spines; spinous dorsal fin with 1 apparent spine, situated on snout and modified into short, thick illicium with bait; illicium retractable within circular hollow between eyes; soft dorsal fin with 11 to 13 rays; anal fin short-based with 5 to 7 rays; pectoral fins small; ventral fins of 1 spine and 4 rays; mouth large, almost vertical, lower jaw projecting; jaws, vomer and palatines with rows of villiform teeth; gill openings reduced to small pore above and behind bases of pectoral fins; lateral line organs of head conspicuous. *Ref:* McCulloch (1915); Pietsch (1981).

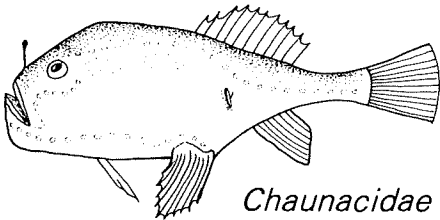
Ogcocephalidae 212 (batfishes): head broad and strongly depressed, *disc-like*, tail short and slender; skin covered with low, strong spines; spinous dorsal fin with 1 spine, situated on snout and modified into short illicium with bait; illicium retractable within hollow between eyes; soft dorsal fin short-based with 4 to 5 rays; anal fin short-based with 4 rays; pectoral fins with prominent elbow-like bend; ventral fins of 1 spine and 5 rays; mouth small, horizontal; jaws and sometimes vomer and palatines with villiform teeth; gill openings small, behind bases of pectoral fins. *Ref:* Bradbury (1967); Pietsch (1981).



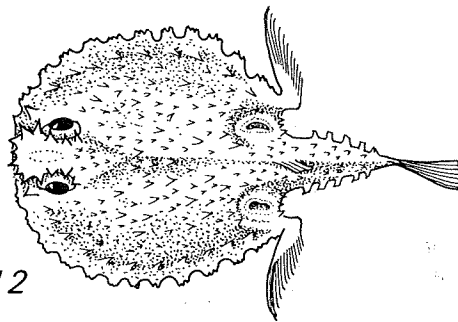
Brachionichthyidae 209



Antennariidae 210



Chaunacidae 211



Ogcocephalidae 212

Pataecidae 292 (prowfishes): body oblong, elevated anteriorly and tapering to slender caudal peduncle, strongly compressed; scales absent, skin loose and naked or with spinules, fleshy appendages or tubercles; 1 continuous dorsal fin extending from snout to tail, united to or free from caudal fin; anal fin relatively short-based; caudal fin truncate to rhomboid; pectoral fins large, with 8 thickened rays; *ventral fins absent*; head large, without strong spines on preoperculum; mouth terminal; jaws and vomer with minute teeth, palatines without teeth. *Ref:* Gunther (1861).

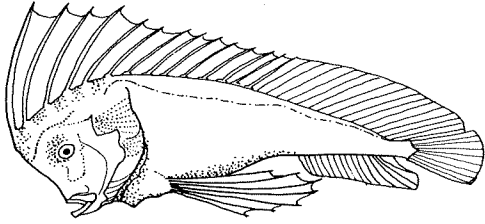
Psychrolutidae 305 (blobfishes): body tadpole-shaped, tapering from bulbous head to slender caudal peduncle; skin loose, naked or with plates bearing prickles, often with jelly-like substance beneath; 2 dorsal fins united and covered with skin, spinous dorsal inconspicuous; anal fin similar to second dorsal fin; caudal fin rounded to truncate; pectoral fins broad-based, with 20 to 26 rays; ventral fins with 1 spine and 3 close-set rays, inserted before pectoral fin base but emerging through skin some distance behind; eyes large, directed upwards and sideways and situated far forward; mouth wide, terminal or with upper or lower jaw projecting slightly; jaws with bands of conical teeth, palatines and usually vomer without teeth. *Ref:* Nelson (1977, 1982).

Uranoscopidae 400 (stargazers): body broad and robust, tapering from *large cube-shaped head*; *head partly covered with bony plates*, body with or without scales; 1 to 2 dorsal fins, first if present with short spines or tubercles; second dorsal fin moderately long, similar to and opposite anal fin; pectoral fins large, rounded, with large poisonous spine (humeral spine) above base; ventral fins jugular, with 1 spine and 5 rays, fins close together; eyes directed upwards to sideways; mouth cavernous, almost vertical; jaws, vomer and palatines with teeth. *Ref:* Jordan & Snyder (1902); Mees (1960).

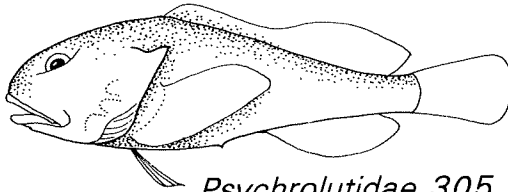
Monocentrididae 259 (pinecone fishes): body ovate and moderately compressed, encased in large, bony scutes forming "coat of mail"; 2 dorsal fins, first with strong, rugose spines, second with 11 to 12 rays; anal fin with 10 to 12 rays; ventral fins with 1 large spine capable of being locked at right angles to body and 2 to 4 small rays, head large with mucous cavities covered by thin skin and with several light organs; eyes large, equal to or greater, than snout length; mouth large and oblique; jaws, palatines and sometimes vomer with bands of minute, close-set teeth. *Ref:* Ogilby (1899); Waite (1899).

Bothidae 460 (left-hand or true flounders): body asymmetrical and strongly compressed, covered with small scales; dorsal and anal fins long-based, origin of dorsal above or before eyes; ventral fins with less than 7 rays; fins without spines; preoperculum margin *free*, not covered by skin; both eyes on left side of body (except in aberrant forms); lower jaw generally prominent. *Ref:* Norman (1926, 1934).

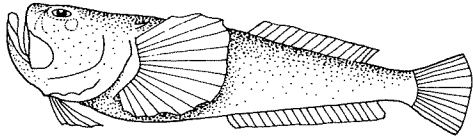
Pleuronectidae 461 (right-hand flounders): as *Bothidae* except: both eyes on right side of body (except in aberrant forms); ventral fins with 3 to 13 rays. *Ref:* Norman (1926, 1934).



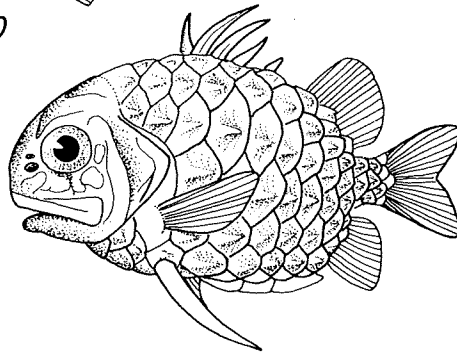
Pataecidae 292



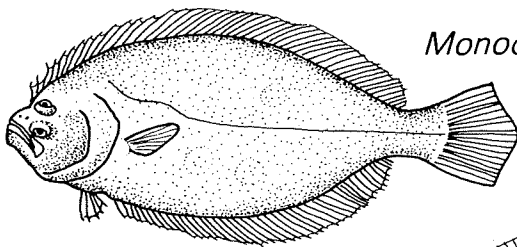
Psychrolutidae 305



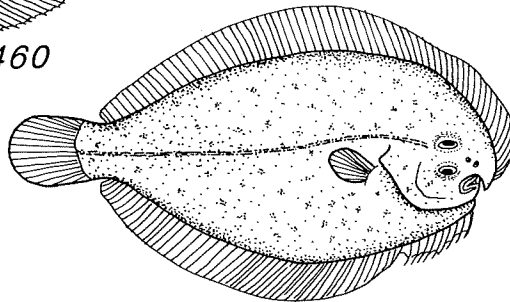
Uranoscopidae 400



Monocentrididae 259



Bothidae 460



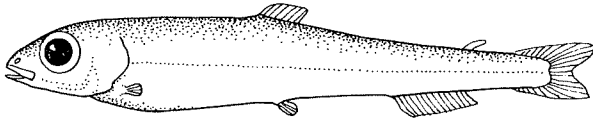
Pleuronectidae 461

MESOPELAGIC FISHES

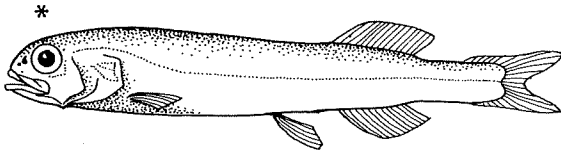
Bathylagidae 098 (deep-sea smelts): body elongate and compressed, with deciduous scales; photophores absent; dorsal fin short-based, with 9 to 13 rays, origin near midlength of body; adipose dorsal fin often present; anal fin sometimes long-based, with 13 to 25 rays, origin on posterior third of body; pectoral fins with 9 to 13 rays, inserted close to ventral profile of body; ventral fins with 7 to 10 rays, inserted near midlength of body; eyes directed sideways to forwards and sideways; snout short, about equal to eye diameter; mouth small, upper jaw usually not extending to anterior border of eye; small teeth on vomer, dentary and sometimes palatines; premaxillae and maxillae without teeth; black, brown or silvery fishes to 20 cm in length. *Ref:* Cohen (1964).

Alepocephalidae 114 (slickheads): body moderately elongate and compressed; head without scales, covered with slick, delicate skin, body with deciduous scales or naked; photophores usually absent, raised above skin if present; dorsal fin with 16 to 21 rays, origin well behind midlength of body; adipose dorsal fin absent; anal fin with 16 to 19 rays, inserted below dorsal fin; pectoral fins very small, with 8 to 10 rays, inserted close to ventral profile of body; ventral fins usually present, with 6 to 8 rays, inserted about midlength of body; eyes directed sideways; mouth small and at tip of tubular snout or of moderate size with upper jaw extending to below eye; small teeth on premaxillae and sometimes on maxillae, mandible and palatines; chin barbel absent; tubular papillae absent from shoulder; blackish fishes to about 70 cm in length. *Ref:* Bigelow (1963a); Sazonov (1978).

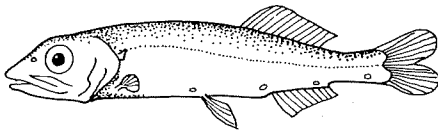
Platyroctidae 115 (tube shoulders): similar to Alepocephalidae but differ as follows: conspicuous *tubular papillae* on shoulder above pectoral fins, emitting luminous fluid; pectoral fins with 14 to 28 rays. *Ref:* Parr (1960); Bigelow (1963b).



Bathylagidae 058



Alepocephalidae 114

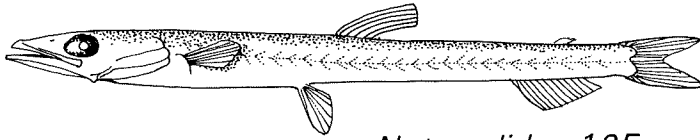


Platytroctidae 115

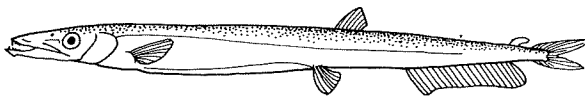
Notosudidae 125 (paperbones, wearyfishes): body elongate, rounded to moderately compressed anteriorly and becoming more compressed beyond anus, with large deciduous scales; photophores absent; dorsal fin short-based, with 9 to 14 rays, origin about midlength of body; adipose dorsal fin present; anal fin with 16 to 21 rays, origin on posterior fourth of body; pectoral fins with 10 to 15 rays, inserted on side of body; ventral fins with 9 rays, inserted slightly to well ahead of dorsal fin; eyes with prominent lensless space, directed sideways; snout long and pointed but usually less than twice eye diameter; mouth large, upper *jaw extending to below or beyond posterior half of eye*; small, closely set teeth on premaxillae and dentary, teeth probably lost in mature adults; teeth on vomer and palatines, absent from tongue; light to dark brown fishes to about 50 cm in length. *Ref:* Bertelsen et al. (1976).

Paralepididae 126 (barracudinas): body elongate and compressed though sometimes rounded posteriorly, naked or with deciduous scales; photophores absent, but some species with luminous ducts on belly beneath skin; dorsal fin short-based, with 7 to 16 rays, origin near or behind midlength of body; adipose dorsal fin well developed; *anal fin long-based*, more than 1.5 times length of dorsal fin base, with 20 to 50 rays, origin on posterior fourth of body; pectoral fins with 11 to 17 rays, inserted on side of body; ventral fins with 9 to 10 rays, inserted ahead to behind dorsal fin; eyes without lensless space, directed sideways; snout long and pointed, at least twice eye diameter; mouth moderate, jaws up to half head length and extending to before or slightly behind anterior border of eye; small to fang-like teeth, fixed or depressible on premaxillae, dentary and palatines; minute teeth on vomer, present or absent on tongue; black to silvery fishes to about 60 cm in length. *Ref:* Harry (1953), Rofen (1966a); Post (1972, 1973, 1976).

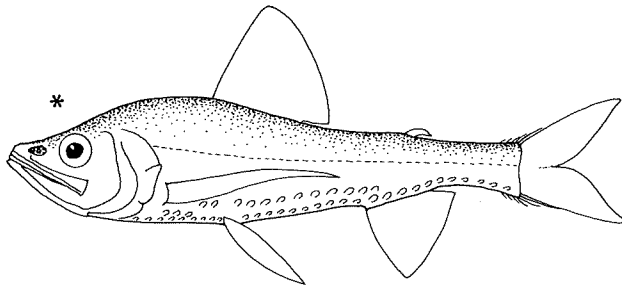
Neoscopelidae 121 (new lanternfishes): body moderately elongate and compressed, with large, deciduous scales; photophores, if present, in 1 or more lengthwise rows on body near ventral profile, *head (except tongue) without photophores*; dorsal fin with 11 to 13 rays, origin well before midlength of body; adipose dorsal fin present; anal fin with 10 to 14 rays, origin well behind dorsal fin base; pectoral fins with 14 to 19 rays, inserted on side of body; ventral fins with 8 rays, inserted well beyond pectoral fin base; minute spine sometimes present at base of first dorsal, first anal, uppermost pectoral and outermost ventral fin rays; eyes directed sideways; *snout compressed and equal to or longer than eye diameter*; mouth large, upper jaw extending to or beyond posterior border of eye, maxillae excluded from gape; small teeth on premaxillae, dentary, vomer and palatines; pale, silvery or brownish to black fishes to about 30 cm in length. *Ref:* Nafpaktitis (1977).



Notosudidae 125



Paralepididae 126



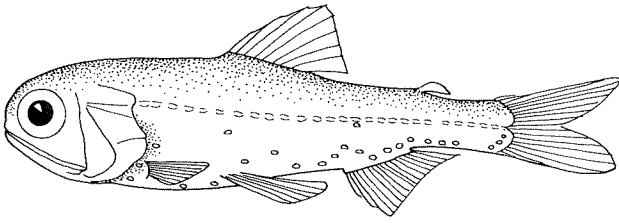
Neoscopelidae 121

Myctophidae 122 (lanternfishes): body moderately elongate and compressed, with adherent or deciduous scales; *photophores in groups or rows on head and body*; dorsal fin with 5 to 26 rays, origin about midlength of body; adipose dorsal fin present; anal fin with 12 to 24 rays, origin under or close behind dorsal fin base; pectoral fins 10 to 18 rays, inserted on side of body; ventral fins usually with 8 rays, inserted well beyond pectoral fin base; minute spine at base of first dorsal, first anal, uppermost pectoral and innermost ventral fin rays; eyes directed sideways; *snout compressed and equal to or shorter than eye diameter*; mouth large, upper jaw extending to or far beyond posterior half of eye, maxillae excluded from gape; small teeth on premaxillae, dentary, palatines and vomer; pale, silvery or brownish to black fishes to about 10 cm in length. *Ref:* Paxton (1972); Nafpaktitis et al. (1977); Nafpaktitis (1978).

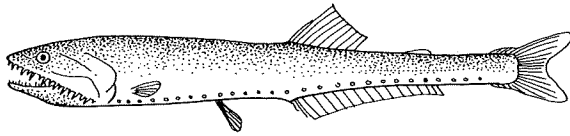
Gonostomatidae 106 (lightfishes): body elongate and moderately compressed, with deciduous scales or naked; *photophores mainly in 1 or more lengthwise rows on body near ventral profile*, others on head and always on branchiostegal membranes; positions of dorsal, anal and ventral fins variable; dorsal fin with 9 to 20 rays; adipose dorsal fin sometimes present; anal fin with 12 to 68 rays, base usually much longer than and below or behind dorsal fin base; pectoral fins with 7 to 16 rays, inserted near ventral profile; ventral fins with 6 to 8 rays; eyes usually directed sideways; mouth usually large, *upper jaw usually extending well beyond eye*, maxillae included in gape; small to large teeth on premaxillae and dentary, small teeth on maxillae, present or absent on vomer, palatines and tongue; blackish to silvery fishes to about 30 cm in length. *Ref:* Grey (1964); Weitzman (1974); Badcock (1982).

Photichthyidae 106a (lighthouse fishes): similar in external form to (and previously included in) *Gonostomatidae*. These 2 families differ primarily in the structure of the photophores and cannot be distinguished using external characters. *Ref:* Grey (1964); Weitzman (1974); Mukhacheva (1980).

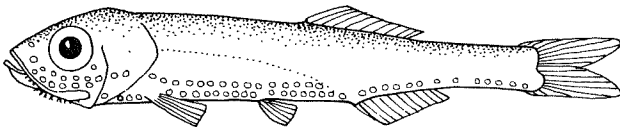
Sternoptychidae 107 (hatchetfishes): body *either* short, deep and strongly compressed *or* elongate and moderately compressed; body with deciduous scales or naked, often with bony plates forming keel along belly; photophores mainly in 1 or more lengthwise rows on ventral profile of body, others on head; dorsal fin with 8 to 17 rays, often preceded by stiff blade or spine, origin near midlength of body; adipose dorsal fin usually present; anal fin long-based, sometimes in 2 parts, with 11 to 27 rays; pectoral fins with 9 to 19 rays, inserted close to ventral profile of body; ventral fins with 6 to 9 rays, inserted near or behind midlength of body; eyes sometimes telescopic, directed sideways or upwards; mouth large to moderate-sized, upper jaw reaching to below posterior half of eye, maxillae included in gape; small to large teeth on premaxillae, dentary and maxillae, present or absent on vomer and palatines; darkish to silvery fishes to about 15 cm in length. *Ref:* Schultz (1964); Baird (1971); Weitzman (1974); Borodulina (1979); Badcock & Baird (1980).



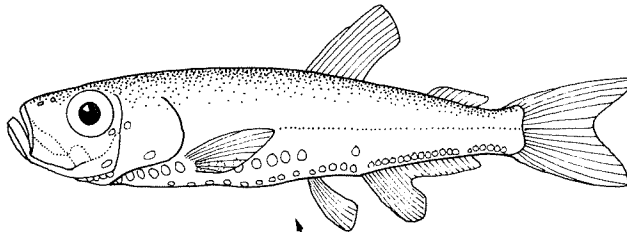
Myctophidae 122



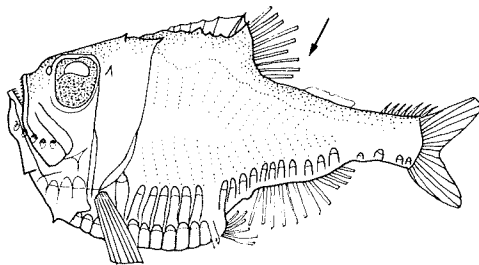
Gonostomatidae 106



Photichthyidae 106a



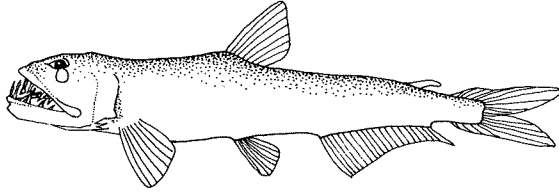
Sternoptychidae 107



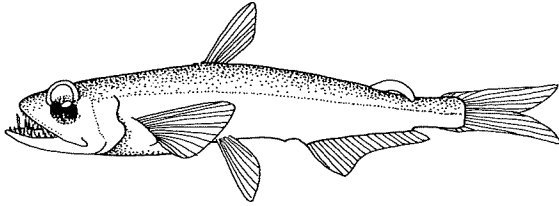
Evermannellidae 130 (sabre-tooth fishes): body moderately elongate and strongly compressed, without scales; light organs internal; *dorsal fin* short-based but *longer than eye diameter*, with 10 to 13 rays, origin midway between gill opening and anal fin origin; adipose dorsal fin well developed; anal fin with 26 to 37 rays, origin on posterior half of body; pectoral fins with 11 to 13 rays, inserted close to ventral profile of body; ventral fins with 8 to 10 rays, inserted below first 7 dorsal rays; eyes normal and directed sideways or tubular and directed upwards; mouth large, jaws about 75 per cent of head length and extending to behind eye; small, closely set teeth on premaxillae, small teeth on vomer; small and *fang-like teeth, fixed and depressible on dentary and palatines*; tongue very short, without teeth; light iridescent to blackish fishes to about 20 cm in length. *Ref:* Rofen (1966b); Johnson (1982).

Scopelarchidae 131 (pearl-eyed fishes): body moderately elongate and moderately to strongly compressed, with scales; *lateral line extending from eye to caudal fin base*; light organs absent; dorsal fin short-based, shorter than eye diameter, with 7 to 9 rays, origin midway between gill opening and anal fin origin; adipose dorsal fin well developed; anal fin with 18 to 27 rays, origin on posterior half of body; pectoral fins with 17 to 27 rays, inserted on side of body; ventral fins with 9 to 10 rays, inserted ahead to slightly behind dorsal fin base; *eyes tubular*, directed upwards or forwards; mouth large, jaws up to 75 per cent of head length and extending to or behind eye; small, closely set teeth on premaxillae, small teeth on vomer; small and fang-like teeth, fixed and depressible on dentary and palatines; *tongue long, with prominent teeth*; brassy, iridescent fishes to about 15 cm in length. *Ref:* Rofen (1966c); Johnson (1974, 1982).

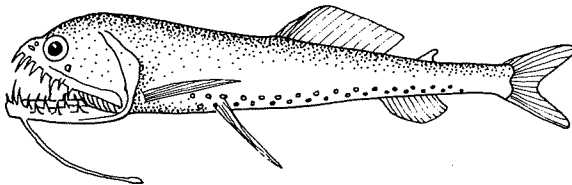
Astronesthidae 108 (stareaters): body very elongate and compressed, without scales; photophores mainly in 2 lengthwise rows on body near ventral profile and 1 prominent photophore on head below eye; dorsal fin with 9 to 21 rays, *origin near midlength of body*; adipose dorsal fin present; anal fin with 12 to 28 rays, origin just under or behind end of dorsal fin base and often preceded by adipose fin; pectoral fins with 6 to 9 rays, inserted close to ventral profile of body; ventral fins with 6 to 8 rays, inserted below or before dorsal fin origin; eyes directed sideways; mouth large, jaws about equal to head length; fang-like teeth on premaxillae and dentary, small teeth on maxillae, vomer and palatines; *chin barbel present*; dark-coloured fishes to about 30 cm in length. *Ref:* Gibbs (1964a); Weitzman (1967); Goodyear & Gibbs (1969).



Evermannellidae 130



Scopelarchidae 131



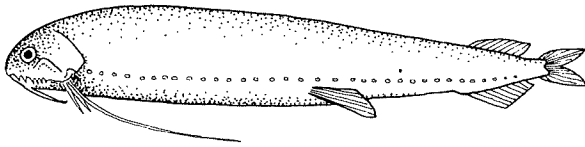
Astronesthidae 108

Melanostomiidae 109 (scaleless dragonfishes): body elongate, slender and slightly compressed, without scales; photophores mainly in 2 lengthwise rows on body and 1 large photophore on head below eye; *dorsal fin* with 9 to 30 rays, *origin on posterior fourth of body*; adipose dorsal fin usually absent; anal fin with 9 to 46 rays, origin below dorsal fin; pectoral fins with 1 to 47 rays, inserted close to ventral profile of body or absent; ventral fins with 4 to 26 rays, inserted about or behind midlength of body; eyes directed sideways; mouth large, jaws about equal to head length; fang-like teeth usually on premaxillae and dentary, small denticles on maxillae, teeth present or absent on vomer and palatines; *chin barbel present*; darkish fishes to about 35 cm in length. *Ref:* Morrow & Gibbs (1964); Gibbs et al. (1983).

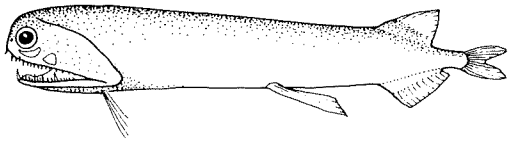
Malacosteidae 110 (loosejaws): body elongate and moderately compressed, without scales; minute photophores scattered over body and head, sometimes 1 large photophore below eye; dorsal fin with 14 to 28 rays, origin on posterior fourth of body; adipose dorsal fin absent; anal fin with 17 to 32 rays, origin below dorsal fin; pectoral fins with 3 to 5 rays, inserted close to ventral profile of body or absent; ventral fins with 5 to 9 rays, inserted at or behind midlength of body; eyes directed sideways; mouth extremely large, *jaws much longer than skull*; *no floor in mouth* (membrane absent between mandible and hyoid arch); small fixed teeth on premaxillae, denticles on maxillae, small and large teeth on mandible; vomer and sometimes palatines without teeth; chin barbel often present; blackish fishes to about 25 cm in length. *Ref:* Morrow (1964c).

Chauliodontidae 111 (viperfishes): body elongate and compressed; 5 longitudinal rows of deciduous scales on body, *each scale centred in more or less pigmented hexagon*; photophores mainly in 2 lengthwise rows on body near ventral profile and 1 photophore below eye; *dorsal fin* with 5 to 7 rays, *origin on anterior third of body*, first ray elongate with small flap at tip; adipose dorsal fin origin on posterior fourth of body; adipose fin preceding anal fin; anal fin with 10 to 13 rays, inserted below adipose dorsal fin; pectoral fins with 11 to 14 rays, inserted close to ventral profile of body; ventral fins with 6 to 8 rays, inserted slightly before midlength of body; eyes directed sideways; snout about equal to eye diameter; mouth large, upper jaw about equal to head length; rigid, fang-like teeth on premaxillae and mandible, numerous fine teeth on maxillae, some on palatines, absent from vomer; short chin barbel present; iridescent to blackish fishes to about 35 cm in length. *Ref:* Morrow (1964a); Parin & Novikova (1974).

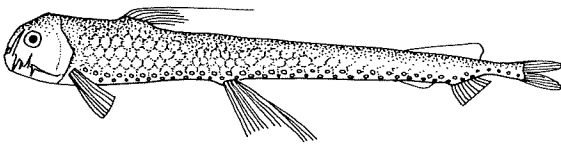
Stomiidae 112 (scaly dragonfishes): body very elongate, slender and moderately compressed; 5 or 6 longitudinal rows of deciduous scales on body, *each scale centred in pigmented hexagon*; photophores mainly in 2 lengthwise rows on body and 1 photophore below eye; *dorsal fin* with 13 to 23 rays, *origin on posterior fourth of body*; anal fin with 15 to 26 rays, origin below dorsal fin; pectoral fins with 6 to 9 rays, inserted close to ventral profile of body; ventral fins with 4 to 5 rays, inserted at or behind midlength of body; eyes directed sideways; snout equal to or less than eye diameter; mouth large, jaws about equal to head length; rigid, fang-like teeth on premaxillae and mandible, fine teeth on vomer and palatines; chin barbel present; blackish fishes to about 40 cm in length. *Ref:* Morrow (1964b); Gibbs (1969).



Melanostomiidae 109



Malacosteidae 110



Chauliodontidae 111

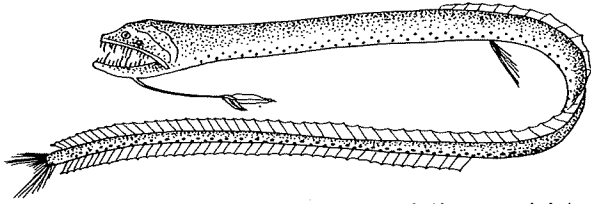


Stomiidae 112

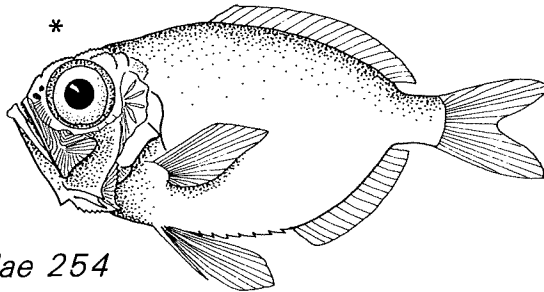
Idiacanthidae 113 (black dragonfishes): body extremely elongate, slender and slightly compressed, without scales or hexagonal pigmented areas; photophores mainly in 2 lengthwise rows on body near ventral profile and 1 large photophore on head behind eye; *dorsal fin long-based, more than half body length*, with 54 to 74 rays, origin before midlength of body; adipose dorsal fin absent; anal fin long-based, about half length of dorsal fin, with 29 to 49 rays, origin under middle dorsal rays; each dorsal and anal ray flanked by 1 pair of spurs; pectoral fins absent in adults; ventral fins with usually 6 rays, inserted before midlength of body in females, absent in males; eyes directed sideways; mouth large, jaws about equal to head length; depressible, barbed, fang-like teeth on premaxillae, maxillae and mandible, few teeth on vomer and palatines; adult males without teeth; chin barbel present in females; extremely sexually dimorphic; blackish fishes, females to about 35 cm, males to about 5 cm in length. *Ref:* Parr (1927); Gibbs (1964b).

Dirtmidae 254 (spinyfins): body disc-like to moderately short and deep and strongly compressed, with small ctenoid scales; dorsal and anal fins without spines though each ray with paired, laterally projecting, small spines near base; dorsal fin long-based, with 24 to 29 rays; anal fin long-based, with 18 to 23 rays; pectoral fins with 16 to 20 rays, inserted on side of body; ventral fins with 1 spine and 6 rays, inserted below or behind pectoral fin base; eyes large, directed sideways, diameter equal to or greater than snout length; mouth of moderate size, oblique, upper jaw reaching to below posterior half of eye; minute teeth in jaws; vomer and palatines usually without teeth; lateral line absent; dark brown fishes to 35 cm in length. *Ref:* Woods & Sonoda (1973); Post & Quero (1981).

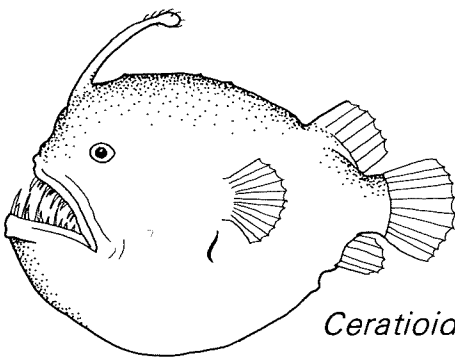
Ceratioidei 213 to 222 (mesopelagic and bathypelagic anglerfishes): body short to moderately elongate and moderately compressed; scales absent, skin loose and naked or with small spines or scattered bony plates; spinous dorsal fin (if present) with 1 spine, situated on snout and modified into movable rod, usually with light organ at tip; soft dorsal fin with 2 to 22 rays; anal fin with 2 to 19 rays; pectoral fins with 13 to 30 rays; *ventral fins absent* (except in larvae and some newly metamorphosed species); mouth large, oblique to vertical; jaws with short to long, slender, recurved teeth in females, true teeth usually absent in males; gill openings reduced to small pore below or behind base of pectoral fins; extremely sexually dimorphic and males often parasitic on females; blackish fishes, females usually to about 25 cm in length but up to 60 cm, males much smaller. At least 7 families occur in southern Australian waters. *Ref:* Bertelsen (1951); Bertelsen & Pietsch (1983).



Idiacanthidae 113



Diretmidae 254



Ceratioidei 212 to 222

GUIDE TO SPECIES

New Zealand hagfish

Eptatretus cirrhatus (Bloch & Schneider, 1801)

Family: Myxinidae p 30

Description: 7 (rarely 6) pairs of gill openings in 2 rows on ventral surface; origin of mid-ventral fin fold behind third gill opening; distance between first and last gill opening less than 16 in total length; maximum body depth 10 to 15 in total length.

Grey to brown above, paler below; white borders to gill openings; prominent clear area over eyes.

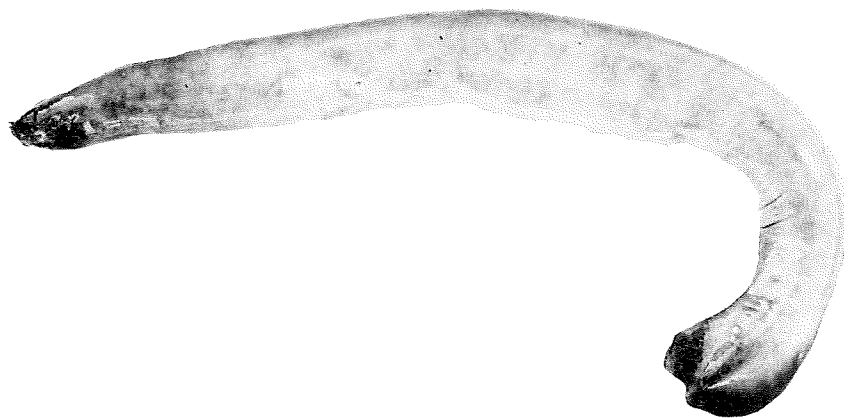
Size: To about 75 cm.

Distribution: (Southern Qld), N.S.W. and Vic.

Habitat and Depth: Demersal, on muddy bottoms of the continental shelf and upper slope to a depth of about 700 m; may bore into body of dead or dying fish caught on lines or in nets.

Note: A similar species, *E. longipinnis*, has been caught off south-east South Australia. It differs from *E. cirrhatus* in having: 6 pairs of gill openings on the ventral surface; origin of mid-ventral fin fold *ahead* of third gill opening; maximum body depth 20 to 25 in total length; *no* white borders to gill openings.

References: Strahan (1975).



K. J. Graham

Sharpnose seven-gill shark

Heptranchias perlo (Bonnaterre, 1788)

Family: Hexanchidae p 24

Other Common Names: One-finned shark, perlon shark, slender seven-gill shark.

Description: 7 gill slits; body relatively firm and stiff; snout narrow and tapering, length more than 1.5 times distance between nostrils; anal fin small, its height about 0.5 to 0.6 height of dorsal fin; upper jaw without central tooth, central tooth of lower jaw with large median cusp; lower jaw usually with 5 rows of large teeth each side of central tooth.

Body brownish grey above, paler below; trailing margins of dorsal and upper caudal fins white in adults; dorsal and upper caudal fins with black tips in young.

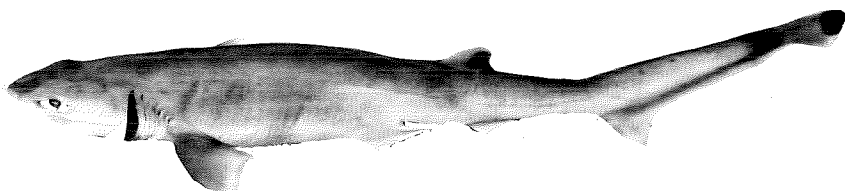
Size: To at least 137 cm.

Distribution: N.S.W., Vic., Tas, S.A. and W.A.

Habitat and Depth: Demersal, recorded from the continental shelf and slope in depths from 100 to 400 m; usually on or near shelf edge.

Note: Another hexanchid (*Hexanchus griseus*), the blunt-nosed six-gill shark has been recorded rarely from N.S.W., Vic. and eastern Tas. It is easily distinguished, having only 6 gill slits.

References: Munro (1956a) as *H. dakini*; Garrick & Paul (1971); Bass et al. (1975d); Bass (1979).



K. J. Graham

Broadnose seven-gill shark

Notorynchus cepedianus (Péron, 1807)

Family: Hexanchidae p 24

Other Common Names: Seven-gilled shark, ground shark, broad snout, Tasmanian tiger shark.

Description: 7 gill slits; body very soft and supple; snout broad and rounded, length less than 1.5 (usually about 1.1) times distance between nostrils; anal fin large, its height about 0.75 height of dorsal fin; each jaw with 1 central tooth, central tooth of lower jaw without large median cusp; lower jaw usually with 6 rows of large teeth each side of central tooth.

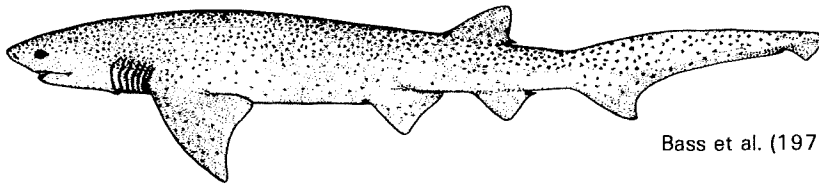
Body pale grey with white and dark spots above, white below; fins with dark spots.

Size: To about 300 cm.

Distribution: N.S.W., Vic., Tas. S.A. and Great Australian Bight.

Habitat and Depth: Demersal, recorded from shallow coastal waters including bays and estuaries.

References: Bass et al. (1975d); Bass (1979); Last et al. (1983).



Bass et al. (1975d)

Port Jackson shark

Heterodontus portusjacksoni (Meyer, 1793)

Family: Heterodontidae p 24

Other Common Names: Bullhead, oyster crusher, tabbigaw.

Description: Crests above eyes sloping gradually rearwards; lateral teeth molar-like with rounded cusps.

Body light brown to grey; harness-like, dark brown bars behind gill slits; dark blotch on snout, dark band between and extending below eyes.

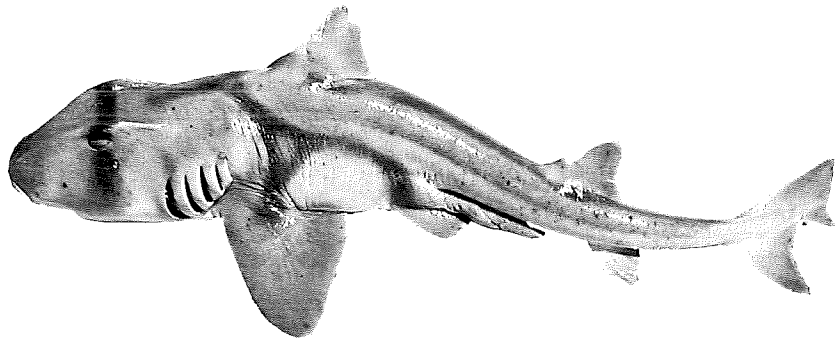
Size: To about 140 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, recorded from the littoral zone to a depth of about 240 m.

Note: The crested Port Jackson shark, *H. galeatus*, has also been recorded from N.S.W. (and Qld) to a depth of about 90 m. In *H. galeatus* the posterior edge of the crests above the eyes is vertical (not gradually sloping) and the dark bars on the body do not join to form a "harness" pattern.

References: Whitley (1940a).



J. G. H. Maxwell

Grey nurse shark

Eugomphodus taurus (Rafinesque, 1810)

Family: Odontaspidae p 22

Description: Snout short and bluntly pointed, length from snout to mouth less than longest gill slit; second dorsal fin only slightly smaller than first; most teeth with only 1 basal denticle on each side of cusp. Body grey-brown above, dirty white below; posterior half of body sometimes with dark spots or blotches.

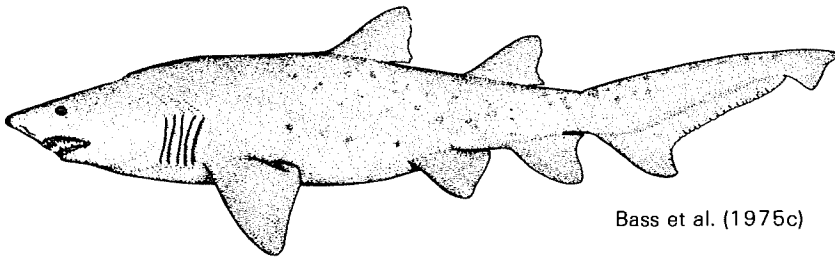
Size: To about 300 cm.

Distribution: (Southern Old), N.S.W., S.A. and W.A.

Habitat and Depth: Demersal, shallow-water species; recorded to a depth of about 150 m, usually in less than 60 m.

Note: *Odontaspis ferox* has also been recorded off N.S.W. in deep shelf and slope waters. It has a long and thin snout (length from snout to mouth equal to or greater than longest gill slit), the second dorsal fin distinctly smaller than the first and most teeth have 2 or more basal denticles on each side of cusp.

References: Munro (1956a) as *Carcharias arenarius* and *O. ferox* as *C. herbsti*; Bass et al. (1975c) as *O. taurus*; Compagno (1984).



White shark

Carcharodon carcharias (Linnaeus, 1758)

Family: Lamnidae p 22

Other Common Names: White pointer.

Description: Caudal fin base with 1 lateral keel extending onto peduncle, no secondary keel; anal fin origin behind second dorsal fin axil; first dorsal fin origin ahead of pectoral fin inner corner; upper teeth triangular, broad, serrated and without lateral denticles (in fish less than 150 cm TL some teeth may be lanceolate, smooth-edged, with small lateral denticles).

Head and body greyish brown, blue-grey or dark grey above, white below; pectoral fins with ventral surfaces of tip black and sometimes black spot in axils.

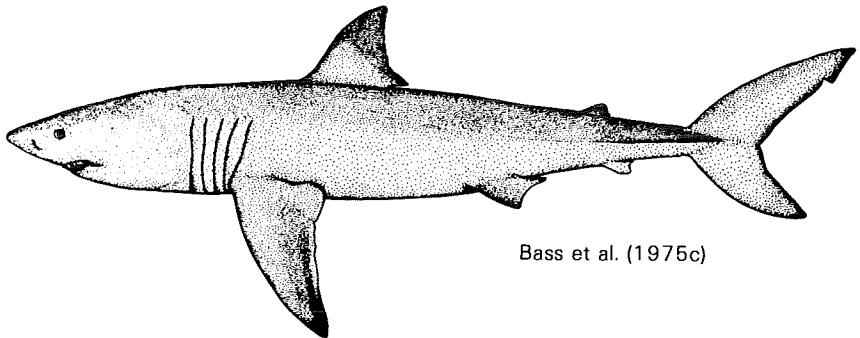
Size: To 640 cm.

Distribution: Australia (all states).

Habitat and Depth: Pelagic in oceanic and continental shelf waters, often close inshore.

Note: Another lamnid, *Lamna nasus* has been recorded from the southern Tasman Sea. It has a secondary keel on the caudal fin base below the main keel, the anal fin origin clearly ahead of the second dorsal fin axil, most teeth with small basal denticles and the distance between snout tip and anterior margin of eye at least half the distance between first gill slit and posterior margin of eye.

References: Bass et al. (1975c); for *L. nasus* Bass et al. (1975c) and Stevens et al. (1983).



Bass et al. (1975c)

Short-finned mako

Isurus oxyrinchus Rafinesque, 1810

Family: Lamnidae p 22

Other Common Names: Blue pointer, mackerel shark.

Description: Caudal fin base with 1 lateral keel extending onto peduncle, no secondary keel; anal fin origin under or behind second dorsal fin axil; first dorsal fin origin over or behind pectoral fin inner corner; teeth large (protruding noticeably from mouth), lanceolate, smooth-edged and without lateral denticles; pectoral fin distinctly shorter than distance between its origin and snout tip.

Head and body dark blue (fading to grey after death) above, white below.

Size: To 370 cm.

Distribution: (N.T., Qld), N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Pelagic in oceanic waters but may occasionally occur near the bottom in continental shelf waters.

Note: The long-finned mako (*I. paucus*) may also occur in southern waters although it is thought to be restricted to tropical waters. It has long pectoral fins, their length about equal to the distance between pectoral fin origin and snout tip.

References: Bass et al. (1975c).



J. G. H. Maxwell

Thintail thresher

Alopias vulpinus (Bonnaterre, 1788)

Family: Alopiidae p 22

Other Common Names: Common thresher shark, fox shark.

Description: Snout short, head conical; teeth relatively small, with 1 sharply pointed subtriangular cusp and without denticles on base; first dorsal fin high (height less than 13 in TL); no deep groove on side of head from above eye to above gill slits.
Body blue-grey (sometimes metallic bronze initially) above, white below.

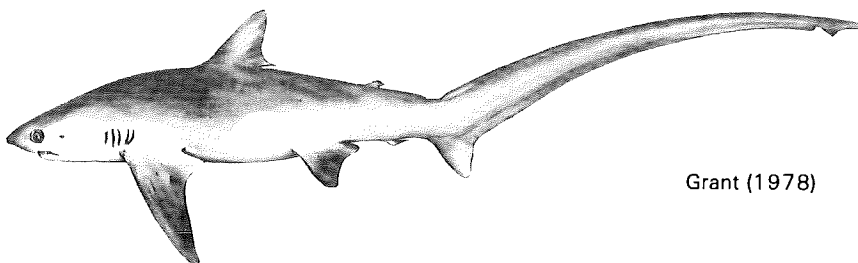
Size: To 500 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Oceanic, occurring from the surface to a depth of about 200m; sometimes found relatively close inshore.

Note: Two other species of thresher shark normally inhabit tropical waters, but may possibly range into southern waters. They differ from *A. vulpinus* as follows: *A. pelagicus* has relatively smaller teeth with an oblique cusp and 1 or more denticles on the outer side of the base and a low first dorsal fin (height about 18 in TL); *A. superciliosus* has a bulbous snout, enormous eyes that extend onto the dorsal surface of the head and a deep groove on each side of the head above the gill slits.

References: Bigelow & Schroeder (1948); Bass et al. (1975c); Compagno (1984).



Wobbegong

Orectolobus maculatus (Bonnaterre, 1788)

Family: Orectolobidae p 26

Description: Dorsal surface of body smooth, without papillae or tubercles; nasal flap with short, *forked* secondary lobe about halfway along its length; 3 to 6 simple, skin flaps present on each side of mouth above upper lip, 4 to 5 flaps near mouth angle, of which first and last are branched and 1 to 2 notched flaps on side of head.

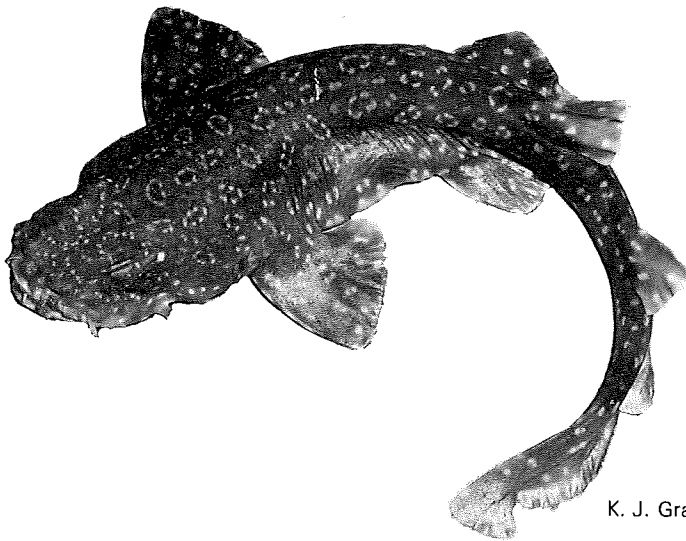
Body brownish above, paler below; numerous white spots and irregular rings on back and sides.

Size: To about 300 cm.

Distribution: (Southern Qld) and N.S.W.

Habitat and Depth: Demersal, occurring in shallow water to a depth of 100 m.

References: Regan (1908); Ogilby & McCulloch (1909); Whitley (1940a).



K. J. Graham

Banded wobbegong

Orectolobus ornatus (De Vis, 1883)

Family: Orectolobidae p 26

Description: Dorsal surface of body smooth, without papillae or tubercles; nasal flap with short, *simple* secondary lobe; 2 to 4 simple, skin flaps present on each side of mouth above upper lip, 2 simple flaps near mouth angle and 2 simple flaps on side of head.

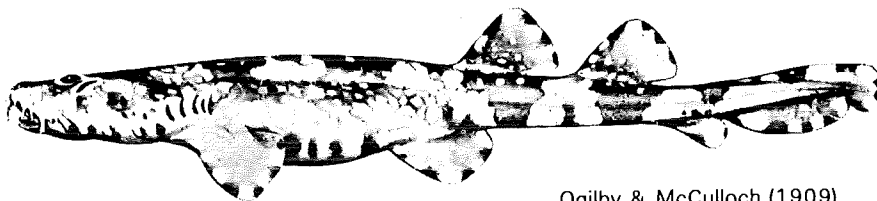
Body brown with dark and light marbling forming crossbars and enclosing imperfect ocelli.

Size: To about 215 cm.

Distribution: (Southern Qld), N.S.W., Vic., S.A. and southern W.A.

Habitat and Depth: Bottom-living, in shallow water on rocky reefs and weed beds.

References: Regan (1908); Whitley (1940a).



Ogilby & McCulloch (1909)

Cobbler carpet shark

Sutorectus tentaculatus (Peters, 1864)

Family: Orectolobidae p 26

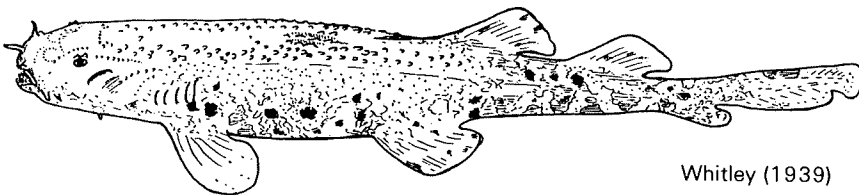
Description: Dorsal surface of body with rows of tubercles; nasal flap without secondary lobe; 1 simple, skin flap on each side of mouth above upper lip, 1 flap at mouth angle and 1 flap on side of head. Body brown above, yellowish below; adults with scattered blackish spots; juveniles with dusky crossbands.

Size: To about 100 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Bottom-living, in shallow water near rocks and weed.

References: Regan (1908); Whitley (1940a).



Whitley (1939)

Collared catshark

Parascyllium collare Ramsay & Ogilby, 1888

Family: Parascyllidae p 26

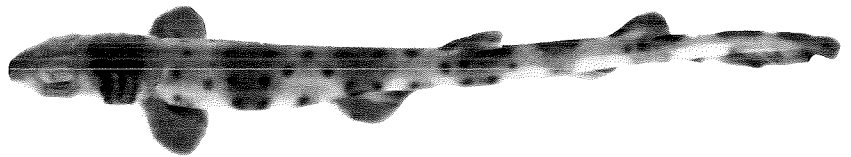
Description: Distance between snout tip and first dorsal fin origin less than half total body length; posterior margin of first dorsal fin truncate to convex; entire anal fin base *ahead* of second dorsal fin.
Body yellowish brown above and paler below, with dark spots and 4 to 5 faint, dark bands; distinct *dark collar* around neck.

Size: To 86 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, occurring on the continental shelf in depths from 20 to 160 m.

References: Whitley (1940a); Last et al.(1983).



K. J. Graham

Rusty catshark

Parascyllium ferrugineum McCulloch, 1911

Family: Parascyllidae p 26

Description: Distance between snout tip and first dorsal fin origin less than half total body length; posterior margin of first dorsal fin truncate to convex; anal fin base partly *below* second dorsal fin.

Body light grey to brown above and paler below with large brown spots and about 5 indistinct, dark cross-bars on back; no distinct collar around neck; fins with brown spots.

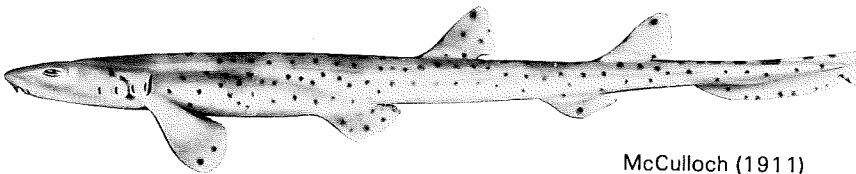
Size: To 80 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, in depths to about 60 m.

Note: The Tasmanian spotted catshark, *P. multimaculatum*, recorded from Vic. and Tas. may be a variety of *P. ferrugineum*. In *P. multimaculatum* the distance between the snout tip and the first dorsal fin origin is slightly more than half the total body length, the posterior margin of the first dorsal fin is concave, and the body is covered with numerous small, dark brown spots, with about 10 indistinct, rusty-brown saddles across the back.

References: Whitley (1940a); Last et al.(1983).



Varied catshark

Parascyllium variolatum (Duméril, 1853)

Family: Parascyllidae p 26

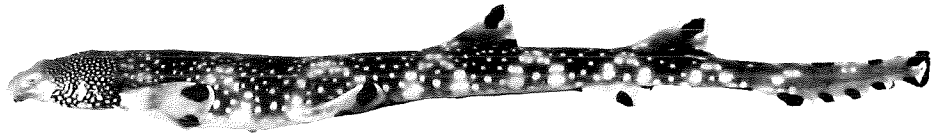
Description: Distance between snout tip and first dorsal fin origin less than half total body length; posterior margin of first dorsal fin truncate to convex; anal fin base partly *below* second dorsal fin.
Body light brown with scattered white spots; *distinct dark collar, speckled with small, white spots* around neck; fins with dark blotches and white spots.

Size: To 90 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, in depths to about 170 m.

References: Whitley (1940a); Last et al.(1983).



J. D. Stevens

Shovel-nosed catshark

Apristurus sp. 1

Family: Scyliorhinidae p 26

Description: Dorsal and ventral edges of caudal fin without enlarged, saw-like denticles; lip grooves prominent; snout elongate, *extremely flattened* and spatulate; *anal fin long*, extending from beneath first dorsal fin almost to lower caudal fin. Body uniformly dark.

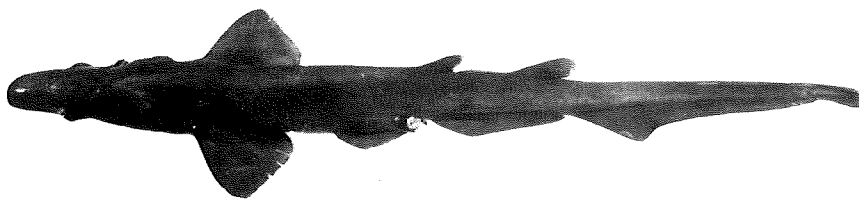
Size: Maximum size unknown, to at least 58 cm.

Distribution: N.S.W.

Habitat and Depth: Demersal, recorded from the continental shelf in depths from 490 to 1000 m.

Note: Approximately 5 undescribed species of *Apristurus* have been trawled recently but specific characters are unknown at present. The specimen pictured below is closest to *A. longicephalus*.

References: Springer (1979) genus only; L. J. V. Compagno pers. comm. (1983); K. J. Graham pers. comm (1984); Compagno (1984).



K. J. Graham

Spotted catshark

Asymbolus analis Ogilby, 1885

Family: Scyliorhinidae p 26

Description: Dorsal and ventral edges of caudal fin without enlarged, saw-like denticles; lip grooves short, lower extending less than one-half distance towards jaw symphysis; snout short, not strongly flattened; ventral fins of males fused along inner margins forming "apron" over claspers; upper caudal fin lobe at least 3 times length of lower caudal lobe; cusp length of largest teeth much less than half spiracle diameter. Body light brown above, paler below; *dark rusty spots* (3-6 mm in diameter) and usually faint, saddle blotches along back and upper sides; fins with dark spots.

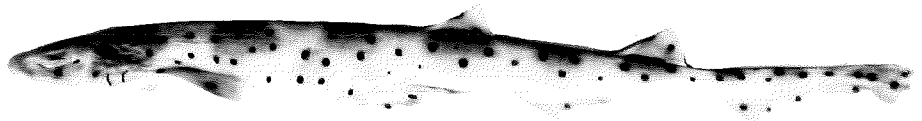
Size: To about 90 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, occurring on the continental shelf and slope in depths from 100 to 250 m.

Note: *Aulohalaelurus labiosus* resembles *A. analis* and has been recorded from southern W.A. It has very long lip grooves that extend more than half the distance towards the jaw symphysis, ventral fins of males not fused along inner margins and the body is brownish grey above, yellowish white below, with scattered black spots on most surfaces. See *Note* for *Asymbolus* sp 1.

References: Whitley (1940a); Springer (1979); Compagno (1984).



J. D. Stevens

Gulf catshark

Asymbolus vincenti (Zietz, 1908)

Family: Scyliorhinidae p 26

Description: Dorsal and ventral edges of caudal fin without enlarged, saw-like denticles; lip grooves short, lower extending less than one-half distance towards jaw symphysis; snout short, moderately flattened; ventral fins of males fused along inner margins forming "apron" over claspers.

Body mottled grey-brown above, pale below; scattered *whitish spots* and 7 to 8 faint, dark saddle blotches along back and upper sides.

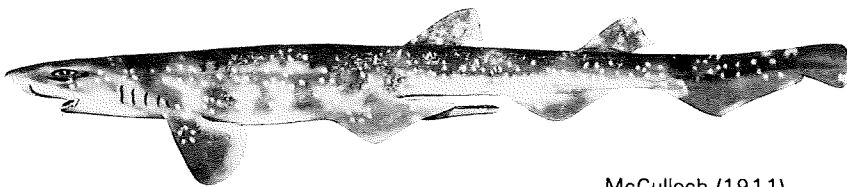
Size: To about 60 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 40 to 220 m.

Note: The size and relative positions of fins and the body colour are variable in this species and further specimens need to be examined to determine whether there is more than one species.

References: Whitley (1940a); Springer (1979); Compagno (1984).



McCulloch (1911)

Large-toothed spotted catshark

Asymbolus sp. 1

Family: Scyliorhinidae p 26

Description: Dorsal and ventral edges of caudal fin without enlarged, saw-like denticles; lip grooves short, lower extending less than one-half distance towards jaw symphysis; snout relatively short, not strongly flattened; ventral fins of males fused along inner margins forming "apron" over claspers; upper caudal fin lobe less than or equal to 2 times length of lower caudal lobe; cusp length of largest teeth at least half spiracle diameter.

Body brownish grey above, paler below; small, chocolate brown spots (1-3 mm in diameter) cover upper surface of body and sometimes lower; 6 rusty brown, saddle blotches on back, and grey blotches on posterior half of flanks; fins with chocolate brown spots.

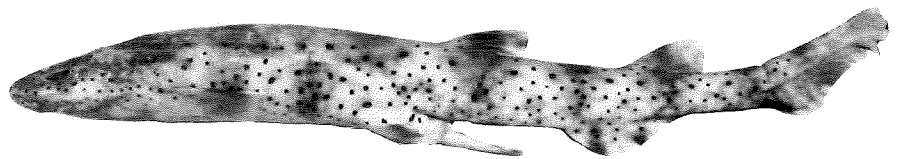
Size: Maximum size unknown, to at least 43 cm.

Distribution: Great Australian Bight, S.A.

Habitat and Depth: Demersal, recorded from the continental shelf at a depth of 70 m.

Note: This genus is poorly known with probably another undescribed species occurring in southern waters. More specimens are required to determine exactly how many species exist and their distinguishing characters.

References: Springer (1979) and Compagno (1984) genus only.



J. D. Stevens

Spotted swellshark

Cephaloscyllium laticeps (Duméril, 1853)

Family: Scyliorhinidae p 26

Other Common Names: Swell shark, draughtboard shark.

Description: Dorsal and ventral edges of caudal fin without enlarged, saw-like denticles; lip grooves *absent*; snout short, head very broad and relatively flattened; nasal flaps relatively short and subtriangular. Body pale grey or brown with variegated pattern of dark brown or greyish blotches and *numerous dark and some light spots*; fins similar to body.

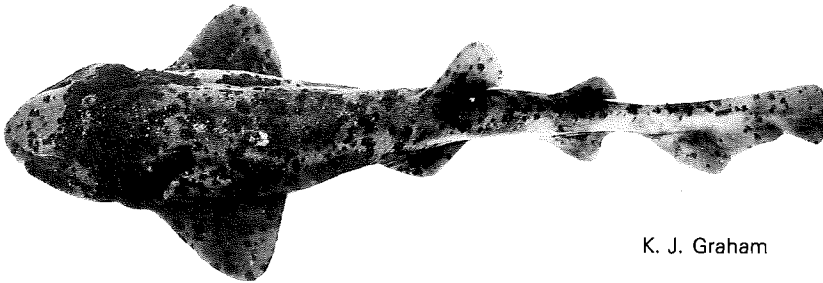
Size: To 100 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, occurring on the continental shelf in depths from 20 to 220 m.

Note: *Cephaloscyllium* species are unique among sharks in their ability to inflate their stomachs with air or water.

References: Whitley (1940a); Springer (1979); Compagno (1984).



K. J. Graham

Draughtboard shark

Cephaloscyllium nascione Whitley, 1932

Family: Scyliorhinidae p 26

Other Common Names: Swell shark.

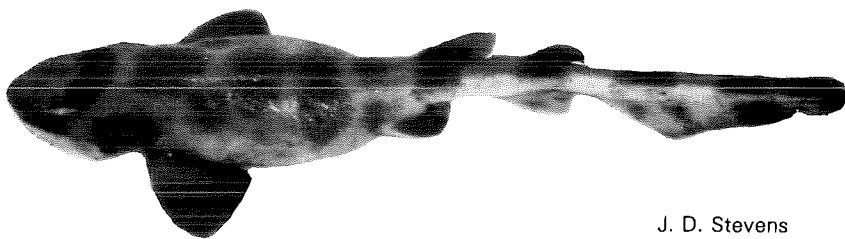
Description: Dorsal and ventral edges of caudal fin without enlarged, saw-like denticles; lip grooves absent; snout short, head very broad and relatively flattened; nasal flaps relatively long and lobate. Body grey-brown to light tan with 8 to 9 darker grey-brown saddles on head and back; fins grey-brown with conspicuous light margins.

Size: To 100 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 150 to 650 m.

References: Whitley (1932); Compagno (1984).



J. D. Stevens

Sawtail shark

Galeus boardmani (Whitley, 1928)

Family: Scyliorhinidae p 26

Other Common Names: Banded shark.

Description: Dorsal and *ventral* edges of caudal fin with *enlarged, saw-like denticles* forming crest; lip grooves prominent, lower extending about one-third distance towards jaw symphysis; snout relatively long, not greatly flattened; pectoral fins broad, maximum width greater than mouth width.

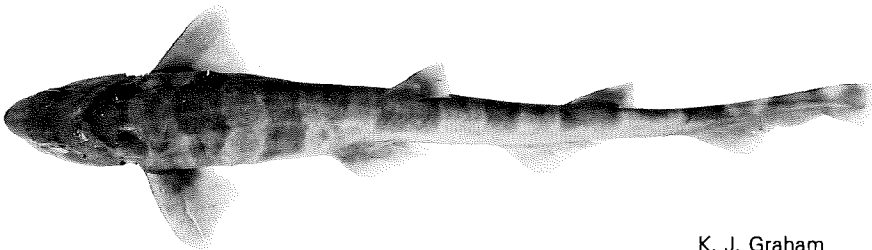
Body light grey; 7 to 8 brownish saddle blotches interspersed with 8 smaller blotches on back and tail.

Size: To about 60 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, common on the continental shelf and slope in depths from 150 to 640 m.

References: Springer (1979).



K. J. Graham

Whiskery shark

Furgaleus macki (Whitley, 1943)

Family: Triakidae p 24

Description: Upper jaw teeth blade-like and triangular with 1 central, outwardly oblique cusp, bearing 4 coarse serrations on outer edge; first dorsal fin origin entirely behind pectoral fins; nostrils with 1 small barbel; subterminal notch of caudal fin not markedly deep; median ridge on back between dorsal fins.

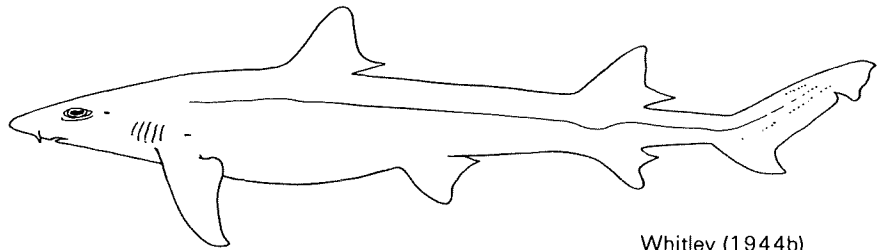
Head and body grey-bronze above, white below; fins without distinctive markings.

Size: To 140 cm.

Distribution: Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, recorded from the continental shelf to a depth of 240 m.

References: Whitley (1943) as *Fur macki* and *F. ventralis*; Compagno (1984).



Whitley (1944b)

School shark

Galeorhinus galeus (Macleay, 1881)

Family: Triakidae p 24

Other Common Names: Snapper shark, tope, soupfin shark.

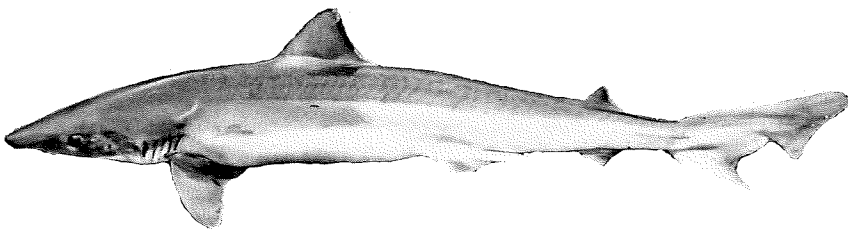
Description: Teeth blade-like and triangular with 1 central, outwardly oblique cusp, bearing (3 to 5 coarse) serrations on outer edge; nostrils without barbel; subterminal notch of caudal fin deep, giving shark "double-tailed" appearance; first dorsal fin origin behind inner corner of pectoral fin but closer to pectoral fin origin than ventral fin origin. Head and body slate-grey to bronze above, white below; underside of snout may be translucent; fins without distinctive markings.

Size: To 180 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Predominantly demersal, in continental shelf and upper slope waters to a depth of 500 m; juveniles inhabit estuaries and large coastal bays.

References: Whitley (1940a) as *Notogaleus australis*; Last et al. (1983) as *G. australis*; Compagno (1984).



J. D. Stevens

Gummy shark

Mustelus antarcticus Günther, 1870

Family: Triakidae p 24

Other Common Names: Sweet William.

Description: Teeth flattened and smooth, arranged in mosaic pattern; first dorsal fin origin above inner corner of pectoral fin; upper lip groove noticeably longer than lower.
Head and body grey to greyish brown often with small, white spots (spots may be indistinct).

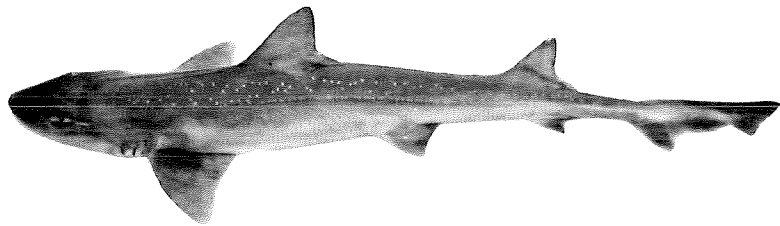
Size: To 175 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, recorded inshore and from the continental shelf and shelf edge to a depth of 300 m; most common in depths less than 80 m.

Note: A major commercial species in southern Australian waters.

References: Heemstra (1973).



K. J. Graham

Bronze whaler

Carcharhinus brachyurus Günther, 1870

Family: Carcharhinidae p 22

Other Common Names: Cocktail shark, copper shark.

Description: Caudal peduncle without lateral keels; spiracles absent; teeth near centre of upper jaw with oblique, narrowly triangular cusps that are *distinct* from broad bases; first dorsal fin origin over or just ahead of pectoral fin inner corner; interdorsal ridge usually absent; tip of first dorsal fin relatively pointed; tip of second dorsal lobe extending beyond tip of anal lobe.

Body brownish grey or bronze above, paler below; dark band usually present along trunk from above pectoral to ventral fins; pectoral and ventral fins sometimes with dusky tips, other fins *unmarked*.

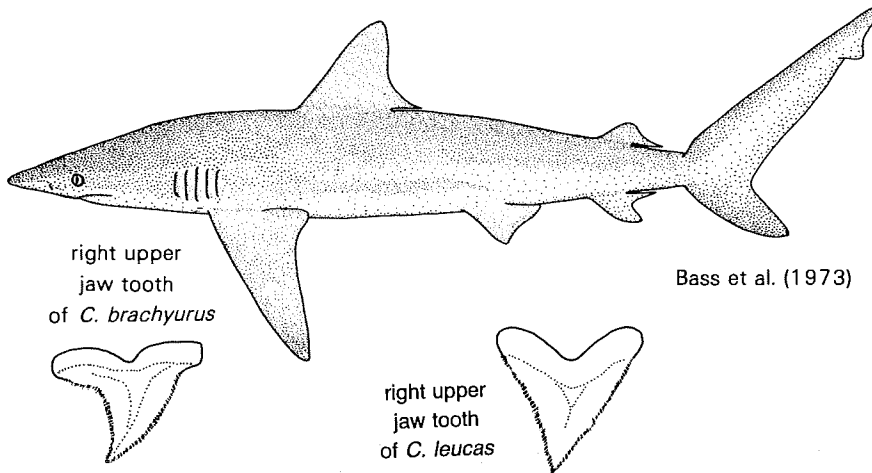
Size: To about 290 cm.

Distribution: Southern N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs in coastal waters, from close inshore off beaches and in estuaries, to a depth of about 100 m; stomach contents indicate that it tends to feed near the bottom.

Note: The river whaler (*C. leucas*) occurs in the rivers of Australia. It has a much stockier body and a very short, blunt snout compared to *C. brachyurus*, teeth of the upper jaw with broad triangular cusps that are not distinct from their bases and the tip of the second dorsal lobe ahead of the tip of the anal lobe.

References: Bass et al. (1973); Garrick (1982).



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Long-nosed grey shark

Carcharhinus brevipinna (Müller & Henle, 1839)

Family: Carcharhinidae p 22

Other Common Names: Spinner shark.

Description: Caudal peduncle without lateral keels; spiracles absent; upper jaw teeth small, with erect, very narrow cusps *that are distinct* from broad bases; first dorsal fin origin behind pectoral fin inner corner; interdorsal ridge absent; tip of first dorsal fin relatively pointed.

Body grey above, paler below; pale band present along mid-flank from below first dorsal to ventral fins; Individuals greater than 130 cm TL usually with all *fins* except ventrals *black tipped*; those less than 70 cm TL with unmarked fins.

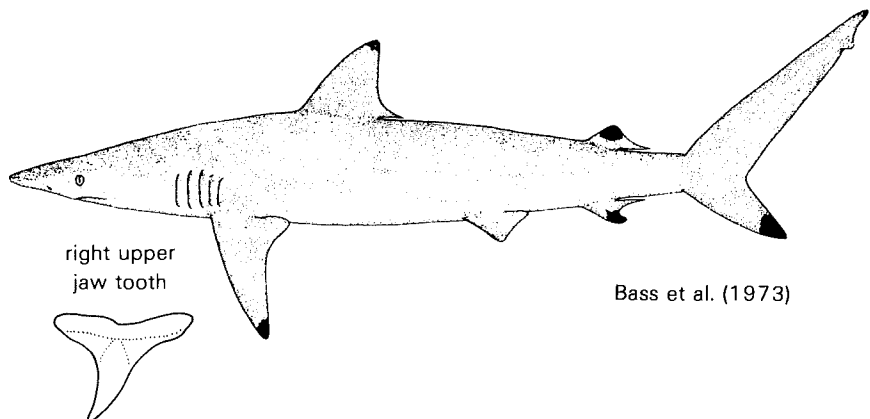
Size: To 270 cm.

Distribution: (N.T., Qld), N.S.W. and W.A.

Habitat and Depth: Pelagic in continental shelf waters; feeds in midwater and occasionally near the bottom.

Note: *C. limbatus* which occurs occasionally in N.S.W. may be confused with *C. brevipinna* but differs as follows: first dorsal fin origin ahead of pectoral fin inner corner; high first dorsal fin (fin height in interdorsal distance less than 2.2 in *C. limbatus*, more than 2.2 in *C. brevipinna*).

References: Bass et al. (1973); Garrick (1982).



Oceanic white tip shark

Carcharhinus longimanus Poey, 1861

Family: Carcharhinidae p 22

Other Common Names: White-tipped whaler.

Description: Caudal peduncle without lateral keels; spiracles absent; teeth near centre of upper jaw with slightly oblique, broad triangular cusps that are *not distinct* from bases; first dorsal fin origin close to pectoral fin inner corner; interdorsal ridge usually present; tip of first dorsal fin *broadly rounded*; *rear tip of anal fin* reaching almost to origin of lower caudal lobe; pectoral fins long (length 3.3 to 5.0 in TL), tips broadly rounded.

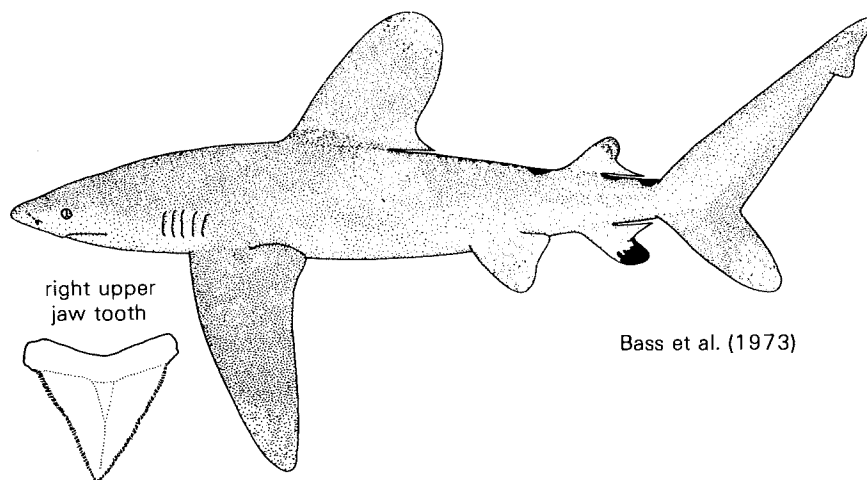
Body grey above, white below; tips of first dorsal, pectoral and caudal fins mottled white. Individuals less than 130 cm TL may have some or all fins with black or dusky tips together with black saddles on caudal peduncle.

Size: To about 300 cm.

Distribution: (Qld), N.S.W., Vic., S.A., W.A.; present in southern waters between December and April.

Habitat and Depth: Pelagic in the deep ocean.

References: Bass et al.(1973); Garrick (1982).



Black whaler

Carcharhinus obscurus (Lesueur, 1818)

Family: Carcharhinidae p 22

Other Common Names: Dusky shark.

Description: Caudal peduncle without lateral keels; spiracles absent; upper jaw teeth with nearly erect, broad triangular cusps that are *not distinct* from bases and without lateral notches; first dorsal fin origin over pectoral fin inner corner; interdorsal ridge present; tip of first dorsal fin relatively pointed.

Body grey above, white below; grey band sometimes present along flanks from above pectoral to ventral fins; fins grey to dusky, sometimes with dusky tips.

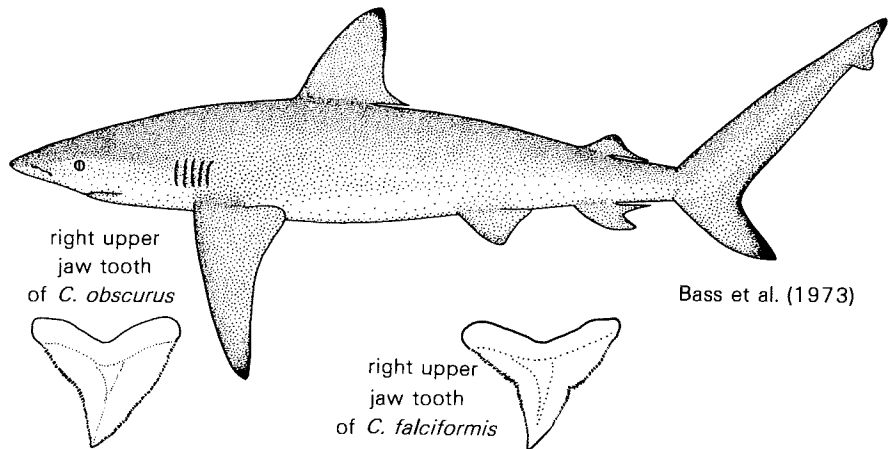
Size: To 360 cm.

Distribution: All states except Tas.

Habitat and Depth: Occurs from close inshore to the outer continental shelf in depths to 400 m; often found near the surface but feeds mainly on bottom-living prey.

Note: *C. falciformis* also occurs in summer off N.S.W. It differs from *C. obscurus* in having: cusps of upper jaw teeth distinctly marked off from bases by lateral notches; origin of first dorsal fin distinctly behind pectoral fin inner corner by at least one-third length of pectoral fin inner margin; anal lobe very long (always more than twice height of second dorsal fin).

References: Bass et al. (1973); Garrick (1982).



Tiger shark

Galeocerdo cuvier (Lesueur, 1822)

Family: Carcharhinidae p 22

Description: Caudal peduncle with lateral keels; spiracles small, slit-like; teeth cockscomb-shaped, with 1 cusp and large serrations; first dorsal fin origin over pectoral fin axil or inner edge.

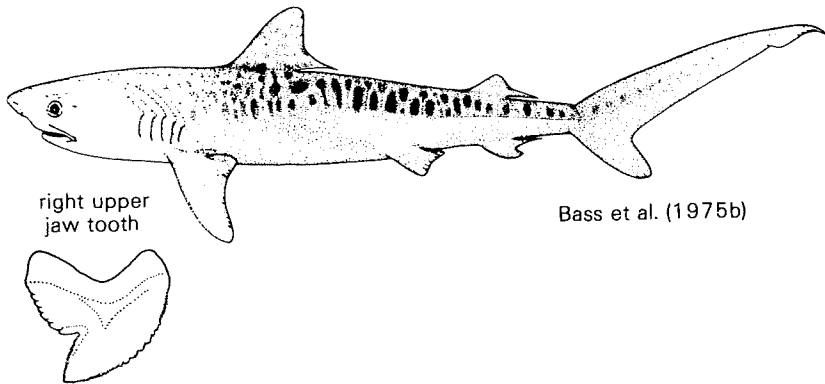
Adults (over 300 cm TL) uniform greyish brown above, paler below; juveniles with dark bars and reticulations on body and fins.

Size: To 550 cm.

Distribution: All states, except Tas.; usually only in southern waters between December and April.

Habitat and Depth: Occurs in shallow waters close inshore and also in oceanic waters.

References: Bigelow & Schroeder (1948); Bass et al. (1975b).



Blue shark

Prionace glauca (Linnaeus, 1758)

Family: Carcharhinidae p 22

Other Common Names: Blue whaler.

Description: Caudal peduncle without lateral keels; spiracles absent; upper jaw teeth with outwardly oblique, subtriangular, serrated cusps, lower jaw teeth more erect and narrower; first dorsal fin origin behind pectoral fin inner corner by distance at least equal to that between first and last gill slits; pectoral fins very long and falcate (in medium to large fish, fin length about equal to distance between snout tip and last gill slit).

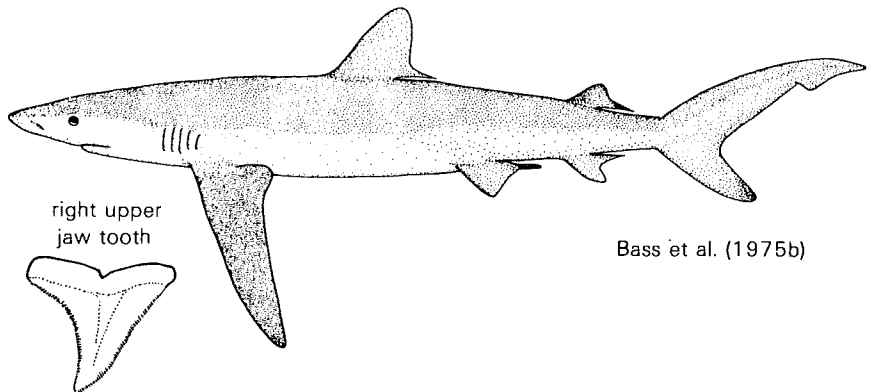
Body dark indigo-blue above, shading to metallic blue on sides, white below.

Size: To 380 cm.

Distribution: Australia (all states).

Habitat and Depth: Pelagic in open ocean; often coming inshore in Tas. during autumn.

References: Bigelow & Schroeder (1948); Bass (1975b).



Smooth hammerhead

Sphyrna zygaena (Linnaeus, 1758)

Family: Sphyrnidae p 22

Other Common Names: Common hammerhead.

Description: Leading edge of "hammer" convex and without indentation or "scallop" at centre; cusps of all teeth finely serrated; first dorsal fin relatively low (height 6.5 to 11.2 in TL); second dorsal fin low, its height less than or equal to length of third gill slit. Body grey to dark grey above, pale below.

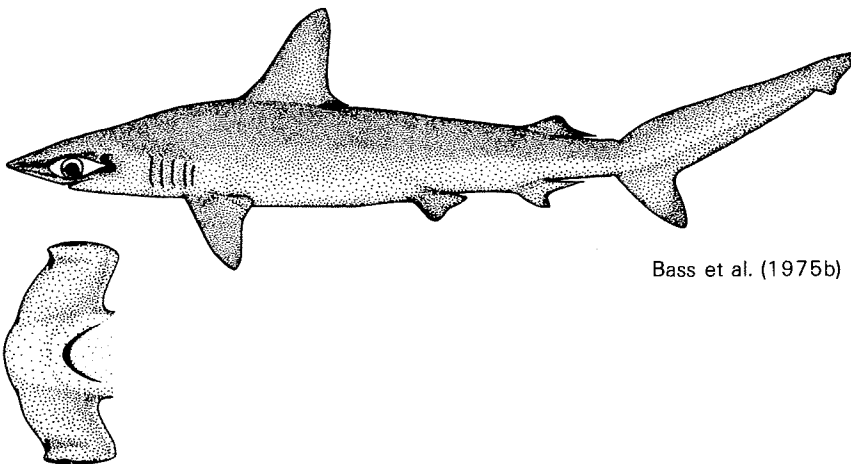
Size: To about 400 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Oceanic but sometimes found close inshore.

Note: The tropical hammerheads, *S. lewini* (scalloped hammerhead) and *S. mokarran* (great hammerhead) are found as far south as Sydney, N.S.W. in summer. They are distinguished from *S. zygaena* as follows: *S. lewini* has a "scallop" at the centre of the leading edge of the "hammer" and teeth with smooth edges; *S. mokarran* has an almost straight leading edge to the "hammer" with a "scallop" at the centre, coarsely serrated teeth, a very high, pointed first dorsal fin (height 5.1 to 7.4 in TL) and a relatively high second dorsal fin (height greater than length of third gill slit).

References: Gilbert (1967); Bass et al. (1975b).



Bass et al. (1975b)

Harrison's dogfish

Centrophorus harrissoni McCulloch, 1915

Family: Squalidae p 24

Other Common Names: Dumb shark.

Description: Each dorsal fin preceded by prominent, grooved, spine; caudal fin with subterminal notch, peduncle without lateral keel; teeth with 1 cusp and most bases overlapping, lowers larger than upper; snout relatively long, not flattened, distance from snout to mouth equal to that from mouth to pectoral fin origin; second dorsal fin about two-thirds to three-quarters height of first dorsal; pectoral fin inner corner extended into short lobe reaching beyond level of first dorsal fin spine, inner edge 2 to 3 times second dorsal height; rear tip of ventral fins under or ahead of exposed part of second dorsal spine; nasal flap with minute side lobe; inner mouth width 1.5 to 1.8 in distance from snout to mouth; snout depth at front of mouth 2.0 to 2.3 in distance from snout to mouth.

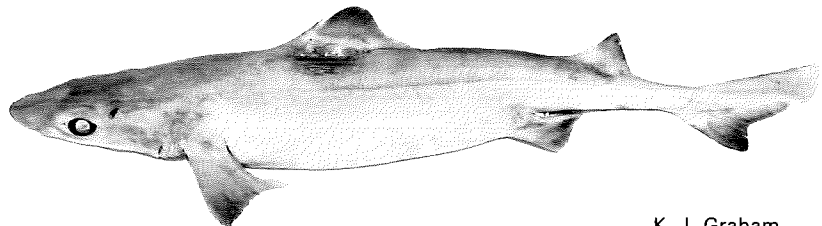
Body grey above, paler below; distinctive dark smudge below first dorsal fin.

Size: To 110 cm.

Distribution: N.S.W. and Vic.

Habitat and Depth: Demersal, on the continental slope in depths from 400 to 700 m.

References: McCulloch (1915); D. F. Hoese pers. comm. (1983); K. J. Graham pers. comm. (1984).



K. J. Graham

Endeavour dogfish

Centrophorus scalpratus McCulloch, 1915

Family: Squalidae p 24

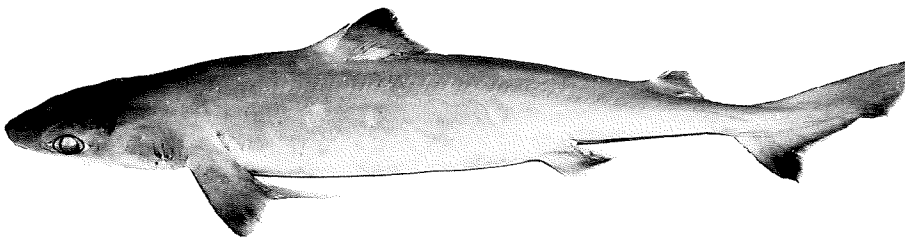
Description: Each dorsal fin preceded by prominent, grooved, spine; caudal fin with subterminal notch, peduncle without lateral keel; teeth with 1 cusp and most bases overlapping, lowers larger than uppers; snout relatively short, distance from snout to mouth equal to or shorter than that from mouth to pectoral fin origin; *second dorsal fin about half height of first dorsal; pectoral fin inner corner extended into long lobe reaching beyond level of first dorsal fin spine, inner edge 3.6 to 4.0 times second dorsal height;* rear tip of ventral fins ahead of exposed part of second dorsal fin spine; nasal flap with small side lobe. Body grey-brown above, whitish below; extended inner corners of pectoral fins white:

Size: To 100 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 140 to 800 m.

References: McCulloch (1915); Bass et al. (1976); D. F. Hoese pers. comm. (1983).



K. J. Graham

Nilson's deepsea dogfish

Centrophorus squamosus (Bonnaterre, 1788)

Family: Squalidae p 24

Other Common Names: Deepsea spiny dogfish.

Description: Each dorsal fin preceded by prominent, grooved, spine; caudal fin with subterminal notch, peduncle without lateral keel; teeth with 1 cusp, small and close-set in upper, larger with bases overlapping in lower; snout relatively short, distance from snout to mouth shorter than that from mouth to pectoral fin origin; *second dorsal fin slightly higher than first dorsal*; pectoral fin inner corner only slightly extended, reaching to level of first dorsal fin spine, inner edge about equal to second dorsal fin height; rear tip of ventral fin under or behind exposed part of second dorsal spine; nasal flap simple without second lobe.

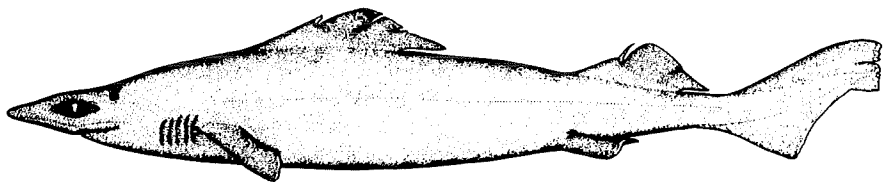
Body uniform dark grey, sometimes with brownish tinge.

Size: To at least 160 cm.

Distribution: N.S.W. and Tas.

Habitat and Depth: Demersal, recorded from the continental slope in depths to 1000 m.

References: Bass et al. (1976); D. F. Hoese pers. comm. (1983).



Bass et al. (1976)

Southern dogfish

Centrophorus uyato (Raffinesque, 1810)

Family: Squalidae p 24

Description: Each dorsal fin preceded by prominent, grooved, spine; caudal fin with subterminal notch, peduncle without lateral keel; teeth with 1 cusp, small and close set in upper, larger with bases overlapping in lower; snout relatively short, distance from snout to mouth shorter than that from mouth to pectoral fin origin; second dorsal fin about two-thirds to three-quarters height of first dorsal; pectoral fin inner corner extended into short lobe reaching beyond level of first dorsal fin spine, inner edge 2 to 3 times second dorsal height; rear tip of ventral fins under or ahead of exposed part of second dorsal spine; nasal flap with small to minute side lobe; inner mouth width 1.2 to 1.5 in distance from snout to mouth; snout depth at front of mouth 1.5 to 1.8 in distance from snout to mouth.

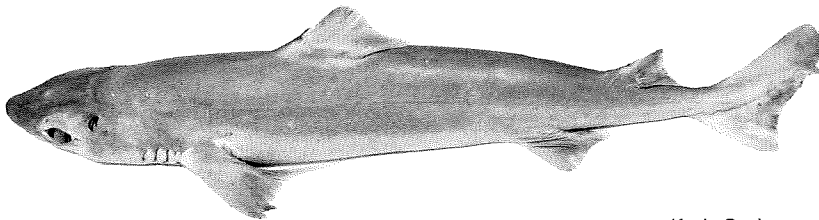
Body dark greyish brown above, paler below; no dark smudge at base of first dorsal fin; trailing margins of fins sometimes black with pale or transparent edges.

Size: To 90 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 50 to 550 m.

References: Bigelow & Schroeder (1957); D. F. Hoese pers. comm. (1983).



K. J. Graham

Deepwater dogfish

Centroscymnus crepidater (Bocage & Capello, 1864)

Family: Squalidae p 24

Other Common Names: Golden dogfish.

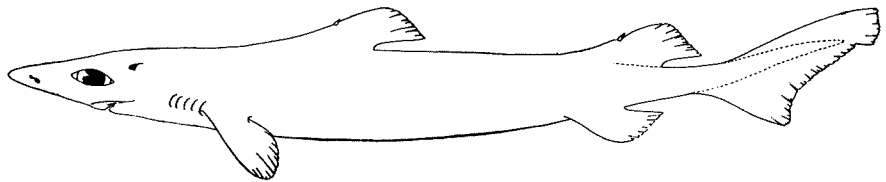
Description: Each dorsal fin preceded by barely exposed, grooved, spine; caudal fin with subterminal notch, peduncle without lateral keel; teeth with 1 cusp, dagger-like and *set apart* in upper jaw, blade-like with bases overlapping in lower; teeth near symphysis of upper jaw *not* notably smaller than teeth in fourth to eight rows from symphysis; snout relatively short, distance from snout to mouth (7.6 to 9.3 in TL) equal to or shorter than that from mouth to pectoral fin origin; second dorsal fin slightly higher than first; pectoral fin inner corner broadly rounded, not reaching to first dorsal spine; *pre-oral clefts long*, their anterior ends almost meeting; distance from snout tip to inner end of nostril about equal to that between nostrils. Body uniform dark brown to black.

Size: To 90 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental slope in depths from 600 to 1100 m.

References: Bigelow & Schroeder (1957); Garrick (1959a); Bass (1979); K. J. Graham pers. comm. (1984).



Garrick (1959a)

Owston's dogfish

Centroscymnus owstoni Garman, 1906

Family: Squalidae p 24

Other Common Names: Owston's spiny dogfish, deepwater dogfish.

Description: Each dorsal fin preceded by barely exposed, grooved, spine; caudal fin with subterminal notch, peduncle without keel; teeth with 1 cusp, dagger-like and *set apart* in upper jaw, blade-like with bases overlapping in lower; teeth near symphysis of upper jaw *not* notably smaller than teeth in fourth to eight rows from symphysis; snout relatively short, distance from snout to mouth (9.4 to 12.0 in TL) shorter than that from mouth to pectoral fin origin; second dorsal fin slightly higher than first; pectoral fin inner corner broadly rounded, not reaching to first dorsal spine; *pre-oral clefts short*, distance between their inner ends at least as wide as that between inner ends of nostrils; distance from snout tip to inner end of nostril about equal to that between nostrils; base of first dorsal fin much shorter than base of second dorsal (each measured from base of exposed spine to axil); distance from snout to mouth greater than distance from eye to first gill slit.

Body uniform dark brown to black.

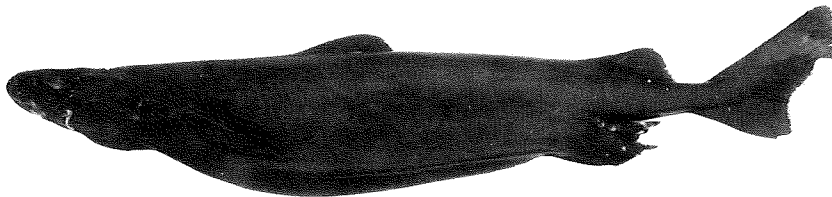
Size: To 100 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental slope in depths from about 800 to 1000 m.

Note: A similar species *C. coelolepis* has also been recently trawled off N.S.W. and Tas. It differs from *C. owstoni* in having: bases of first and second dorsal fins about equal (each measured from base of exposed spine to axil); snout very short (distance from snout to mouth much less than distance from eye to first gill slit).

References: Bigelow & Schroeder (1957); Bass (1979); K. J. Graham pers. comm. (1984).



Plunket's shark

Centroscymnus plunketi (Waite, 1909)

Family: Squalidae p 24

Other Common Names: Lord Plunket's shark.

Description: Each dorsal fin preceded by barely exposed, grooved, spine; caudal fin with subterminal notch, peduncle without lateral keel; teeth with 1 cusp, dagger-like and set apart in upper jaw, blade-like with bases overlapping in lower; teeth near symphysis of upper jaw notably *smaller* than teeth in fourth to eight rows from symphysis; snout short, distance from snout to mouth (13.3 to 20.0 in TL) shorter than that from mouth to pectoral fin origin; second dorsal fin about equal in height to first; pectoral fin inner corner broadly rounded, not reaching to first dorsal spine; pre-oral clefts short, distance between their inner ends at least as wide as that between inner ends of nostrils; distance from snout tip to inner end of nostril about two-thirds that between nostrils.

Body uniform dark greyish brown; margins of fins blackish; eye yellow-green.

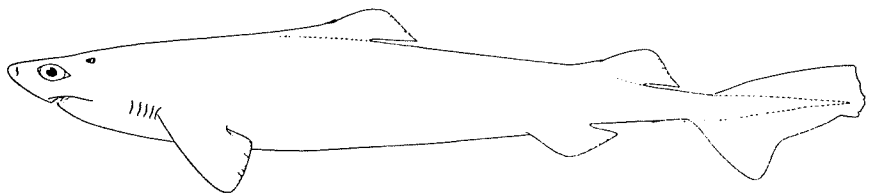
Size: To 140 cm.

Distribution: Vic. and Tas.

Habitat and Depth: Demersal, on the continental slope in depths from 240 to 1500 m.

Note: *Scymnodon squamulosus* also has been recorded off Sydney at a depth of 400 m over a bottom depth of 1000 m. It is most closely related to species of *Centroscymnus* but differs from them in having the lower jaw teeth with relatively high, almost erect cusps (low, almost oblique cusps in *Centroscymnus*).

References: Garrick (1959b) and Bass (1979) as *Scymnodon plunketi*; Compagno (1984).



Garrick (1959b)

Black shark

Dalatias licha (Bonnaterre, 1788)

Family: Squalidae p 24

Other Common Names: Seal shark.

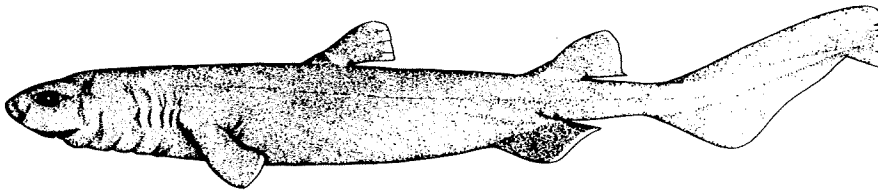
Description: Dorsal fins without spines; dorsal fins widely separated, origin of first closer to pectoral fin origin than ventral fin; caudal fin with distinct subterminal notch; teeth with 1 cusp, thorn-like and set apart in upper jaw, serrated and triangular with overlapping bases in lower. Body uniform violet-black to dark brown; hind margins of fins pale or translucent; eyes green.

Size: To 180 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental slope in depths from 300 to 1000 m.

References: Scott et al. (1974) as *D. phillippsi*; Bass et al. (1976).



Bass et al. (1976)

Brier shark

Deania calcea (Lowe, 1839)

Family: Squalidae p 24

Other Common Names: Dorian Gray, Thompson's deepsea dogfish, shovelnose spiny dogfish.

Description: Each dorsal fin preceded by prominent, grooved, spine; caudal fin with subterminal notch, peduncle without lateral keel; teeth with 1 cusp, thorn-like and close-set in upper jaw, blade-like with bases overlapping in lower; *snout very long and flattened*, distance from snout to mouth (6.4 to 7.9 in TL) longer than from mouth to pectoral fin origin; second dorsal fin higher than first; pectoral fin inner corner short, not reaching to first dorsal fin spine; *first dorsal fin base relatively long*, distance from origin of exposed part of spine to tip of lobe greater than distance from that lobe to origin of exposed part of second dorsal fin spine.

Body uniform brownish grey or light grey.

Size: To 110 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental slope in depths from 450 to 1100 m.

Note: Snout shape is very variable within species of *Deania* and also changes with increase in body length. *Deania* species are also sexually dimorphic in tooth shape, the teeth of mature males differing from those of immature males and females.

References: Bass et al. (1976).



K. J. Graham

Long-snouted dogfish

Deania quadrispinosum (McCulloch, 1915)

Family: Squalidae p 24

Description: Each dorsal fin preceded by prominent, grooved, spine; caudal fin with subterminal notch, peduncle without lateral keel; teeth with 1 cusp, thorn-like and close-set in upper jaw, blade-like with bases overlapping in lower; *snout very long and flattened*, distance from snout to mouth (6.4 to 7.9 in TL) longer than that from mouth to pectoral fin origin; second dorsal fin higher than first; pectoral fin inner corner short, not reaching to first dorsal fin spine; *first dorsal fin base relatively short*, distance from origin of exposed part of spine to tip of lobe less than distance from that lobe to origin of exposed part of second dorsal fin spine.

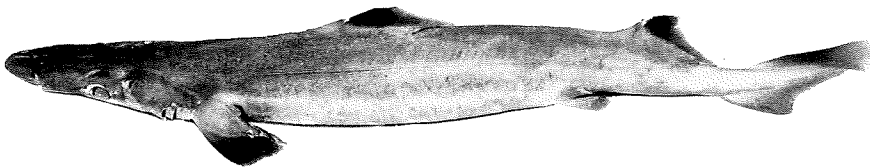
Body grey or dark brown above, paler below.

Size: To 120 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental slope in depths from 275 to 700 m.

References: McCulloch (1915) as *Acanthidium quadrispinosum*; Bass et al. (1976).



K. J. Graham

Moller's deepsea shark

Etmopterus lucifer Jordan & Snyder, 1902

Family: Squalidae p 24

Other Common Names: Lucifer shark, Moller's dogfish.

Description: Each dorsal fin preceded by prominent, grooved spine; caudal fin with subterminal notch, peduncle without lateral keel; teeth with 5 cusps and set apart in upper jaw, blade-like with 1 cusp and bases overlapping in lower; denticles on trunk below first dorsal fin long, erect and thorn-like, with four-angled bases, and arranged in *distinct longitudinal rows*; head long and narrow, maximum width about equal to distance from snout to mouth. Body grey-brown above, black below; *prominent black streaks* extending along flanks from ventral fins almost to posterior tip of second dorsal fin; fins partly translucent-white.

Size: To about 40 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental slope in depths from 270 to 1000 m; usually trawled between 270 to 430 m.

Note: *E. baxteri* has also been recorded from N.S.W. and Tas. in depths of 650 to 1400 m. *E. baxteri* grows to a much larger size (to 75 cm) than *E. lucifer* and differs in having: denticles on trunk in random arrangement (at least in fish larger than 40 cm); body black above and below; black streaks on flanks inconspicuous and confined mostly to area above ventral fins.

References: Bigelow & Schroeder (1957); Garrick (1960b); Bass et al. (1976); K. J. Graham pers. comm. (1984).



K. J. Graham

Cigar shark

Isistius brasiliensis (Quoy & Gaimard, 1824)

Family: Squalidae - p 24

Other Common Names: Luminous shark, cookie-cutter shark.

Description: Dorsal fins without spines, close together, and set far back on body, axil of first over or behind ventral fin origin; caudal fin with distinct subterminal notch; teeth with 1 cusp, thorn-like and set apart in upper jaw, smooth-edged and triangular with overlapping bases in lower.

Body dark brown above, paler below; ventral surface of head, body, pectoral, ventral and caudal fins luminescent; *dark collar-like band encircling throat*; hind margins of fins pale, caudal lobes dark tipped.

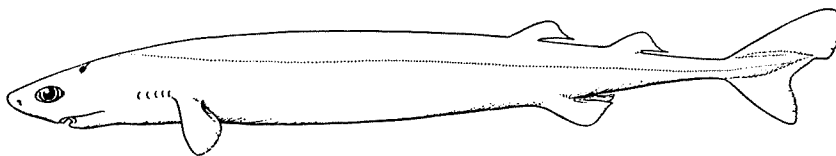
Size: To 50 cm.

Distribution: N.S.W. and Tas.

Habitat and Depth: Occurs in oceanic waters beyond the continental shelf, from midwater to the surface; probably makes diurnal vertical migrations.

Note: *Squaliolus laticaudus* has also been recorded off N.S.W. and may be distinguished as follows: first dorsal fin preceded by 1 small spine (sometimes hidden beneath skin), its origin above pectoral fins; second dorsal fin without spine and long-based (base about twice length of first dorsal fin base); upper and lower lobes of caudal fin nearly equal and without subterminal notch.

References: Bigelow & Schroeder (1957); Bass et al. (1976); D. F. Hoese pers. comm. (1983).



Bigelow & Schroeder (1957)

White-spotted dogfish

Squalus acanthias Linnaeus, 1758.

Family: Squalidae p 24

Other Common Names: Spiny dogfish, spurdog.

Description: Each dorsal fin preceded by prominent spine, spines without lateral grooves; caudal fin without subterminal notch, peduncle with low lateral keel; teeth with 1 cusp and overlapping bases, similar in upper and lower jaws; first dorsal fin spine over (juveniles) or behind (adults) inner pectoral corner; nasal flap simple without definite lobe; denticles arrow-shaped with 1 cusp (broad with 3 cusps in large adults).

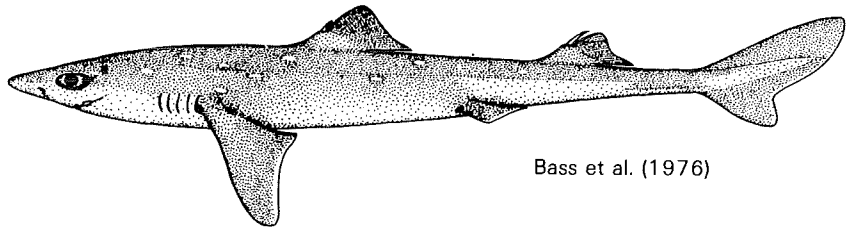
Body grey or brownish grey above, paler below; dorsal surface with scattered, *white spots* which may be faint or absent in large adults.

Size: To 120 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, in estuaries, bays and on the continental shelf to a depth of 180 m.

References: Munro (1956b) as *S. kirki*; Garrick (1960c); Bass et al. (1976).



Bass et al. (1976)

Green-eyed dogfish

Squalus blainvillei (Risso, 1826)

Family: Squalidae p 24

Other Common Names: Spiny dogfish.

Description: Each dorsal fin preceded by prominent spine, spines without lateral grooves; caudal fin without subterminal notch, peduncle with lateral keel; teeth with 1 cusp and overlapping bases, similar in upper and lower jaws; first dorsal fin spine ahead (juveniles and adults) or sometimes over (adults) inner pectoral corner; nasal flap with definite lobe; distance from snout tip to inner end of nostril *greater than* that from inner end of nostril to front end of pre-oral cleft; denticles broad with 3 cusps; pectoral fin inner corner rounded.

Body grey or greyish brown above, paler below; middle of hind margin of caudal fin usually dark.

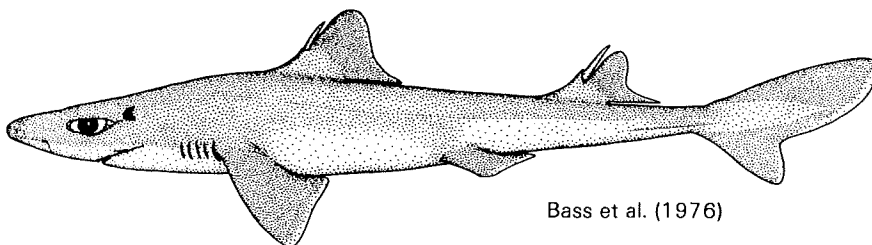
Size: To 95 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 150 to 700 m.

Note: A related species *Cirrhigaleus barbifer* has also been recorded off southern N.S.W. It resembles *S. blainvillei* but is unique among squaloid sharks in having the nasal flap, forming a long barbel, reaching beyond the corner of the mouth.

References: Merrett (1973); Bass et al. (1976); D F. Hoese pers. comm. (1983).



Bass et al. (1976)

Piked dogfish

Squalus megalops (Macleay, 1882)

Family: Squalidae p 24

Other Common Names: Spiked dogfish, spiny dogfish, skittle dogfish.

Description: Each dorsal fin preceded by prominent spine, spines without lateral grooves; caudal fin without subterminal notch, peduncle with lateral keel; teeth with 1 cusp and overlapping bases, similar in upper and lower jaw; first dorsal fin spine ahead (juveniles and adults) or sometimes over (adults) inner pectoral corner; nasal flap with definite lobe; distance from snout tip to inner end of nostril *shorter than or equal* to that from inner end of nostril to front end of pre-oral cleft; denticles dagger-shaped with 1 cusp to arrow-shaped in large adults; pectoral fin inner corner pointed.

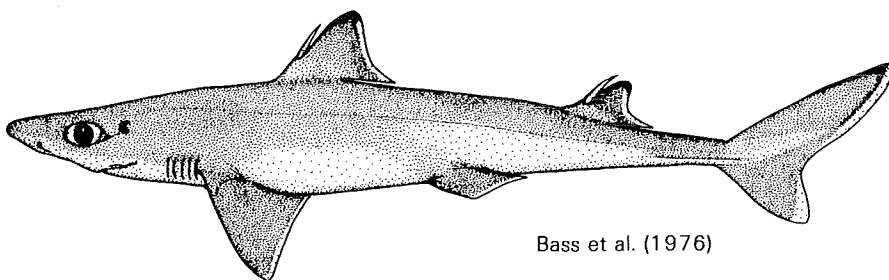
Body brown to grey above, pale below; juveniles may have white-edged fins.

Size: To 70 cm.

Distribution: N.S.W. Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf and upper slope in depths from 50 to 450 m.

References: Bass et al. (1976).



Bass et al. (1976)

Prickly dogfish

Oxynotus bruniensis (Ogilby, 1893)

Family: Oxynotidae p 24

Description: Second dorsal fin smaller than first, its origin about 1 eye length ahead of ventral fin origin; first dorsal fin spine sloping forward, second spine backwards; interspace between dorsal fins about equal to length of second dorsal fin base; body covered with large, erect denticles, prickly to touch.

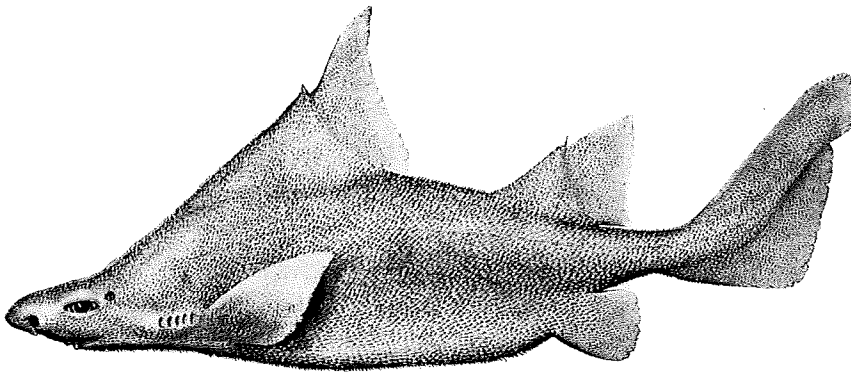
Body uniform greyish brown; tips of dorsal fins and outer margins of pectoral and ventral fins white or translucent.

Size: To about 60 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 45 to 650 m; commonly trawled in 350 to 650 m.

References: Garrick (1960b).



McCulloch (1914b)

Bramble shark

Echinorhinus brucus (Bonnaterre, 1788)

Family: Echinorhinidae p 24

Other Common Names: Spinous shark.

Description: Large, prominent, shield-like denticles (diameter of base at least 15 mm) scattered irregularly on body; adults with noticeable denticles under snout and around mouth.
Body dark purplish grey above, slightly paler below.

Size: To about 260 cm.

Distribution: Vic. and Great Australian Bight.

Habitat and Depth: Demersal, on the continental slope in depths from 400 to 900 m; sometimes occurs in relatively shallow water.

References: Munro (1956c) as *E. mccoyi*; Bigelow & Schroeder (1957); Garrick (1960a); Bass et al. (1976).



Bass et al. (1976)

Common saw shark

Pristiophorus cirratus (Latham, 1794)

Family: Pristiophoridae p 26

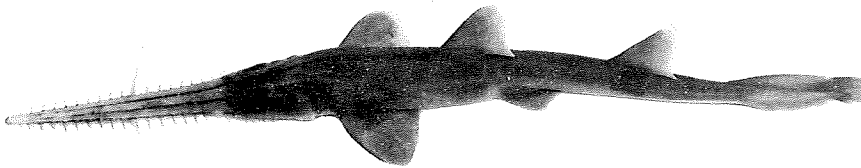
Description: 5 gill slits; distance from snout tip to barbels about equal to distance from barbels to eye; 35 to 52 (usually more than 36) barbs on each side of saw; large specimens with denticles on hind portion of dorsal and pectoral fins.
Body light tan with cream saddle blotches and grey-brown spots.

Size: To 130 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, usually occurring on the continental shelf in depths from 40 to 240 m.

References: Whitley (1940a).



K. J. Graham

Southern saw shark

Pristiophorus nudipinnis Günther, 1870

Family: Pristiophoridae p 26

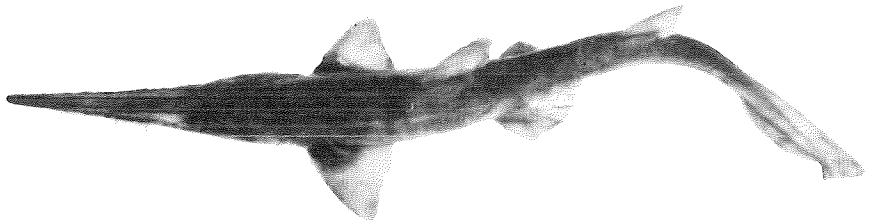
Description: 5 gill slits; distance from snout tip to barbels much greater than distance from barbels to eye; 30 to 37 (usually less than 36) barbs on each side of saw; large specimens lacking denticles on hind portion of dorsal and pectoral fins.
Body uniform brownish grey above, paler below.

Size: To 120 cm.

Distribution: Southern N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, usually occurring on the continental shelf in depths from 40 to 140 m.

References: Whitley (1940a).



K. J. Graham

Ornate angel shark

Squatina tergocellata McCulloch, 1914

Family: Squatinidae p 26

Description: Two dorsal fins, without spines, situated well back on body; denticles on dorsal surface with 3 keels; pectoral and ventral fins without denticles on hind margins.

Dorsal surface of body light yellowish brown with numerous small, blue spots; about 8 prominent, brown-edged and spotted *ocelli* in 2 rows across back; several faint, brown rings along back.

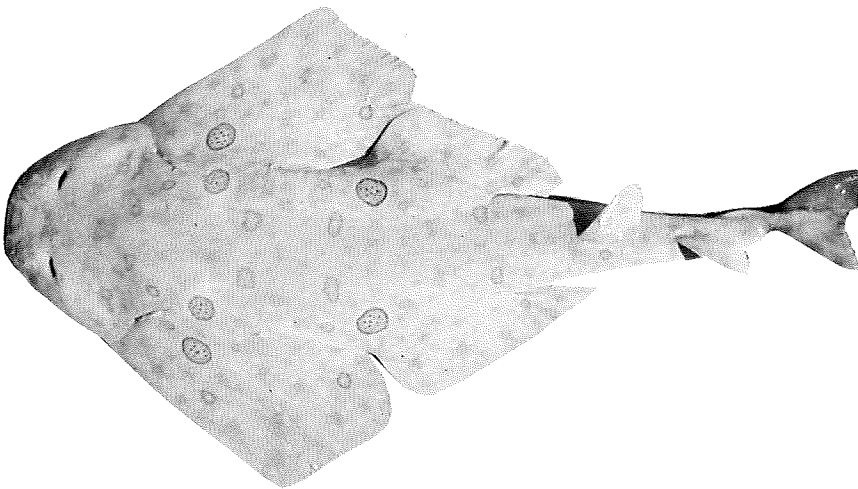
Size: To about 50 cm.

Distribution: N.S.W., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 130 to 400 m.

Note: The angel shark (*S. australis*) also occurs off N.S.W., Vic., Tas., S.A. and southern W.A. usually in shallower water (20 to 50 m). It lacks the ocelli and brown rings of *S. tergocellata* and the denticles are without keels.

References: McCulloch (1914b); Whitley (1940a).



J. G. H. Maxwell

Southern shovel-nose ray

Aptychotrema vincentiana (Haacke, 1885)

Family: Rhinobatidae p 26

Other Common Names: Guitar fish.

Description: Snout wedge-shaped and moderately produced (distance from snout tip to mouth about 3 times mouth width); *no* rectangular skin flap between nostrils; nostrils transverse; jaws almost straight; hind edges of spiracles without folds; distance from snout tip to eyes 3 to 4 times width between spiracles; 1 row of compressed spines along midline of back.

Upper surface sandy, ventral surface paler; large brown patch between snout tip and eye and light brown blotches scattered over disc and tail.

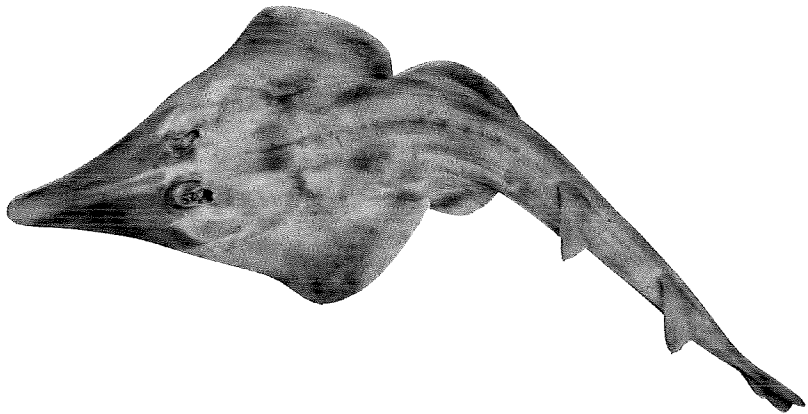
Size: To 120 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal, in shallow water and on the continental shelf to a depth of 130 m.

Note: Two related species occur off eastern Australia. *A. rostrata* recorded from southern Qld, N.S.W. and Vic. to a depth of 60 m has a longer snout than *A. vincentiana* (distance from snout tip to mouth about 3.5 times mouth width). *A. bouganvillii* recorded from N.S.W. has strongly curved jaws and like *A. rostrata* lacks the brown patch on the upper surface of the snout.

References: Bigelow & Schroeder (1953) (genus); Whitley (1940a); Munro (1956c).



J. G. H. Maxwell

Fiddler ray

Trygonorrhina fasciata Müller & Henle, 1838.

Family: Rhinobatidae p 26

Description: Snout obtusely pointed and short (distance from snout tip to mouth 1.5 mouth width); valves of nostrils expanded and united, forming rectangular skin flap; hind edge of spiracle with 1 skin fold; about 18 tubercles along midline of back between eyes and first dorsal fin; 1 tubercle before and 1 behind each eye.

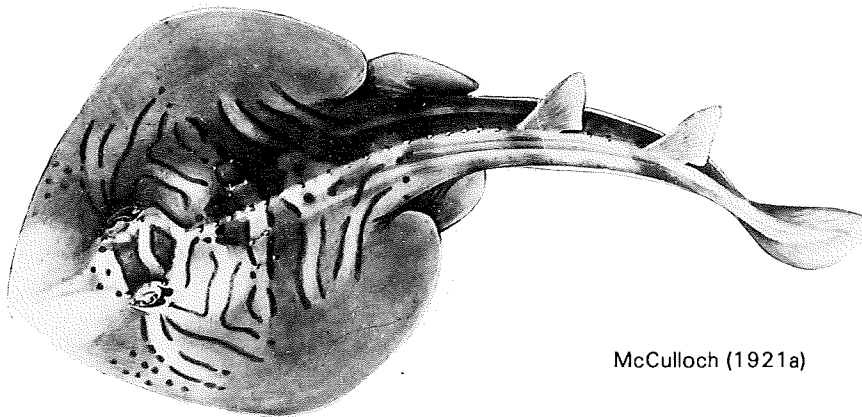
Upper surface light brown, ventral surface white; elaborate pattern of lilac bands with dark brown margins on upper surface of disc; dark, white-edged *triangle* behind eyes.

Size: To 120 cm.

Distribution: (Southern Qld) and N.S.W.

Habitat and Depth: Demersal, on the continental shelf from shallow water to a depth of 120 m.

References: McCulloch (1921a); Bigelow and Schroeder (1953) genus only.



Southern fiddler ray

Trygonorrhina guanerius Whitley, 1932

Family: Rhinobatidae p 26

Other Common Names: Fiddler, fiddler ray, banjo shark, green skate, parrit.

Description: Similar to *T. fasciata* differing only in colour.

Upper surface dark brown, ventral surface white; elaborate pattern of pale wavy lines with dark brown margins on upper surface of disc; *no* dark triangular patch behind eyes:

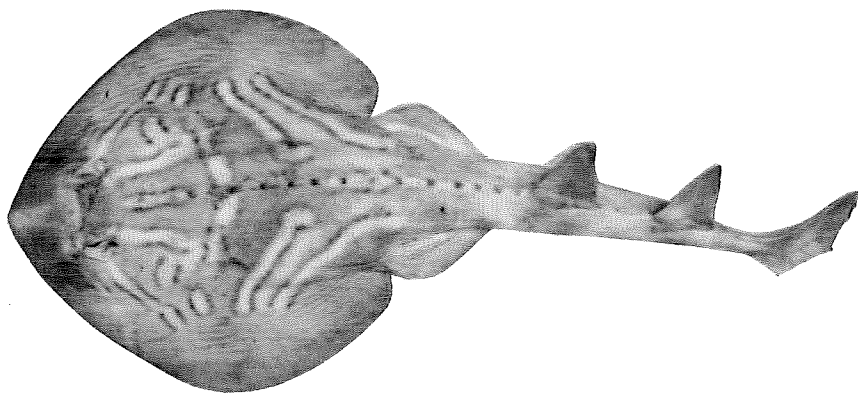
Size: To 120 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf from shallow water to a depth of 50 m.

Note: A related species, the magpie fiddler (*T. melaleuca*) also occurs off S.A. It differs from the southern fiddler ray in having: no tubercles before or behind each eye; upper surface of disc bluish black with yellow to white margins.

References: Whitley (1932); Bigelow & Schroeder (1953) genus only; Last et al. (1983).



J. G. H. Maxwell

Numbfish

Hypnos monopterygium (Shaw & Nodder, 1795)

Family: Torpedinidae p 26

Other Common Names: Crampfish.

Description: Mouth curved and not entirely surrounded by deep groove; disc pear-shaped, anterior margin truncate to slightly concave; tail short, less than half length of disc; 2 dorsal fins and small caudal fin, bases of all 3 fins adjacent; rear margins of ventral fins united across base of tail.

Body yellowish brown to blackish brown above, yellowish below; spiracle folds white.

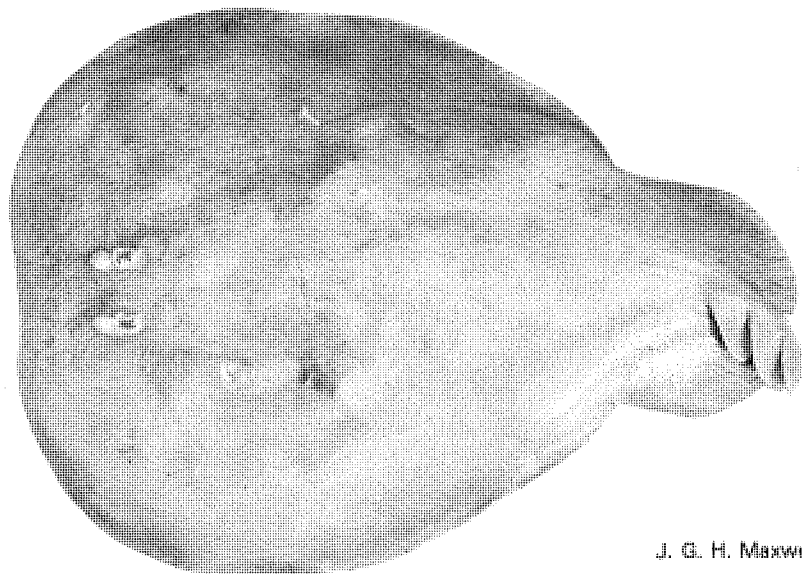
Size: To at least 69 cm.

Distribution: (Southern Qld), N.S.W., Vic., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf to a depth of 265 m; occasionally enters estuaries.

Note: Produces powerful electric shocks from 2 electric organs situated on each side of the skull. The outlines of these organs, composed of columns of hexagonal-shaped "cells", may be visible on the ventral surface of the disc.

References: McCulloch (1921a) as *Hypnarce subnigrum*; Whitley (1940a); McKay (1966); Compagno (1973b).



J. G. H. Maxwell

Little numbfish

Narcine tasmaniensis Richardson, 1840

Family: Torpedinidae p 26

Other Common Names: Tasmanian numbfish.

Description: Mouth transverse and entirely surrounded by deep groove; disc ovate, anterior margin concave; tail long, greater than length of disc; caudal fin small, elongate, hind margin rounded; rear margins of ventral fins not united.

Body *uniform* chocolate-brown above, white below.

Size: To 46 cm.

Distribution: Southern N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 20 to 300 m.

Note: Produces electric shocks. A similar species the ornate numbfish (*N. westraliensis*) occurs in W.A. waters. It is sandy with variable brown markings on the upper surface of the disc and transverse bars on the tail.

References: Waite (1899); McKay (1966); Compagno (1973b); Last et al. (1983).



Richardson (1849)

Electric ray

Torpedo macneilli (Whitley, 1932)

Family: Torpedinidae p 26

Other Common Names: Torpedo ray.

Description: Mouth curved and not entirely surrounded by deep groove; disc almost circular, anterior margin truncate; tail short, less than length of disc; caudal fin large, subtriangular, hind margin truncate; rear margins of ventral fins not united; rear end of first dorsal fin base behind rear ends of ventral fin bases; margins of spiracles smooth. Body uniform chocolate-brown to yellowish brown above, white below.

Size: To 100 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 90 to 600 m.

Note: Produces powerful electric shocks.

References: McCulloch (1919) as *T. fairchildi*; Bigelow and Schroeder (1953); Compagno (1973b); Last et al. (1983).



J. G. H. Maxwell

Round skate

Irolita waitii (McCulloch, 1911)

Family: Rajidae p 26

Description: Anterior pectoral fin rays extending forward to snout tip; snout flexible, rostral cartilage soft and not extending from cranium to snout tip; snout very short, length much less than 4 times interorbital width; *dorsal and ventral surfaces of disc smooth*, without granulations; *thorns absent* from dorsal midline of disc behind eye; 3 to 7 irregular rows of thorns on dorsal surface of tail. Dorsal surface of body brownish with pale blotches and small, blue spots; ventral surface greyish to dark brown.

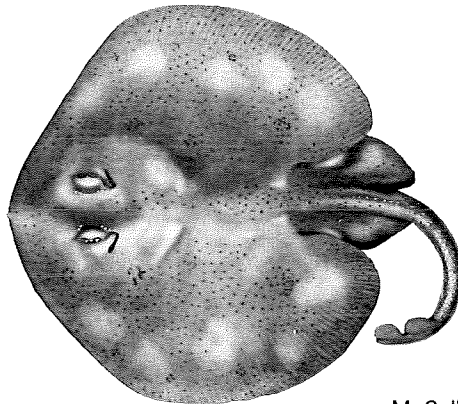
Size: To 50 cm.

Distribution: Vic. S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 35 to 200 m.

Note: In many cases it is impossible to distinguish between species of Rajidae using only external characters as they are classified on the basis of their cartilage structures. In the species descriptions the first 2 characters may be determined by holding the skate in front of a light to see the pectoral fin rays and by feeling the edge of the disc and snout. Identification of *Raja* species is particularly difficult because external characters are highly variable and overlap between species. As a result the skate fauna of temperate Australia, especially the east coast, is poorly known and only the "most common" species have been included here.

References: McCulloch (1911) as *Raja waitii*; Whitley (1940a); Scott et al. (1974) as *Psammobatis waitii*; P. R. Last pers. comm. (1984).



McCulloch (1911)

Peacock skate

Pavoraja nitida (Günther, 1880)

Family: Rajidae p 26

Other Common Names: Graceful skate, roughed-backed skate.

Description: Anterior pectoral fin rays extending forward to snout tip; snout flexible, rostral cartilage soft and not joined between cranium and snout tip; snout very short, length much less than 4 times interorbital width; *dorsal surface of disc uniformly granular*; ventral surface of disc smooth; 1 to 5 *thorns* (confined to nuchal area) on *dorsal midline of disc* behind eye; 3 to 5 irregular rows of thorns on dorsal surface of tail.

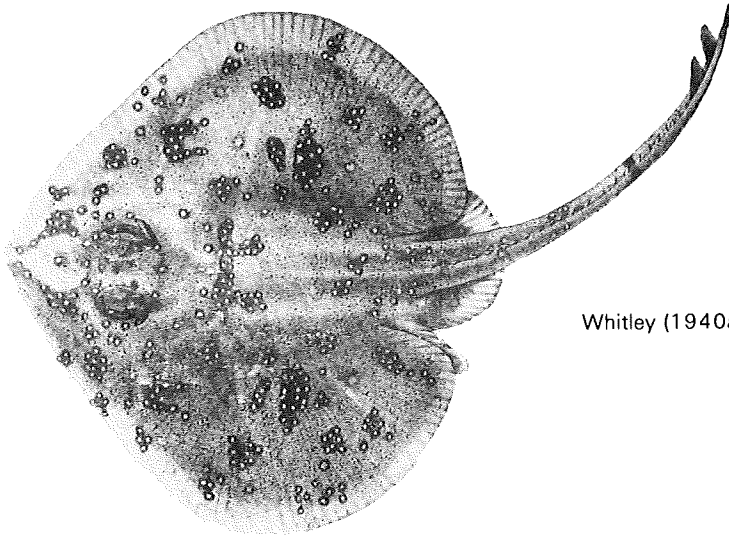
Dorsal surface of body brown with darker blotches and small, yellowish to white spots; ventral surface cream to white.

Size: To at least 40 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf and upper slope in depths from 70 to 350 m.

References: Whitley (1940a); McEachran & Fechhelm (1982); Last et al. (1983); P. R. Last pers. comm. (1984).



Whitley (1940a)

Common skate

Raja australis Macleay, 1884

Family: Rajidae p 26

Other Common Names: Pommy skate.

Description: Anterior pectoral fin rays falling well short of snout tip; snout firm, rostral cartilage robust and extending from cranium to snout tip; snout relatively short, length less than 4 times interorbital width; both dorsal and ventral surfaces of disc without granulations except on anterior third of snout; usually 1 thorn (confined to nuchal area) on dorsal midline of disc behind eyes; usually 3 rows of thorns on dorsal surface of tail in male, usually 5 rows in female.

Dorsal surface of body olive-brown to light brown with long, irregular blotches, snout and margins of disc paler; ventral surface whitish with scattered brown spots and yellowish marks at bases of fins, pores black.

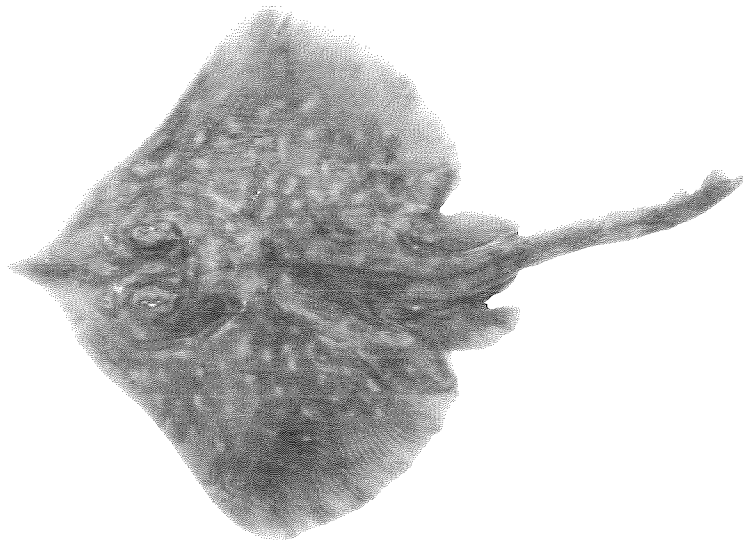
Size: To about 50 cm.

Distribution: (Southern Qld) and N.S.W.

Habitat and Depth: Demersal, common on the continental shelf in depths from 20 to 250 m.

Note: Several undescribed species of *Raja* have been discovered recently in southern waters. Features of these new skates are as yet unknown, however the first 2 characters in the above description are diagnostic for *Raja* species.

References: Macleay (1884); Waite (1899); Whitley (1940a).



White-spotted skate

Raja cerva Whitley, 1939

Family: Rajidae p 26

Other Common Names: Hind skate.

Description: Anterior pectoral fin rays falling well short of snout tip; snout firm, rostral cartilage robust and extending from cranium to snout tip; snout relatively short, length less than 4 times interorbital width; dorsal surface of disc with granulations on snout tip in females and also along antero-lateral margin in adult males, smooth in juveniles; ventral surface of disc smooth; 1 to 3 thorns (confined to nuchal area) on dorsal midline of disc behind eye; 2 rows of thorns on dorsal surface of tail in males, 4 rows in females.

Dorsal surface of disc greyish brown to sandy brown with many *small, pale spots*; ventral surface pale yellowish to white, pores black-edged.

Size: To at least 60 cm.

Distribution: Vic., Tas. and S.A.

Habitat and Depth: Demersal, on the continental shelf and upper slope in depths from 20 to 370 m.

References: Whitley (1940a) Stehmann & McEachran (1978) genus only; Last et al. (1983); P. R. Last pers. comm. (1984).



Whitley (1939)

Bight skate

Raja gudgeri (Whitley, 1940)

Family: Rajidae p 26

Other Common Names: Green-backed skate.

Description: Anterior pectoral fin rays falling well short of snout tip; snout firm, rostral cartilage robust and extending from cranium to snout tip; *snout very long and pointed*, length more than 4 times interorbital width; dorsal surface of disc with sparse granulations in females, restricted to anterior margin of pectoral fins, head and near base of tail in male, smooth in juveniles; ventral surface of disc granular; no thorns on dorsal midline of disc behind eyes; 1 to 3 rows of thorns on dorsal surface of tail.

Dorsal surface of body uniform grey to greyish green, juveniles with dusky blotches; ventral surface greyish brown.

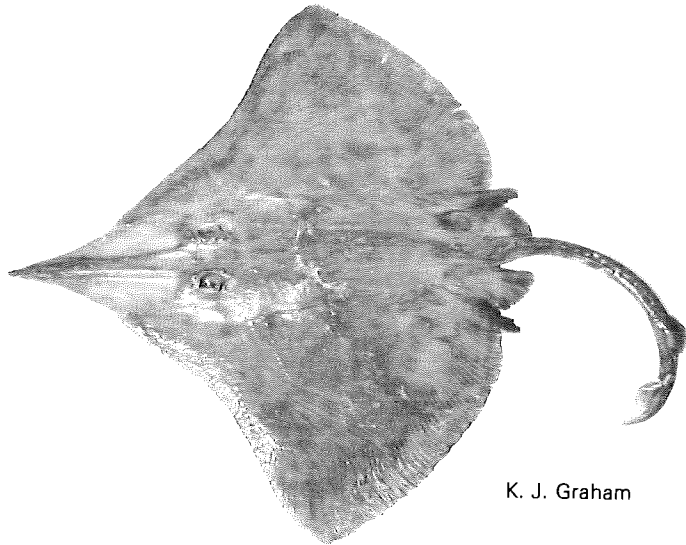
Size: To at least 140 cm.

Distribution: Southern N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 160 to 700 m.

Note: An undescribed species of *Raja* resembling *R. gudgeri* in the extremely long snout but having from 1 to 3 nuchal thorns has been recorded off Vic. and Tas. in depths from 600 to 1100 m.

References: Whitley (1940a); P. R. Last pers. comm. (1984).



K. J. Graham

Thornback skate

Raja lemprieri (Richardson, 1845)

Family: Rajidae p 26

Other Common Names: Lempriere's skate, denticulated skate.

Description: Anterior pectoral fin rays falling well short of snout tip; snout firm, rostral cartilage robust and extending from cranium to snout tip; snout relatively short, length less than 4 times interorbital width; dorsal surface of disc with weak granulations, most dense near midline; ventral surface of disc smooth; *5 to about 30 thorns behind eyes spaced along dorsal midline of disc*; 1 to 5 rows of thorns on dorsal surface of tail.

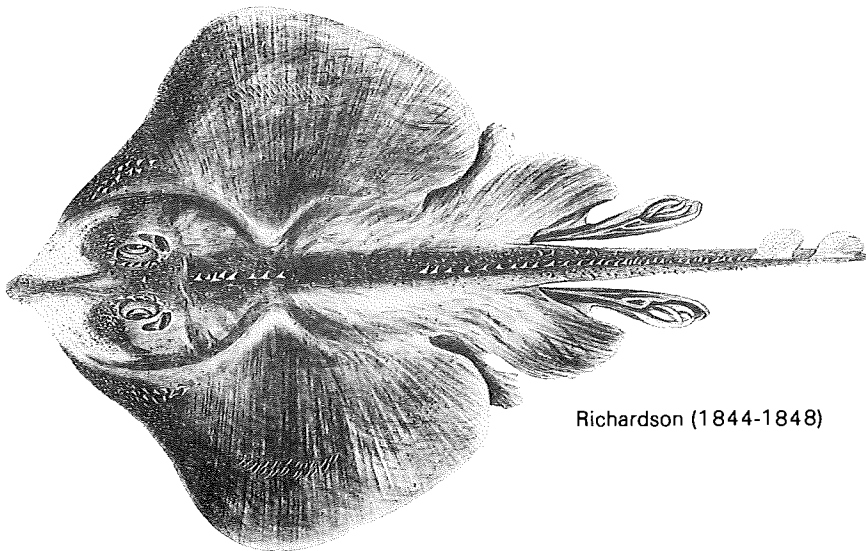
Dorsal surface of disc blackish grey to brownish with pale and dark blotches and reticulations; ventral surface cream or whitish with prominent, *blackish patch on snout tip* and sometimes greyish blotches near margins of disc and tail.

Size: To at least 50 cm.

Distribution: Vic., Tas. and S.A.

Habitat and Depth: Demersal, on the continental shelf in depths to 170 m.

References: Whitley (1940a); Munro (1956c) as *R. dentata*; Last et al. (1983); P. R. Last pers. comm. (1984).



Richardson (1844-1848)

Whitley's skate

Raja whitleyi Iredale, 1938

Family: Rajidae p 26

Other Common Names: Melbourne skate, great skate, rough skate, wedge-nosed ray.

Description: Anterior pectoral fin rays falling well short of snout tip; snout firm, rostral cartilage robust and extending from cranium to snout tip; snout relatively short, length less than 4 times interorbital width; *dorsal and ventral surfaces of disc of adults entirely covered with regularly spaced granulations*; 0 to 4 small thorns (confined to nuchal area) on dorsal midline of disc behind eye; 1 to 3 rows of thorns on dorsal surface of tail.

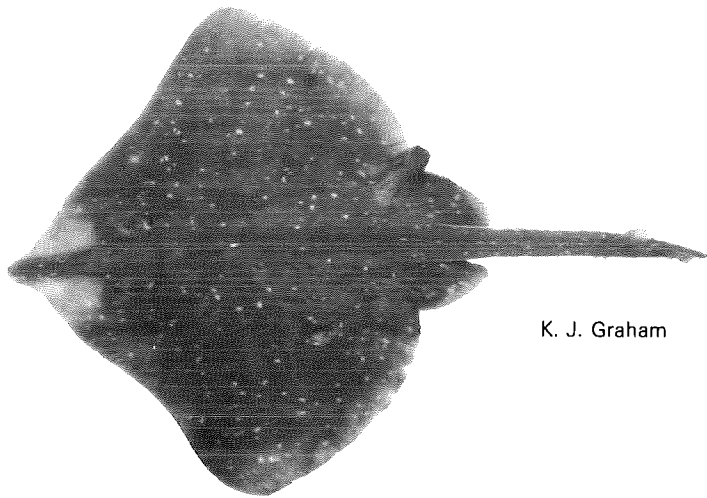
Dorsal surface of body greyish with scattered white flecks; juveniles with large dark blotch on each half of disc; ventral surface cream or whitish.

Size: To 170 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, on the continental shelf in depths to 170 m.

References: Whitley (1940a); Last et al. (1983); P. R. Last pers. comm. (1984).



K. J. Graham

Long-nosed skate

Raja sp. 1

Family: Rajidae p 26

Description: Anterior pectoral fin rays falling well short of snout tip; snout firm, rostral cartilage robust and extending from cranium to snout tip; snout relatively short, length less than 4 times interorbital width; dorsal surface of disc with granulations on midline and along anterior margins; ventral surface with granulations on snout and along anterior margins; 0 to 7 (rarely 0 or 1) thorns (confined to nuchal area) on dorsal midline of disc behind eye; 2 rows of thorns on dorsal surface of tail in males, 6 rows in female.

Dorsal surface of body greyish, brownish or yellowish with paler blotches, *spots and reticulations*; ventral surface whitish, pores black-edged.

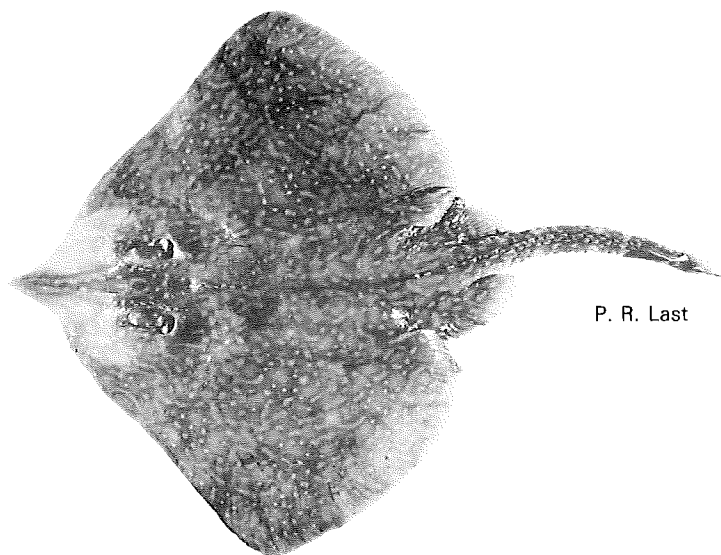
Size: To at least 80 cm.

Distribution: Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf in depths from 40 to 170 m.

Note: This species was previously thought to be *R. nasuta*, but the latter is confined to New Zealand.

References: Whitley (1940a) as *Zearaja nasuta*; Last et al. (1983); P. R. Last pers. comm. (1984).



P. R. Last

Smooth stingray

Dasyatis brevicaudatus (Hutton, 1875)

Family: Dasyatididae p 26

Other Common Names: New Zealand short-tail stingaree, short-tailed stingaree.

Description: Tail short, equal to or less than length of disc; dorsal surface of tail with short, low skinfold behind tip of barb, ventral surface with skinfold *not* extending to tip of tail; antero-lateral profile of disc angular, *not* distinctly convex; disc smooth except for 1 tubercle sometimes present on midline of back and on snout; tail with tubercles on all surfaces.

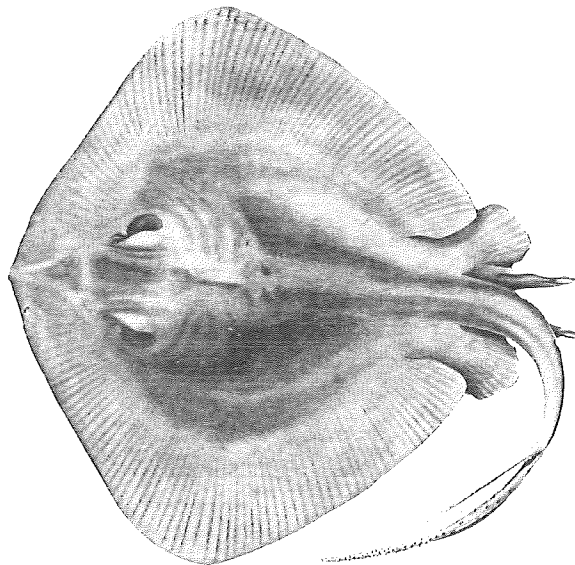
Dorsal surface light grey to brown, sometimes with small indistinct white spots; ventral surface white.

Size: To 430 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, occurring in estuaries, off beaches and on the continental shelf to a depth of 175 m.

References: McCulloch (1915, 1921); Scott et al. (1974); Last (1979); Last et al. (1983).



McCulloch (1915)

Guiler's stingray

Dasyatis guileri Last, 1979

Family: Dasyatidae p 26

Description: Tail whip-like, more than twice as long as disc; dorsal surface of disc without skinfold, ventral surface with skinfold not extending to tip of tail; antero-lateral profile of disc distinctly *convex*; disc with 1 row of sharp tubercles along midline of back; dorsal midline of tail before barb with 1 row of tubercles, tail posterior to barb smooth; tail barb long, greater than twice snout length.

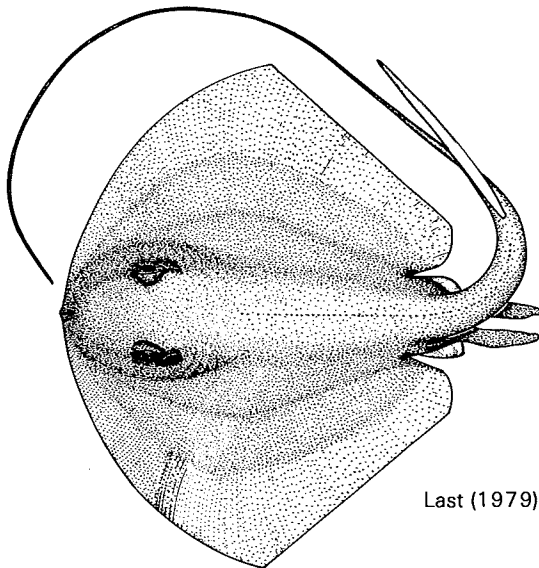
Dorsal surface uniform black; ventral surface brownish black with some lighter flecks; whip-like section of tail black.

Size: To 120 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Usually pelagic in midwater over the continental shelf and slope.

References: Last (1979); Last et al. (1983).



Last (1979)

Black stingray

Dasyatis thetidis (Waite, 1899)

Family: Dasyatididae p 26

Other Common Names: Black stingaree, long-tailed stingray.

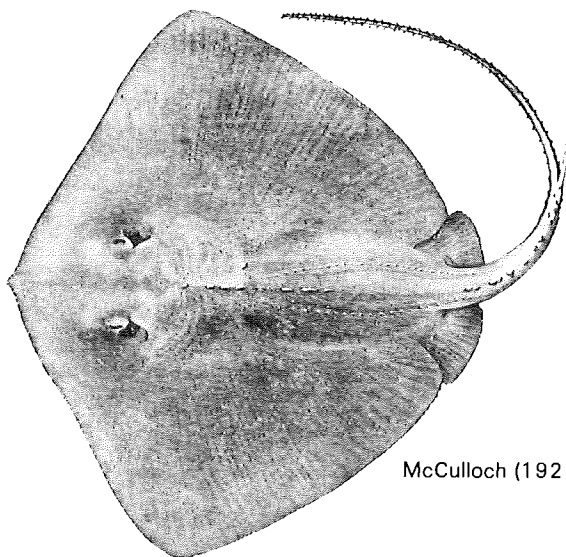
Description: Tail short, about 1.5 times length of disc; dorsal surface of tail without skinfold, ventral surface with skinfold extending to tip of tail; antero-lateral profile of disc angular, *not* distinctly convex; disc with 1 or more rows of spiny tubercles along midline of back; tail with large tubercles and prickles on all surfaces.
Dorsal surface dark grey to black; ventral surface white.

Size: To at least 330 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, occurring in estuaries, coastal waters and on the continental shelf to a depth of 175 m.

References: Waite (1899); McCulloch (1921); Last (1979); Last et al. (1983).



Sandy-backed stingaree

Urolophus bucculentus Macleay, 1884

Family: Urolophidae p 26

Other Common Names: Great stingaree.

Description: Disc wider than long, length (measured from snout tip to centre of cloaca) more than 1.35 in maximum width; tail longer than disc length (each measured from centre of cloaca); dorsal fin present; skinfold on lower lateral edge of tail.

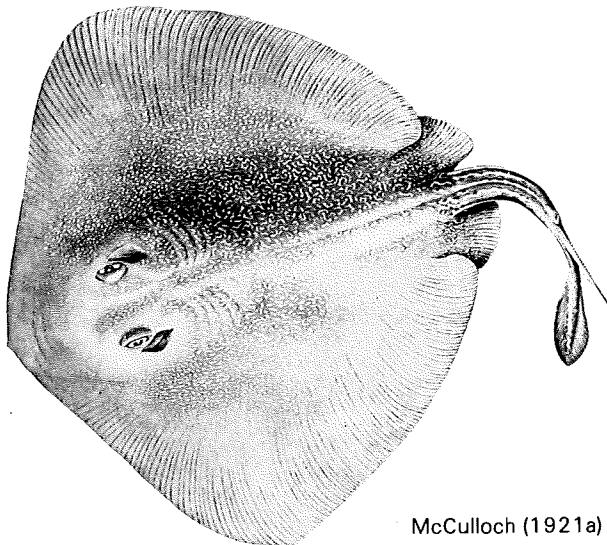
Dorsal surface pale yellowish or dark brown, often closely speckled with lighter dots and reticulations.

Size: To 80 cm.

Distribution: (Southern Qld), N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 50 to 300 m.

References: McCulloch (1916); Last et al. (1983).



Banded stingaree

Urolophus cruciatus (Lacépède, 1804)

Family: Urolophidae p 26

Other Common Names: Cross-backed stingaree.

Description: Disc slightly longer than wide, length (measured from snout tip to centre of cloaca) less than 1.35 in maximum width; tail shorter than disc length (each measured from centre of cloaca); dorsal fin absent in adults, sometimes present in juveniles; no skinfold on lower lateral edge of tail.

Dorsal surface greyish, pinkish or white with *dark stripe down midline of back and several crossbars and stripes.*

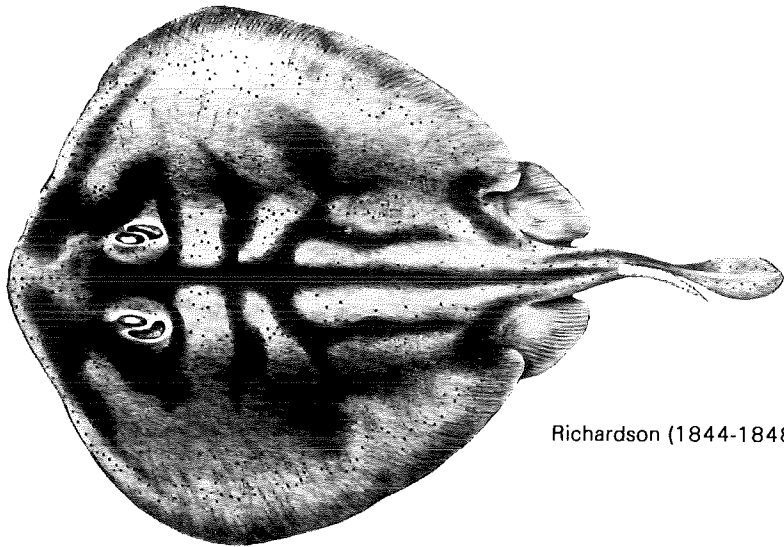
Size: To 50 cm.

Distribution: Southern N.S.W., Vic. and Tas.

Habitat and Depth: Occurs inshore in bays and estuaries and on the continental shelf to a depth of 160 m.

Note: Very common off southeastern Australia. Often confused with *U. sufflavus*. Also see *Note* under *U. paucimaculatus*.

References: McCulloch (1916); Whitley (1940a); Scott (1969); Last et al. (1983).



Richardson (1844-1848)

Wide stingaree

Urolophus expansus McCulloch, 1916

Family: Urolophidae p 26

Description: Disc wider than long, length (measured from snout tip to centre of cloaca) more than 1.35 in maximum width; tail shorter than disc length (each measured from centre of cloaca); dorsal fin absent; prominent keel on lower lateral edge of tail.

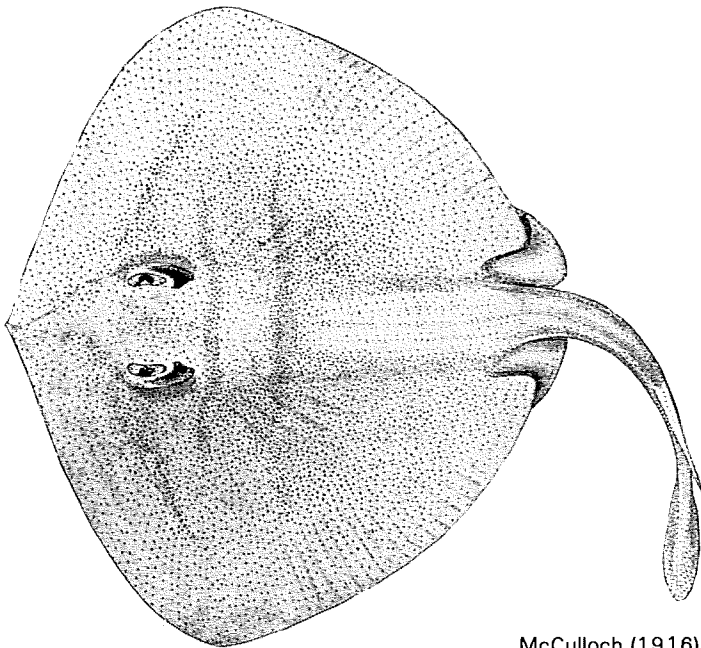
Dorsal surface greenish grey with 2 faint, greyish blue crossbars on disc behind eyes and 1 oblique bar on either side of disc before eyes.

Size: To 46 cm.

Distribution: Great Australian Bight, S.A.

Habitat and Depth: A deepwater species occurring on the continental shelf and upper slope in depths from 145 to 420 m.

References: McCulloch (1916); Whitley (1940); McKay (1966).



McCulloch (1916)

Spotted stingaree

Urolophus gigas Scott, 1954

Family: Urolophidae p 26

Description: Disc slightly longer than wide, length (measured from snout tip to centre of cloaca) less than 1.35 in maximum width; tail shorter than disc length (each measured from centre of cloaca); dorsal fin present; no skinfold along lower lateral edge of tail.

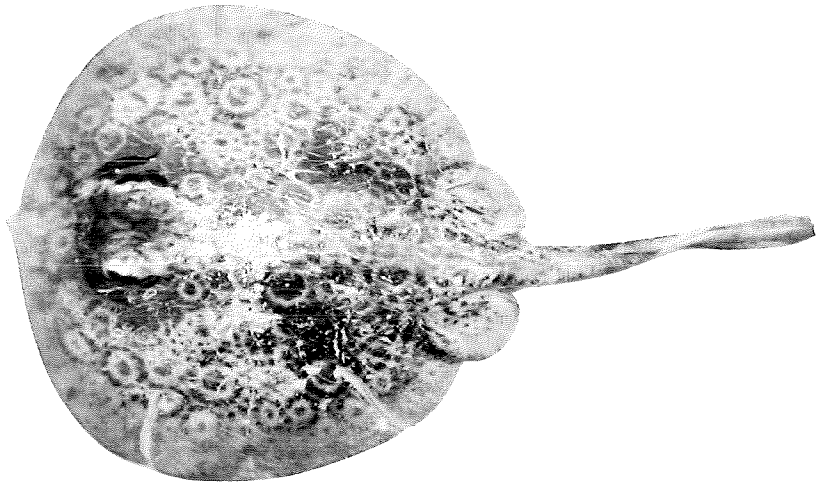
Dorsal surface of disc dark brown or black at centre fading to light brown or white at margin with *white rings and spots*; tail dark brown to bluish grey, sometimes with small cream spots; ventral fins bluish grey; ventral surface white with wide greyish margin.

Size: To 70 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, in shallow water to a depth of 50 m.

References: Scott (1954); Last et al. (1983).



J. G. H. Maxwell

Sparsely-spotted stingaree

Urolophus paucimaculatus Dixon, 1969

Family: Urolophidae p 26

Description: Disc slightly wider than long, length (measured from snout tip to centre of cloaca) less than 1.35 in maximum width; tail slightly shorter to longer than disc length (each measured from centre of cloaca); dorsal fin absent; prominent skinfold along lower lateral edge of tail.

Dorsal surface of disc light grey with several regularly arranged, small, *white spots* encircled by dark border; ventral surface whitish grey, edges darker.

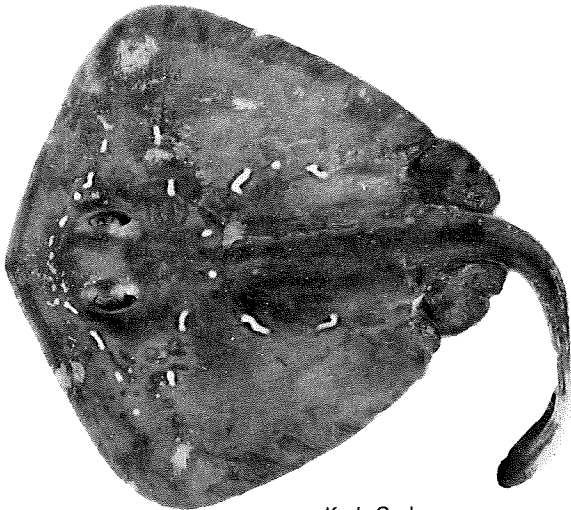
Size: To 38 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, in shallow water and on the continental shelf in depths from 10 to 140 m.

Note: The exact number of urolophid species occurring in southern waters is unknown because many are similar and somewhat variable in form and colour. Recent work suggests that there are several undescribed "species" that may be confused with *U. cruciatus*, *U. viridis* and *U. paucimaculatus*.

References: Dixon (1969); Scott (1969); Last et al. (1983); P. R. Last and M. F. Gomon pers. comm. (1984).



K. J. Graham

Yellow-backed stingaree

Urolophus sufflavus Whitley, 1929

Family: Urolophidae p 26

Description: Disc about as long as wide, length (measured from snout tip to centre of cloaca) less than 1.35 in maximum width; tail shorter than disc length (each measured from centre of cloaca); dorsal fin absent; no skinfold on lower edge of tail.

Dorsal surface uniform *ochre-yellow*, sometimes with pinkish margin; brown stripe down midline of back sometimes present; ventral surface white with purplish margin.

Size: To 40 cm.

Distribution: (Southern Qld) and N.S.W.

Habitat and Depth: Demersal, on the continental shelf in depths from 35 to 200 m.

Note: Often confused with *U. cruciatus*, because although a "typical" *U. sufflavus* lacks the crossbars and stripes of *U. cruciatus*, some specimens may have faint markings on either side of the dorsal midline.

References: McCulloch (1916) as *U. aurantiacus*; Whitley (1929); P. R. Last pers. comm. (1984).



J. G. H. Maxwell

Common stingaree

Urolophus testaceus (Müller & Henle, 1841)

Family: Urolophidae p 26

Description: Disc slightly wider than long, length (measured from snout tip to centre of cloaca) less than 1.35 in maximum width; tail slightly shorter or equal to disc length (each measured from centre of cloaca); dorsal fin present; no skinfold on lower lateral edge of tail.

Dorsal surface uniform cinnamon-brown or dark brown, edges of disc white; ventral surface white, margins of ventral and pectoral fins brown; caudal fin white or blackish.

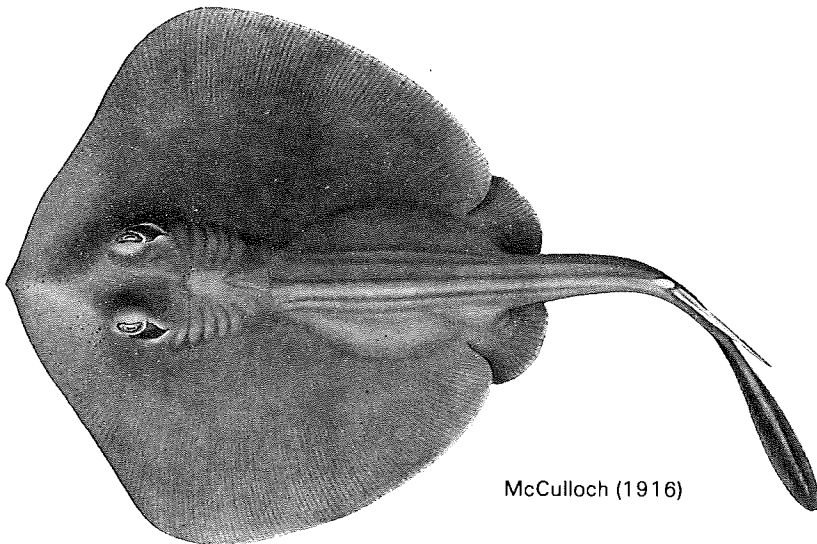
Size: To about 75 cm.

Distribution: (Southern Qld) and N.S.W.

Habitat and Depth: Occurs inshore in bays and estuaries and shallow coastal waters.

Note: A similar species, *U. mucosus*, recorded from eastern Vic. to southern W.A. to a depth of 40 m, lacks a dorsal fin.

References: McCulloch (1916); Whitley (1939a); McKay (1966); P. R. Last pers. comm. (1984).



Green-backed stingaree

Urolophus viridis McCulloch, 1916

Family: Urolophidae p 26

Description: Disc wider than long, length (measured from snout tip to centre of cloaca) less than 1.35 in maximum disc width; tail longer than disc length (each measured from centre of cloaca); dorsal fin absent; prominent skinfold on lower lateral edge of tail.

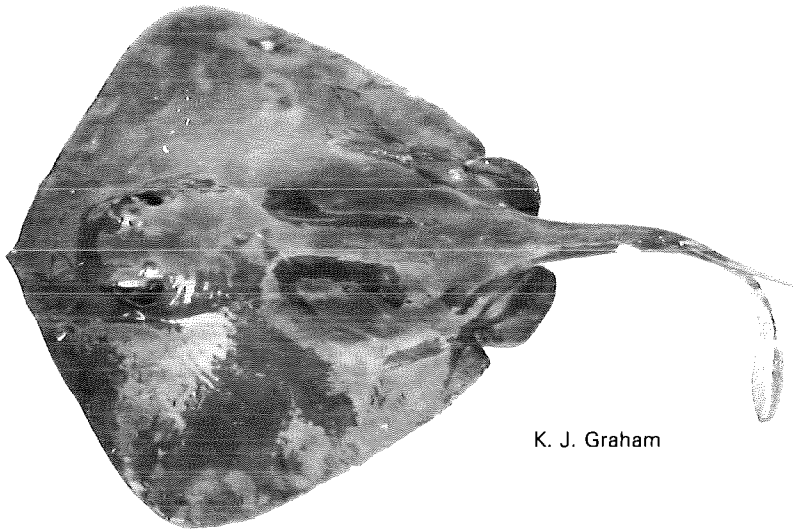
Dorsal surface *light green*, edges of disc white; ventral surface whitish, margin of disc often purplish.

Size: To 43 cm.

Distribution: (Southern Qld), N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, in deep water in bays but more common on the continental shelf and slope to a depth of 200 m.

References: McCulloch (1916); McKay (1966); Last et al. (1983).



K. J. Graham

Eagle ray

Myliobatis australis Macleay, 1881

Family: Myliobatidae p 26

Other Common Names: Bull ray, cowfish, mill ray, whip ray, whiptail ray.

Description: Teeth flat, in about 12 series in each jaw, arranged in 7 transverse rows, those of central row rectangular and much longer than those on sides; small dorsal fin close behind rear tips of ventral fins; 1 or 2 barbs on tail; hind margins of disc concave. Dorsal surface olive or green with or without blue spots and crossbars; ventral surface white to cream.

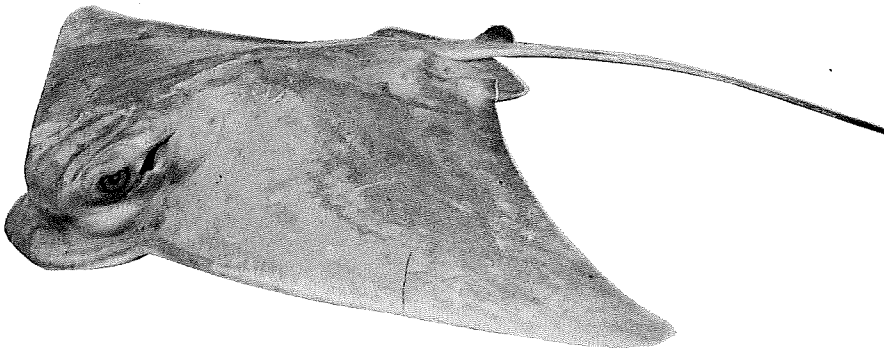
Size: Disc width 120 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, in shallow coastal waters and on the continental shelf to a depth of 240 m.

Note: Small schools are often trawled at depths from 30 to 70 m in the Great Australian Bight.

References: Whitley (1940a); Wallace (1967) and Stehmann & McEachran (1978) genus only.



J. G. H. Maxwell

Deepwater ghost shark

Chimaera sp. 1

Family: Chimaeridae p 30

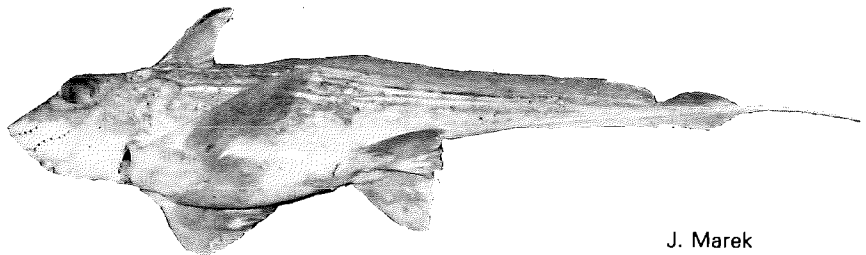
Description: Anal fin separated by deep notch from caudal fin; pectoral fins large, longer than head length; snout short (length more than 1.5 in length of dorsal spine); lateral line, on sides of body between dorsal fins, straight; claspers branched into 3 rod-like structures, length of each free rod less than half total length of clasper. Head and body silvery (fading to white after death); fins light brown to white.

Size: To 80 cm without filament.

Distribution: N.S.W., Vic., Tas. and southern W.A.

Habitat and Depth: Demersal, recorded from the continental slope in depths from 300 to 750 m.

References: Last et al. (1983) as *Hydrolagus* sp.



Ogilby's ghost shark

Hydrolagus ogilbyi (Waite, 1898)

Family: Chimaeridae p 30

Other Common Names: Ghost shark, spookfish.

Description: Anal fin continuous with caudal fin; pectoral fins large, longer than head; *snout relatively long* (length less than 1.5 in length of dorsal spine); lateral line, on sides of body between dorsal fins, wavy; claspers branched into 3 rod-like structures, length of each free rod more than half total length of clasper.

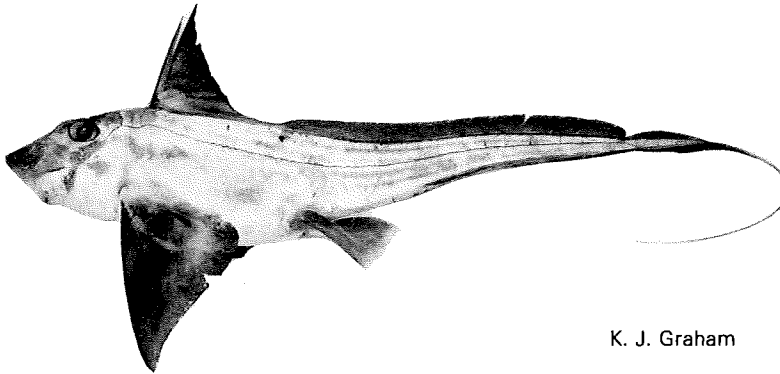
Head and body silvery (fading to brownish after death) above and on sides, yellowish below; fins bluish black to brown.

Size: To 85 cm without filament.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, recorded from the continental shelf and upper slope in depths from 45 to 500 m.

References: Waite (1899) as *Chimaera ogilbyi*; Whitley (1940) as *Psychichthys ogilbyi*; Bigelow & Schroeder (1953); Last et al (1983).



K. J. Graham

Elephant fish

Callorhynchus milii Bory de St. Vincent, 1823

Family: Callorhynchidae p 30

Other Common Names: Silver fish, whitefish.

Description: Origin of second dorsal fin beyond hind tips of pectoral fins; pectoral fins reaching to or slightly beyond ventral fin bases.

Body silvery above, whitish below; blackish band along back; fins brownish with blackish margins; iris green.

Size: To 110 cm.

Distribution: Southern N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, in bays and estuaries and on the continental shelf to a depth of at least 120 m.

References: McCoy (1886a) as *C. antarcticus*; Fowler (1941); Last et al (1983).



K. J. Graham

Spookfish

Harriotta raleighana Goode & Bean, 1895

Family: Rhinochimaeridae p 30

Other Common Names: Ratfish, long-nosed chimaera.

Description: Anal fin absent; dental plates with knobs and ridges on cutting edges; upper margin of caudal fin without denticles; snout depressed, maximum depth more than twice in maximum width. Head and body brownish with irregular, darker markings.

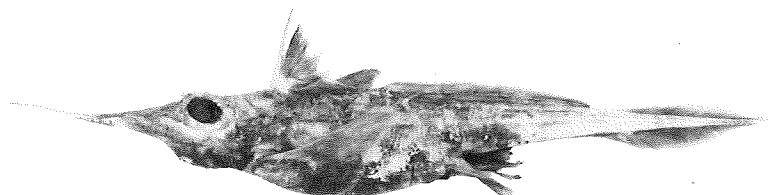
Size: To 120 cm without caudal filament.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal on the continental slope in depths from 550 to 800 m.

Note: Male spookfish have longer snouts than females and the snout as a proportion of body length decreases in larger fish. A related species, *Rhinochimaera pacifica*, has recently been trawled off N.S.W. and Tas. It has smooth dental plates, without knobs or ridges and in adult males and some females, denticles along the upper margin of the caudal fin.

References: Fowler (1941); Bigelow & Schroeder (1953); Garrick (1971); Garrick & Inada (1975); Inada & Garrick (1979); Last et al. (1983).



K. J. Graham

Swollen-headed conger eel

Bassanago bulbiceps Whitley, 1948

Family: Congridae p 30

Description: Anus situated well before midlength of body; several rows of minute teeth in jaws and on vomer, not forming single cutting edge; upper lip weak, supported by 3 prong-like bones; origin of dorsal fin above pectoral fin bases; mouth extending to below middle of eye; anterior lateral line pores in line, none obviously higher than remainder; large fish with minute hair-like papillae on sides of body above lateral line; lateral line pores carried on ends of short tubes; 43 to 48 lateral line pores before anus; body relatively slender (depth at anal fin origin 16 to 20 in TL); pectoral fins with 16 rays.

D 325-355; A 240-260; P 16.

Body greyish brown tinged with pink and speckled with brown above; iris almost colourless.

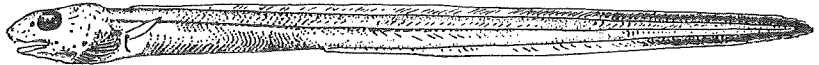
Size: To 50 cm.

Distribution: N.S.W. and Vic.

Habitat and Depth: Demersal, recorded from the continental shelf and slope in depths from 270 to 1100 m.

Note: A similar species, *B. hirsutus*, occurs off north-west Tas. *B. hirsutus* grows to a much larger size (100 cm), has 39 to 44 lateral line pores before the anus, a deeper body (depth at anal fin origin 10 to 16 in TL) and less rays in the pectoral (14-15), dorsal (305-315) and anal (205-225) fins.

References: Castle (1960, 1968) as *Pseudoxenomystax bulbiceps*.



Whitley (1948)

Wilson's conger eel

Conger wilsoni (Bloch & Schneider, 1801)

Family: Congridae p 30

Other Common Names: Common conger, moray (incorrectly).

Description: Anus situated well before midlength of body; outer row of teeth in each jaw forming single cutting edge; upper lip thick, without prong-like bones; origin of dorsal fin distinctly behind level of pectoral fin tips; mouth extending to below hind margin of eye; 36 to 41 lateral line pores before vent.

D 295-330; A 230-260; P 16-18.

Body olive blue-black above, creamy white below, sometimes tinged with yellow; head often with patch of silver behind eye; iris blue-purple; dorsal and anal fins white with narrow black margin.

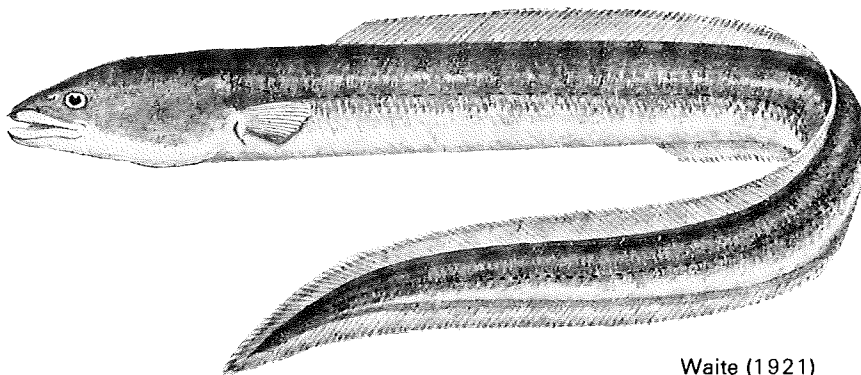
Size: To 140 cm.

Distribution: N.S.W.

Habitat and Depth: Demersal on rocky reefs.

Note: The southern conger, *C. verreauxi*, which grows to about 200 cm occurs off Vic. and Tas. It differs from *C. wilsoni* in having: origin of dorsal fin about level with pectoral fin tips; mouth not extending beyond middle of eye; 40 to 44 lateral line pores before vent.

References: Munro (1957a) as *Leptocephalus wilsoni*; Castle (1964, 1968).



Little conger eel

Gnathophis habenatus (Richardson, 1848)

Family: Congridae p 30

Other Common Names: Silver conger.

Description: Anus situated well before midlength of body; several rows of minute teeth in jaws, not forming single cutting edge; upper lip weak, supported by 3 prong-like bones; origin of dorsal fin over middle of pectoral fins; mouth extending to below front margin of eye; 2nd and 6th to 14th lateral line pores obviously higher than remainder; 28 to 35 lateral line pores before anus; origin of anal fin near midlength of body.

Body silver to olive-grey above, creamy white below, myomeres showing through skin; stomach black; iris silver with black patches at top and bottom; dorsal and anal fins pale with narrow, black margin.

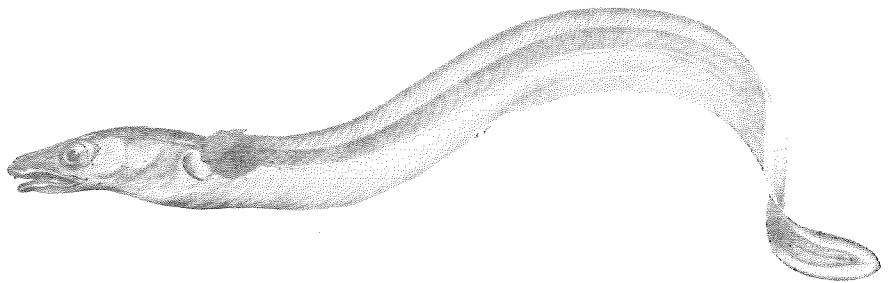
Size: To 43 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf to a depth of 130 m.

Note: *G. longicauda* and *G. umbrellabia* also occur in southern waters. *G. longicauda* closely resembles *G. habenatus* but has only the 2nd anterior lateral line pore higher than the remainder, 30 to 33 lateral line pores before the anus and a pale stomach. *G. umbrellabia* also only has the 2nd anterior lateral line pore higher than the remainder but has 32 to 37 lateral line pores before the anus and the origin of the anal fin well ahead of the midlength of the body.

References: Munro (1957a) as *Poutawa habenata*; Castle (1963, 1977); P. H. J. Castle pers. comm. (1983).



Richardson (1844-1848)

Short-headed worm eel

Muraenichthys breviceps Günther, 1876

Family: Ophichthidae p 30

Other Common Names: Long-finned worm eel.

Description: Pectoral fins absent; caudal fin rays conspicuous but short, confluent with dorsal and anal fins; gill openings short slits (about equal to eye length) on sides of head; origin of dorsal fin nearer gill openings than anus; snout rounded; teeth few, prominent and sharp in 2 to 3 rows in jaws and on vomer (posteriorly in 1 row in small fish). Body olive green above, yellowish below.

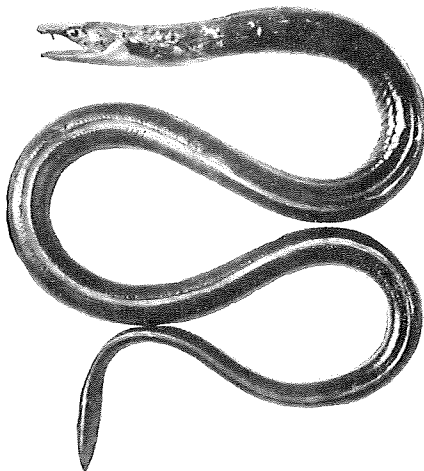
Size: To about 60 cm.

Distribution: Southern Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, in bays and on the continental shelf in depths to 70 m.

Note: A similar species the southern worm eel (*M. australis*) also occurs off N.S.W., Vic., Tas., S.A. and W.A. *M. australis* differs from other southern species of *Muraenichthys* in having the origin of the dorsal fin more or less above to slightly behind the anus. A third species, *M. lengomenah*, has been recorded from Tas. at a depth of 50 m. It differs from *M. breviceps* in having the teeth in the jaws and on the vomer in 1 row.

References: Munro (1957a); McCosker (1977); P. H. J. Castle pers. comm. (1983).



Scott et al. (1974)

Serpent eel

Ophisurus serpens (Linnaeus, 1758)

Family: Ophichthidae p 30

Other Common Names: Giant snake eel.

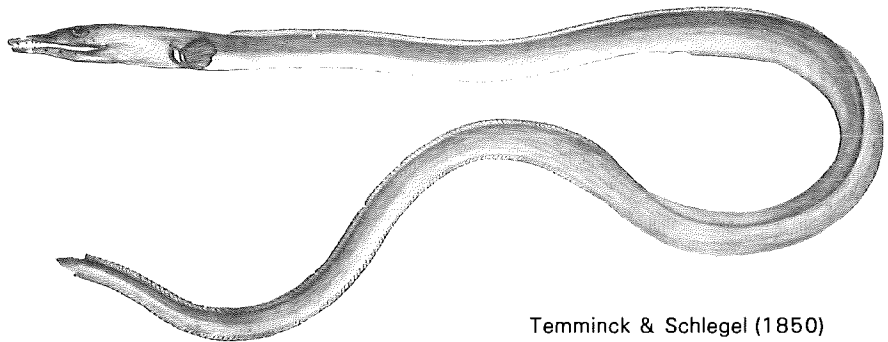
Description: Pectoral fins present, bases narrow and restricted to upper half of gill openings; caudal fin rays absent, tail tip forming hard rigid point; gill openings long slits (about twice eye length) on sides of head; origin of dorsal fin behind level of pectoral fin tips; snout long and pointed; jaws elongate, slender, incapable of closing completely in adults; teeth prominent, sharp, in single row in jaws and on vomer, group of fangs on premaxillae.
Olive-green to golden-brown above, silvery below; head pores black.

Size: To about 250 cm.

Distribution: N.S.W., Tas., S.A. and W.A.

Habitat and Depth: Demersal, in estuaries and on the continental shelf in depths to 300 m.

References: Munro (1957a); McCosker (1977).



Goanna fish

Halosaurus pectoralis McCulloch, 1926

Family: Halosauridae p 32

Other Common Names: Australian halosaur.

Description: Scales (or scale pockets) present on dorsal surface of head; branchiostegal rays 16 to 22.

D 11; A 196-292; P I,14-15; V I,8; GR 15-16.

Body yellowish, lower surface of head dark brown to black; mouth and gill cavities brown to black.

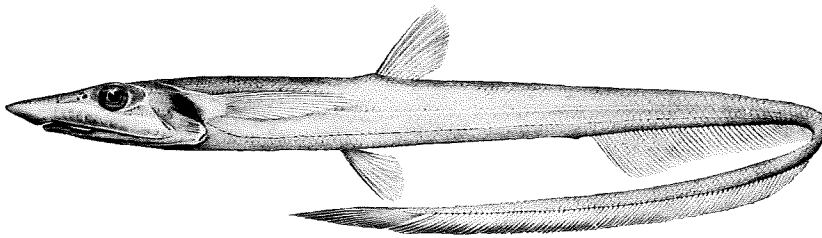
Size: To 68 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental slope in depths from 600 to 1000 m.

Note: A similar species, *Halosauropsis macrochir* recorded from the Great Australian Bight at a depth of 1100 m does not have scales on the dorsal surface of the head, has 11 to 12 branchiostegal rays, and a lateral line with a deeply pigmented sheath.

References: McCulloch (1926); McDowell (1973); Paulin & Moreland (1979).



McCulloch (1926)

Spineback

Notacanthus sexspinis Richardson, 1845

Family: Notacanthidae p 32

Other Common Names: Spiny eel.

Description: Dorsal fin with 6 to 8 short, well separated spines; tip of snout and entire branchiostegal membrane covered with scales; upper and lower jaws and palate each with 1 row of compressed teeth forming serrated cutting edge.

D VI-VIII,1(minute); A XIII-XV,150-160; P 12-14; V I-II,6-8.

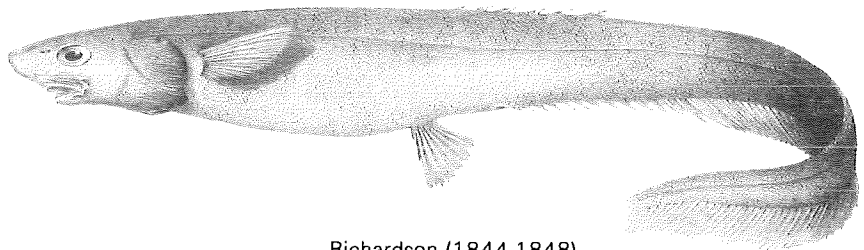
Body pale pinkish grey; mouth region and gill cavities black.

Size: To at least 60 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental slope in depths from 500 to 1100 m.

References: Günther (1887); McDowell (1973).



Maray

Etrumeus teres (De Kay, 1842)

Family: Clupeidae p 42

Other Common Names: Round herring.

Description: Body elongate, oval in cross-section and shallow (depth 5.0 to 6.3 in SL); origin of ventral fins behind dorsal fin base; belly rounded and without keel-like scutes; anal fin with 9 to 12 rays; dorsal fin with 18 to 21 rays.

D 18-21; A 9-12; P 15-16; V 10; scales in lateral series 50-56; GR 48; BR 15.

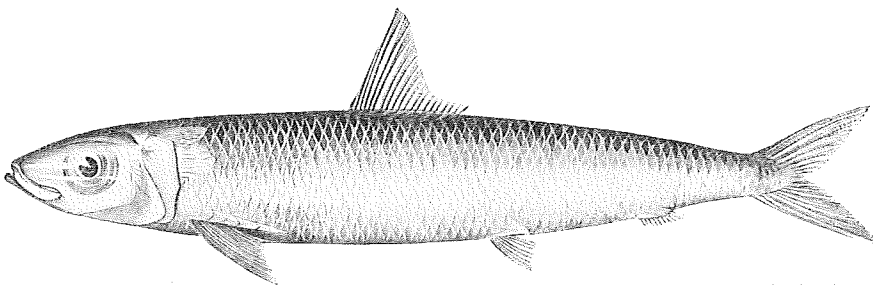
Body dark blue above, silvery below.

Size: To 23 cm.

Distribution: (Southern Qld), N.S.W., Vic., S.A. and southern W.A.

Habitat and Depth: Pelagic, in offshore waters to a depth of at least 75 m.

References: Scott et al. (1974) as *E. jacksoniensis*; Whitehead (1963, 1974).



McCulloch (1914a)

Pilchard

Sardinops neopilchardus (Steindachner, 1879)

Family: Clupeidae p 42

Other Common Names: Blue-bait, mulie, sardine, smig.

Description: Body elongate, oval in cross-section and shallow (depth 4.8 to 5.6 in SL); origin of ventral fins below middle of dorsal fin; belly compressed with weak keel-like scutes; anal fin with 16 to 20 rays; dorsal fin with 17 to 20 rays.

D 17-20; A 16-20; P 17-18; V 8; scales in lateral series 44-50; GR 115; BR 7.

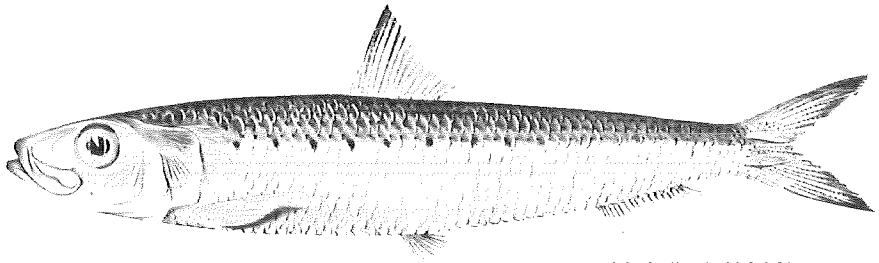
Body steel-blue above, silvery below; row of *dark spots* along upper sides.

Size: To 29 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depths: Occurs in midwater in bays and open coastal waters to a depth of 120 m.

References: Whitehead (1974); Last et al. (1983); M. F. Gomon pers. comm. (1983).



McCulloch (1919)

Blue sprat

Spratelloides robustus Ogilby, 1897

Family: Clupeidae p 42

Description: Body elongate, moderately compressed and shallow (depth 6.2 to 6.7 in SL); origin of ventral fins below posterior half of dorsal fin; belly rounded without keel-like scutes; anal fin with 9 to 12 rays; dorsal fin with 11 to 13 rays.

D 11-13; A 9-12; P 12-13; V 8; scales in lateral series 32-42; GR 35-44; BR 6-7.

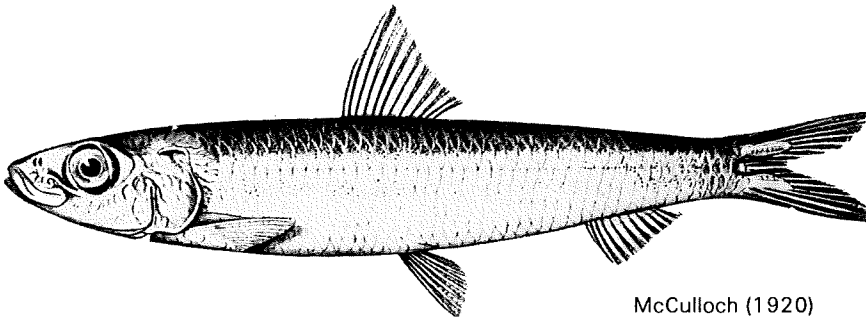
Body dark blue above, silvery below; dark horse-shoe mark on base of caudal fin.

Size: To 10 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Occurs in midwater in bays, inlets and coastal waters.

References: Whitehead (1963); Wongratana (1983); Last et al. (1983).



Australian sprat

Sprattus bassensis McCulloch, 1911

Family: Clupeidae p 42

Description: Body elongate, compressed and shallow (depth 4.3 to 5.0 in SL); origin of ventral fins before or below anterior rays of dorsal fin; belly compressed with *keel-like scutes*; anal fin with 18 to 21 rays; dorsal fin with 15 to 18 rays.

D 15-18; A 18-21; P 18; V 8; scales in lateral series 44-48; GR 92.

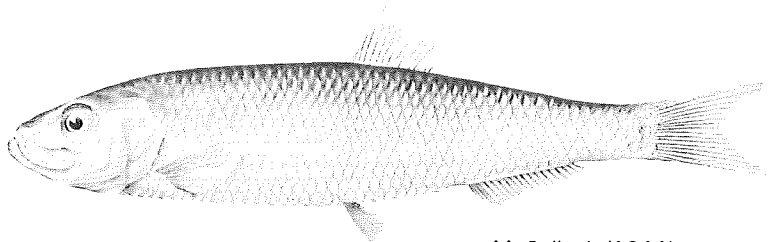
Body dark blue above, silvery below; dark flecks on jaws and base of caudal fin.

Size: To 15 cm.

Distribution: Tas. and S.A.

Habitat and Depth: Occurs in midwater in deep bays and coastal waters.

References: McCulloch (1911), Munro (1956d) and Last et al. (1983) as *Clupea bassensis*.



McCulloch (1911)

Australian anchovy

Engraulis australis (White, 1790)

Family: Engraulididae p 42

Other Common Names: Southern anchovy, whitebait.

Description: Body elongate and moderately compressed; belly rounded, without scutes (except plate-like scutè at base of ventral fins); anal fin origin behind dorsal fin base; maxilla extending almost to anterior border of preoperculum.

D 13-18; A 17-19; P 15-17; V 7; scales in lateral series 35-40; GR 57-70.

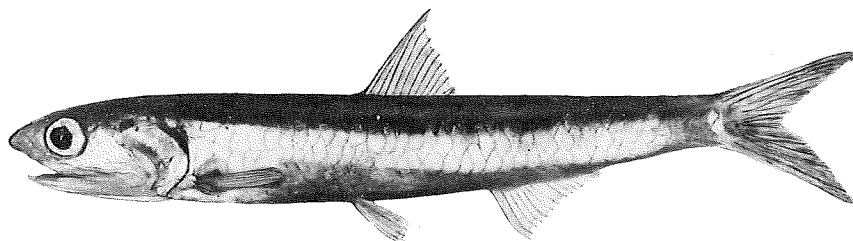
Body blue-green above, silvery below; broad, silver band along side.

Size: To 15 cm.

Distribution: (Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs in midwater in bays, inlets and offshore waters to a depth of about 65 m.

References: Whitehead (1974); Last et al. (1983).



CSIRO

Silverside

Argentina australiae Cohen, 1958

Family: Argentinidae p 40

Description: Head broader than deep, sides sloping inwards; adipose dorsal fin present; pectoral fins with 13 to 15 rays, inserted low on sides of body near ventral profile; scales smooth; head of vomer with band of small closely-set teeth; 5 branchiostegal rays.

D 10-12; A 12-13; P 13-15; V 11-13; L. Lat. 51-54; LGR 6-7; BR 5.

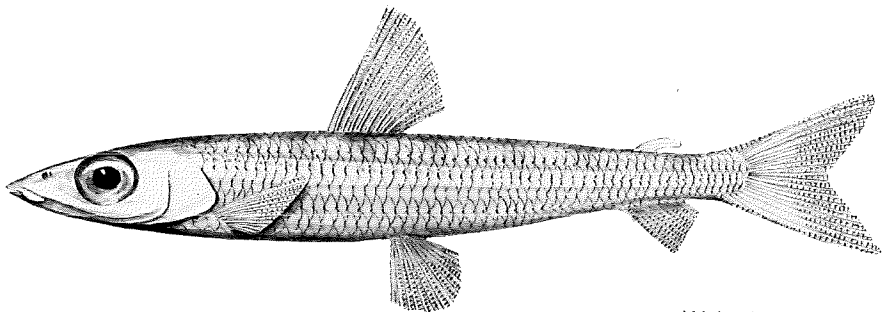
Body yellowish with 9 to 11 dark blotches along back; silver band along side below lateral line; fins translucent.

Size: To at least 13 cm.

Distribution: N.S.W., Vic., Tas., S.A. W.A.

Habitat and Depth: Pelagic, but also occurring near the bottom; recorded from the continental shelf and slope in depths from 30 to 400 m.

References: Cohen (1958); Scott et al. (1974) as *A. elongata*.



Waite (1911)

Sergeant baker

Aulopus purpurissatus Richardson, 1843

Family: Aulopidae p 42

Description: Base of first dorsal fin longer than head; first dorsal fin with 19 to 22 rays, second ray slightly elongate in females, usually longer than fin base in males; eye diameter about 2.5 in snout length; 49 to 51 lateral line scales.

D 19-22; A 12-14; P 11; V 8-9; L. Lat. 49-51.

Head and body pale reddish purple with crimson or orange blotches above, paler below and pearly white on belly; fins yellow with transverse bands of crimson to orange blotches.

Size: To at least 60 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on inshore rocky reefs and the continental shelf to a depth of 100 m.

References: McCoy (1881); Mead (1966a); Scott et al. (1974) as *Latropiscus purpurissatus*.



J. G. H. Maxwell

Cucumber fish

Chlorophthalmus nigripinnis Günther, 1878

Family: Chlorophthalmidae p 42

Description: Anus slightly closer to ventral fin bases than anal fin origin, separated from bases of inner ventral rays by 5 to 8 scale rows; upper jaw extending to below forward half of eye; dorsal fin origin ahead of ventral fin origin; snout broad and short, much shorter than eye diameter; interorbital narrow, width more than 2 in eye diameter; eye 2.5 to 3 in head length; pectoral fins shorter than head length and slightly shorter than or equal to ventral fins; anal fin low, height of longest ray about equal to length of base; teeth present on tongue.

D 11; A 9; P 15. V 9; L. Lat. 48-50; L.G.R. 15-18.

Body pale green with scattered, yellow spots above, silvery yellow with brown blotches on sides and silvery white on belly; *tips of first dorsal and caudal fins black*; pupil lime-green; *no black skin around anus*.

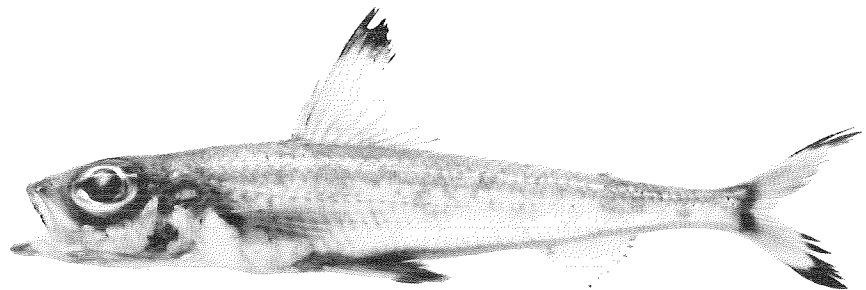
Size: To at least 21 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Generally demersal, on the continental shelf and slope in depths from 80 to 600 m.

Note: An undescribed species of *Chlorophthalmus* has been recorded off Sydney, N.S.W. at a depth of 500 m. It differs from *C. nigripinnis* in having: anus separated from bases of inner ventral rays by 3 to 4 scale rows; pectoral fins longer than ventral fins; skin around anus black; first dorsal and caudal fins dusky but without black tips.

References: Waite (1899); Kamohara (1956); Mead (1966b) genus only.



K. J. Graham

Sandfish

Gonorynchus greyi (Richardson, 1845)

Family: Gonorynchidae p 36

Other Common Names: Beaked salmon, ratfish.

Description: Dorsal fin with 11 to 14 rays, origin above or slightly behind ventral fin origin; anal fin with 9 to 10 rays; lips thick and fringed with papillae.

D 11-14; A 9-10; P 10-12; V 9; L.Lat; 172-178.

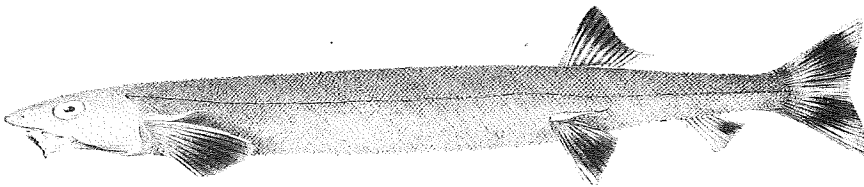
Body sandy above, paler below with pink lateral line; fins with black blotches and narrow, white margins.

Size: To 50 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Adults demersal, on the continental shelf to a depth of 160 m and occasionally entering estuaries; juveniles pelagic in the open ocean.

References: Stead (1908b); Ogilby (1911a).



Richardson (1844-1848)

Australian handfish

Brachionichthys sp. 2

Family: Brachionichthyidae p 64

Other Common Names: Spotted batfish (incorrectly).

Description: Body covered with minute spinules; fleshy tentacles scattered on body except between gill openings and origin of first dorsal fin; second dorsal fin spine clearly longer than longest ray; illicium long, at least 5 times length of bait.

D III+17-18; A 9-10; P 7; V 1,4.

Head and body whitish with thin, almost longitudinal yellowish or orange lines; dorsal, caudal and pectoral fins, with brownish black spots.

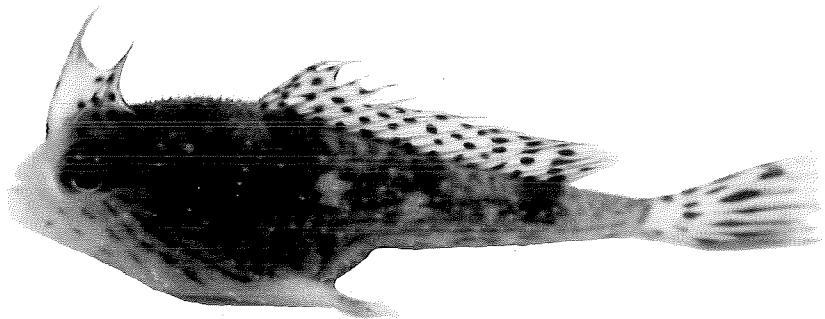
Size: To at least 8 cm.

Habitat and Depth: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 40 to 200 m.

Note: The Australian handfish has previously been confused with *B. hirsutus*, however, the latter species only occurs in southeastern Tasmanian waters. A related species, *B. verrucosus*, occurs off southern N.S.W., Vic. and S.A. in depths from 35 to 100 m. It differs from the above unnamed species in having: body covered with small warts and without spinules; fleshy tentacles on body between gill openings and origin of first dorsal fin; illicium relatively short, less than 4 times length of bait.

References: Last et al. (1983); P. R. Last pers. comm. (1984).



K. J. Graham

Glauert's anglerfish

Allenichthys glauerti Whitley, 1944

Family: Antennariidae p 42

Description: Membrane of dorsal and anal fins attached to body at base of outermost rays of caudal fin; illicium (first dorsal spine) slender, without spinules and with simple *bait* at tip; second dorsal spine very short (11 to 17 in SL) covered with thick skin but not bound to head by membrane; body covered with short, forked close-set *spinules* (length of branches not more than twice distance between branch tips); dorsal fin with 15 to 16 rays.

D III+15-16; A 8; P 9-11; V 5; C 9 (all rays branched).

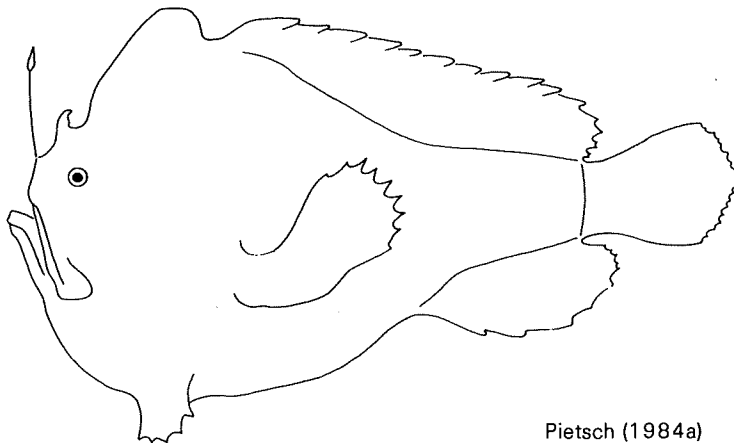
Body pale yellow, yellowish brown or pinkish brown with scattered, dark spots or circles.

Size: To 19 cm.

Distribution: S.A. and W.A.

Habitat and Depth: Demersal, recorded from the continental shelf in depths greater than 145 m.

References: Whitley (1944b) as *Echinophryne glauerti*; Pietsch (1984a); T. W. Pietsch pers. comm. (1984).



Pietsch (1984a)

Prickly anglerfish

Echinophryne crassispina McCulloch & Waite, 1918

Family: Antennariidae p 42

Other Common Names: Thick-spined anglerfish.

Description: Membrane of dorsal and caudal fins not attached to base of rays of caudal fin; illicium slender, covered with *spinules* and without distinct bait (although sometimes with small appendage) at tip; second dorsal spine short (5 to 7 in SL) and conical and not bound to head by membrane; body covered with close-set, relatively short, forked *spinules* (length of branches not more than twice distance between branch tips); dorsal fin with 15 to 16 rays.

D III+15-16; A 8-10; P 10-11; V 5; C 9 (7 innermost rays branched).

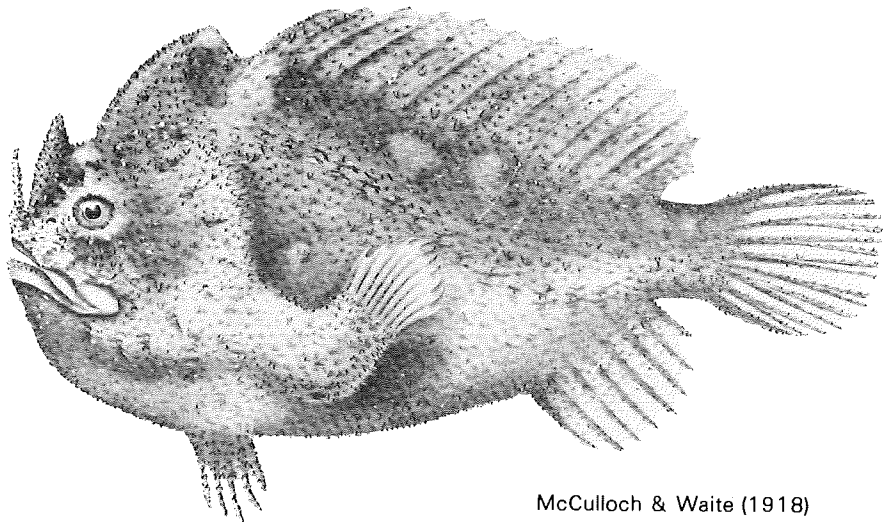
Body pinkish and yellowish brown to brown, slightly darker above than below; caudal peduncle usually with dark saddle and sometimes dark patch on cheek below eye.

Size: To 7 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Bottom-living in coastal waters to a depth of 20 m.

References: McCulloch & Waite (1918); Pietsch (1984a); T. W. Pietsch pers. comm. (1984).



McCulloch & Waite (1918)

Long-spined anglerfish

Echinophryne mitchelli (Morton, 1897)

Family: Antennariidae p 42

Other Common Names: Mitchell's anglerfish, bristly frogfish.

Description: Membrane of dorsal and anal fins not attached to base of rays of caudal fin; illicium long and slender, covered with *spinules* and without distinct bait (although sometimes with small appendage) at tip; second dorsal spine long (5 to 7 in SL) and slender, usually with spinules and short appendages at tip, not bound to head by membrane; body covered with extremely long, forked *spinules* (length of branches 3 to 4 times distance between branch tips); dorsal fin with 13 to 14 rays.

D III+13-14; A 8-9; P 10-11; V 5; C 9 (7 innermost rays branched).

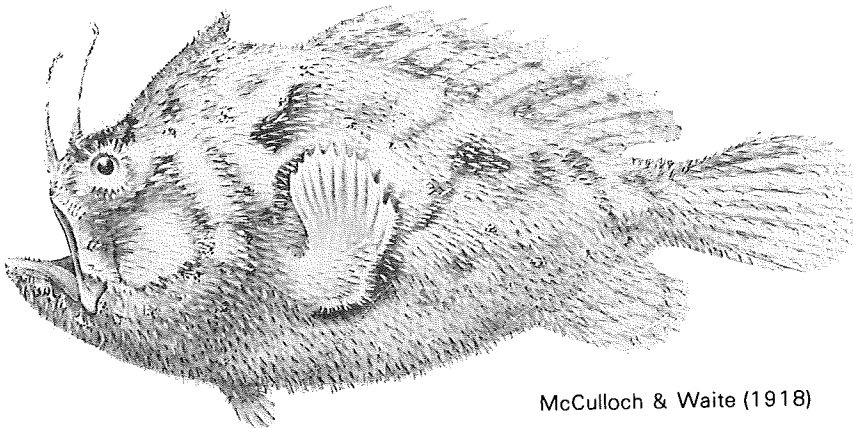
Body whitish, yellowish or pinkish brown with dark brown to black markings.

Size: To 15 cm.

Distribution: Vic. and Tas.

Habitat and Depth: Demersal, recorded from the continental shelf in depths from about 30 to 70 m.

References: McCulloch & Waite (1918) as *Trichophryne mitchelli*; Pietsch (1984a); T. W. Pietsch pers. comm. (1984).



McCulloch & Waite (1918)

Cryptic anglerfish

Histiophryne cryptacanthus (Weber, 1913)

Family: Antennariidae p 42

Description: Membrane of dorsal and anal fins attached to outermost rays of caudal fin; illicium very short (more than 25 in SL), without spinules, but with simple *bait* at tip and partially hidden in narrow groove on snout; second and third dorsal spines laid back and *bound* closely to head by skin; body naked or with well-spaced tiny, simple, spinules; dorsal fin with 13 to 16 rays.

D III+13-16; A 6-9; P 8-9; V 5; C 9 (7 innermost rays branched).

Body light greyish yellow, yellowish brown and pinkish brown to dark brown, usually with lighter patches on sides above pectoral fin bases and sometimes covered with small, dark, close-set ocelli.

Size: To 9 cm.

Distribution: N.S.W., Vic., S.A. and southern W.A.

Habitat and Depth: Bottom-living, recorded from coastal waters in depths from 5 to 130 m.

References: Pietsch (1984a); T. W. Pietsch pers. comm. (1984).



R. H. Kuiter

Rough anglerfish

Kuiterichthys furcipilis (Cuvier, 1817)

Family: Antennariidae p 42

Description: Membrane of dorsal and anal fins not attached to base of rays of caudal fin; illicium long and slender, without spinules, but with *bait* (consisting of about 9 short appendages) at tip; *second dorsal spine long* (3 to 6 in SL), not bound to head by membrane; body covered with close-set short, forked, *spinules* (length of branches not greater than twice distance between branch tips); dorsal fin with 12 to 14 rays.

D III+12-14; A 7-8; P 8-10; V 5; C 9 (7 innermost rays branched).

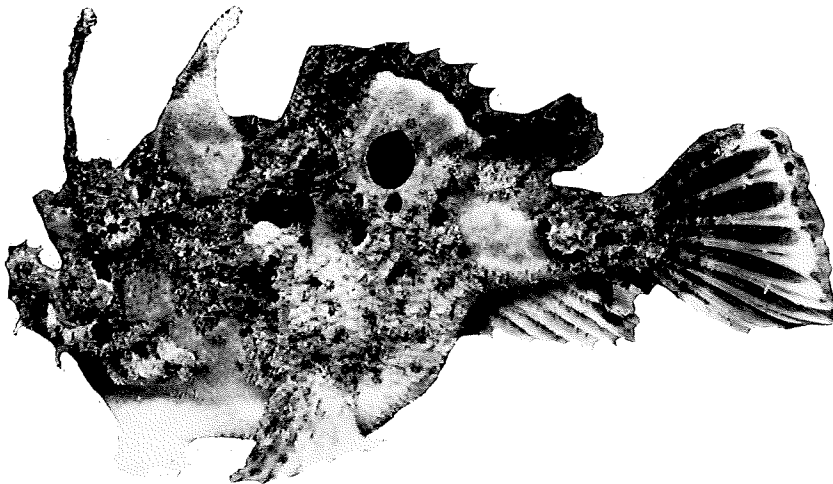
Body greyish yellow, grey and pinkish brown to yellowish brown; dark brown patch usually extending from nape to behind and below pectoral fins and brown bar across caudal peduncle.

Size: To 15 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 10 to 240 m.

References: Last et al. (1983) as *Trichophryne furcipilis*; Pietsch (1984a); T. W. Pietsch pers. comm. (1984).



R. H. Kuiter

Smooth anglerfish

Phyllophryne scortea McCulloch & Waite 1918

Family: Antennariidae p 42

Other Common Names: White-spotted anglerfish.

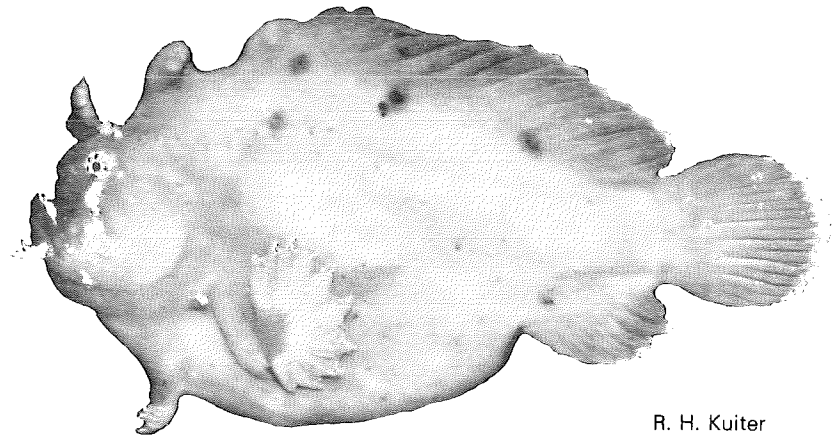
Description: Membrane of dorsal and anal fins attached to base of rays of caudal fin; illicium slender, without spinules, but with fleshy *bait* at tip; second dorsal spine enveloped by loose skin but not bound to head; body without spinules (except near lateral line pores), covered with scattered, flattened, *fleshy appendages*; dorsal fin with 15 to 16 rays. D III+15-16; A 7-9; P 10-12; V 5; C 9 (7 innermost rays branched). Body yellowish brown or brown to dark grey with whitish patches below jaw, on nape and on side between soft dorsal fin and third dorsal spine; body rarely covered with small, dark spots; appendages whitish.

Size: To 10 cm.

Distribution: Vic., Tas., S.A. and south-west W.A.

Habitat and Depth: Bottom-living in coastal waters to a depth of 25 m.

References: McCulloch & Waite (1918) as *Histiophryne scortea*; Pietsch (1984a); T. W. Pietsch pers. comm (1984).



R. H. Kuitert

Tasselled anglerfish

Rhycherus filamentosus (Castelnau, 1872)

Family: Antennariidae p 42

Description: Membrane of dorsal and anal fins not attached to base of rays of caudal fin; illicium long (3 to 6 in SL) and slender, without spinules, but with *bait* (consisting of pair of worm-like appendages and low central flap) at tip; second and third dorsal spines narrow, not bound to head by membrane; body without spinules, covered with close-set, fleshy *appendages*; dorsal fin with 12 to 13 rays.
D III+12-13; A 7-8; P 9-11; V 5; C 9 (all rays branched).
Body dark brown to yellowish brown above, creamy below; 3 broad, dark brown to black bars on head and across back and on sides of body; sometimes silvery white blotches on top of head, nape and on sides of body above pectoral fins.

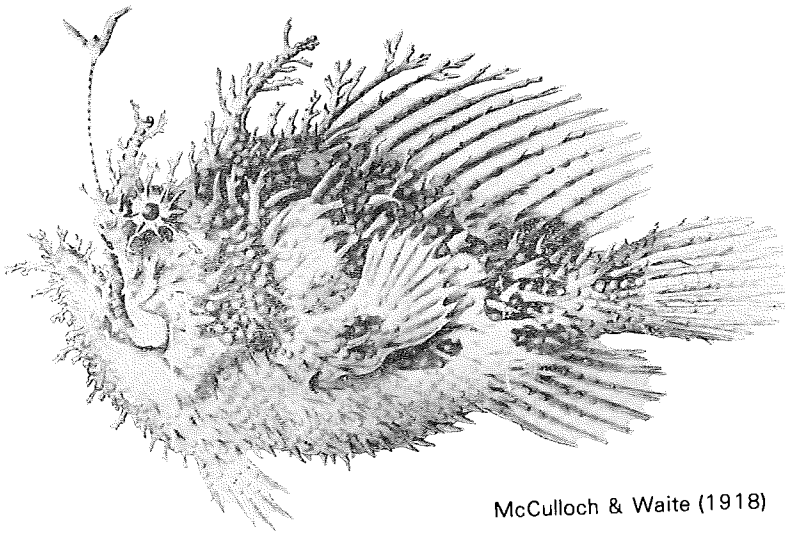
Size: To 23 cm.

Distribution: Vic., Tas. and S.A.

Habitat and Depth: Bottom-living, in coastal waters to at least a depth of 45 m.

Note: A recently described species, *R. gloveri*, also occurs off S.A. and southern W.A. It differs from *R. filamentosus* in having a shorter illicium (6 to 10 in SL) and bait consisting of a single tapering appendage, bearing short filaments.

References: McCulloch & Waite (1918); Pietsch (1984a, 1984b).



McCulloch & Waite (1918)

Coffinfish

Chaunax endeavouri Whitley, 1929

Family: Chaunacidae p 42

Other Common Names: Furry anglerfish, sea toad.

Description: Body ovate and depressed, head square, abdomen often distended; short skin flaps present along lower lateral line channels of head and body and on lips, chin and tail; illicium short, approximately equal to eye diameter, with fringed bait at tip.

D I, I (beneath skin)+12. A 6-7; P 13; V 1,4.

Body salmon pink above, paler below; back, sides and head mottled with greenish to yellowish spots; skin flaps yellow, bait black, illicial cavity pale; fins pink.

Size: To about 22 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on muddy bottoms of the continental shelf and upper slope in depths from 50 to 300 m.

Note: Another species *C. penicillatus* occurs off N.S.W. and eastern Vic. in depths from 200 to 300m. It has a minute illicium, with a relatively large fringed bait at tip, a deep, black illicial cavity and the upper surface of the bait is black and the lower surface white.

References: McCulloch (1915) as *C. fimbriatus*; J. H. Caruso pers. comm. (1984).



J. G. H. Maxwell

Batfish

Haliutaea brevicauda Ogilby, 1911

Family: Ogcocephalidae p 42

Other Common Names: Spiny sea bat.

Description: Head disc-like, flat, almost circular; upper surface covered with small spines (tubercles) of unequal size, lower surface smooth; minute villiform teeth in jaws, none on vomer and palatines; cavity on snout housing illicium, triangular; gill rakers 2½.

D 4; A 4; P 14; V 5.

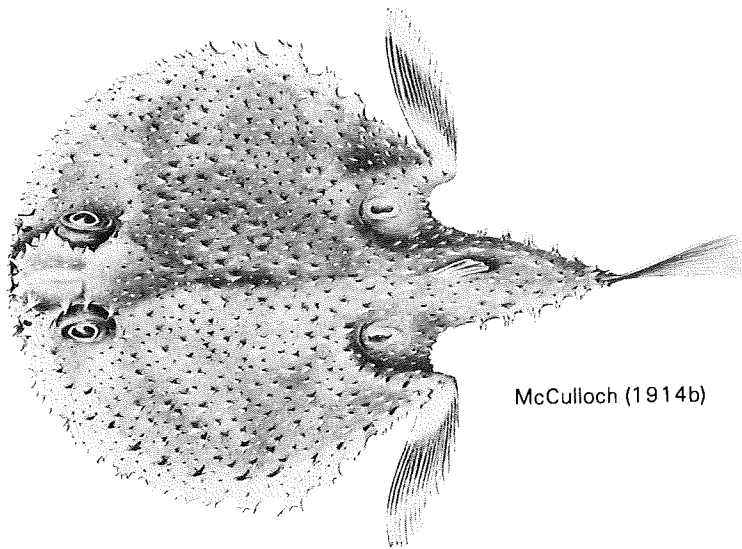
Upper surface of disc and tail bright pink, green or brown; dorsal and pectoral fins with violet band.

Size: To 21 cm.

Distribution: (Qld) and N.S.W.

Habitat to Depth: Demersal, on the continental shelf at depths from 90 to 250 m.

References: McCulloch (1914b); Marshall (1964); Bradbury (1967).



McCulloch (1914b)

Tasmanian cod

Austrophycis marginata (Günther, 1878)

Family: Moridae p 34

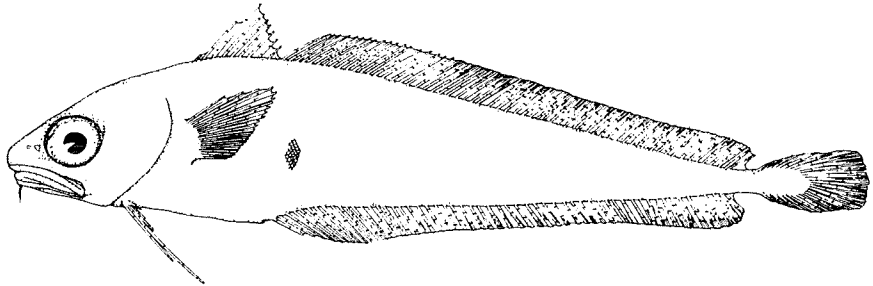
Description: Two dorsal fins, first with 8 to 10 rays, longest ray half length of head; 1 anal fin of almost uniform height; ventral fins with 5 rays; thin abdominal walls (peritoneum visible beneath skin in small specimens); anus adjacent to anal fin; light organ absent from belly; head not broad or cavernous; chin barbel one-third as long as eye diameter; eyes very large, about 3 times interorbital width; 10 to 12 scales in transverse row between lateral line and origin of first dorsal fin; 7 to 9 pyloric caeca; caudal fin slightly rounded to truncate.
D 8-10+51-69; A 48-69; P 21-27; V 5; pyloric caeca 7-9.
Body pinkish tan, back darker and belly bluish black; fins pale, first dorsal fin with black tip.

Size: To at least 22 cm.

Distribution: N.S.W. and Tas.

Habitat and Depth: Demersal, recorded from the continental slope in depths from 485 to 720 m.

References: Paulin (1983).



Paulin (1983)

Slender cod

Halargyreus johnsonii Günther, 1862

Family: Moridae p 34

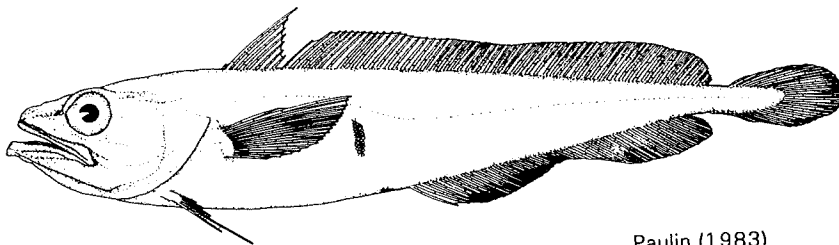
Description: Two dorsal fins, first with 6 to 8 rays, longest ray less than half length of head; 1 anal fin deeply notched near centre; ventral fins with 5 rays; anus adjacent to anal fin; light organ absent from belly; snout rounded, short, length equal to eye diameter; chin without barbel; 8 to 12 scales in transverse row between lateral line and origin of first dorsal fin; caudal fin ovate to forked.
D 6-8+48-60; A 39-53; P 17-20; V 5; pyloric caeca 8-11.
Body reddish silver; mouth and gill cavity black.

Size: To at least 56 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal and pelagic, occurring on the continental slope in depths from about 500 to 1000 m.

References: Paulin (1983).



Fat-headed cod

Laemonema globiceps Gilchrist, 1906

Family: Moridae p 34

Description: Two dorsal fins, first with 5 rays, longest ray much longer than head length; 1 anal fin of uniform height; *ventral fins with 2 long and several minute rays*; abdominal walls thin, peritoneum visible beneath skin; anus adjacent to anal fin; light organ absent from belly; head broad and cavernous; chin barbel minute (visible only with aid of lens); 27 to 28 lower gill rakers on first arch; pectoral fin with 19 to 23 rays.

D 5+56-72; A 61-71; P 19-23; V 2 + rudiments; GR 11-12+27-28.

Colour (in alcohol), yellowish brown; abdomen silver, belly darkish; mouth and gill cavity dark brown.

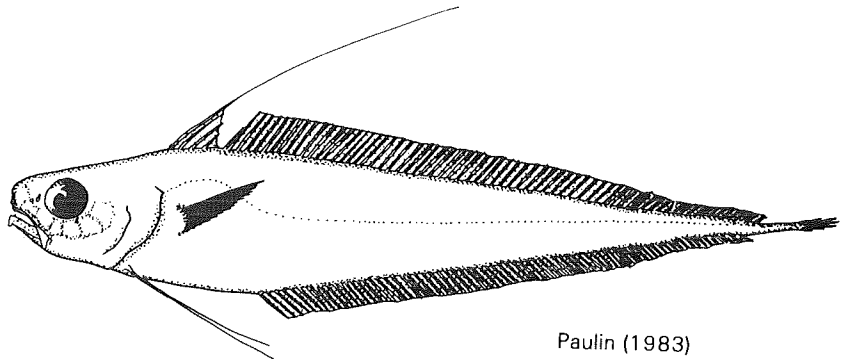
Size: To at least 14 cm.

Distribution: S.A.

Habitat and Depth: Pelagic, recorded from the continental slope in depths of about 1000 m.

Note: A related species, *L. multiradiatum*, has been trawled off southern N.S.W. at a depth of 850 m. It differs as follows; longest ray of first dorsal fin less than one third head length, 17 lower gill rakers on first arch; pectoral fin with 23 to 26 rays.

References: Paulin (1983).



Small-headed cod

Lepidion microcephalus Cowper, 1956

Family: Moridae p 34

Other Common Names: Long-finned cod (N.Z.).

Description: Two dorsal fins, first with 5 to 7 rays, longest ray much longer than head length; 1 anal fin deeply notched near centre; ventral fins with 5 to 7 rays; anus adjacent to anal fin; light organ absent from belly; snout rounded, short, length less than eye diameter; 11 to 15 scales in transverse row between lateral line and origin of first dorsal fin; caudal fin truncate or slightly forked.

D 5-7+49-56; A 40-46; P 17-23; V 5-6; pyloric caeca 10-15.

Body greyish white with pinkish brown areas; second dorsal, anal and pectoral fins with black margins.

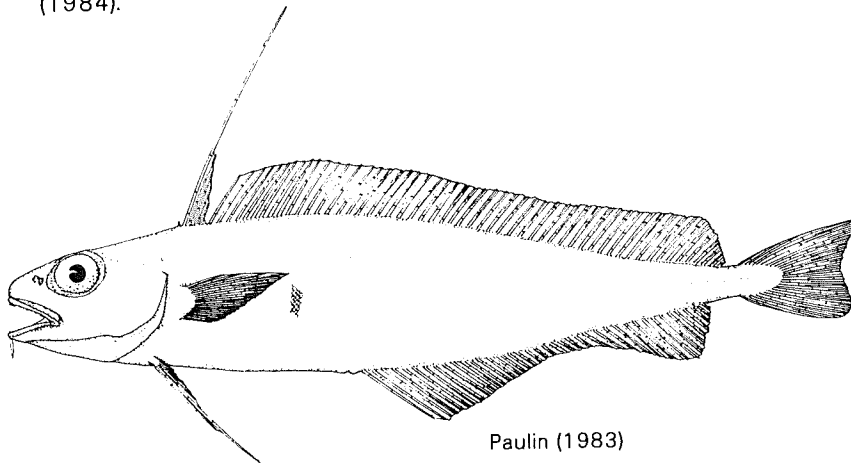
Size: To 48 cm.

Distribution: N.S.W. and Tas.

Habitat and Depth: Demersal, recorded from the continental slope in depths from 750 to 1000 m.

Note: Another deepwater species, *Antimora rostrata*, has also been recorded from N.S.W., Vic. and Tas. in depths from 1000 to 2500 m. *A. rostrata* is distinguished by its flattened, pointed, snout which projects beyond the mouth and forms a conspicuous keel beneath the eye. As well, 2 larger species of *Lepidion* (*L. schmidti* and *L. insomniae*) have recently been recorded from N.Z. and are likely to occur in Australian waters.

References: Last et al. (1983); Paulin (1983); C. D. Paulin pers. comm. (1984).



Paulin (1983)

Ribaldo

Mora moro (Risso, 1810)

Family: Moridae p 34

Other Common Names: Deep-sea cod.

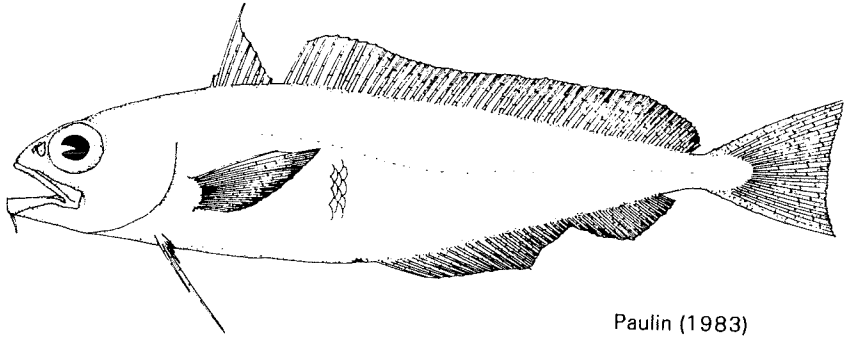
Description: Two dorsal fins, first with 7 to 11 rays, longest ray about half head length; anal fin deeply notched, sometimes divided into 2 sections; ventral fins with 5 to 6 rays; anus adjacent to anal fin; light organ absent from belly; snout rounded, not produced beyond mouth, length less than eye diameter; chin barbel about one-third length of eye diameter; 6 to 11 scales in transverse row between lateral line and origin of first dorsal fin; caudal fin truncate or slightly forked.
D 7-11 + 42-53; A 35-43; P 18-25; V 5-6; pyloric caeca 17-20.
Body silvery blue to whitish; snout and ventral surface of head dark brown.

Size: To 80 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, recorded from the upper continental slope in depths from 450 to 1100 m.

References: Scott et al. (1974) as *M. dannevigii*; Paulin (1983).



Luminescent cod

Physiculus luminosa Paulin, 1983

Family: Moridae p 34

Description: Two dorsal fins, first with 7 to 8 rays; 1 anal fin of uniform height; ventral fins with 5 rays; thin abdominal walls, peritoneum visible beneath skin; anus about midway between anal fin origin and ventral fin bases; light organ on midline of belly slightly behind ventral fin bases and extending beneath skin to second light organ surrounding anus; eyes large, slightly larger than interorbital width; chin barbel half length of eye diameter; 11 to 14 scales in transverse row between lateral line and origin of first dorsal fin; 7 to 10 pyloric caeca; caudal fin rounded.

D 7-8+63-69; A 66-71; P 21-25; V 5; pyloric caeca 7-10.

Colour (in alcohol) pale pinkish brown; belly bluish; ventral fins with black tip; mouth and gill cavity white.

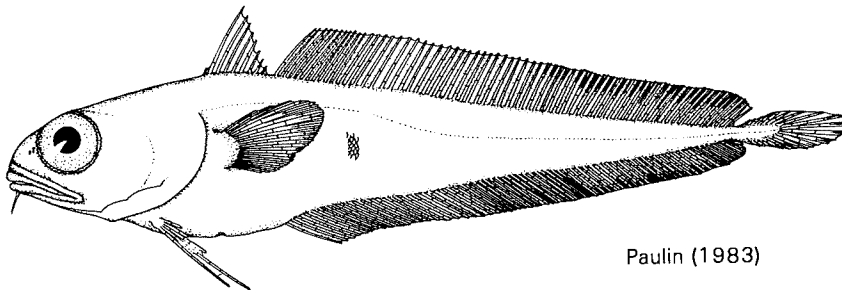
Size: To at least 30 cm.

Distribution: (Qld), N.S.W. and Vic.

Habitat and Depth: Demersal, recorded from the upper continental slope in depths from 240 to 340 m.

Note: Five species of *Physiculus* are found in Australian waters. *P. luminosa* is the most common species in temperate waters, the others occur in warmer northern waters of Qld, N.T. and W.A. but occasionally are found in cooler waters. Possibly 3 of the species are undescribed and are currently being studied.

References: Paulin (1983); C. D. Paulin pers. comm. (1984).



Paulin (1983)

Red cod

Pseudophycis bachus (Bloch & Schneider, 1801)

Family: Moridae p 34

Description: Two dorsal fins, first with 9 to 14 rays, longest ray less than half head length; 1 anal fin of uniform height; ventral fins with 5 to 6 rays; thin abdominal walls (peritoneum visible beneath skin in small specimens); anus adjacent to anal fin; light organ absent from belly; eyes small, equal to or less than interorbital width; chin barbel half length of eye diameter; about 13 scales in transverse row between lateral line and origin of first dorsal fin; 9 to 10 pyloric caeca; caudal fin truncate; body scales small (110 to 137 diagonal rows).
D 9-14+40-52; A 39-59; P 21-26; V 5-6; pyloric caeca 9-10.
Body reddish to grey above, pinkish to white below; dorsal, anal and caudal fins reddish or grey with narrow, black margins; dark grey or *black blotch* at base of pectoral fin.

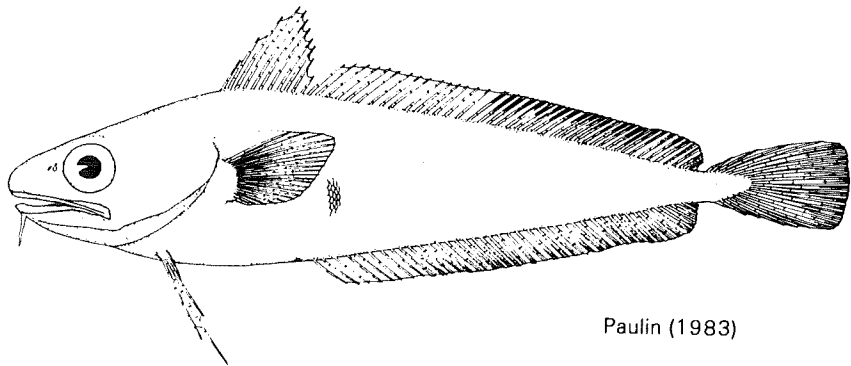
Size: To 80 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, on rocky and soft bottoms in estuaries, bays and the continental shelf to a depth of at least 170 m.

Note: Often confused with *P. barbata*.

References: Last et al. (1983); Paulin (1983); M. F. Gomon pers. comm. (1985).



Paulin (1983)

Bearded rock cod

Pseudophycis barbata Günther, 1863

Family: Moridae p 34

Other Common Names: Southern rock cod, common rock cod.

Description: Two dorsal fins, first with 9 to 11 rays, longest ray about one-third head length; 1 anal fin of uniform height; ventral fins with 5 to 6 rays; thin abdominal walls (peritoneum visible beneath skin in small specimens); anus adjacent to anal fin; light organ absent from belly; eyes small, equal to or less than interorbital width; chin barbel two-thirds length of eye diameter; 13 to 16 scales in transverse row between lateral line and origin of first dorsal fin; 16 to 20 pyloric caeca; caudal fin rounded; body scales small (110 to 137 diagonal rows).

D 9-11+53-63; A 47-63; P 21-26; V 5-6; pyloric caeca 16-20.

Body dark to reddish brown; belly, lower surface of head and lips orange to pinkish white; dorsal, anal and caudal fins reddish brown and orange with wide, black margins; pectoral and ventral fins orange to pinkish; *no* dark blotch at base of pectoral fin.

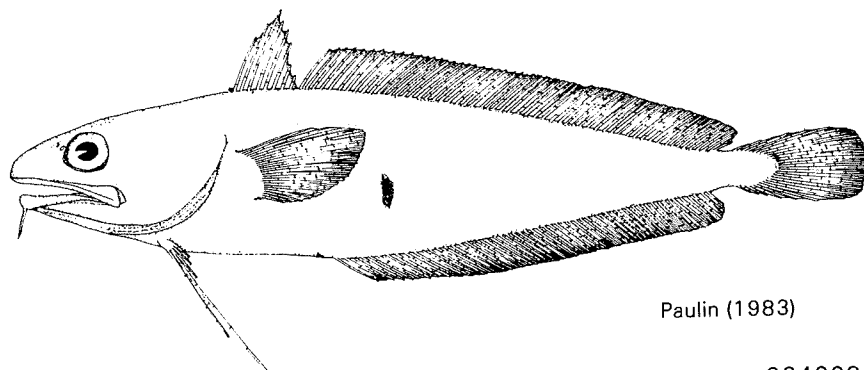
Size: To at least 70 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, in coastal waters over exposed rocky reefs to a depth of at least 60 m.

Note: Another species, *P. breviuscula*, occurs off N.S.W., Vic., Tas. and S.A. It has a rounded caudal fin and lacks the dark blotch at the base of the pectoral fin as does *P. barbata* but has only 6 to 8 pyloric caeca. It differs from both the latter species and *P. bachus* in having 7 to 9 scales in transverse row between lateral line and origin of first dorsal fin and body scales of moderate size (80 to 87 diagonal rows).

References: Scott et al. (1974) as *Physiculus barbatus*; Paulin (1983); M. F. Gomon pers. comm. (1985).



J.L.M. 1985

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Grenadier cod

Tripteryphycis gilchristi Boulenger, 1902

Family: Moridae p 34

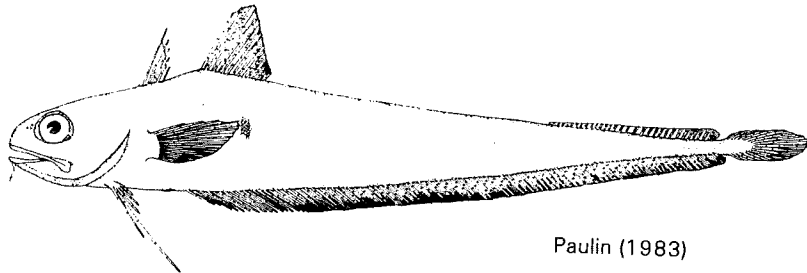
Description: Three well separated dorsal fins, first with 5 to 7 rays, longest ray slightly longer than eye diameter; 1 anal fin of uniform height; ventral fins with 5 rays; anus about one-third distance from anal fin origin to ventral fin base and surrounded by naked black light organ; chin barbel minute, about one-quarter length of eye diameter; 11 to 12 scales in transverse row between lateral line and origin of first dorsal fin; caudal fin rounded to pointed.
D 5-7+14-17+29-38; A 95-112; P 19-20; V 5; pyloric caeca about 10.
Body brownish pink; belly bluish black; dorsal and caudal fins pale with blackish margins; eyes blue.

Size: To 20 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal and pelagic, recorded from the continental slope in depths from 380 to 900 m.

References: Munro (1957d) as *T. intermedius*; Last et al. (1983); Paulin (1983).



Paulin (1983)

Eucla cod

Euclichthys polynemus McCulloch, 1926

Family: Melanonidae p 34

Description: Distinct caudal fin present; 2 dorsal fins, just separated, first short-based and high; anal fin divided into two portions, first short-based and very high, second of short rays increasing in length backwards; ventral fins with 4 long rays, not connected by membrane, first ray reaching well beyond anal fin origin and branched into 3 filaments about one-third distance from its base.
D 12-15+74-77; A 15+77; P 19-20; V 4.

Body yellowish pink to white, throat and belly bluish black; dorsal and caudal fins with black margins; mouth and gill cavities white.

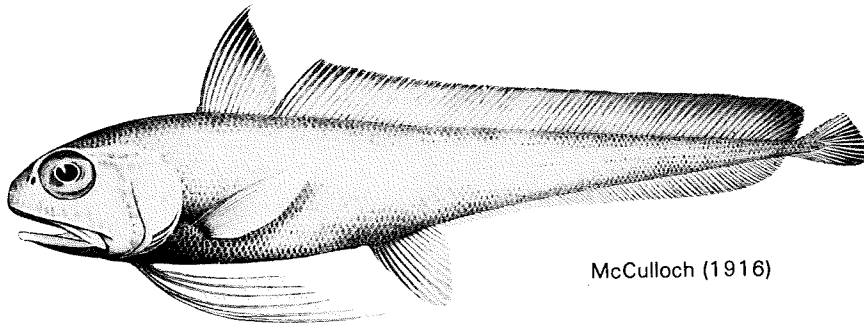
Size: To at least 26 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the upper continental slope in depths from 250 to 800 m.

Note: Eucla cod has previously been included in the family Moridae.

References: McCulloch (1926); Last et al. (1983); Paulin (1983).



Pelagic cod

Melanonus gracilis Günther, 1878

Family: Melanonidae p 34

Description: Caudal fin united to dorsal and anal fins; 1 long-based dorsal fin, first 6 rays slightly longer than following rays; 1 continuous anal fin with rays of uniform height; ventral fins with 5 short rays, connected by membrane and not reaching to anus.

D 61-67 (+C 21); A 54 (+C 21); P 10; V 5.

Body uniform black, mouth cavity black.

Size: To 16 cm.

Distribution: N.S.W. and Vic.

Habitat and Depth: Pelagic, recorded from over the continental slope in depths from 600 to 1100 m.

Note: A related species, *M. zugmayeri*, has been trawled off N.S.W. *M. zugmayeri* has 1 to 3 rows of widely-spaced canines in the jaws and a hump on the shoulder (in fish greater than 10 cm), in contrast *M. gracilis* has 1 row of fine teeth and no hump.

References: Günther (1878); D. M. Cohen pers. comm. (1980); M. F. Gomon pers. comm. (1983).



K. J. Graham

Blue grenadier

Macruronus novaezelandiae (Hector, 1871)

Family: Merlucciidae p 34

Other Common Names: Hoki, blue hake.

Description: Caudal fin united to second dorsal and anal fins; anal fin origin below rays 18 to 20 of second dorsal fin; anterior rays of anal fin elevated, remaining rays shorter than dorsal fin rays; upper jaw with 2 rows of teeth, outer row larger; lower jaw with 1 row of teeth; scales minute, deciduous.

D 12+96; A 89; P 18-20; V 7; BR 7.

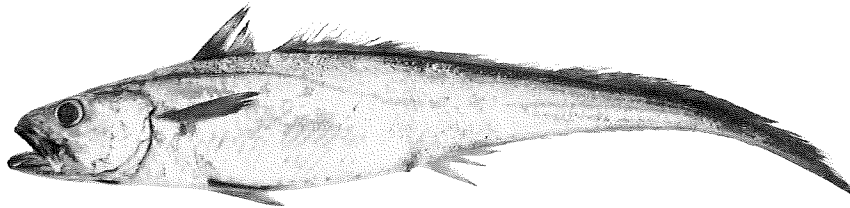
Body iridescent blue-green or purple above, silver below; fins dark blue.

Size: To 110 cm.

Distribution: N.S.W., Vic., Tas., S.A., and southern W.A.

Habitat and Depth: Usually demersal but migrate into the water column at night; adults on the upper continental slope in depths from 200 to 700 m; juveniles (less than 40 cm TL) common in large estuaries, bays and shallow shelf waters of Tasmania.

References: Munro (1957c); Last et al. (1983).



K. J. Graham

Violet cuskeel

Brotulotaenia crassa Parr, 1934

Family: Ophidiidae p 34

Description: Dorsal and anal fins united with caudal fin; snout and chin without barbels; *ventral fins absent*; body covered with minute non-overlapping, horny prickles; pectoral fins very short; angle of operculum and snout without spines; jaws, vomer and palatines with 1 row of small pointed teeth; 4 pyloric caeca.
D 119-134; A 98-108; P 22-26.

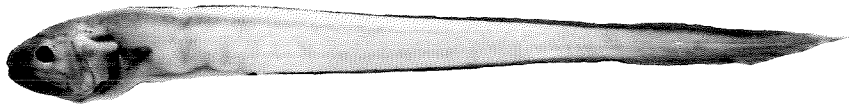
Head and body blue to light purple, head sometimes darker; mouth and gill cavities blackish.

Size: To at least 85 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Pelagic, recorded from over the continental slope to a depth of 800 m.

References: Cohen (1974); Cohen & Nielsen (1978).



K. J. Graham

Australian tusk

Dannevigia tusca Whitley, 1941

Family: Ophidiidae p 34

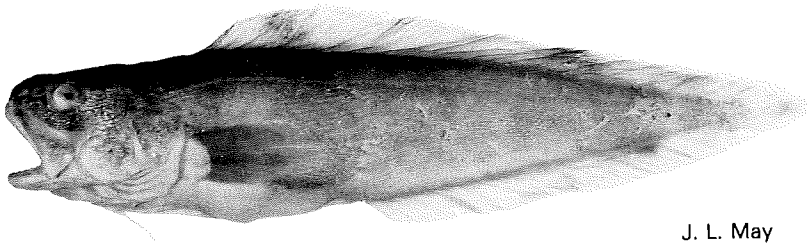
Description: Dorsal and anal fins united with caudal fin; snout and chin without barbels but ventral fins with 2 rays, inserted below rear margin of eye; head and body covered with small overlapping rounded scales arranged in wavy longitudinal rows; pectoral fins well developed, reaching three-quarters of way to anus; *short spine* at angle of operculum, barely reaching beyond rear margin of head; short, weak spines at angle of preoperculum concealed by skin; jaws, vomer and palatines with narrow band of villiform teeth; pyloric caeca numerous. D 96-103; A 76-80; P 24-27; V 2; L. Lat. about 100; GR 4; BR 9. Adults uniform pale brown to greyish purple above, whitish below; juveniles with brown stripes; dorsal and anal fins with narrow, white margins; lips and base of pectoral fins white.

Size: To 56 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 140 to 400 m.

References: Whitley (1941); Cohen & Nielsen (1978).



Pink ling

Genypterus blacodes (Schneider, 1801)

Family: Ophidiidae p 34

Other Common Names: Rock ling.

Description: Dorsal and anal fins united with caudal fin; snout and chin without barbels but ventral fins with 2 rays, inserted beneath eye; body covered with minute overlapping, rounded scales arranged in longitudinal rows; pectoral fins short, reaching less than half-way to anus; angle of operculum and snout without spines; jaws, vomer and palatines with row of moderate-sized teeth; 2 pyloric caeca on right side of intestine, usually 4 on left.

D 142-155; A 104-113; P 20-24; V 2; L. Lat. about 300; GR 4; BR 7.

Head and body pinkish orange with brown, irregular blotches above and on sides; belly white to pink; dorsal and anal fins with dark, longitudinal bars, margins pink or white.

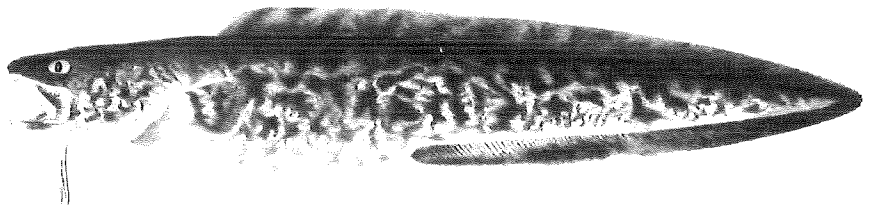
Size: To at least 150 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from about 20 to 750 m; juveniles common on the shelf with adults occurring in deeper waters.

Note: The rock ling *G. tigerinus* has a similar distribution to *G. blacodes* but is usually found on shallow reefs to a depth of 60 m. It has been confused with *G. blacodes* but is greyish white with irregular black blotches and has 3 pyloric caeca on the right side of the intestine and usually 5 on the left.

References: Regan (1903a) as *G. microstomus*; Cohen & Nielsen (1978) genus only; Last et al. (1983).



McCoy (1879)

Southern whiptail

Coelorinchus australis (Richardson, 1839)

Family: Macrouridae p 34

Description: Two well separated dorsal fins, second with shorter rays than in anal fin; anus adjacent to anal fin, not surrounded by broad margin of naked black skin; naked elongate to ovoid pit (light organ) extending from near anus to about midway between anus and ventral fin bases; anterior edge of second spinous dorsal ray not serrated; strong *suborbital ridge* (from snout tip to angle of preoperculum, dividing snout and cheek into upper and lower halves); underside of head between suborbital ridge and mouth densely *scaled*; snout short (length 2.7 to 3.1 in HL); mouth small (length of upper jaw 2.9 to 3.6 in HL) and inferior.

first D II,9-11; P 14-19; V 7; GR 7-10; BR 6.

Body brownish green with pale stripes running along centre of each longitudinal scale row; upper half of dorsal fin blackish; outer margin of anal fin blackish.

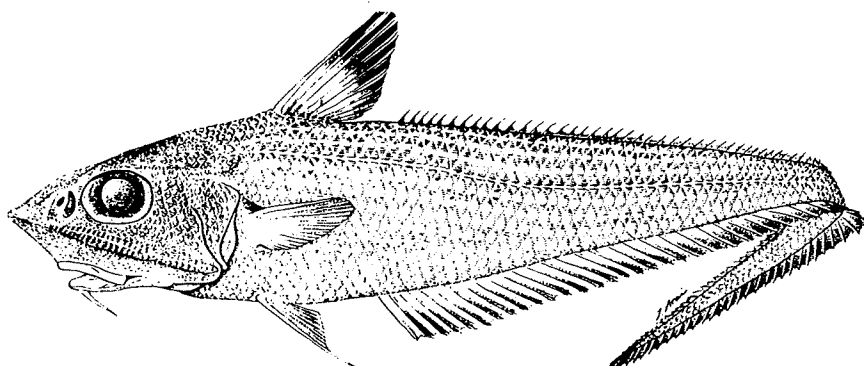
Size: To at least 50 cm.

Distribution: Southern N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Generally demersal, on the continental shelf and upper slope in depths from 100 to 300 m.

Note: A similar species, *C. biclinozonalis* occurs in New Zealand and has previously been confused with *C. australis*.

References: Iwamoto (1978) genus only; Arai & McMillan (1982); P. J. McMillan pers. comm. (1984).



Arai & McMillan (1982)

Banded whiptail

Coelorinchus fasciatus (Günther, 1878)

Family: Macrouridae p 34

Other Common Names: Striped whiptail.

Description: Two well separated dorsal fins, second with shorter rays than in anal fin; anus close to anal fin, not surrounded by broad margin of naked black skin; naked black elongate pit (light organ) extending from near anus to more than midway between anus and ventral fin bases; anterior edge of second spinous dorsal ray not serrated; strong *suborbital ridge*; underside of head between suborbital ridge and mouth without scales; snout short (length 3.0 to 3.3 in HL); mouth inferior; interspace between first and second dorsal fins short, about equal to base of first fin.

first D II,9-10; P 18-20; V 7; GR 7-9; BR 6.

Body whitish with series of about 10 dark saddle blotches along dorsal surface; dorsal fins dusky.

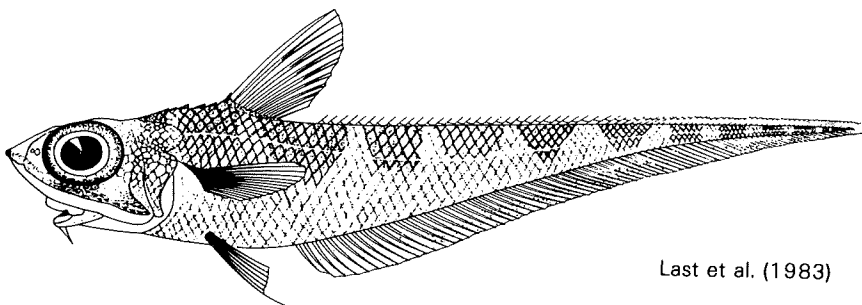
Size: To at least 35 cm.

Distribution: see *Note*.

Habitat and Depth: Usually demersal, on the continental slope in depths from 400 to 1000 m.

Note: At least some specimens from Tasmanian waters identified as the banded whiptail are *C. fasciatus*, however, records from other states have yet to be confirmed. There are at least 3 other undescribed banded species in southern Australian waters.

References: Iwamoto (1978); Last et al. (1983); P. J. McMillan pers. comm. (1984).



Last et al. (1983)

Notable whiptail

Coelorinchus innotabilis McCulloch, 1907

Family: Macrouridae p 34

Description: Two well separated dorsal fins, second with shorter rays than in anal fin; anus close to anal fin, not surrounded by broad margin of naked black skin; light organ externally obvious as blackish area before anus continuing forward to ventral fin base as black streak; anterior edge of second spinous dorsal ray not serrated; strong *suborbital ridge*; area between suborbital ridge and mouth without scales; *snout long* (length 2.3 to 2.6 in HL) and sharply pointed with spiny scute at tip; mouth inferior; interspace between first and second dorsal fins short, less than base of first fin; anterior dorsal surface of snout largely scaleless.

first D II, 9-10; P 17-20; V 7; GR 7-8; BR 6.

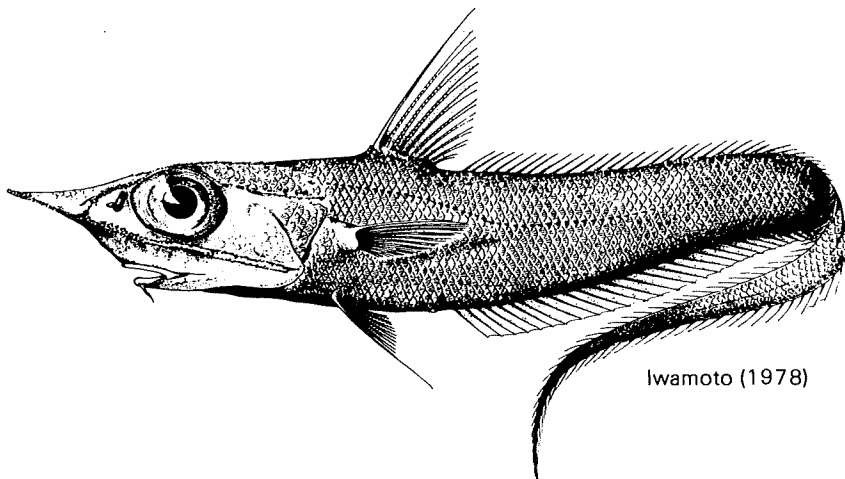
Body greyish white; abdominal area dark from ventral surface to level of pectoral fins.

Size: To at least 32 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Generally demersal, on the continental slope in depths from 600 to 1000 m.

References: Iwamoto (1978) genus only; Arai & Iwamoto (1979); Last et al. (1983); P. J. McMillan pers. comm. (1984).



Kaiyomaru whiptail

Coelorinchus kaiyomaru Arai & Iwamoto, 1979

Family: Macrouridae p 34

Description: Two well separated dorsal fins, second with shorter rays than in anal fin; anus close to anal fin, not surrounded by broad margin of naked black skin; blackish area (light organ) in front of anus continuing forward to ventral fin bases as blackish streak; anterior edge of second spinous dorsal ray not serrated; strong *suborbital ridge*; area between suborbital ridge and mouth without scales; *snout long* (length 2.1 to 2.4 in HL), with spiny scute at tip; mouth inferior; interspace between first and second dorsal fins short, about equal to or less than base of first fin; anterior dorsal surface of snout almost entirely covered with strong scales.

first D II,9-10; P 17-20; V 7; GR 7-8; BR 6.

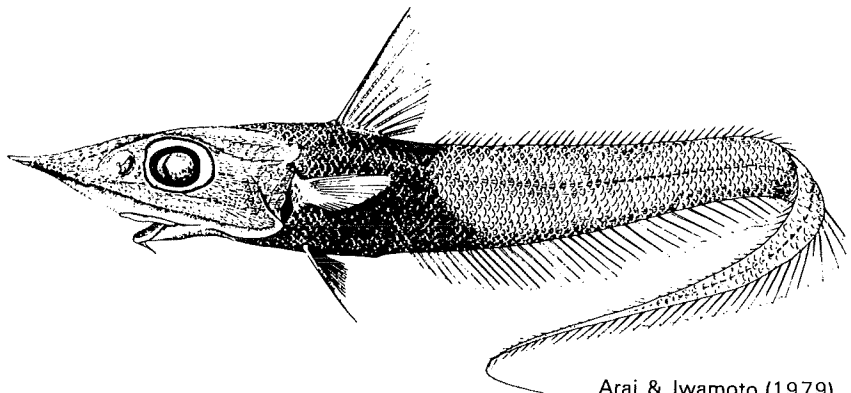
Body greyish; abdominal area dark blue, extending from ventral to dorsal surfaces between origins of 2 dorsal fins.

Size: To about 43 cm.

Distribution: Vic. and Tas.

Habitat and Depth: Demersal, recorded from the continental slope in depths from 840 to 1050 m.

References: Arai & Iwamoto (1979); McCann & McKnight (1980) as *Coelorhynchus campbellicus*.



Large-headed whiptail

Coelorinchus matamua (McCann & McKnight, 1980)

Family: Macrouridae p 34

Description: Two well separated dorsal fins, second with shorter rays than in anal fin; anus closer to anal fin than ventral fin bases, not surrounded by broad margin of naked black skin; thin black line, concealed by scales extending from anus to about midway between anus and ventral fin bases; anterior edge of second spinous dorsal ray not serrated; distinct *suborbital ridge*; area between suborbital ridge and mouth covered with small thin *scales*; snout short (length about 2.9 in HL); mouth large, length of upper jaw about 2.4 in HL and inferior.

first D 11,9-10; P 17-19; V 7; GR 10-11; BR 6.

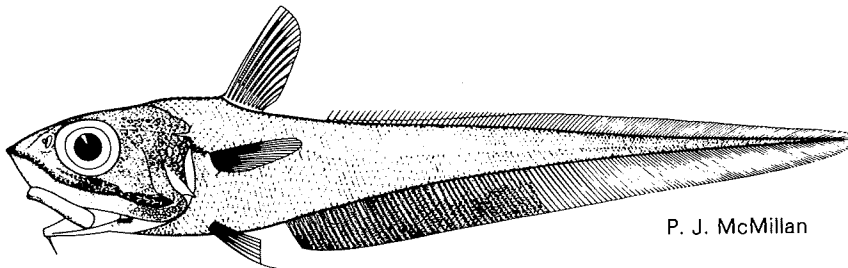
Body grey to greyish pink with *dark blue abdominal* area; anterior half of anal fin black, remainder of fin pale.

Size: To at least 65 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Generally demersal, recorded from the continental slope in depths from 450 to 1000 m.

References: McCann & McKnight (1980) as *Mahia matamua*; Last et al. (1983); P. J. McMillan pers. comm. (1984).



Gargoyle fish

Coelorinchus mirus McCulloch, 1926

Family: Macrouridae p 34

Other Common Names: Small-eye rattail.

Description: Two well separated dorsal fins, second with shorter rays than in anal fin; anus close to anal fin, not surrounded by broad margin of naked black skin; naked black wide ovoid pit (light organ) extending from near anus to between ventral fin bases; anterior edge of second spinous dorsal ray not serrated; strong *suborbital ridge*; area between suborbital ridge and mouth without scales, except for distinctive areas behind angles of mouth; snout short (length 2.9 to 3.3 in HL); mouth inferior; interspace between first and second dorsal fins long, about twice base of first fin.

first D II,9-10; P 17-19; V 7; GR 7-8; BR 6.

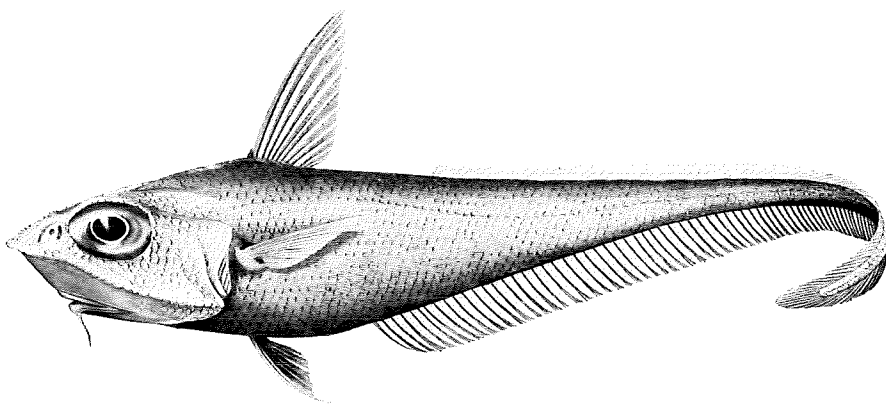
Body uniform grey brown; bases of pectoral fins light with small, black spot on lower rays; ventral fins bluish black, filamentous ray whitish, anal fin whitish with longitudinal, black stripe.

Size: To at least 35 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Generally demersal, on the continental shelf and upper slope in depths from 130 to 400 m.

References: McCulloch (1926); Iwamoto (1978) genus only; Last et al. (1983); P. J. McMillan pers. comm. (1984).



McCulloch (1926)

Serrulate whiptail

Coryphaenoides serrulatus Günther, 1878

Family: Macrouridae p 34

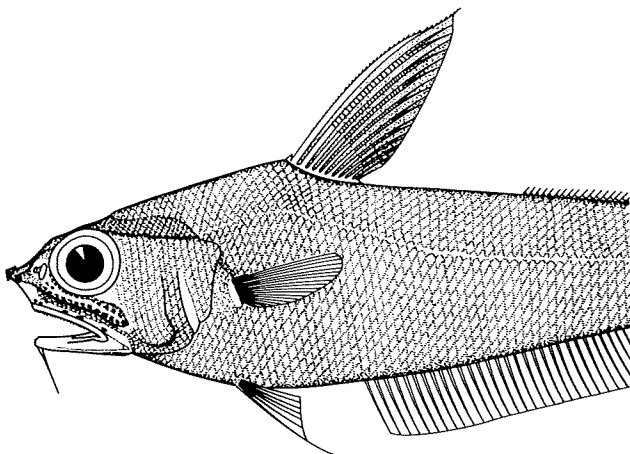
Description: Two well separated dorsal fins, second with shorter rays than in anal fin; anus adjacent to anal fin, not surrounded by broad margin of naked black skin; light organ absent; anterior edge of second spinous dorsal ray *serrated*; weak suborbital ridge; area between suborbital ridge and mouth partly scaled; snout short (length 3.5 to 3.8 in HL) with 1 *enlarged spiny scute* at tip and 1 on each side; all pectoral and ventral fin rays shorter than head length; barbel moderately long, length less than twice in snout.
first D II,8-11; P 19-23; V 7; BR 6.
Body brown or grey; abdomen bluish black; fins dusky.

Size: To at least 45 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Generally demersal, recorded from the continental slope in depths from 600 to 1000 m.

References: Marshall & Iwamoto (1973) genus only; McCann & McKnight (1980); Last et al. (1983); P. J. McMillan pers. comm. (1984).



P. J. McMillan

Long-rayed whiptail

Coryphaenoides subserrulatus Makushok, 1976

Family: Macrouridae p 34

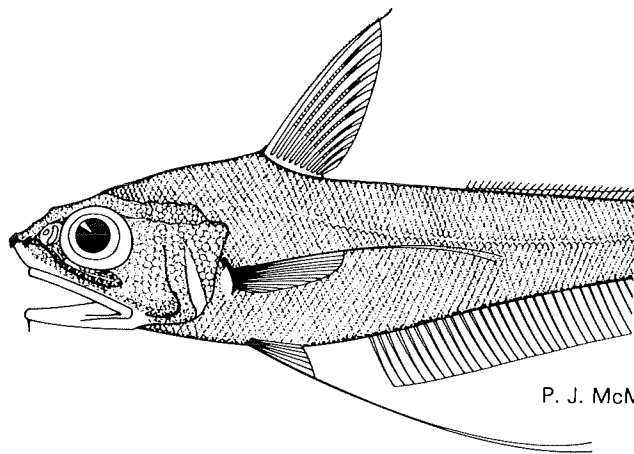
Description: Two well separated dorsal fins, second with shorter rays than in anal fin; anus adjacent to anal fin, not surrounded by broad margin of naked black skin; light organ absent; anterior edge of second spinous dorsal ray *serrated*; weak suborbital ridge; area between suborbital ridge and mouth partly scaled; snout short (length about 3.8 in HL) with 1 *enlarged spiny scute* at tip and 1 on each side; second ray of pectoral and first ray of ventral fins very *elongate*; chin barbel very short, length about 20 in HL.
first D II,8-11; P 14-17; V 7; BR 6.
Body pale silvery grey; fins generally pale.

Size: To at least 37 cm.

Distribution: N.S.W. and Tas.

Habitat and Depth: Demersal, recorded from the continental slope in depths from 550 to 1180 m.

References: McCann & McKnight (1980) as *C. quadripennatus*; Last et al. (1983).



P. J. McMillan

Toothed whiptail

Lepidorhynchus denticulatus Richardson, 1845

Family: Macrouridae p 34

Other Common Names: Javelin fish.

Description: Two well separated dorsal fins, second with shorter rays than in anal fin; anus adjacent to anal fin, not surrounded by broad margin of naked black skin; small naked ovoid pit (light organ) immediately in front of anus; anterior edge of second spinous dorsal ray not serrated; suborbital ridge absent; snout short (length 3.6 to 4.8 in HL) and bluntly rounded; mouth large, terminal; both jaws with 1 row of enlarged teeth and upper jaw with inner band of villiform teeth; scales deciduous.

first D II,10-11; P 16-19; V 9; BR 6.

Body dull grey-green above, sides silvery and blackish below.

Size: To 55 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Generally demersal, on the continental slope in depths from about 200 to 1000 m; most common between 270 and 450 m.

References: Marshall (1973); McCann & McKnight (1980); Last et al. (1983); P. J. McMillan pers. comm. (1984).



K. J. Graham

Smooth whiptail

Malacocephalus laevis (Lowe, 1843)

Family: Macrouridae p 34

Description: Two well separated dorsal fins, second with shorter rays than in anal fin; anus about midway between anal fin origin and ventral fin bases, surrounded by broad *margin of naked black skin*; naked bean-shaped pit (light organ) between ventral fin bases and second smaller, circular pit in front of anus; anterior edge of spinous dorsal ray not serrated; suborbital ridge absent; snout short (length 3.4 to 3.8 in HL); mouth large, subterminal; upper jaw with 2 rows of teeth, outer row enlarged, lower jaw with 1 row of large widely-spaced teeth; scales minute.

first D II,10-12; P 16-20; V 8-9; BR 7.

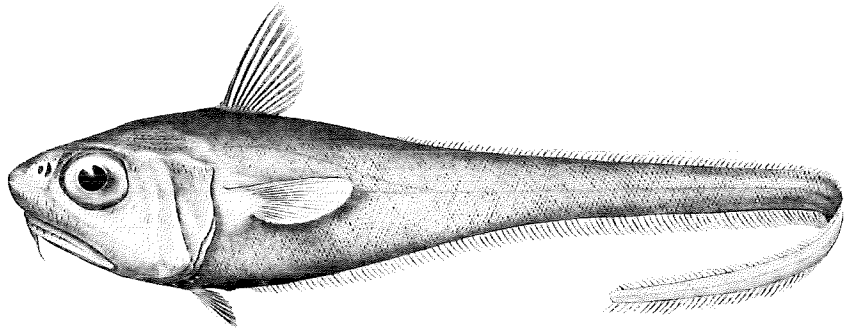
Body brownish to greyish; upper third to half of first dorsal fin blackish.

Size: To about 55 cm.

Distribution: (Qld), N.S.W., Great Australian Bight and W.A.

Habitat and Depth: Generally demersal, on the continental slope in depths from 200 to 800 m.

References: Munro (1957c); Iwamoto (1979); P. J. McMillan pers. comm. (1984).



McCulloch (1926)

Black-spotted whiptail

Ventrifossa nigromaculata (McCulloch, 1907)

Family: Macrouridae p 34

Description: Two well separated dorsal fins, second with shorter rays than in anal fin; anus about midway between anal fin origin and ventral fin bases, surrounded by broad *margin of naked black skin*; naked ovate pit (light organ) in front of anus connected by naked strip to second pit between ventral fin bases; anterior edge of second spinous dorsal ray finely *serrated*; suborbital ridge absent; snout short (length 3.3 to 4.0 in HL) and bluntly rounded without spiny scute at tip; mouth subterminal; both jaws with bands of villiform teeth; *height of first dorsal fin greater than head length*; ventral fins with 13 to 16 rays. first D II,10-12; P 17-24; V 13-16; GR 12-16; BR 7.

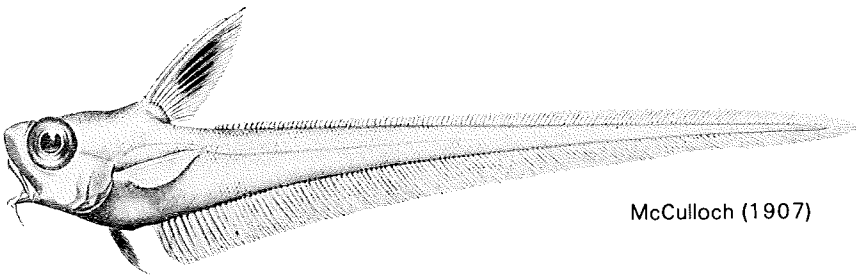
Body dark bluish grey anteriorly, paler grey posteriorly; first dorsal fin with distinct, black blotch.

Size: To at least 34 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Generally demersal, on the continental slope in depths from 300 to 800 m.

References: Iwamoto (1979); McCann & McKnight (1980) as *Nezumia nigromaculata*; Last et al. (1983; P. J. McMillan pers. comm. (1984).



Southern sea garfish

Hyporhamphus melanochir (Valenciennes, 1846)

Family: Hemiramphidae p 36

Other Common Names: South Australian garfish, dusky garfish.

Description: Caudal fin forked; lower jaw equal to or slightly longer than head length; triangular part of upper jaw covered with small *scales*; anal fin with *17 to 20* rays; origin of dorsal fin opposite origin of anal fin; ventral fins inserted at, or behind midway between bases of pectoral and caudal fins.

D 15-18; A 17-20; P 11-13; L. Lat. 52-56; GR 27-35.

Body pale green above and silvery below with silver stripe along each side; fins translucent, caudal with dark margin.

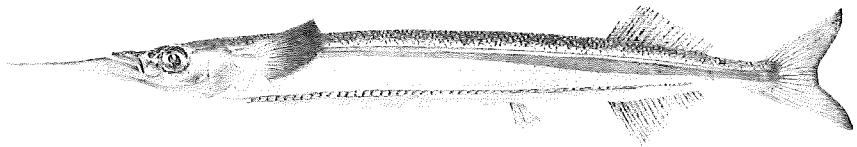
Size: To 43 cm.

Distribution: Southern N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs in surface waters of estuaries, bays, inlets and gulfs.

Note: A similar species the eastern sea garfish (*H. australis*) is found on the east coast of Australia to Eden, N.S.W. This species has more rakers on the first gill arch than *H. melanochir* (usually 34 to 37 in *H. australis*, usually 30 to 32 in *H. melanochir*) and has 3 narrow brown lines along the back above the silvery band.

References: Munro (1957b) and Scott et al. (1974) as *Hemiramphus melanochir*; Collette (1974).



McCoy (1887a)

King gar

Scomberesox saurus (Walbaum, 1792)

Family: Scomberesocidae p 36

Other Common Names: Billfish, saury.

Description: Both jaws produced forming long fragile beak (in fish greater than 10 cm SL), lower only slightly longer than upper; teeth in 2 series in both beaks; pectoral fins with 12 to 15 rays; gill rakers numerous and very closely-spaced; lateral line forming ridge near ventral profile of body.

D 10-11+6-7 finlets; A 11-12+6-7 finlets; P 12-15; V 6; L. Lat. 107-128; GR 39-51.

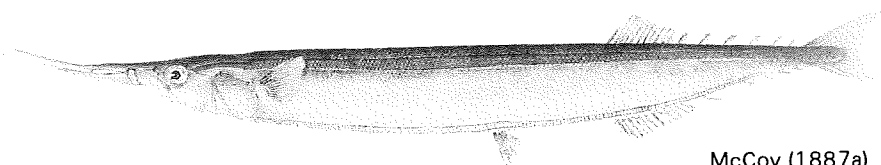
Body dark blue-green above, sides, belly and cheeks silver; caudal fin and finlets on back blue.

Size: To 45 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Pelagic, in surface waters of the open sea; occasionally entering bays and inlets.

References: Munro (1957b) and Scott et al. (1974) as *S. forsteri*; Hubbs & Wisner (1980).



McCoy (1887a)

Darwin's roughy

Gephyroberyx darwini (Johnson, 1866)

Family: Trachichthyidae p 56

Description: Anus immediately before anal fin; dorsal fin with 8 spines, third and fourth spines longest, and 13 to 14 rays; maximum height of dorsal fin much less than its length; lateral line scales slightly larger than body scales each bearing median enlarged and raised spine; body deep, less than 2.5 in SL; eye large (2.5 to 3.3 in HL); 11 to 12 large belly scutes anterior to anus.

D VIII,13-14; A III,11; P 14; V I,6; L. Lat. 27.

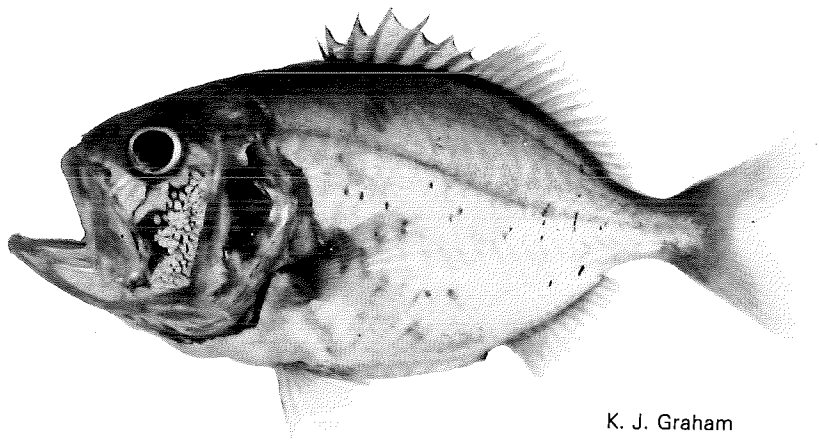
Body light red to brownish red above, sides and belly silvery grey; fins red, tipped with black in young; roof of mouth red, tongue and gill cavity black.

Size: To 32 cm.

Distribution: N.S.W., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental slope in depths from 600 to 900 m.

References: Woods and Sonoda (1973).



K. J. Graham

Orange roughy

Hoplostethus atlanticus Collette, 1889

Family: Trachichthyidae p 56

Other Common Names: Red roughy.

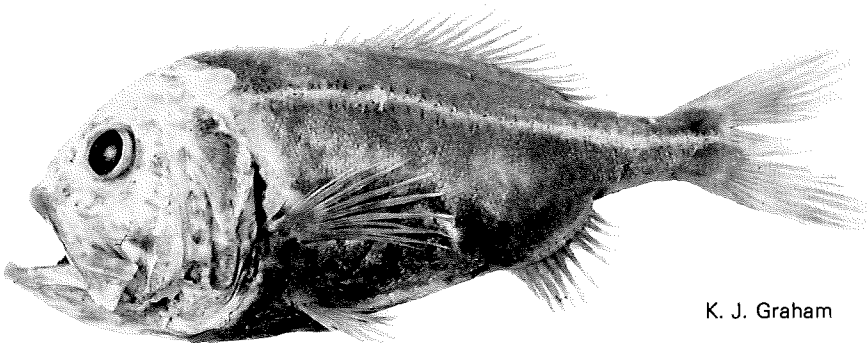
Description: Anus immediately before anal fin; dorsal fin with 6 spines, last spine longest, and 15 to 18 rays; maximum height of dorsal fin much less than its length; lateral line scales very large, 4 to 6 times body scales; body deep (2.1 to 2.6 in SL); eye of moderate size (3 to 3.8 in HL); 19 to 25 belly scutes anterior to anus, feeble in large fish. D VI,15-18. A III,10-11; V I,6; P 18-20; L. Lat. 31-34. Body bright orange to red; fins pale red or orange; mouth and gill cavities black.

Size: To at least 52 cm.

Distribution: N.S.W., Vic., S.A., Tas. and W.A.

Habitat and Depth: Demersal, on the continental slope in depths from 500 to 1200 m.

References: Woods & Sonoda (1973); Paulin (1979).



K. J. Graham

Common sawbelly

Hoplostethus intermedius Cuvier, 1829

Family: Trachichthyidae p 56

Other Common Names: New Zealand sawbelly, roughly.

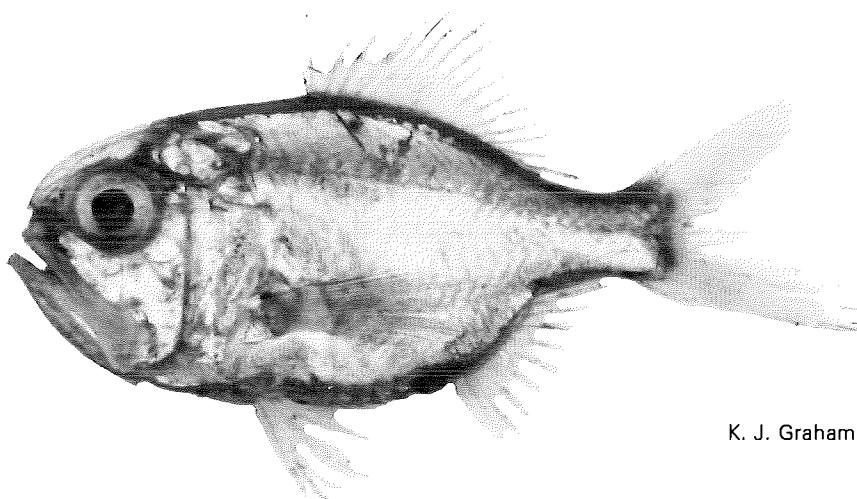
Description: Anus immediately before anal fin; dorsal fin with 6 spines, last spine longest and 12 to 13 rays; maximum height of dorsal fin much less than its length; lateral line scales large, 3 to 4 times body scales; body deep (2 to 2.3 in SL); eye large (2.5 to 2.8 in HL); 9 to 13 moderately large belly scutes anterior to anus.
D VI,12-13; A III,9-10; P 14-16; V I,6; L. Lat. 28-30.
Body pinkish silver; fins pale pink, often with black margins.

Size: To 18 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 200 to 600 m.

References: McCulloch (1914a); Woods & Sonoda (1973); Paulin (1979); Last et al. (1983) as *H. mediterraneus*.



K. J. Graham

Giant sawbelly

Hoplostethus latus McCulloch, 1914

Family: Trachichthyidae p 56

Description: Anus immediately before anal fin; dorsal fin with 5 to 7 spines, last spine longest, and 13 to 14 rays; maximum height of dorsal fin much less than its length; lateral line scales twice as large as body scales; body deep (1.8 to 2.3 in SL); eye of moderate size (3.1 to 3.7 in HL); 8 to 9 large belly scutes ending in large spines.

D V-VII,13-14; A III,9-10; P 12-15; V I,6; L. Lat. 26-30.

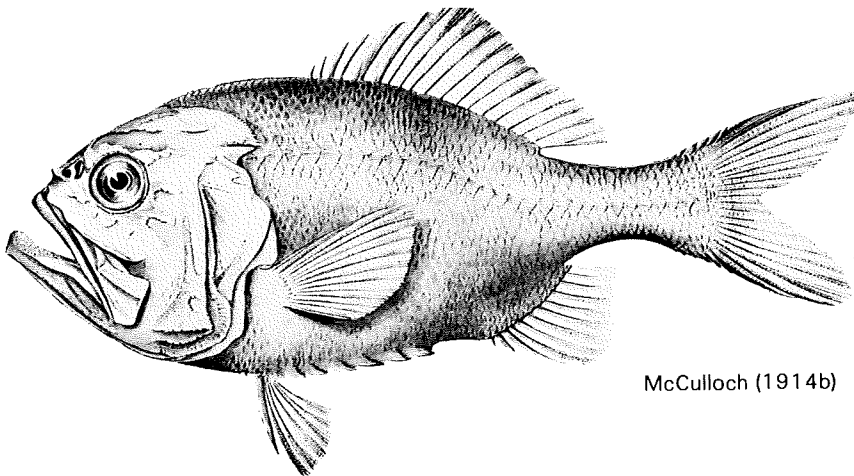
Body rose pink; fins deep pink.

Size: To 53 cm.

Distribution: Great Australian Bight, S.A.

Habitat and Depth: Recorded from the upper continental slope in depths from 250 to 350 m.

References: McCulloch (1914b) as *H. latus* and *H. gigas*; M. F. Gomon pers. comm. (1985).



Violet roughy

Optivus sp. 1

Family: Trachichthyidae p 56

Other Common Names: Slender roughy (incorrectly).

Description: Anus immediately before anal fin; dorsal fin with 4 spines, last spine longest, and 11 rays; maximum height of dorsal fin about equal to its length; lateral line scales same size as body scales; body slender (depth more than 2.8 in SL); 11 to 12 belly scutes.

D IV,11; A III,9; P 10-12; V I,6; L. Lat. 26.

Body violet-brown above silvery violet below; fins orange; each lobe of caudal fin with brown, longitudinal band.

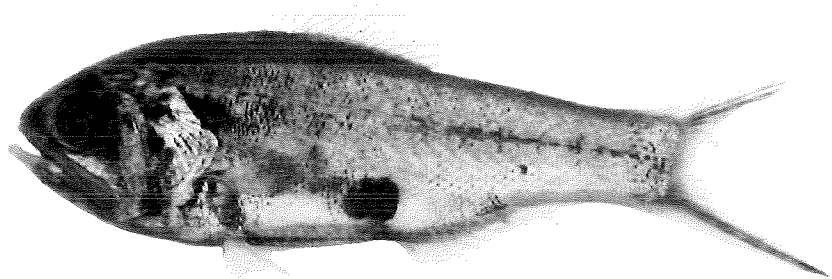
Size: To 10 cm.

Distribution: (Southern Qld), N.S.W. and Vic.

Habitat and Depth: Demersal, on the continental shelf in depths from 20 to 70 m.

Note: Until recently the above species was thought to be the same as the New Zealand species *O. elongatus* (or sometimes *Hoplostethus elongatus*) but the latter species does not occur in Australia. Another undescribed species of *Optivus*, found off southern W.A., lacks the brown bands on the caudal fin.

References: Woods & Sonoda (1973) genus only; M. F. Gomon pers. comm. (1984).



K. J. Graham

Sandpaper fish

Paratrachichthys sp. 1

Family: Trachichthyidae p 56

Other Common Names: Roughy.

Description: Anus between ventral fins bases; dorsal fin with 5 spines, last spine longest and 13 rays; no striated silvery tissue on bases of pectoral fin or along ventral margin of body; maximum height of dorsal fin about equal to its length; lateral line scales same size as body scales; body deep (2.1 to 2.5 in SL); eye of moderate size (2.8 to 3.3 in HL); 11 to 16 strong belly scutes (between anus and anal fin).
D V,13; A III,10; P 12-14; V I,6; L. Lat. 48-52.
Body reddish purple above, sides and belly silvery; fins pink or yellowish and black.

Size: To 25 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 75 to 180 m.

Note: Until recently the above species was thought to be the same as *P. trailli* of New Zealand, but the latter species does not occur in Australia. Two undescribed species of a related genus, *Aulotrachichthys*, have also recently been identified and may have previously been confused with the sandpaper fish. Species of *Aulotrachichthys* have striated silvery tissue on the bases of the pectoral fins, on the isthmus beneath the gill cover and in a narrow strip along the ventral edge of the body. *Aulotrachichthys* sp. 1 occurs in shallow water of S.A. and has striated silvery tissue extending from the base of the ventral fins to well on the caudal peduncle, *Aulotrachichthys* sp. 2 occurs in deep water off the east coast and the striated tissue terminates just beyond the anal fin base.

References: Fowler (1938) and Woods and Sonoda (1973) genera only; M. F. Gomon pers. comm. (1984).



J. G. H. Maxwell

J.L.M. 1985

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Little pineapple fish

Sorosichthys ananassa Whitley, 1945

Family: Trachichthyidae p 56

Description: Anus between ventral fin bases; dorsal fin with 9 to 10 spines, middle spines longest and 8 to 9 rays; striated silvery tissue (obscured by scales) on bases of pectoral fins, on isthmus beneath gill cover and in narrow strip along ventral edge of body from ventral fin bases to caudal peduncle; maximum height of dorsal fin much less than its length; lateral line scales same size as body scales; body deep (2 to 2.3 in SL); eyes of moderate size (3.2 to 3.5 in HL); about 12 strong belly scutes (between anus and anal fin); body scales large and extremely rough.

D IX-X,8-9; A II,8; P 13; V I,5; L. Lat. 24-27.

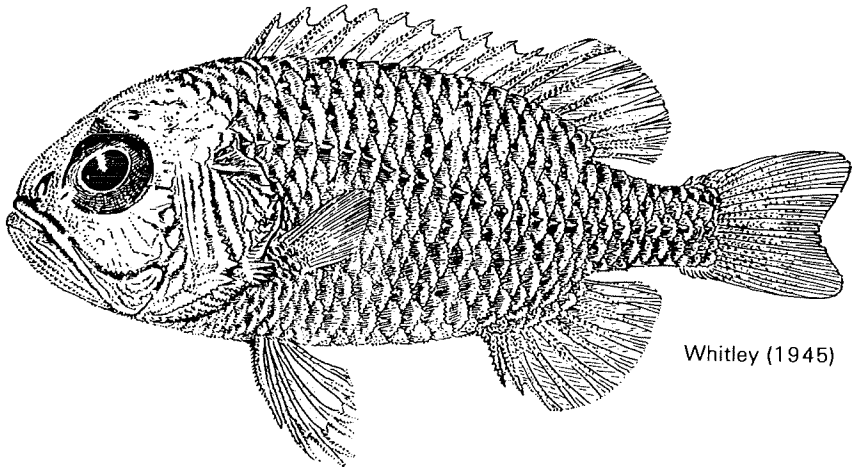
Body dark brown; pectoral and ventral fin bases, mouth and gill cavities black.

Size: To 8 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 50 to 70 m.

References: Whitley (1945); M. F. Gomon pers. comm. (1984).



Imperador

Beryx decadactylus Cuvier, 1829

Family: Berycidae p 56

Description: Dorsal fin shorter than anal fin, with 4 spines and 16 to 20 rays; anal fin with 3 to 4 spines and 28 to 29 rays; body deep (2 to 2.3 in SL); dorsal, anal and ventral fin rays sometimes elongate.

D IV,16-20; A III-IV,28-29; P 15-18; V 1,10; L. Lat. 63-71.

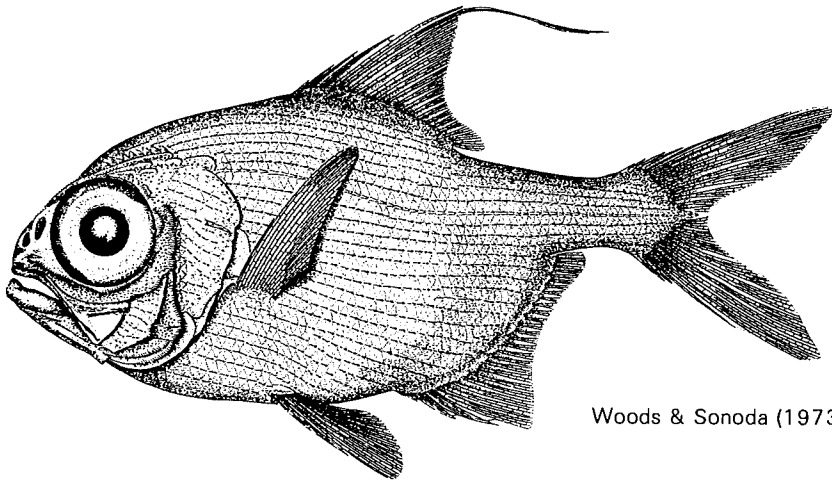
Head and upper body blood-red, sides red with silvery tinge; bones of head shiny white; all fins bright red, darker red at base; mouth cavity pale; eye red.

Size: To 55 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Adults demersal, on the continental slope in depths from 350 to 800 m; young pelagic.

References: Woods & Sonoda (1973); Busakhin (1982).



Woods & Sonoda (1973)

Alfonsin

Beryx splendens Lowe, 1833

Family: Berycidae p 56

Description: Dorsal fin shorter than anal fin, with 4 spines and 13 to 15 rays; anal fin with 4 spines and 26 to 29 rays; body *slender* (2.5 to 2.8 in SL); first dorsal ray sometimes elongate.

D IV,13-15; A IV,26-29; P 17-18; V I,10-13; L. Lat. 71-82.

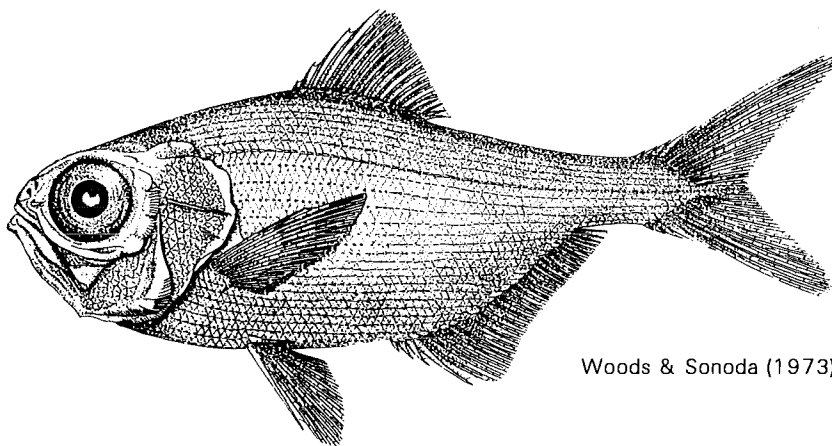
Head and upper body bright red, sides red with silvery tinge; fins, mouth and gill cavities bright red.

Size: To 50 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf in depths from 400 to 600 m.

References: Woods & Sonoda (1973); Busakhin (1982).



Woods & Sonoda (1973)

Redfish

Centroberyx affinis (Günther, 1859)

Family: Berycidae p 56

Other Common Names: Nannygai, golden snapper.

Description: Dorsal fin longer than anal fin, with 7 spines and 11 to 12 rays; anal fin with 4 spines and 12 rays; body deep (depth about 2.2 in SL); caudal fin about equal to head length; outer profile of anal fin more or less parallel to ventral surface of body; 40 to 44 scales in lateral line; 9 to 10 belly scutes between origin of ventral and anal fins (at least in individuals smaller than 20 cm).

D VII,11-12; A IV,12; P 13; V 1,7; L. Lat. 40-44.

Head and body bright red above, creamy white to silvery below; centre of scales bear red spots forming longitudinal, red lines; caudal fin red, other fins pinkish; eye red.

Size: To 46 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: On rocky reefs and muddy substrates of the continental shelf and upper slope in depths from 10 to 450 m; dense schools form close to the sea bottom at dawn and dusk and disperse throughout the water column at night.

Note: Trawled commercially in deep waters on the continental shelf along the N.S.W. coast.

References: McCulloch (1911) as *Austroberyx affinis*; McCulloch (1929); Busakhin (1982).



K. J. Graham

Bight redfish

Centroberyx gerrardi (Günther, 1887)

Family: Berycidae p 56

Other Common Names: Red snapper, king snapper.

Description: Dorsal fin longer than anal fin, with 6 spines and 13 rays; anal fin with 4 spines and 12 to 13 rays; body deep (depth about 2 in SL); caudal fin about equal to head length; hind profile of anal fin almost vertical; 36 to 39 scales in lateral line; 9 to 11 belly scutes between origin of ventral and anal fins.

D VI,13; A IV,12-13; P 13; V 1,7; L. Lat. 36-39.

Head and body crimson with thin, longitudinal, silver lines; fins red, anterior margins silvery white; lateral line white; eye red to reddish silver.

Size: To 66 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on rocky reefs and muddy substrates of the continental shelf and upper slopes in depths from 10 to 500 m.

Note: Two undescribed species of *Centroberyx* are trawled occasionally and may be confused with *C. gerrardi* and *C. affinis*. The yellow-eyed red snapper (*Centroberyx* sp. 1) occurs off S.A. and southern W.A. It has 6 dorsal spines as does *C. gerrardi*, but has bright yellow eyes and reaches a maximum size of 30 cm. The second undescribed species is poorly known, only occurs in the Great Australian Bight, and has a distinctive gold line on the iris encircling the pupil.

References: McCulloch (1911) as *Austroberyx gerrardi*; Munro (1958a) as *Trachichthodes gerrardi*; Busakhin (1982); Hutchins & Thompson (1983); B. Hutchins pers. comm. (1983).



J. Marek

Swallow-tail

Centroberyx lineatus (Cuvier, 1829)

Family: Berycidae p 56

Description: Dorsal fin longer than anal fin, with 6 spines and 14 rays; anal fin with 4 spines and 14 rays; body slender (depth about 2.6 in SL); caudal fin long, about 1½ times head length; 51 scales in lateral line.

D VI,14; A IV,14; P 14; V 1,7; L. Lat. 51.

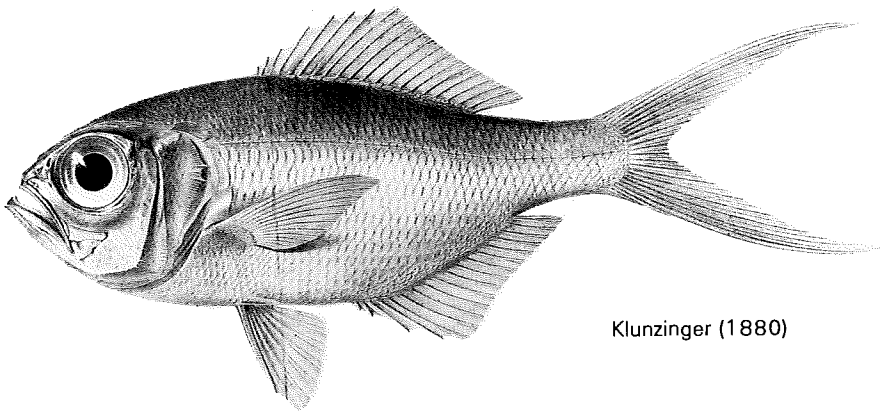
Head and body crimson, centre of scales silvery forming thin, longitudinal lines; fins crimson, spines and outer rays of caudal fin colourless.

Size: To 46 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal on rocky reefs of the continental shelf in depths from 15 to 280 m but most common at about 60 m.

References: Waite & McCulloch (1915) as *Trachichthodes lineatus*; Busakhin (1982).



Klunzinger (1880)

Pineapple fish

Cleidopus gloriamaris De Vis, 1882

Family: Monocentrididae p 66

Other Common Names: Port and starboard lightfish, knightfish.

Description: Bone between eye and maxilla narrow; maxilla almost touching lower edge of eye, not broad at posterior tip; disc-like luminous organ on each side of lower jaw; scale on isthmus very *broad* at base and triangular; vomer with small round patch of teeth.
D VI-VII,12; A 11-12; P 14-15; V I,3-4; L. Lat. 14-15.

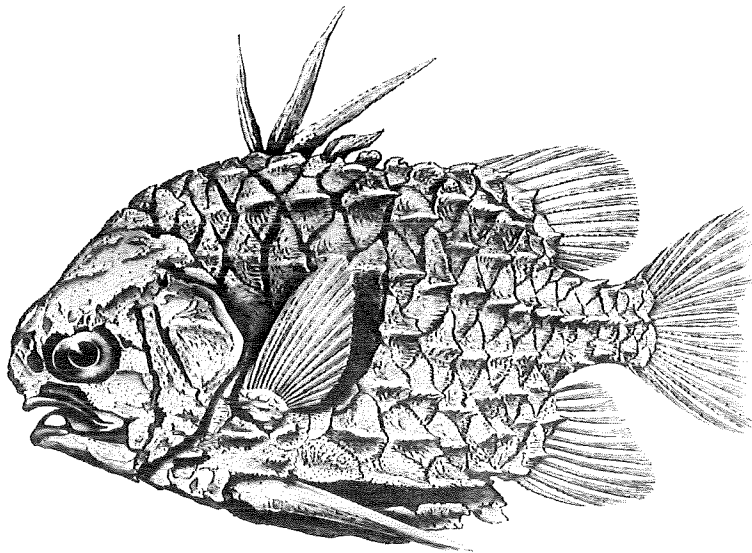
Body and head bright yellow with black-edged scutes; lips, chin and mouth cavity black; luminous organs on lower jaw bright crimson to yellow.

Size: To 22 cm.

Distribution: (Southern Qld), N.S.W., Tas. and southern W.A.

Habitat and Depth: Demersal, on rocky reefs and muddy substrates in depths from 6 to 200 m.

References: Ogilby (1899); Waite (1899).



McCulloch (1921b)

Rosy dory

Cyttopsis roseus (Lowe, 1843)

Family: Zeidae p 58

Description: Dorsal and anal fin bases without bucklers or large scales, fins lying in naked groove; anal fin with 1 to 2 spines and 28 to 31 rays, first spine movable or fixed; ventral fins with 9 rays; ventral midline with series of bucklers forming discontinuous keel between isthmus and anal fin origin; distance from eye to anterior edge of preorbital 3.2 to 5.7 in HL; 69 to 84 lateral line scales; body scales cycloid and deciduous.

D VII-VIII,26-29; A II,28-31; P 13-15; V 9; L. Lat. 69-84.

Body deep pinkish red; ventral fins red, outer posterior two-thirds blackish; outer posterior half of caudal fin red, other fins pink.

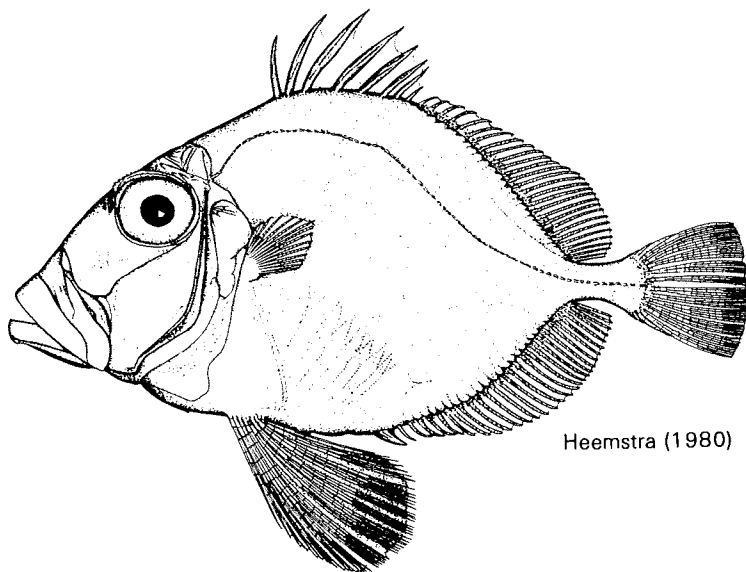
Size: To 28 cm.

Distribution: N.S.W.

Habitat and Depth: Demersal, on the continental shelf and upper slope in depths from 150 to 730 m.

Note: A related but smaller (to 15 cm TL) species, *C. cypho*, also occurs off N.S.W. (and northern W.A.) in depths from 150 to 500 m. It differs from *C. roseus* in having: distance from eye to anterior edge of preorbital 2.5 to 3.4 in HL; 58 to 68 lateral line scales; sides of body with irregular oval blotch below middle of soft dorsal fin.

References: Heemstra (1980); Bray (1983).



Heemstra (1980)

Silver dory

Cyttus australis (Richardson, 1843)

Family: Zeidae p 58

Other Common Names: Bastard dory.

Description: Dorsal and anal fin bases without large bucklers but each with 2 rows of large scales forming low sheath; anal fin with 2 spines and 27 to 30 rays, first spine movable; ventral fins with 1 spine and 6 rays; ventral midline with double row of "zipper-like" scutes between isthmus and origin of ventral fins, no scutes between origins of ventral and anal fins; pectoral fins with 11 rays; *spinous dorsal fin high, longest spine equal to or greater than head length*; 15 to 17 scales between lateral line and spinous dorsal fin; body scales ctenoid and adherent.

D VIII-IX,27-30; A II,28-31; P 11; V I,6; L. Lat. 77-88.

Body rosy silver; membranes of dorsal and ventral fins reddish, outer parts blackish; other fins bright pink.

Size: To 41 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 10 to 350 m.

References: Richardson (1843) as *Capros australis*; Bray (1983).



J. G. H. Maxwell

New Zealand dory

Cyttus novaezelandiae (Arthur, 1885)

Family: Zeidae p 58

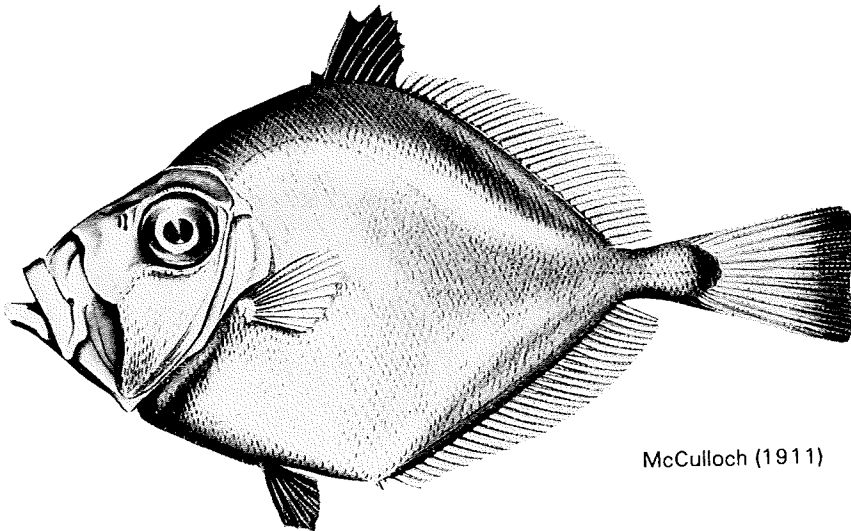
Description: Dorsal and anal fin bases without large bucklers but each with 2 rows of large scales forming low sheath; anal fin with 2 spines and 27 to 30 rays, first spine movable; ventral fins with 1 spine and 6 rays; ventral midline with double row of "zipper-like" scutes between isthmus and origin of ventral fins, no scutes between origins of ventral and anal fins; pectoral fins with 10 to 12 rays; *spinous dorsal fin low, longest spine about equal to eye diameter*; 9 to 11 scales between lateral line and spinous dorsal fins; body scales cycloid and adherent. D VII-VIII,27-30; A II,27-30; P 10-12; V I,6; L. Lat. 70-87. Body and head rosy silver; spinous dorsal, ventral and margin of caudal fins black; soft dorsal, anal and pectoral fins pink.

Size: To at least 40 cm.

Distribution: Southern N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 20 to 450 m.

References: McCulloch (1911); Munro (1957g); Bray (1983).



King dory

Cyttus traversi Hutton, 1872

Family: Zeidae p 58

Other Common Names: McCulloch's dory, lookdown dory, shadow dory, Bight dory.

Description: Dorsal and anal fin bases without large bucklers but each with 2 rows of large scales forming low sheath; anal fin with 2 spines and 33 to 38 rays, first spine immovable; ventral fins with 1 spine and 6 rays; ventral midline with double row of "zipper-like" scutes between isthmus and origin of ventral fins and row of scutes between origins of ventral and anal fins; pectoral fins with 16 to 18 rays; body scales ctenoid and deciduous.

D IX,34-36; A II,33-38; P 16-18; V I,6; L. Lat. 120-136.

Adults silvery pink; ventral fins dusky; other fins grey or pale pink, outer one-third of dorsal fin membrane black. Juveniles (less than 10 cm) silvery with brown blotches on sides.

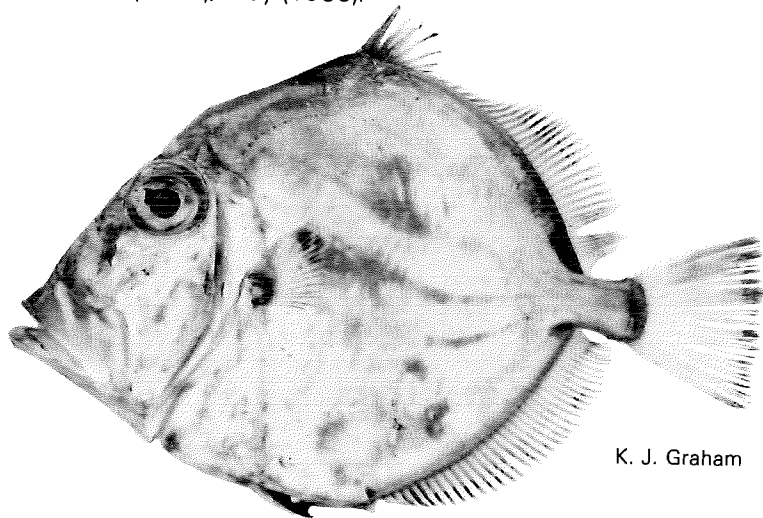
Size: To 54 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Adults demersal, on the continental slope in depths from 200 to 800 m; juveniles pelagic in surface waters.

Note: There is a marked change in body form between adults and juveniles less than 12 cm in length; the latter have filamentous dorsal fin spines and ventral fins bearing leaf-like appendages.

References: Munro (1957g) as *Cyttoidops mccullochi*; James (1976); Heemstra (1980); Bray (1983).



K. J. Graham

Mirror dory

Zenopsis nebulosus (Schlegel, 1845)

Family: Zeidae p 58

Description: Spinous and soft dorsal and anal fin bases with large bony bucklers; 10 to 14 bucklers along dorsal fin base, first 5 to 7 beneath spinous dorsal indistinct; anal fin with 3 spines and 23 to 26 rays, first spine movable; ventral fins with 1 spine and 5 rays; dorsal fin with 8 to 10 spines and 24 to 27 rays; ventral midline with 0 to 3 single, followed by 1 to 4 irregular pairs of keeled bucklers between isthmus and origin of ventral fins; *body scaleless except along lateral line.*

D VIII-IX,24-27; A III,23-26; P 10-13; V I,5.

Body silvery, mirror-like, often with faint, grey, irregular blotches; membrane of spinous dorsal and ventral fins with indistinct, dark, oblique bars.

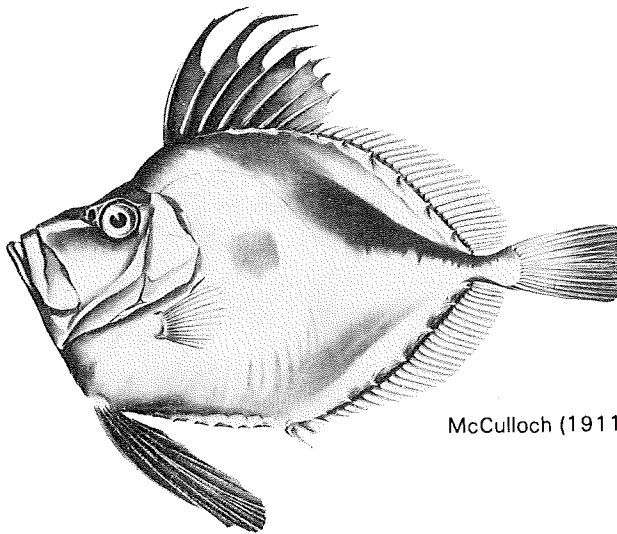
Size: To 70 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 60 to 550 m.

Note: A major species in the south-east trawl fishery, with catches increasing in recent years.

References: McCulloch (1911); Bray (1983).



McCulloch (1911)

John dory

Zeus faber Linnaeus, 1758

Family: Zeidae p 58

Description: Soft dorsal and anal fin bases with large bony bucklers; 3 to 9 bucklers along soft dorsal fin base; anal fin with 4 to 5 spines and 20 to 25 rays; ventral fins with 1 spine and 6 to 7 rays; dorsal fin with 10 spines and 21 to 24 rays; ventral midline with 12 to 27 keeled bucklers between isthmus and origin of ventral fins; body with small cycloid scales.

D X,21-24; A IV-V,20-25; P 12-15; V I,6-7.

Body and head silvery bronze with brownish, wavy, horizontal streaks and large, bluish black spot *ringed in yellow or white* on centre of each side.

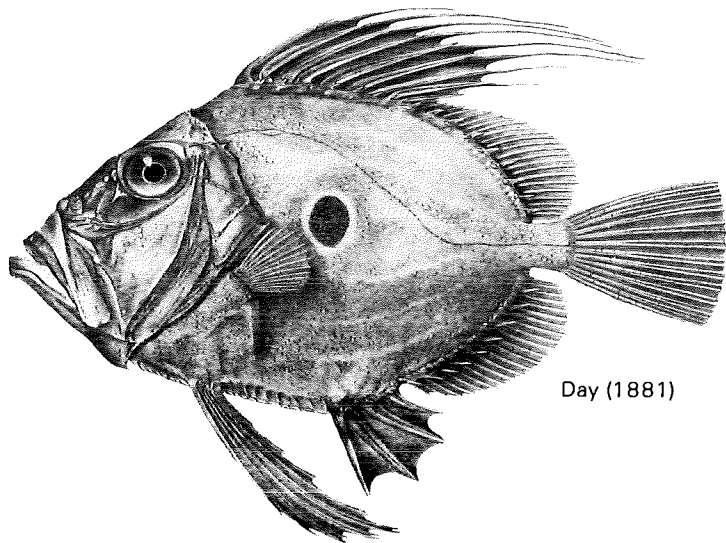
Size: To 66 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 5 to 150 m.

Note: An important trawl species, which is sold fresh; fetches a high market price.

References: Munro (1957g); Heemstra (1980); Bray (1983).



Warty oreo

Allocyttus verrucosus (Gilchrist, 1906)

Family: Oreosomatidae p 58

Other Common Names: Warty dory.

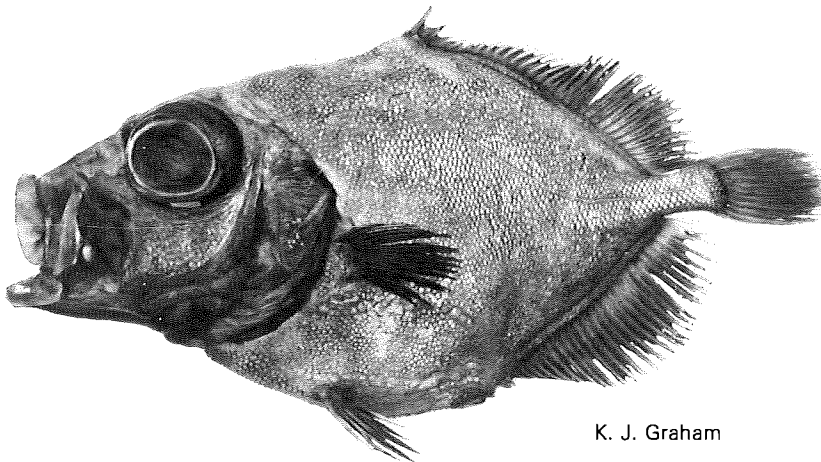
Description: Predorsal profile convex, nearly straight or slightly concave (not rising abruptly before dorsal fin); dorsal spines weak, first much shorter than second; ventral fins with 1 spine and 6 soft rays, not reaching origin of anal fin; scales on sides of body *adherent*; snout without scales; operculum with radiating ridges, not entirely covered with scales; *2 rows of enlarged flat scales beneath pectoral fins.*
D 34-37(total); A 28-33(total); P 17-20; V 1,6; L. Lat. 78-97.
Body dark brownish grey to purple; belly often bluish; gill membranes and ventral and pectoral fins black; other fins greyish black.

Size: To 42 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental slope in depths from 640 to 1100 m.

References: McCulloch (1914b); Heemstra (1980); Last et al. (1983).



K. J. Graham

Spiky oreo

Neocyttus rhomboidalis Gilchrist, 1906

Family: Oreosomatidae p 58

Other Common Names: Spiky dory.

Description: Predorsal profile slightly concave rising sharply to dorsal fin; dorsal spines robust, first much shorter than second; ventral fins with 1 spine and 6 soft rays, reaching beyond origin of anal fin; scales on sides of body *adherent*; *snout entirely covered with scales*; operculum with radiating ridges, not entirely covered with scales; soft rays of dorsal and anal fins *with lateral spinules, rough to touch*.
D 38-41(total); A 33-36(total); P 19-22; V 1,6; L. Lat. 92-114.
Body pale greyish brown; gill membranes and fins black; sides of mouth black.

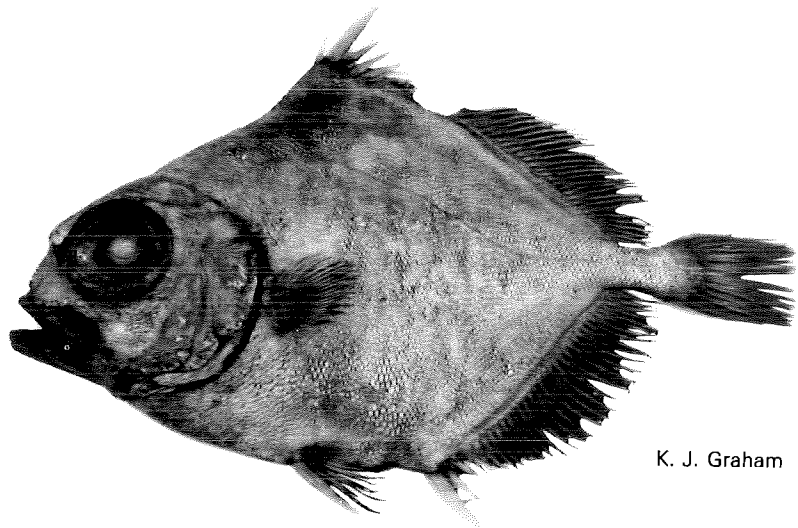
Size: To 42 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental slope in depths from 500 to 1000 m.

Note: Large quantities are trawled off Tasmania but the species is of little commercial value.

References: McCulloch (1914b); Heemstra (1980).



K. J. Graham

Ox-eyed oreo

Oreosoma atlanticum Cuvier, 1829

Family: Oreosomatidae p 58

Other Common Names: Ox-eyed dory.

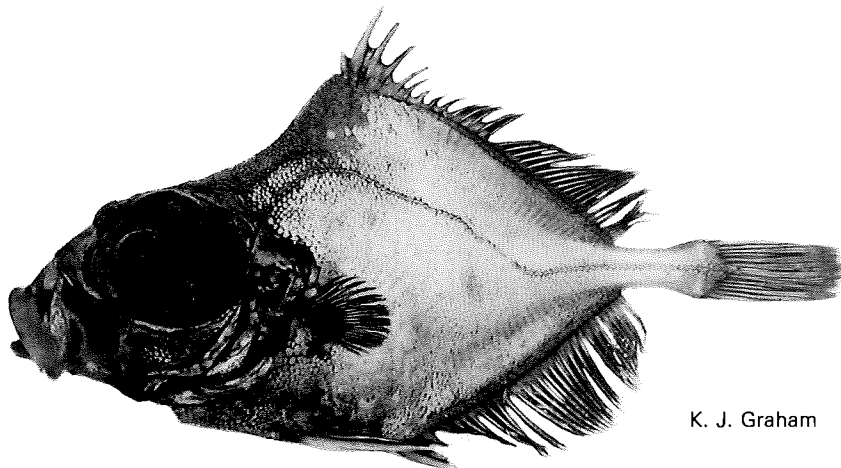
Description: Predorsal profile strongly concave rising sharply to dorsal fin; dorsal spines of moderate strength, first much shorter than second; ventral fins with 1 spine and 7 soft rays, reaching to anal rays; scales on sides of body *deciduous*; snout without scales; operculum with strong spinate ridge, not entirely covered with scales; soft rays of dorsal and anal fins *without* lateral spinules, smooth to touch.
D 35-36(total); A 30-32(total); P 19-21; V 1,7; L. Lat. 82-95.
Body brownish pink; fins dark grey, sometimes with numerous small, brown ocelli on dorsal and anal rays; membrane behind maxilla black.

Size: To at least 21 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental slope in depths from 640 to 820 m.

References: McCulloch (1914b) as *Cyttosoma boops*; Smith (1960); Heemstra (1980).



K. J. Graham

Smooth oreo

Pseudocyttus maculatus Gilchrist, 1906

Family: Oreosomatidae p 58

Other Common Names: Spotted dory.

Description: Predorsal profile nearly straight (not rising abruptly before dorsal spine); dorsal spines weak, first *longer* than second; ventral fins with *1 spine and 5* soft rays, not reaching origin of anal fin; scales on sides of body *small, deciduous*; snout without scales; operculum without strong ridges, entirely covered with scales.

D 39-40(total); A 34-36(total); P 20-21; V 1,5; L. Lat. 102-118.

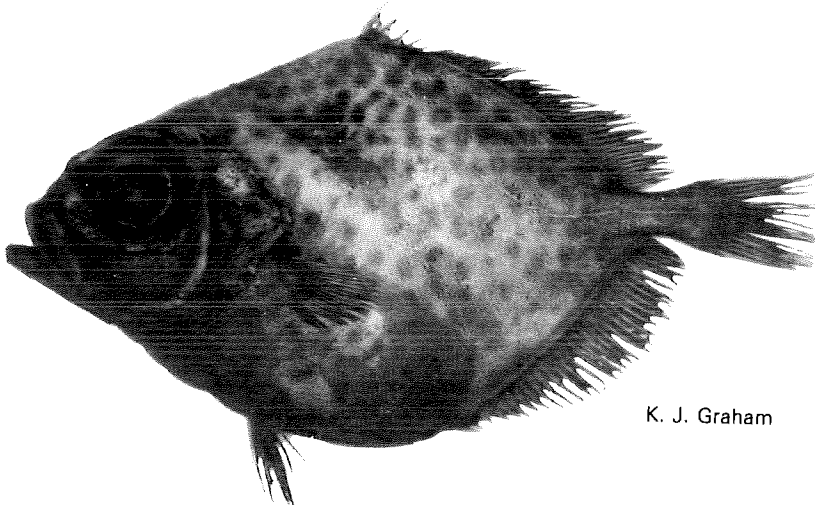
Adults dark brown to bluish brown; fins bluish black to grey; gill membranes and mouth black. Juveniles blue-grey or silver with numerous dark blotches.

Size: To at least 50 cm.

Distribution: N.S.W. and Tas.

Habitat and Depth: Demersal, on the continental slope in depths from 850 to 1000 m.

References: McCulloch (1914b); Smith (1960); Heemstra (1980); Last et al. (1983).



K. J. Graham

Rhomboidal boarfish

Antigonia rhomboidea McCulloch, 1915

Family: Caproidae p 58

Other Common Names: Pink boarfish.

Description: Dorsal fin with 9 spines and 28 or 29 rays; anal fin with 3 spines and 26 to 28 rays; ventral profile of body between lower jaw and ventral fin spine oblique; maximum body depth greater than standard length; ventral fins inserted noticeably above anal fin origin; mouth small, nearly horizontal; 54 to 60 scale rows between operculum and base of caudal fin.

D IX,28-29; A III,26-28; P 1,12. V I,5;

Head and body pink, diffuse, yellow bars on and beneath soft dorsal fin.

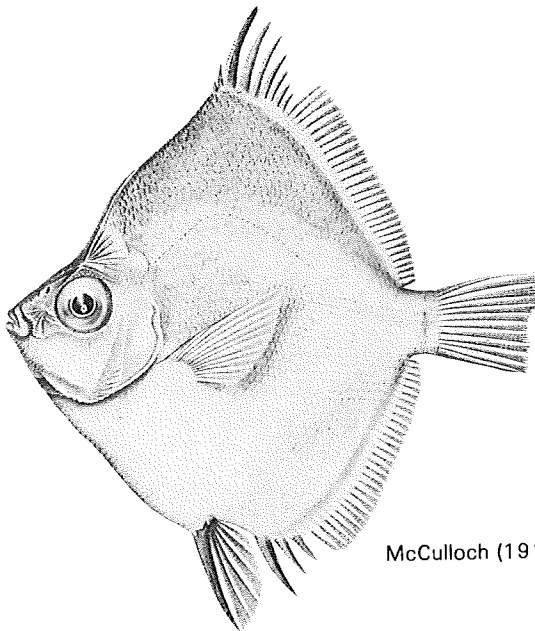
Size: To at least 11 cm.

Distribution: N.S.W., Vic. and W.A.

Habitat and Depth: Generally demersal, on the continental shelf in depths from 400 to 550 m.

Note: A similar species, *A. rubicunda*, may occur in the area: it has a more rounded ventral profile, a maximum body depth equal to the standard length, the ventral fins inserted opposite or below the anal fin origin and about 45 scale rows.

References: McCulloch (1915); Berry (1959); McKay (1970).



McCulloch (1915)

Veilfin

Metavelifer multiradiatus (Regan, 1907)

Family: Veliferidae p 54

Description: Dorsal fin with 21 to 22 spinous and 20 to 23 branched rays, anterior rays increasing in length to greatly elongated fifth or sixth ray; anal fin with 17 to 18 spinous and 16 to 19 branched rays; maxilla not reaching to below front margin of eye; scaly axillary process at bases of ventral fins short and *not free* from body;

D 41-44(total); A 33-36(total); P 15; V 9; L. Lat. 40-42; GR 3+9-10.

Body silvery grey with traces of darker crossbands; oblique, dark grey blotch across cheek beneath eye; large, black blotch on and beneath posterior spinous rays and anterior branched rays of dorsal fin; dorsal fin olive-grey, anal and ventral fins dark grey; several olive-yellow blotches across inner margin of caudal fin.

Size: At least to 25 cm.

Distribution: N.S.W., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 40 to 240 m.

References: Smith (1951) as *Velifer multispinosus*; Walters (1960).



J. G. H. Maxwell

Crested bandfish

Lophotus lacepedei Giorna, 1809

Family: Lophotidae p 32

Other Common Names: Unicorn ribbonfish.

Description: Body depth about 5 to 8 and head length about 7 in total length; upper profile of head overhanging snout and forming keel-like crest; anterior 3 dorsal rays elongate, first with leaf-like lobe at tip; caudal reduced to long, flattened rays.

D about 260; A 12; P 14; V 5.

Body brilliant silver with large silvery spots; fins bright pink; lobe of first dorsal ray bright red.

Size: At least to 140 cm.

Distribution: N.S.W., Vic., Tas. and W.A.

Habitat and Depth: Oceanic; occasionally found stranded in shallow water.

References: Whitley (1933) as *Regilophotes guntheri*; McKay (1970) as *Lophotes guntheri*.



Waite (1914)

Dealfish

Trachipterus arawatae Clarke 1881

Family: Trachipteridae p 32

Other Common Names: Ribbonfish.

Description: Ventral profile of body straight, with large, pointed tubercles; lateral line straight on tail and terminating at base of caudal fin; upper rays of caudal fin upturned and set at steep angle to body axis; scales absent; pectoral fins with 9 to 13 rays; tubercles on body below dorsal fin arranged in verticle rows.

D 166-173; V 5-7; P 9-13; GR 3-5+8.

Head and body bright silver with black stripe along upper surface of head; symphyses of both jaws black; young with 3 to 5 large, dark grey spots on sides; fins pink.

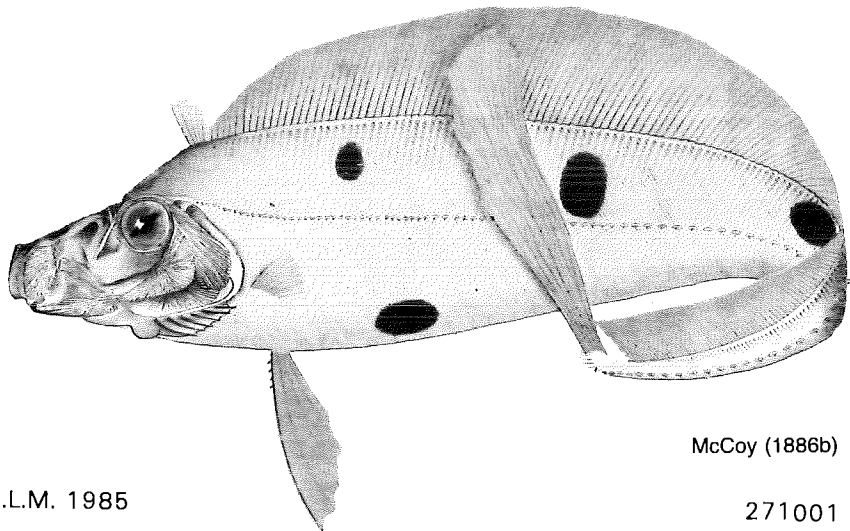
Size: To at least to 200 cm.

Distribution: N.S.W., Vic., Tas. and W.A.

Habitat and Depth: Oceanic in depths to 1000 m, but also entering estuaries.

Note: There is some confusion, as to how many species of *Trachipterus* occur in southern Australian waters, with recent literature being contradictory. *Desmodema polystictum* also occurs off N.S.W., although it is probably restricted to warmer waters. It differs from *Trachipterus* in having: tubercles along midventral line of body not sharp-tipped and caudal fin rays set parallel to body axis.

References: Whitley (1927) as *T. jacksonensis*; Walter & Fitch (1960) genus only; Rosenblatt & Butler (1977); Scott (1983); Heemstra & Kannemeyer (1984).



McCoy (1886b)

Oarfish

Regalecus glesne Ascanius, 1772

Family: Regalecidae p 32

Other Common Names: King of herrings.

Description: Gill rakers numerous, long and spiny; gastric caecum extends well past anus; dorsal fin consisting of about 420 rays, first 10 to 17 long and stiff, forming high crest; ventral fins each of 1 thick ray with small paddle at tip.

D about 420; P 12-13; V 1; C 3-4; GR 40-58.

Body silver with bright blue-purple reflections; wavy, black bands and blotches on sides; fins bright pink to red.

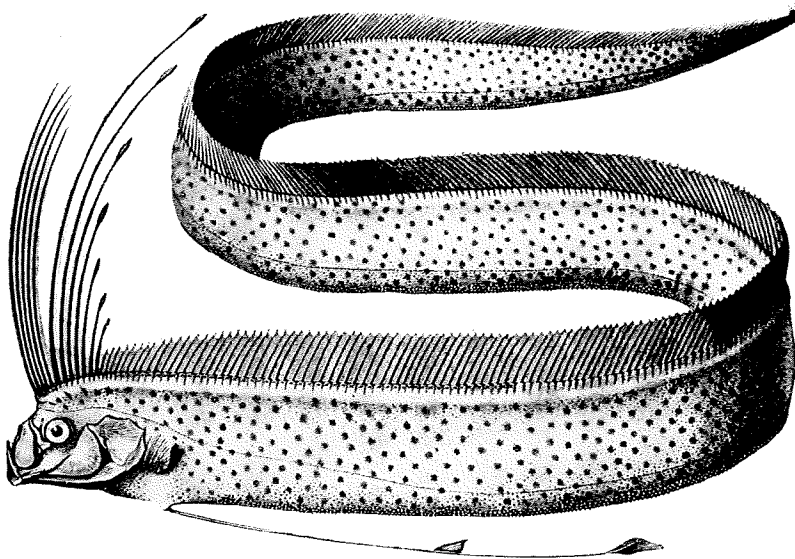
Size: To 1100 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Oceanic, occasionally cast up on beaches.

Note: Another species, Benham's streamerfish (*Agrostichthys benhami*), also occurs off Tas. It has only 8 to 10 gill rakers, the gastric caecum ends before the anus, and only 1 to 3 rays form the dorsal crest.

References: McCoy (1887b) as *R. banksi*; Whitley (1933) as *R. pacificus*; Scott (1934, 1982, 1983); Walters & Fitch (1960); Trunov (1982).



Valenciennes (1843)

Rough flutemouth

Fistularia petimba Lacépède, 1803

Family: Fistulariidae p 36

Description: Elongate bony plates embedded in skin along midline of back; ossifications on posterior lateral line with backwardly directed spine; interorbital concave and without longitudinal ridges; ridges on snout serrate, upper central ridges parallel; skin slightly rough to touch. D 14-16; A 14-15; P 15-17; V 6;

Body reddish to orange-brown above, silvery below; fins orange.

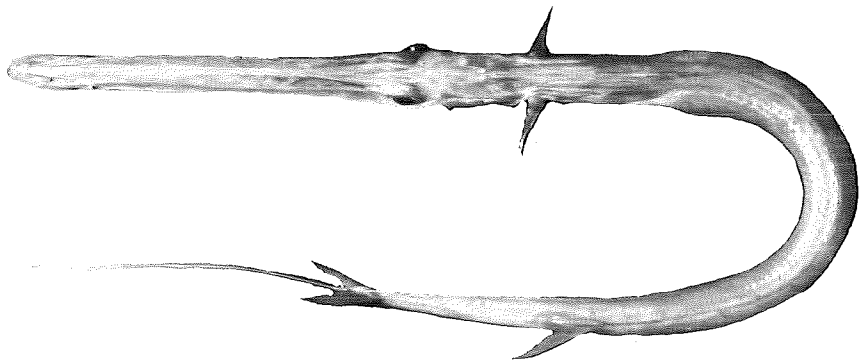
Size: To 185 cm.

Distribution: (N.T., Qld), S.A. and W.A.

Habitat and Depth: Occurring on the continental shelf in depths from 10 to 200 m.

Note: A similar species, the smooth flutemouth (*F. commersonii*), also occurs off N.S.W. and W.A. It differs from the rough flutemouth in having: no bony plates embedded in skin along back; interorbital flat with longitudinal ridges; body olive-brown above with 2 blue lines or rows of blue spots along back.

References: Whitley & Allan (1958) as *F. villosa*; Fritzsche (1976).



G. J. West

Banded bellowsfish

Centriscops humerosus (Richardson, 1848)

Family: Macrorhamphosidae p 62

Other Common Names: Buglet.

Description: Body elevated, depth 2.2 to 2.4 in SL; no patch of bristles on nape; first and second dorsal fins barely separated; dorsal profile between eyes and dorsal fin base undulating, with prominent hump on nape in large specimens; body with coarse prickles, rough to touch; snout elongate, 1.5 to 1.6 times length of remainder of head (each measured from forward margin of eye).

D VI-VII+15-19; A 17-21; P 14-18; V 1,4-5.

Body and head silvery or white with up to 5 oblique, orange, dark pink, blue-grey or black bands on sides; fins orange-red.

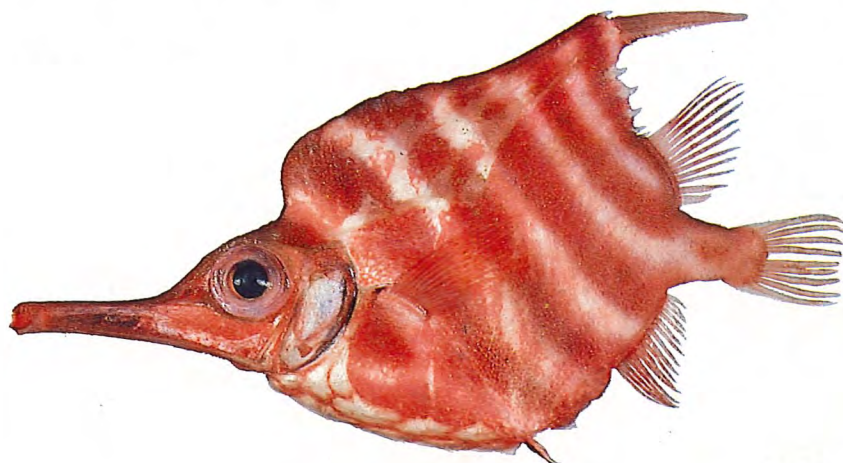
Size: To 25 cm.

Distribution: N.S.W., Vic., Tas., S.A. and south-west W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 35 to 1000 m; most common in depths from 400 to 750 m.

Note: Dorsal hump, serrations on orbit, size of eye and second dorsal spine and colour are thought to change with age in the banded bellowsfish; this has led to taxonomic confusion and the family is in urgent need of revision.

References: McCulloch (1914b); Mohr (1937); Last et al. (1983) as *C. obliquus*; M. F. Gomon pers. comm. (1984).



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Common bellowsfish

Macrorhamphosus scolopax (Linnaeus, 1758)

Family: Macrorhamphosidae p 62

Other Common Names: Snipefish.

Description: Body elongate, depth 2.9 to 4.3 in SL; no patch of bristles on nape; first and second dorsal fins separated, interdorsal distance equal to or greater than length of second dorsal fin; depressed second dorsal spine reaching beyond base of second dorsal fin, origin nearer to caudal fin base than eye.

D IV-V+11-12; A 19; V I,4-5.

Head and body orange-pink above, silvery with violet tinge below; fins yellowish pink.

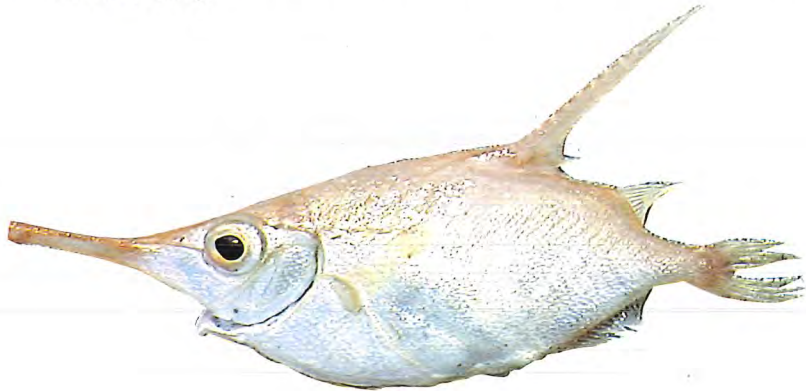
Size: To 15 cm.

Distribution: (Old), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: A midwater species occurring over the continental shelf and slope in depths from 45 to 600 m.

Note: *M. gracilis* also occurs in surface waters off N.S.W., Vic. and Tas. It has a more elongate body and a shorter second dorsal spine (depressed spine not reaching beyond second dorsal fin base) than *M. scolopax* and is grey in colour. However *M. scolopax* also exists in 2 forms: a deep-bodied form which feeds on benthic organisms and a slender-bodied form which feeds on planktonic organisms. Within these 2 forms sexual dimorphism is evident with the females tending to be more slender-bodied than the males.

References: Mohr (1937); Munro (1958c) as *M. elevatus*; Scott (1961); Clarke (1984).



J. G. H. Maxwell

Trumpet-fish

Notopogon fernandezianus (Delfin, 1899)

Family: Macrorhamphosidae p 62

Description: Body elevated, depth 2.2 to 2.6 in SL; patch of bristles always present on dorsal surface above or behind pectoral fin base; dorsal profile between eyes and dorsal fin base undulating, with prominent hump on nape in adults; body with fine prickles, velvety to touch; snout relatively short, 1.2 to 2.0 times length of remainder of head (each measured from front margin of eye).

D VII,15+16; A 17-18; P 15-16.

Head and body rosy pink with silver-yellow tinge; fins white or pinkish.

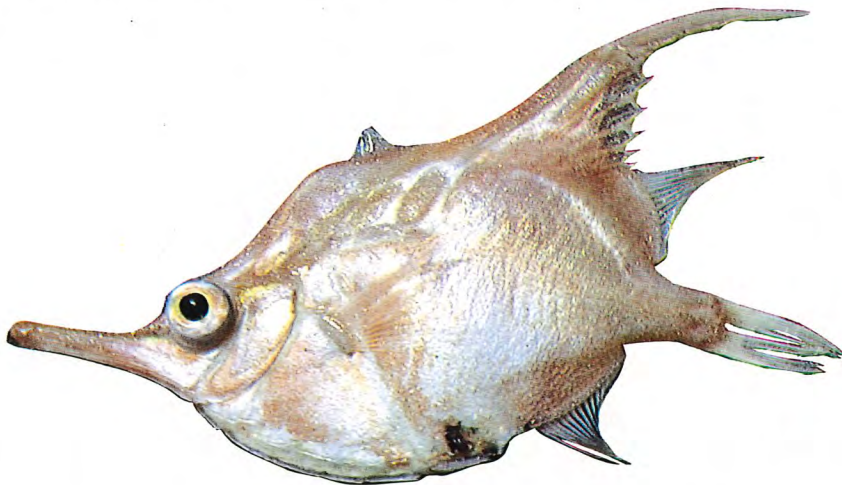
Size: To 18 cm.

Distribution: N.S.W. and Vic.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 150 to 580 m.

Note: Identification of *Notopogon* species are difficult because body shape and development of bristles changes with age and perhaps sex.

References: Mohr (1937); M. F. Gomon pers. comm. (1984).



J. G. H. Maxwell

Crested bellowsfish

Notopogon lilliei Regan, 1914

Family: Macrorhamphosidae p 62

Other Common Names: Bugler.

Description: Body elevated, depth 2.1 to 2.4 in SL; patch of short bristles present (at least in adults) on dorsal surface above or before opercular margin; dorsal profile between eyes and dorsal fin base *straight to convex* (forming crest); body with fine prickles, velvety to touch.
D VI-VII+14-16; A 17-19; P 16-18; V I,4-5.

Body purplish brown above silvery to pale green below; broad, oblique, purplish brown bar extending from behind pectoral fin base to origin of anal fin; head variable, yellow, green, purplish brown or orange; operculum lime-green with silvery white blotches; fins whitish or pink.

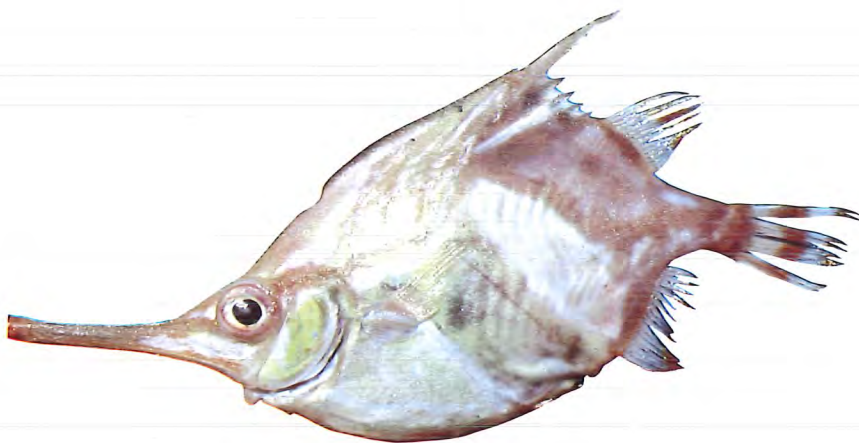
Size: To 27 cm.

Distribution: Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf and upper slope in depths from 80 to 600 m; most common in depths from 150 to 300 m.

Note: See *Note* under *Notopogon fernandezianus*.

References: McCulloch (1914b); Mohr (1937) and Scott (1961) as *N. lilliei* and *N. endeavouri*; Munro (1958c).



J. G. H. Maxwell

Common seadragon

Phyllopteryx taeniolatus (Lacépède, 1804)

Family: Syngnathidae p 36

Other Common Names: Weedy seadragon.

Description: Caudal fin absent, tail slightly prehensile; snout long and compressed; body rings with small spines; head and body with 10 to 14 long *leaf-like flaps*, sometimes in pairs but rarely branched; superior trunk and tail ridges discontinuous; lateral trunk and superior tail ridges continuous; inferior trunk and tail ridges discontinuous; dorsal fin origin on first to second trunk ring; brood area under tail.

D 34-42; A 4; P 23-26; trunk rings 24-27; tail rings 51-59.

Head and body pinkish red to orange with minute, yellowish spots; ventral surface of trunk with 6 to 8 bluish to purplish black, vertical bars; second half of tail blackish; base of dorsal fin yellow; leaf-like flaps reddish to purplish with blackish margins.

Size: To at least 46 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, recorded from the intertidal zone to a depth 50 m.

Note: The leafy seadragon (*Phycodurus eques*) is also occasionally trawled off S.A. and southern W.A. It is yellowish to pale orange with white transverse lines on the trunk, each leaf-like flap has many branches and the inferior trunk and tail ridges are continuous.

References: McCoy (1882) as *Phyllopteryx foliatus*; Whitley & Allen (1958); Dawson (1982).



McCoy (1882)

Spiny pipehorse

Solegnathus spinosissimus (Günther, 1870)

Family: Syngnathidae p 36

Other Common Names: Spiny seadragon.

Description: Caudal fin absent, tail prehensile; snout long and compressed, depth 5.5 to 10 in length; body rings densely covered with small spines; head and body without leaf-like flaps; superior trunk and tail ridges discontinuous; lateral trunk and superior tail ridges continuous; inferior trunk and tail ridges continuous; dorsal fin origin on first to third tail ring; brood area under tail.

D 27-36; A 4; P 20-23; trunk rings 17-18; tail rings 32-37.

Head and body pinkish red to brownish pink; operculum with yellowish spots; about 25 bright yellow, vertical bars on trunk, blotches and spots on tail; ventral surface of trunk and tail bright red.

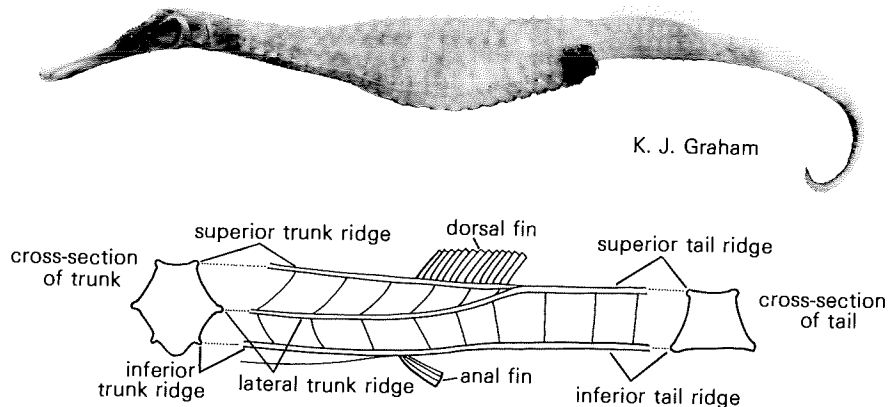
Size: To 49 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, recorded from the continental shelf to a depth of 230 m.

Note: An allied species, *S. robustus* also occurs in Bass Strait and the Great Australian Bight at depths from 40 to 70 m. Its snout is deeper (snout depth in length 3.5 to 4.5) and the body rings have short ridges between the principal ridges. There are at least 30 species of syngnathids in southern waters but most occur in very shallow, seagrass habitats and are unlikely to be captured in a demersal trawl net.

References: Munro (1958b) and Whitley & Allen (1958) as *S. fasciatus*; Dawson (1982); Last et al. (1983).



J.L.M. 1985

282029

Goblinfish

Glyptauchen panduratus (Richardson, 1850)

Family: Scorpaenidae p 50

Description: Body covered with small scales, head without scales; spinous dorsal fin with 16 to 17 spines; nape deeply excavated.

D XVI-XVII,7; A III,5-6; P 14-15; V I,5.

Head and body dark brown to black, sometimes mottled with red; light brown, whitish or reddish band crossing tail and extending through posterior half of soft dorsal and anal fins; caudal fin with red band or white with dark spots.

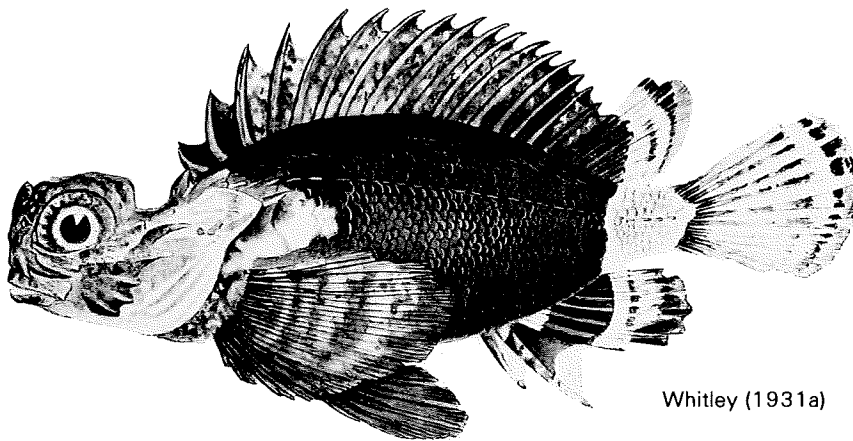
Size: To 20 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 5 to 60 m.

Note: Most scorpaenids, especially the goblinfish and the following species possess venomous spines which are capable of inflicting excruciating pain.

References: Whitley (1931a) as *G. insidiator*.



Cobbler

Gymnapistes marmoratus (Cuvier, 1829)

Family: Scorpaenidae p 50

Other Common Names: Soldierfish, South Australian cobbler.

Description: Head and body without scales; spinous dorsal fin with 12 to 13 spines (tips not free and greatly produced); 1 long, backward-directed spine on each side of snout, capable of extending sideways; bony ridge crossing cheek below eye without spines.
D XII-XIII,8-9; A III,5-6; P 12; V I,5.

Head and body yellowish, whitish or fawn with large, irregular brown, black, green or grey blotches; head with broad, dark, vertical bar passing through eye; fins with dark blotches and narrow, white margins.

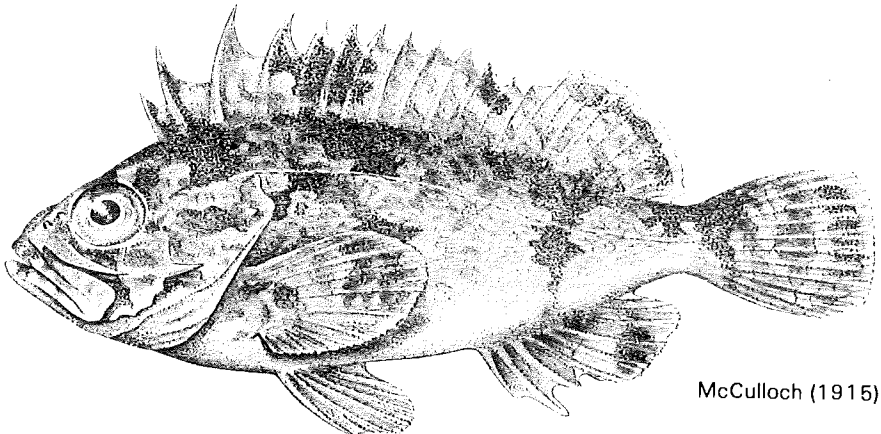
Size: To at least 22 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Generally demersal in inshore waters.

Note: The cobbler is often confused with the fortesque (*Centropogon australis*) which occurs off N.S.W. and eastern Vic. The fortesque differs from the cobbler in having scales.

References: McCulloch (1915) as *Pentaroge marmorata*; de Beaufort & Briggs (1962).



Red gurnard perch

Helicolenus percooides (Richardson, 1842)

Family: Scorpaenidae p 50

Other Common Names: Red ocean perch, ocean perch, sea perch, red gurnard scorpionfish, kuriarki.

Description: Body covered with small scales; spinous dorsal fin with 12 spines (tips not free and greatly produced); bony ridge crossing cheek below eye without spines; pectoral fins with 18 to 20 rays.
D XII,12; A III,5; P 18-20; V I,5.

Head and body reddish orange, sometimes with small, brownish spots; 3 to 4 vertical, diffuse, reddish brown to yellow bands on sides; fins reddish orange and white, caudal fin sometimes with dark crossbar.

Size: To at least 47 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf and slope to a depth of 750 m.

Note: The red gurnard perch is an important commercial species in southern Australia, however there are probably several species masquerading under the name of *Helicolenus percooides*.

References: Eschmeyer (1969), Scott et al. (1974) and Last et al. (1983) as *H. papillosus*; Paulin (1982); C. D. Paulin pers. comm. (1984).



T. Carter

Little scorpionfish

Maxillicosta scabriceps Whitley, 1935

Family: Scorpaenidae p 50

Description: Body covered with small scales; spinous dorsal fin with 13 moderately elongate spines; bony ridge crossing cheek below eye bearing several spines; *maxilla naked and with 5 to 7 strong longitudinal ridges*; upper margin of orbit with 8 to 13 well developed spines; nasal bone with 2 to 3 spines; interorbital groove deep (depth 1.7 to 2.2 in width); scales behind head above lateral line without central ridge.

D XIII,7; A III,5; P 21-24; V I,5; GR 11-14.

Head and body pale brownish above, paler below; large, dark brown blotches on sides of body and smaller blotches on head; dorsal fin brown with white outer margin and black blotch between spines 4 and 9; pectoral fins white with brownish yellow bands.

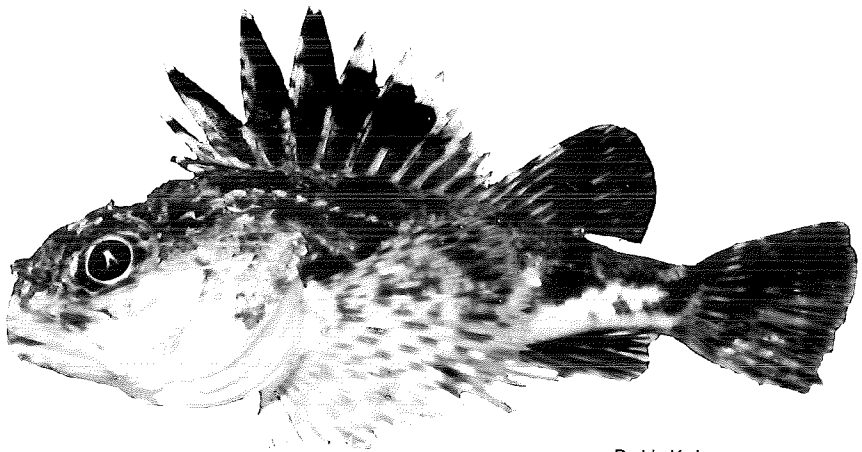
Size: To 12 cm.

Distribution: Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, in inshore waters.

Note: Species belonging to this genus in southern waters are superficially similar. They may be distinguished only by comparing head spines and the relative depth of the interorbital.

References: Scott et al. (1974) as *Neosebastes scabriceps*; Eschmeyer & Poss (1976).



R. H. Kuiter

Whitley's scorpionfish

Maxillicosta whitleyi Eschmeyer & Poss, 1976

Family: Scorpaenidae p 50

Description: Body covered with small scales; spinous dorsal fin with 13 moderately elongate spines; bony ridge crossing cheek below eye bearing several spines; *maxilla naked and with 5 to 7 strong longitudinal ridges*; upper margin of orbit with 12 to 19 weakly developed spines; nasal bone with 4 to 9 spines; interorbital groove shallow (depth 2.5 to 3.3 in width); scales behind head above lateral line without central ridge.

D XIII,7; A III,5; P 20-23; V I,5; GR 10-11.

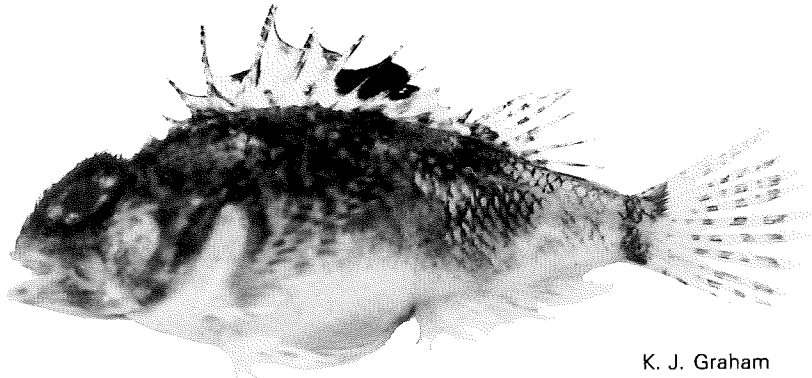
Head and body pale brownish above, paler below; some dark patches on sides of body and head; dorsal fin with black blotch between spines 4 and 9.

Size: To at least 7 cm.

Distribution: (Southern Qld), N.S.W., Vic. and S.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 20 to 140 m.

References: Eschmeyer & Poss (1976).



K. J. Graham

Black-spotted gurnard perch

Neosebastes nigropunctatus McCulloch, 1915

Family: Scorpaenidae p 50

Description: Body covered with small scales; spinous dorsal fin with 13 moderately elongate spines; bony ridge crossing cheek below eye bearing spines; maxilla scaly and without longitudinal ridges; head above and just behind eye *without* deep, naked, transverse groove; pectoral fins short, not reaching to anus and without evenly rounded margin (some lower rays longer than those above); lateral line with about 35 pored scales.

D XIII,8; A III,5-6; P 21; V I,5; L. Lat. 35.

Head and body reddish orange with brownish spots on scales; bases of scales of upper half of head and sides with numerous small, distinct, *black dots*; dorsal fin pale orange-red, inner membrane dusky; pectoral and anal fins with small, orange spots arranged in bands; caudal fin pale with orange spots on inner and outer margins and dusky crossband at centre.

Size: To 36 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 30 to 200 m.

References: McCulloch (1915).



J. G. H. Maxwell

Rough gurnard perch

Neosebastes pandus (Richardson, 1842)

Family: Scorpaenidae p 50

Other Common Names: Gurnard scorpionfish.

Description: Body covered with small scales; spinous dorsal fin with 13 moderately elongate spines; bony ridge crossing cheek below eye bearing several spines; maxilla scaly and without longitudinal ridges; head above and just behind eye with deep naked *transverse groove*; *pectoral fins long*, extending beyond origin of anal fin and with evenly rounded margin; lateral line with about 45 pored scales.
D XIII,8; A III,5; P 18-20; V 1,5; L. Lat. 45-46.

Head dark brown, maxilla, chin and throat orange; body pale brown with brownish black blotches above and orange blotches below; small, dark brown to black spots scattered over head and sides of body; dorsal fin light blue with orange bands; pectoral fins pale green with brown and reddish spots; caudal fin pale with dark brown crossband on outer half and at base.

Size: To 50 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal on soft substrates, on the continental shelf in depths from 5 to 140 m.

References: Richardson (1842) as *Scorpaena panda*; McCulloch (1915).



J. G. H. Maxwell

Gulf gurnard perch

Neosebastes panticus McCulloch & Waite, 1918

Family: Scorpaenidae p 50

Other Common Names: Gulf perch.

Description: Body covered with small scales; spinous dorsal fin with 13 moderately elongate spines; bony ridge crossing cheek below eye bearing several spines; maxilla scaly and without longitudinal ridges; head above and just behind eye with deep, naked, *transverse groove*; pectoral fins short, extending to just beyond anus and without evenly rounded margin (some lower rays longer than those above); lateral line with about 37 pored scales.

D XIII,8; A III,5; P 20-21; V I,5; L. Lat. 37.

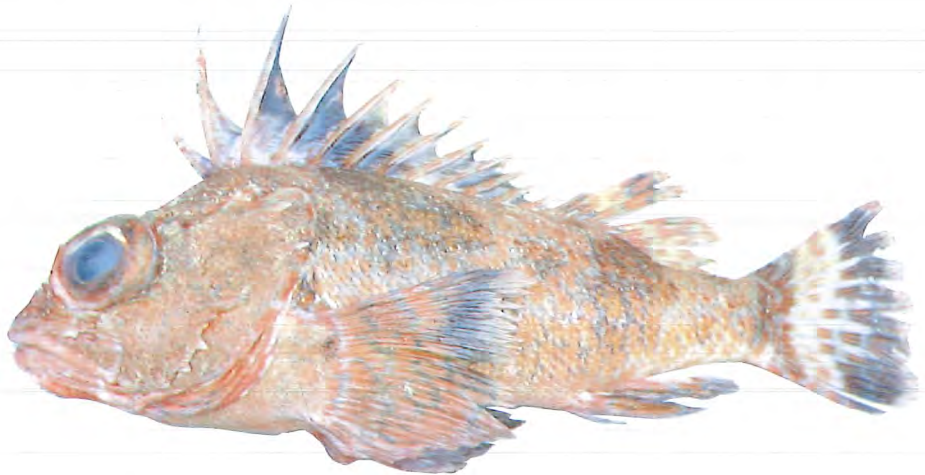
Head pale to reddish brown with brown and orange blotches; body pale to reddish brown with darker blotches forming 1 to 2 irregular, vertical bands on sides; lower sides of body with small, orange spots; dorsal fin with dark blotch on membrane between spines 3 to 8; pectoral and caudal fins with orange spots arranged in bands and broad, dark band on outer half, margins pale.

Size: To about 40 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 10 to about 100 m.

References: McCulloch & Waite (1918).



J. G. H. Maxwell

Ruddy gurnard perch

Neosebastes scorpaenoides Guichenot, 1867

Family: Scorpaenidae p 50

Other Common Names: Red-spotted gurnard perch, common gurnard perch.

Description: Body covered with small scales; spinous dorsal fin with 13 moderately elongate spines; bony ridge crossing cheek below eye bearing spines; maxilla scaly and without longitudinal ridges; head above and just behind eye *without* deep, naked, transverse groove; pectoral fins short, extending to between anus and anal fin and with evenly rounded margin; lateral line with about 45 pored scales.

D XIII,8; A III,5; P 20-22; V I,5; L. Lat. 45-48.

Head reddish green, lower jaw pinkish; body with overlapping red, green, black and white blotches above, white below; pectoral fins yellow to green with reddish spots and dark outer margin; caudal fin pinkish or yellowish with dark band on outer half, margin pale.

Size: To 40 cm.

Distribution: Southern N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Generally demersal, on the continental shelf in depths from 2 to 140 m.

References: McCoy (1889c).



K. J. Graham

Thetis fish

Neosebastes thetidis (Waite, 1899)

Family: Scorpaenidae p 50

Other Common Names: Gurnard perch, rough gurnard perch.

Description: Body covered with small scales; spinous dorsal fin with 13 moderately elongate spines; bony ridge crossing cheek below eye bearing several strong spines; maxilla scaly and without longitudinal ridges; head above and just behind eye *without* deep, naked, transverse groove; pectoral fins short, extending to anus and with evenly rounded margin; lateral line with 38 pored scales.
D XIII,9; A III,5; P 20; V I,5 L. Lat. 38.

Head and body pale brownish orange above, pinkish or whitish below; 3 dark brown to black blotches on back beneath dorsal fin, 1 large blotch behind upper angle of operculum, 2 small blotches on middle of side and 1 large blotch between soft dorsal and anal fins; pectoral and caudal fins with broad, dark band on outer half, margins white.

Size: To 33 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 45 to 260 m.

References: Waite (1899) as *Sebastes thetidis*.



J. G. H. Maxwell

Red rock cod

Scorpaena papillosus (Schneider, 1801)

Family: Scorpaenidae p 50

Other Common Names: Chained scorpionfish, common red gurnard.

Description: Body covered with small scales; spinous dorsal fin with 12 spines (tips not free and greatly produced); bony ridge crossing cheek below eye bearing several large spines; ridge above upper margin of eye spiny; 1 pair of (coronal) spines on dorsal midline, level with rear margin of eyes; pectoral fins with 15 to 16 rays; 43 to 47 diagonal rows of scales.

D XII,9-10; A III,5; P 15-16; V I,5.

Head and body mottled reddish orange to bright crimson; *males* with large, black spot on posterior portion of spinous dorsal fin.

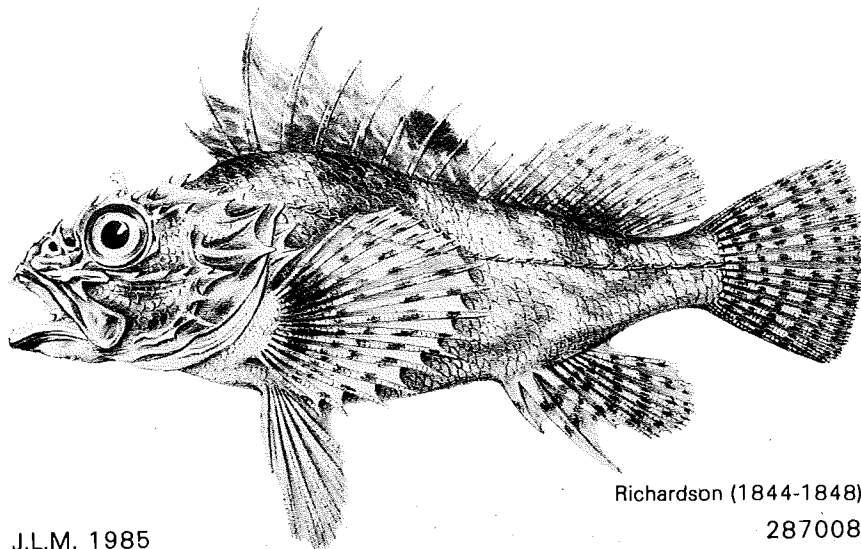
Size: To 30 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, occurring on rocky bottoms in depths from 5 to 50 m.

Note: Two similar species *S. cardinalis* and *S. cooki* also occur off N.S.W. Both lack coronal spines on the head (in contrast to *S. papillosus*) and may be distinguished from each other as follows: *S. cardinalis* has 48 to 53 diagonal rows of scales and no embedded scales on the breast; *S. cooki* has 64 to 67 diagonal rows of scales and embedded scales on the breast.

References: Scott et al. (1974) as *Ruboranga ergastulorum*; Paulin (1982); Last et al. (1983) as *S. esgastulorum*.



J.L.M. 1985

Richardson (1844-1848)

287008

Red gurnard

Chelidonichthys kumu (Lesson & Garnot, 1826)

Family: Triglidae p 40

Other Common Names: Kumu gurnard.

Description: Body smooth, covered in minute cycloid scales (about 110 diagonal rows along sides); humeral spine shorter than eye diameter; second dorsal fin with 15 to 16 rays and row of spiny plates along base; each side of snout tip with few minute spines; dorsal profile of snout straight or slightly concave; caudal fin slightly emarginate.

D VIII-X+15-16; A 14-15; P 11+3 detached; V I,5; L. Lat. 62-65.

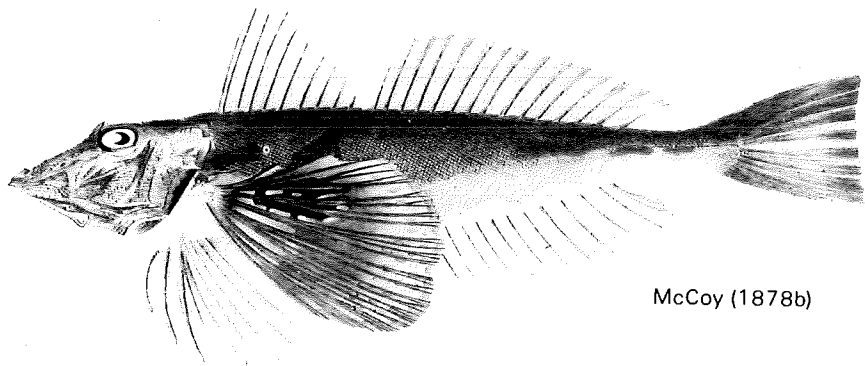
Body red with brighter red blotches above, white below; upper surface of pectoral fin green with numerous bright blue spots, blue outer margin and large, black blotch with white spots near inner margin of fin; other fins deep pink.

Size: To 58 cm.

Distribution: (Qld), N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf to a depth of about 200 m.

References: McCoy (1878a) as *Trigla kumu*; Matsubara & Hiyama (1932); Ochiai & Okada (1966).



McCoy (1878b)

Grooved gurnard

Lepidotrigla modesta Waite, 1899

Family: Triglidae p 40

Other Common Names: Short-finned gurnard, cocky gurnard.

Description: Body rough, covered in moderately large ctenoid scales (less than 75 diagonal rows along sides); second dorsal fin with 15 to 16 rays and with row of spiny plates along base; lateral line scales notably larger than body scales, without prominent spines; each side of snout tip with several moderate spines; dorsal profile of snout concave; head above and just behind eye with deep, transverse groove; caudal fin emarginate.

D IX+15-16; A 16; P 11+3 detached; V 1,5; L. Lat. 58-62.

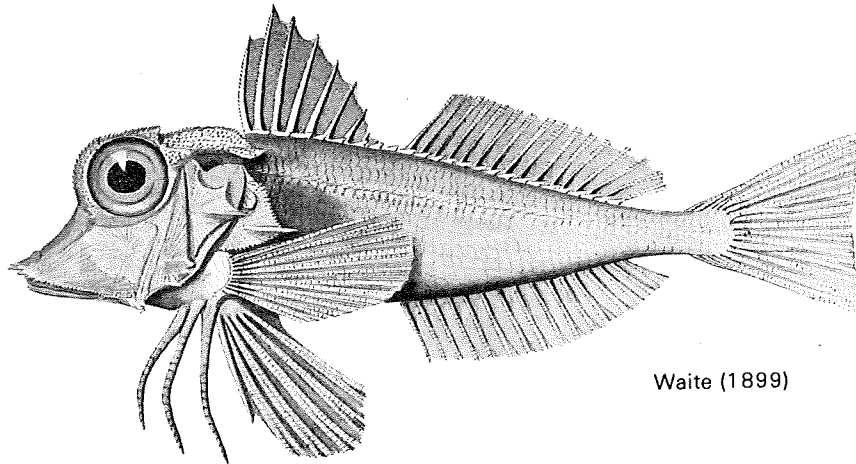
Body bright red above, white below; upper surface of pectoral fin olive green with bluish outer margin; dorsal fin pinkish or whitish with *red spot* over last few spines.

Size: To at least 20 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 50 to 200 m.

References: Waite (1899); M. F. Gomon pers. comm. (1983).



Round-snouted gurnard

Lepidotrigla mulhalli Macleay, 1884

Family: Triglidae p 40

Other Common Names: Mulhall's gurnard.

Description: Body rough, covered in moderately large ctenoid scales (less than 75 diagonal rows along sides); second dorsal fin with 14 to 15 rays and with row of spiny plates along base; lateral line scales not notably larger than body scales and without prominent spines; each side of snout tip with 2 to 3 strong spines and several small spines; dorsal profile of snout straight in small fish, convex in large fish; head above and just behind eye without deep, transverse groove (often shallow groove in small juveniles); caudal fin slightly emarginate.
D VIII-X+14-15; A 15; P 11+3 detached; V 1,5; L. Lat. 53-60.

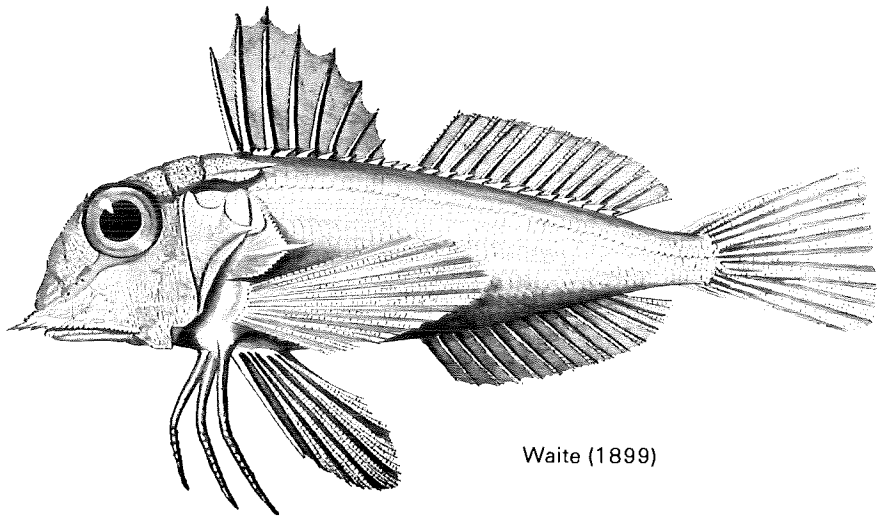
Body reddish orange mottled with dark red above, white below; upper surface of pectoral fin olive-green with bluish outer margin and black spot near inner margin; first dorsal fin pinkish or whitish with bright *red spot* between spines 5 to 7.

Size: To at least 20 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf in depths from 10 to 210 m.

References: Macleay (1884); Waite (1899); M. F. Gomon pers. comm. (1983).



Spiny gurnard

Lepidotrigla papilio (Cuvier, 1829)

Family: Triglidae p 40

Description: Body rough, covered in moderately small ctenoid scales (less than 75 diagonal rows along sides); second dorsal fin with 13 to 15 rays and with row of spiny plates along base; lateral line scales larger than body scales, with prominent spines and elevated, forming ridge; snout tip rounded and smooth or with minute spines; dorsal profile of snout straight to slightly concave; head above and just behind eye with deep, transverse groove; caudal fin truncate.

D VIII-IX+13-15; A 14-15; P 11+3 detached; V 1,5; L. Lat. 54-60.

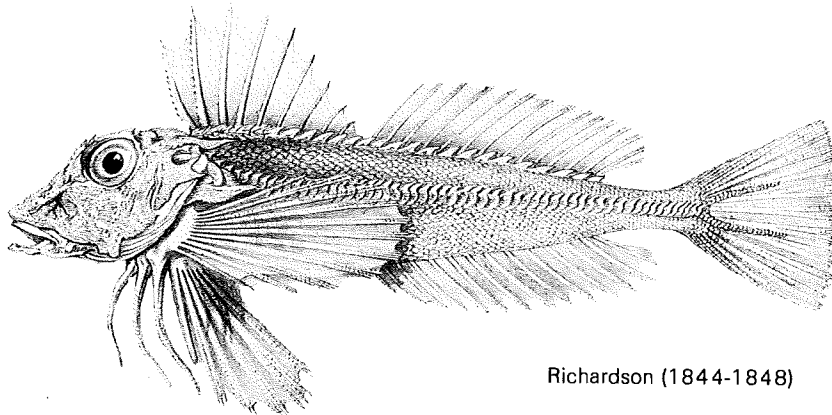
Body usually red mottled with reddish brown above, whitish below; upper surface of pectoral fin olive-green with blue outer margin, no black blotch; first dorsal fin with white-edged, *black spot*.

Size: To 18 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf to a depth of 50 m.

References: Ogilby (1911b) as *Paratrigla papilio*; M. F. Gomon pers. comm. (1983).



Richardson (1844-1848)

Butterfly gurnard

Lepidotrigla vanessa (Richardson, 1839)

Family: Triglidae p 40

Description: Body rough, covered in moderately small ctenoid scales (less than 75 diagonal rows along sides); second dorsal fin with 16 to 17 rays and with row of spiny plates along base; lateral line scales not notably larger than body scales and without prominent spines; each side of snout tip with 1 to 4 short spines; dorsal profile of snout straight to slightly concave (hump before eyes in adults); head above and just behind eye without deep, transverse groove (often shallow groove in small juveniles); caudal fin emarginate.

D X-XI+16-17; A 16-17; P 11+3 detached; V 1,5; L. Lat. 64-69.

Body red with darker red blotches above, white below; upper surface of pectoral fin greenish yellow with bright blue outer margin and large, black blotch near inner margin; first dorsal fin with *black spot* (suffused with red in large fish) between spines 5 and 8.

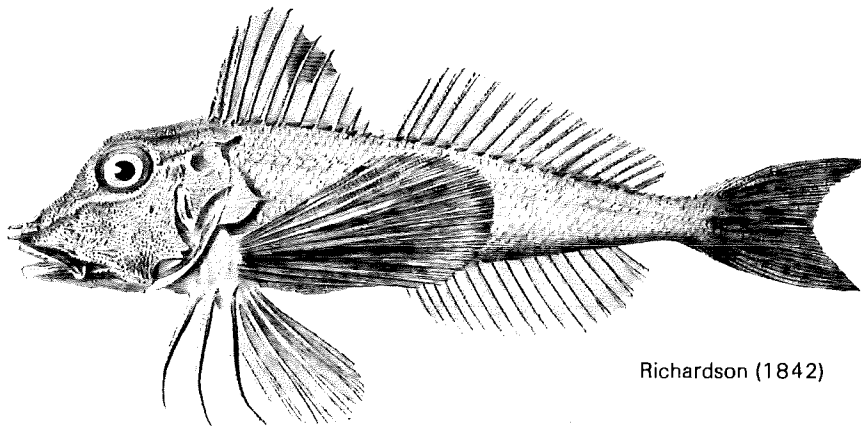
Size: To 25 cm.

Distribution: Vic., Tas. and S.A.

Habitat and Depth: Demersal, on the continental shelf to a depth of 100 m.

Note: Recently an undescribed species of *Lepidotrigla* has been trawled in the Great Australian Bight. It has a straight to slightly concave snout and a black spot on the dorsal fin as does *L. vanessa* but has only 14 to 15 rays in the second dorsal fin and only 51 to 57 lateral line scales, each bearing prominent spines.

References: McCoy (1878a); Scott et al. (1974) as *Paratrigla vanessa*; M. F. Gomon pers. comm. (1983).



Armoured gurnard

Peristedion picturatum McCulloch, 1926

Family: Triglidae p 40

Other Common Names: Sea robin.

Description: Body covered in large bony scutes; snout with 2 long, flat, rostral blades; lateral margin of head angular, preopercular angle forming expanded lobe, without prominent spine; second dorsal fin with 21 rays, anal fin with 20 rays; lower lip with 4 groups of short barbels directed forwards and 1 pair of long, branched barbels directed sideways; 2 abdominal scutes before anus and 2 between anus and first anal ray.

D VIII+21; A 20; P 12+2 detached; V 1,5; L. Lat. 36.

Body pink with brown, wavy markings above; fins pink or white; dorsal fin with broad, black outer margin; pectoral fin with broad, black band across outer half and dusky blotches at base.

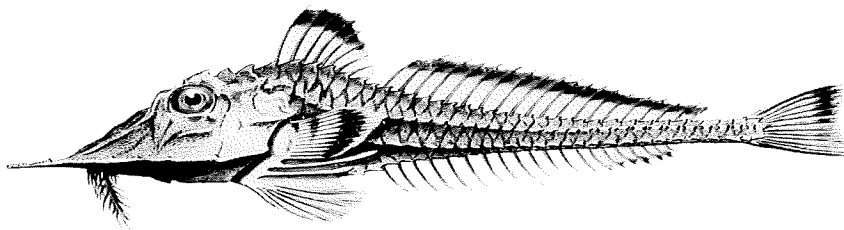
Size: To 40 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 140 to 380 m.

Note: *Satyrichthys lingi* also occurs off N.S.W., Vic. and S.A. It differs from *P. picturatum* in having: preopercular angle with prominent backwardly directed spine; both second dorsal and anal fins with 16 to 17 rays; lower lip with 2 to 3 pairs of short, simple barbels; body reddish with olive edges to scutes. The backwardly directed spine on the preopercular angle is diagnostic for species of *Satyrichthys*. Note also that the shape and position of rostral blades may change with growth.

References: McCulloch (1926); Whitley (1933); Miller (1974).



McCulloch (1926)



Spotted gurnard

Pterygotrigla picta (Günther, 1880)

Family: Triglidae p 40

Other Common Names: Painted gurnard.

Description: Body smooth, covered in minute cycloid scales (about 100 diagonal rows along sides); humeral spine longer than eye diameter; second dorsal fin with 11 to 12 rays and without row of spiny plates along base; each side of snout tip with 1 strong, short spine; dorsal profile of snout straight to slightly concave; caudal fin forked.

D VII-VIII+11-12; A 12; P 12+3 detached; V 1,5; L. Lat. 63-65.

Body pinkish yellow above, silvery white below; head and upper body with *numerous blackish spots* and small, long blotches; upper surface of pectoral fin olive-green with rows of yellow spots and black blotches edged with white or with white spots near inner margin; dorsal and caudal fins yellowish pink.

Size: To 30 cm.

Distribution: N.S.W., Vic., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 120 to 440 m.

References: Waite (1911); Hubbs (1959); Hardy (1982) genus only.



J. G. H. Maxwell

Latchet

Pterygotrigla polyommata (Richardson, 1839)

Family: Triglidae p 40

Other Common Names: Flying gurnard, pastry, sharp-beaked gurnard.

Description: Body smooth, covered in minute cycloid scales (about 120 diagonal rows along sides); humeral spine longer than eye; second dorsal fin with 12 rays and without row of spiny plates along base; each side of snout tip with 1 *long spine*; dorsal profile of snout straight to concave; caudal fin forked.

D VII-VIII+12; A 12; P 12+3 detached; V I,5; L. Lat. 63-70.

Body reddish above, silvery or white below; upper surface of pectoral fins bluish green with rows of yellow spots or bands and 2 black blotches edged with white near inner margin; dorsal fin pink.

Size: To 62 cm.

Distribution: Southern N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, adults occurring on the continental shelf and slope in depths from 40 to 420 m; juveniles entering bays and estuaries.

References: Richardson (1839) as *Trigla polyommata*; Hardy (1982) genus only; Last et al (1983).



J. G. H. Maxwell

Red indianfish

Pataecus fronto Richardson, 1844

Family: Pataecidae p 66

Description: Dorsal fin united to caudal fin; anterior spines of dorsal fin as long or longer than head; pectoral fins distinctly longer than head; skin smooth, without wart-like bumps; dorsal fin with 24 spines and 16 rays.

D XXIV,16; A XI,5; P 8.

Head and body red or reddish orange, sometimes with 4 black spots on upper sides.

Size: To at least 27 cm.

Distribution: (Qld), N.S.W., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from about 40 to 80 m.

References: Waite (1905); Scott et al. (1974).



J. G. H. Maxwell

Deepwater flathead

Neoplatycephalus conatus (Waite & McCulloch, 1915)

Family: Platycephalidae p 40

Description: Head and body with normal, overlapping scales; 2 preopercular spines, lower spine longest but not more than twice length of upper; some large canine teeth (several times larger than other teeth) at front of upper jaw, on vomer, palatines and lower jaw; gill rakers short and thick, 3 to 7 (not including rudiments) on lower limb of first arch; swim bladder present.

D I,VII-VIII+14; A 13-14; P 20-21; V 1,5; L. Lat. about 90.

Body purplish green to greenish grey above, sides paler often with greyish blotches; ventral surface pale; dark blotch on operculum beneath preopercular spines; dorsal, pectoral, ventral and caudal fins greyish.

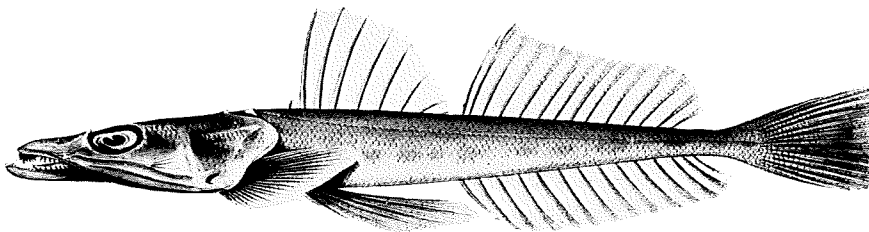
Size: To 70 cm.

Distribution: Vic., Tas. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf and upper slope in depths from 70 to 420 m.

Note: The deepwater flathead has been incorrectly referred to as *Platycephalus speculator* until recently.

References: Waite & McCulloch (1915); P. C. Heemstra & L. Knapp pers. comm. (1981); Last et al (1983).



Waite & McCulloch (1915)

Tiger flathead

Neoplatycephalus richardsoni (Castelnau, 1872)

Family: Platycephalidae p 40

Other Common Names: King flathead, deep-sea flathead, trawl flathead, toothy flathead.

Description: Head and body with normal, overlapping scales; 2 preopercular spines, lower spine about 1.5 times length of upper; some large canine teeth (several times larger than other teeth) at front of upper jaw, on vomer, palatines and lower jaw; gill rakers normal, 9 to 13 on lower limb of first arch; swim bladder present.

D I,VII+13-14; A 14; P 19-22; V I,5; L. Lat. about 70; LGR 9-13.

Head and body pinkish grey to light brown with *orange-brown spots* above and sometimes indistinct, greyish blotches along sides; ventral surface white; spines and rays of dorsal fin with brown spots; ventral and pectoral fins with lines of orange spots; upper half of caudal fin with *transverse lines of orange spots*, lower rear half dark grey.

Size: To 65 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf in depths from about 10 to 170 m; sometimes entering coastal bays.

Note: Once the major trawl species off the eastern Australian coast with catches peaking at over 5000 tonnes per year. The fishery is fully exploited and has stabilised at an annual catch of about 1000 tonnes in recent years.

References: Castelnau (1872) as *Platycephalus richardsoni*; Waite & McCulloch (1915) as *P. macrodon*; P. C. Heemstra & L. Knapp pers. comm. (1981).



T. Carter

Toothy flathead

Neoplatycephalus sp. 1

Family: Platycephalidae p 40

Other Common Names: Yellow-finned flathead.

Description: Head and body with normal, overlapping scales; 2 preopercular spines, lower spine longest but not more than twice length of upper; some large canine teeth (several times larger than other teeth) at front of upper jaw, on vomer, palatines and lower jaw; gill rakers very short, 3 to 7 (not including rudiments) on lower limb of first arch; swim bladder absent.

D I,VII-VIII+14; A 14; P 18-20; V I,5; L. Lat. 75-80.

Body pinkish grey to pale brown with golden spots above and sometimes indistinct, greyish blotches on sides; caudal fin white with yellowish spots and bars.

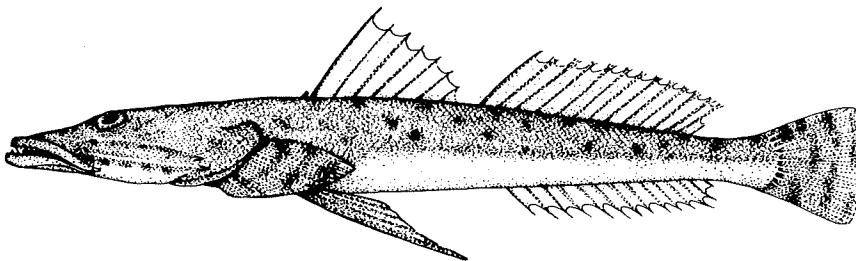
Size: To at least 55 cm.

Distribution: Vic., Tas. and S.A.

Habitat and Depth: Demersal on the continental shelf in depths of about 80 to 100 m; sometimes entering shallow bays.

Note: This species closely resembles *N. richardsoni* and probably has been misidentified in the past.

References: P. C. Heemstra & L. Knapp pers. comm. (1981); Last et al. (1983) as *Platycephalus* sp.



Last et al. (1983)

Sand flathead

Platycephalus bassensis Cuvier, 1829

Family: Platycephalidae p 40

Other Common Names: Slimy flathead, bay flathead.

Description: Head and body with normal, overlapping scales; 2 preopercular spines, lower spine distinctly longest but not more than twice length of upper and with prominent ridge along outer side; teeth minute, uniform size on jaws, vomer and palatines; 14 to 15 gill rakers on lower limb of first arch; swimbladder absent.

D I,VI-VII+14-15; A 14; P 18-20; V I,5; L. Lat. about 85.

Head and body grey to pale brown with numerous *small, reddish brown spots* above, sides with larger spots forming broken, longitudinal stripe; ventral surface white; cheek with dark bar below eye; dorsal and pectoral fins with brown spots; upper half of caudal fin with reddish brown spots, lower rear half with *1 to 2 large white-edged black blotches*.

Size: To 46 cm.

Distribution: Vic., Tas. and S.A.

Habitat and Depth: Demersal, occurring in bays and inlets and on the continental shelf to a depth of about 100 m.

References: P. C. Heemstra & L. Knapp pers. comm. (1981).



T. Carter

Blue-spotted flathead

Platycephalus caeruleopunctatus McCulloch, 1922

Family: Platycephalidae p 40

Other Common Names: Long-nosed flathead, sand flathead.

Description: Head and body with normal, overlapping scales; 2 preopercular spines, lower spine distinctly longest but not more than twice length of upper and without ridge along outer side; some small canines (slightly larger than other teeth) at front of upper jaw, on vomer, palatines and sides of lower jaw; 14 to 16 gill rakers on lower limb of first arch; swim bladder absent.

D I,VII-VIII+ 4; A 14; P 19-21; V 1,5; L. Lat. about 85; LGR 14-16.

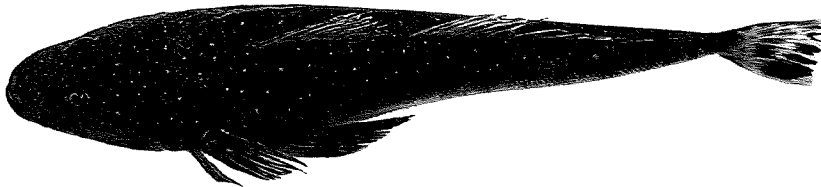
Head and body brownish with scattered small, blue spots and sometimes red spots; dark blotch on operculum above preopercular spines; rear half of caudal fin with several white-edged black bars.

Size: To 45 cm.

Distribution: (Qld) and N.S.W.

Habitat and Depth: Demersal, on the continental shelf in depths from 40 to 100 m.

References: Roughley (1951) as *Trudis caeruleopunctatus*; P. C. Heemstra & L. Knapp pers. comm. (1981).



K. J. Graham

Long-spined flathead

Platycephalus longispinis Macleay, 1884

Family: Platycephalidae p 40

Description: Head and body with normal, overlapping scales; 2 preopercular spines, lower spine 2 to 3 times length of upper and longer than interorbital width; small uniform teeth in jaws and small, conical teeth on palatines; 16 to 18 gill rakers on lower limb of first arch.

D I,VI-VIII+14; A 14; P 20-21; V 1,5; L. Lat. about 75; LGR 16-18.

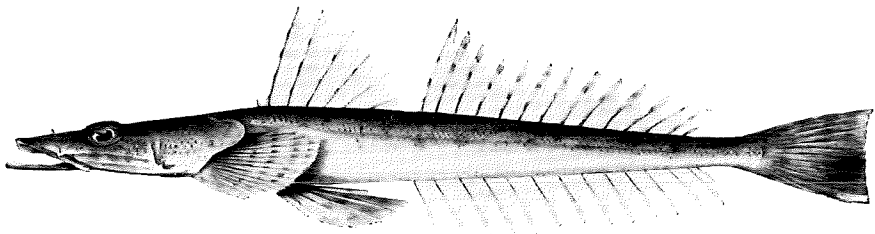
Head and body light brown with small, reddish brown spots and 1 row of well-spaced, bluish grey blotches along each side of dorsal surface; pectoral and ventral fins with red spots; upper half of caudal fin with red spots, lower half grey.

Size: To 38 cm.

Distribution: N.S.W., eastern Vic and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 10 to 75 m.

References: P. C. Heemstra & L. Knapp pers. comm. (1981).



Whitley (1931b)

Yank flathead

Platycephalus speculator Klunzinger, 1872

Family: Platycephalidae p 40

Other Common Names: Castelnau's flathead.

Description: Head and body with normal, overlapping scales; 2 preopercular spines, about equal in length; some small canines (slightly larger than other teeth) at front of upper jaw and in 1 row on palatines and sides of lower jaw; 10 to 12 gill rakers on lower limb of first arch; swim bladder absent.

D I,VII-VIII+14; A 14; P 18-19; V I,5; L. Lat. 85-95.

Body pale sandy to dusky grey with sparsely scattered, white to bluish spots; head with dark spots and blotches above; ventral surface white; upper and anterior half of caudal fin with small, grey-green spots, lower rear half white with about 3 to 4 black blotches.

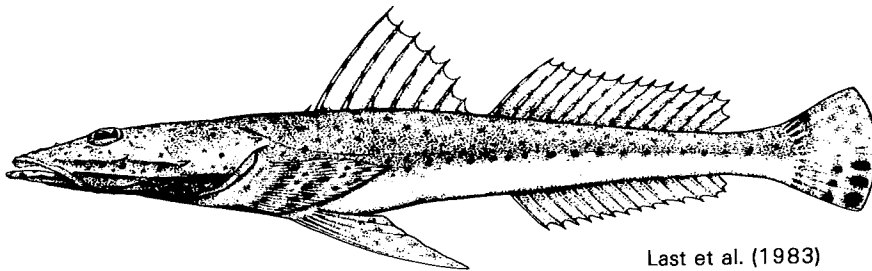
Size: To 90 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: A shallow water species, recorded from surf beaches, estuaries and in bays to a depth of 30 m.

Note: Large adults of this species closely resemble, and have been misidentified as, the dusky flathead (*P. fuscus*) which is the common, estuarine flathead of N.S.W. and southern Qld. *P. fuscus* differs from *P. speculator* in having: 7 to 9 gill rakers on lower limb of first arch; second dorsal and anal fins with 13 rays; upper half of caudal fin brown with dark spots, lower half dark grey or blackish brown.

References: Coleman (1980) as *P. castelnaui*; P. C. Heemstra & L. Knapp pers. comm. (1981).



Last et al. (1983)

Spiny flathead

Hoplichthys haswelli McCulloch, 1907

Family: Hoplichthyidae p 40

Other Common Names: Deep-sea flathead, ghost flathead, armoured flathead.

Description: Snout long with one bony plate extending from nostrils to between eyes and *smooth, fleshy area* below and before eyes; first dorsal fin with 5 spines, second with 14 rays, longest ray shorter than snout length; origin of anal fin below second or third dorsal ray; pectoral fins with 18 rays (lower 4 rays detached); vomer crescent-shaped and with 2 backwardly projecting shafts.

D V,14; A 16-17; P 14+4; lateral scale plates 27.

Body yellowish brown above and pinkish on sides with darker mottling; ventral surface white; pectoral fins yellowish brown, ventral fins white, caudal fin with black margin; eyes bright blue.

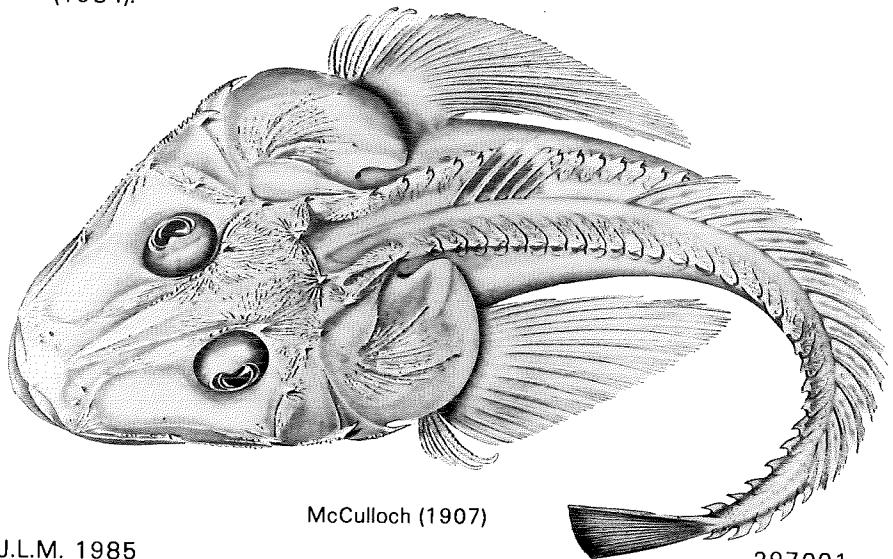
Size: To at least 43 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., and southern W.A.

Habitat and Depth: Demersal, recorded from the continental shelf and slope in depths from 140 to 700 m.

Note: *H. ogilbyi* has also been trawled off N.S.W. and Qld. It differs from *H. haswelli* in having: second dorsal fin with 15 rays; origin of anal fin ahead of origin of second dorsal fin; pectoral fins with 16 rays; vomer without backwardly projecting shafts.

References: McCulloch (1907, 1914); M. McGrouther pers. comm. (1984).



McCulloch (1907)

Blobfish

Psychrolutes marcidus (McCulloch, 1926)

Family: Psychrolutidae p 66

Other Common Names: Australian sculpin.

Description: Body very limp, skin smooth; head without spines and without small flaps of skin on dorsal surface; wide interorbital, distance between eyes more than twice diameter of exposed eye; upper jaw slightly projecting beyond lower; vomer without teeth; dorsal fin with 7 spines and 17 to 18 rays (N.B. remove skin for count); pectoral fins with 24 to 25 rays.

D VII,17-18; A 12-13; P 24-25; V I,3; LGR 7-9.

Head and body uniform grey or greyish pink; pectoral fins dark grey with pale margin.

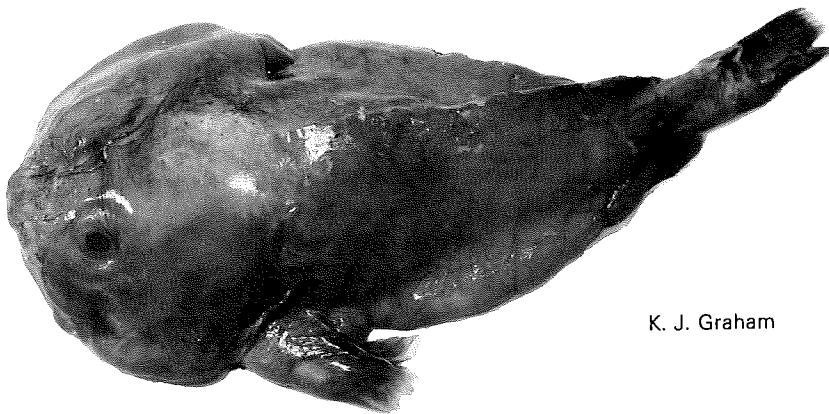
Size: To at least 30 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, recorded from the continental slope in depths from 600 to 1200 m.

Note: A species of *Ebinania* has recently been trawled off S.A. This genus differs from *Psychrolutes* in having teeth on the vomer.

References: McCulloch (1926) and Nelson (1977) as *Neophrynichthys marcidus*; Nelson (1982).



K. J. Graham

Splendid sea perch

Callanthias australis Ogilby, 1899

Family: Serranidae p 52

Description: Dorsal fin with 11 spines and 11 rays; 11 rays in anal fin; lateral line running along back close to base of dorsal fin and terminating on upper surface of caudal peduncle; vomerine teeth small or absent; caudal fin emarginate or lunate with outer rays produced. D XI,11; A III,11; P 20-21; V 1,5; L. Lat. 37-39.

Males orange to crimson with purplish tinge above; yellow blotches on head; caudal peduncle yellow; fins bluish white, yellowish or reddish; caudal fin yellow centrally. *Females* similar to male but duller and without purplish tinge or yellow patch centrally on caudal fin. *Juveniles* uniform pink with pale blue fins.

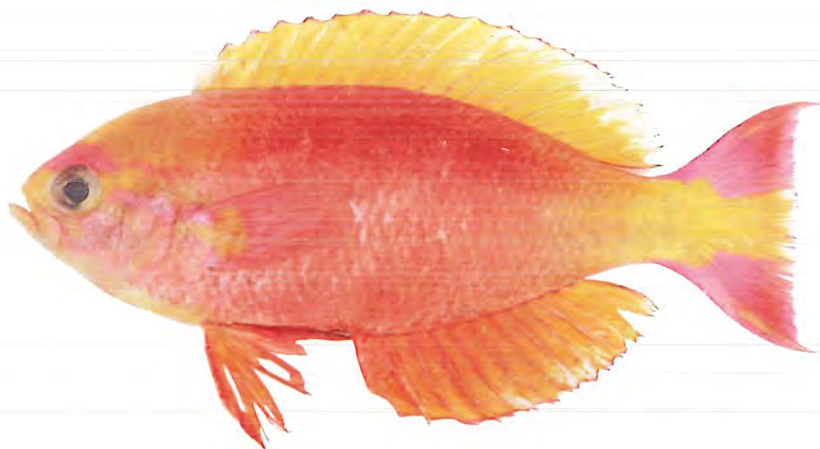
Size: To 30 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs near rocky reefs on the shelf in depths from 20 to 100 m.

Note: The rosy perch, *C. allporti*, also occurs off Tas. It differs from *C. australis* in having 11 rays in both the soft dorsal and anal fins and at least some of the vomerine teeth large and robust.

References: Ogilby (1899); Munro (1961b) as *C. allporti*; R. H. Kuiter pers. comm. (1984).



K. J. Graham

Butterfly perch

Caesioperca lepidoptera (Bloch & Schneider, 1801)

Family: Serranidae p 52

Description: Dorsal fin with 10 spines and 19 to 21 rays; 9 to 10 rays in anal fin; pectoral fin with 16 to 17 rays, long, reaching beyond anus; caudal fin deeply emarginate; tongue *without* teeth; 54 to 65 scales in lateral line.

D X,19-21; A III,9-10; P 16-17; V I,5; L. Lat. 54-65; L.G.R. 27-30.

Head and body light pink often with numerous small, brownish spots; black *blotch* on body near tip of pectoral fins, its height about equal to or less than width; blue streak beneath eye and often blue blotch on upper corner of operculum; fins pinkish.

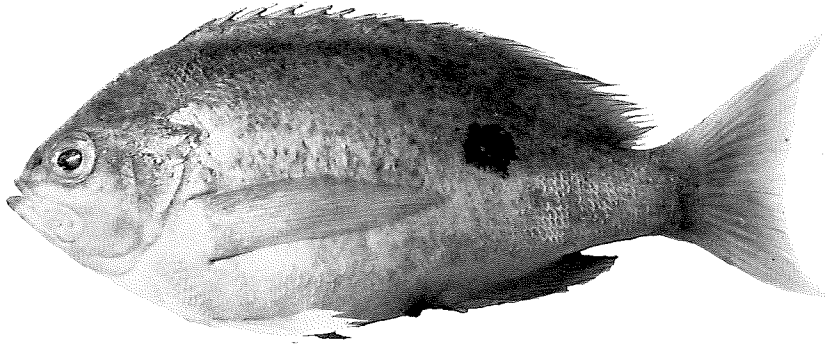
Size: To 30 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: A schooling species occurring over rocky reefs in depths from 10 to 140 m.

Note: Often confused with *C. rasor*.

References: Munro (1961b); Norman (1957).



K. J. Graham

Barber perch

Caesioperca rasor (Richardson, 1839)

Family: Serranidae p 52

Other Common Names: Red perch.

Description: Dorsal fin with 10 or 11 spines and 19 to 22 rays; 9 to 10 rays in anal fin; pectoral fins with 14 to 15 rays, long, reaching beyond anus; caudal fin deeply emarginate; tongue *without* teeth; 49 to 55 scales in lateral line.

D X-XI,19-22; A III,9-10; P 14-15; V I,5; L. Lat. 49-55; LGR 30.

Males light pinkish blue; numerous longitudinal, blue lines on body and head, one curving beneath eye distinctive; black, vertical *bar* on body near tip of pectoral fins, its height more than twice width; fins bright blue with yellow spots. *Females and juveniles* reddish pink, *no dark bar* on side of body; bright blue line curving beneath eye; fins pink to translucent.

Size: To about 25 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: A schooling species occurring over rocky reefs to a depth of about 180 m.

References: Munro (1961b); Norman (1957).



J. G. H. Maxwell

Western sea perch

Lepidoperca occidentalis Whitley, 1951

Family: Serranidae p 52

Description: Dorsal fin with 10 spines and 15 to 16 rays (mostly 15); 7 to 8 rays (mostly 7) in anal fin; pectoral fin long, reaching to origin of anal fin; spinous dorsal fin *without* scales; axil of pectoral fins covered *with* scales; caudal fin lunate; body oblong, greatest depth 3.2 to 4.0 in SL.

D X,15-16; A III,7-8; P 15-16; V I,5; L. Lat. 44-48; LGR 25-30.

Head and body pink with faint, yellow band along sides; ventral fins pink, other fins yellow; anterior rays of soft dorsal fin with *dark blotch*.

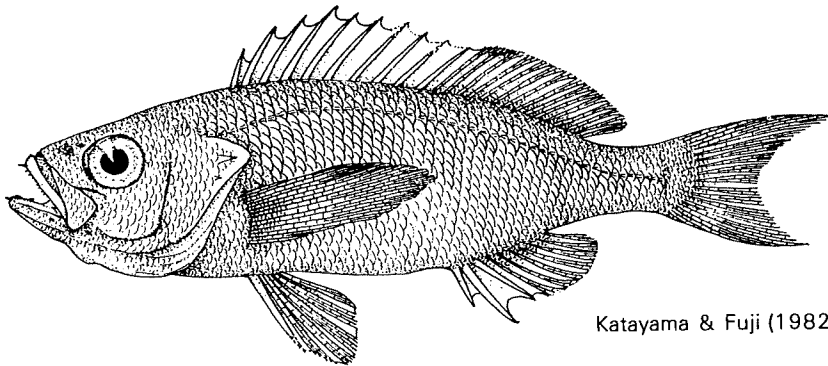
Size: To at least 15 cm.

Distribution: S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 40 to 200 m.

Note: See *Note* under *L. puchella*.

References: Katayama & Fujii (1982).



Katayama & Fujii (1982)

Orange perch

Lepidoperca pulchella (Waite, 1899)

Family: Serranidae p 52

Description: Dorsal fin with 10 spines and 16 to 17 rays; 7 to 8 rays (mostly 8) in anal fin; pectoral fins long, reaching beyond origin of anal fin; lower half of spinous dorsal fin and axil of pectoral fins covered with scales; caudal fin slightly emarginate; body ovoid, greatest depth 2.3 to 2.7 in SL.

D X,16-17; A III,7-8; P 16-17; V I,5; L. Lat. 42-46; LGR 25-29.

Head and body red or orange with faint, yellowish orange band along sides; cheeks yellowish; faint, pink band below eye; eyes red with yellow rim, black blotch on upper rim in females; fins red to yellow; anterior rays of soft dorsal fin with *black blotch* in males.

Size: To 28 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf in depths from 60 to 350 m.

Note: A related species, *L. brochata*, has recently been trawled off N.S.W. in depths from 180 to 400 m. Another species, *L. magna*, inhabits the oceanic ridges and seamounts of the northern Tasman Sea but has not yet been recorded from the continental shelf of eastern Australia. Both *L. brochata* and *L. magna* lack the dark blotch on the soft dorsal fin and the pectoral fin axil is without scales. *L. brochata* is relatively elongate compared to *L. pulchella* (greatest body depth 2.7 to 3 in SL). *L. magna* is similar to *L. pulchella* in body depth but has 21 to 25 lower gill rakers and a distinctive black lateral line.

References: Munro (1961b) as *Anthias pulchellus*; Katayama & Fujii (1982).



J. G. H. Maxwell

Harlequin fish

Othos dentex (Cuvier, 1828)

Family: Serranidae p 52

Description: Dorsal fin notched, with 10 spines and 18 rays; 8 rays in anal fin; pectoral fins short, reaching about midway between origin of ventral and anal fins; caudal fin rounded; maxilla and mandible covered with scales; large canines in both jaws; body elongate, greatest depth 3.3 to 4 in SL.

D X,18; A III,8; P 15; V I,5; L. Lat. 81-87; LGR 8.

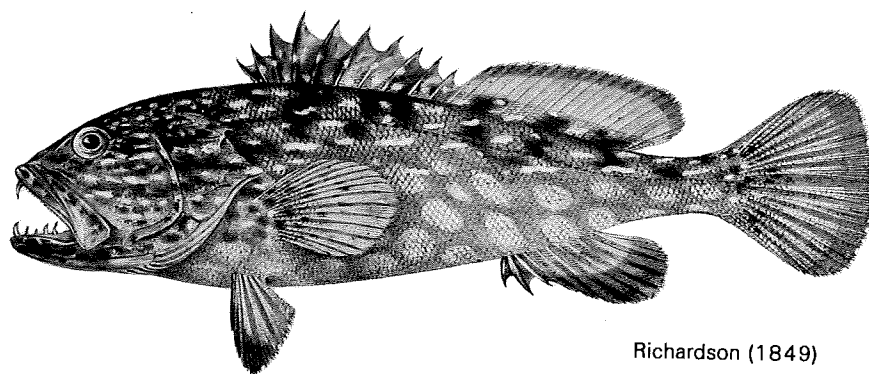
Background colour of head and body variable, from yellow to deep red; bluish to blackish spots above, yellowish or pinkish blotches below; fins yellow, pink or bright red, sometimes blue blotches on spinous dorsal.

Size: To 75 cm.

Distribution: S.A. and W.A.

Habitat and Depth: On rocky reefs to a depth of 30 m.

References: Norman (1957); Munro (1961b).



Three-spined cardinalfish

Apogonops anomalus Ogilby, 1896

Family: Percichthyidae p 50

Description: Two *slightly separated* dorsal fins, *similar in size and shape*, first with 9 spines, second with 1 spine and 10 rays; anal fin with 3 spines and 6 to 7 rays; operculum with 2 soft bony spines; angle of preoperculum slightly produced and finely serrated; body relatively shallow, moderately compressed; caudal fin forked; jaws with villiform teeth; adults with *strong depressible canines* near symphysis of upper jaw and small canines increasing in size posteriorly in lower jaw; vomer with 2 diverging narrow bands of minute teeth; scales large, weakly ctenoid and deciduous; lateral line continuous, extending onto base of caudal fin.

D IX+1,10; A III,6-7; P 14; V I,5; L. Lat. 43-48; LGR 21-22.

Body brownish to purplish grey above, silvery below, often with about 5 dark blotches along sides; operculum often with large, dark blotch; tip of first dorsal fin black between spines 2 to 5.

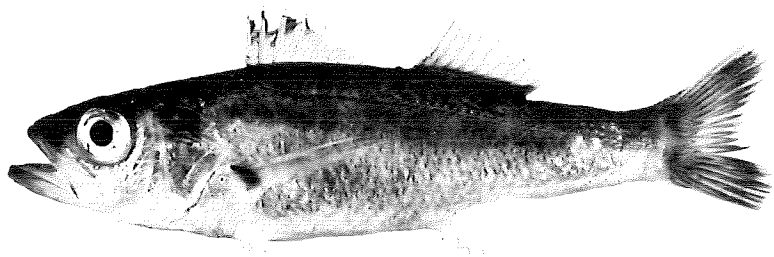
Size: To 13 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, on the continental shelf and upper slope in depths from 100 to 400 m.

Note: A similar species, *Synagrops japonicus*, occurs off N.S.W. and Vic. in depths from 400 to 1000 m. It differs from *A. anomalus* in having; anal fin with 2 spines and 7 rays; vomer with triangular patch of minute teeth; scales extremely deciduous (less so in *Apogonops*); head with numerous minute pores (absent in *Apogonops*); 12 to 15 lower gill rakers; maximum size to about 20 cm.

References: McCulloch (1911); Fowler & Bean (1930); Okamura et al. (1982) for *S. japonicus*.



T. Carter

Hapuku

Polyprion oxygeneios (Schneider, 1801)

Family: Percichthyidae p 50

Other Common Names: New Zealand groper, deepwater rock cod, blue cod.

Description: Dorsal fin notched, with 11 to 12 spines and 12 rays; anal fin with 3 spines and 8 to 9 rays; angle of preoperculum rounded and finely serrated; body stout, slightly compressed; head and mouth large, lower jaw strongly projecting; snout long, eye more than 1.5 in snout length; caudal fin truncate or slightly emarginate; scales small and adherent.

D XI-XII,12; A III,8-9; P 16-18; V I,5; L. Lat. 80-95; LGR 7-8.

Head and body grey-blue to grey-brown above midline of sides, abruptly changing to silvery white below; fins dark blue.

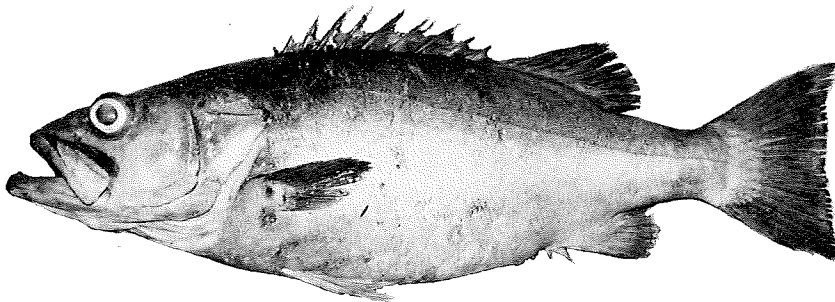
Size: To 150 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf and upper slope to a depth of 450 m.

Note: A similar species, the bass groper (*P. maeone*), has recently been recorded from N.S.W., Tas. and W.A. It is deeper bodied, has a shorter snout (eye less than 1.5 in snout length), the angle of the preoperculum is angular and the grey blue of the upper body blends gradually into the silvery white below.

References: Munro (1961a); C. D. Roberts pers. comm. (1983).



J. Marek

Long-finned bullseye

Cookeolus boops (Schneider, 1801)

Family: Priacanthidae p 56

Other Common Names: Bigeye.

Description: Body deep, depth 1.8 to 2.4 in SL; *ventral fins much longer than head*; last dorsal fin spine longest, *more* than twice length of second; anterior dorsal fin rays prolonged, others decreasing rapidly backwards; membrane of dorsal fin incised; spine at angle of preoperculum.

D X,12 A III,12-13; P 16-18; L. Lat. 54-59; GR 6-7+17-20 (excluding rudiments).

Body reddish above, paler below; membranes of dorsal, anal and ventral fins dark.

Size: To 51 cm.

Distribution: N.S.W. and W.A.

Habitat and Depth: Adults demersal, on the continental shelf in depths from 40 to 200 m; young pelagic.

References: McCulloch (1915) as *Priacanthus velabundus*; Fowler (1931); Caldwell (1962); W. Starnes pers. comm. (1984).



J. G. H. Maxwell

Bigeye

Priacanthus macracanthus Cuvier, 1829

Family: Priacanthidae p 56

Other Common Names: Red bullseye, goggle-eye.

Description: Body elongate, depth 2.9 to 3.5 in SL; ventral fins shorter than head; tenth dorsal spine less than twice length of second; long spine at angle of preoperculum, well developed in fish greater than 8 cm; scales present on preoperculum above and below base of spine.

D X,12-14; A III,13-14; P 17-18; L. Lat. 66-83; GR 2-6+20-24 (excluding rudiments).

Body reddish above, silvery on sides and below; dorsal, anal and ventral fins pink with small, reddish to greyish spots on membranes.

Size: To 46 cm.

Distribution: (N.T., Qld), N.S.W. and W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 10 to 100 m.

References: Fowler (1931); W. Starnes pers. comm. (1984).



M. Dunning

White cardinalfish

Epigonus denticulatus Dieuzeide, 1950

Family: Apogonidae p 50

Description: Soft dorsal and anal fins covered with scales; upper corner of operculum with 3 to 7 membranous projections, *bony spine absent*; preopercular angle produced and broadly rounded; spine of second dorsal (12.5 to 19.2 in SL) and second spine of anal fin (12.2 to 16.7 in SL) *short*; body depth about 4.2 to 6.3 in SL; interorbital broad (9.6 to 12.2 in SL); eye large (2.1 to 2.5 in HL); snout short, blunt; scales extremely deciduous.

D VII+0-1,9-10; A II,8-9; P 18-20; V I,5; L. Lat. 46-49; GR 28-34.

Head and body whitish or yellowish; scale borders mottled with brownish spots; fins greyish.

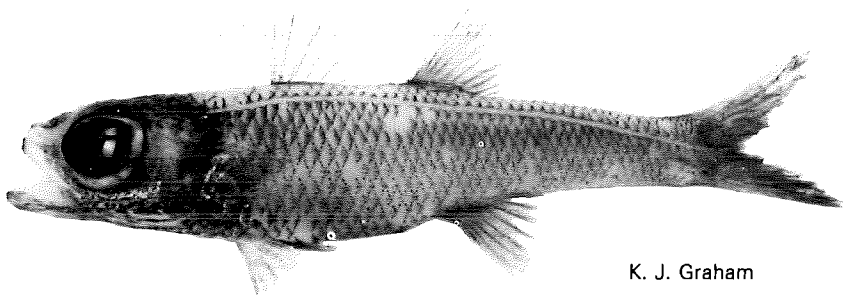
Size: To 20 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Adults demersal, on the continental slope in depths from 300 to 600 m; juveniles pelagic, in depths from 130 to 425 m.

Note: *E. telescopus*, the largest species of the genus (to 55 cm), is also occasionally trawled off N.S.W., Vic. and Tas. Its black to dark brown colouration and the lower number of gill rakers (23 to 26 on first arch) distinguishes it from the 3 other species of *Epigonus* treated here.

References: Mayer (1974).



Big-eyed cardinalfish

Epigonus lenimen (Whitley, 1935)

Family: Apogonidae p 50

Description: Soft dorsal and anal fins covered with scales; upper corner of operculum with pungent *bony spine* and 1 to 5 membranous or horny spinelets; preopercular angle narrowly produced; spine of second dorsal (5.3 to 6.7 in SL) and second spine of anal fin (4.8 to 7.7 in SL) *long*; body depth 3.6 to 4.7 in SL; *interorbital broad* (9.8 to 11.5 in SL); eyes huge (1.9 to 2.5 in HL); snout moderately pointed; scales mostly adherent.

D VII+1,8-9; A II,8-9; P 16-18; V I,5; L. Lat. 47-50; GR 28-34.

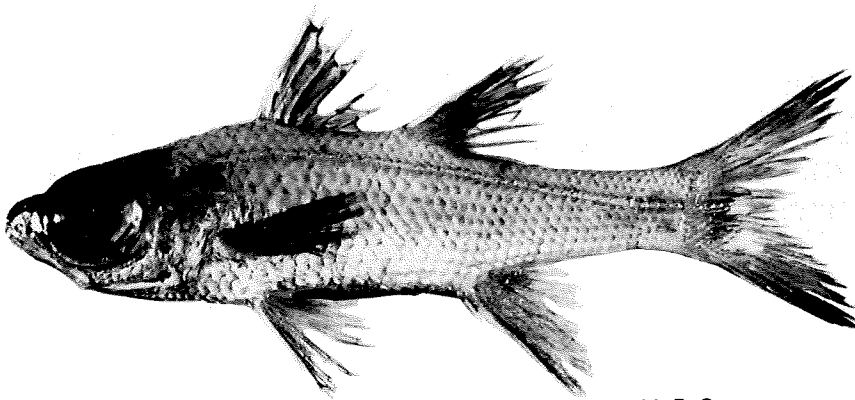
Head rusty brown, body brownish; scale borders mottled with black spots; fin bases rusty brown; fins greyish.

Size: To 21 cm.

Distribution: Vic., Tas., S.A. and W.A.

Habitat and Depth: A deepwater species occurring near the bottom on the continental slope in depths from 500 to 800 m.

References: Mayer (1974).



M. F. Gomon

Robust cardinalfish

Epigonus robustus (Barnard, 1927)

Family: Apogonidae p 50

Description: Soft dorsal and anal fins covered with scales; upper corner of operculum with pungent *bony spine* and 2 to 3 membranous or horny spinelets; preopercular angle not produced; spine of second dorsal (7.9 to 10.0 in SL) and second spine of anal fin (7.5 to 10.7 in SL) of moderate size; body depth 4.1 to 4.9 in SL; *interorbital narrow* (12.2 to 15.4 in SL); eyes relatively small (2.3 to 2.7 in HL) snout short, pointed.

D VI-VIII+I,9; A II,9; P 16-18; V I,5; L. Lat. 47-50; GR 30-33.

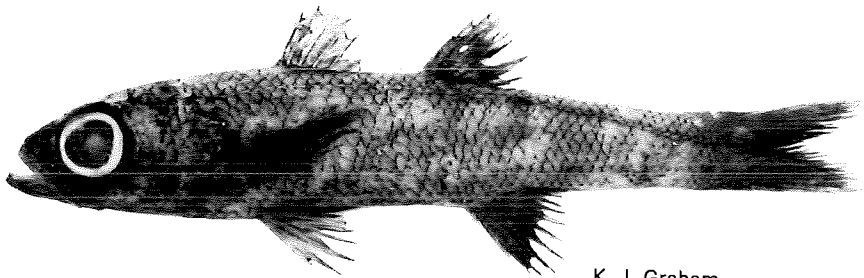
Head and body pale pinkish brown above, silvery below; scale borders mottled with small, black to brown spots; operculum black; fins greyish black.

Size: To 22 cm.

Distribution: S.A. and Tas.

Habitat and Depth: A deepwater species captured in both pelagic and demersal trawls in depths from 500 to 3000 m.

References: Mayer (1974).



K. J. Graham

Long-finned pike

Dinolestes lewini (Griffith, 1834)

Family: Dinolestidae p 38

Other Common Names: Yellowfin pike.

Description: Upper jaw with 2 pairs of fang-like teeth anteriorly and 1 row of small canines with inner band of villiform teeth laterally; lower jaw with 1 row of small canines and 4 to 5 larger canines posteriorly. D V,I,II+18-19; A II,25-26; P 16; V I,5; L. Lat. 64-67. Body golden brown to blackish above, silvery below; soft dorsal and caudal fins yellowish.

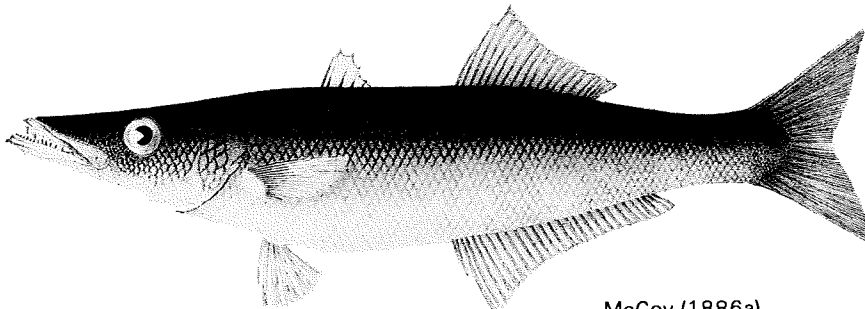
Size: To 84 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: A schooling species occurring in bays over rocky reefs in depths from 5 to 65 m.

Note: This is the only species in the family and has been previously placed in the Apogonidae.

References: McCoy (1886a) as *Lanioperca mordax*; Fraser (1971).



McCoy (1886a)

King George whiting

Sillaginodes punctata (Cuvier, 1829)

Family: Sillaginidae p 46

Other Common Names: Spotted whiting.

Description: Body scales very small (129 to 147 in lateral line); origin of dorsal fin just behind ventral fin bases; soft dorsal fin longer than anal fin; caudal fin forked.

D XII-XIII+I,25-27; A II,21-24; P 13-14; V I,5; L. Lat. 129-147.

Body light brown to blackish above, silvery to golden pink below; *oblique rows of small, brown spots on back and sides*; soft dorsal fin spotted, ventral and pectoral fins white, caudal yellow.

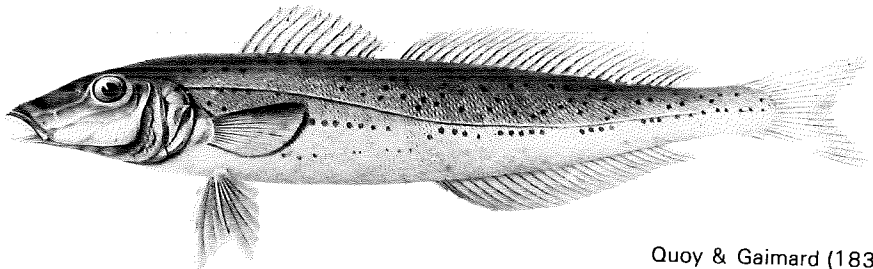
Size: To 70 cm but more commonly taken at lengths of between 30 to 40 cm.

Distribution: Southern N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Adults found in deep water in gulfs and near offshore islands to a depth of 70 m; juveniles inhabiting inshore bays and coastal tidal flats.

Note: This species sustains a valuable commercial fishery in S.A. and Vic.

References: Last et al. (1983); McKay (1985).



Quoy & Gaimard (1834)

Western school whiting

Sillago bassensis bassensis Cuvier, 1829

Family: Sillaginidae p 46

Other Common Names: Silver whiting, red spot whiting, Bass whiting.

Description: Body scales of moderate size (65 to 73 in lateral line); origin of dorsal fin just behind ventral fin bases; soft dorsal fin about equal in length to anal fin; caudal fin forked.

D XI+I,16-19; A II,18-20; P 15-16; V I,5; L.Lat 65-73.

Body olive with oblique, rusty-brown streaks on back and upper sides; conspicuous silvery band along middle of sides; *no* dark blotch at base of pectoral fin; dorsal fin with rows of reddish spots, anal fin yellowish, other fins creamy.

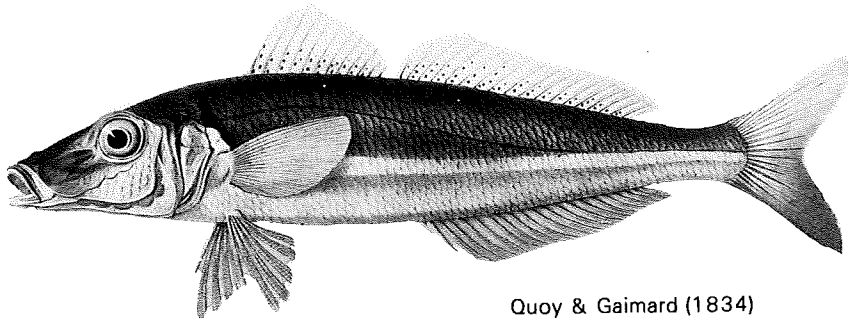
Size: To 33 cm.

Distribution: Western Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf to a depth of about 60 m.

Note: The school whiting has recently been divided into 2 subspecies, the western (*S. bassensis bassensis*) and the eastern (*S. bassensis flindersi*). The eastern school whiting occurs off (southern Qld), N.S.W., eastern Vic. and Tas. and differs from the western subspecies in having a longitudinal row of rusty brown blotches along or below the lateral line and the silvery band along the middle of the sides indistinct. Both subspecies may be confused with the sand whiting (*S. ciliata*), the trumpeter whiting (*S. maculata*) and the yellow-finned whiting (*S. schomburgkii*) which inhabit shallow coastal waters. However, the latter 3 species lack the *rusty brown* lines that are present on the back and upper sides in the school whittings and have emarginate caudal fins. Also, both *S. ciliata* and *S. maculata* have a distinct dark blotch at the base of the pectoral fin which is absent in the school whittings.

References: Marshall (1964); Last et al. (1983); McKay (1985).



Quoy & Gaimard (1834)

Stout whiting

Sillago robusta Stead, 1908

Family: Sillaginidae p 46

Description: Body scales of moderate size (64 to 70 in lateral line); origin of first dorsal fin directly above ventral fin bases; soft dorsal fin about equal in length to anal fin; caudal fin emarginate.

D XI+I,16-18; A II,16-19; P 17; V I,5; L. Lat. 64-70.

Body uniform creamy yellow above, lighter below; inconspicuous, longitudinal, silver stripe along middle of sides; *no* dark blotch at base of pectoral fins; anterior base of first dorsal spine with white or yellow spot and black or blackish brown spot above; dorsal and anal fins finely spotted.

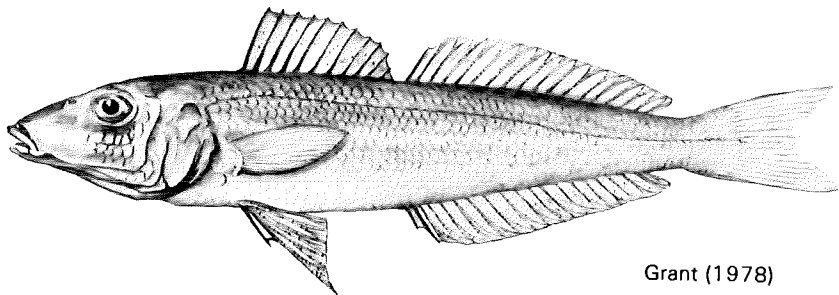
Size: To 27 cm.

Distribution: (N.T., Qld), N.S.W., Vic. and W.A.

Habitat and Depth: Occurs in bays and estuaries but more commonly in deep offshore waters in depths from 10 to 70 m.

Note: This species may be confused with the inshore species, *S. ciliata*, *S. maculata* and *S. schomburgkii*. However both *S. ciliata* and *S. maculata* have a dark blotch at the base of the pectoral fins and *S. schomburgkii* lacks the yellow and black spots on the dorsal spine base.

References: Stead (1908a); McKay (1985).



Grant (1978)

Tailor

Pomatomus saltatrix (Linnaeus, 1758)

Family: Pomatomidae p 44

Other Common Names: Skipjack (rarely), bluefish.

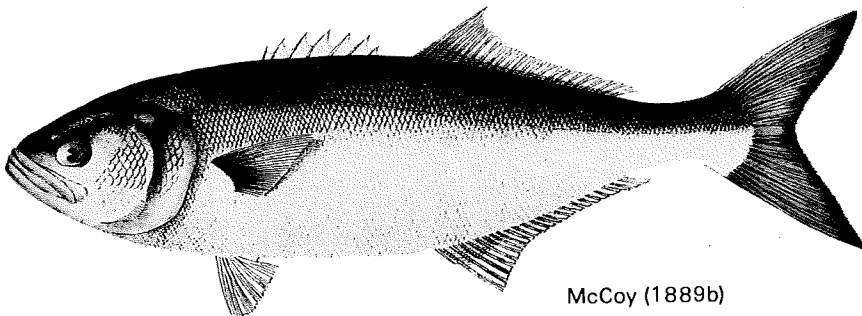
Description: First dorsal fin with 7 to 8 short, weak spines, second with 1 spine and 24 to 26 rays; anal fin with 1 to 3 spines, often concealed by skin, and 24 to 28 rays; jaws with 1 row of strong, compressed teeth, upper jaw with inner row of small conical teeth.
D VII-VIII+I,24-26; A I-III,24-28; P 16-17; V 1,5; L. Lat. 90-100.
Body greenish blue above, sides and belly silvery; dorsal and anal fins pale green, tinged with yellow; caudal fin dull green, tinged with yellow; pectoral fins bluish at base.

Size: To 120 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: A schooling species inhabiting bays, estuaries, beaches and surface waters of the coast.

References: McCoy (1889b) as *Temnodon saltator*.



McCoy (1889b)

Temperate scad

Decapterus scombrinus (Valenciennes, 1855)

Family: Carangidae p 48

Other Common Names: Southern mackerel scad.

Description: Straight segment of lateral line with scutes, curved segment without scutes or scute-like scales; dorsal and anal fins each with 1 detached finlet of 2 rays; upper jaw without teeth, lower jaw with 1 series of small teeth; *pectoral fins short, not extending beyond origin of soft dorsal fin.*

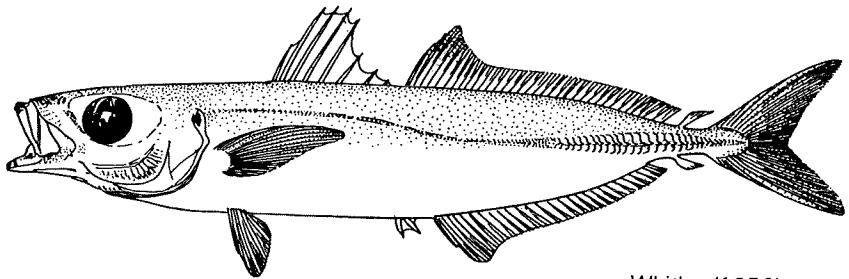
D VIII+I,33-36+2 finlets; A II+I,25-28+2 finlets; lateral line scutes 25-28. Body blue to blue-green above, silver below; operculum with small, black spot; *symphyseal membrane of upper jaw white.*

Size: To about 25 cm.

Distribution: N.S.W.

Habitat and Depth: Pelagic in oceanic and inshore waters.

References: Munro (1958g) as *D. leptosomus*; W. F. Smith-Vaniz pers. comm. (1983).



Whitley (1952)

Pilotfish

Naucrates ductor (Linnaeus, 1758)

Family: Carangidae p 48

Description: Lateral line without scutes; base of soft anal fin relatively short, about 1.5 to 1.8 in length of soft dorsal fin; gill rakers well developed; caudal peduncle with prominent, mid-lateral, fleshy keel.
D IV-V+1,26-27; A II+1,15-17.

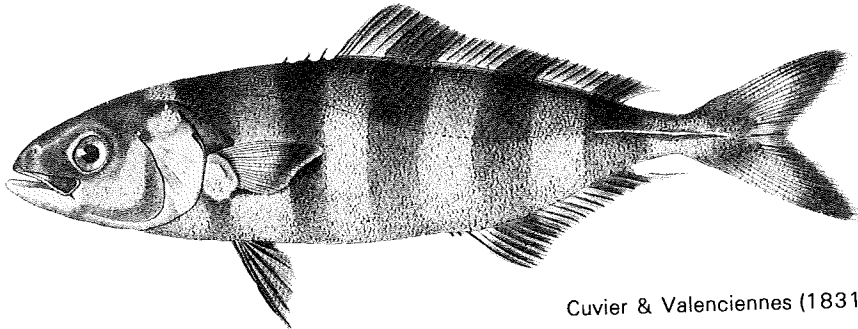
Body blue to black above, pale blue to dusky silver below; 5 to 7 dark, continuous, vertical bars on body and extending onto fins; dorsal, anal and ventral fins dusky yellow; caudal fin dusky blue to grey, tips white.

Size: To at least 50 cm.

Distribution: All Australian states.

Habitat and Depth: Pelagic, in surface waters of the open ocean; juveniles sheltering beneath floating weed and jellyfish.

References: Munro (1958g); W. F. Smith-Vaniz pers. comm. (1983).



Cuvier & Valenciennes (1831)

White trevally

Pseudocaranx dentex (Schneider, 1801)

Family: Carangidae p 48

Other Common Names: Silver trevally, blue trevally.

Description: Straight segment of lateral line with moderate scutes, curved segment without scutes or scute-like scales; dorsal and anal fins without detached finlets; dorsal profile of head from snout to nape low and gently curved, large males often with distinct hump above eye; jaws with 1 row of enlarged, blunt teeth; posterior margin of upper jaw vertical when mouth closed; total gill rakers on first arch 29 to 34. D VIII+I,25-28; A II+I,21-24; L. Lat. 74-90. Body blue-green to silvery green above, silver below; gold band often present along middle of sides; large, diffuse, black spot on upper operculum; fins transparent to dusky green.

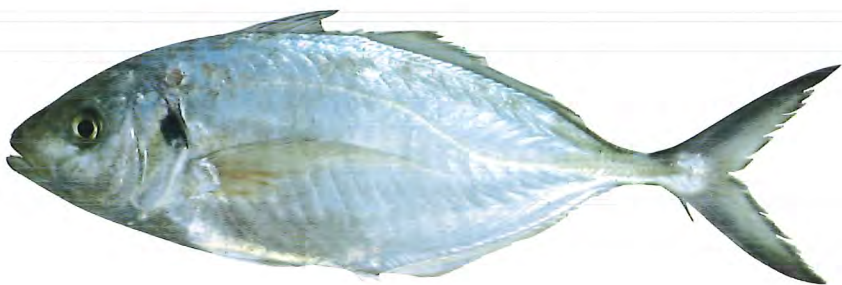
Size: To at least 70 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Pelagic in coastal waters, including estuaries, to a depth of at least 100 m.

Note: *P. dentex* is the *Usacaranx* or *Caranx nobilis* of many authors and has also been lumped on many occasions with *P. wrighti* under *U. georgianus*.

References: W. F. Smith-Vaniz pers. comm. (1981).



J. G. H. Maxwell

Skipjack trevally

Pseudocaranx wrighti (Whitley, 1931)

Family: Carangidae p 48

Other Common Names: Sand trevally.

Description: Straight segment of lateral line with moderate scutes, curved segment without scutes or scute-like scales; dorsal and anal fins without detached finlets; dorsal profile of head from snout to nape low and gently curved; *jaws with 1 row of blunt, enlarged teeth; posterior margin of upper jaw oblique, slanted backwards dorso-ventrally when mouth closed*; total gill rakers on first arch 36 to 44.
D VIII+I,22-26; A II+I,18-22; L. Lat. 44-56.

Body blue-green to silvery green above, silvery below; small, *distinct, black spot* on upper operculum; fins transparent to dusky green.

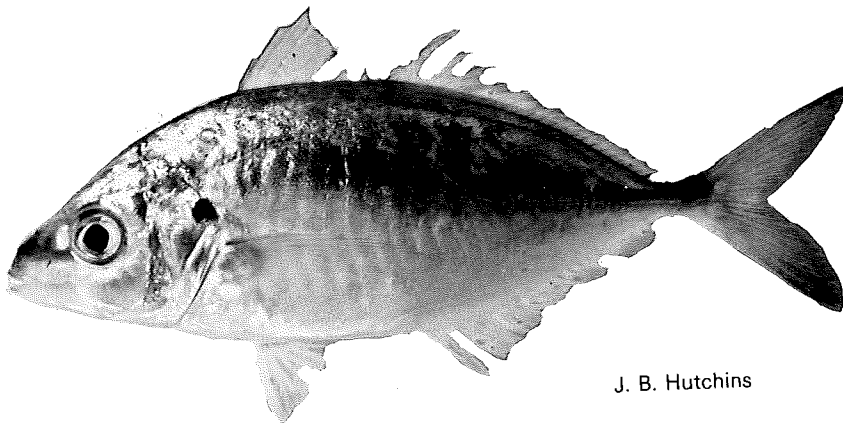
Size: To at least 70 cm.

Distribution: N.S.W., S.A. and W.A.

Habitat and Depth: Pelagic in coastal waters, including estuaries.

Note: *P. wrighti* has not as yet been recorded from Victoria, but this may be because it has not been distinguished from *P. dentex*.

References: W. F. Smith Vaniz pers. comm. (1981).



J. B. Hutchins

Samsonfish

Seriola hippos (Günther, 1876)

Family: Carangidae p 48

Description: Lateral line without scutes; base of soft anal fin relatively short, more than 2 in length of soft dorsal fin base; gill rakers well developed; caudal peduncle with poorly developed, mid-lateral, fleshy keel; dorsal profile of head from snout to nape steep; supramaxilla broad.

D VII-VIII+I,23-25; A 0-II+I,16-17.

Adults blue-green to dark green above, green to silver below; spinous dorsal fin dark blue to black, other fins yellow-green to dusky green. Juveniles green with 4 to 5 black, vertical bars (continuous or broken) on body.

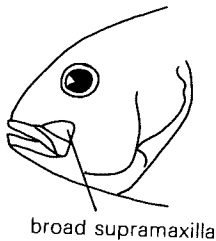
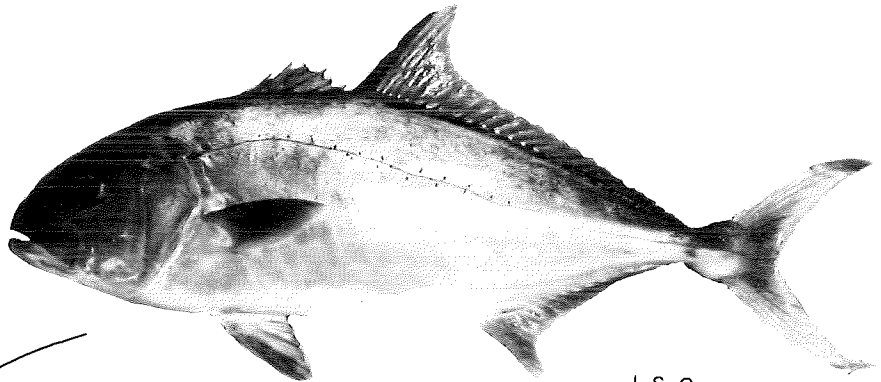
Size: To at least 150 cm.

Distribution: (Southern Qld), N.S.W. and W.A.

Habitat and Depth: Pelagic in inshore oceanic waters; sometimes entering large estuaries.

Note: Two sub-tropical species, *S. dumerili* and *S. rivoliana* resemble *S. hippos* but both have more than 30 rays in the dorsal fin and more than 18 rays in the anal fin.

References: Munro (1958g); W. F. Smith-Vaniz pers. comm. (1983).



J.S.G. 1985

337007

Yellowtail kingfish

Seriola lalandi Valenciennes, 1833

Family: Carangidae p 48

Description: Lateral line without scutes; base of soft anal fin relatively short, more than 2 in length of soft dorsal fin base; gill rakers well developed; caudal peduncle without or with poorly to moderately developed, mid-lateral, fleshy keel; dorsal profile of head from snout to nape low and gently curved; supramaxilla narrow.

D VII-VIII+I,31-34; A 0-II+I,20-22.

Body purple-blue above, silver below; head often with greenish tinge; yellowish green to golden band along midline of sides (fading rapidly after death); dorsal and anal fins pale green, blue-green or yellow; caudal fin olive-green, lobes often yellow.

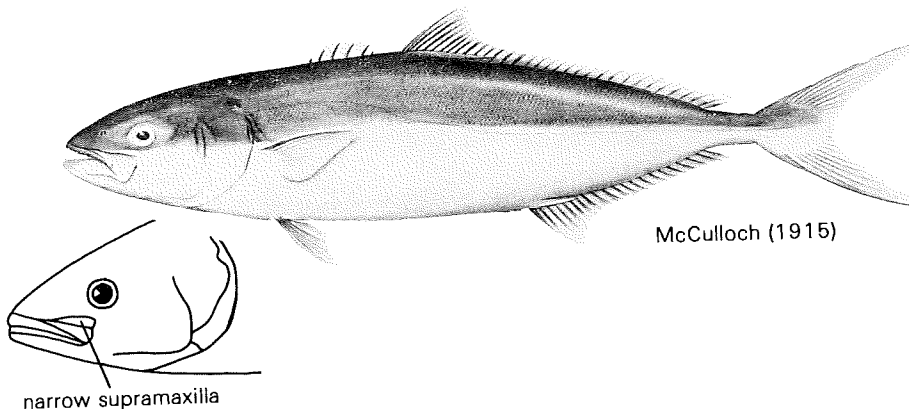
Size: To at least 200 cm.

Distribution: (Qld), N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Pelagic in coastal and oceanic waters; occasionally entering estuaries.

Note: The narrow supramaxilla of *S. lalandi* distinguishes it from the other 3 Australian species of *Seriola* (*S. hippos*, *S. dumerili* and *S. rivoliana*) in which the supramaxilla is broad to very broad.

References: Munro (1958g) as *S. grandis*; W. F. Smith-Vaniz pers. comm. (1983).



Jack mackerel

Trachurus declivis (Jenyns, 1841)

Family: Carangidae p 48

Other Common Names: Greenback scad, horse mackerel, cowanyoung.

Description: Straight segment of lateral line with large scutes, curved segment with keeled scute-like scales; dorsal and anal fins without detached finlets; accessory lateral line (near dorsal fin base) terminating below *sixth to tenth soft dorsal fin ray*.

D VIII+I,29-35; A II+I,24-29; L. Lat. 71-89 (total, including scutes).

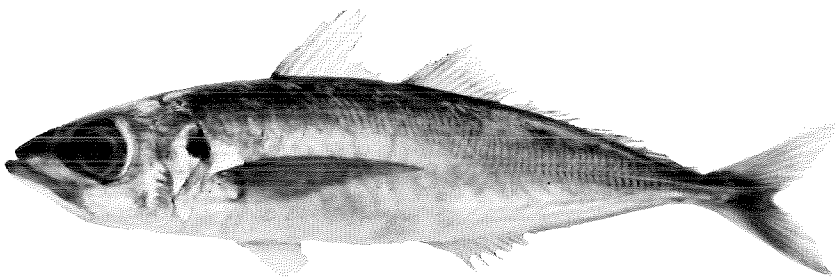
Body dark green to green-blue above and silver below; dorsal, anal and caudal fins green to translucent.

Size: To about 50 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Pelagic, in coastal waters to a depth of at least 200 m.

References: Munro (1958g); Berry & Cohen (1972); Stephenson & Robertson (1977).



K. J. Graham

Yellowtail scad

Trachurus novaezelandiae Richardson, 1843

Family: Carangidae p 48

Other Common Names: Cowanyoung, yakka.

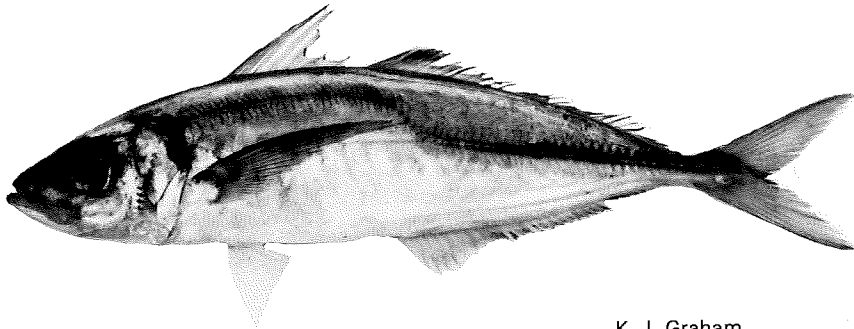
Description: Straight segment of lateral line with large scutes, curved segment with keeled scute-like scales; dorsal and anal fins without detached finlets; accessory lateral line (near dorsal fin base) terminating below area between *eighth dorsal spine and second soft dorsal fin ray*.
D VIII+1,27-33; A II+1,22-29; L. Lat. 67-81 (total, including scutes).
Body yellowish green to green above, silver below; dorsal and anal fins dusky green to white; caudal fin yellow.

Size: To 30 cm.

Distribution: (Southern Qld), N.S.W., Vic., S.A. and southern W.A.

Habitat and Depth: Pelagic in coastal waters, including estuaries.

References: Munro (1958g) as *T. mccullochi*; Berry & Cohen (1972); Stephenson & Robertson (1977).



K. J. Graham

Ray's bream

Brama brama (Bonnaterre, 1788)

Family: Bramidae p 54

Other Common Names Pomfret.

Description: Dorsal and anal fins covered with scales, stiff and erect, and not fully depressible against body; dorsal profile of head strongly arched and rounded; inner lower edges of mandible behind symphysis touching each other hiding isthmus; scales on tail *gradually* decreasing in size from caudal peduncle to midcaudal rays; ventral fins inserted under posterior half of base of pectoral fin; body depth in adults about 2 to 2.2 in FL, width about 7 to 8 in FL.

D III,32-38; A II,26-29; P 19; V I,5; L. Lat. 90-94.

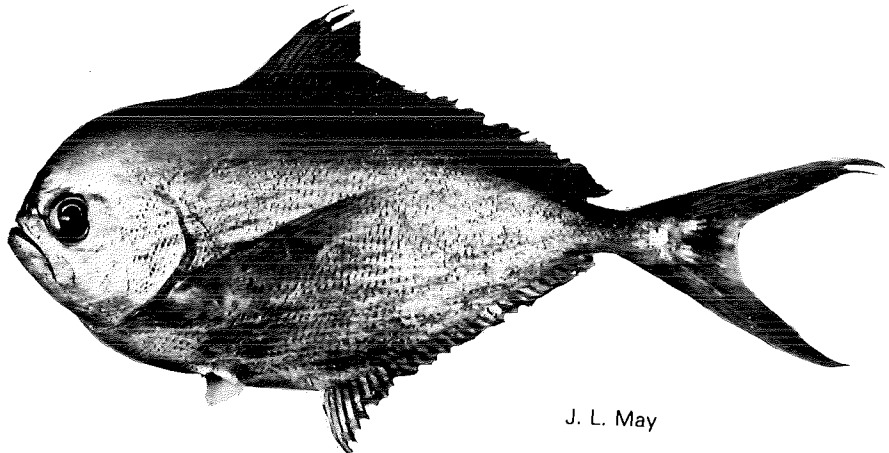
Head and body dark grey with lead lustre; narrow, dark band along dorsal edge of body; strong, black saddle on snout; fins dark grey to black.

Size: To 66 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Pelagic, in oceanic waters from the surface to depths of about 500 m; occasionally coming close to shore.

References: McCoy (1887a) as *B. rayi*; Mead (1972).



Eastern Australian salmon

Arripis trutta (Schneider, 1801)

Family: Arripidae p 44

Other Common Names: Kahawai, blackback salmon, cocky salmon, colonial salmon, native salmon, salmon trout, bay trout.

Description: Dorsal fin with 9 spines and 15 to 19 rays; scales finely ctenoid, body smooth to touch in large fish; 33 to 40 gill rakers on first arch.

D IX,15-19; A III,10; V I,5; P 16-17; L. Lat. 48-52.

Body dark blue-green above, silvery white below; juveniles with series of golden, vertical bars or spots on upper half of body; *pectoral fins bright yellow*, other fins translucent; spinous dorsal and caudal fins with black margins.

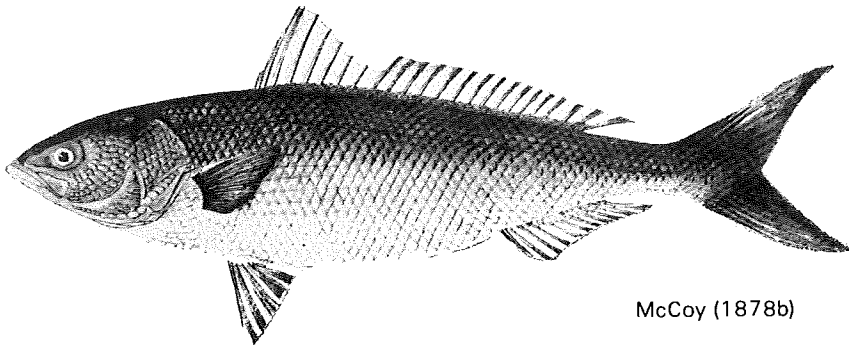
Size: To 91 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Pelagic in coastal waters; a schooling species occurring off beaches and migrating along the coast.

Note: A closely related species, *A. truttaceus*, occurs off S.A. and W.A., with both it and *A. trutta* migrating through Victorian and Tasmanian waters. *A. truttaceus* has fewer gill rakers on the first arch (25 to 31) and reaches an adult size of between 55 and 80 cm compared to *A. trutta* which reaches adult size between 40 and 55 cm. The tommy rough (*A. georgianus*) also occurs in shallows waters off N.S.W., Vic., S.A. and W.A. It differs from both the above species in having 13 to 14 rays in the soft dorsal fin, the body rough to touch and greyish pectoral fins.

References: McCoy (1878b); Fowler (1933); MacDonald (1980, 1983).



McCoy (1878b)

Redbait

Emmelichthys nitidus Richardson, 1845

Family: Emmelichthyidae p 44

Other Common Names: Red baitfish, southern rover.

Description: 2 to 3 short, isolated spines between spinous dorsal and soft dorsal fins; last ray of dorsal and anal fins elongated, about equal to longest anterior ray; body relatively slender (depth 4 to 5 in SL); 87 to 98 lateral line scales and 7 to 10 scale rows between dorsal fin origin and lateral line.

D XIII-XIV,9-11; A 9-10; P 20-23; V I,5; GR 37-43; L. Lat. 87-98.

Body olive-grey to silver above, rosy pink on sides and white to pink below, fins pinkish; fish less than 9 cm silvery with 8 to 9 dark bars across back.

Size: To 36 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: A schooling species occurring in midwater over the continental shelf.

Note: A similar but rare species, *E. struhsakeri*, also occurs off southern N.S.W. It differs from *E. nitidus* in having slightly larger scales (68 to 76 lateral line scales and 6 to 8 scale rows between dorsal fin origin and lateral line) and only 11 to 12 dorsal fin spines.

References: Heemstra & Randall (1977).



J. G. H. Maxwell

Rubyfish

Plagiogeneion macrolepis McCulloch, 1914

Family: Emmelichthyidae p 44

Description: Dorsal fin continuous (spinous and rayed parts not separated by gap); last ray of dorsal and anal fins distinctly shorter than anterior ray; body relatively deep (depth 3.0 to 3.5 in SL); 48 to 51 lateral line scales and 5 to 7 scale rows between middle spines of dorsal fin and lateral line.

D XII,11; A 10-11; P 19-20; V I,5; GR 39-44; L. Lat. 48-51.

Body red to pink with yellow spots along scale rows above, silvery below; head and fins with crimson tinge.

Size: To 47 cm.

Distribution: Great Australian Bight.

Habitat and Depth: A schooling species found near the bottom of the continental shelf and upper slopes in depths from 95 to 390 m.

Note: A similar species, *P. rubiginosus*, occurs in Bass Strait and off N.S.W in depths from 55 to 550 m. It differs from *P. macrolepis* in having smaller, more numerous scales (67 to 74 lateral line scales and 8 to 10 scale rows between middle spines of dorsal fin and lateral line).

References: Heemstra & Randall (1977).



J. G. H. Maxwell

Silverbelly

Parequula melbournensis (Castelnau, 1872)

Family: Gerreidae p 54

Other Common Names: Lowfin.

Description: Dorsal and anal fins of about uniform height, anterior dorsal and anal spines *not* longer than rays; ventral fins without long scale-like axillary process; 16 to 18 rays in both dorsal and anal fins; pectoral fins extending beyond anal fin origin but slightly shorter than head.

D IX,16-18; A III,16-18; P 14-15; V I,5; L. Lat. 37-39.

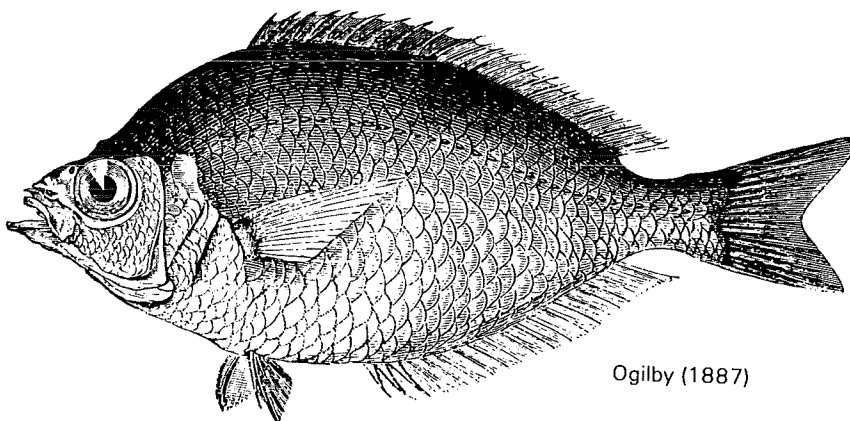
Body silvery with bronze tinge; yellow spots or reticulations on sides; dorsal, anal and caudal fins yellowish; iris yellow.

Size: To 18 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 3 to 100 m.

References: Castelnau (1872) as *Gerres melbournensis*; Ogilby (1887) as *Chthamalopteryx melbournensis*; Scott (1964).



Snapper

Chrysophrys auratus (Schneider, 1801)

Family: Sparidae p 52

Other Common Names: Squire, red bream, cockney.

Description: Second and third anal spines about equal in length; 4 canines in front of upper jaw, 6 in lower; 2 rows of molars on each side of both jaws; 9 to 10 scale rows above lateral line; 9 to 10 rays in dorsal fin, 8 rays in anal fin; dorsal profile of head convex; very large fish often with prominent hump on nape and bulge above eyes.
D XII,9-10; A III,8; P 15; V I,5; L. Lat. 53-55.
Body pinkish with small, blue spots on upper sides; dorsal, caudal and pectoral fins pink.

Size: To 130 cm; more commonly taken between 20 to 45 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, occurring in estuaries and on the continental shelf to a depth of 200 m.

References: Fowler (1933); Yasuda & Mizuguchi (1969); Scott et al. (1976) as *C. unicolor*; MacDonald (1980).



J. G. H. Maxwell

Jewfish

Argyrosomus hololepidotus (Lacépède, 1802)

Family: Sciaenidae p 44

Other Common Names: Mulloway, butterfish, kingfish.

Description: Mouth terminal, upper jaw reaching to below posterior half of eye; jaws with small and large teeth but strong canine teeth absent; dorsal fin with 11 spines and 26 to 29 rays; anal fin with 2 spines and 7 rays, second spine weak and about half length of longest anal ray; caudal fin almost truncate or upper corner bluntly pointed and lower corner rounded; swimbladder carrot-shaped with 25 to 35 branched appendages, appendages not entering head.

D X,I,26-29; A II,7; P 17; V I,5; L. Lat. 46-52.

Body greenish grey above and silvery grey below with bronze sheen on head and along base of dorsal fin; black blotch at base of pectoral fins.

Size To 200 cm; more commonly taken between 100 to 150 cm.

Distribution: (Southern Old), N.S.W., Vic., S.A. and W.A.

Habitat and Depth: Demersal, in coastal waters, including estuaries and on offshore reefs in depths from 5 to 150 m.

References: Roughley (1951) as *Sciaena antarctica*; Trewavas (1977).



K. J. Graham

Red mullet

Upeneichthys lineatus (Schneider, 1801)

Family: Mullidae p 42

Other common Names: Blue-striped red mullet, blue-spotted goatfish.

Description: Second dorsal and anal fins without scales; hind end of maxilla mostly hidden by preorbital when mouth closed; *no teeth on palatines*; several small *teeth on vomer*; jaws with short, conical teeth, 2 rows in front and 1 row at sides.

D VIII,1,8; A II,6; P 15-16; V 1,5; L. Lat. 28-30.

Body pinkish (during day) to bright red (at night and after death) with reddish to black band along mid-sides; head with thin, blue, lines from mouth to eye; body with longitudinal rows of blue spots (1 spot per scale); fins pinkish to reddish with longitudinal rows of blue spots on second dorsal, anal and caudal fins.

Size: To 35 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, schooling on sand and rocky substrates to a depth of about 100 m.

Note: There appears to be 2 forms of red mullet in southern Australian waters, with fish from the east coast differing somewhat in body shape and colour to those of the southern coast.

References: Thomas (1969); Scott et al. (1974) as *U. porosus*; R. H. Kuitert pers. comm. (1984).



K. J. Graham

Slender bullseye

Parapriacanthus elongatus (McCulloch, 1911)

Family: Pempherididae p 56

Other Common Names: Elongate bullseye.

Description: Body elongate, depth less than or equal to head length; lateral line *not* extending to hind margin of caudal fin; anal fin without scales.

D IV-V,9-11; A III,23-27; P 17-18; V I,5; L. Lat. 57-68; LGR 24-27.

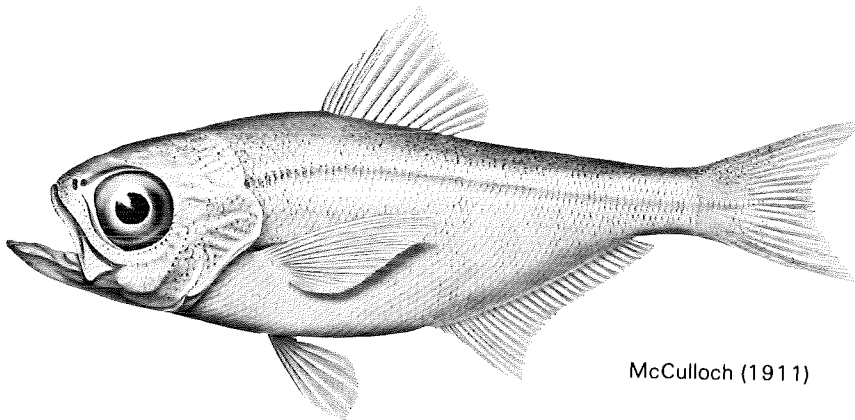
Body grey to light brown above, paler below; upper surface covered with minute, dark spots; fins pink or translucent.

Size: To 14 cm.

Distribution: Southern N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, schooling near rocky reefs in depths from 2 to 60 m.

References: McCulloch (1911); Tominaga (1968); Jubb (1977).



Rough bullseye

Pempheris klunzingeri McCulloch, 1911

Family: Pempheridae p 56

Other Common Names: Klunzinger's bullseye.

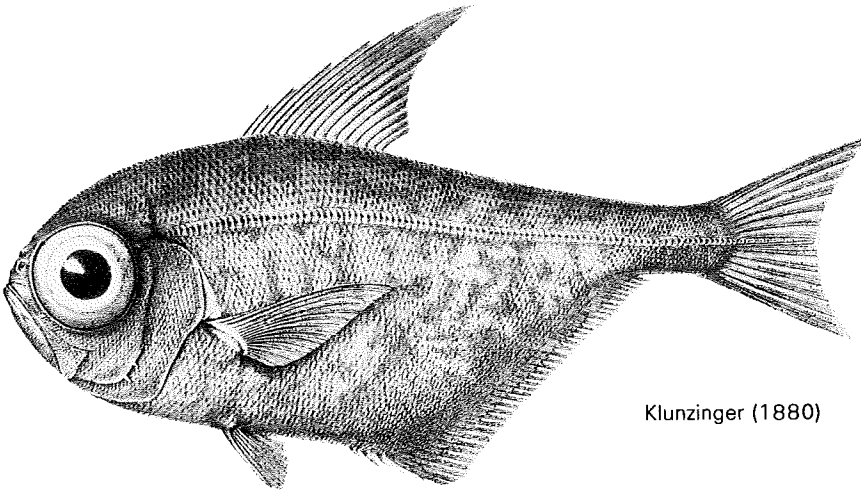
Description: Body deep, depth greater than head length; lateral line extending to hind margin of caudal fin; basal part of anal fin scaly; scales on flanks ctenoid and adherent; 66 to 80 scales in lateral line. D V,10-12; A III,36-41; P 16-17; V I,5; L. Lat. 66-80; LGR 24-27. Body reddish brown to brownish orange with dark mottling; leading edge and tip of dorsal fin, and margin of anal fin dark brown.

Size: To 18 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal, schooling in caves and near rocky reefs to a depth of about 50 m.

References: McCulloch (1911); Tominaga (1968); Jubb (1977).



Klunzinger (1880)

Common bullseye

Pempheris multiradiatus Klunzinger, 1879

Family: Pempheridae p 56

Other Common Names: Big-scaled bullseye.

Description: Body deep, depth greater than head length; lateral line extending to hind margin of caudal fin; basal part of anal fin scaly; scales on flanks cycloid and *deciduous*; 42 to 49 scales in lateral line. D V,11-13; A III,32-39; P 16-17; V I,5; L. Lat. 42-49; LGR 22-25. Adults metallic blue or reddish brown above, silvery below with 8 to 9 longitudinal, silvery lines on sides; fin greyish brown. Juveniles translucent with bronze to yellowish tinge; anal and ventral tips blackish.

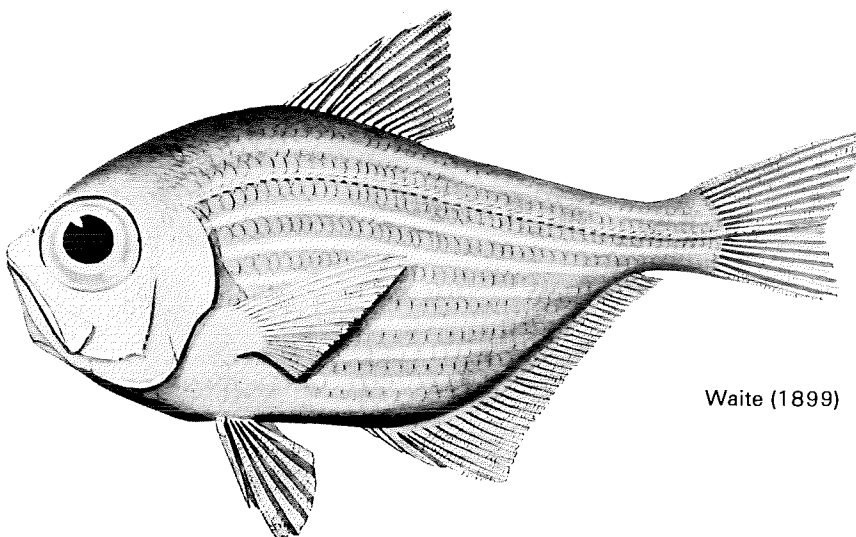
Size: To 28 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, schooling in caves and near rocky reefs to a depth of about 30 m.

Note: An undescribed species, probably the smallest (maximum length 7 cm) Australian *Pempheris*, has been discovered in S.A. and southern W.A. waters. Like *P. multiradiatus* it has deciduous, cycloid scales on the flanks but has only 32 to 36 scales in the lateral line and 5 to 6 longitudinal orange lines on the sides of the body.

References: McCulloch (1911); Tominaga (1968); Jubb (1977); R. N. Jubb pers. comm. (1983).



Footballer sweep

Neatypus obliquus Waite, 1905

Family: Scorpididae p 60

Description: Mouth small, not extending to anterior border of eye; dorsal fin spines not graduated, middle spines longest; caudal fin emarginate or slightly forked; base of *spinous* and soft dorsal and anal fins covered with scales; dorsal profile of head convex or straight above eyes; body scales of moderate size, about 50 in lateral line.

D X,22; A III,18; P 15; V 1,5; L. Lat. 51.

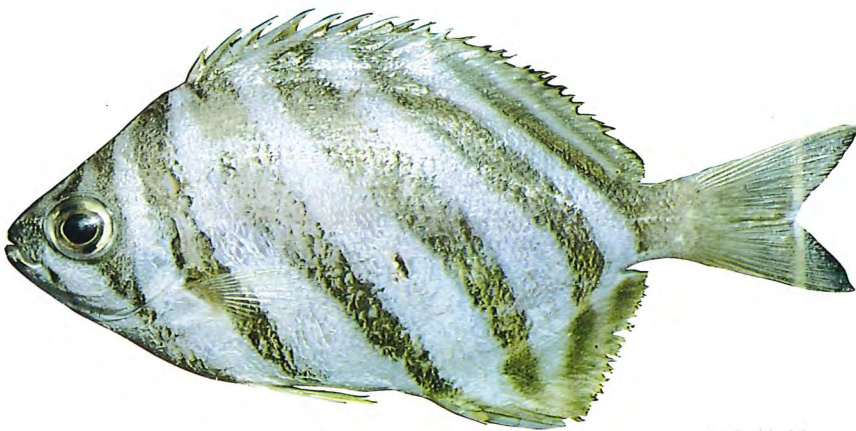
Head and body silvery white to greyish; 6 dark brown to yellow, *oblique, bands* edged with black on head and sides; fins yellowish to greenish brown.

Size: To 22 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal, on offshore reefs to a depth of at least 60 m.

References: Waite (1905); Norman (1957).



J. G. H. Maxwell

Sea sweep

Scorpis aequipinnis Richardson, 1848

Family: Scorpididae p 54

Other Common Names: Snapjack.

Description: Mouth of moderate size, extending beyond anterior border of eye; dorsal fin spines graduated, last spine longest; caudal fin deeply forked; anterior rays of dorsal and anal fins elevated, but longest ray less than head length in adults.

D IX-X,27-28; A III,25-26; P 17-18; V I,5; L. Lat. about 100.

Head and body silvery blue above, paler below; upper sides sometimes with 1 to 2 indistinct, darker blue crossbands; lower jaw bright yellow; fins bluish grey.

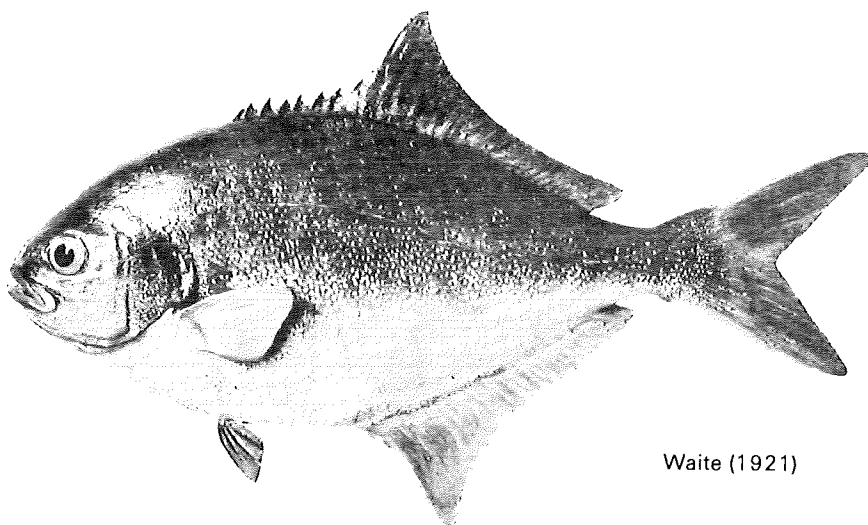
Size: To 40 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal on offshore and deepwater reefs.

Note: At least 2 other species of *Scorpis* occur in temperate waters. The sweep (*S. lineolatus*), recorded from N.S.W., Vic. and Tas., lacks the elevated anterior rays of the dorsal and anal fins and is uniform bluish grey. In the banded sweep (*S. georgianus*), recorded from S.A. and southern W.A., the longest rays of the dorsal and anal fins are greater than the head length in adults and there are 2 black vertical bars on the body and 1 on the operculum.

References: Richardson (1848); D. F. Hoese pers. comm. (1983).



Waite (1921)

Moonlighter

Vinculum sexfasciatum (Richardson, 1842)

Family: Scorpididae p 60

Other Common Names: Six-banded coralfish.

Description: Mouth small, not extending to anterior border of eye; dorsal fin spines not graduated, middle spines longest; caudal fin emarginate; base of *spinous* and soft dorsal and anal fins covered with scales; dorsal profile of head concave, rising steeply above eyes; body scales very small, 75 to 90 in lateral line.

D X,20-21; A III,17-19; P 17; V I,5; L. Lat. 75-90.

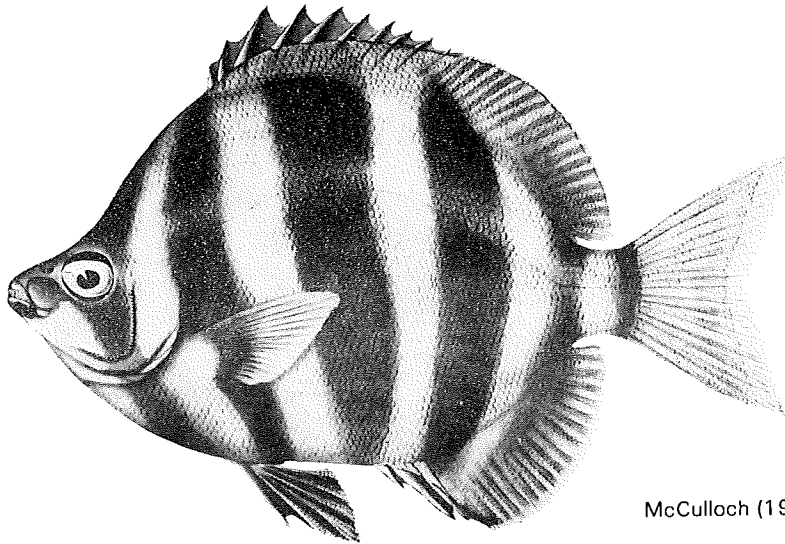
Body and head silvery white or pale yellowish green; 6 black, *vertical bars* on head, body and caudal peduncle; fins greyish brown, margins of dorsal, anal and caudal fins white; juveniles with black ocellus on anterior part of soft dorsal and anal fins.

Size: To 40 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on offshore rocky reefs to a depth of 120 m.

References: Norman (1957).



McCulloch (1914a)

Lord Howe Island butterflyfish

Amphichaetodon howensis (Waite, 1903)

Family: Chaetodontidae p 60

Other Common Names: Broad-barred butterflyfish.

Description: Mouth small, terminal; soft dorsal and anal fin rays not extended; dorsal fin continuous with 12 long, strong spines increasing in length to fourth or fifth then decreasing to last; fourth dorsal spine *not* greatly elongate; lateral line complete, ending at base of caudal fin; pectoral fins moderately long, rounded; anal fin with 3 spines and 16 rays.

D XII,22-23; A III,16; P 15; V I,5; L. Lat. 47-50.

Body yellowish above, silvery below; sides with 5 black, broad, vertical bands (bands much wide than eye diameter) continuing onto dorsal and anal fins; caudal fin and remainder of dorsal and anal fins yellow.

Size: To 18 cm.

Distribution: (Southern Qld, Lord Howe Island) and N.S.W.

Habitat and Depth: Demersal, on rocky reefs to a depth of 150 m.

References: Burgess (1978).



K. J. Graham

Coralfish

Chelmonops truncatus (Kner, 1859)

Family: Chaetodontidae p 60

Other Common Names: Truncate coralfish, talma.

Description: Snout prolonged, robust, not tubular; soft dorsal and anal fins triangular with first few rays extended in adults; dorsal fin continuous with 11 strong spines increasing in length posteriorly, last spine longest; lateral line complete, ending at base of caudal fin; pectoral fins moderately long, rounded.

D XI,25-27; A III,19-20; P 14-17; V I,5; L. Lat. 48-56.

Body silvery with brownish tinge and 4 to 5 black, vertical bands; posterior margins of soft dorsal and anal fins black; *juvenile* with distinct ocellus in soft dorsal fin.

Size: To 20 cm.

Distribution: (Southern Qld), N.S.W., S.A. and southern W.A.

Habitat and Depth: Demersal, on rocky reefs to a depth of 70 m.

Note: Coralfish from S.A. and W.A. waters differ somewhat in fin counts and body depth to those of N.S.W. and may represent an undescribed species.

References: Burgess (1978); R. H. Kuitert pers. comm. (1983).



J. G. H. Maxwell

Old wife

Enoplosus armatus (White, 1790)

Family: Enoplosidae p 60

Description: See family description.

D IX,14-15; A III,14-15; V I,5; L. Lat. 50-60.

Head and body silvery white with 8 blackish, vertical bands, some extending onto dorsal and anal fins; elongate rays of soft dorsal and anal fins dark brown; pectoral fins pinkish; caudal fin pink, bordered above and below with dark brown; iris bright yellow.

Size: To 25 cm.

Distribution: (Qld), N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on inshore and offshore rocky reefs and seagrass beds to a depth of 90 m.

References: Fowler (1933).



J. L. May

Short boarfish

Parazanclistius hutchinsi Hardy, 1983

Family: Pentacerotidae p 60

Description: Base of soft dorsal fin much longer than base of spinous dorsal; dorsal fin with 6 spines and 25 to 27 rays; dorsal spines increasing in length to last; anterior dorsal rays much longer than last spine; anal fin with 3 to 4 spines and 13 to 14 rays; hind margin of soft anal fin convex, anterior rays short, about same length as posterior rays; pectoral fins long (length 2.1 to 2.5 in SL); ventral fins inserted just ahead of pectoral fin bases; *operculum covered with scales*; bony crest above eye rounded, becoming less pronounced in large fish.
D VI,25-27; A III-IV,13-14; P 16-18; V I,5; L. Lat. 66-72; GR 20-22.

Body pale olive-brown; 2 broad (usually diffuse), darker crossbands on side from dorsal spines to anus and from anterior dorsal rays to posterior anal rays; dorsal surface of head from mouth corner to nape dark brown; dorsal, anal and caudal fins pale brownish grey with darker bands crossing rays; distinct, black spot *encircled by white* on posterior rays of dorsal fin.

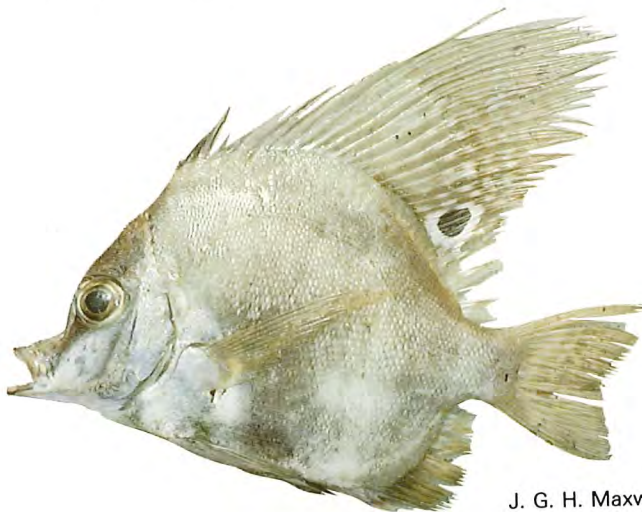
Size: To at least 34 cm.

Distribution: Southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 10 to 80 m.

Note: This recently described species has previously been confused with *Zanclistius elevatus*.

References: Hardy (1983b).



J. G. H. Maxwell

Yellow-spotted boarfish

Paristiopterus gallipavo Whitley, 1944

Family: Pentacerotidae p 60

Description: Base of soft dorsal fin slightly longer than base of spinous dorsal; dorsal fin with 7 to 8 spines and 16 to 18 rays; third to seventh dorsal spines very elongate, anterior rays shorter than longest spine; *anal fin with 3 spines.*

D VII-VIII,16-18; A III,9-10; P 16-17; V I,5; L. Lat. 72-83; GR 19-20.

Adults pearly grey, suffused with pink on head and along back; head, body and fins with *numerous small, yellowish or brownish spots*; fins greyish. Juveniles with several dark brown spots and 3 dark brown, oblique bands between pectoral fin and caudal peduncle.

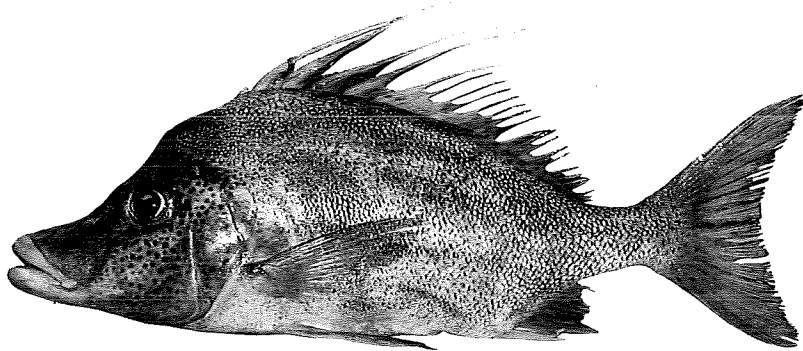
Size: To 74 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 60 to 260 m.

Note: Adults have relatively more elongated bodies and longer snouts than juveniles.

References: Hardy (1983a).



J. Marek

Giant boarfish

Paristiopterus labiosus (Günther, 1871)

Family: Pentacerotidae p 60

Description: Base of soft dorsal fin slightly longer than base of spinous dorsal; dorsal fin with 7 spines and 16 to 18 rays; third to seventh dorsal spines slender and elongate in juveniles, shorter and heavier in adults; anterior dorsal rays shorter than longest spine; *anal fin with 2 spines.*

D VII,16-18; A II,8-10; P 16-18; V I,5. L. Lat. 85-96; GR 18-21.

Adults olive-brown to greyish green above, paler below; 3 dark, oblique bands on sides, upper sometimes forming flattened ring below soft dorsal fin and 1 longitudinal band between pectoral fins and anus; *males* with numerous small, yellow spots; fins greyish. Juveniles similar to adults but bands more distinct.

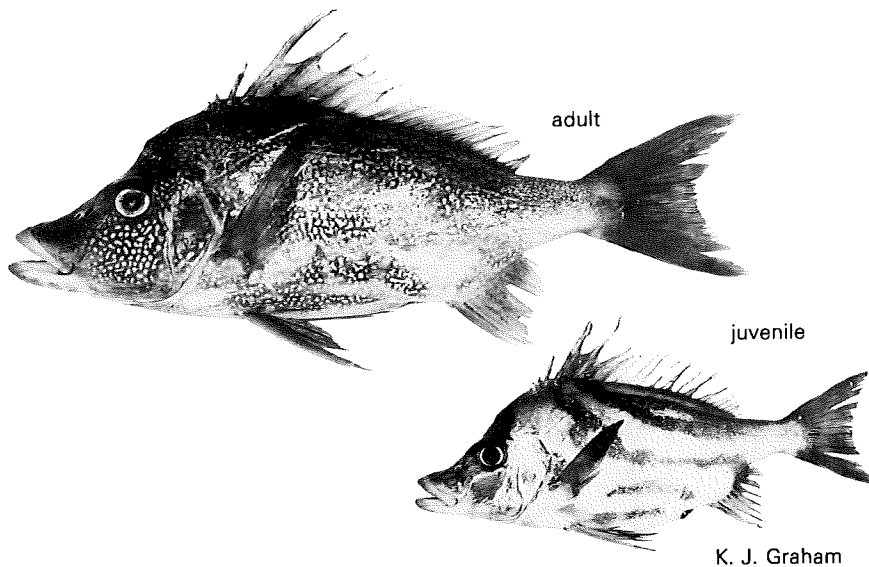
Size: To 100 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depths: Demersal, recorded from the continental shelf in depths from 20 to 170 m.

Note: Adults have more elongated bodies and longer snouts than juveniles.

References: Hardy (1983a).



Long-snouted boarfish

Pentaceropsis recurvirostris (Richardson, 1845)

Family: Pentacerotidae p 60

Other Common Names: Striped boarfish, duckfish.

Description: Base of soft dorsal fin shorter than base of spinous dorsal; dorsal fin with 10 to 11 spines and 14 to 15 rays; middle dorsal spines produced and anterior rays long, about equal in length to longest spine; anal fin with 3 slender spines; body rectangular, back sharply bent from below anterior dorsal rays to caudal peduncle.

D X-XI,14-15; A III,10-11; P 16-18; V I,5; L. Lat. 78-85; GR 19-22.

Adults silvery white with 2 to 3 dark, *oblique bands* on side and 1 band from snout through eye to nape; dorsal and anal fins translucent, leading edge black; caudal fin translucent with upper and lower edges black; ventral fins black. Juveniles pale with large, brown blotches on body and dark band from snout to eye.

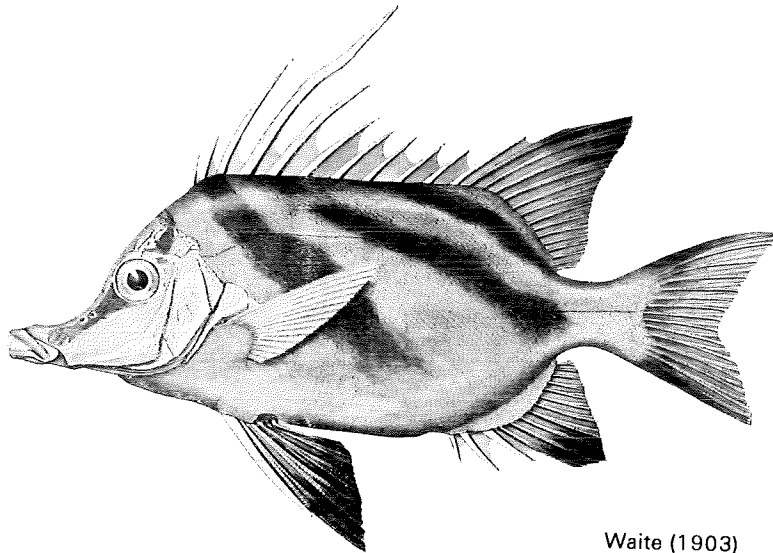
Size: To at least 50 cm.

Distribution: Southern N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 10 to 260 m; most common in depths less than 40 m.

Note: Snout lengthens considerably with increasing body size.

References: Hardy (1983a).



Waite (1903)

Big-spined boarfish

Pentaceros decacanthus Günther, 1859.

Family: Pentacerotidae p 60

Description: Base of soft dorsal fin much shorter than base of spinous dorsal; dorsal fin with 11 spines and 12 to 14 rays; anterior dorsal rays much shorter than longest spine; anal fin with 4 to 5 (rarely 5) robust spines; scales on ventral midline flattened, 21 to 33 on throat to level of ventral fins spines.

D XI,12-14; A IV-V,8-10; P 15-18; V I,5; L. lat. 45-53; GR 20-25.

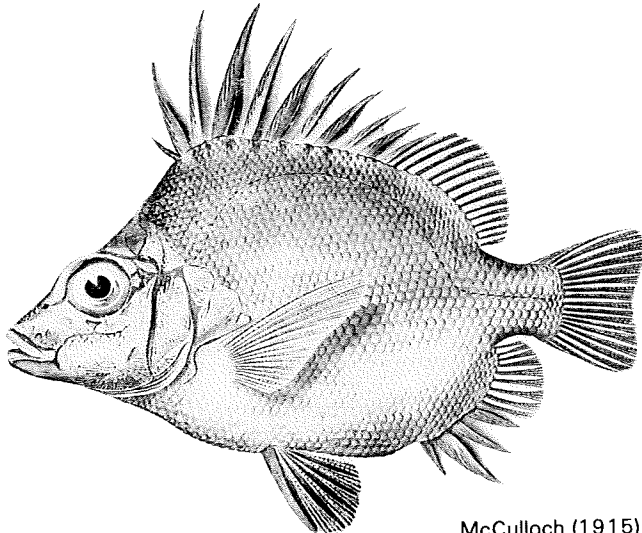
Adults yellowish grey, scales with white centres; belly yellow with yellow streaks below and before pectoral fin bases; membranes of ventral fins black, other fins pale yellow. Juveniles pale with dark mottling.

Size: To 24 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 37 to 460 m; usually in depths greater than 300 m.

References: Scott et al. (1974) as *Undecimus hendecacanthus*; Hardy (1983a).



McCulloch (1915)

Richardson's boarfish

Pseudopentaceros richardsoni (Smith, 1844)

Family: Pentacerotidae p 60

Other Common Names: Pelagic armourhead.

Description: Base of soft dorsal fin much shorter than base of spinous dorsal; dorsal fin with 14 to 15 spines and 8 to 9 rays; anterior dorsal rays much shorter than longest spine; anal fin with 4 to 5 spines; scales on ventral midline plate-like, 32 to 39 on throat to level of ventral fins spines.

D XIV-XV,8-9; A IV-V,7-8; P 17-18; V I,5; L. Lat. 70-89; GR 20-23.

Adults steel blue to greyish green above, paler below; membranes of dorsal and anal fins bluish, margins darker. Juveniles dark with pale lines and spots above, pale with dark spots below.

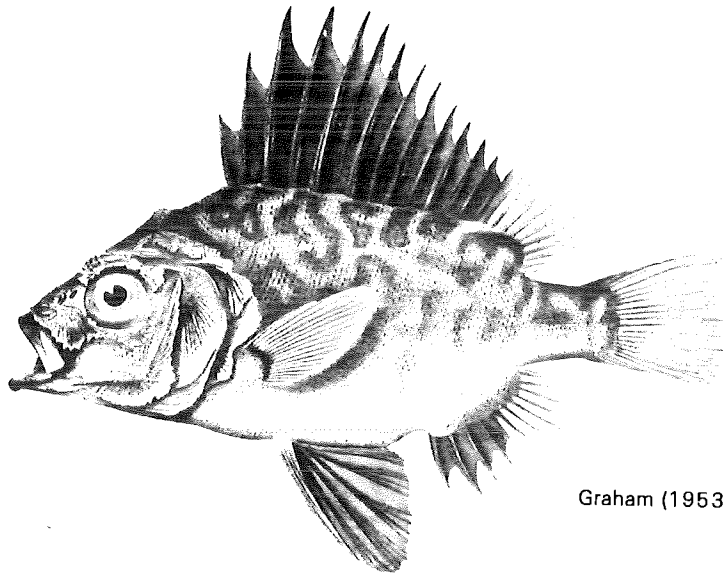
Size: To at least 47 cm.

Distribution: Vic., Tas. and W.A.

Habitat and Depth: Adults may be pelagic and have been trawled on the continental shelf and slope in depths to 500 m; juveniles have been recorded from surface waters.

Note: Little is known of this species in Australian waters.

References: Hardy (1983a).



Graham (1953)

Long-finned boarfish

Zanclistius elevatus (Ramsay & Ogilby, 1889)

Family: Pentacerotidae p 60

Other Common Names: One-spot boarfish, short boarfish, black-spotted boarfish.

Description: Base of soft dorsal fin much longer than base of spinous dorsal; dorsal fin with 5 to 7 spines and 25 to 29 rays; dorsal spines increasing in length to last; anterior dorsal rays much longer than last spine, sometimes extending beyond caudal fin; anal fin with 3 spines; hind margin of soft anal fin vertical to concave, anterior rays extending to caudal fin base; pectoral fins moderately short (length 2.6 to 2.9 in SL); ventral fins inserted below or behind posterior half of pectoral fin bases; *operculum without scales*; bony crest above eye (usually hooked in fish larger than 23 cm.

D V-VII,25-29; A III,12-17; P 15-17; V I,5; L. Lat. 55-65; GR 19-22.

Body pale grey with orange to purple sheen above, yellowish green sheen below; 2 broad (usually diffuse), darker crossbands on side from dorsal spines to anus and from anterior dorsal rays to posterior anal rays; fins greenish grey to pale brownish; distinct, black spot on posterior rays of dorsal fin.

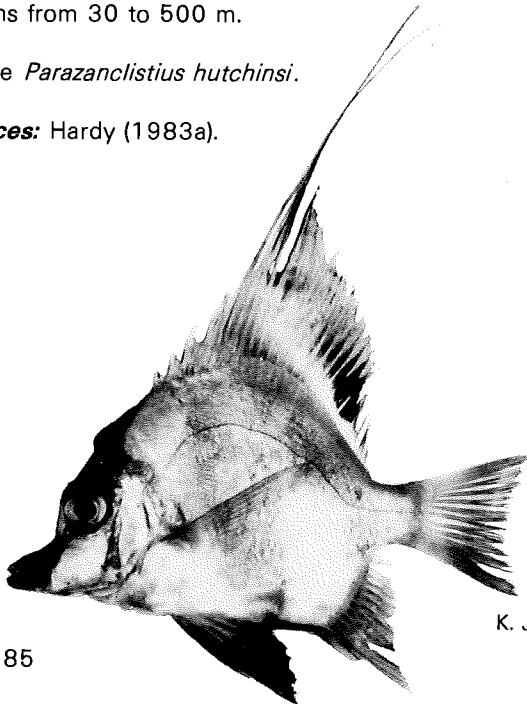
Size: To at least 33 cm.

Distribution: Southern N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 30 to 500 m.

Note: See *Parazanclistius hutchinsi*.

References: Hardy (1983a).



K. J. Graham

J.L.M. 1985

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Knifejaw

Oplegnathus woodwardi (Waite, 1900)

Family: Oplegnathidae p 60

Description: Dorsal fin with 11 spines and 11 rays, spinous and rayed portion of similar height; third spine and first ray of anal fin of similar height; eyes large, 3 to 4 in head length; angle of preoperculum entire in adults, serrated in young.

D XI,11; A III,11; P 17; V I,5; L. Lat. 62.

Head and body pale brown to yellowish grey above, silvery below; 5 brown to black broad, vertical bars on sides, bars becoming narrower towards ventral surface in adults; dorsal and anal fins dusky with black blotches; caudal fin dusky, sometimes with yellow hind margin.

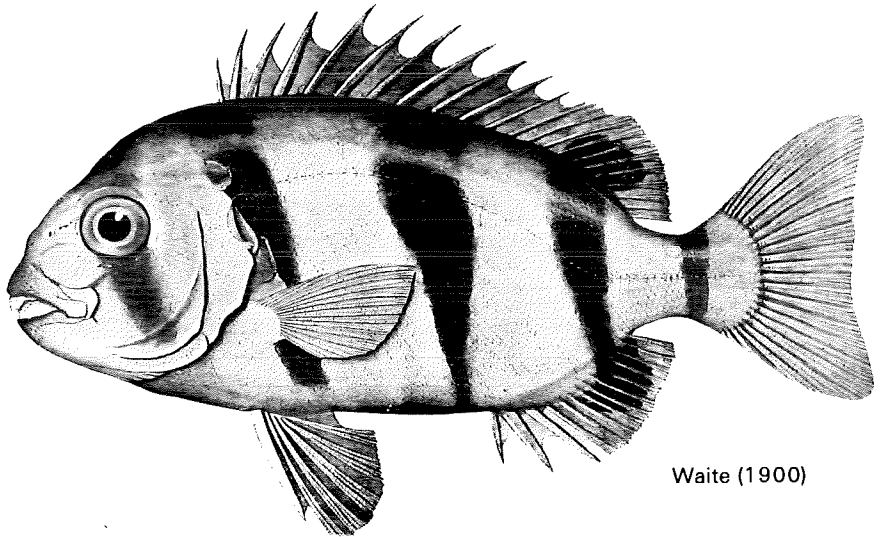
Size: To 45 cm.

Distribution: Southern N.S.W., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf and upper slope in depths from 50 to 400 m.

Note: Body proportions and colour of the knifejaw varies with growth, the juveniles having a much deeper, shorter body with broader and more extensive black bands.

References: Waite (1900) as *Hoplegnathus woodwardi*; McCulloch (1916); Scott et al. (1974) as *Ostorhinchus conwaili*.



Magpie perch

Cheilodactylus nigripes Richardson, 1850

Family: Cheilodactylidae p 52

Other Common Names: Black-striped morwong, magpie morwong.

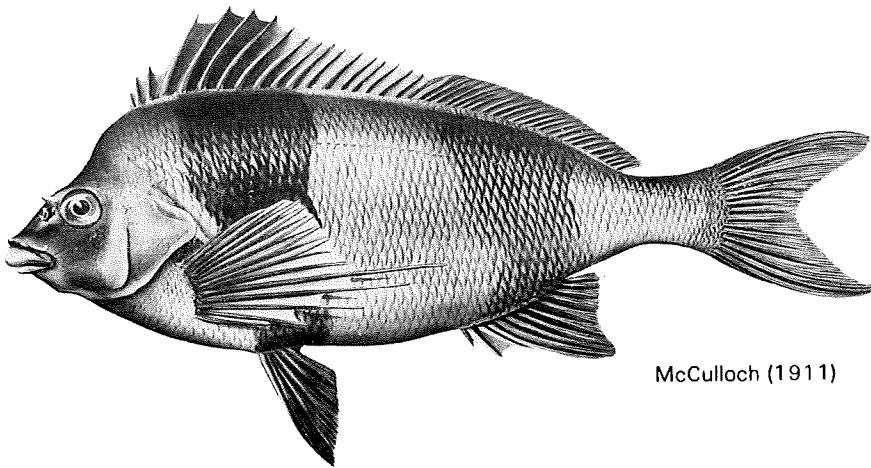
Description: Base of anal fin *shorter* than or equal to length of longest ray; 9 to 10 (usually 10) rays in anal fin; dorsal fin with 18 to 19 (usually 18) spines and 25 to 28 rays; 63 to 69 scales in lateral line. D XVIII-XIX,25-28; A III,9-10; P 13; V I,5; L. Lat. 63-69. Body silvery white with *1 to 2 very broad, vertical, black bands* (second band sometimes pale); blackish band from nape through eye, continuing vertically on cheek; caudal fin reddish or yellow.

Size: To at least 41 cm.

Distribution: Southern N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on rocky reefs to a depth of about 65 m.

References: Scott et al. (1974) as *Goniistius vizonarius*; Randall (1983).



Banded morwong

Cheilodactylus spectabilis (Hutton, 1872)

Family: Cheilodactylidae p 52

Other Common Names: Brown-banded morwong.

Description: Base of anal fin *shorter* than length of longest ray; 8 rays in anal fin; dorsal fin with 17 to 18 spines and 26 to 27 rays; 48 to 54 scales in lateral line.

D XVII-XVIII,26-27; A III,8; P 14-15; V I,5; L. Lat. 48-54.

Head and body pale reddish above, white below with *6 to 8 broad, vertical, reddish brown bars*; fins reddish brown or grey.

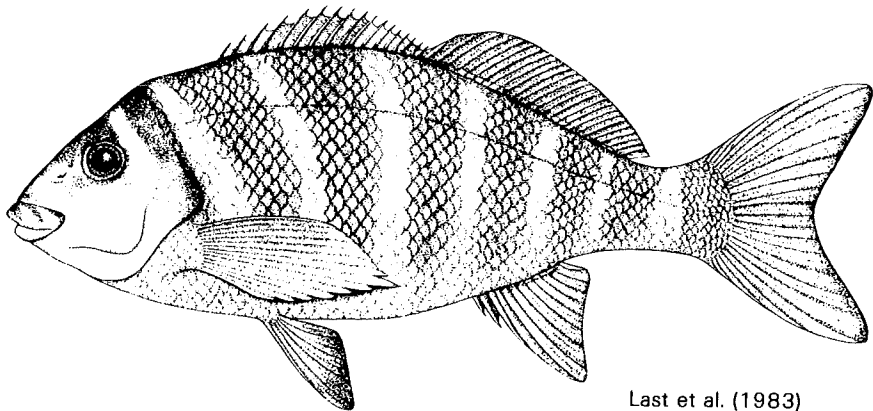
Size: To 100 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on shallow reefs to a depth of about 50 m.

Note: A related species, the red morwong (*C. fuscus*), also occurs off N.S.W. and Vic. and as it sometimes displays a banded pattern, could be confused with *C. spectabilis*. The red morwong, however, has more rays in the soft dorsal (31 to 33) and anal (9 to 10) fins than does the banded morwong.

References: Allen & Heemstra (1976).



Last et al. (1983)

Crested Morwong

Cheilodactylus vestitus (Castelnau, 1878)

Family: Cheilodactylidae p 52

Other Common Names: Eastern morwong.

Description: Base of anal fin *shorter* than length of longest ray; 8 to 9 (usually 8) rays in anal fin; dorsal fin with 16 to 17 spines (fourth very long) and 32 to 35 rays; 58 to 65 scales in lateral line.

D XVI-XVII,32-35; A III,8-9; V I,5; L. Lat. 58-65.

Head and body silvery white with broad, *oblique*, dark bands; longest band extending from middle dorsal spines along back and crossing caudal peduncle onto lower lobe of caudal fin; soft dorsal, upper lobe of caudal and pectoral fins dusky yellow.

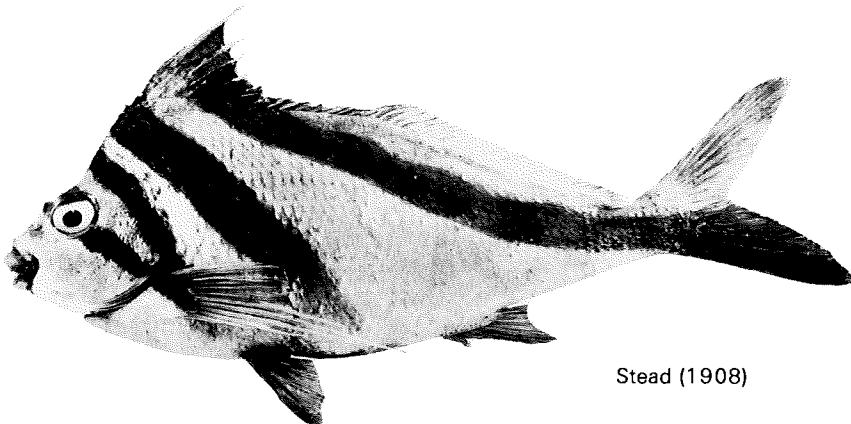
Size: To 35 cm.

Distribution: (Southern Qld), N.S.W. and Vic.

Habitat and Depth: Demersal, in shallow inshore waters and offshore reefs.

Note: A similar species, the magpie morwong (*C. gibbosus*), occurs in southern W.A. waters. However, in *C. gibbosus*, the long dark band extending along the back terminates below the rear base of the dorsal fin and the anal fin usually has 9 rays.

References: Randall (1983).



Dusky morwong

Dactylophora nigricans (Richardson, 1850)

Family: Cheilodactylidae p 52

Other Common Names: Strongfish.

Description: Base of anal fin *shorter* than length of highest ray; 9 to 10 rays in anal fin; dorsal fin with *15 to 16 spines* and 24 to 26 rays; 45 to 55 scales in lateral line.

D XV-XVI,24-26; A III,9-10; P 14; V I,5; L. Lat. 45-55.

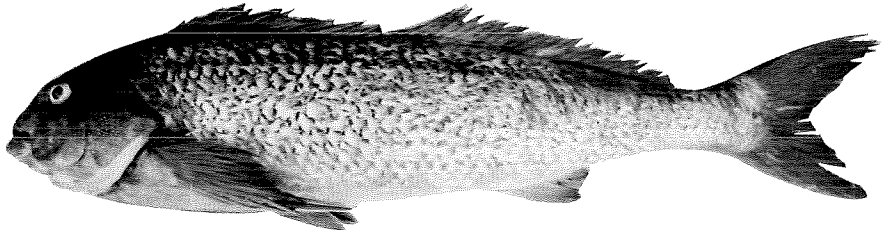
Head and body *uniform* greenish to brownish above, paler below. Juveniles with orange spots and dark blotches on back and 1 to 2 brownish, longitudinal, bars on cheek below eye; caudal and dorsal fins with dark spots.

Size: To 120 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, in seagrass beds and near rocky outcrops to a depth of about 60 m.

References: Scott et al. (1974) as *Psilocranium nigricans*; Allen & Heemstra (1976).



J. G. H. Maxwell

Grey morwong

Nemadactylus douglasi (Hector, 1875)

Family: Cheilodactylidae p 52

Other Common Names: Blue morwong, rubberlip morwong, porae, Douglas' morwong.

Description: Base of anal fin *longer* than length of highest ray; 16 to 17 rays in anal fin; dorsal fin with 17 to 18 spines and 27 to 28 rays; 47 to 55 scales in lateral line.

D XVII-XVIII,27-28; A III,16-17; P 15; V I,5; L. Lat. 47-55.

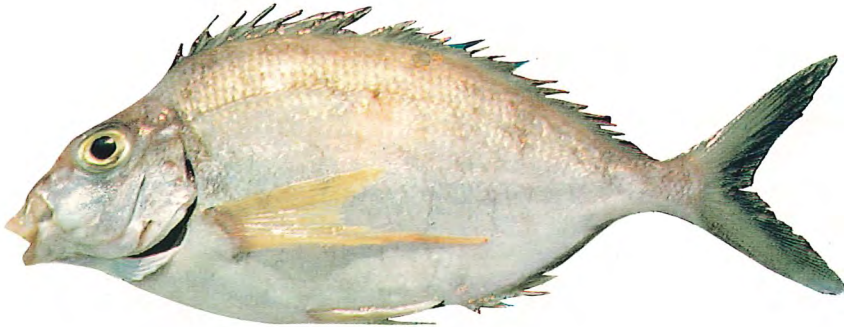
Head and body uniform light silvery blue, sometimes with brownish tinge; *no* distinct, dark saddle on nape; fins bluish. Juveniles (less than 6 cm SL) with dark blotch near middle of lateral line.

Size: To 74 cm.

Distribution: (Southern Qld), N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf in depths from 10 to 100 m.

References: Ramsay & Ogilby (1887) as *Chilodactylus morwong*; Allen & Heemstra (1976).



J. G. H. Maxwell

Jackass morwong

Nemadactylus macropterus (Schneider, 1801)

Family: Cheilodactylidae p 52

Other Common Names: Jackass fish, silver perch, tarakihi, deepsea perch, mowie, sea bream.

Description: Base of anal fin *longer* than length of highest ray; 14 to 15 rays in anal fin; dorsal fin with 17 to 18 spines and 25 to 28 rays; 59 to 60 scales in lateral line.

D XVII-XVIII,25-28; A III,14-15; P 14-15; V I,5; L. Lat. 59-60.

Head and body greyish silver with yellow tinge above, silvery below; broad, grey to black *band on nape*; fins greenish grey. Juveniles (less than 6 cm SL) *without* single dark blotch near middle of lateral line but often with 3 to 4 light brown, vertical, bars on side.

Size: To 70 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Adults demersal, on the continental shelf and upper slope in depths from 40 to 400 m; post-larvae (paper-fish stage) pelagic in surface waters.

Note: The jackass is the most abundant of the commercial morwongs with about 1500 tonnes being marketed each year in N.S.W. alone.

References: Scott et al. (1974); Allen & Heemstra (1976).



J. G. H. Maxwell

Queen snapper

Nemadactylus valenciennesi (Whitley, 1937)

Family: Cheilodactylidae p 52

Other Common Names: Blue morwong, sea carp.

Description: Base of anal fin *longer* than length of highest ray; 17 to 19 rays in anal fin; dorsal fin with 16 to 17 spines and 30 to 31 rays; 64 to 68 scales in lateral line.

D XVII,30-31; A III,17-19; P 15; V I,5; L. Lat. 64-68.

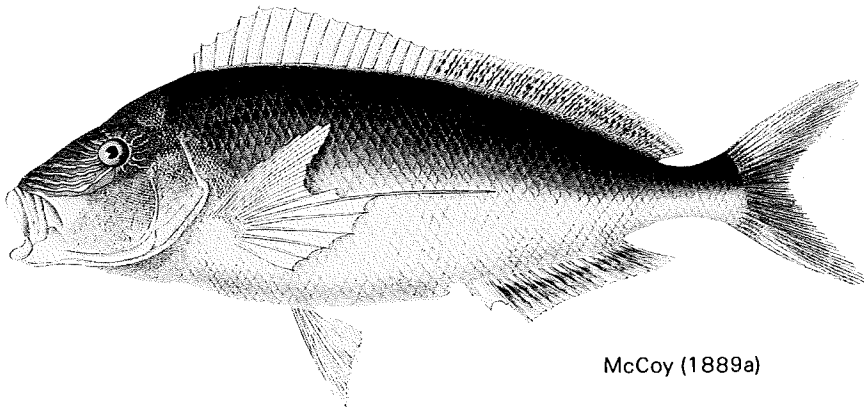
Head and body bright blue above, paler below; *bright yellow lines* radiating from eyes; caudal, dorsal and anal fins with yellow spots and lines. Juveniles with yellow, longitudinal lines on sides and often indistinct, greyish blotch near middle of lateral line.

Size: To 90 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from about 40 to 240 m.

References: Scott et al. (1974); Allen & Heemstra (1976).



McCoy (1889a)

Bastard trumpeter

Latridopsis forsteri (Castelnau, 1872)

Family: Latrididae p 52

Other Common Names: Silver bastard trumpeter, white bastard trumpeter, red bastard trumpeter, copper moki.

Description: 17 spines in dorsal fin; pectoral fins with upper rays longest; vomer without teeth.

D XVII,38-40; A III,32-35; P 18; V I,5; L. Lat. 115-120.

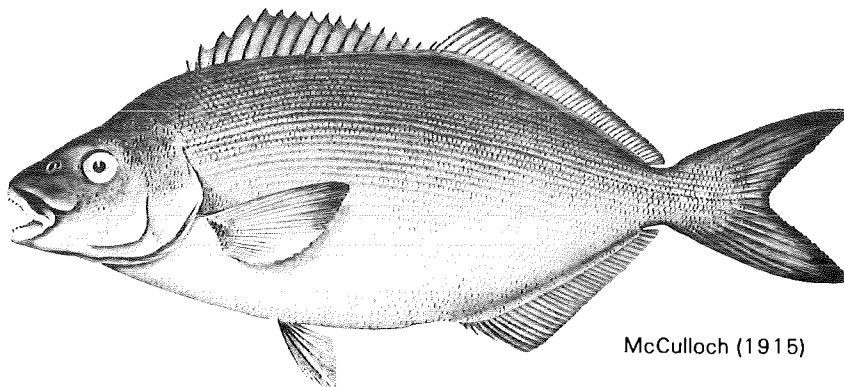
Body dark olive green to greyish brown above, silvery below; upper sides with thin, gold lines along scale rows; fins greyish to brown; margins of dorsal, pectoral and caudal fins black.

Size: To 65 cm.

Distribution: Southern N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 20 to 160 m.

References: McCulloch (1915); Scott et al. (1974); Last et al. (1983).



Striped trumpeter

Latris lineata (Schneider, 1801)

Family: Latrididae p 52

Other Common Names: Tasmanian trumpeter, real trumpeter, stripy, realie, kokikohi.

Description: 18 spines in dorsal fin; pectoral fins with middle rays longest; vomer with small patch of villiform teeth.

D XVIII,34-36; A III,31-32; P 18; V I,5; L. Lat. 114.

Body olive-green above, silvery below; 3 dark, longitudinal bands on upper sides continuing forward onto head as blotches; fins greenish yellow, membrane of spinous dorsal with greenish black blotches.

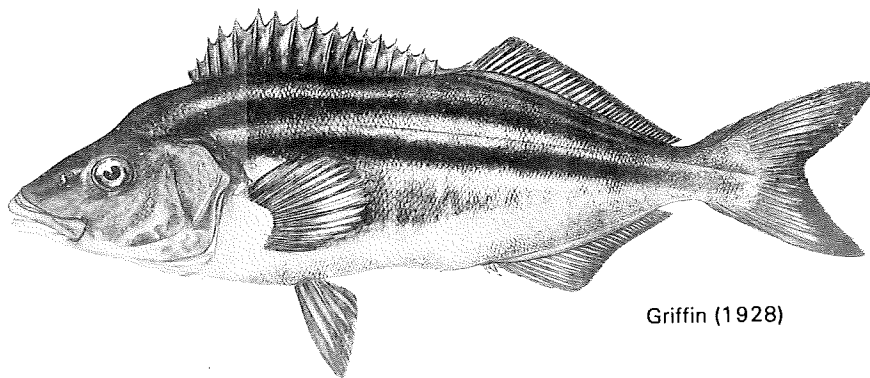
Size: To 120 cm.

Distribution: Southern N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, on offshore reefs in depths from 50 to 300 m; spawning fish move closer to shore.

Note: A third latrid, *Mendosoma allporti*, occurs off Tas. It is dark olive green with thin, yellowish lines along sides and has 23 spines and 23 to 26 rays in the dorsal fin and 3 spines and 18 to 19 rays in the anal fin.

References: Scott et al. (1974); Last et al. (1983).



Griffin (1928)

Sea mullet

Mugil cephalus Linnaeus, 1758

Family: Mugilidae p 44

Other Common Names: Bully mullet, grey mullet, hardgut mullet.

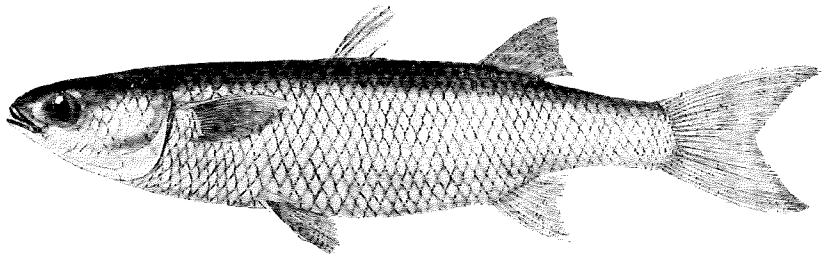
Description: Eye almost completely covered by fatty (adipose) tissue; lips thin, without papillae, lower lip with high symphyseal knob; hind tip of maxilla not sharply curved upwards; head much flattened dorsally; pectoral fin with long axillary scale (2.7 to 3 in pectoral length).
D IV+I,8; A III,8; P 16-17; V I,5; scales in lateral series 38-42.
Body olive-green above, silvery on sides, whitish below; base of pectoral fins with dark purple blotch; ventral fins pale yellow, other fins dusky.

Size: To 76 cm.

Distribution: All Australian States.

Habitat and Depth: A schooling species inhabiting bays, estuaries, beaches and surface waters of the coast.

References: Thomson (1954); Fischer & Whitehead (1974); Thomson (1984).



Gunther (1877)

Short-finned seapike

Sphyraena novaehollandiae Günther, 1860

Family: Sphyraenidae p 38

Other Common Names: Snook.

Description: Origin of first dorsal fin well behind tip of pectoral fins; origin of ventral fins below or slightly behind first dorsal fin origin; maxilla terminating below area ahead of nostrils; lower edge of preoperculum obtuse, without membranous flap; first gill arch with 1 slender, long gill raker and without spiny tubercles; body elongate and shallow, depth 9 to 11 in SL; 130 to 155 scales in lateral line.

D VI+I,9; A II,9-10; P 13; V I,5; L. Lat. 130-155.

Body greenish above, silvery below; second dorsal and caudal fins yellowish green, caudal with dark green margin; first dorsal and pectoral fins green.

Size: To 100 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs near the surface in inshore and offshore waters.

Note: *S. waitii* occurs off N.S.W. and closely resembles *S. novaehollandiae* but differs from it in having only 122 to 128 scales in the lateral line and a deeper body (depth 6 to 8 in SL).

References: Munro (1958d); de Sylva (1973); Au (1979).



J. G. H. Maxwell

Striped seapike

Sphyraena obtusata Cuvier, 1829

Family: Sphyraenidae p 38

Other Common Names: Striped barracuda.

Description: Origin of first dorsal fin before tip of pectoral fins; origin of ventral fins below centre of pectoral fins; maxilla terminating below area between nostrils and eyes; lower edge of preoperculum triangular, with distinct naked membranous flap; first gill arch with 2 (rarely 3) slender, long gill rakers and without spiny tubercles; body relatively deep, depth 6 to 8 in SL; longest dorsal fin spine equal to or greater than distance from eye to edge of operculum.

D V+I,9; A II,9; P 13-15; V I,5; L. Lat. 85-96.

Body green to bluish black above, silvery below; 1 longitudinal, dusky green band from snout to tail on sides above pectoral fin bases; dorsal, anal, caudal and pectoral fins yellowish, dorsal and caudal with blackish tips.

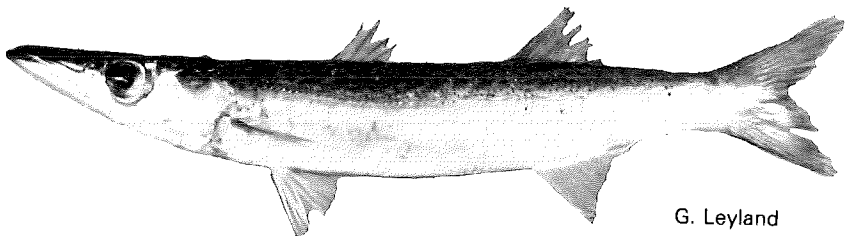
Size: To 55 cm.

Distribution: (Qld), N.S.W., Vic. and S.A.

Habitat and Depth: A schooling species occurring over seagrass beds and rocky reefs.

Note: Tropical species such as *S. flavicauda* and *S. forsteri* may occasionally venture into southern waters. *S. flavicauda* strongly resembles *S. obtusata* but the origin of the first dorsal fin in *S. flavicauda* is above or behind the pectoral fin tips and the longest dorsal spine is shorter than the distance from the eye to the edge of the operculum. *S. forsteri* is distinguished from all other sphyraenids by its lack of gill rakers (the first arch bearing only spiny tubercles) and a blackish blotch on the body on the innerside of the pectoral fin bases.

References: de Sylva (1973); Fischer & Whitehead (1974); Au (1979) as *S. pinguis*.



G. Leyland

Western blue groper

Achoerodus gouldii (Richardson, 1843)

Family: Labridae p 52

Other Common Names: Western blue wrasse, Gould's wrasse, parrotfish.

Description: Dorsal fin with 11 spines and 11 rays, spines much shorter than longest ray; anal fin with 3 spines and 11 rays; pectoral fins with 2 unbranched and 14 to 16 branched rays; lateral line continuous with 33 to 37 pored scales; lips large and fleshy; each jaw with 2 pairs of large, peg-like teeth anteriorly; upper jaw without large canine at angle; caudal fin rounded; cheek with about 7 rows of small scales behind eye; 7 to 7.5 rows of scales above lateral line.

D XI,11; A III,11; P 16-18; V 1,5; L. Lat. 33-37.

Males uniform olive-green to blue; fins bluish to yellow. *Females* uniform grey to red. *Juveniles* grey to green, sometimes with yellowish to whitish spots on back.

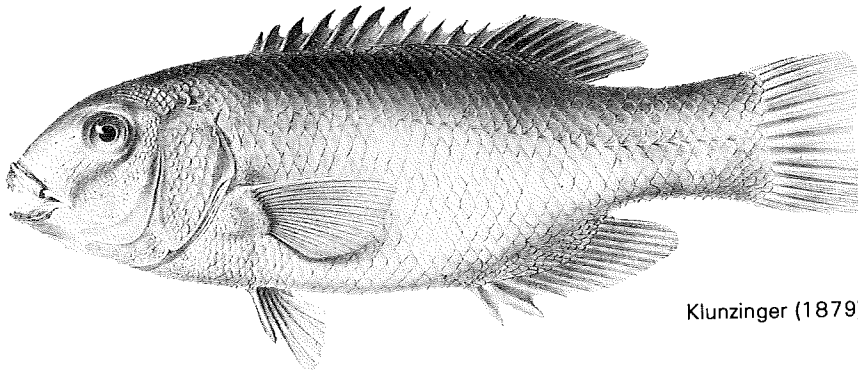
Size: To 175 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 5 to about 65 m.

Note: A very similar species, the eastern blue groper (*A. viridis*), also occurs off (Qld), N.S.W. and eastern Vic. *A. viridis* has 9 to 10.5 rows of scales above the lateral line.

References: Richardson (1843) as *Labrus gouldii*; Gomon (1979).



Klunzinger (1879)

Pigfish

Bodianus vulpinus (Richardson, 1850)

Family: Labridae p 52

Other Common Names: Pig wrasse, black spot pigfish.

Description: Dorsal fin with 12 spines and 11 rays, each spine with fleshy projection from tip; anal fin with 3 spines and 12 rays; pectoral fins with 2 unbranched and 15 branched rays; lateral line continuous with 31 to 32 pored scales; each jaw with 2 pairs of large, curved canines anteriorly; upper jaw with large, curved canine at angle; caudal fin truncate to lunate; head pointed, snout somewhat slender and elongate.

D XII,11; A III,12; P 17; V I,5; L. Lat. 31-32.

Males orange-red above, white below; large, crimson patch on back beneath soft dorsal fin; lower sides with faint, red lines along scale rows; spinous dorsal fin red to white with large, *black blotch edged with blue*. *Female* pinkish-orange above, paler below; 2 red lines radiating posteriorly from eye; *reddish pink lines*, stripes and dashes with black scribbles on back and sides; spinous dorsal fin pale red, sometimes with black spot at base. *Juveniles* similar to female but paler.

Size: To about 50 cm.

Distribution: (Southern Qld), N.S.W. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 20 to at least 140 m.

References: McCulloch (1929) as *Verreo oxycephalus*; Gomon & Randall (1978).



Eastern foxfish

Bodianus sp. 1

Family: Labridae p 52

Other Common Names: Pigfish, New Zealand foxfish.

Description: Dorsal fin with 12 spines and 10 rays, each spine with fleshy projection from tip; anal fin with 3 spines and 11 rays; pectoral fin with 2 unbranched and 12 to 13 branched rays; caudal fin rounded; lateral line continuous with 34 to 38 scales; each jaw with 2 pairs of large canines anteriorly; upper jaw with large, curved canine at angle; snout moderately elongate.

D XII,10; A III,11; P 14-15; V I,5; L. Lat. 34-38.

Head and body bright red, belly and ventral surface of head white; 2 large, white patches on back beneath spinous dorsal fin; anal and ventral fins white, caudal and pectoral fins bright yellow.

Size: To 40 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf in depths from about 30 to 180 m.

Note: This undescribed species may have been confused with the western foxfish (*B. frenchii*) which occurs in S.A. and W.A. in depths of 10 to 35 m. However, *B. frenchii* has a slightly more rounded head and a blunt snout, 2 yellow blotches on the back, 1 beneath the spinous dorsal and 1 behind the dorsal fin base, pinkish red caudal and pectoral fins and in large adults the dorsal fin has a conspicuous black margin.

References: Last et al. (1983); M. F. Gomon pers. comm. (1983).



J. G. H. Maxwell

Purple wrasse

Pseudolabrus fucicola (Richardson, 1840)

Family: Labridae p 52

Other Common Names: Banded parrotfish, blue wrasse, kelpie, purple parrotfish, southern wrasse, winter bream, yellow-saddled wrasse.

Description: Dorsal fin with 9 spines and 11 rays, membrane incised and produced beyond spine tips; anal fin with 3 spines and 10 rays; pectoral fins with 2 unbranched and 12 branched rays; *lateral line abruptly bent downward* beneath last dorsal rays, with 25 to 26 pored scales; jaw with 2 pairs of large recurved canines anteriorly, upper jaw with first pair longest; upper jaw with large canine at angle; caudal fin rounded to truncate; *cheek with 2 to 5 rows of scales behind eye and 3 to 6 rows below eye.*

D IX,11; A III,10; P 14; V I,5; L. Lat. 25-26.

Head and body purplish to greenish brown; *4 yellowish saddles on back* above lateral line extending onto dorsal fin; 1 yellow saddle on caudal peduncle; 6 indistinct, dark bars on side of body; fins same as body colour except anal fin with 2 yellowish bars and base of pectoral fins with diffuse grey bar.

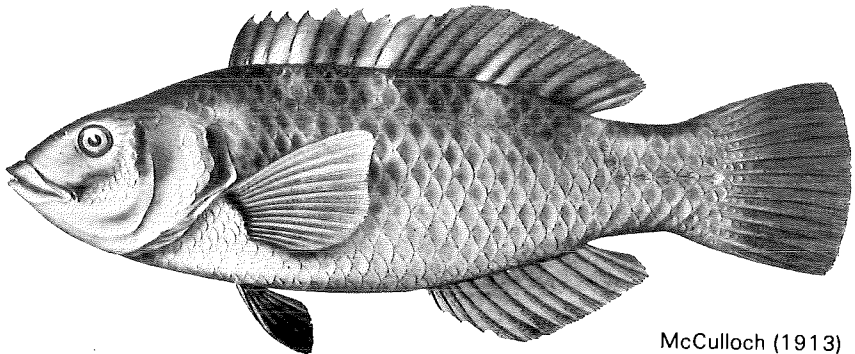
Size: To 38 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, on rocky reefs.

Note: There are at least 7 species of *Pseudolabrus* in southern Australian waters although most usually occur on shallow, inshore rocky reefs and so are unlikely to be captured in a trawl net.

References: McCulloch (1913); Russel (1980).



McCulloch (1913)

Rosy wrasse

Pseudolabrus psittaculus (Richardson, 1840)

Family: Labridae p 52

Other Common Names: Rosy parrotfish.

Description: Dorsal fin with 9 spines and 11 rays, membrane incised and produced beyond spine tips; anal fin with 3 spines and 10 rays; pectoral fins with 2 unbranched and 11 branched rays; lateral line abruptly bent downward beneath last dorsal rays, with 25 to 26 pored scales; each jaw with 2 pairs of recurved canines anteriorly, upper jaw with second pair longest; upper jaw with large canine at angle; caudal fin with upper rays produced; cheek with 3 to 4 rows of scales behind eye and 3 to 4 rows below eye.

D IX,11; A III,10; P 13; V I,5; L. Lat. 25-26.

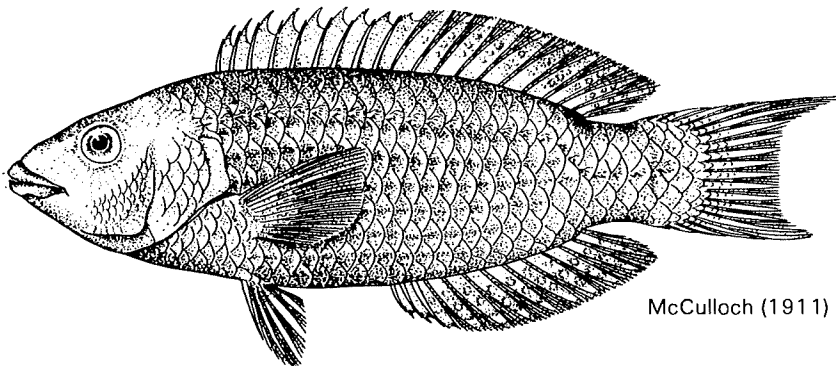
Head and body reddish above, whitish below; base of 3 last dorsal rays with black saddle and small, white spot; dorsal and anal fins with 2 longitudinal rows of small red spots.

Size: To 20 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on rocky reefs in depths from 2 to 220 m.

References: McCulloch (1911); Russel (1980).



Blue-throated wrasse

Pseudolabrus tetricus (Richardson, 1840)

Family: Labridae p 52

Other Common Names: Bluehead, blue-throated parrotfish, lilac-banded parrotfish, parrotie, winter bream.

Description: Characters are the same as for *P. fucicola* except as follows: cheeks with 1 row of scales behind eye and 2 to 3 rows below eye.

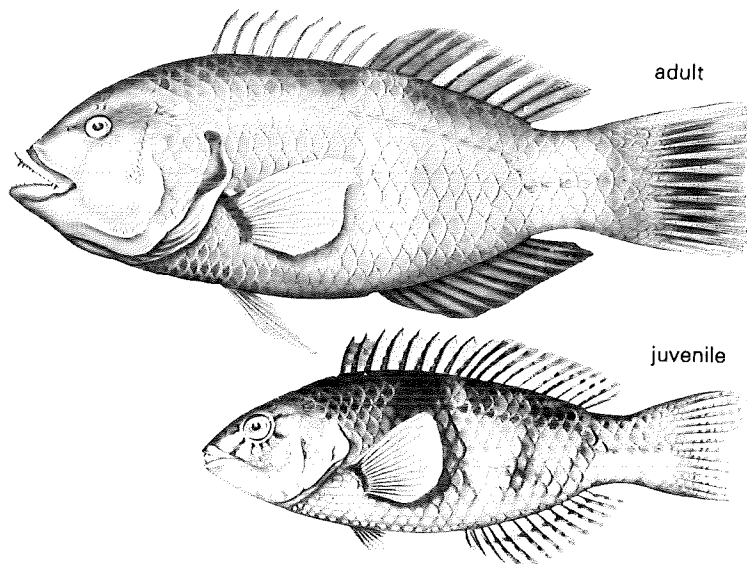
Males greenish blue to reddish brown; white, vertical bar between anterior rays of dorsal and anal fins; caudal fin base white; chin and throat dark blue. *Females* and *juveniles* greenish to reddish brown above, whitish below; indefinite, greyish to black, vertical bar beneath spinous dorsal fin and often 2 to 3 indistinct bars beneath soft dorsal fin.

Size: To about 50 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, on rocky reefs to a depth of at least 50 m.

References: McCulloch (1913); Russel (1980).



McCulloch (1911)

Slender weed whiting

Siphonognathus attenuatus (Ogilby, 1897)

Family: Odacidae p 46

Other Common Names: Slender rock whiting, short-snouted pencil weed whiting.

Description: Body very shallow, depth 10 to 12.5 in SL; snout relatively short (3 to 3.6 in HL) and pointed; dorsal fin with 19 to 21 spines and 14 to 16 rays; anal fin with 3 spines and 7 to 8 rays; caudal fin rhomboid; ventral fin present; 38 to 45 scales in lateral line.
D XIX-XXI,14-16; A III,7-8; P 13-15; V I,4; L. Lat. 38-45.

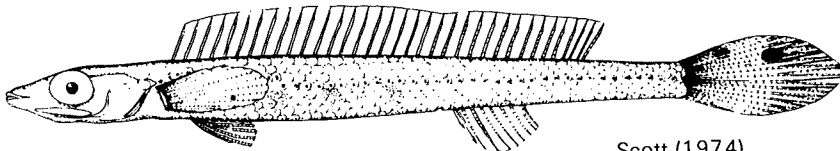
Body reddish brown above, white below, with dark brown stripe along middle of sides; caudal fin brownish with narrow, white margin and with white-edged black spot on upper half; *males* with yellowish ventral fins, other fins clear.

Size: To 14 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Bottom-living, on sand near weed beds to at least a depth of 45 m.

References: Last et al. (1983); Gomon & Paxton (1985).



Long-rayed weed whiting

Siphonognathus radiatus (Quoy & Gaimard, 1834)

Family: Odacidae p 46

Other Common Names: Long-rayed rock whiting, bridled rock whiting.

Description: Body shallow, depth 6.6 to 7.7 in SL; snout moderately elongate (1.8 to 3.7 in HL) and pointed; dorsal fin with 17 to 20 spines and 11 to 13 rays, first spine produced in adult males; anal fin with 3 spines and 9 to 11 rays; caudal fin rhomboid; ventral fin present; 38 to 42 scales in lateral line.

D XVII-XX,11-13; A III,9-11; P 12-14; V I,4; L. Lat. 38-42.

Males dark green above abruptly changing to paler green below; head and sides with longitudinal, blue lines; dorsal fin green to yellow with blue lines and blue-edged black blotches near centre of base bordered by black and orange streaks; anal and caudal fins green to yellow with blue lines, ventral fin yellow with brown streaks. *Females* and *juveniles* reddish brown or green above, lighter below; head with brown stripe from snout through eye to operculum and whitish stripe below eye extending along side of body.

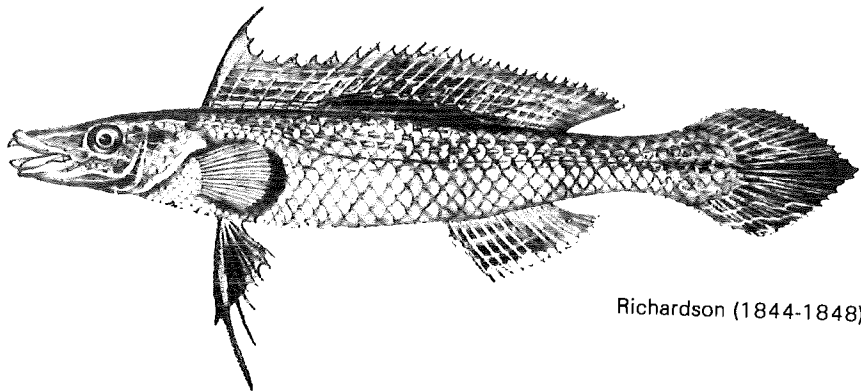
Size: To 21 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Bottom-living in weed beds in coastal waters.

Note: A third odacid, *S. argyrophanes*, is occasionally trawled. It occurs in shallow waters off western Vic., S.A. and W.A. and is distinguished from all other odacids by its lack of ventral fins, the long filament on the upper lip and tiny scales (L. Lat. 96-108).

References: Last et al. (1983); Gomon & Paxton (1985).



Richardson (1844-1848)

Barred grubfish

Parapercis allporti (Günther, 1876)

Family: Mugiloididae p 46

Description: Dorsal fin with 5 spines and 21 rays, all spines about same length, slightly longer posteriorly; membrane from last dorsal fin spine connected to first soft ray *opposite* tip of spine; anal fin with 18 to 19 rays; pectoral fins with 21 to 22 rays; top of head without scales; 8 canine teeth in outer row of lower jaw; *palatine teeth absent*; 8 vomerine teeth present in 3 rows.

D V,21; A 18-19; P 21-22; V 1,5; L. Lat. 58-60; GR 15-18 (total).

Body light brown above, paler below; *back with about 7 dark brown, vertical bars*; fins yellow with orange lines.

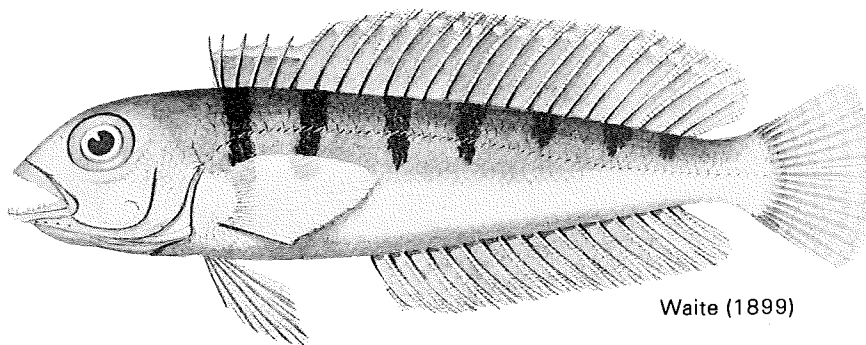
Size: To 33 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 60 to 200 m.

Note: *P. binivirgata* also occurs off N.S.W. It may be distinguished by the following characters: dorsal fin with 5 spines and 23 rays; anal fin with 20 rays; pectoral fins with 19 to 21 rays; 6 canine teeth in outer row of lower jaw; palatine teeth present; body yellowish red, upper half with about 14 brown, vertical bars arranged *in pairs*; dorsal and caudal fins with oblique, brown bars.

Reference: Cantwell (1964); Schultz (1968); Allen (1976).



Wavy grubfish

Parapercis haackei (Steindachner, 1884)

Family: Mugiloididae p 46

Description: Dorsal fin with 5 spines and 22 rays, middle spines longest; membrane from last dorsal fin spine connected to *base* of first soft ray; anal fin with 19 rays; pectoral fins with 13 to 15 rays; head mostly covered with scales; 10 canine teeth in outer row of lower jaw; palatine teeth present.

D V,22; A 19; P 13-15; V I,5; L. Lat. 50-53; GR 9-12.

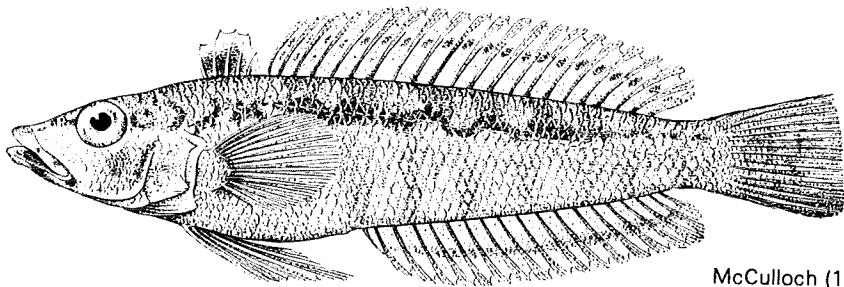
Body sandy above, light yellow below; *wide, dark brown, wavy band* extending from snout to base of caudal fin; about 9 indistinct, vertical bars below lateral line from pectoral fins to base of caudal fin; spinous dorsal fin with large, dark spot; soft dorsal and anal fins with 2 to 3 longitudinal rows of dark spots on membranes.

Size: To 10 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal, on coastal reefs to a depth of 35 m.

References: Cantwell (1964); Schultz (1968); Allen (1976).



McCulloch (1914b)

Spotted grubfish

Parapercis ramsayi Steindachner, 1884

Family: Mugiloididae p 46

Other Common Names: Ramsay's grubfish.

Description: Dorsal fin with 4 spines and 24 rays, spines increasing in length from first to last; membrane from last dorsal fin spine connected to first soft ray *opposite* tip of spine; anal fin with 19 to 20 rays; pectoral fins with 16 to 17 rays; head without scales except on margin of operculum; 8 canine teeth in outer row of lower jaw; palatine teeth present.

D IV,24; A 19-20; P 16-17; V I,5; L. Lat. 65-75; GR 17-20 (total).

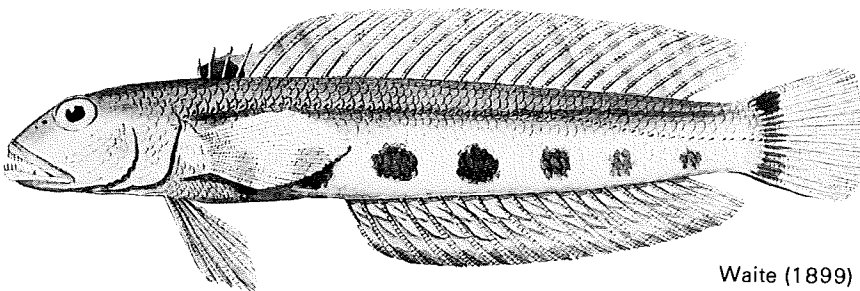
Body light brown above, yellow below; thin, dark line extending along sides from upper base of pectoral fins to mid-base of caudal fin; about 7 dark brown to brownish orange blotches below lateral line from pectoral fins to caudal peduncle; spinous dorsal fin with large, black blotch; anal and caudal fins bluish white with dark margins, caudal with dark patch along base.

Size: To 20 cm.

Distribution: N.S.W., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 5 to 80 m.

References: Cantwell (1964); Schultz (1968); Allen (1976).



Bulldog stargazer

Gnathagnus innotabilis Waite, 1904

Family: Uranoscopidae p 66

Other Common Names: Brown stargazer, green stargazer.

Description: Anterior tip of chin with vertical cleft, forming 2 free bony lobes; lips without fleshy fringe; 1 dorsal fin with 12 to 13 rays; humeral spine not fringed with tentacles; body covered with minute scales, embedded in hollows.

D 12-13; A 15-16; P 19-21; V 1,5.

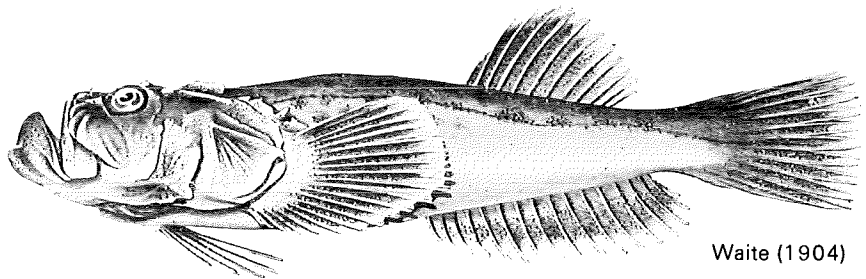
Head and body uniform dark brown to greenish above, white below; ventral fins whitish, other fins greyish brown to green with white margins.

Size: To 40 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Demersal, on the continental shelf and upper slope in depths from 80 to 500 m.

References: Waite (1904); Last et al. (1983).



Fringed stargazer

Ichthyoscopus barbatus Mees, 1960

Family: Uranoscopidae p 66

Description: Chin without vertical cleft forming 2 free bony lobes; lips with prominent, fleshy fringe; 1 dorsal fin with 19 rays; *humeral spine fringed with short tentacles*; hind border of operculum fringed; 2 small barbels on chin; scales present.

D 19; A 15-16; P 14; V 1,5.

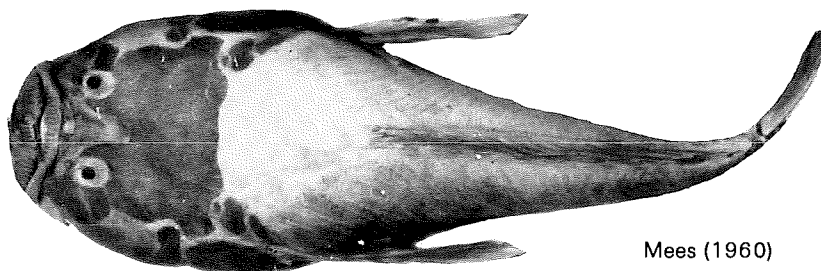
Head and body pale brown above, pinkish below; 2 indistinct, large, dark brown blotches on back, 1 beneath first 5 rays and other beneath last 7 rays of dorsal fin; caudal peduncle with blackish brown spot; dorsal and pectoral fins light brown; anal fin whitish, ventral fins pinkish white.

Size: To 41 cm.

Distribution: Southern N.S.W., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 10 to 50 m.

References: Mees (1960).



Common stargazer

Kathetostoma laeve (Bloch & Schneider, 1801)

Family: Uranoscopidae p 66

Other Common Names: Banded stonelifter.

Description: Chin without vertical cleft forming 2 free bony lobes; lips with narrow, fleshy fringe; 1 dorsal fin with 16 to 17 rays; humeral spine not fringed with tentacles; scales absent; hind margin of bony plate on dorsal surface of head straight or with 2 small rounded projections near midline; smooth, non-bony space between orbits wide (width 4.0 to 7.0 in HL).

D 16-17; A 14-15; P 15-20; V 1,5

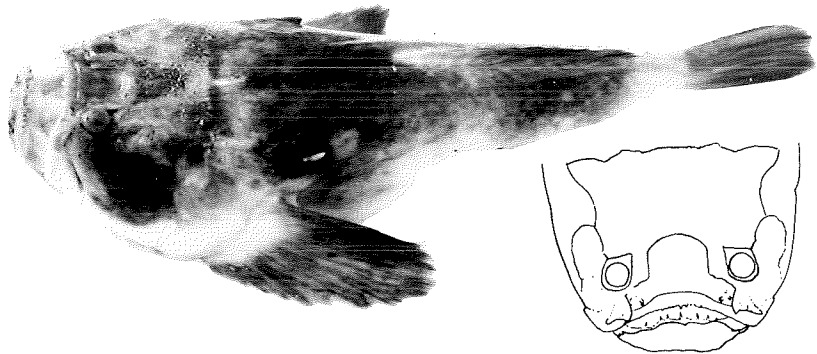
Body uniform greyish brown above, whitish below; usually 2 dark brown, broad, vertical bands on back and sides; operculum greyish above, white below; preoperculum with dark greyish brown patch; caudal and pectoral fins grey to blackish with white margins; dorsal, anal and ventral fins greyish white.

Size: To 75 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, in coastal waters to a depth of 60 m.

References: Mees (1960); M. F. Gomon pers. comm. (1985).



K. J. Graham; Mees (1960)

Deepwater stargazer

Kathetostoma nigrofasciatum Waite & McCulloch, 1915

Family: Uranoscopidae p 66

Description: Chin without vertical cleft forming 2 free bony lobes; lips with narrow, fleshy fringe; 1 dorsal fin with 13 to 15 rays; humeral spine not fringed with tentacles; scales absent; hind margin of bony plate on dorsal surface of head with 2 pointed projections near midline; smooth, non-bony space between orbits narrow (width 5.5 to 10.0 in HL).

D 13-15; A 14; P 17-18; V I,5

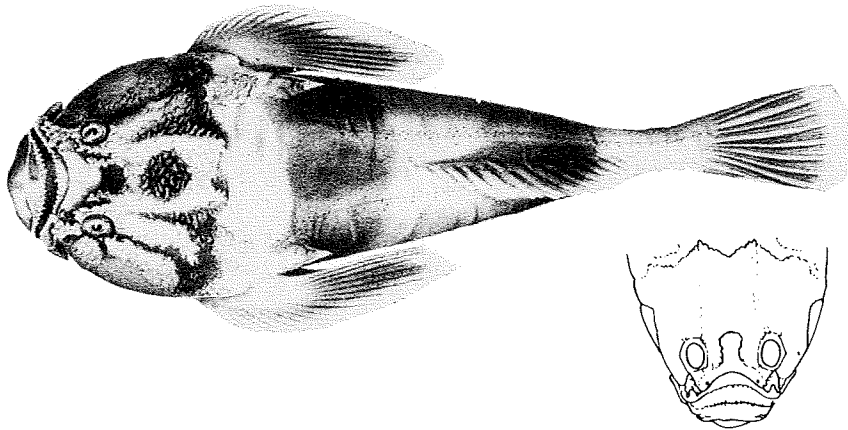
Body creamy tan; 2 blackish, broad, vertical bands on back and sides; upper corner of operculum black and large, dark brown spot on centre of head; caudal and ventral fins brownish with white margins.

Size: To 28 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 130 to 270 m.

References: Waite & McCulloch (1915); Mees (1960); M. F. Gomon pers. comm. (1983).



Waite & McCulloch (1915); Mees (1960)

Speckled stargazer

Kathetostoma sp. 1

Family: Uranoscopidae p 66

Description: Chin without vertical cleft forming 2 free bony lobes; lips with narrow, fleshy fringe; 1 dorsal fin with 16 to 18 rays; humeral spine not fringed with tentacles; scales absent; hind margin of bony plate on dorsal surface of head concave, sometimes with 2 small rounded projections laterally; smooth, non-bony space between orbits wide (width 2.9 to 3.7 in HL).

D 16-18; A 15-16; P 18-20; V 1,5.

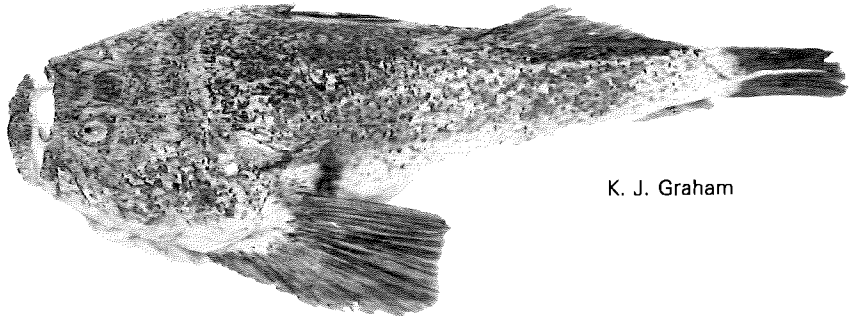
Body greyish brown with numerous *dark brown or purplish speckles* and spots above, whitish below; 2 dark brown, broad, vertical bands (sometimes indistinct) on back and sides; head similar to body, preoperculum without dark patch; caudal and pectoral fins greyish brown with white margins.

Size: To 65 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 30 to 700 m.

References: Last et al. (1983); M. F. Gomon pers. comm. (1983).



K. J. Graham

Purple stargazer

Pleuroscopus sp. 1

Family: Uranoscopidae p 66

Other Common Names: Scaled stargazer, spotted stargazer, blue stargazer.

Description: Chin without vertical cleft forming 2 free bony lobes; lips without fleshy fringe; 2 dorsal fins, first consisting of 9 to 10 very short tubercles, second with 8 to 10 rays; humeral spine not fringed with tentacles; scales present on entire body (deeply embedded in skin on ventral surface); *scales smooth*, with low central hump; underside of head naked, without rough bony plates; smooth, non-bony space between orbits *wide* (width 4.0 to 4.5 in HL).
D IX-X+8-10; A 10-11; P 22; V I,5.

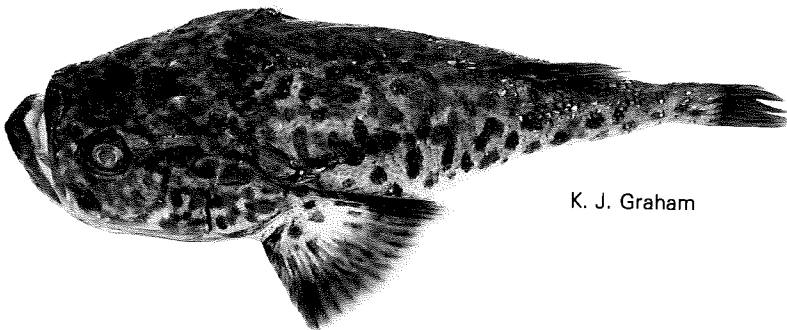
Head and body purple to grey-blue above, paler below; back and sides covered with large, irregular, brown to bluish black spots; ventral fins reddish pink, other fins bluish grey to brown.

Size: To 70 cm.

Distribution: N.S.W., Vic., Tas. S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental slope in depths from 400 to 900 m.

References: Last et al. (1983); M. F. Gomon pers. comm. (1983).



K. J. Graham

Painted stinkfish

Eocallionymus papilio (Günther, 1864)

Family: Callionymidae p 40

Other Common Names: Painted dragonet.

Description: Preopercular spine curved upwards at tip with 1 hook on inner edge, but no antrorse spine at base; lateral lines *interconnected* by transverse branch on dorsal surface of caudal peduncle; tip of each dorsal ray forked; tip of each anal ray (except last) simple; second dorsal fin with 7 rays, last branched at base; anal fin with 6 to 7 rays, last branched at base.

D IV+7; A 6-7; P 18-20; V 1,5.

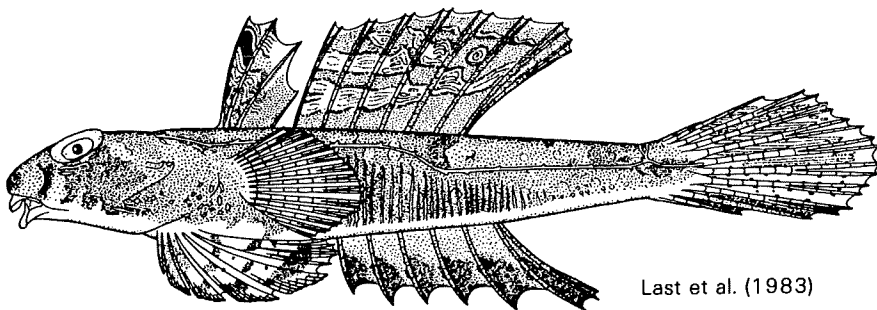
Body dark grey to pale brown with dark mottling above, silver below; *males* with whitish, vertical lines edged with violet and white spots on sides below lateral line, *females* covered with white spots; first dorsal fin with small black blotch on outer membrane between first and second spines, tips of spines blue or black in adults; anal fin brown in males, translucent in females.

Size: To 10 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, in coastal waters to a depth of 50 m.

References: Johnson (1971) as *Callionymus papilio*; Nakabo (1982); Last et al. (1983).



Common stinkfish

Foetorepus calauropomus (Richardson, 1844)

Family: Callionymidae p 40

Description: Preopercular spine curved upwards at tip with 1 hook on inner edge, but no antrorse spine at base; lateral lines not interconnected by transverse branch on dorsal surface of caudal peduncle; tip of each dorsal ray (except last) forked; tip of each anal ray simple; second dorsal fin with 8 rays, last branched at base; anal fin with 7 rays, last branched at base; middle rays of caudal fin filamentous in males.

D IV+8; A 7; P 17-21; V 1,5.

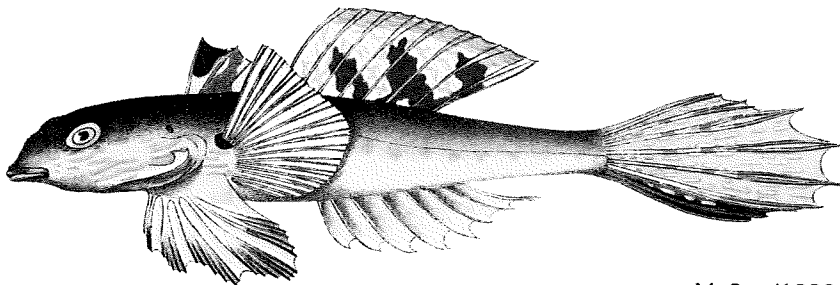
Male greenish brown, mottled with pink above, pale purplish white with narrow, yellow lines along sides and *female* dull bronze-brown above, whitish below with irregular mottling; first dorsal fin orange to purplish, second dorsal fin purplish blue with yellow lines; pectoral fins yellowish with purplish blue spots and males with darker blotch at base.

Size: To 30 cm.

Distribution: (Old), N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, in coastal waters to a depth of 100 m.

References: Johnson (1971, 1973) as *Callionymus calauropomus*; Nakabo (1982); Last et al. (1983).



McCoy (1889c)

Bight stinkfish

Foetorepus phasis (Günther, 1880)

Family: Callionymidae p 40

Other Common Names: Dragonet, long-rayed stinkfish.

Description: Preopercular spine curved upwards at tip with 2 hooks on inner edge, but no antrose spine at base; lateral lines not interconnected by transverse branch on dorsal surface of caudal peduncle; tip of each dorsal ray (except last) forked; tip of each anal ray simple; second dorsal fin with 8 to 9 rays, last branched at base; anal fin with 7 rays, last branched at base.

D IV+8-9; A 7; P 19-22; V 1,5.

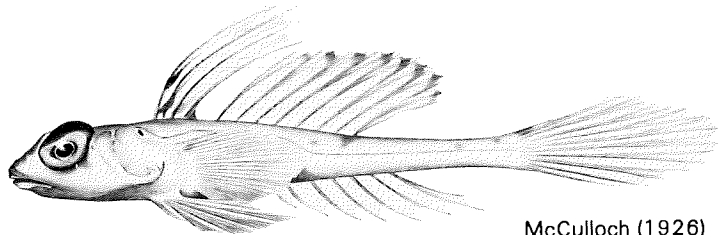
Head and body rose-pink with orange bars and spots; first dorsal fin orange with blackish brown spots; second dorsal fin alternately orange and white with broad, oblique, blackish bars; pectoral fins rose-pink with yellowish brown spot on upper base.

Size: To 13 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from 160 to 200 m.

References: Johnson (1971) as *Callionymus phasis*; Nakabo (1982); Last et al. (1983).



Spotted stinkfish

Repomucenus calcaratus (Macleay, 1881)

Family: Callionymidae p 40

Description: Body notably depressed; preopercular spine curved upwards at tip with 3 hooks on inner edge and *antrose spine at base*; lateral lines *interconnected* by transverse branch on dorsal surface of caudal peduncle; tip of each dorsal ray (except last) simple; tip of each anal ray simple; second dorsal fin with 9 rays, last branched at base; anal fin with 9 rays, last branched at base.

D IV+9; A 9; P 18-21; V 1,5.

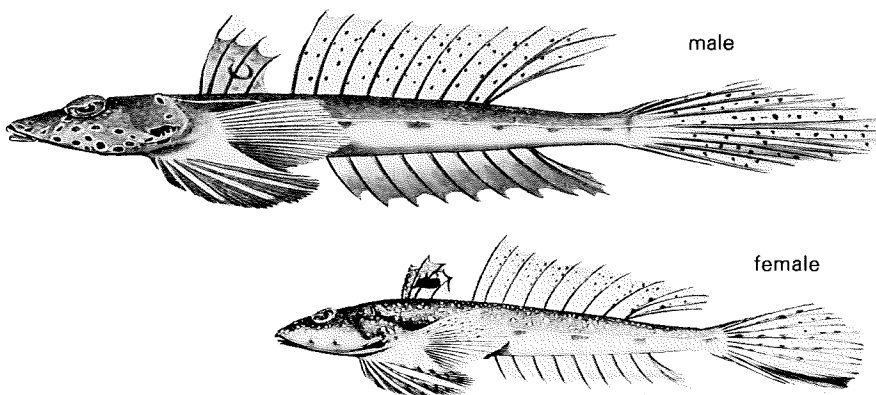
Male yellowish brown with small, grey and orange spots above, white with dark blotches below; head with yellow-edged, grey ocelli and 1 white-edged, black spot beneath preopercular spine; first dorsal fin with dark ring or first and second dorsal fins mottled with brown and yellow spots. *Female* lemon-yellow with pale grey ocelli above, silvery with greyish blotches below; head with pale yellowish marbling; first dorsal fin yellowish brown with blue spots anteriorly, white with black blotch centrally; second dorsal fin transparent with brownish and whitish spots; upper half of pectoral fin with dark spots.

Size: To at least 22 cm.

Distribution: (Qld), N.S.W., S.A. and W.A.

Habitat and Depth: Demersal, recorded from coastal waters in depths from 35 to 110 m.

References: McCulloch (1923) and Johnson (1971, 1973) as *Callionymus calcaratus*; Nakabo (1982).



McCulloch (1926); McCulloch (1923)

Gemfish

Rexea solandri (Cuvier, 1831)

Family: Gempylidae p 38

Other Common Names: Hake, king barracouta, king couta, deepsea kingfish, southern kingfish.

Description: 2 lateral lines, upper along back to below middle of soft dorsal fin base; lower lateral line branching off upper below about 6th spine of dorsal fin, continuing along middle of sides to caudal peduncle, sometimes wavy above anal fin; body covered in minute deciduous scales; ventral fins minute, with 1 spine and 2 to 3 rays, origin below or behind end of pectoral fin bases; 2 finlets behind both second dorsal and anal fins; first dorsal fin with 17 to 18 spines. D XVII-XVIII+I-II, 15-17+2 finlets; A I-II, 14-16+2 finlets; P 13-14; V I, 2-3. Body iridescent blue above, silvery below; first dorsal fin with black blotch between first and third spines; second dorsal, anal and caudal fins dusky orange.

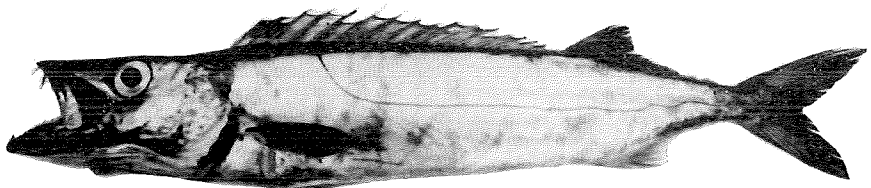
Size: To at least 110 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Mainly demersal, on the continental shelf and upper slope in depths from 40 to 500 m; dense pre-spawning schools migrate along the continental slope at a depth of about 400 m during winter.

Note: An undescribed species of *Rexea* has also been recorded off N.S.W. Large fish (greater than 25 cm) of this undescribed species lack ventral fins while the smaller fish have ventral fins of 1 spine and no rays, originating below or before the middle of the pectoral fin base.

References: Matsubara & Iwai (1952); Parin & Bekker (1972).



K. J. Graham

Oilfish

Ruvettus pretiosus Cocco, 1829

Family: Gempylidae p 38

Other Common Names: Escolar.

Description: Lateral line obscure, extending along middle of sides to caudal peduncle; *body covered with adherent, spiny scales*; bony tubercles forming keel along belly; ventral fins small with 1 spine and 5 rays; no lateral keels on caudal peduncle; first dorsal fin with 13 to 15 low spines.

D XIII-XV, 16-17+1-2 finlets; A 15-18+1-2 finlets; P 13-14; V I,5.

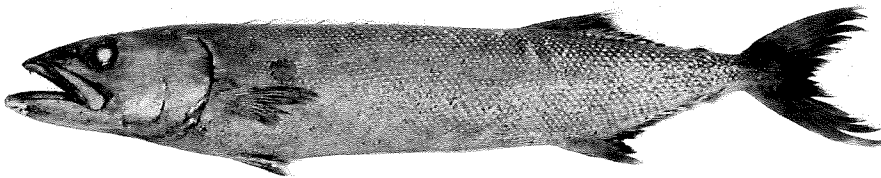
Body pale grey to purple-brown above, paler below; first dorsal fin dark grey; eyes phosphorescent.

Size: To 300 cm.

Distribution: N.S.W., Vic., S.A., and W.A.

Habitat and Depth: Mesopelagic, over the continental slope in depths from 100 to 800 m.

References: Grey (1953); Whitley (1948) and Munro (1958f) as *R. tydemani*.



K. J. Graham

Barracouta

Thyrsites atun (Euphrasen, 1791)

Family: Gempylidae p 38

Other Common Names: Snoek, couta.

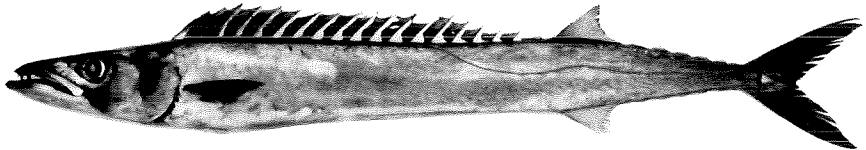
Description: 1 lateral line running along back and diverging sharply downwards below dorsal fin between 13th to 15th spine, continuing along middle of sides; body covered in minute deciduous scales; ventral fin small, with 1 spine and 5 rays; 5 to 7 finlets behind both second dorsal and anal fins; first dorsal fin with 18 to 21 spines.
 D XVIII-XXI, 10-12+5-7 finlets; A III, 8-12+5-7 finlets; P 14-15; V I, 5.
 Body steel blue or dark grey above, silvery below; first dorsal fin black, margin of second dorsal and pectoral fins black.

Size: To 140 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Pelagic, over the continental shelf from surface waters to the bottom.

References: Munro (1958f) as *Leionura atun*; Parin & Bekker (1972).



K. J. Graham

Slender frostfish

Benthodesmus elongatus (Clarke, 1879)

Family: Trichiuridae p 38

Description: Caudal fin forked; lower hind margin of operculum rounded, barely reaching pectoral fin bases; dorsal surface of head without bony crest, profile rising evenly to dorsal fin origin; interorbital not strongly convex, eyes almost touching dorsal surface; body extremely elongate, depth about 30 to 40 in SL; ventral fins scale-like, inserted slightly behind pectoral fin bases.

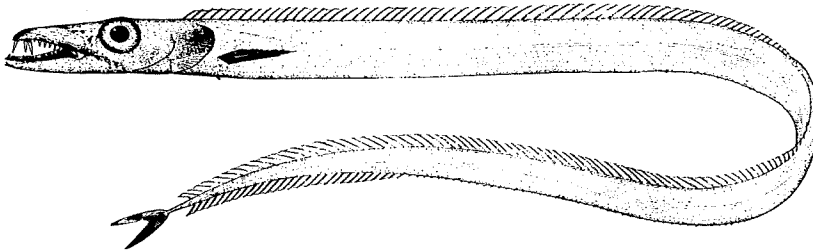
D XLIV-XLVI,104-110; A 25 supporting rays; P 12; V 1,1.
Body uniform silver; fins yellowish.

Size: To at least 77 cm.

Distribution: N.S.W. and Vic.

Habitat and Depth: Mainly mesopelagic, over the continental slope in depths from 500 to 900 m.

References: Tucker (1956); Munro (1958g); Parin & Bekker (1970, 1972).



Goode & Beane (1895)

Southern frostfish

Lepidopus caudatus (Euphrasen, 1788)

Family: Trichiuridae p 38

Other Common Names: Ribbonfish.

Description: Caudal fin forked; lower hind margin of operculum rounded, barely reaching pectoral fin bases; *bony crest* on mid-dorsal surface of head confined to nape; interorbital not strongly convex, eyes almost touching dorsal surface; body elongate, *depth 10 to 18* in SL; ventral fins scale-like, inserted at least 1 eye diameter behind pectoral fin bases.

D IX,89-96; A 15-24 supporting rays; P 12; V I,1.

Body uniform silver; black blotch between second and third dorsal fin spines.

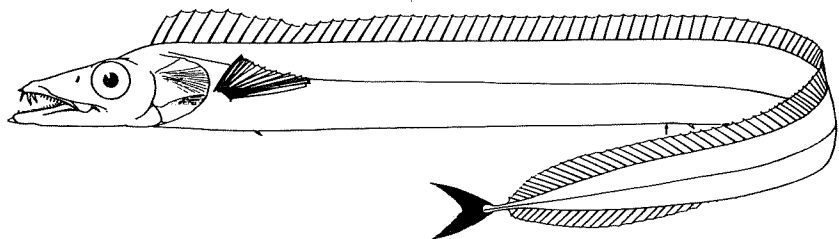
Size: To at least 200 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Mainly demersal, on the continental slope in depths from 300 to 600 m.

Note: The Australian hairtail (*Trichiurus lepturus*) also occurs in coastal waters but is unlikely to be trawled. It lacks both caudal and ventral fins and the lower hind margin of the operculum is concave and overlaps the pectoral fin bases.

References: Tucker (1956); Munro (1958g) as *L. lex* and Australian hairtail as *T. coxii* and *T. haumela*; Mikhaylin (1977).



Tucker (1956)

Butterfly mackerel

Gasterochisma melampus Richardson, 1845

Family: Scombridae p 46

Other Common Names: Scaly tuna, butterfly tuna, butterfly kingfish.

Description: 2 small keels on each side of caudal peduncle in large adults, absent in smaller fish; entire body uniformly covered with *large* scales; 2 minute flaps on belly between ventral fin bases; 2 dorsal fins, widely separated in adults, united in juveniles; fine teeth in jaws and on roof of mouth; gill rakers vestigial; deep central groove along belly; ventral fins enormous in juveniles, much shorter in adults.

D XVII-XVII+1,9-10+6-8 finlets; A II-III,9-10+6-8 finlets; V 1,5; L. Lat. 64-70.

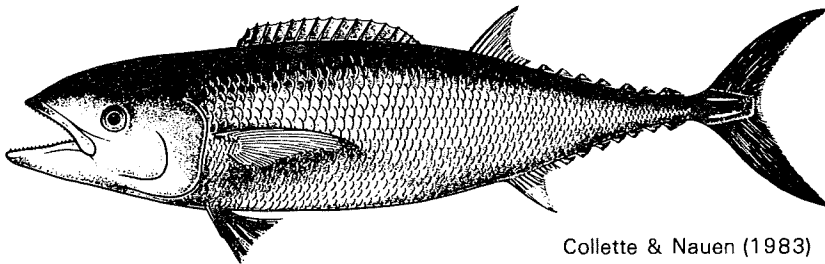
Body dark blue-black above, silvery below; pectoral fins silver, ventral and caudal fins black or translucent.

Size: To 180 cm.

Distribution: (Qld), N.S.W., Vic., and Tas.

Habitat and Depth: Pelagic, in deep oceanic waters.

References: Munro (1958e); Collette & Gibbs (1963); Collette & Nauen (1983).



Skipjack tuna

Katsuwonus pelamis (Linnaeus, 1758)

Family: Scombridae p 46

Other Common Names: Striped tuna, stripy, oceanic bonito.

Description: Mid-lateral keel on caudal peduncle with 1 smaller keel above and below; body without scales except for (pectoral) corselet and lateral line; 2 very small flaps on belly between ventral fin bases; 2 dorsal fins barely separated, interspace shorter than eye diameter; upper surface of tongue with 2 longitudinal ridges; small conical teeth in jaws; 53 to 63 gill rakers on first arch.

D XIV-XVI+14-16+7-9 finlets; A 14-15+7-8 finlets; P 26-29; V 1,5.

Body black with metallic, purplish blue and green sheen above, silvery below; sides *below* lateral line with 2 to 6 *dark grey, longitudinal stripes*; fins silvery grey.

Size: To 100 cm.

Distribution: (Qld), N.S.W, Vic., Tas., S.A. and W.A.

Habitat and Depth: Pelagic, in coastal and oceanic waters.

References: Collette & Gibbs (1963); Collette & Nauen (1983).



J. G. H. Maxwell

Australian bonito

Sarda australis (Macleay, 1880)

Family: Scombridae p 46

Description: Mid-lateral keel on caudal peduncle with 1 smaller keel above and below; entire body covered with minute scales, scales larger on well defined corselet; 2 minute flaps on belly between ventral fin bases; 2 dorsal fins almost united, interspace minute; upper surface of tongue without longitudinal ridges or teeth; small conical teeth in jaws; 19 to 21 gill rakers on first arch.

D XVII-XIX+15-17+6-7 finlets; A 14-17+6-7 finlets; P 25-27; V 1,5.

Body bluish green above, silvery below; upper sides with about 10 longitudinal, grey or black stripes; fins greyish brown.

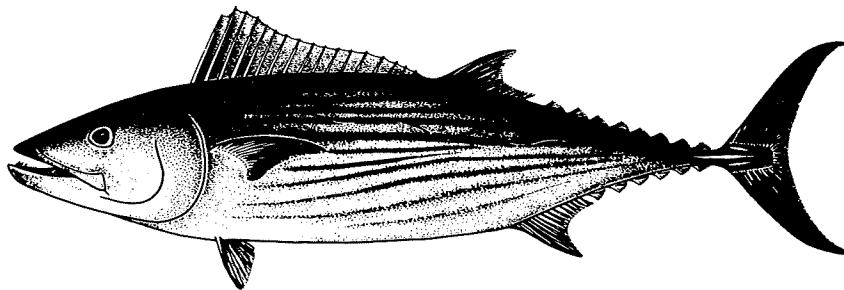
Size: To at least 100 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Pelagic, in coastal waters.

Note: A very similar species, the oriental bonito (*S. orientalis*), occurs in coastal waters off southern W.A. but has only 8 to 13 gill rakers on the first arch.

References: Munro (1958f) as *S. chiliensis australis*; Collette & Chao (1975); Yoshida (1980).



Collette & Nauen (1983)

Blue mackerel

Scomber australasicus Cuvier, 1832

Family: Scombridae p 46

Other Common Names: Slimy mackerel, common mackerel, Pacific mackerel, spotted chub mackerel.

Description: 2 small keels on each side of caudal peduncle; entire body covered with small scales, those behind head and around pectoral fins slightly larger; 1 very small flap on belly between ventral fin bases; 2 dorsal fins widely separated, interspace longer than snout; small teeth in jaws and on roof of mouth; 35 to 40 gill rakers on first arch.

D X-XIII+I, 11+5-6 finlets; A I, 12+5-6 finlets; P 20-21; V I, 5.

Body greenish blue above, silvery white below; dark, oblique zig-zag bars along back grading to spots on sides and smaller, irregular spots on belly; fins dark grey or translucent.

Size: To 50 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Pelagic, in coastal and oceanic waters to at least a depth of 200 m.

References: Matsui (1967); Collette & Nauen (1983).



J. G. H. Maxwell

Southern bluefin tuna

Thunnus maccoyii (Castelnau, 1872)

Family: Scombridae p 46

Other Common Names: Bluefin, southern tunny.

Description: Mid-lateral keel on caudal peduncle with 1 smaller keel above and below; entire body covered with very small scales, larger scales on pectoral corselet; 2 flaps on belly between ventral fin bases; 2 dorsal fins barely separated, interspace shorter than eye diameter; upper surface of tongue with 2 longitudinal ridges; small conical teeth in jaws; 31 to 40 gill rakers on first arch; pectoral fins short, more than 1.25 in head length; ventral surface of liver with striations.

D XII-XIV+14-15+8-9 finlets; A 14-15+7-8 finlets; P 28-34; V 1,5.

Body bluish black to bluish green along back, silvery below without dark stripes or spots; first dorsal fin grey with yellow tinge, anal fin silvery grey, dorsal and anal finlets yellow; *caudal keel usually yellow.*

Size: To 220 cm.

Distribution: N.S.W., Vic., Tas., S.A. and W.A.

Habitat and Depth: Pelagic, in coastal and oceanic waters.

Note: There are at least another 2 species of *Thunnus* in temperate Australian waters but all 3 species are unlikely to be taken in traw nets. *T. albacares* (yellowfin tuna) lacks striations on the liver and large fish have very long rays in the second dorsal and anal fins. *T. alalunga* (albacore) has enormous pectoral fins, reaching well beyond the second dorsal fin and only 25 to 31 gill rakers on the first arch.

References: Serventy (1956); Gibbs and Collette (1967); Collette & Nauen (1983).



J. G. H. Maxwell

Rudderfish

Centrolophus niger (Gmelin, 1789)

Family: Centrolophidae p 48

Description: Body firm, elongate, thick and slender in adults, slightly compressed and deeper in juveniles; dorsal fin with about 40 elements, spines short, weak and grading into longer rays; anal fin with 24 to 27 elements; lateral line slightly arched above pectoral fins then continuing straight along middle of sides from anal to caudal fins; snout long and very blunt; mouth large, upper jaw reaching slightly beyond anterior margin of eye; pectoral fins very small, not reaching midway to anus (adults); ventral fins very small, not reaching one-quarter distance to anus (adults); top of head scaleless to about level with posterior margin of eyes.

D 37-42 (total); A 24-27 (total); P 20-23; LGR 13-15; vertebrae 25.

Body dusky brown to grey brown above, greyish white to brown below; head deep brown, snout creamy pink; fins dark brown; juveniles with 2 dark, broad, vertical bands on sides.

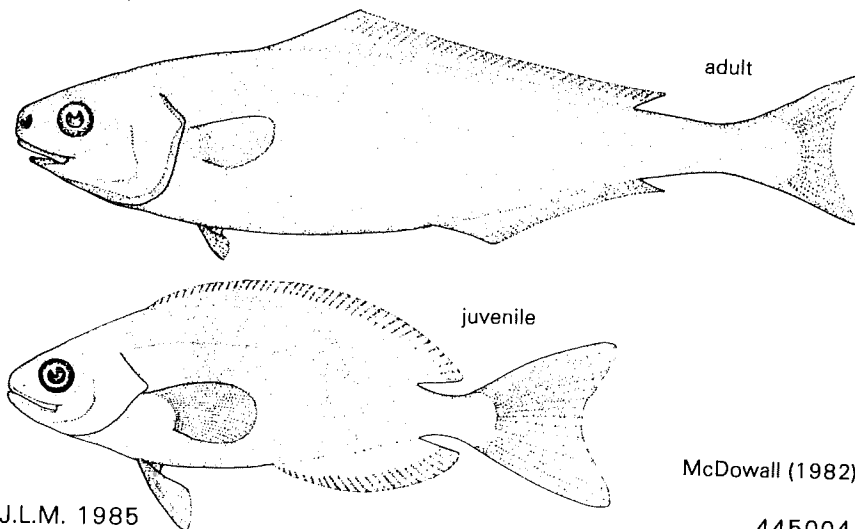
Size: To at least 120 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Adults demersal, on the continental slope in depths from 200 to 600 m; subadults (about 30 cm) oceanic in surface waters; juveniles oceanic in surface waters, sometimes in association with jellyfish.

Note: Young rudderfish are less elongate and have higher dorsal and anal fins and longer ventral and pectoral fins than adults.

References: Munro (1958g) as *C. maoricus*; McDowall (1982); Last et al. (1983).



J.L.M. 1985

McDowall (1982)

445004

Deepsea trevalla

Hyperoglyphe antarctica (Carmichael, 1818)

Family: Centrolophidae p 48

Other Common Names: Blue-eye, big-eye, bluenose.

Description: Body firm, moderately deep, slightly compressed; dorsal fin with 8 stout spines, abruptly shorter than, and easily distinguishable from rays; soft dorsal fin with 15 to 21 rays, base about equal to head length; anal fin with 17 to 19 elements; caudal peduncle without lateral keel; lateral line arched above pectoral fins then continuing straight along middle of sides from rear portion of anal to caudal fins; snout almost truncate; mouth of moderate size, upper jaw reaching to below middle of eye.

D VIII,15-21; A III,14-16; P 19-21; LGR 15-17; vertebrae 25.

Body bluish grey above, metallic blue below; eyes deep blue; no black blotch above pectoral fins.

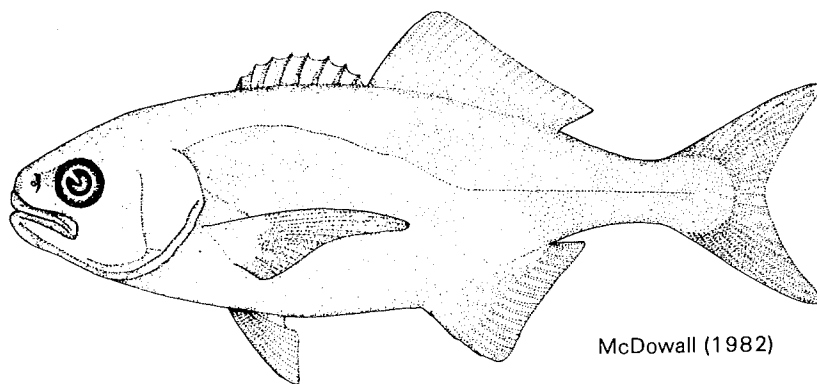
Size: To 140 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Adults occur near the bottom during the day and on the bottom at night in continental shelf and upper slope waters at depths from 100 to 600 m.

Note: Small specimens (less than 40 cm) are rarely caught and would be of interest to museums.

References: Scott et al. (1974) as *H. porosa*; McDowall (1982); Last et al. (1983).



New Zealand ruffe

Schedophilus huttoni (Waite, 1910)

Family: Centrolophidae p 48

Description: Body limp, elongate, compressed and slender; dorsal fin with about 60 elements, spines short and weak, indistinguishable from rays; anal fin with 35 to 41 elements; lateral line slightly arched above pectoral fin then following dorsal profile to caudal fin; snout long and blunt; mouth large, upper jaw reaching well beyond anterior margin of eye; pectoral fins small, not reaching one-third distance to anus; ventral fins very small, almost vestigial in adults; top of head scaleless to about level with preoperculum.

D 57-62 (total); A 35-41 (total); P 18-19; LGR 12; vertebrae 30.

Body uniform brown to whitish brown, head paler with reddish areas around eyes.

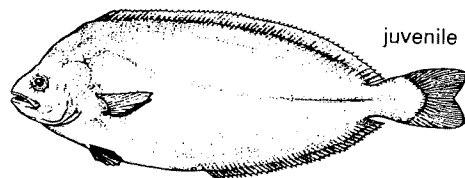
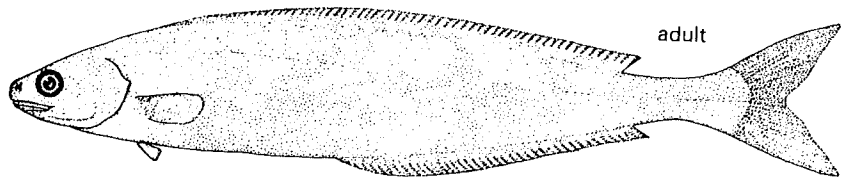
Size: To at least 80 cm.

Distribution: Southern N.S.W., Vic. and Tas.

Habitat and Depth: Adults demersal on the continental slope in depths from 800 to 1000 m; subadults and juveniles pelagic in surface waters.

Note: Very few *S. huttoni*, especially fish of 40 cm and less, have been captured and museums would welcome specimens. Like other centrolophids, young fish are probably deeper bodied than adults with high dorsal and anal fins.

References: McDowall (1982); Last et al. (1983).



McDowall (1982); Last et al. (1983)

Pelagic butterfish

Schedophilus maculatus Günther, 1860

Family: Centrolophidae p 48

Description: Body limp, elongate-oval and compressed; dorsal fin with about 35 elements, spines short and weak, barely distinguishable from rays; each dorsal ray with 2 pores behind base; anal fin with 26 to 27 elements; lateral line following dorsal profile to caudal fin; snout short and bluntly rounded; mouth of moderate size, upper jaw reaching to below middle of eye; pectoral fins very small, not reaching midway from base to anus; ventral fins small; top of head scaleless to nape.
D 35-37; A 26-27; P 19-21; LGR 14-15; vertebrae 29.

Colour (in preservative) uniform dull brown; juveniles dull grey-brown with dark and pale brown blotches on sides and on dorsal and anal fins.

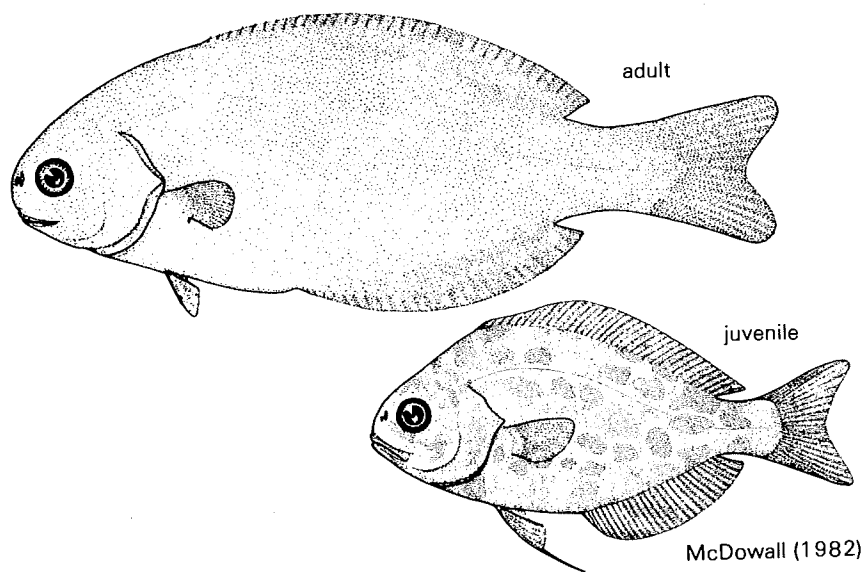
Size: To at least 28 cm.

Distribution: N.S.W.

Habitat and Depth: Adults pelagic in oceanic waters; juveniles in surface waters beneath jellyfish.

Note: Unlike other centrolophids, very few adult *S. maculatus* have been captured. Specimens of all sizes would be of interest to museums.

References: McDowall (1982).



Warehou

Seriolella brama (Günther, 1860)

Family: Centrolophidae p 48

Other Common Names: Sea bream, blue warehou, common warehou, snotgall trevally, snotty.

Description: Body firm, moderately elongate, moderately compressed and relatively deep (maximum depth 2.3 to 3.2 in SL); dorsal fin with 7 to 9 spines abruptly shorter than anterior rays; soft dorsal fin with 25 to 29 rays, base much longer than head length; anal fin with 22 to 26 elements; mid-lateral caudal peduncle with low but distinct *keel*; lateral line following dorsal profile to caudal fin; snout bluntly rounded; mouth of moderate size, upper jaw barely reaching to below anterior margin of eye; *pectoral fins very long*, extending to or beyond anal fin origin; top of head scaleless for at least three-quarters distance from snout tip to dorsal fin origin; eyes small (5.0 to 6.3 in HL).

D VII-IX,25-29; A III,19-23; P 19-22; LGR 15-18; vertebrae 25.

Head dark greyish brown above, silvery below; body steely blue to greenish grey, or purplish above, silvery white below; sides with large but faint greyish blue blotches; prominent, black blotch above pectoral fin bases; dark, vertical bar through eyes.

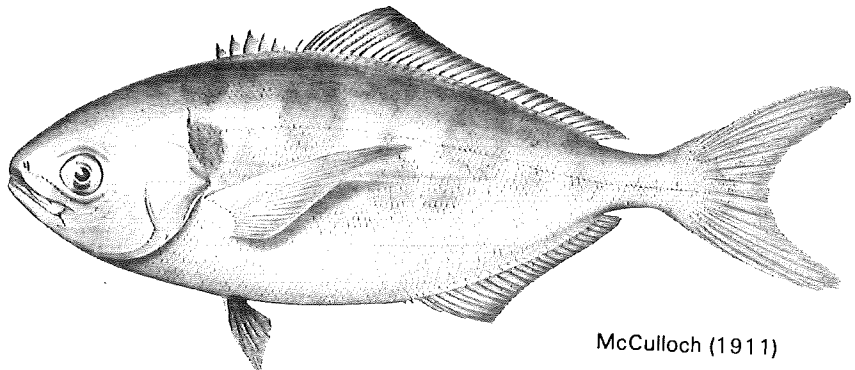
Size: To at least 76 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Adults usually demersal, on the continental shelf to a depth of 200 m but, also occasionally taken in surface waters; juveniles pelagic, recorded offshore from the surface to a depth of 100 m and sometimes entering estuaries, often in association with jellyfish.

Note: Young warehou have deeper, more compressed bodies than adults and different shaped fins.

References: McDowall (1982); Last et al. (1983).



McCulloch (1911)

White trevalla

Seriolella caerulea Guichenot, 1848

Family: Centrolophidae p 48

Other Common Names: White warehou.

Description: Body firm, moderately elongate, moderately compressed and relatively deep (maximum depth 2.2 to 3.0 in SL); dorsal fin with 6 to 8 thick spines abruptly shorter (adults) or slightly shorter (juveniles) than anterior rays; soft dorsal fin with 30 to 33 rays, base much longer than head length; anal fin with 21 to 27 elements; caudal peduncle without lateral keel; lateral line following dorsal profile, undulating beneath soft dorsal fin; snout blunt; mouth large, upper jaw reaching to below or slightly beyond anterior margin of eye; pectoral fins of moderate length, extending about two-thirds distance to anal fin origin (adults); top of head scaleless to about midway from snout tip to dorsal fin origin; eyes large (3.7 to 4.4 in HL).

D VII-VIII,30-33; A II-III,19-24; P 20-23; LGR 12-16; vertebrae 26.

Adults silvery grey to creamy white; no large black blotch above pectoral fin bases; dark, vertical bar through eyes; *juveniles* with irregular, pale and dark grey stripes along sides.

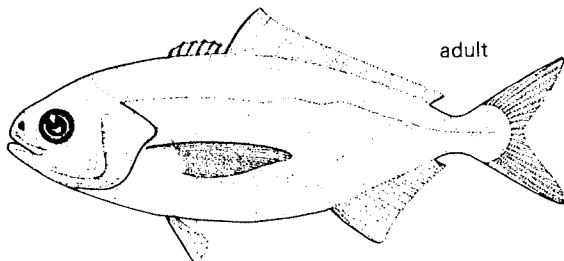
Size: To at least 65 cm.

Distribution: Southern N.S.W., Vic. and Tas.

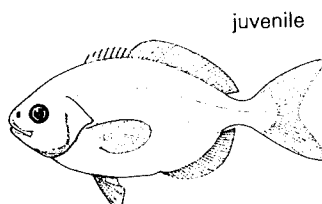
Habitat and Depth: Adults demersal, on the continental shelf and upper slope in depths from 500 to 800 m; juvenile habitat unknown.

Note: Young white trevalla have deeper bodies than adults, higher and more rounded dorsal and anal fins and ovate rather than falcate pectoral fins.

References: McDowall (1982); Last et al. (1983).



adult



juvenile

Spotted trevalla

Seriolella punctata (Forster, 1801)

Family: Centrolophidae p 48

Other Common Names: Mackerel trevalla, silver warehou.

Description: Body firm, moderately elongate, moderately compressed and relatively slender (maximum depth 2.9 to 4.0 in SL); dorsal fin with 7 to 9 spines abruptly shorter than anterior rays; soft dorsal fin with 35 to 39 rays, base much longer than head length; anal fin with 24 to 27 elements; caudal peduncle without lateral keel; lateral line following dorsal profile to caudal fin; snout pointed; mouth of moderate size, upper jaw reaching to below anterior margin of eye; pectoral fins of moderate length, extending only two-thirds distance to anal fin origin; top of head scaleless for at least three-quarters distance from snout tip to dorsal fin origin; eyes of moderate size (4.4 to 6.8 in HL).
D VII-X,35-39; A III,24-27; P 19-22; LGR 13-15; vertebrae 25.
Head dark greyish brown above, dark colouration extending back to anterior margin of body scales forming distinct *mid-dorsal point on nape*; body bluish grey above, silvery below; sides with many *small, dark spots* just beneath lateral line, faint in large fish; prominent, black blotch or bar above pectoral fin bases; dark, vertical bar through eyes.

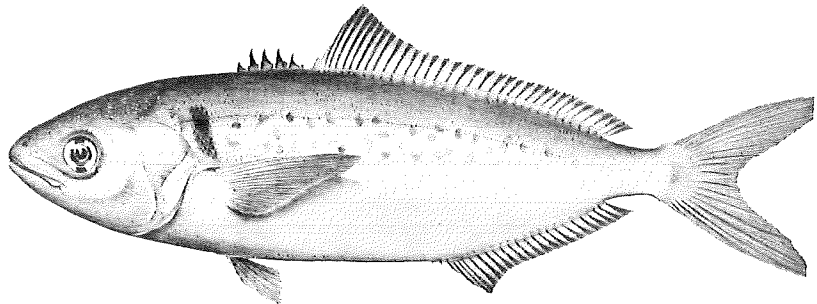
Size: To 66 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Adults usually demersal, on the continental shelf and slope in depths from 100 to 650 m but, occasionally occurring at the surface; subadults (to 25 cm) pelagic in surface waters, sometimes entering bays; juveniles pelagic, offshore in depths to 100 m.

Note: Unlike many species of centrolophids, spotted trevalla greater than 10 cm in length are similar to the adult in body form.

References: Scott et al. (1974) as *S. maculata*; McDowall (1982); Last et al. (1983).



McCulloch (1911)

Tasmanian ruffe

Tubbia tasmanica Whitley, 1943

Family: Centrolophidae p 48

Other Common Names: Mauve ruffe, Tasmanian rudderfish.

Description: Body limp, elongate-oval and compressed; dorsal fin with about 50 elements, spines short and weak, indistinguishable from rays; dorsal and anal fins with band of small pores (in oblique rows of about 10) along base; anal fin with 33 to 37 elements; lateral line arched slightly above pectoral fins then following dorsal profile to caudal fin; snout bluntly rounded; mouth of moderate size, upper jaw reaching to below middle of eye; pectoral fins very small, not reaching two-fifths distance to anus; ventral fins very reduced, almost *vestigial* in adults; top of head covered with minute *scales*.

D 47-51(total); A 33-37(total); P 18-21; LGR 12-15; vertebrae 43-45.

Body of adults dull brown, head paler; fins chocolate-brown; juveniles pale mauve above, silver below; head with silver spots.

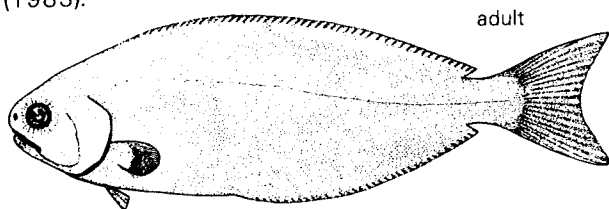
Size: To at least 67 cm.

Distribution: Tas.

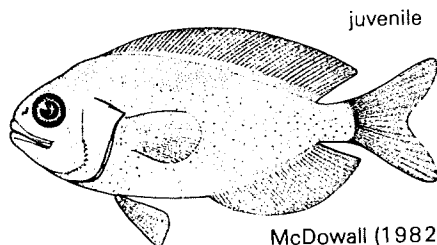
Habitat and Depth: Adults demersal, on the continental slope in depths from 700 to 850 m; subadults occur near the surface over deep water; juveniles found inshore in surface waters and to at least a depth of 50 m.

Note: Young Tasmanian ruffe are much deeper bodied than adults and have larger heads, longer pectoral and ventral fins and higher dorsal and anal fins.

References: Munro (1958g) as *Mupus tasmanica*; McDowall (1982); Last et al. (1983).



adult



juvenile

McDowall (1982)

Keeled cubehead

Cubiceps pauciradiatus Günther, 1872

Family: Nomeidae p 48

Description: Top of head with scales (scale pockets in damaged fish) from nostrils to nape; origin of first dorsal fin slightly behind pectoral fin bases; breast with *bony keel*; vomer with broad *patches* of knobby teeth; second dorsal fin with 1 spine and 15 to 17 rays; pectoral fins with 17 to 20 rays, longer than head length in fish greater than 10 cm; anal fin with 2 spines and 14 to 16 rays.
D X-XI+I,15-17; A II,14-16; P 17-20; L. Lat. 49-53; LGR 16-19; vertebrae 30-31.
Colour (in preservative) brown above, yellowish brown below; fins hyaline.

Size: To 20 cm.

Distribution: N.S.W.

Habitat and Depth: Pelagic, in offshore waters.

Note: A related species *C. caeruleus* also occurs off N.S.W. and Tas. It lacks the bony keel on the breast and has 23 to 27 rays in the dorsal fin, 21 to 24 rays in the anal fin, 19 to 22 rays in the pectoral fins and probably grows to a larger size.

References: Butler (1979); Last et al. (1983).



Butler (1979)

Coastal cubehead

Cubiceps squamiceps (Lloyd, 1909)

Family: Nomeidae p 48

Description: Top of head with scales (scale pockets in damaged fish) from nostrils to nape; origin of first dorsal fin over pectoral fin bases; breast without bony keel; vomer with teeth in *single row*; second dorsal fin with 1 spine and 18 to 21 rays; pectoral fins with 18 to 20 rays, shorter than head length; anal fin with 3 spines and 18 to 20 rays. D X-XI+I,18-21; A III,18-20; P 18-20; L. Lat. 56-63; vertebrae 31-32. Colour (in preservative) brown above, tan below; fins dusky.

Size: To at least 16 cm.

Distribution: Southern N.S.W.

Habitat and Depth: Pelagic, in coastal and offshore waters from the surface to a depth of at least 300 m.

Note: A related species, *C. baxteri*, also occurs off N.S.W. and Tas. It reportedly reaches a length of at least 100 cm and has 20 to 23 rays in the dorsal fin, 19 to 22 rays in the anal fin and the pectoral fins are longer than the head length in fish greater than 10 cm.

References: Butler (1979).



K. J. Graham

Shepherd fish

Nomeus gronovii (Gmelin, 1788)

Family: Nomeidae p 48

Other Common Names: Portuguese man-o'-war fish, bluebottle fish.

Description: Top of head anterior to eyes without scales; origin of first dorsal fin over or slightly behind pectoral fin bases; jaws with small, pointed, curved teeth; second dorsal fin with 1 spine and 24 to 28 rays; anal fin with 24 to 29 rays; ventral fins fan-shaped, longer than head in juveniles, innermost rays attached to belly by membranes along *entire* length; body firm, elongate (depth 3.3 in SL).

D IX-XII+24-28; A I-II,24-29; P 21-23; LGR 15-18; vertebrae 41.

Adults probably uniform dark brown; juveniles bright blue above, silvery below with blue blotches and spots on sides.

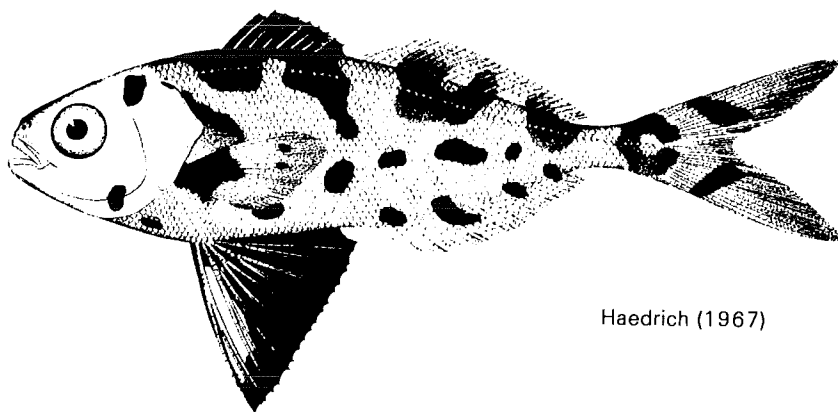
Size: To at least 23 cm.

Distribution: N.S.W. and Vic.

Habitat and Depth: Adults possibly demersal in deep water; juveniles pelagic in coastal and offshore waters to a depth of at least 30 m.

Note: Young shepherd fish up to at least 15 cm are often found swimming beneath the tentacles of the bluebottle jellyfish, physalia.

References: Munro (1958g) as *N. albula*; Haedrich (1967); Haedrich & Horn (1972).



Haedrich (1967)

Blackrag

Psenes pellucidus Lütken, 1880

Family: Nomeidae p 48

Other Common Names: Eyebrow fish.

Description: Top of head anterior to eyes without scales, narrow band of scales from between eyes to nape; origin of first dorsal fin before pectoral fin bases; upper jaw with small, conical, slightly recurved teeth; lower jaw with large, laterally compressed *bladeliike* teeth; second dorsal fin with 1 to 2 spines and 27 to 32 rays; anal fin with 3 spines and 26 to 31 rays; innermost rays of ventral fins incompletely attached to belly by membranes; body soft and flabby, deep in young (depth 1.4 in SL) to elongate in adults (depth 5.0 in SL).

D X-XI+II,27-32; A III,26-31; P 18-20; LGR 14-16; vertebrae 41-42.

Body uniform brown, deep blue or grey; fins dark grey; juveniles with spots or dark, vertical bands.

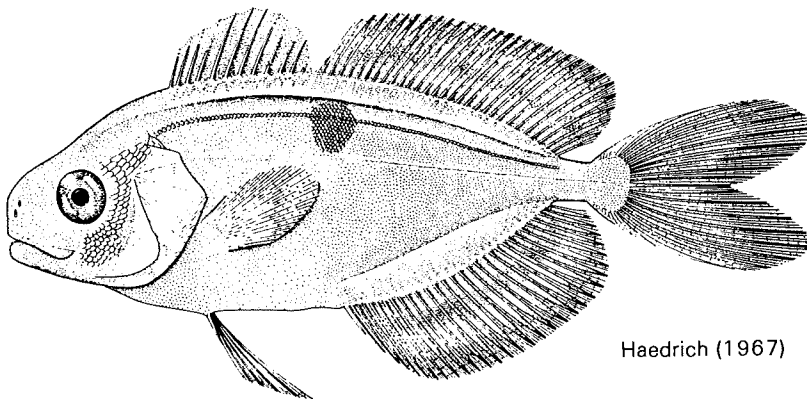
Size: To at least 40 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Pelagic in offshore waters; adults occurring over the continental slope in depths from 200 to about 1000 m; juveniles (less than about 20 cm) inhabiting surface waters.

Note: A related species, *P. whiteleggii*, occurs off N.S.W. It has conical teeth in both the upper and lower jaws, only 17 to 20 rays in the dorsal fin and 17 to 18 rays in the anal fin.

References: Haedrich (1970, 1972).



Haedrich (1967)

Squaretail

Tetragonurus cuvieri Risso, 1910

Family: Tetragonuridae p 48

Description: Body and caudal peduncle very elongate (maximum depth less than 5 in SL); lower jaw closing almost completely within upper jaw, with heavy, knifelike, close-set teeth; origin of first dorsal fin slightly behind or above tip of pectoral fin in adults, over posterior half of fin in juveniles; distance between upper angle of pectoral fin insertion and insertion of ventral fin greater than eye diameter in adult; first dorsal fin with 15 to 21 spines.

D XXV-XXI+10-17; A I,10-15; P 14-21; V I,5; L. Lat. 97-114.

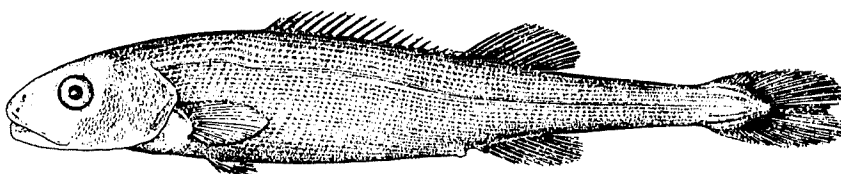
Adults uniform brownish black; juveniles white to light grey.

Size: To 60 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: Adults demersal, recorded from the continental slope in depths from 500 to 650 m; juveniles pelagic in surface waters.

References: Grey (1955); Haedrich (1967); Last et al (1983).



Haedrich (1967)

Mueller's flounder

Arnoglossus muelleri (Klunzinger, 1872)

Family: Bothidae p 66

Description: Anterior dorsal rays not produced; origin of ventral fins at anterior tip of chest; left ventral fin base longer than right; lateral line absent from blind side; scales ctenoid on eyed-side, cycloid on blind side; eyes 4.0 to 5.0 in HL; 68 to 73 scales in lateral line.

D 89-97; A 69-75; P 10-12; V 6; L. Lat. 68-73.

Eyed-side brown, often with darker brown spots along midline; fins with dark speckles.

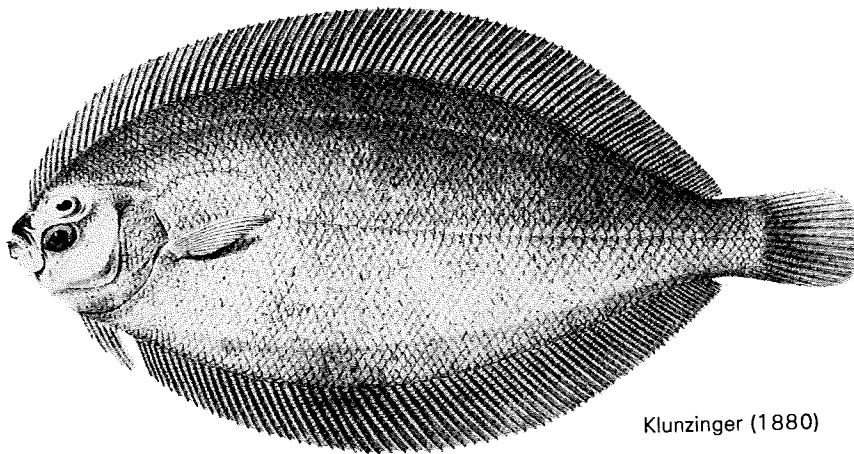
Size: To 21 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, on the continental shelf in depths from about 5 to 200 m.

Note: A similar species, the Bass Strait flounder (*A. bassensis*), occurs to a depth of at least 70 m off N.S.W., Vic. and Tas. It differs from *A. muelleri* in having cycloid scales on both sides of the body and 86 to 92 scales in the lateral line. An undescribed *Arnoglossus*, has been recorded from the eastern Great Australian Bight in depths of 40 to 60 m and differs from the above species as follows: eyes 4.5 to 6.0 (rarely less than 5) in HL; 50 to 55 scales in lateral line, but scales and skin very weakly attached; body uniform brown.

References: Norman (1934); M. F. Gomon pers. comm. (1983).



Klunzinger (1880)

Crested flounder

Lophonectes gallus Günther, 1880

Family: Bothidae p 66

Description: Some anterior dorsal rays greatly *produced* (2nd to 5th or 8th rays in male, 3rd to 4th or 5th in females); origin of ventral fins at anterior tip of chest; left ventral fin base much longer than right; lateral line absent from blind side; blunt spines on snout and chin (absent or only feebly developed in females); eyes separated by bony ridge.

D 87-93; A 72-78; P 9-11; V 6; L. Lat. 62-70.

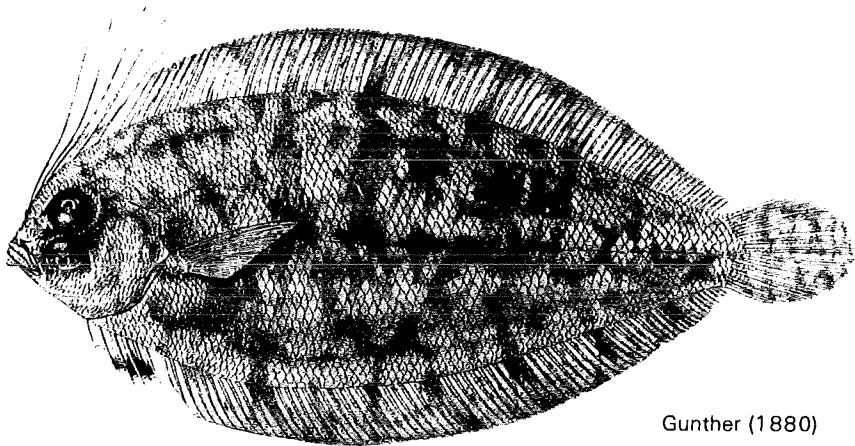
Eyed-side sandy to dark brown, usually with darker markings; fins with dark spots; left ventral fin with black blotch and pale margin.

Size: To 20 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 30 to 240 m.

References McCulloch (1914b); Norman (1926, 1934).



Small-toothed flounder

Pseudorhombus jenynsii (Bleeker, 1855)

Family: Bothidae p 66

Other Common Names: Jenyn's flounder.

Description: Anterior dorsal rays not produced; origin of ventral fins about midway between anterior tip of chest and anal fin origin; left and right ventral fin bases equal in length; lateral line present on each side of body; head more or less notched in front of eyes; small teeth in jaws, no enlarged canines; dorsal fin origin above or slightly ahead of anterior margin of lower eye; eyes separated by bony ridge; scales ctenoid on eyed-side, cycloid on blind side.

D 67-74; A 51-56; P 11-12; V 6; L. Lat. 68-75; LGR 7-10.

Eyed-side brown or grey with darker markings and ocelli; 5 ocelli large and prominent, consisting of several small, white spots surrounded by dark ring; fins with dark spots.

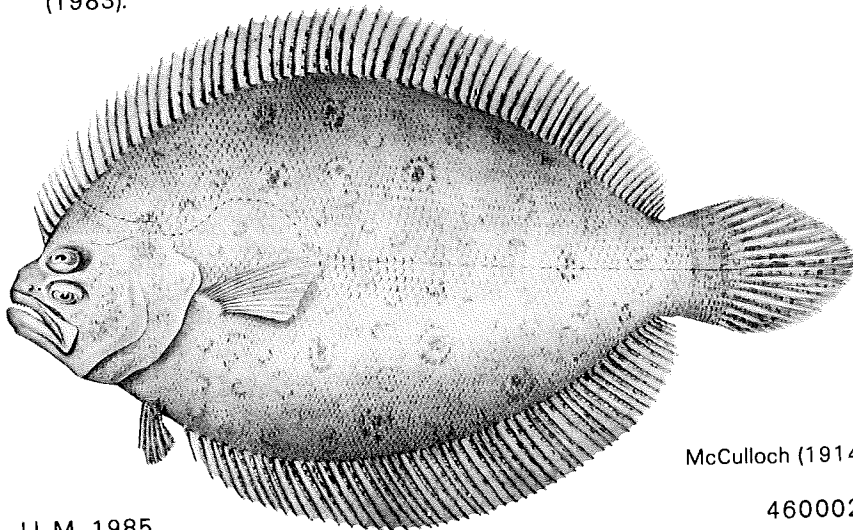
Size: To 34 cm.

Distribution: (Southern Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, in estuaries and offshore over mud and sandy bottoms to a depth of 150 m.

Note: A similar species, the large-toothed flounder (*P. arsius*), is trawled in depths of 15 to 70 m off (N.T., Qld), N.S.W., S.A. and W.A. It has several pairs of enlarged canines anteriorly in each jaw and the dorsal fin originating above a point about midway between the tip of the snout and the anterior margin of the lower eye.

References: Norman (1934); Munro (1957e); M. F. Gomon pers. comm. (1983).



McCulloch (1914b)

460002

Elongate flounder

Ammotretis elongatus McCulloch, 1914

Family: Pleuronectidae p 66

Description: Snout produced into fleshy hook overlapping mouth; origin of dorsal fin at tip of snout; right ventral fin joined to anal fin, with 12 to 14 rays, much longer than left which has 3 to 4 rays; left pectoral fin equal to right in length and first ray without swollen tip; scales ctenoid or cycloid on eyed-side, mostly ctenoid on blind side; mouth not extending to beneath lower eye.

D 74-75; A 50-54; P(right) 8-10; V(right) 12-14, V(left) 3-4; L. Lat. 88-92; LGR 10.

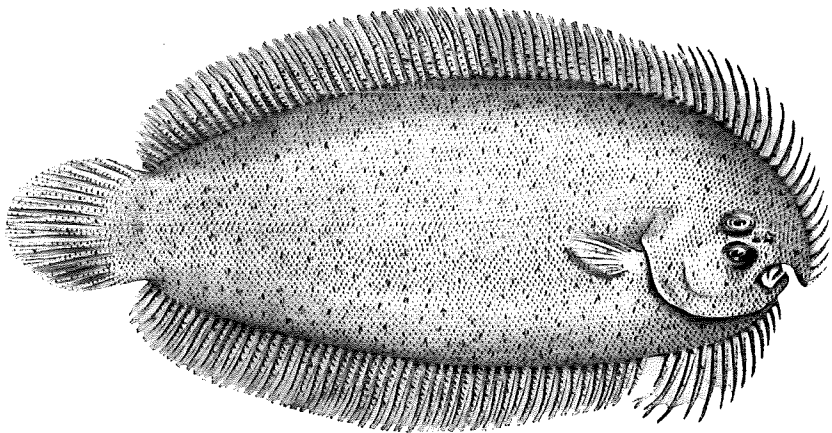
Eyed-side sandy with minute black spots over head, body and fins; blind side whitish.

Size: To 22 cm.

Distribution: Tas., S.A. and southern W.A.

Habitat and Depth: Demersal, in coastal waters.

References: McCulloch (1914b); Norman (1934); Munro (1957f).



McCulloch (1914b)

Spotted flounder

Ammotretis lituratus (Richardson, 1843)

Family: Pleuronectidae p 66

Other Common Names: Tudor's flounder, Bass flounder, sole.

Description: Snout produced into fleshy hook overlapping mouth; origin of dorsal fin at tip of snout; right ventral fin joined to anal fin, with 9 to 10 rays, larger than left which has 6 rays; left pectoral fin shorter than right and first ray with swollen tip; scales ctenoid on eyed-side but mostly cycloid on blind side; mouth not extending to beneath lower eye; edges of anterior dorsal and right ventral fin rays serrated.
D 77-82; A 54-58; P(right) 10-11; V(right) 9-10, V(left) 6; L. Lat. 78; LGR 2-3.

Eyed-side grey to brown with or without small, black spots on head, body and fins; blind side whitish.

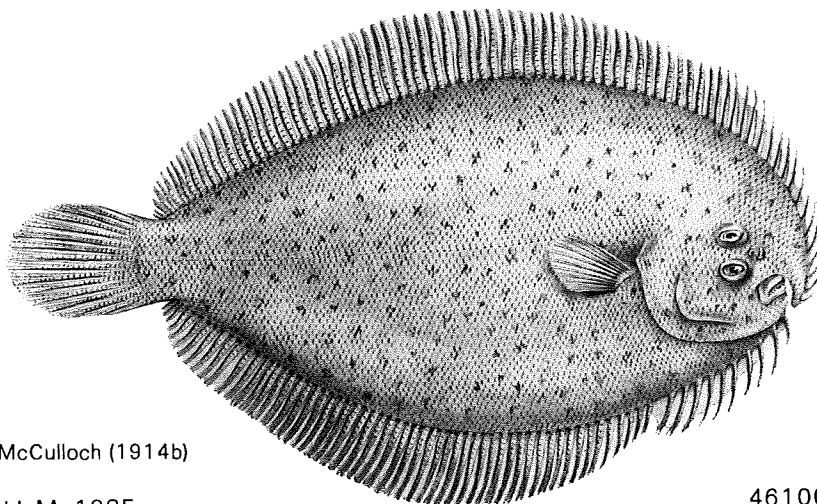
Size: To 23 cm.

Distribution: Vic., Tas. and S.A.

Habitat and Depth: Demersal, inshore off beaches and on the continental shelf in depths to 80 m.

Note: A small species (to 10 cm), the large-scaled flounder (*A. macrolepis*), is also found in Bass Strait and S.A. in depths from 60 to 80 m. It may be distinguished by the following characters: left pectoral fin much shorter than right and first ray without swollen tip; scales ctenoid on both sides; mouth extending to beneath lower eye; 66 scales in lateral line.

References: Norman (1934) and Munro (1957f) as *A. tudori*; Last (1978); M. F. Gomon pers. comm. (1983).



McCulloch (1914b)

J.L.M. 1985

461004

Long-snouted flounder

Ammotretis rostratus Günther, 1862

Family: Pleuronectidae p 66

Other Common Names: Sole.

Description: Snout produced into fleshy hook overlapping mouth; origin of dorsal fin at tip of snout; right ventral fin joined to anal fin, with 7 rays, longer than left which has 3 to 4 rays; left pectoral fin pointed, almost equal to right in length and first ray without swollen tip; scales ctenoid on both sides of body; mouth not extending to beneath lower eye.
D 78-86; A 51-56; P(right) 11-13, P (left) 9-12; V(right) 7, V(left) 3-4; L. Lat. 70-90; LGR 10-12.

Eyed-side mottled dark green to black with or without numerous small, blue spots; right pectoral fin sometimes blackish; blind side whitish.

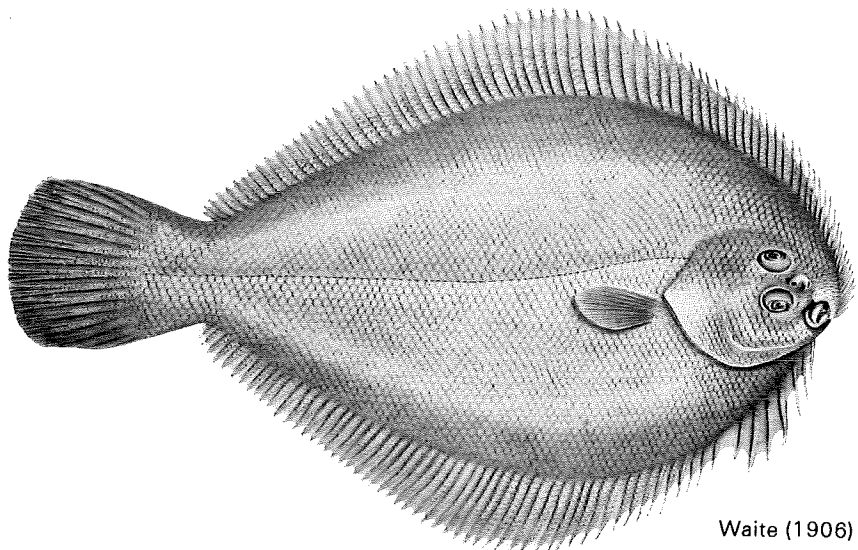
Size: To 30 cm.

Distribution: N.S.W., Vic., Tas., S.A. and south-west W.A.

Habitat and Depth: Demersal, in estuaries and offshore in depths to 80 m.

Note: A related but smaller (to 18 cm) species, *A. brevipinnis*, occurs off S.A. It may be distinguished by the following characters: right ventral fin with 7 rays, left with 5 to 6 rays; left pectoral fin much shorter than right and first ray with swollen tip; mouth not extending to beneath lower eye; dorsal fin with 69 rays.

References: Norman (1934); Last (1978); M. F. Gomon pers. comm. (1983).



Waite (1906)

Banded-fin flounder

Azygopus pinnifasciatus Norman, 1926

Family: Pleuronectidae p 66

Description: Snout *not* produced into fleshy process; origin of dorsal fin just before eyes, first ray produced and free from others; right ventral fin free from anal fin, with 10 to 11 rays, much longer than left which has 5 to 6 rays; left pectoral fin much shorter than right; eyes close together, almost touching; scales ctenoid on both sides of body.
D 104-115; A 84-92; P(right) 10-11; V(right) 10-11, V(left) 5-6; L. Lat. 88-95; LGR 11-12.

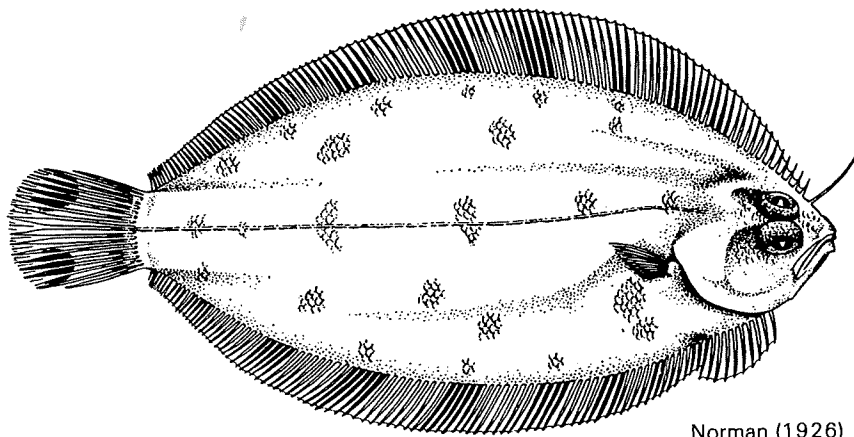
Eyed-side brown with irregular, black patches; short, black bars on dorsal and anal fins, black blotches on caudal fin; blind side whitish.

Size: To 20 cm.

Distribution: N.S.W., Vic., Tas., S.A. and western W.A.

Habitat and Depth: Demersal, on the continental shelf and slope in depths from 120 to 600 m.

References: Norman (1926); Last (1978).



Greenback flounder

Rhombosolea tapirina Günther, 1862

Family: Pleuronectidae p 66

Other Common Names: Southern flounder, Melbourne flounder.

Description: Snout produced into fleshy process; origin of dorsal fin just before nostrils; left ventral fin absent, right united to anal fin; left pectoral fin slightly shorter than right; scales cycloid on both sides of body.

D 56-59; A 40-50; P(right) 10-13; V(right) 6; L. Lat. 72-83; LGR 7-12.

Eyed-side brown, dark green or grey often with large, dark blotches; blind side whitish.

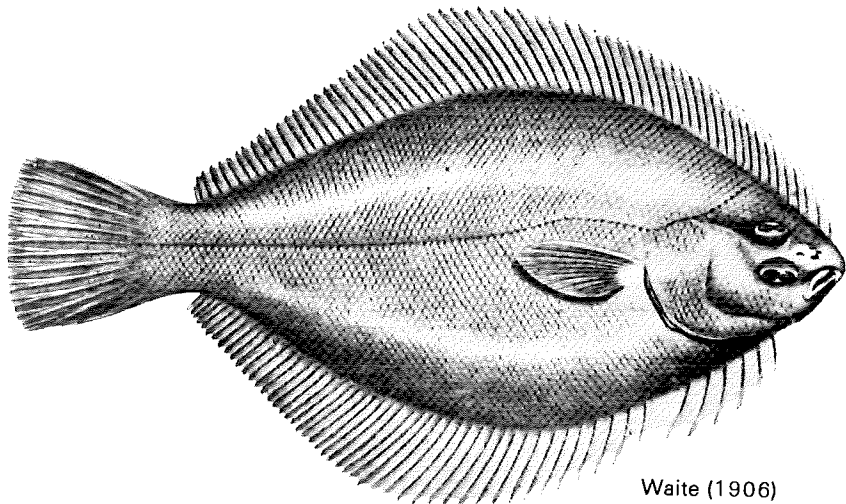
Size: To 45 cm.

Distribution: Vic., Tas., S.A. and eastern W.A.

Habitat and Depth: Demersal, in estuaries and offshore in depths to 100 m.

Note: Body shape and proportions are highly variable in *R. tapirina* and in the past specimens may have been misidentified as *R. plebeia*, a New Zealand species.

References: Norman (1934); Last (1978).



Derwent flounder

Taratretis derwentensis Last, 1978

Family: Pleuronectidae p 66

Description: Snout not produced into fleshy process; origin of dorsal fin opposite lower edge of upper eye; right ventral fin joined to anal fin, similar to left fin, both with 5 to 6 rays; left pectoral fin slightly shorter than right and first ray without swollen tip; scales ctenoid on both sides of body.

D 69-80; A 50-59; P(right) 8-11, P(left) 7-9; V 5-6; L. Lat. 75-83.

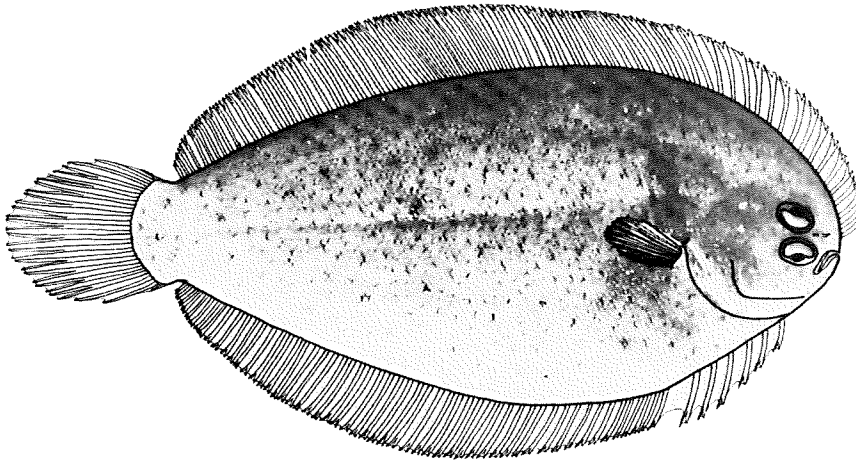
Eyed-side sandy with numerous fine, dark brown spots; fins with orange and black markings; blind side whitish.

Size: To 12 cm.

Distribution: Southern Vic., Tas. and S.A.

Habitat and Depth: Demersal, in coastal waters in depths from 3 to 50 m.

References: Last (1978); Last et al. (1983).



Last (1978)

Spiny-tailed leatherjacket

Bigener brownii (Richardson, 1846)

Family: Monacanthidae p 62

Description: Bony ventral fin rudiment tiny, *immovable* and located at *tip* of pelvis; dorsal spine *wholly* received into deep groove when depressed; first dorsal spine square in cross-section, each corner armed with prominent barbs; *2 pairs of spines* on caudal peduncle, large and curved backward in adult males, small in females and juveniles; dense patch of bristles anterior to caudal peduncle spines in males; central pair of teeth in both jaws pointed; dorsal and anal fins not elevated anteriorly.

D II+31-34; A 29-31; P 10-11.

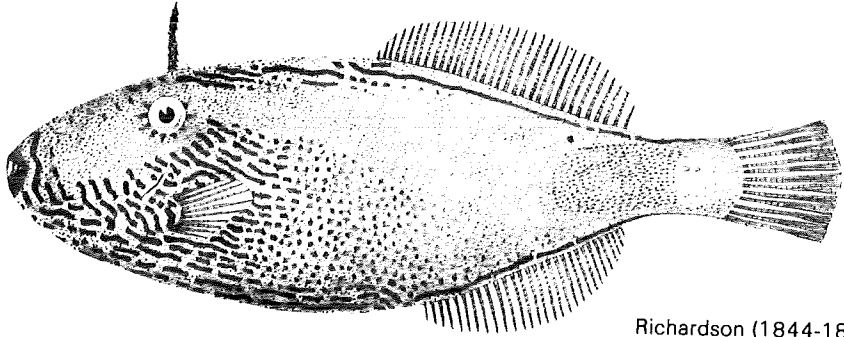
Head and body bright green; blue lines around mouth, on abdomen, back and below dorsal and above anal fins; small, blue spots on sides and orange patch at base of caudal spines; caudal fin green.

Size: To 55 cm.

Distribution: Vic., S.A., and southern W.A.

Habitat and Depth: Occurs on coastal reefs to a depth of 50 m.

References: Scott et al. (1974) as *Acanthaluteres brownii*; Hutchins (1977).



Richardson (1844-1848)

Pigmy leatherjacket

Brachaluteres jacksonianus (Quoy & Gaimard, 1824)

Family: Monacanthidae p 62

Description: Bony ventral fin rudiment *absent*; first dorsal spine without barbs, connected along its length to back by membrane, and *not* received into groove when depressed; short locking dorsal spine absent; no enlarged spines on caudal peduncle; body short and rounded, *belly inflatable*; central pair of teeth in upper jaw pointed; anterior rays of dorsal and anal fins not elevated.

D 1+27-29; A 25-27; P 10-12.

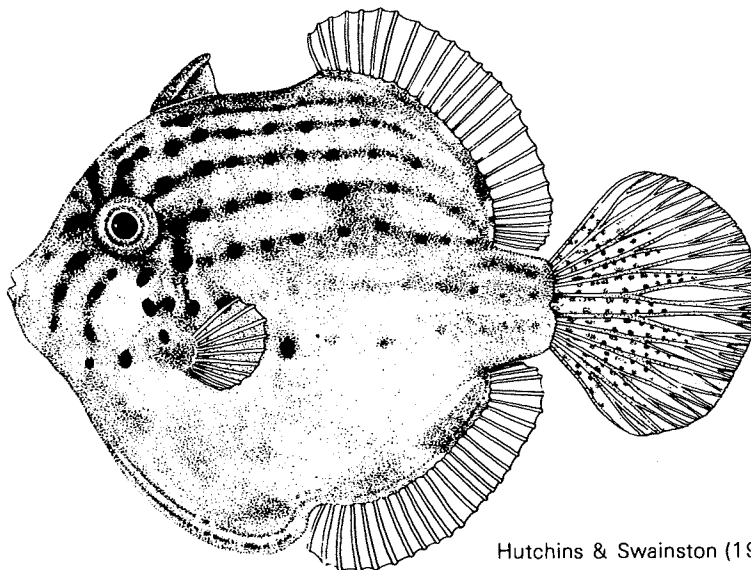
Colour variable, brown, green, grey, orange or red, often with longitudinal stripes or dark spots; fins translucent.

Size: To 10 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs in estuaries and on coastal reefs and offshore islands.

References: Whitley (1931c) as *B. fidens*; Scott et al. (1974) as *B. trossulus*; Hutchins (1977); Hutchins & Swainston (1985).



Black reef leatherjacket

Eubalichthys bucephalus (Whitley, 1931)

Family: Monacanthidae p 62

Other Common Names: Whitley's leatherjacket.

Description: Bony ventral fin rudiment minute and located about 0.5 to 1 eye diameter *anterior* to rear end of pelvis; first dorsal spine only *partly* received into groove when depressed; no enlarged spines on caudal peduncle; anterior rays of dorsal and anal fins not elevated; caudal fin *short*, shorter than head; anal fin base shorter than soft dorsal fin base; lateral line prominent.

D II+36; A 36; P 14.

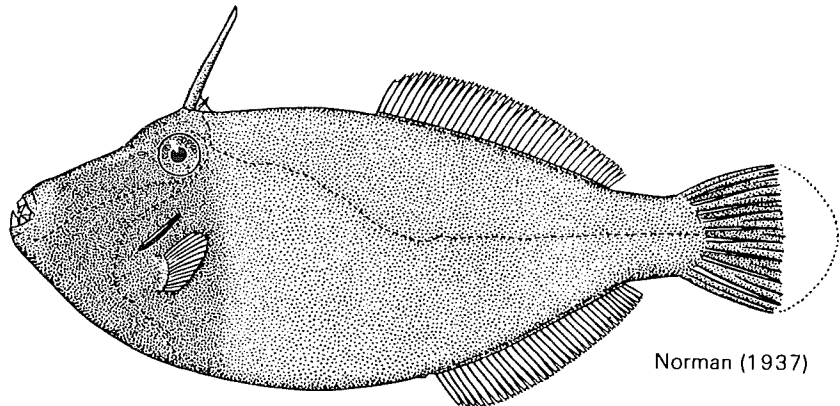
Adults brown to black, or brownish grey, sometimes with 3 to 4 longitudinal, black stripes; *eye margin white*. Juveniles pale brown with dark brown spots on head and body.

Size: To 50 cm.

Distribution: N.S.W., Vic., S.A. and southern W.A.

Habitat and Depth: Occurs on the continental shelf to a depth of about 250 m.

References: Hutchins (1977, 1980).



Mosaic leatherjacket

Eubalichthys mosaicus (Ramsay & Ogilby, 1886)

Family: Monacanthidae p 62

Other Common Names: Deep-bodied leatherjacket.

Description: Bony ventral fin rudiment minute, located about 1 eye diameter *anterior* to rear end of pelvis; first dorsal spine only *partly* received into groove when depressed; no enlarged spines on caudal peduncle; anterior rays of dorsal and anal fins prominently elevated in males; caudal fin *short*, less than or equal to head length; anal fin shorter than soft dorsal fin base.

D II+35-36; A 32-34; P 13.

Adults bright blue to bluish grey with rows of yellow-brown blotches or stripes; fins blue-green. Juveniles yellow-orange to brown with wavy, blue lines and dark brown blotches.

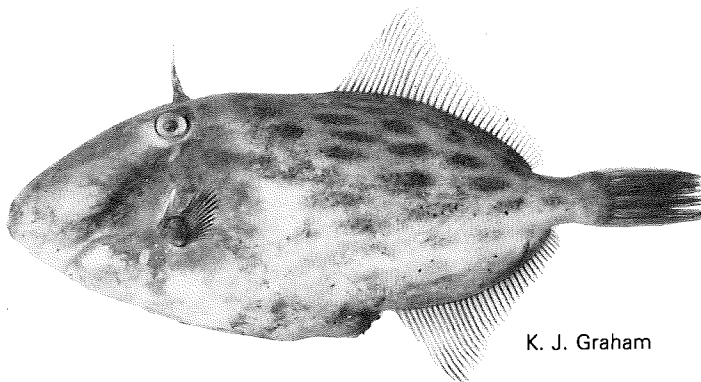
Size: To 60 cm.

Distribution: (Qld), N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Adults occur on deep offshore reefs to a depth of about 140 m; juveniles occur in estuaries and on coastal reefs.

Note: Females and juveniles have deeper bodies than males. Gunn's leatherjacket (*E. gunnii*) is also found off Vic., Tas. and S.A. It may be distinguished by the following characters: long gill slit, length of slit much longer than eye diameter (equal to or only slightly longer in *E. mosaicus*); males dull brown to greyish black sometimes with green tinge, those in S.A. waters with bright blue band on caudal fin; females and juveniles light to dark brown with network pattern of white lines on sides.

References: Waite (1899) as *Monacanthus mosaicus*; Scott et al. (1974) as *Weerutta ovalis* and *E. mosaicus*; Hutchins (1977, 1980).



K. J. Graham

Four-spined leatherjacket

Eubalichthys quadrispinis Hutchins, 1977

Family: Monacanthidae p 62

Description: Bony ventral fin rudiment *minute*, located about 1 eye diameter *anterior* to rear end of pelvis; first dorsal spine *not* received into groove when depressed; *2 pairs of small spines* on each side of caudal peduncle; anterior rays of dorsal and anal fins not elevated; caudal fin long (in fish to 30 cm), much longer than head; anal fin base longer than soft dorsal fin base.

D II+32; A 33; P 13-14.

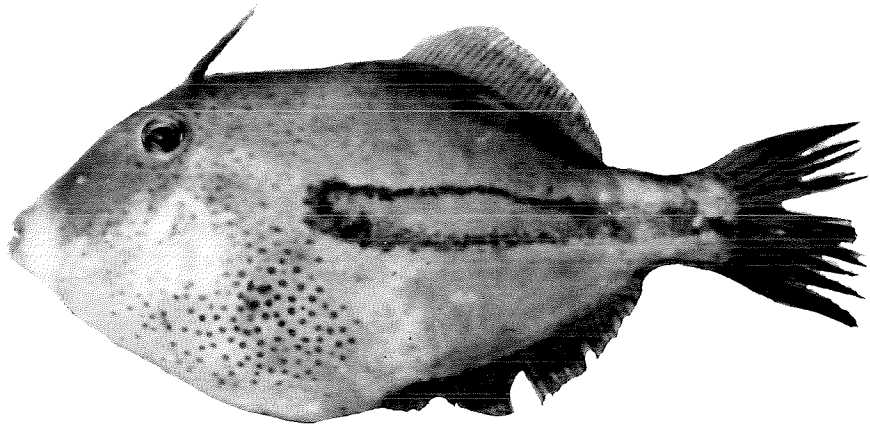
Body sandy with dark brown spots anteriorly, most prominent on belly; adults with dark brown band along middle of sides; fins yellowish grey.

Size: To 40 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Occurs on the continental shelf to a depth of 165 m.

References: Hutchins (1977).



M. Dunning

Brown-striped leatherjacket

Meuschenia australis (Donovan, 1824)

Family: Monacanthidae p 62

Other Common Names: Southern leatherjacket.

Description: Bony ventral fin rudiment small, immovable and located at *tip* of pelvis; first dorsal spine only *partly* received into groove when depressed; no enlarged spines on caudal peduncle; gill slit slightly longer than eye diameter in adults; anterior rays of soft dorsal and anal fins not elevated.

D II+34-37; A 32-36; P 12-15.

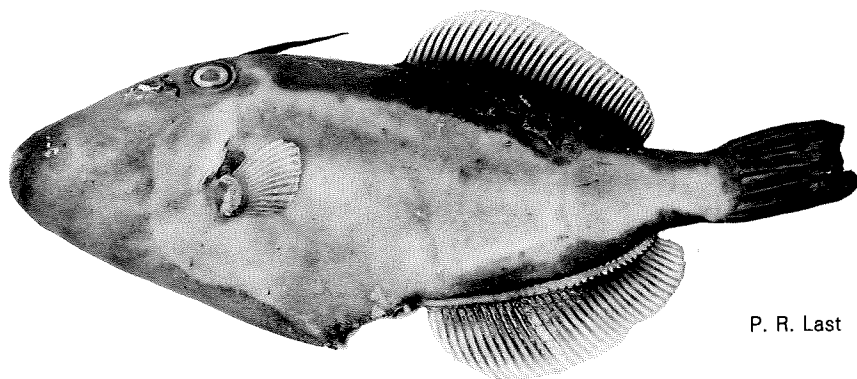
Males brownish body, yellowish brown head; lower snout, chin, belly, base of pectoral and anal fins blue to purple; thin, blue or pale line beneath soft dorsal fin; caudal fin blue with broad, black margin; dorsal, anal and pectoral fins green. *Females and juveniles* pale with 4 to 5 dark, longitudinal bars; head and belly covered with brown spots and usually with 2 to 3 dark bars on chin; all fins greenish and rear margin of caudal fin dusky.

Size: To 30 cm.

Distribution: Vic., Tas. and S.A.

Habitat and Depth: Occurs on rocky reefs to a depth of about 100 m.

References: Hutchins (1977).



P. R. Last

Yellow-striped leatherjacket

Meuschenia flavolineata Hutchins, 1977

Family: Monacanthidae p 62

Description: Bony ventral fin rudiment small, immovable and located at *tip* of pelvis; first dorsal spine only *partly* received into groove when depressed; *1 to 4 spines* (usually 2 pairs) on caudal peduncle, large and curved forward in adult males, minute in females and juveniles; adult males with dense patch of small bristles anterior to peduncle spines; anterior rays of dorsal and anal fins not elevated.

D II+33-37; A 31-35; P 11-12.

Head and body greenish brown to blackish brown with *yellowish patch* on caudal peduncle extending along middle of sides; dorsal and anal fins yellowish brown; caudal fin black in *males*, black with large, yellow blotch in *females*. *Juveniles* (less than 10 cm SL) pale brownish green with irregular, pale blotches.

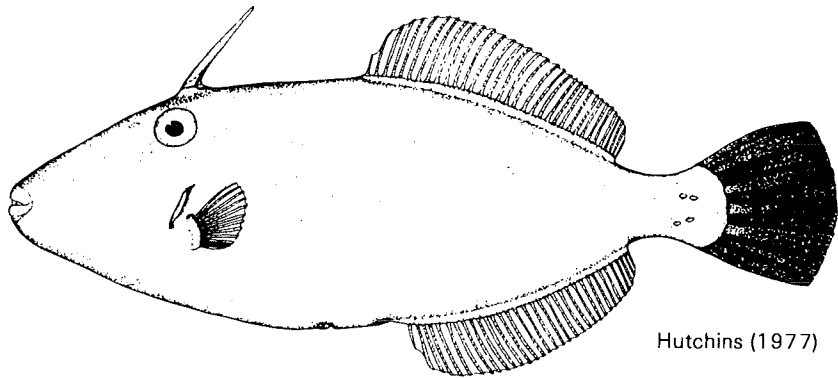
Size: To 30 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs on rocky reefs to a depth of about 50m.

Note: A similar species, *Cantheschenia longipinnis*, occurs off N.S.W. and W.A. Both *C. longipinnis* and *M. flavolineata* have a concave snout (except in adult males) and the first dorsal spine originating over the centre or anterior half of the eye. However *C. longipinnis* has much smoother skin than *M. flavolineata* and is dull brown usually with indistinct brown spots on sides.

References: Hutchins (1977).



Six-spined leatherjacket

Meuschenia freycineti (Quoy & Gaimard, 1824)

Family: Monacanthidae p 62

Other Common Names: Variable leatherjacket.

Description: Bony ventral fin rudiment small, immovable and located at *tip* of pelvis; first dorsal spine only *partly* received into groove when depressed; *1 to 8 spines* (mostly 3 pairs) on caudal peduncle, large and curved forwards in males, small in juveniles and females; anterior rays of soft dorsal and anal fins not elevated.

D II+33-38; A 33-36; P 11-14.

Males blue to greyish brown; *females and juveniles* yellow, green or greyish brown with 3 to 5 broad, dark, longitudinal stripes; series of thin, blue lines on head, along back and above anal fin; often large yellow-orange blotch behind pectoral fins in *males*; soft dorsal and anal fins yellow; caudal fin pale, sometimes with dark blotch near base and black crescent-shaped subterminal bar.

Size: To 60 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Adults occur on the continental shelf to 100 m; juveniles occur in estuaries and shallow bays.

Note: The yellow-finned leatherjacket (*M. trachylepis*) also occurs off N.S.W. and the juveniles and females are similar to those of *M. freycineti*, however the former has only 2 pairs of spines on the caudal peduncle.

References: Hutchins (1977).



K. J. Graham

Blue-lined leatherjacket

Meuschenia galii (Waite, 1905)

Family: Monacanthidae p 62

Other Common Names: Gal's leatherjacket.

Description: Bony ventral fin rudiment small, immovable and located at *tip* of pelvis; first dorsal spine only *partly* received into groove when depressed; no enlarged spines on caudal peduncle; gill slit longer than eye diameter in adults; anterior rays of soft dorsal and anal fins not elevated.

D II+32; A 32; P 11.

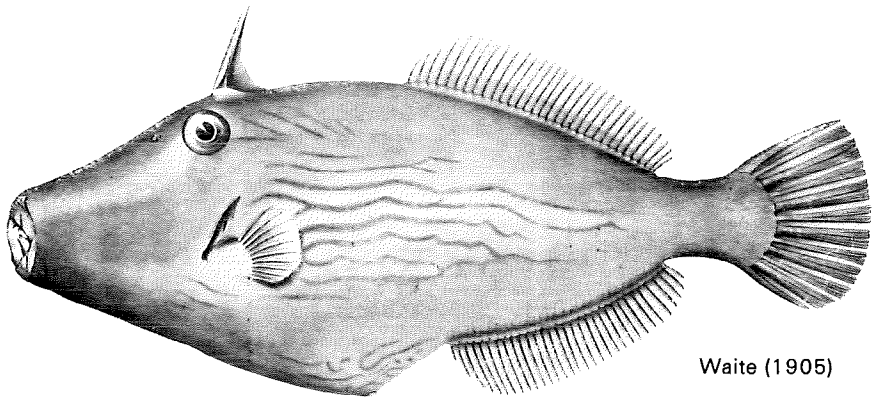
Body and head dark green to brown; yellow, blue or white, longitudinal lines and blotches on sides, oblique lines on head; caudal fin yellow to orange with short, blue bar on upper and lower corners.

Size: To 35 cm.

Distribution: Vic., S.A. and southern W.A.

Habitat and Depth: Occurs on offshore reefs to a depth of at least 40 m.

References: Waite (1905) as *Pseudomonacanthus galii*; Hutchins (1977, 1979).



Horse-shoe leatherjacket

Meuschenia hippocrepis (Quoy & Gaimard, 1824)

Family: Monacanthidae p 62

Description: Bony ventral fin rudiment small, spiny, *immovable* and located at *tip* of pelvis; first dorsal spine only *partly* received into groove when depressed; *3 to 4 spines* (usually 2 pairs) on caudal peduncle, large and curved forwards in males, small in females and juveniles; anterior rays of soft dorsal and anal fins not elevated. D II+34-36; A 32-33; P 13.

Males olive green with small, blue spots above, greyish green or blue below; bright blue line along back and several along ventral surface; centre of sides yellow with black *horse-shoe* marking outside of green to blue-edged, dark blotch; wide, dark blue to brown bar on cheek and blue and yellow bars on throat; gill slit white; caudal fin greenish with black crescent-shaped subterminal bar, pale margin and dark blotch near base. *Females and juveniles* similar to males but lacking dark bar on cheek.

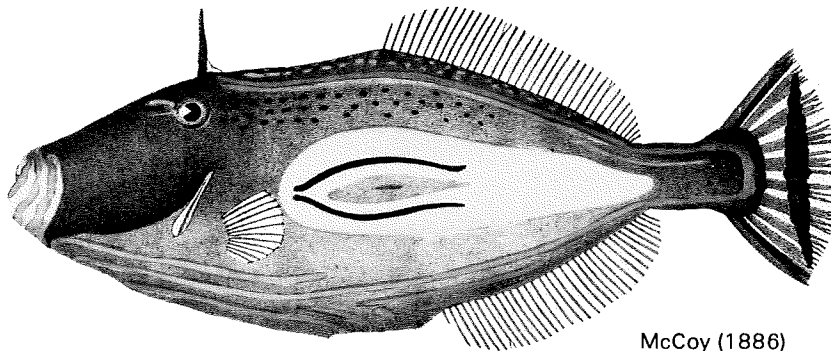
Size: To 51 cm.

Distribution: Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs on offshore reefs to a depth of about 120 m.

Note: The horse-shoe marking is diagnostic for this species.

References: McCoy (1886b) as *Monacanthus hippocrepis*; Hutchins (1977).



Fan-bellied leatherjacket

Monacanthus chinensis (Osbeck, 1765)

Family: Monacanthidae p 62

Other Common Names: Centre-board leatherjacket.

Description: Bony ventral fin rudiment long, *movable* and located at *tip* of pelvis; first dorsal spine rounded in front and flattened behind with strong barbs on each edge, *not* received into groove when depressed; *♂* spines on caudal peduncle, large and curved backwards in adult males, small in females and juveniles; *belly with large, extendible ventral flap*, its posterior border expanded beyond ventral fin rudiment; central pair of teeth in both jaws pointed; anterior rays of soft dorsal fin prominently elevated, those of anal fin slightly elevated; upper lobe of caudal fin produced to form filament in adult males.

D II+32-34; A 32-34; P 13.

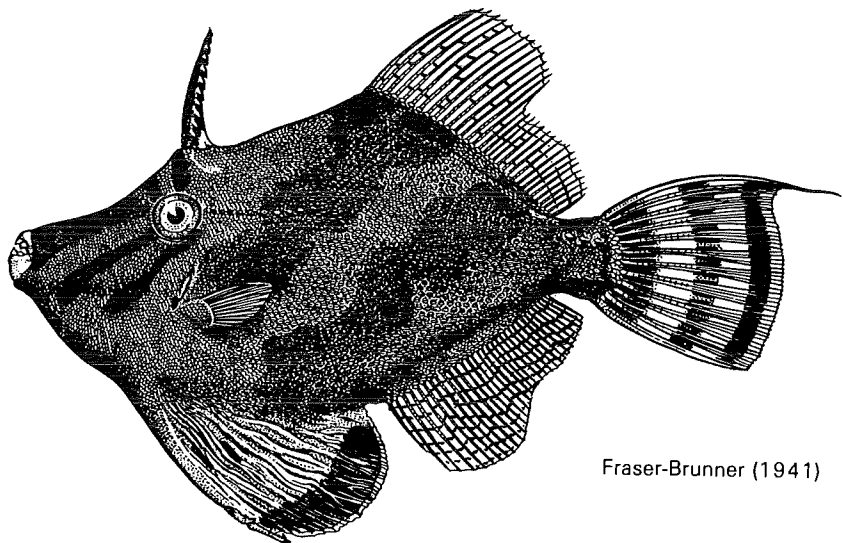
Body brownish green with irregular, dark blotches; head and ventral flap olive-green with several small, blue spots; caudal fin with 3 dark, vertical bars and narrow, blue lines along margin.

Size: To 22 cm.

Distribution: (Qld), N.S.W. and W.A.

Habitat and Depth: Occurs in estuaries and on coastal and offshore reefs.

References: Fraser-Brunner (1941a) as *M. macrolepis*; Marshall (1964); Hutchins (1977).



Chinaman-leatherjacket

Nelusetta ayraudi (Quoy & Gaimard, 1824)

Family: Monacanthidae p 62

Description: Bony ventral fin rudiment small, *immovable* and located at *tip* of pelvis; first dorsal spine inserted just behind posterior border of eye (in adults), flattened front and back and only *partly* received into groove when depressed; no enlarged spines on caudal peduncle; anterior rays of soft dorsal and anal fins prominently *elevated*; head length much greater than body depth.

D II+31-32; A 31-33; P 13.

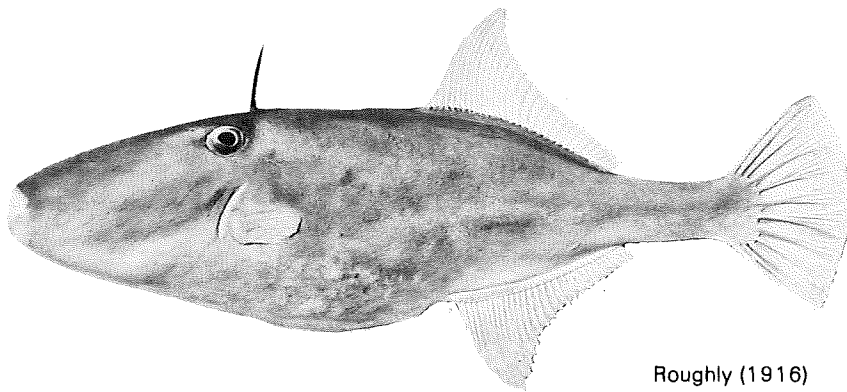
Males greenish grey; caudal fin yellowish grey, other fins bright yellow.
Females and juveniles yellowish grey; occasionally with 4 longitudinal stripes from head to tail; fins as in male but paler.

Size: To 100 cm.

Distribution: (Qld), N.S.W., Vic., S.A. and W.A.

Habitat and Depth: Adults occur on the continental shelf and slope in depths to 360 m; juveniles school seasonally in inshore waters.

References: Hutchins (1977); Hutchins and Thompson (1983).



Roughly (1916)

Velvet leatherjacket

Parika scaber (Forster, 1801)

Family: Monacanthidae p 62

Other Common Names: Scaber leatherjacket, cosmopolitan leatherjacket.

Description: Bony ventral fin rudiment of moderate size, *immovable* and located at *tip* of pelvis; first dorsal spine inserted over eye and only *partly* received into groove when depressed; no enlarged spines on caudal peduncle; gill slit equal to or smaller than eye diameter in adults; soft dorsal and anal fins usually elevated *only* in adult males; head length equal to or less than body depth.

D II+33-35; A 31-36; P 12.

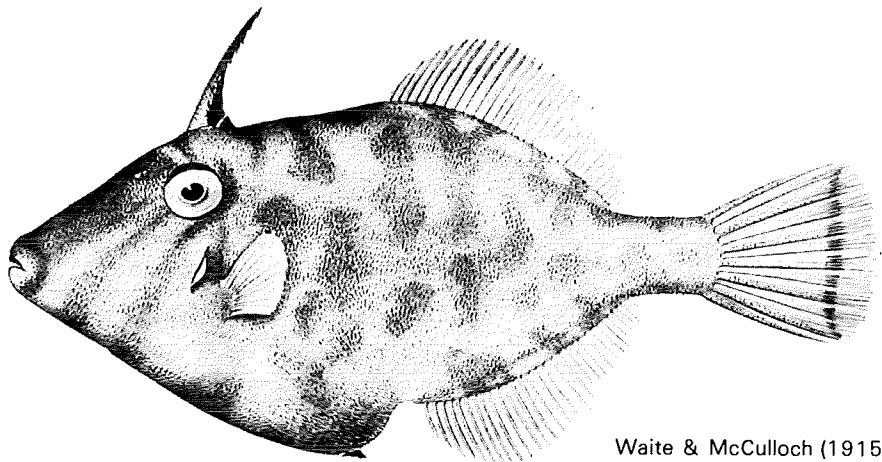
Body and head pale brownish grey to sandy, often with dark blotches on sides; *sometimes* 3 to 4 dark bars radiating from eye across throat; dorsal and anal fins yellowish; caudal fin pale with thin, black, subterminal bar prominent in males.

Size: To 31 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs on the continental shelf in depths from about 20 to 200 m.

References: Waite (1899) as *Monacanthus setosus*; Scott et al. (1974) as *Navodon australis*; Hutchins (1977).



Toothbrush leatherjacket

Penicipelta vittiger (Castelnau, 1873)

Family: Monacanthidae p 62

Other Common Names: Brown leatherjacket.

Description: Bony ventral fin rudiment small, *immovable* and located at *tip* of pelvis; first dorsal spine square in cross-section, each corner armed with prominent barbs and *wholly* received into deep groove when depressed; no enlarged spines on caudal peduncle; males with prominent, long patch of bristles on sides between soft dorsal and anal fins; central pair of teeth in upper jaw *truncate*, middle one of each side usually pointed; 31 to 35 rays in soft dorsal and 30 to 34 rays in anal, both fins slightly elevated anteriorly.

D II+31-35; A 30-34; P 13.

Males brownish yellow above, with blue lines and spots; head and belly purple to pink with reticulating, blue lines; long, white or blue patch behind eye, another beneath pectoral fins; bristles red to black; caudal fin olive or pink with dark, subterminal, vertical bar, other fins olive to orange. *Females and juveniles* usually pale brown with creamy blotches, though sometimes varying from grey to orange; fins orange, pink or translucent.

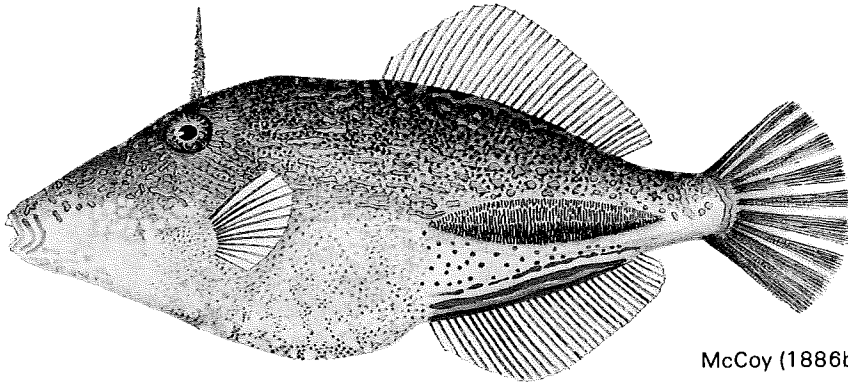
Size: To 35 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs in seagrass beds and on rocky reefs to a depth of about 40 m.

Note: The female of this species is similar to that of the rough leatherjacket (*Scobinichthys granulatus*).

References: McCoy (1886b) as *Monacanthus browni*; Scott et al. (1974) as *Acanthaluteres guntheri*; Hutchins (1977).



McCoy (1886b)

Rough leatherjacket

Scobinichthys granulatus (Shaw, 1790)

Family: Monacanthidae p 62

Description: Bony ventral fin rudiment spiny, *immovable* and located at *tip* of pelvis; first dorsal spine rounded in front and flattened behind with small barbs on each edge, *not* received into groove when depressed; no enlarged spines on caudal peduncle; belly extended ventrally but posterior margin not expanded beyond ventral fin rudiment; central pair of teeth in upper jaw abruptly rounded; 28 to 31 rays in soft dorsal and 26 to 29 rays in anal, fins not elevated anteriorly; scales on sides of body each with 1 strong spine, capped by flat, fleshy papilla.

D II+28-31; A 26-29; P 12.

Body brown with darker blotches and spots, sometimes with small, blue spots and lines along back, on belly and above anal fin.

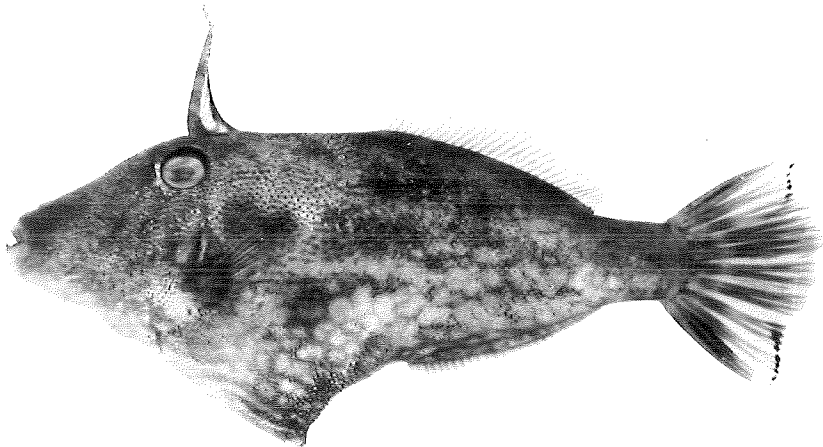
Size: To 30 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs in seagrass beds and on rocky reefs.

Note: Female rough leatherjackets may be confused with female toothbrush leatherjackets (*Penicipelta vittiger*).

References: Scott et al. (1974); Hutchins (1977).



K. J. Graham

Degen's leatherjacket

Thamnaconus degeni (Regan, 1903)

Family: Monacanthidae p 62

Other Common Names: Blue-finned leatherjacket.

Description: Bony ventral fin rudiment small, immovable and located at *tip* of pelvis; first dorsal spine inserted over eye and only *partly* received into groove when depressed; no enlarged spines on caudal peduncle; gill slit equal to or less than eye diameter in adults; anterior rays of soft dorsal and anal fins prominently elevated; head length equal to or less than body depth.

D II+34-36; A 33-35; P 12-14.

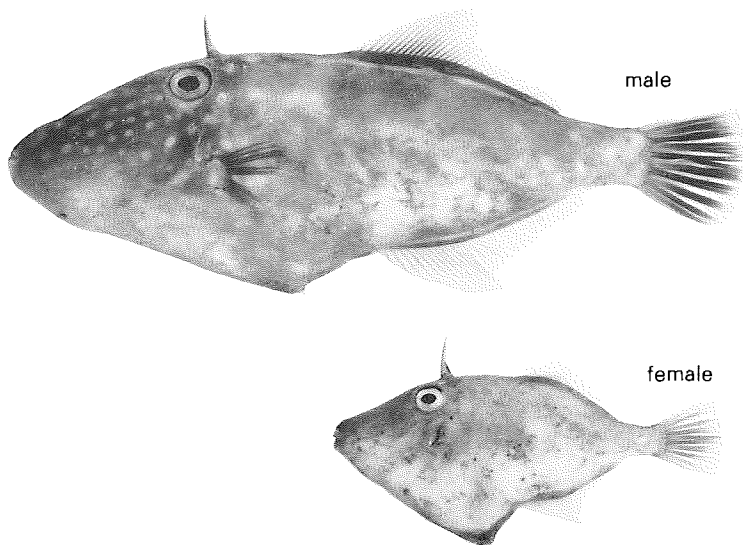
Males light blue to grey with several large, blue spots on snout, along back and on caudal peduncle; fins blue-green. *Females and juveniles* light brown to pale grey; fins blue, orange or translucent.

Size: To at least 28 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Occurs on the continental shelf to a depth of about 70 m.

References: Regan (1903b) as *Pseudomonacanthus degeni*; Hutchins (1977); Last et al. (1983).



male

female

K. J. Graham

Western smooth boxfish

Anoplocapros amygdaloides Fraser-Brunner, 1941

Family: Ostraciidae p 62

Description: Carapace with 2 prominent ridges (i.e. dorsal and ventral ridges), dorsal ridge elevated; caudal peduncle with 1 to several distinct bony plates just behind dorsal and anal fins and *completely* encircled by ring of bony plates adjacent to base of caudal fin; dorsal profile before eyes straight; carpace without stout spines (although tubercles sometimes present).

D 10; A 9-10; P 12; C 11.

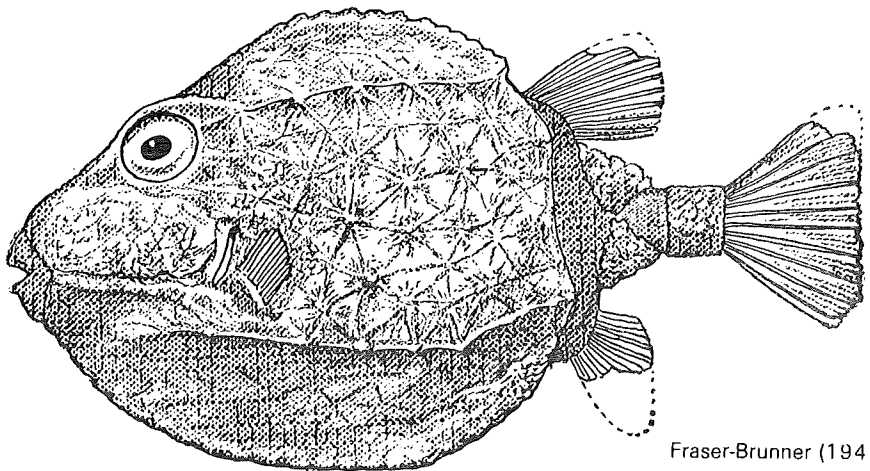
Males pale blue with small, black spots and reticulations above, bone-white below; fins blue. *Females* yellowish white with brownish areas and large, dark spots above, bone-white below; fins plain.

Size: To 30 cm.

Distribution: S.A. and south-west W.A.

Habitat and Depth: Occurs on the continental shelf in depths from 5 to 100 m.

References: Fraser-Brunner (1941b); Fujii & Uyeno (1979) genus only; R. H. Kuiter pers. comm (1984).



Eastern smooth boxfish

Anoplocapros inermis (Fraser-Brunner, 1935)

Family: Ostraciidae p 62

Other Common Names: Polled boxfish, robust boxfish.

Description: Carapace with 2 prominent ridges (i.e. dorsal and ventral ridges), dorsal ridge only slightly elevated; caudal peduncle with 1 to several distinct bony plates just behind dorsal and anal fins and *incompletely* encircled by 2 bony plates adjacent to base of caudal fin; dorsal profile before eyes convex to straight; carapace without stout spines.

D 10-11; A 10-11; P 12; C 11.

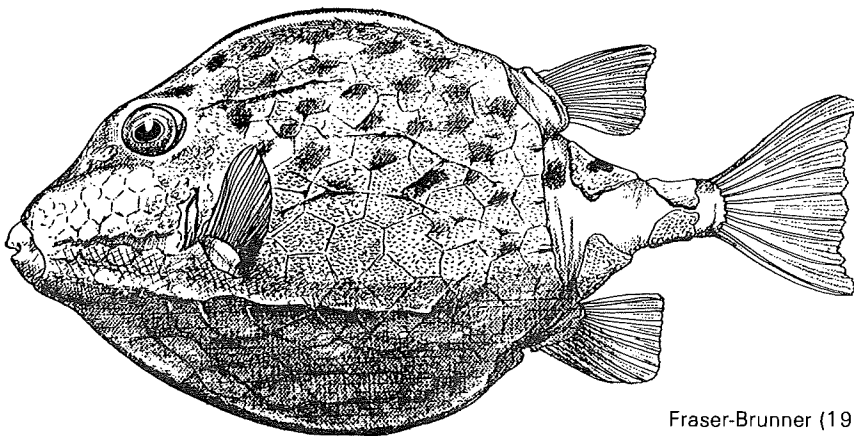
Males pale blue above, yellowish below; fins plain. *Females* yellowish to white or brown with large, dark yellow to brown spots; fins plain.

Size: To about 37 cm.

Distribution: (Southern Qld), N.S.W. and Vic.

Habitat and Depth: Occurs on the continental shelf in depths from 10 to 300 m.

References: Fraser-Brunner (1935) as *Strophiurichthys inermis*; Fraser-Brunner (1941b) as *S. robustus*; Fujii & Uyeno (1979) genus only; R. H. Kuiter pers. comm. (1984).



Fraser-Brunner (1941)

White-barred boxfish

Anoplocapros lenticularis (Richardson, 1841)

Family: Ostraciidae p 62

Other Common Names: High-backed boxfish, smooth boxfish.

Description: Carapace with 2 prominent ridges (i.e. dorsal and ventral ridges), dorsal ridge strongly elevated; caudal peduncle with several distinct bony plates just behind dorsal and anal fins and *completely* encircled by ring of bony plates adjacent to base of caudal fin; dorsal profile before eyes concave; carapace without stout spines (although tubercles sometimes present).

D 9-11; A 10-11; P 11-12; C 10-11.

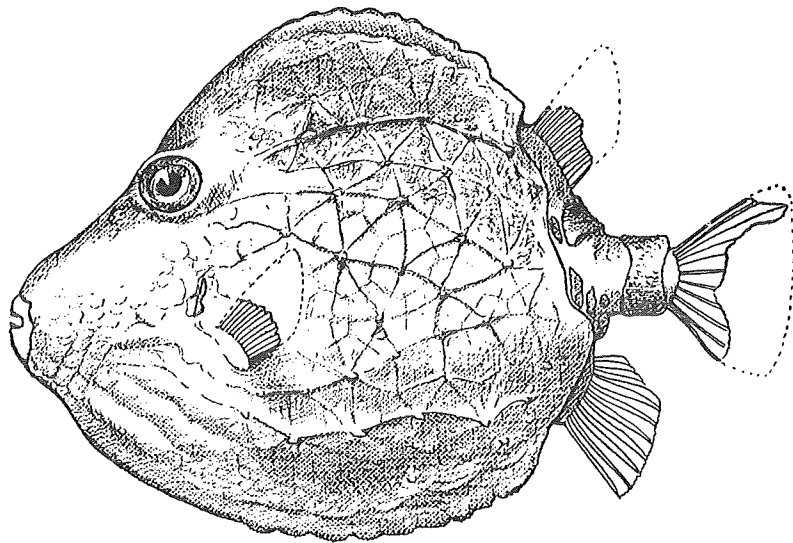
Head and body yellowish to red with characteristic, white bars and sometimes with irregular, blackish lines.

Size: To about 33 cm.

Distribution: Western S.A. and southern W.A.

Habitat and Depth: Occurs on the continental shelf in depths from 10 to 220 m.

References: McCulloch & Waite (1915) as *A. gibbosus*; Fujii & Uyeno (1979) genus only; D. P. Clarke pers. comm. (1983).



Fraser-Brunner (1941)

Shaw's cowfish

Aracana aurita (Shaw, 1798)

Family: Ostraciidae p 62

Other Common Names: Striped cowfish.

Description: Carapace with 5 ridges (i.e. 2 lateral, 2 pelvic and 1 ventral ridge); caudal peduncle with 2 large, bony plates just behind dorsal and anal fins and completely or almost completely encircled by bony ring adjacent to base of caudal fin; dorsal profile before eyes straight to concave; lateral ridge with 3 stout spines, spine above eye directed backwards; caudal fin rounded.

D 10-11; A 10-11; P 11-12; C 11-12.

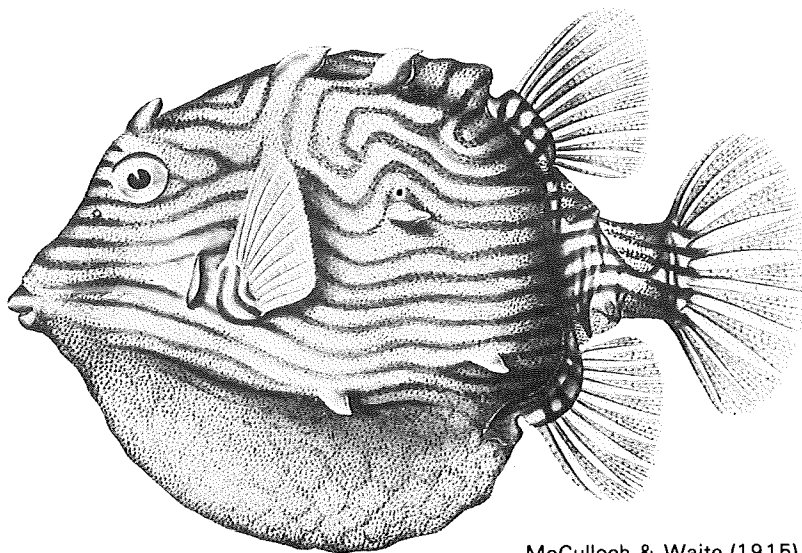
Males bright blue with yellow, longitudinal lines above and on sides; belly with yellow and orange spots; caudal fin bright yellow with about 5 blue loops. *Females* whitish with olive-green to black, longitudinal lines above and on sides; belly red with olive-green to black spots; caudal fin yellow to translucent.

Size: To about 20 cm.

Distribution: N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs on the continental shelf in depths from 10 to about 200 m.

References: Scott et al. (1974); Fujii & Uyeno (1979) genus only; D. P. Clarke pers. comm. (1983).



McCulloch & Waite (1915)

Ornate cowfish

Aracana ornata (Gray, 1838)

Family: Ostraciidae p 62

Description: Carapace with 5 ridges (i.e. 2 lateral, 2 pelvic and 1 ventral ridge); caudal peduncle with several small, bony plates behind dorsal and anal fins; dorsal profile before eyes convex and distinctly humped in males; lateral ridge with 3 stout spines, spine above eye directed upwards or slightly forward; caudal fin truncate.

D 10-11; A 10; P 10; C 11.

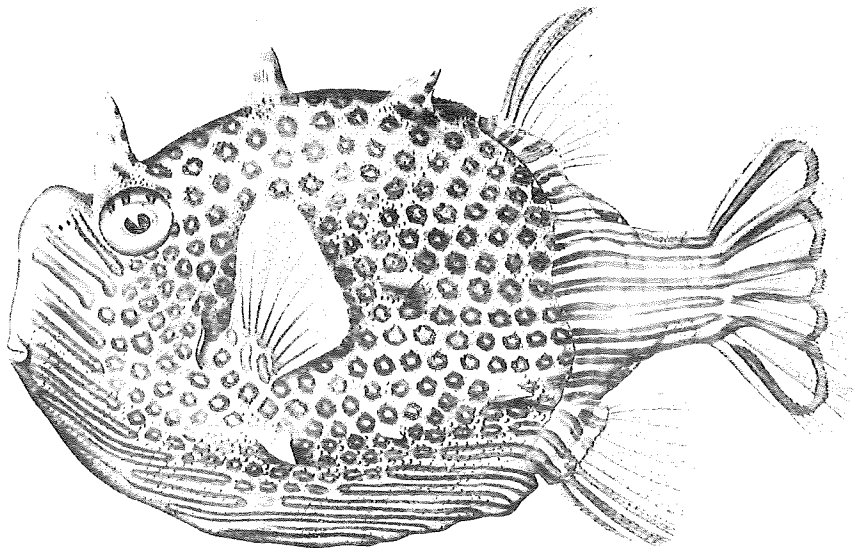
Males yellow with dark-edged, blue spots above and on sides of body; bright blue, diagonal lines on snout; bright blue, longitudinal lines on belly and caudal peduncle; caudal fin orange to yellow with about 5 blue loops. *Females* white or yellow with brownish, longitudinal lines above and on sides; belly orange; caudal fin yellow to translucent.

Size: To at least 15 cm.

Distribution: Western Vic., Tas., S.A. and southern W.A.

Habitat and Depth: A shallow water species recorded in depths from 5 to 60 m; more commonly in depths less than 20 m.

References: Scott et al. (1974); Fujii & Uyeno (1979) genus only; Last et al. (1983).



McCulloch & Waite (1915)

Rigid boxfish

Caprichthys gymnura McCulloch & Waite, 1915

Family: Ostraciidae p 62

Other Common Names: Ornate pigmy boxfish.

Description: Carapace with 6 prominent ridges (i.e. 1 dorsal, 2 lateral, 2 pelvic and 1 ventral ridge), dorsal and ventral ridges forming keels; caudal peduncle sometimes with several small, bony plates, not forming ring; lateral and pelvic ridges each with 1 large, broad, flat spine posteriorly; 1 small, flattened spine usually present above eye. D 12-13; A 12; P 11-12; C 10-11.

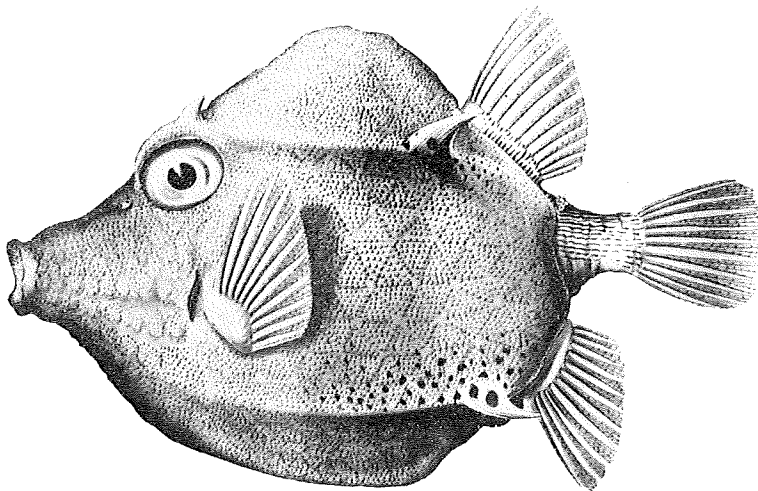
Males yellowish fawn; upper surface and fin bases with numerous black reticulations; lower surface with numerous black spots and reticulations; fins yellow. *Females* yellowish fawn; black spots and reticulations on caudal peduncle and bases of dorsal, anal and pectoral fins; lateral and pelvic ridge spines surrounded by black spots.

Size: To about 11 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Occurs on the continental shelf in depths from 40 to 200 m.

References: McCulloch & Waite (1915); Fujii & Uyeno (1979) genus only; D. P. Clarke pers. comm. (1983).



McCulloch & Waite (1915)

Spiny boxfish

Capropygia unistriata (Kaup, 1855)

Family: Ostraciidae p 62

Other Common Names: Black-banded pigmy boxfish.

Description: Carapace with 6 prominent ridges (i.e. 1 dorsal, 2 lateral, 2 pelvic and 1 ventral ridge), dorsal and ventral ridges forming keels; caudal peduncle with several distinct, bony plates just behind dorsal and anal fins and completely encircled by ring of bony plates adjacent to base of caudal fin; lateral and pelvic ridges each with 1 large, broad, flat spine posteriorly; no small, flattened spine above eye.

D 12-14; A 12-13; P 11-12; C 10-11.

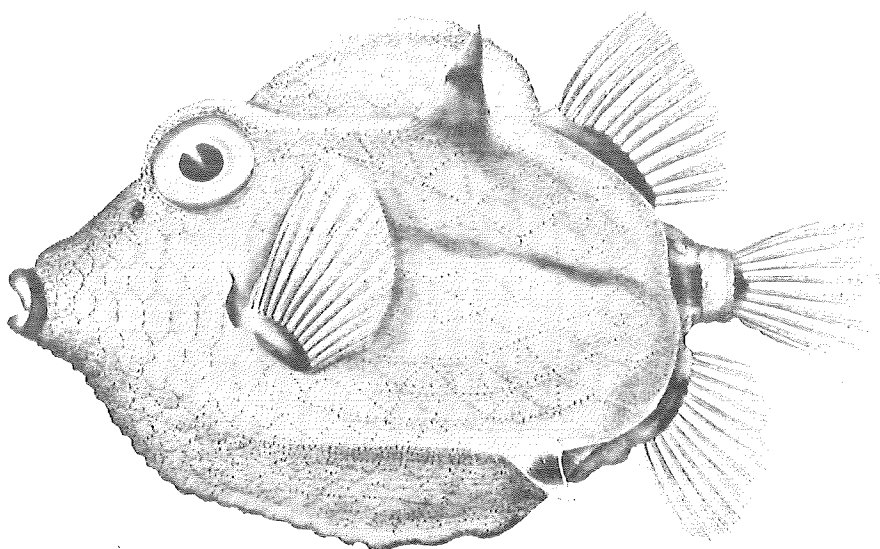
Body bright yellow above, creamy yellow below, sometimes with black, longitudinal line along middle of sides; fins bright yellow with black blotches or bands surrounding bases; lateral and pelvic ridge spines each with 1 large, black blotch.

Size: To about 12 cm.

Distribution: S.A. and southern W.A.

Habitat and Depth: Occurs on the continental shelf in depths from 60 to 200 m.

References: McCulloch & Waite (1915); Fujii & Uyeno (1979) genus only; D. P. Clarke pers. comm. (1983).



Waite (1921)

Starry toadfish

Arothron firmamentum (Temminck & Schlegel, 1850)

Family: Tetraodontidae p 62

Other Common Names: Starry toado.

Description: Eye completely adnate (i.e. no skinfold between eye and orbit); nasal organ consisting of flattened tube divided nearly to base with 1 obscured opening; small spines covering most of body and head, spines sometimes hidden by papillae; no skinfold on ventro-lateral surface of body; dorsal and anal fins bluntly pointed, caudal and pectoral fins truncate.

D 13-15; A 13-15; P 15-17; C 11.

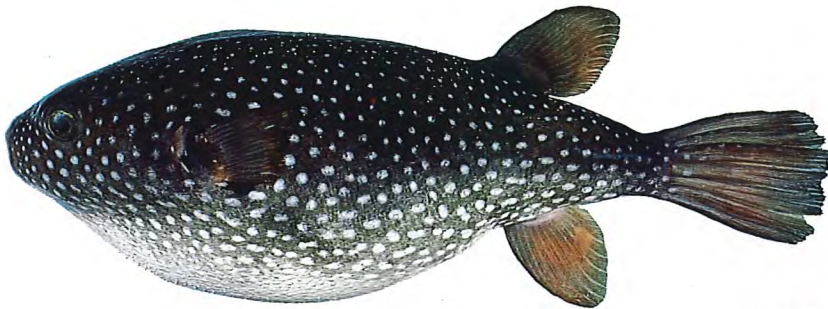
Body and head dark blue to purple-brown with silvery spots above, white to silvery below; spots slightly larger and more elongate on sides of body; papillae on spines enamel-white.

Size: To 34 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: Pelagic, over the continental shelf and slope in depths from 10 to 180 m.

References: Hardy (1980, 1983c).



T. Carter

Prickly toadfish

Contusus richiei (Fréminville, 1813)

Family: Tetraodontidae p 62

Other Common Names: Barred toadfish, toado.

Description: Eye completely adnate (i.e. no skinfold between eye and orbit); nasal organ consisting of short, flattened tube with 2 well separated openings; small, close-set spines covering most of body; no skinfold on ventro-lateral surface of body; dorsal and anal fins bluntly pointed, caudal fin truncate, pectoral fins rounded.

D 9-11; A 8-10; P 14-17; C 11.

Body and head greenish grey above, white below; back and upper sides with distinct, black spots and blotches; top of head with black, irregular, transverse bars.

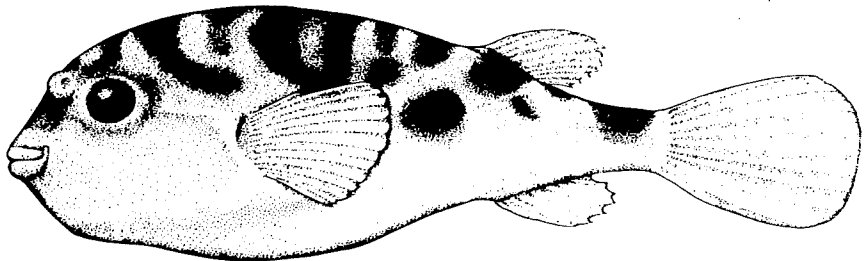
Size: To at least 25 cm.

Distribution: Vic., Tas. and S.A.

Habitat and Depth: Occurs in coastal waters in depths from 1 to 50 m.

Note: *C. brevicaudus*, a shallower water species occurs throughout the range of *C. richiei* and is also found in W.A. and N.S.W. It differs from *C. richiei* in having a shorter caudal peduncle (the dorsal and anal fins almost reaching the caudal fin base in *C. brevicaudus*, but ending well short of the caudal fin base in *C. richiei*) and lacking the dark, transverse bars on the head.

References: Hardy (1981a, 1983c).



Last et al. (1983)

Giant toadfish

Lagocephalus sceleratus (Gmelin, 1788)

Family: Tetraodontidae p 62

Other Common Names: Silver toadfish, North-West blowfish.

Description: Eye completely adnate (i.e. no skinfold between eye and orbit); nasal organ consisting of very short, flattened tube with 2 openings; small, well-spaced spines covering head and body *except sides*; prominent *skinfold* along ventro-lateral surface of body; dorsal and anal fins pointed, anterior rays more than twice as long as posterior; caudal fin distinctly *lunate*, pectoral fins truncate; body elongate, tapering to slender caudal peduncle.

D 12; A 11; P 17; C 11.

Body and head greyish green with well-spaced, black spots above, white below; broad silver band along middle of sides.

Size: To 76 cm.

Distribution: (Qld), N.S.W., S.A. and W.A.

Habitat and Depth: Demersal, occurring on offshore reefs.

Note: A related species, *L. lagocephalus*, has been recorded from Tas. It has spines on the belly but not on the back, 14 to 15 rays in the dorsal fin and 13 to 14 rays in the anal fin.

References: Whitley (1933) as *Pleuranacanthus scleratus*; Hardy (1981b, 1983c).



G. Leyland

Ringed toadfish

Omegophora armilla (Waite & McCulloch, 1915)

Family: Tetraodontidae p 62

Other Common Names: Ringed pufferfish.

Description: Eye completely adnate (i.e. no skinfold between eye and orbit); nasal organ consisting of 1 *leaf-shaped flap* without obvious openings; small spines (often concealed in pores) densely covering back, sides and belly; no skinfold on ventro-lateral surface of body; dorsal, anal and caudal fins rounded; pectoral fins *bilobed* (i.e. median rays shorter than those above or below).

D 11-13; A 9-11; P 20-23; C 11.

Body light brown, yellow or grey above, lighter below; thin, *black ring*, sometimes incomplete, encircling pectoral fin bases, area enclosed by ring brownish or grey; adult males with blue spots on head and flanks and thin, blue ring outside and encircling black ring around pectoral fins.

Size: To 25 cm.

Distribution: Southern N.S.W., Vic., Tas., S.A. and southern W.A.

Habitat and Depth: Occurs on the continental shelf to a depth of 146 m.

Note: A similar species, *O. cyanopunctata*, is found off S.A. and the south-west corner of W.A. It has iridescent blue spots on the cheeks and flanks but lacks the black ring encircling the pectoral fin bases, although adult males have a black blotch partly surrounded by a blue line.

References: Scott et al. (1974) as *Sphaeroides armilla*; Hardy & Hutchins (1981); Hardy (1983c).



J. G. H. Maxwell

Balloonfish

Sphoeroides pachygaster (Müller & Troschel, 1848)

Family: Tetraodontidae p 62

Description: Eye only dorsally adnate (i.e. narrow skinfold present between ventral rim of eye and orbit); nasal organ consisting of 1 short tube with 2 openings; body smooth, without spines, but with numerous longitudinal *wrinkles* on belly; no skinfold on ventro-lateral surface of body; dorsal and anal fins rounded, caudal fin rounded to truncate, pectoral fins *slightly* bilobed; belly often distended.

D 8-9; A 7-8; P 16; C 11.

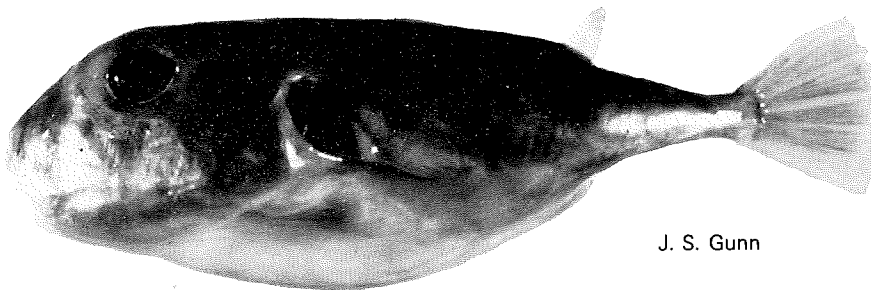
Body dark blue above with scattered, black diffuse patches, pale below.

Size: To at least 24 cm.

Distribution: N.S.W., Vic. and Tas.

Habitat and Depth: A deepwater species occurring on the continental shelf and slope in depths from 120 to 400 m.

References: Whitley (1928) as *Liosaccus aerobicus*; Hardy (1981b, 1983c).



J. S. Gunn

Weeping toado

Torquigener pleurogramma (Regan, 1903)

Family: Tetraodontidae p 62

Other Common Names: Common blowfish, striped toadfish, banded toadfish.

Description: Eye only dorsally adnate (i.e. narrow skinfold present between ventral rim of eye and orbit); nasal organ consisting of short, flattened tube with 2 widely separated openings; strong, close-set spines covering body from nasal organs to midway between pectoral and dorsal fins; prominent *skinfold* on ventro-lateral surface of body; dorsal and anal fins elongate and bluntly pointed, caudal fin truncate, pectoral fins rounded; large spines overlapping most of anterior margin of gill openings.

D 9-11; A 8-11; P 14-17; C 11.

Head and body light grey or greenish with irregular, dark and pale spots above, silvery to white below; dark, transverse bands on top of head and back; dark stripe with pale upper border along middle of sides; cheek with several thin, dark, "tear-like", vertical lines.

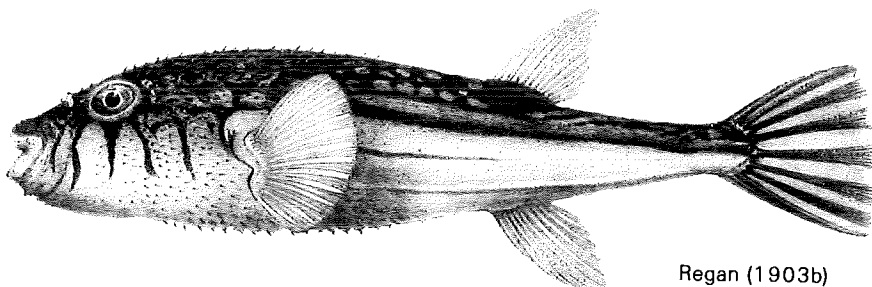
Size: To 21 cm.

Distribution: (Southern Qld), N.S.W., Vic., S.A. and W.A.

Habitat and Depth: A shallow water species occurring in estuaries and coastal waters to 30 m.

Note: Several other species of *Torquigener* occur off N.S.W. but only *T. andersonae* has been recorded in southern waters. In *T. andersonae* the anterior margins of the gill openings are almost devoid of spines and there are no "tear-like", vertical stripes on the cheek.

References: Hardy (1983c).



Deepwater burrfish

Allomycterus pilatus Whitley, 1931

Family: Diodontidae p 62

Other Common Names: Porcupine fish.

Description: Body spines short, blade-like and with 3 roots at base; spines *non-erectile* (not able to project upright); nasal organ consisting of two flat lobes; no spines on snout, but 1 spine directly behind nostril and 1 spine near rim above middle of eye.

D 16; A 16; P 20.

Back and upper parts of sides olive-grey, with large, black spots around bases of some spines, pale below; 1 yellow blotch between eyes and gill openings, black blotch behind pectoral fins and often olive-yellow blotch on middle of sides below origin of dorsal fin.

Size: To 50 cm.

Distribution: N.S.W., Vic., Tas. and S.A.

Habitat and Depth: A deepwater species occurring on the continental shelf in depths from 40 to 270 m.

Note: Deepwater burrfish, like other diodontids, are able to inflate their bodies by sucking in water or air and are easily tangled in nets.

References: McCulloch (1921b) as *A. jaculiferus*; Whitley (1931c); Last et al. (1983).



J. G. H. Maxwell

Globe fish

Diodon nichthemerus Cuvier, 1818

Family: Diodontidae p 62

Other Common Names: Slender-spined porcupine fish.

Description: Body spines long (longest spine on dorsal surface greater than height of gill slit), slender and with 2 roots; most spines *erectile*, those on head able to project well forward of upright; nasal organ consisting of short tentacle with pair of lateral openings or tentacle divided into 2; no spines on snout and broad spineless area around eye.

D 12-13; A 12-14; P 19-21.

Upper head and body greenish yellow, white to silvery below; 4 irregular, dark bands on sides; spines yellow, tips white to pink; fins yellowish green.

Size: To about 40 cm.

Distribution: N.S.W., Vic., Tas., S.A. and south-west W.A.

Habitat and Depth: A shallow water species occurring on the continental shelf in depths from 1 to 70 m.

Note: A subtropical species, *Dicotylichthys punctulatus*, sometimes occurs off N.S.W., Vic. and Tas. However, it has slightly shorter spines than the globe fish (longest spine on dorsal surface less than height of gill slit), erectile spines only on head and belly, non-erectile spines on back and sides and a belly covered with numerous black spots.

References: Leis (1978); Last et al. (1983).



J. G. H. Maxwell

REFERENCES

- Adam, H. and Strahan, R. (1963). Systematics and geographical distribution of myxinoids. In A. Brodal and R. Fange (Eds.) *The Biology of Myxine* (Universitetsforlaget: Oslo). 588 pp.
- Ahlstrom, E.H., Butler, J.L. and Sumida, B.Y. (1976). Pelagic stromateoid fishes (Pisces, Perciformes) of the Eastern Pacific: kinds, distributions, and early life histories and observations on five of these from the Northwest Atlantic. *Bulletin of Marine Science* **26**(3), 285-402.
- Allen, G.R. (1976). Descriptions of three new fishes from Western Australia. *Journal of the Royal Society of Western Australia* **59**(1), 24-30.
- Allen, G.R. and Heemstra, P.H. (1976). *Cheilodactylus rubrolabiatus*, a new species of morwong (Pisces: Cheilodactylidae) from Western Australia, with a key to the cheilodactylid fishes of Australia. *Records of the West Australian Museum* **4**, 311-25.
- Arai, T. and Iwamoto, T. (1979). A new species of the macrourid fish genus *Coelorinchus* from off Tasmania, New Zealand, and the Falkland Islands. *Japanese Journal of Ichthyology* **26**, 238-246.
- Arai, T. and McMillan, P.J. (1982). A new macrourid fish, *Coelorinchus biclinozonalis* from New Zealand and redescription of *C. australis* from Australia. *Japanese Journal of Ichthyology* **29**(2), 115-126.
- Au, K.C. (1979). Systematic study on the barracudas (Pisces: Sphyraenidae) from a northern sector of the South China Sea. *Journal of Natural History* **13**, 619-647.
- Badcock, J. (1982). A new species of the deep-sea fish genus *Cyclothone* Goode & Bean (Stomiatoidei, Gonostomatidae) from the tropical Atlantic. *Journal of Fish Biology* **20**, 197-211.
- Badcock, J. and Baird, R.C. (1980). Remarks on systematics, development and distribution of the hatchetfish genus *Sternoptyx* (Pisces, Stomiatoidei). *Fishery Bulletin* **77**(4), 803-820.
- Baird, R.C. (1971). The systematics, distribution and zoogeography of the marine hatchet fishes (family Sternoptychidae). *Bulletin of the Museum of Comparative Zoology Harvard University*. **142**(1), 128 pp.
- Bannikov, A.F. (1981). Systematics and origin of the family Scombridae. *Journal of Ichthyology*. **21**(2), 1-9.
- Bass, A.J. (1979). Records of little-known sharks from Australian waters. *Proceedings of the Linnean Society of N.S.W.* **103**(4), 247-254.

- Bass, A.J., D'Aubrey, J.D. and Kistnasamy, N. (1973). Sharks of the east coast of southern Africa. I. The genus *Carcharhinus* (Carcharhinidae). *Oceanographic Research Institute (Durban) Investigational Report No. 33*. 168 pp.
- Bass, A.J., D'Aubrey, J.D. and Kistnasamy, N. (1975a). Sharks of the east coast of southern Africa. II. The families Scyliorhinidae and Pseudotriakidae. *Oceanographic Research Institute (Durban) Investigational Report No. 37*. 64 pp.
- Bass, A.J., D'Aubrey, J.D. and Kistnasamy, N. (1975b). Sharks of the east coast of southern Africa. III. The families Carcharhinidae (excluding *Mustelus* and *Carcharhinus*) and Sphyrnidae. *Oceanographic Research Institute (Durban) Investigational Report No. 38*. 100 pp.
- Bass, A.J., D'Aubrey, J.D. and Kistnasamy, N. (1975c). Sharks of the east coast of southern Africa. IV. The families Odontaspidae, Scapanorhynchidae, Isuridae, Cetorhinidae, Alopiidae, Orectolobidae and Rhinodontidae. *Oceanographic Research Institute (Durban) Investigational Report No. 39*. 102 pp.
- Bass, A.J., D'Aubrey, J.D. and Kistnasamy, N. (1975d). Sharks of the east coast of southern Africa. V. The families Hexanchidae, Chlamydoselachidae, Heterodontidae, Pristiophoridae and Squatinidae. *Oceanographic Research Institute (Durban) Investigational Report No. 43*. 50 pp.
- Bass, A.J., D'Aubrey, J.D. and Kistnasamy, N. (1976). Sharks of the east coast of southern Africa. VI. The families Oxynotidae, Squalidae, Dalatiidae and Echinorhinidae. *Oceanographic Research Institute (Durban) Investigational Report No. 45*. 103 pp.
- Berry, F.H. (1959). Boarfishes of the genus *Antigonia* of the Western Atlantic. *Bulletin of the Florida State Museum Biological Sciences* **4**(2), 205-250.
- Berry, F.H. and Cohen, L. (1972). Synopsis of the species of *Trachurus* (Pisces: Carangidae). *Quarterly Journal of Florida Academy of Sciences* **35**, 177-211.
- Bertelsen, E. (1951). The certatioid fish. Ontogeny, taxonomy, distribution, and biology. *Dana Report No. 39*. 276 pp.
- Bertelsen, E., Krefft, G. and Marshall, N.B. (1976). The fishes of the family Notosudidae. *Dana Report No. 86*. 114 pp.
- Bertelsen, E. and Pietsch, T.W. (1983). The ceratioid anglerfishes of Australia. *Records of the Australian Museum* **35**, 77-99.
- Bigelow, H.B. (1963a). Fishes of the Western North Atlantic. Family Alepocephalidae. *Memoirs of the Sears Foundation for Marine Research No. 1*. Part 3. (Yale University: New Haven), pp 250-253.

- Bigelow, H.B. (1963b). Fishes of the Western North Atlantic. Family Searsiidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 3. (Yale University: New Haven), pp 253-256.
- Bigelow, H.B. and Schroeder, W.C. (1948). Fishes of the Western North Atlantic. Sharks. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 1. (Yale University: New Haven). 576 pp.
- Bigelow, H.B. and Schroeder, W.C. (1953). Fishes of the Western North Atlantic. Sawfishes, Guitarfishes, Skates, Rays and Chimaeroids. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 2. (Yale University: New Haven). 588 pp.
- Bigelow, H.B. and Schroeder, W.C. (1957). A study of the sharks of the suborder Squaloidea. *Bulletin of the Museum of Comparative Zoology* **117**(1), 1-150.
- Borodulina, O.D. (1979). Composition of the *Polyipnus spinosus* species complex (Sternoptychidae, Osteichthyes) with a description of three new species of this group. *Journal of Ichthyology* **19**(2), 1-10.
- Boulenger, G.A. (1895). *Catalogue of the fishes in the British Museum*. Second Edition London, 1895. 394 pp.
- Bradbury, M.G. (1967). The genera of batfishes (family Ogcocephalidae). *Copeia* 1967(2), 399-422.
- Bray, D.J. (1983). Revision of the fish family Zeidae. *M.Sc. Thesis*, Macquarie University. 160 pp.
- Burgess, W.E. (1978). *Butterflyfishes of the World*. (Tropical Fish Hobbyist Publications Inc.: New Jersey). 832 pp.
- Busakhin, S.V. (1982). Systematics and distribution of the family Berycidae (Osteichthyes) in the world ocean. *Journal of Ichthyology* **22**(6), 1-21.
- Butler, J.L. (1979). The nomeid genus *Cubiceps* (Pisces) with a description of a new species. *Bulletin of Marine Science*. **29**(2), 226-241.
- Caldwell, D.K. (1962). West Atlantic Fishes of the Family Priacanthidae. *Copeia* 1962(2), 417-424.
- Cantwell, G.E. (1964). A revision of the genus *Parapercis*, family Mugiloididae. *Pacific Science* **18**(3), 239-280.
- Castelnau, F.L. (1872). Contribution to the ichthyology of Australia. *Proceedings of the Royal Zoological and Acclimatization Society of Victoria* **1**, 29-247.
- Castle, P.J.H. (1960). Two eels of the genus *Pseudoxenomystax* from New Zealand waters. *Transactions of the Royal Society of New Zealand* **88**, 463.

- Castle, P.J.H. (1963). The systematics, development and distribution of two eels of the genus *Gnathophis* (Congridae) in Australasian Waters. *Zoology Publications from Victoria University of Wellington* **34**, 15-47.
- Castle, P.J.H. (1964). Congrid leptocephali in Australasian Waters with descriptions of *Conger wilsoni* (Bl. and Schn.) and *Conger verreauxi* Kaup. *Zoology Publications from Victoria University of Wellington* **37**, 1-45.
- Castle, P.J.H. (1968). The congrid eels of the Western Indian Ocean and the Red Sea. *Rhodes University Department of Ichthyology, Ichthyological Bulletin* **33**, 685-726.
- Castle, P.H.J. (1977). The congrid genus *Fimbriceps*, a synonym of *Gnathophis*. *Copeia* 1977(**3**), 581-582.
- Clarke, F.E. (1879). On some new fishes. *Transactions of the New Zealand Institute* **11**, 291-295.
- Clarke, T.A. (1984). Diet and morphological variation in snipefishes, presently recognised as *Macrorhamphosus scolopax*, from southeast Australia: evidence for two sexually dimorphic species. *Copeia* 1984(**3**), 595-608.
- Cohen, D.M. (1958). A revision of the fishes of the subfamily Argentininae. *Bulletin of Florida State Museum* **3**(3), 93-172.
- Cohen, D.M. (1964). Fishes of the Western North Atlantic. Suborder Argentinoidea. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 4. (Yale University: New Haven). 70 pp.
- Cohen, D.M. (1974). A review of the pelagic ophidioid fish genus *Brotulataenia* with descriptions of two new species. *Zoological Journal of the Linnean Society* **55**, 119-149.
- Cohen, D.M. and Nielsen, J.G. (1978). Guide to the identification of genera of the fish order Ophidiiformes with a tentative classification of the order. *NOAA Technical Report NMFS Circular* **417**. 72 pp.
- Coleman, N. (1980). *Australian Sea Fishes South of 30°S*. (Doubleday Australia: Sydney). 302 pp.
- Collette, B. (1974). The garfishes (Hemiramphidae) of Australia and New Zealand. *Records of the Australian Museum* **29**, 11-105.
- Collette, B.C. and Chao, L.N. (1975). Systematics and morphology of the bonitos (*Sarda*) and their relatives (Scombridae, Sardini). *United States National Marine Fisheries Service, Fishery Bulletin* **73**(3), 516-625.
- Collette, B.B. and Gibbs, R.H. (1963). *Preliminary field guide to the mackerel and tuna like fishes of the Indian Ocean (Scombridae)*. (United States National Museum, Smithsonian Institution: Washington). 48 pp.

- Collette, B.B. and Nauen, C.E. (1983). FAO species catalogue. Volume 2: scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos, and related species known to date. *FAO Fisheries Synopsis* (125) **2**, 1-137.
- Compagno, L.J.V. (1973a). *Gogolia filewoodi*, a new genus and species of shark from New Guinea (Carcharhiniformes: Triakidae), with a redefinition of the family Triakidae and a key to triakid genera. *Proceedings of the Californian Academy of Sciences* **39**(19), 383-410.
- Compagno, L.J.V. (1973b). Interrelationships of living elasmobranchs. *Zoological Journal of the Linnean Society (Supplement No. 1)* **53**, 15-61.
- Compagno, L.J.V. (1979). Carcharhinoid sharks - morphology, systematics and phylogeny. (Vols. 1 and 2). *Phd. Thesis* Stanford University. (University Microfilms: Ann Arbor, Michigan). 932 pp.
- Compagno, L.J.V. (1984). FAO species catalogue. Volume 4: sharks of the world. An annotated and illustrated catalogue of shark species known to date. Parts 1 and 2. *FAO Fisheries Synopsis* (125) **4**, 1-655.
- Cuvier, G. and Valenciennes, A. (1831). *Histoire Naturelle des Poissons* (Paris: Levrault). vol. VIII, pp 312-328.
- Dawson, C.E. (1982). Synopsis of the Indo-Pacific genus *Solegnathus* (Pisces: Syngnathidae). *Japanese Journal of Ichthyology* **29**(2), 139-160.
- Day, F. (1881). *The fishes of Great Britain and Ireland*. Parts 2-3. (London and Edinburgh), pp 65-240. Pls. 27-68.
- de Beaufort, L.F. (1940). *The Fishes of the Indo-Australian Archipegado*. Vol. 8. (E.J. Brill: Leiden). 580 pp.
- de Beaufort, L.F. and Briggs, J.C. (1962). *The Fishes of the Indo-Australian Archipelago*. Vol. 11. (E.J. Brill: Leiden). 481 pp.
- de Sylva D.P. (1973). Barracudas (Pisces: Sphyraenidae) of the Indian Ocean and adjacent seas - a preliminary review of their systematics and ecology. *Journal of the Marine Biological Association of India* **15**(1), 74-94.
- Dixon, J.M. (1969). A new species of ray of the genus *Urolophus* (Elasmobranchii: Urolophidae) from Victoria. *Victorian Naturalist* **86**(1), 11-18.
- Eschmeyer, W.N. (1969). A systematic review of the scorpionfishes of the Atlantic Ocean (Pisces: Scorpaenidae). *Occasional Papers of the California Academy of Sciences* **79**, 1-130.

- Eschmeyer, W.N., and Poss, S.G. (1976). Review of the scorpioid fish genus *Maxillicosta* (Pisces: Scorpaeniformes) with a description of three new species from the Australian New Zealand Region. *Bulletin of Marine Science* **26**, 433-49.
- Fischer, W. and Whitehead, P.J.P. (Eds). (1974). *FAO Species Identification Sheets for Fishery Purposes. Eastern Indian Ocean (Fishing Area 57) and Western Central Pacific (Fishing Area 71)*. Vols. 1-4. (FAO: Rome). page various.
- Fowler, H.W. (1931). The fishes of the families Pseudochromidae, Lobotidae, Pempheridae, Priacanthidae, Lutjanidae, Pomadasyidae and Teraponidae, collected by the United States Bureau of Fisheries Steamer "Albatross", chiefly in Philippine seas and adjacent waters. *United States National Museum Bulletin* **100** **11**. 388 pp.
- Fowler, H.W. (1933). The fishes of the families Banjosidae, Lethrinidae, Sparidae, Girellidae, Kyphosidae, Oplegnathidae, Gerridae, Mullidae, Emmelichthyidae, Sciaenidae, Sillaginidae, Arripidae and Enoplosidae collected by the United States Bureau of Fisheries Steamer "Albatross", chiefly in Philippine seas and adjacent waters. *United States National Museum Bulletin* **100** **12**. 465 pp.
- Fowler, H.W. (1938). Descriptions of new fishes obtained by the United States Bureau of Fisheries steamer "Albatross", chiefly in Philippine Seas and adjacent waters. *Proceeding of the United States National Museum* **85**(3032), 31-135.
- Fowler, H.W. (1941). Contributions to the biology of the Philippine Archipelago and Adjacent Regions. The fishes of the groups Elasmobranchii, Holocephali, Isospondyli and Ostarophysii obtained by the United States Bureau of Fisheries Steamer "Albatross" in 1907 to 1910, chiefly in the Philippine Islands and Adjacent Seas. *United States National Museum Bulletin* **100** **13**. 879 pp.
- Fowler, H.W. and Bean, B.A. (1930). Contributions to the biology of the Philippine Archipelago and adjacent regions. *United States National Museum Bulletin* **100** **10**. 334 pp.
- Fraser, T.H. (1971). The fish *Dinolestes lewini* with comments on its osteology and relationships. *Japanese Journal of Ichthyology* **18**(4), 157-163.
- Fraser, T.H. (1972). Comparative osteology of the shallow water cardinal fishes (Perciformes: Apogonidae) with reference to the systematics and evolution of the family. *Ichthyological Bulletin of the J.L.B. Smith Institute of Ichthyology Rhodes University* **34**, 1-105.
- Fraser-Brunner, A. (1935). Notes on the plectognath fishes. II. A synopsis of the genera of the family Ostraciontidae. *Annals and Magazine of Natural History* series 10, **16**, 313-330.

- Fraser-Brunner, A. (1941a). Notes on the plectognath fishes. VI. A synopsis of the genera of the family Aluteridae, and descriptions of seven new species. *Annals and Magazine of Natural History* series 11, **8**, 176-199.
- Fraser-Brunner, A. (1941b). Notes on the plectognath fishes. VII. The Aracanidae, a distinct family of ostraciontoid fishes with descriptions of two new species. *Annals and Magazine of Natural History* series 11, **8**, 306-13.
- Fraser-Brunner, A. (1943). Notes on the plectognath fishes. VIII. The classification of the suborder Tetraodontoidea, with a synopsis of the genera. *Annals and Magazine of Natural History* series 11, **10**, 1-18.
- Fraser-Brunner, A. (1950a). The fishes of the family Scombridae. *Annals and Magazine of Natural History* series 12, **3**, 131-163.
- Fraser-Brunner, A. (1950b). Notes on the fishes of the genus *Antignonia* (Caproidae). *Annals and Magazine of Natural History* series 12, **3**, 721-724.
- Fritzsche, R.A. (1976). A review of the cornetfishes, genus *Fistularia* (Fistulariidae) with a discussion of intra-generic relationships and zoogeography. *Bulletin of Marine Science* **26**, 196-204.
- Fritzsche, R.A. (1980). Revision of the eastern Pacific Syngnathidae (Pisces: Syngnathiformes), including both recent and fossil forms. *Proceedings of the California Academy of Sciences* **42**(6), 181-227.
- Fujii, E. and Uyeno, T. (1979). *Polyplacapros tyleri*, a new genus and species of ostraciid trunkfish from off eastern Australia and Norfolk Ridge. *Japanese Journal of Ichthyology* **26**(1), 1-10.
- Garrick, J.A.F. (1959a). Studies on New Zealand Elasmobranchii. Part VIII. Two northern hemisphere species of *Centroscymnus* in New Zealand waters. *Transactions of the Royal Society of New Zealand* **87**(1 and 2), 75-89.
- Garrick, J.A.F. (1959b). Studies on New Zealand Elasmobranchii. Part IX. *Scymnodon plunketi* (Waite, 1910), an abundant deep-water shark of New Zealand waters. *Transactions of the Royal Society of New Zealand* **87**(3 and 4), 271-282.
- Garrick, J.A.F. (1960a). Studies on New Zealand Elasmobranchii. Part X. The genus *Echinorhinus*, with an account of a second species, *E. cookei*. *Transactions of the Royal Society of New Zealand* **88**(1), 105-117.
- Garrick, J.A.F. (1960b). Studies on New Zealand elasmobranchii. Part XI. Squaloids of the genera *Deania*, *Etmopterus*, *Oxynotus* and *Dalatias* in New Zealand waters. *Transactions of the Royal Society of New Zealand* **88**, 489-517.

- Garrick, J.A.F. (1960c). Studies on New Zealand elasmobranchii. Part XII. The species of *Squalus* from New Zealand and Australia; and a general account and key to the New Zealand Squaloidea. *Transactions of the Royal Society of New Zealand* **88**, 519-57.
- Garrick, J.A.F. (1967). Revision of sharks of the genus *Isurus* with a description of a new species (Galeoidea: Lamnidae). *Proceedings of the United States National Museum* **118**, 663-90.
- Garrick, J.A.F. (1971). *Harriotta raleighana* a long nosed chimera (family Rhinochimaeridae), in New Zealand Waters. *Journal of the Royal Society of New Zealand* **1**(3/4), 203-213.
- Garrick, J.A.F. (1982). Sharks of the genus *Carcharhinus*. *NOAA Technical Report NMFS Circular* **445**, 1-194.
- Garrick, J.A.F. and Inada, T. (1975). Dimensions of long nosed chimaera *Harriotta raleighana* from New Zealand. *New Zealand Journal of Marine and Freshwater Research* **9**(2), 159-167.
- Garrick, J.A.F. and Paul, L.J. (1971). *Heptranchias dakini* Whitley, 1931, a synonym of *H. perlo* (Bonnaterre, 1788), the sharp snouted sevengill or perlon shark, with notes on sexual dimorphism in this species. *Zoology Publications from Victoria University of Wellington* **54**, 1-12.
- Garrick, J.A.F. and Paul, L.J. (1974). The taxonomy of New Zealand skates (suborder Rajoidea), with descriptions of three new species. *Journal of the Royal Society of New Zealand* **4**(3), 345-377.
- Gibbs, R.H. (1964a). Fishes of the Western North Atlantic. Family Astronesthidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 4. (Yale University: New Haven), pp 311-350.
- Gibbs, R.H. (1964b). Fishes of the North West Atlantic. Family Idiakanthidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 4. (Yale University: New Haven), pp 511-514.
- Gibbs, R.H. (1969). Taxonomy, sexual dimorphism, vertical distribution, and evolutionary zoogeography of the bathypelagic fish genus *Stomias* (Stomiidae). *Smithsonian Contributions to Zoology* **31**. 25 pp.
- Gibbs, R.H., Clarke, T.A. and Gomon, J.R. (1983). Taxonomy and distribution of the stomioid fish genus *Eustomias* (Melanostomiidae), I: subgenus *Nominostomias*. *Smithsonian Contributions to Zoology* **380**. 139 pp.
- Gibbs, R.H. and Collette, B.B. (1967). Comparative anatomy and systematics of the tunas, genus *Thunnus*. *Fishery Bulletin* **66**(1), 65-130.
- Gilbert, C.R. (1967). A revision of the hammerhead sharks (Family Sphyrnidae). *Proceedings of the United States National Museum*. **119**(3539), 1-88.

- Glover, C.J.M. (1976). The goblin shark *Scapanorhynchus owstoni* (Jordan, 1898): confirmation of the first Australian record. *The South Australian Naturalist* **50**(4), 69-72.
- Gomon, M.F. (1979). A revision of the labrid genus *Bodianus* with an analysis of the relationships of other members of the tribe Hypsigenyini. *Phd. Thesis*, University of Miami. 679 pp.
- Gomon, M.F. and Paxton, J.R. (1985). A revision of the Odacidae, a temperate Australian-New Zealand labroid fish family. *Indo-Pacific Fishes* No. 8.
- Gomon, M.F. and Randall, J.E. (1978). Review of the Hawaiian fishes of the labrid tribe Bodianini. *Bulletin of Marine Science* **28**(1), 32-48.
- Goode, G.B. and Bean, T.H. (1895). *Oceanic ichthyology, a treatise on the deep-sea and pelagic fishes of the world*. (United States National Museum, Smithsonian Institution: Washington). 553 pp. 123 pl.
- Goodyear, R.H. and Gibbs, R.H. (1969). Results of the research cruises of FRS "Walter Herwig" to South America: X. Systematics and zoogeography of stomiatoid fishes of the *Astronesthes cyanus* species group (family Astronesthidae), with descriptions of three new species. *Archiv fuer Fischereiwissenschaft* **20**(213), 107-131.
- Gosline, W.A., (1966). The limits of the fish family Serranidae, with notes on other lower percoids. *Proceedings of the Academy of Science* **33**(6), 91-112.
- Graham, D.H. (1956). *A Treasury of New Zealand Fishes*. Second Edition. (A.H. & A.W.Reed: Wellington). 424 pp.
- Grant, E.M. (1978). *Guide to Fishes*. Fourth Edition. (Department of Harbours and Marine: Brisbane). 768 pp.
- Grey, M. (1953). Fishes of the family Gempylidae with records of *Nesiarchus* and *Epinnula* from the Western Atlantic and descriptions of two new subspecies of *Epinnula orientalis*. *Copeia* 1953(**3**), 135-141.
- Grey, M. (1955). The fishes of the genus *Tetragonurus* Risso. *Dana Report* No. 41. 75 pp.
- Grey, M. (1964). Fishes of the Western North Atlantic. Family Gonostomatidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 4. (Yale University: New Haven), pp 78-240.
- Griffin, L.T. (1928). Studies in New Zealand Fishes. *Transactions of the New Zealand Institute* **59**, 374-388.
- Günther, A. (1861). *Catalogue of the Acanthopterygian Fishes in the Collection of the British Museum* Vol. 3. (British Museum: London). 586pp.

- Günther, A. (1862). *Catalogue of the Acanthopterygian Fishes in the Collection of the British Museum* Vol. 4. (British Museum: London). 534pp.
- Günther, A. (1877). Fische de Sudsee 6. *Journal des Museum Godeffroy* **6**, 169-216.
- Günther, A. (1878). Preliminary notices of deep-sea fishes collected during the voyage of the "Challenger". *Annals and Magazine of Natural History* series 5, **2**, 17-28.
- Günther, A. (1880). Report on the shore fishes procured during the voyage of H.M.S. "Challenger" in the years 1873-1876. *Report of the Scientific Results of the Voyage of H.M.S. "Challenger" 1880-1895, Zoology* **1**(6). 82 pp. 32 pls.
- Günther, A. (1887) Report on the deep sea fishes collected by H.M.S. "Challenger" during the years 1873-1876. *Report of the Scientific Results of the Voyage of H.M.S. "Challenger" 1880-1895, Zoology* **22**(57). 268 pp.
- Haedrich, R.L. (1967). The stromateoid fishes: systematics and a classification. *Bulletin of the Museum of Comparative Zoology* **135**, 31-139.
- Haedrich, R.L. (1970). A new species of the nomeid fish genus *Psenes* from the equatorial Pacific Ocean. *Breviora* **351**, 1-7.
- Haedrich, R.L. (1972). Ergebnisse der Forschungsreisen des FFS "Walter Herwig" nach Südamerika: XXIII. Fishes of the family Nomeidae (Perciformes, Stromateoidei). *Archiv fuer Fischereiwissenschaft* **23**(2), 73-88.
- Haedrich, R.L. and Horn, M.H. (1972). A key to the stromateoid fishes. *Woods Hole Oceanographic Institution Technical Report*, 72-15. (unpublished). 46 pp.
- Hardy, G.S. (1980). A redescription of the antitropical pufferfish *Arothron firmamentum*. (Plectognathi: Tetraodontidae). *New Zealand Journal of Zoology* **7**, 115-125.
- Hardy, G.S. (1981a). A redescription of the pufferfish *Contusus richei* (Tetraodontiformes: Tetraodontidae), and description of a second species of *Contusus*. *New Zealand Journal of Zoology* **8**, 11-23.
- Hardy, G.S. (1981b). New records of pufferfishes (family Tetraodontidae) from Australia and New Zealand, with notes on *Sphoeroides pachygaster* (Muller and Troschel) and *Lagocephalus sceleratus* (Gmelin). *National Museum of New Zealand Records* **1**(20), 311-316.
- Hardy, G.S. (1982). A new species of *Pterygotrigla* (Pisces: Triglidae) from New Zealand. *New Zealand Journal of Zoology* **9**, 207-210.

- Hardy, G.S. (1983a). A revision of the fishes of the family Pentacerotidae (Perciformes). *New Zealand Journal of Zoology* **10**, 177-220.
- Hardy, G.S. (1983b). A new genus and species of boarfish (Perciformes: Pentacerotidae) from Western Australia. *Records of the Western Australian Museum* **10**(4), 373-380.
- Hardy, G.S. (1983c). Revision of Australian species of *Torquigener* Whitley (Tetraodontiformes: Tetraodontidae), and two new generic names for Australian pufferfishes. *Journal of the Royal Society of New Zealand* **13**(1/2), 1-48.
- Hardy, G.S. and Hutchins, J.B. (1981). On the validity of the pufferfish genus *Omegophora* Whitley. (Tetraodontiformes: Tetraodontidae) with the description of a new species. *Records of the Western Australian Museum* **9**, 187-201.
- Harry, R.R. (1953). Studies on the bathypelagic fishes of the family Paralepididae. I. Survey of the genera. *Pacific Science* **7**(2), 219-249.
- Heemstra, P.C. (1973). A revision of the shark genus *Mustelus* (Squaliformes: Carcharhinidae). *Phd. Thesis* University of Miami. (University Microfilms: Ann Arbor, Michigan). 187 pp.
- Heemstra, P.C. (1980). A revision of the zeid fishes Zeiformes: Zeidae of South Africa. *Ichthyological Bulletin of the J.L.B. Smith Institute of Ichthyology* No. 41. 18pp.
- Heemstra, P.C. (1982). Taxonomic notes on some triglid and peristediid fishes (Pisces: Scorpaeniformes) from southern Africa. *Copeia* **1982**(2), 291-295.
- Heemstra, P.C. and Kannemeyer, S.X. (1984). The families Trachipteridae and Radiicephalidae (Pisces, Lampriformes) and a new species of *Zu* from South Africa. *Annals of the South African Museum* **94**(2), 1-27.
- Heemstra, P.C. and Randall, J.E. (1977). A revision of the Emmelichthyidae (Pisces: Perciformes). *Australian Journal of Marine and Freshwater Research* **28**, 361-96.
- Hubbs, C.L. (1959). Initial discoveries of fish faunas on seamounts and offshore banks in the eastern Pacific. *Pacific Science* **13**(4), 311-316.
- Hubbs, C.L. and Wisner, R.L. (1980). Revision of the sauries (Pisces, Scomberesocidae) with descriptions of two new genera and one new species. *U.S. National Marine Fisheries Service Fishery Bulletin* **77**(3), 521-566.
- Hutchins, J.B. (1977). Descriptions of three new genera and eight new species of monacanthid fishes from Australia. *Records of the West Australia Museum* **5**, 3-55.
- Hutchins, J.B. (1979). *The Fishes of Rottnest Island*. (Creative Research: Perth). 103 pp.

- Hutchins, J.B. (1980). Leatherjackets of Australia. In *Master Guide to Practical Fishing*. (Bay Books: Sydney). pp 883-893.
- Hutchins, B. and Thompson, M. (1983). *The Marine and Estuarine Fishes of South-western Australia*. (Western Australian Museum: Perth). 103 pp.
- Hutchins, J.B. and Swainston, R. (1985). Revision of the monacanthid fish genus *Brachaluteres*. *Records of the Western Australian Museum* **12**(1), 57-78.
- Inada, T. and Garrick, J.A.F. (1979). *Rhinochimaera pacifica*, a long-snouted chimaera (Rhinochimaeridae), in New Zealand Waters. *Japanese Journal of Ichthyology* **25**(4), 235-243.
- Iwamoto, T. (1978). Eastern Pacific macrourids of the genus *Coelorinchus* Giorna (Pisces: Gadiformes) with description of a new species from Chile. *Proceedings of the Californian Academy of Sciences series 4*, **41**(12), 307-337.
- Iwamoto, T. (1979). Eastern Pacific macrourine grenadiers with seven branchiostegal rays (Pisces: Macrouridae). *Proceedings of the Californian Academy of Sciences* **42**(5), 135-179.
- Iwamoto, T. (1981). Family Macrouridae. In Fischer, W. (ed.), *FAO Species Identification Sheets for Fishery Purposes. Eastern Central Atlantic (Fishing Area 34 and part of 47)*. Vol. 2. (Rome: FAO). page various.
- James, G.D. (1976). *Cyttus traversi* Hutton: juvenile form of *C. ventralis* Barnard and Davies (Pisces: Zeidae). *Journal of the Royal Society of New Zealand* **6**, 493-8.
- Johnson, C.R. (1971). Revision of the callionymid fishes referable to the genus *Callionymus* from Australian waters. *Memoirs of the Queensland Museum* **16**(1), 103-140.
- Johnson, C.R. (1973). Biology and ecology of three species of Australian dragonets (Pisces: Callionymidae). *Zoological Journal of the Linnean Society London* **52**(1-4), 1-361.
- Johnson, R.K. (1974). A revision of the alepisauroid family Scopelarchidae (Pisces, Myctophiformes). *Fieldiana Zoology* **66**, 249 pp.
- Johnson, R.K. (1982). Fishes of the families Evermannellidae and Scopelarchidae: systematics, morphology, interrelationships, and zoogeography. *Fieldiana Zoology new series*, **12**, 252 pp.
- Jordan, D.S. and Snyder, J.O. (1902). A review of the trachinoid fishes and their supposed allies found in the waters of Japan. *Proceedings of the U.S. National Museum* **24**, 461-497.
- Jubb, R.N. (1977). A revision of the Australian fishes of the family Pempheridae (Pisces: Perciformes). *B.A. Honours Thesis* Macquarie University, Sydney.

- Kamohara T. (1956). On the fishes of the family Chlorophthalmidae. *Research Reports of the Kochi University* **5**(15), 1-8.
- Katayama, M. (1960). *Fauna Japonica*. Serranidae. vol. 8. (Biogeographical Society of Japan: Tokyo). 189pp.
- Katayama, M. and Fujii, E. (1982). Two new species of the anthiine genus *Lepidoperca* from Australia and New Zealand. *Japanese Journal of Ichthyology* **29**(3), 241-252.
- Kawaguchi, K. and Shimizu, H. (1978). Taxonomy and distribution of the lantern fishes, genus *Diaphus* (Pisces: Myctophidae) in the western Pacific, eastern Indian Oceans and the South-east Asian Seas. *Bulletin of the Ocean Research Institute University of Tokyo* **10**, 145 pp.
- Klunzinger, C.B. (1880). Die v. Müller sche Sammlung australischer fische in Stuttgart. *Osterreichische Akademie der Wissenschaften, (fmlly Kaiserliche Akademie), Vienna* **80**, 325-430.
- Kotlyar, A.H. (1980). Systematics and distribution of trachichthyid fishes (Beryciformes) of the Indian Ocean. (in Russian) *Trudy Instituta Okeanologii Akademii NAUK SSR* **110**, 177-225.
- Last, P.R. (1978). A new genus and species of flounder (f. Pleuronectidae) with notes on other Tasmanian species. *Papers and Proceedings Royal Society Tasmania* **112**, 21-7.
- Last, P.R. (1979). A new species of stingray (f. Dasyatidae) with a key to the Australian species. *Papers and Proceedings of the Royal Society of Tasmania* **113**, 169-76.
- Last, P.R., Scott, E.O.G. and Talbot, F. (1983). *Fishes of Tasmania* (Government Printer: Hobart). 563 pp.
- Leis, J.M. (1978). Systematics and zoogeography of porcupine-fishes *Diodon*, Diodontidae, Tetraodontiforms with comments on egg and larval development. *NOAA Technical Report NMFS Special Scientific Report Fisheries Bulletin* **76**(3), 535-67.
- MacDonald, C.M. (1980). Population structure, biochemical adaptation and systematics in temperate marine fishes of the genera *Arripis* and *Chrysophrys* (Pisces: Perciformes). *Phd. Thesis* Australian National University, Canberra.
- MacDonald, C.M. (1983). Population, taxonomic and evolutionary studies on marine fishes of the genus *Arripis* (Perciformes: Arripidae). Abstract only. *Bulletin of Marine Science* **33**(3). p780.
- Macleay, W. (1884). Some results of trawl fishing outside Port Jackson. *Proceedings of the Linnean Society of New South Wales* **8**, 457-462.
- Marshall, N.B. (1966). The relationship of the anacanthine fishes, *Macruronus*, *Lyconus*, *Steindachneria*. *Copeia*. 1966, 275-280.

- Marshall, N.B. (1973). Fishes of the Western North Atlantic. Family Macrouridae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 6. (Yale University: New Haven), pp 496-537.
- Marshall, N.B. and Cohen, D.M. (1973). Fishes of the Western North Atlantic. Order Anacanthini (Gadiformes), characters and synopsis of families. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 6. (Yale University: New Haven), pp 479-495.
- Marshall, N.B. and Iwamoto, T. (1973). Fishes of the Western North Atlantic. Genus *Coryphaenoides*. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 6. (Yale University: New Haven), pp 565-580.
- Marshall, T.C. (1964). *Fishes of the Great Barrier Reef and Coastal Waters of Queensland* (Angus and Robertson: Brisbane). 566 pp.
- Matsubara, K. (1943). Studies on the scorpaenid fishes of Japan (I and II). *Transactions of the Sigenkagaku Kenkyusyo*. 486 pp.
- Matsubara, K. and Hiyama, Y. (1932). A review of the Triglidae, a family of mail-cheeked fishes, found in the waters around Japan. *Journal Imperial Fisheries Institute* **28**(1), 3-67.
- Matsubara, K. and Iwai, T. (1952). Studies on some Japanese fishes of the family Gempylidae. *Pacific Science* **6**, 193-212.
- Matsubara, K. and Ochiai, A. (1950a). Studies on Hoplichthyidae, a family of mail cheeked fishes found in Japan and its adjacent waters. Part I and Part 2. *Japanese Journal of Ichthyology* **1**(2), 73-88. (in Japanese with English summary).
- Matsubara, K. and Ochiai, A. (1950b). *ibid.* Part III. *Japanese Journal of Ichthyology* **1**(3), 145-156.
- Matsubara, K. and Ochiai, A. (1955). A revision of the Japanese fishes of the family Platycephalidae (the flatheads). *Memoirs of the College of Agriculture, Kyoto University* No. 68, 1-109.
- Matsui, T. (1967). Review of the mackerel genera *Scomber* and *Rastrelliger* with description of a new species of *Rastrelliger*. *Copeia* 1967(**1**), 71-83.
- Matsuura, K. (1979). Phylogeny of the superfamily Balistoidea (Pisces: Tetraodontiformes). *Memoirs of the Faculty of Fisheries, Hokkaido University* **26**(1/2), 49-169.
- Mayer, G.F. (1974). Revision of the cardinal fish genus *Epigonus* (Perciformes: Apogonidae) with description of two new species. *Bulletin of the Museum of Comparative Zoology* **146**(3), 147-203.
- McCann, C. and McKnight, D.G. (1980). The marine fauna of New Zealand: macrourid fishes (Pisces: Gadida). *Memoirs of the New Zealand Oceanography Institute* **61**. 92 pp.

- McCosker, J.E. (1977). The osteology, classification and relationships of the eel family Ophichthidae. *Proceedings of the Californian Academy of Sciences* series 4, **41**(1), 23 pp.
- McCoy, F. (1878a). Natural History of Victoria. *Prodromus of the Zoology of Victoria* **1**(I), 5-38.
- McCoy, F. (1878b). *ibid.* *Prodromus of the Zoology of Victoria* **1**(II), 7-31.
- McCoy, F. (1879). *ibid.* *Prodromus of the Zoology of Victoria* **1**(III), 7-50.
- McCoy, F. (1881). *ibid.* *Prodromus of the Zoology of Victoria* **1**(VI), 7-46.
- McCoy, F. (1882). *ibid.* *Prodromus of the Zoology of Victoria* **1**(VII), 7-37.
- McCoy, F. (1886a). *ibid.* *Prodromus of the Zoology of Victoria* **2**(XII), 47-78.
- McCoy, F. (1886b). *ibid.* *Prodromus of the Zoology of Victoria* **2**(XIII), 79-118.
- McCoy, F. (1887a). *ibid.* *Prodromus of the Zoology of Victoria* **2**(XIV), 119-156.
- McCoy, F. (1887b). *ibid.* *Prodromus of the Zoology of Victoria* **2**(XV), 157-193.
- McCoy, F. (1889a). *ibid.* *Prodromus of the Zoology of Victoria* **2**(XVIII), 259-295.
- McCoy, F. (1889b). *ibid.* *Prodromus of the Zoology of Victoria* **2**(XIX), 297-327.
- McCoy, F. (1889c). *ibid.* *Prodromus of the Zoology of Victoria* **2**(XX), 329-375.
- McCulloch, A.R. (1907). The results of the deep sea investigation in the Tasman Sea. II. The expedition of the "Woy Woy". I. Fishes and crustaceans from eight hundred fathoms. *Records of the Australian Museum* **6**, 345-355.
- McCulloch, A.R. (1911). Report on the fishes obtained by the F.I.S. "Endeavour" on the coasts of New South Wales, Victoria, South Australia and Tasmania. Part 1. *Zoological Results of the Fishing Experiments carried out by F.I.S. "Endeavour" 1909-10*, **1**(1), 1-89.
- McCulloch, A.R. (1913). Studies in Australian Fishes No. 3. *Records of the Australian Museum* **9**(3), 355-389.
- McCulloch, A.R. (1914a). Notes on some Western Australian fishes. *Records of the Western Australian Museum* **1**(3), 211-227.

- McCulloch, A.R. (1914b). Report on some fishes obtained by the F.I.S. "Endeavour" on the coasts of Queensland, New South Wales, Victoria, Tasmania, South, and south-Western Australia. Part 2. *Zoological Results of the Fishing Experiments carried on by F.I.S. "Endeavour" 1909-14*, **2**(3), 75-165.
- McCulloch, A.R. (1915). *ibid.* Part 3. *Zoological Results of the Fishing Experiments carried on by the F.I.S. "Endeavour" 1909-14*, **3**(3), 97-170.
- McCulloch, A.R. (1916). *ibid.* Part 4. *Biological Results of the Fishing Experiments carried on by the F.I.S. "Endeavour" 1909-14*, **4**(4), 167-200.
- McCulloch, A.R. (1919). Studies in Australian Fishes No. 5. *Records of the Australian Museum* **12**(8), 171-177.
- McCulloch, A.R. (1920). Studies in Australian Fishes No. 6. *Records of the Australian Museum* **13**(2), 41-72.
- McCulloch, A.R. (1921a). Notes on, and descriptions of Australian fishes No. 2. *Proceedings of the Linnean Society of New South Wales* **46**(4), 457-472.
- McCulloch, A.R. (1921b). Studies in Australian fishes No. 7. *Records of the Australian Museum* **13**(4), 123-142.
- McCulloch, A.R. (1923). Notes on fishes from Australia and Lord Howe Island. *Records of the Australian Museum* **14**(1), 1-17.
- McCulloch, A.R. (1926). Report on some fishes obtained by the F.I.S. "Endeavour" on the coasts of Queensland, New South Wales, Victoria, Tasmania, South, and South-western Australia. Part 5. *Biological Results of the Fishing Experiments carried on by the F.I.S. "Endeavour" 1909-14*, **5**(4), 155-216.
- McCulloch, A.R. (1929). A checklist of the fishes recorded from Australia. *Australian Museum Memoir* **5**, 534 pp.
- McCulloch, A.R. and Waite, E.R. (1915). A revision of the genus *Aracana* and its allies. *Transactions of the Royal Society of South Australia* **39**, 477-493.
- McCulloch, A.R. and Waite, E.R. (1918). Some new and little known fishes from South Australia. *Records of the South Australian Museum* **1**, 39-78.
- McDowall, R.M. (1982). The centrolophid fishes of New Zealand (Pisces: Stromateoidei). *Journal of the Royal Society of New Zealand* **12**(2), 103-142.

- McDowell, S.M.B. (1973). Fishes of the North West Atlantic. Order Heteromi (Notacanthiformes). *Memoir of the Sears Foundation for Marine Research* No. 1. Part 6. (Yale University: New Haven), pp 1-261.
- McEachran, J.D. and Fechhelm, J.D. (1982). A new species of skate from Western Australia with comments on the status of *Pavoraja* Whitley, 1939 (Chondrichthyes: Rajiformes). *Proceedings of the Biological Society of Washington* **95**(1), 1-12.
- McKay, R.J. (1966). Studies of Western Australian sharks and rays of the families Scyliorhinidae, Urolophidae and Torpedinidae. *Journal of the Royal Society of Western Australia* **49**, 65-82.
- McKay, R.J. (1970). Additions to the fish fauna of Western Australia, 5. *Fisheries Bulletin (Western Australia Department of Fish and Fauna)* **9**, 3-24.
- McKay, R.J. (1976). The fishes of the family Sillaginidae from India with a description of a new species. *Journal of the Marine Biological Association of India* **18**(2), 375-385.
- McKay, R.J. (1985). A revision of the fishes of the family Sillaginidae. *Memoirs of the Queensland Museum* **22**(1), 1-73.
- Mead, G.W. (1966a). Fishes of the Western North Atlantic. Family Aulopidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 5. (Yale University: New Haven), pp 19-29.
- Mead, G.W. (1966b). Fishes of the Western North Atlantic. Family Chlorophthalmidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 5. (Yale University: New Haven), pp 162-189.
- Mead, G.W. (1972). Bramidae. *Dana Report* No. 81. 166 pp.
- Mees, G.F. (1960). The Uranoscopidae of Western Australia (Pisces: Perciformes). *Journal of the Royal Society of Western Australia* **43**(2), 46-48.
- Merret, N.R. (1973). A new shark of the genus *Squalus* (Squalidae: Squaloidea) from the equatorial western Indian Ocean; with notes on *Squalus blainvillei*. *Journal of Zoology, London* **171**, 93-110.
- Mikhaylin, S.V. (1977). The intraspecific variability of the frostfish, *Lepidopus caudatus*. *Journal of Ichthyology* **17**(2), 201-209.
- Miller, G.C. (1967). A new species of western Atlantic armoured searobin *Peristedion greyae* (Pisces: Peristediidae). *Bulletin of Marine Science* **17**, 16-41.
- Miller, G.C. (1974). Fishes of the Indian Ocean. A systematical section. XIV: Scorpaeniformes (2) family Peristediidae. *Meteor Forsch Ergebnisse Series D* **18**, 61-72.

- Mohr, E. (1937). Revision der Centriscidae (Acanthopterygii Centrisciformes). *Dana Report* No. 13. 70 pp.
- Morrow, J.E. (1964a). Fishes of the Western North Atlantic. Family Chauliodontidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 4. (Yale University: New Haven), pp 274-289.
- Morrow, J.E. (1964b). Fishes of the Western North Atlantic. Family Stomiidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 4. (Yale University: New Haven), pp 290-310.
- Morrow, J.E. (1964c). Fishes of the Western North Atlantic. Family Malacosteidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 4. (Yale University: New Haven), pp 523-549.
- Morrow, J.E. and Gibbs, R.H. (1964). Fishes of the Western North Atlantic. Family Melanostomiidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 4. (Yale University: New Haven), pp 351-511.
- Mukhacheva, V.A. (1980). A review of the genus *Ichthyococcus* Bonaparte (Photichthyidae). *Journal of Ichthyology* **20**(6), 1-14.
- Munro, I.S.R. (1949). Revision of Australian silver breams *Mylio* and *Rhabdosargus*. *Memoirs of the Queensland Museum* **12**(IV), 182-223.
- Munro, I.S.R. (1956a). Handbook of Australian Fishes No. 1. *Australian Fisheries Newsletter* **15**(7), 13-20.
- Munro, I.S.R. (1956b). *ibid.* No. 2. *Australian Fisheries Newsletter* **15**(8), 15-18.
- Munro, I.S.R. (1956c). *ibid.* No. 3. *Australian Fisheries Newsletter* **15**(9), 15-18.
- Munro, I.S.R. (1956d). *ibid.* No. 5. *Australian Fisheries Newsletter* **15**(11), 15-18.
- Munro, I.S.R. (1957a). *ibid.* No. 11. *Australian Fisheries Newsletter* **16**(5), 15-18.
- Munro, I.S.R. (1957b). *ibid.* No. 13. *Australian Fisheries Newsletter* **16**(7), 15-18.
- Munro, I.S.R. (1957c). *ibid.* No. 14. *Australian Fisheries Newsletter* **16**(8), 15-18.
- Munro, I.S.R. (1957d). *ibid.* No. 15. *Australian Fisheries Newsletter* **16**(9), 15-18.
- Munro, I.S.R. (1957e). *ibid.* No. 16. *Australian Fisheries Newsletter* **16**(10), 15-18.

- Munro, I.S.R. (1957f). *ibid.* No. 17. *Australian Fisheries Newsletter* **16**(11), 15-22.
- Munro, I.S.R. (1957g). *ibid.* No. 18. *Australian Fisheries Newsletter* **16**(12), 17-20.
- Munro, I.S.R. (1958a). *ibid.* No. 19. *Australian Fisheries Newsletter* **17**(1), 17-20.
- Munro, I.S.R. (1958b). *ibid.* No. 22. *Australian Fisheries Newsletter* **17**(4), 17-20.
- Munro, I.S.R. (1958c). *ibid.* No. 23. *Australian Fisheries Newsletter* **17**(5), 17-20.
- Munro, I.S.R. (1958d). *ibid.* No. 26. *Australian Fisheries Newsletter* **17**(8), 17-20.
- Munro, I.S.R. (1958e). *ibid.* No. 27. *Australian Fisheries Newsletter* **17**(9), 17-20.
- Munro, I.S.R. (1958f). *ibid.* No. 28. *Australian Fisheries Newsletter* **17**(10), 17-20.
- Munro, I.S.R. (1958g). *ibid.* No. 29. *Australian Fisheries Newsletter* **17**(11), 17-20.
- Munro, I.S.R. (1958h). *ibid.* No. 30. *Australian Fisheries Newsletter* **17**(12), 17-20.
- Munro, I.S.R. (1961a). *ibid.* No. 40. *Australian Fisheries Newsletter* **20**(8), 19-22.
- Munro, I.S.R. (1961b). *ibid.* No. 42. *Australian Fisheries Newsletter* **20**(12), 19-22.
- Myers, G.S. (1960). A new zeomorph fish of the family Oreosomatidae from the coast of California, with notes on the family. *Stanford Ichthyological Bulletin* **7**(4), 89-98.
- Nafpaktitis, B.G. (1977). Fishes of the Western North Atlantic. Family Neoscopelidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 7. (Yale University: New Haven), 1-12.
- Nafpaktitis, B.G. (1978). Systematics and distribution of lantern fishes of the genera *Lobianchia* and *Diaphus* (Myctophidae) in the Indian Ocean. *Bulletin of the Los Angeles County Museum of Natural History Science* **30**, 1-92.
- Nafpaktitis, B.G., Backus, R.H., Craddock, J.E., Haedrich, R.L. and Robinson, B.H. (1977). Fishes of the Western North Atlantic. Family Myctophidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 7. (Yale University: New Haven), 13-299.

- Nakabo, T. (1982). Revision of genera of the dragonets (Pisces: Callionymidae). *Publications of Seto Marine Biological Laboratory* **27**(1/3), 77-131.
- Nelson, J.S. (1977). Fishes of the Southern Hemisphere genus *Neophrynichthys* (Scorpaeniformes: Cottoidei), with descriptions of two new species from New Zealand and Macquarie Island. *Journal of the Royal Society of New Zealand* **7**(4), 485-511.
- Nelson, J.S. (1982). Two new South Pacific fishes of the genus *Ebinania* and contributions to the systematics of Psychrolutidae (Scorpaeniformes). *Canadian Journal of Zoology* **60**(6), 1470-1504.
- Norman, J.R. (1926). Report on the flatfishes (Heterosomata) collected by the F.I.S. "Endeavour", with a synopsis of the flat-fishes of Australia and a revision of the sub-family Rhombosoleinae. *Biological Results of the Fishing Experiments carried on by the F.I.S. "Endeavour" 1909-14*, **5**(5), 217-308.
- Norman, J.R. (1934). A systematic monograph of the flatfishes (Heterosomata). *British Museum of Natural History* **1**, 1-459.
- Norman, J.R. (1957). A draft synopsis of the orders, families and genera of recent fishes and fish-like vertebrates. Unpublished photo offset copies distributed by British Museum of Natural History. 649 pp.
- Ochiai, A. and Okada, K. (1966). On the two allied red gurnards referable to *Chelidonichthys* from the Pacific Ocean. *Bulletin of the Misaki Marine Biological Institute Kyoto University* **9**, 1-6.
- Ogilby, J.D. (1887). On a new genus of Percidae. *Proceedings of the Zoological Society (London)* 1887, 616-618.
- Ogilby, J.D. (1899). Contribution to Australian ichthyology. *Proceedings of the Linnean Society of New South Wales* **24**, 159-165.
- Ogilby, J.D. (1911a). On the genus *Gonorrhynchus* (Gronovius). *Annals of the Queensland Museum* **10**, 31-35.
- Ogilby, J.D. (1911b). Descriptions of new or insufficiently described fishes from Queensland waters. *Annals of the Queensland Museum* **10**, 36-58.
- Ogilby, J.D. and McCulloch, A.R. (1909). A revision of the Australian Orectolobidae. *Proceedings of the Royal Society of New South Wales* **42**, 264-269.
- Okamura O., Amaoka, K. and Mitai, F. (eds.) (1982). *Fishes of the Kyushu-Palan Ridge and Tosa Bay*. (Japan Fisheries Resource Conservation Association: Tokyo). 435 pp.

- Parin, N.V. and Bekker, V.E. (1970). Materials for a revision of the trichiuroid fishes of the genus *Benthodesmus* with the description of four new species and one new subspecies. *Proceedings of the Biological Society of Washington* **83**(33), 351-364.
- Parin, N.V. and Bekker, V.E. (1972). Classification and distribution data on some trichiuroid fishes (Pisces: Trichiuroidae: Scombrolabracidae, Gempylidae, Trichiuridae) *Trudy Instituta Okeanologii im P.P. Shirshov* **93**, 111-204. (in Russian).
- Parin, N.V., Collette, B.B. and Shcherbachev, Yu.N. (1980). Preliminary review of the marine halfbeaks (Hemiramphidae, Beloniformes) of the tropical Indo-West Pacific. *Transactions of the P.P. Shirshov Institute of Oceanology* **97**, 7-173. (in Russian with English summary).
- Parin, N.V. and Novikova, N.S. (1974). Systematics of viperfishes (Chauliodontidae, Osteichthyes) and their distribution in the world ocean. *Trudy Instituta Okeanologii im. P.P. Shirshov* **26**, 255-315. (in Russian).
- Parr, A.E. (1927). The stomiatooid fishes of the suborder Gymnophotodermi (Astronesthidae, Melanostomiidae, Iliacanthidae) with a complete review of the species. *Bulletin of the Bingham Oceanographic Collection* **3**(2), 1-123.
- Parr, A.E. (1960). The fishes of the family Searsidae. *Dana Report* No. 51. 109 pp.
- Paulin, C.D. (1979). New Zealand roughies (Pisces Berycomorphii: Trachichthyidae). *New Zealand Journal of Zoology* **6**(1), 69-76.
- Paulin, C.D. (1981). Fishes of the family Bramidae recorded from New Zealand. *New Zealand Journal of Zoology* **8**, 25-31.
- Paulin, C.D. (1982). Scorpionfishes of New Zealand (Pisces: Scorpaenidae). *New Zealand Journal of Zoology* **9**, 437-450.
- Paulin, C.D. (1983). A revision of the family Moridae (Pisces: Anacanthini) within the New Zealand region. *Records of the National Museum New Zealand* **2**(9), 81-126.
- Paulin, C.D. and Moreland, J.M. (1979). Halosauridae of the south-west Pacific (Pisces: Teleostei: Notacanthiformes). *New Zealand Journal of Zoology* **6**, 267-271.
- Paxton, J.R. (1972). Osteology and relationships of the lanternfishes (family Myctophidae). *Bulletin of the Los Angeles County Museum of Natural History and Science* **13**, 1-81.
- Pietsch, T.W. (1981). The osteology and relationships of the anglerfish genus *Tetrabanchium* with comments on lophiiform classification. *Fishery Bulletin* **79**(3), 387-420.

- Pietsch, T.W. (1984a). The genera of the frogfishes (family Antennariidae). *Copeia* 1984(1), 27-44.
- Pietsch, T.W. (1984b). A review of the frogfish genus *Rhycherus* with the description of a new species from Western and South Australian. *Copeia* 1984(1), 68-72.
- Post, A. (1972). Catalogue of type - specimens and designation of the fish family Paralepididae (Osteichthyes, Myctophoidei). *Archiv fuer Fischereiwiss* 23(2), 136-165.
- Post, A. (1973). Ergebnisse der Forschungsreisen des FFS "Walter Herwig" nach Sudamerika. XXVII *Macroparalepis* Ege, 1933 (Osteichthyes, Myctophoidei, Paralepididae). Revision der Gattung und Beschreibung zweier neuer Arten. *Archiv fuer Fischereiwiss* 23(3), 202-242. (in German with English summary).
- Post, A. (1976). Notes on the ichthyofauna of the South-Eastern Atlantic. *Hypoclydonia bella* Goode and Bean, 1895 and *Macroparalopsis macrogeneion* Post, 1973. *Journal of Ichthyology* 16(4), 657-659.
- Post, A. and Quero, J.C. (1981). Revision des Diretmidae (Pisces, Trachichthyoidei) de l'Atlantique avec description d'un nouveau genre et d'une nouvelle espece. *Cybium*, 3e serie. 5(1), 33-60.
- Quoy, J.R.C. and Gaimard, P. (1934). *Voyage de "L Astrolabe" sous de commandement de M.J. Dumont d Urville. Zoologie*. Vol. 3. Poissons, pp 647-720.
- Ramsay, E.P. (1881). On a new species of *Regalecus* (*R. jacksoniensis*) from Port Jackson. *Proceedings of the Linnean Society of New South Wales* 5, 631-633.
- Ramsay, E.P. and Ogilby, J.D. (1887). On an undescribed species of *Chilodactylus* from Port Jackson. *Proceedings of the Linnean Society of New South Wales* 2(1), 879.
- Randall, J.E. (1983). A review of the fishes of the subgenus *Goniistius*, genus *Cheilodactylus*, with description of a new species from Easter Island and Rapa. *Occasional Papers of Bernice P. Bishop Museum* 25(7), 1-24.
- Regan, C.T. (1903a). Description of a new fish of the genus *Genypterus* with notes on the allied species. *Annals and Magazine of Natural History* series 7, 11, 599-600.
- Regan, C.T. (1903b). On the classification of the fishes of the suborder Plectognathi; with notes and descriptions of new species from specimens in the British Museum collection. *Proceedings of the Zoological Society, London 1902* 2(2), 284-303.
- Regan, M.A. (1908). A revision of the sharks of the family Orectolobidae. *Proceedings of the Zoological Society of London* 1908, 347-364.

- Richards, W.J. and Saksena, V.P. (1977). Systematics of the gurnards, genus *Lepidotrigla* (Pisces, Triglidae), from the Indian Ocean. *Bulletin of Marine Science* **27**(2), 208-222.
- Richardson, J. (1839). Descriptions of fishes collected at Port Arthur in Van Diemen's Land. *Proceeding Zoological Society of London* **7**, 95-100.
- Richardson, J. (1842). Contributions to the ichthyology of Australia. *Annals and Magazine of Natural History* **9**, 207-218.
- Richardson, J. (1843). Contributions to the ichthyology of Australia. *Annals and Magazine of Natural History* series 1, **11**, 169-182 and 352-359.
- Richardson, J. (1844-1848). Ichthyology of the voyage of H.M.S. "Erebus and Terror". In Richardson, R. and Gray, J.E. (eds.) *The Zoology of the Voyage of H.M.S. "Erebus and Terror" under the command of Captain Sir J.C. Ross during 1839-1843*.
- Richardson, J. (1849). Description of Australian fish. *Transactions of the Zoological Society London* **3**, 133-185.
- Rofen, R.R. (1966a). Fishes of the Western North Atlantic. Family Paralepididae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 5. (Yale University: New Haven), 205-460.
- Rofen, R.R. (1966b). Fishes of the Western North Atlantic. Family Evermannellidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 5. (Yale University: New Haven), 511-565.
- Rofen, R.R. (1966c). Fishes of the Western North Atlantic. Family Scopelarchidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 5. (Yale University: New Haven), 566-602.
- Rosenblatt, R.H. and Butler, J.L. (1977). The ribbonfish genus *Desmodema* with a description of a new species (Pisces; Trachipteridae). *U.S. National Marine Fisheries Service Fishery Bulletin* **75**(4), 843-856.
- Roughley, T.C. (1916). *Fishes of Australia and their Technology*. (Government Printer: Sydney). 296 pp.
- Roughley, T.C. (1951). *Fish and Fisheries of Australia*. (Angus and Robertson: Sydney). 343 pp.
- Russel, B.C. (1980). Revision of the fish genus *Pseudolabrus* and allied genera (family Labridae) with a phylogenetic analysis of relationships. *Ph.D. Thesis* Macquarie University, Sydney.
- Sazonov, Yu.I. (1978). *Rouleina squamilatera* (Salmoniformes, Alepocephalidae) from the bathyal zone of the Okhotsk Sea new to the fauna of the USSR *Journal of Ichthyology* **18**(4), 670-672.
- Schultz, L.P. (1946). A revision of the genera of mullets, fishes of the family Mugilidae, with descriptions of three new genera. *Proceedings of the United States National Museum* **96**(3204), 377-395.

- Schultz, L.P. (1957). The frogfishes of the family Antennariidae. *Proceedings of the United States National Museum* **107**(3383), 47-105.
- Schultz, L.P. (1964). Fishes of the Western North Atlantic. Family Sternoptychidae. *Memoirs of the Sears Foundation for Marine Research* No. 1. Part 4. (Yale University: New Haven), 241-272.
- Schultz, L.P. (1966). Family Platycephalidae: flatheads. pp 45-62. In Shultz, L.P., Woods, L. P. and Lachner, E.A. "Fishes of the Marshall and Marianas Islands II." *Bulletin of the United States National Museum* **202**(3), 1-176.
- Schultz, L.P. (1968). Four new fishes of the genus *Parapercis* with notes on other species from the Indo-Pacific area (family Mugiloididae). *Proceedings of the United States National Museum* **124**(3636), 1-16.
- Scott, E.O.G. (1934). Observations of some Tasmanian fishes with descriptions of new species. *Papers and Proceedings Royal Society Tasmania* **47**, 31-53.
- Scott, E.O.G. (1961). Observations on some Tasmanian fishes. Part X. *Papers and Proceedings Royal Society Tasmania* **95**, 49-65.
- Scott, E.O.G. (1964). Observations on some Tasmanian Fishes. Part XII. *Papers and Proceedings Royal Society Tasmania* **98**, 85-106.
- Scott, E.O.G. (1969). Description of *Brachaluteres wolferi*, sp. nov. (Aluteridae) and first Tasmanian record of *Urolophus paucimaculatus* Dixon, 1969 (Urolophidae). *Papers and Proceedings Royal Society Tasmania* **103**, 35-45.
- Scott, E.O.G. (1974). Observations on some Tasmanian fishes. Part 19. *Papers and Proceedings Royal Society Tasmania* **107**, 247-292.
- Scott, E.O.G. (1982). Observations on some Tasmanian fishes. Part 28. *Papers and Proceedings Royal Society Tasmania* **116**, 181-217.
- Scott, E.O.G. (1983). Observations on some Tasmanian fishes. Part 29. *Papers and Proceedings Royal Society Tasmania* **117**, 167-202.
- Scott, J.K. (1976). A review of the fish genus *Neoodax* (Odacidae) of Western Australia with description of a closely allied new genus and species. *Records of the West Australian Museum* **4**, 349-73.
- Scott, T.D. (1954). Four new fishes from South Australia. *Records of the South Australian Museum* **11**(2), 105-112.
- Scott, T.D., Glover, C.J.M. and Southcott, R.V. (1974). *The Marine and Freshwater Fishes of South Australia*. Second Edition. (Government Printer: Adelaide). 392 pp.

- Smith, D.G. (1971). Osteology and relationship of the congrid eels of the western North Atlantic (Pisces, Anguilliformes). *Phd. Thesis* University of Miami. 163 pp.
- Smith, J.L.B. (1951). The fishes of the family Veliferidae from south-east Africa. *Annals and Magazine of Natural History* series 12, **4**, 497-510.
- Smith, J.L.B. (1960). *Oreosoma atlanticum* Cuvier, 1829 in South Africa with notes on other zeid fishes. *Annals and Magazine of Natural History* series 13, **3**(33), 565-569.
- Smith, M.M. (1980). A review of the South African cheilodactylid fishes (Pisces: Perciformes), with descriptions of two new species. *J.L.B. Smith Institute of Ichthyology Ichthyological Bulletin* No. 42. 14 pp.
- Springer, S. (1979). A revision of the catsharks, family Scyliorhinidae. *NOAA Technical Report NMFS Circular* **422**. 152 pp.
- Stead, D.G. (1908a). *New Fishes from New South Wales No. 1*. (Department of Fisheries: New South Wales). 12 pp.
- Stead, D.G. (1908b). *The beaked salmon · Gonorhynchus gonorhynchus (Linnaeus) and its distribution in the waters of N.S.W.* (Department of Fisheries: New South Wales). 8 pp.
- Steene, R.C. (1978). *Butterfly and Angelfishes of the World*. Vol. 1. Australia. (A.H. & A.W.Reed Pty.Ltd.: Sydney). 144 pp.
- Stehmann, M. and McEachran, J.D. (1978). Batoid fishes. In Fischer, W. (Ed.), *FAO Species Identification Sheets for Fishery Purposes. Western Central Atlantic (Fishing Area 31)*. Vol. V. (FAO: Rome). page various.
- Stephenson, A.B. and Robertson, D.A. (1977). The New Zealand species of *Trachurus* Pisces: Carangidae). *Journal of the Royal Society of New Zealand* **7**, 243-53.
- Stevens, J.D., Dunning, M.C. and Machida, S. (1983). Occurrence of the porbeagle shark, *Lamna nasus*, in the Tasman Sea. *Japanese Journal of Ichthyology* **30**(3), 301-307.
- Stevens, J.D. and Paxton, J.R. (1985). A new record of the goblin shark, *Mitsukurina owstoni* (Family Mitsukurinidae), from eastern Australia. *Proceedings of the Linnean Society of N.S.W.* in press.
- Strahan, R. (1975). *Eptatretus longipinnis*, n. sp., a new hagfish (family Eptatretidae) from South Australia, with a key to the 5-7 gilled Eptatretidae. *Australian Zoologist* **18**, 137-48.
- Suzuki, K. (1962). Anatomical and taxonomical studies on the carangid fishes of Japan. *Report of the Faculty of Fisheries, Prefectural University of Mie* **4**, 43-232.

- Temminck, C.J. and Schlegel, H. (1850). *Fauna Japonica, Pisces.* (Leiden). 323 pp.
- Thomas, P.A. (1969). Goatfishes (family Mullidae) of the Indian Seas. *Marine Biological Association of India, Memoirs III*, 1-174.
- Thomson, J.M. (1954). The Mugilidae of Australia and adjacent seas. *Australian Journal of Marine and Freshwater Research* **5**(1), 70-131.
- Thomson, J.H. (1984). Mugilidae. In Fischer, W. & Bianchi, G. (Eds.), *FAO Species Identification Sheets for Fishery Purposes. Western Indian Ocean (Fishing Area 51)*. Vol. III. (FAO: Rome). page various.
- Tominaga, Y. (1968). Internal morphology, mutual relationships and systematic position of the fishes belonging to the family Pempheridae. *Japanese Journal of Ichthyology* **15**(2), 43-95.
- Trewavas, E. (1977). The sciaenid fishes (croakers or drums) of the Indo-West Pacific. *Transactions of the Zoological Society of London* **33**(4), 253-541.
- Trunov, I.A. (1982). Species of the family Regalecidae (Lampridiformes) from the south eastern Atlantic Ocean. *Journal of Ichthyology* **22**(1), 1-6.
- Tucker, D.W. (1956). Studies on the trichiurid fishes 3: a preliminary revision of the family Trichiuridae. *Bulletin of the British Museum (Natural History) Zoology* **4**(3), 73-130.
- Tyler, J.C. (1980). Osteology, phylogeny and higher classification of the fishes of the order Plectognathi (Tetraodontiformes). *NOAA Technical Report NMFS Circular* **434**. 422 pp.
- Waite, E.R. (1899). Scientific results of the trawling expedition of H.M.C.S. "Thetis". Fishes. *Australian Museum Memoir* **4**, **1**, 1-132.
- Waite, E.R. (1900). Notes on fishes from Western Australian and description of a new species. *Records of the Australian Museum* **3**(7), 212-216.
- Waite, E.R. (1903). New records or recurrences of rare fishes from eastern Australia, No. 2. *Records of the Australian Museum* **5**(1), 56-61.
- Waite, E.R. (1904). New records or recurrences of rare fishes from Eastern Australia, No. 3. *Records of the Australian Museum* **5**(4), 231-244.
- Waite, E.R. (1905). Notes on fishes from Western Australia No. 3. *Records of the Australian Museum* **6**(2), 55-82.
- Waite, E.R. (1906). Description of and notes on some Australian and Tasmanian fishes. *Records of the Australian Museum* **6**(3), 194-210.

- Waite, E.R. (1911). Scientific results of the New Zealand government trawling expedition, 1907. Pisces, Part 2. *Records of the Canterbury Museum* **1**(3), 157-272.
- Waite, E.R. (1914). Notes on New Zealand fishes No. 4. *Transactions of the New Zealand Institute* **46**(4), 127-131.
- Waite, E.R. (1921). Illustrated Catalogue of the fishes of South Australia *Records of the South Australian Museum* **2**(1), 1-208.
- Waite, E.R. and McCulloch, A.R. (1915). The fishes of the South Australian government trawling cruise, 1914. *Transactions of the Royal Society of South Australia* **39**, 455-476.
- Wallace, J.H. (1967). The batoid fishes of the East Coast of Southern Africa. Part II: manta, eagle, duckbill, cownose, butterfly and sting rays. *The Oceanographic Research Institute: Durban, Investigational Report* No. 16, 1-56.
- Walters, V. (1960). Synopsis of the lampridiform suborder Veliferoidei. *Copeia* 1960**(3)**, 245-247.
- Walters, V. and Fitch, J.E. (1960). The families and genera of the lampridiform (Allotriognath) suborder Trachipteroidea. *Californian Fish and Game* **46**, 441-451.
- Weber, M. and de Beaufort, L.F. (1922). *The Fishes of the Indo-Australian Archipelago*. Vol. 4 (E.J. Brill Ltd.: Leiden). 410 pp.
- Weber, M. and de Beaufort, L.F. (1929). *The Fishes of the Indo-Australian Archipelago*. Vol. 5 (E.J. Brill Ltd.: Leiden). 457 pp.
- Weber, M. and de Beaufort, L.F. (1931). *The Fishes of the Indo-Australian Archipelago*. Vol. 6 (E.J. Brill Ltd.: Leiden). 448 pp.
- Weitzman, S.H. (1967). The osteology and relationships of the Astronesthidae, a family of oceanic fishes. *Dana Report* No. 71. 54 pp.
- Weitzman, S.H. (1974). Osteology and evolutionary relationships of the Sternoptychidae, with a new classification of stomiatoid families. *Bulletin of the American Museum of Natural History* **153**(article 3), 327-478.
- Whitehead, P.J.P. (1963). A revision of the recent round herrings (Pisces : Dussumieriidae). *Bulletin of the British Museum Natural History* **10**(6), 305-380.
- Whitehead, P.J.P. (1974). Family Clupeidae. In Fischer, W. and Whitehead, P.J.P. (ed.), *FAO Species Identification Sheets for Fishery Purposes. Eastern Indian Ocean (Fishing Area 57) and Western Central Pacific (Fishing Area 71)*. Vol. 1. (FAO: Rome). page various.

- Whitley, G.P. (1927). Studies in ichthyology No. 1. *Records of the Australia Museum* **15**(5), 289-304.
- Whitley, G.P. (1928). Studies in ichthyology No. 2. *Records of the Australia Museum* **16**(4), 211-239.
- Whitley, G.P. (1929). Additions to the checklist of the fishes of New South Wales. *Australian Zoologist* **5**, 353-357.
- Whitley, G.P. (1931a). Studies in ichthyology No. 4. *Records of the Australia Museum* **18**(3), 96-133.
- Whitley, G.P. (1931b). Studies in ichthyology No. 5. *Records of the Australia Museum* **18**(4), 138-160.
- Whitley, G.P. (1931c). New names for Australian fishes. *Australian Zoologist* **6**, 310-334.
- Whitley, G.P. (1932). Studies in ichthyology No. 6. *Records of the Australia Museum* **18**(6), 314-348.
- Whitley, G.P. (1933). Studies in ichthyology No. 7. *Records of the Australia Museum* **16**(1), 60-112.
- Whitley, G.P. (1939). Taxonomic notes on sharks and rays. *Australian Zoologist* **9**(3), 227-262.
- Whitley, G.P. (1940a). *The Fishes of Australia. Part 1. The Sharks, Rays, Devil-fish and other Primitive Fishes of Australia and New Zealand.* (Royal Zoological Society of New South Wales: Sydney). 288 pp.
- Whitley, G.P. (1940b). Illustrations of some Australian fishes. *The Australian Zoologist* **7**, 397-428.
- Whitley, G.P. (1941). Ichthyological notes and illustrations. *Australian Zoologist* **10**(1), 1-50.
- Whitley, G.P. (1943). A new Australian shark. *Records of the South Australia Museum* **7**(4), 397-399.
- Whitley, G.P. (1944a). New sharks and fishes from Western Australia. *The Australian Zoologist* **10**(3), 252-273.
- Whitley, G.P. (1945). New sharks and fishes from Western Australia. *Australian Zoologist* **11**(1), 1-42.
- Whitley, G.P. (1948). Studies in ichthyology No. 13. *Records of the Australia Museum* **22**(1), 70-94.
- Whitley, G.P. and Allan, J. (1958). *The Sea-Horse and its Relatives.* (Georgian House: Melbourne). 84 pp.

- Williams, F. (1959). The barracudas (genus *Sphyaena*) in British East African waters. *Annals and Magazine of Natural History* **2** series 13, 92-128.
- Winterbottom, R. and Tyler, J.C. (1983). Phylogenetic relationships of aracania genera of boxfishes (Ostraciidae: Tetraodontiformes). *Copeia* 1983(4), 902-917.
- Wisner, R.L. (1974). The taxonomy and distribution of lanternfishes (family Myctophidae) of the eastern Pacific Ocean. *Navy Ocean Research and Development Activity (NORDA) Report 3*, Scripps Institution of Oceanography, San Diego. 229 pp.
- Wongratana, T. (1983). Diagnoses of 24 new species and proposal of a new name for a species of Indo-Pacific clupeoid fishes. *Japanese Journal of Ichthyology* **29**(4), 385-407.
- Woods, L.P. and Sonoda, P.M. (1973). Fishes of the North West Atlantic. Order Berycomorphi (Beryciformes). *Memoir of the Sears Foundation for Marine Research* No. 1. Part 6. (Yale University: New Haven), pp 263-396.
- Yasuda, F. and Mizuguchi, K. (1969). Specific characters of three sparid fishes referred to the genus *Chrysophyrus* in the Indo-Pacific. *Japanese Journal of Ichthyology* **16**(1), 24-30.
- Yoshida, H.O. (1980). Synopsis of biological data on bonitos of the genus *Sarda*. NOAA Technical Report NMFS Circular **432**. 50 pp.

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