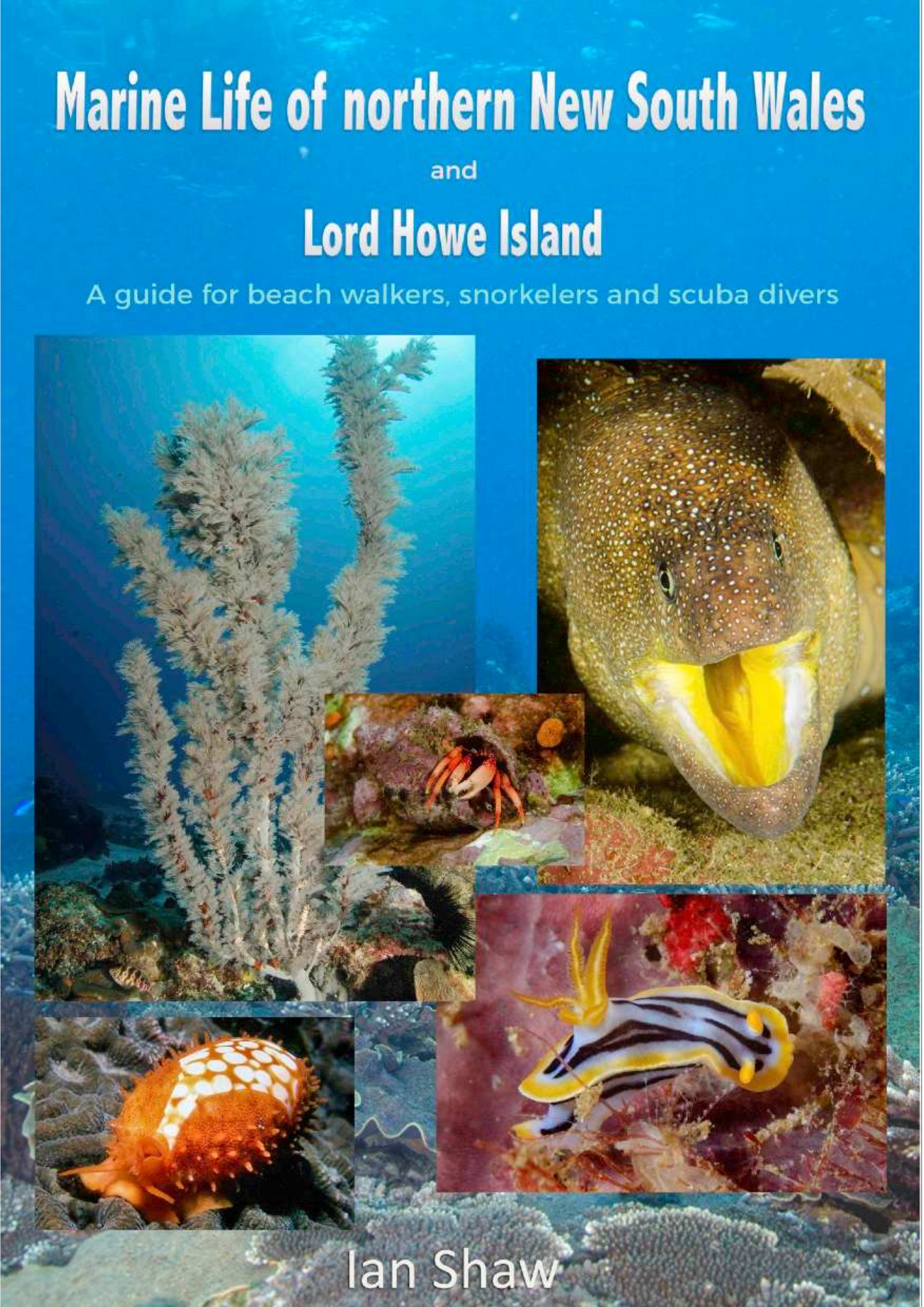

Marine life of northern New South Wales

and

Lord Howe Island

A guide for beach walkers, snorkelers and scuba divers

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Marine Life of northern New South Wales and Lord Howe Island.

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INTRODUCTION

This guide is intended to provide a quick reference to help identify some of the more common, along with some less common, marine species encountered by beach walkers, rockpoolers, snorkelers and scuba divers on the north coast of New South Wales and Lord Howe Island.

It came about as a result of my attempts to identify many of the species I had photographed over a number of decades, scuba diving and rock-pooling in the northern region of the state, in particular, at the Solitary Islands near Coffs Harbour. Online resources have made it possible to identify many of the more obscure subjects, and this book grew to be a citizen science project to record the identifications for the many photographs collected over this time.

Unless otherwise noted, all photographs have been taken in situ, and while most of them have been taken in the geographical area covered by the book, others taken outside of this area have been included for the sake of completeness. Each photograph is accompanied by brief text with some characteristics noted that hopefully will aid the reader to make an identification.

Species are organised, in most part, according to the order prescribed by the World Register of Marine Species (WoRMS), a readily accessible on-line database that provides an authoritative and comprehensive list of the world's marine species.

Common names are used sparingly for all species except for fishes, sharks and rays. For these species, the Standard Names of Australian Fishes, CSIRO Marine and Atmospheric Research Paper 009, was used as the reference. Abundances of species in the area covered were taken, where possible, from records in the Atlas of Living Australia on-line database.

Members of two volunteer groups, the Solitary Islands Underwater Research Group (SURG) and Reef Life Survey, (RLS), have demonstrated how the work of citizen scientists can help to educate the wider public and assist in management of the marine environment along our coasts. Being a member of these groups nurtured my interest in the creatures I was encountering, as well as leading me to the realisation there is still so much to learn below the waves.

Mating *Nembrotha purpureolineata* nudibranchs.

Brown algae, brown seaweeds

Brown algae comprise most of the large conspicuous seaweeds on exposed shores, in rivers, and estuaries. These algae are an important food and habitat source for many fish, invertebrates and other small organisms.

Approximately 350 species occur in Australian seas, many of which exist on the northern NSW coastline. Their large size and colouration (many shades of brown through olive-green), often allow for relatively easy recognition, but many still require examination of the cellular layers to determine species.

Brown algae vary significantly in size from single-cell-width filaments to the giant kelp, *Macrocystis* sp., which may form forests up to 20 m high. Many species incorporate pneumatocysts, (float-like structures), giving the thalli buoyancy and elevating the structures into the water column.

Brown algae grow in various habitats and may be attached to hard substrate by a holdfast, as in the kelps and sargassums, or as epiphytes on other algae and seagrasses.

Family - DICTYOTACEAE ***Dictyota* sp.**

Members of this genus generally have a branched, flattened thallus which is of similar width throughout. Growth forms vary. Some are semi-prostrate, others erect in habit. Members of this genus are difficult to identify to species level by appearance alone. Most species are common and found to depths of at least 25 m.

Family - DICTYOTACEAE ***Lobophora* sp.**

Flattened fan-shaped thalli, growth forms varying according to the conditions under which they grow. In shallow locations, thalli grow closer to the substrate, deeper water individuals are more upright in form. Often in association with coral reefs where it may be abundant. Thallus length to 14 cm. Rock, rubble, depth to 11 m.

Family - DICTYOTACEAE
***Padina* sp.**

Usually has flattened, fan-shaped fronds, either complete or split longitudinally, with concentric markings and with an in-rolled margin. *Padina* is one of only two genera that are lightly calcified, and generally only on one surface, visible as a white layer. Separate species are distinguished by internal features such as number of cell layers. Thallus length to 11 cm. Intertidal and shallow subtidal areas, estuaries. Depth to 12 m. Common.

Family - DICTYOTACEAE ***Rugolopteryx marginata***

Crinkleweed has a flattened, forked thallus which has regular undulations, giving rise to its common name. Thallus length to 15 cm. Moderately exposed, sand-swept rocky reef. Depth to 8m. Common.

Family - DICTYOTACEAE ***Stypopodium* sp.**

Fan-shaped fronds, which may be divided and overlap to some degree. Young thalli have blue sheen that fades with maturity. Specimen pictured similar to **banded fanweed**, *Stypopodium flabelliforme,* which grows to 9 cm thallus length and occurs on moderately exposed reef to 15 m depth. Common.

Family - SCYTOSIPHONACEAE
***Colpomenia* sp.**

Ballweed is a globular alga usually attached to other seaweeds. Thalli are hemispherical or irregularly lobed with a hollow interior. Sheltered seagrass and reef to 3 m depth. Common.

Family - HORMOSIRACEAE
Hormosira banksii

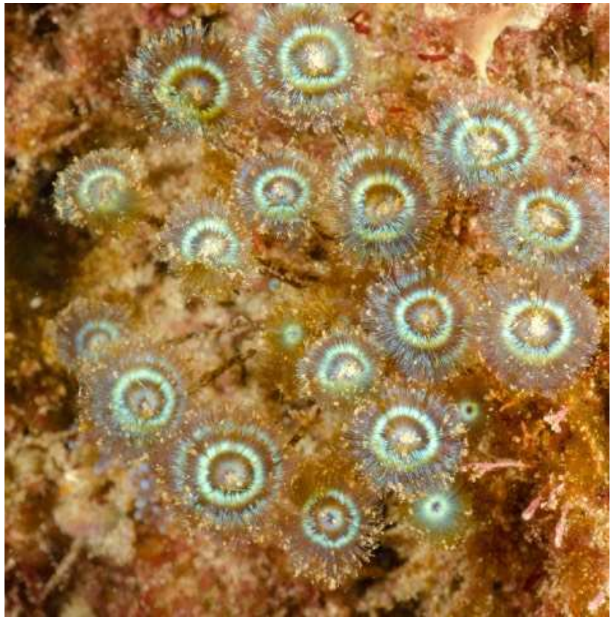
Distinctively shaped, **Neptune's necklace**, is common on sheltered rocky shore intertidal platforms. Thallus grows to 30 cm. Growth is restricted to intertidal zones where it forms large exposed mats at low tide. Common.

Family - SARGASSACEAE ***Sargassum* sp.**

Members of this genus have a short stipe with numerous primary branches. Spherical vesicles are usually present to support the thalli in the water column. Thallus length varies up to 1.5 m depending on species. Sheltered to exposed reef, depth to at least 48 m. Common.

Family - LESSONIACEAE ***Ecklonia radiata***

Common kelp has a thallus comprising a long stipe attached by a holdfast to firm substrate, and bears a flattened blade with lateral branches. The blade is often spiny with a corrugated surface, and total length may reach up to 2 m. Kelp beds are important habitat for the fishing and rock lobster industries. Exposed coasts, depth to 40 m. Abundant in the southern part of its range, although its range appears to be contracting southwards due to global warming and other factors.



Family - SPOROCHNACEAE ***Tomaculopsis herbertiana***

Distinctive species consisting of unbranched stems with flattened plate-like extremities. Apical tufts are iridescent in shades of blue and green. Endemic to sub-tropical eastern Australia, found only between Noosa Heads and Byron Bay. Specimens pictured photographed in 16 m depth. Rare.

Red algae, red seaweeds

Red algae comprise a diverse group of mostly-benthic algae, normally easily recognised by their red colouration, but with a few species being yellow, brown or purple. All red algae contain chlorophyll A, a specific form of chlorophyll that converts light to food via the process of photosynthesis. However, in red algae, the green of the chlorophyll is masked somewhat by a red pigment phycoerythrin.

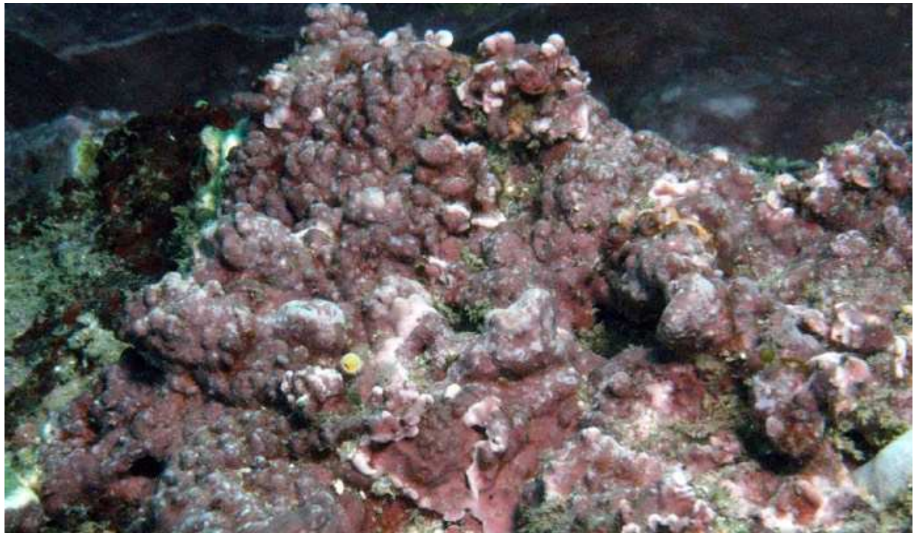
Approximately 1300 species are found in Australian waters, and there is an amazing variety of thallus forms with many spectacular and attractive specimens. Red algae rarely dominate the reef, being usually of small to medium size and never forming extensive beds. Generally, red algae can withstand lower light levels, and they are the dominant large algae in deeper waters, where they may appear deep reddish-purple.

For the most part, identifying individual species requires microscopic examination of cell arrangement and reproductive structures. Many forms, for example sheet-like and branched species, can occur together in one genus, while superficially-similar algae may be only very distantly related.

Photo by Graham Edgar

Family - CORALLINACEAE ***Corallina officinalis***

Pale purple or pink, has pinnately branched fronds with white tips arising from a crustose base. Thallus length to 6 cm. Reef, intertidal to 19 m. Common.



Family - CORALLINACEAE

Encrusting coralline algae forms a thin film over rock and plant surfaces, appearing as a pink or pinkish grey crust. Members of this family have an important role in binding dead corals and other materials into a solid structure. Occurs at depths from intertidal to at least 40 m. Abundant.

Family - LITHOPHYLLACEAE ***Amphiroa anceps***

Articulated, calcified red algae with regularly dividing flattened branches that are generally of equal width throughout. Thallus length to 20 cm, on moderately exposed reef to 12 m depth. Common.

Family - BONNEMAISONIACEAE ***Asparagopsis taxiformis***

Elaborately branched species, thalli resembling asparagus spears or foxtails, emanating from prostrate stolons attached to the reef. Thallus length to 30 cm. Moderately exposed reef, depth to 19 m. Common.

Family - BONNEMAISONICEAE ***Delisea pulchra***

The flattened thallus is much branched, with short spines on alternating positions on the main stem. Grows to 60 cm. Found on sheltered and moderately exposed reef, depth to 25 m. Common.

Family - RHODOMELACEAE
Chondria armata

Recognisable in the field by its leaf-like pattern, with characteristic clusters of short spiny branches at the tips of the thalli. Thallus length to 7 cm. Rocky reef, intertidal to 10 m depth. Common in northern NSW.

Family - SOLIERIACEAE
Solieria robusta

Fleshy thallus, round or slightly compressed in cross section, irregularly branched, lateral branches with a distinct constriction at the base. Generally reddish below with yellow upper branches. Found in areas of moderate to turbulent water movement, from shallow water with high current flow to deeper water. Rocky reef, depth to 20 m. Common.

Photo by Steve Smith

Family - PEYSSONNELIACEAE
***Peyssonnelia* sp.**

This family contains flattened thalli that are often calcified. Attaches to rock or other seaweed surfaces on moderate or sub-maximally exposed reef. Specimen pictured on reef at 15 m depth. Common.

Green algae, green seaweeds

Green algae occur on shallow coastal reefs, from intertidal to relatively shallow subtidal depths. Their shape may vary from fleshy clumps, sheets and beads, to feathery and leafy shapes or filaments. Most species are relatively small but some can be up to a metre in length.

Green algae can be generally recognised by their colour: grass-green or with a slightly greyish hue, never with a yellowish tinge as present on some red or brown algae. The green colouration results from the presence of chlorophyll A and B, and the absence of any accessory pigments.

These algae commonly attached to hard substrate or occur as epiphytes on other organisms. While some families are readily discernible, species identification often requires microscopic examination or DNA sequencing.

In common with other forms of algae, green algae are an important food source and habitat for a variety of fish, crustaceans and molluscs.

Family - BRYOPSIDACEAE
***Bryopsis* sp.**

Thalli of this genus are composed of branched filaments attached to an erect primary axis. Mostly fern-like in appearance with thallus length up to 25 cm. Exposed reef, depth to at least 4 m. Common.

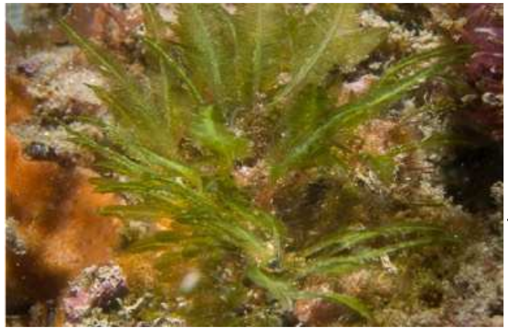


Photo by Steve Smith

Family - CAULERPACEAE
Caulerpa cactoides

Recognised by large, club-shaped vesicles which are constricted towards their base. Thallus length to 40 cm. Sheltered and moderately exposed sand and reef, where it can form extensive meadows. Depth to 38 m. Common.

Family - CAULERPACEAE
Caulerpa filiformis

Localised in the Sydney - Port Stephens areas, with a disjunct population around headlands in the far north of NSW. Thallus has a rounded end and is bright green with a length up to 18 cm. Moderately exposed reef, depth to 8 m. Locally common.

Family - CAULERPACEAE
Caulerpa taxifolia

The pale to bright green upright thalli have pinnate lateral ramuli which are closely set, attached directly opposite each other and upward pointing. A tropical species that has been found to colonise outside of its normal range and has invaded cool temperate waters to the south of NSW. When established it can smother seagrasses. Thallus height to 30 cm. Sheltered reef, sand, seagrass, depth to 50 m. Common.

Family - CAULERPACEAE
***Caulerpa* sp.**

Upright ramuli that broaden into flat topped apices, originating from a creeping stolon. Specimen pictured, possibly *C. chemnitzia,* photographed at depth of 15 m at Lord Howe Island where it is common.

Family - CAULERPACEAE
***Caulerpa* sp.**

Upright stems, densely covered with subspherical vesicles on all sides, generally in rows. Thallus length to 45 mm. Species pictured in tidal pool, possibly *C. lentillifera*. Reef, low tide level to 59 m depth. Common.

Family - CAULERPACEAE
***Caulerpa* sp.**

Members of this genus are recognised by its creeping stolon, with numerous upright fronds, which in this particular species are disc-shaped branches. Species pictured possibly *C. peltata*. Thallus height to 35 mm, photographed in 12 m depth. Common.

Family - CODIACEAE ***Codium duthiae***

Dark green forked branches, with a dense covering of hairs giving a furry appearance. Attaches to hard substrate in shallow water on sheltered reef to 10 m depth. Common at Lord Howe Island and in the south of NSW.

Family - CODIACEAE
***Codium* sp.**

Stout green fronds emanating from a single basal attachment. Has broad flattened branches that may be up to 3 cm diameter and 30 cm high. Specimen pictured possibly ***C. platyclados***. Shallow subtidal sheltered habitats, depth to 20 m. Common.

Family - CODIACEAE
Codium spongiosum

Large, firm, irregularly lobed, sponge-like thalli, with a covering of fine hair-like structures. Often washed up on beaches if dislodged. Thallus up to 14 cm wide. Reef, depth to 30 m. Abundant.


Photo by Bob Edgar

Family - HALIMEDACEAE
***Halimeda* sp.**

All species of *Halimeda* are composed of green, calcified segments. Species pictured possibly ***H. discoidea*** which has a single thallus and a variety of segment shapes. Grows to 20 cm high. Reef, depth of this specimen 12 m. Common in northern NSW.

Family - HALIMEDACEAE
***Halimeda* sp.**

This genus comprises green flattened, disc-shaped, calcified segments, and may form dense colonies. Specimen pictured with intermingling branches possibly ***H. fragilis***. Common on sheltered and exposed rocky reefs, from shallow subtidal to 8 m depth. Common.

Family - UDOTEACEAE
Chlorodesmis major

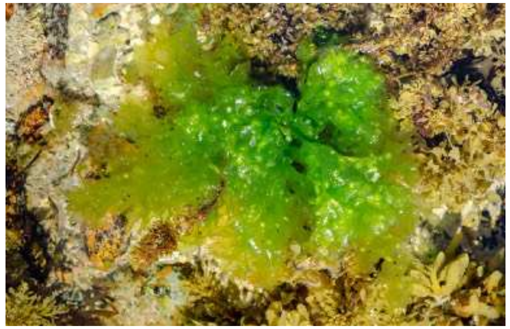
Turtle weed has bright green, hair-like filaments. Common on subtidal exposed reefs and rocks, it provides habitat for various species of sea hare and crustaceans. Thallus grows to 10 cm. Reef, wave exposed shores, depth to 24 m. Common.

Family - VALONIACEAE
***Valoniopsis* sp.**

Medium to dark green, densely packed cylindrical segments, which form firm, cushion-like, clumps. Occasionally washes up on beaches after storm events. Thallus may spread 10 cm or more. Reef, intertidal pools, depth to 5 m. Uncommon.

Family - ULVACEAE
***Ulva* sp.**

Sea Lettuce has bright green leaves, resembling lettuce leaves, which grow to 5 cm. Common on intertidal rocky shores, it is often used as bait by fishers. Rocky reef, intertidal to 5 m depth. Abundant.

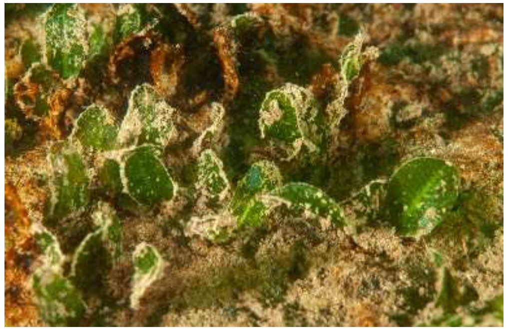


Seagrasses

Seagrasses are flowering plants adapted to living in a marine or estuarine environment. Like terrestrial plants they produce flowers and seeds although these may not be visible to the casual observer. The species shown here each have an extensive system of stolons that are half buried in the sand and can cover large areas of the seabed. They provide valuable habitats for a variety of fish, mollusc and crustacean species.

Family - HYDROCHARITACEAE
Halophila australis

Southern paddlegrass, like other members of this genus, may be recognised by its upright stalks bearing leaves in pairs. Ovate leaves up to 7 cm long, joined to a stolon by a short stalk. Common in estuaries and sheltered bays. Depth to 23 m.



Family - HYDROCHARITACEAE
Halophila ovalis

Oval paddlegrass has a shorter leaf, up to 4 cm long, and forms extensive beds in sheltered or moderately exposed sand. Depth to 10 m. Locally common.

Family - POSIDONIACEAE
Posidonia australis

Strapweed has long, wide leaves, 30 to 60 cm long, and forms extensive beds. Grows rapidly and is important as a nursery habitat and in preventing erosion. Estuaries, sheltered embayments, depth to 15 m. Common.

Family - ZOSTERACEAE
Zostera capricorni

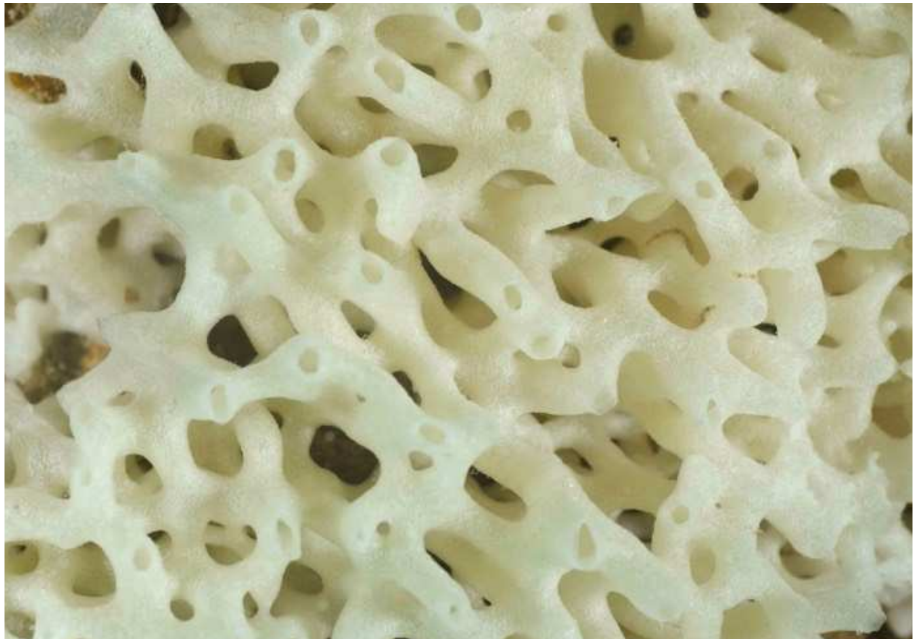
Eelgrass has narrow leaves to 50 cm long, arising directly from the rhizome. May form extensive meadows, which become important habitats for juvenile fish and other species. Sheltered bays, estuaries and rivers, depth to 12 m. Common.

Sponges

Sponges generally are attached to the substrate and vary in shape primarily according to the conditions in which they live. There are about 1500 known species in Australian waters, but it is thought there may be at least double that number, as many remain undescribed.

Sponges act as efficient vacuum cleaners, drawing in many times their own volume in seawater. From this seawater, they filter and feed on food items, and ingest and store waste products and toxins from other organisms and the environment. Sponges convert these into compounds that help repel predators, out-compete competitors or bio-erode dead corals, thus recycling calcium back into the reef system.

Sponges reproduce asexually (via buds and fragmentation) and sexually (with separate sexes or hermaphroditic adults). Identifying many species is difficult, relying on microscopic examination of the skeleton and internal spicules.



Order - CLATHRINIDA?

Firm texture with visible spicules, this calcareous sponge has large numbers of interconnected tubes with large exhalant pores. Specimen pictured, possibly *Leucetta* sp., on rocky reef, 12 m depth. Uncommon.

Family - GRANTIIDAE ***Teichonopsis labyrinthica***

Distinctive growth form with short thick round stem, upright thin laminae which are folded closely together. Colour from cream to grey, grows to around 15 cm across. Specimen pictured on rocky reef, depth 10 m. Uncommon.

Family - SYCETTIDAE
***Sycon* sp.**

A tubular calcareous sponge, where the spicules are made of calcium carbonate rather than silica. This species characterised by the single terminal oscule and the finely papillate and protruding spicules, giving the surface a hairy appearance. Colour may vary from white to cream or pale yellow, their surface texture attracting detritus. May be found among seaweeds and rocks in sheltered waters. Specimen pictured around 7 cm in length, depth 8 m. Uncommon.

Family - DICTYONELLIDAE ***Acanthella cavernosa***

May assume different growth forms including sub-spherical, hand or fan shaped, and globular, and may be bright to pale orange or light brown in colour. Has a rubbery texture with large exhalant pores which are flush with the surrounding surface. Specimen pictured 20 cm across at a of depth 20 m. Common.

Family - CLIONAIDAE ***Cliona* sp.**

Members of this family have various growth forms, from encrusting to raised or massive. They bore into calcareous substrate using chemical and mechanical means. Specimen pictured around 15 cm high, depth 20 m. Common.

Family - CLIONAIDAE
Spheciospongia papillosa

Mustard yellow colour, the surface covered with small bumps and some large projections, which are often overgrown with other organisms. May form massive wall-like structures up to 1 m across. Endemic to northern NSW and southern Qld. Depth to at least 20 m. Common.

Family - CALLYSPONGIIDAE ***Callyspongia manus***

Pale blue or blue-green, the erect fans and digits have a smooth surface with a soft, rubbery, texture. Colony pictured approximately 60 cm across. Moderately exposed rock and coral reef, subtidal to 25 m depth. Common.

Family - CALLYSPONGIIDAE
***Callyspongia* sp.**

Members of this family assume many physical appearances and colours. Apart from flattened finger- or hand-like forms, they occur as bushy tree-like structures, in tube forms, or vase-like structures with spikes and ridges, as shown below. Texture may be soft and flexible, or firm, some species containing sand fragments or spicules. Found on exposed or sheltered reef, depth to at least 47 m. Common.

Family - NIPHATIDAE
***Niphates* sp.**

Growth forms in this family may be encrusting, massive, fan- or vase-shaped and branching. Often there are chimney-like oscular processes as pictured. Surface appears furry, texture is soft. Specimen at left 30 cm across. Reef, depth 15 m. Common.

Family - PETROSIIDAE
Xestospongia testudinaria

Large upright barrel sponge, with smooth interior and deep valleys and ridges on the outside of near-vertical walls. Solid with a rough texture. Usually a deep red-brown colour, may grow to a height of over 2 m in ideal conditions, but usually smaller. Clear reef waters to a depth of 45 m. Uncommon.

Family - PHLOEODICTYIDAE
***Oceanapia* sp.**

Burrowing sponges are characterised by hollow tube-like structures called fistules, which appear above the surface of the substrate. They are often coloured white, yellow or orange. The fistules project, in some cases, centimetres above the surface, often through a layer of encrusting organisms, as in the top photograph. They are attached to the basal root of the sponge, buried below the surface. Relatively common in soft and hard substrates; specimen in lower photograph is part of a large sponge covering over 50 cm, on reef at a depth of 12 m.

Family - MICROCIONIDAE
Clathria (Thalysias) cactiformis

Pale orange or brown and variable in size. Has oscules that vary in size from 1 to 3 mm wide that are usually flush with the surface. Has a firm texture, the surface uneven with bumps and ridges. Common in high current areas, to depths of 100 m.

Family - MICROCIONIDAE
Holopsamma laminaefavosa

Large grey, white or yellow sponge which may take varied forms including massive, hand shaped and lobed. It is arenaceous and brittle, with a honeycomb surface and prominent raised reticulate ridges. Grows to 50 cm on exposed reef. Depth to 80 m. Common.

Family - HALICHONDRIIDAE
***Ciocalypta* sp.**

The base is buried and there are numbers of conical yellow projections each with a thick base and ending in a thin extension with terminal oscules. Texture is firm and easy to break. Sandy or gravel areas amongst reef. Grows to around 20 cm high. Common.

Family - TETHYIDAE
***Tethya* sp.**

Rounded shape, firm texture with raised bumpy surface and longer processes which are asexual buds. Members of this family attach to the substrate with one or a number of short stalks. Specimen pictured about 6 cm across, on reef, depth 6 m. Common.

Family - TETILLIDAE
***Cinachyrella* sp.**

Spherical, grey in colour, usually with sand covering. Has a spiky, firm texture. Specimen pictured about 3 cm diameter, on rocky reef, depth 5 m. Uncommon.

Family - DARWINELLIDAE ***Dendrilla rosea***

Rose sponge has a massive or thickly encrusting growth form, often with upright projections, and is pinkish-mauve in colour. The texture is soft, the uneven surface with prominent conules having soft flexible tips. May grow to at least 40 cm across, specimen pictured about 20 cm. Rocky reef, depth to at least 8 m. Common.

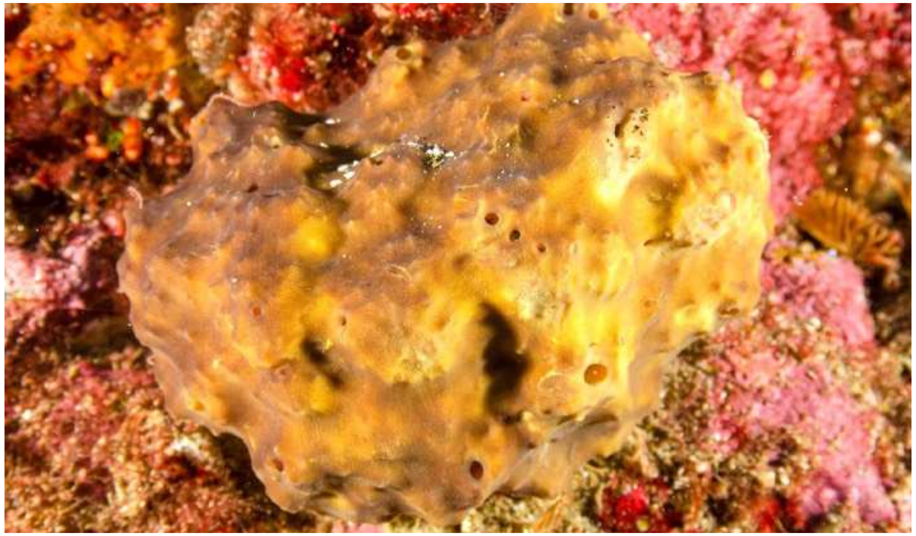
Family - DARWINELLIDAE ***Aplysilla* sp.**
Members of this genus have a sub-spherical and complex branching habit with moderately large oscules with raised lips. Colour is variable, including orange and blue. The specimen pictured, with firm texture and uneven ridged surface, was photographed on rocky reef, depth 15 m. Common.

Family - DARWINELLIDAE ***Darwinella* sp.**

The yellow encrusting sponge illustrated has a soft texture with highly corrugated surface, prominent surface canals and exhalant siphons. Specimen pictured on rocky reef, depth 15 m. Common.

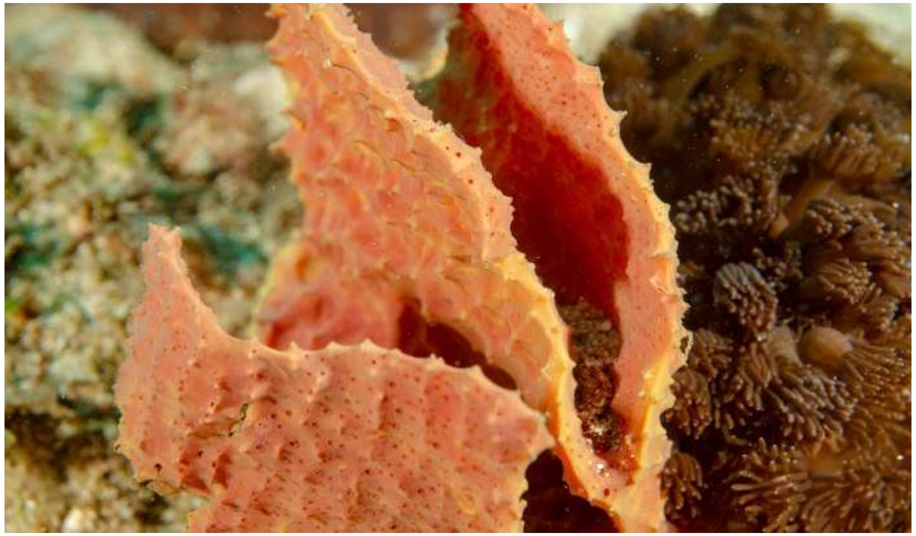
Family - IRCINIIDAE ***Ircinia* sp.**

Members of this family may be cup- or bowl-shaped, thickly encrusting or mounded as shown here. In this specimen, on rocky reef, depth 9m, the oscules are clustered along the ridges, the texture is firm and leathery. Dark grey to brownish-black, often encrusted with other organisms. Common.



Family - APLYSINELLIDAE ***Suberea* sp.**

Massive in form with distinctly conulose surface. The numerous oscules, irregularly sized, are level with the surface. Yellow in colour, with a firm compressible texture and uneven membraneous surface. Specimen pictured on rocky reef, depth 12 m. Common.



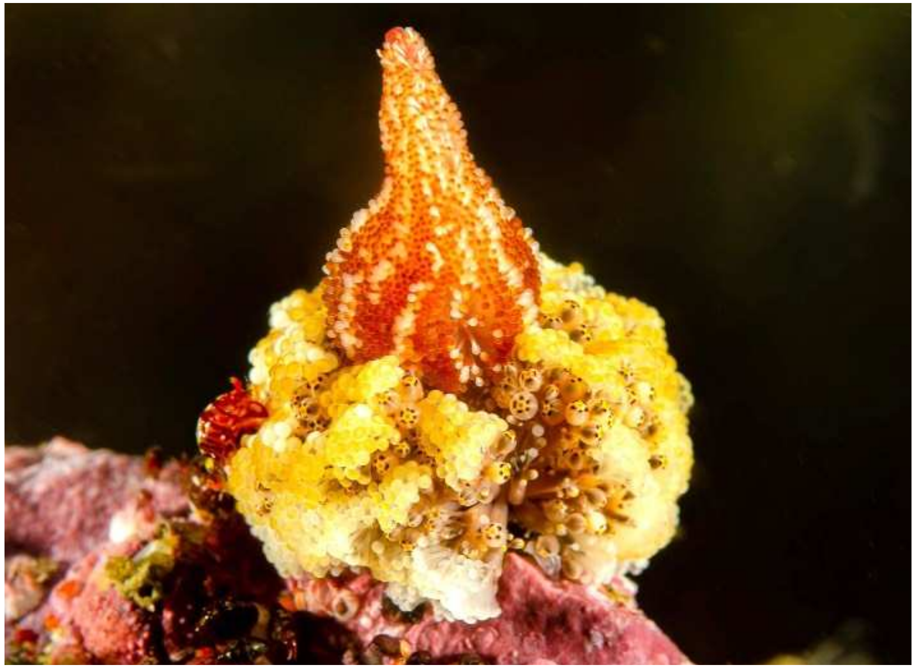
Family - IANTHELLIDAE ***Ianthella quadrangulata***

Has semi-circular irregularly shaped fans, 5 to 10 mm thick, attached to substrate. The surface is smooth with prominent conules, the oscules are small and only on one surface. Orange, yellow or bluish-violet colour. Texture is fleshy, easily torn. Specimen pictured on rocky reef, 9 m depth. Relatively common.

Hydrozoans, hydroids

Hydroids are members of the phylum Cnidaria. This means they possess nematocysts, stinging cells for protection and food collection. Hydroids are a diverse group with a various life cycles and growth forms. Colonial growth forms are those most commonly encountered by divers, with some hydroids forming a single layer of polyps that spread across a substrate, others may be erect structures with polyps growing off the stems.

Many colonies have polymorphic polyps, with different structures reflecting different functions, such as defence, feeding or reproduction. Feeding is by means of stinging nematocysts; the food collected is transferred to the gastric cavity for digestion. Some colonial hydroids have nematocysts capable of giving a nasty sting and should not be handled. Hydroids are a common food source for many nudibranch species; the nematocysts sometimes stored by the nudibranch as a defence mechanism.



Family - CANDELABRIDAE ***Candelabrum australe***

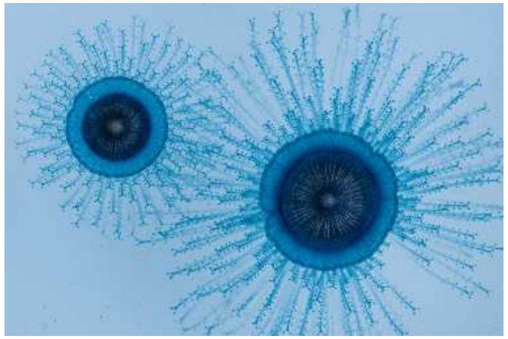
A solitary hydroid usually associated with seaweeds. There are three parts, the basal region by which it attaches to an object, the mid region bearing gonophores, and the head consisting of nematocyst-bearing tentacles, which in this example are folded together and not extended. Depth to 20 m. Rare.

Family - TUBULARIIDAE ***Tubularia* sp.**

Distinctively shaped, these large solitary hydroids have two sets of tentacles, one surrounding the inner mouth, another outer set that bends into the current. There may be up to 100 in a group, usually among other encrusting organisms. Moderately exposed reef, depth to 15 m. Common

Family - PORPITIDAE
Porpita porpita

A flat disc-shaped colony of hydroids surrounded by delicate blue tentacles attached at the periphery. The disc is gas-filled, the tentacles contain nematocysts. The colony feeds on planktonic organisms on the ocean surface. Disc size to 2 cm, rarely larger. Common.



Family - PORPITIDAE
Velella velella

The **By-the-wind Sailor** is a colony consisting of a float with a low angled sail above, and a fringe of feeding tentacles under. There are also reproductive polyps and a mouth. The sail allows it to move on the water at an angle to the wind. Feeds on planktonic organisms. Grows to 7 cm. Common.

Family - AGLAOPHENIIDAE ***Aglaophenia sinuosa***

Brown stems up to 10 cm long, with numerous pale side branches. The central stem reverses repeatedly along its length, giving a distinctive crinkled appearance. Attached to hard substrate. Specimen pictured on rocky reef, depth 9 m. Common.

Family - AGLAOPHENIIDAE ***Macrorhynchia philippina***

White feathery colonies, single or multi-stemmed, up to 45 cm high. Stems are dark with pale grey to white branchlets. Commonly known as fire or stinging hydroid, it should not be handled. Depth to 25 m. Common.

Family - PHYSALIIDAE
Physalia physalis

Bluebottles are not single animals but consist of colonies of four separate specialised individuals. The bladder provides buoyancy, the tentacles detect and capture food, other individuals digest the food, and still others are involved in reproduction. The bladder may measure up to 15 cm, with a trail of tentacles reaching up to 2 m.

Bluebottles drift on the ocean surface, feeding on minute planktonic organisms in the water column. The bladder has aerodynamic properties and sails at a slight angle to the wind.

Bluebottles cause painful stings, and are commonly seen in summer when onshore winds bring them close to shore. Along with By-the-wind sailors (*Velella velella*), and other floating organisms, they are often blown to the coast in large numbers.

Aquarium photo

Anemones

Anemones, members of the phylum Cnidaria, consist of solitary polyps that lack a skeleton. They have a central mouth surrounded by hollow tentacles that radiate outwards in one or more rows. They rely on water pressure for support and become limp and contracted if exposed at low tide. Many are attached to rocky substrates; some live in tubes in sand or mud, and others attach to algae or other invertebrates. They feed on a variety of small prey, such as copepods, crustaceans and fish, collected from the water column by nematocysts in their tentacles.

Tube anemones, of the order Ceriantharia, have bodies encased in sand-encrusted mucus tubes which are mostly buried in soft sediments.

The body is not directly attached to the tube and the anemone quickly retracts if disturbed. They have two sets of tentacles, one set surrounding the mouth, the other set of longer tentacles is arranged around the edge of the disc. They are most closely related to the black corals, (order Antipatharia).

The largest of the tube anemones may have a tube extending as far as 30 cm into the substrate. The long tentacles may measure up to 10 cm.

There are many colour forms and they are widespread around Australia where they are common on muddy or sandy bottoms.

The three specimens pictured here are all unidentified *Cerianthus* sp.

Family - CERIANTHIDAE
Pachycerianthus delwynae

Until recently, two of the most common tube anemones with different patterns of bands or stripes on the tentacles, were thought to be separate species. Recent studies have shown both colour forms are the same species. One has brown outer tentacles which have regular pale banding, and inner tentacles brown to cream. The other has a longitudinal stripe on the outer tentacles. In each the tube is firmly anchored into the substrate and they are often associated with phoronid worms (black feathery gills, pictured). Common in sheltered sandy conditions, estuaries, bays. Depth to 15m.

Family - EDWARDSIIDAE
***Edwardsianthus* sp.**

The **little sand anemone** is a burrowing species with a characteristic pose - the inner five tentacles are often erect over the mouth while the outer tentacles are spread over the substrate. Found on muddy or sandy bottoms. Uncommon.

Family - ACTINIIDAE
Actinia australiensis

The **white-flecked shore anemone** has a flat oral disc, reddish or light brown with white flecks near the base of the tentacles, which have a pale or purplish-coloured tip. The column is red. Intertidal, on and under rocks in surf zone. Uncommon.

Family -ACTINIIDAE
Actinia tenebrosa

The **waratah anemone** has a bright red oral disc and tentacles and is often observed fully retracted at low tide as a dull red blob. It is not until they are fully submerged that their true beauty is revealed. Grow to 4 cm. Common.

Photo by Nicola Fraser

Family - ACTINIIDAE
Aulactinia veratra

Green tentacles surround a brown or green trunk, sometimes with a red mouth. Numerous narrow, smooth tentacles up to 4 cm long. Depth from low tide level to 3 m. Grows to 7 cm column width. Common.

Family - ACTINIIDAE ***Entacmaea quadricolor***

The **bubble-tip anemone** is the most common giant anemone in northern NSW and Lord Howe Island, with numerous tentacles, each often with a bulb at or just below the tip. They are variable in colour, most often greenish or brown. The base is attached to hard substrate, often under rocks. The oral disc measures up to 40 cm across. Clear water, depth to 25 m.

Family - ACTINIIDAE
Oulactis muscosa

The **sand anemone** is found in the bottom and around the sides of rockpools, most of its body in the sand with only the oral disc and tentacles in view. Feeds on small bivalves dislodged by wave action. Mid to low intertidal depth. Grows to 8 cm across. Common.

Family - ACTINIIDAE
Phlyctenactis tuberculosa

The **swimming anemone** is often seen attached to seagrasses or algae where it catches floating prey. Column, up to 15 cm across, consists of numerous brown and blue striped vesicles up to 25 cm long. Depth to 30 m. Common.

Family - ACTINIIDAE ***Phlyctenanthus australis***

The **southern sea anemone** is permanently attached to the substrate. Column up to 10 cm across, blue grey in colour, with short brown tentacles numbering up to 100. Occurs subtidally to 35 m depth, more common in southern NSW.

Family - PHYMANTHIDAE
Heteranthus verruculatus

Disc of various shades of brown with white highlights, small papilliform discal tentacles with longer pointed marginal tentacles. Grows to around 5 cm across. Usually inconspicuous on a rubble bottom in rocky or coral reef. Common.

Family - STICHODACTYLIDAE ***Heteractis crispa***

One of two common giant anemone species in the north of NSW. Its base is attached to a rock or other hard surface, usually embedded deep in the substrate. The tentacle tips are often mauve or blue and the oral disc grows to around 30 cm diameter. The underside of the oral disc has small round protrusions, called verrucae, that adhere to items from the substrate, this feature distinguishing it from the smooth underside of the oral disc of *Entacmaea quadricolor*, also common in this area. Both species host several different symbiont fish and crustaceans, including species of anemonefish, shrimps and porcelain crabs. Prefers clear water, depth to 25 m. Found southwards to around South West Rocks.

Family - AIPTASIIDAE
Exaiptasia diaphana

The **pale anemone** has a pale oral disc surrounded by many fine, banded tentacles. A small species often in large aggregations. Each disc approximately 10 - 15 mm across. Uncommon.

Family - ALICIIDAE
Triactis producta

A small anemone, up to 15 mm in height, with characteristic vesicles (spherical bumps) that are dense with nematocysts. Occur in closely packed aggregations, depth to 30 m, but mostly shallower, 1 to 5 m. Common.

Family - ANDVAKIIDAE ***Telmatactis* sp.**

Oral disc marbled with browns and greys, only a few bulbed tentacles are on the disc itself, with many more on the disc margin. Rocky and coral reef, grows to around 75 mm. Depth to at least 8 m. Common.

Family - HORMATHIIDAE
***Calliactis* sp.**

Attaches to floating objects, and is often attached by some hermit crab species to their shell. Brown column with cream stripes, the oral disc is brownish, the tentacles plain or banded. Discharges threads containing nematocysts as a defensive mechanism. Common.

Family - NEMANTHIDAE
***Nemanthus* sp.**

Wandering sea-anemones are often seen attached to sea whips, hydroids or black coral trees in deeper water. There are various colour forms, some are pure white and others with stripes or spots, and they often occur in large numbers. Disc width around 3 cm. Depth to at least 35 m.

Photo by Steve Smith

Family - SAGARTIIDAE
Anthothoe albocincta

The **white striped anemone** has distinctive white stripes on its column, and the oral disc may be green or orange. Up to 200 short white or pale tentacles. Column width up to 3 cm. Common on rocky shores and man-made structures, depth to 40 m.

Family - CORALLIMORPHIDAE
Corynactis australis

The **jewel anemone** forms large colonies, sheets of polyps joined to a single base, often covering large areas. Tentacles have a small, light-coloured round tip. Polyps to 15 mm, coloured pink, purple, orange and brown. Reef and man-made structures to 30 m depth.

Family - DISCOSOMIDAE
***Rhodactis* sp.**

Known as a **corallimorph** or **hairy mushroom anemone**, this family looks like an anemone but is more closely related to the corals. The flat disc is typically 15 to 20 cm across, may be green through shades of grey and brown and they have numerous short tentacles. Colonies may be quite large and in ideal conditions can smother large areas of reef. Common in the Solitary Islands, depth to 20 m.

Zoanthids

Zoanthids belong to an order of Cnidarians that superficially resemble small anemones. They can usually be distinguished from anemones by their tentacles, which are in one or two rows around the disc margin, and by the characteristic incorporation of sand and other small material into their structure. They may be solitary and attached to the substrate by a fleshy stolon, or in the form of a mat which interconnects the bases of colonial types. They feed by capturing plankton from the environment or on the products of photosynthesis from zooxanthellae in their tissues.

Family - SPHENOPIDAE
Palythoa mutuki

Variable in shape and colour, the oral disc of which is brown, green, white or purple. May have extended polyps on a short stalk. Often has sand incorporated into the body giving it a rough leathery texture. Common in high surge areas of exposed rocky or rubble reef, where it can cover large areas. Low intertidal to a depth to 15 m. Common.

Family - SPHENOPIDAE
Palythoa tuberculosa

Consists of a colony of large individual polyps, in a mat-like structure which has sand or other material incorporated into it. Common in high surge areas of low intertidal rocky shores, depth to 15 m. Colonies up to 40 cm across. Common.

Family - ZOANTHIDAE
Isaurus cliftoni

Occurs in large aggregations of sausage-like individuals, usually on soft substrate adjacent to rocky reef. The column may be green or khaki, with white specks, blotches or stripes, and measure up to 6 cm in length. The tentacles retract when disturbed or not feeding. A hard shell mollusc, *Heliacus* sp., is known to feed on this species. Depth to 10 m. Uncommon.

Family - ZOANTHIDAE
Isaurus tuberculatus

Pale brown with knobbly appearance, often in small aggregations attached to the substrate. Sphincter tightly closed and tentacles not visible unless feeding. Rocky reef, depth to 20 m. Uncommon.

Family - EPIZOANTHIDAE
Epizoanthus sabulosus

The grey polyps of this family are small and encrusting on other organisms, especially sponges. Common in a variety of intertidal and subtidal habitats. Polyps up to 8 mm long. Depth to at least 12 mm. Common.

Black corals

Belonging to the phylum Cnidaria, black corals may be whip- or spiral-shaped, others tree-like, with slender, delicate branches and thicker central stems. The rigid central skeleton of the stems and branches is covered with a thin layer of living tissue that supports the many polyps. Most are commonly found on deeper rocky or coral reefs in areas of high current flow.

Family - ANTIPATHIDAE ***Cupressopathes* sp.** BLACK CORAL TREE

Black corals are so named because the central skeleton of the branches is made from a rigid black horny substance which is sometimes polished and used for jewellery. Members of this family are common throughout the region, and colonies may reach over 1.5 m in length. They host many species of shrimp, fish and often the red-coloured snake star, *Astrobrachion constrictum,* is visible entwined around the branches, as above. Depth from 10 to at least 35 m.

Spiral black coral ***Cirrhipathes* sp.** above. May be yellow, green, brown or orange. Home to various goby and crustacean species. Grows to 2 m length, depth to 475 m. Common.

Hard corals

Hard corals, members of the phylum Cnidaria, are anemone-like animals living within a hard calcareous skeleton. Our region has both reef-building and non reef-building species, which take many forms. These forms include encrusting, branching, massive and individual solitary polyps. Coral tissues contain photosynthetic symbiont algae known as zooxanthellae which provide food to the coral. These algae are particularly susceptible to high water temperatures and their loss may cause the death of the coral colony.

Family - ACROPORIDAE
Acropora glauca

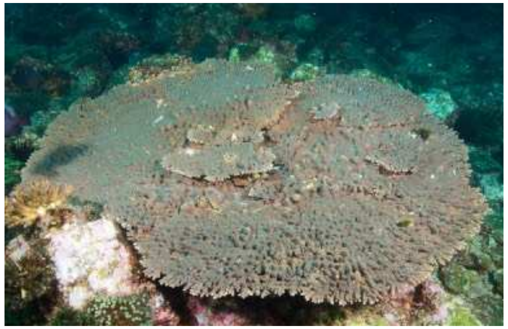
Variable colouration, cream, brown or green. Colonies consist of flat, fused, horizontal branches forming plates, with or without upward branches. Common in shallow subtropical waters.

Family - ACROPORIDAE
Acropora robusta

Irregularly shaped colonies, often with thick conical branches at the centre, and thinner upturned branches at the periphery. Radial corallites are smaller than the axial corallites and are rasp-like in appearance (see lower photograph).

Colour variable from bright green to yellow or pink-brown with lighter branch tips.

Common in shallow reef environments in subtropical waters of the northern part of the state.



Family - ACROPORIDAE
Acropora solitaryensis

Colonies are dark green or brown and consist of a horizontal perforated or solid plate with irregular upright branchlets.

Very common in the Solitary Islands where colonies in protected shallow waters may exceed 2 m in width.

Family - ACROPORIDAE
***Acropora* sp.**

Colonies consist of short fused horizontal branches with short vertical branchlets. Radial corallites are usually in neat rows. Colours vary from cream to pale brown or greenish brown. Common.

Family - ACROPORIDAE
***Montipora* sp.**

Colonies may be submassive, laminar, foliaceous, encrusting or branching in form, and their colours range from cream through brown, purple, pink, green and blue. Characterised by having the smallest corallites of all corals.

Family - DENDROPHYLLIIDAE
Australopsammia aurea

Small groups of polyps, up to 2 cm wide, fused at the base rather than solitary. The polyps are elliptical, and up to 2 cm across. The tentacles are transparent orange with groups of nematocysts visible. Specimens pictured on rocky reef at 10 m depth. Common.

Family - DENDROPHYLLIIDAE
Balanophyllia bairdiana

A solitary coral which is elliptical in cross-section, tapering at the base. Polyps may be orange, white or pink and the polyp width is up to 2 cm. The tentacles are transparent with groups of coloured nematocysts. Prefers areas of low light, depth up to 70 m. Common.

Family - DENDROPHYLLIIDAE
Tubastraea coccinea

Sunshine coral has fleshy orange polyps up to 12 mm across, these often extended during the day. Often identified as *T. faulkneri,* which is considered a synonym of *T. coccinea* rather than two separate species. Depth to at least 40 m. Common in caves, shaded areas.

Family - DENDROPHYLLIIDAE
Tubastraea diaphana

Corallites are large and dark green; the fleshy polyps are usually only exposed at night. Most often found in caves or in the shadows of reefs and overhangs. Rocky, coral reef, depth to 30 m. Common.

Family - DENDROPHYLLIIDAE
Turbinaria frondens

Colonies, initially cup-shaped, are very variable in size and form, spreading into broad upright or horizontal fronds, sometimes irregularly contorted.
The colony overall can be massive, columnar, encrusting, cup-shaped or leaf-like. The corallites may be immersed or long and tubular. Colonies are coloured greenish-brown, yellowish to grey. Common on shallow and deeper water reefs to 20 m.

Family - DENDROPHYLLIIDAE
Turbinaria mesenterina

Variable growth form, depending on light, depth and turbidity. Sometimes convoluted and upright, vase-like or horizontal as the depth increases. May be the dominant species in shallow turbid habitats. Up to 1 m across.

Family - LOBOPHYLLIIDAE
Micromussa lordhowensis

Very conspicuous, fleshy polyps which may be red, purple or green in colour. Colonies up to 1.5 m across. Very common in northern NSW, often in shallow subtidal rockpools.

Family - MERULINIDAE ***Hydnophora* sp.**

The genus has a variety of growth forms - massive, encrusting or arborescent (elongate tree-like branches). Polyps are usually only extended at night and colours may be cream, dull green-brown or grey. Found in a variety of sheltered areas such as lagoons and reef flats protected from strong wave action.

Family - MERULINIDAE ***Paragoniastrea australensis***

Variable in colour, usually dull green or brown and with valley walls and floors of differing dull or bright colours. Colonies may be submassive or encrusting and are sometimes the dominant species on temperate reefs. Found in shallow, clear waters.

Family - POCILLOPORIDAE
Pocillopora aliciae

Hardy and widespread, colour varies from cream, brown and pink to green and blue. Colonies have robust flattened branches with rounded ends. Similar *P. damicornis* (not shown) has finer, more pointed branches. Depth to at least 15 m. Common.

Family - PORITIDAE
***Goniopora* sp.**

Colonies are columnar, massive or less commonly encrusting. The polyps are normally extended day and night and are long and fleshy, sometimes extending up to 40 cm. This is an aggressive species and it is unusual to see other coral species growing close by. Commonly found in sheltered turbid areas protected from strong wave action. Depth to at least 15 m. Common.

Soft corals, gorgonians and sea pens

Soft corals, gorgonians, and sea pens are members of the phylum Cnidaria, and all have polyps with eight tentacles. They take many forms for example, soft corals may be leathery and knobbed or finger-like and flexible, while gorgonians may have few branches or many. Sea pens consist of a primary polyp with secondary polyps attached, and mostly spend daylight hours buried in soft substrate. Sea pens emerge at night, erecting their feathery secondary polyps to feed.

Family - ALCYONIIDAE
Lobophytum crassum

Rubbery texture with thick lobes branching into small knobs or fingers. Pale cream or brown with a spotty appearance as polyps are often retracted. Clear water shallow reefs, depth to 15 m. Uncommon.

Family - ALCYONIIDAE
***Sarcophyton* sp.**

This genus comprises over 40 species of soft coral. They are attached to the substrate by a rounded trunk, the flattened top section, the capitulum, covered with many polyps. The capitulum is commonly cream or light brown but may be pinkish, yellow or green, the polyps a similar colour but usually with lighter-coloured tips or tentacles. Members of this genus have a firm rubbery texture with distinct folding around the edges. They are commonly preyed upon by on by several species of mollusc, see *Ovula costellata* on *S. tortuosum* at left. Grows to at least 1 m in shallow reefs, clear water. Depth to 16 m. Common in the Solitary Islands.

Family - ALCYONIIDAE
Sinularia flexibilis

Colonies of finger-like branched lobes, which may be brown to grey-black, soft and fleshy to the touch. A filter feeder that possesses zooxanthellae, it may grow to more than 1 m across. Reefs, depth to 20 m. Common in the north of NSW.

Family - NEPHTHEIDAE
***Dendronephthya* sp.**

Single pale stem developing a branch-like structure with massed spiky polyps, typically orange or bright red. Host to many commensal species including species of ovulids. Reef, exposed and sheltered waters. Depth to about 15 m. Uncommon.

Family - XENIIDAE ***Xenia* sp.**

Large grey-brown flower-like polyps that rhythmically open and close while feeding. The colonies grow in small to medium-sized clumps on hard substrate, and are home to many types of small invertebrates. Depth to 20 m. Common.

Gorgonians come in many colours, shapes and sizes. ***Euplexaura* sp.** (left) form branches with no, or few, branchlets, ***Melithaea ellisi*** (above) are small fan-like structures usually on the sides of rocks or under rock overhangs. Others of this Genus, as below, may measure more than 1 m across. Common in reef areas, often on the side of gutters and drop offs and other high current areas. Depth to 30 m.

Family - CLAVULARIIDAE
***Carijoa* sp.**

Colonies consisting of numerous lateral polyps arising from a long central polyp with a root-like base. The central polyp, or stem, is usually covered with an orange encrusting sponge. Lateral polyps are always white, grows to around 25 cm. Depth to 20 m. Common.

Family - VERETILLIDAE
Cavernularia obesa

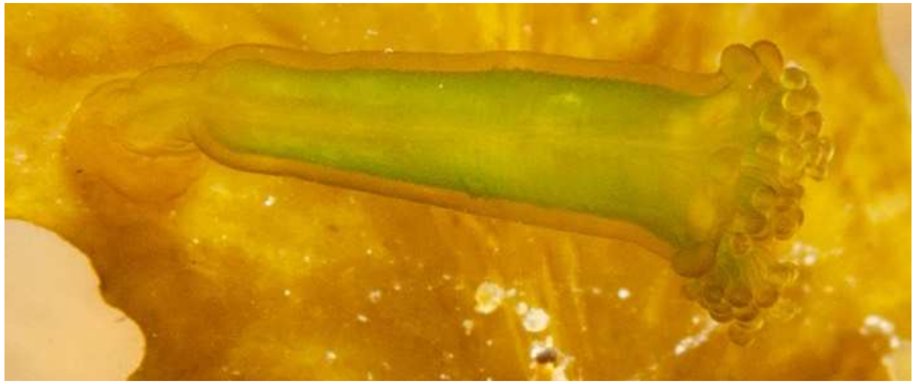
The **fat sea pen** is rarely sighted by divers during the day, as it usually remains buried in the sand. Sea pens consist of a primary polyp, or stalk, with secondary polyps arranged around the outside to gather food. In this species the outside polyps are feathery and large. Sea pens are prey to a variety of nudibranchs, especially members of the family Arminidae. Found in sheltered waters to 30 m depth. Common.

Stalked jellyfish

Members of the phylum Cnidaria, Order Stauromedusae, stalked jellyfish are related to the free swimming jellyfish. They spend most of their lives attached to the substrate, usually a rock or algae, but can move short distances by gradually moving their base along the surface. Stalked jellyfish may release from the substrate altogether, and drift freely in the water column.

It is thought there are about 50 species of stalked jellyfish worldwide, ranging from just millimetres in size to at least 15 cm. They inhabit predominantly cooler waters, but also subtropical and tropical waters, and have been discovered in the deep ocean, associated with deep-sea hydrothermal vents.

Stalked jellyfish are probably more common than records show, as they are cryptically coloured and rarely noticed by observers. The animals pictured here, each around 2 cm long, were observed attached to algae at a depth of 12 m.



Flatworms

Flatworms, or polyclads, are members of the phylum Platyhelminthes. They are soft, flat-bodied, symmetrical creatures with a defined head region with sensory organs. They may be elongate or discoid, and grow to 15 cm long. Flatworms are primarily benthic creatures, and, propelled by a layer of mucous and beating cilia on the underside, glide over the substrate. A few can swim short distances by undulations of the body in the water column or by ruffled waves passing along the body

Flatworms are carnivorous, feeding on dead or injured animals and sessile organisms such as bryozoans and alcyonarians, (anemones and soft corals). Flatworms have no respiratory or circulatory organs, oxygen diffusing into the cells via the body walls or gastrovascular tract. Flatworms can regenerate lost tissues; fragments containing the “brain” can regenerate into a new animal, and large wounds can be repaired in 24 hours.

Most flatworms possess male and female sex organs and transfer sperm between individuals. While some species are parasitic, the juveniles produced by the non-parasitic families shown here are basically miniature forms of the adult. Flatworms are often very colourful; the colours, however, only rarely provide a positive confirmation of species. The identification of many flatworms relies upon microscopic examination of internal organs and structures.

Flatworms are found intertidally, often under rocks or slabs, down to hydrothermal vents in the deep ocean. Their soft appearance and flamboyant colour patterns mean they are sometimes mistaken for nudibranchs. Flatworms are distinguished from nudibranchs by their lack of obvious gills and rhinophores and their body thickness of around 1 mm.

Family -
CALLIOPLANIDAE
Callioplana marginata

Dark brown to black body with two non-retractile head tentacles positioned well behind the front margin. Thin white marginal stripe with thin orange submarginal stripe. Grows to 8 cm. Uncommon.

Family - STYLOCHIDAE
Possibly ***Imogine meganae***

Light brown body mottled with darker brown flecks. Darker in the middle, edge and head area, tentacles yellowish. Believed to frequent oyster reefs and commercial oyster leases. Specimen pictured around 7 cm long. Uncommon.

Family - EURYLEPTIDAE
Cycloporus venetus

Powder blue body, yellow margin, becoming orange near pseudo-tentacles. Dark spot posterior to head, sometimes white mid-line. Grows to 45 mm.

Family - EURYLEPTIDAE
Maritigrella eschara

Pale cream, white or light grey background colour, orange spots on raised central ridge, transverse lines or rows of black spots radiating to ruffled edges. Grows to 45 mm.

Family - PSEUDOCEROTIDAE
Phrikoceros baibaiye

Family - PSEUDOCEROTIDAE
Pseudobiceros apricus

Family - PSEUDOCEROTIDAE
Pseudobiceros bedfordi

Photo by Neil Vaughan

Family - PSEUDOCEROTIDAE
Pseudoceros bifurcus

Photo by Neil Vaughan

Family - PSEUDOCEROTIDAE
Pseudobiceros fulgor

Family - PSEUDOCEROTIDAE
Pseudobiceros gloriosus

Photo by Bob Edgar


Family - PSEUDOCEROTIDAE
Pseudobiceros gratus


Family - PSEUDOCEROTIDAE
Pseudobiceros hancockanus


Family - PSEUDOCEROTIDAE
Pseudobiceros hymanae


Family - PSEUDOCEROTIDAE
Pseudoceros indicus


Family - PSEUDOCEROTIDAE
Pseudoceros paralaticlavus


Family - PSEUDOCEROTIDAE
Pseudoceros prudhoei


Family - PSEUDOCEROTIDAE
***Pseudoceros* sp.**


Family - PSEUDOCEROTIDAE
***Thysanozoon* sp.**



Unidentified flatworms

Family - CONVOLUTIDAE
Acoel flatworms

Bronze in colour, disc or leaf shaped around 3 or 4 mm in diameter and often with tiny white spots. Usually occurs in large numbers on soft and stony corals where they are thought to feed on the corals' mucus deposits.

Polychaete worms

Polychaetes are a diverse group of segmented worms, phylum Annelida. The segments, or annuli, separate the polychaetes from other common worms, such as flatworms, ribbon worms or peanut worms, none of which have a body constructed of segments. Polychaetes are abundant and mainly found in the marine environment, from the shallows to the depths of the deep-sea trenches. Each segment has parapodia, or small appendages, which project from the animals side. These parapodia sometimes contain many bundles of chaetae, (bristles). Often polychaete worms have a well developed head with sensory appendages. In others, the head has been modified into feeding tentacles or radioles; these animals often referred to as "feather duster" or "fan worms".

These exposed radioles are often the most obvious visible feature to scuba divers. The worms live in tubes constructed of sand and shell fragments (**Sabellarids**) or calcium carbonate (**Serpulids**), buried in or attached to the substrate. They are filter feeders, capturing food items from the water column when the radioles are extended.

Other polychaetes, such as "spaghetti worms" (**Terebellids**), have long thread-like tentacles spread out over the substrate, these are used to find and transport food particles.

The sexes of polychaetes are nearly always separate, with eggs and sperm released externally, producing large numbers of distinctively-shaped planktonic larvae. Night diving scuba divers will sometimes see many of these attracted to their torch beam.

Over 10,000 species of polychaetes have been identified, with many more thousands still to be studied. Identification of many species requires microscopic examination of the head region and the chaetae.

Family - AMPHINOMIDAE
Chloeia flava

Reddish-brown to yellow-brown, each segment has a central dark spot outlined in white, and on the sides, two tufts of white or yellowish bristles, with branching gill structure above. Associated with mud, fine sand or rubble substrate. Depth to 12 m. Grows to 20 cm.

Family - AMPHINOMIDAE
Chloeia fusca

Reddish-brown in colour, each segment with a pair of dark central lines and the sides with dense tufts of white or yellowish bristles. Known as "fire worms", the bristles are extremely irritating if handled. Crawls over substrate, rubble, sand. Depth to 14 m. Grows to 8 cm.

Family - AMPHINOMIDAE
***Eurythoe* sp.**

Pink or pale orange body, small orange frilly gill structure and tuft of white bristles extend from the sides of each segment. The head, and several segments behind, flattened. Nocturnal scavenger, found under rocks and coral slabs. May grow to 26 cm.

Family - ONUPHIDAE ***Hirsutonuphis gygis***

Members of this family construct a tube in the sand from mucus and mud. There are five tentacles extending from the head, each with darker rings at the base. The central parapodial projections have a dark reddish brown spot, and segments immediately behind the head, numbers 2 to 8, bear parapodia used for digging or crawling. Lives in sand, depth to at least 6 m. Nocturnal. Grows to 50 cm.

Family - SABELLIDAE ***Sabellastarte australiensis***

Fan worms, or **feather-duster worms**, are common on exposed reefs. They have tentacles coloured red, white, yellow or brown, and sometimes with darker lines on the back of each radiole. The feathery crown may reach up to 10 cm across. The tentacles filter minute food organisms, which the animal feeds upon, from the water column. Depth to 30 m, in areas with good current flow.

Family - SABELLIDAE **Sabellidae sp.**

The feathery crown has two whorls and the radioles are without the contrasting colour up the spine. They are very sensitive to light and touch, withdrawing rapidly if disturbed. Common on rocky reef in areas with good current flow. Specimen pictured around 6 cm across. Rocky reef, depth 10m. Common.

Family - SERPULIDAE
Galeolaria gemineoa

This worm lives in small calcareous tubes 3 mm diameter and around 25 mm long. It has a black or brown fan when extended, (shown here exposed at low tide), and occurs only in the narrow band just below high tide on exposed rocky coasts. Common.

Family - SERPULIDAE
Salmacina australis

Intertwined colonies of white, narrow, calcified tubes attached to the substrate on sheltered or moderately exposed reef. The animal is small, 2 mm across, with a crown of red tentacles. Depth to 15 m. Common.

Family - SERPULIDAE
***Spirobranchus* sp.**

Spectacular twin conical spiral crowns in almost every colour imaginable. Often in large aggregations on their coral host and sometimes referred to as Christmas Tree worms. The tentacular fans are around 2 cm diameter and withdraw rapidly if disturbed, the calcareous tube then sealed with an operculum, (seen at left in top photo).

The feathery tentacles are used for respiration and to capture minute organisms from the water column, which are then transferred to the mouth. Depth to 15 m. Relatively common.

Family - SERPULIDAE

This family is characterised by the presence of an operculum and a calcareous tube, both visible in the unidentified individuals pictured above. Tube diameter in the specimen in right hand picture approximately 3 mm.

Family - TEREBELLIDAE

Spaghetti worms live in tubes constructed of sand or mud, spreading their tentacles over the substrate in search of food and tube building materials. The food particles are transported via cilia and mucus along a groove in the tentacle; smaller food particles transferred to the mouth, larger non-food particles used for tube building. Common under rocks, rocky reef, seagrass beds. Depth to at least 100 m.

Pycnogonids, sea spiders

Pycnogonids, commonly called sea spiders, are Arthropods, and closely related to crustaceans. They are spider-like in appearance, usually having four pairs of legs, each leg ending with a claw. The head contains two pairs of eyes and there is a proboscis through which the animal sucks up food. The abdomen is usually much reduced with the gonads and part of the gut extending into the legs. Oxygen and waste products diffuse through cell walls as pycnogonids lack respiratory or excretory organs.

Pycnogonids feed on anemones, sponges, hydroids and bryozoans. Most are tiny, less than 1 cm; usually, only brightly coloured individuals are noticed. Pycnogonids occur in most marine habitats, from intertidal rockpools to the deepest ocean.

Family - CALLIPALLENIDAE
Meridionale harrisi

Family - CALLIPALLENIDAE
***Meridionale* sp.**

Family - CALLIPALLENIDAE
Stylopallene cheilorhynchus

Family - NYMPHONIDAE
Nymphon aequidigitatum

Family - PALLENOPSIDAE ***Pallenopsis macneilli***

Family - PHOXICHILIDIIDAE ***Anoplodactylus evansi***

Crustaceans

Crustaceans are an extremely diverse group belonging to the phylum Arthropoda. The crustacean body consists of a hard exoskeleton made of calcium and is divided into three parts: head, thorax and abdomen. The head has two compound eyes, two pairs of antennae and three pairs of mouthparts.

Most species have separate sexes, and the female carries the eggs attached to appendages under the abdomen. Mostly the young enter a planktonic stage after hatching, their form changing with each moult. The resulting adult may look dramatically different from the larvae, barnacles being one example. Crustaceans may be the most dominant animal group in plankton, algal and other marine environments.

Over 60,000 species of crustacea have been identified and they range in size from less than 1 mm to over 2 m for some species of spider crabs.

Family - LEPADIDAE
Conchoderma virgatum

A distinctively marked stalked barnacle which attaches to floating objects and occasionally to fish, crabs, turtles, sea snakes and whales. A filter feeder, it extends its feathered cirri into the water column to collect plankton and small organic particles. Total length to 7 cm. Common.

Family - LEPADIDAE
Lepas anserifera

This barnacle has 5 side plates, a body length up to 4 cm, with a stalk length of up to 2 cm. Often seen attached to mooring lines or floating objects which are sometimes washed ashore. This family sometimes referred to as **goose barnacles**. Common.

Family - AMARYLLIDIDAE
Amaryllis philatelica

This **white-lined amphipod** has a yellow stripe on its back and white margins to its red body segments. Its preferred habitat is among sponges, bryozoans and soft corals. Grows to 2 cm. Depth to at least 18 m. Uncommon.

Family - PALINURIDAE ***Panulirus longipes longipes***
The **coral rock lobster** is recognised by dark brown and white bands on the small antennae, legs with longitudinal white stripes and an abdomen covered in white speckles and spots. Length to 30 cm. Rocky, coral reef. Depth to 122 m. Common.

Photo by Graham Edgar

Family - PALINURIDAE
Panulirus ornatus

Blue-green carapace with orange spines, the large antennae orange with a pale base, smaller antennae have black and white bands. Legs dark with white spots and bands. Turbid areas, sandy, mud or rock bottoms, coral reefs. Grows to 50 cm, depth to 50 m. Common.

Family - SCYLLARIDAE
Arctides antipodarum

The **rough spanish lobster** is red-brown, the plate-like antennae closest to the head having strong spines; the two front legs are reddish with white spots and blue tips. Clear water, rocky reefs, overhangs, cave roofs. Depth to 146 m. Grows to 30 cm. Common.

Family - SCYLLARIDAE
Scyllarides haanii

Red-brown body, prominent humps on abdominal segments 2-4, the antennae margin purple and almost smooth. Legs orange with purplish tips. Clear water, rocky reefs, caves. Depth to 135 m. Grows to 50 cm. Rare on NSW coast, relatively common at Lord Howe Is.

Family - SCYLLARIDAE
Scyllarides squammosus

Red-brown body, abdominal segments with low humps, antennae are almost smooth-edged, red-purple in colour and legs are orange with purplish banding. Similar *Arctides antipodarum* has serrated antennae. Reef, depth to 80 m. Grows to 40 cm. Uncommon.

Photo by Graham Edgar

Family - GALATHEIDAE
Allogalathea elegans

Colour is variable depending on colour of host, but usually shades of yellow or white with dark central stripe, and further stripes on either side. Rostrum long and tapering. Found in and around the base of crinoids, the **elegant squat lobster** grows to 2 cm. Uncommon.

Family - PORCELLANIDAE ***Neopetrolisthes maculatus***

White body with red-brown spotting, flattened chelipeds and large mouthparts, the **spotted porcelain crab** lives on or around the oral disc of giant anemones. Carapace width up to 2 cm, depth to 20 m. Common.

Aquarium photo

Family - PORCELLANIDAE
Neopetrolisthes spinatus

Whitish body covered in fine red spots that form blotches. Dorsal surface of carapace is lumpy and uneven, with large triangular spines above each eye socket. The **spiny porcelain crab** lives in and around giant anemones. Carapace width up to 2 cm. Depth to 20 m. Rare.

Family - DIOGENIDAE
Calcinus gaimardii

Dull brown or orange legs, darker claws with white tips, eye stalks orange-brown with pale blue then dark blue distal ring. Found in coral and rocky reefs, often associated with *Pocillopera* spp. corals. Carapace length to 12 mm, depth to 20 m. Common.

Family - DIOGENIDAE
Calcinus imperialis

Dark claws with blue or purple spots, legs banded green, brown and white with fine orange rings. Eyestalks greenish with narrow blue distal ring, eyeball black with many small white dots. Coral reef, branching corals. Depth to 30 m. Carapace length 6 mm. Uncommon.

Family - DIOGENIDAE
Calcinus laevimanus

Chocolate-brown claws with white tips, legs orange-brown with white bands, eyestalks orange with blue proximal band. Small species found in tidal pools and reef flats. Depth intertidal to 95 m. Carapace length to 12 mm, total length around 4 cm. Common.

Family - DIOGENIDAE
Calcinus latens

Claws and legs mid-green fading towards tips, walking legs with purple or brown band toward the tip. Eyestalks pinkish-grey, paler on the distal end, eyes black with many small white dots. Intertidal to subtidal depths to 95 m. Carapace length to 7 mm. Common.

Family - DIOGENIDAE
Calcinus lineapropodus

Claws pale with brown markings, legs white with pink bands and brown stripes, last segment pink with black claws. Eye stalks red becoming pale distally, eyes black with many small white dots. Coral, rubble, depth to 25 m. Length around 2 cm. Uncommon.

Family - DIOGENIDAE
Calcinus minutus

Pale body covered with small orange pits, claws pale, ends of walking legs orange. Eyestalks white or pale orange, eye black with white dots. Associated with branching corals. Carapace length to 8 mm, total length around 25 mm. Depth to 32 m. Common.

Family - DIOGENIDAE
Calcinus morgani

Carapace pale, dark burgundy claws, legs lighter orange-brown with narrow white tips. Eyestalks banded black-blue-black, thin white distal band. Eyes black, small white dots. Intertidal to 10 m depth. Carapace length to 12 mm, overall length to 4 cm. Common.

Family - DIOGENIDAE ***Calcinus spicatus***

Dark red claws with white spots and blotches, legs pink with distinct broad pale bands. Eyestalks orange with white distal band, eyes black with small white spots. Rocky and coral reef, often associated with branching corals. Depth to 90 m. Small species, carapace length from 4 to 8 mm. Uncommon.

Family - DIOGENIDAE ***Calcinus sirius***

Claws whitish, carpus, or wrist, red with white spots, carapace white. Walking legs pale red, darker at the joints, eyestalks reddish-brown fading distally, eyes black with many small white spots. Rocky and coral reef, depths to 22 m. Carapace length to around 5.5 mm. Common.

Family - DIOGENIDAE
Ciliopagurus strigatus

Red and orange striped pattern, white carapace. Flattened carapace and claws allows this species to inhabit shells with narrow apertures, such as cone shells. Rocky and coral reefs, depths to 90 m. Carapace length to 12 mm, total length to 4 cm. Common.

Family - DIOGENIDAE
Clibanarius longitarsus

Body, claws, and legs brown, all with small white spots. Antennae brown with fine white stripes. Eyestalks orange-brown with brown eye. Carapace length of specimen pictured around 1 cm. Intertidal, mangroves, mudflats. Common.

Family - DIOGENIDAE
Clibanarius taeniatus

Green and yellow striped carapace, green claws and legs with yellow stripes. Claws with prominent white spines. Eyestalks greenish-orange with longitudinal dark stripe. Rocky reefs, mangrove areas, intertidal rockpools. Carapace length up to 4 cm. Common.

Family - DIOGENIDAE
Clibanarius virescens

Claws greenish-black with white spines and tips, legs green to brown, with last segment pale. Eyestalks brown with thin pale distal ring. Mangroves, rocky shores, rubble areas, intertidal pools. Carapace length to 8 mm, total length to 2 cm. Common.

Family - DIOGENIDAE ***Dardanus crassimanus***

Claws and legs are red with mauve or pink bands, all covered with fine, stiff hairs. Eyestalks are mauve with a thin white distal band. Rocky reef, reef flats, seagrass and rubble. Depth to 30 m. A large, active species, grows to 15 cm total length. Common.

Family - DIOGENIDAE
Dardanus guttatus

Claws and legs are red-brown with scattered small to medium-sized white spots. Distinctive blue spot above second segment on claws and walking legs. Eyestalks tan with white terminal ring, eye black. Coral and rocky reefs, depth to 50 m. Carapace length to 3 cm. Rare.

Family - DIOGENIDAE
Dardanus lagopodes

Claws and legs mottled and covered with white-tipped hairs. Eyestalks pale, yellow terminal ring, eye black. Intertidal, rocky and coral reef, depth to 50 m. Total length to 10 cm. Common. Two forms, with either red or blue knees, thought to be separate species.

Family - DIOGENIDAE
Dardanus longior

Claws and legs red, all covered with white-tipped stiff hairs, antennae yellow, eyestalks pale to yellow, eye black. Similar *D. crassimanus* has mauve eyestalks and brown or tan eyes, mauve bands on legs. Specimen pictured at depth of 10 m on rocky reef. Possibly common.

Family - DIOGENIDAE
Dardanus megistos

Claws and legs red with black-ringed white spots, all covered in dense hairs. Eyestalks red, eyeball red or brown. Antennae white. Rocky and coral reef, rubble and lagoon bottoms. Carapace length to 8 cm, total length to 20 cm. Uncommon.

Family - DIOGENIDAE
Dardanus pedunculatus

Pink claws with prominent spines, the legs orange, eyestalks short with white, red, then white bands, the eye brown. Often attaches *Calliactis* sp. anemones to its shell for defence. Rocky reef, rubble, seagrass beds, depth to 95 m. Total length to 15 cm. Common.

Family - DIOGENIDAE
Paguristes pugil

Pale reddish carapace and legs, setae covering claws and first pair of walking legs. Eyestalks green-brown, with distal white band, eyes black. Antennae banded brown and white. Grows to around 2 cm carapace length. Soft sediment, reef, low intertidal to 69 m depth. Uncommon.

Family - PAGURIDAE
Pagurixus jerviensis

Pale body, carapace white, dominant claw very large, pale to dark brown, the walking legs brown with white banding. Eyestalks pale, blue highlights, brown band proximally. Small species photographed on rocky reef, shell diameter about 1 cm. 9 m depth. Common.

Family - PAGURIDAE ***Pagurus sinuatus***

Body, claws and legs are mottled brown and orange, all covered with dense hairs. Right claw larger than left, a characteristic of the Family Paguridae. Eyestalks pale with orange ring on the midsection. Rocky and rubble reef, depth to 20 m. Total length to 6 cm. Common.

Family - PAGURIDAE ***Pagurus* sp.**

Pale body, claws and legs, all with brown longitudinal stripes. Eyestalks long, pale and with longitudinal dark stripes, antennules bluish with orange flagellum. Carapace with pink blotches. Animal photographed in shell around 2 cm long, rocky reef, depth 10 m. Uncommon.

Family - CALLIANASSIDAE
Trypaea australiensis

Ghost shrimps, also known as **yabbies** or **nippers**, commonly occur in soft sandy or muddy substrates, often in estuaries. The soft bodies are pale in colour and almost transparent. The male, top photo, has a large claw, while the female has two relatively even-sized smaller claws. The female below is carrying an orange egg mass under her abdomen.
Their presence is indicated by small holes in intertidal mudflats and sandbanks, where they are sometimes pumped for bait by fishers. They are preyed upon by most fish species, including whiting, bream and flathead. Grow to around 5 cm in length. Common.

Family - CALAPPIDAE ***Calappa capellonis***

The **lumpy box crab** has a reddish coloured carapace which is covered with large, rounded protuberances. The eyes are small, the claws held close to body making the animal difficult to distinguish in its natural environment. Rocky reef, rubble habitat, depth to 80 m. Carapace width to 5 cm. Uncommon.

Family - CALAPPIDAE
Calappa gallus

The **rough box crab** is a greyish-brown colour, with less prominent protuberances than other members of the family, and rounded eyes without stalks. Rocky reef, rubble, sandy habitat, depth to 218 m. Carapace width to 8 cm. Uncommon.

Photo by Liz Hardaker

Family - CALAPPIDAE
Calappa woodmasoni

The **little box crab** has pink carapace and claws covered with different sized pale spotted protuberances. The eyes are large and attached by small stalks. Rocky reef, rubble habitat, depth to 350 m. Carapace width to 3 cm. Uncommon.

Photo by Liz Hardaker

Family - MATUTIDAE ***Matuta victor***

Yellowish in colour with fine black spots, the **common moon crab** has a carapace with two well developed lateral spines. In common with other box crabs, it feeds on crustaceans and molluscs. Sandy or rubble bottom, depth to 20 m. Carapace width to 5 cm. Uncommon.

Family - GRAPSIDAE
Leptograpsus variegatus

The **swift-footed crab** has a flattened body and a rounded carapace with parallel grooves across its width. Adults have purple chelipeds. Commonly seen on rocky shores and intertidal areas, under rocks and among cunjevoi. Carapace width to 8 cm. Common.

Family - PERCNIDAE
Percnon guinotae

The flattened body is mottled green and brown. The eye is red, the legs with green and brown bands and with a yellow band near tip, the pincers pink. Rocky and coral reef to depths of 20 m. Carapace width around 2 cm. Common.

Family - EPIALTIDAE
Huenia* cf. *brevifrons

Cryptically coloured the same as the host *Caulerpa* sp. algae it lives on, it has a rounded rostrum, and a green body with white bands on legs. Intertidal and subtidal reef to 10 m deep. Carapace length 1 cm. Uncommon.

Family - EPIALTIDAE
Hyastenus elatus

This species is one of a number of **decorator crabs** able to attach pieces of sponge and other material to its rostrum and body to provide camouflage to avoid predators. Estuaries and harbours, jetties, pylons. Depth to 72 m. Carapace length of 8 cm. Common in Sydney and Port Stephens waters.

Family - EPIALTIDAE
Xenocarcinus depressus

The **depressed spider crab** is cryptically coloured orange or red to match its gorgonian host, usually with a white stripe on its back. Found on gorgonians, coral or rocky reef. Depth to 60 m. Grows to a carapace length of 2 cm. Uncommon.

Family - INACHIDAE
Achaeus japonicus

The **orangutan crab** has long claws and legs, all covered with fine reddish hairs. Its reddish eyes are on short stalks. It is found in and around giant anemones, areas of seaweed and rubble. Depth to at least 20 m. Carapace size to 2 cm but often smaller. Uncommon.

Family - HELOECIIDAE
Heloecius cordiformis

The carapace is dark purple to black, the claws are of nearly equal size and coloured purple in adults, orange in juveniles (shown here). Toxins in its tissues have been used as an indicator of estuary health in scientific studies. Mud flats, intertidal. Carapace width of 25 mm. Common.

Family - MICTYRIDAE
Mictyris longicarpus

The **banded soldier crab** has a bright blue carapace and legs with purple bands on the joints. It processes sand to gather algae and detrital food. Often in large numbers at low tide on sand and mud flats. Carapace width 1.5 cm. Common. Similar *M. platycheles* (not shown) has a more dull carapace and lacks purple bands on legs.

Family - OCYPODIDAE
Austruca perplexa

Variably coloured, carapace only slightly more wide than long. Male fiddler crabs have one enormously enlarged claw, which is often brightly coloured. Females have two small claws and are darker than males. Intertidal mud flats, carapace width to 35 mm. Common.

Family - OCYPODIDAE
Gelasimus vomeris

The **orange-clawed fiddler crab** has a dark brown carapace, long thin eyestalks and one large dominant claw, used for defence and attracting females. Prefers unshaded sand or mud banks of creeks, bays and estuaries. Carapace width to 3 cm. Common.

Family - OCYPODIDAE
Ocypode ceratophthalmus

The **horn-eyed ghost crab** is pale with maroon markings under the legs and body, and a dark “H” marking on lower back. It has brown terminal stylets on top of each eye. Lives on open sandy surf beaches, width of carapace up to 4 cm. Common in northern NSW.

Family - OCYPODIDAE
Ocypode cordimana

The **smooth-handed ghost crab** has a squarish body, coloured cream with a grey or grey-green tinge. Eyes are without terminal stylets. Sandy ocean beaches, dune systems, burrows may be up to 200 m inshore. Carapace width to 35 mm. Common.

Family - PARTHENOPIDAE ***Cryptopodia* sp.**

Elbow crabs have a triangular carapace with greatly expanded lateral margins, and large knobbly claws. Colour is variable but usually camouflaged against substrate. Specimen pictured around 2 cm across. Depth 10 m. Uncommon to rare.

Family - PILUMNIDAE
Tiaramedon spinosum

Angular carapace with bifurcated rostrum forming two horns and two shorter spines behind. Reddish brown in colour with highly variable lighter markings. The **thorny crinoid crab** is found on host crinoids to a depth of 59 m. Carapace width to 1 cm. Rare.

Family - PORTUNIDAE
Caphyra loevis

Pale cream-coloured oval body, with darker stripes and blotches. Eyes reddish with numerous small white dots. The **soft coral crab** lives within the folds of Xeniidae and Alcyoniidae spp. soft corals. Depth to 16 m. Carapace width 2 cm. Common.

Family - PORTUNIDAE
Lissocarcinus laevis

Distinctive reddish colour with five larger and numerous smaller white spots on carapace. The claws are banded red and white, the legs translucent. Lives in association with tube and giant anemones. Depth to 82 m. Carapace width 15 mm. Uncommon.

Family - PORTUNIDAE
Portunus armatus

The carapace is grey with a blue tinge and has a long spine on each side. Males much more colourful than the mottled olive and brown female. The **blue swimmer** is found in shallow, sandy, inshore waters and seagrass beds. Depths to 60 m. Carapace width to 21 cm. Common.

Family - PORTUNIDAE ***Scylla serrata***

The **mangrove crab** is greenish-brown in colour, heavyset with powerful claws. The smooth carapace has numerous sharp serrations along the front. Found in mangroves in tidal creeks and estuaries, where it may bury as far as 2 m deep into the mud. Depth to 10 m. Carapace width to 24 cm. Weight to 3 kg. Common.

Family - PORTUNIDAE
Charybdis hellerii

Carapace brown with a pale stripe between the eyes that extends half the carapace depth. Rocky reef, crevices, depth to 51 m. Carapace width to 5 cm. Common.

Family - PORTUNIDAE
Charybdis natator

The **hairy swimmer crab** is stout, purple-orange in colour, with a carapace that is covered in fine hairs. The large claws have ridges and bumps. Sandy or muddy areas, seagrass, depth to 50 m. Carapace width to 15 cm. Common.

Family - PORTUNIDAE
Goniosupradens acutifrons

Carapace is mottled brown-orange, the legs blue and yellow, claws with distinctive red pincers. Rocky and coral reef habitats, depths to 200 m. Carapace width 75 mm. Uncommon.

Photo by Liz Hardaker

Family - PORTUNIDAE
Thalamita danae

Colour variable, blue, green or brown. The carapace is flattened with raised lateral ridges, the claws large with multiple spines and purple-red tips. Rocky reef and sand, under rocks, depth to 100 m. Carapace width to 75 mm. Common.

Family - DOMECIIDAE
Domecia hispida

The **coral pit crab** has a mottled cream and brown body, dark brown pincers and numerous small brown spots over claws and carapace. Induces the host coral to form a pit, within which it lives. Branching corals, depth to 40 m. Carapace width to 15 mm. Uncommon.

Family - TRAPEZIIDAE
Trapezia rufopunctata

Flattened body, with a dense cover of small red spots on pink or white background, and greenish eyes. The **rust-spotted coral crab** lives symbiotically with branching corals, depth to 30 m. Carapace width to 15 mm. Common.

Family - TRAPEZIIDAE
Trapezia septata

Carapace and claws with red honeycomb pattern, body flattened. Lives among coral branches, feeding on coral tissue and mucus as do other members of this Family. The **honeycomb coral crab** grows to a carapace width of 2 cm. Uncommon.

Photo by Bob Edgar

Family - XANTHIDAE
Cymo melanodactylus

The **hairy coral crab** has an almost circular carapace, green or green-brown in colour and is covered with fine hairs. Symbiotic with branching hard corals, especially *Acropora* and *Pocillopora* spp. Carapace width to 3 cm. Uncommon.

Family - XANTHIDAE
Liomera* cf. *margaritata

Rounded reddish carapace, furrows leading back from front margin, central furrow divided in two into a "V" shape. Claws and legs bright red. Coral and rocky reefs, under rocks and rubble. Specimen pictured 1 cm carapace width. Depth 8 m. Uncommon.

Photo by Bob Edgar

Family - XANTHIDAE
Lophozozymus pulchellus

White rounded carapace with red reticulations and blotches, the anterior surface with slight granulations. The red and white claws stout, the walking legs with broad red bands. Rocky and coral reef, depth to 120 m. Carapace width 25 mm. Rare.

Family - XANTHIDAE
Lybia tesselata

The **boxer crab** has a pale carapace with black-edged orange patches, legs have white speckles and narrow dark banding. Claws carry anemones for protection and collecting food particles. Coral, rocky reef, depth to 15 m. Carapace width 2 cm. Uncommon.

Family - ALPHEIDAE
Alpheus ochrostriatus

The **fine-striped snapping shrimp** is blue-green in colour, has fine longitudinal lines, and white saddles behind head and at abdominal hump. Maintains the burrow while the shrimpgoby stands guard. Sand and rubble, depth to 20 m. Length to 4 cm.

Family - ALPHEIDAE
Alpheus richardsoni

Dark green with banding across abdomen, one claw enlarged. **Richardson's snapping shrimp** is able to use the large claw to make loud snapping sounds that stuns prey and startles predators. Under rocks and rubble. Length to 5 cm. Depth to at least 15 m. Common.

Family - HIPPOLYTIDAE
Alcyonohippolyte commensalis

Transparent with white transverse bars across body and white stripe along back. The **xenia shrimp** lives amongst the tentacles of *Xenia* spp. soft corals. Depth to at least 12 m. Grows to 16 mm. Probably common but rarely noticed.

Family - HIPPOLYTIDAE
Saron marmoratus

Variable background colour of red, blue or brown, with many, often closely-set, pale round spots. The dorsal surface of the carapace and abdomen have tufts of setae. Nocturnal, coral and rocky reefs. Depths to 12 m. Grows to 5 cm. Uncommon.

Photo by Bob Edgar

Family - HIPPOLYTIDAE
Thor amboinensis

Green to orange body with large rounded dark-edged white patches on head, abdomen and tail. Adopts upright stance with tail held high. often associated with giant anemones. Coral and rocky reef to 80 m. Length to 2 cm. Relatively common.

Family - LYSMATIDAE
Lysmata amboinensis

Orange body with darker orange back, and broad white stripe from rostrum to telson. Crevices, holes and caves in rocky and coral reefs where it cleans parasites and dead tissue from fishes at cleaner stations. Depth to 120 m. Grows to 5 cm body length. Common.

Family - RHYNCHOCINETIDAE
Rhynchocinetes durbanensis

Red body, white stripes separating carapace from abdomen and crossing abdominal hump. Red legs with white stripes, white stripe on long rostrum. Forms large groups at cleaner stations, rocky and coral reefs, depth to 22 m. Length to 4 cm. Common.

Family - RHYNCHOCINETIDAE
Rhynchocinetes serratus

Red body with many white spots, and with fewer white stripes than *R. durbanensis*. White bands on legs. Rostrum short, often yellowish. Rocky reefs where it forms aggregations at cleaning stations. Depth to at least 12 m. Length to 6 cm. Common.

Family - PALAEMONIDAE
Actinimenes ornatus

Translucent pinkish body, with white bar between eyes and purple and white speckles on the telson, legs and chelipeds. Found on giant anemones where it feeds on material collected from the oral disc. Depth to at least 20 m. Length to 4 cm. Uncommon.

Family - PALAEMONIDAE
Ancylocaris brevicarpalis

The body transparent with white spots and flecks, a white bar across the eyes and white patches on the abdomen and base of tail. The telson has five blue-margined orange spots, the legs and claws have blue bands. Females are larger and more heavily patterned. **Anenome shrimps** live in association with giant anemones, where they feed on detritus and other material that collects on the anemone disc. Depth to 30 m. Length to 4 cm. Uncommon.

Family - PALAEMONIDAE
Ancylomenes holthuisi

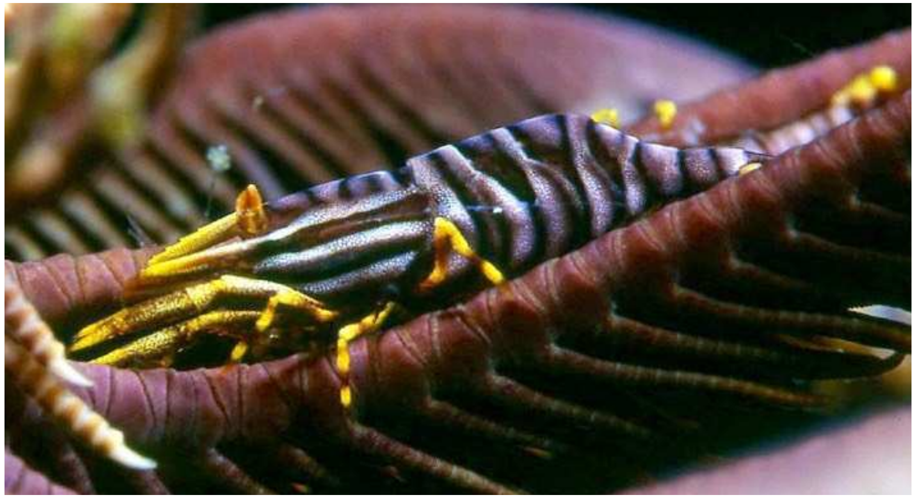
Transparent body, characteristic white blotch encircled with brown on abdominal hump, red-brown bar at base of tail. Lives in and around giant anemones. Grows to 25 mm. Depth to 25 m. Common at Lord Howe Is, rare on NSW coast.

Family - PALAEMONIDAE
Hamodactylus* cf. *boschmai

Translucent body with red or orange blotches and with prominent white bands across the carapace and abdomen. The body and telson with scattered yellow markings. Found on red gorgonian soft coral. Grows to 1 cm. Depth to 30 m. Uncommon.

Family - PALAEMONIDAE ***Hymenocera picta***

White, with prominent blue, lavender or burgundy blotches and similar-coloured banding on legs. The **harlequin shrimp** has flattened chelipeds specially evolved to prey on sea stars, which it consumes alive over several days. Grows to 5 cm. Rare.



Family - PALAEMONIDAE ***Laomenes* sp.**

The **crinoid shrimp** is variable in colour depending upon its host. Typically it has longitudinal lines on the head and transverse banding on the abdomen and tail. The legs and claws have yellow or white banding, and there is a stripe along the rostrum. Lives exclusively on crinoids, length to 2 cm. Uncommon.

Family - PALAEMONIDAE ***Palaemon serenus***

The **rockpool shrimp** is transparent pale green with oblique darker lines and flecks of red or orange over the abdomen. The legs have black flecks and orange bands near the joints, and there is an obvious red collar above the claws on the second pair of legs. Rocky reef, intertidal to 15 m depth. Length to 6 cm. Common.

Family - PALAEMONIDAE ***Pontonides ankeri***

A small translucent shrimp with transverse banding the same colour as its host, in this case the wire coral, *Cirrhipathes* sp. Has a smoothly rounded carapace as opposed to the similar *Dasycaris zanzibarica* (not shown), which has a pointed projection on the hump of the carapace. Typically found in pairs, the female the larger of the two. Commensal on wire corals, depth to at least 42 m. Length to 15 mm. Rare.

Family - PALAEMONIDAE ***Urocaridella antonbruunii***

Transparent body covered in small red and white flecks, the legs banded red and white, rostrum upturned and red and white stripes on the abdominal hump. Often seen in the water column close to crevices and holes in reef, cleaner stations. Sometimes in large numbers. Depth to 66 m. Length to 3 cm. Common.

Family - PALAEMONIDAE ***Zenopontonia rex***

Bright red body, often with large white patches on dorsal surface, sometimes spotted as above. Legs purple, claws orange with purple tips. Associated with large holothurians, or as in this case, with large nudibranch, *Hexabranchus sanguineus,* where it lives on the upper surface or among the gills. Length to 2 cm. Common.

Family - PALAEMONIDAE ***Zenopontonia soror***

Variable body colour, usually purple to orange, often with white dorsal stripe extending to tail. Prominent rostrum with numerous small spines. Usually associated with large sea stars, depth to 25 m. Length to 15 mm. Common.

Family - STENOPODIDAE
Stenopus hispidus

The **banded coral shrimp** has a white body and red bands: over the eyes, two on the abdomen and one at the base of the tail. The white claws have four red bands, the antennae are white. On the roof of caves or in recesses. Depth to 210 m. Length to 9 cm. Common.

Family - SPONGICOLIDAE
Microprosthema validum

Lobster-like in appearance, the **robust boxer shrimp** has a white body with golden brown pigmentation, large spines on the carapace and abdomen. The chelipeds are large and flattened. Intertidal to 70 m depth. Grows to 16 mm. Common.

Family - ODONTODACTYLIDAE ***Odontodactylus scyllarus***

The **peacock mantis shrimp's** body is olive-green to orange with transverse bars across the abdomen. It is a voracious predator of small crustaceans, molluscs and fish and lives in a double ended burrow in sand or rubble. Depth to 40 m. Length to 18 cm. Uncommon.

Molluscs, bivalves

Bivalves, Class Bivalvia, belong in the group of molluscs that possess two calcareous valves, or shells, joined at a hinge by an elastic ligament. Bivalves are usually bilaterally symmetrical and most species fully retract into their shells. The shells open and close through the contraction of muscles called adductor muscles. Bivalves have no head and are filter feeders, using a highly developed gill system for both respiration and feeding. Beating rows of cilia draw water into the inhalant siphon, from where it passes across the gills and out the exhalant siphon. Food particles are passed to the mouth, located near the front of the foot.

Some species of bivalve are well adapted for life in soft sediments and sand, and are covered with only their inhalant and exhalant siphon tips reaching the surface of the substrate. Others, using byssal threads secreted by the foot, attach themselves to hard surfaces like piles or rocks, while still others have adapted to bore into wood or soft rock.

Many bivalves can move short distances using their muscular foot or by expelling water by rapid muscular contraction of their shells.

Some species of bivalves are raised commercially, oysters being the most common in NSW. Pipis, commonly found on sandy beaches, are collected as a food resource or for fishing bait; other species are farmed in the pearl industry.

Bivalves occur in nearly all marine environments, attaching to virtually all substrates. Some species foul ships hulls, buoys and wharf pilings, and can block sea-water intakes on ships and shore-based installations.

They vary in size from only millimetres across to over 1.3 metres, the giant clams of tropical waters reaching a weight of over 200 kg and living for over 100 years.

Bivalves are preyed upon by a variety of fish, other molluscs and echinoderms.

Family - CLAVAGELLIDAE
Dacosta australis

Lives in a hole bored by chemical means into calcareous substrate. The calcium carbonate produced during this process forms the tube visible in the photograph. This species is classed as a bivalve because the juvenile form possesses the same characteristics as other bivalve shells. Grows to a tube length of at least 21 cm. The specimen pictured was found on an intertidal rock platform. Uncommon.

Photo by Nicola Fraser

Family - CARDIIDAE ***Tridacna maxima***

The **elongate giant clam** has valves with 5 or 6 rounded ribs, each with a series of low flutes. The mantle is usually blue or green. Coral and rocky reefs, depth to 35 m. Width to 35 cm. Recorded south to around Coffs Harbour and commonly at Lord Howe Island.

Family - CARDIIDAE ***Plebidonax deltoides***

Triangular shell with one short side, variable in colour including yellow-brown, orange, purple, mauve, white and green. Commonly found on surf beaches, often used for bait or sometimes for food. Food item for various shore birds. Grows to 6 cm across. Intertidal, sandy shores. Common.

Family - CHAMIDAE ***Chama* sp.**

Jewel box shells have an oval-shaped deep lower valve and relatively flat upper valve. Both valves are concentrically ridged with rows of small flat spines. The lower valve is cemented to the rocky or reef substrate. Grows to 9 cm. Common.

Family - VENERIDAE
Antigona persimilis

Pale with brownish scattered blotches and stripes, the shell has numerous fine ribs and distinct raised growth lines. The **venus clam** lives in soft sediment and grows to at least 35 mm across. Common.

Family - ARCIDAE
Anadara trapezia

The **Sydney cockle** has a heavy calcareous shell with many prominent radiating ridges and brown periostracum. It lives in protected estuarine habitats, intertidal to subtidal depths of 2 m. Width to 75 mm. Common.

Photo by Nicola Fraser

Family - LIMIDAE ***Limaria* sp.**

The **fragile file clam** has a pale translucent shell, an orange-red body and sensory tentacles. The shell has a permanent gape with tentacles protruding and can “swim” by “clapping” its valves. On sand and rubble, under rocks, depth to 10 m. Shell width to 35 mm. Common.

Family - MYTILIDAE
Trichomya hirsuta

Dark brown shell with many fine hairs. The interior is bright blue. May form dense aggregations on rocky reef and in estuarine habitats. Depth to 15 m. Shell length to 6 cm. Common.

Family - GRYPHAEIDAE
Hyotissa hyotis

A robust oyster heavily encrusted with algae or encrusting sponge. The mantle is black, and the valves usually have a cockscomb shape, giving it its common name **cockscomb oyster**. Rocky and coral reef, pylons. Grows up to 30 cm. Common.

Family - OSTREIDAE
Saccostrea glomerata

The **sydney rock oyster** often dominates the mid-tidal area along sheltered shorelines of harbours and estuaries. The upper shell is bluish-grey and slightly convex while the lower shell, cemented to the substrate, is cup shaped. They grow thickly on rocks and piles and are the basis of a large shellfish industry in NSW and elsewhere. Oyster spat, collected from estuaries in northern NSW, are then grown in oyster farms until they reach marketable size, often 6 or 7 cm across. Depth from mid to low intertidal. Common.

Family - PINNIDAE
Pinna bicolor

A fan-shaped bivalve with its narrow end embedded in mud, sand or rubble. Mottled light to dark brown or black, the shells are often covered with a variety of bryozoans and other organisms. Commonly known as a **razor clam** because of the sharp edges of the valves protruding from the substrate. Prefers soft sand or mud substrate, in and around reefs and rocky shores. Grows to 50 cm in length. Depth to 10 m. Common.

Family - PINNIDAE
Pinna deltodes

Fan-shaped, only slightly longer than wide, with triangular end firmly embedded in mud, sand or rubble. Grows to 37 cm. Depth to 15 m. Uncommon.

Family - MARGARITIDAE ***Pinctada margaritifera***

Externally gray-brown or green, often with white spots or blotches. The **black-lip pearl oyster** is cultivated in aquaculture for pearl production. Attached to hard substrates, depth to 66 m. Grows to 17 cm. Common.

Family - PTERIIDAE
Pinctada imbricata fucata

Almost square in shape, the **Akoya pearl oyster** is slightly longer than it is wide, mature shells being reddish or golden brown, with radiating streaks. Length to 75 mm. Attached to rocks and other hard surfaces. Common. Farmed overseas to produce cultured pearls.

Family - PTERIIDAE
Pterelectroma physoides

Translucent pale shell with regular dark, thin stripes. Short wing with scalloped margin behind. Attaches to hydroids, grows to 2 cm. Depth to 30 m. Common.

Family - PTERIIDAE
***Pteria* sp.**

Winged oysters are closely allied to the pearl oysters, genus *Pinctada*, and are sometimes used for the production of mabe or “blister pearls”. Usually attached to gorgonians or black coral trees, may grow to over 20 cm. Depth to 20 m. Common.

Family - PECTINIDAE
Scaeochlamys livida

The left, or top, valve with 9 - 12 ribs, each with large erected scales. The **spiny scallop** is usually attached to the underside of rocks or among shell debris, where it attaches with byssal threads. Grows to 75 mm. Depth to 15 m. Common.

Family - SPONDYLIDAE
Spondylus varius

The **giant thorny oyster** shell has spines which may be hidden under algal growth. Has orange, purple and white markings on mantle, and a large gape between valves when fully open. Found in rocky reef caves and recesses, depth to 30 m. Grows to 25 cm. Uncommon.

Squid, cuttlefish and octopuses

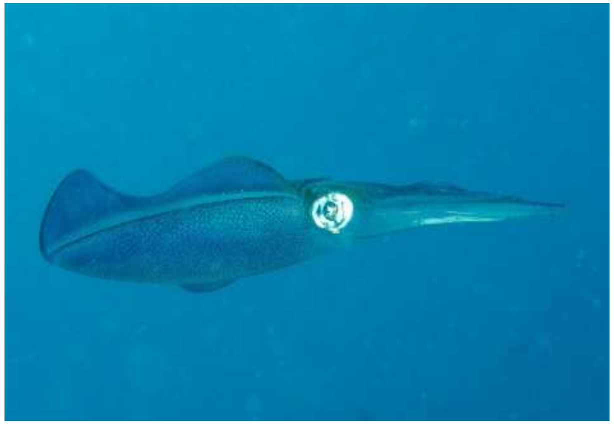
This group, collectively called cephalopods, comprises soft bodied molluscs with a head partially or completely fused with the foot. Octopuses have eight arms, squid and cuttlefishes ten; each arm equipped with powerful suckers used for catching prey.

These animals can rapidly change appearance and skin texture by stimulating pigment-rich cells in the epidermis. This ‘trick’ enables them to change colour and shape as camouflage, to appear larger when threatened, or possibly as a mating signal.

Sexes are separate; the male has a modified arm for fertilising the female by depositing spermatophores into her mantle cavity. Female squid and cuttlefish attach their eggs to a hard surface, usually under an object or in small recesses. Some female octopuses brood their eggs in a specially constructed lair until the live, crawling octopuses hatch. Most species of squid, cuttlefish and octopuses are semelparous, meaning they breed only once in their lifetime, dying shortly after.

Propulsion is achieved by drawing water into the mantle cavity and expelling it via a directional funnel. Octopuses may also use their tentacles to walk over the substrate; cuttlefish and squid may use their lateral fins for propulsion as well. All cephalopods have a special gland containing a dark, viscous, inky substance that can be expelled via the siphon if the animal is threatened. The ink cloud hangs in the water column as a decoy, allowing the animal to escape.

Some cephalopods are very small, measuring only millimetres. Conversely, giant squid, the largest of the group, may measure 6 metres or more in length.



Family - LOLIGINIDAE
Sepioteuthis australis

Southern calamari is a common squid found in bays and estuaries. It has a large eye and a distinguishing side fin that completely encircles the mantle.
Depth to 100 m. Grows to mantle length of 38 cm. Common.

Family - SEPIADARIIDAE
Sepioloidea lineolata

The **lined dumpling squid** usually lies buried in the sand and is most commonly seen at night. Has a pale body with longitudinal dark brown or black stripes; found in sand and seagrass meadows, estuaries and bays. Depth to 20 m. Grows to 70 mm. Common.

Family - SEPIIDAE
Sepia apama

The **giant cuttlefish** is easily recognised by its large size as well as the distinctive flaps of raised skin above its eyes. The largest of all cuttlefishes, it can change colour, texture and shape to imitate its surroundings. Large cuttles exhibit stunning colour displays during mating, after which the female deposits her eggs in crevices or hollows where they hatch after three to five months. They feed on other cuttles, fish and crustaceans and live for a relatively short period of between two to four years.
Large cuttlebones are sometimes found washed up on beaches, often with tooth marks from predators such as dolphins, small sharks and fishes. The cuttlebone is without a spine and may measure up to 45 cm long.
Rocky reef, seagrass or kelp beds, depth to 100 m. Grows to 1 m long. Seasonally common, usually late autumn and winter.

Family - SEPIIDAE
Sepia grahami

Ken's cuttlefish may be pale or reddish, with short arms, a gold ring around the eye socket, and two darker blotches towards the rear of the upper body. There are two reddish or gold blotches immediately in front of the dark blotches, this distinguishes it from the similar, less common, *S. mestus* (not shown). Able to rapidly alter its colour and shape in response to the environment it feeds on invertebrates and small fish. The cuttlebone, more wide and oval than that of *S. plangon,* is often found in large numbers on beaches. Sheltered reef on the open coast, bays and estuaries. Depth to 85 m. Grows to 20 cm. Common.

Family - SEPIIDAE ***Sepia plangon***

The **mourning cuttle** is so named due to it often having a bluish tinge around the eyes. It has slightly longer arms than its close relative *S. grahami*, and is often observed resting on the seafloor with its tentacles arranged in a tripod fashion. Sheltered waters, seagrass beds, depth to 85 m. Grows to 13 cm. Common.

Family - OCTOPODIDAE ***Hapalochlaena fasciata***

The **blue-lined octopus** is well camouflaged until disturbed. When alarmed it displays vivid blue rings and lines on its body, similar to the blue-ringed octopus (not shown). Seagrass, rubble, sand, depth to 30 m. Preys on small fishes and crustaceans which are paralysed with a toxic venom. Dangerous to humans and should not be handled. Grows to around 20 cm arm span. Common.

Family - OCTOPODIDAE ***Octopus cyanea***

Recognised by the false eyespots on either side of the arm crown and regular white spots on the arms, the **day octopus** is so named because it is active during daylight hours. Rapidly able to change colour and texture, it preys mainly on crabs. Coral, rocky reef to 60 m depth. Arm span to 2 m, may reach 6 kg in weight. Common.

Family - OCTOPODIDAE ***Octopus tetricus***

Primarily a night hunter, the **common Sydney octopus** is usually seen at the entrance to its lair, where it hides behind discarded shells or other items pulled into the opening. It can be recognised by its orange or rust-coloured arm underside and its white eye. It preys on crabs and hard-shelled molluscs. The female lays her eggs in its lair and guards them until they hatch. This species has a short life-span of around 11 months. Rocky shores, offshore reef, estuaries, depth to 30 m. A large species that grows to 2 m arm span, usually much smaller at 80 cm. Common.

Sea snails

Sea snails are marine gastropod molluscs, class Gastropoda. They generally secrete a hard shell into which the animal can completely withdraw, and most species have an operculum. This horny or calcareous disc is used to block the aperture completely.

Sea snails have a well-developed head bearing a pair of tentacles and eyes situated at the tentacle base. The muscular foot is used for locomotion, but may also be modified for swimming or clamping.

Most species described here have a right-handed spirally-coiled shell. The majority of sea snails are benthic, but a few such as the Violet Snail, *Janthina janthina* are planktonic.

In most species, the sexes are separate and fixed from birth. Fertilisation of sea snail eggs may occur externally, with sperm and eggs mixing in the water column, or internally in the female, the resulting fertilised eggs deposited on the substrate in a capsule or gelatinous mass. Although some species hatch as tiny crawling snails, generally there are two larval stages and the latter stage, the veliger, when it settles, quickly transforms into the shelled form of the adult.

Feeding habits are varied and specialised. Most species are grazers, their specialised radula scraping organic material off hard surfaces and sea weeds. Some are carnivorous, their modified radula adapted for feeding on other molluscs, and some cone snails are venomous with a needle-shaped radula modified to prey on fish.

Sea snails are found in all types of marine habitats, from above the high tide line, to rockpools on intertidal rocky platforms, seagrass, sandy and muddy bottoms and rocky and coral reefs. Many species are dredged from the ocean depths by fishing trawlers.

Their size varies greatly. Some sea snails are microscopic, and others, such as the giant whelk, may reach over 70 cm and 18 kg in weight.

Family - BATILLARIIDAE
Batillaria australis

Solid grey-brown shell, sculptured with axial ribs and fine radial lines. The aperture and columella are fawn, and the interior of outer lip purplish-brown with black lirae. Mangroves, estuarine tidal flats. Grows to 49 mm. Common.

Family - BATILLARIIDAE ***Pyrazus ebeninus***

The **mud whelk** has a solid, heavy shell which is brown in colour and often covered in algae. The aperture is white with black or purple edging. Mid to high tide level in estuaries, mangrove swamps. Grows to 97 mm. Common.

Family - EPITONIIDAE
Epidendrium aureum

Found only in association with its food source solitary coral, *Tubastraea coccinea* upon which it feeds by inserting its proboscis into the coral polyp. A small shell, the **golden wentletrap** has a high spire with smoothly rounded whorls and a yellow periostracum so as to be camouflaged against its food source.
Grows to 1 cm in length. While the food source coral is common and found under overhangs or on walls of caves, the golden wentletrap is less common. Depth to 16 m.

Family - EPITONIIDAE ***Epitonium pyramidale***

Shell conical, fragile, and pure white in colour, with a deep suture between whorls. There are 8 - 14 ribs per whorl, each with a characteristic hook, the space between the ribs is smooth. Feeds upon anemones and corals. Specimen above in rubble at base of giant sea anemone. Grows to 26 mm. Rare in NSW.

Family - EPITONIIDAE
Janthina janthina

Almost spherical violet-coloured shell with a low, flat, spire, often washed ashore in large numbers with on-shore winds. The **violet snail** excretes mucus which forms a bubble raft, keeping the animal afloat on the ocean surface. It preys on surface cnidarians such as the common bluebottle, small jellyfish and crustaceans. It uses countershading camouflage, (shell darker above and lighter below), to avoid predators. Grows to around 4 cm. Seasonally very common.

Aquarium photo

Aquarium photo

Family - EPITONIIDAE

Recluzia johnii

Brown shell with 5 whorls and a thin brown periostracum. Note the cylindrical egg capsules. A bubble raft allows it to float on the ocean's surface, where it preys on floating anemones, *Actinecta* spp. Found on beaches after strong onshore winds. Grows to 29 mm. Rare.

Family - CYPRAEIDAE

Cypraea tigris

Dorsum black-blotched on a cream or bluish background, the base almost pure white. Shell pattern is visible through the transparent mantle, which has elongated whitish papillae. Rocky and coral reef, depth to 15 m. Grows to 115 mm. Uncommon.

Family - CYPRAEIDAE

Mauritia arabica

Shell fawn with three indistinct bands, and irregular dark brown markings. Base and sides fawn, teeth dark brown. Has more callus on the margins, hence a broader and flatter base than similar *M. eglantina*. Rocky and coral reef. Depth to 10m. Grows to 85 mm. Common.

Family - CYPRAEIDAE

Mauritia eglantina

Shell off-white to fawn with indistinct darker bands, overlain with dark brown scribbles. Base and sides fawn, teeth dark brown. Shell is more cylindrical than that of similar *M. arabica* and lacks the broad base. Rocky and coral reef, depth to 20 m. Grows to 75 mm. Common.

Family - CYPRAEIDAE

Cribrarula cribraria

The dorsal surface is tan or yellow-brown with white spots in a sieve pattern. The orange mantle has small papillae of the same colour and a fine dark netted pattern. Found under rocks and in crevices in shallow reefs. Grows to 35 mm. Uncommon to rare.

Family -CYPRAEIDAE

Erronea caurica

Elongated cylindrical shape, dorsum pale, greenish, with diffuse brown spots, crossed by three pale brown bands. Base and sides fawn, large marginal spots brown, the teeth strong. Rocky and coral reefs, turbid areas, depth to 20 m. Grows to 35 mm. Common.

Photo by Steve Smith

Family - CYPRAEIDAE

Erronea errones

Dorsum pale blue-grey, with yellow or greenish-brown speckling, and a brown blotch of variable size and intensity in the centre. The mantle is greenish with reticulated dark pattern and many branched papillae. Rockpools, shallow reef. Grows to at least 35 mm. Common.

Family - CYPRAEIDAE

Erronea xanthodon

Dorsum light blue-grey, numerous small brown flecks and three broad brown bands. Flecks in centre of dorsum may form large botch. Base and sides pale red-brown, teeth coarse. Rocky and coral reef, under rocks and slabs. Depth to 10 m. Grows to 35 mm. Common.

Photo by Steve Smith

Family - CYPRAEIDAE

Melicerona listeri

Dorsum pale blue-grey with four transverse interrupted brown bands, covered with yellow-brown specks. Base, sides, and teeth white, with black-brown marginal spots of varying size. Rocky, coral reef intertidal areas. Grows to 25 mm. Common.

Family - CYPRAEIDAE

Talostolida pellucens

Very pale shell with numerous pale brown flecks, three interrupted broad brown bands which are sometimes faint. Base, sides, and teeth white, mantle bright orange with short, pale, papillae. Rocky and coral reef, depth to 18 m. Grows to 37 mm. Uncommon.

Family - CYPRAEIDAE

Monetaria annulus

Dorsum and sides off-white with pale brown, grey or blue tones. Distinctive orange ring encircles dorsum, base is off-white, the white teeth large. Mantle is grey-black, papillae are short and yellowish in colour. Rockpools and shallow reef. Grows to 3 cm. Common.

Family - CYPRAEIDAE

Monetaria moneta

Dorsum off-white to yellow, with three indistinct narrow bands, sometimes with faint orange encircling band on upper section of dorsum. The base and teeth white. Rockpools and shallow reef. Grows to 3 cm. Common.

Family - CYPRAEIDAE

Naria erosa

Light yellowish-brown to medium brown in colour, covered with medium-sized brown spots and numerous fine white spots. Teeth, base and sides white or creamy white, pale brown blotch midway on columella. Grows to 45 mm. Common.

Family - CYPRAEIDAE
Naria helvola

Dorsum orange-brown with many small white spots and a lesser number of darker orange-brown spots. Base, margins and teeth orange-brown, no marginal spots present. Subtidal to at least 18 m. Grows to 30 mm. Rare.

Family - CYPRAEIDAE
Naria labrolineata

Olive-green to light brown dorsal surface with varying-sized pale spots and distinct pale mantle line. Brown blotches above extremities. Base, sides and teeth white. Rocky reef. Grows to 25 mm. Common.

Family - CYPRAEIDAE
Lyncina carneola

Honey or salmon-coloured shell, often with growth marks visible. Base, sides, and extremities fawn, teeth purple. Mantle is mottled fawn and brown with long grey or white papillae. Rocky and coral reef, depth to 8m. Grows to 6 cm. Common.

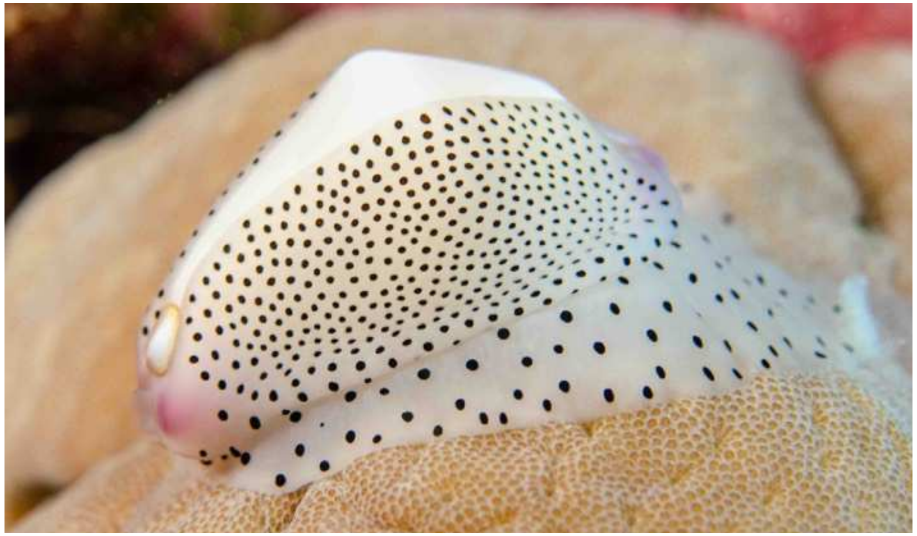
Family - CYPRAEIDAE
Lyncina vitellus

Dorsum brown with three darker bands and numerous white spots of varying size. Mantle blotched black or brown, with white or brownish papillae. The **milk spot cowrie** is found in coral and rocky reef habitats, depth to 12 m. Grows to 65 mm. Common.

Photo by Steve Smith

Family - CYPRAEIDAE ***Talparia talpa***

Dorsum brown with three indistinct pale bands. Base, sides, and teeth dark brown, spaces between the teeth white. Mantle semi-transparent, covered with fine white spots, large papillae. Coral and rocky reef, depth to 20 m. Grows to 85 mm. Rare.



Family - OVULIDAE ***Calpurnus verrucosus***

Solid, oval, white shell with conspicuous toenail-like knobs and pinkish ends. Mantle transparent with numerous small dark spots. Lives and feeds on the fleshy soft coral, *Lobophytum* spp. Shallow subtidal, grows to 35 mm. Uncommon.

Family - OVULIDAE

Cuspivolva draperi

Shell white with cloudy orange blotching and a high transverse ridge. Mantle pale yellow with orange dark-edged spots. The foot white with orange spots. Sheltered waters, found on *Euplexaura* spp. gorgonians. Depth to 20 m. Grows to 22 mm. Common.

Family - OVULIDAE

Cuspivolva howlandae

Shell pale with orange anterior end and high transverse angular ridge. Mantle pale with black spots and streaks, small white papillae. Foot pale, siphon black. Sheltered waters, found on *Euplexaura* spp. gorgonians. Depth to 20 m. Grows to 2 cm. Uncommon.

Photo by Steve Smith

Family - OVULIDAE

Cuspivolva ostheimerae

Shell pale with cloudy orange blotching, high transverse ridge, orange anterior end. Mantle pale orange with numerous small dark spots, papillae white and very small. Found on gorgonians to a depth of 20 m. Grows to 1 cm. Uncommon.

Family - OVULIDAE

Cuspivolva platysia

Pale shell, transverse ridge with orange band, orange blotches at both ends. Mantle translucent white with black circular spots, the foot pale with numerous black spots, the siphon black. Found on *Euplexaura* spp. gorgonians. Grows to 2 cm. Uncommon.

Family - OVULIDAE

Cuspivolva tigris

Yellow-orange shell with high transverse ridge, mantle is yellow with white-edged black stripes. Orange foot with black spots, the siphon orange and tentacles orange with black distal bands. Found on *Euplexaura* spp. gorgonians. Grows to 15 mm. Uncommon.

Family - OVULIDAE

Diminovula culmen

Shell pale, mantle has fine pink, red or purple net pattern that weaves around tall simple papillae. Foot pale with similar-coloured transverse lines. Found on *Dendronephthya* spp. soft corals. Depth to 20 m. Grows to 15 mm. Common.

Family - OVULIDAE

Diminovula margarita

Pale pink ovate shell, ends white, the mantle translucent with dark pink-edged circular pink spots, and pale papillae. Siphon pale, edged with dark pink, foot pale with pink transverse lines. Found on leathery soft corals. Depth to 20 m. Grows to 15 mm. Uncommon.

Family - OVULIDAE

Diminovula whitworthi

Ovate shell, off-white to fawn or pale brown colour. Mantle pale with closely packed darker red blotches, short white papillae, foot pale with dark red streaks, siphon dark pink-red. Found on *Dendronephthya* spp. soft corals. Grows to 19 mm. Uncommon.

Photo by Steve Smith

Family - OVULIDAE
Globovula cavanaghi

Ovate pink shell with white ends, mantle has closely spaced dark-edged pink spots, short white simple papillae. Foot white with pink stripes and blotches, siphon pale pink. Common, found on *Dendronephthya* spp. soft corals. Depth to 20 m. Grows to 13 mm.

Family -OVULIDAE
Primovula rosewateri

White shell with orange ends. Mantle translucent with large dark-edged red blotches, papillae yellow and white. Siphon red with dark edge, foot pale with dark striations. Found on gorgonian branches. Grows to 15 mm. Uncommon.

Family - OVULIDAE
Prionovolva brevis

Shell ovate, off-white to salmon pink in colour, often with two pale bands. Mantle has net pattern of pink spots with long white papillae. Foot pale without streaks but with dark pink blush at rear. Found on *Dendronephthya* spp. soft corals. Grows to 25 mm. Uncommon.

Family - OVULIDAE
Procalpurnus lacteus

Shell white, mantle with reddish-brown to black netted pattern and occasional large dark spots. Foot pale with dark netted pattern, tentacles with pale brown band mid-length. Feeds on leathery soft corals, depth to 80 m. Grows to 19 mm. Uncommon to rare.

Family - OVULIDAE
Procalpurnus semistriatus

Shell white, mantle netted with reddish-brown to black pattern. Foot pale with dark spots, tentacles pale with pale pink band mid length. Similar *P. lacteus* has netted pattern on foot. Feeds on leathery soft corals, depth to 80 m. Grows to 2 cm. Uncommon.

Family - OVULIDAE
Prosimnia semperi

Elongated shell, coloured white, fawn, pink or light purple and sculptured with fine spiral ribs,. Mantle reddish to match colour of host gorgonian upon which it feeds. Depth to 30 m. Known to feed on the gorgonian *Mopsella ellisi*. Grows to 13 mm. Rare.

Photo by Steve Smith

Family - OVULIDAE
Testudovolva ericae

Ovate white shell, mantle pale pink with network of red to brown scribbles, with scattered long white simple papillae. Foot with widely spaced dark red lines, and dark-edged pink siphon. Feeds on *Dendronephthya* spp. soft corals. Grows to 12 mm. Uncommon.

Photo by Steve Smith

Family - OVULIDAE
Testudovolva nebula

Shell white, fawn or pink-purple, often with cloudy darker blotches. Mantle translucent with coarse netted pattern, coloured pink, red or brownish. Foot pale with darker striations. Feeds on *Dendronephthya* spp. soft corals. Grows to 13 mm. Uncommon.

Family - OVULIDAE ***Ovula costellata***

Shell ovate, white with pink tinge. The mantle pale with numerous small orange spots and larger orange-tipped papillae. The foot white with fine black margin. Feeds on leathery soft corals, depth to 20 m. Grows to 5 cm. Uncommon.

Family - OVULIDAE ***Ovula ovum***

Shell ovate, pure white, mantle black with loose netted pattern of white spots and dots. Foot black with occasional white spots. Feeds on leathery soft corals, depth to 20 m. Grows to 10 cm. Note egg capsules in background. Common.

Family - OVULIDAE
Pellasimnia improcera

Elongated shell, white, fawn or grey in colour, with yellow-orange ends. Mantle translucent with fine or medium thickness red or orange lines which form a net-like pattern. The papillae white or yellow. Feeds on gorgonian fans. Grows to 32 mm. Rare.

Photo by Steve Smith

Family - OVULIDAE
Phenacovolva nectarea

Elongated shell, coloured fawn to salmon pink with yellow ends, and pale band around centre. Mantle transparent with small red- and yellow-tipped papillae. Foot pale, siphon light to dark pink. Feeds on *Euplexaura* spp. gorgonians. Grows to 65 mm. Uncommon.

Family - OVULIDAE
Phenacovolva poppei

Elongated white or pale fawn shell with cloudy darker blotches. Mantle white with red longitudinal lines and scribbles, and long white papillae. The foot white with red edging. Found on *Antipathes* spp. black coral trees. Grows to 38 mm. Uncommon.

Family - OVULIDAE
Phenacovolva rosea

Elongated shell, coloured fawn caramel or salmon pink. Mantle pale to dark pink-red with short red, white and yellow papillae. Foot light to dark pink-red. Found on *Euplexaura* spp. gorgonians and *Dendronephthya* spp. soft corals. Grows to 65 mm. Common.

Family - OVULIDAE ***Volva volva***

Very elongated lightweight shell, coloured white, pink or pale purple, which shows through transparent mantle. Mantle with numerous reddish-brown spots, each with long black-tipped papillae. Lives on soft corals, gorgonians. Grows to 13 cm. Rare.

Family - TRIVIIDAE ***Trivirostra oryza***

Globular shell, white with fine ribs and deep groove on the dorsum. Mantle predominantly black or brown, with long white papillae. Foot pale with opaque white lines. Under rocks and coral, rarely seen. Grows to 13 mm. Common.

Family - VELUTINIDAE ***Djiboutia australis***

This brightly coloured animal is mostly orange with white-edged pale spots with dark centres and numerous smaller dark spots. Often found under rocks and coral slabs, grows to around 5 cm. Uncommon. Previously named ***Lamellaria australis***.

Family - VELUTINIDAE
***Lamellaria* sp.**

Largely undescribed, this family mostly has internal shells. Often brightly coloured, with a rugose mantle exterior, sensory tentacles and a short siphon. They feed on compound ascidians. Found both intertidally and subtidally. Size range from 1 cm up to 8 cm for ***Coriocella nigra***, top left. Uncommon.

Family - LITTORIDINAE
Bembicium nanum

Solid conical shell, often eroded and with brown wavy lines on the body whorl. Has a tight-fitting operculum allowing survival for long periods between tides. Intertidal species, rocky shores and platforms. Grows to 22 mm, usually 15 mm. Common.

Family - LITTORIDINAE
Austrolittorina unifasciata

Blue-grey shell, lighter on upper half of whorls, brown apex. Ratio of shell height to width variable. Tolerates temperature extremes, in crevices on rocky shores from above high tide to almost low tide level. Grows to 25 mm long, usually less than 15 mm. Common.

Family - LITTORIDINAE
***Littoraria* sp.**

Lightweight shell, well-rounded whorls, usually dark brown but sometimes lighter, with or without pattern of dashes or stripes. At least two species are commonly encountered in mangroves along the NSW coast, *L. luteola* and *L. scabra,* the latter being the larger, growing to at least 4 cm in length.

Although a marine snail, it is effectively terrestrial, migrating up the trunks and branches of the mangroves, staying above the water at all times. They graze on the roots, trunks, branches and leaves, feeding on zooplankton, bacteria, algae and mangrove tissue. Common.

Family - LITTORINIDAE
Nodilittorina pyramidalis

Grey, solid shell, two rows of strong white or fawn nodules on body whorl. Columella smooth and the operculum corneous. Lives on rocky shores near and above high tide level. Grows to 27 mm but usually less than 15 mm. Common.

Family - NATICIDAE

Sand snails are commonly seen on intertidal beaches and mudflats, leaving a characteristic trail just below the sand surface (top). Some species are also known from deeper waters, often only from the shells retrieved from dredging or trawling operations. They are carnivorous, feeding largely on bivalves, using a radula and secretions to drill a small hole in the shell, then sucking out the tissues.
The shell pictured at right, ***Mammilla simiae***, was photographed at 18 m depth. Grow to 38 mm, but often 3 cm. Members of this Family are common, but because of their habit of burying in the sand, are rarely seen. Intertidal to over 500 m depth.

Family - STROMBIDAE
Canarium mutabile

Solid shell, white or fawn, often dark stripes. Brown or orange columella with white lirae. Has prominent eyestalks and eyes. The long thin operculum is used to propel the shell across the substrate. Sheltered areas, intertidal, sand and algae. Grows to 42 mm. Common.

Family - STROMBIDAE
Conomurex luhuanus

Shell solid, heavy and conical, the aperture elongate, outer lip orange internally. Exterior white with around seven spiral brown bands on body whorl. Prominent eyestalks and eyes. Seagrass areas, intertidal, shallow subtidal. Grows to 73 mm. Uncommon.

Family - STROMBIDAE
Gibberulus gibberulus

Shell moderately solid, outer lip slightly thickened and flared. Exterior white with spiral bands of brown blotches, interior white or tinted violet, brown or yellow. Sandy patches on reef flats, lagoons. Depth to 20 m. Grows to 7 cm. Rare in NSW.

Family - BURSIDAE
Lampasopsis rhodostoma

Aperture magenta, posterior canal short. Exterior usually heavily encrusted. Members of this family known as frog shells, due to their warty pustulose surface. Rocky and coral reef, tropical species, rare in NSW. Depth to 250 m. Grows to 35 mm.

Family - BURSIDAE
Tutufa bufo

Shell solid and heavy, exterior white or fawn, columella shield and outer lip white or pink, the deep interior white. Columella and interior of outer lip orange. Rocky reef. Depth to 250 m. Grows to 23 cm. Uncommon.

Family -CHARONIIDAE ***Charonia lampas***

Colour fawn to brown with irregular dark axial streaks. White interior, outer lip lirae brown, the oval operculum brown. Feeds on sea urchins and sea stars. Rocky shores, intertidal areas. Depth to 250 m. Grows to 265 mm. Common.

Family - CYMATIIDAE ***Cabestana spengleri***

Solid shell with strong spiral ribs. Outer lip thickened, strongly toothed within, columella white and smooth, interior white. Shell has thin brown periostracum. Rocky shores. Depth to 80 m. Grows to 18 cm. Common.

Family - CYMATIIDAE ***Monoplex aquatilis***

Solid heavy shell, sculptured with broad, low spiral ribs orange-brown in colour with thick hairy periostracum. Columella orange with white lirae, outer lip expanded and thickened. Coral, rocky reef, under slabs. Depth to 60m. Grows to 12 cm. Uncommon.

Family - CYMATIIDAE
Monoplex parthenopeus

Shell sculptured with broad, low spiral ribs, colour light brown, with thick hairy periostracum. Columella dark brown with white lirae. Anterior canal short. Rocky and muddy shores on exposed coasts and in estuaries. Depth to 150 m. A known predator of bivalves, is considered a pest in oyster beds. Grows to 116 mm. Common.

Family - RANELLIDAE
Ranella australasia

Heavy shell with high spire, uniformly dark brown with low ridges around the whorls, relatively wide aperture. Interior and columella white, shell covered with thick velvet-like periostracum. Rocky coasts. Depth to 350 m. Grows to 13 cm. Common.

Family - TONNIDAE
Tonna perdix

Large, globular, thin reddish-brown shell, spire projecting slightly. Foot, siphon and tentacles dark with lighter streaking and mottling. Feeds on sea cucumbers. Sandy areas, burrowing under the surface by day. Depth to 50 m. Grows to 13 cm. Uncommon.

Family -EULIMIDAE
Annulobalcis yamamotoi

Shell is high, slender, conical, coloured bluish-white and semi-transparent, showing the brightly coloured soft parts within. Host specificity in this genus is high, the shells attaching themselves to their preferred feather stars with a well-developed proboscis. They are believed to be parasitic. Found around the base of crinoids, often the ten-armed feather star *Tropiometra afra* in northern NSW. Grows to 1 cm. Uncommon.

Family - VERMETIDAE
Thylacodes sipho

Members of this family live in an irregularly coiled worm-like shell, the early whorls being attached to the substrate. An operculum is absent. Feeds on organic matter trapped on mucus-laden threads. Subtidal exposed reef. Shell length up to 7 cm. Common.

Family - COLLUMBELLIDAE
Euplica scripta

Solid shell, variable colouration, fawn with darker blotches, dark zig-zag markings. Aperture is around half shell length. Feeds on diatoms and other animal life on fronds of algae. Intertidal and shallow subtidal, rockpools. Grows to 19 mm. Common.

Family - COLLUMBELLIDAE
Graphicomassa ligula

Variably-shaped, from relatively tall to relatively broad. Colour may be white, or fawn with white patches, and irregular brown streaks or mottling. Intertidal to 20 m depth. Grows to 17 mm. Relatively common.

Family - FASCIOLARIIDAE
Latirus polygonus

Spindle-shaped with medium length spire and aperture around half shell length. Mid- to dark brown with white radial lines. Interior white, anterior canal long, operculum dark brown. Rocky and coral reef. Grows to 7 cm. Uncommon.

Family - FASCIOLARIIDAE
Turrilatirus turritus

Shell spindle-shaped, rich brown in colour with chocolate brown spiral lines, prominent axial folds. Aperture small, interior and foot orange. Brown corneous operculum. Coral and rocky reef, under slabs and rocks. Grows to 4 cm. Uncommon.

Family - FASCIOLARIIDAE
Marmorofusus nicobaricus

Shell spindle-shaped, body whorl rounded with heavy shoulder nodules. Anterior canal straight and moderately long. Shell whitish with brown patches, aperture and columella white, operculum orange. Coral and rocky reef. Grows to 9 cm. Common.

Family - FASCIOLARIIDAE ***Nodopelagia brazieri***

Shell light brown with thin brown periostracum. Whorls with 7 or 8 axial folds, surface irregular due to numerous axial growth lines. Columella white or yellowish brown, operculum and foot are orange. Rocky shores, intertidal and subtidal. Grows to 37 mm. Common.

Family - NASSARIIDAE **_Nassarius glans particeps_**

Shell moderately light weight, cream to fawn in colour with thin brown spiral lines. The foot cream with numerous black spots, the operculum red. Very active predator. Sandy areas of rocky shores, depth to 77 m. Grows to 32 mm. Common.

Photo by Steve Smith

Family - NASSARIIDAE
Nassarius jonasii

Globular, fawn coloured shell with prominent spire and dark spiral bands. They have a long proboscis for reaching into recesses and have well developed chemical sensors. Very agile and active, they are mostly found on sand or mud. Generally carrion feeders, the lower photo shows numbers feeding on a fish carcass. Intertidal to 100 m depth. Grows to 2 cm. Common.

Family - CONIDAE
Conus arenatus

Stout shell, white or cream with many small dark spots, sometimes with diffuse darker bands. Low spire, slightly convex sides and rounded, slightly nodulose shoulders. Interior white. Sand or rubble, rocky and coral reefs. Grows to 6 cm. Uncommon.

Family - CONIDAE
Conus capitaneus

Low spire, almost straight sides, wide at the shoulder. Distinct white bands at shoulder and centre, spiral rows of small, less distinct spots around most of the body. Rocky and coral reefs, under rocks. Grows to 8 cm. Relatively common.

Family - CONIDAE
Conus coronatus

Shell pale, with interrupted spiral lines of alternating brown and white over irregular light to dark brown patches. Spire low to medium height, slightly convex sides, deep interior blue-white tending purple near margin. Grows to 43 mm. Intertidal to depth 10 m. Common.

Family - CONIDAE
Conus ebraeus

Shell solid with low spire and straight or slightly convex sides. Pale colour with three or four rows of large dark blotches. Aperture narrow, the interior white with dark blotching. Intertidal to shallow subtidal, rock platforms. Grows to 62 mm. Uncommon.

Family - CONIDAE
Conus miles

Solid shell with medium-height spire, slightly convex sides and slightly rounded shoulders. Pale colour with thin axial orange-brown lines and two broad, dark, spiral bands: one central, one at anterior end. Subtidal to 20 m depth. Grows to 8 cm. Common.

Family - CONIDAE
Conus miliaris

Shell light to heavy with convex sides, the shoulder rounded, spire low to medium height and pointed. Colour white, slightly darker bands overlaid with fine spiral darker lines. Intertidal to 10 m. Feeds on polychaete worms. Grows to 43 mm. Common.

Family - CONIDAE ***Conus musicus***
Shell is lightweight, pale with broad grey, orange or reddish-brown bands, overlaid with dotted or dashed brown spiral lines. Spire low to moderate height, darker blotching on shoulder. Subtidal to 18 m. Grows to 3 cm. Common.

Family - CONIDAE ***Conus omaria***

Pale or white background with a dark, tent-like, mosaic of triangles and patches. Low rounded spire, convex sides, aperture widening towards the tip. Preys on other molluscs, worms and small fish. Rocky and coral reef, depth to at least 50 m. Grows to 8 cm. Uncommon.

Photo by Nicola Fraser

Family - CONIDAE ***Conus textile***

Moderately high spire, orange-brown base colour, two darker central bands, overlaid with brown undulating axial lines and white triangular blotches. Aperture interior white. Extremely venomous, feeds on other molluscs, worms and small fish, should not be handled. Depth to 50 m. Grows to 11 cm. Common.

Family - CONIDAE
Conus vexillum

Yellow-brown or orange-brown in colour, pale spiral band at centre, narrower pale band at shoulder, aperture straight and relatively wide, interior white. Rocky, coral reef, depth to 35 m. Grows to 8 cm. Rare.

Family - TEREBRIDAE
Myurella nebulosa

Long, solid, slender shell, small elongated aperture with horny operculum. Nearly flat axial ribs on early whorls. White with diffuse orange-red blotches and thin spiral lines. Preys on worms in sand or rubble. Depth to 165 m. Grows to 65 mm. Uncommon.

Family - TEREBRIDAE
Perirhoe circumcincta

Solid, almost flat-sided whorls, sculptured with spotted, deeply incised spiral grooves. Colour ivory, with spiral series of rusty brown dots. Operculum orange-brown. Sandy substrate. Specimen shown photographed at 10 m depth. Uncommon to rare.

Family - TEREBRIDAE
Terenolla pygmaea

Solid pinkish shell, sutures with dark brown lines, has axial grooves and concave sides, Elongate aperture with pink interior. Exterior often with algal covering. Sandy substrate, thought to feed on polychaete worms. Shells shown 15 mm long at 10 m depth. Rare.

Family - MITRIDAE
Isara carbonaria

Solid shell with straight or concave spire profile, aperture about half shell length. Shell brown, usually covered with black periostracum when alive. Known to prey on peanut worms. Sand, mud, kelp or mussell beds. Grows to 8 cm. Common.

Photo by Steve Smith

Family - MURICIDAE
Coralliophila monodonta

Solid shell, pale exterior, aperture pale with purple shades. Usually found on *Pocillopora* spp. corals, subtidal to at least 12 m depth. This species has no radula and probably feeds by sucking juices or mucous from host. Grows to 25 mm. Common.

Family - MURICIDAE
Coralliophila radula

Solid shell, whorls rounded and crossed by fine spiral ribs. Aperture about half shell length, with purple interior. Siphonal canal equal in length to actual aperture. Preys on hard corals, and often found in depressed centre of plate or vase corals. Grows to 28 mm. Common.

Family - MURICIDAE
Coralliophila squamosissima

Whorls rounded or slightly shouldered, about 12 axial ribs crossed with fine spiral ribs alternating in size. Aperture more than half shell length, white inside. The columella white and smooth. Coral or rocky reef rubble. Grows to 22 mm. Uncommon.

Family - MURICIDAE
Cronia aurantiaca

Solid shell with about 8 broad, low axial folds, crossed by fine heavily-scaled spiral ribs. Outer lip toothed, columellar and aperture white or light orange, operculum brown. Under rocks, rocky reef, to 10 m depth. Grows to 4 cm. Common.

Family - MURICIDAE
Ergalatax contracta

Solid shell, angulate whorls, strong axial folds, with scaly spiral ribs crossing the axial folds. Fawn exterior sometimes with brown spiral bands. Columella calloused; aperture white. Intertidal, subtidal, rocky shores. Grows to 45 mm. Uncommon.

Family - MURICIDAE
Oppomorus nodulifera

Solid shell, grey-white in colour, often with heavy algal encrustation. Whorls rounded, sculptured with broad, rounded, oblique axial ribs. Aperture and columella whitish. Intertidal, subtidal rocky shores. Grows to 25 mm. Common.

Family - MURICIDAE ***Tenguella marginalba***

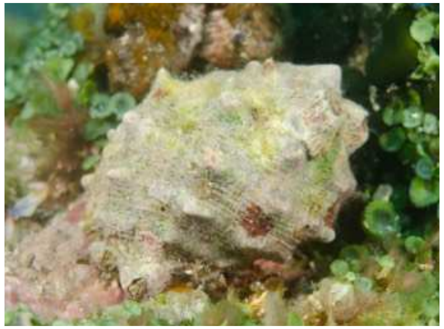
Solid, grey-coloured shell, with 5 spiral rows of black or brown nodules on body whorl. Aperture deep interior is purple-grey, outer lip cream or cream alternating with black or brown. On rocks on intertidal shores. Grows to 35 mm. Common.

Family - MURICIDAE ***Dicathais orbita***

Solid shell, strong spiral sculpture with 7 to 9 strong spiral ribs and similar width grooves on body whorl. Columella smooth, interior of outer lip reflects external shell profile. Shell coloured off-white or grey, aperture cream with yellow edge. NSW specimens usually have a much stronger spiral sculpture than their southern counterparts. Found on rock platforms and rocky shores, especially in crevices in the surf zone. Feeds on mussels, barnacles and snails by drilling a hole through the shell with a specialised radula. Grows to 12 cm. Common.

Family - MURICIDAE ***Drupa ricinus***

Relatively heavy shell, nodulose with low spire and flat base. Shell has a white exterior, often with algal growth, and body whorl has 4 spiral rows of black, or black-tipped long spines. Aperture white, often with yellow or orange blotches around margins, columella white, with a pair of fused denticles. Intertidal reefs. Grows to 3 cm. Common.



Family - MURICIDAE ***Mancinella alouina***

Broadly ovate, heavy shell with a moderately high spire. The body whorl has 5 weak, nodulose spiral ribs, and many fine spiral lirae. The shell is creamy-white to orange, the aperture and columella light orange and the operculum is solid brown in colour. Rocky reef. Grows to 61 mm. Uncommon.

Family - MURICIDAE
Thais ambustulata

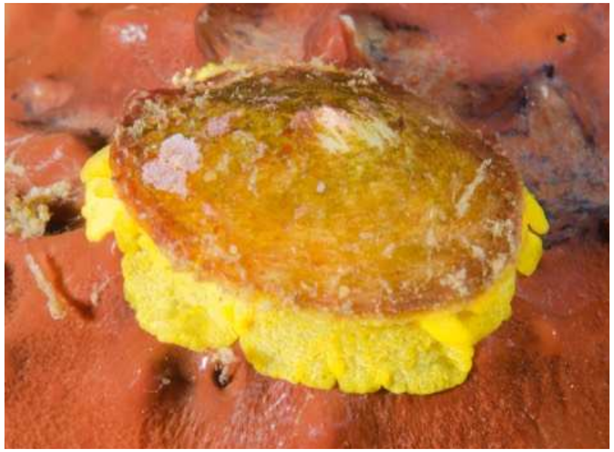
Heavy shell, cream colour with brown axial folds. Body whorl with 6 or 7 broad, low, nodulose axial folds. Columella smooth, aperture white. Operculum with brown and orange radial stripes. Subtidal rocky reef. Grows to 38 mm. Common.

Family - OLIVIDAE ***Oliva amethystina***

Solid shell, smooth glossy surface, cream or fawn-yellow in colour sometimes with diffuse brown blotches. Interior orange-brown, the columella pillar with plaits. Lives in subtidal sandy areas, often with only the siphon exposed. Grows to 6 cm. Rare.

Family - VOLUTIDAE
Cymbiola magnifica

Shell large, colour variable, with four dark brown bands on body whorl. Whorls rounded or shouldered, and sometimes with nodules on the shoulder. Aperture typically more than 3/4 total shell length, interior orange. Sand areas, near reef. Grows to 35 cm. Common.



Family - TYLODINIDAE
Tylodina corticalis

Lightweight limpet shaped shell, which often supports algal or other encrustation. The animal is bright yellow, and when fully extended is about twice the length of the shell. Intertidal to 165 m. Feeds on sponges. Shell length to 4 cm. Common.

Family - UMBRACULIDAE
Umbraculum umbraculum

The lightweight shell, with hairy periostracum, is often heavily encrusted. The globular animal is pustulose and the body does not extend much when crawling. Feeds on sponges. Exposed rocky shores, depth to 100 m. Shell length to 10 cm. Common.

Family - ARCHITECTONICIDAE
Heliacus ponderi

Conical shell with a rather flat base. Sculptured with beaded spiral and radial ribs, umbilicus of varying width. Reddish-tan in colour, often encrusted with algae. Conical operculum. Feeds on zoanthids. Depth to 110 m. Grows to 14 mm. Common.

Family - ARCHITECTONICIDAE
Heliacus variegatus

Conical shell with a flat base, similar to *H. ponderi* above, but the sculpture more strongly beaded. Bluish-white with brown or black bands. Operculum conical. Feeds on zoanthids, intertidal and subtidal, to at least 10 m depth. Grows to 18 mm. Common.

Photo by Nicola Fraser

Family - NERITIDAE
Nerita albicilla

Exterior black with whitish flecks or patches. Spire depressed, width greater than height, columellar deck pustulose, particularly at outer edge. Rocky shores and platforms, under rocks and in crevices, mid to low tide level. Grows to 24 mm. Uncommon.

Photo by Graham Edgar


Family - NERITIDAE ***Nerita melanotragus***

Dull grey or black exterior, width equal to height. Columella deck white, 2-4 denticles at centre. Operculum tan and black, finely pustulose. Rocky shores, intertidal platforms, in crevices, and among mangroves. High tide to mid tide level. Grows to 3 cm, usually smaller. Common.


Family - NERITIDAE ***Nerita plicata***

Exterior white, fawn or pink, ribs sometimes spotted with black. Shell with low spire, width equal to or less than height, about 16 strong spiral ribs. Columella deck lirate, with three strong denticles centrally. Rocky shores and platforms, in crevices and amongst weed, mid to low tide level. Grows to 3 cm. Uncommon.

Family - NACELLIDAE
Cellana tramoserica

Shape varies according to location within the tidal zone, flat shells in areas of high wave action, taller shells further up the shore. Apex slightly in front of centre, 30 - 40 strong radial ribs. Colour variable, black, brown, yellow to pink. Feeds on microalgae in the shallow subtidal zone. Grows to 65 mm. Abundant.

Family - FISSURELLIDAE
Scutus antipodes

Shell solid and heavy, white inside and out, and usually partly or completely enclosed by two black mantle flaps on either side of the body. Active at night, it feeds on algae. Under rocks or in crevices, intertidal to 20 m depth. Grows to 125 mm. Common.

Family - HALIOTIDAE ***Haliotis coccoradiata***

Shell with low spire and rounded shoulders, siphonal holes low, the last 5 to 8 open. Shell sculpture varies from smooth to strongly spirally ribbed, colour brown, orange or red. Rocky reef, under rocks, subtidal. Grows to 75 mm. Common.

Family - TROCHIDAE
Austrocochlea porcata

Shell heavy and solid, colour variable with diagonal brown or black stripes of varying width and angle. Aperture white. Rocky shores, seagrass, mangroves, estuaries. Intertidal to subtidal depths. Grows to 43 mm. Common.

Family - TROCHIDAE
Stomatella impertusa

Lightweight shell, very flat, apex at posterior end. Colour variable from fawn and grey to green or black, with or without stripes or mottling. Lives under rocks and boulders, intertidal and subtidal depths, feeds on algae. Shell length to 25 mm. Common.

Family - TURBINIDAE ***Astralium rhodostomum***

Shell solid, conical with flat sided whorls, and a series of projecting spines especially on lower edge. Shell normally covered with coralline algae, aperture white with rose or mauve tint. Grows to 4 cm. Rocky, coral reef, depth to at least 20 m. Rare on NSW coast, more common at Lord Howe Is.

Family - TURBINIDAE ***Astralium tentoriiforme***

Shell solid, conical, coloured white, grey or reddish brown and often covered in algae. Interior nacreous, operculum white with purple or blue areas. Exposed rocky reef, intertidal to 15 m depth. Feeds on algae. Grows to 7 cm tall. Common.

Photos by Nicola Fraser

Family - TURBINIDAE ***Lunella torquata***

Shell solid, heavy, width greater than height. Colour pale brown, juveniles sometimes mottled green or orange. Operculum calcareous, white, with strongly spiral ribbed exterior surface. Intertidal and subtidal rocky reef, feeds on algae. Grows to 11 cm, usually smaller. Common.

Family - TURBINIDAE ***Lunella undulata***

Solid shell, spiral ribs, with zigzag axial streaks of white and dark green covered with a brown periostracum. Circular operculum is calcareous, and white externally with central dome. Intertidal to subtidal depths, on exposed, semi-sheltered rocky shores. Feeds on algae. Grows to 57 mm high. Common.

Family - TURBINIDAE ***Turbo cepoides***

Smoothly rounded whorls, wavy brown lines on greenish background. The round operculum is calcareous and thick, pustulose in the centre, and dull white with red-brown blotch extending to outer edge. Rocky reef, depth to 21 m. Grows to 8 cm. Common. Endemic to Lord Howe, Elizabeth and Middleton Reefs.

Family - TURBINIDAE
Turbo militaris

The shell large and solid, the whorls rounded. Some individuals are completely smooth, with others showing incipient to strongly developed spines on the body whorl. Both forms may occur together in the same location. Aperture is almost circular, and nacreous within, the outer lip with sharp edge. The operculum is calcareous, flat and brown internally. Externally it is white tinged with green, domed and minutely pustulose. Rocky shores from low tide level to at least 5 m depth. Easily collected, it is prone to overexploitation throughout its range. Grows to 102 mm in length. More common below low tide level.

Family - APLUSTRIDAE
Aplustrum amplustre

Smooth shell, two broad, black-edged, pale pink or white bands. Translucent white mantle with eye spots visible. Intertidal, shallow subtidal sandy and seagrass areas. Feeds on polychaete worms. Shell length to 24 mm. Relatively common.

Family - APLUSTRIDAE
Bullina lineata

White shell has two spiral red lines, joined by wavy axial red lines. The mantle is transparent with eye spots visible between the frontal lobes. Feeds on polychaete worms. Sandy areas, intertidal to 40 m depth. Shell length to 18 mm. Common.

Family - APLUSTRIDAE ***Hydatina physis***
White or pale brown shell with many closely-spaced brown or black spiral lines. The rose-coloured mantle has triangular projections anteriorly and the enlarged parapodia are edged with blue. Feeds on polychaete worms. Seagrass flats, rock platforms, intertidal to at least 10 m depth. Shell length to 55 mm. Common.

Family - APLUSTRIDAE ***Micromelo* sp.**

White shell with three, rarely four, spiral red lines, connected by wavy axial red lines. The foot, head shield, and infrapallial lobe all have large white spots; the foot has a yellow and blue margin. The foot may extend some distance behind the shell when crawling. All members of this family have lost the ability to completely retract into their shell. Feeds on polychaete worms. Prefers hard substrates, intertidal to 15 m depth. Shell length 25 mm. Uncommon.

Nudibranchs and related molluscs

Nudibranchs are gastropod molluscs of the order Nudibranchia and are distinguished from other gastropods by lacking a shell at maturity. The term “nudibranch” means “naked gill”, a name that describes how the gills are visible on the back, or mantle, of some species. Nudibranchs are found in all marine environments, from the poles to the tropics, and from intertidal rockpools to the depths of the oceans.

Nudibranchs are functional hermaphrodites, which means they can mate with any mature individual of the same species they encounter. Copulation may last for seconds or as long as 24 hours, after which each individual lays a number of sometimes brightly coloured egg masses, often in the form of a spiral, commonly attached to a food source.

The eggs hatch either as minute larvae or directly as miniature adults. The planktonic larvae drift in the water column and most require contact with a suitable food source before settling.

The nudibranchs’ lifespan is largely unknown. Their life cycle mirrors the cycle of food abundance, this factor helping explain why large numbers appear at particular locations, followed by periods where few, if any, are noted. It is thought those species living on slow growing organisms live for up to a year, while others on transitory organisms, such as hydroids and bryozoans, have only short life spans of up to six weeks. Some nudibranchs store zooxanthellae from their prey in special ducts connected to their digestive system, the sugars produced by photosynthesis providing energy for the nudibranch.

Nudibranchs feed on various organisms including sponges, hydroids, sea anemones, gorgonians, hard and soft corals, and ascidians, and some species prey almost exclusively on other nudibranchs. Feeding is accomplished using a specialised ribbon-shaped tongue called a radula, which has many precisely arranged teeth. This radula is used for scraping or rasping its food.

Nudibranchs have a variety of defence mechanisms. Some use camouflage, being coloured the same as the food source, and some collect stinging cells or toxins from their food source, rendering them unpalatable. Some species have toxic mantle glands, while still others are adept at swimming short distances. Many species advertise their unpalatability by adopting very bright colours, considered to be a warning to potential predators. Some autotomise, leaving body parts behind if disturbed.

The largest nudibranchs grow to 60 cm, although most are smaller than 1 cm and many are microscopic.

Family - AEOLIDIIDAE
Baeolidia australis

Tan body, white-edged bluish spot in front of the rhinophores and between the oral tentacles. Cerata with white spotting, a red apical ring and white tip. Preys on small anemones living on fronds of brown algae, depth to 12 m. Grows to 5 cm. Common.

Family - AEOLIDIIDAE
Bulbaeolidia alba

Creamy white in colour, the pale yellowish rhinophores with two distinctive bulges. The base of each rhinophore encircled by a red line. Has a characteristically rhythmic movement when crawling. Rocky reef, areas of sand and mud to 12 m depth. Grows to 18 mm. Common.

Family - AEOLIDIIDAE
***Cerberilla* sp.**

Members of this genus have a broad foot and the numerous cerata are arranged in transverse rows across the body. These cerata can be raised and lowered rapidly if threatened. Sandy substrates, feed on burrowing sea anemones. Grow to 6 cm. Relatively common.

Family - AEOLIDIIDAE
Spurilla braziliana

Tan or orange body, often with opaque white spots. The greenish-brown cerata with white spots and cnidosacs at their tips. Feeds on anemones, and stores their nematocysts as protection. Intertidal to 12 m depth. Grow to 6 cm. Common.

Family - FACELINIDAE
Austraeolis ornata

Variable in colour from drab brown to orange, with bright blue specks on body and foot. Tips of rhinophores white, each with twelve or more annular laminae. Preys on other nudibranchs. Intertidal to subtidal depths. Grows to 4 cm. Abundant.

Family - FACELINIDAE
Caloria indica

Clear whitish body, the cerata orange with black tip. The long slender oral tentacles have white ends and white band at middle. Rhinophores erect, with white tips and band, cerata orange with black tips. Intertidal to subtidal depths. Grows to 2 cm. Uncommon.

Family - FACELINIDAE
Cratena lineata

Clear whitish body and cerata, all usually with longitudinal white lines. Cerata with red or brown digestive glands. Slender pale oral tentacles and erect rhinophores. Feed on anemones, hydroids. Rocky shores, intertidal to subtidal depths. Grows to 2 cm.

Family - FACELINIDAE
Facelina newcombi

Head reddish-brown, the cerata brown, the foot long and slender. Rhinophores with four or five lamellae, the oral tentacles white distally, often with an indistinct white band at the midpoint. Intertidal to subtidal depths. Grows to 25 mm. Uncommon.

Family - FACELINIDAE ***Favorinus tsuruganus***

Body and oral tentacles opaque white, cerata containing digestive gland ducts are orange with black tips. Rhinophores black, each with three bulbous swellings. Rocky reef. Depth to at least 23 m. Feeds on other nudibranch eggs. Grows to 2 cm. Uncommon.

Family - FACELINIDAE
Pteraeolidia ianthina

The “**blue dragon**” body colour is pale or translucent tan. The cerata on adults can vary in colour from golden brown to lavender and dark purple. The tips of the cerata contain nematocysts. The cerata may sometimes be arranged in a fan-like arrangement along the animals back. The rhinophores are clear or body-coloured with purple tips, the oral tentacles have two purple bands along their length. Young nudibranchs are pale as they have yet to take up zooxanthellae and are sometimes mistaken for other species, (lower photo). Rocky reef, algal substrate. Depth to 20 m. Feeds on hydroids. Grows to 10 cm. Common.

Aquarium photo

Family - GLAUCIDAE
Glaucilla bennettae

The ventral surface visible here, the silvery-grey dorsal surface faces down. The cerata are in multiple rows, the tail short. Floats on the ocean surface upside down, feeds on blue-bottles and stores the nematocysts for protection. Grows to 35 mm. Seasonally common.

Aquarium photo

Family - GLAUCIDAE
Glaucus atlanticus

Similar to *Glaucilla bennettae* but has single row of cerata, a longer tail, and less stout body. Also uses countershading, (dark above, light below) to avoid predators. Floats on the ocean surface, feeds on blue-bottles. Grows to 4 cm. Seasonally common.

Family - MYRRHINIDAE ***Phyllodesmium crypticum***

Colour variable, brown or pale grey-blue, numerous long, knobbly, or sometimes flattened cerata. Feeds on *Xenia* spp. soft corals and stores zooxanthellae as a food source. Rocky, coral reef. Intertidal to 23 m depth. Grows to 6 cm. Common.

Family - MYRRHINIDAE
Phyllodesmium macphersonae

Translucent tan body, often with blue highlights. Brown spots and patches on the body and cerata are zooxanthellae that provide food. Distal end of cerata and tentacles white. Feeds on soft corals. Mixed habitat, intertidal to 20 m depth. Grows to 35 mm. Common.

Family - MYRRHINIDAE
Phyllodesmium magnum

Large body with many cerata, blue and brown common, with a purplish tinge. Rhinophores, oral tentacles, and cerata all tipped yellow, foot has yellow border. Feeds on *Sinularia* spp. soft corals. Rocky, coral reef, depth to 42 m. Grows to 13 cm. Uncommon.

Family - MYRRHINIDAE ***Phyllodesmium poindimiei***

Transparent body and long curved cerata with coiled tips; the transparent cerata revealing the pink colour of the digestive glands. This species does not harbour zooxanthellae. Feeds on *Carijoa* spp. soft corals. Autotomises readily if disturbed. Reef, mixed habitat, depth to 20 m. Grows to 4 cm. Common.

Family - MYRRHINIDAE
Phyllodesmium serratum

Transparent body, the colour variable dependent on food source, and often has white median dorsal line. Feeds on octocorals and does not harbour zooxanthellae. Autotomises readily if disturbed. Reef, mixed habitat, intertidal to 20 m depth. Grows to 4 cm. Common.

Family - PLEUROLIDIIDAE
Pleurolidia juliae

Elongated, narrow, purple-black body with fine white speckling, and mid-dorsal white stripe. Cerata with white tips, rhinophores have clear tips and subapical white ring. Lives on *Solanderia* spp. hydroids. Reef, mixed habitat, depth to at least 15 m. Uncommon.

Family - ARMINIDAE
Armina magna

Mantle edged with orange-yellow, yellow longitudinal stripes on dark dorsal surface. Rhinophores orange. This Family is poorly described, many species remaining unidentified. Family members are characterised by having an elongated flattened body, a narrow posterior end and longitudinal ridges or pustules on the dorsal surface. There is a distinct oral veil, the rhinophores are retractile with longitudinal laminae. They prey on gorgonions, soft corals and sea pens, stripping the latter of their polyps, leaving only the central stalk. Estuarine, silty or sandy habitats, depth to at least 20 m. Grows to 20 cm. Uncommon.

Family - ARMINIDAE
Armina papillata

Black body, white or pale yellow “pinstripe” longitudinal lines on back. Foot black, a distinct oral veil with numbers of pale papillae present. Preys on soft corals and sea pens. Estuarine, sandy or silty habitats. Depth to at least 12m. Grows to 7 cm. Rare.

Family - ARMINIDAE
***Dermatobranchus* sp.**

White body with fine black lines on mantle ridges, the mantle, foot, and oral veil all edged in orange, and the oral veil and foot are white with scattered black spots. Estuarine, sandy or silty habitats. Grows to 7 cm. Uncommon.

Family - BORNELLIDAE
Bornella anguilla

The body has a mosaic pattern of orange, yellow, and black circles and spots and two rows of dorsal processes along each side of the back. Has an “eel-like” swimming motion in midwater. Rocky reef, feeds on hydroids. Depth to 20 m. Grows to 8 cm. Rare.

Family - BORNELLIDAE
Bornella hermanni

Pale elongate body with pattern of fine red lines. Rhinophore sheaths are tall with three anterior papillae and a taller posterior papillae. Rocky shores, intertidal rockpools shallow subtidal. Feeds on hydroids. Grows to 15 mm. Uncommon.

Family - HANCOCKIIDAE

Hancockia burni

Colour translucent reddish-brown to dark brown, sometimes with a network of fine white lines on back and sides. Two rows of branched papillae, one on either side. Lives on brown algae where it feeds on hydroids. Depth intertidal to 12 m. Grows to 15 mm. Common.

Family - TETHYDIDAE

Melibe australis

Slender body, may be translucent cream, beige, or pink, sometimes with red or brown speckles. Usually has five pairs of short mushroom-shaped cerata. Small oral hood. Found under rocks in brown algal habitat. Intertidal to 10 m depth. Grows to 28 mm. Common.

Family - FLABELLINIDAE

***Coryphellina* sp.**

Once named *Flabellina rubrolineata.* Pink, with three darker lines longitudinally, one at the centre and one each side; the lines may be broken or absent. Cerata have a magenta ring below the white tip. Feed on hydroids. Depth to 18 m. Grows to 4 cm. Common.

Family - SAMLIDAE

Samla bicolor

White body with long tapering tail. The cerata in clusters, each with golden band just below the white tip. Rhinophores large and lamellate, the oral tentacles have flattened terminal lobes. Feeds on hydroids. Intertidal to 15 m depth. Grows to 3 cm. Uncommon.

Family - TRINCHESIIDAE

Trinchesia sibogae

Colour pale lilac-purple, cerata with yellow tips arranged in fan-like clusters on each side of the body. Oral tentacles and upper part of the rhinophores are reddish purple. Feeds on orange hydroid, *Sertularella* spp. Depth to 20 m. Grows to 35 mm. Uncommon.

Family - JANOLIDAE

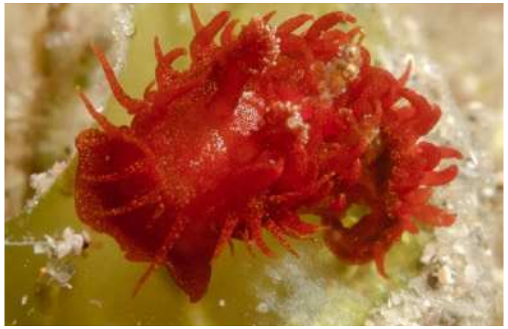
***Janolus* sp.**

Members of this genus are characterised by their numerous colourful cerata, which completely, or almost completely, cover the dorsal surface. The cerata of some species are transparent, allowing a view of the digestive tract, which branches near the tip. The rhinophores are non-rectractable and there is a characteristic caruncle, or warty lump, between them, this sometimes a contrasting colour. They feed on bryozoans in a variety of habitats. Intertidal to at least 20 m depth. Some members of the genus grow to 75 mm. Uncommon.

Family - MADRELLIDAE

Madrella sanguinea

Bright red or orange-red with faint white spotting on the body that is concentrated and more distinct on and between the rhinophores. Cerata long and thin, has a distinct oral veil. Feeds on bryozoans. Intertidal to 5 m depth. Grows to 15 mm. Rare.



Family - TRITONIIDAE ***Marionia* sp.**

Undescribed species sometimes indentified as *M. cyanobranchiata* or *M. arborescens* (top) and *M. pustulosa* (bottom). Generally, there is a network of low to medium height pustules on the back, and around eight bushy clumps of gills down each side, some with quite long stalks as in top photo. The characteristic rhinophores are multi-tentacled, similar to the body colour, and project from quite long, frilly-edged sheaths. The oral veil may have multiple branches or multi-lobed projections. Rocky and coral reef areas, intertidal to at least 20 m depth. Feeds on soft corals including *Xenia* spp. and *Sinularia* spp. Grows to at least 14 cm. Uncommon.

Family - TRITONIIDAE
Tritoniopsis elegans

Often white background colour but may be translucent, opaque orange or orange-red. Lacy gills are along the edges of the broad back, the oral veil has multiple projections. Feeds on soft corals. Rocky and coral reef, depth to 15 m. Grows to 6 cm. Common.

Family - CHROMODORIDIDAE
Ardeadoris averni

Large soft body, white in colour with ruffled red or red-orange margin on body and foot. Gills and rhinophores the same colour as margin. Feeds on sponges. Rocky reef, depth to 20 m. Lays a yellow egg ribbon. Grows to 3 cm. Uncommon.

Family - CHROMODORIDIDAE
Ardeadoris rubroannulata

Large soft body, yellow-orange in colour. Ruffled mantle and foot edged in bright yellow, with narrow red inner border then white towards centre. Rhinophores and gills red-orange. Feeds on sponges. Coral and rocky reef, depth to 30 m. Grows to 7 cm. Uncommon.

Family - CHROMODORIDIDAE
Chromodoris aspersa

White body with numerous purple spots, each having a characteristic purplish halo. Gills transparent with purple spots, the rhinophores orange. Yellowish mantle border sometimes present. Rocky reef, intertidal to 30 m depth. Grows to 3 cm. Uncommon.

Family - CHROMODORIDIDAE ***Chromodoris elisabethina***

Mantle light or dark blue with thick black or dark blue border, with similarly coloured longitudinal lines enclosed. Mantle has narrow white border, broad yellow stripe then narrow white stripe internally. Rhinophores and gills orange. Similar *C. strigata* lacks this narrow internal white stripe. Rocky or coral reef, depth to 20 m. Feeds on sponges. Grows to 7 cm. Rare.

Family - CHROMODORIDIDAE
Chromodoris kuiteri

Black mantle with four narrow blue-white longitudinal lines, the outer pair joining behind the gills and in front of the rhinophores. Orange rhinophores and gills, the edges of the mantle and foot orange. Rocky, coral reef, depth to 30 m. Feeds on sponge. Grows to 7 cm. Common.

Family - CHROMODORIDIDAE
Chromodoris magnifica

Bluish-white back with three broad black stripes, the outer two joining behind the gills. Mantle has outer narrow white, then yellow, then white border, the rhinophores and gills orange. Feeds on sponges. Rocky and coral reef, depth to 20 m. Grows to 6 cm. Rare.

Family - CHROMODORIDIDAE ***Chromodoris strigata***

Bluish mantle, longitudinal black lines. Mantle with narrow white margin, then yellow, adjoining the blue of the back. Gills orange with characteristic white stripe, the rhinophores orange. Similar *C. elisabethina* has internal white line adjoining black stripe on mantle back. Feeds on sponges. Rocky, coral reef, depth to 20 m. Grows to 3 cm. Rare.

Family - CHROMODORIDIDAE
***Chromodoris* sp.**

White with thin black lines, distinct from *C. lineolata* (not shown) which is black with white lines. White line on inside of orange mantle margin, the gills and rhinophores are orange with white spots. Feeds on sponges. Mixed habitat, intertidal to 22 m. Grows to 58 mm. Uncommon.

Photo by Matt Nimbs

Family - CHROMODORIDIDAE
Diversidoris aurantionodulosa

White body, the mantle with narrow orange border, and rounded low tubercules, often, but not always, tipped with orange. Rhinophores white with orange tips, gills white with orange line on outside. Feeds on sponges. Rocky reef, subtidal. Grows to 35 mm. Uncommon.

Family - CHROMODORIDIDAE ***Doriprismatica atromarginata***

Body colour is pale white to creamy mustard brown, mantle with black ruffled edges, black border around rhinophore pockets and black rhinophore clubs. Gills white with black edging. Similar *G. angasi* has tan or brown mantle edge. Feeds on sponges. Intertidal to 20 m depth. Grows to 6 cm. Common.

Family - CHROMODORIDIDAE

Glossodoris angasi

White body with tan or brown narrow marginal band, black-tipped rhinophores and gills, wide mantle skirt. Feeds on sponges. Rocky reef, intertidal to 20 m depth. Grows to 45 mm. Common.

Family - CHROMODORIDIDAE

Goniobranchus albonares

Mantle and body uniformly opaque white, mantle with yellow-orange border. Rhinophores and gills translucent white with opaque edging. Rhinophores relatively large in comparison to overall body size. Rocky reef, subtidal. Grows to 13 mm. Rare.

Family - CHROMODORIDIDAE ***Gonibranchus aureopurpureus***

White mantle with dull yellow to light brown spots over the dorsal surface. The mantle border has a diffuse purple band with scattered larger diffuse yellow-bordered purple spots. The rhinophore clubs and gills are reddish-brown or purple. Feeds on sponges. Rocky reef, depth to 20 m. Grows to 5 cm. Common.

Family - CHROMODORIDIDAE

Goniobranchus collingwoodi

Mantle centre is reddish-brown, encircled by a broad white band with scattered yellow spots. Mantle with thin purple margin. Rhinophore clubs red-brown, gills translucent lined with brown. Feeds on sponges. Rocky reef, depth to 35 m. Grows to 7 cm. Common.

Family - CHROMODORIDIDAE

Goniobranchus daphne

White body has scattered small red spots. Mantle has red margin with narrow orange submarginal band, distinguishing it from similar *G. splendidus.* Gills and rhinophore clubs red. Feeds on sponges. Rocky reef, depth to 20 m. Grows to 3 cm. Common.

Family - CHROMODORIDIDAE
Goniobranchus geometricus

Dorsal surface a network of purple lines enclosing white tubercules. Rhinophores and gills yellow-green. Underside of the front of mantle is purple. Feeds on sponges. Rocky reef, intertidal to 20 m. Grows to 5 cm. Uncommon.

Family - CHROMODORIDIDAE
Goniobranchus hunterae

Pink to blue body with wide yellow mantle margin, foot blue, small red spots. Transparent rhinophores and gills distinguish this from similar *Hypselodoris bennetti,* which has red lines on both. Feeds on sponges. Rocky reef to 7 m depth. Grows to 15 mm. Uncommon.

Family - CHROMODORIDIDAE
Goniobranchus leopardus

Pale with diffuse brown highlights. Spots, hollow rings and margin all purple. Rhinophores light with dark vertical line, gills pale. Similar *Hypselodoris tryoni* has more solid spots, darker rhinophores and gills. Feeds on sponges. Reef, depth to 20 m. Grows to 5 cm. Rare.

Family - CHROMODORIDIDAE
Goniobranchus loringi

Body pink to reddish-blue, red spots and discontinuous yellow border at mantle front, yellow rhinophores. Similar *Hypselodoris bennetti* has continuous mantle border, pink rhinophores. Feeds on sponges. Rocky reef, depth to 20m. Grows to 2 cm. Rare.

Family - CHROMODORIDIDAE
Goniobranchus* cf. *roboi

Variable colouration, NSW specimens have a yellow body with circular white spots, the mantle edge with elongated purple-edged white blotches and rhinophores and gills pale with purple stripes. Feeds on sponges. Rocky reef, depth to 25 m. Grows to 5 cm. Uncommon.

Family - CHROMODORIDIDAE
Goniobranchus setoensis

Mantle translucent straw colour, with white Y-shaped pattern on back. Narrow white line on mantle edge, then submarginal translucent orange band with purple spots. Rhinophores and gills white. Rocky reef, depth to 20 m. Grows to 2 cm. Possibly common intertidally.

Family - CHROMODORIDIDAE
Goniobranchus splendidus

White body with bright yellow margin, red spots of varying number and size on dorsal surface. Foot uniformly white, sometimes with yellow margin on posterior end, rarely red spots. Rhinophores red, the gills transparent with red edges. Northern NSW specimens have fewer spots, often just large red blotches, while those in the south of the state have numerous spots. Rarely, in the north this species appears with no red spots at all. Feeds on encrusting red sponge. Rock and coral reef, depth to 25 m. Grows to 6 cm. Common.

Family - CHROMODORIDIDAE
Goniobranchus tasmaniensis

White body with numerous red or orange spots, often a ring around the base of the rhinophores and gills. Rhinophores white, gills white with red or orange edging. Feeds on *Darwinella* spp. sponges. Rocky reef, depth to 25 m. Grows to 5 cm. Uncommon in northern NSW.

Family - CHROMODORIDIDAE
Goniobranchus verrieri

White mantle and foot, mantle with narrow outer red and inner yellow border, rhinophores and gills are translucent red with white edging. Similar *G. splendidus* has yellow mantle border. Feeds on sponges. Rocky reef, to 24 m depth. Grows to 4 cm. Uncommon.

Family - CHROMODORIDIDAE
Goniobranchus woodwardae

Blue-pink body with scattered small red spots, each with faint white halo. Transclucent mantle edged with red then orange border. Gills and rhinophores white. Feeds on *Callyspongia* spp. finger sponge. Rocky reef, depth to 20 m. Grows to 2 cm. Uncommon.

Family - CHROMODORIDIDAE
***Goniobranchus* sp.**

White body with close reticulate pattern of red blotches and spots, distinct yellow margin on mantle and foot. Scattered pustules with purple tips may be present. Gills and rhinophores red. Feeds on sponges. Rocky reef, depth to 20 m. Grows to 7 cm. Common.

Family - CHROMODORIDIDAE ***Goniobranchus* sp.**

White body, broad yellow margin. Numerous red spots on dorsum, purple-black rhinophores and gills distinguish from similar *G. splendidus*. Feeds on sponges. Rocky reef, depth to 20 m. Grows to 24 mm. Uncommon. Sometimes referred to as *G. fidelis.*

Family - CHROMODORIDIDAE ***Hypselodoris bennetti***

Blue body, mantle with yellow border with row of red spots on inner side. Pale red tinged gills and rhinophores. Feeds on sponges, *Psammocinia* spp. Rocky reef, depth to 20 m. Grows to 6 cm. Common. Mating pair pictured above.

Photo by Graham Edgar

Family - CHROMODORIDIDAE **_Hypselodoris bullocki_**

Variable colour, yellow-brown, pink to bluish-purple, smooth body and mantle. Mantle border usually white, sometimes reddish purple, gills and rhinophores orange or yellow, with a pink or purple basal band. Feeds on sponges. Coral and rocky reef, depth to 21 m. Grows to 4 cm. Rare.

Family - CHROMODORIDIDAE
Hypselodoris jacksoni

Translucent cream or grey with reticulation of dark lines enclosing yellow patches and spots. Gills edged with orange, rhinophores orange with white tip. Mantle has thin orange border. Feeds on sponges. Rocky reef, depth to 25 m. Grows to 35 mm. Common.

Family - CHROMODORIDIDAE
Hypselodoris maculosa

Variable colouration, mantle milky-brown to red with orange margin, five or six white lines with purple spots. Gills with orange line and tip, rhinophores clear with two orange bands. Feeds on sponges. Rocky reef, intertidal to 18 m. Grows to 3 cm. Uncommon.

Family - CHROMODORIDIDAE
Hypselodoris maritima

Pale with black lines on mantle, which has thin white border, then blue, then broader, yellow-orange band. Gills white with red edging, rhinophores clear with red clubs. Feeds on sponges. Rocky reef, intertidal to 18 m depth. Grows to 4 cm. Uncommon.

Family - CHROMODORIDIDAE
Hypselodoris obscura

Two colour forms; the dark blue background more common in the north of NSW, the grey form (lower photo), found throughout its range. The blue form has large yellow spots and streaks, the gills clear with red streaks, the rhinophores with blue base and red clubs. The grey form has numerous small black spots interspersed with small yellow spots, and dark background shading. The gills and rhinophores are paler. Feed on sponges, including *Dysidea* spp. Rocky reef, mixed habitat and silty areas, intertidal to 30 m depth. Grows to 6 cm. Common.

Family - CHROMODORIDIDAE
Hypselodoris tryoni

Pale tan to purplish, diffuse darker reticulations around solid purple spots inside pale halos. Mantle has thin purple margin, foot has solid spots inside pale halo. Rhinophores reddish, gills pale with red stripe. Feeds on sponges. Reef, depth to 25 m. Grows to 9 cm. Uncommon.

Family - CHROMODORIDIDAE
Hypselodoris whitei

Pale cream, with five red or purple lines, often joining to form reticulations, mantle and foot have thin purple margin. The rhinophores and gills red with white tips. Feeds on sponges. Rocky reef, intertidal to 18 m depth. Grows to 4 cm. Rare.

Family - CHROMODORIDIDAE
Hypselodoris zephyra

Pale background colour with thin black lines and diffuse purple blotches. Foot similarly lined with purple margin. Rhinophores red with white tips, the gills red. Feeds on *Euryspongia* spp. sponges. Rocky reef, to 12 m depth. Grows to 25 mm. Uncommon.

Family - CHROMODORIDIDAE ***Hypselodoris* sp.**

Creamy colour, mantle and foot with numerous tiny yellow spots. The mantle has pinkish tinge, and a purple border with larger yellow spots. Gills clear with purplish stripes, rhinophores purple. Feeds on sponges. Rocky reef, depth to 25 m. Grows to 5 cm. Uncommon. Previously known as *H. godeffroyana.*

Family - CHROMODORIDIDAE
Mexichromis festiva

White body; mantle with red-purple spots, (rarely none), bordered with yellow spots and dashes. Foot has pale, violet margin. Rhinophores have purple clubs, gills clear with purple lines. Rocky reef, mixed habitat, intertidal to 25 m depth. Grows to 35 mm. Common.

Family - CHROMODORIDIDAE
Thorunna daniellae

White slender body, mantle with a purple submarginal band. Foot white, elongated, with diffuse purple margin at posterior end. Gills white with orange stripes, rhinophores clear with orange clubs. Rocky reef, mixed habitat, depth to 20 m. Grows to 2 cm. Uncommon.

Family - CHROMODORIDIDAE
Thorunna purpuropedis

Body elongate, mantle purplish-white with broad orange-red margin. Rhinophore stalks clear, the clubs red, the gills orange-red. Foot pale purple, and elongated. Rocky reef, mixed habitat, depth to 34 m. Grows to at least 2 cm (specimen pictured). Rare.

Family - CHROMODORIDIDAE
Verconia haliclona

Variable colouration, mantle typically pink with scattered red spots. The mantle margin either pale yellow or white. Gills and rhinophores same colour as mantle. Feeds on sponges including *Darwinella rosea*. Intertidal to 20 m depth. Grows to 15 mm. Common.

Family - CHROMODORIDIDAE
Ceratosoma amoenum

Variable colour and pattern, mostly pink with large orange and small red spots, mantle edges white with orange patches. Gills and rhinophores red with white stripes. Feeds on sponges. Rocky reef, depth to 25 m depth. Grows to 6 cm. Common.

Family - CHROMODORIDIDAE
Ceratosoma brevicaudatum

Stout body, yellow, orange, or red in colour, with red and purple haloed spots. Distinctive low glandular lobe behind gills. Rhinophores and gills orange. Feeds on sponges. Rocky reef, mixed habitat to 120 m depth. Grows to 12 cm. Common.

Family - CHROMODORIDIDAE ***Ceratosoma tenue***

Pale, orange or reddish-purple blotches, all covered with medium sized yellow-orange spots. Mantle has purple margin, which is absent on edge between lobe on head and forebody. Raised appendage behind gills contains defensive chemicals. Feeds on sponges. Rocky reef, depth to 30 m. Grows to 12 cm.
Common.

Family - CHROMODORIDIDAE ***Miamira flavicosta***

Colour variable, blue, green or purple. There is a row of 3 pustules on the mid-line, largest in front of the gills. Each of the pustules aligns with transverse bands to the edge of the mantle, which is pale with numerous yellow spots. The foot tall and elongated, with orange-yellow spots. Gills and rhinophores are reddish. Feeds on sponges. Rocky reef, depth to 25 m. Grows to 85 mm. Uncommon.

Family - CHROMODORIDIDAE ***Miamira sinuata***

Colour variable, green to purplish-brown. Sometimes locally known as the **jolly green giant**. The mantle and foot have small yellow dots and scattered larger blue dots or reticulations. Transparent gills and rhinophores the same colour as the body but with small white spots. Feeds on sponges. Rocky reef, depth to 25 m. Grows to 6 cm. Uncommon.

Photo by Steve Smith

Family - HEXABRANCHIDAE **_Hexabranchus sanguineus_**

Red or violet-red background with white or orange spots over mantle and body. Six sets of gills, each attached separately to the mantle and not retractable. Rhinophores red with white lamellae. Mantle edges fold around the body edges, unfolding when the animal swims in an undulating fashion, giving it the common name of **spanish dancer**. Small juvenile markedly different, see lower photo. Feeds on sponges. Rocky reef, depth to 30 m. The largest of the nudibranchs, this species grows to 60 cm. Common. Large gills and mantle edges sometimes home to small commensal shrimp, *Zenopontonia rex*.

Family - DISCODORIDIDAE
Atagema intecta

Brown to black, mantle studded with compound tubercules. Mid-dorsal cream line, microscopic white spots cover mantle, gills and rhinophores. Feeds on sponges. Rocky reef, intertidal to 18 m depth. Grows to 8 cm. Common.

Family - DISCODORIDIDAE
Atagema sp.

White, with prominent spicules, forming a visible network in the mantle wall. Gills and rhinophores white. Lives and feeds on sandy coloured sponge. Intertidal rock platforms, shallow subtidal depths. Grows to 24 mm. Sometimes known as *A. albata*. Uncommon.

Family - DISCODORIDIDAE
Carminodoris nodulosa

Pale yellow to dark red-brown. Pustules cover mantle, largest each side of the mid-line, often with pale ring at base. Gills the same as body colour but orange on inner surfaces. Rhinophores brown. Feeds on sponges. Intertidal to 55 m depth. Grows to 4 cm. Common.

Family - DISCODORIDIDAE
Halgerda aurantiomaculata

Firm, pale, almost translucent body, orange-tipped tubercles and a scattering of orange blotches and spots. Rhinophores and gills translucent with small brown spots, the foot with orange margin. Feeds on sponges. Depth to 23 m. Grows to 7 cm. Rare.

Family - DISCODORIDIDAE
Halgerda willeyi

Variable in colour, white ranging to almost orange. The mantle is firm and smooth with a network of yellow-capped ridges, brown or black lines in the valleys between, which radiate to the mantle edge. Rhinophores pale with black band around club, gills large but sparse, pale with dark edges. Specimen in lower photo is similar colouration to individuals found in the southern part of NSW; studies are needed to determine if it is a separate species. Feeds on sponges. Depth from intertidal to at least 32 m. Grows to 95 mm but usually smaller. Common.

Family - DISCODORIDIDAE
Jorunna funebris

Snow-white mantle covered with microscopic tubercles and circles of dark brown, or more commonly, black tubercles. Rhinophores and gills are uniformly the same colour as the dark circles. Feeds on sponges. Rocky reef, depth to 20 m. Grows to 5 cm. Rare.

Family - DISCODORIDIDAE
Jorunna pantherina

Pinkish to red-brown body. Mantle covered with microscopic tubercles (caryophyllidia) giving a roughened appearance. Tall rhinophores, the apex narrowed and white. Gills are fawn with white speckles. Rocky reef, Intertidal. Grows to 13 mm. Rare.

Family - DISCODORIDIDAE
***Jorunna* sp.**

This undescribed species has a golden yellow body with regularly spaced black spots over the mantle. These spots are made up of black caryophyllidia in groups. In some cases the background can be pale yellow or almost white and the caryophyllidia are scattered rather than grouped. There is one large conspicuous black spot or stripe on the rear of the foot, (see lower photograph). Rhinophores are black and held erect, gills clear with black edging. Members of this genus feed on sponges. Rocky reef, depth to 15 m. Grows to 21 mm. Uncommon.

Family - DISCODORIDIDAE
Peltodoris murraea

Flattened greyish-white body with microscopic raised tubercles and small darker blotches, sometimes faint and enclosing a darker spot. Gills and rhinophores same colour as body or faintly yellow-green. Feeds on sponges. Intertidal to 8 m depth. Grows to 4 cm. Uncommon.

Family - DISCODORIDIDAE
Rostanga arbutus

Mantle orange-red with translucent caryophyllidia giving a rough appearance. Rhinophore stalks are clear, the club brown to black, the club apex straw-coloured. Gills are watery orange. Intertidal to 8 m. Feeds on orange sponges. Grows to 12 mm. Common.

Family - DISCODORIDIDAE

Sebadoris fragilis

Flattened body mottled white and grey with scattered large brown blotches. Uniformly covered in raised tubercles. Gills and rhinophores pale brown. Autotomises readily if disturbed. Feeds on sponges. Intertidal. Grows to 12 cm. Common.

Family - DORIDIDAE

Aphelodoris varia

White to light brown, concentric brown lines often encircle mantle, which can be blotched or reticulated. Gills pale to dark brown, the rhinophores have high sheaths and are dark brown. Feeds on sponges. Depth to 15 m. Grows to 6 cm. Common.

Family - DORIDIDAE

Doriopsis pecten

Variably coloured from green to deep blue and almost black. Gills pale blue in a transverse line across the back, rhinophores darker. Feeds on blue sponges, intertidal to 20 m depth. Grows to 16 mm. Uncommon.

Family - DORIDIDAE

Doris cameroni

Pale fawn to green-brown in colour, often with darker patch in front of gills. Mantle has capstan-like pustules, each with a dark apical spot. Gills and rhinophores the same as pale body colour. Feeds on sponges. Intertidal to 60 m depth. Grows to 3 cm. Uncommon.

Family - DORIDIDAE

Doris chrysoderma

Pale or bright yellow body, rhinophores and gills. Body has pustules with pale or yellow tips, the gills readily retract if disturbed. Feeds on sponges. Coral and rocky reef, depth to at least 20 m. Grows to 3 cm. Uncommon.

Family - AEGIRIDAE

Notodoris gardineri

Yellow body with rigid texture and many small rounded tubercles. Mantle with black blotches which may vary from few to many. Gills and rhinophores are yellow. Feeds on sponges. Coral and rocky reef, subtidal to 20 m depth. Grows to 10 cm. Uncommon.

Family - GONIODORIDIDAE

Okenia atkinsonorum

Bright pink in colour, with large sausage-shaped cerata with darker tips. Rhinophores and gills also darker shade. Feeds on bryozoans. Rocky reef, depth to 109 m, usually 15 m. Grows to 15 mm. Uncommon.

Family - DENDRODORIDIDAE

Dendrodoris fumata

Colour beige or orange through to black. This species has small black-tipped papillae and the six gills lie horizontal when fully extended, helping to distinguish black form from similar *D. nigra*. Feeds on sponges. Intertidal, shallow reef. Grows to over 8 cm. Common.

Family - DENDRODORIDIDAE

Dendrodoris guttata

Pale yellow-orange to orange-brown colour, scattered small black spots, each with diffuse white halo. Gills pale with black axes, rhinophores darker with white tips. Feeds on sponges. Intertidal, shallow subtidal. Grows to 46 mm. Uncommon.

Family - DENDRODORIDIDAE

Dendrodoris krusensternii

Soft body, pink, orange or brown in colour. Mantle pustules with white border, and blue or purple tips. Scattered blue spots on dorsum, gills reddish or brown, rhinophores similar with white tips.
Specimen in lower photo has previously been known as *D. gunnamatta.* Recent studies have confirmed it is actually a morphotype of *D. krusensternii*. Feeds on sponges. Intertidal, depth to 15 m. Grows to 10 cm. Common.

Family - DENDRODORIDIDAE

Dendrodoris nigra

Juveniles often pink or orange, adults black. Mantle sometimes has clusters of white spots, mantle edge may be pale or red. Gills form upright plume when fully extended, rhinophores have white tips. Feeds on sponges. Intertidal, shallow subtidal. Grows to 8 cm. Common.

Family - PHYLLIDIIDAE ***Phyllidia ocellata***

Colour variable from yellow to dark orange, with four large black circular patches symmetrically in the centre of the body, two smaller at front and rear, all with a yellow or white tubercle at the centre. Gills yellow. Characteristically has a row of large tubercles running along the mid-line of the mantle. Feeds on sponges. Rocky reef, depth to 30 m. Grows to 6 cm. Common.

Family - PHYLLIDIIDAE

Phyllidia varicosa

Recognised by the black mantle and by three to six longitudinal notal ridges, one on the mid-line. Ridges and tubercle bases blue-grey, tubercules capped in yellow. Rhinophores are yellow. Feeds on sponges. Rocky reef, depth to 16 m. Grows to 12 cm. Uncommon.

Family - PHYLLIDIIDAE

Phyllidiella pustulosa

Black mantle with clusters of pink or greenish tubercles, often in groups of three. Mantle has pale pink continuous thin margin. Rhinophores are black. Feeds on sponges, depth to at least 15 m. Grows to 6 cm. Common.

Family -POLYCERIDAE
***Martadoris* sp.**

Undescribed species, body is uniformly orange, rhinophores orange and gills yellowish with purple tips. Believed to feed on bryozoans, specimen 3 cm long and photographed at 20 m depth. Rare.

Family - POLYCERIDAE
***Nembrotha* sp.**
Chocolate brown, with regular small orange or red spots, fewer white ones. Brown gills have white patch at their base, brown rhinophores with white cross shape at base. Reef, intertidal to 25 m depth. Feeds on ascidians, grows to 6 cm. Uncommon. Previously named *N. livingstonei.*

Family - POLYCERIDAE ***Nembrotha purpureolineata***

Creamish white body, dark brown longitudinal streaks, sometimes forming large patches. Gills and rhinophores reddish, all with blue or purple banding at base, foot with blue or purplish margin. Feeds on solitary ascidians. Reef areas, depth to 20 m. Grows to 8 cm. Uncommon.

Family - POLYCERIDAE ***Nembrotha rosannulata***

Dull green body with longitudinal ridges. Scattered blue-black pustules are enclosed by pink or orange rings. Rhinophores black, gill stalks and branches orange, pinnae black. Feeds on ascidian *Sigillina cyanea.* Silty coastal waters to 14 m. Grows to 12 cm. Uncommon.

Family - POLYCERIDAE
Roboastra gracilis

Dark with yellow or orange lines or series of dots forming lines. Large rhinophores and gills, watery bluish-green or purple in colour. Feeds on other nudibranchs. Rocky, coral reefs, intertidal to 15 m depth. Grows to 25 mm. Uncommon.

Photo by Liz Hardaker

Family - POLYCERIDAE
Tambja caeruleocirrus

Pale blue-green body, narrow black longitudinal streaks, sometimes broken. Rhinophores with blue stalks, five sparsely branched gills are blue with black streaks up the inner face of the pinnae. Subtidal reef, depth to at least 15 m. Grows to 5 cm. Rare.

Photo by Kate Shaw

Family - POLYCERIDAE ***Tambja morosa***

Body is black or very dark green in colour, with scattered blue markings. Occasional individuals may be green or green-grey with black and blue markings. Feeds on arborescent bryozoan colonies. Depth to 22 m. Grows to 7 cm. Rare.

Family - POLYCERIDAE
Tambja tenuilineata

Pale green colour with longitudinal fine black lines. Rhinophores and gills same color as background, rhinophores with black or purple tips, gills with black or purple lamellae. Feeds on arborescent bryozoan colonies. Depth to 18 m. Grows to 3 cm. Common.

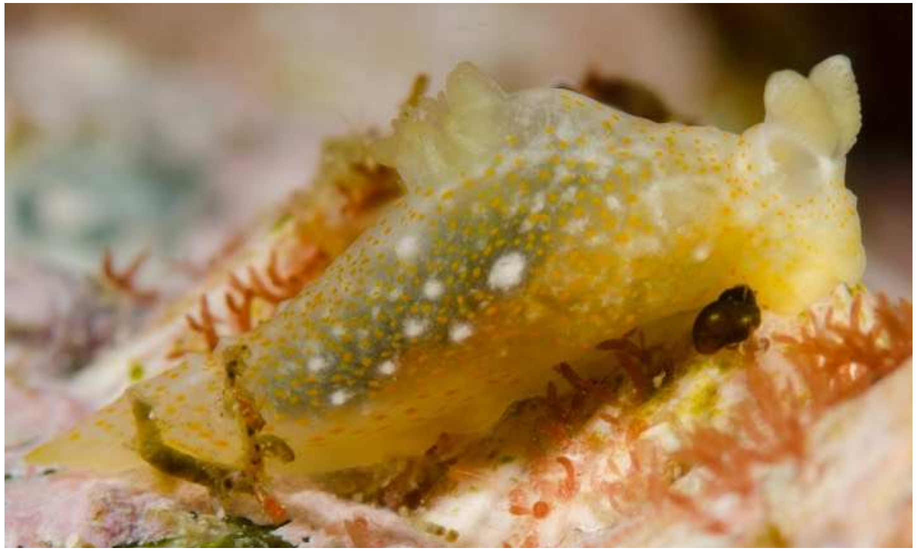
Photo by Kate Shaw

Family - POLYCERIDAE
Tyrannodoris luteolineata

Yellow-orange body, black longitudinal stripes, lime green patches between blue rhinophores, blue foot, pointed tail. Gills lime green with blue pinnae. Depth to at least 15 m. Grows to 9 cm. Rare NSW coast, uncommon at Lord Howe Is.

Family - POLYCERIDAE
Gymnodoris alba

Cream body, scattered small orange spots. Rhinophores white with orange tips, gills white with fine orange stripes. Gills arranged in a tight horseshoe shape. The tail of the foot is pointed. Predates other nudibranchs. Intertidal to 15 m depth. Grows to 2 cm. Uncommon.



Family - POLYCERIDAE ***Gymnodoris okinawae***

Body, gills and rhinophores are translucent cream or white, body has raised white pustules and many small orange spots. Feeds on other nudibranchs. Grows to 4 cm. Depth to at least 12 m. Uncommon.

Family - POLYCERIDAE
***Gymnodoris* sp.**

An undescribed species, with a translucent body, long pointed tail and closely spaced small orange spots. Members of this Genus prey on other nudibranchs. Specimen pictured around 15 mm long, at a depth of 12 m. Uncommon.

Family - POLYCERIDAE ***Polycera capensis***

Pure white body with black lines along centre of back and each flank, yellow line on posterior lobe of the foot. Conspicuous yellow papillae on either side of the gills with six on the frontal margin of the head. Gills and rhinophores grey to black. Feeds on bryozoans. Depth to 15 m. Grows to 45 mm. Uncommon.

Family - POLYCERIDAE
Kaloplocamus acutus

Pale to dark orange, scattered white spots over body. There are numerous branched papillae, four on each side and six at the front. Gills and rhinophores the same as body colour, each with white tips. Feeds on bryozoans. Depth to 20 m. Grows to 7 cm. Uncommon.

Photo by Liz Hardaker

Family - POLYCERIDAE
Plocamopherus imperialis

Orange or red body with many small dark speckles. There are large compound papillae on the mantle and oral veil, often with a bulb at the tip, these luminesce if the animal is disturbed. Feeds on bryozoans. Intertidal to 10 m depth. Grows to 10 cm. Common.

Family - POLYCERIDAE ***Plocamopherus tilesii***

White body with close orange-brown mottling. Orange colouration on foot, oral veil, on base of gills, rhinophores and numerous large compound papillae. Tail flattens for use when swimming. Feeds on bryozoans. Depth to 15 m. Grows to 7 cm. Rare.

Side-gilled slugs and sea hares

Side-gilled slugs and sea hares are gastropod molluscs. Side-gilled slugs, order Pleurobranchida, are soft-bodied oval shaped molluscs, with a mantle that may be smooth or covered with small rounded polygonal tubercles. The enrolled rhinophores are joined at the base and project from under the anterior mantle edge. A thin fragile shell, or the remains thereof, may be present above the visceral mass. Their common name, side-gilled slug, comes from the placement of a feathery gill on the right side of the body wall between the mantle and the foot. They are often found under rocks or coral slabs and they mostly feed on sponges and ascidians.

Sea hares, order Aplysiida, range in size from less than 2 cm to over 70 cm in length. The head bears a pair of enrolled rhinophores and larger enrolled oral tentacles. The bulbous visceral mass is enclosed in a pair of parapodial lobes, larger in some species than others, and there may be a very reduced shell present. Some species of sea hare are well known for the red or purple dye released as a means of defence when disturbed but most emit a clear or whitish fluid repugnant to potential predators. Sea hares feed on algae and are found in intertidal and subtidal rocky reef and sandy seagrass habitats.

Family - PLEUROBRANCHAEIDAE ***Euselenops luniceps***

Broad rounded shape, white or cream coloured with many dark round spots of varying size. The foot is similarly coloured and quite large. Broad oral veil, fringed with sensory papillae, and with triangular lobes on each side. Posteriorly the mantle folds into a long tube which allows the mantle cavity and gills to remain in contact with fresh salt water when the animal is buried in sand or soft sediment. Can move quickly across the substrate when hunting; usually buried during the day. Believed to feed on small crustaceans. Sandy substrate, intertidal to at least 15 m depth. Grows to 20 cm. Common.

Family - PLEUROBRANCHIDAE
Berthella martensi

Colour variable, cream or white to orange or black, contrasting coloured spots. Rhinophores with black tips. Autotomises parts of its mantle if disturbed. Feeds on sponges. Coral, rocky reef. Depth to 38 m. Grows to 12 cm. Uncommon.

Family - PLEUROBRANCHIDAE
***Berthella* sp.**

Translucent white, cream, or yellow, all with opaque white cross-like marking on the back which also has a reticulate pattern. Feeds on sponges. Under rocks, rocky reef, intertidal to 12 m depth. Grows to 2 cm. Common. Previously known as *B. stellata*.

Family - PLEUROBRANCHIDAE ***Berthellina citrina***

Orange to bright red, mantle with a scattering of small white spots or glands that secrete a milky defensive substance. Feeds on sponges, also reported to feed on several hard coral varieties. Small internal remnant shell, common to the genera *Berthella* and *Berthellina,* is visible as a small dark shape through the centre of the mantle. Under rocks, rocky reef, depth to at least 30 m. Grows to 3 cm. Common.

Family - PLEUROBRANCHIDAE
Pleurobranchus peronii

Pale orange to dark red colour, mantle surface comprises small papillae each with polygonal outline. The enrolled rhinophores are fused at the base. Feeds on ascidians. Under rocks, rocky reef, intertidal to at least 15 m depth. Grows to 8 cm. Common.

Family - APLYSIIDAE ***Aplysia argus***

Yellow to dark brown, with black lines and large rings scattered across the body and parapodia, often with a distinctive black tail. Prominent enrolled oral tentacles and rhinophores. Discharges purple dye if disturbed or accidentally trodden on in rockpools. Feeds on algae, including species of sea lettuce. Intertidal, rocky and seagrass areas to 20 m depth. Grows to 30 cm. Abundant.

Family - APLYSIIDAE
Aplysia concava

Mottled green or brown, reddish, usually with scattered white spots. Characteristic dark edges to the parapodia, tentacle ends, and the round foramen on the back, where the fragile shell is found. Feeds on algae. Intertidal to 50 m depth. Grows to 10 cm. Common.

Photo by Kate Shaw

Family - APLYSIIDAE ***Aplysia extraordinaria***

Reddish or orange colouration, dark vein-like markings or blotches, white patches. Large parapodia enable it to be an active swimmer. Emits clouds of reddish-purple ink if disturbed. Bays, estuaries, algal reefs and flats, intertidal and subtidal depths to at least 15 m. Grows to at least 40 cm. Common.

Family - APLYSIIDAE ***Aplysia juliana***

Colour variable, with white spots or blotches, including a distinctive white area around each eye. Parapodia fused high posteriorly, rear of foot forms a sticky sucker enabling it to stretch forward when moving. Feeds on algae. Sandy, algal substrate, intertidal to 20 m depth. Grows to 20 cm. Common.

Family - APLYSIIDAE
Aplysia sydneyensis

Translucent reddish brown, with fine vein-like lines and pale patches. Large parapodia which enable it to actively swim. Emits dull reddish fluid if disturbed. Feeds on algae. Intertidal to 10 m depth. Grows to at least 40 cm. Common.

Family - APLYSIIDAE
Bursatella leachii

Shades of brown, darker blotches and scattered blue spots. Mantle covered with many multi-branched papillae which aid its camouflage. Feeds on cyanobacteria which mats on rocks, mud. Estuaries, intertidal rockpools. Depth to 10 m. Grows to 15 cm. Common.

Family - APLYSIIDAE
Dolabella auricularia

Mottled browns and greens, the posterior end resembles a sloping disc-like shield. Numerous long papillae aid camouflage amongst alga. Emits clouds of purplish ink if disturbed. Intertidal sheltered areas, lagoons. Grows to 40 cm. Common.

Family - APLYSIIDAE
Dolabrifera brazieri

Mottled browns, greens and pinks, small tubercules cover the mantle, each tubercle with a retractile filament. Parapodia are mostly fused, the foot has a characteristic green edge. Feeds on algae. Rocky reef, intertidal to 12 m depth. Grows to 15 cm. Common.

Family - APLYSIIDAE
Petalifera ramosa

Translucent green to brown body, distinctive conical tubercles, small ones pink, larger ones pale brownish-white, all with a pale basal ring. Larger tubercles may have a branched terminal papilla. Diet unknown. Algal habitat, depth to 12 m. Grows to 8 cm. Uncommon.

Family - APLYSIIDAE ***Syphonota geographica***

Yellow-brown in colour, with a pattern of lines and blotches. Rhinophores positioned close together and placed well back between the parapodial lobes. Observed to feed on *Halophila* sp. seagrass. Sandy substrate, depth to 12 m. Grows to 13 cm. Uncommon.

Family - APLYSIIDAE
Stylocheilus striatus

Photo by Matt Nimbs

Elongate body, light brown or green, usually with longitudinal dark lines and scattered white spots. Small white tubercles may have terminal branched papillae. Feeds on cyanobacteria on the substrate. Grows to 65 mm. Common.

Bubble snails and headshield slugs

Bubble snails and headshield slugs are gastropod molluscs, members of the order Cephalaspidea. Broadly there are two groups. Members of the first group live **in** the sediments and usually have a shell into which the animal can fully retract. These are known as infaunal species. The second group, the epifaunal species, live **on** soft substrate or hard surfaces and usually have a thin fragile internal shell over their visceral mass.

Infaunal species include members of the family Bullidae, which are among the largest of the bubble shells and the animal can be contained within the shell. Members of the family Haminoeidae also have a shell into which the animal can retract, but it is usually small and fragile, and most are infaunal. Epifaunal species include the headshield slugs, Family Aglajidae. These are elongate, cylindrical animals, many species having projecting caudal lobes, the left being longer than the right. The shell is usually reduced and internal. Some epifaunal species have pads of extensile setae on each side of the mouth, used to detect food sources. Most members of the family Gastropteridae have no shell in their later stages. Also epifaunal, some can use their very wide parapodia to swim and are often very colourful.

Family - BULLIDAE
Bulla quoyii

Shell greyish-brown, mottled or uniform in colour with strong spiral grooves at shell base. The animal is red or orange, with white speckling. Feeds on algae. Intertidal sandy areas or mudflats, depth to 10 m. Grows to 62 mm. Common, mostly seen at night.

Family - BULLIDAE
Bulla ampulla

Shell brown with pale streaks and specks. The animal is brown with orange and white mottling, shown here retracted into shell. Similar *B. quoyii* has spiral grooves around shell base. Feeds on algae. Sand, mud, depth to 24 m. Grows to 4 cm. Common, mostly seen at night.

Family - HAMINOEIDAE
***Haminoea* sp.**

The body is pale with black and salmon blotches and spots. Shell thin, fragile and transparent. Parapodia are low, the head shield is split posteriorly and just reaches the front of the shell. Feeds on algae. Intertidal, rockpools, sandy areas. Grows to 12 mm. Common.

Family - HAMINOEIDAE
Lamprohaminoea cymbalum

Translucent shell, animal pale or green in colour with orange spots and sometimes stripes. Parapodia low over sides and rear of shell, headshield split posteriorly, foot elongated. Feeds on filamentous algae. Intertidal to 6 m depth. Grows to 1 cm. Uncommon.

Family - AGLAJIDAE
Biuve fulvipunctata

Variable in colour, ranging from orange to salmon or tan, and black. Distinguishable by the white or pale "W" mark on the head, although sometimes parts of the "W" may be missing. There is also a small white crescent on the posterior margin of the head shield. Members of this genus have a characteristic long thin "tail", or filament projecting from the left caudal lobe. Observed feeding on acoel flatworms which it detects with setae each side of its mouth. Intertidal and shallow subtidal areas, depth to 12 m. Grows to 28 mm. Uncommon.

Family - AGLAJIDAE **Chelidonura electra**

Translucent white body, yellow edging to parapodia and caudal lobes. Parapodia are large and overlap each other slightly, the left caudal lobe is roughly twice the length of the right lobe. Often found with hard corals. Believed to feed on acoel flatworms. Subtidal to at least 12 m depth. Grows to 8 cm. Uncommon.

Family - AGLAJIDAE
Chelidonura hirundinina

Black background margined with blue or turquoise, and longitudinal gold lines which outline the letter “T” on the head. Parapodia are large, caudal lobes extended, the left one longer. Feeds on acoel flatworms. Subtidal to 15 m depth. Grows to 4 cm. Uncommon.

Family - AGLAJIDAE
Mariaglaja inornata

Black body, the parapodial lobes with numerous white specks. Head has broad white band with orange anterior corners. The caudal lobes are enlarged, the left twice as long as the right. Feed on acoel flatworms. Subtidal to 15 m depth. Grows to 4 cm. Common.

Family - AGLAJIDAE
Tubulophilinopsis gardineri

Black body, blue lined parapodia are rounded at rear. May have a yellow crescent at mid-body, or other yellow marks. Believed to feed on polychaete worms. Silty or mud substrate, intertidal to at least 10 m depth. Grows to 5 cm. Uncommon.

Family - AGLAJIDAE
Tubulophilinopsis lineolata

Black, greenish or reddish brown with regular yellow lines crossing body and parapodia. The bulbous head contains an eversible buccal tube used to catch prey, believed to be polychaete worms. Silt, mud substrate, intertidal to 60 m depth. Grows to 5 cm. Uncommon.

Family - GASTROPTERIDAE
Gastropteron bicornutum

Translucent with scattered spots of yellow, black or brown, and white. Posterior end of headshield narrowed and raised, very wide parapodia. Food source unknown. Shallow subtidal to 10 m depth. Grows to 12 mm. Rare.

Family - GASTROPTERIDAE
Sagaminopteron ornatum

Reddish-pink or purple, with yellow or orange margins on parapodia and headshield. Small internal shell. Food source uncertain. Swims by undulating the parapodia. Reef, areas of sponges. Depth to 25 m. Grows to 25 mm. Common.

Family - GASTROPTERIDAE ***Sagaminopteron psychedelicum***

Body has shades of pink with dark-edged green reticulations enclosing pink or orange spots and stripes. Parapodia are large with a distinct pinkish margin. There is a large feathery gill mass around halfway along the dorsum. Often found on sponges but actual food source is unknown. Intertidal to 20 m depth. Grows to 15 mm. Uncommon.

Sap-sucking sea slugs

Sap-sucking sea slugs are a diverse group of marine gastropods in the superorder Sacoglossa, which is so named for the sac in which the animal stores its used radula teeth. The radula is used to pierce the walls of the green and red alga on which the slugs feed, and mouthparts are then used to suck out the contained fluids.

Some species have an external shell into which the animal can wholly or partly retract, while others have no shell at all. Many species have parapodia which fold to cover the shell. Others have cerata which may be flattened in the form of overlapping leaves, or rounded and bubble-like. Some species retain plastids in their cells, which continue to photosynthesise, providing an additional food source.

These sea slugs are distinguished from nudibranchs by the presence of only two tentacles arising from the head. They are mostly well camouflaged and easily overlooked as they are often the same colour as their food source. Some brightly coloured species exude distasteful secretions, and most members of the order practise autotomy as a defensive strategy against predators, casting off cerata or other body parts.

Family - OXYNOIDAE
Lobiger nevilli

Shell green sometimes with blue lines, pale green body with many yellow pustules. Parapodial tentacle-like flaps enclose the shell, becoming erect if animal disturbed. Intertidal, shallow subtidal depths, feeds on *Caulerpa* sp. algae. Grows to 3 cm. Uncommon.

Family - OXYNOIDAE
Oxynoe viridis

Fragile green shell and body covered with small blue spots or specks, parapodial flaps cover sides of shell. Enrolled tentacles often pale at tips. Intertidal, shallow subtidal, feeds on *Caulerpa* sp. algae. Grows to 12 mm. Uncommon.

Family - HERMAEIDAE
Cyerce nigricans

Black leaf-like cerata with orange spots, orange submarginal band and white margin. Cerata move in a waving motion if threatened, and are cast off if handled. Feeds on *Chlorodesmis* sp. green algae. Intertidal to at least 10 m depth. Grows to 4 cm. Uncommon.

Family - HERMAEIDAE
***Polybranchia* sp.**

Flattened leaf-like cerata cover the body, the colour of which varies with the food source; from almost transparent, red-brown or green. Cerata are cast off if the animal is handled. Under rocks, coral slabs, intertidal to 11m depth. Grows to 48 mm. Uncommon.

Family - LIMAPONTIIDAE
Placida barackobamai

Orange body with numerous elongated orange and black cerata. The black tentacles have a white stripe on their rear face. The foot orange with dark stripe at rear. Feeds on filamentous green algae. Intertidal to 20 m depth. Grows to 2 cm. Uncommon.

Family - LIMAPONTIIDAE
Sacoproteus smaragdinus

The same colour as its food source, the algae *Caulerpa racemosa*. Each bubble-like ceras has a small nipple-like protrusion; the enrolled tentacles have distinctive white ends. Intertidal to 12 m depth. Grows to 5 cm. Uncommon.

Family - LIMAPONTIIDAE ***Stiliger aureomarginatus***

Black or dark bluish-green with many black cerata with orange or yellow tips. The enrolled tentacles have a grey or white base with blue ends. Known to feed on a variety of *Codium* spp. algae. Intertidal to 15 m depth. Grows to 15 mm.

Family - PLAKOBRANCHIDAE
Elysia maoria

Green body with very fine white spots, enrolled white-tipped tentacles. Parapodial flaps enclose the body and taper to a point. Feeds on green algae *Codium* spp. Intertidal to subtidal depths. Grows to 12 mm. Common.

Family - PLAKOBRANCHIDAE
Elysia marginata

Green body has fine black spots and white speckles. Parapodial flaps with submarginal orange or yellow adjoining black margin, enrolled tentacles with similar colours. Feeds on green filamentous algae. Subtidal to 20 m depth. Grows to 35 mm. Uncommon.

Family - PLAKOBRANCHIDAE
Elysia pusilla

White or green, or a combination of both. Parapodial flaps may appear flattened or cylindrical depending on the shape of the *Halimeda* sp. algae it is feeding on. Intertidal and shallow subtidal depths. Grows to 32 mm. Uncommon.

Family -PLAKOBRANCHIDAE
Elysia* cf. *tomentosa

Green with black spots, but often with white blotches and papillae on body and parapodia. Parapodia with pink border, enrolled tentacles with pink tinge at ends. Feeds on *Caulerpa* sp. algae. Intertidal to 20 m depth. Grows to 45 mm. Common.

Family - PLAKOBRANCHIDAE
***Elysia* sp. 1**

An unnamed species, green body with lighter margins on the parapodial flaps, numerous electric blue spots and blue tentacles. Thought to feed on encrusting species of *Codium* algae. Depth to 15 m. Grows to 2 cm. Common.

Family - PLAKOBRANCHIDAE
***Elysia* sp. 2**

An unnamed species, green, fine black spots, faint pink edges to the parapodia and to extremities of the enrolled tentacles. Thought to feed on green algae including *Caulerpa* and *Codium* spp. Specimen pictured at 8 m depth, 15 mm long. Uncommon.

Family - PLAKOBRANCHIDAE ***Thuridilla carlsoni***

Pale cream body with dark green dots that merge to form blotches, the undulating edges of the parapodia with pale pink edging. Enrolled tentacles are pale with green markings at the base, the extremities tipped with brown or orange. Feeds on green algae. Grows to 3 cm. Common.

Chitons

Chitons, phylum Mollusca, are unique among molluscs in that they have an oval body comprising eight plates, or valves, which are held together by a fleshy muscular girdle, an adaptation of the mantle.

The chiton body underside comprises the head and the muscular foot, each separated by a groove which contains the gills. Water is drawn under the head of the animal, flows across the gills by means of cilia and is expelled at the rear of the foot.

The chiton's head has no eyes, but has a mouth containing a toothed radula used to rasp algae off the substrate. While most feed on algae, some species are able to raise the front of their body, enabling them to trap small invertebrates which may subsequently shelter underneath. Other species of chiton have eye-like light-sensitive organs located in pits in the valves that are responsive to changes in light levels.

By day, most chitons are hidden in crevices or under rocks, coming forth to graze as night falls. Some species roll into a tight ball for protection when disturbed, while others are surprisingly quick to move away from the disturbance.

Family - CRYPTOPLACIDAE
Cryptoplax striata

Elongated, very wide yellow or brown girdle, with small spines. Plates are almost completely embedded. Valves are light reddish-brown, grey or yellow. *C. mystica* believed to be a synonym of *C. striata*. Under rocks to depth of 12 m. Grows to 12 cm. Common.

Family - CHITONIDAE
Liolophura gaimardi

Broadly ovate, width about half the length. Girdle fairly wide, with light and dark banding and dense covering of blunt, straight or curved conical spines. Upper surfaces of rocks, rocky shores, high tide to low intertidal. Grows to 61 mm. Common.

Family - CHITONIDAE
Onithochiton quercinus

Broadly or elongate ovate, the girdle wide and covered with fine spicules. Valves often eroded, cream, fawn, or green in colour, with darker streaks or blotches. Girdle pinkish brown, often with pale bands. Exposed reef, intertidal to 5 m depth. Grows to 8 cm.

Family - CHITONIDAE
Rhyssoplax translucens

Elongate ovate, girdle relatively wide, valves fawn with shades of olive, or mid-green. Valves usually polished and appear smooth, the surface finely granulated. Girdle with irregular dark bands. Under rocks, low intertidal to 15 m depth. Grows to 55 mm. Uncommon.

Photo by Nicola Fraser

Family - ISCHNOCHITONIDAE
Ischnochiton australis

Elongate ovate, with a moderately narrow girdle, uniformly dark green, khaki, or grey in colour. Girdle scales large and tightly packed. Can move rapidly or roll up into a ball if disturbed. Under rocks, intertidal to 8 m depth. Grows to 8 cm. Common.

Family - ISCHNOCHITONIDAE
Ischnochiton cariosus

Broadly ovate, variable colour includes cream, yellow, and brown. Valves with obvious longitudinal grooves and beads. Large inner scales and small outer scales on the girdle are an identifying feature. Under rocks, intertidal to 30 m depth. Grows to 5 cm. Uncommon.

Phoronid worms

Phoronis australis, Family PHORONIDAE, is one of about 15 species of marine horseshoe worms. They live in association with *Cerianthus* spp. tube anemones and grow to a length of around 20 cm when fully extended. The worm secretes a chitinous tube which is attached to the anemone tube, and into which it can withdraw if disturbed.

The worms lobophores are similar to those found in bryozoans, but much larger. They vary in colour from pink to dark red but are commonly black. The ciliated tentacles are coiled into a spiral shape and filter food particles from the water column.

Found in sheltered mud or silt habitat at depths up to 30 m, *Phoronis australis* are common in silty areas like Sydney Harbour and Port Stephens.

Bryozoans, lace corals

Bryozoans are minute colonial animals that belong to the phylum Bryozoa. Most colonies are attached to hard substrate, each comprising numbers of zooids. Each zooid is enclosed and separate from the other, sometimes with a skeleton of calcium carbonate or organic cuticle. The side walls of the enclosure are perforated to allow direct connections between cells throughout the whole colony. The zooid has a large opening in the upper wall which allows the feeding tentacles, or lobophores, to protrude. There are sometimes long spines on the zooid upper surface for protection, and there may be an operculum to enclose the lobophore when it is retracted.

Bryozoans do not sting their prey, distinguishing them from some similar looking cnidarians called hydroids. The lobophore collects minute particles from the water column, which are then transported to the pharynx by cilia.

Bryozoans are often brightly coloured and may be easily confused with algae or corals. They may take flower-like shapes, encrusting sheets or coral-like formations sometimes referred to as lace corals. Identification by sight or growth habit alone is difficult, most requiring close examination of the zooid.

Family - ADEONIDAE ***Adeonellopsis* sp.**

Rigid, convoluted structure, purple to brown or orange-brown in colour. Folds are without perforations, and are rigid and fragile. Sheltered clear water conditions, often under or on the sides of rocks. Grows to 40 cm. Relatively common.

Family - CATENICELLIDAE

Dense luxuriant orange tufts attached firmly to the substrate. Forked branches, comprising jointed chains of zooids, are curved at the ends, forming an enclosed bell shape. Exposed reefs to depths of 25 m. Colonies may cover up to 20 cm. Often home to various *Pycnogonid* spp. sea spiders. Common.

Family - PHIDOLOPORIDAE ***Triphyllozoon moniliferum***

The colonial animals are supported by intricate convoluted folds of calcium carbonate. Resembling perforated sheets, they are found in clear sheltered waters. Colonies may grow to 40 cm across. Common.

Family - PHIDOLOPORIDAE ***Iodictyum phoeniceum***

Similar rigid colonial structure to other members of the family, it is easily recognised by the characteristic pinkish-purple colouration. Sometimes common in deep, clear water reefs. Specimen pictured photographed at a depth of 15 m.

Family - SCHIZOPORELLIDAE
Schizoporella errata

The encrusting colonies, orange in colour, are composed of a single layer of zooids which overgrows the substrate. Often found on sheltered reefs and man-made structures, depth to around 8 m. Common.

Family - CRISINIDAE
Mesonea radians

With a rigid and fragile branch-like structure, often called **tuning fork bryozoan** due to its growth habit of bifurcation. Grows in sheltered locations, under rocks or overhangs. Usually small, growing to 4 cm across. Common.

Echinoderms, sea stars

Sea stars are members of the phylum Echinodermata, collectively referred to as echinoderms. In common with other echinoderms, sea stars have an internal calcareous skeleton comprising an arrangement of plates, spines or spicules underneath the surface skin, and have a pentamerous body plan, that is, based on five or multiples of five.

Sea stars have star-shaped bodies, with five or more arms radiating from a central disc. Each arm contains part of the digestive system and a pair of gonads. On the underside of the arm, in the ambulacral groove, are the tube feet, which are retractible and often protected by rows of spines.

A unique hydraulic vascular system facilitates a sea star’s movement. This system utilises a device known as a madreporite, or sieve plate, found on the animal’s upper surface. The madreporite allows a controlled flow of water into and out of the animal, muscular contractions maintain body shape and provide power to the tube feet. The tube feet, which may be either pointed or equipped with suckers, are used for various functions including locomotion, adhesion to the substrate and food capture.

Sea stars feed by everting a thin, sack-like stomach through the mouth to envelop the food item, part of the digestion taking place outside of the body. Most sea star species are scavengers and feed on organic or animal detritus, but some prey on bivalves or other molluscs. Others are specialised feeders, such as the Crown of Thorns sea star, adults of which feed exclusively on live corals.

Many species of sea star can regenerate new limbs or body components if damaged. Some species reproduce by fission, deliberately shedding body parts or splitting their body to reproduce asexually. The sexes of most species are separate, with gametes being released and fertilised externally. Many of these have a planktonic larval stage which may last from a few days to a few weeks.

Sea stars come in a variety of shapes, sizes and colours. They are found in every marine habitat, from the intertidal zone to the ocean depths, and inhabit all types of terrain, including rock, mud and silt.

Family - ASTERIIDAE **_Coscinasterias muricata_**

Blue and brown mottling, the upper surface has rows of discs with upright spines. Usually 11 arms, often 7 to 14. Can regenerate arms lost by autotomy. Carnivorous, preys on molluscs, encrusting invertebrates. Rocky reef, depth to 150 m. Grows to 50 cm diameter. Common.

Family - ASTERIIDAE **_Uniophora granifera_**

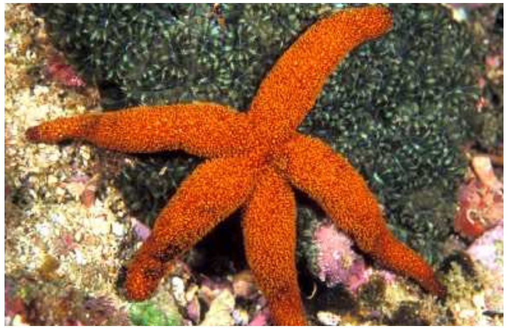
Five blunt-tipped stubby arms, the upper surface covered with rounded spines and tubercles. Red to orange-brown in colour. Preys on bivalve molluscs and encrusting invertebrates. Rocky reef, soft substrates, depth to 30 m. Grows to 24 cm diameter. Common.

Family - STICHASTERIDAE
Allostichaster polyplax

Generally 8 arms but often 6 to 9, colour cream, pink to brown, or black. Arm length often irregular as this species reproduces by fission, the animal splitting and each part growing new arms. Carnivorous. Rocky reef. Depth to 238 m. Grows to 10 cm across. Common.

Family - ECHINASTERIDAE
Echinaster colemani

Small disc, light to dark orange, with 5 long cylindrical arms each covered with raised papillae, which may be pale orange or yellow. Carnivorous, feeding on encrusting invertebrates. Rocky reef, sand and soft substrate, depth to 110 m. Grows to 30 cm across. Uncommon.



Family - ECHINASTERIDAE
Echinaster luzonicus

Wide colour variation from yellow-orange to red-brown or very dark red, often with dark tips on the arm ends. Usually 5 arms but often with more, due to its well documented ability to shed arms and regenerate, (lower photo). In this instance, an arm, along with a section of the central disc necessary for regeneration, has been shed. This is known as a “comet”, and in time will regenerate into a complete sea star. Rocky and coral reef, where it feeds on algae and micro organisms in the substrate. Grows to 25 cm diameter. Common northwards from Coffs Harbour.

Family - ECHINASTERIDAE
Plectaster decanus

The **mosaic sea star** has a pattern of red, purple or blue papules, enclosed by orange or pale raised ridges. Relatively small disc, five cylindrical arms, soft texture. Rocky reef, depth to 200 m. Feeds on sponges, ascidians, molluscs. Grows to 24 cm across. Common.

Family - ASTROPECTINIDAE
Astropecten polyacanthus

Brown to purplish colouration above, cream to bright orange below. Has two rows of spines at right angles along each of the five straight-sided arms. Buries by day in sand, silt habitat. Depth to 185 m. Grows to 18 cm diameter. Common.

Family - ACANTHASTERIDAE ***Acanthaster* cf. *solaris***

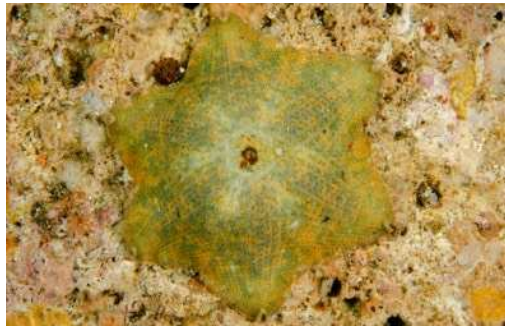
Previously named *A. planci,* studies show those in Australia may be a separate species. Large disc is greyish with orange-brown markings and distinctive sharp, venomous spines. Preys on live coral. Depth to 31 m. Grows to 70 cm across. Found from the Solitary Islands north, rarely Lord Howe Island.

Family - ASTERINIDAE
Meridiastra calcar

Usually with 8 narrow arms, it has a humped disc coloured in patterns of reds, greens, browns, and blues. The upper surface has a scale-like appearance. Intertidal rocky reef, rockpools. Feeds on algae, mussels and other sea stars. Grows to 10 cm diameter. Common.

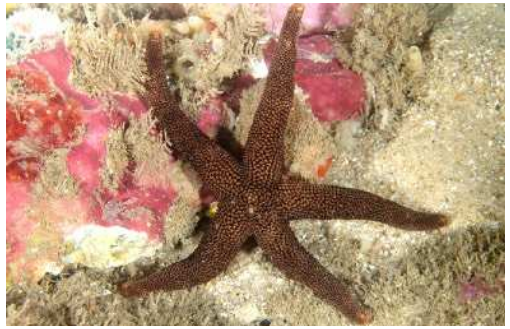
Family - ASTERINIDAE
Meridiastra oriens

Large flattened disc with six broad arms, the whole coloured in combinations including green, blue, red, cream, and brown. Found under rocks on rocky reef. Intertidal to 30 m depth. Feeds on molluscs, sponges, algae and dead animals. Grows to 8 cm diameter. Common.



Family - ASTERINIDAE
Pseudonepanthia nigrobrunnea

Small central disc and five long pointed arms, all dark brown or black base colour with raised light brown papillae in clusters on upper surface. Exposed rocky reef, depth to 30 m. Grows to 12 cm diameter. Uncommon, rare south of Nambucca Heads.



Family - ASTEROPSEIDAE
Petricia vernicina

Large disc with five arms, the whole cream, pink or red; paler individuals with red mottling. Large respiratory papillae visible on the upper surface impart a velvet appearance. Feeds on encrusting sponges, ascidians and bryozoans. Rocky reef, depth to 60 m. Grows to 18 cm. Common.

Family - CHAETASTERIDAE
Chaetaster moorei

Reddish-brown with small disc and very long slender arms, each with characteristic large, naked, terminal yellow tips. In Australia has been recorded only at Middleton Reef and Lord Howe Is. Reef, depth 20 - 73 m. Grows to about 18 cm. Rare.

Family - GONIASTERIDAE
Pentagonaster duebeni

Has orange, red or yellow plates usually separated by white lines on the upper surface, but occasionally without. Five rounded slightly incurved arms. Rocky reef, depth to 200 m. Feeds on encrusting invertebrates. Grows to 13 cm. Common.

Family - GONIASTERIDAE
Nectria ocellata

Red, orange, or brown, often with a contrasting pattern. The dorsum covered with cylindrical structures called tabulae, which gradually decrease in size towards the ends of the arms. Feeds on encrusting invertebrates. Rocky reef, depth to 240 m. Grows to 26 cm. Rare.

Family - MITHRODIIDAE ***Mithrodia clavigera***

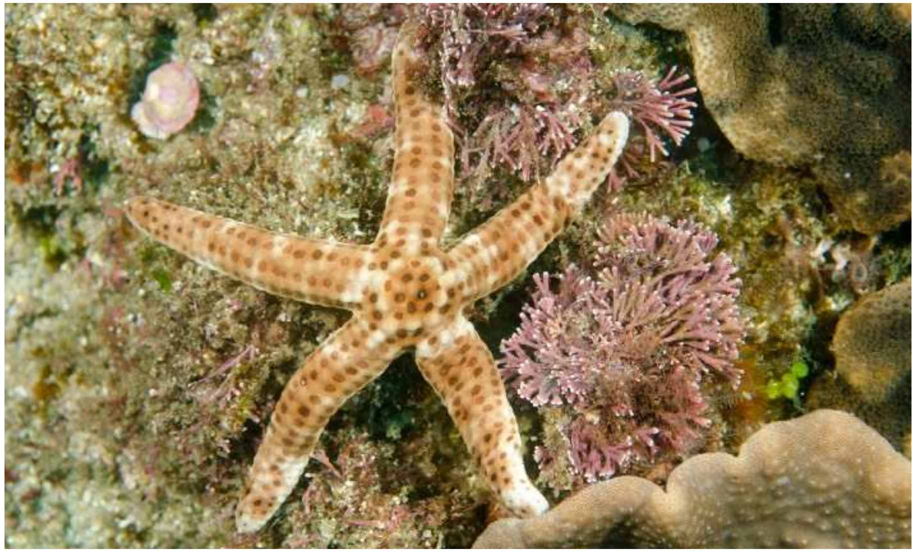
Small central disc with long cylindrical arms. White base colour mottled with brown spots, and brown blotches forming bands. The upper surface has prominent blunted spines. Feeds on encrusting invertebrates. Rocky reef, depth to 81 m. Grows to 20 cm diameter. Rare coastal NSW, uncommon at Lord Howe Is.

Family - OPHIDIASTERIDAE ***Fromia indica***

Bright orange or red with a pattern of thin black lines. The moderately-sized central disc has five arms, each often blackish at the tip. Feeds on encrusting invertebrates. Rocky reef, depth to 44 m. Grows to 7 cm diameter. Uncommon.

Family - OPHIDIASTERIDAE ***Fromia polypora***

Reddish-orange or brown in colour, mostly with five long arms, rarely six. The upper surface has prominent raised papillae present, these being extended small respiratory structures. Mostly feeds on sponges, bryozoans and compound ascidians. Rocky reef, depth to 280 m. Grows to 22 cm. Common.



Family - OPHIDIASTERIDAE ***Hacelia helicosticha***

Small central disc and five stout cylindrical arms tapering evenly to a narrow tip. There are dark pores in rows on upper surface, which is variably dark or light brown with white blotching. Rocky reef, depth to 70 m. Rare.

Family - OPHIDIASTERIDAE ***Leiaster leachi***

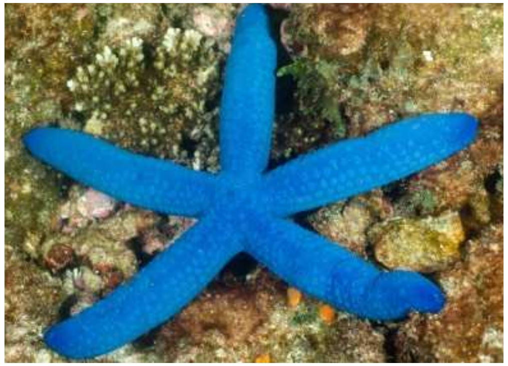
Small central disc, typically with five long cylindrical arms, uniform wine red or mottled with white, red and purple blotches. Rocky and coral reef, depth to 183 m. Grows to 32 cm diameter. Uncommon at Lord Howe Is, rare on the NSW coast.

Family - OPHIDIASTERIDAE ***Leiaster* sp.**

Small central disc, long cylindrical arms, cream with reddish purple blotches. Specimen pictured possibly *L. coriaceus*, approximately 55 cm diameter on rocky reef, depth 15 m. Uncommon.

Family - OPHIDIASTERIDAE ***Linckia guildingi***

Small central disc, five long cylindrical arms, often green or brown but also blue and dull red. Longer arms distinguish from similar *L. laevigata*. Feeds on detritus and micro-organisms on the substrate. Rocky reef, depth to 29 m. Grows to 31 cm. Uncommon.



Family - OPHIDIASTERIDAE
Linckia laevigata

Small central disc, five cylindrical arms, bright blue but also brown and pale blue forms, which may be distinguished from *L. guildingi* by smaller size. Herbivorous, feeds on algae. Reef and seagrass areas. Intertidal to 60 m depth. Grows to 21 cm. Uncommon.

Family - OPHIDIASTERIDAE
Ophidiaster confertus

Orange-brown in colour, with small central disc, five cylindrical blunted arms, the upper surface with dimpled appearance. Feeds on sessile invertebrates and algae. Rocky reef, depth to 50 m. Grows to 23 cm. Common.

Family - OREASTERIDAE
***Pentaceraster* sp.**

Robust, large central disc, five arms, upper surface covered with variably coloured and sized conical tubercules. Background colour variable. Members of this genus prefer areas of sediment and seagrass, depth to 54 m. Grows to 46 cm diameter. Uncommon.

Brittle, basket and snake stars

Brittle stars have five slender, unbranched arms attached to a central disc. The disc contains all the reproductive and digestive organs, and the mouth and madreporite, for the hydraulic water vascular system, are located on the underside.
The long thin arms have spines and reduced tube feet; the latter used for respiration, food transport and as sensory organs. The arm structure consists of small interlocking segments, called ossicles, which restrict the arm to sideways or downwards movement; they cannot bend upwards. Movement of the animal is achieved via a sinuous flexing of the arms in a snake-like or rowing movement.
Brittle stars are suspension feeders, bottom detritus feeders, and scavengers; the food particles are picked up by the tube feet and transported to the mouth.
Basket stars have many features in common with brittle stars but differ mainly by having five many-branched arms, which can move in three dimensions. Basket stars hide in the reef, or contract into a tight ball during daylight, erecting their arms into a fan shape at night to capture organisms from the water column.
Closely related to the basket star, the snake star is also a filter feeder. It has five long slender arms and lives its whole life in the branches of black coral trees. Coiled tightly by day, it feeds at night by extending some of its arms into the water column while others brush the branches of the host coral, removing mucus and food captured by the coral.

Family - EURYALIDAE ***Astrobrachion constrictum***

The **eastern snake star** is mostly red but may also be yellow or variegated. Lives exclusively on black coral trees. It feeds on the mucus and food captured by the host as well as extending its arms to catch food independently. Central disc up to 23 mm across, the five unbranched arms up to twenty times the disc diameter. Depth to 540 m. Common.

Photo by Kate Shaw

Family - GORGONOCEPHALIDAE
Astroboa granulatus

The **granulated basket star** has shades of grey, black and brown. By day it is contracted into a ball, spreading its arms to feed at night. Covered in coarse granulations, it has a disc diameter to 4 cm, arm spread to 14 cm. Reef, exposed areas, depth to 60 m. Uncommon on the NSW coast, relatively common at Lord Howe Is.

Family - GORGONOCEPHALIDAE
Astrosierra amblyconus

The **granular basket star** is pinkish-orange with many large tubercles covering the disc and branched arms. Disc size to 5 cm with arm length up to 15 cm. Attaches to sponges and gorgonians on exposed reef, where at night it captures planktonic organisms from the water column. Depth to 640 m. Commonly seen in Port Stephens.

Family - GORGONOCEPHALIDAE
Conocladus australis

Light grey to brown, dark brown bands sometimes absent. The **southern basket star** has raised tubercles on the arms and disc. Attaches to sponges, gorgonians, feeding mostly at night by spreading its arms into the current. Disc up to 55 mm in diameter, arms up to 15 cm long. Depth to 430 m. Commonly seen in Port Stephens.

Family - OPHIURIDAE
Ophioplocus imbricatus

Long, stout, banded arms bearing short adpressed spines. Disc pale with many small brown and black spots. Disc diameter to 12 mm, arm length to 10 cm. Sand pockets on reef flats, under rocks or coral slabs. Common in northern NSW.

Family - OPHIOTRICHIDAE
***Macrophiothrix* sp.**

Members of this genus are characterised by their large disc size and proportionally long arms. They are among the largest of the brittle stars, with discs circular or roughly pentagonal, often with a visible pattern on the radial shields adjacent to each arm.

The arms are covered in numerous fine spines, on some species as many as 10 per arm segment, and each often as long as the arm is wide, giving a “bottle brush” appearance.

Colour and pattern is highly variable, and may include bright colours and speckles. Darker bands and lighter stripes along the arms are common.

Disc size varies from around 10 mm to greater than 26 mm, arm length varying between 6 and 20 times the disc diameter.

Species identification often relies on microscopic examination of internal structures, colouration alone is not always a reliable indicator.

Found under rubble, sandy reef areas, depth to at least 73 m. Common.

Macrophiothrix lampra

Macrophiothrix spongicola

***Macrophiothrix* sp.**

Family - OPHIONEREIDIDAE ***Ophionereis schayeri***

Grey-brown disc, arms with alternating bands of dark grey or black and pale grey or cream. Members of this family have a large flat disc, the arms typically robust and narrowing slightly at their attachment beneath the disc. Disc diameter to 3 cm, arm length to 15 cm. Rocky subtidal reefs, depth to 183 m. Common.

Family - CLARKCOMIDAE
Clarkcoma pulchra

Large disc, moderate length arms covered with long pale-banded spines, some of which are swollen at their ends. Colour usually dark purple or brown, disc usually dark also, with fine white spots. Diameter to 12 cm. Rocky reef, depth to 40 m. Common.

Family - OPHIOCOMIDAE
Breviturma dentata

Large disc, variably pale to dark with black reticulated markings. Arms stout with light and dark grey banding. Prefers shallow reef habitats, under rocks, to 10 m depth. Disc diameter to 15 mm, arm length to 7 cm. Common

Family - OPHIOCOMIDAE
Ophiomastix endeani

Large dark grey to black disc, with long arms of similar colour which may sometimes be banded. Arms have long stout spines. Endemic to eastern Australia. Arm length to 13 cm. Reef, under rocks or coral slabs. Depth to 20 m. Common.

Family - OPHIOMYXIDAE
Ophiarachna incrassata

Green disc with black-edged white spots, black and white banded arm spines. Known predator of small fish, which it traps under its disc using a spiral motion of the arms. Disc diameter up to 5 cm, arm length to 25 cm. Coral rubble, depth to 20 m. Rare.

Family - OPHIOMYXIDAE
Ophiarachna megacantha

Reddish black body, arms of similar colour with pale banding, arm spines bright red. Endemic to eastern Australia. Disc diameter 25 mm, arm length to 16 cm. Rocky and coral reef, under rocks and coral slabs. Depth to 42 m. Uncommon.

Family - OPHIOMYXIDAE
Ophiomyxa australis

Variable colouration including reds, browns, and greens. Arms relatively short and distinctly banded, with short blunt spines. Disc diameter to 35 mm, arm length to 14 cm. Rocky reefs and shores, depth to 250 m. Common.

Featherstars

Featherstars, or crinoids, have a cup-like body, or theca, that encloses the visceral mass. There are five rays, which are usually branched and feather-like, arising from the theca, and on the undersurface there is a ring of jointed cirri. The cirri are used for locomotion and to attach the animal to the substrate.

The branched arms consist of jointed linear sequences of calcareous ossicles. There are side branches, or pinnules, alternating on opposite sides of the arm, giving the arms their characteristic feather-like appearance. Although there are only five rays, there may be multiple branches arising from each, meaning some species may have many, perhaps hundreds, of arms.

In the normal feeding position the arms are held upwards, the pinnules, the primary food-collecting surfaces, capture food particles which are then transferred via ambulacral grooves on the inside of each arm to the mouth on the oral, or upper, surface of the body.

Featherstar food mainly consists of single cell organisms, invertebrate larvae, small crustaceans, and detritus. Featherstars rely on water movement to bring food particles within reach, and many only feed at night, retreating to recesses within the reef, with arms folded tightly into a ball, during daylight hours.

The identification of featherstars from banding and colour pattern alone is unreliable. Often microscopic inspection of the arm branches, ossicles and cirri is required to identify to genus or species level.

Fishes, sea urchins and sea stars are known featherstar predators, many attacks by fish appearing opportunistic when the featherstar is disturbed from its hiding place.

Featherstars are found in all marine environments, usually where there is increased water movement, and the more colourful or conspicuous species are those most likely to be observed by divers.

Family - COLOBOMETRIDAE

Members of this family may have from 10 to 120 arms, which may be up to 18 cm long. They have distinctive spines on the cirri, and may be uniformly black as pictured or have banded patterns. Depths commonly to 50 m but some species to at least 500 m. Common.

Family - COMATULIDAE ***Anneissia bennetti***

Highly variable in colour including yellow, orange and black, this species is one of the few that may be mostly or completely exposed during the day. Number of arms may vary from 31 to 120, and arm length to 22 cm. The cirri are longer and more robust than other members of this family. Often seen on rocky or sponge reefs, perched high in the water column. Uncommon in NSW.

Family - MARIAMETRIDAE ***Dichrometra* sp.**

Often with concentric bands of contrasting colours, the number of arms usually 15 to 40, up to 15 cm long. Members of this genus are nocturnal, generally hiding in recesses or under rubble with arms coiled during the day. Common.

Family - PTILOMETRIDAE ***Ptilometra australis***

Variable colouration includes cream, pink, and purple. Arms number 18 - 23, up to 8 cm long. The cirri are as long or longer than the arms, most segments with an aboral spine. Endemic to east Australian waters, common in deeper waters and may enter deep estuaries. Depth to at least 70 m. Common in Port Stephens.

Family - TROPIOMETRIDAE ***Tropiometra afra***

Usually dark purplish brown, appearing black *in situ,* with 10 arms up to 26 cm long. The pinnules are long, making the arms appear as long broad combs. Often the body is hidden deep within the reef, with only the arms extended. Sometimes host to cryptic shrimps and molluscs, including *Annulobalcis* sp. a member of the family Eulimidae. Depth to 110 m, commonly shallower. Abundant.

Sea urchins

Sea urchins are found in all marine habitats, from intertidal rockpools to the oceans depths. They are generally free-moving, with a rigid outer shell, or test, and most have primary and secondary spines and tube feet for locomotion. They also have small pincer-like structures on stalks, called pedicillariae, which are used for defence. Most of the more common sea urchins are spherical or ovoid, and some may be slightly flattened on the oral (ventral) surface. Heart urchins and sand dollars have an oval or heart-shaped body, often slightly flattened.

The sea urchin test is divided into five equal segments, each radiating from a central axis, while the tests of heart urchins and sand dollars are bilaterally symmetrical. Each test comprises a series of interlocking plates which form alternating double columns, one column with holes for tube feet, the other without holes, bearing the primary and secondary spines.

Sea urchin spines take many forms. On some species there are fewer large solid spines, often with barbs or other sculpturing; some have large numbers of erect long fine spines; and still others have large numbers of relatively short spines, which may be either sharp or blunted.

Nearly all sea urchins are omnivorous, usually ingesting algal materials, and animal material if available. The grazers use a five-toothed beak-like arrangement, known as Aristotle's Lantern, to scrape algal and other material from the substrate. Heart urchins have reduced mouthparts and ingest large quantities of sand and sediment, from which they separate fine organic material.

Species that occur in high densities have been known to create urchin barrens; locations where all algal material has been removed. Populations of the long-spined sea urchin, *Centrostephanus rodgersii*, have increased dramatically in New South Wales in recent years, depleting the habitat which supports the abalone and lobster fisheries.

Family - CIDARIDAE
Goniocidaris tubaria

Large serrated primary spines, the secondary spines flattened and shaped like small plates, forming a corona-like structure at the base of the primary spine. Test to 6 cm diameter, primary spines to 8 cm. Sheltered or moderately exposed reef, silt, depth to 630 m. Common.

Family - CIDARIDAE
Prionocidaris callista

Reddish purple colouration with large serrated primary spines. Test diameter to 7 cm, spines to 12 cm in length. Reef or rubble habitat, depth to 275 m. Common.

The spines of cidarids lack an epithelial layer and are often colonised by organisms such as sponges, bryozoans and hydroids. In soft substrate habitats these may often be the primary hard substrate for a diversity of species.

Diet of cidarids varies depending on where they are found. On soft substrates they ingest benthic material, on hard surfaces they consume sponges, algae and other encrusting organisms.

Family - CIDARIDAE
Phyllacanthus parvispinus

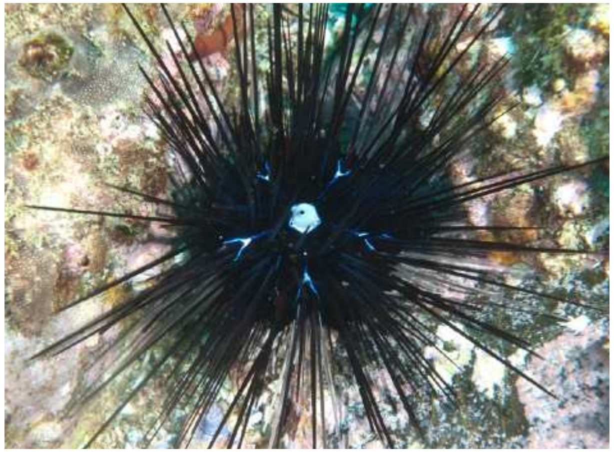
Large blunt primary spines with flattened secondary spines at their bases. Test to 9 cm diameter, spines to 7 cm. Usually found wedged hard in reef crevices, in areas of high water movement, depth to 80 m. Common.

Family - DIADEMATIDAE
Centrostephanus rodgersii

Large purple-black sea urchin with test to 10 cm diameter, spines to 9 cm. Responsible for creating urchin barrens by overgrazing if in large numbers. Is the basis of a small fishery in southern states. Rocky reef, shallow subtidal to 35 m depth. Common.

Family - DIADEMATIDAE
Diadema palmeri

Dark body with long sharp spines, some with white bands. The anal cone has a dark central spot, and body and spines glow red when exposed to torch or flash. Test 7 cm diameter, spines to 15 cm length. Exposed reef, 10 - 60 m depth. Rare.



Family - DIADEMATIDAE
Diadema savignyi

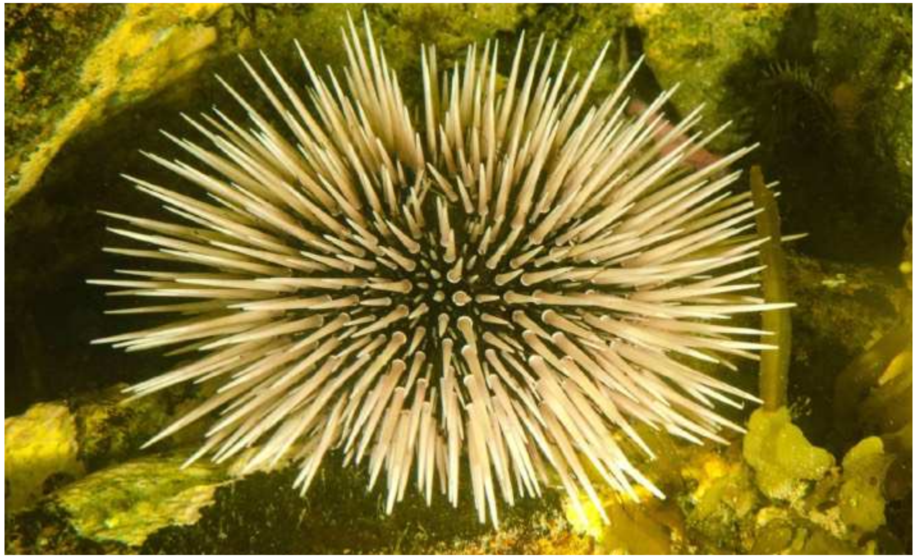
Black test with needle-sharp spines up to 30 cm long. Anal cone pale with dark central spot. Test, up to 8 cm across, has five characteristic blue-white v-shaped lines. Reef, shallow subtidal to 70 m depth. Common.

Family - DIADEMATIDAE
Echinothrix calamaris

Green markings on test, primary spines white or banded. Secondary spines brown and very sharp. Anal cone is pale to dark with small white spots and dark central spot. Test diameter to 92 mm, spines to 7 cm. Reef, shallow subtidal to 90 m depth. Common in northern NSW.

Family - ECHINOTHURIIDAE
Asthenosoma intermedium

Flattened test, orange brown in colour. Secondary spines highly venomous with venom sac covering the tip of the spine. Test diameter to 20 cm, primary spines 15 mm long. Reef slopes, depth to at least 72 m. Uncommon.

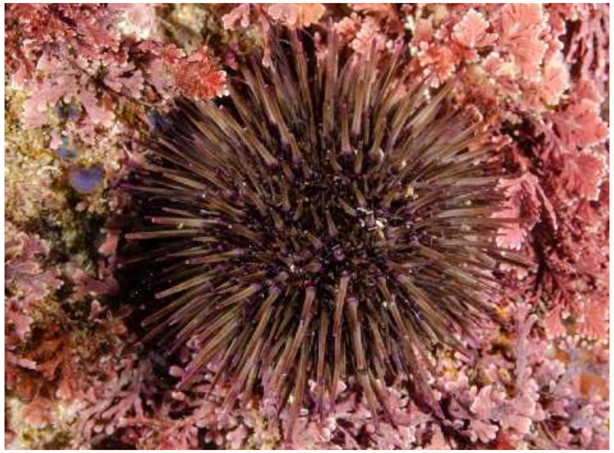


Family - ECHINOMETRIDAE ***Echinometra* sp. A**

Squat, oval-shaped test, with short stout primary spines which may be tipped with white and often with white ring around the spine base. Research shows five different colour variants may actually be different species in the ***E. mathaei*** species complex and the taxonomy is currently being revised. Bores into limestone and in high concentrations can generate large amounts of sediments. Exposed reef, depth to 34 m. Test diameter to 69 mm. Primary spines up to 25 mm. Common.

Family - ECHINOMETRIDAE
Echinostrephus aciculatus

A burrowing species having long primary spines. This species remains permanently in a cavity it excavates in the coral or rock substrate. It relies on drift material for its food; this gathered by the needle sharp spines, which are also used for defence. The food collected is passed to the mouth using the spines and the tube feet. Test to 2 cm diameter, primary spines to 5 cm length. Rocky reef, depth to 50 m. Common.

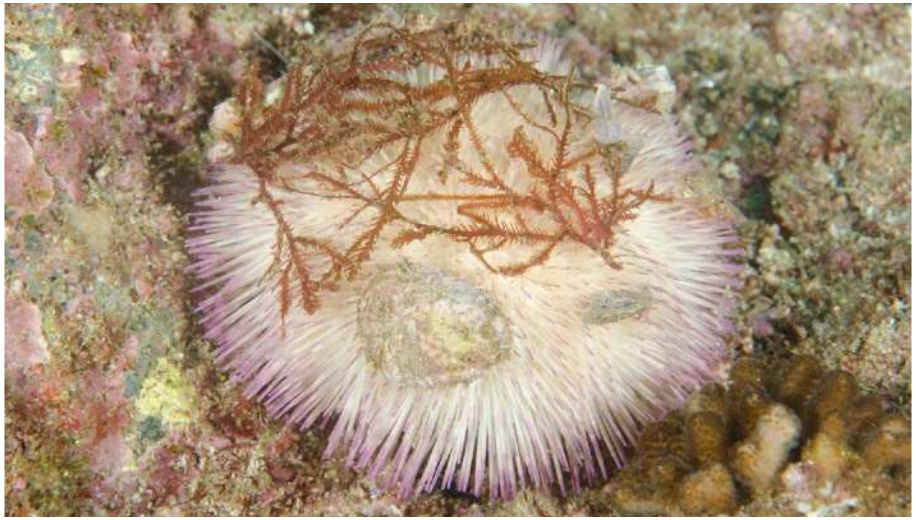


Family - ECHINOMETRIDAE ***Heliocidaris erythrogramma***

The **purple urchin** has several colour variants. Southern specimens often have dark tests with white or pale green spines, others may have pale or white tests with light brown or pale green spines. Northern NSW specimens are usually darker, with purple spines or purplish bases to the primary spines. In NSW they occur with similar *H. tuberculata,* but can usually be distinguished by the lack of red on the spines or spine tips. An important commercial fishery exists in southern Australia where this species occurs in large numbers. Test diameter usually to 8 cm. Spine length to 3 cm. Moderately exposed reef, depth to 35 m. Common.

Family - ECHINOMETRIDAE ***Heliocidaris tuberculata***

Orange-red in colour, primary spines solid with a reddish tinge towards the often blunt tip. Exposed reef, depth to 10 m. Test diameter to 115 mm, spine length to 4 cm. An abundant species on shallow reefs at Lord Howe Island. Common.



Family - TOXOPNEUSTIDAE ***Pseudoboletia indiana***

Flattened circular test, wth white spines having pinkish-purple tips. Often has a covering of debris on the upper surface to provide shade, camouflage, or as a food source. Test diameter to 84 mm, primary spines to 15 mm. Sheltered or moderately exposed reef, depth to 100 m. Common.

Family - TOXOPNEUSTIDAE ***Pseudoboletia maculata***

Flattened circular test with brown patterns of blotches or lines. Where sympatric with *P. indiana* has been known to hybridise, hybrids identified by irregular brown blotches. Collects debris on upper surface as shade or camouflage. Test diameter to 9 cm, primary spines to 15 mm. Sheltered reef, depth to 70 m. Uncommon.

Family - TOXOPNEUSTIDAE **Toxopneustes pileolus**

Flattened test, short spines, many very large and venomous pedicillariae which can cause pain and, reportedly, death. Exhibits covering behaviour, debris held in place on the upper surface by the tube feet. Test diameter to 105 mm, primary spine length to 12 mm. Rocky reef, depth to 90 mm. Uncommon.

Family - TOXOPNEUSTIDAE - **Tripneustes gratilla**

Family - TOXOPNEUSTIDAE
***Tripneustes* sp.**

Flattened test, variable colouration, usually dark browns and orange. Studies show the species known as the “lamington urchin”, a black and white urchin shown here at top, is actually ***Tripneustes kermadecensis*** and the true *T. gratilla* (bottom, previous page), has various shades of brown and orange.

Where both species exist sympatrically, hybridisation may result in animals with a colouration similar to photographs at right and bottom.

Members of this family, exhibit covering behaviour, debris and possibly food items are held in place on the upper surface by tube feet. This species supports an important fishery due to its fast growth in tropical waters. Feeds on algae and seagrass, high populations sometimes occur, resulting in areas devoid of seagrass or macroalgae (urchin barrens). Test diameter to 15 cm, primary spines to 15 mm length. Reef, seagrass, kelp areas, intertidal to 75 m depth. Common.

Family - TEMNOPLEURIDAE
Holopneustes purpurascens

Spherical test, orange to white, adapted for living in algal canopies with strongly-suckered elongated tube feet. Test diameter to 6 cm, primary spines to 6 mm. Moderately exposed reef, intertidal to 8 m depth. Common.

Family - TEMNOPLEURIDAE
Mespilia globulus

Round test, red or orange with five bare, broad, spineless areas usually coloured blue, green, or brown. Tube feet long, protruding further than primary spines. Test diameter to 56 mm, spines 6 mm long. Rocky reef, depth to 60 m. Uncommon.

Family - TEMNOPLEURIDAE
Salmacis belli

Test rounded, white or pale brown in colour and with a conical profile. Primary spines reddish with pale tips and green base. Test to 95 mm diameter, spines to 18 mm. Exposed reef, areas of good current flow, depth to 125 m. Common.

Family - TEMNOPLEURIDAE
Salmacis sphaeroides

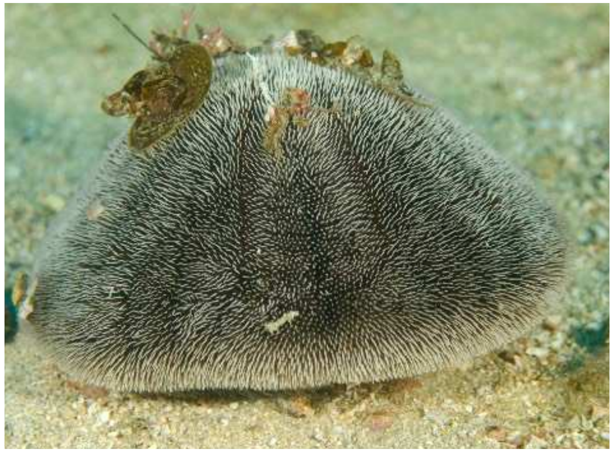
Test is coloured green and slightly domed. The short spines have a green base with red and white bands at their ends. Test diameter to 9 cm, primary spines to 2 cm length. Seagrass areas, reef, depth to 90 m. Common.

Family - MARETIIDAE
Maretia planulata

Flattened test is white with alternating light and dark areas, primary spines white with orange bands. Adapted to bury quickly into the sand. Areas of sand and coarse shell grit, depth to 60 m often shallower. Grows to 7 cm. Uncommon.

Family - CLYPEASTERIDAE
Clypeaster australasiae

Cream to brown test with obvious petal shapes and a dense covering of small spines and tube feet. The process of burying is aided by the tube feet transporting material to the upper surface. Sand, coarse rubble, depth to 130 m. Grows to 136 mm. Common.



Family -
CLYPEASTERIDAE
Clypeaster tumidus

High-domed brown test with a flattened base, covered with short white spines. Members of this family contribute to the bioturbation of the substrate. Buries in soft sediment, sand, rubble, depth to at least 12 m. Grows to 15 cm. Uncommon.

Sea cucumbers

Holothurians or sea cucumbers are typically cylindrical or sausage-shaped animals. As a member of the phylum Echinodermata, a basic five sided symmetry is present, but it is sometimes difficult to detect. As sea cucumbers have evolved, many of the typical five-sided characteristics we associate with the spiny echinoderms have been modified or lost. The spiny skeleton has been reduced to microscopic calcareous elements, or ossicles, embedded in the body walls. The ossicles come in many shapes, and being characteristic for each species of sea cucumber, when examined under a microscope can be used to identify them positively.

Sea cucumbers have a mouth connected to a convoluted gut with the anus at the opposite end. Many species have branched tentacles surrounding the mouth and use these tentacles to capture small particles from the substrate and the water column. Other species ingest large quantities of sediment and digest the organic material found within.

Most sea cucumbers are found on the substrate but a few bury themselves with just their tentacles exposed to catch passing plankton and other food items. The arms of these species rhythmically fold into the open mouth, removing the food collected.

Colours and shapes are only sometimes characteristic of sea cucumber species. Many are dull black or brown but others are quite colourful with bright reds and yellows. Sea cucumber sexes are mostly separate, with external fertilisation of eggs and sperm, but several species can reproduce using the method of transverse fission, where the sea cucumber splits into two halves.

Family -
CUCUMARIIDAE
Neoamphicyclus altoffi

Pinkish-grey colour with a square cross section and having tube feet at each corner. Grows to at least 46 mm. Soft sediment habitat to at least 59 m depth. Uncommon.

Family -
PHYLLOPHORIDAE
Massinium magnum

The body buried beneath the substrate. The rings of tentacles extend into the water column to capture particles, each tentacle in turn is then folded into the mouth. Tentacles pictured 10 cm long. Reef, soft substrate. Depth to at least 10 m. Common.

Family -
HOLOTHURIIDAE
Holothuria (Halodeima) atra

Black soft body with small papillae, and almost always has a covering of sand except for irregular oval patches. On sand around reef, depth to 30 m. Grows to 50 cm, usually smaller. Uncommon.

Family - HOLOTHURIIDAE
Holothuria (Platyperona) difficilis

Brownish green, texture firm with small papillae. Reproduces asexually, often in large numbers. Grows to 10 cm. Found under rocks and the oral discs of giant anemones, depth to at least 15 m. Locally common in the north of the state.

Family - HOLOTHURIIDAE
Holothuria (Stauropora) dofleinii

Cream with numerous small tan papillae, often two or three longitudinal pale lines. Soft texture, often found amongst algae on sandy substrates. Specimen pictured 40 cm long. Uncommon.

Family - HOLOTHURIIDAE
Holothuria hilla

Brown or orange-brown, with numerous white conical protuberances, often arranged in rows. The outer skin is soft, thin and wrinkled. Mostly nocturnal on reef, coral, sand, depth to 30 m. Grows to 40 cm. Common.

Family - HOLOTHURIIDAE
Holothuria (Mertensiothuria) leucospilota

Black, with long pointed papillae, the body often elongated with extended feeding tentacles. Ejects sticky cuverian tubules if handled. Grows to 50 cm. Intertidal to 19 m depth. Common.

Family - HOLOTHURIIDAE
Holothuria (Stauropora) pervicax

Grey or greenish to brown, typically round in cross section with flattened underside. Has raised tubercules and ejects thick cuvierian tubules if disturbed. Rocky, coral reef, under coral slabs. Depth to 20 m. Grows to 17 cm. Uncommon.

Family - HOLOTHURIIDAE
Holothuria (Microthele) whitmaei

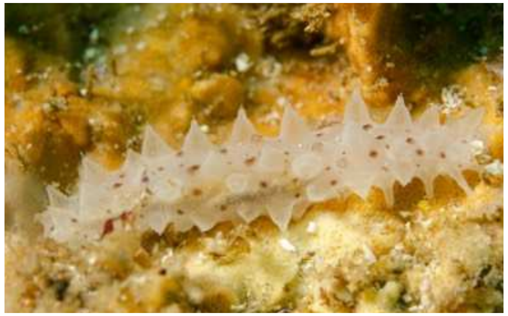
Large black body is stout and firm to the touch, mostly dusted with sand. Found on sand patches around reef, depth to 14 m. Grows to 40 cm. Listed under CITES, it is rare on NSW coast, uncommon at Lord Howe Is.

Family - HOLOTHURIIDAE
Labidodemas semperianum

Elongated white body, with pointed papillae and dark posterior end. The tube feet pale or yellow. Mostly found buried in sand and under rocks or coral slabs. Grows to 25 cm. Reef to 30 m depth. Uncommon.

Family - STICHOPODIDAE
Stichopus* cf. *monotuberculatus

Square cross section, firm to the touch, blotches of grey, orange-brown, and yellowish-brown. Cone-shaped warty papillae often present. A nocturnal species, it does not bury, preferring harder substrate. Reef, depth to 25 m. Grows to 20 cm. Uncommon.



Family - STICHOPODIDAE
***Stichopus* sp.**

Members of this family are mostly large or medium sized. They have a squarish cross section, a flat ventral surface and large, often pointed, fleshy projections. They are mostly found on sand or rubble and generally do not bury into the substrate.

Top photograph *Stichopus* sp.

Bottom photograph, juvenile *Stichopus* sp. about 5 cm long.

Ascidians, sea squirts

Ascidians are members of the phylum Chordata, class Ascidiacea. Sometimes referred to as sea squirts they are attached to the substrate throughout their adult life. Adult ascidians have a variety of forms. Some appear jelly-like with a transparent gelatinous body, and others have a tough leathery outer covering made of a substance called tunicin, similar to plant based cellulose. Many ascidians are solitary animals, attached to the substrate by a stalk or tough base. Some ascidian species are colonial, where groups of small animals (zooids) are embedded in a gelatinous test, and still others are encrusting and may cover large areas of the substrate.

Ascidians feed by removing food particles from the water column. They have an inhalant siphon which directs water through a large perforated pharynx where the food particles are filtered out, the waste water then ejected from an exhalant siphon. Water movement is facilitated by internal cilia beating in unison. In large solitary ascidians the horizontal inhalant siphon faces down, while the exhalant siphon is directed upward and away. In some colonial examples the independent zooids have individual inhalant siphons and are interconnected to shared common exhalant canals and apertures.

Most ascidian species have male and female sex organs, and self-fertilisation is avoided by differences in the timing of maturity for the testes and ovaries. Some species release eggs for external fertilisation, while others may be fertilised internally by free-swimming sperm. The tadpole-like larvae swim briefly (some just a few hours) in the water column before settling. The larvae do not feed, being adapted solely for dispersal.

Ascidians can be distinguished from similar looking sponges by their ability to retract or close their siphons if disturbed.

About 400 species are known from Australian waters where they are common on almost all coral and rocky reefs.

Family - CLAVELINIDAE
Clavelina australis

The zooids are transparent, flecked with fine white spots and each has a longitudinal blue line and two blue spots near the the siphon openings. Reef, rock walls, depth to 20 m. Grows to 8 cm. Common.

Family - CLAVELINIDAE ***Clavelina meridionalis***

A solitary species, the transparent head, which is about the same length as the stalk, has bright yellow markings. The stalk and highlights of the head are mauve. Sheltered and moderately exposed reef, depth to 16 m. Grows to 20 cm. Common.

Family - CLAVELINIDAE
Euclavella claviformis

Translucent, firm, gelatinous test, on a short fleshy stalk. Individual zooids have red-orange lip on the inhalant and exhalant siphons. Individuals pictured around 5 cm long. Reef, moderate and exposed shores, depth to 15 m. Common.

Family - DIDEMNIDAE
Didemnum lissoclinum

Orange with pale overtones and relatively firm to the touch, often overgrowing other sessile organisms. The cloacal apertures are raised above the surrounding tissue. Specimen pictured around 50 cm across, on rocky reef. Depth 10 m. Common.

Family - DIDEMNIDAE
***Leptoclinides* sp.** upper
***Lissoclinum* sp.** lower

These genera have small, often brightly coloured zooids, which are arranged around, and open into, highly developed cloacal systems. Usually thin and encrusting, often only up to 5 mm thick, they may cover a considerable area of reef. They are fixed to the substrate by their whole basal surface. Identification to species level, as with many ascidians, relies on microscopic examination of internal structures. Specimens pictured on ascidian-dominated rocky reef, depth 10 m. Common.

Family - HOLOZOIDAE
Distaplia florida

An encrusting species, the zooids appear to be in circular systems around raised common cloacal apertures. Specimen pictured around 20 cm across, on hard substrate in an exposed location. Depth 15 m. Uncommon.

Family - HOLOZOIDAE
Sigillina cyanea

A stalked colonial species easily recognised by its bright blue colour. The “head” consists of large numbers of zooids deeply embedded into the fleshy mass. Grows to 9 cm. Specimen pictured in 6 m depth on rocky algae dominated substrate. Common.

Family - HOLOZOIDAE
Sycozoa cerebriformis

The **brain ascidian** has small colonies that are flat and fan-shaped, attached to the substrate by an obvious stout stalk. Larger colonies are more convoluted with many separate folds. Zooids are arranged in double rows on the inside surfaces of the convolutions with large exhalant siphons along the outer margins of the top surface of the colony. Variable colours including red and orange, grey-blue and almost transparent as shown here (lower left). Grows to 10 cm. Reef, depth to 150 m. Common.

Photo by Graham Edgar

Family - HOLOZOIDAE
Sycozoa pulchra

Cylindrical colony of zooids attached to the substrate by a long narrow stalk. Transparent body, zooids with white stripes or spots. Colony to 6 cm, stalk up to 30 cm. Soft substrate with high water movement, depth to 25 m. Common.

Family - POLYCITORIDAE
Polycitor giganteus

Clear, firm, gelatinous body with orange or white zooids that appear to radiate outwards from inside. Zooids retract quickly if colony disturbed. Colony may grow to 30 cm, usually smaller. Reef, depth to 400 m. Common.

Family - PSEUDODISTOMIDAE
Pseudodistoma fragile

Clear, gelatinous body, firm texture, clear zooids that appear to radiate from inside body. Zooid distal ends have small white dots or streaks. Colony to 20 cm, often smaller. Sheltered reefs, depth to 20 m. Common.

Family - PSEUDODISTOMIDAE
Pseudodistoma inflatum

Bright orange colonial ascidian, with erect rounded shape. Zooids with inhalant and exhalant siphons opening directly on surface. Occurs in small clumps or groups on exposed shallow reef, depth to at least 10 m. Specimen pictured around 7 cm tall. Uncommon.

Family - ASCIDIIDAE
Phallusia julinea

Translucent test with dense covering of yellow spots and protuberances. Inhalant and exhalant siphons are often the only parts visible through holes in encrusting organisms on the reef. Grows to 17 cm height, coral and rocky reef, depth to 30 m. Uncommon.

Family - ASCIDIIDAE ***Phallusia obesa***

Solitary ascidian with a solid body. Pale- or dark-grey to yellow, often has numerous dark spots and a surface with raised ridges and bumps. Reef, estuaries, other sheltered waters with high nutrients and good water flow. Grows to 16 cm.

Family - CORELLIDAE
Rhodosoma turcicum

The oval or elongate test is firm and rigid, translucent cream or pale green in colour and attached to the substrate at the posterior end.
The anterior end has a large rounded lid that folds out to reveal inhalant and exhalant siphons. If disturbed, these siphons retract and the lid closes as shown in the lower photograph. This remarkable adaptation is characteristic of this monotypic genus. Usually under rocks or coral slabs, this specimen about 4 cm long, photographed on rocky reef, depth 8 m. Uncommon.

Family - PEROPHORIDAE
Ecteinascidia maxima

Colonies of upright cylindrical yellowish zooids, each banded red both around the base and the aperture of the siphons. The zooids attach to the substrate by a network of stolons. Colonies may be up to 30 cm across. Specimens pictured on reef, depth 10 m. Uncommon.

Family - PYURIDAE ***Herdmania grandis***

Leathery body, often half buried or covered with sponges or other encrusting organisms. Each siphon has a red ring around the opening. Usually solitary on reef, seagrass and sponge areas, jetty piles. Depth to 100 m. Grows to around 20 cm. Common.

Family - PYURIDAE
Herdmania momus

A large solitary species with pink and white stripes inside siphon apertures. Often packed tightly together on reef surfaces and covered with encrusting organisms with only the siphons visible. Rocky reef, depth to 50 m. Grows to around 20 cm. Common.

Family - PYURIDAE ***Pyura spinifera***

Sea tulips usually occur as a group of stalked animals, the oval or rounded head covered with short pointed protuberances, the whole covered with a pink or yellow encrusting sponge. Usually found in deeper water on exposed reef, depth to 80 m. Grows to 32 cm. Common.

Family - PYURIDAE ***Pyura praeputialis***

Cunjevoi has a tough outer tunic and a flat upper surface with two siphons. When exposed at low tide the siphons remain tightly closed. Forms a dense mat at mid or low tide level. Used in some areas as bait by fishermen. Found on rocky reef, intertidal to 12 m depth. Common.

Family -STYELIDAE
Botrylloides leachii

An encrusting species with many colour combinations. Has double rows of zooids and communal exhalant siphons. It grows on rock and other hard substrate, as well as large seaweeds. Depth to 30 m. Colonies may be up to 15 cm wide. Common.

Family - STYELIDAE ***Botrylloides magnicoecus***

A colonial species, with soft, conical lobes that may be yellow, or blue and yellow. Has rows of small zooids on the outside and longitudinal canals inside the lobe that converge into a large opening. May form mats up to 30 cm across on sheltered or moderately exposed reef. Depth to 20 m. Lobes to 3 cm long. Common.

Family - STYELIDAE
Cnemidocarpa pedata

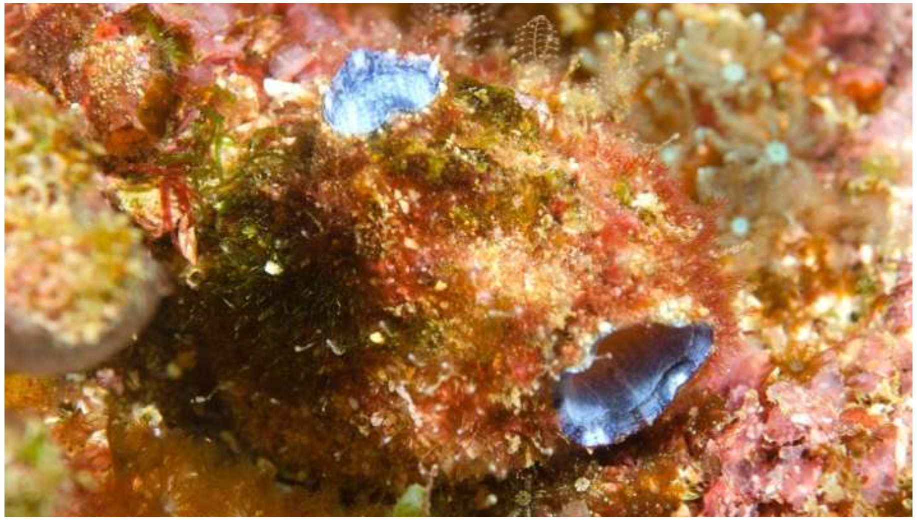
A large, robust, solitary ascidian with an orange, cream, or yellow surface. The large siphons are directed away from each other and the test usually has a covering of encrusting organisms. Rocky reef, sand, depth to 60 m. Grows to 20 cm. Common.

Family - STYELIDAE ***Cnemidocarpa stolonifera***

Tough leathery test, often reddish-brown but also grey or whitish, the surface with bumps lighter in colour than background and siphons with numerous strong pleats. Stalks and lower half of body often embedded in sand. Depth to at least 30 m. Grows to around 10 cm. Uncommon.

Family - STYELIDAE
Polyandrocarpa colemani

One of the largest colonial ascidians found in northern NSW, it is known to grow into large wall-like structures up to 2 m long. The angled openings are the inhalant pores, the upright openings the exhalant pores. Because of its large size and shape may be mistaken for a sponge, but is easily recognised as an ascidian as the pores tend to close when disturbed. Endemic to northern NSW and southern Qld and locally common in the Solitary Islands. Specimens pictured on rocky reef, depth 15 m.



Family - STYELIDAE ***Polycarpa pigmentata***

Tough leathery exterior usually covered with other encrusting organisms. The **blue-mouthed ascidian** is recognisable by the distinctive blue-coloured siphon linings. Attaches to hard substrates in lagoons and on rocky or coral reef. Specimen pictured 8 cm across at a depth of 9 m. A tropical species, uncommon in NSW.

Family - STYELIDAE ***Symplegma* sp.**

A colonial species, with independent zooids embedded in a transparent test which forms a thin layer across the substrate. Specimen pictured about 18 cm across at a depth of 12 m on rocky algal covered reef. Common.

Sharks and rays

Sharks and rays belong to the phylum Chordata, class Elasmobranchii, which contains around 1200 species of jawed fishes whose skeletons are cartilage, rather than bone. Their bodies are covered with skin consisting of small dermal denticles or tooth-like scales and, with the exception of ghost sharks, possess 5 to 7 gill slits on each side. They have no swim bladder, so buoyancy is assisted in some species by light oils in the liver and the low-density cartilage, and most sharks must swim continuously to maintain neutral buoyancy.

Rays share many features with sharks, but unlike sharks, the main body of a ray is flattened and the pectoral fins are attached to the back of the skull and greatly enlarged to form a body disc. The tail of most rays is greatly reduced and not used for locomotion, that being achieved by undulation of the oversized pectoral fins. Sharks and rays reproduce when the male passes sperm to the female using modified ventral fins called claspers. The female may produce an egg case which is attached to the sea floor, but most species produce live young.

Photo by Liz Hardaker

Family - DASYATIDAE **_Bathytoshia brevicaudata_** SMOOTH STINGRAY

The **smooth stingray** is dark grey to black with a thick-based tail around the same length as the body. Dorsal surface generally smooth, with a row of white spots on the flank on either side of the head. Similar black stingray, *Bathytoshia lata*, (not shown), is smaller and has a longer tail with prominent spines on the mid-line. Grows to at least 4.3 m long and 1.8 m wide. Sand and reef areas, often in shallows adjacent to boat ramps and jetties. Depth to 100m. Common.

Family - DASYATIDAE
Hemitrygon fluviorum

ESTUARY STINGRAY

Pale brown, triangular-shaped disc. The tail, bearing a large spine, up to twice length of body. Often encountered in shallow estuaries in large numbers. Grows to 1.3 m long, width to 63 cm. Depth to 40 m. Common.

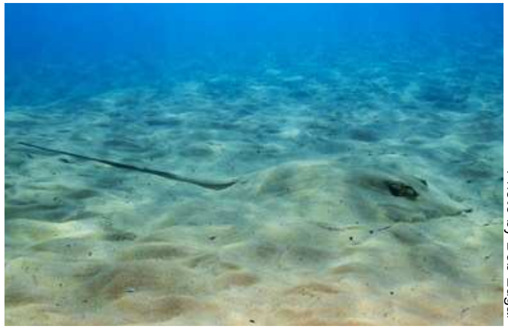
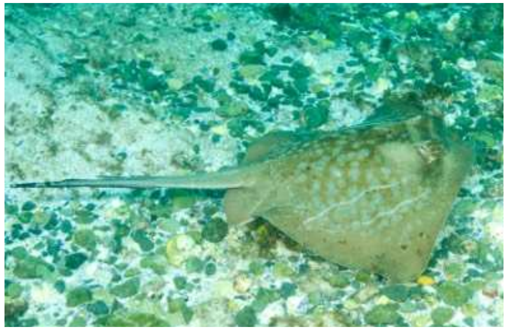


Photo by Bob Edgar

Family - DASYATIDAE
Neotrygon trigonoides

CORAL SEA MASKRAY

Tan with pale blue spots, often dark mask across eyes. Tail longer than disc, thin, alternating black and white bands at tail tip, (often missing). Length to 70 cm. Sandy reef areas, depth to at least 170 m. Common.



Family - DASYATIDAE
Taeniurops meyeni

BLOTCHED FANTAIL RAY

Almost circular black disc, which may be spotted or mottled. Thick-based tail of length similar to disc width. Length to 330 cm. Sand, reef areas, depth to at least 500 m. Uncommon.

Family - GYMNURIDAE
Gymnura australis

AUSTRALIAN BUTTERFLY RAY

Light tan colour with dark spots and circles. Pectoral rays much wider than body length, banded tail is short and thin. Length to 94 cm. Sandy, muddy habitat. Depth to at least 250 m. Rare.

Photo by Brian Mayes

Family - MYLIOBATIDAE ***Mobula alfredi*** REEF MANTA RAY

Black upper surface, often with whitish highlights, white underneath. Distinguished from the Giant Manta Ray (not shown), by the presence of black spots on middle of underside between gill openings. Tail long and whip-like. Pelagic, common in the north during the summer. Grows to 5 m across, often smaller in the Solitary Islands.

Photo by Liz Hardaker

Family - MYLIOBATIDAE ***Myliobatis australis*** SOUTHERN EAGLE RAY

Olive-green with blue spots and crescents, tapered wing tips with stout body, tail long and whip-like. Length to 2.4 m, sand, seagrass, reef, often in shallows. Depth to at least 85 m. Common.

Family - MYLIOBATIDAE ***Aetobatus ocellatus*** WHITESPOTTED EAGLE RAY

Dark with numerous blue-white spots on back, white underbelly. Long thin tail with spines at the base. Head thick with pronounced beak. Wings wide and pointed. Grows to 1.5 m across. Rocky, coral reef, edges and drop-offs, depth to 100 m. Juveniles often in estuaries, adults offshore, sometimes in small groups. Common.

Family - UROLOPHIDAE ***Trygonoptera testacea*** COMMON STINGAREE

Pale to dark greyish-brown almost circular disc, tail has distinctive small dorsal fin just before one or two stout spines, caudal fin is leaf-shaped. Similar *Urolophus kapala* (not shown) has dark mask around eyes and ridge along side of caudal fin. Grows to 47 cm. Beaches, estuaries, depth to 135 m, often shallower. Common.

Family - RHINOBATIDAE ***Trygonorrhina fasciata*** SOUTHERN FIDDLER RAY

Grey to reddish brown, disc almost oval with distinct characteristic pattern of dark-edged grey bars. Two large erect dorsal fins, raised sharp denticles on shoulders and mid-line. Grows to about 1.2 m, usually smaller. Sandy reef areas, coastal beaches, depth to 100 m. Common.

Family - RHINOBATIDAE
Aptychotrema rostrata

EASTERN SHOVELNOSE RAY

Pale grey to brown, triangular head slightly longer than wide. Body sandy brown, pale to dark, with brownish blotches. Grows to 1.2 m. Sand, mudflats, estuaries, beach zones, depths to 100m. Common.

Family - RHINOBATIDAE
Rhynchobatus australiae

WHITESPOTTED GUITARFISH

Two high dorsal fins, three rows of spines on head of adults, white spots scattered over head and forebody. Grows to 3 m. Coral and rocky reef, depth to at least 60 m. Uncommon.

Family - HYPNIDAE ***Hypnos monopterygius*** COFFIN RAY

Pale tan to brown, double-lobed body with two rounded dorsal fins and rounded caudal fin. Eyes set close together and often the only parts visible if ray is buried in sand. Catches prey with powerful electric shock. Has shocked unsuspecting divers. Grows to 70 cm. Soft substrate, depth to 240 m. Common.

Family - CARCHARHINIDAE ***Carcharhinus amblyrhynchos***

GREY REEF SHARK

Grey to bronze-grey body, black margins to pectoral, second dorsal, anal and caudal fins. Offshore reefs and islands, depth to 1000 m. Grows to 2.6 m. Uncommon to rare.

Family - CARCHARHINIDAE ***Carcharhinus galapagensis***

GALAPAGOS SHARK

Uniformly grey, becoming pale underneath, lacking other distinctive markings. Predominant shark around remote oceanic islands and reefs. Grows to 3.7 m, commonly smaller. Depth to 284 m. Common at Lord Howe Island.

Family - CARCHARHINIDAE ***Triaenodon obesus*** WHITETIP REEF SHARK

Grey slender body, white tips to dorsal and upper ray of caudal fins. Often close to reef, sometimes resting in gutters or caves. Grows to 2.2 m, often smaller. Coral reef, depth to 330 m. Rare in NSW.

Family - HETERODONTIDAE ***Heterodontus galeatus***

CRESTED HORN SHARK

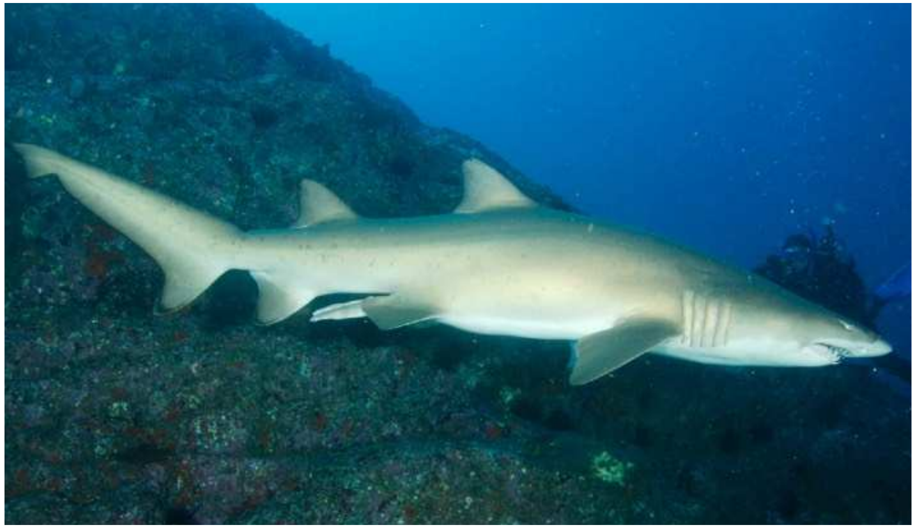
Medium brown body with broad darker bands and high crests above eyes. Similar *H. portusjacksoni* has distinct harness pattern. Both have venomous barbs in front of dorsal fins. Grows to 1.5 m. Inshore reefs and islands, depth to 93 m. Common.

Photo by Graham Edgar

Family - HETERODONTIDAE ***Heterodontus portusjacksoni***

PORT JACKSON SHARK

Light to dark brown body with distinct harness-like pattern in front of first dorsal fin. Grows to 92 cm. Coastal inshore reefs and islands, often in large breeding aggregations. Depth to 90 m. Common.

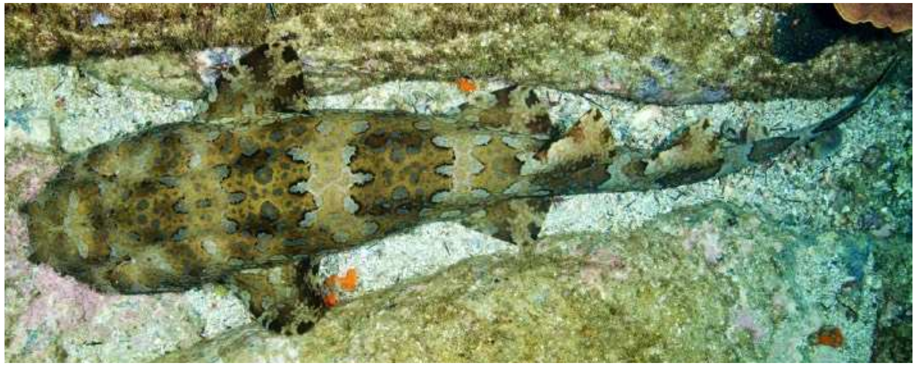


Family - ODONTASPIDIDAE ***Carcharias taurus*** GREYNURSE SHARK

Grey or bronze-grey in colour, juveniles with numerous black spots. Mouth agape showing many long, needle-sharp, teeth. Two similarly-sized dorsal fins. Rocky reef areas, offshore islands, often in small to medium sized aggregations. Depth to 190 m. Grows to 3.3 m. A protected species gradually becoming more common.

Family - BRACHAELURIDAE ***Brachalurus waddi*** BLIND SHARK

Brown or brownish-grey, with darker bands, white spots, sometimes white blotches. Rocky reef, rockpools, often secreted in recesses. Intertidal to at least 140 m depth. A harmless species which grows to 66 cm. Common.



Family - ORECTOLOBIDAE

Orectolobus halei

BANDED CARPET SHARK

Tan to brownish-grey background, with distinct black-edged bands, distinguished from similar *O. ornatus* by presence of prominent supraorbital knobs, branched post-spiracular dermal lobes (see left), and larger size. Rocky reef, gutters and caves, depth to 195 m. Grows to at least 2.9 m. Should not be approached, may bite if provoked. Relatively common.

Family - ORECTOLOBIDAE ***Orectolobus maculatus***

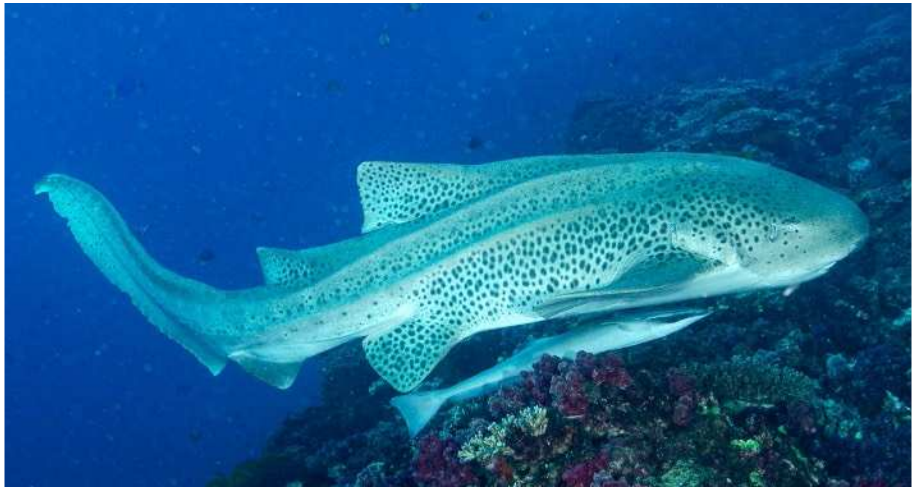
SPOTTED WOBBEGONG

Tan to grey background, darker bands and blotches with white edges. Reef, gutters and caves, depth to at least 110 m. Grows to 3 m. May bite if harassed or disturbed. Common.

Family - ORECTOLOBIDAE ***Orectolobus ornatus***

DWARF ORNATE WOBBEGONG

Tan to brownish-grey, distinct black-edged brown bands. Distinguished from similar *O. halei* by smaller size, lack of supraorbital processes, and unbranched post-spiracular dermal lobes. Grows to maximum 1.2 m. Rocky reef, gutters, caves, often under rocks or coral slabs, depth to at least 50 m. Common.



Family - STEGOSTOMATIDAE ***Stegostoma fasciatum*** ZEBRA SHARK

Brownish-grey body with a pair of parallel ridges on each side. Many small dark spots, upper tail lobe much elongated. Grows to 3.5 m. Sluggish nature, sometimes easy to approach, sandy areas around rocky and coral reefs. Depth to 90 m. Uncommon.

Bony fishes

Bony fishes belong to the phylum Chordata, class Actinopteri, and there are believed to be more than 30,000 living species. They are characterised by a skeleton of bone and a single gill opening on either side of the head. Other features include, in most forms, the presence of a swim bladder, overlapping plate-like scales, well-developed fins and fin spines and external fertilisation of eggs. Many fish species have a lateral line, along which there is a series of sensory pores or receptors for detecting vibrations and pressure changes in the water column.

Bony fishes exist in many sizes, ranging from giant sunfish or mola-mola weighing over 500kg, to tiny gobies weighing less than a gram.

Bony fishes take many forms. Some species have both eyes on the same side, such as flounders and soles, some are elongated and eel-like; while others are encased in a body of bony plates or covered with erectile spines. Many species are edible and provide a valuable food source, being extensively fished or artificially farmed. A few species are poisonous, notably the puffers or toadfish, and must never be eaten.

Photo by Liz Hardaker

Family - MURAENIDAE ***Echidna nebulosa*** STARRY MORAY

Pale body, with brown bands and blotches incorporating yellow spots, and yellow eye. Front of upper and lower jaw and inside of mouth pale. Nocturnal and secretive during the day. Intertidal on rock platforms, rocky and coral reef. Depth to 48 m. Grows to 1 m but usually smaller at 50 cm. Common.

Photo by Kate Shaw

Family - MURAENIDAE
Enchelycore ramosa

MOSAIC MORAY

Creamy yellow body, brown reticulated pattern, slender upturned lower jaw with prominent sharp teeth. Coral and rocky reef, depth to 40 m. Grows to 1.5 m. Uncommon on NSW coast, more common at Lord Howe Is.

Photo by Matt Nimbs

Family - MURAENIDAE
Gymnothorax annasona

LORD HOWE MORAY

Mottled dark brown and yellow body, head distinctly grey with dark brown mottling, yellow eye. Rocky, coral reef, depth to 30 m. Grows to 55 cm. Rare on NSW coast, relatively common at Lord Howe Is.

Family - MURAENIDAE
Gymnothorax chilospilus

LIPSPOT MORAY

Tan, indistinct groupings of pale spots, corner of mouth with dark brown spot, preceded on lower lip with large white spot. Reef, coastal reef flats, depth to 45 m, often shallower. Grows to 50 cm. Uncommon.

Family - MURAENIDAE
Gymnothorax cribroris

SIEVE MORAY

Tan, snowflake pattern of pale spots and blotches, distinctive dark brown blotches on upper jaw and side of head. Reef, depth to 78 m. Grows to 46 cm. Common.

Family - MURAENIDAE
Gymnothorax eurostus

STOUT MORAY

Dark brown body with yellow spots and reticulations on head and forebody, becoming distinct large dark reticulations towards tail. A pale specimen, (lower photo) with pale body and brown to black reticulations found commonly at Lord Howe Island. It is thought to be a colour form of this species, but may yet prove to be a separate species pending further study. Rocky and coral reef, depth to 78 m. Grows to 80 cm. Common.

Family - MURAENIDAE
Gymnothorax meleagris

WHITEMOUTH MORAY

Dark background with many close-set white spots, characteristic white interior to mouth. Rocky and coral reef, depth to 58 m. Grows to 1.2 m. Common at Lord Howe Is.

Family - MURAENIDAE
Gymnothorax mucifer

KIDAKO MORAY

Brownish background, pale snowflake-type pattern becoming indistinct bands towards the tail, plain coloured lower jaw. Rocky reef, depth to 350 m. Grows to 72 cm. Uncommon to rare in NSW.

Photo by Kate Shaw

Family - MURAENIDAE ***Gymnothorax nubilus*** GREY MORAY

Pale body, darker brown blotches and spots on body forming indistinct bars along the sides, white margin on vertical fins, distinct black bar through eye. Coral and rocky reef, depth to 40 m. Grows to 54 cm. Not recorded from the NSW coast, common at Lord Howe Is.

Family - MURAENIDAE ***Gymnothorax nudivomer*** YELLOWMOUTH MORAY

Brown to brownish yellow, face and forebody with many small white spots, these growing larger and more widely spaced towards the rear of the body, bright yellow inside mouth, large black blotch on gills. Rocky reef, depth to 271 m. Grows to 1.8 m. Uncommon.

Family - MURAENIDAE
Gymnothorax prasinus

GREEN MORAY

Yellowish-brown blending into green body, distinctly humped, almost bulbous head, no other conspicuous markings. Rocky reef, intertidal to at least 40 m depth. In common with other moray species, spends most of its daytime hours secreted in holes in the reef, coming forth at night to feed on fish and crustaceans. Probably the most common moray seen by divers and often caught by line fishermen who consider it a pest. As with most morays, should not be eaten due to the risk of ciguatera poisoning. Grows to 97 cm. Common.

Family - MURAENIDAE ***Gymnothorax thyrsoideus*** GREYFACE MORAY

Pale mottled brown appearance, with dark or light grey head, distinctive white eye. Rocky reef, sometimes in shallow intertidal pools, depth to 30 m. Grows to 66 cm, usually smaller. Common.

Family - MURAENIDAE ***Rhinomuraena quaesita*** RIBBON EEL

Compressed strap-like body, usually only the head seen projecting from a burrow in the sand. Mouth invariably agape, twin conical shaped nostrils, juvenile as shown, coloured black with yellow stripe on centre of back. Adult males blue and yellow, females, yellow. Sand and rubble areas, lagoons, depth to 57 m. Grows to 1.3 m. Rare in NSW.

Family - ACANTHURIDAE ***Acanthurus blochii*** DARK SURGEONFISH

Bluish-grey to dark brown, irregular lines on face, yellow or orange spot behind eye, often white bar at tail base. Similar *A. dussumieri* has yellow mask through eye and white tail base spine, spots on caudal fin. Lagoons and seaward reefs, depth to 15 m. Grows to 45 cm. Rare on NSW coast, more common at Lord Howe Is.

Family - ACANTHURIDAE

Acanthurus dussumieri

PENCIL SURGEONFISH

Base colour variable from blue to pale brown, dark-edged white tail-base spine, yellow mask around eyes, dorsal fin yellow, dorsal and anal fins with blue line at base and blue outer margin. Juvenile (lower photograph), pale with white tail base spine, yellow or white tail base. Similar looking juveniles of *A. xanthopterus* and *Prionurus microlepidotus* occur in estuaries, but lack the white tail base spine and the bright blue margin on anal fin. Outer reef, seaward slopes, juveniles inshore, estuaries. Depth to 130 m. Grows to 54 cm. Common.

Family - ACANTHURIDAE
Acanthurus grammoptilus

INSHORE SURGEONFISH

Dark blue-grey to pale yellow-brown, yellow around eye and outer pectoral fin, fine white margin on tail fin. Reef, depth to 91 m. Grows to 35 cm. Uncommon.

Family - ACANTHURIDAE
Acanthurus lineatus

BLUELINED SURGEONFISH

Yellow with black-edged blue lines, pale belly. Bright yellow to orange ventral fins. Coral reef, depth to 16 m. Grows to 38 cm. Adults rare, juveniles uncommon.

Family - ACANTHURIDAE ***Acanthurus mata*** PALE SURGEONFISH

Usually pale blue-grey with yellow mask over eyes, blue scribbles on face and body, dark tail base spine. Can rapidly change from light to dark colouration. Coral, rocky reef, depth to 100 m. Adults uncommon, juveniles (right) south to Sydney.

Family - ACANTHURIDAE
Acanthurus nigricans

VELVET SURGEONFISH

Black head fading to lighter rear body, white tail with yellow stripe, white crescent under eye. Fins with fine blue margin. Coral reef, depths to 67 m. Grows to 21 cm. Rare.

Family - ACANTHURIDAE
Acanthurus nigrofuscus

DUSKY SURGEONFISH

Slightly concave head profile, dusky body, orange spots on head and breast. Dorsal and anal fins with fine blue margin. Similar *Ctenochaetus binotatus* has blue iris. Coral and rocky reef, depth to 28 m. Grows to 21 cm. Common.

Family - ACANTHURIDAE ***Acanthurus olivaceus***

ORANGEBLOTCH SURGEONFISH

Pale front half, darker rear-body, large blue-edged orange blotch behind eye, white rear edge to tail. Juveniles bright yellow (right), indistinct orange patch behind eye. Coral, rocky reef, depth to 46 m. Grows to 35 cm. Adults uncommon, juveniles commonly seen south to Sydney.

Family - ACANTHURIDAE ***Acanthurus pyroferus*** MIMIC SURGEONFISH

Pale to darker brown body, black crescent-shaped mark behind gill cover extends under chin, orange blotch above pectoral fin base. Sub-adult pictured left, small juveniles yellow (not shown) similar to *Centropyge flavissimus,* while older juveniles (right) mimic *Centropyge vrolikii* angelfish. Coral, rocky reef, depth to 60 m. Grows to 25 cm. Uncommon.

Family - ACANTHURIDAE

Acanthurus triostegus

CONVICT SURGEONFISH

Pale golden yellow, five thin dark bands, additional broken band on tail base. Coral, rocky reef, juveniles in shallow intertidal pools, depth to 90 m. Grows to 27 cm. Common.

Family - ACANTHURIDAE

Acanthurus xanthopterus

YELLOWMASK SURGEONFISH

Bluish body, yellow around eye, yellow pectoral fin, black margin to tail. Coral, rocky reef, juveniles in estuaries, depth to 100 m. Grows to 70 cm. Uncommon.

Family - ACANTHURIDAE

Ctenochaetus binotatus

TWOSPOT BRISTLETOOTH

Orange-brown in colour, pale bluish spots on head and breast, distinct blue iris, dark spots above and below tail base. Juvenile, (below) with yellow tail. Similar *Acanthurus nigrofuscus* lacks the blue iris and has more prominent blue margin to dorsal and anal fin. Coral and rocky reef, depth to 53 m. Grows to 22 cm. Juveniles more commonly seen in NSW, adults uncommon.

Family - ACANTHURIDAE

Ctenochaetus striatus

LINED BRISTLETOOTH

Olive-brown with thin pale stripes along body, yellow-orange spots on upper half of face, strongly lunate tail. Coral reef, depth to 30 m. Grows to 26 cm. Uncommon.

Family - ACANTHURIDAE

Naso hexacanthus

SLEEK UNICORNFISH

Bluish grey, often dark above the mid-line, pale under, becoming yellowish, gill cover with dark margin and oblique line. Coral reef, usually schools midwater, depth to 150 m. Grows to 75 cm. Rare on NSW coast. Common Lord Howe Is.

Photo by Graham Edgar

Family - ACANTHURIDAE
Naso lituratus

CLOWN UNICORNFISH

Brown with yellow patch above eyes, yellow crescent between eyes and rear of mouth, two orange spines on tail base, yellow stripe on tail. Coral reef, depth to 90 m. Grows to 46 cm. Uncommon. Sub-adult shown here.

Family - ACANTHURIDAE
Naso tonganus

HUMPNOSE UNICORNFISH

Hump on shoulder, rounded hump on snout, dark marks from eye to above mouth and on gill cover. Black margin on pectoral and tail fins. Reef, depth to 40 m. Grows to 60 cm. Rare on NSW coast, uncommon at Lord Howe Is.

Family - ACANTHURIDAE
Naso vlamingii

BIGNOSE UNICORNFISH

Blue stripe from eyes to nose, blue lips, blue spots and lines on body, tail with long trailing filaments on male (left). Changes from light to dark background colour rapidly. Coral reef, depth to 50 m. Grows to 60 cm. Rare.

Family - ACANTHURIDAE
Paracanthurus hepatus

BLUE TANG

Bright blue body, large black pattern on upper body, yellow tail fin with black upper and lower margins, yellow margin on pectoral fin. Coral reef, where it schools amongst branching corals. Depth to 40 m. Grows to 31 cm. Common.

Family - ACANTHURIDAE
Prionurus maculatus

SPOTTED SAWTAIL

Blue-grey with close yellow spots and stripes on body and fins. Three tail base spines, juveniles may have white band on tail base. Often schools around algae covered reef to depths of 20 m. Grows to 45 cm. Common.

Family - ACANTHURIDAE ***Prionurus microlepidotus*** AUSTRALIAN SAWTAIL

Grey, slightly elongated body, five to seven tail base spines, schools in large numbers around algae covered reefs. Juvenile (right) yellow-brown similar to juvenile *Acanthurus dussumier* but lacking the white tailbase spine, sometimes with white tailbase band. Depth to 38 m. Grows to 70 cm. Common.


Family - ACANTHURIDAE ***Zebrasoma scopas*** BROWN TANG

Disc-shaped body, long snout, long dorsal and anal fins and single white tail base spine. Intermediate phase at left, juvenile at right. Coral reef, depth to 60 m. Grows to 40 cm. Uncommon.


Family - ACANTHURIDAE ***Zebrasoma velifer*** SAILFIN TANG

Very long dorsal and anal fins give adults (left) a disc shaped appearance when flared. Vertical black, yellow and white bars distinguish from similarly-shaped *Z. scopas* (shown above). Coral reef, depth to 45 m. Grows to 40 cm. Uncommon.

Family - CHAETODONTIDAE
Amphichaetodon howensis

LORD HOWE BUTTERFLYFISH

Deep body, five black bars, first through eye, last on tail base, yellow upper body. Exposed reef, depth to 150 m. Grows to 20 cm. Common at Lord Howe Is, uncommon in northern NSW.

Family - CHAETODONTIDAE
Chaetodon auriga

THREADFIN BUTTERFLYFISH

White forebody with dark offset chevron pattern. Upper rear body yellow, trailing filaments and ocellus at rear of dorsal fin. Similar *C. vagabundus* has black stripe through tail and at rear of body, lacks trailing fin. Coral reef, depth to 35 m. Juveniles (right) in estuarine areas. Grows to 23 cm. Common.

Family - CHAETODONTIDAE
Chaetodon bennetti

ECLIPSE BUTTERFLYFISH

Yellow body, bar through eye, two blue-white lines curving above and below pectoral fin. Large white-margined spot upper rear back. Coral reef, depth to 30 m. Grows to 20 cm. Rare on NSW coast, uncommon at Lord Howe Is.

Family - CHAETODONTIDAE
Chaetodon citrinellus

CITRON BUTTERFLYFISH

Lemon body, fine blue spots forming lines, dark margin to anal fin, black bar through eye. Similar *C. guentheri* lacks dark anal fin edge. Coral reef, depth to 36 m. Grows to 13 cm. Common.

Family - CHAETODONTIDAE
Chaetodon ephippium

SADDLE BUTTERFLYFISH

Black patch on upper back, transparent tail, yellow snout. Coral reef, depth to 30 m. Grows to 30 cm. Rare on NSW coast, common at Lord Howe Is.

Family - CHAETODONTIDAE ***Chaetodon flavirostris*** DUSKY BUTTERFLYFISH

Brown body, yellow snout, yellow dorsal and anal fins with orange margin, tail with orange submarginal band and transparent rear margin. Noticeable bump on forehead. Coral, rocky reef, depth to 22 m. Juveniles (right) paler in colour, in estuaries. Grows to 20 cm. Common.

Family - CHAETODONTIDAE
Chaetodon guentheri

GUNTHER’S BUTTERFLYFISH

White forebody grading to yellow at rear, fine dark spots on sides, dark stripe through eye, dorsal and anal fins yellow with blue-white margin. Similar *C. citrinellus* has dark anal fin edge. Reef, depth to 70 m. Grows to 22 cm. Common.

Family - CHAETODONTIDAE
Chaetodon kleinii

KLEIN’S BUTTERFLYFISH

Brown forebody grading to yellow rear, two broad pale bands behind eye and mid-body, yellow tail with clear rear margin. Stripe blue on forehead, black below eye. Reef, depth to 61 m. Grows to 15 cm. Common.

Family - CHAETODONTIDAE
Chaetodon lineolatus

LINED BUTTERFLYFISH

Vertical dark lines, yellow fins, broad dark band at rear of white body. Black bar through eye encloses white spot on forehead. Coral reef, depth to 171 m. Grows to 30 cm. Rare on NSW coast, common on Lord Howe Is.

Family - CHAETODONTIDAE
Chaetodon lunula

RACOON BUTTERFLYFISH

Black bar through eye, white bar, then black bar diagonally upwards to dorsal fin. Dusky back, black bar on tail base. Coral reef, depth to 30 m. Grows to 20 cm. Rare on NSW coast, uncommon Lord Howe Is.

Family - CHAETODONTIDAE
***Chaetodon* sp.**

Photographed at Lord Howe Island in 2018, this fish thought to be a hybrid between *C. lunula* and *C. flavirostris*. Photographed at dive site known as "the Arch" outside of the lagoon. Length 15 cm. Uncommon.

Family - CHAETODONTIDAE
Chaetodon lunulatus

PINSTRIPE BUTTERFLYFISH

Mostly yellow, paler on dorsal surface, thin mauve stripes along body, reddish brown bands on dorsal and anal fins, grey tail base. Coral reef, depth to 25 m. Grows to 14 cm. Uncommon.

Family - CHAETODONTIDAE ***Chaetodon melannotus***

BLACKBACK BUTTERFLYFISH

White body, black diagonal lines darkening to black band on rear dorsal surface, yellow fins. Black spot on tail base merges into dorsal black band, black patch on body near start of anal fin. Coral reef, depth to 20 m. Grows to 18 cm. Common.

Family - CHAETODONTIDAE
Chaetodon mertensii

MERTEN'S BUTTERFLYFISH

White body, black chevron bars with yellow band at rear, white band on tail base and part of tail. White-margined black bar through eye, fading on cheek. Juvenile (below) similar colouration, more triangular in shape. Coral reef, depth to 120 m. Grows to 13 cm. Common.

Family - CHAETODONTIDAE
Chaetodon ornatissimus

ORNATE BUTTERFLYFISH

White body, diagonal gold stripes, black bars on snout and through eye, fins yellow with black margin, black bar through tail. Coral reef, depth to 36 m. Grows to 20 cm. Uncommon.

Family - CHAETODONTIDAE
Chaetodon pelewensis

DOT AND DASH BUTTERFLYFISH

Dots form oblique rows across white body, grading to yellow at rear. Orange band on tail base, black-margined yellow bar through eye. Coral reef, depth to 30 m. Grows to 13 cm. Uncommon.

Family - CHAETODONTIDAE
Chaetodon plebeius

BLUESPOT BUTTERFLYFISH

Yellow body, bright blue patch in centre, dark blotch on upper centre of tail base, dots forming numerous thin lines on body. Coral reef, depth to 23 m. Grows to 15 cm. Common.

Family - CHAETODONTIDAE
Chaetodon rainfordi

RAINFORD'S BUTTERFLYFISH

Yellow body, orange bar through eye, two broad, dark, orange-margined bands on mid-body, large dark spot on tail base. Fins yellow, clear rear margin on tail. Coral reef, depth to 17 m. Grows to 15 cm. Uncommon.

Family - CHAETODONTIDAE
Chaetodon reticulatus

RETICULATE BUTTERFLYFISH

Pattern of pale spots on black body, yellow-edged black bar through eye, followed by pale bar continuing into dorsal fin. Yellow-orange margin on rear of anal fin. Coral reef, depth to 30 m. Grows to 18 cm. Uncommon.

Family - CHAETODONTIDAE
Chaetodon speculum

OVALSPOT BUTTERFLYFISH

Yellow body, black bar through eye, diffuse dark black spot on upper back, tail with clear rear margin. Coral reef, depth to 30 m. Grows to 18 cm. Uncommon.

Family - CHAETODONTIDAE

Chaetodon tricinctus

THREEBAND BUTTERFLYFISH

Oval body, three black bands; first through eye. Orange snout, dorsal and anal fin margins, clear margin on tail. Reef, depth to 22 m. Grows to 15 cm. Uncommon on NSW coast, common at Lord Howe Is.

Family - CHAETODONTIDAE

Chaetodon trifascialis

CHEVRON BUTTERFLYFISH

Elongated white body, distinct dark chevron markings, black band through eye, black tail with yellow band at rear, yellowish dorsal and anal fins. Coral reef, depth to 30 m. Grows to 18 cm. Common.

Family - CHAETODONTIDAE

Chaetodon ulietensis

DOUBLESADDLE BUTTERFLYFISH

White body, black bar through eye, two diffuse black saddles on back, yellow rear body and tail, black spot on tail base. Coral reef, depth to 30 m. Grows to 15 cm. Rare on NSW coast, uncommon at Lord Howe Is.

Family - CHAETODONTIDAE

Chaetodon unimaculatus

TEARDROP BUTTERFLYFISH

Yellow upper body, black tear-drop shaped mark on upper back, black bar through eye. Black bar on rear dorsal and anal fins, tail base. Coral reef, depth to 60 m. Grows to 20 cm. Uncommon.

Family - CHAETODONTIDAE

Chaetodon vagabundus

VAGABOND BUTTERFLYFISH

Distinctive dark offset chevron pattern, white body, dark bands through eye, at rear of body, and through tail. Similar *C. auriga* lacks dark bands at rear of body. Coral, rocky reef, depth to 30 m. Grows to 23 cm. Common.

Family - CHAETODONTIDAE

Chelmon rostratus

BEAKED CORALFISH

High triangular shaped body, dark-edged orange bar through eye, three further bars along body, the last with pale-margined ocellus high on dorsal fin. Black band on tail base. Coral, rocky reef, depth to 25 m. Grows to 20 cm. Uncommon.

Family - CHAETODONTIDAE
Chelmonops truncatus

EASTERN TALMA

Silver body, five dark bands, first through eye, the last marginal on the pointed dorsal and anal fins. Juveniles (at left) more elongate, with large ocellus high on the dorsal fin. Rocky reef, depth to 40 m. Grows to 20 cm. Common.

Family - CHAETODONTIDAE
Forcipiger flavissimus

FORCEPS FISH

Long snout, black forehead, remainder of body yellow, black spot on anal fin. Lacks longer snout and small black spots on breast of *F. longirostris* (not shown). Rocky, coral reef, depth to 114 m. Grows to 22 cm. Common.

Family - CHAETODONTIDAE
Heniochus acuminatus

LONGFIN BANNERFISH

Silver, long pennant on dorsal fin, the forward margin on the second black bar is behind the corner of the anal fin, distinguishing from similar *H. diphreutes.* Reef, depth to 75 m. Grows to 25 cm. Common.

Family - CHAETODONTIDAE
Heniochus chrysostomus

PENNANT BANNERFISH

Triangular shaped, three oblique dark bands, the third enclosing the dorsal fin, extended dorsal spine with feather-like pennant. Yellow snout. Coral reef, depth to 40 m. Grows to 18 cm. Uncommon.

Family - CHAETODONTIDAE
Heniochus diphreutes

SCHOOLING BANNERFISH

Similar to *H. acuminatus*, but forward margin of second black bar intersects at apex of anal fin, and snout is shorter. Often seen in large schools. Reef, depth to 115 m. Grows to 21 cm. Common.

Family - CHAETODONTIDAE
Heniochus monoceros

MASKED BANNERFISH

Pennant-like rays at front of dorsal fin, black bar on face, one through pectoral fin base, one at rear of body. Anal fin half white or yellow, dorsal fin and tail yellow. Coral reef, depth to 30 cm. Grows to 24 cm. Uncommon.

Family - CHAETODONTIDAE
Heniochus varius

HORNED BANNERFISH

White diagonal bands enclose dark triangular shape on body, prominent horns on forehead, black ventral and anal fins. Coral reef, caves, depth to 22m. Grows to 19 cm. Uncommon.

Photo by Graham Edgar

Family - EPHIPPIDAE
Platax orbicularis

ROUND BATFISH

Silvery, often with black speckles on sides, dark bar through eye and another on body through pectoral fin. Rounded head profile with indentation between eye and mouth, pelvic fins black. Reef, depth to 30 m. Grows to 50 cm. Uncommon.

Family - EPHIPPIDAE ***Platax teira*** ROUNDFACE BATFISH

Spade shaped body, high head profile, dark bar through eye, another broader band incorporating characteristic black blotch just below pectoral fin. Rocky reef, shipwrecks, often in small groups, depth to 20 m. Grows to 70 cm. Common.

Family - POMACANTHIDAE ***Centropyge bicolor*** BICOLOR ANGELFISH

Yellow head with dark bar through eye, blue rear body, yellow pectoral and ventral fins, yellow tail. Reef, rubble areas, depth to 25 m. Grows to 15 cm. Common.

Family - POMACANTHIDAE
Centropyge bispinosa

CORAL BEAUTY

Orange body with narrow bluish bars, blue lips, blue fins. Orange-red margin to gill cover and bluish gill cover spine. Secretive in coral, rocky reef, depth to 45 m. Grows to 10 cm. Uncommon.

Family - POMACANTHIDAE
Centropyge flavissima

LEMONPEEL ANGELFISH

Yellow body and fins, blue margin on gill cover, blue around eye, orange blotch above pectoral fin base. Similar *Acanthurus pyroferus* juvenile lacks gill cover spine. Coral reef, depth to 50 m. Grows to 14 cm. Uncommon.

Family - POMACANTHIDAE
Centropyge heraldi

YELLOW ANGELFISH

Yellow body and fins, dusky mark around eye, faint orange streaks on anal fin. Uncommonly has broad black rear edge to dorsal fin. Secretive, coral reef, depth to 90 m. Grows to 12 cm. Rare.

Family - POMACANTHIDAE
Centropyge tibicen

KEYHOLE ANGELFISH

Dark blue body, white bar centrally on body, anal fin with distinct yellow margin, dorsal and tail fins with fine light blue margin. Rocky, coral reef, depth to 55 m. Grows to 19 cm. Common.

Family - POMACANTHIDAE
Centropyge vrolikii

PEARLSCALE ANGELFISH

Grey forebody grading to black at rear of body and tail. Orange-brown bar on gill cover and pectoral fin base. Similar *A. pyroferus* juvenile lacks gill cover spine. Secretive, coral reef, depth to 25 m. Grows to 12 cm. Uncommon.

Family - POMACANTHIDAE
Chaetodontoplus ballinae

BALLINA ANGELFISH

White body, black mask over eyes, black back with band extending down to pectoral fin base, yellow tail. Reef, depth to 120 m. Grows to 20 cm. Rare on NSW coast, in deeper water at Lord Howe Island and Balls Pyramid.

Family - POMACANTHIDAE ***Chaetodontoplus conspicillatus***

CONSPICUOUS ANGELFISH

Chocolate brown body, lighter on back, orange mask with blue ring around eye, white ventral fin, yellow tail with black margin, blue lips. Rocky reef, depth to 40 m. Grows to 25 cm. Rare on NSW coast, common at Lord Howe Is.

Family - POMACANTHIDAE ***Chaetodontoplus meredithi***

QUEENSLAND YELLOWTAIL ANGELFISH

Body mostly blue or black, usually white band behind head, face blue with fine yellow spots and shading, yellow ventral fin and tail. Pectoral fin black with yellow margins. Reef, depth to 50 m. Grows to 25 cm. Rare.

Family - POMACANTHIDAE
Genicanthus semicinctus

HALFBANDED ANGELFISH

Male (top) with grey-blue upper body, yellow-orange belly, narrow black bands on upper half of body only, tail with elongated upper and lower lobes, spots on membrane between. Female dark upper body, white below, dark swallow tail, blue ring around eye. Rocky reefs, depth to 100 m. Grows to 21 cm. Common at Lord Howe Is and Balls Pyramid where it is considered endemic.

Family - POMACANTHIDAE
Pomacanthus imperator

EMPEROR ANGELFISH

Bluish body with pattern of yellow stripes, pale face with dark blue mask over eyes, dark blue underbelly and anal fin, blue bar extends upwards through pectoral fin base, yellow rear dorsal and tail fin, white upper dorsal fin margin. Juvenile (bottom) blue with concentric light blue and white circular pattern, the innermost forming a complete circle. Similar juvenile *P. semicirculatus* lacks the enclosed complete white circle marking and has patterned tail fin. Coral, rocky reef, depth to 100 m. Grows to 40 cm. Uncommon.

Family - POMACANTHIDAE
Pomacanthus semicirculatus

BLUE ANGELFISH

Green-blue overall, often with pale band through mid-body, scales with dark blue centres. Blue ring around eye, blue spine and margin on gill cover, fine blue margin on other fins. Juvenile (lower) dark blue with blue and white semi-circular markings. Similar juvenile *P. imperator* has enclosed complete circle marking on body, and broad, clear, tail fin margin. Coral reef, depth to 40 m. Grows to 40 cm. Common.

Family - SCATOPHAGIDAE
Scatophagus argus

SPOTTED SCAT

Silvery greenish-yellow, body roughly rectangular in shape with steeply sloping forehead, dark spots, fading with age. Estuaries, rivers, embayments, depth to 5 m. Grows to 38 cm. Uncommon.

Family - SCATOPHAGIDAE
Selenotoca multifasciata

STRIPED SCAT

Silvery rectangular body, distinctive banded pattern on upper back, spots below, black lips. Estuaries, river entrances, mangrove creeks, depth to 5 m. Grows to 40 cm. Common.

Family - SIGANIDAE
Siganus fuscescens

BLACK RABBITFISH

Variable colour, can change rapidly from silvery to almost black with spots and stripes. Often with schooling surgeonfishes over algae-covered reefs, seagrass, depth to 17 m. Grows to 40 cm. Common.

Family - SIGANIDAE
Siganus argenteus

FORKTAIL RABBITFISH

Blue-grey elongated body, small pale yellow spots, thin dark bar at rear of gill cover, forked tail. Offshore reefs, usually in schools, depth to 40 m. Grows to 40 cm. Uncommon.

Family - ZANCLIDAE
Zanclus cornutus

MOORISH IDOL

High body, black, white, and yellow bars, distinctive elongated ray on dorsal fin, black-edged yellow patch on protruding snout. Often schooling in small to large numbers on reef, depth to 182 m. Grows to 23 cm. Common.

Family - GLAUCOSOMATIDAE ***Glaucosoma scapulare*** PEARL PERCH

Silvery scales, large eye and mouth, usually a diagonal dark bar through the eye which fades with age. Small dark blotch present at rear base of dorsal fin. Rocky reef, sometimes small schools. Depth to 90 m. Grows to 70 cm. Common.

Family - DINOLESTIDAE ***Dinolestes lewini*** LONGFIN PIKE

Silver elongated body, yellow tail and pointed snout. Similar *Sphyraena obtusata* is more slender and usually has multiple stripes along side and sometimes a reticulate pattern on dorsal surface. Reef, depth to 65 m. Grows to 84 cm. Common.

Family - PEMPHERIDAE
Parapriacanthus ransonneti

GOLDEN BULLSEYE

Gold head, translucent body, large eye, faint dark bar at tail base. Forms large schools in gutters and under overhangs. Grows to 10 cm. Depth to 30 m. Rare NSW coast, uncommon at Lord Howe Is.

Family - PEMPHERIDAE
Pempheris affinis

BLACKTIP BULLSEYE

Golden body, prominent lateral line. Dorsal, tail fin lobes with distinct black tips, anal fin with narrow black margin. Gutters, under overhangs in reef, often in large schools. Depth to 30 m, often shallower. Grows to 15 cm. Common.

Family - PEMPHERIDAE
Pempheris analis

BRONZE BULLSEYE

Copper-coloured body, pinkish lateral line, dark patches on dorsal, anal and tail fin lobes. Similar *P. compressa* has uniformly black anal fin. Caves, overhangs in reef, depth to 40 m. Grows to 20 cm. Uncommon NSW coast, common Lord Howe Is.

Family - PEMPHERIDAE
Pempheris compressa

SMALLSCALE BULLSEYE

Copper-coloured body, reddish bar below eye, another behind gill cover, thin black front margin on dorsal fin. Anal fin is uniformly dark, similar *P. analis* has dark blotch on anal fin lobe. Reef, depth to 30 m. Grows to 20 cm. Common.

Family - PEMPHERIDAE
Pempheris multiradiata

BIGSCALE BULLSEYE

Bronze coloured, with 8 - 10 darker stripes on body and dark tips to dorsal and anal fins. Juveniles (left) have yellow pelvic fin with dark tip. Reef, depth to 30 m. Grows to 28 cm. Common north to around South West Rocks.

Family - PEMPHERIDAE
Pempheris oualensis

OUALAN BULLSEYE

Gold- or copper-coloured body, pink pectoral fin with large black spot at base, and black inner margin on anal fin. Caves or deep overhangs in reef during daylight hours, depth to 36 m. Grows to 22 cm. Uncommon.

Family - PENTACEROTIDAE ***Evistias acutirostris*** STRIPED BOARFISH

Protruding snout with fine hair-like processes on lower jaw. Has five pale bars on dark background, all fins are yellow apart from brown ventral fin. Reef, depth to 193 m. Grows to 90 cm. Rare on NSW coast, common at deeper sites at Lord Howe Is.

Family - CREEDIIDAE ***Limnichthys fasciatus*** TOMMYFISH

Elongated pale grey body with up to eight dark blotches forming bands on upper back, distinct rounded swivelling eyes and lighter coloured shield-like plate on snout. Sand, particularly amongst reef. Rarely seen except when disturbed. Depth to 150 m. Grows to 2 cm. Common.

Family - AULOPIDAE
Latropiscis purpurissatus

SERGEANT BAKER

Red to pink in colour with darker bars across back. Male has extended first ray on dorsal fin (shown here). Perches on substrate, rocky reef. Depth to 100 m. Grows to 60 cm. Common.

Family - SYNODONTIDAE
Saurida nebulosa

CLOUDED SAURY

Light colouration with dull speckled markings. Three distinct dark bars over rear of body, and teeth visible with mouth closed distinguishes from lizardfish species. Reef, sandy areas, depth to 60 m. Grows to 17 cm. Common.

Family - SYNODONTIDAE
Synodus dermatogenys

BANDED LIZARDFISH

Light blue-grey stripe starts above pectoral fin and is often unbroken by dark bars, the row of white dashes start behind pectoral fin. Often has yellowish tail. Reef, sandy areas, rubble, depth to 97 m. Grows to 24 cm. Common.

Family - SYNDONTIDAE ***Synodus jaculum*** TAILSPOT LIZARDFISH

Variable colouration, pale to dark reddish-brown, four blotchy bands on back often edged with blue and with blue scribbles between. Dark blotch at tail base bulges forward. Reef sand and rubble areas, depth to 100 m. Grows to 20 cm. Common.

Family - SYNODONTIDAE ***Synodus rubromarmoratus***

REDMARBLED LIZARDFISH

Unbroken blue-bordered reddish bands across back, slender body, red patch on cheek. Reef, sand and rubble areas, depth to 50 m. Grows to 20 cm. Uncommon.

Family - SYNODONTIDAE ***Synodus variegatus*** VARIEGATED LIZARDFISH

Variable in colour, reddish to drab brown, with two lateral rows of rectangular blotches; the upper row dark, the lower with regular and smaller whitish blotches originating behind the pectoral fin. Most commonly observed lizardfish in NSW. Reef, sand and rubble areas, depth to 121 m. Grows to 25 cm. Common.

Family - BATRACHOIDIDAE ***Batrachomoeus dubius***

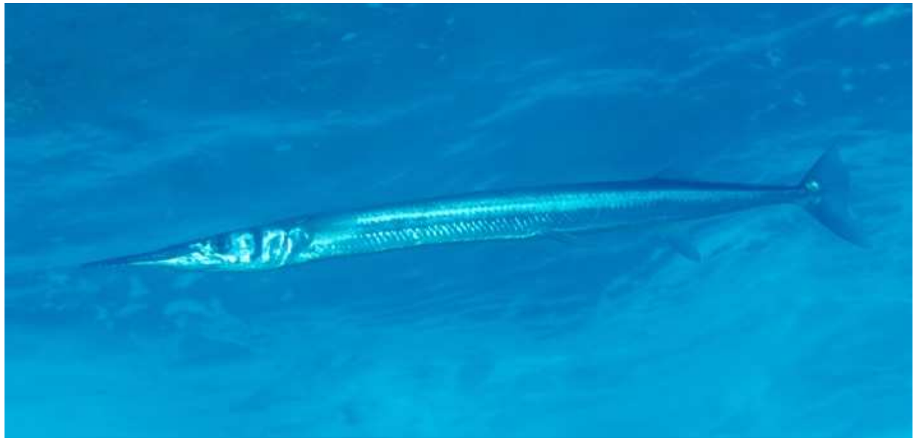
EASTERN FROGFISH

Colour variable, mottled brown to pale grey, usually two broad bands across the body with scattered dark spots. Lacks the orange blotches near dorsal fin of similar *B. dubius*. Rocky inshore silty habitats, estuaries and harbours. Depth to 150 m. Grows to 35 cm. Common.

Family - BATRACHOIDIDAE ***Halophryne queenslandiae***

SCULPTURED FROGFISH

Pale brown with darker blotches, adults with small orange blotch either side of spinous dorsal fin, distinguishing it from similar *Batrachomoeus dubius*. Rocky reef, depth to 20 m. Grows to 30 cm. Uncommon.



Family - BELONIDAE ***Tylosurus* sp.** STOUT LONGTOM

Stout silvery body, robust jaws of equal length. Lower lobe of caudal fin longer than upper lobe confirms genus as *Tylosurus*, probably *T. gavialoides* due to location in northern NSW. Surface waters of lagoons, harbours, large estuaries, around offshore islands. Grows to 80 cm. Common.

Family - MONOCENTRIDAE ***Cleidopus gloriamaris***

AUSTRALIAN PINEAPPLEFISH

Golden yellow body with dark diamond pattern, covered in spines, light organ on lower jaw containing luminescent bacteria. In caves or recesses by day, offshore reefs, silty areas, estuaries, depth to 200 m. Grows to 22 cm. Common.

Family - BLENNIIDAE ***Aspidontus dussumieri*** LANCE BLENNY

Slender body, yellowish-green dorsal surface, dorsal and anal fins with thin black margin, black stripe from tail to nose through eye, white stripe below. Mouth on underside of snout. Rocky, coral reefs, often retreating to holes in the substrate with only head protruding, depth to 20 m. Grows to 12 cm. Common.

Family - BLENNIIDAE ***Aspidontus taeniatus*** FALSE CLEANERFISH

Slender body, tapering black stripe from nose through eye, widening and continuing through tail. Remainder blue to white, often yellowish blush to head and chest. Mouth on underside of snout helps distinguish from the common cleaner wrasse, *Labroides dimidiatus*, which it mimics, and which has terminal mouth on end of snout. Coral, rocky reef, depth to 25 m. Grows to 115 mm. Common.

Family - BLENNIIDAE ***Meiacanthus atrodorsalis*** EYELASH FANGBLENNY

Grey-blue forebody, yellow at rear, black stripe on lower section of dorsal fin, diagonal black “eyelash” through eye distinguishes from similar *Plagiotremus laudandus*. Coral, rocky reef, drop-offs, depth to 30 m. Grows to 11 cm. Uncommon on mainland, more common on Lord Howe Is.

Family - BLENNIIDAE
Meiacanthus grammistes

LINESPOT FANGBLENNY

Three wide black stripes, above, below and through eye, all ending in dots and continuing onto tail fin. Large white-edged blotch at pectoral fin base. Coral, rocky reef, depth to 20 m. Grows to 11 cm. Rare.

Photo by Graham Edgar

Family - BLENNIIDAE
Meiacanthus lineatus

LINED FANGBLENNY

Three wide black stripes, white or yellow body, white belly, tail yellow. White-edged black margin on dorsal fin. Similar *Petroscirtes fallax* has yellow dorsal with thinner black margin and clear tail. Coral, rocky reef. Grows to 95 mm. Uncommon to rare.

Family - BLENNIIDAE
Omobranchus anolius

OYSTER BLENNY

Olive-green, rows of dots along body, males with prominent hump on head just behind eyes, white stripes radiating downwards. Lives in oyster or mussel shells, depth to at least 5 m. Grows to 8 cm. Common.

Family - BLENNIIDAE
Petroscirtes fallax

YELLOW SABRETOOTH BLENNY

Three wide black stripes, white or yellow body, white belly, and clear tail. Dorsal fin yellow with thin white-edged black margin; which with clear tail differs from *Meiacanthus lineatus*. Coral, rocky reef. Grows to 10 cm. Common.

Family - BLENNIIDAE
Petroscirtes lupus

BROWN SABRETOOTH BLENNY

Distinctive rounded head shape, row of four or five dark blotches along top of mid-side, with scattered small blue spots. Often lives in bottles or holes in reef, or amongst algae. Estuaries and bays, depth to 10 m. Grows to 13 cm. Common.

Family - BLENNIIDAE
Petroscirtes variabilis

VARIABLE SABRETOOTH BLENNY

Often olive or green with greenish-yellow belly, and densely mottled with irregular dark blotches and spots. Small blue spots posteriorly. Seagrass beds, estuaries, bays, depth to 10 m. Grows to 15 cm. Rare.

Family - BLENNIIDAE
Plagiotremus laudandus

BICOLOR FANGBLENNY

Bluish forebody, yellow rear, upper dorsal fin with black stripe. Coral, rocky reef, depth to 30 m. Grows to 8 cm. Common.

Family - BLENNIIDAE ***Plagiotremus rhinorhynchos***

BLUESTRIPED FANGBLENNY

Dusky yellow, sometimes black form, both with two white-blue stripes, transparent yellowish tail. In holes in rocky reef, depth to 30 m. Grows to 12 cm. Common.

Family - BLENNIIDAE ***Plagiotremus tapeinosoma*** PIANO FANGBLENNY

Orange-brown to black colouration, white belly, characteristic piano key pattern on sides with stripes continuing onto tail. Sinuous swimming motion. Coral, rocky reef, depth to 45 m. Grows to 14 cm. Common.

Photo by Graham Edgar

Family - BLENNIIDAE ***Cirripectes alboapicalis*** WHITEDOTTED BLENNY

Dark body with many closely-spaced small blue-white dots, fins clear orange-red. Black spot behind eye. Coral reef, depth to 18 m. Grows to 16 cm. Rare on NSW coast, common at Lord Howe Is.

Family - BLENNIIDAE
Cirripectes castaneus

CHESTNUT BLENNY

Base colour greenish to dark red-brown, but with oblique dark bars on head, continuing as bars or spots on body. Stripes difficult to discern on dark forms. Eye with orange ring. Coral reef, depth to 32 m. Grows to 10 cm. Uncommon.

Family - BLENNIIDAE
Cirripectes stigmaticus

REDSTREAKED BLENNY

Bright to dull red base colour, with many lighter dusky spots on head, body and pectoral fin base. Dark red ring around eye. Coral reef, depth to 20 m. Grows to 10 cm. Uncommon.

Photo by Graham Edgar

Family - BLENNIIDAE
Crossosalarias macrospilus

TRIPLESPOT BLENNY

Square-fronted head, black fleshy flap at base of first dorsal spine, dark squarish blotches on sides, fading towards tail. Numerous oval pale spots on rear body. Coral reef, depth to 25 m. Grows to 10 cm. Uncommon.

Family - BLENNIIDAE
Ecsenius bicolor

BICOLOR COMBTOOTH BLENNY

Usually grey front with yellow or orange rear body, sometimes all grey, or tricolour, with dark grey and yellow above, white below. Coral, rocky reef, depth to 25 m. Grows to 11 cm. Common.

Photo by Kate Shaw

Family - BLENNIIDAE
Ecsenius fourmanoiri

BLACKSTRIPED COMBTOOTH BLENNY

Colour yellow-orange to pink-brown, dark stripes forming prominent grid-like pattern on sides. Coral, rocky reef, depth to 20 m. Grows to 5 cm. Rare on NSW coast, uncommon at Lord Howe Is.

Family - BLENNIIDAE ***Exallias brevis*** LEOPARD BLENNY

Intricate netted pattern over body, tending to spot pattern on head. Females mostly brown, males (above) brown on head tending pink or red to rear of body. Inhabits rich coral areas, perches upright on branched corals. Depth to 20 m. Grows to 15 cm. Common.

Family - BLENNIIDAE ***Istiblennius edentulus*** RIPPLED ROCKSKIPPER

Squarish head, simple filaments over eye, males (pictured) with flap-like ridge on head. Greenish-grey with banded pattern on body, often with pale band horizontally around snout and cheeks. Rocky reef, intertidal to 5 m. Grows to 16 cm. Common.

Family - BLENNIIDAE ***Istiblennius meleagris*** PEACOCK ROCKSKIPPER

Green to brown body with small light spots, broken vertical bars on head below eyes. Pupil-sized brown spot behind eye, complex filaments above, both sexes develop blade-like crest on head. Intertidal to 2 m, rockpools. Grows to 15 cm. Common.

Family - BLENNIIDAE
Parablennius intermedius

HORNED BLENNY

Dark grey to brown base colour, gold or yellow stripes or spots on face, series of brown blotches along sides, multi-lobed filaments above each eye, large and filamentous in males. Sheltered reef, estuaries, rivers, often in holes in piles or jetties with only head appearing. Depth to 15 m. Grows to 12 cm. Abundant.

Family - BLENNIIDAE
Stanulus talboti

TALBOT'S BLENNY

Mottled upper body, blotchy brown line from eye towards tail, reflective white spots on lower head, brown spot on pectoral fin base. Reef, depth to 15m. Rare on NSW coast, common at Lord howe Is.

Family - CLINIDAE
Cristiceps aurantiacus

YELLOW CRESTED WEEDFISH

Variable colour, brown, yellow, or orange. Identified by first dorsal fin which starts in front of eye, with vertical stripe through eye. Kelp, weed beds, depth to 30 m. Grows to 22 cm. Common.

Family - CLINIDAE
Heteroclinus roseus

ROSY WEEDFISH

Variable colouration, mottled greenish-yellow through pinks to reddish-brown, transparent fins, first dorsal fin attachment point above or behind the eye. Reef with weed beds, depth to at least 14 m. Grows to 15 cm. Common.

Family - TRIPTERYGIIDAE
Enneapterygius atrogulare

RINGSCALE THREEFIN

Males (above) red, (often with white mottling), black dorsal fins, head and lips. Females mottled red-brown, few distinctive marks. Similar *E. similis* female has green rear body, male has black third dorsal fin, white saddles before and after. Coral, rocky reef, depth 10 m. Grows to 5 cm. Common.

Family - TRIPTERYGIIDAE
Enneapterygius howensis

LORD HOWE THREEFIN

Female mottled red and white, male (not shown) rear body lighter, with vertical black streaks above anal fin. Reef, depth to 6 m. Grows to 4 cm. Common at Lord Howe Is, rare NSW coast.

Family - TRIPTERYGIIDAE
Enneapterygius rufopileus

BLACKCHEEK THREEFIN

Female (left) grey body, head brown. Male lower head black, lower lip red. Both sexes with white bar at tail base. Reef, 6 m depth. Grows to 45 mm. Common.

Family - TRIPTERYGIIDAE
Enneapterygius similis

MASKED THREEFIN

Male (top) red, dark mask to lower head, black tail, including third dorsal fin. Female mottled brown with green tinge to tail, white saddles before and after third dorsal fin both sexes. *E. atrogulare* male has black dorsal fins, and female lacks greenish rear body. Rocky reef, depth to 13 m. Grows to 4 cm. Abundant.

Family - TRIPTERYGIIDAE
Helcogramma chica

LITTLE HOODED THREEFIN

Translucent body, red or green shades, distinctive plate-like hood on head, often with red spots or streaks. Coral, rocky reef, depth to 32 m. Grows to 4 cm. Rare on NSW coast, uncommon at Lord Howe Is.

Family - TRIPTERYGIIDAE
Lepidoblennius haplodactylus

EASTERN JUMPING BLENNY

Dark blotches on upper sides, pale below, with irregular pale spots. Sheltered shallow reef, intertidal rockpools, depth to 5 m. Grows to 12 cm. Common.

Family - TRIPTERYGIIDAE
Trinorfolkia clarkei

CLARK'S THREEFIN

Grey-brown or pink, with (usually) seven dark bars. Distinct backward-curving stripe below eye, large dark blotch on first dorsal fin. Reef, man-made structures, depth to 30 m. Grows to 8 cm. Common south of Coffs Harbour.

Family - CALLIONYMIDAE
Dactylopus dactylopus

FINGER DRAGONET

Pale, complex dark blotches with blue spots, pale snout, dark bar through eye. First three spines of dorsal fin long and filamentous, first ray of pelvic fin separated, finger-like. Sand, weed beds. Depth to 55 m. Grows to 30 cm. Rare.

Family - CALLIONYMIDAE
Diplogrammus goramensis

GORAM DRAGONET

Pale, pattern of grey and brown blotches and spots, characteristic fold of skin below lateral line presents as row of white projections. Reef, sand areas, depth to 40 m. Grows to 10 cm. Uncommon.

Family - CALLIONYMIDAE
Eocallionymus papilio

PAINTED STINKFISH

Male (top) with pale body, darker, fine blue-margined blotches on upper back, dark streaks on side, elongated first and second dorsal fin. Females and immatures grey with darker blotches, well camouflaged on sand and rubble. Small juvenile (15 mm), at bottom. Rubble, sand areas on reef, depth to 50 m. Grows to 13 cm. Common areas north of Sydney, uncommon in far northern NSW.

Family - CALLIONYMIDAE ***Repomucenus calcaratus*** SPOTTED DRAGONET

Sand coloured with bright blue spots on dorsal surface, pale belly, distinctive dark patch on first dorsal fin. Sand, weedy areas, coastal bays and estuaries, depth to at least 100 m. Grows to 28 cm. Uncommon.

Family - SPHYRAENIDAE
Sphyraena forsteri

BLACKSPOT BARRACUDA

Elongate silvery body, very pointed head, lower jaw markedly longer than top jaw, black spot at base of pectoral fin. Schooling species, offshore islands, reefs, depth to 300 m. Grows to 75 cm. Rare.

Family - SPHYRAENIDAE
Sphyraena obtusata

STRIPED BARRACUDA

Silvery, often with green tinge, darker on back, usually visible scribbles and stripes on body, one from nose to tail. Similar *Dinolestes lewini* has yellow tail, deeper body. Inshore reefs, estuaries, depth to 200 m. Grows to 50 cm. Common.

Family - SPHYRAENIDAE
Sphyraena qenie

BLACKFIN BARRACUDA

Silvery body, 18 or more chevron marks along side, dark scalloped tail, as opposed to regularly forked tail of similar *S. jello* (not shown). Schooling species, offshore islands, reefs, depth to 100 m. Grows to 1.7 m. Uncommon.

Family - CARANGIDAE
Carangoides chrysophrys

LONGNOSE TREVALLY

Silver body, greenish above, black spot high on gill cover usually present. Offshore reefs and islands, juveniles in estuaries, depth to 90 m. Grows to 72 cm. Common.

Photo by Craig Lewis

Family - CARANGIDAE
Carangoides orthogrammus

THICKLIP TREVALLY

Pale-blue body, blue fins, scattering of yellowish spots on side. Similar *Caranx melampygus* has numerous small spots and blue line above scutes at tail. Offshore reefs and islands, depth to 168 m. Grows to 75 cm. Common.

Family - CARANGIDAE
Caranx ignobilis

GIANT TREVALLY

Stout body, silvery-grey to black above, steep head; sometimes displaying vertical silver bar markings on upper body. Visible scutes from tail base, large mouth. Offshore reefs and islands, depth to 188 m. Grows to 1.7 m. Uncommon.

Family - CARANGIDAE ***Caranx melampygus*** BLUEFIN TREVALLY

Iridescent blue fins and tail, numerous larger blue and smaller black spots on body, blue line above row of dark scutes from tail. Similar *Carangoides orthogrammus* has yellow spots on sides. Inshore and offshore islands and reefs, depth to 190 m. Grows to 1.17 m. Uncommon.

Family - CARANGIDAE ***Caranx sexfasciatus*** BIGEYE TREVALLY

Silvery-grey body, large eye, black spot on upper edge of gill cover, prominent row of dark scutes extends almost half body length. Tips of dorsal and anal fins white. Schooling species, offshore reefs and islands, juveniles in estuaries. Depth to 146 m. Grows to 1.2 m. Uncommon.

Family - CARANGIDAE
Decapterus macarellus

MACKEREL SCAD

Silvery elongated body, small detached finlets on tail base, small black spot usually visible on upper rear edge of gill cover. Mostly below 40 m on offshore reefs and islands, depth to 400 m. Grows to 46 cm. Uncommon.

Family - CARANGIDAE
Elagatis bipinnulata

RAINBOW RUNNER

Pointed, oval-shaped bluish-green or green body, two bright blue lines from face to large strongly forked tail. Offshore reefs, floating debris, depth to 150 m. Grows to 1.8 m. Common.

Family - CARANGIDAE
Pseudocaranx georgianus

SILVER TREVALLY

Silver body, yellow fins and usually a yellow mid-line stripe. Diffuse black spot on upper rear of gill cover. Similar *P.* sp. [*dentex*] (White Trevally) has longer snout. Reef, sandy patches, estuaries, depth to 120 m. Grows to 55 cm. Common.

Family - CARANGIDAE ***Pseudocaranx* sp. [*dentex*]** WHITE TREVALLY

Undescribed species, thus far in Australia known only from Queensland and Lord Howe Is. Adults (shown) pale with yellowish dorsal, anal and tail fins. Black spot on upper rear of gill cover, long snout. Juveniles silver, yellow fins and yellow stripe up mid-line. Similar *P. georgianus* (Silver Trevally) has shorter snout. Shallow bays, coastal reefs, depth to 238 m. Grows to 1.22 m. Common at Lord Howe Is.

Family - CARANGIDAE ***Scomberoides lysan*** LESSER QUEENFISH

Silver body, blue-black tail lobes, black-tipped dorsal fin. Two rows of dark silver blotches, one above and one (sometimes indistinct) below the lateral line. Similar *S. commersonnianus,* Giant Queenfish, (not shown), lacks the dark-tipped dorsal fin and has only one row of silver blotches on the side. Offshore reefs and islands, depth to 100 m. Grows to 1.1 m. Common.

Family - CARANGIDAE
Seriola dumerili

AMBERJACK

Silvery body, olive on back, amber stripe along mid-side of body, often diagonal dark stripe from forehead, through eye, to jaw. Less rounded head than similar *S. hippos*, Samsonfish, not shown. Offshore reefs and islands, depth to 360 m. Grows to 1.9 m. Common.

Family - CARANGIDAE
Seriola lalandi

YELLOWTAIL KINGFISH

Slender body, greenish-blue above, silver below, with broad dark stripe from snout to tail base, tail often yellow or dusky. Offshore reefs and islands, depth to 860 m. Grows to 2.5 m. Common.

Family - CARANGIDAE
Trachinotus blochii

SNUBNOSE DART

Silvery disc-shaped body, bulbous head, elongated lobes on dorsal and anal fins have dark leading edges, tail fin strongly forked. Sandy shorelines, offshore reefs, depth to 7 m. Grows to 1.1 m. Uncommon.

Family - CARANGIDAE
Trachinotus coppingeri

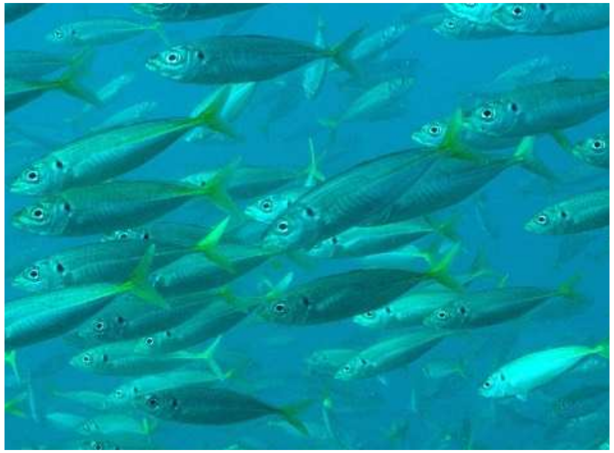
SWALLOWTAIL DART

Silver-grey above, silver below, six or seven elongated darker spots along body above lateral line, elongated rays on dorsal and anal fins, large deeply forked tail. Sandy beaches, estuaries, depth to 5 m. Grows to 26 cm. Common.

Family - CARANGIDAE
Trachurus novaezelandiae

YELLOWTAIL SCAD

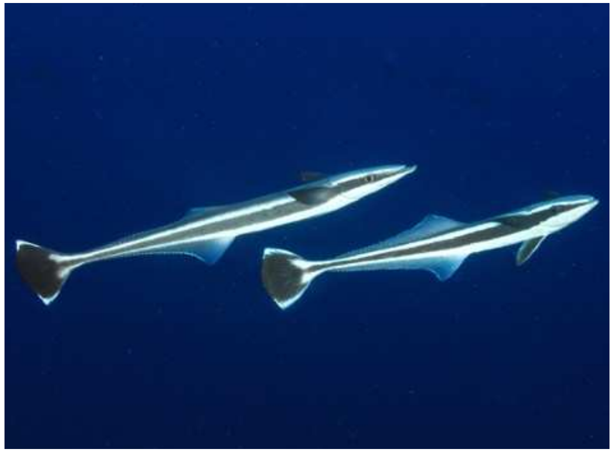
Elongated silver body, yellow stripe along side, yellow tail, black blotch on gill cover. Schooling species, inshore reefs, depths to 500 m, often much shallower. Grows to 50 cm. Common.



Family - ECHENEIDAE
Echeneis naucrates

SHARKSUCKER

Elongated body, dark stripe along mid-side usually visible, sucker pad on top of head. Usually attached to a suitable host, such as rays, sharks or turtles. Depth to 85 m. Grows to 1.1 m. Common.



Family - APLODACTYLIDAE
Aplodactylus etheridgii

NOTCH-HEAD MARBLEFISH

Humped shoulder, blunt head, white spots on body and fins, upper body with white blotches, gill cover with orange margin. Rocky reef, depth to 40 m. Grows to 45 cm. Not recorded NSW coast, common at Lord Howe Is.

Photo by Kate Shaw

Family - APLODACTYLIDAE
Aplodactylus lophodon

ROCK CALE

Mottled brown to grey-black, light spots on body and fins, blunt head and humped shoulder. Similar *Chironemus marmoratus* has pointed snout. Exposed reef, algal areas, depth to 10 m. Grows to 45 cm. Common in NSW, not seen at Lord Howe Is.

Family - CHEILODACTYLIDAE
Goniistius francisi

BLACKTIP MORWONG

Four oblique black stripes, the last ending on lower lobe of tail fin, top lobe with black blotch. Similar *G. vestitus* lacks this blotch. Reef, depth to 88 m. Rare NSW coast, uncommon at Lord Howe Is.

Family - CHEILODACTYLIDAE
Goniistius vestitus

CRESTED MORWONG

Four oblique dark stripes, yellow patch behind eye and under dorsal fin, may have red lips. Top lobe of tail clear or yellow, distinct from similar *G. francisi.* Reef, juveniles in bays and estuaries, depth to 20 m. Grows to 35 cm. Common.

Family - CHEILODACTYLIDAE
Morwong ephippium

PAINTED MORWONG

Darker back, oblique pale bands on the front of the body. Light blotches below the dorsal fin. Tail fin with red-brown stripes and spots. Reef, depth to 250 m. Grows to 55 cm. Uncommon coastal NSW, common Lord Howe Is.

Family - CHEILODACTYLIDAE
Morwong fuscus

RED MORWONG

Red-brown body, mask over eyes, white cheek, series of pale bands near tail and on tail fin. Rocky reef, often in groups on the substrate, juveniles in estuaries, depth to 30 m. Grows to 65 cm. Common.

Family - CHEILODACTYLIDAE
Nemadactylus douglasii

GREY MORWONG

Silver-blue body, narrow tail base with large forked tail, greatly-elongated pectoral fin rays. Exposed reef, sand areas, depth to 100 m. Grows to 74 cm. Common.

Family - CHIRONEMIDAE
Chironemus marmoratus

EASTERN KELPFISH

Mottled brown and cream, pointed snout, dense covering of small white spots distinguishing it from similar *Aplodactylus lophodon*. Thickened pectoral fin rays. Surge areas of exposed reef, depth to 10 m. Grows to 40 cm. Common.

Family - CIRRHITIDAE
Cirrhitichthys aprinus

BLOTCHED HAWKFISH

Pale, relatively-deep body with a pattern of wide red-brown bars separated by narrower bars and blotches, dark spot on gill cover, tail mostly without spots. Perches on reef substrate, depth to 30 m. Grows to 13 cm. Common.

Family - CIRRHITIDAE
Cirrhitichthys falco
DWARF HAWKFISH
White body, red-orange bars dark at shoulder with spots between, stripes from eye, usually spots on tail. Less deep body, and lacks opercular spot of similar *C. aprinus* and spotted pattern of *C. oxycephalus*. Reef, depth to 45 m. Grows to 7 cm. Common.

Family - CIRRHITIDAE
Cirrhitichthys oxycephalus
SPOTTED HAWKFISH
Large even-sized spots on body, smaller blotches and spots on head, spots on tail. Similar *C. falco* has lines on face and *C. aprinus* has bars on sides and few, if any, spots on tail,. Coral, rocky reef, depth to 45 m. Grows to 10 cm. Uncommon.

Family - CIRRHITIDAE
Cyprinocirrhites polyactis
LYRETAIL HAWKFISH
Pink or orange-brown, high shoulder, extended rays on first soft dorsal fin and lobes of tail. Often with other fishes in the water column above the substrate. Rocky, coral reef, depth to 132 m. Grows to 15 cm. Common.

Family - CIRRHITIDAE ***Neocirrhites armatus*** FLAME HAWKFISH
Vivid red body, black shading along back under dorsal fin, black ring around eyes. Lives exclusively in branching corals, depth to 10 m. Grows to 9 cm. Rare in northern NSW, no records from Lord Howe Is.

Family - CIRRHITIDAE ***Notocirrhitus splendens*** SPLENDID HAWKFISH
Light base colour with vivid red dark-edged spots on head and pectoral fins, turning into darker reddish blotches on body and tail. Often on roofs of caves, reef, depth to 10 m. Grows to 20 cm. Uncommon on the NSW coast, more common at Lord Howe Is.

Family - CIRRHITIDAE
Paracirrhites arcatus

RINGEYE HAWKFISH

Colour variable, dark-red to almost-white, but always with distinct multi-coloured ring behind eye, white stripe down side and three rectangular orange marks on gill cover near pectoral fin. Coral reef, depth to 91 m. Grows to 20 cm. Common.

Family - CIRRHITIDAE
Paracirrhites forsteri

FRECKLED HAWKFISH

Variable colouration, from reddish to almost-white, nearly always with two white stripes; one below dorsal fin, another through mid-body. Reddish spots on head and forebody. Coral reef, depth to 35 m. Grows to 20 cm. Common.

Family - ENOPLOSIDAE
Enoplosus armatus

OLD WIFE

Distinctive shape, silver with black bars relatively evenly spaced along body, elongated dorsal and anal fins, large pectoral fins. Usually in pairs, occasionally in small to medium schools. Rocky reef, depth to 90 m. Grows to 50 cm. Common.

Family - KHULIIDAE
Kuhlia mugil

FIVEBAR FLAGTAIL

Silver, relatively deep body, five distinctive black stripes on tail fin. Schooling species, near the surface of rocky shorelines and offshore islands, depth to 18 m. Grows to 40 cm. Common but rarely seen.

Family - KYPHOSIDAE
Girella cyanea

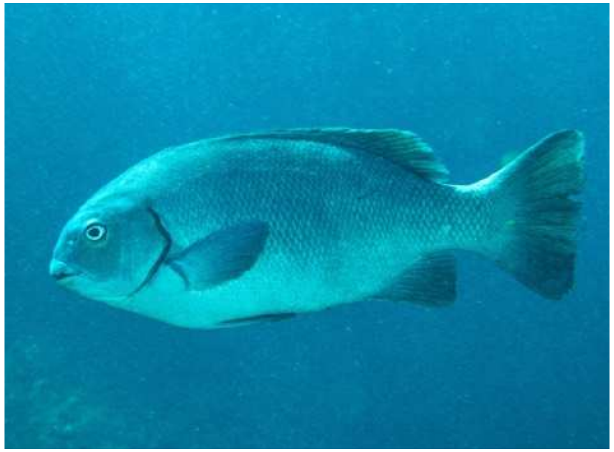
BLUE DRUMMER

Blue, with random gold scales on side, edge of gill cover is dark. Rocky reef, depth to 30 m. Juveniles in tidal pools. Grows to 76 cm. Uncommon on NSW coast, common at Lord Howe Is.

Family - KYPHOSIDAE
Girella elevata

ROCK BLACKFISH

Powerful body and tail, dark blue-black colour, lacking obvious markings. Surge zones along rocky shorelines, offshore islands, depth to 25 m. Grows to 76 cm. Common.



Family - KYPHOSIDAE
Girella tricuspidata

LUDERICK

Solid body, grey to bronze with 10 - 12 dark narrow bars. Forms large schools on rocky shorelines and in estuaries. Juveniles in seagrass. Depth to 20 m, but often much shallower. Grows to 62 cm. Common.

Family - KYPHOSIDAE
Kyphosus biggibus

GREY DRUMMER

Silver-grey, dark tail and fins, small black spot at pectoral fin base. Cheek area below eye often with pale streak. Similar *K. sydneyanus* has pale front section of tail. Reef, depth to 25 m. Grows to 75 cm. Common.

Photo by Graham Edgar

Family - KYPHOSIDAE
Kyphosus cinerascens

SNUBNOSE DRUMMER

Grey body, higher dorsal and anal fins and more pointed snout than other drummers. Often with other *Kyphosus* spp. in mixed schools over reef, depth to 45 m. Grows to 50 cm. Uncommon.

Family - KYPHOSIDAE ***Kyphosus sectatrix*** PACIFIC DRUMMER

Grey with greenish tinge on upper back, light stripe under dorsal fin. Occasional individuals are golden on upper surface with white belly. Golden form often seen at Lord Howe Is. Reef, depth to 30 m. Grows to 66 cm. Common.

Family - KYPHOSIDAE
Kyphosus sydneyanus

SILVER DRUMMER

Oval silver body, dark fins, small black spot at base of pectoral fin and characteristic pale section at front of tail, which distinguishes from similar, and common, *K. biggibus*. Schooling species, reef, depth to 20 m. Grows to 80 cm. Common.

Photo by Graham Edgar

Family - KYPHOSIDAE
Kyphosus vaigiensis

BRASSY DRUMMER

Silver with rows of golden scales, tan rear margin of gill cover, tan streak below eye. Fins only slightly darker than body. Juveniles mottled with light and dark patches. Reef, depth to 40 m. Grows to 70 cm. Common.

Photo by Graham Edgar

Family - KYPHOSIDAE
Atypichthys latus

NEW ZEALAND MADO

Numerous dark stripes along body and on face and breast, yellow fins. Somewhat similar *Atypichthys strigatus* lacks stripes under eye and on breast. Reef, depth to 60 m. Grows to 30 cm. Uncommon on NSW coast, common at Lord Howe Is.

Family - KYPHOSIDAE
Atypichthys strigatus

MADO

Silver, dark stripes along sides, thicker towards the dorsal surface, white belly and yellow fins. Similar *A. latus* has stripes on belly and deeper body. Offshore islands, jetties, estuaries, often in schools. Depth to 30 m. Grows to 25 cm. Common.

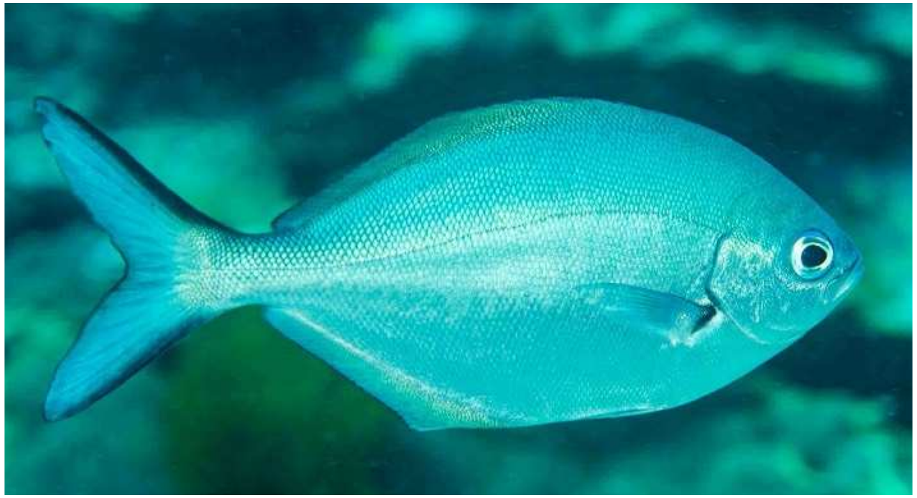
Family - KYPHOSIDAE
Microcanthus joyceae

STRIPEY

Yellow squarish body, evenly-spaced black stripes extending full length of body including dorsal and anal fins. The small head is positioned low on the body. Rocky reef, estuaries, depth to 15 m. Grows to 16 cm. Common.

Family - KYPHOSIDAE ***Labracoglossa nitida*** BLUE KNIFEFISH

Blue, yellow stripe from above pectoral fin base to tail base separated from dorsal fin by thin blue margin. Black pectoral fin spot, yellow anal fin. Similar *Paracaesio xanthura* lacks black pectoral fin spot and yellow anal fin, *Caesio teres* lacks the blue margin below dorsal fin. Rocky reef, depth to 20 m. Grows to 20 cm. Rare on the NSW coast, relatively common at Lord Howe Island.



Family - KYPHOSIDAE ***Scorpis lineolata*** SILVER SWEEP

Oval-shaped body, silver-grey with a greenish tinge on the back. Dark margins on upper and lower tail lobes. Often schools in large numbers in mid-water over rocky reef, depth to 30 m. Grows to 37 cm. Common.

Family - KYPHOSIDAE
Scorpis violacea

VIOLET SWEEP

Violet-blue colouration, small black spot at top of pectoral fin base, distinct lateral line. More elongated body than other sweeps. Rocky reef, depth to 30 m. Grows to 40 cm. Rare on NSW coast, common at Lord Howe Is.

Family - TERAPONTIDAE
Helotes sexlineatus

EASTERN STRIPED GRUNTER

Silver body with six narrow dark stripes from nose to tail, slight spotting at tail base. Algal areas at the mouths of estuaries, depth to 30 m. Grows to 20 cm. Common.

Family - TERAPONTIDAE
Terapon jarbua

CRESCENT GRUNTER

Pale body, three or four crescent-shaped dark stripes along the side and on tail, large black blotches at front and rear of dorsal fin. Sandy areas of coral and rocky reefs, estuaries, depth to 350 m. Grows to 36 cm. Relatively common but rarely seen.

Family - CLUPEIDAE
Herklotsichthys castelnaui

SOUTHERN HERRING

Silvery, deep-keeled body shape, three distinct dark scale rows on upper body, black tip on dorsal fin. Surface layers of inshore waters and estuaries, often in large numbers. Grows to 20 cm. Common.

Family - CLUPEIDAE
Hyperlophus vittatus

SANDY SPRAT

Elongate, almost-transparent silvery body, silvery band along flank. Often in large schools in the surface layers of inshore bays and estuaries, depth to 13 m. Grows to 10 cm. Common.

Family - PEGASIDAE
Eurypegasus draconis

LITTLE DRAGONFISH

Light to dark brown, pectoral fins white with bands and spots. With a body encased in bony armour, this little fish is rarely seen on the rubble bottom it prefers. Depth to 90 m. Grows to 10 cm. Uncommon. Small juvenile 2 cm pictured.

Family - CAESIONIDAE
Caesio caerulaurea

GOLDBAND FUSILIER

Blue-green, wide yellow blue-edged stripe starts above eye, continues as a dark median streak on upper tail lobe. Similar streak on lower tail lobe, black blotch at pectoral fin base. Reef, depth to 50 m. Grows to 35 cm. Common.

Family - CAESIONIDAE
Caesio cuning

YELLOWTAIL FUSILIER

Blue, greenish on back, often pink on belly. Black spot on upper pectoral fin base. Yellow tail, yellow patch below dorsal fin extends about the same length as the tail. Reef, silty areas, depth to 60 m. Grows to 60 cm. Rare.

Family - CAESIONIDAE
Caesio teres

BLUE FUSILIER

Blue body, yellow tail fin, yellow patch extends on back to near front of dorsal fin. Black blotch on upper pectoral fin base. More slender body than *C. cuning*, and yellow patch extends further. Coral reef, depth to 50 m. Grows to 40 cm. Uncommon.

Family - CAESIONIDAE
Pterocaesio digramma

DOUBLELINE FUSILIER

Blue-green back, pale belly, two gold stripes, one above, one mostly below the lateral line, dark tips on tail lobes. Similar *P. trilineata* has broad green stripes on back. Reef, depth to 50 m. Grows to 30 cm. Common.

Family - CAESIONIDAE
Pterocaesio tile

NEON FUSILIER

Broad iridescent blue stripe from eye to tail base, bordered by dark stripe that extends onto top tail lobe. Similar streak on lower lobe, dark spot at pectoral fin base, pink underbelly, zig-zag scale pattern on back. Coral reef, depth to 60 m. Grows to 30 cm. Rare.

Family - CAESIONIDAE
Pterocaesio trilineata

THREESTRIPE FUSILIER

Silver upper body tending to pink below, three broad green stripes along back, dark tips to tail lobes. Similar *P. diagramma* has only two thinner gold lines at middle and upper back. Reef, depth to 30 m. Grows to 20 cm. Rare.

Family - GERREIDAE

Gerres subfasciatus

COMMON SILVERBIDDY

Silver body, black blotch on elongate spines at start of dorsal fin, black dorsal fin margin. Protractile mouthparts adapted for feeding in soft substrates. Estuaries, harbours, to 40 m depth. Grows to 22 cm. Common.

Family - HAEMULIDAE

Diagramma labiosum

PAINTED SWEETLIPS

Adults (top) plain grey or spotted, dorsal fin extends beyond anal fin, elongated tail base. Lacks dark fins and fleshy lips of somewhat similar *Plectorhinchus gibbosus*. Sub-adults (not shown) silver-grey with brownish-orange spots on head, body and median fins. Large juveniles as below, silver or white with alternating stripes and rows of dots, blotched dorsal and tail fins. Small juveniles (not shown) have black spinous dorsal fin, yellow body with broad black stripes from behind eye to tail. Coral, rocky reef, often in turbid, silty conditions, in caves or under overhangs. Depth to 88 m. Grows to 90 cm. Common.

Family - HAEMULIDAE

Plectorhinchus flavomaculatus

GOLDSPOTTED SWEETLIPS

Adults with blue-grey body with dense covering of yellow spots, forming scribbled lines on face. Red blotch at pectoral fin base. Juveniles silver with broken golden stripes or rows of golden spots. Rocky, inshore reefs, often in caves or under overhangs. Depth to 30 m. Grows to 51 cm. Common.

Family - HAEMULIDAE

Plectorhinchus gibbosus

BROWN SWEETLIPS

High shoulder, heavy body, dark grey to brown, dark mask over eyes and face, dark dorsal, anal and tail fins, fleshy lips. Similar *Diagramma labiosum* lacks the dark fins and dark mask. Rocky reef, inshore turbid waters, depth to 25 m. Grows to 75 cm. Common.

Family - HAEMULIDAE
Plectorhinchus picus

DOTTED SWEETLIPS

Dense covering of reddish-brown spots on body and fins, rusty red blotch at pectoral fin base, and rusty red bar on upper edge of gill cover. Large fleshy lips. Sub-adults (centre) black on upper surface with two large white saddles, white patch around mouth, white belly, dark spots on tail. Small juveniles (lower photograph) black and white, large tail fin proportional to body length, swim in a sinuous manner close to the substrate. Rocky and coral reef, depth to 50 m. Grows to 84 cm. Common.

Family - LABRIDAE
Achoerodus viridis

EASTERN BLUE GROPER

Heavy body, large adults (top) grey to blue, often with pale saddle through middle. Large fleshy lips and peg-like teeth. Subadults (middle) greenish-brown, orange scale centres, and with scattered white blotches. Juveniles (bottom photo), greenish with blue and yellow markings on face, stripes on body. Rocky reef, depth to 40 m. Juveniles in sheltered waters, estuaries and bays. Grows to 1.2 m. Common.

Family - LABRIDAE

Anampses caeruleopunctatus

DIAMOND WRASSE

Adult males with greenish forebody, green-blue at rear, pale yellow or green mid-band, high forehead, blue lips, blue band across eyes. Similar adult *Coris aygula* male has pronounced hump on forehead, often two pale bars through midsection and ragged tail margin. Female and larger juveniles (centre) with distinct rows of iridescent blue spots. Small juveniles (lower) grey or brown, clear tail, swim with twisting, head-down, motion. Reef, depth to 30 m. Grows to 42 cm. Common.

Family - LABRIDAE

Anampses elegans

ELEGANT WRASSE

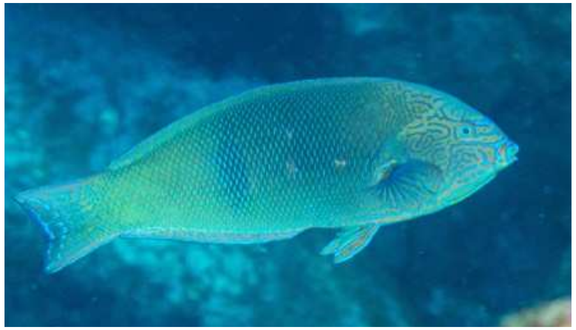
Male (top) with blue scribbles on head, bright yellow patch on upper part of gill cover, blue-green on body above lateral line, bright blue below, yellow tail. Female (below) with blue scribbles around eye, yellow on back above lateral line with rows of bright blue dots, white below lateral line, yellow anal fin and tail. Reef, algal areas, depth to 30 m. Grows to 29 cm. Rare on NSW coast, common at Lord Howe Is.

Family - LABRIDAE

Anampses femininus

BLUETAIL WRASSE

Male (top) with blue head and dark blue scribbles, yellow body with thinner vertical blue scale edges. Female (lower) with yellow head turning to dark blue at rear, bright blue lines on face and body. Males rarely seen, females and juveniles often in small groups of two or three. Coral, rocky reef, depth to 30 m. Grows to 24 cm. Common.



Family - LABRIDAE

Anampses geographicus

SCRIBBLED WRASSE

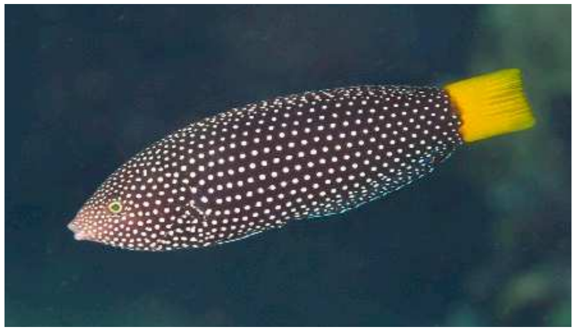
Male (top) with thick blue scribbles on pinkish head, criss-cross pattern of bright blue scale centres on reddish-green body. Females (lower) and juveniles with distinctive white mouth, blue-green body with lighter tail base, dark tail with transparent rear margin, ocelli at rear of both dorsal and anal fin. Males rarely seen, juveniles and females often in small groups in surge zones. Coral, rocky reef, depth to 25 m. Grows to 31 cm. Common.

Family - LABRIDAE

Anampses melanurus

BLACKTAIL WRASSE

Dark body with evenly-spaced white speckles, yellow tail base with broad black margin. Coral reef, depth to 40 m. Grow to 12 cm. Rare.



Family - LABRIDAE

Anampses meleagrides

SPECKLED WRASSE

Female (left) dark with rows of white spots, yellow tail. Male dark with light speckles, scribbles on head, dark tail with fork-like pale marking. Coral reef, depth to 60 m. Grows to 22 cm. Rare.

Family - LABRIDAE

Anampses neoguinaicus

BLACKBACK WRASSE

Males (top) pale, upper head dark with blue scribbles. Females (lower right) more commonly seen, black back, white on lower head and body. Ocelli on gill cover, rear of dorsal and anal fins. Small juvenile (below) with ocelli at rear of body, clear tail. Coral, rocky reef, depth to 30 m. Grows to 20 cm. Common.

Family - LABRIDAE ***Austrolabrus maculatus***

BLACKSPOTTED WRASSE

Pinkish-brown to yellow-brown, often with pale belly. Scattering of small black spots over back, white-edged black spot at tail base. Reef, algal areas, depth to 40 m. Grows to 20 cm. Common.

Family - LABRIDAE
Bodianus axillaris

CORAL PIGFISH

Red-pink forebody, white rear, yellowish tail, black spots on dorsal and anal fin. Juvenile (lower) black, large white spots evenly-spaced and opposite, white lips. Juvenile *Coris bulbifrons* has white spots on mid-line. Rocky reef. Depth to 100 m. Grow to 20 cm. Common.

Family - LABRIDAE
Bodianus bilunulatus

SADDLEBACK PIGFISH

Pale with brown-orange scribbled lines along body, dark patch on upper tail base, white patch on lower cheek. Rocky, coral reef, depth to 160 m. Grows to 55 cm. Rare.

Family - LABRIDAE
Bodianus dictynna

PACIFIC DIANA'S PIGFISH

Reddish head and back, pale midsection may be yellow, orange or white, tail may be pink or white. Lower jaw pale, usually four gold spots evenly spaced on upper back, black spots on pelvic fins, anal fin and central on tail fin. Juveniles (lower) reddish brown with rows of scattered white spots, black spots on pelvic and anal fins, rear of dorsal fin and central base of tail fin. Coral reefs, often under overhangs and in caves, depth to 100 m. Grows to 25 cm. Common in the north of NSW.

Family - LABRIDAE ***Bodianus frenchii*** FOXFISH

Brown or red, usually pale under jaw, three pale spots, one at upper mid-body, one at tail base and one faint on tail itself. Rocky reef, depth to 80 m. Grows to 48 cm. Common.

Family - LABRIDAE
Bodianus mesothorax

ECLIPSE PIGFISH

Red forebody, dark oblique bar then yellowish rear body. Pale under jaw, black horizontal stripe from lower lip to pectoral fin. Juveniles (lower) dark with evenly-spaced large yellow spots around body periphery, compared to white spots for similar juvenile *B. axillaris*. Rocky, coral reef, drop offs, caves, depth to 40 m. Grows to 25 cm. Rare.

Family - LABRIDAE
Bodianus perditio

GOLDSPOT PIGFISH

Pinkish body, male (top) with evenly spaced small yellow spots on head, white blotch followed by black blotch on upper mid-body, yellow tail with elongated rays top and bottom. Females (not shown) tending more yellow, white bar with large rounded black patch behind. Juveniles (lower) pinkish forebody, white band adjoining black blotch under rear of dorsal fin, yellow tail fin. Rocky reef, depth to 35 m. Grows to 80 cm. Uncommon.

Family - LABRIDAE
Cheilinus chlorourus

FLORAL MAORI WRASSE

Reddish-brown body, dense scattering white spots on body and fins, red scribbles and dots on head, white blotches across back. Coral, rocky reef, depth to 30 m. Grows to 45 cm. Common.

Family - LABRIDAE
Cheilinus trilobatus

TRIPLETAIL MAORI WRASSE

Fine vertical lines on body, white blotches on base of dorsal fin, scribbles on face. Large individuals have red-margined tail with three lobes. Reef, depth to 30 m. Grows to 45 cm. Uncommon.

Family - LABRIDAE
Cheilio inermis

SHARPNOSE WRASSE

Adults (top) grey with orange blotch on side, juveniles (bottom) and subadults with brown upper body, pale lower body, with thin dark line between, occasional yellow-coloured individuals sighted. Juveniles thinner and less stout than adults, which are rarely seen. Coral reef, depth to 30 m. Grows to 50 cm. Common.

Photo by Graham Edgar

Family - LABRIDAE ***Choerodon fasciatus*** HARLEQUIN TUSKFISH

Vertical bands of bright orange and white on forebody, darkening to almost black at rear of body, white tail base. Prominent canine teeth often visible. Coral, rocky reef, depth to 35 m. Grows to 30 cm. Uncommon.

Family - LABRIDAE
Choerodon graphicus

GRAPHIC TUSKFISH

Pale body, adults with 5 to 7 broad dark bands, brown bars radiating from eye, which has distinct blue ring around the iris. Sand, rubble, depth to 30 m. Juvenile, as shown, in weed, algal areas. Grows to 52 cm. Common.

Family - LABRIDAE
Choerodon jordani

DAGGER TUSKFISH

Bluish body, yellow stripe to mid-body, then black oblique blotch with white blotch following. Coral reef, rubble areas, depth to 30 m. Grows to 17 cm. Uncommon.

Family - LABRIDAE ***Choerodon venustus*** VENUS TUSKFISH

Greenish body, pink overtones, rows of blue-centred scales on upper body, red spot sometimes visible on upper rear body. Rocky reef. Depth to 95 m. Grows to 65 cm. Common.

Family - LABRIDAE ***Cirrhilabrus laboutei*** LABOUTE’S WRASSE

Olive-brown dorsally, white belly, red stripes on side form curved loop, silver stripes across head and upper back. Coral rubble, depth to 55 m. Grows to 12 cm. Rare on NSW coast, uncommon at Lord Howe Is.

Family - LABRIDAE
Cirrhilabrus punctatus

FINESPOT WRASSE

Dark upper body, male (top) with blue overtones and elongated rays on pelvic fins. Females (lower) predominantly brown flecked with bright blue spots, black blotch on pectoral fin base. Small juveniles (not shown) reddish brown with small white spot on snout, and black blotch on tail base. Often groups of females with only one male present. Coral, rocky reef, depth to 32 m. Grows to 13 cm. Common.

Family - LABRIDAE
Coris aurilineata

GOLDLINED WRASSE

Pale green-gold base colour with rows of orange dots. Adults (top) have broken green bars across the back, juveniles (below) have blue-edged black ocelli at rear of dorsal fin and at top of tail base, both of which fade with age. Some individuals have white belly with pale yellow longitudinal lines. Rocky reef with algae, depth to 10 m. Grows to 14 cm. Uncommon.

Family - LABRIDAE ***Coris aygula*** REDBLOTCHED WRASSE

Commonly seen subadult (top) with black dotted pale front half, pale bar then dark rear. Adults (above left) blue front half, pale bar then greenish rear half, ragged tail, a humped forehead develops with age. Juveniles (lower right) with white-edged black and orange dorsal blotches. Similar *Anampses caeruleopunctatus* adult has even tail margin, lacks hump on forehead. Rocky, coral reef, depth to 30 m. Grows to 1.2 m. Common Lord Howe Is. and north of Coffs Harbour.

Family - LABRIDAE ***Coris batuensis*** VARIEGATED WRASSE

Adults (left) with pink bars on head, tending darker on dorsal surface which has vertical pale bars. Juveniles (right) with pink spotted forebody, white bars on dorsal surface, three white- edged black ocelli in dorsal fin, centre one largest. Algal areas on reef, depth to 30 m. Grows to 17 cm. Common.

Family - LABRIDAE ***Coris bulbifrons*** DOUBLEHEADER

Grey-blue body, large males (top) with pronounced hump over eyes. Smaller sub-adults (middle) grey with dark scale pattern, larger juveniles (bottom left) black with white blotches and scribbles on face, along dorsal surface and through mid-line. Small juveniles (bottom right) black with white spots, including through mid-line. Similar *Bodianus axillaris* juvenile has spots only around the periphery of body, white lips. Rocky reef, depth to 22 m. Grows to 60 cm. Small juveniles and sub-adults uncommon on NSW coast, adults rare. All stages common at Lord Howe Is.

Family - LABRIDAE ***Coris dorsomacula*** PINKLINED CORIS

Adults (top) and sub-adults (above left) with wide red-brown stripe through eye, pinkish lines below, all breaking into spots towards the tail which has v-shaped pinkish pattern. Young juveniles (above right) orange-green, distinct yellow and black mark on rear of gill cover, small black spot on dorsal surface at tail, evenly-spaced narrow white bars along body. Algal areas of sand amongst rocky reef, depth to 40 m. Grows to 20 cm. Common.

Family - LABRIDAE ***Coris gaimard*** CLOWN WRASSE Sub-adult shown here.


Family - LABRIDAE ***Coris gaimard*** CLOWN WRASSE

Large adults (rarely seen, not shown), have dark green-blue body, wide green stripes on head and pale green bar on body, yellow tail. Sub-adults (bottom, previous page), have orange head, green forebody tending to concentration of blue spots at rear of body, bright yellow tail. Older juveniles (above left) orange, pale nose, rear body darkening with blue spots, small juvenile (above right) orange with black-edged white saddles dorsally from nose to tail base. Reef, depth to 50 m. Grows to 40 cm. Common north of Coffs Harbour.

Family - LABRIDAE ***Coris picta***

COMB WRASSE

Adults (above) with wide black stripe having comb-like lower edge, yellow tail. Juveniles (right) broad black stripe, reddish stripe along base of dorsal fin, distinguishing from *Labroides dimidiatus* juvenile which has a more tapered dark stripe. Sand areas in rocky reef, depth to 25 m. Grows to 25 cm. Common.

Family - LABRIDAE
Coris sandeyeri

EASTERN KING WRASSE

Males (top) with grey forehead, greenish lower jaw, dark cheek, broad white band at shoulder bisected with dark band, grey rear body. Females (lower) pale with gold or grey body stripe with jagged lower edge, dark blotch on upper body behind gill cover. Small juveniles (not shown) similar to juvenile *Halichoeres hartzfeldi*, but with more-solid yellow band and white-edged black spot at tail base. Rocky reef, depth to 40 m. Grows to 45 cm. Common.


Family - LABRIDAE
Epibulus insidiator

SLINGJAW WRASSE

Females (not shown) grey or yellow, male (right) has large head with pale face, dark-edged scales, black stripe through eye. Mouthparts highly extendable. Rocky reef, depth to 42 m. Grows to 54 cm. Rare on NSW coast, uncommon at Lord Howe Is.

Family - LABRIDAE
Eupectrichthys angustipes

SNAKESKIN WRASSE

Green or grey-brown above, pale below, with broad dark bands which extend to belly, spots on head. Often adopts a head-up, tail-down posture. Sandy reef areas with algae. Depth to 40 m. Grows to 15 cm. Common.

Family - LABRIDAE
Gomphosus varius

BIRDNOSE WRASSE

Male (top) dark green, lime green dorsal and anal fins, blue tail, lime green blotch above pectoral fin base, long tubular snout. Female (centre) also with long snout, pale head, grey forebody with dark scale margins darkening towards tail, reddish-brown stripe from front of snout to eye. Small juvenile (lower photo) green dorsally with black mid-stripe, white band and second black stripe on underbody. Similar small juvenile *Thalassoma lutescens* lacks second lower stripe. Coral reef, depth to 30 m, often shallower. Grows to 30 cm. Common north of Coffs Harbour and at Lord Howe Is.

Family - LABRIDAE ***Halichoeres biocellatus*** FALSE-EYED WRASSE

Adults (above left) green base colour, darkening towards centre of body, orange stripes from head to mid-body, black-edged pinkish semicircular pattern on tail. Juveniles (right) tan with white stripes, 2 ocelli on dorsal fin and black spot on tail base. Rocky, coral reef, depth to 35 m. Grows to 12 cm. Common.

Family - LABRIDAE ***Halichoeres chrysus*** GOLDEN WRASSE

Adults (left) golden yellow, faint scribbled markings on head, black spot at start of dorsal fin, triangular tapered orange markings on tail. Similar *Thalassoma lutescens* has more distinct marks on face and orange margins on top and bottom of caudal fin. Small juveniles (right) with two white-edged ocelli on dorsal fin, small black spot on tail base. Reef, rubble areas, depth to 30 m. Grows to 12 cm. Common.

Family - LABRIDAE
Halichoeres hartzfeldii

ORANGELINE WRASSE

Males (above) with green body, yellow stripe at rear with black blotches above. Females (not shown) with yellow stripe from eye to tail, lack black spots. Juveniles, (right) orange stripe from nose continuing onto tail, black spot in line at tail base. Similar *Coris sandeyeri* juvenile has white-edged black spot at tail. Reef, depth to 70 m. Grows to 18 cm. Uncommon.

Family - LABRIDAE
Halichoeres hortulanus

CHECKERBOARD WRASSE

Adult males (top) with greenish head and pink-red stripes and spots pattern. Body with darker scale centres, dark patch at tail base, small yellow patch at front of dorsal fin. Intermediate phase and females (centre) with pale sides, black blotch following yellow blotch under front of dorsal fin, yellow tail. Small juveniles (lower) white with dark head, dark stripes, one through eye, lower one across cheek. Large black blotch at midsection, smaller patch at rear, twin white or yellow spots on tail base. Rocky, coral reef, depth to 30 m. Juveniles often in gutters, under overhangs. Grows to 27 cm. Juveniles and intermediate stages common, adult males rare and shy.

Family - LABRIDAE
Halichoeres margaritaceus

PEARLY WRASSE

Adults (left) green, scattered red-pink scales, numerous on upper body. Cheek pattern has straight oblique line which differs from boomerang shaped mark on similar *H. nebulosus.* Stripe from eye curls around gill cover to lower jaw. Surge areas, reef, depth to 14 m. Grows to 13 cm. Common.

Family - LABRIDAE ***Halichoeres marginatus*** DUSKY WRASSE

Males (left) yellow-green body, rows of thin dark stripes, pointed snout, deep body profile, bright green tail base. Juveniles (right) brown, white stripes and spots, two ocelli in dorsal fin, light band in front of clear tail. Females (not shown) dusky brown, clear tail with dark rear margin. Rocky, coral reef, depth to 30 m. Juveniles in rockpools. Grows to 18 cm. Uncommon.

Family - LABRIDAE
Halichoeres nebulosus

CLOUD WRASSE

Large adults (top) green, scattered red scales forming indistinct vertical bars, pink blotch on lower belly, often black blotches above mid-line and towards tail base. Stripe on cheek is boomerang shaped and there is no continuous semi-circular cheek stripe as in *H. margaritaceus*. Intermediate phase (middle) with yellow patch before and after pectoral fin base, bright pink blotch on belly, cheek markings may be indistinct. Small juveniles (bottom) brown with black blotches on head and body, white patch at mid-body. Rocky, coral reef, depth to 40 m. Grows to 12 cm. Common.

Family - LABRIDAE
Halichoeres prosopeion

TWOTONE WRASSE

Bluish face grading to orange-yellow tail, black blotch on front of dorsal fin, white pelvic fin. Juvenile (not shown) pale, four black stripes, yellow tail, dark spot on dorsal fin. Rocky, coral reef, depth to 40 m. Grows to 13 cm. Uncommon.

Family - LABRIDAE
Halichoeres trimaculatus

THREESPOT WRASSE

Large adults (top) pale with purplish scale edges, pink scribbles and spots on face and forebody. Small black blotch on upper gill cover, larger blotch at tail base. Juveniles (lower) pale, small black spot on tail base, pale yellow blotch preceding it, often small black spot on nose. Sandy areas, lagoons, depth to 30 m. Grows to 27 cm. Common on coast north of Coffs Harbour and at Lord Howe Is.

Family - LABRIDAE
Hemigymnus fasciatus

FIVEBAND WRASSE

Back green with orange scale centres turning black lower. Five white stripes, black spot on centre of tail base, head green with pink scribbles and stripes. Coral reef, depth to 21 m. Grows to 80 cm. Uncommon.

Family - LABRIDAE ***Hemigymnus melapterus*** THICKLIP WRASSE

Immatures as pictured, forebody pale with white midband stripe, dark rear body, yellow tail. Large adults green with dark scale edges, green patch behind eye. Coral reef, depth to 30 m. Grows to 90 cm. Uncommon.

Family - LABRIDAE
Hologymnosus annulatus

RINGED SLENDER WRASSE

Male (right) green, pink stripes on deep body, blue dorsal and anal fins. Intermediate phase (below left) dark underbody, vertical bars above. Small juvenile (below right) black stripe below dorsal fin, then broad yellow stripe, then black belly. Similar *H. doliatus* adult has more elongate body. Rocky, coral reef, depth to 30 m. Grows to 40 cm. Uncommon.



Family - LABRIDAE
Hologymnosus doliatus

PASTEL SLENDER WRASSE

Adult males (not shown) with elongate body, bluish-green with narrow vertical pinkish bars, distinct pale band behind the pectoral fin, small blue spot on upper corner of gill cover. Females and initial phase (top and centre) with three thin reddish stripes, numerous thin reddish bars, blue spot upper corner of gill cover. Small juveniles (bottom) elongate, pale with three reddish-brown stripes. Rocky, coral reef, depth to 30 m. Grows to 50 cm. Adults rarely seen. Common north of Coffs Harbour and at Lord Howe Island.


Family - LABRIDAE ***Iniistius pavo*** BLUE RAZORFISH

High rounded head, first two very long dorsal spines separated from rest of dorsal fin, eye set high on head, small black spot on back. Juveniles (right) pale brown with white blotches or bars, numerous brown spots in rows along sides. Sandy patches near reef, depth to 100 m. Grows to 41 cm. Juveniles seen but uncommon on NSW coast, adults and juveniles common at Lord Howe Island.

Family - LABRIDAE
Labrichthys unilineatus

ONELINE WRASSE

Adults (top) green, thin pale lines along body, large pale-yellow blotch behind pectoral fin, rounded tail, extended pelvic fins. Juveniles (below) dark green to black, thin white line from nose to tail, protruding lips. Rocky, coral reef, depth to 20 m. Grows to 18 cm. Rare on NSW coast, uncommon at Lord Howe Island.


Family - LABRIDAE
Labroides bicolor

BICOLOR CLEANERFISH

Elongate body, dark front half with dark stripe through eye, pale-yellow tail with dark sub-marginal band. Cleans parasites from other fish at cleaner stations. Rocky, coral reef, depth to 40 m. Grows to 15 cm. Uncommon.

Family - LABRIDAE
Labroides dimidiatus

COMMON CLEANERFISH

Elongate body, dark stripe through eye broadens and continues, bright blue margins on tail. Terminal mouth. Similar *Aspidontus taeniatus*, has mouth under head, *Coris picta* juvenile has reddish stripe below dorsal fin. Rocky, coral reef, depth to 40 m. Grows to 14 cm. Common.


Family - LABRIDAE
Labropsis australis

SOUTHERN TUBELIP

Adults (top) with dark head, white lips, golden body with orange spot at base of pectoral fin, rounded tail. Juveniles (below) with broad white stripes and black rounded tail with white margin. Adults feed on coral polyps, juveniles sometimes act as cleaners removing parasites from other fishes. Coral reef, depth to 55 m. Grows to 11 cm. Common.


Family - LABRIDAE
Macropharyngodon choati

CHOAT'S WRASSE

White background with scattered orange patches, orange lines on lower head, yellow-edged dark spot on gill cover behind eye. Adult at top, small juveniles (below) found near the substrate in company of other juvenile wrasses. Rocky, coral reef, depth to 30 m. Grows to 8 cm. Uncommon.

Family - LABRIDAE ***Macropharyngodon kuiteri*** KUITER'S WRASSE

Pink with evenly-spaced rows of white-centred scales on side, fins greenish with blue-white spots. Dark white-margined blotch behind eye. Sand, rubble areas in reef, depth to 55 m. Grows to 10 cm. Rare.

Family - LABRIDAE
Macropharyngodon meleagris

LEOPARD WRASSE

Male (top) has rows of green spots on sides, small yellow and black mark above pectoral fin. Female (below left) with pattern of black blotches, orange fins. Juveniles (below right) pale, blotched, with ocelli either side of tail base. Reef, depth to 30 m. Grows to 15 cm. Common.



Family - LABRIDAE ***Macropharyngodon negrosensis***

BLACK LEOPARD WRASSE

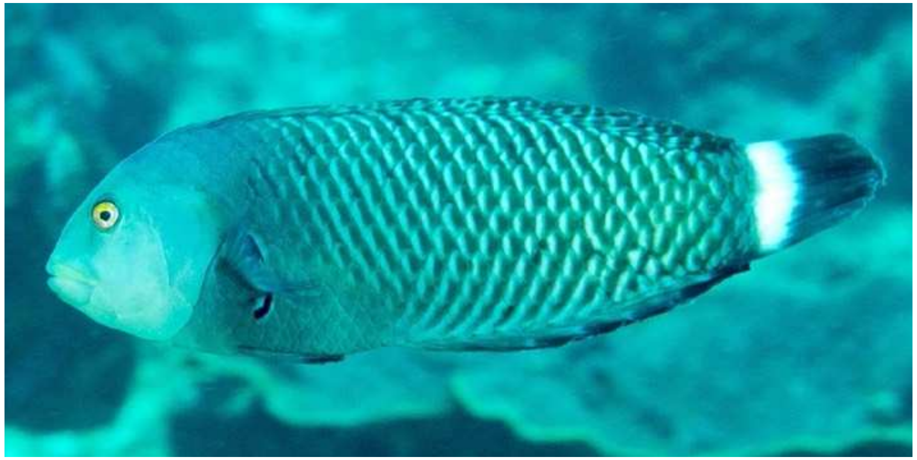
Rarely seen, males (top) have light-edged dark scales, dark upper and lower lobes on tail. Juveniles (top left) reddish or dark with white spots, pale dorsal fin, often observed floating leaf-like near the bottom. Intermediate phase top right. Reef, depth to 32 m. Grows to 12 cm. Common.

Family - LABRIDAE ***Notolabrus gymnogenis*** CRIMSONBAND WRASSE

Male (left) has dark head with pale cheek, dark mid-body then red band and pale tail. Pectoral fin yellow. Intermediate phase (right) reddish-brown, scribbles on face, rows of white spots on sides. Reef, depth to 40 m. Grows to 40 cm. Common.

Family - LABRIDAE ***Notolabrus inscriptus*** INSCRIBED WRASSE

Male (left) has pale dorsal and anal fins, greyish base colour with light-edged scales. Females and smaller adults (right) are brown with rows of white spots, scribbled markings on face. Reef, depth to 17 m. Grows to 50 cm. Common at Lord Howe Is, rare on NSW coast.



Family - LABRIDAE ***Novaculichthys taeniourus*** CARPET WRASSE

Adults (top) greyish, red or yellow eye, prominent scale pattern, light tail base, dark diffuse band behind head. Intermediate phase (above left) bright scale centres, dark lines radiating from eye. Juveniles (above right) reddish-brown with flag-like front dorsal spines and four rows of large white spots on sides. Rubble amongst reef, algae, depth to 25 m. Grows to 40 cm. Juveniles commonly seen, adults secretive.

Family - LABRIDAE
Ophthalmolepis lineolatus

SOUTHERN MAORI WRASSE

Adults are reddish or brown on upper half of body, with white midsection stripe and yellow-cream belly. There are blue scribbles on the head, blue spots and thin lines cover body and fins. Males (top) have additional black stripe along sides. Small juveniles (left) are very slender, with white midsection stripe, and black blotch at front of dorsal fin, yellowish tail. Often follow divers. Rocky reef, depth to 30 m. Grows to 41 cm. Common.

Family - LABRIDAE ***Oxycheilinus bimaculatus*** LITTLE MAORI WRASSE

Colour variable but with wide broken dark stripe along mid-side, ocellus at front of dorsal fin and with black spot in central body. Reef, algal areas, depth to 110 m. Grows to 15 cm. Common.

Family - LABRIDAE ***Oxycheilinus digramm**a* VIOLETLINE MAORI WRASSE

Juveniles greenish-grey, adults with yellow band on rear of tail, dark oblique lines on lower head usually visible, faintly in pale individuals. Similar *O. unifasciatus* lacks lines on cheek and has pale band at tail. Coral reef, depth to 60m. Grows to 24 cm. Rare.

Family - LABRIDAE
Oxycheilinus unifasciatus

RINGTAIL MAORI WRASSE

Base colour dark red-green, with distinct scale edges, adults sometimes have scales with pale centres. Adults (top) and juveniles (below) have pale band with red-brown edges from eye to rear of gill cover, distinct white band at tail base. Adults often with pale tail. Distinguished from similar *O. digramma* by lack of distinct oblique marks on underside of head and presence of white tail base band. Coral reef, depth to 160 m. Grows to 46 cm. Rare on NSW coast, uncommon at Lord Howe Island.

Family - LABRIDAE ***Pictilabrus laticlavius*** SENATOR WRASSE

Males greenish-yellow tending more yellow towards tail, with distinctive pattern of reddish stripes from eye to tail and along mid-line. Fins with bright blue stripes or spots, blue margins, on both sexes. Females (not shown) reddish background, stripes absent or indistinct. Rocky reef, algal areas, depth to 30 m. Grows to 30 cm. Common.

Family - LABRIDAE
Pseudocheilinus evanidus

PINSTRIPE WRASSE

Reddish-pink body colour, numerous thin pinstripes, prominent white stripe along jawline under eye, pale chin. Coral reef, depth to 61 m, usually below 20 m. Grows to 9 cm. Rare.

Family - LABRIDAE
Pseudocheilinus hexataenia

SIXLINE WRASSE

Mauve-blue body, six orange stripes, small ocellus on top of tail base, green-yellow tail. Coral reef, depth to 35 m. Grows to 9 cm. Secretive, uncommon.

Family - LABRIDAE
Pseudojuloides elongatus

LONG GREEN WRASSE

Males (top) have dark olive-green body, the head with bright blue scribbles radiating from the eye, bright yellow and blue pectoral fin base. Females (lower) have uniform yellow-green slender body, distinctive white eye, identification best confirmed by presence of males. Similar female *P. splendens* pale to dark pink, yellow eye, tends to have a deeper body. Algal areas amongst reef, depth to 50 m. Grows to 14 cm. Uncommon.

Family - LABRIDAE
Pseudojuloides splendens

SPLENDID PENCIL WRASSE

Males (top) have green upper body, blue lower body and face and two blue lines extending from eye to rear gill cover. There is a bright blue stripe above a yellow stripe along the body, the caudal fin has distinct black semi-circular blotch. Females (bottom) pinkish above, paler below, with yellowish tinge to fins and tail, snout yellowish to blue. Similar *P. elongatus* female is more slender and yellow-green in colour. Coral, rocky reef, rubble areas, depth to 28 m. Grows to 9 cm. Uncommon.

Family - LABRIDAE
Pseudolabrus guentheri

GUNTHER'S WRASSE

Males (top) have pale green head, brown bars radiating from the eye, and broken brown bars on body. Females (centre) pale or reddish with yellowish bars on face and forebody, juveniles (bottom) pale under and with white lateral stripe from above eye and black spots along upper back. Juveniles and females with distinct black spot at start of dorsal fin. Similar *P. luculentus* females and juveniles lack the black dorsal fin spot and have a yellow anal fin. Coral and rocky reef, depth to 26 m. Grows to 18 cm. Common.

Family - LABRIDAE
Pseudolabrus luculentus

LUCULENT WRASSE

Males (top) reddish or greenish-brown, blue and red marks at pectoral fin base, series of black and white blotches on back. Females and juveniles (at right) reddish, white stripes on chin, thin vertical white lines on belly, yellow anal fin. Similar *P. guentheri* females lack white stripes on chin and have pinkish-red anal fin. Coral, rocky reef, depth to 60 m. Grows to 17 cm. Common.

Family - LABRIDAE
Pteragogus enneacanthus

COCKEREL WRASSE

Colour greenish to reddish brown, distinctive light-edged opercular blotch. Similar *P. cryptus* (not shown), best separated by fin counts. Algal, rocky reefs, sponge habitats, depth to 64 m. Grows to 15 cm. Uncommon.

Family - LABRIDAE
Stethojulis bandanensis

REDSPOT WRASSE

Males (top) olive-green above, pale below, blue line from snout through eye to tail, shorter blue line extends from behind eye, line below eye extends above red patch on pectoral fin base to mid-body. Yellow patch on cheek and below pectoral fin. Initial phase (below), stippled pattern of white spots on back, cross-hatched scale pattern on belly, red spot above pectoral fin, yellow blush on snout. White-rimmed black spots at tail base. Coral and rocky reef, depth to 30 m. Grows to 15 cm. Common.

Family - LABRIDAE
Stethojulis interrupta

BROKENLINE WRASSE

Males (left) green, broken blue line through mid-body, orange blush at pectoral fin base. Initial phase (below left) yellow snout, pinkish above, white below, dark mottling behind pectoral fin, juveniles (below right) brown above, white below with white, brown, black stripes mid-body. Rocky reef, depth to 21 m. Grows to 13 cm. Common.

Family - LABRIDAE
Suezichthys arquatus

PAINTED RAINBOW WRASSE

Males (top) predominantly greenish with blue dotted lines on mid section, white streak more distinct towards tail, purplish dorsal and anal fins and distinctive flag pattern on tail fin. Somewhat similar *S. devisi* male has similar flag pattern on tail but body is pale green-blue above and white belly and lacks dotted lines. Females (centre) are more orange-yellow with bluish dotted lines, ocelli on front and rear of dorsal and upper section of tail base. Small juveniles (bottom) are darkish above mid-line, pale below, with rows of white spots, ocelli on front and rear of dorsal fin and upper section of tail base. Sandy or algal patches in rocky reef, depth to 100 m. Grows to 14 cm. Common.

Family - LABRIDAE
Suezichthys devisi

AUSTRALIAN RAINBOW WRASSE

Juvenile (right) pale with brown stripe, spot high on tail base. Adults (not shown, rarely seen) with flag pattern similar to *S. arquatus* but without spots and lines. Reef, depth to 30 m. Grows to 14 cm. Uncommon.

Family - LABRIDAE ***Thalassoma amblycephalum*** BLUEHEAD WRASSE

Male (top) with blue-green head, followed by yellow bar then purple rear body and distinctly lunate tail. Outer edge of pectoral fin distinctly purple. Juveniles (lower images) more commonly seen, usually in small schools, have dark dorsal surface and dark mid-stripe, distinctive orange colour to top and bottom of tail base. Coral, rocky reef to 15 m. Grows to 16 cm. Common.

Family - LABRIDAE
Thalassoma hardwicke

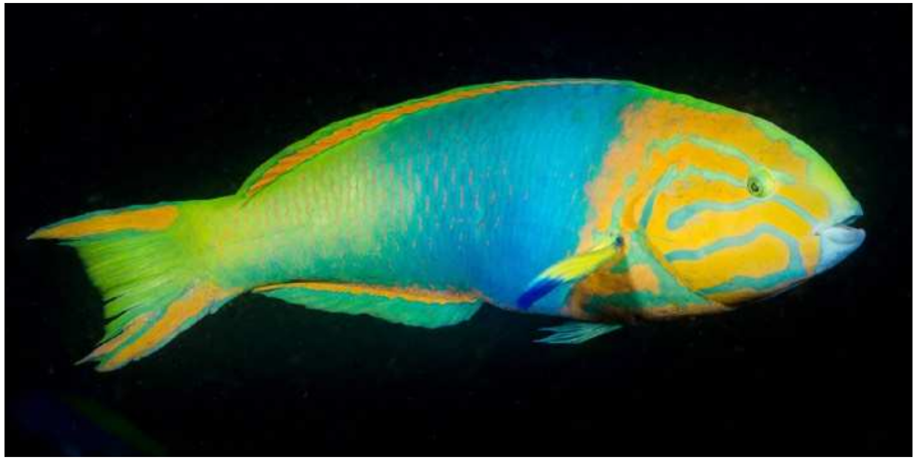
SIXBAR WRASSE

Pale or greenish body, pink blotches radiating from eye, five or six dagger-like bars on side, reducing in size toward rear of body. Coral reef, depth to 15 m. Grows to 20 cm. Uncommon.

Family - LABRIDAE ***Thalassoma lunare***

MOON WRASSE

Adults (above) greenish with pink lines radiating from eye, fine vertical reddish lines on body and yellow tail centre. Pectoral fin blue with purple centre, differs from *T. lutescens* pectoral fin with blue distal margin. Juveniles (right) olive-green on back with blue belly, black spots in middle of dorsal fin and at base of tail. Coral, rocky reef to 20 m depth. Grows to 20 cm. Common.



Family - LABRIDAE ***Thalassoma lutescens*** GREEN MOON WRASSE

Adult pictured above.

Family - LABRIDAE

Thalassoma lutescens

GREEN MOON WRASSE

Males (previous page) with pink or orange head then wide blue band, shading yellow towards tail. Yellow pectoral fin has blue outer margin, differing from *T. lunare*. Females (top) yellow overall, fine vertical orange lines. Similar *Halichoeres chrysus* lacks dark margins on tail fin, and has ocelli on dorsal fin. Small juveniles (at left) greenish-yellow on back, dark midstripe, then white with orange stripe on belly. Similar juvenile *Gomphosus varius* has second black stripe on belly. Rocky reef, depth to 30 m. Grows to 30 cm. Common.

Family - LABRIDAE ***Thalassoma nigrofasciatum*** BLACKBARRED WRASSE

Greenish-black with three white bars across the body, the last on the tail base. The underparts of the head are pale. In females these pale areas are white, in males (as shown) these areas are more yellowish, and the underside of the chin is pinkish. Coral and rocky reef, depth to 15 m. Grows to 20 cm. Common.

Family - LABRIDAE

Thalassoma purpureum

SURGE WRASSE

Green with purple-red ladder pattern and distinctive “V” pattern on face in front of eye. Rocky reef, surge zones to 10 m deep. Grows to 46 cm. Rare on NSW coast, common at Lord Howe Is.

Family - LABRIDAE

Thalassoma quinquevittatum

RED-RIBBON WRASSE

Green or greenish-yellow with red or purple ladder pattern, red or purple stripes radiating from eye, which distinguishes from similar *T. purpureum*. Juveniles (bottom) greenish with reddish-purple striped pattern above mid-line, white with fainter stripe below, ocelli front, centre and rear of dorsal fin. Coral reefs, often in the surge zone, depth to 40 m. Grows to 17 cm. Adults rare on NSW coast, common at Lord Howe Is.

Family - LABRIDAE

Thalassoma trilobatum

LADDER WRASSE

Reddish-green, pale ladder pattern, plain snout on male (shown here), may have spots on female. Snout lacks lines or “V” shape of *T. purpureum*. Coral, rocky reef, surge zones to 10 m. Rare NSW coast, common at Lord Howe Is.

Family - LETHRINIDAE
Gnathodentex aureolineatus

GOLDSPOT SEABREAM

Thin white stripes on dark back, belly with yellow stripes, yellow blotches at base of soft dorsal fin and pectoral fin, pinkish tinge to dorsal and tail fins. Schools on reef, depth to 30 m. Grows to 30 cm. Common.

Family - LETHRINIDAE
Gymnocranius euanus

PADDLETAIL SEABREAM

Silver body with scattered dark scales on sides, sometimes with indistinct vertical bar through eye. Sand patches near reef, depth to 50 m. Grows to 45 cm. Rare on NSW coast, more common at Lord Howe Is.

Family - LETHRINIDAE
Lethrinus miniatus

REDTHROAT EMPEROR

Silver body with brown bars often displayed, red blotches at pectoral fin base and base of pelvic fin. Red stripes on head, red band on dorsal fin tips. Long snout, slightly concave. Coral reef, depth to 30 m. Grows to 90 cm. Common.

Family - LETHRINIDAE
Lethrinus nebulosus

SPANGLED EMPEROR

High body with slightly concave upper head profile, blue streaks on face, blue bar on gill cover and rows of pale blue scales on body. Juvenile has elongate silver or yellowish body, with yellow stripes on belly. Juveniles sometimes found in estuaries, adults over reef, or sand, where they are often very pale in colour. Depth to 75 m. Grows to 87 cm. Common.

Photo by Graham Edgar

Family - LUTJANIDAE ***Aprion virescens*** GREEN JOBFISH

Elongate robust body, rounded snout, pale green-grey colouration, strongly forked tail. Difficult to approach, often in midwater along reefs and drop-offs. Depth to 180 m. Grows to 1.12 m. Uncommon.

Family - LUTJANIDAE
Lutjanus adetii

HUSSAR

Deep body, pinkish above, white below with dusky or yellow stripe from snout through eye then to tail base. Often in medium sized schools around coral, rocky reef. Depth to 20 m. Grows to 50 cm. Uncommon.

Family - LUTJANIDAE
Lutjanus argentimaculatus

MANGROVE JACK

Robust body, usually dusky or reddish, with dark coloured dorsal, anal and tail fins. Lacks deep groove in front of eye of similar looking *L. bohar*. Rocky reef, juveniles in estuaries, depth to 120 m. Grows to 1.2 m. Common.

Family - LUTJANIDAE
Lutjanus bohar

RED BASS

Adults silver to reddish, light centred scales on sides, dark fins, including pectoral fin. Oblique groove in front of orange or reddish eye. Juveniles, (left), with two pale spots on sides. Reef, depth to 180 m. Grows to 90 cm. Juveniles common, adults uncommon.

Family - LUTJANIDAE
Lutjanus fulviflamma

BLACKSPOT SNAPPER

Silver body, darker above, 5 - 7 yellow stripes along sides, one continuing through eye, rectangular black blotch under mid dorsal fin. Coral, rocky reef, juveniles in estuaries, depth to 35 m. Grows to 35 cm. Common.

Family - LUTJANIDAE
Lutjanus fulvus

BLACKTAIL SNAPPER

Adult (not shown) yellowish to pink, with dark reddish-brown dorsal and tail fin with white margins, all other fins yellow. White chin. Juveniles (right) mostly yellow, often seen in estuaries. Coral reef, depth to 75 m. Grows to 40 cm. Common.

Family - LUTJANIDAE
Lutjanus gibbus

PADDLETAIL

Adults reddish with distinctive humped profile, dorsal fin dark, tail fin dark with large rounded lobes. Other fins red to black. Juveniles, as shown, are pinkish with dark dorsal fin, tail fin and tail base. Coral, patch reef, depth to 150 m. Grows to 50 cm. Uncommon.

Family - LUTJANIDAE
Lutjanus kasmira

BLUESTRIPED SNAPPER

Yellow upper body with four dark-edged pale blue stripes, pale belly with faint dark stripes, all fins yellow. Pinkish snout. Small to medium sized schools around coral, rocky reef. Depth to 265 m. Grows to 40 cm. Common.

Family - LUTJANIDAE
Lutjanus quinquelineatus

FIVELINE SNAPPER

Yellow body, five dark-edged pale blue lines, yellow belly. Faint black spot sometimes on rear upper body, pink snout. Similar *L. kasmira* has 4 lines and pale belly with stripes. Coral, rocky reef, depth to 40 m. Grows to

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Family - LUTJANIDAE ***Lutjanus russelli*** MOSES SNAPPER

Adults (left) silvery-pink, dorsal and tail fins usually dark, all other fins yellow, black axil spot and dark blotch under rear soft dorsal fin. Juveniles, (right), in estuaries, adults coral and rocky reef. Depth to 80 m. Grows to 50 cm. Common.

Family - LUTJANIDAE
Paracaesio xanthura

FALSE FUSILIER

Blue with yellow stripe from above pectoral fin to tail, thin blue stripe under dorsal fin. Similar *Caesio cuning* has black spot at pectoral fin base, deeper body, *Labracoglossa nitida* has black spot at pectoral fin base. Rocky reef, depth to 150 m. Grows to 50 cm. Common.

Family - MALACANTHIDAE
Malacanthus brevirostris

FLAGTAIL BLANQUILLO

Elongated pale body, with two black stripes on tail, often displays faint bars on sides. Usually hovers above substrate, often in pairs over sand and rubble. Depth to 50 m. Grows to 32 cm.

Family - MALACANTHIDAE ***Malacanthus latovittatus*** BLUE BLANQUILLO

Adults with blue forebody, broad black stripe from pectoral fin to tail, pointed snout, eye set well back. Juvenile (right) predominantly black with white upper body. Hovers above sand and rubble substrate. Depth to 21 m. Grows to 45 cm. Uncommon.

Family - MONODACTYLIDAE
Monodactylus argenteus

DIAMONDFISH

Diamond-shaped body, with black tips on dorsal and anal fins. Juveniles (not shown) have curved dark bars through eye and pectoral fin. Reef, estuaries, jetties, depth to 18 m. Grows to 27cm. Common.

Family - MONODACTYLIDAE
Schuettea scalaripinnis

EASTERN POMFRED

Reflective silver body with yellow back, yellow dorsal, tail and anal fins. Large eye. Black stripe behind head extends almost to pectoral fin base. Often in very large schools, rocky reef, depth to 30 m. Grow to 20 cm. Common.

Family - NEMIPTERIDAE
Pentapodus aureofasciatus

YELLOWSTRIPE THREADFIN BREAM

Juvenile pictured here, adults with two yellow stripes on purple body, with upper stripe and purple body fading with age. Rocky reef, rubble, depth to 35 m. Grows to 29 cm. Juveniles uncommon, adults rare.

Family - NEMIPTERIDAE
Pentapodus paradiseus

PARADISE THREADFIN BREAM

Brown upper body, pale under, blue stripe under dorsal fin, yellow-blue stripe from eye to tail base wraps around small black spot. Trailing filament from upper tail lobe. Inshore reef, rubble, depth to 70 m. Grows to 30 cm. Uncommon.

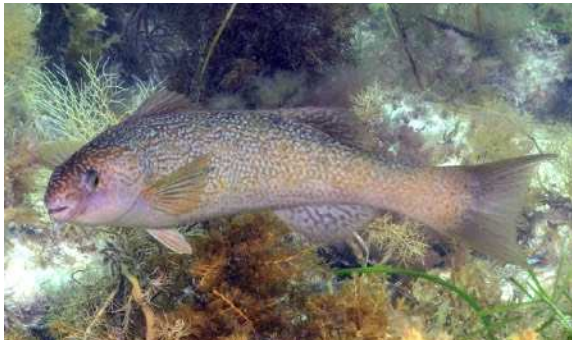
Family - NEMIPTERIDAE ***Scolopsis bilineata*** TWO-LINE MONOCLE BREAM

Adults (left) greenish-brown upper body separated from pale belly by dark-edged curved white stripe. Juveniles (right) black and yellow stripes upper body, white belly. Coral, rocky reef, depth to 25 m. Grows to 25 cm. Common.

Family - NEMIPTERIDAE ***Scolopsis monogramma***

RAINBOW MONOCLE BREAM

Blue stripes on face, tan patch mid-body, long filament from upper tail lobe. Juveniles (right) pale with two dark stripes. Sand, depth to 50 m. Grows to 38 cm. Uncommon.



Family - ODACIDAE
Olisthops cyanomelas

HERRING CALE

Males (top) are dark blue with bright blue lines on upper and lower sections of tail fin. Females and juveniles (below) are greenish-brown with mottled markings. Both sexes have elongated bodies and employ sinuous swimming motion. Secretive, staying near the bottom in their preferred algal habitat. Exposed algae covered reef, depth to 30 m. Grows to 51 cm. Common up to around Coffs Harbour, rare further north.

Family - PRIACANTHIDAE ***Heteropriacanthus carolinus*** BLOTCHED BIGEYE

Oval body, reflective pink to red, may change rapidly from solid colour to blotches. Convex tail margin, spots on dorsal, anal and tail fins. Coral and rocky reef, depth to 300 m. Grows to 50 cm. Common. Previously known as *H. cruentatus.*

Family - PRIACANTHIDAE
Priacanthus hamrur

LUNARTAIL BIGEYE

Oval body, reflective silvery-pink to red, often displaying reddish bars. Has lunate tail margin and diffuse black spot on base of pelvic fin. Coral, rocky reef, in caves and recesses. Depth to 250 m. Grows to 45 cm. Common.

Family - SCARIDAE
Chlorurus microrhinos

STEEPHEAD PARROTFISH

Male (top) green-blue with pale chin below corner of mouth, female (centre) green or reddish, pale chin. Both sexes have strongly lunate tail, eyes set well back on head. Large males with well rounded bump on forehead. Small juveniles (bottom) are black with four white stripes and black tail. Similar *C. spilurus* juvenile, is brown with pale stripes and clear tail. Coral reef, depth to 35 m. Grows to 70 cm. Rare on NSW coast, uncommon at Lord Howe Is.

Family - SCARIDAE ***Chlorurus spilurus*** GREENFIN PARROTFISH

Male (top) variably coloured but with pale yellow or blue patch on or in front of tail base, pink or purple patch on snout, level with and below eye, two pink or purple lines radiating from behind eye, and pink or purple streak near outer pectoral fin margin. Intermediate stages (centre left and right and lower left) variable, from plain dark brown to reddish with white blotches or spots, often with white teeth visible in reddish snout. Small juveniles (above right) brown with four pale stripes, clear tail. Similar juvenile *C. microrhinos* has black stripes and black tail. Coral, rocky reef, depth to 50 m. Grows to 40 cm. Common.

Family - SCARIDAE ***Scarus frenatus*** SIXBAND PARROTFISH

Males (top) with reticulated pattern on head and front part of body, pale chin and pale section in front of lunate tail. Females (above left) reddish with large golden scales on belly, diffuse dark patch at rear of body, pale stripe under dorsal fin, small juveniles (above right) with light stripes fading at rear of body, which is pale blue. Coral, rocky reef, depth to 20 m. Grows to 47 cm. Uncommon.

Family - SCARIDAE
Scarus ghobban

BLUEBARRED PARROTFISH

Male (not shown) green with blue curved bars, two short stripes behind eye, strongly lunate tail markings. Females (right) orange with scattered blue scales. Coral, rocky reef, depth to 30 m. Grows to 90 cm. Common.

Family - SCARIDAE
Scarus globiceps

VIOLETLINE PARROTFISH

Male with purple stripe through eye, pale chin, three violet stripes on belly. Female (not shown) brown, two pale stripes on belly. Coral reef, depth to 23 m. Grows to 27 cm. Uncommon.

Family - SCARIDAE
Scarus niger

SWARTHY PARROTFISH

Male (top) dark green, dark scale margins, green spot behind eye. Females (not shown) reddish, both sexes with blue-margined dorsal fin. Juveniles (at left) pale, rows of small white dots on dark belly and white band with two dark spots at tail base. Coral reef, depth to 22 m. Grows to 40 cm. Rare NSW coast, common at Lord Howe Is.

Family - SCARIDAE
Scarus rubroviolaceus

BLACKVEIN PARROTFISH

Males blue-green with square face, strongly lunate tail. Females (as shown), reddish, dark scale margins, red pelvic fins. Coral reef, depth to 36m. Uncommon.

Photo by Bob Edgar

Family - SCIAENIDAE ***Argyrosomus japonicus*** MULLOWAY

Silvery body, prominent reflective spots along lateral line, rounded tail margin and humped shoulder. Schooling species found on reef, in estuaries, on open beaches, pictured here among school of tarwhine. Depth to 150 m. Grows to 2 m. Common.

Family - SILLAGINIDAE
Sillago ciliata

SAND WHITING

Silver body with black spot at pectoral fin base, yellow pelvic and anal fins. Over sand on open beaches, in estuaries. Depth to 46 m. Grows to 51 cm. Common.

Family - SPARIDAE
Acanthopagrus australis

YELLOWFIN BREAM

Silver, black margin on tail, black axil spot, pointed snout, yellow pelvic and anal fins. *Rhabdosargus sarba* similar but has rounded snout. Reef, sand areas, estuaries, depth to 32 m. Grows to 66 cm. Common.

Family - SPARIDAE
Pagrus auratus

SNAPPER

Large adults with humped profile and large bump on forehead, pink colour with many bright blue spots. Juveniles (lower) similar shape to *Acanthopagrus australis* but with pink colouration and bright blue spots. Juveniles often in estuaries where they are known variously as Cockney Bream, Red Bream or Squire, according to increasing size. Rocky reef, sheltered estuaries, depth to 200 m. Grows to 1.3 m. Common.

Family - SPARIDAE ***Rhabdosargus sarba*** TARWHINE

Silver body with rounded forehead profile, dark scales forming distinct rows on body. Yellow pelvic and anal fins. Similar *Acanthopagrus australis* has more pointed snout, black pectoral fin spot and lacks distinctly defined scale rows. Schooling species, rocky reef, sand, depth to 38 m. Grows to 45 cm. Common.

Family - GOBIESOCIDAE ***Aspasmogaster costata*** PINK CLINGFISH

Pinkish colour with irregular darker banding, ventral fins united to form sucking disc with which it attaches to the substrate. Secretive on rocky reef, under rocks and boulders, coral slabs, behind sea urchins. Depth to 20 m. Grows to 5 cm. Common.

Family - GOBIESOCIDAE ***Cochleoceps orientalis***

EASTERN CLEANER CLINGFISH

Greenish-yellow to bright orange or red, many small dark spots with fine iridescent blue dashes and lines interspersed across back and sides. Found in kelp beds or on sponges, depth to 40 m. Grows to 5 cm. Common.

Family - GOBIIDAE
Amblyeleotris ogasawarensis

REDSPOTTED SHRIMPGOBY

Dark spot on upper corner of gill cover and curved bar on front of tail fin. Faint narrow bars between five broad reddish bars on body. Reef, rubble areas, depth to 35 m. Grows to 11 cm. Rare.

Family - GOBIIDAE
Amblyeleotris periophthalma

BROADBANDED SHRIMPGOBY

Red blotch at rear corner of mouth, dark-edged orange spots on head, five blotchy bars along body, separated by pale areas with spots or blotches. Reef, rubble areas, depth to 35 m. Grows to 11cm. Rare.

Family - GOBIIDAE
Amblyeleotris wheeleri

BURGUNDY SHRIMPGOBY

Seven red bars (first two often faint), separated by yellow areas, small blue-white spots scattered across head and body. Reef, rubble areas, depth to at least 40 m. Often in hole with Alpheid shrimps. Grows to 10 cm. Uncommon.

Family - GOBIIDAE
Amblygobius nocturnus

PYJAMA GOBY

Pale greenish-grey body with prominent red stripe through eye, fading to pinkish-grey, other stripes on body and anal fin faded. Sand, silty areas, lagoons. Depth to 30 m, often shallower. Grows to 10 cm. Not found on NSW coast, common at Lord Howe Is.

Family - GOBIIDAE
Amblygobius phalaena

WHITEBARRED GOBY

Variable colour and markings, vertical bars and horizontal broken stripes on paler individuals, vertical bars on darker individuals appearing white (lower image). Distinct ocellus on first dorsal fin and top of the tail fin near the base, tail pinkish. Sheltered sand, lagoons, estuarine areas, depth to 20 m. Grows to 15 cm. Common.

Family - GOBIIDAE
Arenigobius bifrenatus

BRIDLED GOBY

Grey with two dark stripes from head fading to spots, bright blue spots on body. Sand, mud, seagrass. Depth to 3 m. Grows to 15 cm. Common.

Family -GOBIIDAE
Bathygobius cocosensis

COCOS FRILLGOBY

Male (left) pale brown, six to eight dark spots and numerous longitudinal lines along sides. Females mottled, often dark saddles on upper sides. Reef, intertidal rockpools, depth to 10 m. Grows to 12 cm. Common.

Family - GOBIIDAE
Bathygobius krefftii

KREFFT'S FRILLGOBY

Brown with dark patches, almost triangular in shape, below first and second dorsal fins, dark underside. Rounded head, bulbous, high-set eyes. Sand, estuaries, depth to 6 m. Grows to 9 cm. Common.

Family - GOBIIDAE
Bryaninops yongei

SEAWHIP GOBY

Transparent with six to seven triangular, reddish-brown markings extending above mid-line. Red iris. Found exclusively on *Cirrhipathes* sp. sea whips. Depth to 45 m. Grows to 4 cm. Uncommon.

Family - GOBIIDAE
Cryptocentroides gobioides

CRESTED OYSTERGOBY

Dark body, sometimes more pale on dorsal surface, vertical red and blue stripes on sides of lower body, blue spots towards rear. Oyster beds, estuaries. Depth to 3 m. Common.

Family - GOBIIDAE
Eviota hoesei

DOUG'S EVIOTA

Body green or red, sides with crosshatch pattern, black spots at tail fin base and two large spots on pectoral fin base. Similar *E. readerae* lacks cross hatched pattern. Reef, depth to 25 m. Grows to 21 mm. Not found NSW coast, relatively common at Lord Howe Is.

Family - GOBIIDAE
Eviota readerae

SALLY'S EVIOTA

Red bands on pale body for male (right), bands less distinctive on female, but both solid colour rather than cross-hatching as in *E. hoesei*. Dark spot at tail and pectoral fin base. Reef, tidal pools, depth to 30 m. Grows to 18 mm. Not found on NSW coast, common at Lord Howe Is.

Family - GOBIIDAE
Eviota sebreei

STRIPED EVIOTA

Translucent body with white dashes from behind eye to tail, white-edged black spot at tail base. Orange stripe from nose through eye. Reef, often with live corals, depth to 40 m. Grows to 3 cm. Uncommon.

Family - GOBIIDAE
Eviota teresae

TERRY'S PYGMYGOBY

Translucent body with three square, red shapes on belly; separated by white bars, solid red eye colour. Red and white dashes along spine. Previously known as *E. guttata*. Rocky, coral reef. Depth to 24 m. Grows to 3 cm. Common.

Family - GOBIIDAE ***Favonigobius exquisitus*** EXQUISITE SANDGOBY

Mottled brown with row of black spots below mid-line, some joined. Red spots on dorsal and tail fins are characteristic, as is extended second ray of first dorsal fin on males, pictured. Estuaries, coastal bays, depth to 10 m. Grows to 9 cm. Common.

Family - GOBIIDAE ***Favonigobius lentiginosus*** EASTERN LONGFIN GOBY

Grey speckled body with a series of white, often crescent-shaped lines on sides. Orange-brown spots on dorsal fin. Male (pictured) with extended first dorsal fin ray. Larger brown spots on side have oblique brown or yellowish streak extending dorsally. Sand, mudflats, estuaries, depth to at least 6 m. Grows to 6 cm. Common.

Family - GOBIIDAE ***Fusigobius duospilus*** TWOSPOT SANDGOBY

Pale, translucent body with small brown blotches on head tending to small spots on body. Fine brown bars on back, one extending onto first dorsal fin. Sand patches in reef, depth to 42 m. Grows to 6 cm. Uncommon.

Family - GOBIIDAE
Fusigobius inframaculatus

INNERSPOT SANDGOBY

Translucent, orange spots on body and head and large white spot followed by black spot on tail. Male (pictured) has long first dorsal spine. Sand patches in reef, often floor of caves. Depth to 30 m. Grows to 7 cm. Common.

Family - GOBIIDAE ***Fusigobius neophytus*** NEOPHYTE SANDGOBY

Evenly scattered pattern of spots and blotches, oblique bars on back below dorsal fins, first dorsal with white margin and small black spot halfway up. Sand areas, reef, depth to 25 m. Grows to 6 cm. Uncommon on NSW coast, common at Lord Howe Is.

Family - GOBIIDAE ***Gnatholepis cauerensis*** EYEBAR GOBY

Thin bar through eye to lower head, thin stripes down side, shoulder spot may be visible. Similar *G. anjerensis* (not shown) has less distinct stripes, scattered black spots on back. Sand patches in reef, depth to 50 m. Grows to 8 cm. Common.

Family - GOBIIDAE
Gobiodon histrio

MAORI CORALGOBY

Green body, with four or five red-brown or red lines on head, spots forming lines on body. Lives amongst branches of *Acropora* sp. corals. Depth to 15 m. Grows to 35 mm. Uncommon.

Family - GOBIIDAE
Gobiodon okinawae

YELLOW CORALGOBY

Uniform bright yellow colour, lives amongst branches of *Acropora* sp. corals. Grows to 4 cm. Depth to 20 m. Uncommon.

Family - GOBIIDAE
Gobiodon quinquestrigatus

FIVELINE CORALGOBY

Reddish body with five fine, pale-blue lines on head. Found among branches of live corals, depth to 20 m. Grows to 45 mm. Uncommon.

Family - GOBIIDAE ***Istigobius decoratus*** DECORATED SANDGOBY

Dark oblique marks on gill cover, distinctive row of alternate black and white marks behind pectoral fin, at least some of the black marks fused to form dashes. Similar *I. rigilius* has brown spots in this row rather than black, and lacks black spot at front of first dorsal fin. Sand, rubble, amongst rock and coral reef, depth to 20 m. Grows to 13 cm. Common.

Family - GOBIIDAE ***Istigobius goldmanni*** GOLDMAN'S SANDGOBY

Light grey-brown body with white belly, slightly oblique dark stripe on cheek, rows of small black spots in broken series along back, a mid-lateral row of black spots in pairs, alternating with single spots, above this, a largely unbroken series of pale spots. Rock, coral rubble, depth to 9m. Grows to 6 cm. Uncommon.

Family - GOBIIDAE ***Istigobius hoesei*** HOESE'S SANDGOBY

Pinkish with rows of distinctly rectangular blue-white spots, sometimes blackish lips. Immatures, sub-adults (bottom) often with sprinkling of gold coloured spots on back and snout. Usually oblique mark on lower cheek below eye. Silty, estuarine areas, depth to 9 m. Grows to 7 cm. Rare north of Port Stephens.

Family - GOBIIDAE ***Istigobius rigilius*** ORANGESPOTTED SANDGOBY

Translucent grey, many small, brown spots on back, mid-lateral row of paired brown spots with row of small white spots above. Similar *I. decoratus* has black spots on side, lacks row of white spots. Dark oblique marks on gill cover and diagonal line from upper lip to below eye often visible. Sand near reef, depth to 30 m. Grows to 10 cm. Uncommon on NSW coast, more common at Lord Howe Is.

Family - GOBIIDAE
Koumansetta rainfordi

OLD GLORY GOBY

Green, five thin orange-red stripes from nose to tail, white spots on back. Sandy areas, lagoons, where it hovers around entrances to crevices. Depth to 30 m. Grows to 9 cm. Recorded from Lord Howe Is. where it is rare.

Family - GOBIIDAE
Pleurosicya mossambica

MANY-HOST GOBY

Translucent body, solid red colour on sides, red lines on snout, dark speckling, sometimes white dashes on spine. Colour varies according to substrate. Rock, coral reef depth to 30 m. Grows to 35 mm. Uncommon.

Family - GOBIIDAE
Priolepis cincta

GIRDLED REEFGOBY

Green to brown body, narrow dark-edged pinkish or whitish bars on head and along length of body, and brown spots on dorsal and tail fins. Secretive, in holes in reef, depth to 70 m. Grows to 7 cm. Common.

Family - GOBIIDAE
Psammogobius biocellatus

SLEEPY GOBY

Dark brown, two or three dark saddles or blotches on sides and upper back, dark band on first dorsal fin and on lower part of tail fin. Estuaries, mangroves, silty sand, depth to 3 m. Grows to 12 cm. Uncommon south of Coffs Harbour.

Family - GOBIIDAE
Redigobius macrostoma

LARGEMOUTH GOBY

Pale body, dark blotches on forebody turning into checker-like pattern at tail. Males (left) with dark-edged blue spot on first dorsal fin. Often above substrate in the water column. Estuaries, depth to 5 m. Grows to 5 cm. Common.

Family - GOBIIDAE ***Valenciennea decora*** DECORATED GLIDERGOBY

Pale blue-grey body with gold stripe, six narrow gold bars extending onto back. Black patch on first dorsal fin. Sand patches in reef, depth to 33 m. Grows to 11 cm. Rare.

Family - GOBIIDAE ***Valenciennea helsdingenii*** BLACKLINED GLIDERGOBY

Tan back with two distinct parallel red-black lines from snout to end of tail and black patch on first dorsal fin. Sandy, rubble patches, near reef. Depth to 45 m. Grows to 25 cm. Uncommon.

Family - GOBIIDAE ***Valenciennea immaculata*** IMMACULATE GLIDERGOBY

Two blue-edged orange stripes, prominent on head and fading towards tail, which has single extended filament. Sandy, silty areas, seagrass, depth to 30 m. Quickly retreat to holes in substrate if approached. Grows to 13 cm. Common.

Family - GOBIIDAE ***Valenciennea longipinnis*** OCELLATE GLIDERGOBY

Pale body with four narrow stripes, each interrupted by a series of dark blotches or dashes. Two narrow pinkish-red stripes and blue dashes on lower head. Sand areas amongst reef, depth to 30 m. Grows to 18 cm. Uncommon to rare.

Family - GOBIIDAE ***Valenciennea puellaris***

ORANGESPOTTED GLIDERGOBY

Silver-grey body with rows of orange spots above mid-line, orange line below mid-line and blue spots and dashes on head. Sand, coral rubble. Depth to 84 m. Grows to 20 cm. Uncommon.

Family - GOBIIDAE ***Valenciennea strigata*** BLUEBAND GLIDERGOBY

Grey body with bright yellow head which has horizontal dark-edged electric blue stripes and similar coloured oblique marks on gill cover. Often in pairs, retreat to holes in substrate if approached. Sand, rubble areas amongst reef. Depth to 25 m. Grows to 18 cm. Common.

Family - MICRODESMIDAE ***Nemateleotris magnifica*** RED FIREGOBY

Pale head and forebody with yellow blush on snout, turning orange mid-body and darkening towards tail. Elongated dorsal spine. Hovers in midwater above sandy, rubble substrate, depth to 70 m. Grows to 9 cm. Often in pairs. Common.

Family - MICRODESMIDAE ***Ptereleotris evides*** ARROW DARTGOBY

Pale blue forebody tending darker towards tail, which has dark upper and lower lobes and pale centre. Hovers in midwater above sandy, rubble substrate, sometimes in small groups. Depth to 24 m. Grows to 14 cm. Common.

Family - MICRODESMIDAE
Ptereleotris heteroptera

TAILSPOT DARTGOBY

Pearly blue-green, elongated body with black blotch in rear section of tail fin. Hover in midwater above sandy rubble substrate, often in groups. Depth to 45 m. Grows to 14 cm. Common.

Family - MICRODESMIDAE
Ptereleotris monoptera

LYRETAIL DARTGOBY

Silvery-green body, electric-blue dashes on head and gill cover. Dorsal and anal fins with orange margins that carry through to both margins of tail fin. Often in pairs, above rubble substrate. Depth to 50 m. Grow to 12 cm. Common.

Family - HOLOCENTRIDAE
Neoniphon sammara

SLENDER SQUIRRELFISH

Silver body, narrow dark stripes, large blotch at front of spinous dorsal fin. Shy, in or around branching corals. Depth to 46 m. Grows to 32 cm. Rare on NSW coast, uncommon at Lord Howe Is.

Family -
HOLOCENTRIDAE
Sargocentron diadema

CROWN SQUIRRELFISH

Bright pink-red with distinct white stripes and white patch on upper tail base. Raised dorsal fin reddish-black. Rocky, coral reef, depth to 60 m, usually shallower. Grows to 17 cm. Common.

Family -
HOLOCENTRIDAE
Sargocentron ittodai

SAMURAI SQUIRRELFISH

Bright red body has white stripes of equal width, raised dorsal fin with white tips, white spots low on dorsal membrane form curved white line. Rocky, coral reef, depth to 60 m. Grows to 20 cm. Common.

Family -
HOLOCENTRIDAE
Sargocentron rubrum

RED SQUIRRELFISH

Red body, broad white lines, dark blotch on back under soft dorsal fin, similar small spot rear of anal fin and often dark streak on tail base. Reefs, lagoons, depth to 84 cm. Grows to 32 cm. Relatively common at Lord Howe Is.

Family -
HOLOCENTRIDAE
Myripristis berndti

BIGSCALE SOLDIERFISH

Spinous dorsal fin yellow-orange, lower jaw protrudes slightly further than in other soldierfish species. Similar *M. murdjan* has red dorsal fin. Rocky, coral reef, depth to 159 m. Grows to 30 cm. Uncommon.

Family -
HOLOCENTRIDAE
Myripristis kuntee

EPAULETTE SOLDIERFISH

Red body, with noticeably smaller scale size than other soldierfishes, distinguishes from similar *M. murdjan*. In groups in recesses, rocky, coral reef, depth to 62 m, often shallower. Grows to 26 cm. Common.

Family -
HOLOCENTRIDAE
Myripristis murdjan

CRIMSON SOLDIERFISH

Large, dark-edged scales, distinct opercular bar, red dorsal fin. Red dorsal fin distinguishes from similar *M. berndti*, large scale size from *M. kuntee*. Rocky, coral reef, small groups. Depth to 50 m. Grows to 27 cm. Common.

Family - APOGONIDAE
Apogon semiornatus

HALFBAND CARDINALFISH

Reddish, with semi-transparent body, narrow stripe below dorsal fin, wide stripe above eye through to tail, another behind eye to anal fin. Secretive in crevices, back of caves. Reef, depth to 30 m. Grows to 5 cm. Uncommon.

Family - APOGONIDAE
Apogonichthyoides atripes

BULLSEYE CARDINALFISH

Grey to brown, with yellow-edged dark blotch mid-body, the tail and tail base are white. Reef, in protected coastal bays and estuaries. Depth to 30 m. Grows to 9 cm. Uncommon.

Family - APOGONIDAE ***Cheilodipterus macrodon*** TIGER CARDINALFISH
Juvenile shown here.

Family - APOGONIDAE
Cheilodipterus macrodon

TIGER CARDINALFISH

Pale, eight broad brown stripes, whitish tail base has indistinct dark blotch. Tail sometimes with dark upper and lower margins. Juvenile, previous page, yellowish head, white tail, large black spot. Reef, depth to 40 m. Grows to 25 cm. Common.

Family - APOGONIDAE
Cheilodipterus quinquelineatus

FIVELINE CARDINALFISH

Pale, five black stripes, tail base yellow with black spot positioned in line with central stripe. Reef, depth to 40 m. Grows to 13 cm. Uncommon on NSW coast, common at Lord Howe Is.

Family - APOGONIDAE
Ostorhinchus aureus

RINGTAIL CARDINALFISH

Yellowish body, two short neon-blue stripes from snout through eye to gill cover, pale tail base with broad black stripe, and pinkish fins. In caves, overhangs, rocky reef, depth to 40 m. Grows to 15 cm. Common.

Family - APOGONIDAE
Ostorhinchus angustatus

BROADSTRIPE CARDINALFISH

Five dark stripes, centre stripe ending in distinct spot on tail base, fins reddish. Tail spot in similar *O. nigrofasciatus* only as wide as stripe and may be diffuse. Reef, depth to 65 m. Grows to 11 cm. Uncommon.

Family - APOGONIDAE
Ostorhinchus apogonoides

PLAIN CARDINALFISH

Pale-yellow fore-body, tending mauve towards tail. Yellow-brown stripe through eye, bordered by blue or white lines which may faintly extend part-way along the body. Reef, depth to 60 m. Grows to 10 cm. Uncommon.

Family - APOGONIDAE
Ostorhinchus capricornis

CAPRICORN CARDINALFISH

Orange-yellow body, blue lines through eye, the lowest from lip to rear of gill cover, black blotch on tail base. Similar *O. flavus* has short white lines through eye. Reef, depth to 15 m. Grows to 6 cm. Uncommon.

Family - APOGONIDAE
Ostorhinchus cookii

COOK'S CARDINALFISH

Five full-length dark stripes plus short stripe from top of eye to rear of gill cover. Middle stripe merges with large white-margined black blotch on tail base. Inshore reef, depth to 10 m. Grows to 10 cm. Uncommon.

Family - APOGONIDAE
Ostorhinchus cyanosoma

ORANGELINED CARDINALFISH

Six silver stripes, two above the eye joining past the gill cover, stripe on lower cheek extending onto belly, this belly stripe lacking in similar *O. properuptus*. Reef, depth to 50 m. Grows to 8 cm. Uncommon.

Family - APOGONIDAE
Ostorhinchus doederleini

FOURLINE CARDINALFISH

Pinkish-brown body and fins, four or five brown stripes, central one fading to dark blotch on tail base. Lacks the short stripe above the eye of similar *O. limenus*. Reef, depth to 10 m. Grows to 14 cm. Common.

Family - APOGONIDAE
Ostorhinchus flavus

YELLOW CARDINALFISH

Orange-yellow body, white lines through eye do not extend to body, black spot on tail base, tail with dark margins. Tail spot lacking on similar *O. capricornis.* Reef, depth to 25 m. Grows to 6 cm. Rare NSW coast, common at Lord Howe Is.

Family - APOGONIDAE
Ostorhinchus limenus

SYDNEY CARDINALFISH

Pinkish body, five dark stripes, short fainter stripe from top of eye, (lacking on similar *O. doederleini*). Centre stripe fades to large black spot on tail base. Reddish-pink fins. Reef, depth to 30 m. Grows to 14 cm. Common.

Family - APOGONIDAE
Ostorhinchus nigrofasciatus

BLACKSTRIPED CARDINALFISH

Five full dark stripes, central one merging with a dark blotch which is often difficult to discern. Similar *O. angustatus* has larger blotch with some white margin. Reef, depth to 50 m. Grows to 10 cm. Uncommon.

Family - APOGONIDAE
Ostorhinchus norfolcensis

NORFOLK CARDINALFISH

Pale body has brown spots on back above the lateral line, prominent scale edges below, pale tail base with dark spot, pale bar at mid-body. Reef, depth to at least 10 m. Grows to 14 cm. Common at Lord Howe Is.

Family - APOGONIDAE
Ostorhinchus properuptus

CORAL CARDINALFISH

Golden yellow, six whitish stripes, the lower one not extending past the gill cover, (stripe on similar *O. cyanosoma* extends onto belly). White stripe near base of dorsal and anal fin, white margin on ventral fin. Reef, depth to 30 m. Grows to 6 cm. Common.

Family - APOGONIDAE
Ostorhinchus taeniophorus

PEARLY-LINE CARDINALFISH

Pinkish body, five dark stripes plus short fainter stripe from top of eye. Central stripe ends with indistinct dark blotch, unlike more distinct blotch on *O. limenus*. Reef, depth to 15 m. Grows to 115 mm. Uncommon.

Family - APOGONIDAE
Pristiapogon fraenatus

SPINYEYE CARDINALFISH

Translucent clear or pink. Has a single, dark, white-edged stripe from eye tapering at tail base. Large dark spot at tail base in line with centre of stripe. White lines on eye. Reef, depth to 50 m. Grows to 11 cm. Uncommon.

Family - APOGONIDAE
Pristiapogon kallopterus

SPINYHEAD CARDINALFISH

Pinkish body, prominent scale edges, yellow spine at front of first dorsal fin. Stripe and blotch prominent on juveniles (as shown) may fade with age. Reef, depth to 158 m. Grows to 12 cm. Uncommon.

Family - APOGONIDAE
Rhabdamia gracilis

SLENDER CARDINALFISH

Transparent body with backbone and visceral mass visible, pale-red patch behind eye, small, black tips on tail fin. Often schools with other cardinal fish in caves, depth to 15 m. Grows to 6 cm. Common.

Family - APOGONIDAE
Siphamia cephalotes

WOOD'S SIPHONFISH

Variable colour, brown or green depending on kelp or seagrass habitat. Brown band from behind eye to tail, with dark blotch at tail base. Schooling species over algal areas of inshore reef, in estuaries, depth to 30 m. Grows to 5 cm. Common.

Family - APOGONIDAE
Taeniamia leai

LEA'S CARDINALFISH

White-margined brown stripe through eye, two half-body bars followed by full dark bar from base of dorsal fin to anal fin. Yellowish tail, pinkish fins. Reef, depth to 40 m. Grows to 9 cm. Uncommon.

Family - ANTENNARIIDAE
Antennarius commerson

GIANT ANGLERFISH

Colour and texture highly variable, corresponding often to that of sponges in surrounding habitat. Small head compared to body, upright stance. Reef, primarily with sponges. Depth to 45 m. Grows to 45 cm. Uncommon.

Family - ANTENNARIIDAE ***Antennarius pictus*** PAINTED ANGLERFISH

Variable colouration, from yellow and orange to black, pale individuals often have darker saddle down side. Have a sponge-like appearance which aids camouflage. The bony section of the lure appendage is banded. Reef, primarily with sponges, depth to 45 m. Grows to 30 cm. Common.

Family - ANTENNARIIDAE ***Antennarius striatus*** STRIATE ANGLERFISH

Highly variable colour, from black to light yellow or orange, often with zebra-like bands or elongate blotches and long skin filaments. Anglerfish are ambush predators that use a worm-like lure to entice unsuspecting prey, which they then swallow whole. Among sponges, shallow estuaries to deep reef. Depth to 219 m. Grows to 25 cm. Common.

Family - ANTENNARIIDAE ***Antennatus nummifer*** SPOTFIN ANGLERFISH

Variable colour, ranging through mottled yellow, orange, pink, red and black, with scattered blotches. There is a pale-edged dark spot towards the rear of the dorsal fin and often has darkish bands radiating from the eye. Rocky and coral reef, depth to 176 m. Grows to 13 cm. Uncommon.

Family - ANTENNARIIDAE ***Histrio histrio*** SARGASSUM FISH

Green, yellow, or brown banding and mottling with numerous fleshy appendages on head, body and fins. Usually associated with floating rafts of weed in the open ocean. Found in-shore after storm events. Grows to 20 cm. Uncommon.

Family - MUGILIDAE

Gracilimugil argenteus

GOLDSPOT MULLET

Dorsal surface is pale greenish-brown, silver below, with distinctive gold spot on upper rear of gill cover. Schooling species usually found in estuaries. Depth to 20 m. Grows to 45 cm, more often around 18 cm. Common.

Family - MUGILIDAE

Mugil cephalus

SEA MULLET

Dorsal surface is bluish-grey when in open ocean, olive-brown (as shown) in estuarine habitats. The belly is silver to white. Large schools migrate northwards along the coast before spawning. Depth to 20 m. Grows to 70 cm, usually smaller at 40 cm. Common.

Family - MUGILIDAE

Myxus elongatus

SAND MULLET

Silver overall, slightly darker on dorsal surface. Has small black spot at the pectoral fin base and pointed snout. Coastal and estuary waters, bays, intertidal rockpools. Depth to 10 m, typically shallower. Grows to 40 cm. Common.

Family - MULLIDAE

Mulloidichthys flavolineatus

YELLOWSTRIPE GOATFISH

Slender silver-green body. Yellow stripe from behind eye to tail base includes black blotch at mid-body, (not present in similar *M. vanicolensis*). Sandy areas amongst reef, depth to 35 m. Grows to 43 cm. Uncommon.

Family - MULLIDAE

Mulloidichthys vanicolensis

GOLDSTRIPE GOATFISH

Silver to pinkish body with yellow stripe from behind eye to tail base and yellow fins. Lacks black blotch of *M. flavolineatus*. Often small to medium schools on reef, depth to 113 m. Grows to 38 cm. Common.

Family - MULLIDAE

Parupeneus barberinoides

BICOLOUR GOATFISH

Front half of body red-brown with two oblique pale stripes, rear body yellow with dark central spot, white mid band. Sandy areas amongst reef, depth to 40 m. Grows to 30 cm. Uncommon.

Photo by Graham Edgar

Family - MULLIDAE
Parupeneus barberinus

DOT-AND-DASH GOATFISH

Pale body, sometimes reddish, with single dark stripe from snout fading towards tail, followed by black blotch central in tail base. Reef, depth to 100 m. Grows to 60 cm. Uncommon to rare on NSW coast, uncommon at Lord Howe Is.

Family - MULLIDAE
Parupeneus ciliatus

DIAMONDSCALE GOATFISH

Pink to brown body, dark-edged scales. Three pale stripes from snout, uppermost stripe longest extending back towards mid-body. Yellow pelvic and anal fins. Reef, depth to 91 cm. Grows to 38 cm. Uncommon.

Family - MULLIDAE ***Parupeneus cyclostomus*** GOLDSADDLE GOATFISH

Yellow phase shown above.

Family - MULLIDAE
Parupeneus cyclostomus

GOLDSADDLE GOATFISH

Two colour forms, yellow with blue lines on head as on previous page, or blue-green with gold blotch following soft dorsal fin. Characteristic long barbels. Reef, depth to 100 m. Grows to 50 cm. Uncommon to rare.

Family - MULLIDAE
Parupeneus multifasciatus

BANDED GOATFISH

Grey to brownish body, blue-edged black stripe through eye. Narrow black and white bars at mid-body precede broader black and white bands at rear. Reef, depth to 161 m. Grows to 35 cm. Common.

Family - MULLIDAE
Parupeneus pleurostigma

SIDESPOT GOATFISH

Pink to silver-grey, large black blotch followed by smaller white patch and large black patch at base of soft dorsal fin. Sandy areas amongst reef, depth to 75 m. Grows to 33 cm. Common.

Family - MULLIDAE
Parupeneus spilurus

BLACKSADDLE GOATFISH

Brownish-pink to almost-white, two broad, dark stripes and three white stripes extend from nose to rear of body. Black blotch on top of tail base preceded by pale patch. Reef, estuaries, depth to 38 m. Grows to 47 cm. Common.

Family - MULLIDAE
Upeneichthys lineatus

BLUESTRIPED GOATFISH

Variable colouration from pale-pink to reddish with blue lines radiating from eye and blue spots forming lines along body. Sandy areas of sheltered reef, bays, estuaries. Depth to 100 m. Grows to 31 cm. Common.

Family - MULLIDAE
Upeneus australiae

AUSTRALIAN GOATFISH

Dark stripe from eye to tail base, blotched lower tail lobe. Dark spots and scribbles on back, plain belly below stripe. Similar *U. tragula* has spotted belly, blotched dorsal fins. Sandy areas, reef. Depth to 30 m. Grows to 9 cm. Common.

Family - MULLIDAE
Upeneus tragula

BARTAIL GOATFISH

Silver body with dark stripe from nose to tail. Differs from similar *U. australiae* by having spots on underside and distinct dark blotches on dorsal fins. Sheltered sand. Depth to 40 m. Grows to 30 cm. Common.

Family - AMBASSIDAE
Ambassis jacksoniensis

PORT JACKSON GLASSFISH

Slender, translucent body, rounded snout, visceral mass visible. Deeply-notched dorsal fin. Forms large schools in protected bays, in estuaries and around jetties. Depth to 6 m. Grows to 7 cm. Common.

Family - OPISTOGNATHIDAE
Opistognathus jacksoniensis

SOUTHERN SMILER

Elongate body with rounded head, large eyes and wide mouth. Head with reticulate dark pattern. Rarely seen outside of hole in sand and rubble flats near reef. Depth to at least 30 m. Grows to 25 cm. Rare.

Family - PLESIOPIDAE
Paraplesiops bleekeri

EASTERN BLUE DEVIL

Blue body with three white stripes, yellow pectoral fins. Tail base yellow, darkening to blue towards rear tail margin. Pelvic fins elongated, bright blue spots on head. Shy, caves and overhangs in rocky reef. Depth to 30 m. Grows to 40 cm. Common.

Family - PLESIOPIDAE
Trachinops taeniatus

EASTERN HULAFISH

Elongated body, black dorsal fin. Yellow stripe dorsally, red and black central stripe, white belly. Has a rhomboid shaped tail fin. Swims in a sinuous motion, forms small to large schools. Rocky reef. Depth to 20 m. Grows to 10 cm. Common.

Family - POMACENTRIDAE
Abudefduf bengalensis

BENGAL SERGEANT

Grey body with distinct scale margins and seven black bars. Dorsal, anal and rounded tail fins all with fine white margin. Iris of eye often blue. Rocky, coral reef, depth to at least 8 m. Grows to 17 cm. Common.

Family - POMACENTRIDAE
Abudefduf sexfasciatus

SCISSORTAIL SERGEANT

Pale body with five dark bars, one at rear continues as stripe along top of forked tail, with black stripe on lower part. Coral, rocky reef, depth to 20 m. Often seen in midwater. Grows to 19 cm. Common.

Family - POMACENTRIDAE
Abudefduf vaigiensis

INDO-PACIFIC SERGEANT

Pale or greyish body with five distinct blue-black stripes, often yellow scales scattered over the body and on the upper back. Adults (top) with rounded tail, sometimes with indistinct white tips. Juveniles (lower) similar colouration without the high, rounded forehead profile of adults. Midwater on coral, rocky reef, sometimes in medium sized aggregations. Depth to 15 m. Grows to 20 cm. Common.

Family - POMACENTRIDAE
Abudefduf whitleyi

WHITLEY'S SERGEANT

Grey forebody tending greenish-yellow towards rear. Up to six, narrow, bars, often only those on mid-body visible. Midwater on rocky, coral reef. Depth to 10 m. Grows to 14 cm. Common.

Family - POMACENTRIDAE
Amblyglyphidodon curacao

STAGHORN DAMSEL

Deep silver-grey body with three broad, dark bars, these sometimes indistinct. Pelvic fin rays long and white. Coral reef, depth to 40 m, usually shallower. Grows to 11 cm. Rare.

Family - POMACENTRIDAE
Amphiprion akindynos

BARRIER REEF ANEMONEFISH

Orange body, two white bars of similar width, white tail. Juvenile (left) with two white bars, white on top section only of tail base and tail fin. Juvenile *A. latezonatus* has white band over whole of tail base. Associated with giant anemones, depth to 25 m. Grows to 9 cm. Common.

Family - POMACENTRIDAE ***Amphiprion latezonatus***

WIDEBAND ANEMONEFISH

Adult (top), dark body, often golden dorsally, with three white bands, the middle one broadly pyramid-shaped. Tail has broad, white rear margin, upper lip with blue tinge. Juveniles (lower) with three bands, the third over whole of tail base distinguishing it from similar *A. akindynos* juvenile. Simliar *A. maccullochi* juvenile has yellow tail base. Rocky, coral reefs, associated with giant anemones, depth to 45 m, often shallower at 15 m. Grows to 14 cm. Common north from the Solitary Islands and at Lord Howe Island.

Family - POMACENTRIDAE
Amphiprion maccullochi

McCULLOCH'S ANEMONEFISH

Adults (top) dark with pale nose and chin, one white bar or faint scribble behind eye, white tail and tail base. Intermediate stage (centre) has two white bars and white tail. Small juveniles, (bottom) the second white bar includes broad white margin on rear of dorsal fin, the tail base has a yellow band. Tail is dark with white margin. Similar *A. latezonatus* juvenile has a white band at the tail base. Associated with giant anemones. Coral, rocky reef, depth to 45 m. Grows to 12 cm. Common. Endemic to Lord Howe and Norfolk Islands, Elizabeth and Middleton Reefs.

Family - POMACENTRIDAE ***Amphiprion melanopus***

BLACKBACK ANEMONEFISH

Orange body with black patch at rear, one broad blue-white stripe behind eye and black pelvic and anal fins. Associated with giant anemones, depth to 18 m. Grows to 12 cm. Relatively common north of the Solitary Islands, rare at Lord Howe Is.

Family - POMACENTRIDAE
Chromis amboinensis

AMBON PULLER

Grey-yellow body with yellow spot at pectoral fin base, forked tail with dark-edged lobes, trailing filaments. Coral reef, depth to 70 m. Grows to 9 cm. Not recorded NSW coast, rare at Lord Howe Is.

Family - POMACENTRIDAE
Chromis atripectoralis

BLACKAXIL PULLER

Blue-green body, tail strongly-forked, dark spot at pectoral fin base distinguishes it from similar *C. viridis.* Associated with staghorn corals, often in schools. Depth to 29 m. Grows to 12 cm. Common.

Family - POMACENTRIDAE
Chromis chrysura

STOUTBODY PULLER

Deep, olive body, with dark-edged scales, head darker. White rear body and tail, black spot at pectoral fin base. Rocky, coral reef, depth to 45 m. Grows to 14 cm. Uncommon.

Family - POMACENTRIDAE
Chromis hypsilepis

ONESPOT PULLER

Variable colour; blue to yellowish-green, with white spot on body at rear of dorsal fin, and large black spot at pectoral fin base. Rocky reef, depth to 46 m. Grows to 16 cm. Common.

Family - POMACENTRIDAE ***Chromis kennensis*** YELLOWTAIL PULLER

Grey-green body with dark blotch at pectoral fin base, black margin to dorsal fin, black anal fin, and yellow tail. Reef, depth to 40 m. Grows to 16 cm. Common. Previously known as *C. flavomaculata*.

Family - POMACENTRIDAE
Chromis lepidolepis

SCALY PULLER

Grey-green, black tips on dorsal, anal, and tail fins. Dark bar through eye. Similar *C. weberi* has tips on tail only, bars on cheek and gill cover. Coral reef, depth to 43 m. Grows to 9 cm. Uncommon.

Family - POMACENTRIDAE
Chromis margaritifer

WHITETAIL PULLER

Body dark-grey to black. Tail, including base and rear of dorsal and anal fins, all white. Black spot on pectoral fin base. Coral, rocky reef, depth to 26 m. Grows to 9 cm. Common.

Family - POMACENTRIDAE
Chromis nitida

YELLOWBACK PULLER

Yellow-olive forehead and back, oblique dark stripe then bright white belly. Dark margins to dorsal and anal fins and both tail lobes. Coral, rocky reef, depth to 25 m. Grows to 7 cm. Common.

Family - POMACENTRIDAE
Chromis vanderbilti

VANDERBILT’S PULLER

Grey upper body, yellow below, narrow blue stripes to tail. Dark anal fin and lower tail lobe, upper lobe yellow. Blue spots on lower head, Coral reef, depth to 20 m. Grows to 5 cm. Uncommon.

Family - POMACENTRIDAE
Chromis viridis

BLUE-GREEN PULLER

Blue-green body lacking the black axil spot of very similiar *C. atripectoralis*. Midwater, usually above staghorn corals. Depth to 17 m. Grows to 8 cm. Common.

Family - POMACENTRIDAE
Chromis weberi

WEBER'S PULLER

Olive-green body, dark scale margins, black bars on cheek and gill cover, black vertical bar through eye. Black tips on tail fin. Rocky, coral reef, depth to 40 m. Grows to 14 cm. Common.

Family - POMACENTRIDAE
Chrysiptera flavipinnis

YELLOWFIN DEMOISELLE

Blue central body, bright yellow dorsal, anal, and tail fins, pale belly. Similar *Pomacentrus coelestis* lacks yellow on back. Coral rubble areas, depth to 38 m. Grows to 8 cm. Common.

Family - POMACENTRIDAE
Chrysiptera notialis

SOUTHERN DEMOISELLE

Elongate grey or bluish body, with head slightly paler. Rear dorsal and anal fins pointed, with fine blue margins. Tail fin ragged. Reef, depth to 45 m. Grows to 9 cm. Common.

Family - POMACENTRIDAE ***Chrysiptera talboti*** TALBOT'S DEMOISELLE

Yellow forebody and pelvic fin merging to pink rear body. Large black spot on upper rear body below mid-dorsal fin. Coral reef, depth to 35 m. Grows to 6 cm. Rare.

Family -POMACENTRIDAE
Dascyllus aruanus

BANDED HUMBUG

White body with three black bands and black pelvic fin. Coral reef, depth to 20 m. Grows to 10 cm. Not recorded from NSW coast, common at Lord Howe Is.

Family - POMACENTRIDAE
Dascyllus reticulatus

HEADBAND HUMBUG

Rounded body, variable colouration; from cream to grey-blue. Black bar behind head and often fainter bar at rear of dorsal fin. Branching corals, depth to 50 m. Grows to 9 cm. Common.

Family - POMACENTRIDAE
Dascyllus trimaculatus

THREESPOT HUMBUG

Juveniles (top) black with white spots on forehead and on upper side, often in giant anemones. Adults (left), rounded black or grey body, scales with dark edges and white spot on upper body that fades with age. Rocky, coral reef, depth to 55 m. Grows to 11 cm. Common.

Family - POMACENTRIDAE
Mecaenichthys immaculatus

IMMACULATE DAMSEL

Juveniles (left) grey above, yellow below, blue lines from above eye to tail. Ocellus on upper body, long pelvic fin rays, pointed snout. Adults (next page) pearly grey, pointed snout, blue margins to dorsal, anal and tail fins. Reef, depth to 30 m. Grows to 15 cm. Common.

Family - POMACENTRIDAE ***Mecaenichthys immaculatus***

IMMACULATE DAMSEL - Adult

Family - POMACENTRIDAE
Neoglyphidodon polyacanthus

MULTISPINE DAMSEL

Adults (top) dark blue-grey with dark scale edges, yellow pectoral fin and yellowish pelvic fin. Small blue ear spot and small blue spot at pectoral fin base. Usually with yellow markings around mouth. Juveniles (bottom) are orange, central body darker and one continuous blue line from above eye to blue-edged black spot on upper back, below midpoint of dorsal fin. Smaller blue spot at rear of dorsal fin on tail base and short blue lines and spots on face. Rocky, coral reef, depth to 30 m. Grows to 12 cm. Rare on the NSW coast, common at Lord Howe Is.

Family - POMACENTRIDAE
Neopomacentrus azysron

YELLOWTAIL DEMOISELLE

Elongated, dark-grey to blue body, blue spot at pectoral fin base and dark ear spot. Rear of dorsal and anal fins yellow, tail yellow. Coral reef, depth to 16 m. Grows to 8 cm. Rare.

Family - POMACENTRIDAE
Parma microlepis

WHITE EAR

Adults (top) brown to dark-grey with white patch on gill cover. Juveniles (bottom) yellow-orange, with blue lines from eye to blue-margined black spot at mid dorsal fin. Other similar juvenile damsels lack white patch on gill cover. Rocky reef, estuaries. Depth to 30 m. Grows to 20 cm. Common.

Family - POMACENTRIDAE
Parma oligolepis

BIGSCALE SCALYFIN

Adults (top) with light to dark-grey body with relatively large scales, often with random lighter scales scattered across the body. Juveniles (lower) orange-brown with two blue lines from above eye to front of dorsal fin that tend to join together before continuing to large blue-black spot at rear of dorsal fin. Very similar *P. microlepis* juvenile has distinct white patch on rear of gill cover. Exposed rocky and coral reef. Depth to 25 m. Grows to 20 cm. Common.

Family - POMACENTRIDAE
Parma polylepis

BANDED SCALYFIN

Large adults (top) with yellow head and face with lumpy protrusions. The mid-body is dark with some banding, and dark tail. Juveniles (bottom) have distinct pale banding, a pale spot on upper tail base and a pale-edged blue blotch on soft dorsal fin. A pugnacious defender of its territory, has been known to bite divers. Reef, depth to 22 m. Grows to 25 cm. Common.

Family - POMACENTRIDAE
Parma unifasciata

GIRDLED SCALYFIN

Adults (top) pale to dark-grey with white-centred scales and broad white bar through centre. Juvenile (lower) is yellow-orange, with pale bar through mid section, blue lines from eye that join under front of dorsal fin and continue to large blue-margined ocellus. Small blue spots scattered over face and body. Similar adult *Plectroglyphidodon leucozonus* is orange-brown with less distinct white bar through body and prefers shallow surge zone habitat. Reef, depth to 25 m. Grows to 20 cm. Common.

Family - POMACENTRIDAE ***Plectroglyphidodon dickii*** DICK'S DAMSEL

Yellow-brown body with prominent scale edges, yellow pectoral fins and prominent black bar at rear of body, with white or pale tail and base. Similar *P. johnstonianus* has broader black bar with rear edge on tail base and distinct blue eye. Coral reef, amongst branching and tabular corals. Depth to 19 m. Grows to 11 cm. Common.

Family - POMACENTRIDAE
Plectroglyphidodon fasciolatus

PACIFIC GREGORY

Adults (top) grey to dark-brown, dark scale margins form vertical lines. Outer eye distinctly golden. Juveniles (lower) grey to brown, golden outer eye, black ocellus with yellow margin at front of spiny dorsal fin, anal fin with black margin, black axil spot. *Stegastes apicalis* juvenile has yellow margin along length of spiny dorsal fin, lacks black anal fin margin and axil spot. Coral, rocky reef, depth to 30 m. Grows to 15 cm. Rare NSW coast, common at Lord Howe Is. Previously known as *Stegastes fasciolatus.*

Family - POMACENTRIDAE ***Plectroglyphidodon johnstonianus***

JOHNSTON DAMSEL

Creamy-yellow body with distinct blue eye, a wide black bar that extends to tail base and yellowish tail. Similar *P. dickii* has white or pale tail and lacks blue eye. Coral reef, branching and tabular coral. Depth to 19 m. Grows to 14 cm. Common.

Family - POMACENTRIDAE
Plectroglyphidodon leucozonus

WHITEBAND DAMSEL

Adults (top) orange-brown, dark scale edges, pale band at mid-body which fades with age. There is a blue spot at the pectoral fin base. Adult *Parma unifasciata* is more grey with white band at mid-body and lacks pectoral fin spot. Juveniles (lower) brighter with more distinct white bar, a white-edged black ocellus high on rear of body and a second small black blotch on the upper tail base. Secretive, in surge zones on rocky reef. Depth to 6 m. Grows to 12 cm. Common.

Family - POMACENTRIDAE
Pomacentrus amboinensis

AMBON DAMSEL

Yellow body, darker above in adults. Small ear spot and larger spot at pectoral fin base. Similar *P. moluccensis* has solid colour on tail and fins. Coral reef, depth to 40 m. Grows to 9 cm. Uncommon.

Family - POMACENTRIDAE
Pomacentrus australis

AUSTRALIAN DAMSEL

Bright-blue juvenile becomes dull blue-grey with age. Small ear spot and larger blotch at pectoral fin base. Scale edges distinct. Reef, depth to 35 m. Grows to 8 cm. Common.

Family - POMACENTRIDAE
Pomacentrus bankanensis

SPECKLED DAMSEL

Adults (top) greenish with white tail base and transparent tail, small spot at pectoral fin base, small ear spot, blue lines over forehead. There is a white-margined ocellus low on the rear of dorsal fin. Juveniles (lower) have bright orange head and upper body, greenish or blue below, with bright blue lines from face along upper body. Blue-edged ocellus on the dorsal fin and a white tail base, transparent tail. Rocky, coral reef, depth to 19 m. Grows to 9 cm. Common.

Family - POMACENTRIDAE
Pomacentrus coelestis

NEON DAMSEL

Neon-blue body with yellow tail and part of underside, including anal fin, is yellow. Similar *Chrysiptera flavipinnis* has yellow over top of body. Rocky, coral reef, depth to 22 m. Grows to 9 cm. Common.

Family - POMACENTRIDAE
Pomacentrus lepidogenys

SCALY DAMSEL

Pale grey body, sometimes with yellow on upper body and yellow tail, anal and dorsal fins. White pelvic fins and black tips to dorsal fin. Coral reef, depth to 19 m. Grows to 9 cm. Uncommon.

Family - POMACENTRIDAE
Pomacentrus moluccensis

LEMON DAMSEL

Solid yellow colour, including fins, small black spot at pectoral fin base, small ear spot. Faint mauve lines and spots on head. Similar *P. amboinensis* has more transparent fins and tail. Coral reef. Depth to 18 m. Grows to 9 cm. Common.

Family - POMACENTRIDAE
Pomacentrus nagasakiensis

BLUE-SCRIBBLED DAMSEL

Grey to dark-blue with dark scale margins, wavy blue lines on fins, black spot at pectoral fin base, dark tips on dorsal spines. Ocellus at rear of dorsal fin on juveniles. Reef, depth to 35 m. Grows to 10 cm. Uncommon.

Family - POMACENTRIDAE ***Pomacentrus wardi*** WARD'S DAMSEL

Grey to dark-brown, few distinctive markings apart from faint pale ear spot and pale blue spot at pectoral fin base of adults (left). Dark scale margins and similar shape to *Stegastes* species damsels, but lacks orange outer eye. Juveniles (right) yellow-orange with blue lines from snout fading at mid-body, blue-edged ocellus at rear of dorsal fin. Rocky, coral reef, depth to 20 m. Grows to 12 cm. Uncommon.

Family - POMACENTRIDAE
Stegastes apicalis

YELLOWTIP GREGORY

Adults (top) grey to dark brown body, dark scale margins, yellow tips to dorsal fin and top lobe of tail fin, distinct blue margin to pelvic and anal fins. Often a faint yellow-orange blotch behind the eye. Juveniles (lower) pale green-brown, distinct scale margins, black ocellus on front of dorsal fin, yellow margin along the whole of the spinous section. Juvenile *Plectroglyphidodon fasciolatus* similar but has yellow on start of dorsal fin only, lacks axil spot. Coral, rocky reef, depth to 11 m. Grows to 15 cm. Common.

Family - POMACENTRIDAE ***Stegastes gascoynei*** CORAL SEA GREGORY

Grey body with golden belly, dark scale margins form vertical lines, small dark axil spot and eye with yellow iris. Rarely, all yellow individuals. Reef, depth to 30 m. Grows to 15 cm. Common.


Family - POMACENTRIDAE **_Stegastes lacrymatus_** JEWEL DAMSEL

Adults (left) brown body, dark scale margins, an even spacing of bright blue spots on upper body, gold ring around the the eye and pale tail. Juveniles (right) darkish-green, scattered blue spots, gold ring around eye. Reef, depth to 40 m. Grows to 14 cm. Uncommon. Previously known as *Plectroglyphidodon lacrymatus.*

Family - POMACENTRIDAE
Teixeirichthys jordani

JORDAN'S DAMSEL

Grey to blue body, small dark spot at pectoral fin base, dorsal fin with pale margin. Eye with vertical bar. Reef, sandy areas, depth to 20 m. Grows to 14 cm. Common at Lord Howe Is.

Family - PERCOPHIDAE **_Enigmapercis reducta_** BROAD DUCKBILL

Elongated body with pale belly and variable pattern of light and dark blotches on back. Independent eyes set high on head, pointed snout. Usually buried in upper ridges of wave-formed clear sand, in estuaries and around rocky reef. Not noticed unless disturbed. Depth to 130 m. Grows to 9 cm. Common.

Family - PINGUIPEDIDAE
Parapercis australis

SOUTHERN GRUBFISH

Black blotches on back, pale stripe along side, belly has indistinct blotches and stripes. Large black blotch at start of first dorsal fin, darker vertical bar below eye. Reef, sand and rubble areas. Depth to 82 m. Grows to 10 cm. Common.

Family - PINGUIPEDIDAE
Parapercis clathrata

SPOTHEAD GRUBFISH

Upper belly with eight or nine dark-centred red-brown patches joined by thin reddish line, tail with white or yellow streak. White-margined dark blotch behind eye of males (right). Reef sand, rubble areas. Depth to 50 m. Grows to 24 cm. Common.

Family - PINGUIPEDIDAE
Parapercis millepunctata

THOUSANDSPOT GRUBFISH

Tail with white blotch, preceded by larger black blotch and joined dark blotches along side. Oblique bar under eye differentiates from similar *P. clathrata*. Reef, sand, rubble areas. Depth to 50 m. Grows to 18 cm. Uncommon.

Family - PINGUIPEDIDAE
Parapercis nebulosa

PINKBANDED GRUBFISH

Pink body with brown to reddish blotched bands broken by a pale lateral stripe. Dark diagonal stripe below eye and dark spots on spiny dorsal fin and pectoral fin base. Sand, rubble areas. Depth to 120 m. Grows to 25 cm. Common.

Family - PINGUIPEDIDAE
Parapercis ramsayi

SPOTTED GRUBFISH

Pale body, with brown diffuse blotches on belly, broken brown stripe and spots on back. White-edged black spot on upper tail base, and lower third of eye white or pale. Sand and rubble areas around reef. Depth to 80 m. Grows to 20 cm. Common.

Family - PINGUIPEDIDAE
Parapercis schauinslandii

LYRETAIL GRUBFISH

Reddish blotches forming broken bars on body, red-margined dark spot on spiny dorsal fin, paired red stripes on pectoral fin base and body. Juvenile shown here. Sand, rubble areas around reef, depth to 50 m. Grows to 18 cm. Uncommon.

Family - PINGUIPEDIDAE
Parapercis stricticeps

WHITESTREAK GRUBFISH

Dark-scribbled back, pale streak on mid-line and dark blotches along mid-side joined by brown lines or rows of brown spots. Dark bar from eye to lower cheek. Sand, rubble patches around reef. Depth to 26 m. Grows to 18 cm. Common.

Family - PLATYCEPHALIDAE
Onigocia oligolepis

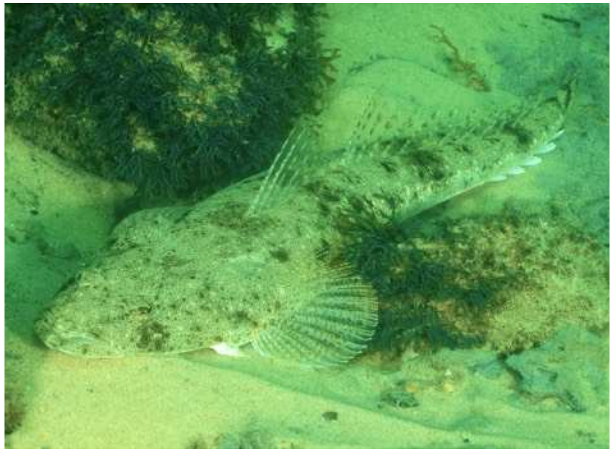
SHORTSNOUT FLATHEAD

Pale with a broad, dark band at spiny dorsal fin, two or three smaller bands posteriorly, broad head. Small species easily overlooked in sand, rubble around reef. Depth to 30 m. Grows to 10 cm. Rare.

Family - PLATYCEPHALIDAE
Platycephalus fuscus

DUSKY FLATHEAD

Light tan with numerous close-set brown spots on body, pectoral and pelvic fins. Bands across body darkening posteriorly. Tail with dark blotch below spotted upper margin. Sheltered sand, mud. Depth to 25 m. Grows to 1.2 m. Common.



Family - PLATYCEPHALIDAE ***Platycephalus marmoratus***

MARBLED FLATHEAD

Sandy-coloured with distinct, paired, light and dark markings on dorsal surface, tail with black blotch. Sand and rubble near reef, depth to 80 m. Grows to 45 cm. Common.

Family - PLATYCEPHALIDAE ***Thysanophrys cirronasa***

TASSLESNOUT FLATHEAD

Variable colouration, often purple-red head and similarly-coloured broad bands on body. Dorsal fins are transparent with reddish-brown blotches. Head up to one third of body length. Has complex ocular flaps on eyes. Sand patches amongst rocky or weedy reef. Depth to at least 15 m. Grows to 38 cm. Common.

Family - SERRANIDAE
Acanthistius cinctus

YELLOWBANDED WIRRAH

Pale-yellow with vertical dark bands on body, and dark stripes through eye. Some spotting on head and fins. Rocky reef, depth to at least 30 m. Grows to 38 cm. Rare on NSW coast, common at Lord Howe Is.

Family - SERRANIDAE
Acanthistius ocellatus

EASTERN WIRRAH

Olive-green with numerous closely-spaced, black-margined blue spots on body, and dark fins. Dark stripes through eye may not always be visible. In caves, crevices on rocky reef. Depth from intertidal to 100 m. Grows to 64 cm. Common.

Family - SERRANIDAE
Cephalopholis argus

PEACOCK ROCKCOD

Light- to dark-green body, with uniform coverage of dark-edged blue spots, including on blue fins. Often with pale bars at rear of body. Able to change colour rapidly. Rocky, coral reef, depth to 40 m. Grows to 60 cm. Uncommon.

Family- SERRANIDAE
Cephalopholis miniata

CORAL ROCKCOD

Orange-red body, tending bluish at rear, sometimes with faint, pale bars mid-body. Even covering of dark-edged blue spots over body and most fins. Pectoral fin is yellow-orange. Coral reef, depth to 90 m. Grows to 45 cm. Common in the Solitary Islands, Lord Howe Is.

Family - SERRANIDAE
Cephalopholis sonnerati

TOMATO ROCKCOD

Reddish with a dense covering of red to dark spots on body and fins. White margin on rear of dorsal, anal and tail fins. Juveniles (not shown) dark blue-black with small black spots. Reef, depth to 150 m. Grows to 57 cm. Uncommon.

Family - SERRANIDAE
Cephalopholis urodeta

FLAGTAIL ROCKCOD

Pale reddish spotted forebody with broad, red bars that darken posteriorly. Two pale stripes converge obliquely on tail. Coral reef, depth to 60 m. Grows to 28 cm. Uncommon.

Family - SERRANIDAE
Cromileptes altivelis

BARRAMUNDI COD

Greenish-brown body, often with up to nine, indistinct darker blotches. Round black spots on head, body and fins, and concave head profile with humpbacked appearance. Coral reef, often silty areas. Depth to 40 m. Grows to 70 cm. Rare.

Family - SERRANIDAE
Diploprion bifasciatum

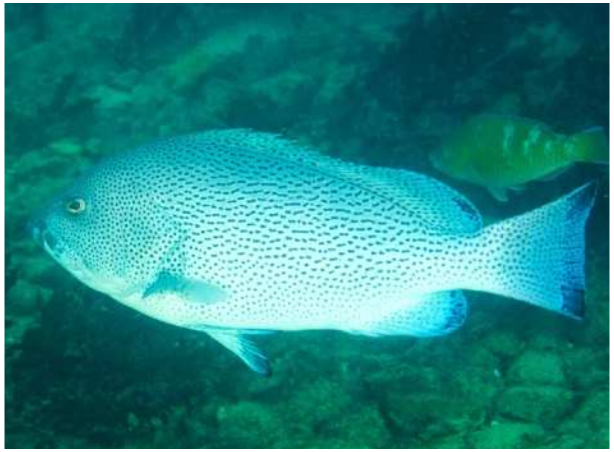
BARRED SOAPFISH

Yellow body with black bar through eye and across body from rear of first dorsal fin. Occasional individuals all black with yellow fins. Rocky, coral reef, often silty conditions. Depth to 100 m. Grows to 25 cm. Uncommon.

Family - SERRANIDAE
Epinephelus coioides

GOLDSPOTTED ROCKCOD

Five or six broken light bars over tan body, with scattered small orange-brown spots which darken with age. Similar *E. malabaricus* has black spots and darker body. Turbid coastal reefs, estuaries. Depth to 100 m. Grows to 1.2 m. Common.



Family - SERRANIDAE
Epinephelus cyanopodus

PURPLE ROCKCOD

Blue-grey with scattered, small dark spots, dark bars on upper and lower lips, black bar on tail which fades with age. Juveniles (not shown) with distinct yellow tinge to fins. Reef, estuaries, depth to 150 m. Grows to 1.2 m. Common.

Family - SERRANIDAE ***Epinephelus daemelii*** BLACK ROCKCOD

Variable colouration depending upon habitat. In areas of reef, often dark-grey with black banding and scattering of white blotches. In mid-water often turns light grey with or without banding. Juveniles (not shown) are often pale grey, sometimes darker, without banding. Black spot present on top of tail base, tail has black margin in all colour phases. Rocky reef, juveniles recorded from tidal rockpools, estuaries. Depth to 50 m. Grows to 1.55 m. A territorial species, populations decimated in the past by overfishing, now fully protected. Relatively common.

Family - SERRANIDAE
Epinephelus fasciatus

BLACKTIP ROCKCOD

Pale-pinkish, fading towards the tail, usually five or six pale bands. Dark-red cap on head and shoulder, black and white tips on dorsal fin. Similar *E. rivulatus* has yellow fin tips. May change colour to almost white. Reef, depth to 160 m. Grows to 40 cm. Common.

Family - SERRANIDAE ***Epinephelus lanceolatus*** QUEENSLAND GROPER

Mottled olive or grey body, often with marginal green tints and black spots on fins and tail. Has a large mouth and relatively small eye. Juveniles (not shown) have a black body with white mottling, bright yellow fins mottled with black. Large adults grow to 300 kg and 2.7 m long. Coral and rocky reefs, deep estuaries and large rivers. Juveniles in estuaries. Depth to 100 m. A territorial species fully protected in NSW. Uncommon.

Family - SERRANIDAE
Epinephelus maculatus

HIGHFIN GROUPER

Sub-adult (at left), pale-brown with dark spots, white saddles at start and end of spiny dorsal fin, yellow fin margins. Adults tan or grey, with evenly-spaced polygonal black spots, white saddles on dorsal fin. Reef, sand, depth to 100 m. Grows to 60 cm. Common.

Family - SERRANIDAE
Epinephelus malabaricus

BLACKSPOTTED ROCKCOD

Five dark bars across pale body with covering of small black spots. Similar *E. coioides* has gold-brown spots. Juveniles, as shown, in estuaries. Reef. Depth to 150 m. Grows to 2.4 m. Common.

Family - SERRANIDAE
Epinephelus merra

BIRDWIRE ROCKCOD

Pale to dark-tan colour, with close pattern of dark spots and blotches on body and fins. Many close-set small spots on snout. *E. quoyanus*, (not shown), has black margin on tail fin, and fewer spots on snout. Reef, depth to 50 m. Grows to 31 cm. Uncommon.

Family - SERRANIDAE
Epinephelus polyphekadion

CAMOUFLAGE GROUPER

Pattern of pale blotches on upper body. Close-set small, brown spots on lower body, black patch on upper tail base distinctive. Reef, depth to 46 m. Grows to 90 cm. Rare NSW coast, more common at Lord Howe Is.

Family - SERRANIDAE
Epinephelus rivulatus

CHINAMAN ROCKCOD

Variable in colour, from dull red to khaki, with four or five darker bars on body. Yellow tips on dorsal fin distinguish from similar *E. fasciatus*. Coral, rocky reef, seagrass areas. Depth to 30 m. Grows to 46 cm. Common.

Family - SERRANIDAE
Epinephelus tauvina

GREASY ROCKCOD

Greenish-grey with reddish-brown spots on head and body which may form up to five indistinct bars. Often one to three dark blotches below dorsal fin, although these may be hidden within dark bars. Coral reef, depth to 300 m. Grows to 70 cm. Uncommon.

Family - SERRANIDAE
Epinephelus tukula

POTATO ROCKCOD

Pale body with rows of dark oval blotches and dark streaks radiating from eye. Curious, and will sometimes approach divers. Coral, rocky reef, depth to 150 m. Grows to 2.0 m. Rare in NSW, not recorded from Lord Howe Is.

Family - SERRANIDAE
Epinephelus undulatostriatus

MAORI ROCKCOD

Adults (above) pale body with fine brown spots aligned in scribbled rows, pale streaks radiating from eye and yellow margins to fins. Juveniles (left) are red-orange with black stripe under dorsal fin. Reef, estuaries, depth to 80 m. Grows to 61 cm. Common.

Family - SERRANIDAE
Grammistes sexlineatus

LINED SOAPFISH

Rounded dark body, clear fins and blue-edged black spot in centre of upper lip. On older fish the stripes break into a series of dashes, sub-adult shown here. Juveniles with thin yellow stripes. Reef, depth to 130 m, juveniles shallower. Grows to 30 cm. Uncommon.

Family - SERRANIDAE
Hypoplectrodes maccullochi

HALFBANDED SEAPERCH

Pinkish-red, with dark bars on back not reaching belly, pale spot on gill cover, blue-edged stripe from eye to snout. Lacks filaments on dorsal spines of similar looking hawkfishes. Reef, depth to 50 m. Grows to 20 cm. Common.

Family - SERRANIDAE
Pseudanthias fasciatus

REDSTRIPE BASSLET

Orange body with broad light-edged red stripe along side and two mauve lines from snout to base of pectoral fin. Rocky reefs, usually deep below 20 m in caves, ledges. Depth to 150 m. Grows to 21 cm. Uncommon.

Family - SERRANIDAE
Pseudanthias hypselosoma

PINK BASSLET

Female, (left), red margin to tail, mauve on upper eye and blue margin on dorsal fin. Male similar colouration with red patch two-thirds along dorsal fin, and pink streak from under eye to pectoral fin base. Coral reef, depth to 50 m. Grows to 19 cm. Uncommon.

Family - SERRANIDAE
Pseudanthias pictilis

PAINTED BASSLET

Male, (above), purplish forebody changing abruptly to orange-red at rear third, tail with pale ellipse in centre. Female (left), purplish, fading to yellow, fins with red margins. Reef, depth to 40 m, usually below 20 m. Grows to 13 cm. Uncommon.

Family - SERRANIDAE
Pseudanthias squamipinnis

ORANGE BASSLET

Male (top) purplish body, red-purple spot on pectoral fin, pink stripe from eye to pectoral fin base. Female (right) orange, purple upper eye, purple and orange streaks from eye to pectoral fin base. Reef, depth to 55 m. Grows to 15 cm. Common.

Family - SERRANIDAE
Trachypoma macracanthus

PACIFIC ROCKCOD

Reddish body, may sometimes appear mottled, with dense covering of pale spots, large eye, fins with thin blue-white margins. Coral, rocky reef, depth to 45 m. Grows to 22 cm. Common.

Family - SERRANIDAE
Variola louti

YELLOWEDGE CORONATION TROUT

Adult colour variable, from pale to almost purple (above), many small purple-edged blue spots, yellow margin to tail, yellow on rear edge of dorsal and anal fins. Juveniles (left) two tone: purplish above mid-line, pale below. Coral reef, depth to 250 m. Grows to 83 cm. Uncommon.

Family - SCORPAENIDAE
Dendrochirus brachypterus

DWARF LIONFISH

Reddish-brown, pectoral fins lack ray extensions and have dark transverse bars, lacking on similar *D. zebra*. Dorsal spine filaments with red-margined black spots. Reef, depth to 40 m. Grows to 15 cm. Uncommon.

Family - SCORPAENIDAE ***Dendrochirus zebra*** ZEBRA LIONFISH

Reddish-brown body, pectoral fins with short rays and lacking transverse bars of *D. brachypterus*. Distinguished from other lionfish species by white spots on upper and lower tail base, spots sometimes joined together at edges. Reef, depth to 80 m. Grows to 25 cm. Common.

Family - SCORPAENIDAE ***Pterois volitans*** COMMON LIONFISH

Body with alternating broad dark and pale bands, each separated by white margins. Dorsal fin spines and pectoral fin rays are long with flag-like membranes. Reef, depth to 55 m. Grows to 30 cm. Common.

Family - SCORPAENIDAE **_Scorpaena cardinalis_** COOK'S SCORPIONFISH

Body colour variable from dull grey-brown to red and usually with numerous small, dark spots over head and body. Distinguished from similar *S. jacksoniensis* by size and location, being found at Lord Howe Is and not on the NSW coast. Reef, depth to 154 m. Grows to 55 cm. Common.

Family - SCORPAENIDAE **_Scorpaena jacksoniensis_**
EASTERN RED SCORPIONFISH

Colour variable, usually red with medium-sized black spots on pale belly and thorax, may have pale bands on head behind eyes and across body. Similar *S. cardinalis* has small dark spots on head and body. Reef, depth to 73 m. Grows to 40 cm. Common on NSW coast, not recorded from Lord Howe Is.

Family - SCORPAENIDAE
Scorpaena papillosa

SOUTHERN RED SCORPIONFISH

Body red to brown, usually with broad pale band behind eye, and pale patch behind anal fin. Dark margin on body scales. Reef, estuaries, kelp, depth to 50 m. Grows to 30 cm. Common north to Newcastle.

Family - SCORPAENIDAE
Scorpaenodes evides

CHEEKSPOT SCORPIONFISH

Body reddish with red dashes on fins, bright-red iris, dark spot on lower section of gill cover. Often upside down in crevices, cave roofs. Reef, depth to 40 m. Grows to 12 cm. Common.

Family - SCORPAENIDAE
Scorpaenopsis diabolus

FALSE STONEFISH

Variable in colour, body often with fine filaments giving fuzzy appearance thus aiding camouflage. Humpback shape, broad dark-red bands behind shoulder and at tail base, not always visible. Large, round pectoral fins. Reef, depth to 70 m. Grows to 30 cm. Uncommon.

Family - SCORPAENIDAE
Scorpaenopsis eschmeyeri

ESCHMEYER'S SCORPIONFISH

Body mottled, red, brown and white, with numerous skin flaps. Cirri above eye, if present, less than eye width. Similar *S. venosa* has long cirri and triangular patch under eye. Reef, depth to 24 m. Grows to 12 cm. Rare.

Family - SCORPAENIDAE
Scorpaenopsis venosa

RAGGY SCORPIONFISH

Reddish-brown with numerous skin flaps, long cirri above eyes. Adult has scattered blue ocelli on body, dark triangular patch below eye. Juveniles (left) with three distinctive white spots on back. Reef, depth to 95 m. Grows to 25 cm. Rare.

Family - SCORPAENIDAE
Sebastapistes strongia

BARCHIN SCORPIONFISH

Mottled body with reds, whites and browns, a white bar below eye, radial white bars on iris, numerous dark bars on lower jaw. Rubble, sand areas, reef. Depth to 37 m, but usually shallower. Grows to 10 cm. Rare.

Family - SCORPAENIDAE
Taenianotus triacanthus

LEAF SCORPIONFISH

Body may be mottled red, yellow, brown, or black, with sail-like dorsal fin. Often with oblique stripe from eye to pectoral fin base. Usually motionless on the bottom or rocking back and forth with the swell. Reef, depth to 135 m, often shallower. Grows to 10 cm. Uncommon.

Family - TETRAROGIDAE
Centropogon australis

EASTERN FORTESCUE

Colour variable, often light with broad, dark bands, the first through the eye, others spaced along the body. Dorsal fin has robust spines, pectoral fin large, reaching halfway along body. Estuaries, harbours and rocky reef. Depths to 30 m. Grows to 15 cm. Common.

Family - TRIGLIDAE
Lepidotrigla papilio

SPINY GURNARD

Adults (shown) reddish-brown body with scute-like lateral line scales. Large white-edged black spot on dorsal fin, tail with pale band and margin. Pectoral fins large and blue-green. Sand, rubble in estuaries. Depth to 60 m. Grows to 20 cm. Common.

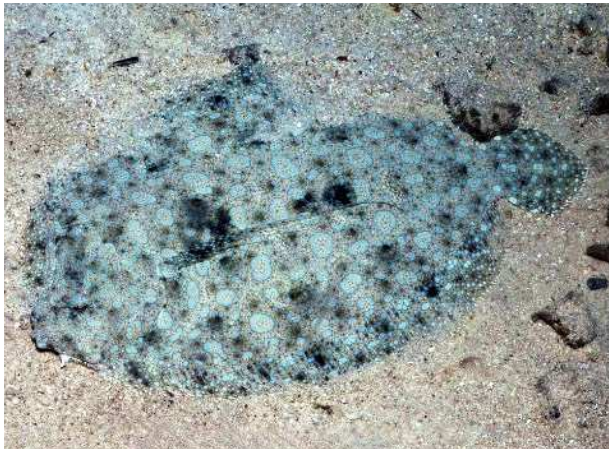


Photo by Graham Edgar

Family - BOTHIDAE
Bothus mancus

FLOWERY FLOUNDER

Body blue-grey to pale tan with blue-edged pale spots and scattered dark spots. Two or three diffuse blotches along mid-line, males (left) have extended pectoral fin rays. Sand, reef, depth to 150 m. Grows to 48 cm. Uncommon Lord Howe Is, rare NSW coast.

Family - BOTHIDAE
Bothus pantherinus

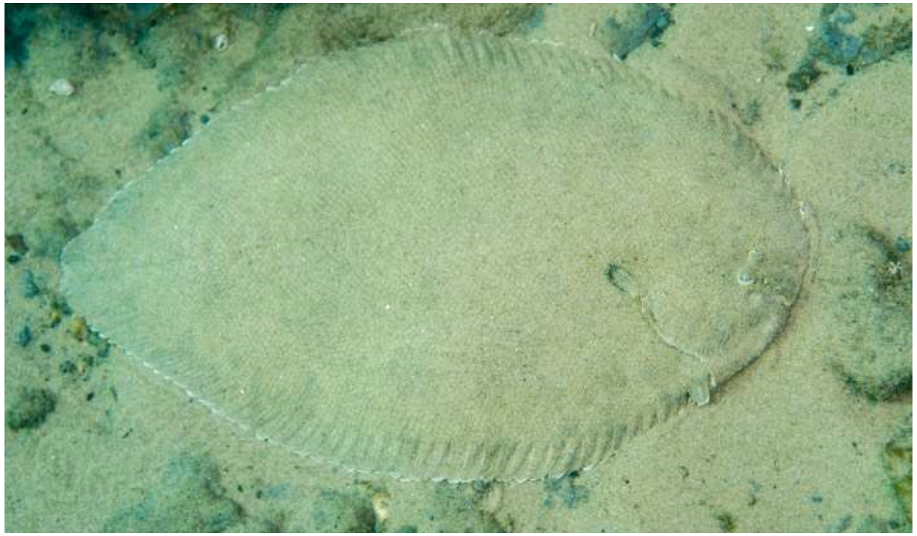
LEOPARD FLOUNDER

Pale to dark tan body with dark spots, blotches and rings, and a large diffuse spot around two-thirds distance along back. Males (left) have extended pectoral fin rays that reach to caudal fin. Sand, depth to 150 m. Grows to 39 cm. Common.

Family - PARALICHTHYIDAE
Pseudorhombus jenynsii

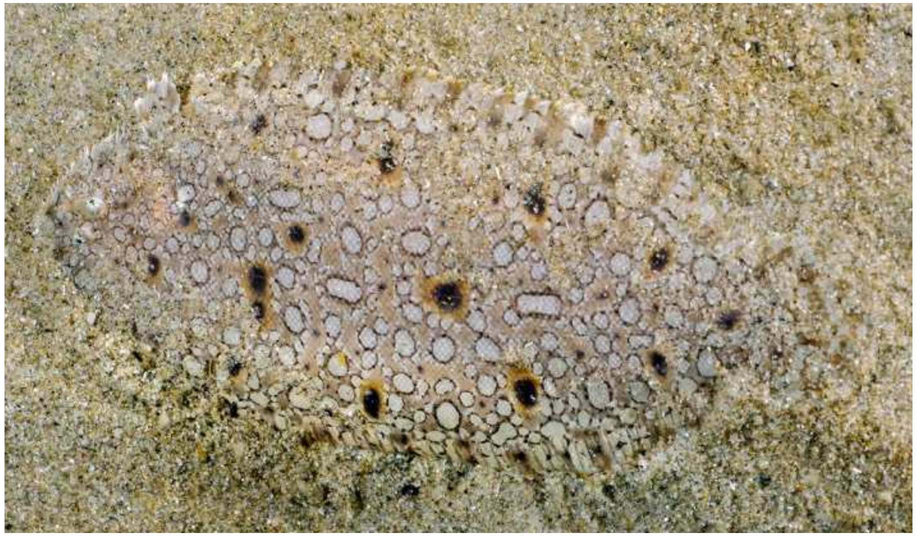
SMALLTOOTH FLOUNDER

Body a sandy colour with paired distinct eye spots either side of lateral line behind head. Eyes protruding, sometimes darker. Sand, depth to 50 m. Grows to 35 cm. Common.



Family - SOLEIDAE ***Brachirus niger*** BLACK SOLE

Oval-shaped body with pale-grey or black upper surface, tail fin connected to dorsal and anal fins. The pectoral fin is small and blackish. Soles have eyes on right side of head compared to flounders, which have eyes on left side. Sand, depth to 20 m. Grows to 35 cm. Common.



Family - SOLEIDAE ***Pardachirus hedleyi*** SOUTHERN PEACOCK SOLE

Sandy coloured body with diffuse dark blotches and dark-edged rings, the eyes are elevated and tail is separate from dorsal and anal fins. Sheltered sandy areas, depth to 20 m. Grows to 15 cm. Common.

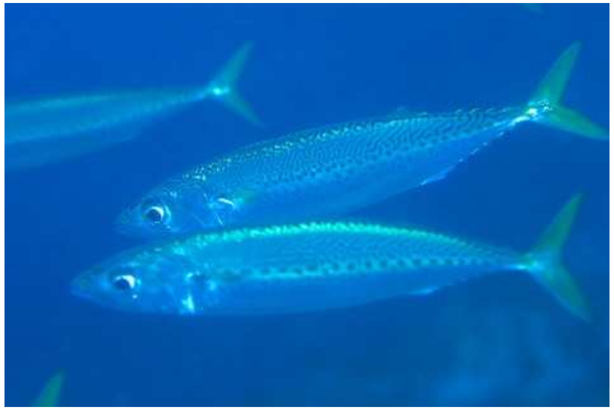
Family - SCOMBRIDAE
Sarda australis

AUSTRALIAN BONITO

Stout silver body with distinct horizontal stripes on upper half, fading below mid-line. Coastal pelagic, schooling species. Depth to 30 m. Grows to 1 m. Common.

Family - SCOMBRIDAE ***Scomberomorus commerson*** SPANISH MACKEREL

Elongate body, silver-grey on back, mouth large with jaw opening extending behind eye. Thin wavy lines on lower body. Pelagic, depth to 70 m. Grows to 2.4 m. Common.



Family - SCOMBRIDAE
Scomber australasicus

BLUE MACKEREL

Silvery body, greenish on back with a pattern of scribbled lines giving way to spots on lower sides. Has five or six finlets in front of tail. Schooling species, coastal pelagic. Depth to 200 m. Grows to 50 cm. Common.

Family - SCOMBRIDAE ***Gymnosarda unicolor*** DOGTOOTH TUNA

Elongate solid body, bluish above, silver-grey below, with white tips to dorsal and anal fins, a large eye and mouth. Pelagic species, reef passes and drop-offs. Small schools of around 6 individuals. Depth to 250 m. Grows to 2.5 m. Uncommon.

Family - PLOTOSIDAE
Cnidoglanis macrocephalus

ESTUARY COBBLER

Body mottled yellow and brown, with eel tail. Snout has five pairs of barbels. Pectoral and dorsal fins have venomous spines. Estuaries, weedy areas, depth to 30 m. Grows to 91 cm. Common.

Family - PLOTOSIDAE
Plotosus lineatus

STRIPED CATFISH

Juveniles (right) are white with black stripes and silver belly, adults nearly black with faded white stripes. Juveniles in schools, adults solitary. Estuaries, coral reefs, depth to 60 m. Grows to 32 cm. Common.

Family - AULOSTOMIDAE *Aulostomus chinensis*

TRUMPETFISH

Elongated body with short dorsal and anal fins at rear of body, tail is wedge shaped without a filament as on *Fistularia* spp. Small mouth at the end of a long snout. May change colour rapidly from dark to pale, with or without stripes and banding. Yellow individuals sometimes common. Juveniles (not shown) observed upright in corals and assuming background colour for camouflage. Coral, rocky reefs, depth to 122 m. Grows to 80 cm. Common.

Family - FISTULARIIDAE ***Fistularia commersonii*** SMOOTH FLUTEMOUTH

Long tube-like snout, large eye, elongated body blue-green above, with blue spots and lines, white belly. Tail with long trailing filament. Similar *F. petimba* (not shown) has embedded elongate plates in front of dorsal fin. *Aulostomus chinensis* has patterned wedge-shaped tail. Coral, rocky reefs, juveniles in estuaries, depth to 128 m. Grows to 1.6 m. Common.

Family - SOLENOSTOMIDAE ***Solenostomus paradoxus***

ORNATE GHOSTPIPEFISH

Body and fins with relatively-long spiny filaments, colour variable, from black to red or yellow, with bands and streaks, and long tubular snout. Usually among branches of gorgonians, crinoids or floating weeds, depth to 35 m. Grows to 11 cm. Uncommon.

Family - SOLENOSTOMIDAE ***Solenostomus cyanopterus***

ROBUST GHOSTPIPEFISH

Colour variable, from brown and pink to green or yellow, with small black and white spots. Always in pairs. Weedy areas, lagoons, algal flats. Depth to 35 m. Grows to 17 cm. Rare.

Family - SYNGNATHIDAE
Hippocampus whitei

WHITE'S SEAHORSE

Variable in colour, often browns, greenish or yellow. Coronet, with seven points, is high and inclined backwards, the snout long. The head is quite narrow, with prominent eye spines. Inhabits estuarine areas of seagrass, soft corals and sponges, often in man-made structures such as nets and under jetties. Depth to 20 m. Grows to 13 cm, usually smaller. Disjunct populations from southern NSW north to Port Stephens, then from the Tweed River north through southern Queensland. Locally common in the south, uncommon in northern range.

Family - SYNGNATHIDAE
Doryrhamphus excisus

BLUESTRIPE PIPEFISH

Body with red-orange and blue stripe, large fan-like tail. Cryptic, often in pairs, in caves, under ledges. Depth to 45 m. Grows to 7 cm. Uncommon.

Family - SYNGNATHIDAE
Festucalex cinctus

GIRDLED PIPEFISH

Grey to brown body with slender snout and leafy appendages on dorsal ridges. Bays, estuaries, seagrass and sponges. Depth to 30 m Grows to 16 cm. Common.

Family - SYNGNATHIDAE ***Filicampus tigris*** TIGER PIPEFISH

Pale to dark-brown body, may display evenly-spaced, pale bands along length. Distinctive oblique stripes from behind eye onto gill cover. Often has blue vertical patch on upper body at regular intervals, and there is a row of dark-edged white spots along lower edge of body. Harbours, estuaries, on rubble or sand with sparse algae or sponge life. Depth to 30 m. Grows to 30 cm. Common.

Family - SYNGNATHIDAE
Lissocampus runa

JAVELIN PIPEFISH

Pale to dark-brown body with broad, with often-indistinct bands and short snout. Secretive, shallow reefs, rockpools, depth to 20 m. Grows to 10 cm. Uncommon.

Family - SYNGNATHIDAE
Trachyrhamphus bicoarctatus

BENTSTICK PIPEFISH

Smooth, elongate body, often "standing" on posterior part of tail, facing current. Bays, estuaries, depth to 25 m. Grows to 40 cm. Uncommon.

Family - BALISTIDAE
Balistoides conspicillum

CLOWN TRIGGERFISH

Pattern of large white spots on belly, yellow scribbles on back, yellow lips and broad, white band through black tail fin. Clear water, rocky and coral reefs. Depth to 75 m. Grows to 50 cm. Uncommon.

Family - BALISTIDAE
Rhinecanthus rectangulus

WEDGETAIL TRIGGERFISH

Black patch from eye to anal fin, black triangular patch at tail base, yellow chevron markings and red stripe on pectoral fin base. Secretive, surge zones on reef, depth to 20 m. Grows to 30 cm. Uncommon.

Family - BALISTIDAE
Sufflamen bursa

PALLID TRIGGERFISH

Pale-grey with yellowish tint, thin white line from mouth towards vent, two crescent shaped yellow stripes running through and behind eye. Uniformly grey tail. Coral reef, clear water, drop-offs. Depth to 90 m. Grows to 25 cm. Rare.

Family - BALISTIDAE
Sufflamen chrysopterum

EYE-STRIPE TRIGGERFISH

Adult (top) with pale back, blue belly from mouth to near anal fin, tail with yellow centre with broad white margins. Pale stripe from below eye to just below front of pectoral fin base. Intermediate stage (centre), has darker belly with pale snout and yellowish back, small juveniles (bottom), have white belly to above mid-line and are black and yellow above. Secretive habit, often slipping sideways into crevices if approached. Inshore and offshore rocky and coral reefs. Depth to 30 m. Grows to 30 cm. Common.

Family - BALISTIDAE
Sufflamen fraenatum

BRIDLED TRIGGERFISH

Grey-brown body with twin pale stripes forward of eye and pale yellow band around mouth. Often with pale stripe from corner of mouth towards pectoral fin base. Rocky, coral reef, depth to 186 m. Grows to 38 cm. Uncommon.

Family - DIODONTIDAE
Dicotylichthys punctulatus

THREEBAR PORCUPINEFISH

Pale body with three dark bars, small, dark spots, large eyes. Fins yellowish without spots. Similar *Diodon hystrix* has spots on all fins. Coastal reefs, estuaries, depth to 50 m. Grows to 43 cm. Common.

Family - DIODONTIDAE
Diodon holocanthus

FRECKLED PORCUPINEFISH

Pale-grey to tan body with dark blotches on back, scattered small dark spots over body and large needle-like spines. No spots on fins. Inshore rocky and coral reef, mud, sand. Depth to 200 m. Grows to 50 cm. Uncommon.

Family - DIODONTIDAE
Diodon hystrix

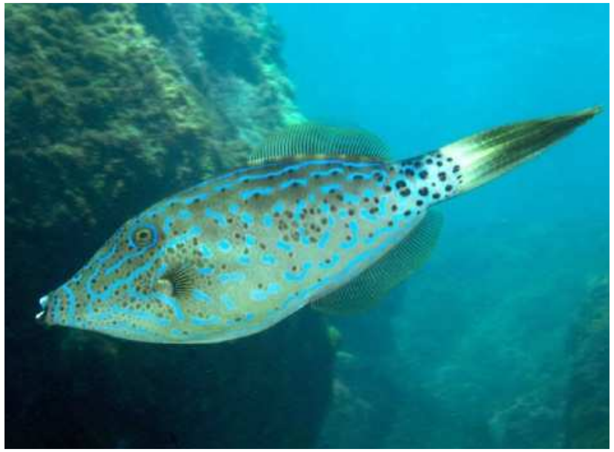
SPOTTED PORCUPINEFISH

Grey with numerous small dark spots on body and fins, differing from similar *Dicotylichthys punctulatus,* which has no spots on fins. Short, moveable spines, erect when body inflated. Reef, depth to 50 m. Grows to 91 cm. Uncommon.

Family - MONACANTHIDAE
Aluterus scriptus

SCRAWLED LEATHERJACKET

Olive or yellow-brown body, blue lines and scribbles, black spots. Tail fin long, over half body length in males, (sub-adult pictured). Reef, sometimes around floating objects. Depth to 120 m. Grows to 1.1 m. Uncommon.



Family - MONACANTHIDAE
Brachaluteres jacksonianus

SOUTHERN PYGMY LEATHERJACKET

Round body, yellow to green, with or without spots or lines. Able to inflate abdomen. Inshore seagrass and algal beds, depth to 25 m. Grows to 9 cm. Common.

Family - MONACANTHIDAE
Brachaluteres taylori

TAYLOR'S PYGMY LEATHERJACKET

Adults yellowish-green with small spots on head and dark lines on body, juvenile, (shown), pink or yellow, with spots and lines. Reefs, sponges, crinoids, hard and soft corals, depth to 60 m. Grows to 5 cm. Rare.

Family - MONACANTHIDAE ***Cantherhines dumerilii***

BARRED LEATHERJACKET

Grey green with thin dark bars on rear of body, yellow eye and yellow fins. Juvenile (left), yellowish with many pale spots. Coral reef, depth to 35 m. Grows to 35 cm. Uncommon.

Family - MONACANTHIDAE ***Cantherhines fronticinctus***

SPECTACLED LEATHERJACKET

Dark body, with darker blotches and spots on sides, dark band near eyes, and white band on tail base. Coral reef areas with sponges, soft corals. Depth to 43 m. Grows to 25 cm. Uncommon.

Family - MONACANTHIDAE ***Cantherhines pardalis***

HONEYCOMB LEATHERJACKET

Dark body with honeycomb pattern of small dark spots (not always visible) on sides, distinct white spot on upper tail base and greenish fins. Coastal and outer reefs, often in silty conditions. Depth to 20 m. Grows to 25 cm. Common.

Family - MONACANTHIDAE ***Cantheschenia grandisquamis***

LARGESCALE LEATHERJACKET

Adult (above, with spine extended) yellowish-brown body, blue spots under chin and blue lines at base of dorsal and anal fins. Yellow tail has blue stripes top and bottom, and black rear margin. Rocky, coral reef, depth to 29 m. Grows to 26 cm. Uncommon.

Family - MONACANTHIDAE
Eubalichthys mosaicus

MOSAIC LEATHERJACKET

Pale, rounded body with mosaic pattern of scattered dark blotches and blue lines. Rocky reef, depth to 140 m. Grows to 60 cm. Southern species, uncommon in northern NSW.

Family - MONACANTHIDAE
Meuschenia trachylepis

YELLOWFIN LEATHERJACKET

Colour variable with dark blotches and dark scribbles on mid-body. Blue lines at base of dorsal fin and along belly to tail. Tail with pale bar through centre. Reef, depth to 40 m. Grows to 35 cm. Common.

Family - MONACANTHIDAE
Monacanthus chinensis

FANBELLY LEATHERJACKET

Brown to grey body, with irregular brown blotches, small filaments on skin, extendable ventral flap. Tail fin rounded and banded. Inshore areas, estuaries with weed beds. Depth to 50 m. Grows to 38 cm. Common.

Family - MONACANTHIDAE ***Nelusetta ayraud*** OCEAN JACKET

Pale elongate body with long, rounded snout, three or four dark stripes from nose to tail that tend to fade with age, long thin erectable spine. Juveniles inshore in algal beds, adults in deep water. Reef, depth to 360 m. Grows to 71 cm. Southern species, uncommon in northern NSW.

Family - MONACANTHIDAE ***Oxymonacanthus longirostris***
HARLEQUIN FILEFISH

Blue-green body with rows of evenly-spaced golden-yellow spots, fading towards tail, long yellow snout. Black spot on tail, black patch with small white spots in front of anal fin. Coral reef, branching corals, depth to 30 m. Grows to 12 cm. Uncommon.

Family - MONACANTHIDAE
Paraluteres prionurus

BLACKSADDLE FILEFISH

White body with black saddles that extend to lower body. Long-based dorsal and anal fins differ from similar *Canthigaster valentini,* which it mimics. Rocky, coral reef, depth to 25 m. Grows to 11 cm. Common.

Family - MONACANTHIDAE
Pervagor alternans

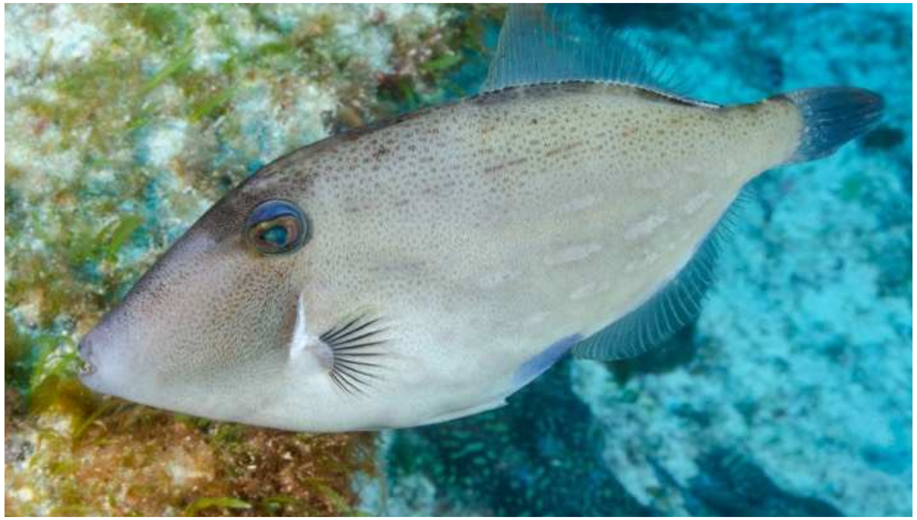
YELLOWEYE LEATHERJACKET

Blackish-brown body with black band around mouth, yellow ring around eye and orange centred tail fin. Shy, retreating to crevices in rocky and coral reefs. Depth to 17 m. Grows to 16 cm. Uncommon.

Family - MONACANTHIDAE
Pervagor janthinosoma

GILLBLOTCH LEATHERJACKET

Grey to blue forebody, yellow-green at rear, tail fin orange with yellow spots, dark vertical patch above gill opening. Shy, retreats to crevices in rocky and coral reef. Depth to 20 m. Grows to 13 cm. Uncommon.



Family - MONACANTHIDAE ***Thamnaconus analis***

DARKVENT LEATHERJACKET

Pale grey to yellow-grey body, dark patch around anus, often broken streaks visible along sides. Deep reef, depth to 360 m. Grows to 20 cm. Not recorded on NSW coast, uncommon at Lord Howe Is.

Family - OSTRACIIDAE
Anoplocapros inermis

EASTERN SMOOTH BOXFISH

Adults (top) pale-yellow to brown above, white below. Large yellow or dark spots on back and sides, mature males losing these, becoming pale blue with yellow hue. Small juveniles (below) orange, with many small brownish blotches. Pea shaped, and showing bony ridges of adult. Similar juvenile *Ostracion cubicum* has more defined spots, lacks bony ridges. Rocky reef, depth to 300 m. Grows to 35 cm. Uncommon in northern NSW.

Family - OSTRACIIDAE ***Lactoria fornasini*** THORNBACK COWFISH

Tan, grey or pale-yellow body, head with bright blue spots and streaks, body with wavy blue lines. Two spines in front of eyes, single spine on back, two spines at rear of lower body. Rocky and coral reef, depth to 132 m. Grows to 23 cm. Common.

Family - OSTRACIIDAE ***Ostracion cubicum*** YELLOW BOXFISH (Adult)

Family - OSTRACIIDAE
Ostracion cubicum

YELLOW BOXFISH

Adult, (previous page), bluish with yellow reticulations on face and sides, blue fins with small dark spots, and numerous larger dark spots on back. Small juveniles (top) pea shaped, orange or yellow with black circular spots. Larger juveniles (below), almost square in cross section, compared to similar *Anoplocapros inermis,* which is taller in the body. Sub-adults (not shown) may be pale-tan with scattered black-margined blue-white spots. Juveniles often in crinoids or spines of sea urchins, adults in coral or rocky reef. Depth to 280 m. Grows to 45 cm. Juveniles more common on NSW coast, juveniles and adults common at Lord Howe Is.

Family - OSTRACIIDAE
Tetrosomus reipublicae

SMALLSPINE TURRETFISH

Pale-green to brown body, dark outlining on plates, and blue spots on body. Mature individuals have more numerous blue spots, ridges and spines are reduced in size. Coastal waters, estuaries, depth to 180 m. Grows to 30 cm. Common.

Family - TETRAODONTIDAE
Arothron hispidus

STARS-AND-STRIPES PUFFER

Adults (top) greenish-brown to grey, white spots on upper body, pale lines on belly. Light-margined dark blotch on pectoral fin base. Juveniles (left) in estuaries. Reef, depth to 50 m. Grows to 50 cm. Common.

Family - TETRAODONTIDAE
Arothron manilensis

NARROWLINED PUFFER

Grey or tan body with pale belly and narrow brown stripes. Dark blotch on pectoral fin base lacks pale margin of *A. hispidus*. Coastal reef, estuaries, sand and rubble. Depth to 20 m. Grows to 31 cm. Common.

Family - TETRAODONTIDAE
Arothron mappa

SCRIBBLED PUFFER

Pale-tan body with numerous darker blotches overlaid with spots and scribbles. Narrow bars on tail, dorsal and anal fins. Dark lines radiating from eye and irregular black patch around pectoral fin base. Reef, depth to 30 m. Grows to 65 cm. Rare.

Family - TETRAODONTIDAE
Arothron nigropunctatus

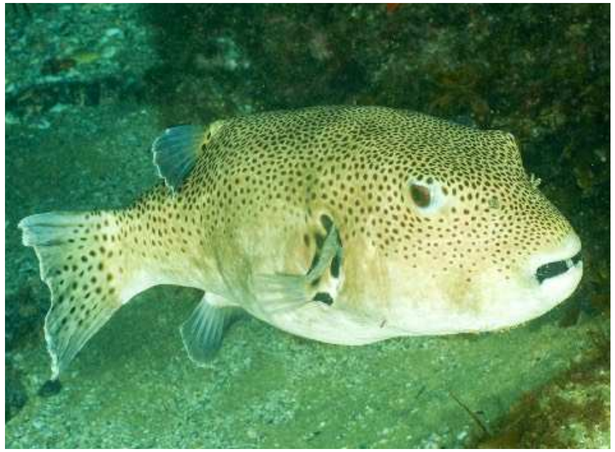
BLACKSPOTTED PUFFER

Body colour variable, from yellow, tan, pale-grey to blue, all with sparsely-scattered black spots. White patch on snout, dark shading around eyes and mouth. Reef, depth to 25 m. Grows to 33 cm. Common.

Family - TETRAODONTIDAE
Arothron stellatus

STARRY PUFFER

Pale-grey with dense covering of dark spots on head, body and fins, greyish belly. Irregular black and white patches around pectoral fin base. Reef, depth to 58 m. Grows to 1.2 m. Uncommon.



Family - TETRAODONTIDAE
Canthigaster axiologus

CROWNED TOBY

Three black saddles over back, a fourth over eyes. Saddles have broken yellow or orange margins, yellow and blue lines radiating from the eye. Coral, rocky reef, depth to 80 m. Grows to 10 cm. Uncommon.

Family - TETRAODONTIDAE
Canthigaster bennetti

BLACKSPOT TOBY

Light underside, dark above, often with dark diffuse bar between. Pale-edged black blotch encircles dorsal fin base and orange and blue lines radiate from eye. Coral, rocky reef, depth to 15 m. Grows to 10 cm. Uncommon.

Family - TETRAODONTIDAE
Canthigaster callisterna

CLOWN TOBY

Dark-edged pale stripe from nose to tail, stripes continuing to upper and lower margins of tail. The head and back olive-green or grey with dark lines and small spots and scribbles. Reef, depth to 250 m. Grows to 23 cm. Common.

Family - TETRAODONTIDAE
Canthigaster valentini

BLACKSADDLE TOBY

Pale body with black patch over eyes and on tail base. Two central bars extend to belly. Short-based dorsal and anal fins distinguish from similar *Paraluteres prionurus*. Reef, depth to 55 m. Grows to 11 cm. Common.

Family - TETRAODONTIDAE
Reicheltia halsteadi

HALSTEAD'S TOADFISH

Sandy coloured body with blotched reticulate pattern top and sides, pale belly and slightly elongate eye. Solitary, in surge zones on surf beaches, sheltered bays, depth to 80 m. Grows to 16 cm. Uncommon.

Family - TETRAODONTIDAE
Tetractenos hamiltoni

COMMON TOADFISH

Sandy coloured, spots on back may form dark bands, dark teardrop blotches on sides. Skin with small spines. Similar *T. glaber* lacks spines, has reddish fins. Shallow sand areas, estuaries. Depth to at least 12 m. Grows to 14 cm. Common.

Family - TETRAODONTIDAE
Tetractenos glaber

SMOOTH TOADFISH

Pale body with light and dark blotches on back and teardrop blotches on sides. Reddish tail and dorsal fin, the body lacks spines of similar looking *T. hamiltoni.* Sheltered areas, rockpools, depth to 10 m. Grows to 16 cm. Common.

Family - TETRAODONTIDAE
Torquigener pleurogramma

WEEPING TOADFISH

Body is sandy above with close-set pattern of light and dark circular spots, stripe from behind eye to tail, thin vertical bars below eye. Sheltered bays, estuaries, on sand. Depth to 27 m. Grows to 22 cm. Common.

Family - TRACHICHTHYIDAE
Trachichthys australis

SOUTHERN ROUGHY

Circular body, bronze or dark coloured. Gill cover has white stripe followed by dark stripe, leading edges of fins white. Reef, depth to 1500 m. Grows to 15 cm. Uncommon in northern NSW.

Glossary

aboral in echinoderms, denoting the side or end that is furthest from the mouth.

adpressed lying closely against the adjacent part.

ambulacral groove the narrow groove on the underside of echinoderm arms.

antennule the first antennae of crustaceans.

apex, **apical (plural apices)** terminal, the highest point.

arborescent resembling a tree in growth or appearance.

arenaceous containing sand or sediment in the tissues.

autotomise to shed or cast off a body part.

axil spot a spot or blotch on the body of a fish adjacent to the pectoral fin base.

axis (plural axes) the main stem or branch, or the central filament of a structure.

benthic associated with or occurring on the bottom of a body of water.

bifurcate to divide into two branches.

byssal thread a fibre produced by bivalves to attach to the substrate.

calcareous containing calcium carbonate.

caryophyllidia tubercles containing spicules on the mantle surface of some nudibranchs.

cerata (singular ceras) finger-like processes on the dorsal surface of some nudibranchs. They function in respiration, digestion and defence.

cheliped the claw-bearing appendage of decapod crustaceans.

cilia (singular cilium) hair-like filaments that beat in unison to create water flow, also used for the transfer of food particles to the mouth of various organisms.

cirri a filamentous structure above the eye in some species of scorpionfish, also a slender claw-like appendage on featherstars used for locomotion or attachment to the substrate.

CITES the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

cnidosacs a small sac containing stinging cells at the apex of the cerata of some nudibranchs.

columella the central pillar surrounding the axis of a coiled shell including the inner lip of the aperture.

conules conical elevation on the body surface of certain sponges.

crustose a growth habit of some types of algae where the organism adheres very closely to the substrate.

cuvierian tubules clusters of fine tubes discharged from the anus of some sea cucumbers as a defence mechanism.

denticles tooth-like scales on the skin of sharks and rays, also refers to tooth-like structures found near the aperture of some shell species.

discal like, or relating to, a disc.

distal away from the point of attachment or from the centre of the body.

dorsal, dorsum the back or upper side of an organism.

enrolled cylindrical with a lateral groove.

epiphytes a plant or algae that grows upon another plant merely for physical support.

epithelial the thin tissue normally forming the outer layer of an organism's surface.

exhalant relating to the pores and siphons of sponges that emit circulated water.

fin rays structures that support the membranes of fins on fishes. May be soft or spiny.

finlets small, detached ray of a fin commonly found on Scombridae spp.

fistules of sponges, the conical structures that project through the substrate.

flagellum the slender, tapering, distal portion of the antennae or antennule, particularly relating to hermit crabs.

gamete the reproductive cells of an organism.

gonophores an organ in Hydrozoa that produces reproductive cells.

holdfast the root-like structure at the base of kelp that attaches the plant to the substrate.

infrapallial lobe part of the posterior section of the mantle of bubbleshells that folds up and over the apex of the shell.

inhalant relating to the pores and siphons of sponges that allow water to be drawn into the organism.

intertidal that area of shoreline between the extremes of high and low tides.

laminae a thin layer or plate-shaped structure of organic material, coral.

lamellate comprised of thin plate structures, similar to a stack of plates.

lirae (singular lira) a ridge on the shell surface within the outer lip.

lobophore a fan-like collection of tentacles used to collect food from the water column.

lunate shaped like a crescent moon. On fish, tails with extended upper and lower lobes.

madreporite a perforated plate-like organ that controls the inflow and outflow of water in the water-vascular system of echinoderms.

nacreous with a sheen resembling mother-of-pearl.

nematocyst a specialised cell found in the tentacles of animals belonging in the phylum Cnidaria. It contains a barbed or venomous coiled thread that is projected in self-defence or to capture prey.

nodulose having small protrusions or lumps.

ocellus an eye-like marking in the form of a spot or ring of colour.

operculum a horny or calcareous structure used for closure of the aperture in some marine gastropods; the bony flap that covers and protects the gills of fish.

oscula (singular osculum) an excretory structure of a sponge.

ossicles small calcareous structures embedded in the body of certain echinoderms.

papilliform in shape, resembling a projecting body part, such as a nipple.

papules small, ciliated projections on the outer surface of echinoderms, serving for respiration and excretion.

parapodia (singular parapodium) enlarged fleshy protrusions from the sides of the foot in bubble shells and sea hares, also projections from the sides of segments of polychaete worms.

periostracum a thin organic coating over the external surface of many shelled molluscs.

photosynthesis the process by which plants use sunlight, water and carbon dioxide to produce oxygen, and energy in the form of sugar.

pinnate resembling a feather, having similar parts arranged on either side of an axis.

plastids parts of a cell in plants and algae responsible for photosynthesis and food storage.

polymorphic a genetic variation resulting in the occurrence of two or more clearly different forms among the members of a single species.

polyp a structure typically having a columnar body with the mouth, surrounded by a ring of tentacles, uppermost.

post-spiracular behind the spiracle on sharks and rays.

proboscis in invertebrates relates to a tubular mouthpart used for feeding.

proximal close to the point of attachment or to the centre of the body.

pustulose marked with pimple-like projections.

radiole one of the many ciliated structures that forms the tentacles on fan or feather-duster worms.

ramuli (singular ramulus) small branches or branchlets, particularly relating to algae and seaweeds.

reticulate resembling a net or network pattern.

rhinophore a sensory tentacle on the head or anterior section of the mantle of nudibranchs and related molluscs.

rhizome a subterranean plant stem that sends out roots and shoots from its nodes.

rostrum in a crustacean is the projection of the carapace that extends forward of the eyes.

rugose wrinkled or corrugated.

setae a stiff hair-like structure, common on some invertebrates, with a variety of uses including sensing food and locomotion.

spicules are microscopic structures composed of either calcium or silica, which form part of the skeleton of sponges and echinoderms.

spiracle respiratory openings behind the eyes in sharks and rays.

stipe the stem between the holdfast of kelp and the kelp blades or fronds.

stolon a slender horizontal stem that attaches to or under the substrate.

stylets terminal horns found on the eyestalks of some species of adult crabs.

subtidal the region below the intertidal zone and always covered by water.

supraorbital the region immediately above the eye-socket.

symbiosis the relationship between two organisms that often results in a benefit to both.

telson the last segment of the abdomen, or an appendage attached to it, in crustaceans.

thallus (plural thalli) the plant body of algae or fungus.

theca the cup-like central body containing the mouth and visceral mass, as in featherstars.

tubercules small raised projections.

veliger the planktonic larva of many kinds of marine and freshwater gastropod molluscs, as well as most bivalve molluscs.

vesicle a small bladder-like cavity occurring in certain seaweeds and aquatic plants.

zooid one of the individual animals that make up a compound organism such as a bryozoan or ascidian colony.

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While all care has been taken with identifications and descriptions contained herein, any errors in this publication are solely the responsibility of the author.

With over 1500 photographs detailing more than 1300 species, this guide showcases a wide selection of invertebrates and fishes from the northern New South Wales coastline. It includes species found in rockpool and shallow offshore environments from Sydney to Tweed Heads (including Lord Howe Island), with a focus on the Solitary Islands off Coffs Harbour.

Ian Shaw is a scuba diver and rockpool rambler with over 30 years diving experience in Australia and South-East Asia. This work is essentially a citizen science project that originated from his efforts to identify many of the creatures he had photographed over that period and is sure to appeal to beach walkers, rockpool ramblers and scuba divers alike.