Victoria's Freshwater Fishes

E-version Part 1

Pictorial Guide to
Victoria's
Freshwater Fishes
Part 1
2018

e-Version Part 1

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Contents

Introduction

This book in 2 parts provides a pictorial account of all the freshwater fishes known in Victoria's waters, the rivers, lakes and streams, illustrated with over 700 images taken alive in aquariums as well as underwater in the wild. Included are species that live primarily in freshwater, as part of their life-cycle, and the estuarines that may normally be considered to be marine, but commonly travel up rivers or streams as adult or juvenile into the freshwater. Species that were reliably recorded from Victoria, but may have gone extinct recently are also included with images taken in neighbouring states or prior to their extinction. The native fishes are treated most comprehensively, whilst the introduced exotics to a lesser extend in Part 1. The largest family, the Galaxiidae is treated in a separate volume as Part 2.

Most Australian freshwater fishes are elongated, variably compressed and streamlined with a small head. Eyes are usually located centrally on sides of the head, but few bottom hugging fishes may have them placed high on the sides. Oxygen is obtained by the gills that are covered by solid plates and water flow is produced by moving the plates in and out to suck the water in through the mouth and expel it from the posterior long slit controlled by flaps. The body of fishes is usually covered with scales, but in many of the Victorian species they may lack and instead have a tough mucous coated skin. Large scales may restrict flexibility of the body and usually provide protection to the small perch-like species. Eels and galaxiid fishes that have minute embedded ones or completely lack scales easily undulate their body that is required for mobility in rocky fast flowing streams. Fins are arranged in various ways in their setting on the body and in their make up of rays. Fishes such as the galaxias have soft-rayed fins and scaled fishes usually have soft rays combined with sharp leading spines. Spines provide protection and soft parts are used for propulsion. An important feature is the lateral line, comprising series of structures with tubed pores leading to pressure sensors, like listening devices that provide information about movements of detect objects around them. They are most developed in schooling fishes to swim in harmony like birds in flocks, but are not always obvious in the small species. In the bottom orientated fishes the lateral line runs close to the back to sense the above and in most schooling species that usually swim midwater the line runs close the middle of their sides.

The characters used in this book are the external and usually clearly visible, but for consistency some counts may be provided for obscure parts of the body or fins, such as in the case of numerous tiny scales or the large number of fin rays such as in catfish and eels.

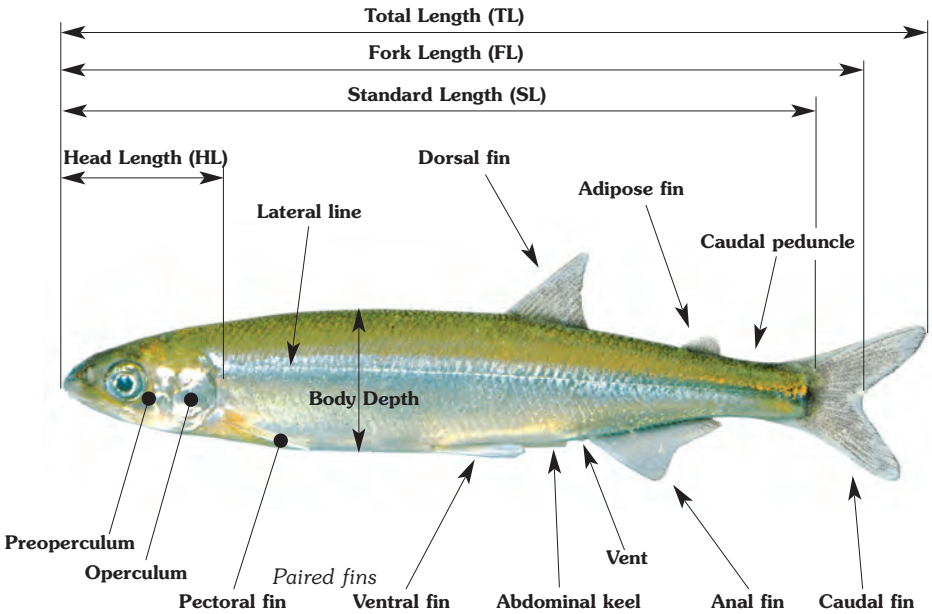


Figure 1. Terminology used

Character terminology

Counts and measurements vary between the various families due to the range of different characters and where needed a more detailed methodology is given under the family introductory segment. Lengths can be provided in certain ways and the use of a certain method usually differs between the way a fish is used. In figure 1 the commonly used ways are shown with their abbreviations in brackets. Standard length is often used when dealing with preserved specimens, fork length usually by fisherman for most species and total length by aquarists. For this book the total length is most appropriate, but standard length is sometimes used in the species descriptions.

Figures 1 & 2 show the terminology used in this book. Additional terminology that is unique to a family maybe provided in the treatment of that family. Fin-element counts are presented in combination of Roman and Arabic numerals, representing spines and rays respectively. Eg. IX, 9 means nine spines followed by nine rays. Counts of scales are only given where they are moderately distinct, not embedded or tiny. They are provided from either counting along the lateral line or diagonal scale rows along the centre of the sides. In general the used abbreviations are limited to those shown in the diagrams in figures 1 & 2.

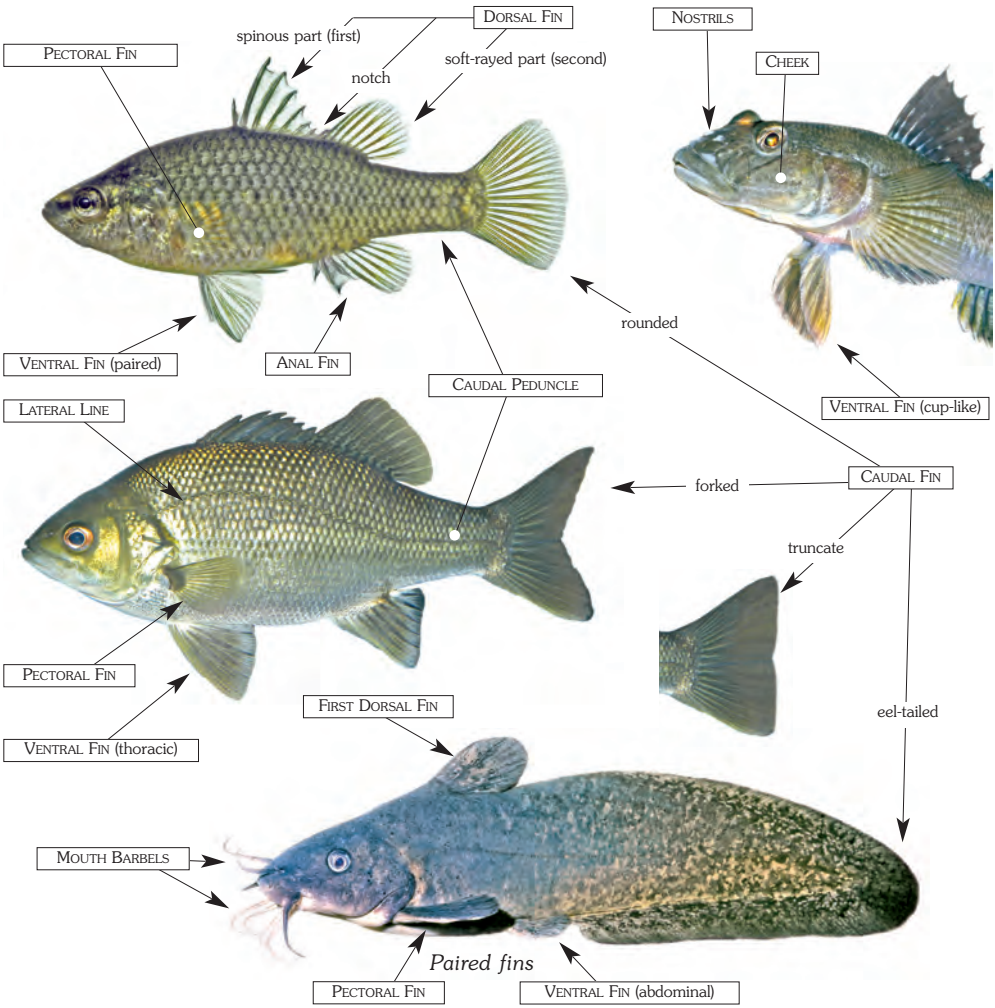


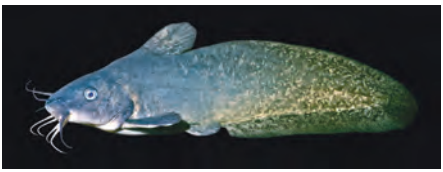
Figure 2. Terminology used

Quick-guide to the Families (Native Fishes)

Mordaciidae
Eel-like, no jaws, no paired fins, eyes positioned dorsally. Suction disk not surrounded by fringed lappets.....**p 8**

Geotriidae
Eel-like, no jaws, no paired fins, eyes positioned laterally. Disk surrounded by fringed lappets. .....**p 9**

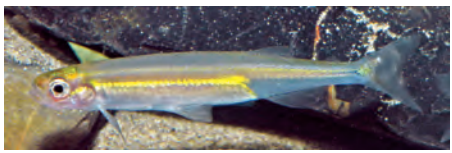
Anguillidae
Paired fins: pectorals present, no fin spines. Dorsal, caudal and anal fins continuous as one fin. No barbels on snout. .....**p 10**



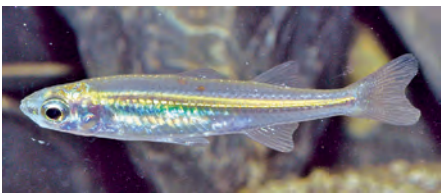
Plotosidae Tail eel-like. Second dorsal, caudal and anal fins continuous as one fin. 2 dorsal fins. Sharp stout spines leading dorsal and ventral fins. 4 pairs of barbels around mouth. .....**p 14**

Clupeidae Body compressed, scaly, very reflective silvery. Single dorsal fin midway on back. Series of keeled scales forming serrated edge ventrally along abdominal surface. .....**p 15**

Galaxiidae Body slender, often tubular, no scales present. Median fins set posteriorly from about vent. Lateral line distinct. .....**Part 2**



Retropinnidae Body slender, compressed, scales present. Lateral line indistinct. First dorsal fin above vent. Small adipose fin present. .....**p 19**



Atherinidae Body silvery, reflective. Scales loosely attached. Lateral line indistinct. Two separated dorsal fins of similar size, with ventral and anal fins mirrored below with slightly more separation. .....**p 24**

Melanotaeniidae Body deep and compressed. Two dorsal fins, first short, second long based. Anal fin long based, about half body length. Scales reflective, usually colourful. .....**p 28**

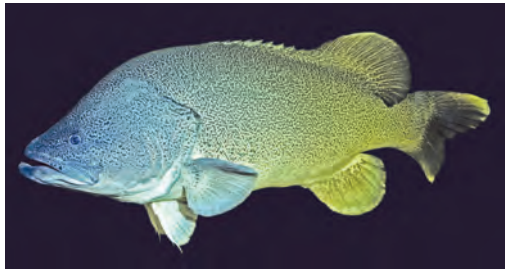
Ambassidae Small, silvery. Deep bodied, compressed. Caudal fin forked. Two dorsal fins joined at base, first triangular. Anal fin short based. .....**p 30**

Gadopsidae Body with minute scales and slimy. Mouth large. A single continuous long-based dorsal fin with numerous rays. Ventral fins thoracic and reduced to a single divided soft ray. .....**p 31**

Nannopercidae (Percichthyidae)
Small, body distinctly scaled, slightly compressed. Lateral line distinct. Mouth small. Caudal fin rounded. Two dorsal fins joined at base, first rounded. Anal fin base short. Large ventral fins headed by spine. .....**p 43**

Terapontidae
Ventral fins set posteriorly to pectoral fin bases. Mouth small, not reaching below *eye*. A scaly sheath along base of dorsal fin. .....**p 64**

Eleotridae Slender to oval shaped, head often depressed and body compressed. Ventral fins paired. Anal fin short based with one leading spine, set below second dorsal fin with similar base length. .....**p 70**



Percichthyidae Medium to large fishes. Mouth large in adult, reaching to posterior margin of *eye*. Ventral fins set below or anteriorly to pectoral fins. Moderately deep bodied with small scales. Dorsal fin with strong spinous section and slightly shorter, but taller soft part. Anal fin of similar size and set mirrored like below soft part. .....**p 53**

Pseudaphritidae Slender with moderate sized scales. Eyes high on head. Anal fin very long-based, headed by 2 spines, and many rays, its origin anterior to second dorsal fin origin. First dorsal fin short based. .....**p 68**

Gobiidae Small primarily marine fishes. Usually slender and slightly compressed. Head with short rounded snout. Two separate dorsal fins. Ventral fins joined, forming a cup. Anal fin headed by 1 spine. .....**p 84**

Quick-guide to the Families (Exotic Fishes)

Cobitidae Slender, covered in mucus. Barbels around mouth. Median fins well separated, single dorsal fin. .....**p 94**

Cyprinidae Body compressed. Stout spines heading dorsal and pectoral fins. No teeth in jaws. .....**p 95**

Percidae large spiny first dorsal fin. Anal fin short based, set below second dorsal fin. Head smallish. .....**p 100**

Poeciliidae Small with deep rounded belly. No fin spines and single dorsal fin. Ventral fins tiny, abdominal. .....**p 101**

Cichlidae Compressed scaly body with large head. A long-based dorsal fin without notch. .....**p 101**

Salmonidae Adipose fin present. Scales tiny. Dorsal fin tall, midway on back, ventral fins further back. .**p 105**

Family Mordaciidae – Southern Top-eyed Lampreys

The name "lamprey" is derived from Latin *lampetra*, which means "stone licker" (*lambere* = to lick & *petra* = stone). There are about ten genera of Lampreys (sometimes they are called lamprey eels) that are anti-tropical in the northern and southern hemispheres. The family Mordaciidae has three species found only in the southern hemisphere, one in Chile and the other two in Australia. Only one, the Short-headed Lamprey, is known from Victoria, whilst the second one, the Non-parasitic Lamprey, is known only from the Moruya and Tuross Rivers in New South Wales. The two species are virtually identical when young and the Non-parasitic Lamprey may also occur in rivers in Victoria.

The lampreys belong to the Petromyzontiformis, part of the Agnatha superclass of jawless fishes in the phylum Chordata (Agnatha means “no jaws”) a very ancient lineage of vertebrates. Adults are eel-like and their mouth lack jaws. Instead they have a round ventrally angled suction disc with numerous flat horny teeth (left: the larger orange upper and lower teeth). Juveniles are known as ammocete that live worm-like in the substrates of streams and rivers for some years, where they feed on detritus and micro-organisms. They metamorphose over a few months into a young adult with a tooth-bearing sucker disc that migrates downstream to the sea and become parasitic, attaching themselves to a host fish or mammals. They bore into the flesh to suck their blood. When fully grown it stops feeding and returns to the rivers to spawn, after which they soon die.

Shortheaded Lamprey *Mordacia mordax*

Petromyzon mordax Richardson, 1846. Tasmania.

Description

Adult body eel-like, but lacks paired fins. Eyes on top of head. Mouth of adult with sharp horny teeth on 2 plates. Each side of the body with a series of 7 small gill slits following eye. Two posteriorly set dorsal fins, second dorsal fin base about twice as long as first dorsal fin base. Anus positioned below second dorsal fin.

Size Length of larval stage up 17 cm, adult to about 56 cm TL.

Colour Young brownish, adults grey to bluish grey and silvery below.

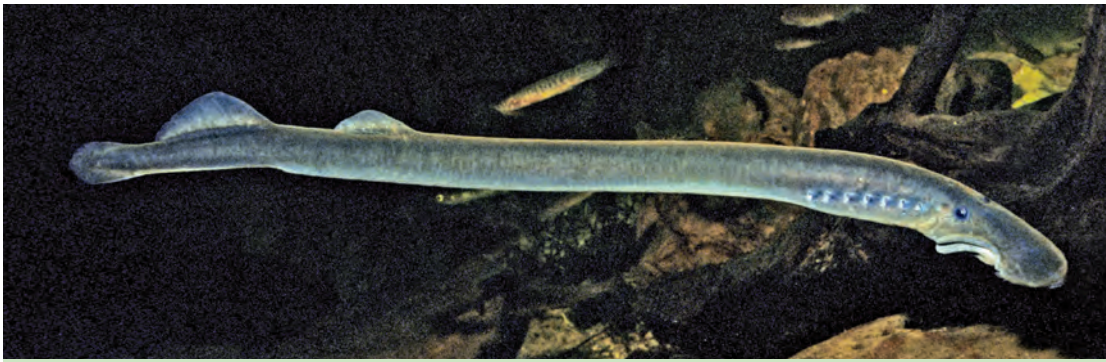
Distribution and remarks Occurs throughout just about all of Victoria’s waterways.

Similar species Other Lampreys.

Other names used Australian Lamprey or Murray Lamprey.

Family Geotriidae – Pouched Lampreys

This family has a single monotypic genus that occurs in cooler waters of the southern hemisphere. Similar to the Mordaciidae, but has eyes laterally placed, has short fleshy papillae fringing their oral disc, and their teeth are blunt versus sharp that are also arranged differently, otherwise similar to Mordaciidae, see previous page.



Pouched Lamprey *Geotria australis*

Geotria australis Gray, 1851. Onkaparinga River, SA.

Description
Adult body eel-like, but no paired fins. Eyes laterally on head. Males develop a large pouch-like feature beneath the head. Mouth of adult with blunt flat horny teeth on 2 plates (see opposite page). Each side of the body with a series of 7 small gill slits following eye. Two separate posteriorly set dorsal fins, second fin base is about 1.5 times as long as first fin base. Anus positioned below origin of second dorsal fin.

Size
Length of larval stage up to 10 cm, adult to about 60 cm TL.

Colour Young stages bright silvery with 2 longitudinal blue-green stripes on back. Adults in freshwater grey-brown to bluish grey and silvery below.

Distribution and remarks Occurs broadly along the south coast of Victoria from Bass Strait into South Australia and in the south-west part of Western Australia. It also occurs in New Zealand and the southern regions of south America.

Similar species Other Lampreys.

Other names used Pouch Lamprey or Wide-mouthed Lamprey.

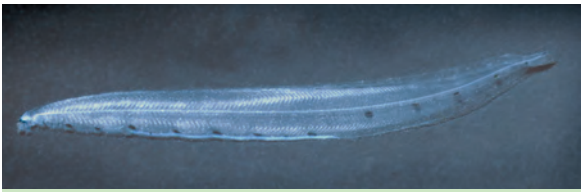
***Geotria australis* distribution in Victoria**

Family Anguillidae – Freshwater Eels

The family is represented by the single genus *Anguilla* with up to 19 species that spent most of their lives in freshwater, but spawn usually in the sea at particular sites. However, some large individuals may take residence in saltwater estuaries. Newly born eel larvae live only in the sea, and these transparent deep bodied flat fishes with a small head are known as leptocephali. As they grow into glass eels, their next stage, they enter estuaries and travel upstream in freshwater rivers as elvers and grow into adults. The adults have a long tubular body, strong and muscular, with a pointed head. The mouth is large, reaching well past the eye and jaws have numerous tiny teeth. As for paired fins, they lack ventrals, but have moderately large pectoral fins. Median fins are joined as one very long fin from the back around the tail to vent. Their tiny scales are thin, soft and embedded, barely visible, and their slimy coat makes the body very slippery. Two species are known from Victoria that are commonly referred to as shortfin and longfin in relation to the length of the dorsalfin, obvious by differences in dorsalfin origin above analfin origin, which also distinguishes them easily as different species.

The eels travel up rivers and streams and eventually settle in slow flowing or still water systems where they may live many years until sexually mature. This including lakes and swamps situated well inland, and during rain these fishes may move overland over considerable distances. Freshwater eels are predatory fishes that usually hunt at night and will attack relatively large prey. Although easily kept in an aquarium, the eels can not be kept with many other fishes.

Freshwater eels are important food fish and liked in many countries, regarded as good angling fish, being very strong and grow large. Many of the *Anguilla* taxa are aquacultured around the world, especially in Asian countries. In Victoria the Shortfin Eel is collected in some lakes for export.



Leptocephalus stage of *Anguilla australis* collected near Portsea in Port Philip Bay. Length about 70 mm and close to Glass Eel stage.

Above Shortfin Eel *Anguilla australis*. Dorsal fin origin only slightly anterior to anal fin origin. Plain colouration.
Below Longfin Eel *Anguilla reinhardtii*. Dorsal fin origin well in advance of anal fin origin. Blotched colouration.

Shortfin Eel *Anguilla australis*

Anguilla australis Richardson, 1841. Port Arthur, Tasmania.

Description
Adult long and cylindrical, body depth about 5–9% in TL. Head long, 10–14% TL with small gill-opening. Mouth large, about 30% in HL, jaws horizontal, lower jaw slightly protruding. Eye small, about 7% in HL, set above posterior end of mouth. Pectoral fins of moderate size, about as long as mouth, ovate and set just behind gill openings. Vent just anterior to midway of total length. Dorsal fin origin not far in advance of vent and anal fin origin. Body covered by a mosaic of tiny indistinct scales embedded in thick skin coated with a layer of mucus. Lateral line runs centrally as a series of small pores.

Size
Length females up to 1.1 m TL, males much smaller. Weight up to 3.2 kg.

Colour
Uniformly dark dusky brown over back and sides, pale whitish ventrally below head and body.

Distribution and remarks
Widespread in the southwest Pacific. Spawning is thought to occur in the Pacific Ocean at considerable depths. Its larval form, known as *Leptocephalus,* is a marine pelagic stage that occurs all year around in the ocean. Adults and juveniles occur in connecting coastal waters along all of Victoria's southeast coast and they can migrate far inland, reaching the upper reaches of many rivers and inland lakes via small streams or channels. Freshwater eels may move around obstacles overland at night, usually during heavy rain.

Similar species
Longfin Eel.

Other names used
Freshwater Eel, River Eel, Silver Eel.
Anguilla australis occidentalis.

Anguilla australis **distribution in Victoria**

Longfin Eel *Anguilla reinhardtii*

Anguilla reinhardtii Steindachner, 1867. Fitzroy River, Queensland.

Description
Adult long and cylindrical, its depth about 6–8% in TL. Head long, 12–18% TL with small gill-opening. Mouth large, about 34% in HL, jaws horizontal, lower jaw moderately protruding. Eye small, about 6% in HL, set above posterior end of mouth. Pectoral fins small, much shorter than length of mouth, ovate and set just behind gill openings. Vent anterior to midway of total length. Dorsal fin far in advance of vent and anal fin origin. Body covered by a mosaic of tiny scales embedded in thick skin coated with a layer of mucus. Lateral line runs centrally as a series of small pores.

Size
Length females up to 1.58 m TL, males much smaller. Weight up to 16.8 kg.

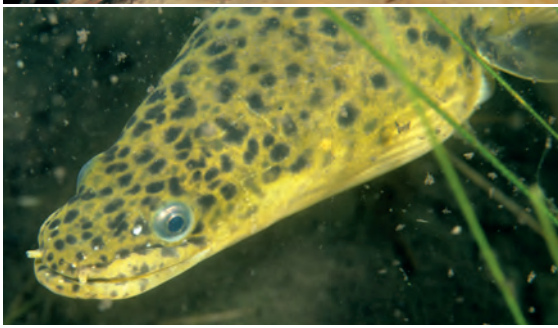
Colour
Brown to yellow with numerous small black spots over back and sides, pale yellow to whitish ventrally below head and body.

Distribution and remarks
Widespread along east coast of Australia and also known from New Caledonia and Lord Howe Island. This species seems to prefer the clear water rivers and lakes and is often found in fast flowing systems. Adults may also settle in marine estuaries where some individuals have been observed for a number of years living in the same crevices amongst rocks covered with oysters, and where they are often confused with conger eels.

***Anguilla reinhardtii* distribution in Victoria**

Similar species
Shortfin Eel and sometimes confused with conger eels.

Other names used
Freshwater Eel, River Eel, Spotted Eel.



Adult marine

Adult marine

Family Plotosidae – Eel-tailed Catfishes

The large family with about 35 species living in fresh and salt waters, but are primarily found in the tropical region of the Indo-West Pacific. They are characterised in having joined median fins into an eel-like tail that distinguishes this group from the closely related family Ariidae, which have a separate forked caudal fin. Only one species, the Freshwater Catfish *Tandanus tandanus*, occurs in Victoria.

Freshwater Catfish *Tandanus tandanus*

Plotosus tandanus Mitchell, 1838. Table lands, New South Wales.

Description

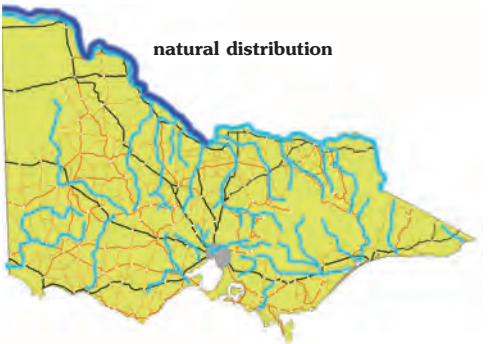
Head and anterior part of body broad, flattened below, changing to compressed posteriorly. Mouth angled downward with thick lips and four pairs of barbels around it. Dorsal fin divided. First part rounded, short-based and placed high on back, headed be a single spine with 6 rays. Second part continuous with caudal and anal fins with numerous rays (140 to 150 in total of continuous fins). Pectoral fin large and headed by a spine followed by 10 rays. Ventral fins small, abdominal and set well back, reaching anal fin. Scales are completely lacking and the skin is smooth. Lateral line present as a series of small pores running centrally from upper of gill opening to end of tail.

Size

Length reported up to 90 cm TL and a weight of 7 kg, but weight usually less than 2 kg.

Colour

Darkest on back, sides grey to brown with a dense pattern of darker to black blotches giving a mottle appearance, especially on the tail, and white below head and abdomen.



***Tandanus tandanus* distribution in Victoria**

Distribution and remarks

Throughout the Murray Darling system. Populations in coastal Queensland and New South Wales may represent a different species. In Victoria its natural occurrence is only the Murray River region (as shown in the map), but it was introduced to other parts, such as the Wimmera River and the Yarra River. They are carnivorous, feeding mainly on the bottom on a great variety of small creatures including large insects, crustaceans, molluscs and other fishes.

In most catfishes the fin spines are venomous and handling any of these fishes should be done with care.

Similar species None in Victoria.

Other names used Tandan, Eel-tail Catfish, Kenaru.

Family Clupeidae – Herrings

The large Herring family Clupeidae comprises more than 60 genera and over 200 species. They are mostly marine, but quite a large number live in freshwater or are diadromous. Only two freshwater species occur in Australia and they just range into Victoria: the Bony Bream *Nematalosa erebi* and the Freshwater Herring *Potamalosa richmondia* readily identified by their shape (see below).

Left *Nematalosa erebi,* deep bodied. **Right** *Potamalosa richmondia,* more slender.

Genus *Nematalosa* Regan, 1917

Gender: feminine. Type-species: *Clupea nasus* Bloch, 1795.
Members of the genus *Nematalosa* are known as gizzard shads, comprising eleven mostly marine species. They have a strongly-compressed body, small mouth, a sharp and serrated ridge ventrally, anteriorly to vent, formed by scute-like scales. Fins lack spines. A single centrally placed dorsal fin.

Bony Bream *Nematalosa erebi*

Chatoessus erebi Günther, 1868. Mary River, Queensland.

Description
Deep-bodied and very compressed. Head of moderate size with rounded snout. Mouth small and a little downturned. Scales moderately large, cycloid and in distinct rows, 40–46 rows along side. Ventral scales scute-like, forming a sharp serrated ridge. No scales on head and lateral line indistinct. Fins all soft rayed. Dorsal fin short based with 14–19 rays and last ray very long filamentous. Anal fin moderately long-based with 17–25 rays. Caudal fin large and deeply forked. Ventral fins rather small, mid-abdominal. Pectoral fins moderately large, tip reaching to above ventral fin origin.

Size
Length reported up to 32 cm. Length usually 12–15 cm TL. …

Colour
Silvery reflective scales on sides, some with dusky centers forming indistinct longitudinal stripes centrally, greenish silvery on back and white on belly. Gill covers sometimes yellowish.

***Nematalosa erebi* distribution in Victoria**

Distribution and remarks
Known from throughout the Murray Darling system, but found at altitudes less than about 200 m.
Reported as occurring widely throughout Australia and also known in Papua New Guinea, but is restricted in Victoria to the Murray River. A schooling species that can be locally abundant. Primarily feeds on the bottom.

Similar species
Other small silvery scaly fishes.

Synonyms
Chatoessus elongatus Macleay, 1883.
Chatoessus horni Zietz, 1896.
Chatoessus richardsoni Castelnau, 1873.
Fluvialosa bulleri Whitley, 1948.
Fluvialosa paracome Whitley, 1948.

Other names used
Bony Herring, Hairback Herring, Pyberry, Melon Fish, Tukari.
Fluvialosa richardsoni, Nematalosa richmondia

Freshwater Herring *Potamalosa richmondia*

Clupea richmondia Macleay, 1879. Richmond River, New South Wales.

Description
Body slender and compressed. Head rather small, its length about the same as body depth. Mouth small a little oblique, snout in front of centre of eye and lower jaw protruding. Eye large, about 33% in HL. Scales large, cycloid and in 41–48 rows along side. Ventral scales scute-like, forming a sharp serrated ridge. No scales on head and lateral line not visible. Fins all soft rayed. Dorsal fin short based, triangular and centrally on back with 15–18 rays. Anal fin small and short-based with 15–17 rays. Caudal fin large and deeply forked. Ventral fins small, triangular, mid-abdominal and set below dorsal fin. Pectoral fins set low and small, not reaching to near ventral fin origin.

Size
Length reported up to 30 cm. Usually 12–15 cm TL.

Colour
Body and head bright silver on sides, highly reflective. Back dusky or greenish yellow with dusky margins on scales. Usually has blackish longitudinal stripes on upper and lower sides. Lower stripe shows as a broad black band when viewed under water in situ (see page 18).

Distribution and remarks
Known only from the east coast in river systems ranging from northern New South Wales to just into Victoria. Fast swimming schooling fishes (see next page) that prefers clear water as they seem to rely on their eye-sight to feed in the water column on plankton and may also target surface insects. Mainly found commonly north from Sydney.

Similar species
Other small silvery scaly fishes.

Synonyms
Potamalosa antiqua Ogilby, 1897.
Potamalosa novaehollandiae Ogilby, 1897.

Other names used
Common Nepean Herring.

***Potamalosa richmondia* distribution in Victoria**

Schooling Freshwater Herring *Potamalosa richmondia* in the Bellinger River, New South Wales. These fishes are rarely observed underwater due to poor visibility. Upstream, away from farmland and pollution, the water is clear and this species can be abundant in such pristine habitats. Note the broad black stripe along their lower sides as they feed on plankton in the water column.

Family Retropinnidae – Prototroctinae & Retropinninae

A small family divided into two subfamilies: Prototroctinae, the southern graylings, and Retropinninae, the southern smelts. In both only two species were recognised with one of each in New Zealand and in Australia. The New Zealand grayling became extinct soon after their rapid 1930's decline. In Australia the smelt comprises a species complex, at least one in Tasmania and several more on the mainland. There are possibly three species in Victoria and perhaps several others in NSW and Qld.

The Australian Grayling attains a length of about 30 cm and lives in the larger rivers running into the Ocean on the east and south coasts, usually travelling in schools. The much smaller smelts occur in a variety of small creeks to the larger rivers in most parts of Victoria, but has three genetically distinct populations divided between the Murray system, south coast and eastern drainages of the Great Dividing Range. Members of this family are characterised by their body shape with small scales, the placement of a short-based dorsal fin, the presence of a small adipose fin and a forked caudal fin.

Prototroctinae
Body not transparent, dusky silvery in colour. Dorsal fin placed over area between ventral and anal fins, scales distinct. Mouth near horizontal and reaching to below front of *eye*. Lateral line indistinct. Medium sized, up to nearly 30 cm TL.....**p 20**

Retropinninae
Body semi-transparent, silvery or whitish in colour. Dorsal fin placed above anal fins, scales indistinct. Mouth oblique and just reaching to below center of *eye*. Lateral line present as a thin line. Small fishes, up to about 10 cm TL. .....**p 22**

Whitebait stage of *Prototroctes maraena* schooling during early May under St Kilda Pier, Hobson Bay. With a length of about 50 mm TL they are about ready to head for the Yarra River to migrate upstream.

Genus *Prototroctes* Günther, 1864

Gender: masculine. Type-species: *Prototroctes maraena* Günther 1864.
Comprises one species in Australia and there was one in New Zealand that became extinct a long time ago after destruction of their habitat. Medium, somewhat deep-bodied fishes, slender when young, more oval shaped as adult, the greatest body depth up to about 25% in SL, and compressed. Body covered by small cycloid scales. Further details in the single species account below.

Australian Grayling *Prototroctes maraena*

Prototroctes maraena Günther, 1864. Southern Australia.

Description
Dorsal fin short based, high on back with 9–13 soft rays, first ray longest followed by progressively shorter rays, last short. A small adipose fin midway between dorsal and caudal fin. Anal fin origin below posterior reach of dorsal fin with 16–20 soft rays, first longest, followed by progressively shorted rays, last one very short. Ventral fins placed midway of standard length. Pectoral fin set low with 12–14 rays. Caudal fin has 18 segmented rays. Body covered by small ctenoid scales in 68–84 mid-lateral rows and over top of head to above edge of preoperculum. Lateral line centrally as a straight line, but usually indistinct. Body slender, evenly curved profile, depth variable, juveniles most slender, adults usually less than 25% in SL. A shallow abdominal keel present in front of vent. Mouth small, near horizontal, just reaching to below front-edge of eye, snout jaw slightly protruding from lower jaw.

Size
Length up to 30 cm TL, but usually 20–25 cm.

Colour
Pale silvery yellowish brown to dusky grey above, shading to silvery-white below. Scales on upper half with dusky edges. In life adults may show large saddle-like dusky areas over the back and upper sides that show especially when seeing the fish underwater. Juveniles have a small dark peduncular spot. Fins usually clear in juveniles, but may show intermittently blackish areas. Operculum silvery, reflective.

Prototroctes maraena distribution in Victoria

Distribution & remarks
Widespread along Victoria's coast, diadromous, entering rivers and they may travel far inland up moderate elevations where this species spents most of its time. Adults were found in good numbers in Crooked River, some 100 km in a straight line from the sea. Also occurs north to about central New South Wales and in South Australia it has been observed and photographed in Ewens Ponds. Uses gravel beds as spawning sites.

Similar species
Juveniles may be confused with *Retropinna* species.
Synonyms None.
Other names used Yarra Herring.

Genus *Retropinna* Gill, 1862

Gender: Feminine. Type-species: *Argentina retropinna* Richardson 1848.
Comprises an undetermined number of species in Australia and two in New Zealand. Small slender fishes, becoming somewhat oval shaped in large females, the greatest body depth up to about 20% in SL, and compressed. Body covered by small, thin cycloid scales. Further details in species accounts.

Southern Smelt *Retropinna victoriae*

Retropinna victoriae Stokell, 1941. Victoria, Australia.

Description
Dorsal fin short based with 7–11 soft rays, its origin above vent. A small adipose fin above end of anal fin base. Anal fin long based with 13–19 soft rays, first few rays longest, followed by progressively shorted rays, last one very short. Ventral fin placed midway of abdomen. Pectoral fin set very low with 8–12 rays. Caudal fin has 18 segmented rays. Body covered by small and thin ctenoid scales in 50–70 mid-lateral rows in eastern populations and 70–92 in other populations, none on head. Lateral line straight as a thin dark line. Body of males slender, back with an almost straight profile and shallow depth; females deepening with a more curved profile. Males with a moderate abdominal keel in front of vent. Mouth oblique, just reaching to below centre of eye, jaws subequal or lower slightly protruding due to angle. Eye large, its diameter 25–35% of head length. Snout very short and rounded in males, length less than eye diameter, slightly more pointed in females.

Size Length up to 90 mm TL, but usually 60–65 mm.

Colour
Semitransparent silvery, dusky back and internal stripe just below lateral line to above vent, yellow in the southern and Murray system forms, and orange in the eastern form, brightest in males. Fins usually clear at all stages. A dotted black line formed by markings on ray-joints of dorsal and anal fins. Eastern form usually peppered with tiny black spots on back.

Retropinna victoriae distribution in Victoria

Distribution
Widespread in Victoria, but as subspecific populations in the inland drainages to the Murray River (1) and the coastal drainages of the southwestern (2) & eastern (3) zones.

Similar species
Retropinna tasmanica in Tasmania.

Synonyms
It was previously confused with *Retropinna semoni,* a smaller species from northern New South Wales and Queensland, in which adults have orange fins, the most obvious of the many subtle differences in colouration.

Other names used None.

<<< Murray River form (1 – Ovens River)

<< East coast form (3 – Brodribb River)

<< East coast form (3 – Tambo River)

<<<< East coast form (3 – Avon River, Briagolong)

Family Atherinidae – Hardyheads or Silversides

A large family of small fishes, comprising about 25 genera and 165 species worldwide. Most species are coastal marine, often found in estuaries, but some have adapted to freshwater. Some 9 genera and 25 species are recognised in Australia, many of which occurring in freshwater. One genus, *Craterocephalus* occurs in freshwater in Victoria with only 2 species, both in the Murray River, the Murray River Hardyhead *C. fluviatilis* and Unspecked Hardyhead *C. fulvus*. Other species in Victoria are primarily marine, but one of which and is included here: the commonly observed Small-mouthed Hardyhead *Atherinosoma microstoma*, as it can be found commonly in coastal freshwater lakes and lower reaches of rivers. All members of the family are small, silvery, translucent fish recognised by their two well separated dorsal fins, the first with slender spines, the second with a single first spine and soft rays. The anal fin has a single first spine (usually 3 in other similar fishes).

Genus *Atherinosoma* Castelnau, 1872

Gender: neutral. Type-species: *Atherinosoma vorax* Castelnau 1872 (Synonym of *A. microstoma*).
Comprises 2 or 3 closely related species known only from southeastern Australia. Coastal species, mostly occurring in estuarine waters, coastal lakes and river mouths. The species are small, up to about 10 cm SL and translucent silvery green appearance with reflective gills and midlateral line.

Atherinosoma
Scales diamond-shaped with straight edges. Ventral fin smaller than first dorsal fin. Anal fin with usually about 10 rays.
Hidden characters
Gill rakers not tuberculate, more than half diameter of pupil; premaxilla dorsal process short and broad.
..... **p 25**

Genus *Craterocephalus* McCulloch, 1912

Gender: masculine. Type-species: *Craterocephalus fluviatilis* McCulloch 1912.
Comprises about 25 species, known from Australia and New Guinea, mostly occurring in freshwater. Members are characterised by their small size, silvery appearance. Only 2 species are known from Victoria from the Murray River flood plains. These once common species have greatly declined in their numbers and have vanished from many sites in New South Wales due land clearing and the associated pollution from it, and the presence of exotic fishes such as Redfin, *Gambusia* and carp.

Craterocephalus
Posterior edge of scales rounded. Ventral fin and first dorsal fin of similar size. Anal fin usually with about 7 rays.
Hidden characters
Gill rakers tuberculate and less than half diameter of pupil; premaxilla dorsal process long and slender.
..... **p 26**

Small-mouth Hardyhead *Atherinosoma microstoma*

Atherina microstoma Günther, 1861. Tasmania.

Description

Two well separated short based dorsal fins V–IX; I, 8–11, first angular, pointed, second with slightly concave margin. Caudal fin forked and with 17 segmented rays; upper and lower lobe tips a little rounded. Anal fin (I, 8–12) slightly larger in size and mirrored to second dorsal fin. Pectoral fins 12–16 positioned high on sides; broad, upper rays longest. Ventral fin small and angular, set about mid-abdominal. Body elongate and moderately compressed. Caudal peduncle long and slender. Head large, 24–31% SL; snout somewhat pointed. Eye large and set just above midlateral level on side of head. Mouth oblique, just reaching to anterior edge of eye. Body covered with relatively large cycloid scales, extending forward onto head, operculum and cheeks. Lateral line shows as a thin whitish line. Midlateral scale rows 35–41.

Size Length up to 95 mm TL, usually about 80 mm.

Colour Body translucent with a greenish or yellowish silvery sheen above. White reflective silvery below lateral line. Brownish in freshwater. Parts on the head and lateral line with iridescent blue or green areas. Fins translucent clear to greyish.

Distribution and remarks

Widespread along the coast ranging from South Australia to northern New South Wales and northern half of Tasmania. A very common species in estuaries where forming massive schools. Commonly found in freshwater channels, lakes and slow moving waters near the coast. May comprise more than one species.

Similar Species Other hardyheads or small mullet.

Synonyms None.

Other names used Greyback, Silverside.

Atherinosoma microstoma distribution in Victoria

Murray Hardyhead *Craterocephalus fluviatilis*

Craterocephalus fluviatilis distribution in Victoria

Craterocephalus fluviatilis McCulloch, 1912. Junction Namoi R., Barwon R. and McIntyre River, Narrandera, NSW.

Description
Two well separated short based dorsal fins IV–VII; I, 5–8, first angular with slightly rounded margin, pointed, second with straight to slightly rounded margin. Caudal fin forked and with 17 segmented rays; upper and lower lobe ends rounded. Anal fin I, 6–9 and similar in size to second dorsal fin. Pectoral fins moderately large, broad, positioned high on sides with 11–13 rays, upper rays longest and lowest very short. Ventral fin angular similar in size to first dorsal fin, set mid-abdominal. Ventral and anal fins mirroring dorsal fins, but are much more separated. Body elongate and moderately compressed. Caudal peduncle long and slender. Head large, about 28% SL. Eye large and set just above midlaterally level on side of head. Mouth small, protrusible, not reaching to anterior edge of eye. Body covered and most of head with moderately large cycloid circular scales, extending forward to above head. Lateral line shows as a series of dashes forming a thin blue line. Midlateral scale rows 31–35.

Size
Length up to about 70 mm TL, usually much smaller.

Colour
Body translucent yellowish above, pale silvery white below, Lateral line as a thin iridescent greenish line, shaded by a dusky stripe below. A dark spot at upper of operculum and at start of lateral line. Fins transparent to translucent pale yellowish.

Distribution and remarks
Historically known from the Murray-Darling River system in South Australia, Victoria and New South Wales, where once abundant, but has vanished from most of its geographical range and now appears to be restricted to few lakes associated with the Murray River. The Murray Hardyhead is mainly threatened by degrading habitats in which carp and other exotic fishes do well, especially the pestfish *Gambusia*.

Similar Species
Unspecked Hardyhead *Craterocephalus fulvus*.

Synonyms Was confused with *Craterocephalus eyresii*.

Other names used None.

Unspecked Hardyhead *Craterocephalus fulvus*

Craterocephalus stercusmuscarum fulvus Ivantsoff, Crowley & Allen, 1987. Collarenebri, New South Wales,

Description
Two well separated short based dorsal fins IV–VIII; I, 5–9, first angular with rounded margin, pointed, second with slightly concave near vertical margin. Caudal fin forked and with 17 segmented rays; upper and lower lobe ends rounded. Anal fin I, 6–9 and similar in size to second dorsal fin. Pectoral fins moderately large, broad, positioned high on sides with 11–14 rays, upper rays longest. Ventral fin angular similar in size to first dorsal fin, set about mid-abdominal. Ventral and anal fins mirroring dorsal fins, but more separated. Body elongate and moderately compressed. Caudal peduncle long and slender. Head large, about 25% SL; snout somewhat pointed. Eye large and set just above midlaterally level on side of head. Mouth small, protrusible, not reaching to anterior edge of eye. Body covered with thin, relatively large cycloid oval scales, extending forward to above head. Lateral line shows as a thin blue line. Midlateral scale rows 32–35.

Size
Length up to 80 mm TL, usually about 60 mm.

Colour
Body translucent bluish grey to yellowish above, and reflective silvery white below lateral line. An indistinct to distinct dusky stripe from snout through eye, continuing below lateral line. Parts on the head and lateral line with iridescent blue or green areas. Fins clear or translucent to pale yellowish.

Distribution and remarks
Known in Victoria only from the Murray River system. This species was originally regarded as a subspecies of *Craterocephalus stercusmuscarum* that occurs further north in the system. This species, the Flyspecked Hardyhead, has many small dark spots over the back and along upper sides. As *C. fulvus* is a closely related form without the spots over the back the name Unspecked Hardyhead was adopted.

Similar Species
The Murray Hardyhead *Craterocephalus fluviatilis,* but this species lacks the dusky stripe on the snout.

Other names used Flyspecked Hardyhead.

Craterocephalus fulvus distribution in Victoria

Family Melanotaeniidae – Rainbowfishes

A large family of tropical fishes restricted to the Australia and New Guinea regions, comprising an undetermined number of species in 6 genera. At least 16 species in 4 genera occur in Australian waters and perhaps as many as 60 species in the New Guinea region where many species are localised on islands or valleys surrounded by mountainous terrain. Only one species, *Melanotaenia fluviatilis,* ranges south into Victoria. Rainbowfishes are the only Australian freshwater fishes that have been utilised extensively as aquarium fishes.

Genus *Melanotaenia* Gill, 1872

Gender: feminine. Type-species: *Atherina* (*Melanotaenia*) *nigrans* Richardson, 1843.

Murray Rainbowfish *Melanotaenia fluviatilis*

Aristeus fluviatilis Castelnau, 1878. Murrumbidgee River, New South Wales.

Description

Body compressed and slender when young, deepening with age. Greatest depth at vent, anterior to midway of SL. Two separated dorsal fins V–VIII; I, 10–13, first short-based, its origin above vent, second long-based with posterior tip reaching caudal fin in males. Caudal fin shallowly forked. Anal fin I, 17–21 with long base about total of both dorsal fin bases. Pectoral fins moderately large, broad, positioned midway up on sides with 11–14 rays, upper rays longest. Ventral fins set about mid-abdominal. Caudal peduncle short and deep. Head large, about 28% SL; snout somewhat pointed. Eye large and set just above midlaterally level on side of head. Mouth small, oblique, upper jaw short. Body covered with relatively large cycloid rounded scales, extending forward to above head and usually about 11–16 scales on cheek. Lateral line not visible. Midlateral scale rows 35–37.

Melanotaenia fluviatilis distribution in Victoria

Size Length up to 90 mm TL, usually about 60–70 mm. Males grow larger than females.

Colour Reflective silvery with bluish or greenish iridescence, greenish on back and bluish on abdominal region, and usually shows a darker broad midlateral band that intensifies on caudal peduncle. Males may show yellowish longitudinal lines between scale rows and a red spot develops on the upper gill cover. Dorsal and anal fins become yellowish with a submarginal dark band and caudal fin turns red, especially during displays.

Distribution and remarks
Widespread in the Murray Darling River system. Known in Victoria only from the Murray River and its tributaries at low altitudes up to about 170 m and its range is largely restricted by water temperatures. Recorded from the, Broken River, Goulburn River, Loddon River, the Lake Nagambie area. Has become rare in most areas due to loss of habitat and pollution. Fish shown here are wild fish from the Ovens River. They occur in schools and they can often be seen swimming near to surface.

Similar Species
None in Victoria.

Synonyms
None.

Other names used
Australian Rainbowfish,
Crimson-spotted Rainbowfish, Pink Ear.

Family Ambassidae – Glassfishes

A family of mainly tropical small fishes comprising about 40 species that are variously distributed in the Indo-Pacific region. They are mainly coastal fishes and about half of the species occur in marine estuaries or in protected coastal bays. Some can live in both fresh and saltwater, but 6 species are restricted to freshwater in Australia and one of which ranges south in the Murray River in Victoria. They are small semi-transparent silvery fishes, deep bodied with large fins. Dorsal fin is deeply notched and caudal fin forked. Ventral and anal fins are set about below spinous and soft rayed sections.

Genus *Ambassis* Cuvier, 1828

Gender: feminine. Type-species: *Centropomus* (*Ambassis*) *ambassis* Lacepède, 1802.

Olive Perchlet *Ambassis agassizii*

Ambassis agassizii Steindachner, 1867. Fitzroy River, Rockhampton, Queensland.

Description

Body deep at abdominal region, very compressed. Greatest depth at ventral fin inserts. Dorsal fin deeply notched VII; I, 7–9, spinous part short based, triangular, its origin at greatest body depth, second part with similar base length, headed by a long spine and its margin slightly concave. Caudal fin deeply forked. Anal fin I, 17–21 with moderately long base and concave margin, similar to soft part of dorsal fin directly above. Pectoral fins moderately large, reaching to about vent 12–13 rays, upper rays longest. Ventral fins set below pectoral fin base. Caudal peduncle moderately long and deep. Head large, its length about 40% SL; snout somewhat pointed. Eye large and set at about midlateral level on side of head. Mouth large, oblique, reaching to below anterior edge of eye. Body covered with relatively large cycloid scales, extending forward to above head and usually a few small scales on cheek. Lateral line as a long and somewhat down-curving line with intermittent tubed or pored scales. Midlateral scale rows 24–25.

Ambassis agassizii distribution in Victoria

Size Length up to 80 mm SL, usually less than 60 mm TL.

Colour Semi-transparent, reflective silvery, greenish on back and upper sides. Scales with yellowish dusky margin, giving it an overall olive colour. Fins clear in young, developing black on membranes between longest spine in fins and often some blackish areas on soft parts of dorsal and anal fins.

Distribution and remarks

Widespread in the Murray Darling River system and coastal region from northern New South Wales to southern Queensland. Known in Victoria only from the Murray River where it has become rare due to pollution and exotic predators such as Redfin. Occurs in various habitats, usually forming schools around branching logs or aquatic vegetation.

Similar Species None in Victoria.

Other names used Agassiz's Glassfish, Agassiz's Perchlet, Chanda Perch, Glassy Perchlet, Olive Glassfish. *Ambassis castelnaui*, *A. nigripinnis*, *Priopis nigripinnis*, *P. olivaceus*, *Pseudambassis castelnaui*, *P. nigripinnis, P. pallidus*.

Family – Gadopsidae (Percichthyidae) – River Blackfishes

The Gadopsidae name for the River Blackfishes seem to have derived from the resemblance to some members of the large cod family the Gadidae in the northern hemisphere, especially the freshwater Burbot (*Lota lota*), and some of the Gadiform marine fishes in southern waters. They were recently moved from their own family Gadopsidae, and placed together with Nannopercidae as subfamilies in the family Percichthyidae, but the true percichthyids from South America are so unlike them that they should not be combined. Australia's biggest freshwater fish, the Murray Cod is included with the Percichthyidae family at present and their ancestral forms would have been close relatives in Gondwana times, but if any of the Australian families should be placed into Percichthyidae is highly questionable. The Gadopsidae & Nannopercidae are retained here, reverted back as families in the Perciformes, which is most sensible from a taxonomic point of view.

The river blackfishes are freshwater only and endemic to southern regions of Australia with only three species recognised as valid, but there are genetically different populations in the various drainages of the Great Dividing Range and in the western region of Victoria. *Gadopsis marmorata* is used as a 'catch-all' for most populations. The recently named *G. bispinosa* has a more restricted occurrence along the inland slopes of the divide and the overlooked McCoy's *G. gracilis* from the Yarra River is clearly valid, but within the genus there are several other cryptic species. Members of Gadopsidae are characterised by having their ventral fins reduced to single dividing rays, which functions as a feelers rather than fins, placed under the head (see image below). Because of this character, at some stage *Gadopsis* was thought to belong to the Blennioid family (Richardson, 1848, Stead, 1908).

There have been several attempts to analyse the different forms in these fishes within and between populations of *Gadopsis marmorata*, that show much variation in morphology and colour, but only one additional species was described (Sanger, 1984), whilst failing to recognise *G. gracilis* as valid. Tables produced, such as meristics versus altitudes or data plotted in graphs by meristics seem the wrong approach to separate any of these as a valid species. Recent work (Hammer *et al*, 2014) was along the lines of Sanger's work and suggested that the various taxa-complexes were likely to contain cryptic valid species, but went no further and again *G. gracilis* was ignored. As found in Galaxiidae, differences become more evident in correlation with the various river systems or drainages, showing consistencies in their morphometrics and colour within the populations.

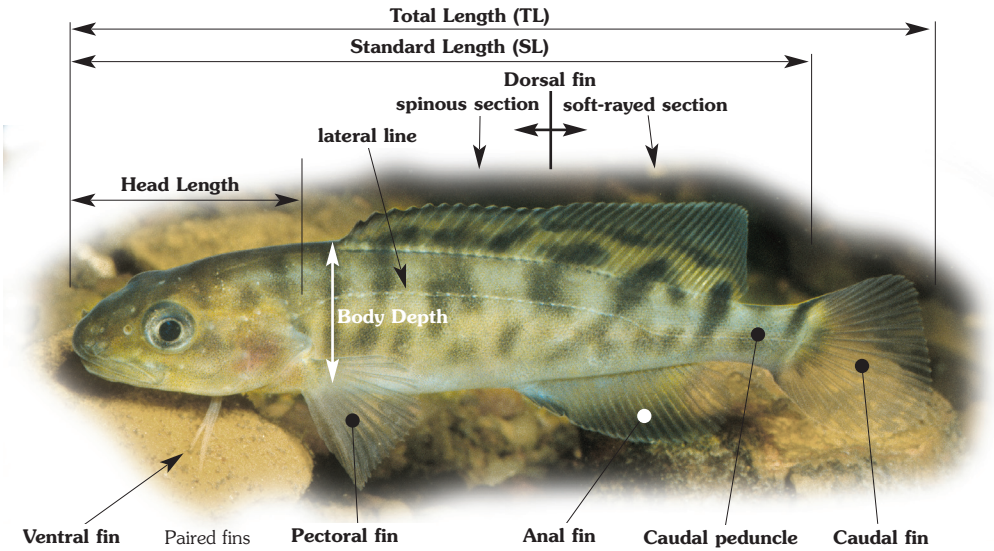


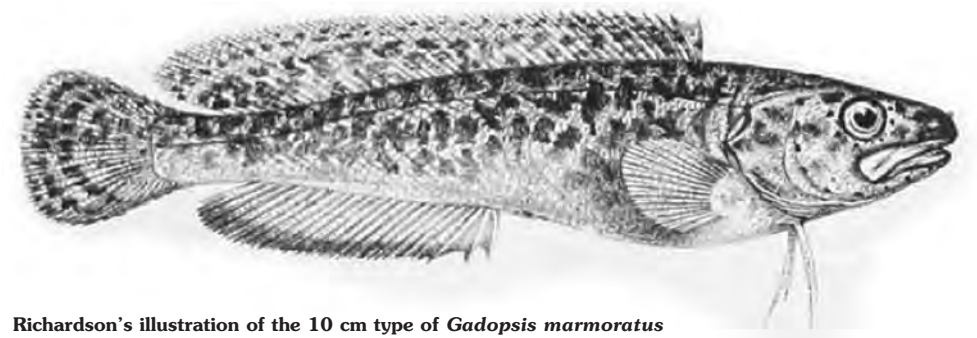
Figure 3. Terminology used

Genus Gadopsis Richardson, 1848

Gender: feminine. Type-species: *Gadopsis marmoratus* Richardson 1848.

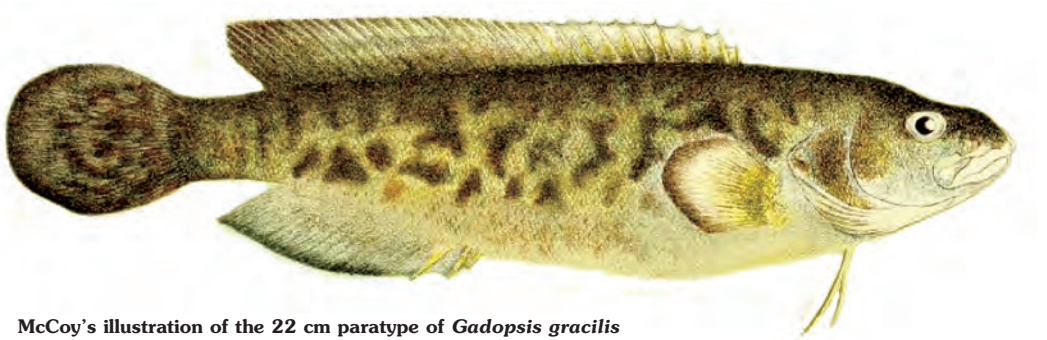
Gadopsis is the only genus name applied to the river-blackfishes. Generally are small, usually not exceeding 30 cm, but *G. gracilis* can reach over 60 cm. There are six or more nominal species, most of which were going under *G. marmoratus* and *G. bispinosus* names. As the genus gender is feminine, the correct names for these are *G. marmorata* and *G. bispinosa*. McCoy's *G. gracilis* was named from the Yarra catchment and is also valid, whilst his *G. gibbosa* from the Bunyip River is regarded synonymus based on morphology description, which suggests it to be a more juvenile *G. gracilis*. Blackfishes appear to prefer slow moving lowland streams, lakes and billabongs, but some population are in fast flowing streams, including in the high country with rocky substrates. They are mainly nocturnal, hiding under logs or rocks during the day, but were observed being active during the day in some creeks and Ewens Ponds, S.A., in deep water, 15–20 m. Behaviour may relate to intensity of light. They feed on all kinds of creatures, including other fish.

Valid and Nominal species



Richardson's illustration of the 10 cm type of *Gadopsis marmoratus*

Richardson described *Gadopsis marmoratus* from a single specimen about 10 cm TL. Locality as 'Rivers in the southern parts of Australia'. Fins as D.X,25–26; A.III,19; P.17; V.1. The description and illustration matches the populations from the Murray River region of SA and Glenelg River basin in Victoria. It has a moderately high number of dorsalfin spines and a whitish bar above the pectoralfin base, as shown in the above figure. Head profile flat or slightly convex over eye.



McCoy's illustration of the 22 cm paratype of *Gadopsis gracilis*

McCoy had 3 specimens, about 10, 22 and 64 cm TL. He provided river localities, the Yarra and Watts, and fins as D.XI–XII,26–27; A.III,18; P.16–17. The description and illustration matches the populations from Healesville (Yarra/Watts) and the Bunyip River catchment. *Gadopsis gracilis* has a higher number of dorsalfin spines and it can grow much larger (up to 3x) than *G. marmorata*. Note the short first dorsalfin spine and concave profile above the eye, typical in adults.

Gadopsis bispinosa is distinct in having only I–III dorsalfin spines, being more slender and has a smaller head than the members of the *G. marmorata* complex. This taxon may comprise two forms as the western populations from the Goulburn River catchment look rather different from the typical (var.1) and need further investigation.
Gadopsis* cf *marmorata from the Wannon River catchment has a low number of dorsalfin spines (VI–VIII).
Gadopsis* cf *gracilis is deep-bodied with D.XII–XIII,27 and distinct colouration, to date known only from Darlot Creek.

It is clear that different catchments contain localised forms and that there are several more valid species. Illustrations seen from the east coast show fish as far north as southern Queensland that can not be identified, all going under the 'catch all' name of *Gadopsis marmoratus*. Population sympatric with *G. bispinosa* in the Goulburn look very different as well.

Main Literature used

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Spring-fed and crystal clear Ewens Ponds. In the deepest parts *Gadopsis marmorata* congregates on some rocky ledges and were found to be active during the day at about 20 m depth. Most river-blackfishes occur in lowland slow running streams, lakes and billabongs, but some populations at moderately high altitudes in fast flow and rocky substrate habitats.

Darlot Creek in southwestern Victoria. Adult *Gadopsis* cf. *gracilis* were trapped at night. Schools of *Galaxias maculatus* and some *Galaxias* sp. 1 were observed in the fast flowing sections with an abundance of aquatic vegetation. *Nannoperca australis* and *N. obscura* were present in large numbers, and *Galaxiella* was common in the sheltered overgrown parts.

River Blackfish *Gadopsis marmorata*

Gadopsis marmoratus Richardson, 1848. Rivers in the southern parts of Australia.

Description

D.IX–XI,25–30. The 1st spine long, followed by progressively slightly longer spines, end of soft part rounded. A.III,17–20, spines short, end of soft part rounded. P.16–18 and strongly rounded. Ventral fins jugular (set below head) comprising just a single divided ray. Body covered by tiny ctenoid scales (almost impossible to count). A distinct lateral line with evenly long curves and a series of tubed pores, rising from upper of gill opening, following contour of back to below posterior half of soft dorsal to a midlaterally section along caudal peduncle. Head profile convex above eyes. Body depth variable at all sizes, but usually about 25% SL. Mouth large, just reaching to below posterior-edge of eye.

Size

Length up to 25 cm TL, but usually 15–18 cm. Sizes are based on fish observed.

Colour

Adults dark brownish grey to near black or reddish brown with large dusky to near black blotches over head and most of the body, darkest above, shading to greyish or bluish ventrally. Colours well extended onto the fins. A pale broad bar behind head above pectoral fin base. Median fins with pale to white narrow margin. Juveniles more brownish or yellowish.

Distribution

As a complex of localised taxa ranging from variations to species in the Murray and Darling River systems, inland drainages of the Great Dividing Range and in the southwest the Glenelg River and South Australia's subcoastal lowlands.

Gadopsis marmorata-complex distribution in Victoria

Similar species

Other members of the genus.

Synonyms

Brosmius bleasdalii Blandowski, 1858. (lower Murray)
Gadopsis fuscus Steindachner, 1884. (South Australia)

Other names used

Freshwater Blackfish, Marbled River Cod. Slippery or Slimy.

Remarks

Type specimen 10 cm. The name *Gadopsis marmorata* was used as a 'catch all' for genus members. Although variable in colour, the species have certain colour characteristics that can be use to identify them, apart from their geographical location. In Stead, 1908, an illustration of the taxon in New South Wales shows a large adult of *G. bispinosa* on plate LXXX.

Ewens Ponds, SA >>

Typical form. Winnap. Glenelg River

Creighton. var. Goulburn River

Wannon River, Hamilton >>>>

Wannon River Blackfish *Gadopsis* cf. *marmorata*

Undescribed species.

Description

Dorsal fin VI–VIII,26–30. The 1st spine shortest, followed by progressively slightly longer spines and soft rays, end of soft part rounded. Anal fin III,16–19, spines short, end of soft part rounded. Pectoral fin 15–16 doubled rays, large and strongly rounded. Ventral fins jugular with just a single divided ray. Body covered by tiny ctenoid scales (almost impossible to count). A distinct lateral line with an intermittent series of long-tubed pores rising from upper of gill opening, following contour of back, and descending below posterior half of soft dorsal fin to a straight section midlaterally along caudal peduncle. Head with several large pores. Body depth variable at all sizes, but generally usually slender ranging about 20–25% SL. Mouth large, reaching to below posterior half of eye.

Size

Length up to 17–20 cm TL. Sizes are based on fish observed.

Colour

Adults dark dusky-yellow with blackish mottling and large blotches on sides of the body. Colours well extended onto the fins. A dark blotch followed by a whitish broad bar behind head and above pectoral fin base. Small juvenile more brownish or yellowish with dusky blotches. Median fins with pale to white narrow margin along soft rays. Spines of dorsal fin with black tips forming a line, often shaded by a white line below. Juveniles more yellowish.

juvenile

Distribution

Appears to be restricted to the Wannon River catchment of coastal Victorian region.

Similar species Other members of the genus.

Remarks

Superficially similar to *Gadopsis marmorata*, but dorsalfin with fewer spines (modally 7 versus 10).

<< Darlot Creek

Condah River Blackfish
Gadopsis cf. *gracilis*

Undescribed species.
Only 2 specimens were collected from Darlot Creek in the Condah region of southwestern Victoria, which joins the Fitzroy River near the coast. Large, 20–24 cm in TL and they appeared to be fully grown adults. Fin meristices virtually identical to *Gadopsis gracilis* with D.XII–XIII,27; A.III,17; P.16–17, but deeper bodied and has a unique colouration. Juveniles were not seen.

River Blackfish reported from the more eastern coastal drainages, including the Otways, were reported as *Gadopsis marmorata* were not seen, but are likely to be this taxon or closely related.


Yarra River

Yarra River Blackfish *Gadopsis gracilis*

Gadopsis gracilis McCoy, 1879. Yarra River, Victoria, Australia.

Description

Dorsal fin XI–XIII,25–28. The 1st spine very short, 2nd twice as long, followed by progressively slightly longer spines, rays slightly higher and end of soft part rounded. Anal fin III,17–19, spines short, end of soft part rounded. Pectoral fin 14–16 rays and rounded. Ventral fins jugular (set below head) with just a single divided ray. Body covered by minute ctenoid scales (almost impossible to count). A distinct lateral line with an intermittent series of tubed pores, curving up from upper of gill opening, following contour of back, and descending below posterior half of soft dorsal fin to a straight section midlaterally along caudal peduncle. Head with several large pores, adult profile concave above eye. Body depth variable at all sizes, but usually about 25% SL. Mouth large, just reaching to below anterior half of eye.

Size

Length up to 65 cm TL, but usually 20–25 cm. Sizes are based on fish observed.

Colour

Yellowish brown when juvenile to near black in large adults. Usually barred with black over the back with some splitting into an upside down 'V' and fading below lateral line. In large adults the pattern persist, but may break up into blotches and in general the body colour darkens variably brown to near black. Dorsal fin spines with whitish tips, shaded by a black line.

Distribution

Coastal drainages of the Great Dividing Range from about the Yarra River to the Snowy River system, but it comprises a taxa complex of eastern forms that are close siblings of an undetermined status. Occurs in streams with moderate flows and from low altitudes in the foothills to moderately high up in the Snowy River.

Similar species Other members of the genus.

Synonyms *Gadopsis gibbosus* McCoy, 1879 (?). Bunyip River. Morphology description suggest it being more juvenile.

Gadopsis gracilis distribution in Victoria

Other names used

Freshwater Blackfish, Eastern or Southern River Blackfish, Marbled River Cod. Slippery or Slimy.

Remarks

The name *Gadopsis marmoratus* was used in general for all members in the genus. Juvenile *G. gracilis* have an irregular pattern of dark blotches some forming bars, and adults are grey with similar but busier pattern or have black saddles and spots to almost completely black. The type illustration by McCoy confirms the adult pattern. The River Blackfish found on Tasmania's north coast may also be this species. It now occurs in many other areas in Tasmania caused by introductions to other rivers and stocking in dams. It was informally named *Gadopsis tasmanica* by Parrish (1966).

<<<< **Bunyip River**

Two-spine River Blackfish *Gadopsis bispinosa*

Gadopsis bispinosus Sanger, 1984. Cheshunt, Victoria.

Description
Dorsal fin I–III,35–39. Spines weak and slender, the 1st spine very short, 2nd about twice as long, followed by a longer 3rd (if present), few increasingly longer rays and than subequal rays with posterior half slightly taller until rounded end. Anal fin III,17–20, spines short, rays progressively longer and end of soft part rounded, mirroring dorsal fin part above. Pectoral fin moderately large with 14–15 rays and strongly rounded. Ventral fins jugular (set below head) with just a single divided ray. Body covered by very tiny ctenoid scales (almost impossible to count). A distinct lateral line with numerous tubed pores curving up from upper of gill opening to below origin of dorsal fin, following contour of back, and descending above anal fin to a straight section midlaterally along caudal peduncle. Head with several large pores, its profile evenly curved with rounded snout. Body slender, depth variable at all sizes, but usually shallower than 24% SL. Mouth large, just reaching to below anterior half of eye.

Size
Length up to 32 cm TL, but usually up to 25 cm (McDowall).

Colour
Typical form yellow-brown when juvenile to brown in large adults with a mosaic pattern of large dark brown blotches that extend high up into the dorsal fin and onto caudal fin. Usually a black blotch at origin of lateral line and a white blotch just behind it a fraction lower. Colour patterns most distinct in juveniles. Fins greenish yellow with broad dusky margins and median fins with whitish tips on rays, forming a white margin in some individuals. Dark form with indistinct blotching and lacks blotched below origin of lateral line.

Distribution
Inland drainages of the Great Dividing Range from about the Goulburn River into New South Wales. Occurs in streams with strong flows and in Victoria at moderately high altitudes. Nocturnal, hiding under logs, rocks or overhung banks that are exposed to the currents. Two forms, the western dark-form taxa from the King and Goulburn Rivers look different from the typical mosaic patterned from the eastern part of the geogaphical range.

Gadopsis bispinosa distribution in Victoria

Similar species
Other members of the genus, but *Gadopsis bispinosa* has a distinct mosaic pattern and few feeble dorsal fin spines.

Synonyms
None.

Other names used
Freshwater Blackfish, Marbled River Cod. Slippery or Slimy.

Remarks
The name *Gadopsis marmoratus* was widely used for a long time for all members in the genus. *G. bispinosa* is completely different in colour and may look greenish when first caught.

Large adult – Corryong, Murray River tributary

var. 1 – ? King River

Ovens River >>>

var. 1 – Goulburn River

Little River, Taggerty
***Gadopsis bispinosa* habitat (western form)**

Family Nannopercidae (Percichthyidae) – Pygmy Perches

The family Nannopercidae comprises the genera *Nannoperca* with 6 species and *Nannatherina* with one species restricted to southwestern Australia. A distinctive group of small fishes that were recently placed in the family Percichthyidae, but are considerably different from the large members such as the Murray Cod that closely resemble percichthyids. They are endemic to Australia and all but one species occur along the southern regions from Western Australia to Victoria and Tasmania. *Nannoperca oxleyana* is the exception, as it occurs in northern New South Wales and Queensland. There are three species known in Victoria, the widespread *Nannoperca australis* with several genetically different populations, basically divided over the inland drainages from the Great Dividing Range and western and eastern coastal populations. *N. obscura* is found in the southern coastal regions of Victoria west from Port Phillip Bay. Populations were known just east of Port Phillip Bay, but appeared to have gone extinct. The third species, *N. variegata* is restricted to the Glenelg region of Victoria and in South Australia where it was originally discovered in Ewens Ponds.

Pygmy perches are small scaly fishes, that occur in slow moving streams, lakes and billabongs and can be locally common, less than 10 cm in total length and usually 5–7 cm fully grown. These fishes feed on a variety of small animals such as tiny crustaceans or insect, mainly taking from the water column or the bottom. Habitats in most areas were lost due to land clearing, drainage alterations, pollution and the introduction of exotic plants and animals, including salmonid fishes and *Gambusia*.

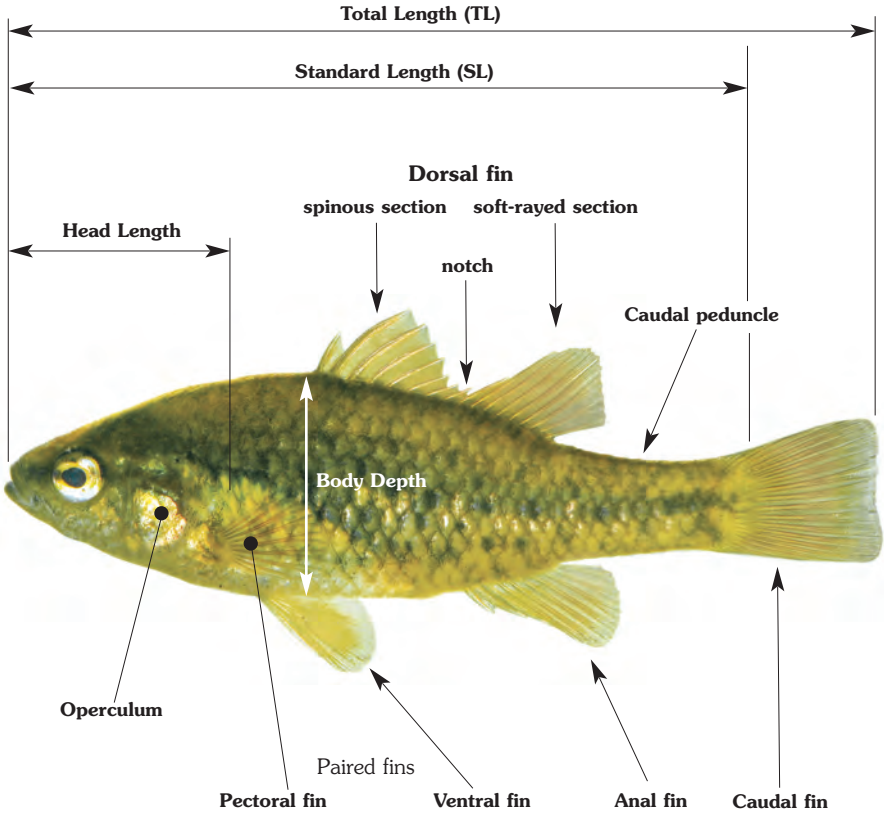

Figure 4. Terminology used

Genus *Nannoperca* Günther, 1861

Gender: feminine. Type species: *Nannoperca australis* Günther 1861.
Small, moderately deep-bodied fishes, oval shaped and slightly compressed, the greatest body depth usually more than 30% in SL. Body covered by medium-sized ctenoid scales in about 30 mid-lateral scale rows extending more or less on top of head where sometimes cycloid. Lateral line present (except in *Nannoperca oxleyana*) as two section of series of irregularly placed tubed scales. Anterior section from head to below dorsal fin, following contour of body, and posterior section midlaterally straight from below dorsal fin to caudal fin. Dorsal fin single, deeply notched centrally. All other fins rounded. Male and female are similar marked, but breeding males may have bright colours.

Taxonomy

The genus *Edelia* was used for *obscura* and *vittata* based on minor differences that are often lost in large adults. The inclusion with *Nannoperca* was further supported by molecular work. Victoria has 3 species: *N. australis, N. obscura* and *N. variegata*, all of which range into the eastern regions of South Australia. Western Australia has 2 species: *N. pygmaea* and *N. vittata*, whist the single taxon *N. oxleyana* is found only in northern New South Wales and southern Queensland. The species *N. australis* and *N. vittata* comprise genetically distinct populations that virtually look the same and maybe sub-specific, but these are best treated as localised forms or variations.

Quick-guide to the *Nannoperca* species

Nannoperca australis. Second dorsal fin spine longest and third often subequal. Abdomen not coloured. **p 43**

Nannoperca obscura. Second dorsal fin spine distinctly longest. Males drab with black ventral and anal fins. **p 46**

Nannoperca variegata. Third dorsal fin spine distinctly longest. Males with bright orange abdomen. **p 48**

Main Literature used

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Southern Pygmy Perch *Nannoperca australis*

Nannoperca australis Günther, 1861. Murray River, Australia.

Description
Dorsal fin VI–IX, 7–10, usually VIII, 9. The 2nd spine longest and 3rd often subequal. Anal fin III, 6–9, usually 7–8. Pectoral fin 11–14, usually 12–13. Body covered by ctenoid scales in 28–32 mid-lateral rows and extended over top of head to about interorbital region. Lateral line with an intermittent series of tubed scales from upper of gill opening to about below centre of dorsal fin, following contour of back, and a straight series midlaterally from below soft dorsal fin to caudal fin. Body depth variable, usually more than 30% in SL, but sometimes slightly less in adults. Mouth small, just reaching to below front-edge of eye. Eye diameter about 29% in head length.

Size
Length up to 90 mm TL, but usually 60–65 mm.

Colour
Pale creamish to green or yellowish brown, darkest on top and grading to whitish on belly. Dark spots and blotches on sides, but extremely variable and usually with a more distinct enlarged peduncular spot. Breeding makes show vivid red colouring in the median fins, usually with broad black edges, and a series of red or pink blotches intermittently midlaterally above the abdomen. Females do not develop bright colours. Some geographical variations.

Distribution
Widespread in the low elevated waters of Victoria and can be locally common in coastal regions. Also ranging well into South Australia and occurs in the Murrumbidgee River in southern New South Wales. Regions shown in the map below as **1** to **3** represent the areas which have populations that are considered to be genetically slightly different. This species occurs in slow-flowing systems with good vegetation. They usually occur in small aggregations in wetlands and billabongs.

Similar species
None when adult. Juveniles of different species can look similar.

Synonyms
Paradules leetus Klunzinger, 1872. Murray River, SA
Nannoperca riverinae Macleay, 1881. Murrumbidgee River
Microperca tasmaniae Johnston, 1883. Esk River, Tasmania.
Nannoperca australis flindersi Scott, 1971. Lackrana, Flinders Island, Bass Strait, Tasmania.

Other names used None.

Remarks
This species has lost most of its habitat and populations are scattered as isolated pockets. Predation from Redfin and trouts is another treat, whilst the pestfish *Gambusia* is also harmful. Unlike the latter, the Southern Pygmy Perch is an excellent fish for mosquito control in Victoria.

Nannoperca australis distribution in Victoria

Southern populations of *Nannoperca australis*


western Victoria


Ewens Ponds, SA


Beaufort >>


Lancefield


Ewens Ponds, SA


Frankston >>


Tuerong


Langwarrin

Eastern populations of *Nannoperca australis 'flindersi'*


Stratford >>


Orbost


Yarram >>>


Bruthen >>>


<< Flinders Island (type-locality for var. *flindersi*)

Yarra Pygmy Perch *Nannoperca obscura*

Paradules obscurus Klunzinger, 1872. Yarra Lagoon, Melbourne, Victoria.

Description
Dorsal fin VIII–X, 7–9, usually IX, 8. The 2nd spine distinctly longest. Anal fin III, 6–7, usually 7. Pectoral fin 11–13, usually 12. Body covered by ctenoid scales in 28–30 mid-lateral rows and over top of head to short of interorbital region. Lateral line with an intermittent series of tubed scales from upper of gill opening to about below centre of dorsal fin, following contour of back, and a straight series mid-laterally from below soft dorsal fin to caudal fin. Body depth variable, from about 30–35 % in SL, least depth in large adults. Mouth small, not quite reaching to below front-edge of eye. Eye diameter about 25% in head length.

Size
Length up to 75 mm TL, but usually 50–60 mm.

Colour
Dusky brownish, yellowish or greenish grey with few blackish spots. Darkest on back, gradually changing to pale ventrally. Blackish irregular spots usually mid-laterally as a intermittent series, most of which on caudal peduncle. Each scale with a dusky margin. Tail base usually with a pair of larger spots and a whitish chevron bar followed by a pupil-size dusky spot. Fins semi-translucent to yellowish. Breeding males do not produce vivid colours, but the spinous part of the dorsal fin, anal fin and ventral fins may turn black during display.

Distribution
Southern Victoria west from the Melbourne region and ranging to the Koorong in South Australia. The Yarra Pygmy Perch prefers still or slow-flowing systems and usually occur in small aggregations in well-vegetated streams, wetland lagoons and billabongs. The species is often found sympatric with *Nannoperca australis*, but is much less common and has a much more limited geographical distribution.

Nannoperca obscura distribution in Victoria

Similar species
Juveniles or females of other pygmy perches that show little colour.

Synonyms
Paradules obscura Klunzinger, 1872.
Microperca yarrae Castelnau, 1872.

Other names used None.

Remarks
This species has lost most of its habitat and populations are scattered as isolated pockets. In most areas their numbers have rapidly declined. Predation from Redfin and trout is a great treat, whilst the pestfish *Gambusia* is also harmful. Unlike the latter, the Yarra Pygmy Perch is an excellent fish for mosquito control in Victoria.

May hybridise with *Nannoperca australis*.


Lancefield >>


breeding male


Langkoop. 75 mm TL


Lancefield. 70 mm TL


Lancefield >>


Condah >>>>

Ewens Pygmy Perch *Nannoperca variegata*

Nannoperca variegata Kuiter & Allen, 1986. Winnap, Victoria.

Description
Dorsal fin VIII–IX, 9–10. The 3rd spine longest. Anal fin III, 8–9. Pectoral fin 14, rarely 15. Body covered by ctenoid scales in about 30 mid-lateral rows and over top of head well short of interorbital region. Scales on head cycloid. Lateral line with an intermittent series of tubed scales from upper of gill opening to about below centre of dorsal fin, following contour of back, and a straight series mid-laterally from below soft dorsal fin to caudal fin. Body depth slightly variable, from about 32–35 % in SL, least depth in large adults. Mouth small, reaching to just below front-edge of eye. Eye moderately large, diameter about 30% in head length.

Size
Length up to 65 mm TL, but usually 50–55 mm.

Colour
Dusky, yellowish or greenish grey with few to many irregular blackish blotches. Darkest on back, gradually changing to pale ventrally. A horizontal blackish band on head from snout through eye onto body as a series of dark blotches mid-laterally. Blotched may form up to 3 horizontal series along sides in dark individuals. Each scale with a dusky margin. Usually with a black pupil-size round to vertically elongated spot on tail base. Breeding males produce vivid colours from ochre to bright red-orange on the fins and ventrally on the body. Eye yellow.

Distribution
Known from Ewens Ponds, in the Eight Mile and the Deep Creek drainage system, SA, and from creeks in the Glenelg River system in Victoria. Found in the streams in primarily fast flowing habitats with dense aquatic vegetation and gravel and rocks. In Ewens ponds it occurred primarily in the high-current races connecting the ponds.

Similar species
Juveniles or females of other pygmy perches that show little colour.

Nannoperca variegata distribution in Victoria

Synonyms None.

Other names used
Golden Pygmy Perch, Variegated Pygmy Perch.

Remarks
This species has a very restricted distribution and in Victoria it is threatened by salmonids that occur in the same streams. A few fish were kept in a large aquarium with currents created by power filters and fed garden-amphipods, mosquito larvae and small shrimps (also marine mysids). Eggs were deposited amongst rocks and guarded by the male. Fry often laid on the bottom and would shoot around in the water column in pursuit of planktonic prey. Fry were about 5 mm in length and grew to about 20 mm in about eight weeks. After being released in a large pond some reached the adult stage.

gravid female

breeding male

Ewens Ponds, 1981 >>

Winnap, type-locality

Early stages of *Nannoperca variegata* (26.10.06 to 07.01.07)

Family Percichthyidae – Temperate Perches

A family of medium to large species with about 10 genera and may comprise more than 20 species, but the inclusion of several genera and species is questionable. They are closely related to the very large marinefish family Serranidae that is very diverse and has been divided in many subfamilies or families, depending on the different views of taxonomists. Similarly, depending on ones view is the inclusion of some groups such as the Pygmy Perch and River Blackfish. Using molecular techniques certainly show them to be closely related, but the interpretation of data can result in different views to where to draw the line.

Most species regarded as true percichthyids occur in freshwaters of Australia, South America and a few marine species in the northern Pacific area. The greatest number of species occur in Australia and these are generally known as freshwater cods, perch and basses. They occur primarily in temperate regions, but some range to subtropical zones and the Bloomfield River Cod, *Guyu wujalwujalensis,* is a tropical species from northern Queensland. The best known Murray Cod is the largest freshwater fish in Australia that can attain a weight of well over 100 kg. Several of the larger species are used in aquaculture. Some species have become rare due to river regulation and degradation or pollution.

In Victoria the genera *Maccullochella* and *Macquaria* are true percichthyids and perch-like, characterised by their elongate-oval body shape with large sturdy fins. They have a large single dorsal fin notched at their last two spines, with large sections of spine and soft rays with bases of about equal length. The anal fin is similar to soft section of dorsal fin and set mirror-like below. First soft ray of ventral fins is often extended with a short filament. Body covered in small ctenoid scales and with a distinct long curving lateral line.

Quick-guide Percichthyid species

Caudal fin forked. Anal fin margin about vertical. *Macquaria novemaculeata* **p 54**

Caudal fin forked. Anal fin margin not vertical. *Macquaria colonorum* **p 56**

Caudal fin rounded. Head laterally compressed, concave. Medium sized scales. *Macquaria australasica* **p 57**

Caudal fin rounded. Head compressed, very concave. Very small scales. *Macquaria ambigua* **p 58**

Caudal fin rounded. Head dorsally depressed. Upper jaw protruding. *Maccullochella macquariensis* **p 60**

Caudal fin rounded. Head dorsally depressed. Lower jaw protruding. *Maccullochella peelii* **p 62**

Genus *Macquaria* Cuvier, 1830

Gender: feminine. Type species. *Macquaria australasica* Cuvier 1830.
Comprises 4 species that are know as Bass or Perch. Since 1830 several more genera were applied to these fishes: *Ctenolates, Murrayia, Paschalestes, Percalates, Plectroplites, Riverina* … junior synonyms. Two species occur inland, which have rounded tails, and two on the coastal fringes, which have forked tails.

Australian Bass *Macquaria novemaculeata*

Macquaria novemaculeata distribution in Victoria

Dules novemaculeatus Steindachner, 1866. Port Jackson, New South Wales.

Description
Dorsal fin VII–IX, 8–11. Spinous section rounded, the 3rd spine longest. Anal fin III, 7–9, short based with margin near vertical. Pectoral fin 12–16. Body covered by small ctenoid scales, extending onto cheek on head. Scales on head cycloid. Lateral line distinct with 48–55 scales from upper of gill opening to about below centre of dorsal fin, following contour of back, and a straight section mid-laterally from below end of soft dorsal fin to caudal fin. Body compressed and deep, depth about 42 % in SL. Head large, length about 37% in SL. Head profile near straight to slightly concave. A sharp spine on end of operculum. Mouth moderately large, reaching to just below front-half of eye. Eye moderately large, diameter about 27% in head length.

Size
Length reported up to 60 cm TL and a weight of 3.8 kg.

Colour
Dark grey with silvery scales, an olive to greenish overtone and yellowish on the side of the head. Pectoral fin base dusky and a dusky blotch on upper operculum membrane. Individuals seen underwater looked near black. Fins dark grey and brownish, lower fins and caudal fin with narrow white leading edges. Small juveniles have large black blotches on first dorsal ventral and anal fins, and dusky narrow bands on body.

Distribution and remarks
Known from eastern coastal streams and lakes from about Lake Entrance to Fraser Island. It migrates downstream to breed in estuaries, but also occurs in land locked lakes. They were seen in small aggregations around large rocks formations and large tree logs in the Bellinger River in New South Wales. Some very large individuals were observed underwater in Lake Hiawatha that would easily match the reported 60 cm length. These were swimming in open water and came in as small groups of 4–6 and seemed to be curious, but quickly disappeared after first coming fairly close.

Similar species Estuary Perch, Macquarie Perch and Silver Perch.

Other names used Common Perch, Freshwater Perch.

Synonyms *Percalates fluviatilis* Stead, 1906. *Dules reinhardti* Steindachner, 1867. *Lates similis* Castelnau, 1872.

Estuary Perch *Macquaria colonorum*

Lates colonorum Günther, 1863. Victoria.

Description

Dorsal fin VIII–IX, 8–11. Spinous section rounded, the 4th & 5th spines longest, first very short. Anal fin III, 7–9, short based and margin not vertical. Pectoral fin 12–16. Body covered by small ctenoid scales, extending to below eyes on cheek on head. Scales on head cycloid. Lateral line distinct with 48–55 scales from upper of gill opening to about below centre of dorsal fin, following contour of back, and a straight section mid-laterally from below end of soft dorsal fin to caudal fin. Body compressed and deep, depth about 40 % in SL. Head large, length about 35% in SL. Head profile near straight in young to shallowly concave in adults. A small spine on end of operculum. Mouth moderately large, reaching to below front-half of eye, lower jaw protruding. Eye moderately large, diameter about 20% in head length.

Macquaria colonorum distribution in Victoria

Size

Reported length up to 75 cm TL and a weight of 10 kg.

Colour

Silvery grey, dark on back changing to whitish below. Mostly silvery in estuaries and coppery or brownish in rivers. Fins dark brownish grey.

Distribution and remarks

Occurs along entire Victorian coast and ranges into South Australia and north to northern New South Wales. Also occurs in northern Tasmania. Mainly occurs in estuaries and more saline water than pure freshwater and breeds in salt water parts of estuaries. Larval stages are planktonic in the sea.

Similar species Australian Bass and Macquarie Perch.

Other names used Australian Bass and Macquarie Perch.

Synonyms

Dules novemaculeatus var. *alta* Klunzinger, 1872.
Lates antarcticus Castelnau, 1872.
Lates curtus Castelnau, 1875.
Lates ramsayi Macleay, 1881.
Lates victoriae Castelnau, 1872.

Macquarie Perch *Macquaria australasica*

Macquaria australasica Cuvier, 1830. Macquarie River at Bathurst, New South Wales.

Description
Dorsal fin with moderate notch, VIII–XII, 11–14. Spinous section rounded, the 4th & 5th spines longest, first very short. Anal fin III, 8–11, short based and margin rounded. Pectoral fin 12–16, margin rounded with upper rays longest. Body covered by small ctenoid scales, extending to below eyes on cheek on head. Scales on head cycloid. Lateral line distinct with 42–60 scales from upper of gill opening to about below centre of dorsal fin, following contour of back, and a straight section mid-laterally along caudal peduncle. Body compressed and deep, depth about 35 % in SL. Head large, length about 28% in SL. Head profile near straight in young to shallowly concave in adults and snout somewhat rounded. Operculum with two serrated spines. Mouth moderately large, reaching to below front-half of eye, and jaws about equal. Eye moderately large, diameter about 24% in head length.

Size
Reported length up to 46 cm TL and a weight of 3.5 kg.

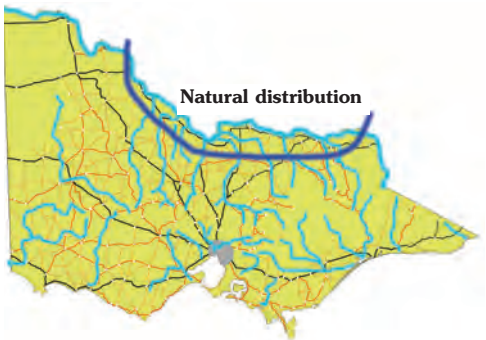
Colour
Dark silvery grey to near black with coppery sheen. Eye whitish to silvery. Fins dark dusky to brownish grey.

Distribution and remarks
Natural occurrence is along a large section of the Murray River and the associated low land regions in Victoria. It has been introduced to many other rivers, including the Yarra.

Similar species Golden Perch and juveniles similar to juvenile Silver Perch or small Redfin.

Other names used Silvereye, White-eye, Mountain Perch, Bream, Black Bream.

Synonyms
Murrayia bramoides Castelnau, 1872.
Dules christyi Castelnau, 1872.
Murrayia cyprinoides Castelnau, 1872.
Riverina fluviatilis Castelnau, 1872.
Murrayia guntheri Castelnau, 1872.
Murrayia jenkinsi Macleay, 1885.
Murrayia riverina Macleay, 1881
Dules viverrinus Krefft, 1868.



Macquaria australasica distribution in Victoria

Golden Perch *Macquaria ambigua*

Datnia ambigua Richardson, 1845. Locality unknown.

Description

Dorsal fin VIII–XI, 11–13. Spinous section rounded, the 3rd & 4th spines longest, first very short. Anal fin III, 7–10, short based with margin rounded and near vertical. Pectoral fin 15–18 large, broad and rounded with lowest rays moderately long and upper rays not much longer. Ventral fin with feeler-like extentions on first soft ray. Caudal fin rounded. Body covered by small ctenoid scales, extending onto cheek on head. Scales on head cycloid. Lateral line distinct with 50–63 scales from upper of gill opening to about below centre of dorsal fin, following contour of back, and a straight series mid-laterally from below end of soft dorsal fin to caudal fin. Body compressed and becoming deep in adults, depth about 39 % in SL. Head large, length about 33% in SL. Head profile slightly rounded in small juveniles to deeply concave in adults. A sharp spine on end of operculum. Mouth moderately large, reaching to just below front-half of eye. Eye diameter about 16% in head length.

Size

Length reported up to 76 cm TL and a weight of 23 kg, but usually much less and 5 kg is considered a good size fish.

Colour

Variable from greenish grey to golden yellow with dusky back and upper sides. Paired fins and spinous parts of dorsal and anal fins yellow in adults.

Macquaria ambigua distribution in Victoria

Distribution and remarks

Throughout the Murray-Darling system at low altitudes, but may comprise more than one species. Occurs mainly in warm slow flowing rivers and flood plain lakes. They can tolerate high temperatures and often occur in very turbid conditions.

Similar species Large fish are distinct, but juveniles could easily be confused with various other scaly fishes.

Other names used Yellowbelly, Callop, Murray Perch.

Synonyms

Dules auratus Castelnau, 1872.
Dules flavescens Castelnau,1875.
Ctenolates macquariensis Günther, 1871.
Macquaria ambigua oriens Musyl & Keenan, 1992.

Genus *Maccullochella* Whitley, 1929

Gender: feminine. Type species. *Grystes macquariensis* Cuvier, 1829. Replacement name for *Oligorus* Günther 1859 (preoccupied). Comprises 2 species in Victoria and *Maccullochella ikea* and *M. mariensis* are found only in New South Wales and Queensland. They are the largest freshwater fishes in Australia.

Trout Cod *Maccullochella macquariensis*

Grystes macquariensis Cuvier,1829. Macquarie River, Bathurst, New South Wales.

Description

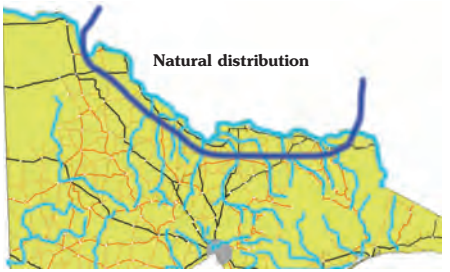
Dorsal fin moderately notched at last spine XI–XII, 14–16. Spinous section evenly rounded over tips, first spine very short, the 5th & 6th spines longest. Soft rays elevated taller than longest spine and posterior margin strongly rounded. Anal fin III, 10–13, short based with margin strongly rounded, similar in size and mirrored to soft part of dorsal fin. Pectoral fin 19–20 large, broad and evenly rounded with outer rays fairly short. Ventral fin inserted below pectoral fin with feeler-like extentions on first soft ray. Caudal fin broadly rounded. Body covered by small mostly ctenoid scales, changing to cycloid onto head, snout naked. Lateral line with 63–82 scales, curving up from upper of gill opening following contour of back to a straight part mid-laterally from below end of soft dorsal fin to caudal fin. Body elongate oval shaped and compressed. Caudal peduncle deep and long, its length similar to the length of bases of soft part of dorsal and anal fins. Head large, slightly depressed, about 35% in SL, with a mostly straight to posteriorly slightly rounded profile. Operculum with a small angular flat spine, and flap fleshy. Mouth large, reaching to below *eye*. Lower jaw clearly overhung by upper. Eye changes from a moderate size in young to becoming relatively small in large adults.

Size

Reported up to 85 cm TL and 16 kg weight, but usually up to 5 kg.

Colour

Grey to bluish or brownish with a pattern of vermiculating dark spots. A horizontal line on snout to *eye* and behind *eye* to edge of preoperculum that become indistinct in large individuals. Ventral and median fins dusky to blackish with distinct white outer margins, spines with white tips.



Maccullochella macquariensis distribution in Victoria

Distribution and remarks

Natural distribution was the southern region of the Murray-Darling system, but this species has been introduced to other parts in Victoria. Once an abundant species that has greatly declined in their numbers and populations.

Similar species Other *Maccullochella* species.
Other names used Blue-nose Cod, Blue Cod.
Synonyms
Gryptes brisbani Lesson, 1825 (not valid).
Grystes brisbani Lesson, 1831.
Oligorus gibbiceps Macleay, 1885.
Oligorus mitchelii Castelnau, 1873.

Murray Cod *Maccullochella peelii*

Acerina (Gristes) peelii Mitchell, 1838. Peel River, New South Wales.

Description

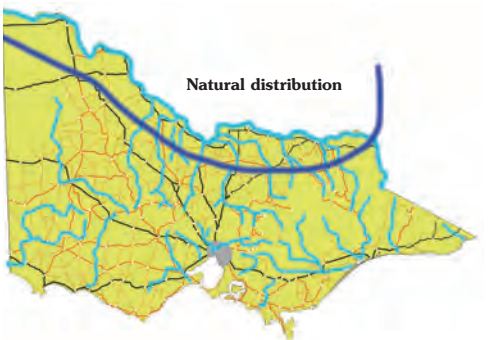
Dorsal fin moderately notched at last spine X–XII, I, 13–16. Spinous section rounded anteriorly, the 3rd & 4th spines longest followed by progressively shorter spines and rays elevated to height or higher of longest spine with margin strongly rounded. Anal fin III, 11–15, short based with margin strongly rounded. Pectoral fin 18–21 large, broad and rounded with lowest rays moderately long and upper rays not much longer. Ventral fin inserted anteriorly to pectoral fin with feeler-like extentions on first soft ray. Caudal fin broadly rounded. Body covered by small mostly ctenoid scales, some cycloid ones extending onto head, snout naked. Lateral line with 65–81 scales, running from upper of gill opening high along sides following contour of back, and a straight series mid-laterally from below end of soft dorsal fin to caudal fin. Body deep but elongated, deepening and broadening with age. Head large with straight to slightly rounded profile in juveniles and as body deepens becomes depressed in adults giving it a concave profile. Operculum end fleshy with 2 spines, lowest largest. Mouth large, reaching well behind eye. Eye becomes very small in large adults.

Size

Length reported up to 1.8 m TL and a weight of 113.5 kg, but now rarely exceed 20 kg.

Colour

Variable from greenish grey to yellowish with dusky spots and reticulations. Juveniles with less numerous and darker spots. Ventral fins white and caudal fin blackish with white margins over tips. Other fins similar to body colour.



Maccullochella peelii distribution in Victoria

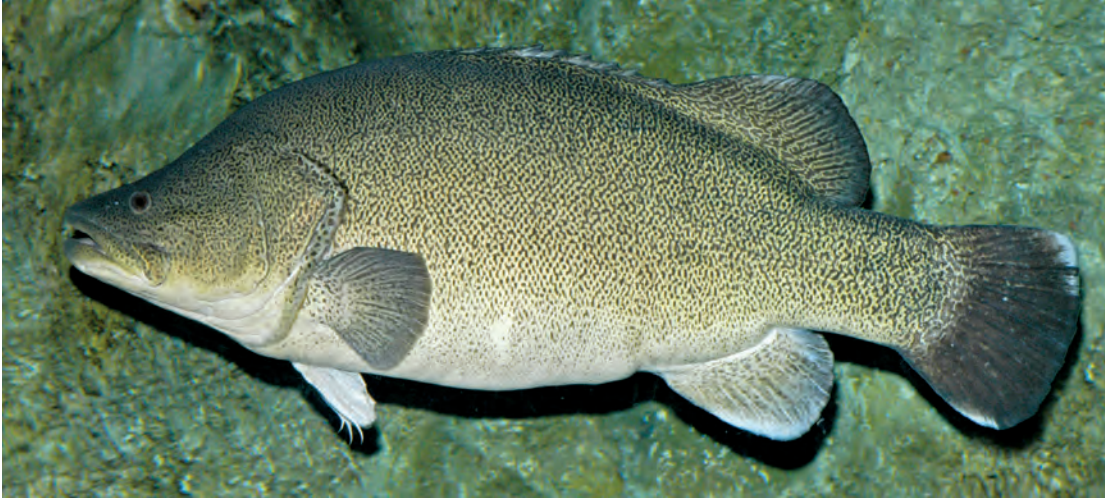
Distribution and remarks

Throughout the Murray-Darling system at low altitudes. Has become relatively rare in its natural distribution caused by dams and other alterations to the river system. This species has been stocked in many waters throughout Victoria as far south as the Yarra River.

Similar species Mary River Cod *Maccullochella mariensis* and Eastern Cod *M. ikei*, but these do not occur in Victoria.

Other names used Cod, Codfish.

Synonyms None.



Family Terapontidae – Grunters

Comprises 16 genera and more than 40 species in the Indo-Pacific region. The species are variously distributed in the warmer parts region, occurring in marine, estuary and freshwater habitats. They are particularly well represented in Australia with 13 and some 30 species, most of which in the northern parts. The natural distribution of only species is south to Victoria in the Murray River. Medium sized, perch-like fishes with a long-based single dorsal fin with long spinous section. Some fishes may make grunting sounds when caught, hence their common name.

Genus *Bidyanus* Cuvier, 1830

Gender: feminine. Type species. *Acerina (Cernau) bidyana*, Mitchell, 1838.
Comprises 2 species, the more widespread Silver Perch *Bidyanus bidyanus* shown here, and the South Australian *B. welchi* from the Innamincka area.

Silver Perch *Bidyanus bidyanus*

Acerina (*Cernau*) *bidyana* Mitchell, 1838. River between Gwydir River and McIntyre River, New South Wales.

Description

Dorsal fin XII, 11–12. First spine very short followed be progressively longer ones to 4th & 5th, the rest progressively shortening by a little and soft rayed section distinctly taller than last spine. Anal fin III, 7–9, short based with margin near vertical in young, becoming angular in adults. Pectoral fin smallish with 14–17 rays, upper longest, lowest ones short. Body covered by very small scales, extending onto cheek on head, snout and interorbital naked. Lateral line distinct with 70–90 scales from upper of gill opening curving up slightly, following contour of back, and continuing as a straight section on caudal peduncle. Body compressed, slender when young and deepening with age, depth up to about 33 % in SL. Head small, length about 22% in SL. Head profile slightly rounded in juveniles to near straight to slightly concave in adults. Operculum and preoperculum margins serrate. Mouth small, just short of reaching to below of eye. Eye moderately large in young, becoming proportionally small in adults.

Bidyanus bidyanus natural distribution in Victoria

Size

Length usually up to 40 cm TL and a weight of 1.5 kg, but used to grow much large and reported to 8 kg.

Colour
Head and body dark grey with silvery centred scales, an olive to greenish overtone in some, depending habitat condition. Fin colouration similar to body colour, sometimes blackish brown. Juveniles more silvery (shown on the right) with mottled grey bars on the body.

Distribution and remarks
Widespread in the Murray-Darling system, including well upstream in many streams. Normally occurs in fast flowing waters with rapids. Populations have greatly declined since the river alterations with dams and weirs. It has been introduced to other areas in Victoria, but more so in New South Wales and Queensland and also in Western Australia.

Similar species Estuary Perch, Macquarie Perch. and Silver Perch.

Other names used Common Perch, Freshwater Perch.

Synonyms
Therapon macleayana Ramsay, 1882.
Therapon niger Castelnau, 1872.
Therapon richardsoni Castelnau, 1872.

Family Sparidae – Snapper & Bream

A large worldwide marinefish family with some 30 genera, many of which are of great commercial importance, such as Snapper (*Chrysophrys auratus*) in Victoria. One species of bream can be found entering freshwater in coastal rivers, moving well upstream.

Genus *Acanthopagrus* Peters, 1855

Gender: masculine. Type species. *Chrysophrys vagus* Peters, 1852.
Comprises 7 Indo-West Pacific species, 4 of which in Australia. One on the south coast of Victoria.

Black Bream *Acanthopagrus butcheri*

Acanthopagrus butcheri distribution in Victoria

Mylio butcheri Munro, 1949. Gippsland Lakes, Victoria.

Description
Dorsal fin XII–XIII, 10–13. Anal fin III, 8–10. Pectoral fin 14–16 rays, upper longest into a point. Body covered by mostly ctenoid scales, extending onto head except snout. Lateral line distinct with 44–56 scales, following contour of back. Body compressed and deep, greatest depth about 50 % in SL. Head profile evenly rounded dorsally.

Size
Length up to 60 cm TL and weight of 3.5 kg.

Colour
Silvery, bluish grey to brownish above. Head often dark and bluish with reflective gill cover. Juveniles with dusky barring on back and upper sides.

Distribution and remarks
Southern coastline from Western Australia to central New South Wales. Occurs primarily in harbours and estuaries, and moves far up the rivers flowing into them. Upper two images were taken in freshwater.

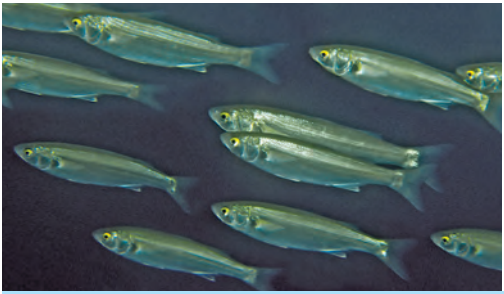
Similar species
Other Bream species, but these are marine in Victoria. Juveniles could be mistaken for other silvery species such as Estuary Perch.

Other names used
Blue-nose Bream, Golden Bream, Silver Bream, Southern Bream, and Yellow-fin Bream, but the latter name belongs to *Acanthopagrus australis* that occurs on the east coast south to Lakes Entrance, which is a purely marine species.

Synonyms None.

Family Mugilidae – Mullets

A large worldwide marinefish family with 17 genera and about 80 species. Few enter freshwater and in Victoria it is usually only the juveniles of some species that can be found in freshwater, usually in estuary channels influenced by tidal movements. Because adults are only marine, only juveniles are shown here to assist in their identification. In the sea juveniles are more silvery and in freshwater more brownish. The Yellow-eye Mullet and the Sand Mullet have small scales that separates them from the other two species and their body shapes are also characteristic.



Yellow-eye Mullet *Aldrichetta forsteri*

Aldrichetta forsteri (Valenciennes, 1836) is the most common mullet in Victoria that occurs in large schools in bays and harbours in the run-offs of freshwater. In freshwater the juveniles are brownish. Slender species at all sizes, body with small scales in about 56 diagonal rows. Snout bluntly pointed. Eye golden yellow.

Sea Mullet *Mugil cephalus*

Mugil cephalus Linnaeus, 1758, occurs world-wide in tropical and temperate seas and moderately large juveniles may swim up freshwater streams for a considerable distance. Anal fin origin only slightly advanced from second dorsal fin origin. Both fins with 8 soft rays (9 & 10 in next species). Small juveniles with stocky body and have a moderately short snout. Body with relatively large scales in about 40 diagonal rows.

Gold-spot Mullet *Liza argentea*

Liza argenta (Quoy & Gaimard, 1852), occurs in mainland coastal waters from about Shark Bay in Western Australia and along the south coast to northern Queensland. This species most common in tropical waters. It is a more stocky species with first dorsal fin placed back from centre of body and snout is somewhat pointed. Also known as Flat-tail Mullet.

Sand Mullet *Myxus elongatus*

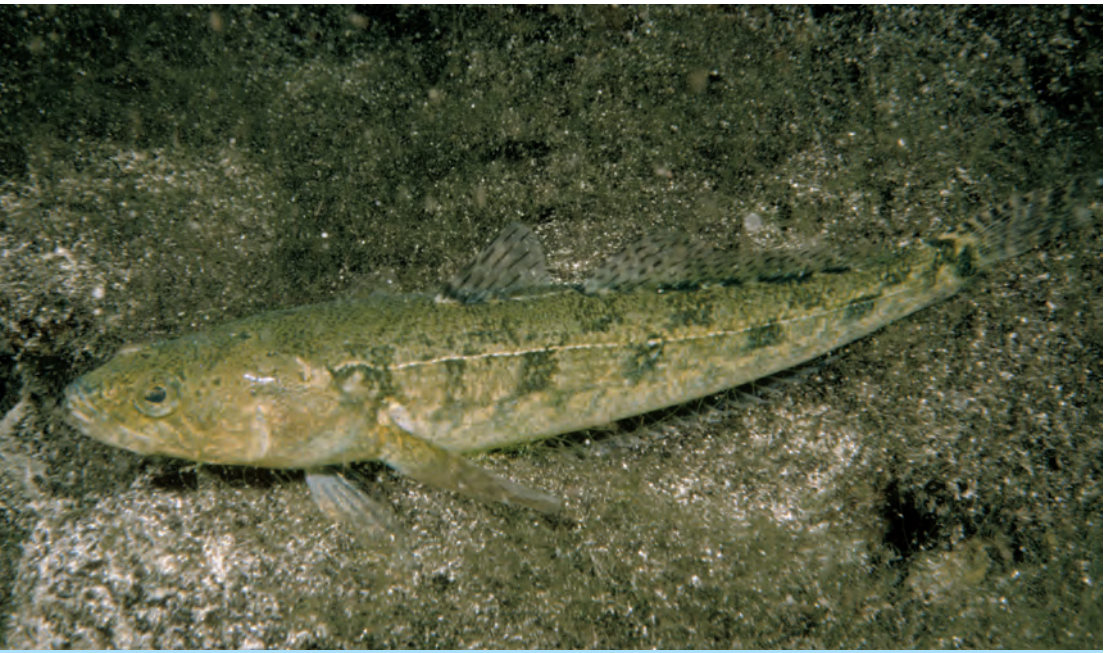
Myxus elongatus Günther, 1861, occurs coastal waters of the southern half of Australia. A slender species with body outline evenly curved dorsally and ventrally. Snout pointed. A small black spot on upper pectoral fin base. Body covered with small scales in about 56 oblique rows.

Family Pseudaphritidae – Congolli, Tupong

Comprises a single genus and species, endemic to southern Australian waters. Closely related to the Antarctic Ice-fishes and until recently was included with the family Bovichthyidae.

Genus *Pseudaphritis* Castlenau, 1872

Gender: feminine. Type-species: *Pseudaphritis bassii* Castelnau 1872.
Comprises a single species, see below.



Congolli *Pseudaphritis urvillii*

Aphritis urvillii Valenciennes, 1832. No locality (= Tasmania).

Description

Two separate dorsal fins, VII–VIII; 19–22. Spinous first dorsal fin short based, its origin about midway above abdomen. Second soft dorsal fin long based, both fins moderately tall. Anal fin II, 21–22, of similar height to dorsal fins and its origin below last spine of first dorsal fin, ending below last ray of soft dorsal fins. Caudal fin truncate, long with small corners. Pectoral fin long with 18 rays, middle part longest, lower rays shortest. Ventral fins I, 5 placed below operculum. Body covered by small ctenoid scales, extending over most of head with smaller scales. Lateral line distinct with 59–65 scales from upper of gill opening and mostly straight to end of caudal peduncle. Head moderately depressed at interorbital, changing to cylindrical posteriorly from where the body gradually changes to compressed toward tail. Very slender when young and becoming more stockier with age. Head of a moderately large size, length about 28% in SL. Head profile flattened on top with large eyes placed forward and dorsally. Operculum with small spine on corner. Mouth large, reaching well to below of eye.

Pseudaphritis urvillii distribution in Victoria

Size

Length usually up to 36 cm. usually up to about 25 cm TL.

Colour

Variable cream, grey to brown with large squarish dark, near black blotches and dusky irregular markings. Principally with 6 large blotches equally spaced from behind head to caudal base, sometimes interspaces darkening, forming a broad black band. Fins clear with series of dark spot on rays.

Distribution and remarks
Widespread in coastal areas ranging from South Australia to New South Wales and around Tasmania. Primarily a marine species that moves into rivers well into the freshwater habitats, migrating far inland in large rivers not blocked by weirs. They can quickly acclimatise from either salt or fresh waters. Fish observed in Ewens Pond (freshwater), South Australia, ranged in sizes from about 100 mm to 300 mm in total length and were seen perched on the bottom with their ventral fins. Some were buried in the sand with upper part of the head exposed. They are carnivorous fishes that feed on moderately large prey, including other fishes, shrimps and various bottom dwelling creatures.

Similar species
Usually confused in estuaries with flathead (Platycephalidae) that are purely marine fishes.

Other names used
Tupong, Flathead, Sandy Marble Fish, Sand Trout.

Synonyms
Pseudaphritis bassii Castelnau, 1872.
Eleginus bursinus Cuvier, 1830.
Aphritis dumerili Günther, 1874.
Aphritis undulatus Jenyns, 1842.

Family Eleotridae – Gudgeons

A large family with mostly small species comprising 36 genera worldwide, marine and freshwater, half of which with representatives in Australia. The number of species is unclear, but thought to be around 45 in Australia that mostly occur in tropical freshwater. In Victoria there are 4 genera, *Philypnodon* with 2 species, *Gobiomorphus* with 2 species, *Mogurnda* with a single species and *Hypseleotris* with at least 3 species.

The gudgeons are closely related to the gobies, Gobiidae, and in Victoria they are best distinguished from them in having paired ventral fins separated versus joined as a single fin into a cup-shape (see page 82). They feature 2 close-set, but distinctly separate dorsal fins, and a scaly body. A lateral line is usually not showing.

Quick-guide to the Eleotridae genera

Mogurnda
Body and head compressed. Head length about equal or less than greatest body depth (body deepens with age), profile curved over eyes. Eyes on side of head. Mouth small, reaching to anterior edge of eye. Does not sit on substrate. Adults with ornamental colours.
.....**p 71**

Philypnodon
Body and head depressed. Head longer than greatest body depth, profile flat over eyes. Eyes high on head. Mouth large, reaching to below posterior part of eye. Usually sits on substrate. No ornamental colours.
.....**p 72**

Gobiomorphus
Body and head compressed. Head length about equal or slightly longer than greatest body depth, profile angled over eyes. Eyes high on head. Mouth small, reaching to anterior edge of eye. Often perched on substrate. No ornamental colours. .....**p 76**

Hypseleotris
Body and head compressed. Head length about equal or shorter than greatest body depth (may deepen greatly in large adults), profile rounded over eyes or over snout. Eyes not high on head. Mouth small, reaching to near anterior edge of eye. Does not sit on substrate. Males become ornamentally coloured.
.....**p 80**

Genus *Mogurnda* Gill, 1863

Gender: feminine. Type-species: *Eleotris mogurnda* Richardson, 1844.
Comprises over 25 species, variously distributed in the West Pacific region from Australia to Japan, 6 of which known from Australia. Tropical freshwater fishes and only one species reported from Victoria.

Purple-spotted Gudgeon *Mogurnda adspersa*

Eleotris adspersa Castelnau, 1878. Fitzroy River, Rockhampton, Queensland, Australia.

Description
Two close-set separate dorsal fins, VI–IX; I, 11–13. Anal fin I, 9–10, similar and mirrored to second dorsal fin. Caudal fin large and rounded. Pectoral fin large with 14 or 16 rays, middle rays longest. Body covered by small ctenoid scales, and smaller scales on cheek and operculum. Lateral scale rows 30–36 from upper of gill opening to end of caudal peduncle. Head large, length about 36% in SL. Mouth oblique, reaching to below anterior edge of *eye*, lower jaw protruding.

Size
Length up to 120 mm, usually up to about 70 mm TL.

Colour
Pale greyish to pinkish brown with blue shine. Many pupil-sized brick-red pots on body and median fins along bases in adults. Two or three lines running diagonally from *eye* to posterior margin of operculum. Dorsal fins with yellow margin.

Distribution and remarks
Widespread in Murray-Darling system and coastal region from northern New South Wales and southern Queensland. Thought to have become extinct in Victoria. Usually found in still water with aquatic plants, logs or rocks.

Similar species Other members of the genus.

Other names used Southern Purple-spotted Gudgeon, Trout Gudgeon, Checkered Gudgeon.

Synonyms
Eleotris mimus De Vis, 1884.
Eleotris striata Steindachner, 1866.

Mogurnda adspersa distribution in Victoria

Genus *Philypnodon* Bleeker, 1874

Gender: masculine. Type-species: *Eleotris nudiceps* Castelnau 1872.
Comprises 4 species, 2 endemic to southeastern Australia and 2 in New Zealand. Fresh and brackish water.

Flathead Gudgeon *Philypnodon grandiceps*

Eleotris grandiceps Krefft, 1864. Upper Hawkesbury River, near Bronte & Richmond, Eastern Creek, NSW.

Description
Two well separate dorsal fins, VI–VII; I, 8–10. Anal fin I, 9–10, similar and mirrored to second dorsal fin. Caudal fin large and rounded. Pectoral fin large with 18 or 19 rays, middle part longest. Body covered by small ctenoid scales, extending on top of head to above operculum. Lateral scale rows 33–44, from upper of gill opening to end of caudal peduncle. Head broadly depressed with eyes placed dorsally. Head large, length about 36% in SL. Mouth large, reaching to below end of eye.

Philypnodon grandiceps distribution in Victoria

Size
Length up to 110 mm, usually up to about 80 mm TL.

Colour
Very variable, usually brownish with dusky mottling with dusky and pale and blotches. Adults often show dark vertical bar above pectoral fin base and thin barring midlaterally along abdominal section and a blackish peduncular spot. Dorsal fins with dusky curving stripes formed by series of blotches on membranes and with additional yellow in adults.

Distribution and remarks
Widespread in coastal areas ranging from South Australia to Queensland and northern Tasmania. Travels far inland and is widespread in the Murray-Darling system. Occurs in a variety of habitats ranging from saltwater estuaries to freshwater lakes. Often in turbid waters.

Similar species
Dwarf Flathead Gudgeon.

Other names used
Big-head Gudgeon, Bull Head, Collundera, Yarra Gudgeon.

Synonyms
Ophiorrhinus angustifrons Ogilby, 1898.
Eleotris gymnocephalus Steindachner, 1866.
Eleotris (Eleotriodes) melbournensis Sauvage, 1880.
Eleotris nudiceps Castelnau, 1872.

Dwarf Flathead Gudgeon *Philypnodon macrostomus*

Philypnodon macrostomus distribution in Victoria

Philypnodon macrostomus. Hoese & Reader, 2006.
Near Glenreagh, north of Coffs Harbour, New South Wales.

Description
Separate dorsal fins, VI–VII; I, 8–9. Anal fin I, 7–9, similar and mirrored to second dorsal fin. Caudal fin large and rounded. Pectoral fin large with 15 or 16 rays, middle rays longest. Body covered by small ctenoid scales and on top of head to near interorbital. Lateral scale rows 32–36 from upper of gill opening to end of caudal peduncle. Head broadly depressed with eyes placed dorsally. Head large, length about 33% in SL. Mouth large, reaching to below end of eye.

Size
Length usually up to 50 mm TL.

Colour
Pale brown with yellow to near black, sides with dusky marking forming indistinct bars. Upper margin of first dorsal fin with yellowish to orange band and spot posteriorly near base. Second dorsal fin with more stripes, but paler colour. Fins may have blackish marking or stripes as well and often a short black bar present on caudal fin base.

Distribution and remarks
Widespread in coastal areas ranging from South Australia to Queensland. Mainly coastal, but occurs in localities scattered throughout the southern Murray-Darling system as well. Freshwater and brackish tidal zone habitats.

Similar species
Small or juvenile Flathead Gudgeon.

Other names used
None.

Synonyms
None.

Genus *Gobiomorphus* Gill, 1863

Gender: masculine. Type-species: *Eleotris gobioides* Valenciennes, 1837.
Comprises 9 species, 2 endemic to southeastern Australia and 7 confined to New Zealand. Small, stocky scaly fishes with large fins found in near coastal freshwater streams in Australia, but widespread in New Zealand from coastal to high altitudes, where *Gobiomorphus alpinus* is found in lakes at about 1000 m.

Striped Gudgeon *Gobiomorphus australis*

Eleotris australis Krefft, 1864. Creeks near Sydney, NSW.

Description
Two distinctly separate dorsal fins, VI–VIII, usually VII; I, 8. Anal fin I, 8, similar and mirrored to second dorsal fin. Caudal fin large and rounded. Pectoral fin large with 14 or 16 rays, middle rays longest. Body covered by small ctenoid scales, extending onto head but small on cheeks. Lateral scale rows 30–34 from upper of gill opening to end of caudal peduncle. Head broad with eyes placed about mid-laterally. Head large, length about 32% in SL. Mouth oblique, reaching to just below anterior edge of eye.

Size
Length up to 150 mm, usually to 100 mm TL.

Colour
Very variable, from yellowish brown to cream or brown with longitudinal lines along scale rows. Lines black and distinct when found in clear water, but indistinct when found in turbid water. When large with a yellow bar on pectoral fin base and anal fin reddish, darkening on outer with bluish or white margin. Dorsal fins with similarly coloured margins.

Gobiomorphus australis distribution in Victoria

Distribution and remarks
East coast from just north of Wilsons Promontory to about Maryborough in Queensland. Occurs mainly in coastal freshwater streams and rivers, but may occur well upstream with low elevations. Usually in slow moving systems. Juveniles were seen in the Bellinger River in small aggregations.

Similar species
Cox's Gudgeon, but only when juvenile. Adults of that species are much more slender.

Other names used None.

Synonyms None.

Cox's Gudgeon *Gobiomorphus coxii*

Eleotris coxii Krefft, 1864. Upper Hawkesbury River, New South Wales, NSW.

Description

Two well separate dorsal fins, VI–VII; I, 8–10. Anal fin I, 9–10, similar and mirrored to second dorsal fin. Caudal fin large and rounded. Pectoral fin large with 18 or 19 rays, middle part longest. Body covered by small ctenoid scales, extending on top of head to above operculum. Lateral scale rows 33–44 from upper of gill opening to end of caudal peduncle. Head broadly depressed with eyes placed dorsally. Head large, length about 36% in SL. Mouth of moderate size, oblique, but not reaching to below eye.

Size

Length up to 150 mm, usually up to about 110 mm TL.

Colour

Very variable in colour, usually pale yellowish to dark brownish with dusky to black blotches which may form an intermittent midlateral stripe from snout to end of caudal peduncle with a second thinner and shorter one on upper sides. Fins marked with indistinct bands or spots. Patterns most distinct in clear water and more drab in more turbid streams.

Distribution and remarks

East coast from north of Wilsons Promontory to northern New South Wales. Coastal freshwater streams and rivers at low to moderate elevations in foothills. Usually in moderate currents and rocky on substrates. Juveniles occur usually in small aggregations.

Similar species

Striped Gudgeon, which is deeper bodied.

Other names used

Mulgoa Gudgeon.

Synonyms

Eleotris mastersii Macleay, 1881.
Eleotris richardsonii Steindachner, 1866.

Gobiomorphus coxii distribution in Victoria

Genus *Hypseleotris* Gill, 1863

Gender: feminine. Type-species: *Eleotris cyprinoides* Valenciennes, 1837.
Comprises 11 named species plus several more yet to be determined. Widespread in the Indo-West Pacific region, including many island streams as far west as Madagascar and north to Japan. Generally small, often schooling fishes found in slow moving or still freshwater systems.

Empire Gudgeon *Hypseleotris compressa*

Eleotris compressus Krefft, 1864. Clarence River and creeks near Port Denison, Australia.

Description
Two distinctly separate dorsal fins, VI; I, 8–9. Anal fin I, 9–10, similar and mirrored to second dorsal fin. Caudal fin large and slightly rounded. Pectoral fin rounded with 14 or 15 rays, middle rays longest. Body very slender in young, changing with growth to moderately deep and covered by moderately large finely-ctenoid scales, extending as cycloid over top of head and onto cheeks. Lateral scale rows 26–29 from upper of gill opening to end of caudal peduncle. Head fairly broad when juvenile to compressed and deep in large adults, especially in males in which the profile becomes very rounded. Eyes placed about mid-laterally. Head large, length about 32% in SL. Mouth small and oblique, short of reaching to below anterior edge of eye.

Hypseleotris compressa distribution in Victoria

Size
Length up to 100 mm, usually up to about 50 mm TL.

Colour
Very variable as images show. Large males gaudily coloured with orange-red on head that extends along the body to the dorsal and anal fins, which have a variable-width black band and blue to white margins. Usually a black 'ear-spot' present above pectoral fin base at most stages.

Distribution and remarks
Coastal low-elevation streams of northern Australia from northwestern Australia to the Latrobe Valley in Victoria and also known from southern New Guinea. Usually found in still or slow moving systems with aquatic plants.

Similar species Adults none, but juveniles to other members of the genus.

Other names used Carp Gudgeon, Empirefish.

Synonyms
Carassiops longi Ogilby, 1897.
Eleotris brevirostris Steindachner, 1867.
E. cavifrons De Vis, 1884.
E. compressus Macleay, 1878.
E. devisi Ogilby, 1897.
E. elevata Macleay, 1881.
E. humilis De Vis, 1884.
E. modesta Castelnau, 1873.
E. reticulatus Klunzinger, 1879.
E. simplex Castelnau, 1878.







Carp Gudgeon *Hypseleotris klunzingeri*

Carassiops klunzingeri Ogilby,1898. Murray River, South Australia.

Description

Two separate low dorsal fins, VI–VII; I, 8–9. Anal fin I, 9–11, similar and mirrored to second dorsal fin. Caudal fin large and truncate to slightly rounded. Pectoral fin rounded with 13 to 15 rays, middle rays longest. Body slender in with long caudal peduncle and covered by moderately large finely-ctenoid scales, extending over head to near interorbital. Scale rows along a straight thin midlateral line 27–32 from upper of gill opening to end of caudal peduncle. Head and body compressed, slightly deepening in adults, in which head profile of male becomes very rounded. Eyes placed about mid-laterally. Mouth small and oblique, short of reaching to below anterior edge of eye.

Hypseleotris klunzingeri distribution in Victoria

Size Length up to 45 mm TL.

Colour

Greenish to bluish grey, brownish over back, abdomen usually pinkish. Short curved to chevron dusky lines along lateral line, one at margins of each scale row. A pale 'ear-spot' at origin of lateral line. Dorsal fins in males with broad pale orange-yellow margins. Sides with reflective blue shine.

Distribution and remarks

Mainly north of the Murray River from South Australia to Queensland. Natural range in Victoria appears to be restricted to tributaries of the Murray and Goulburn Rivers and in some parts in far western parts of the state. Occurs in habitats with heavy growth of aquatic plants in slow moving small streams and billabongs.

Similar species

None in Victoria.

Other names used

Western Carp Gudgeon.

Synonyms None.

Family Gobiidae – Gobies

The gobies are part of a very large and complicated group of small fishes comprising several hundred genera and over two thousand species, but those in the family Gobiidae that are considered to be the 'true' gobies comprise about 150 genera and an undetermined number of species. Most species are tiny, usually less than 25 mm TL and the greatest majority by far live in the oceans, in tropical reefs, and since people took up diving, new ones are being discovered on a regular basis. The family is well represented in Australia, but most species live in the sea, many in estuaries or enter lower reaches of rivers near the coast, but a few have adapted freshwater in the center of Australia and are known as desert gobies. These fishes live only in the water that emerges from geothermal springs.

In Victoria none of the gobies are considered to be truly freshwater fishes. Most live in estuaries and some enter freshwater where they can live for considerably long periods. Species such as those in *Mugilogobius* are usually found in drains of swamps influence by tides. *Afurcagobius* is often found sympatric, but is more common further downstream and in the marine environment in the run-off of freshwater. *Pseudogobius* can be found further inland in freshwater as well as in coastal bays.

Gobies are somewhat stocky with a bulbous head, a moderately elongated body and have a rather large mouth. Two usually separate dorsal fins, first spinous and second with segmented rays, headed by a spine. Anal fin usually long-based mirroring the above soft dorsal fin. Pectoral fins moderately large and set low, primarily used for swimming as well as stabilising itself on the bottom.

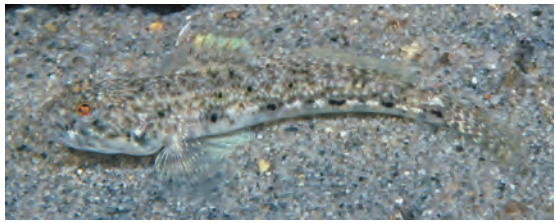
In general the Victorian species grow relatively large. Most species range from about 45 mm to 100 mm in total length, but the genus *Arenigobius* can attain a length of about 150 mm, whilst the member of the genus *Gobiopterus* is very small, usually less then 30 mm in total length. The latter is a tiny translucent species that swims midwater in schools and is commonly mistaken for post-larval juveniles of other species. All the other Gobiidae members are bottom dwellers and most species usually rest on the substrate. They feed on various tiny creatures and gobies can be easily kept in aquaria as they are small and feed on just about anything on offer, but keeping Victorian species can be more demanding. Most Victorian gobies require somewhat saline conditions, such as in the coastal estuaries, and cold water.

Included in this book are only the species that can be found in freshwater on a regular basis. The Victorian goby taxa are readily identified by their cup-shape joined ventral fins (upper image on left), and this is a distinguishing character that separates the gobies from the closely related gudgeons, in which the fins are present as clearly paired (lower image on left).

Quick-guide to the Gobiidae genera

Arenigobius
No scales on head. Snout strongly rounded in lateral view. Head compressed and with distinct black lines from rear of *eye* onto body and pectoral fin base. Caudal fin strongly rounded to lanceolate. Marine, estuarine and lower reaches freshwater. .....**p 86**

Afurcagobius
No scales on head. Snout not strongly rounded in lateral view. Head depressed and without black lines. Body sandy coloured with irregular spotting and blotches, usually a series of distinct black spots spaced along sides. Caudal fin truncate with rounded corners to slightly rounded. Marine, estuarine, and lower reaches of freshwater. .....**p 87**

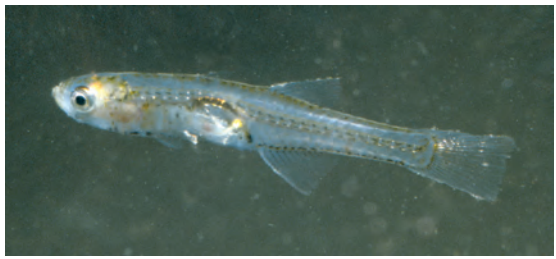


Mugilogobius
Few scales on head. Head depressed, very rounded to bulbous with small *eye*. Interorbital broad, width equal to *eye* diameter or greater. First dorsal fin with black streak posteriorly. Estuaries, usually muddy freshwater and tidal runs from swamps. .....**p 88**

Pseudogobius
Scales on most of head. Head compressed, rounded to a little bulbous, with moderately large *eye*. Interorbital narrow, width about equal to half *eye* diameter. First dorsal fin usually with a small bright blue spot, placed posteriorly and close to base. .....**p 89**

Redigobius
Scales on most of head, *eye* small. Head and body moderately compressed. Interorbital narrow, width about equal to *eye* diameter. Head deepens in large males. Mouth very oblique and large in males. Body with dusky bars along lower sides of the body.
.....**p 90**

Gobiopterus
No scales on head and anterior half of the body. First dorsal and ventral fins minute. Tiny transparent fishes. Mouth very oblique to near vertical. Eye relatively large and set mid-laterally. Estuaries, entering freshwater.
.....**p 91**



Genus *Arenigobius* Whitley, 1930

Gender: masculine. Type-species: *Gobius bifrenatus* Kner 1865.
Comprises 3 species endemic to Australia. *Arenigobius leftwichi* occurs in Queensland and *A. bifrenatus* and *A. frenatus* occur on the south and east coasts. Only *A. bifrenatus* is known to enter freshwater.

Bridled Goby *Arenigobius bifrenatus*

Arenigobius bifrenatus distribution in Victoria

Gobius bifrenatus Kner, 1865. Sydney, New South Wales.

Description
Two separate dorsal fins, VI; I, 10. Anal fin I, 10, similar and mirrored to second dorsal fin. Caudal fin large and rounded to lanceolate. Pectoral fin centrally elongated, and with 14 or 15 rays. Body elongated, head short and slightly compressed. Lateral scale rows 35–42, no scales in midline in front of dorsal fin. Head naked, relatively broad on cheeks with short rounded snout. Eyes placed high on head and interorbital width much less than eye diameter. Mouth oblique and of a moderate size, reaching to below middle of eye.

Size
Length up to 150 mm TL.

Colour
Pale greenish grey to brownish with dusky thin vertical lines, some forming square patches along upper sides. Dark brown to black stripes running from behind eye, lower to pectoral fin base and upper onto body and dissipating over abdomen. Another line forms from upper of pectoral base running along lower sides. Unpaired fins become yellow on membranes and have longitudinal reddish bands near bases and yellow on their margins, often tipped with blue.

Distribution and remarks
Entire south coast and east coast to northern Queensland. In estuaries and coastal freshwater on sandy, often silty, substrates around rock or debris to hide in.

Similar species Halfbridled Goby *Arenigobius frenatus*, a marine species usually found in estuarine seagrass beds.

Other names used None.

Synonyms
Gobius bassensis Castelnau, 1872.
Gobius castelnaui Macleay, 1881.
Gobius caudatus Castelnau, 1873.
Gobius filamentosus Castelnau, 1875.
Gobius infaustus Sauvage, 1880.

Genus *Afurcagobius* Gill, 1993

Gender: masculine. Type-species: *Gobius suppositus* Sauvage, 1880.
Comprises 2 species endemic to Australia. *Afurcagobius suppositus* occurs Western Australia and *A. tamarensis* occurs on the southeast coast.

Tamar Goby *Afurcagobius tamarensis*

Gobius tamarensis Johnston, 1883. Tamar River, Tasmania.

Description
Two separate dorsal fins, VI; I, 8. Anal fin I, 8, similar and mirrored to second dorsal fin. Caudal fin large and near truncate to slightly rounded. Pectoral fin broad and rounded with 14 or 15 rays. Body elongated, deepest at abdominal region, tapering to caudal fin base. Lateral scale rows 30–35. Head naked, none in front of dorsal, depressed and relatively broad on cheeks. Eyes placed high on head and interorbital width much less than eye diameter. Mouth slightly oblique, near horizontal, of moderate to large size, reaching to below middle of eye and further in fully grown males.

Size
Length up to 110 mm TL.

Colour
Variable in relation to habitat. Pale grey to yellowish brown to dusky with numerous small cream blotches and dusky blotches forming saddle on back. Usually a series of 6 distinct black spots spaced in line along sides, first at upper of gill-opening and rest in a straight line from behind pectoral base to caudal fin base. Second dorsal and anal fins with series of dusky spots forming indistinct stripes or bands. First dorsal fin with a broad black band in females, showing as a faint spot in males.

Distribution and remarks
South coast of Victoria, ranging into South Australia and east coast to northern New South Wales. In estuaries and coastal freshwater on sandy, often silty, substrates of rivers and creeks. Buries itself in the sand to hide.

Similar species
Other sand gobies, especially when juvenile.

Other names used
None. Was previously included with the genera *Arenigobius* or *Favonigobius*.

Synonyms
Gobius tasmanicus Whitley, 1929.

Afurcagobius tamarensis distribution in Victoria

Genus *Mugilogobius* Smitt, 1900

Gender: masculine. Type-species: *Ctenogobius abei* Jordan & Snyder, 1901.
Indo-West Pacific with 25 species. Mostly tropical in mangroves. One species occurs in southeastern Australia. Small fishes with a depressed bulbous head, especially showing in males.

Flatback Mangrove Goby *Mugilogobius platynotus*

Gobius platynotus Günther, 1861. No locality.

Description
Two separate dorsal fins, V–VI; I, 8–10, both more or less rounded. Anal fin I, 8–10, similar and mirrored to second dorsal fin. Caudal fin large and rounded. Pectoral fins large and rounded, with 13–17 rays. Body a little compressed and elongated, back flattened centrally. Head of moderate size and broadly flattened above. Scales small, mostly cycloid with few weakly ctenoid scales on belly and side of body. Lateral scale rows 45–59. Head mostly naked, few small cycloid scales on operculum. Eyes fairly small, placed high on side of head and interorbital equal or greater than eye diameter. Mouth quite large with thick lips, slightly oblique, near horizontal, reaching to below centre of eye in female and slightly behind eye in males. Snout broad and rounded.

Size
Length up to 70 mm TL.

Colour
Grey to dusky brown with irregular dark blotching and scale margins, sometimes forming irregular short bands on upper half of body and below eyes on cheek. Abdominal ventral region usually pale. Dorsal fins with series of blackish spots forming line in first dorsal fin. Unpaired fins turn yellow in large individuals and outer with broad bright yellow margin in males.

Distribution and remarks
Entire south coast and east coast to northern Queensland. In estuaries and coastal freshwater on sandy, often silty, substrates around rock or debris to hide in.

Mugilogobius platynotus distribution in Victoria

Similar species
Pseudogobius olorum.

Other names used
None.

Synonyms
Ellogobius abascantus Whitley, 1937.
Waiteopsis paludis Whitley, 1930.

Genus *Pseudogobius* Popta, 1922

Gender: masculine. Type-species: *Popta* included *P. penango* & *P. javanicus*, neither designated as type. Indo-West Pacific with about 15 species. Mostly tropical in estuaries and mangroves. One or two species occur in southeastern Australia. Small fishes with a somewhat bulbous head.

Blue-spot Goby *Pseudogobius olorum*

Gobius olorum Sauvage, 1880. Swan River, WA.

Description
Two separate dorsal fins, VI; I, 7–9. First fin with short base, first spines tall and followed by progressively shorter ones. Second fin of similar height, rays of subequal lengths. Anal fin I, 7–9, similar and mirrored to second dorsal fin. Caudal fin large and very rounded, somewhat elongating centrally. Pectoral fin broad and rounded with 15–17 rays. Body cylindrical, slightly compressed on posterior half, deepest just behind head and abdominal part, tapering to caudal fin base. Lateral diagonal scale rows 25–30. Body scales ctenoid, changing to cycloid extending over nape. Eyes smallish, placed high and forward on head and interorbital width about equal to half eye diameter. Mouth overhung a little by rounded snout, slightly oblique to near horizontal, reaching to below anterior edge of eye.

Size
Length up to 50 mm TL.

Colour
Brownish with dusky blotches and spots, some cream spots. Unpaired fins yellowish with dark horizontal lines formed by series of dark spots in dorsal fins and vertical bars in upper two-thirds of caudal fin. Anus fin usually plain yellowish with pale blue margin. First dorsal fin with small bright blue spot placed posteriorly just above base.

Distribution and remarks
Widespread southern and east coast, but 2 forms in Victoria. Western form from Western Australia to southern Victoria and eastern form from southern Victoria to well north into Queensland, but it could comprise more than one species. Usually found in coastal freshwater run-offs in mangroves or harbours. Also in coastal lagoons and lakes.

Similar species
Other sand gobies when of similar sizes.

Other names used
Swan River Goby.

Synonyms
Mugilogobius galwayi McCulloch & Waite, 1918.

Pseudogobius olorum distribution in Victoria

Genus *Redigobius* Herre, 1927

Gender: masculine. Type-species: *Gobius sternbergi* Smith, 1902.
Indo-West Pacific with at least 15 species. Mostly tropical in rivers and estuaries. Few live in freshwater. One species in southern waters. Head and body very compressed and mouth becomes large in males.

Large-mouth Goby *Redigobius macrostoma*

Redigobius macrostoma distribution in Victoria

Gobius macrostoma Günther, 1861. Australia.

Description
Two separate dorsal fins, VI; I, 7. First dorsal fin triangular with first ray forming sharp point. Second dorsal fin short based and rounded with long rays. Anal fin I, 6, similar and mirrored to second dorsal fin. Caudal fin large and rounded. Pectoral fin large, broad and rounded with 16–18 rays. Ventral fins as a large cup, reaching vent. Body and head very compressed. Body covered with ctenoid scales, extending onto head to eyes and some scales on operculum. Midlateral scale rows 25–30. Eyes placed high on head and interorbital width narrow, width about equal to eye diameter. Mouth oblique and of a moderate to large size, reaching to well beyond the eye, especially in large males.

Size
Length up to 50 mm TL.

Colour
Pale brownish with dusky dark brown mottling over back and upper sides. Lower sides with brown to reddish bars, abdomen yellowish. First dorsal fin with a large black spot and dark brown stripes. Other unpaired fins with yellow and dark brown dotting or bands near their bases. Pectoral fin clear.

Distribution and remarks
Entire south coast and east coast to southern Queensland. In estuaries and coastal freshwater around rocks in muddy and silty habitats. Swims just above the bottom, often stationary in one spot. Usually in small loose groups.

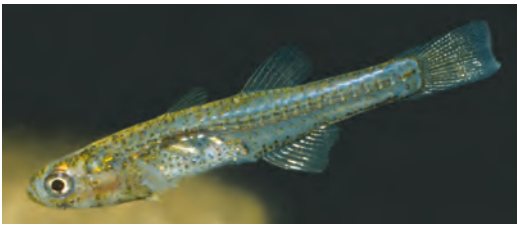
Similar species
None in Victoria.

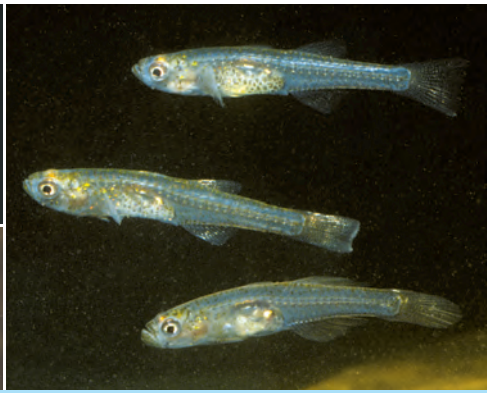
Other names used
None.

Synonyms
Gillichthys australis Ogilby, 1894.
Gobius microphthalmus Günther, 1861.

Genus *Gobiopterus* Bleeker, 1874

Gender: masculine. Type-species: *Apocryptes brachypterus* Bleeker, 1855.
Comprises at least 9 species in various parts of southeast Asia, 4 of which in Australia and one species occurs in Victoria. Tiny transparent fishes, usually forming large schools at river mouths.





Glass Goby *Gobiopterus semivestitus*

Paraphya semivestita Munro, 1949. Clarence River, NSW.

Description
Two separate dorsal fins, V; I, 6–10. First dorsal minute, spines flexible, second dorsal headed by a flexible spine. Anal fin I, 7–11, similar and mirrored to second dorsal fin. Caudal fin large and truncate to slightly rounded. Pectoral fin small and rounded with 14 or 15 rays. Ventral fins tiny and fused. Body elongated, compressed, tapering from dorsal and anal fin origin with long caudal peduncle to caudal fin base. Head and anterior half of body naked. Eyes not high on head. Snout short and mouth very oblique, near vertical.

Size
Length up to 28 mm TL.

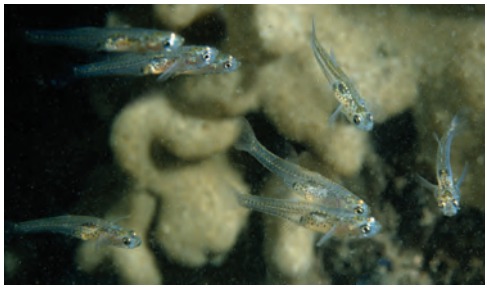
Colour
Transparent from almost no pigmentation to small brown or dusky spots and yellowish over back and above eyes.

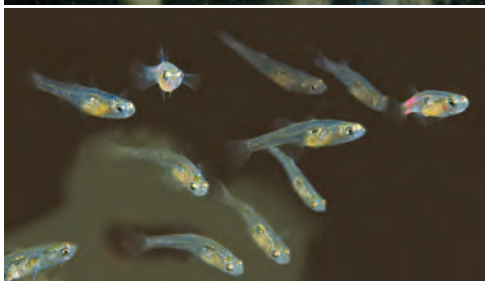
Distribution and remarks
Entire coast of Victoria, ranging into South Australia and on east coast north well into Queensland. In estuaries and tidal coastal freshwater in still parts out of the currents. Feeds on planktonic matter, probably tiny creatures living in freshwater being washed out to sea.

Similar species
Larval stages of other fishes.

Other names used
None.

Synonyms
None.





Gobiopterus semivestitus distribution in Victoria

Introduced Exotic Fishes

Since European settlement numerous plant and animal were introduced to Australia for various purposes, agriculture, entertainment, pets or sentimental reasons, but also were bringing hijackers on ships such as rats and marine invasive species attached to the hull of a boat. The problems caused by feral animals is well know and combined with the clearing of bushland, Australia has an embarrassing high rate of extinctions. A report published in March, 2018 by The Australian Conservation Foundation has revealed that Australia has lost more animals to extinction than any other country in the world, but usually not much attention is paid to the critical aquatic habitats. Whilst there are attempts to conserve and protect wildlife and prevent extinctions of iconic land animals, little effort is made to the more cryptic creatures, especially the small fishes. Habitat loss effected all fishes, but the introductions of predatory salmonid fishes wiped-out all the accessible small native fish populations. Numerous species of the Galaxiidae family, the largest fish-family in Victoria, were driven to extinction and most vanished members were undetermined and not yet scientifically described taxa.

Salmonid introduction

To satisfy the sport-fishing clubs, James Youl shipped live salmonids as ova to Australia in April 1864, with 90,000 salmon eggs and 2700 brown-trout eggs, and the first 'Australian' trout hatched on the 4th May 1864 that were released into Badgers Creek near Healesville, but unfortunately (or fortunately!), no sign of them was ever to be seen again (from "*The introduction of Trout to Victoria*" by Jack Ritchie, 1985). Many releases were unsuccessful and it appears no though was given to what they would have available as a food source. Reading in the Victorian Naturalist, Vol. XLVI, about feeding the trout in Lake Catani, on Mount Buffalo, is a good example. To have a facility for ice-skating a creek was dammed in the early 1900s to form a lake and soon after was stocked with trout, but the fish remained small. A few thousand specimens of the native *Galaxias maculatus* from a southwestern Victorian lake were transferred to Lake Catani with a view of providing food for trout there, 'in the hope of increasing the average size of the fish, which has been decreasing of late years, apparently because they have overtaken their food supply'. The lake being artificial and at high altitude above the snowline, the natural aquatic fauna is minimal and the introduced natives were not suited to the habitat. A single fish species, a small mountain *Galaxias* lived in the small streams on the plains and were soon wiped out. This still undescribed galaxias now survives in upper reaches above sections running underground, inaccessible to the predators. The brown trout (*Salmo trutta*) are now in almost every small creek on the plateau plains and remains small. The species can grow to 1 m in its native rivers, but the largest specimens seen on Mount Buffalo were perhaps 20 cm in total length and probably have to feed on their offspring. In general man-made lakes need to be large to provide ample food for exotic species. Unfortunately, salmonid fishes are invasive and can handle most natural barriers. In lake Tali Karng the large population of galaxias was completely wiped out after a careless trout release (see next page).

Gambusia introduction

Deliberately introducing *Gambusia holbrooki* for mosquito control was a disaster, creating an aquatic pest problem. The small fish originated from the north American continent and it became abundant in many of the waterways, competing with other small native species and they have a terrible habit of nibbling fins of the larger native fishes, whilst preying on mosquitos was usually their last choice. For mosquitos control the native species of the *Galaxiella* and *Nannoperca* genera are perfect, but they were not even considered. Like the introduction of the environmentally disastrous cane toad from Hawaii to protect the sugar industry from mice and bugs, it may have seemed a good idea at the time, but was just not thought through, and now the *Gambusia* are a seen as pestfish and declared a noxious species, but have remained everywhere in the introduced systems. Just like the cane toad, these pestfish are almost impossible to eradicate, as they can survive in the most polluted waters or stagnant pools, unless the waterways dry up completely.

Introduction of carp, goldfish, etc.

Carp (*Cyprinus carpio*) from Europe and Asia, roach (*Rutilus rutilus*), redfin (*Perca fluviatilis*), tench (*Tinca tinca*) and other European species were deliberately introduced into Australia in an attempt to imitate the European environment, along with blackberries, blackbirds, etc. Favourite pond or pet fish for beginners are Goldfish (*Carassius auratus*) that may be 'kindly' released or manage to escape, but in the wild the can grow quite large and continuously feed on plant and invertebrates. Of many other kept species the spread in the wild is contributed to their accidental escapes, especially the stocking in dams as well as the aquacultured fish.

The carp became well established in the deteriorating habitats from land-clearing and the modifications of wetlands or river catchments to which they were perfectly suited, and now have a widespread distribution and can cause great problems in man made environments. Tench and Roach have a limited impact as they

are not predatory, but may compete for food with native species, whilst Redfin preys on small native fishes and invertebrates. The Redfin populations can become very large in lakes, unless stocked together with Roach which competes during their planktonic stages and would normally greatly outnumber them.

Other aquarium fishes are rarely found in the wild, usually from 'unwanted' releases and in Victoria they would normally do not cause environmental problems due to the cold climate. Only in the Hazelwood Power Station cooling ponds, in which the water temperature was about 35°C, several tropical Cichlidae species established that were released by aquarists, of which in particular the Spotted Tilapia and Red Devils became very abundant. In 2016 a large number of Barramundi fingerlings were released by the Victorian Fisheries Authority to create a sport-fishing attraction and the cichlids would be a good food-source, but in 2018 the power station was decommissioned. These tropical fishes relying on the high temperatures have no future and trout or bass introductions are planned for the future once cooled. The cold-water Oriental Weatherloach *Misgurnus anguillicaudatus* is now found in many rivers, even in the highlands, but it is puzzling how they became so widespread. The believe that their arrival is from aquarium releases is only speculation.

Hitchhikers

Marine life attached to the hull of ships or from being present in ballast waters is a worldwide problem with exotic species establishing in major harbours, but a few of the freshwater fishes are transported this way as well. Many species can live is seawater during early stages and the Japanese *Acanthogobius flavimanus* is intermittently present in Port Phillip Bay. The adults can be found in freshwater streams, including the Yarra River, but fortunately they can not handle vertical barriers and it seems that breeding populations have not established, as they are only present in numbers during some years and none seen in others.

All the above mentioned exotic fish species are included in the following section of the book.

Lake **Tali Karng** in the Alpine region of Victoria was thought to have formed during the 5th century by a rock-slide, blocking Nigothoruk Creek, the origin of the Wellington River. It is about 15 hectares in area and the greatest depth reported is 51 m near the blockage. It emerges from underground about 150 m below in the Valley of Destruction, where now the Wellington River begins. The first white man to see the lake was a stockman known as Snowden in 1886, and the first explorers arrived in 1887, a seven day round trip with packed horses from Heyfield, the nearest town. In the lake they'd collected a few specimens of a small schooling *Galaxias*, which was later named *G. nigothoruk* (Lucas, 1892). The population descended from the diadromous Climbing Galaxias *Galaxias coxii* which had adapted to the land-locked situation. The lake is only accessible on foot and the nearest camping ground is a difficult one-day return 2 km long walk with a 700 m drop. PARKS VICTORIA wrote in a brochure: *Tali Karng is a hidden jewel nestled deep in the mountains of Gippsland, fed by snowmelt waters of the Wellington Plains,* but also wrote: *Walkers should respect the Gunai/Kurnai people of Gippsland by not camping at the lake itself*, being a sacred site, which begs the question *why were trout so carelessly released*? It shows no consideration to the Gunai/Kurnai people and environment, spoiling the lake's ecosystem forever to please a few walkers? The *Galaxias* population was eliminated soon after and the trout remain small as the lake can not support large fish. In addition, the vanishing of the small galaxias would have had an effect on the fish-feeding birds and various other creatures that had become accustomed to the small native fishes.

Family Cobitidae – Loaches

A large family of fishes in Europe and Asia and one member has become established in southeastern Australia. Being a popular aquarium fish it may have been released or escaped and somehow got into the rivers. It was first recorded in the Yarra River in 1984 and images presented here are fish from there. Tiny juveniles were found in the inundated grasses along the waters edge and confirmed that this species was breeding in the system.

Oriental Weather-loach *Misgurnus anguillicaudatus*

Cobitis anguillicaudata Cantor, 1842. Chusan Island, China.

Description
Elongate fishes with a tubular body and 5 pairs of barbels around the mouth. Large adults become eel-like. Body is covered by a layer of mucus which makes handling these fishes difficult.

Size Length up to 200 mm TL.

Colour Pinkish brown with dusky dark brown mottling over back and upper sides. Upper sides with bluish shine, lower sides usually spotless. A small black spot on upper of caudal base.

Distribution and remarks
In Australia it has become established in many locations of Victoria and New South Wales, including the Yarra and Murray River and even in the Snowy Mountains, and coastal southern Queensland. Usually found in still parts of rivers in sandy and muddy substrated where they seek refuse in amongst debris, rocks or logs. Males have an enlarged upper ray in pectoral fin (see bottom image). In females this fin is evenly rounded.

Family Cyprinidae – Carps and true Minnows

A very large family of fishes variously distributed in many parts of the world with nearly 2000 species, but none are native to Australia. Several species were introduced in Australia and 4 species have become established in souther waters of which Carp and Goldfish are common. Due to the degrading habitats the native fishes have declined and replaced by Carp that are more suited to the conditions.

Quick-guide to genus and species

Tench *Tinca tinca*
Body covered by tiny scales. Dorsal fin tall with short base. Fins rounded or with rounded corners. Mouth with a short barbel at corner. Attains a length of up to about 40 cm.
.....**p 96**

Roach *Rutilus rutilus*
Body covered by moderate sized scales. Dorsal fin tall with short base. Fins angular with angled corners. No barbel at corner of mouth. Attains a length of up to about 45 cm, usually much less.
.....**p 97**

Goldfish *Carrassius auratus*
Body covered by moderate sized scales. Dorsal fin tall with long base. No barbel at corner of mouth. Attains a length of up to about 40 cm, usually less than 20 cm.
.....**p 98**

Carp *Cyprinus carpio*
Body covered by moderate sized scales. Dorsal fin tall with long base. Two barbels, one short and one long at corner of mouth on upper lip. Large species, can attain a length of over a meter. .....**p 99**

Tench *Tinca tinca*

Cyprinus tinca Linnaeus, 1758.
European Lakes.

Description
Medium sized fishes. A strong thick-bodied species, moderately deep centrally, the back evenly curved, rising up from above head, and covered by tiny scales. Caudal peduncle very deep. Head large with blunt snout and small eye. Mouth oblique and small, not reaching to below eye, with a short barbel at each corner. All fins moderately long with tops rounded, caudal broadly rounded at the tips. A tall short-based dorsal fin (III, 8), centre rays longest, broadly rounded over top and origin well posterior to middle of SL. Ventral fins placed mid-abdominal, large and reaching vent in adults, much larger in male than in female. Anal fin (III, 6–8) of similar size. Pectoral fin set low with 17–19 rays. A distinct lateral line with about 100 scales, evenly down-curving over abdominal region, following ventral contour.

Size
Length up to 70 cm, but rarely over 40 cm TL. Possibly growing much larger in Tasmania.

Colour
Plain greenish golden, dusky on back, pale below. Eye reddish. Fins clear to reddish in young and dusky in adults.

Distribution and remarks
In Australia it has become established in locations in Victoria, southern NSW, eastern South Australia and throughout the Derwent River basin in Tasmania. A secretive species in still waters, and usually active at night. Mainly occurs in muddy, but good condition habitats. Feeds on the bottom, often taken a mouth full of debris to filter for food. Feeds on small invertebrates and algae.

Roach *Rutilus rutilus*

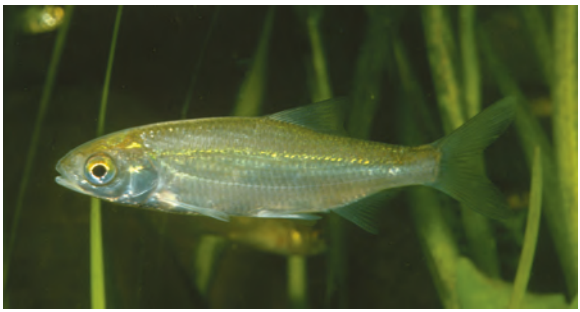
Cyprinus rutilus Linnaeus, 1758.
European Lakes.

Description
Medium sized fishes. Body compressed, deep centrally, the back evenly curved, rising well above head, and covered by moderately large scales. Caudal peduncle about as long as deep. Head large with blunt snout and with a moderate sized *eye*. Mouth small, near horizontal, reaching about halfway to below *eye*. All fins moderately long with tops angled and dorsal and anal fin with shallow concave shape, last rays short. Caudal fin distinctly forked with rounded tips. An anteriorly tall, short based dorsal fin (III, 9–11), pointed at the top, its origin about middle of SL. Ventral fins placed about mid-abdominal, large and reaching near vent. Anal fin (III, 9–11) of similar in shape to dorsal fin but with shorter rays. Pectoral fin set low with 15–16 rays. A distinct lateral line with about 45 scales, curving steeple down from origin to more evenly over abdominal region and following ventral contour.

Size
Length up to 45 cm, but rarely reaches 25 cm TL in Victoria.

Colour
Plain greenish silver, brownish or dusky on back, pale below. Fins clear to pale yellow in young and dusky to bright red in adults. Eye reddish.

Distribution and remarks
Roach has become established in a few locations in Victoria, where mainly in the Yarra catchment, but also occurs in the Goulburn River and potentially in other systems at low elevations, also occurs in New South Wales. Usually forms small schools in open sections of streams.



Goldfish *Carassius auratus*

Cyprinus auratus Linnaeus, 1758. China; Japanese rivers.

Description Medium sized fishes. A thick-bodied species, moderately deep centrally, the back evenly curved, rising high above head, and covered by moderately large scales. Caudal peduncle very deep. Head large with blunt snout and small *eye*. Mouth oblique and protrusible, small, not reaching to below *eye*. Caudal fin shallowly forked and lobes broadly rounded. A long-based dorsal fin (III–IV, 14–20), highest anteriorly with rounded top, its origin well anterior to middle of SL. Ventral fins placed a little anterior to below dorsal fin origin. Anal fin (II–III, 5–7) small and short-based, set below end of dorsal fin. Pectoral fin set low with 16–18 rays. Lateral line with about 33–40 scales, and almost straight from origin to caudal peduncle.

Size Length up to 40 cm, but rarely over 20 cm TL.

Colour Wild fish usually plain coppery yellowish to blackish brown with reflective sides. Some individuals may turn bright orange or red.

Distribution and remarks
In Australia it has become widespread in Victoria and New South Wales. Usually found commonly in slow running or stagnant waters in various habitats and often tolerating very degrading conditions.

Carp *Cyprinus carpio*

Cyprinus carpio Linnaeus, 1758. Europea.

Description Body thick, compressed and elongated, the back evenly curved, rising well above head, and covered by moderately large scales. Caudal peduncle deep. Head moderately large with blunt snout. Mouth, slightly oblique, well short of reaching to below eye. Caudal fin distinctly forked with rounded lobes. A long-based dorsal fin (III–IV, 15–25), elevated anteriorly with rounded top, its origin anterior to middle of SL. Ventral fins placed about below dorsal fin origin. Anal fin (III, 5) small and short-based below end of dorsal fin. Pectoral fin set low with 16–17 rays. Lateral line with about 33–40 scales, curving down slightly from origin to abdominal region and further straight to caudal peduncle.

Size Length up to 1.2 m TL, commonly to 80 cm.

Colour Dark brown to olive-green or yellowish to dark bluish grey. Fins similar to body colour.

Distribution and remarks Originally native to Asia, but spread to Europe by people. Widespread in low lands of Victoria where regarded as a pest. The can live well in degraded habitats and are often wrongly blamed for causing these.

Family Percidae – Freshwater Perches

A small family of fishes variously distributed in the northern hemisphere. Fishes of medium size, naturally found in temperate to sub-tropical freshwaters. One species was introduced to Australia, commonly known as Redfin, which is now well established and widespread in Victoria and New South Wales. Also occurs in Tasmania and ranges into South Australia and southern Queensland.

Redfin *Perca fluviatilis*

Perca fluviatilis Linnaeus, 1758. Europe.

Description Medium sized fishes a moderately deep body, the back rising well above head, compressed and covered by firmly implanted ctenoid scales. Head large, operculum ending with a broad flat spine. Mouth large, reaching to below middle of eye. Two separate large dorsal fins. First sailfin-like with strong spines (XIII–XVII). Second not as tall headed by one or two short spines (I–II, 13–16). Anal fin similar and below second dorsal fin (I–II, 8–10) with shorter base. A distinct lateral line with 58–68 scales.

Size Length up to 45 cm TL.

Colour Greenish pale brown, dusky on back, pale below, with blackish broad bands fading at ventral ends. Dorsal fins in adults greenish grey with a large black blotch in first fin, posteriorly near base. Ventral fins and anal fin, and outer parts of caudal fins red. Juveniles less colourful.

Distribution and remarks
In Australia it has become well established in many locations and in Victoria it occurs commonly in many lakes and rivers. Occurs mainly in still waters at low elevations. Hatchlings are planktonic and compete with hatchings from Roach *Rutilis rutilis,* also introduced. Juveniles and adults will feed on small fishes and various other small creatures. This species is easily kept in aquaria, but can not be kept with smaller fishes. Due to lack of predators this species may become very abundant and often this generally results in lots of small fish. Population are kept well down when Roach is sympatric due to being outnumbered during their larval stages when competing for zooplankton.

Family Poeciliidae – Livebearers

A large family of fishes native in the Americas and southern Africa, but popular aquarium fishes and some members were introduced to other areas for mosquito control. They now occur in many parts of the world in tropical and subtropical areas. Most give birth to young, some lay eggs. Unfortunately *Gambusia* was introduced to Australia, which has become a pestfish that is a threat to many of the native fishes and is now a declared noxious species.

Pestfish *Gambusia holbrooki*

Gambusia holbrooki Girard (ex Agassiz), 1859. Palatka, eastern Florida; Charleston, South Carolina, U.S.A.

Description Small deep-bellied, especially females. Fins soft-rayed, a single dorsal fin. Ventral fins very small.

Size
Length of female up to 60 mm, male up to 35 mm TL.

Colour
Pale greenish to olive on back, sides with bluish sheen. Small dark spots in dorsal and caudal fins, sometimes on back. Female with bluish black blotch just above vent.

Distribution and remarks
Widespread in Victoria. Introduced as a means to control mosquitos, but they are a major threat to native fishes that were doing a much better job. It now is a pest and has become the cane-toad in the world of fishes. Known also as the Eastern Gambusia and the name mosquito fish should not be used as it is of no value to control mosquitos.

Family Cichlidae – Cichlids

A large family of fishes from the Americas, Africa, and the Middle East. Amazing diversity in Lakes as in Tanzania. Popular aquarium fishes that require warm water. Several species were introduced to the Hazelwood power station cooling pondage. These fishes can not live in the cooler natural systems in Victoria and will vanish once the power station is decommissioned (2017). Only a quick-guide to some of the species is provided on the two next pages. Others species maybe present.

Zebra Mbuna *Metriaclima lundoensis*



Spotted Tilapia *Pelmatolapia mariae*

Easily identified by its colour pattern and deep body. Originally from West Africa, a fresh and brackish water fish. The most common cichlid in the Hazelwood pondage. It is also known as Spotted Mangrove Cichlid or Black Mangrove Cichlid.





Red Devil *Amphilophus labiatus*

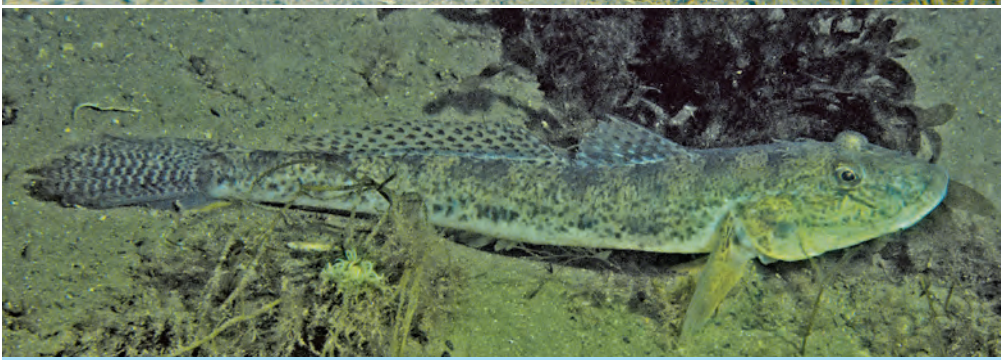
Very variable in colour, best identified by the pointed long snout. Originally endemic to Lake Managua and Lake Nicaragua in Central America. Very common in the Hazelwood pondage.

Zebra Mbuna *Metriaclima lundoensis*

Recognised by the more slender body and banded pattern. Originally endemic to Lake Malawi, Tanzania, located between Malawi, Mozambique and Tanzania. This large and deep water lake is the home for at least 1000 cichlid species.

Convict Cichlid *Amatitlania nigrofasciata*

Known also as the zebra cichlid and is easily identified by the deep body with black bands. Originally native to Central America. Occurs in the Hazelwood pondage around rocky outcrops and is not often seen.



Yellowfin Goby *Acanthogobius flavimanus*

Gobius flavimanus Temminck & Schlegel, 1845. Nagasaki, Japan.

Description A large goby. Body elongated, head large, broad and somewhat depressed. Mouth large, reaching to below anterior edge of *eye*. Eyes set high dorsally and about midway on head. Two separate dorsal fin. First short based, angular shaped (VIII–IX). Second long based with subequal rays (I, 12–14). Anal fin similar, slightly shorter based, and below second dorsal fin (I, 11). Pectoral fin with 21 rays. Caudal fin long and rounded. Body covered with numerous small scales in about 50 diagonal rows. Some small scales on top of head and operculum.

Size Length up to 25 cm TL.

Colour Dusky yellowish with darker dusky saddle-like blotches on back and numerous small dusky spots on sided. Ventrally pale yellowish or pinkish. Juveniles with black blotch in first dorsal fin, posteriorly near base. Adults have a distinct black line running from below posterior edge of *eye* to corner of mouth.

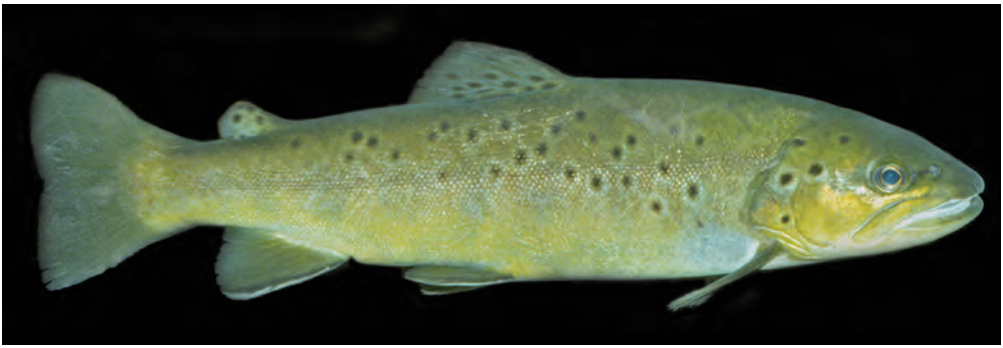
Distribution and remarks
An introduced species to many major harbours around the world in subtemperate zones. Probably came originally from Japan or China seas where the species is common in estuaries and rivers. Comprises various forms, some of which live entirely in freshwater and others migrate between rivers and estuaries to spawn. In Victoria the species occurs mainly in Port Phillip Bay and moves up the Yarra River and can be abundant at times below barriers. Most fish have been observed underwater at Coria Bay, near Geelong, Altona, Mornington and Seaford. Usually on silty sandy or muddy substrates. Their populations seem to fluctuate greatly between seasons that may be due to lack of breeding and re-introductions. These fishes grow large for a goby and feed on various creatures, including other fishes. One was observed eating a proportionally large juvenile Congolli.

Family Salmonidae – Salmons & Trouts

Salmonids are originally from the northern hemisphere that have been introduced in many parts of the world as an angling fish and for aquaculture. The live mostly in cold water of the northern Atlantic and Pacific with the large salmons well documented with their migrations up rivers to spawn. A few species were introduced to Australia and in Victoria, two of which occur in lakes and mountain streams, the Brown Trout *Salmo trutta* and the Rainbow Trout *Oncorhynchus mykiss*. Both can be found in the wild and have invaded most of the rivers and streams, wiping out many of the native species. They were especially most detrimental to the various Mountain Galaxias, and have already driven several species to extinction, whilst surviving ones are struggling in isolated pockets where trout can not get in. The effects of introducing such predatory fishes has consequences that effects the entire ecosystem, and that is not obvious to most people. Now the struggling surviving native species need protection the salmonids are still released in astonishing numbers every year.

The two trout species in Victoria can grow over a meter in length, but rarely come close to this size in Australia as nearly all the waterways can not support large fish. The large adult sizes reported are usually from sea-going populations in their native regions. Salmonids are streamlined strong solid fish with a centrally placed short-based tall dorsal fin, an adipose fin and ventral fins placed posterior to below dorsal fin origin. They have a large mouth that increases proportionally in size with growth with a single row of small canine teeth in each jaw. Placement in the genus relates to the different ways teeth are present in the roof of the mouth. The body is covered with tiny scales and a lateral line runs about centrally along sides. Genera are not distinguishable by their external morphology, but can be identified by colour as shown below.

Rainbow Trout *Oncorhynchus mykiss.* Caudal fin usually distinctly spotted. Numerous black body spots without halos. Adults with midlateral pink streak and pink on operculum. No red pupil-sized spots on the body. .....**p 106**



Brown Trout *Salmo trutta.* Caudal fin usually not distinctly spotted. Adults have dark spots with pale halos. Sub-adults have red pupil-sized spots on the body and pale halos. .....**p 108**

Rainbow Trout *Oncorhynchus mykiss*

Salmo mykiss Walbaum,1792. Kamchatka, Russia.

Description Dorsal fin short based, 10–12 rays. Anal fin 10–12 rays. Ventral fins abdominal placed well back, posteriorly to dorsal fin origin. Pectoral fin set very low under operculum and 14–16 rays. Caudal fin shallowly forked in juveniles to truncate in large adults. Body covered with numerous tiny round scales. Lateral line 125–150. Juveniles slightly compressed and not deep-bodied with relatively large fins. Body deepens with age and fins become proportionally smaller.

Size Attains a length of over 1 meter TL in the northern hemisphere, but in Victoria to about 80 cm TL.

Colour Dusky yellowish with numerous small black spots above lateral line, few below, also few on head and on dorsal and caudal fins. Small juveniles with a series of large black blotches midlaterally which fade with growth, but often faintly evident in fairly large individuals. A pinkish streak develops over the series of black midlateral blotches, becoming prominent as the blotches fade. Albino form as shown below is rare and usually appears in aquaculture. Large individuals in lakes are usually more silvery than those in small rivers.

Distribution and remarks
This species is native to the northern Pacific in Russia and Alaska ranging to California where the sea-run populations occur. In Victoria it occurs in cold healthy ecosystems from still lakes to the larger streams with strong currents. Tolerates slightly higher temperatures than Brown Trout and is less common in small streams and not as widespread. The Rainbow Trout would probably not survive in the wild in the long term if stocking was halted.

Brown Trout *Salmo trutta*

Salmo trutta Linnaeus, 1758. European rivers.

Description Dorsal fin short based with 9–14 rays. Anal fin with 9–12 rays. Ventral fins placed well back on abdomen, posteriorly to dorsal fin origin. Pectoral fin set very low under end of operculum with 14–16 rays. Caudal fin shallowly forked in juveniles to truncate in large adults. Body covered with numerous tiny round scales. Lateral line 114–130. Juveniles thick, slightly compressed and not deep-bodied with large fins. Body deepens with age and fins become relatively smaller.

Size Attains a length of over 1 meter TL in the northern hemisphere, but in Victoria to about 80 cm TL.

Colour Dusky yellowish or greenish brown on back and upper sides. Pale yellowish or white ventrally. Adults usually with many small black spots above lateral line, few below, few on head and on dorsal fin, but none of caudal fin. Small juveniles with a series of large dusky blotches midlaterally which fade with growth, and a series of near pupil-sized red spots along lateral line with fewer above and below. Spots mostly with pale halos. Large lake fish are often silvery with few spots.

Distribution and remarks
This species is a native to northern European regions and comprises river and sea-going populations. It has been introduced in many cool temperature regions around the world. In Victoria it occurs usually in streams and rivers with moderate to fast currents. Prefers cooler temperatures than Rainbow Trout and it has become common in the highlands where it has caused the loss of most galaxiid populations and, combined with clearing and logging of forests, salmonids have driven many native species to extinction.

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Pictorial Guide to Victoria's Freshwater Fishes

E-book Edition Part 1

Most native freshwater fishes in Victoria are small, live in cold water, and a very few show bright colours. Originating from the ancient southern supercontinent called Gondwana, they evolved into unique families and genera, with close relatives in temperate southern America and Africa. Most of Victoria's small native fishes are too demanding to keep and of little interest to aquarist. Many species are now critically endangered or have gone extinct due to habitat loss. Most populations were wiped out with land-clearing, logging and introduction of the salmonid fishes. Exotic fishes were introduced, some to please the anglers and others for mosquito control, all of which were detrimental to the native species. All the known Victorian fish species are illustrated in this e-book version with approximately 870 images over 2 volumes.

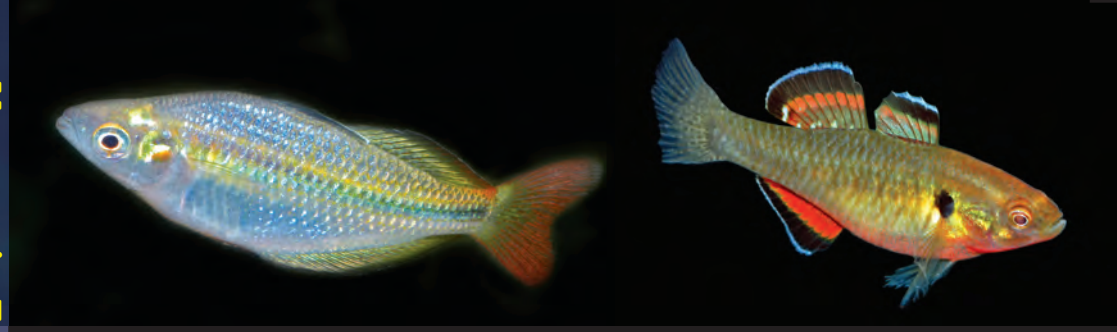
Native fishes are treated comprehensively in taxonomic order in the first and largest part of this volume, showing the various in juvenile and adult stages, as well as the geographical and localised forms.

The large Galaxiidae family with about 40 taxa are treated in the second volume as *Victoria's Galaxiid Fishes*, including many only recently recognised, and others are yet to be named.

The introduced exotic fishes are presented with basic treatment in the last section of this first volume.

Aquatic Photographics

Victoria's Freshwater Fishes Rudie H Kuiter E-book Part 1



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