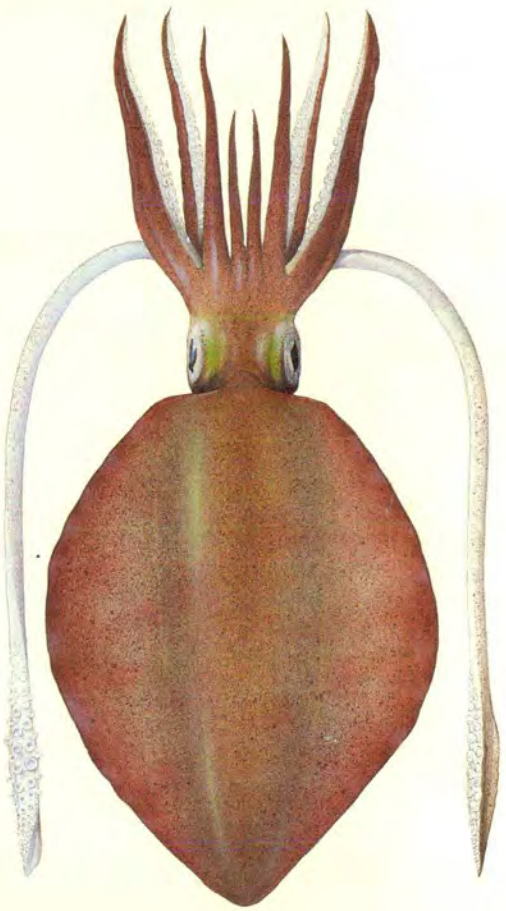
Cephalopods

of Commercial Importance in Australian Fisheries



By Victoria Wadley and Malcolm Dunning

Illustrations by Roger Swainston and Georgina Davis

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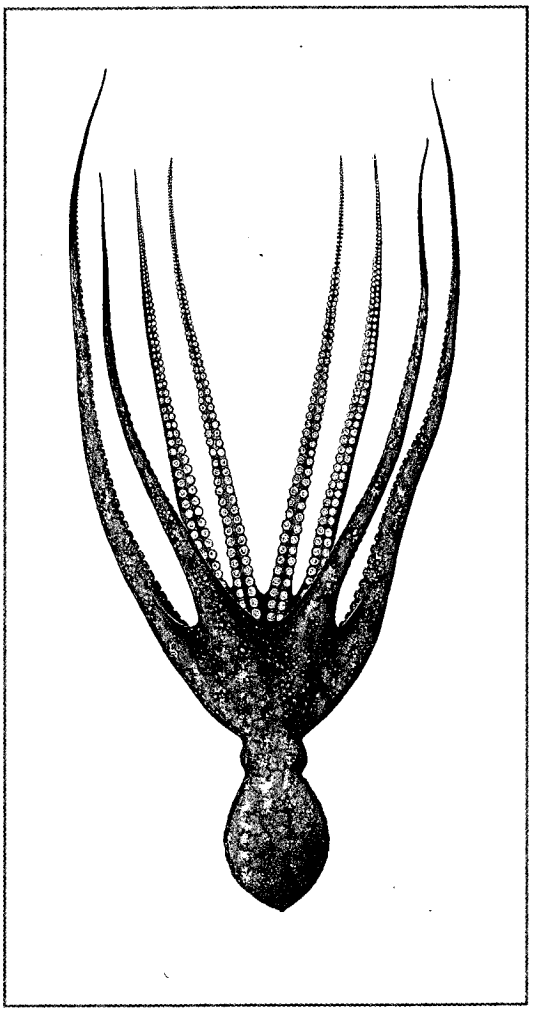

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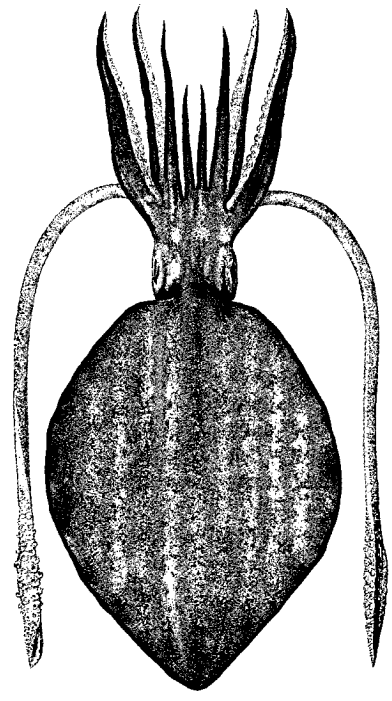

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Cephalopods of commercial importance in Australian fisheries

Bibliography
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1. Cuttlefish - Australia - Identification
2. Squids - Australia - Identification
3. Octopus - Australia - Identification
4. Cephalopoda - Australia - Identification
5. Squid Fisheries - Australia
6. Octopus fisheries - Australia

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Bev Austin, Centre for Food Technology
19 Hercules Street, Hamilton, Qld, 4007
ph: 07 3406 8617
fax: 07 3406 8677

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Please direct comments or enquiries to Dr Victoria Wadley at:

CSIRO Marine Research
GPO Box 1538
HOBART
TAS 7001
Tel: (03) 6232 5222
Fax: (03) 6232 5000
Telex: CSIRO AA57182

Australian Fisheries Management Authority
CSIRO MARINE RESEARCH
FISHERIES RESEARCH & DEVELOPMENT CORPORATION
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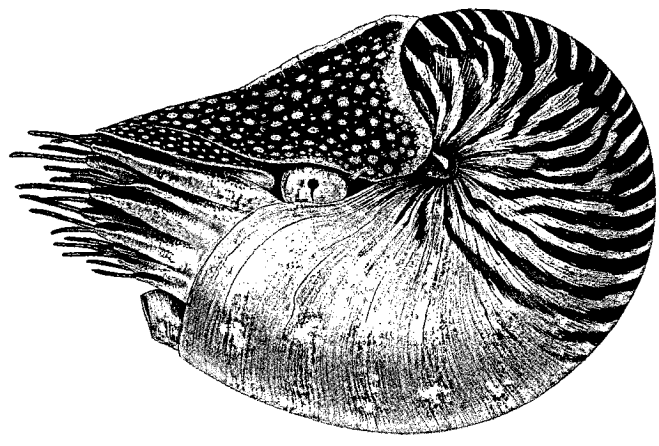
The colour plates were illustrated by Roger Swainston; line drawings by Georgina Davis. Details for the illustrations are cited on page 65. Permission to reproduce their previously published and unpublished illustrations was given by Mark Norman, Tim Stranks and Julia Yeatman. We also thank the Australian Biological Resources Study (ABRS) for permission to use illustrations prepared for the Mollusca volume of Fauna of Australia. Fisheries and Agriculture Organisation (FAO) gave permission to reproduce illustrations from the forthcoming FAO Identification Guide to Living Marine Resources of the Western Central Pacific.

We are grateful for financial assistance toward production of the guide from the Australian Fisheries Management Authority. Some of the specimens were collected with assistance from the Fisheries Research and Development Corporation (Grants number 1988/74 and 1994/17). Funds towards printing of the guide were provided by the National Seafood Centre.



Preface

The aim of this guide is to help commercial fishers, scientific observers and recreational fishermen to identify the most common cephalopods (cuttlefish, squid and octopus) caught in Australian fisheries. Logbooks kept by commercial and recreational fishers provide essential information for fisheries research and management; however, for the records to be useful the catch must be correctly identified, especially in any developing fishery.

Malcolm Dunning of Fisheries Group, Department of Primary Industries, Queensland, prepared the tropical sepiid and *Photololigo* pages, while Vicki Wadley prepared the other sections. The cephalopod specimens for this guide were collected by CSIRO and QDPI scientific staff on commercial and research vessels. They were caught by demersal trawling, jigging and seine netting.

After landing, the freshly dead cephalopods were photographed on the vessels. The cephalopods were then frozen, and later preserved in the laboratory. A single specimen of each species was chosen for illustration in colour. Many squid were badly damaged from trawling and have been illustrated to reflect this. Line drawings, or published illustrations, were used for some species. The specimens have been deposited in the Museum of Victoria, Melbourne, and the CSIRO fish collection in Hobart.

Cephalopods, particularly squid, occur in commercial quantities throughout the Australian Fishing Zone but remain largely under utilised. Squid are highly productive species, and generally live for less than a year. They are caught throughout the year, usually with high catches in spring and summer. High catch rates (up to 90 kg h^{-1}) have been recorded in targeted cephalopod trawl fisheries off northern Australia.

Many of the species treated here have not been described and illustrated in the literature, and until now there has been no shipboard guide to the local Australian cephalopods of commercial importance. However, some of the species are included in other publications, some of which are in the bibliography. If you are unsure of the identity of a specimen, consult these works or take the specimen to your regional museum.

As Australia's cephalopod fisheries develop to the stage where management plans are required, the composition, size and sustainable harvest levels of the stocks must be assessed. Commonwealth-managed fisheries are evaluated on the basis of this information. At present, recorded landings represent only a fraction of the cephalopod catch, as cephalopods taken as bycatch are often discarded at sea or used as bait in other fisheries.

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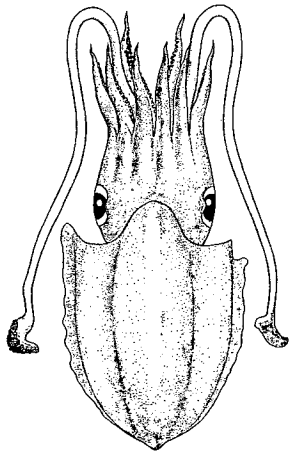

Sepioidea

Cuttlefish

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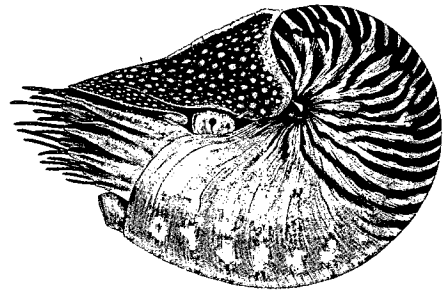

Nautiloidea

Nautilus

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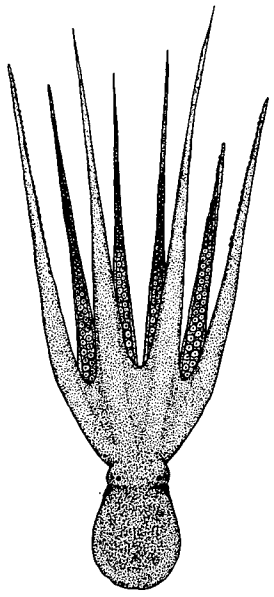

Octopoda

Octopus

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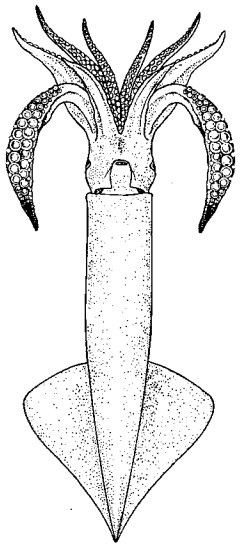

Teuthoidea

Squid

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Quick-find Reference

Sepia apama Gray, 1849

Common Name: Australian giant cuttlefish

Key Features: *External:*

Dorsal surface of head with three flat, semicircular, flap-like papillae over each eye

Large species with broadly oval mantle, particularly in juveniles

Dorsal mantle margin projects forward, reaching the level of anterior border of the eye

Suckers on tentacular club form five or six longitudinal rows; suckers vary greatly in size but the central ones are largest

Cuttlebone:

Pronounced V-shaped callus on posterior inner edge of inner cone

Outer cone well developed and greatly extended posteriorly; cone less developed in juveniles

No spine in adults, although usually present as a small knob in juveniles

Dorsal surface of cuttlebone white-grey in colour

Colour in Life: Opalescent or cream flesh when fresh-caught, fading rapidly to pale cream-grey; spectacular stripes on mantle during mating displays

Distribution: Australia—southern Australia, from southern Qld to Point Cloates in WA

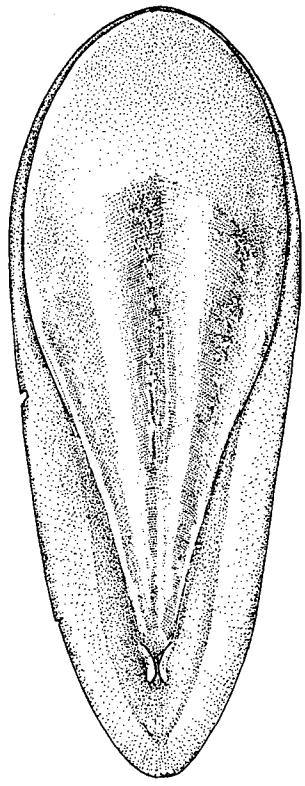
Habitat: Rocky reefs; occupies and defends a crevice or cave; found to J100 m depth, but most common in shallow waters

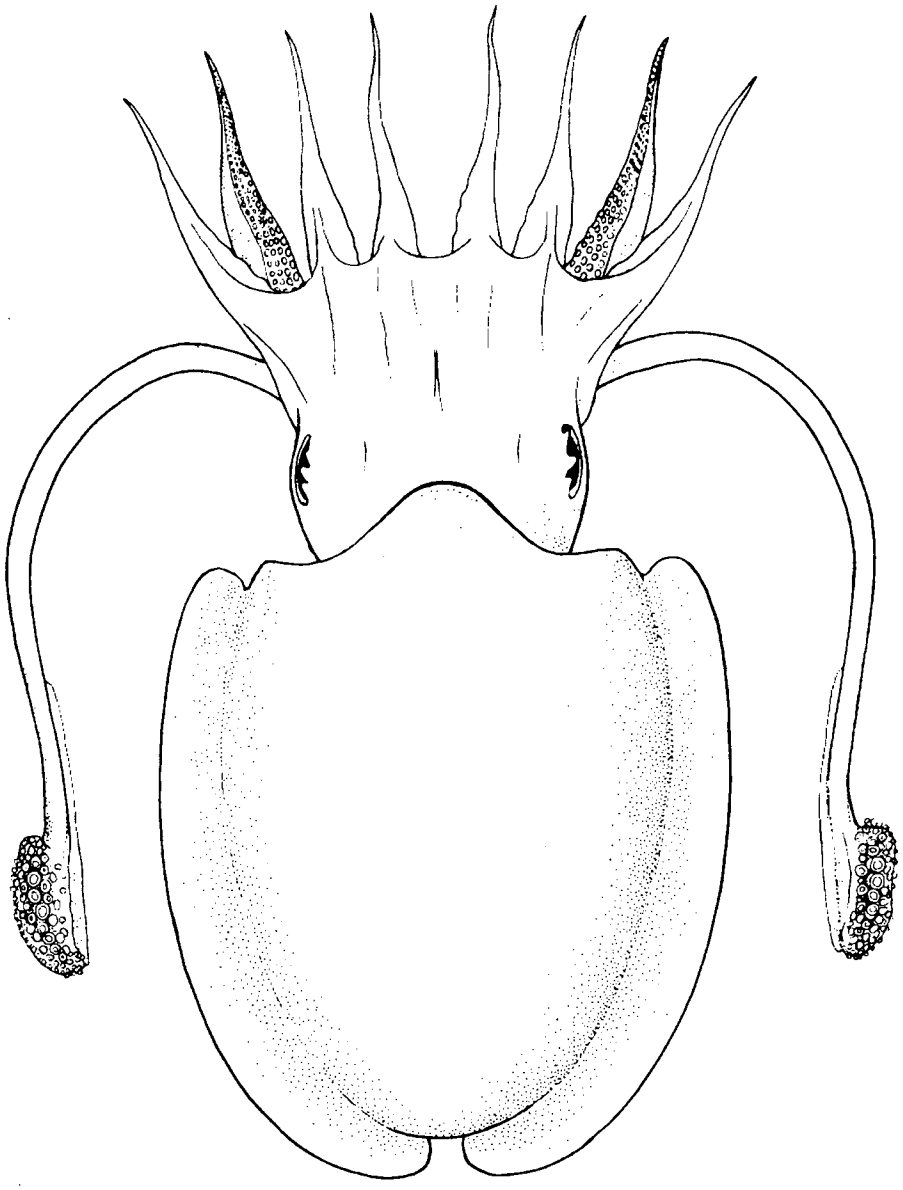
Size: Dorsal mantle length commonly 200 mm, maximum 520 mm, maximum weight over 5 kg

Comments: An endemic species in southern Australian waters. Commonly caught by fishers, usually as trawl or Danish seine bycatch but also on squid lures. Sold on the domestic market; also used as bait.

References:

Lu,1998
Zeidler and Norris, 1989





Sepia apama

Sepia cultrata Hoyle, 1885

Common Name: Knife-bone cuttlefish (FAO)

Key Features: *External:*

Arm suckers in four rows; left ventral arm of male modified for sperm transfer, with the two dorsal rows of suckers smaller than the two ventral rows

Ventral mantle margin slightly notched; dorsal mantle margin projects strongly forward, beyond the level of the eye

Tentacles with strong swimming membranes, about 1.5 times the length of the clubs; dorsal protective membrane as wide as the sucker-bearing surface of the club, separated from ventral protective membrane at the base

Tentacular club with 5–6 transverse rows of small, similar-sized suckers

Cuttlebone:

Cuttlebone elongate, oval, widest just anterior of middle

Anterior triangular in shape, posterior tapers evenly to a point

Dorsal surface cream or salmon coloured, flat anteriorly with a distinct narrow median ridge and two indistinct lateral ridges

Outer cone narrow anteriorly, wider posteriorly, forming two short posterior wings around the posterior part of inner cone

Inner cone narrow, with rounded edges

Spine without keels, turned upwards, sometimes slightly curved with concave ventral side

Colour in Life: Pale cream in fresh-caught specimens

Distribution: Australia—southern Australia, from the Houtman Abrolhos, WA, along the southern and eastern Australian coast, including Tas, to southern Qld

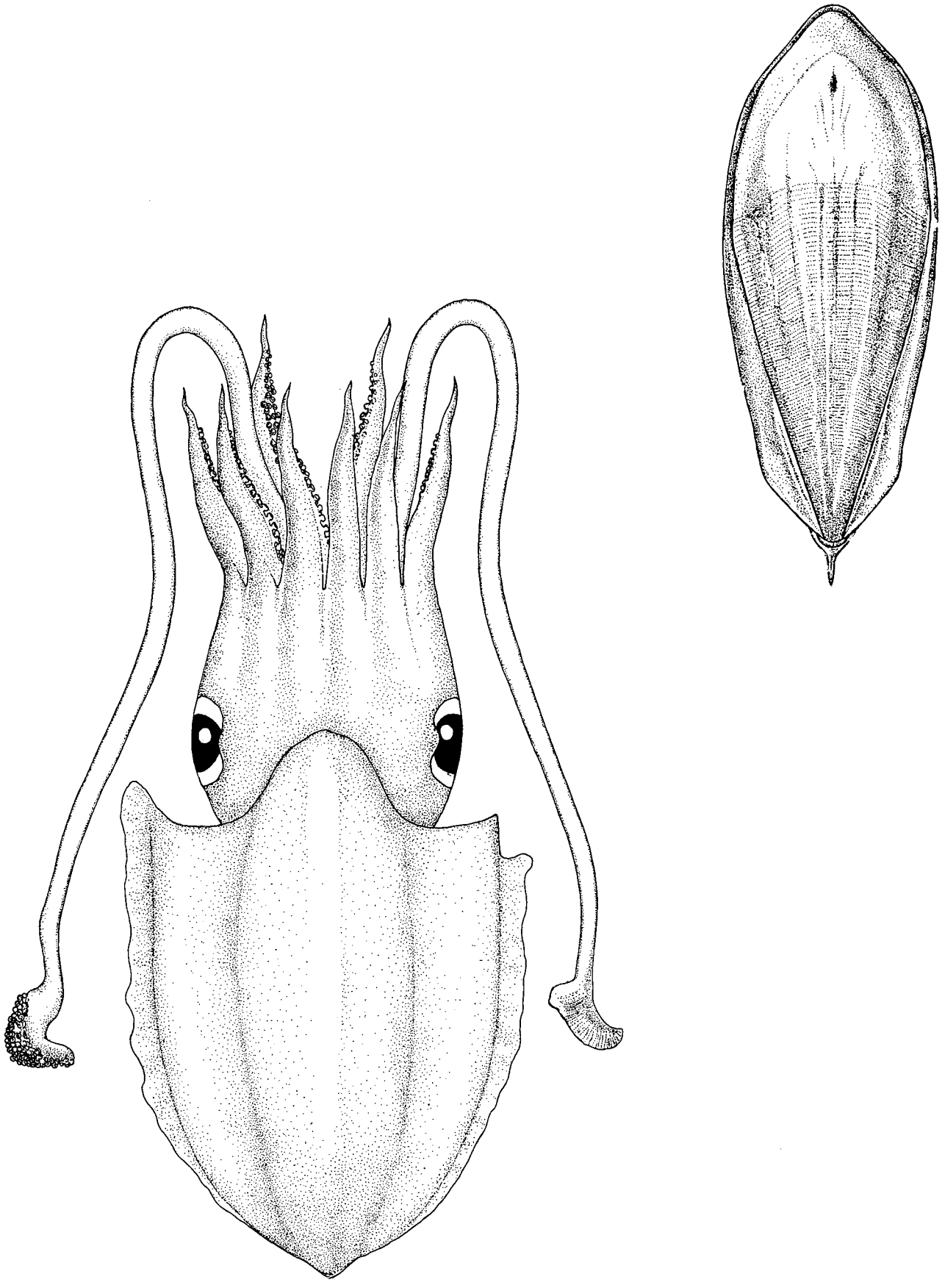
Habitat: Rare and probably deep-water species; recorded from depths of 130–800 m, with most catches from 300–500 m

Size: Mantle length to 100 mm

Comments: Bycatch of trawlers, particularly in south-east Australia; sold on domestic market as food or bait.

References:

Lu, 1998
Zeidler and Norris, 1989



Sepia cultrata

Sepia elliptica Hoyle, 1885

Common Name: Oval bone cuttlefish (FAO)

Key Features:

External:

Dorsal mantle broadly oval, dorsal margin rounded posteriorly; ventral mantle has notched margin

Tentacular club with 10–12 minute, similar-sized suckers in transverse rows; arm suckers in four rows

Swimming membrane of club extends beyond the club base

Protective membranes narrow, separated at base in smaller specimens and fused in larger specimens; membranes connected at base of club by a membranous ridge

Six or seven long, membranous, fleshy papillae along base of each fin

Arm suckers in four rows

Cuttlebone:

Oval, anterior rounded; constricted from the midline to the posterior

Dorsal surface granular; ventral surface with a shallow median groove

Dorsally, a broad central ridge flanked by two lateral ridges with depressions to each margin

Outer cone with postero-lateral edges forming small wings

Spine pointed slightly upwards, without keels

Colour in Life: Pale transverse stripes across dorsal surface of mantle; white line along base of fins

Distribution: Australia—northern Australia from Exmouth Gulf, WA, to Capricorn Group, Qld, including Gulf of Carpentaria

World—Indo-west Pacific, New Guinea, South China Sea

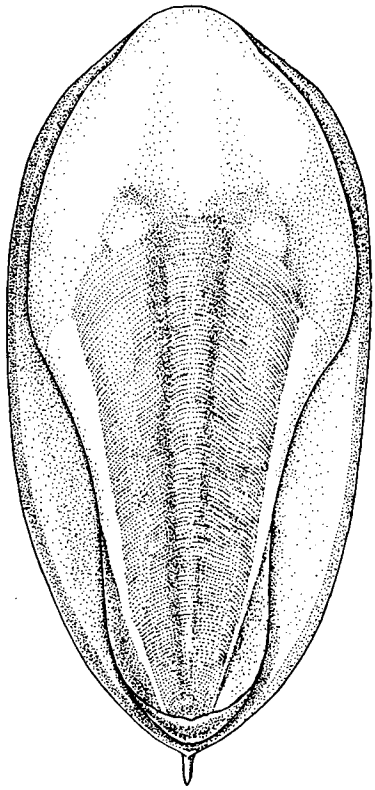
Habitat: Demersal and neritic species found on sandy and muddy bottoms in 15–140 m depth; overwinters in deeper waters and migrates to shallow coastal areas for spawning

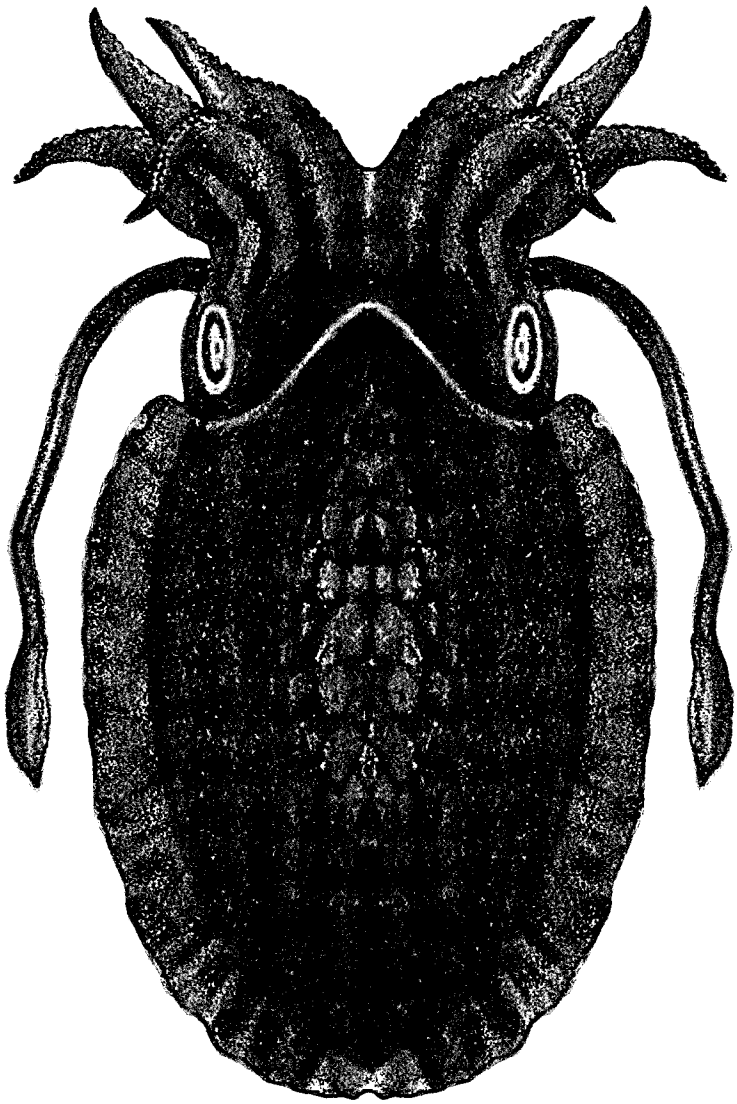
Size: Maximum mantle length 180 mm; weight about 0.6 kg

Comments: Commonly caught in Western Pacific regions, supporting local and subsistence fisheries in, for example, the Philippines; a highly appreciated species in Japan and South East Asian countries.

References:

Lu, 1998
Roper *et al.*, 1984
Dunning *et al.*, 1994





Sepia elliptica

Sepia novaehollandiae Hoyle, 1909

Common Name: None known

Key Features: *External:*

Anterior dorsal mantle margin rounded, extends to mid-level of eyes, notched ventrally

Tentacular club short with suckers in eight rows; suckers of second and third rows from dorsal surface are distinctly larger

Distinct swimming membrane extends slightly beyond base of club; protective membranes well developed

Arm suckers in four rows throughout

Cuttlebone:

Elongate oval, pointed toward both ends

Pink dorsally; weak median ridge, flanked by two smaller lateral ridges; dorsal surface granular, particularly near spine

Ventral groove wide and deep along striated area; two rounded ribs with depressions on either side flank the ventral groove

Inner cone fused to outer cone, which is expanded posteriorly

Spine without keel, straight or turned slightly upward; base of spine enlarged dorsally and laterally, with a deep groove on ventral side; groove also located dorsally in larger specimens

Colour in Life: Flesh cream when fresh, with luminous yellow-green streaks

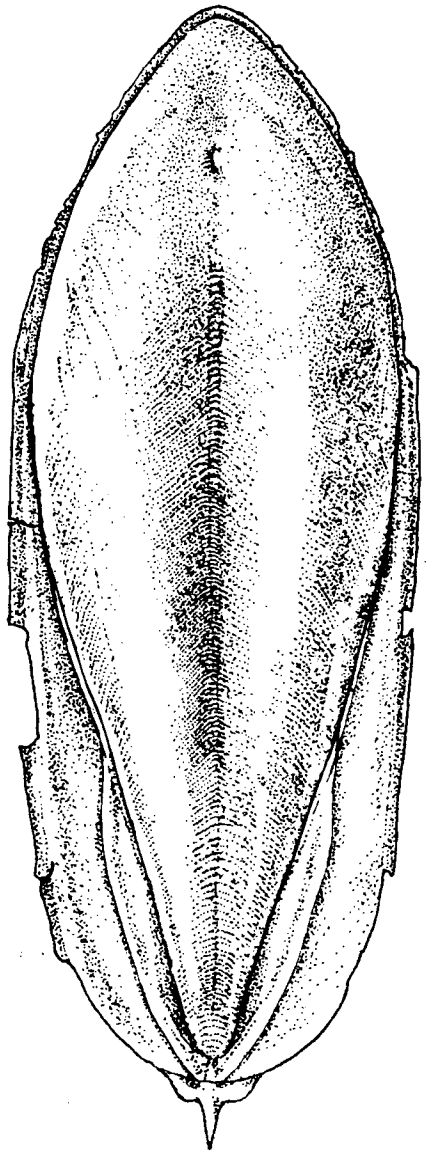
Distribution: Endemic to Australian waters. Southern Australia from Shell Harbour, NSW, to North West Shelf in WA

Habitat: Occurs in depths of 15–348 m

Size: Mantle length to 100 mm

Comments: Bycatch of trawlers; sold on domestic market as food or bait.

References: Lu, 1998



Sepia novaehollandiae

Sepia opipara (Iredale, 1926)

Common Name: Stare gaze cuttlefish (FAO)

Key Features: *External:*

Dorsal mantle margin extends to mid-level of eyes, ventral margin slightly curved

Tentacular clubs short, with suckers in eight transverse rows on flattened face; suckers differ greatly in size; four to five big suckers in the middle of the club; dorsal and ventral membranes not fused at base of club

Arms with suckers in four rows; left ventral arm of male modified for sperm transfer, with five or six series of normal suckers at the base, then six to seven rows of much smaller paired suckers, then normal suckers to the tip

Cuttlebone:

Long oval shape, the anterior margin fragile

Ventral surface with a shallow, narrow median groove

Dorsal surface pimply, light tan or pink in colour, flat at sides and centre, with a prominent, rounded median rib and wide lateral ribs

Spine long and relatively straight, with a ventral keel

Colour in Life: Dorsal surface of mantle and head dark tan or brown, with darker blotches; ventral surface white; iridescent orange bars along the margin between the mantle and fins

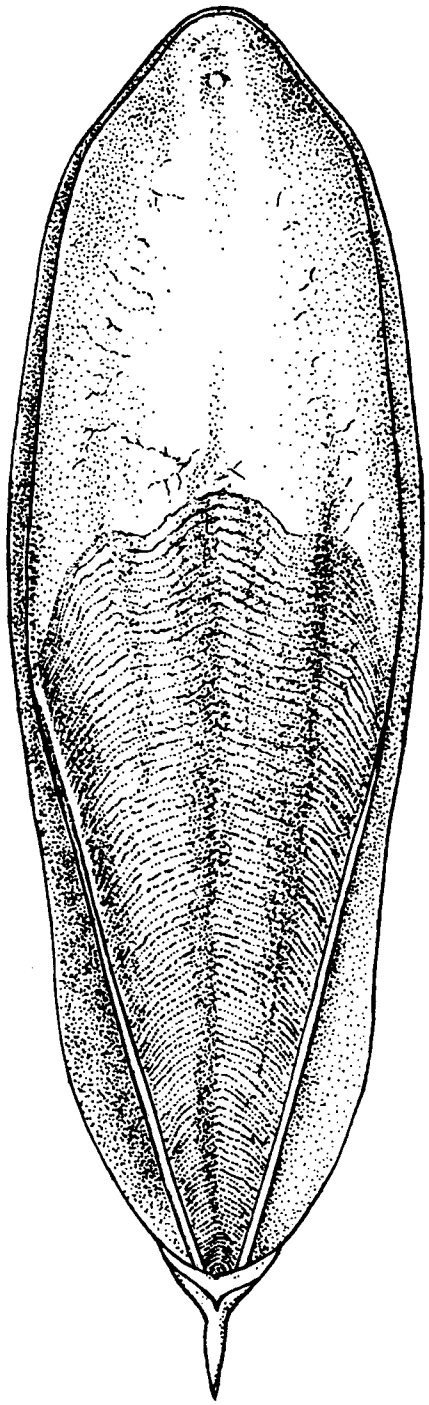
Distribution: Australia—endemic to northern Australia, from Fremantle, WA, to southern Qld; not in the Gulf of Carpentaria

Habitat: Shelf waters from 40–184 m depth

Size: Up to 130 mm mantle length from trawl bycatch; males and females of similar size

Comments: Bycatch of demersal trawl fisheries.

References: Adam, 1979
Lu, 1998



Sepia opipara

Sepia papuensis Hoyle, 1885

Common Name: None known

Key Features: *External:*

Small papillae scattered over the dorsal surface of the mantle, head and arms; two pairs of large papillae over each eye and one on each eyelid

Suckers on ventral arms in four transverse rows in males and females; suckers on other arms in four transverse rows towards base but two transverse rows at tips

Tentacular club suckers vary in size; suckers in five or six transverse rows, largest suckers towards centre; dorsal protective membrane much longer than ventral protective membrane

No obvious modification of the ventral arms in mature males

Cuttlebone:

Anterior and posterior ends bluntly rounded

Dorsal surface with three rounded ribs separated by two grooves; dorsal median rib distinct, flared toward anterior end

Chitinous margins broad

Ventral surface with a distinct, wide, median groove

Spine straight, with a ventral keel

Colour in Life: Dark greenish-brown with white blotches, matching the colour of its habitat in seagrass and algal beds

Distribution: Australia—northern Australia from Fremantle, WA, through the Arafura and Coral seas, to southern NSW; includes the Gulf of Carpentaria

World—central Indo-west Pacific (Philippines, Indonesia)

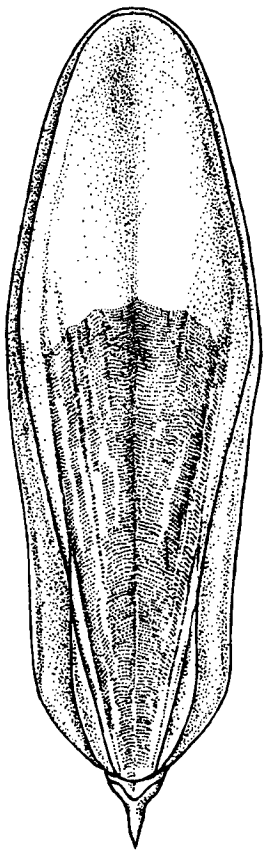
Habitat: From shallow inshore waters over soft bottoms, to about 150 m depth

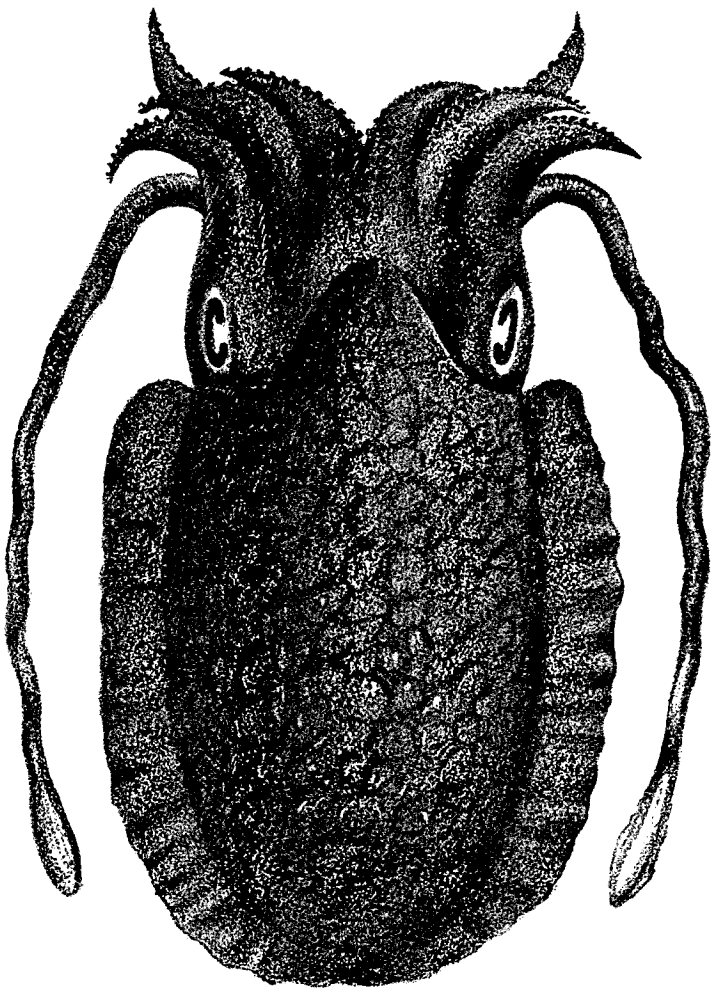
Size: Up to about 100 mm mantle length from trawl bycatch; males and females of approximately equal size

Comments: Bycatch of demersal trawl fisheries.

References:

Adam, 1979
Dunning *et al.*, 1994
Lu, 1998





Sepia papuensis

Sepia pharaonis (Ehrenberg, 1831)

Common Name: Pharaoh cuttlefish

Key Features: *External:*

Mantle broad, with base of fin marked by a row of tubercules and a dashed, white line

Fins wide, continuing around the edge of the mantle except for a notch at the tail

Left ventral arm modified for spermatophore transfer in mature males; ten series of normal suckers at base, then six series of reduced suckers, then normal suckers to tip

Tentacle club long, with eight suckers in transverse rows; suckers differ greatly in size; five or six central suckers much larger than the others; dorsal and ventral protective membranes not fused at base of club

Cuttlebone:

Cuttlebone is long and oval

Inner cone is horn-like and greatly enlarged, overlapping posterior part of striated area, not found in other Australian species

Granular dorsal surface with three longitudinal ridges

Ventral surface with shallow ventral groove in striated zone, last loculus faintly grooved

No keel on spine; two thick, lateral expansions at its base

Colour in Life: In live or freshly dead animals, spectacular white stripes cross the body and head from side to side

Distribution: Australia—north and north-western Australia, including Gulf of Carpentaria

World—Indo-Pacific

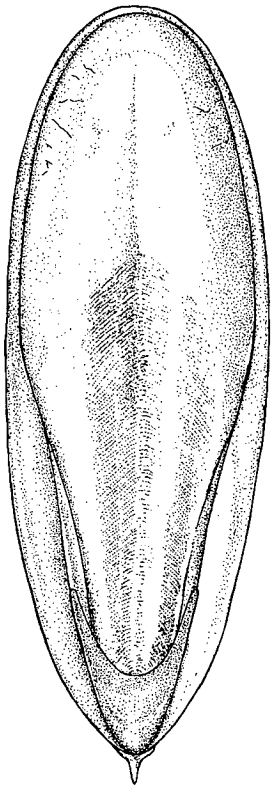
Habitat: On the continental shelf in depths to about 110 m; most common in waters to 40 m depth

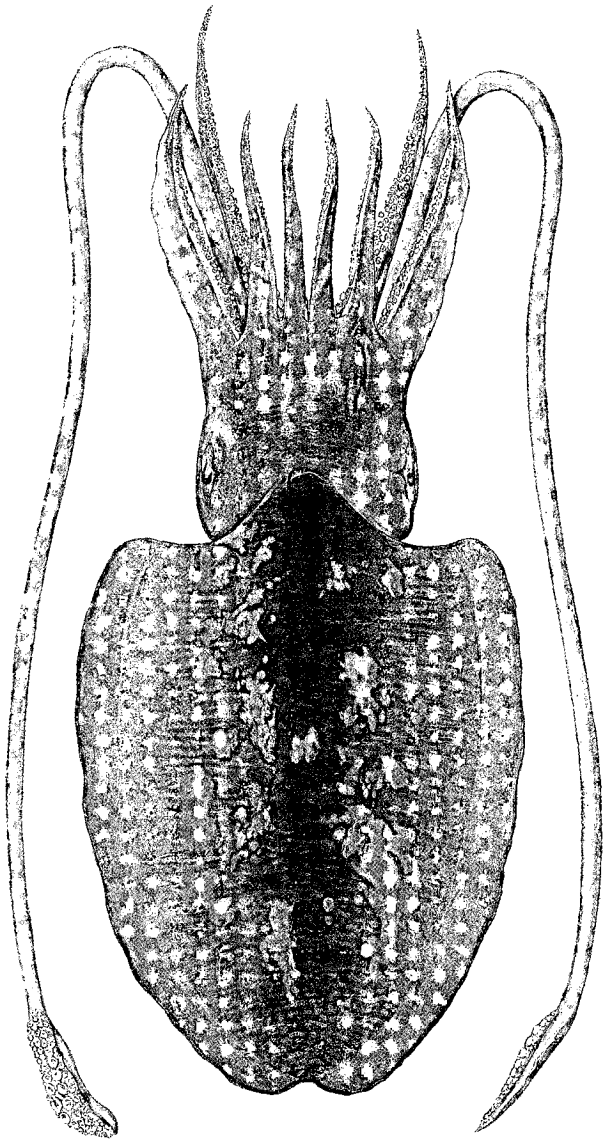
Size: Mantle length commonly 15–200 mm, maximum 430 mm in males and 330 mm in females (Roper *et al.* 1984); males tend to be smaller than females

Comments: This species is commercially important throughout its range.

References:

Lu, 1998
Roper *et al.*, 1984
Wadley, 1995





Sepia pharaonis

Colour Plate i

Sepia rex (Iredale, 1926)

Common Name: King cuttlefish (FAO)

Key Features: *External:*

Dorsal mantle margin projects forward to mid level of eyes; ventral margin slightly notched

Swimming membrane of tentacular club extends slightly beyond the base of club, and the protective membranes remain separated at the base

Tentacular club with 10–12 rows of massed suckers

Arm suckers in four rows

Male with left ventral arm adapted for transferring sperm; suckers in four rows, but appear to be in two or three rows only, because suckers in the middle third are much smaller and further apart

Cuttlebone:

Elongate diamond shape, narrowed anteriorly; at least twice as long as wide

Wide, but not prominent, ventral groove

Dorsal surface rose pink in colour and pimply on posterior third

Prominent dorsal median ridge bounded by two shallow grooves; lateral ridges less distinct

Large chitinous margin around cuttlebone, occupying most of outer cone

Spine bluntly tapering to a point, usually curved upward, without keel

Colour in Life: Pale cream

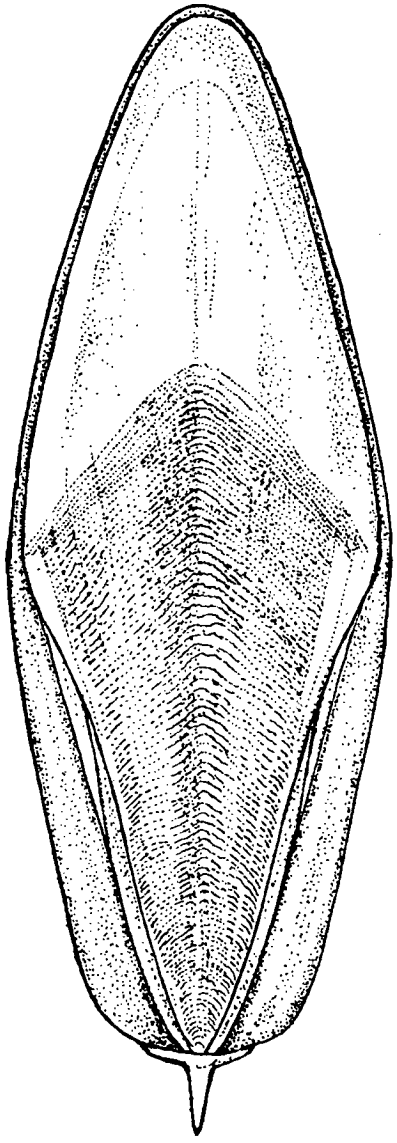
Distribution: Australia—southern Australia from southern Qld to SA

Habitat: Found at depths 55–400 m

Size: Mantle length up to 120 mm

Comments: There is still some taxonomic confusion between this species and *S. jaenschi*, so its distribution is unclear.

References: Lu, 1998



Sepia rex

Sepia rozella (Iredale, 1926)

Common Name: Rose cone cuttlefish

Key Features: *External:*

Anterior dorsal margin tapering strongly to a point, extending toward anterior borders of eye; ventral margin notched

Swimming membrane of tentacular club extends beyond base of club; protective membranes of varied size, fused at base of club

Tentacular club suckers in eight transverse rows; arm suckers in four rows

Left ventral arm of mature male with basal 40% bearing reduced suckers; oral surface wider than corresponding right ventral arm

Cuttlebone:

Cuttlebone elongate oval, tapering to a point at both ends

Dorsal surface of cuttlebone pink in colour, with granulose dorsal surface and three faint longitudinal ribs

Ventral surface with deep groove in striated zone, flanked by two prominently convex ribs; anterior ventral surface flat

Posterior striae are slightly arched, and V-shaped anteriorly

Inner cone rose in colour, with broad limbs, fusing with outer cone

Outer cone with wing-like expansions posteriorly

Spine strong, curved upward; ventral keel notched

Colour in Life: Dorsal surface rose coloured, ventral surface cream to light pink

Distribution: North-eastern Australia, from southern Qld to NSW

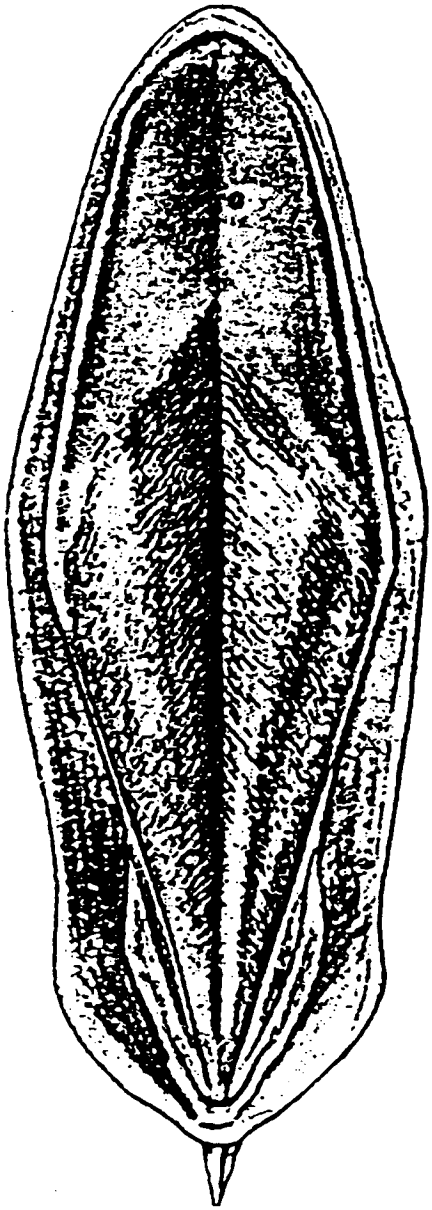
Habitat: Found at depths 27–183 m

Size: Up to 140 mm mantle length

Comments: Taken as by-catch of prawn and other trawl fisheries; commonly marketed in Sydney.

References:

Iredale, 1926
Lu, 1998
Reid, In prep.



Sepia rozella

Sepia whitleyana (Iredale, 1926)

Common Name: Whitley's cuttlefish

Key Features: *External:*

Both ventral arms modified in mature males for sperm transfer; left ventral arm bearing 7–8 series of normal suckers at the base, 5–6 series of reduced suckers in the middle, then normal suckers to the tip

Tentacular club with 20 transverse rows of minute, similar-sized suckers

Cuttlebone:

Oblong shape, sides roughly parallel

Striated zone deeply concave

No keel on spine

Colour in Life: In freshly-caught animals, the upper surface of the mantle is a dark olive-grey in colour with a characteristic pattern of wavy longitudinal lines and spots

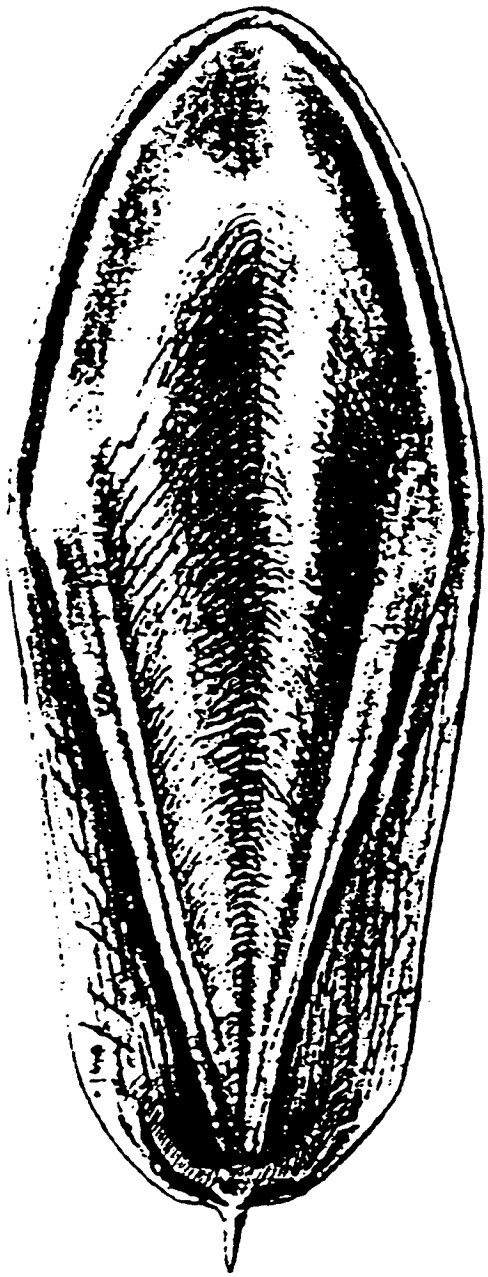
Distribution: Australia—endemic to eastern Australia, from Gulf of Carpentaria to NSW

Habitat: Found at depths between 23–160 m

Size: Cuttlebone known to reach at least about 168 mm; larger specimens may occur

Comments: Co-occurs with *S. smithi*; the two species are frequently confused, but *S. smithi* has only the left ventral arm modified for sperm transfer. Features of the cuttlebone are also different.

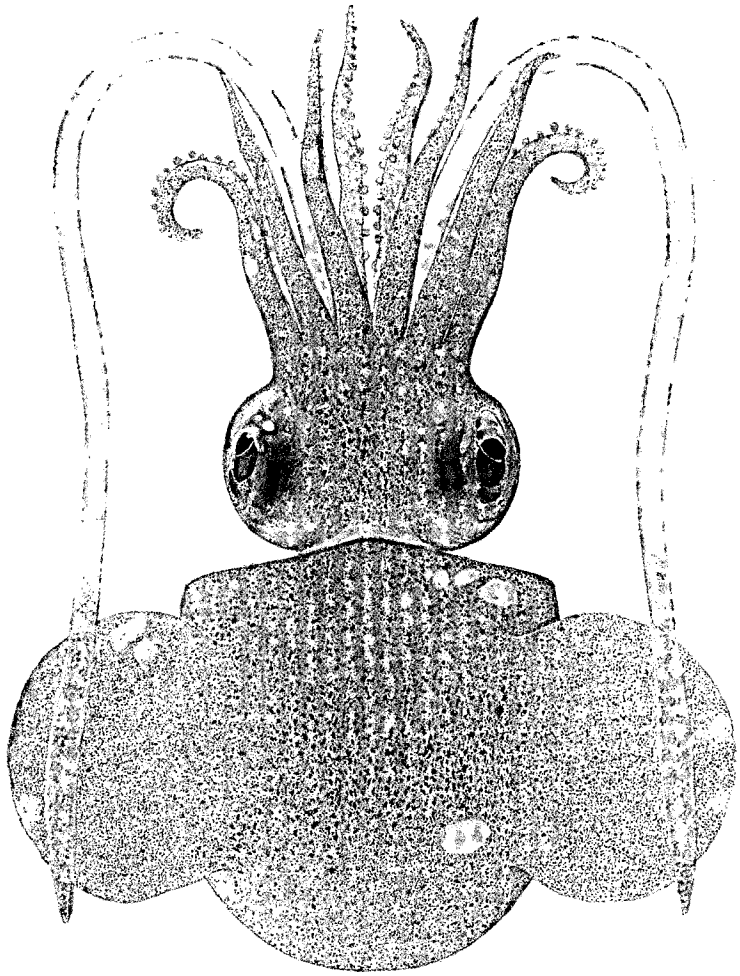
References: Lu, 1998



Sepia whitleyana

Rossia species 1

Common Name:	Dumpling squid, Bobtail squid
Key Features:	Mantle short, rounded towards the head, not fused with the head
	Fins rounded
	Arms short, with two rows of suckers; all arms, except those on the dorsal surface, are joined by a web; the pair of dorsal arms are modified for spermatophore transfer in mature males
	Eyes large, well developed, with opalescent colour and covered by a thin, transparent membrane
	No luminous organs on the ink sac
Colour in Life:	Beige, speckled with darker brown; green-blue eyes
Distribution:	Australia—North West Slope and Shelf
	World—possibly the same species off the east coast of South Africa
Habitat:	Benthic, found on the continental shelf and slope, probably in muddy habitats
Size:	Maximum mantle length recorded in the North West Slope trawl fishery is 60 mm; males mature at a smaller size than females and do not grow as large
Comments:	Little commercial interest in Australia for this or similar species, although sepiolid squid of the family Rossiinae are regularly marketed in the Mediterranean from prawn trawl bycatch. *Rossia* species 1 as described by Reid (1991) may be the same species as the South African *Rossia mastigophora.*
References:	Nesis, 1987 Okutani *et al.,* 1987 Reid, 1991

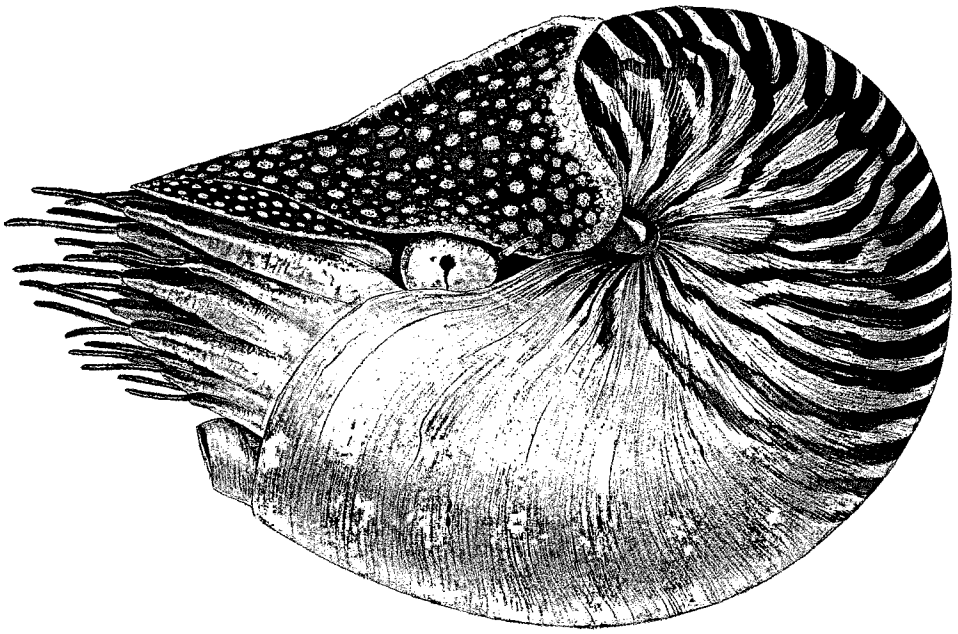


Rossia species 1

Colour Plate ii

Nautilus pompilius (Linnaeus, 1758)

Common name	Emperor nautilus (FAO)
Key Features:	Chambered shell is coiled around the animal
	"Bellybutton" of shell filled in, no deep hole
	Stripes on shell, with well-defined edges
Colour in Life:	Pale shell with red-brown stripes
Distribution:	Australia—north-west, northern and eastern Australia to NSW; not in the Gulf of Carpentaria
	World—western Pacific
Habitat:	Deeper continental shelves and slopes; migrates from the bottom (to 750 m) by day to the surface waters at night; particularly associated with coral reefs
Size:	Maximum diameter of shell recorded is about 200 mm
Comments:	Shell attractive, although trade strongly discouraged for conservation of the species; flesh used as food in artisanal fisheries in parts of the Indo-Pacific. Other species of *Nautilus* occur in northern Australia and a revision of the genus is needed.
References:	Roper *et al.*, 1984



Nautilus pompilius

Colour Plate iii

Octopus australis Hoyle, 1885

Common Name: Southern octopus

Key Features: Ventrolateral integumental ridge continuous around entire mantle circumference; forms a sharply angled peak on posterior mantle

In males, ligula large and shaped like a coffee-bean, as shown

Mantle globular and egg shaped; slight constriction separates narrow head from mantle

Skin surface on upper side of animal covered by fine, rounded and closely set tubercles; underside with by fewer, smoother tubercules

Long, slender, similar-sized arms tapering to fine tips

A large papilla over each eye; small but prominent eyes

Colour in Life: Uniform mottled yellow-tan on upper side and white on the underside in fresh specimens

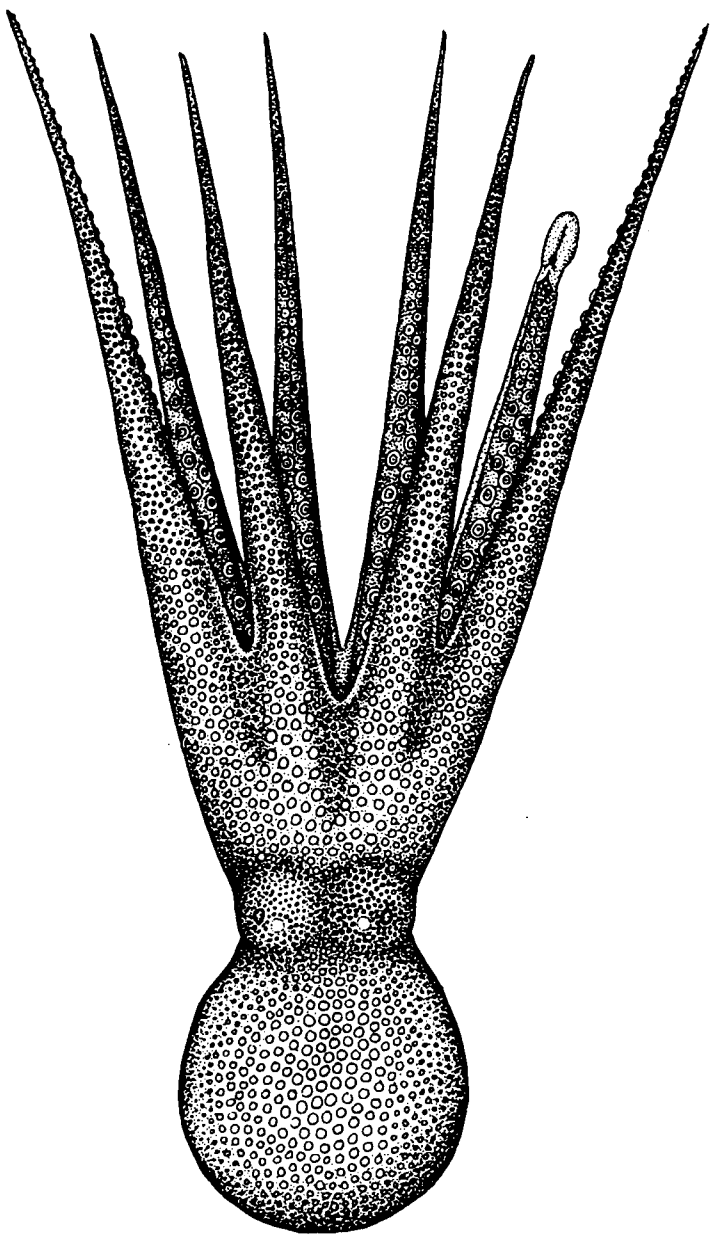
Distribution: Australia—eastern Australia from Hervey Bay, Qld to Jervis Bay, NSW

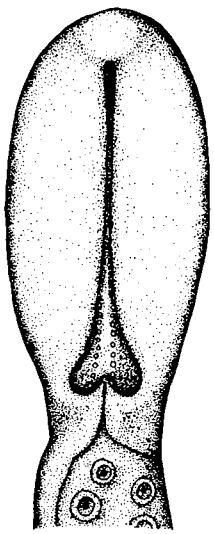
Habitat: Common in subtropical inshore waters from 3–134 m depth, living on sand and mud bottoms, and among sponges

Size: Males mature at 20–25 mm mantle length, females at 50–60 mm mantle length

Comments: A southern species now known as *Octopus berrima* was previously treated under this name. Catch records show that this species constitutes a high percentage of the total octopus fisheries yield from eastern Australia, taken as a commercial bycatch from prawn trawlers; estimated annual catch about 150 t. Another species, *Octopus graptus* Norman, 1993, forms a small bycatch fishery of less than 100 t annually on the east Australian coast.

References:
Stranks and Norman, 1992
Winstanley *et al.*, 1983





Octopus australis

Octopus berrima Stranks and Norman, 1992

Common Name: None known

Key Features: Egg shaped mantle separated from arms by constriction around the head

Arms long, similar-sized and slender, tapering to fine tips; suckers in two rows

Skin with fine, rounded, closely set tubercles which are large and dense dorsally, fine and less prominent ventrally

Ventrolateral integumental ridge around mantle, obvious near mantle opening, but less so posteriorly

A row of one large and three to four small unbranched papillae around eye region, and also on the dorsal side where four papillae form a diamond arrangement

Colour in Life: When at rest, grey-white with light brown mottling dorsally, white to cream ventrally; bar of dark brown runs from behind each eye, through eye, to tentacles; when stimulated, the animal becomes uniformly dark brown to purple-brown dorsally, cream to light brown ventrally; two white spots on dorsal mantle behind eyes; white bar present between eyes; two thin white stripes along basal length of dorsal arms

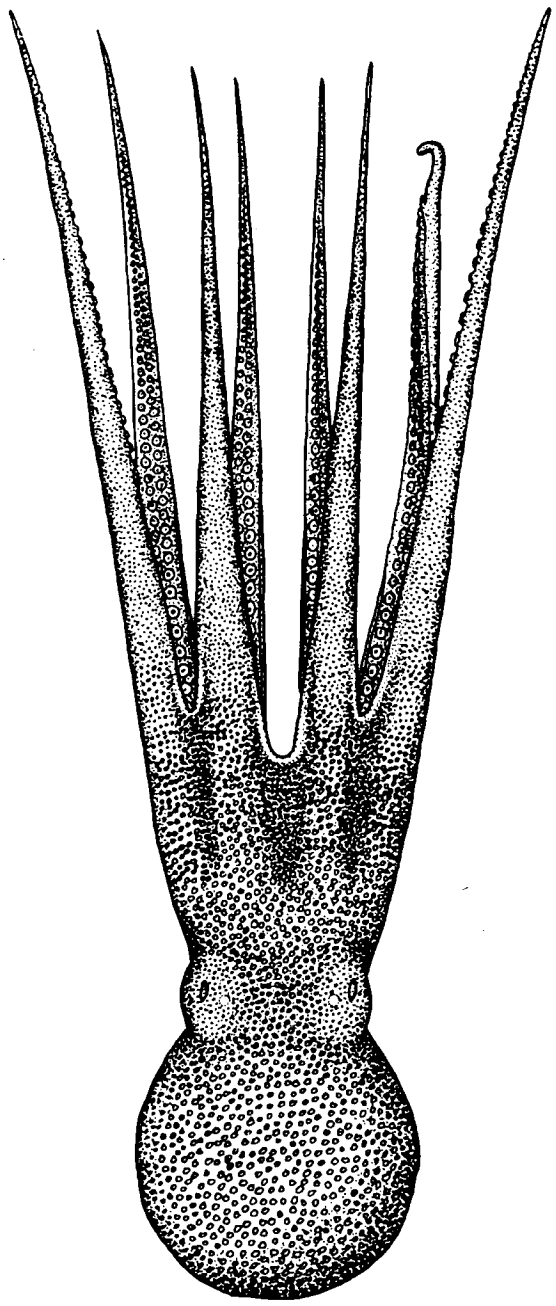
Distribution: Australia—south-eastern Australia from the central Great Australian Bight to Twofold Bay, NSW, including Bass Strait and Tas

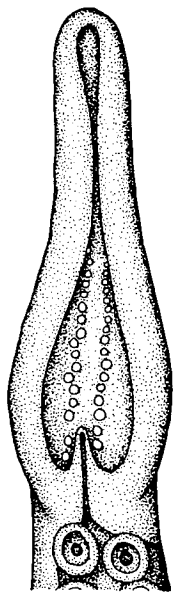
Habitat: Common in temperate inshore waters, living on sandy and muddy bottoms, and among sponges and sea squirts; depths 5–267 m

Size: Males mature at about 20–25 mm mantle length and females at 30–40 mm mantle length

Comments: Previously confused with *Octopus australis*, which is now known to be a subtropical species. Caught incidentally during scallop and mussel dredging and seine netting; often used as bait.

References: Stranks and Norman, 1992





Octopus berrima

Octopus maorum (Hutton, 1880)

Common Name: Maori octopus

Key Features: Long arms with slender tips; arms of unequal length; dorsal arms (those between eyes) are longest and most robust

Large in size

Pear-shaped body

Skin smooth when fresh, compared with warty skin of other local octopus

Gill lamellae count high: usually 13–15

Colour in Life: Brick red, with small, dark red blotches scattered over the entire dorsal and ventral surfaces

Distribution: Australia—temperate waters around south eastern Australia, from Tuncurry in NSW, around Tas and Bass Strait to west of Ceduna in SA

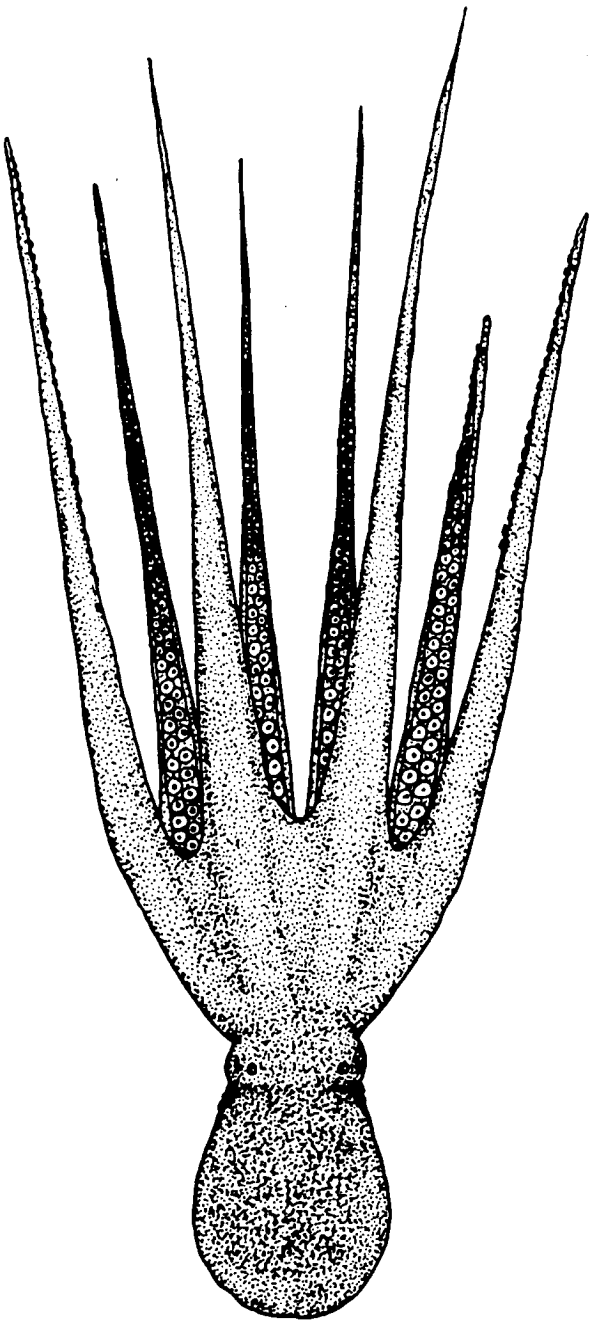
World—South-western Pacific Ocean, New Zealand

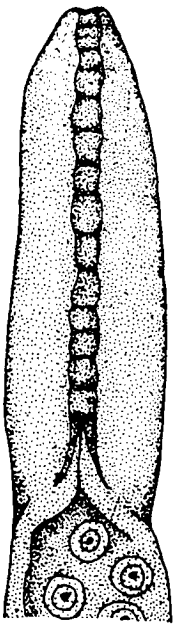
Habitat: Continental shelf and upper continental slope, living on reefs or rocky areas and among sponges; recorded from depths to 550 m

Size: Large species often growing to 1 200 mm total length, sometimes over 2 500 mm, of which 25% is body length; weighs up to 9 kg

Comments: A major bycatch of the SA rock lobster fishery; sold on the domestic market for food or bait. Targeted in small-scale fisheries in southern Tas; value-adding by pickling or smoking attracts a premium price. Stranks recently confirmed that *O. flindersi* (Cotton, 1932) from Australia is a junior synonym of *O. maorum*, originally described from New Zealand.

References:
Kailola *et al.*, 1993
Stranks, 1988a
Zeidler and Norris, 1989





Octopus maorum

Octopus pallidus Hoyle, 1885

Common Name: Pale octopus

Key Features: Medium in size

Chunky appearance, egg-shaped mantle with stout arms of equal length

Distinctive pattern of closely set tubercules and prominent cirri on dorsal surface, giving skin a warty appearance

Enlarged suckers on all arms of mature males; medium-sized ligula (occupies about 10% of length of third right arm)

Colour in Life: Resting animals are brown to mottled cream, dorsally; paler ventrally; colour becomes uniformly dark brown to purple when animal is stimulated; a faint orange stripe is often present along the length of dorsal arms

Distribution: Australia—endemic to temperate waters around south-eastern Australia from Sydney to west of Ceduna in SA; also in Bass Strait and off the north and east coasts of Tas

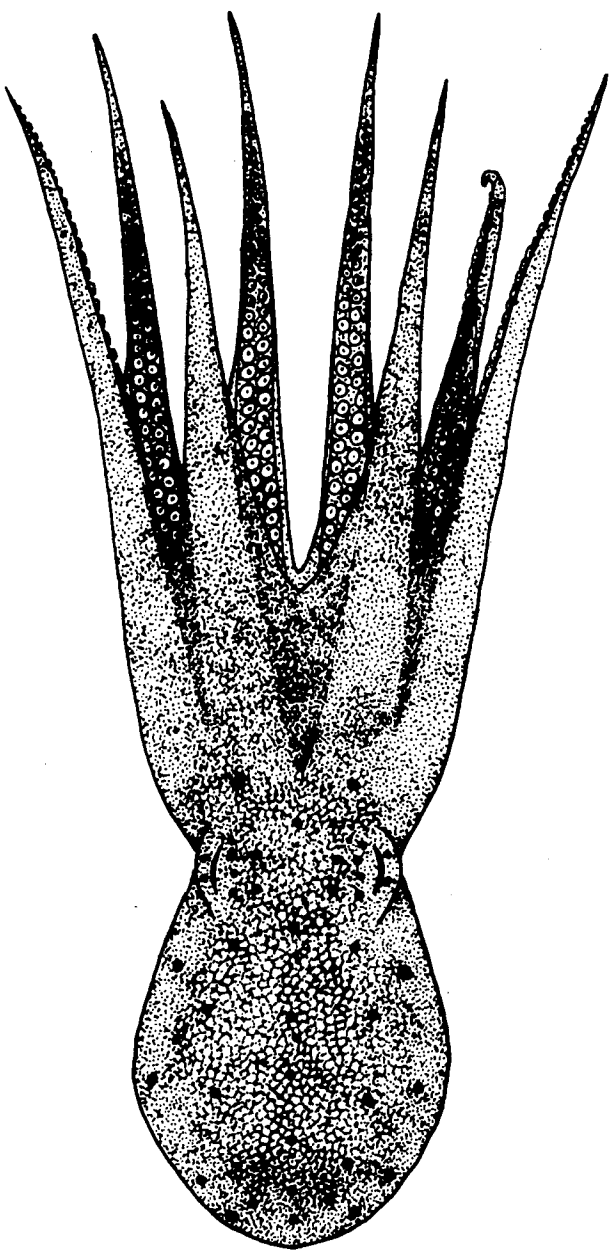
Habitat: Primarily an inshore species, living among bryozoans, sponges and sea squirts on sandy substrates; recorded from 7–593 m depth, usually in less than 110 m; common in bays and coastal waters

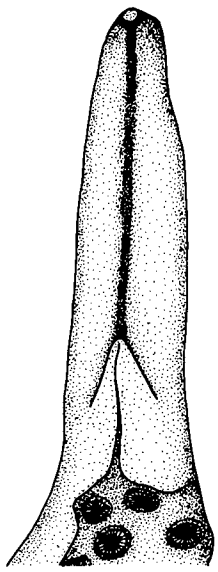
Size: May grow to 350 mm total length, 150 mm mantle length; usually weighs about 500 g, but sometimes up to 800 g

Comments: This species is taken as incidental catch by inshore demersal otter trawlers and Danish seiners in Victoria. A small-scale fishery for pale octopus occurs in north-western Tasmania using longlines and plastic pots. Small numbers are taken as incidental catch from southern rock lobster pots.

References:

Stranks, 1988a
Stranks, 1988b
Winstanley *et al.*, 1983





Octopus pallidus

Octopus "tetricus" (Gould, 1852)

Common Name: None known

Key Features: Arms long and thin, occupying 80–90% total length of animal; lateral arms longer and more robust than others

Skin covered with conical, rosette-shaped tubercules with erect central knobs

Funnel organ shaped like the letter W

In mature males, right arm III modified in leaf-shape at tip for sperm transfer; shorter than left arm III

Colour in Life: Mantle brick red, suckers white; after capture colour patterns on mantle and arms change rapidly to blotched olive on beige, then intense purple-red

Distribution: Australia—WA

World—apparently endemic to Australia, but see comments below

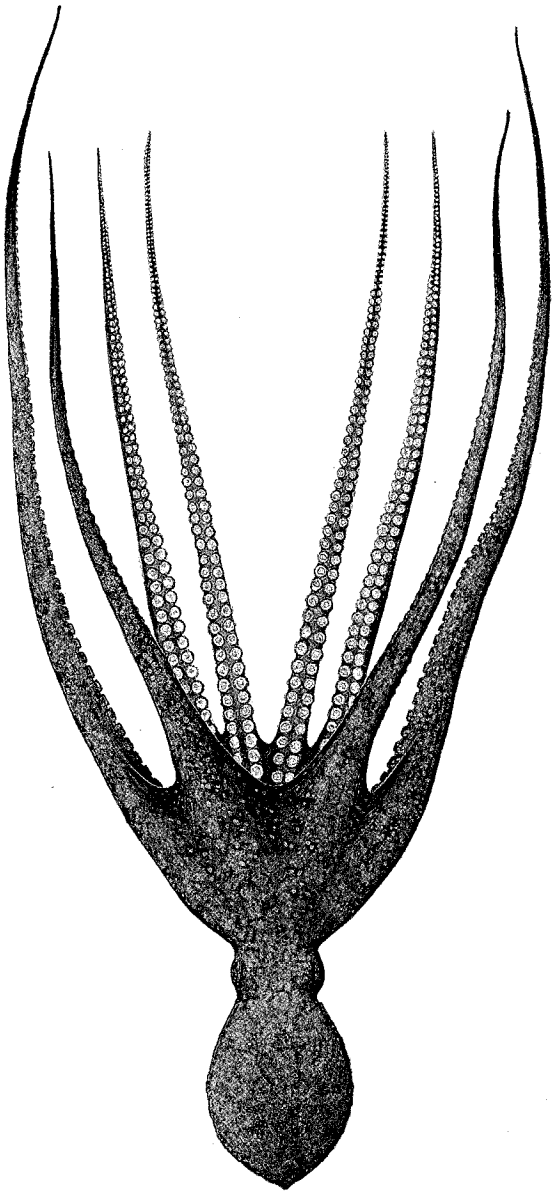
Habitat: Found in cryptic habitats, particularly on inshore limestone reefs to about 60 m depth

Size: Maximum recorded total length is 800 mm

Comments: A large bycatch in the WA rock lobster fishery; sold as food or bait. This species is currently undescribed. The true *O. tetricus* is found only in the warm temperate waters of eastern Australia. However, the name *O. "tetricus"* has been consistently used for the western species by Joll and others. A trial trap fishery for *O. "tetricus"* was started in WA in 1990 as a fisheries development program. The octopus are caught using unbaited pipes with a single, open end.

References:

Joll, 1977
Roper *et al.*, 1984
Wadley, 1995
Winstanley *et al.*, 1983



Octopus "tetricus"

Colour Plate iv

"Photololigo chinensis" complex (Gray, 1849)

Common Name: Pencil squid, Mitre squid (FAO)

Key Features: Mantle slender, cylindrical, elongate, tapering to a blunt cone

Fins long, extending over 60% of mantle length, fan-shaped, with straight or slightly concave borders toward the tail in adults

A pair of luminous organs ventrally beneath the ink sac

Head small, cube-shaped, narrower than mantle; transparent membrane covering the eyes

Arms with two rows of suckers; large suckers towards tip of arm have rings with 10–18 sharp conical teeth; left ventral arm in males (next to funnel) modified towards its tip (in 33–40% of its length) for sperm transfer in males

Tentacles with four rows of suckers on their clubs; the 12 or so central suckers are 1.5 times the diameter of the suckers at the edge, and twice that of the largest arm sucker; central large sucker rings with 20–30 sharp conical teeth

Colour in Life: Flesh-coloured; pale tan to pink-cream mantle when fresh

Distribution: Australia—Northern Australian coastal bays and continental shelf waters, from Shark Bay, WA, through Arafura and Timor seas, to Botany Bay, NSW

World—*"P. chinensis"* found in the western Pacific, including South and East China seas to Okinawa, Japan; Gulf of Thailand

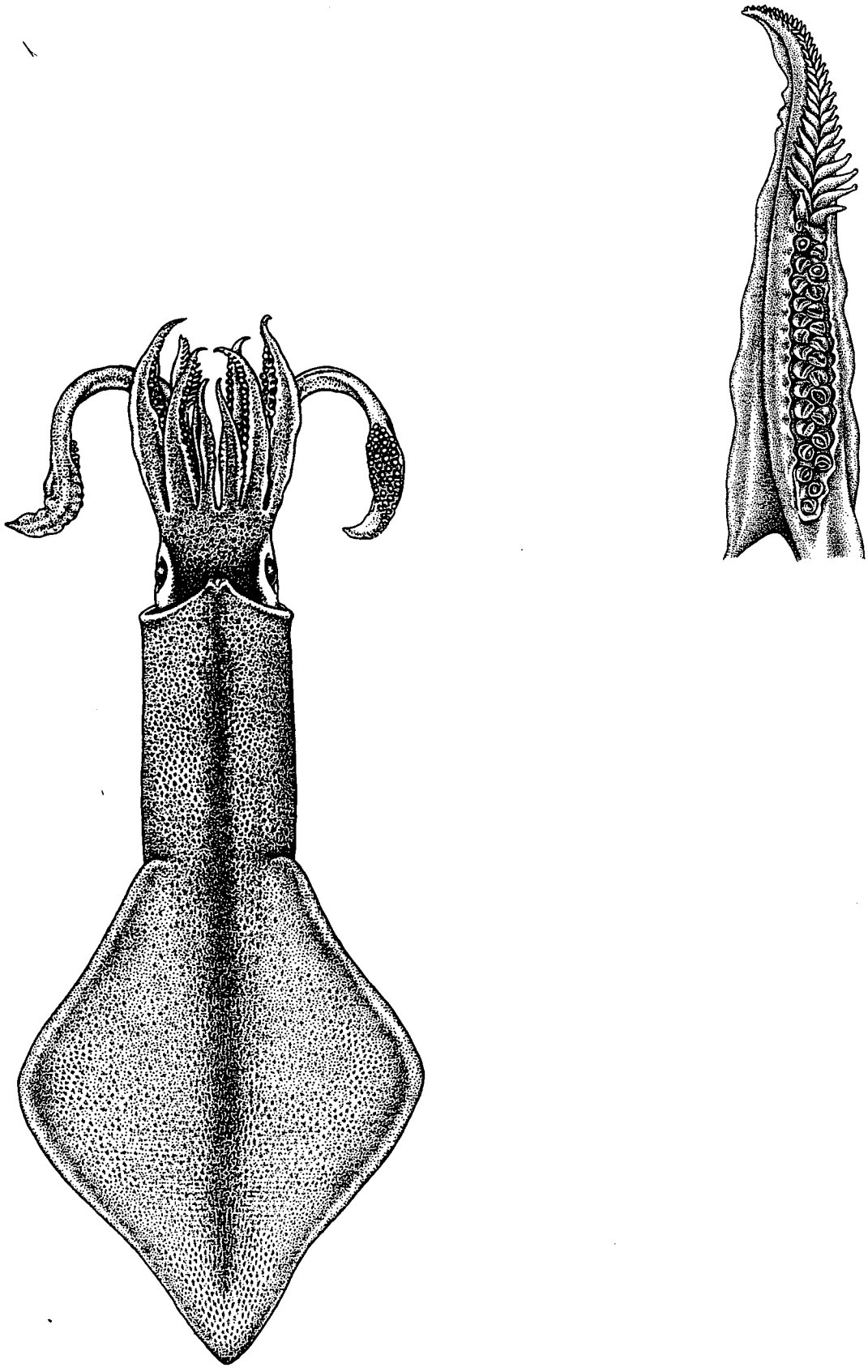
Habitat: Inhabits shallow inshore waters, coastal bays and inlets to 170 m; demersal eggs

Size: Maximum mantle length 400 mm; in trawl catch commonly 200 mm; 7–180 mm mantle length squid are commonly trawled in Moreton Bay

Comments: Targeting with banana prawn nets off the Kimberleys and western Gulf of Carpentaria has yielded several hundred tonnes during spring in recent years. Bycatch of demersal and otter trawl catches in northern Australia. In Moreton Bay about 100 t are caught annually and sold as seafood or bait. Taken by recreational fishers with baited jigs or lures. The *"P. chinensis"* complex contains two currently unnamed species, which can occur in the same location; specimens that cannot be identified should be forwarded to a museum. *"P. chinensis"* should not be confused with the closely related *"P. edulis"* complex, which has an overlapping distribution.

References:

Kailola *et al.*, 1993
Roper *et al.*, 1984
Yeatman and Benzie, 1994 (as *Photololigo* species 3 and *P. chinensis*)



"Photololigo chinensis" complex

"Photololigo edulis" complex (Hoyle, 1885)

Common Name: North-west pink squid, Mitre squid (FAO)

Key Features: Mantle slender, cylindrical, elongate, tapering to a blunt cone

Fins long, extending over 70% of mantle length, fan-shaped, with distinctly concave borders towards the tail in adults

A pair of luminous organs ventrally beneath the ink sac

Head small, cube-shaped, narrower than mantle; transparent membrane covering the eyes

Arms with two rows of suckers; large suckers in the central arm have rings with 6–12 squared, truncate teeth; left ventral arm in males (next to funnel) modified towards its tip (for over 50% of its length) for sperm transfer

Tentacles with four rows of suckers on their clubs; the 16 or so central suckers are 1.2 times the diameter of the suckers at the edge, and equal to that of the largest arm suckers; central large sucker rings with 30–40 sharp conical teeth

Colour in Life: Flesh-coloured, with small pink spots on mantle

Distribution: Australia—northern regions, from North West Cape to the North West Shelf, Arafura Sea, Gulf of Carpentaria and NE Cape York

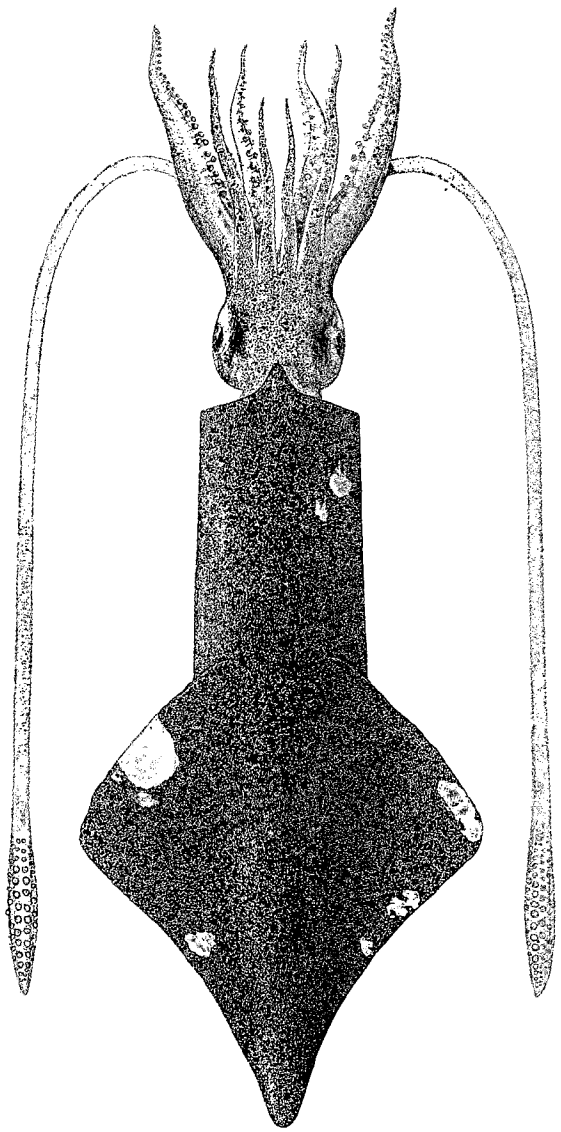
World—western Pacific; Philippine Islands, northern South China Sea to central Japan

Habitat: On the continental shelf, 15–170 m depth; attracted to light; forms large aggregations at some times of the year; demersal eggs

Size: Maximum mantle length 150 mm; mature at 120 mm or smaller; size in trawl catch commonly 100–120 mm

Comments: Commercial potential, already marketed in Australia; excellent for human consumption; high market value; in Asia, processed into a dry product and also used raw for sashimi. See fishing comments on *"P. chinensis"* complex which also apply to this group. *"P. edulis"* complex contains two unnamed species which have overlapping distributions. Individuals belonging to both *"P. edulis"* and *"P. chinensis"* complexes can be caught at the same location. However, *"P. chinensis"* can be distinguished by the conical, pointed teeth on the suckers of the arms.

References:
Okutani, 1980, Okutani *et al.*, 1987
Wadley, 1995
Yeatman and Benzie, 1994 (as *Photololigo* species 1 and 2)
Jackson and Yeatman, 1996



"Photololigo edulis" complex

Colour Plate 0

Sepioteuthis australis (Quoy and Gaimard, 1832)

Common Name: Southern calamary

Key Features: Mantle tapers to a blunt point at the tail

Fins continuous around the edge of the mantle; widest at about half their length; luminescent blue marginal stripe on fins

Arms moderately long, robust; the left ventral arm is modified at the tip for spermatophore transfer in mature males

Eyes large, well-developed, with opalescent colour and covered by a thin, transparent membrane

Funnel tapering strongly to a blunt tip, becoming narrow anteriorly, with a raised fleshy pad at tip and a well-developed apical papilla

Colour in Life: Translucent on capture, changing rapidly to rust-red; luminescent blue margin on fins

Distribution: Australia—southern Australia; from 20°S in WA, around the southern coast, to 27°S in eastern Australia including Tas

World—endemic to southern Australia and northern New Zealand

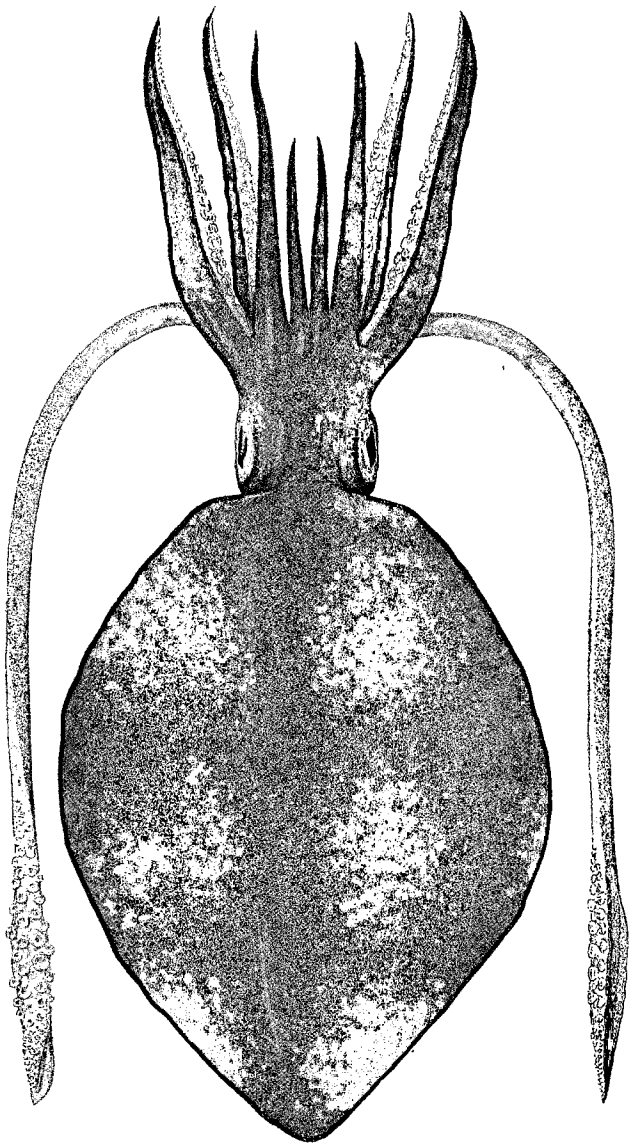
Habitat: A neritic species, commonly found in the surface waters to a depth of 10 m

Size: Males grow to 550 mm mantle length and 4 kg in weight (Cape Jervis, SA); females to 350 mm and 1.2 kg (Bicheno, Tas); in general, males mature at a smaller size (about 90 mm) and reach a larger maximum size than females

Comments: Commercial interest in inshore fisheries around southern Australia, including eastern and south-eastern Tasmania. Mainly fished in inshore habitats, particularly with trolled jigs over seagrass. Commercially important bycatch of SA prawn fishery. Heavily fished by amateurs in SA using baited jigs and lures.

References:

Lu and Tait, 1983
Wadley, 1995
Zeidler and Norris, 1989



Sepioteuthis australis

Colour Plate vi

Sepioteuthis lessoniana Lesson, 1830

Common Name: Northern calamary

Key Features: Long, robust mantle, its width about 40% of its length, tapering to a blunt tip posteriorly

Fins large, 90–100% of mantle length, width 75% of mantle length; fins widest in their posterior third

Funnel very stout, large

Funnel expanded in anterior and posterior third, tapers to a blunt tip posteriorly; anterior very blunt

Colour in Life: Translucent to light green in life with distinct white bars across the dorsal mantle

Distribution: Australia—inhabits northern Australian waters from Geraldton in WA to Moreton Bay on east coast (27°S)

World—Indo-Pacific; Red-Sea, Arabian Sea east to 160°E, northern Australia, and north to Japan, eastward to the Hawaiian Islands

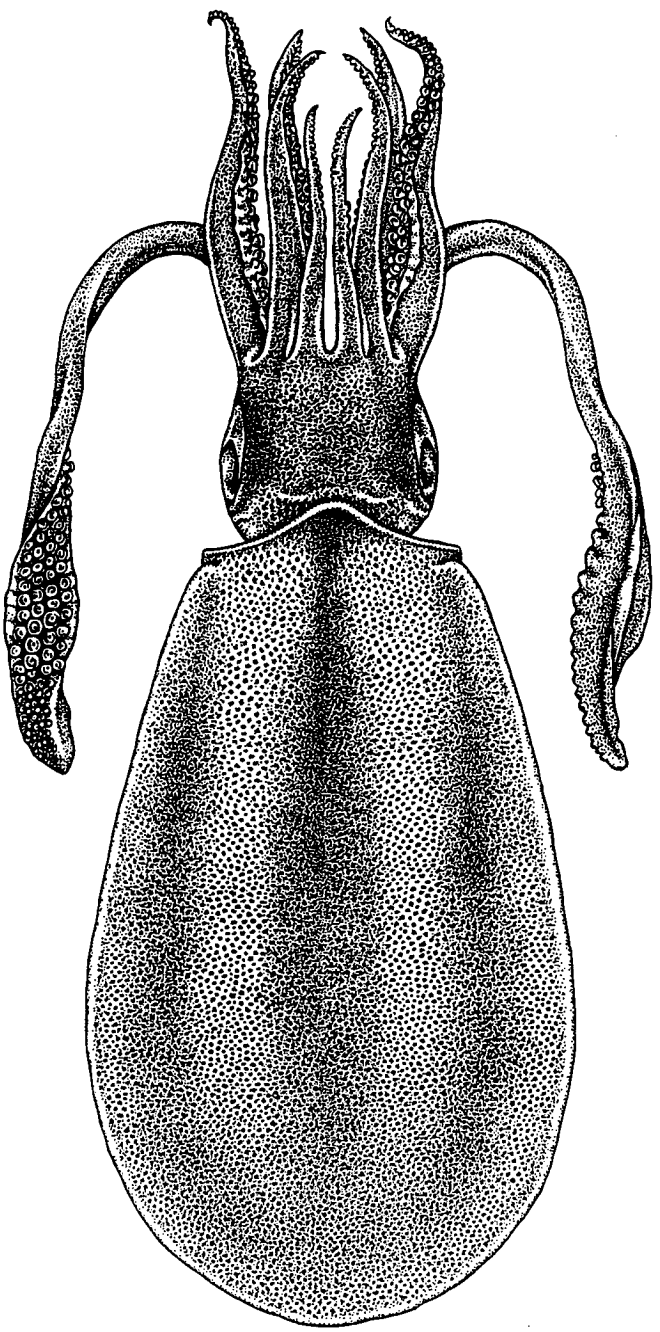
Habitat: Occurs in subtropical coastal bays and inlets and offshore reefs to depths of at least 100 m; off Townsville, found to 100 km offshore on outer Great Barrier Reef

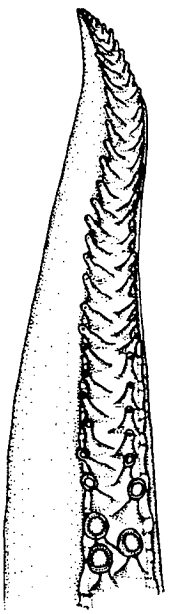
Size: Maximum mantle length recorded 420 mm, commonly 200–300 mm; weight about 1.8 kg

Comments: This species is a minor bycatch of prawn trawling in Qld, the northern prawn fishery and WA prawn fisheries. In southern Qld, it is taken by tunnel net fishers from March to mid-December. Recreational fishers take calamary by baited jigs or lures. This species is sold for human consumption.

References:

Kailola *et al.*, 1993
Lu and Tait, 1983
Okutani, 1980
Winstanley *et al.*, 1983





Sepioteuthis lessoniana

Nototodarus gouldi (McCoy, 1888)

Common Name: Gould's arrow squid

Key Features: Mantle heavily muscled, tapering gradually to the fins, then sharply to the tail

Smooth skin on surface of mantle, head and arms

Cartilage that locks funnel to mantle is shaped like an inverted letter T

Funnel groove with folds of skin forming pockets

Both ventral arms modified in mature males, with two rows of papillae (one flattened) and one middle row of very small papillae

Large suckers on tentacles, with sharp teeth of about equal size; large suckers on arms with 10–14 triangular teeth grading to a single, large, tooth

Colour in Life: Light brownish-pink mantle with a bluish-purple dorsal stripe

Distribution: Australia—south-western, southern and eastern Australian waters, extending northward to 28°S at Geraldton, WA, and in eastern Australia, northward to the border of NSW and Qld including Tas

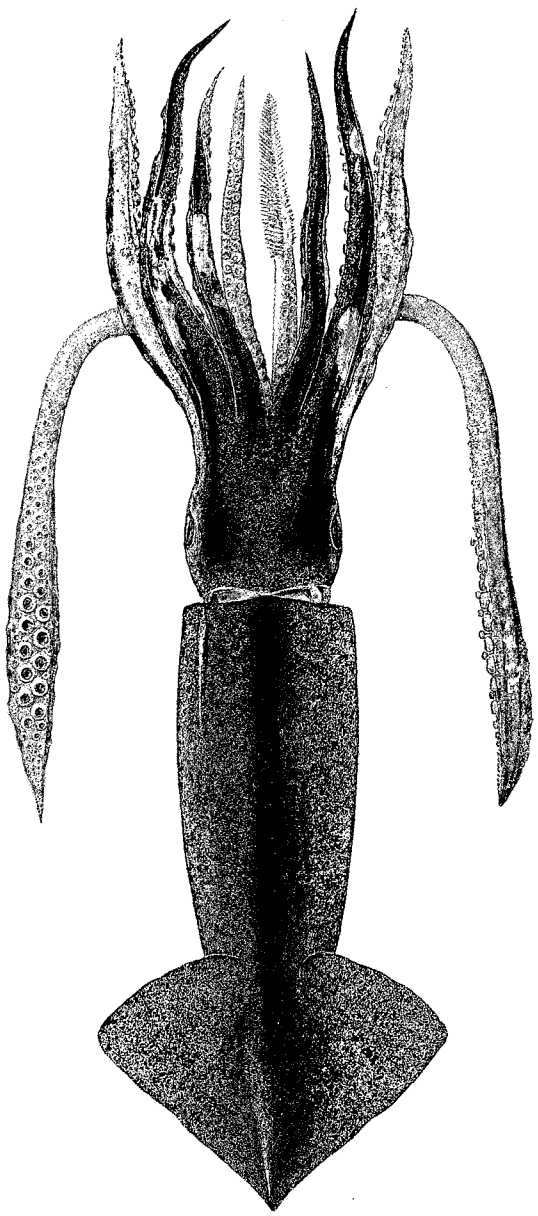
World—restricted to southern Australian and northern New Zealand waters

Habitat: Found to about 500 m depth

Size: Maximum mantle length recorded for females 400 mm and for males 350 mm

Comments: May be confused with *N. hawaiiensis* in more northern waters; *N. gouldi* is most easily differentiated by smooth skin texture of mantle and slightly larger size of mature specimens. Good flavour and texture; supports largest Australian fishery of over 1 000 t, particularly in Bass Strait and Great Australian Bight. Bycatch in demersal trawling, but main fishing method is jigging under lights.

References:
Dunning and Brandt, 1985
Lu and Dunning, 1982
Wadley, 1995



Nototodarus gouldi

Colour Plate vii

Nototodarus hawaiiensis (Berry, 1912)

Common Name: Hawaiian arrow squid (FAO)

Key Features: Mantle heavily muscled, tapering gradually to the fins and then sharply to the tail

Regularly spaced thickenings of the skin produce a rough or "chamois leather" texture of the mantle

Cartilage that locks funnel to mantle is shaped like an inverted letter T

Funnel groove with folds of skin forming a pocket

Both ventral arms modified for spermatophore transfer in mature males; modified arms bearing three rows of fleshy papillae (one row usually flattened)

Arms bearing sucker rings with a single, large distal tooth plus 16–17 smaller teeth; most obvious in males and in the large suckers near the body

Colour in Life: Light pinkish-brown mantle, with a purplish-blue dorsal stripe

Distribution: Australia—predominantly in northern waters; in the west coast from 29°S at Geraldton, WA, along the North West Shelf and Slope; in the east coast from 31°S at Port Macquarie, NSW, along the South East Shelf and Slope

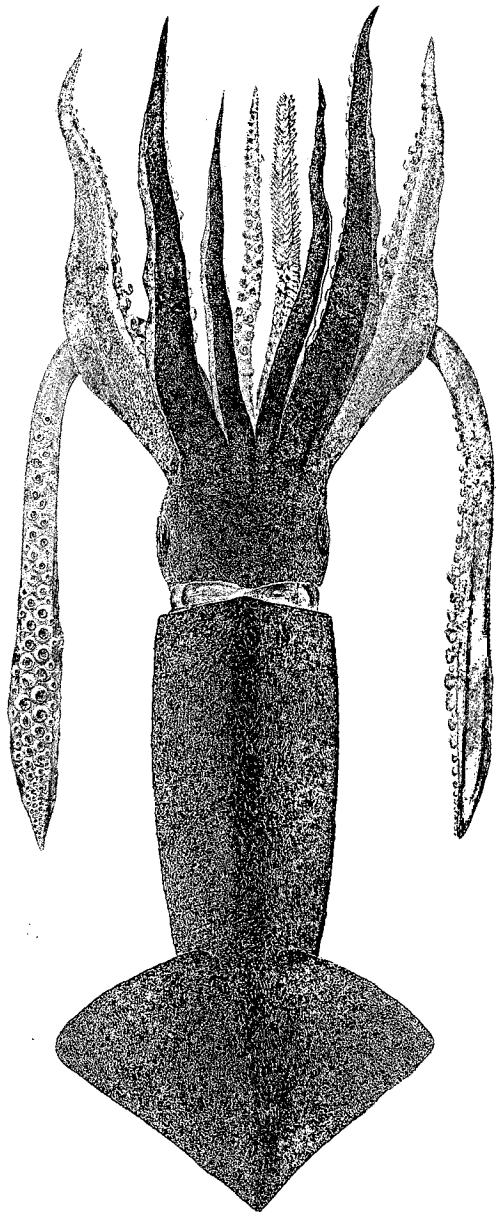
World—Hawaiian Islands, Midway Islands and South China Sea

Habitat: Demersal on the continental shelf and slope, recorded at 100–710 m depth

Size: Maximum recorded mantle length from the North West Shelf trawl fishery was 248 mm for males, 215 mm for females

Comments: Commonly caught by North West Shelf demersal trawlers, with catches of 90 kg h^{-1} recorded in October to December 1986. May be mistaken for *N. gouldi*; most easily differentiated by rough texture of skin. Palatable, has commercial fishery potential.

References:
Dunning, 1988
Wadley, 1990, 1993
Jackson and Wadley, 1998



Nototodarus hawaiiensis

Colour Plate viii

Ommastrephes bartramii (Lesueur, 1821)

Common Name: Red ocean squid, Neon flying squid (FAO)

Key Features: Mantle long, muscular and robust

Fins muscular; length about 40–45% of mantle length, and width about 60% of mantle length; single fin angle 45–50°

Small light organs present beneath the ventral mantle skin, which when cut, appear as small yellow spots

Ventral protective membrane of arms very broad, particularly on arm III; with sexual maturation, this becomes web-like

Right or left ventral arms of males may be modified for sperm transfer, in which case the arm tip is smooth and free of suckers

Large tentacular suckers with four equally spaced teeth, interspersed with 7–10 smaller teeth

Colour in Life: A broad, deep, blue-purple longitudinal band occurs on the dorsal surface; the ventral surface is bronze, with a golden midventral patch

Distribution: Australia—southern Australian waters, south of the Tropic of Capricorn, including eastern Tas and the western Great Australian Bight

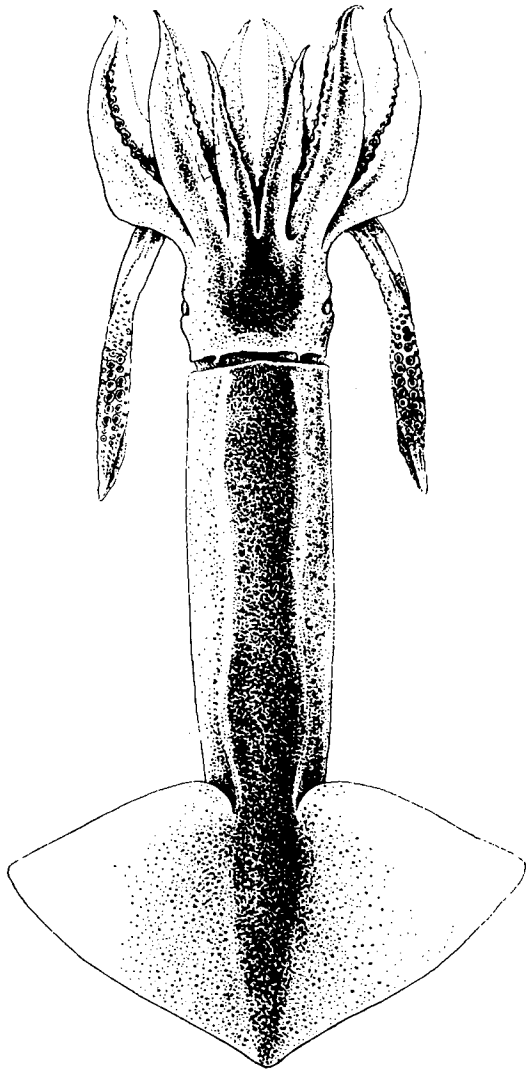
World—a discontinuous worldwide distribution throughout subtropical and temperate oceans

Habitat: Oceanic species, occurring from the surface to about 1500 m depth

Size: Maximum mantle length in females is about 600 mm; males smaller in size (about 400 mm); maximum weight about 7 kg; females mature at a little less than 400 mm and males at about 300 mm

Comments: Exploited commercially in the North Pacific, e.g. off Japan and Canada. More than 300,000 t caught annually in the North Pacific in the late 1980's. Tasty, edible flesh, although may be tough in large individuals. Suitable for processing, e.g. smoking, shredding and drying.

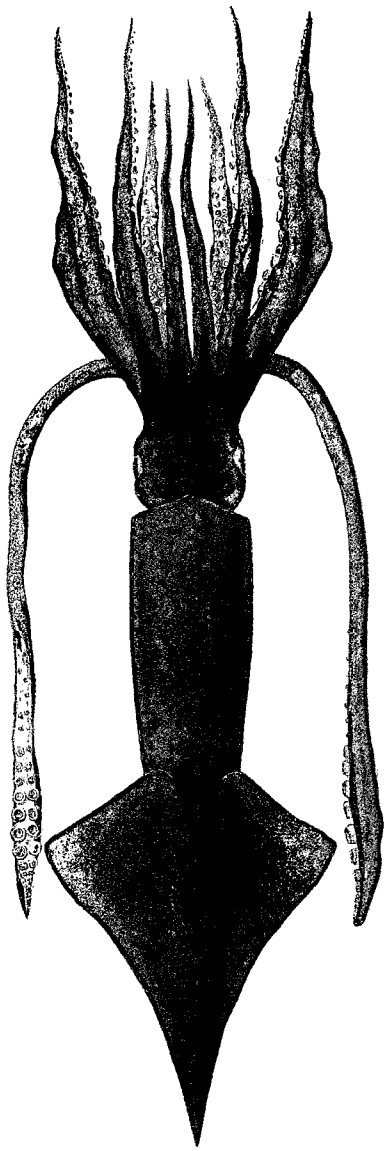
References:
Lu and Dunning, 1982
Roper *et al.*, 1984
Dunning, 1993



Ommastrephes bartramii

Ornithoteuthis volatilis (Sasaki, 1915)

Common Name:	Long-tailed flying squid
Key Features:	Mantle slender, tapering gradually to form a long tail posteriorly
	Fins long, at least half length of mantle, tapering to a point at the tail
	Cartilage that locks funnel to mantle is shaped like an inverted letter T
	Funnel groove with folds of skin forming a pocket
	Right ventral arm modified for sperm transfer in mature males; criss-cross pattern on modified part
	Luminous strip and large light organ on gut, visible from underside
	Tentacles bearing largest sucker ring usually with 18–21 (22 on some specimens) evenly-spaced teeth
Colour in Life:	Dark red-brown mantle, with bright strip beneath from luminous organ on gut
Distribution:	Australia—predominantly in northern and eastern waters, in the Timor, Coral and Tasman seas
	World—central, western Pacific and Indian oceans
Habitat:	Tropical slope and oceanic waters, occasionally caught at the sea surface on jigs and in nets
Size:	Maximum mantle length recorded from the Western Deepwater Trawl Fishery was 140 mm for a female; world records to 210 mm for female and 310 mm for male
Comments:	Rarely collected anywhere in its range, but if concentrations were found they would be commercially attractive because of the size of the animals and texture of their flesh.
References:	Lu and Dunning, 1982 Roper *et al.*, 1984



Ornithoteuthis volatilis

Colour Plate ix

Sthenoteuthis oualaniensis (Lesson, 1830)

Common Name: Yellow-backed squid

Key Features: Mantle stout, tapering uniformly from fin to tail

Fins broad, about twice as wide as long, less than half the length of the mantle

Cartilage that locks funnel is fused to mantle and shaped like an inverted letter T

Right or left ventral arm modified for sperm transfer in mature males; no suckers on modified part

Luminous oval patch below "neck" on upper surface of mantle

Tentacles bearing largest sucker ring with four large teeth, interspersed equally with five to six smaller teeth

Colour in Life: Dark red-brown mantle, somewhat darker on midline; bright yellow dorsal patch may light up after capture

Distribution: Australia—North West Shelf and Slope; eastern coast from Qld, occasionally to southern NSW in warm East Australian Current waters

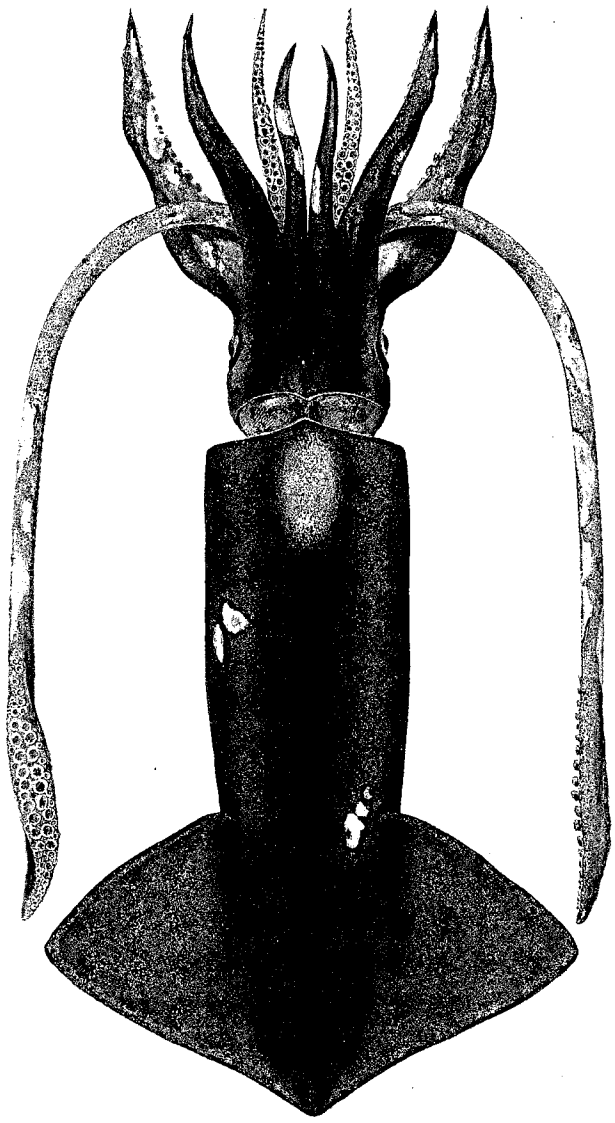
World—Indian and Pacific oceans

Habitat: Tropical oceanic waters

Size: Maximum mantle length 300 mm for females, 250 mm for males in Australian waters

Comments: Widespread oceanic species with commercial potential for jig fisheries if areas and times of abundance can be established.

References:
Dunning and Brandt, 1985
Lu and Dunning, 1982
Roper *et al.*, 1984



Sthenoteuthis oualaniensis

Colour Plate x

Todarodes filippovae Adam, 1975

Common Name: Southern ocean arrow squid

Key Features: Mantle muscular, long, narrow, tapering to a pointed tail

Tentacles very large and robust, with 7–12 large, sharp, teeth evenly spaced, alternating with low plates

Arms relatively short

Expanded clubs occupy nearly entire length of tentacles

Right arm IV modified for sperm transfer, with the distal 40% of the arm modified to papillae and tubercles

Colour in Life: Deep red or carmine overall; no distinct mid-dorsal stripe apparent

Distribution: Australia—found around the southern Australian coast from central NSW to south-west WA; also off Tas

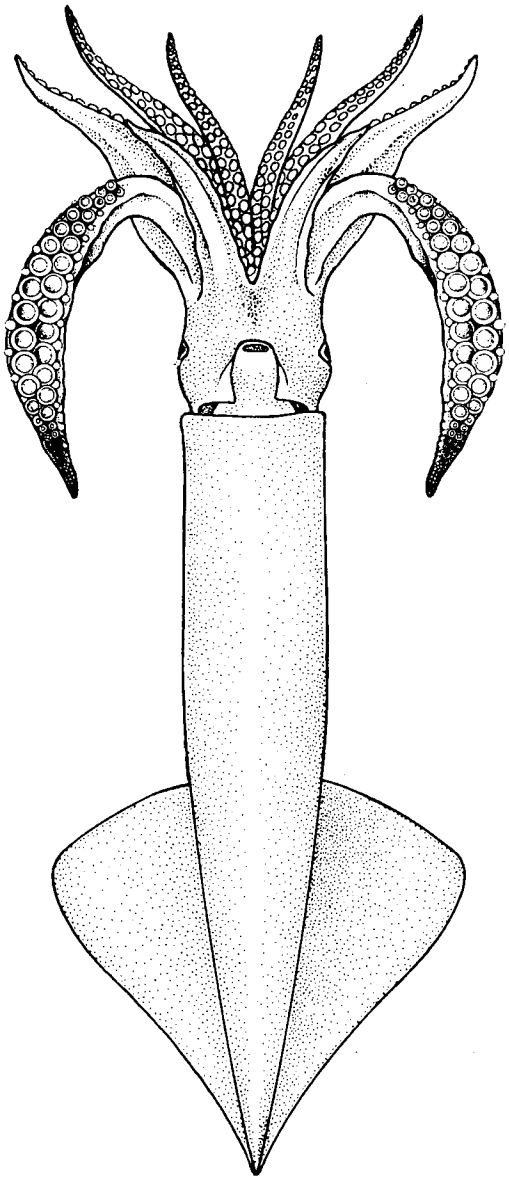
World—circumpolar in the Southern Ocean, south of approximately 35°S; common in the Subtropical Convergence Zone

Habitat: Oceanic species, occurring from surface waters to about 500 m depth; also associated with continental slope waters

Size: Between 200–400 mm mantle length, although individuals of greater than 550 mm have been recorded

Comments: Taken as bycatch by Japanese jig fishers off New Zealand and southern Australia. Caught in commercial quantities off north-eastern Tas in 1978. Also taken incidentally in demersal trawls in slope waters off southern Australia and a major component in the diets of sperm whales. Possible commercial potential.

References:
Dunning, 1993
Lu and Dunning, 1982
Roper *et al.*, 1984



Todarodes filippovae

Todaropsis eblanae (Ball, 1841)

Common Name: Golden arrow squid, Lesser flying squid (FAO)

Key Features: Mantle short, squat; head large and broad; four nuchal folds on the neck

Fins fan-shaped

Cartilage that locks funnel to mantle is shaped like an inverted letter T

Funnel groove smooth, without folds of skin forming pockets

Both ventral arms modified in mature males; left arm slightly longer than right

Large suckers on tentacles, with 30 or more evenly spaced long, pointed teeth of equal size

Colour in Life: Mantle golden with a darker mid-dorsal stripe

Distribution: Australia—northern slope waters off the north-west and east coasts

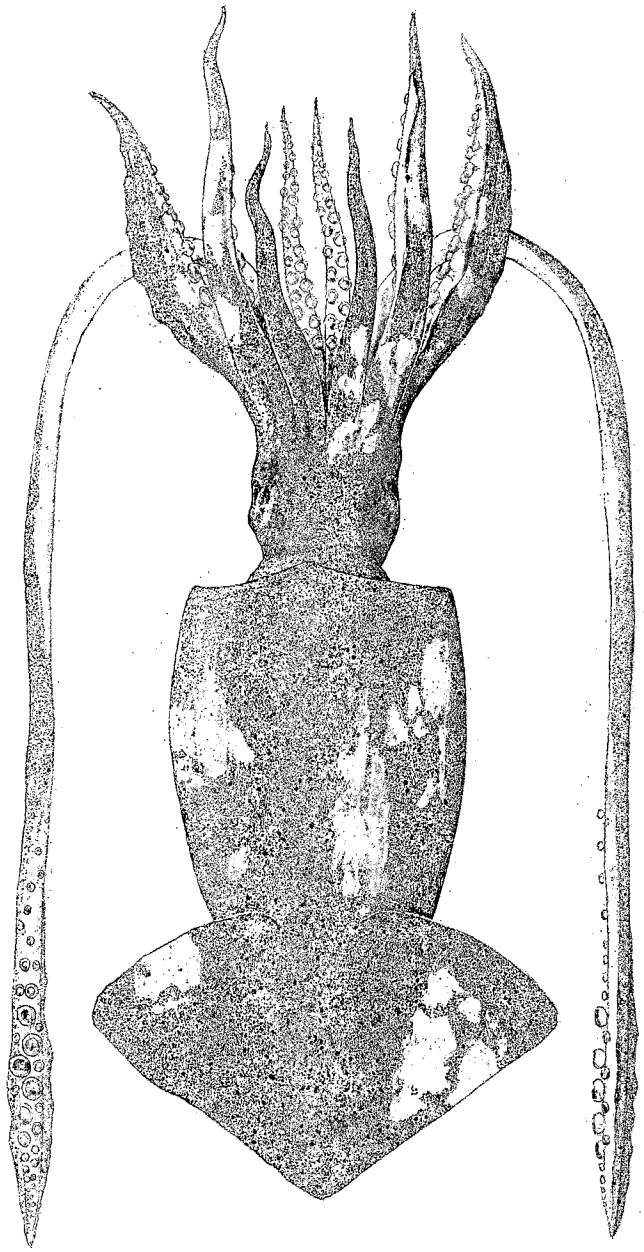
World—eastern Atlantic from Shetland Islands to the Cape of Good Hope; Indian Ocean including Agulhas Bank and Mascarenes Ridge; Timor Sea, western Pacific from northern Australia to East China Sea

Habitat: Demersal species, found on the continental slope; usually associated with sandy or muddy bottoms between 200–700 m depth

Size: Maximum mantle length recorded in the North West Shelf trawl fishery was 160 mm for males, 270 mm for females

Comments: Target of minor fisheries in the north-eastern Atlantic. The species does not generally rise to the surface or approach the shore. It is not taken on jigs.

References:
Dunning and Brandt, 1985
Roper *et al.*, 1984
Wadley, 1990, 1993, 1995



Todaropsis eblanae

Colour Plate xi

Moroteuthis loennbergi Ishikawa and Wakiya, 1914

Common Name: Hooked squid (FAO)

Key Features: Mantle long, slender, soft, covered with fleshy warts; tip drawn out into a long, pointed tail

Head cube-shaped, eyes large with thick, pigmented lobes on either side of the indentation in the eyelid

Ventral arms not modified for spermatophore transfer in mature males

Tentacular clubs narrow, with up to 15 hooks in each of two rows

Sucker rings chitinous, smooth and without teeth

Colour in Life: Reddish-purple with closely spaced longitudinal grain (as in timber)

Distribution: Australia—North West Shelf

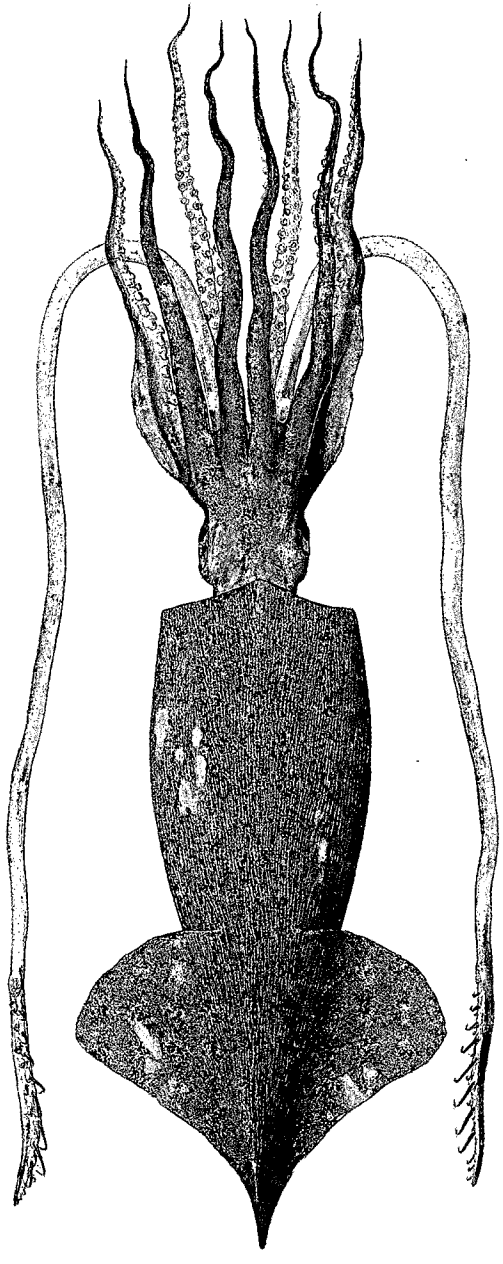
World—north-west Japan, Kuroshio, Indian Ocean

Habitat: Deepwater, generally found at between 400–500 m depth

Size: Maximum mantle length recorded 360 mm

Comments: *Moroteuthis* are not currently fished commercially in Australia but are in other parts of the world, particularly by Russian trawlers. This species is unpalatable due to ammonia taste. The genus is an important food for sperm whales.

References:
Okutani *et al.*, 1987
Roper *et al.*, 1984
Wadley, 1990



Moroteuthis loennbergi

Colour Plate xii

Glossary of Terms

Anterior	at or near the head-end; antero-dorsal - at the head-end on the upper surface
Chitin	horny (fingernail-like) substance that forms the sucker rings, hooks and beaks of cephalopods
Cirri	finger-like extensions
Club	enlargement of tentacle at the tip, with suckers and/or hooks
Continental shelf	zone of shallow water less than about 200 m deep that surrounds a continental land mass
Continental slope	zone of deep water greater than about 200 m deep that surrounds a continental land mass
Demersal	near the sea bottom
Distal	in direction, away from the centre of the body
Dorsal	uppermost or back surface
Funnel	the siphon or funnel lies below the head in a groove; it is a tapered tube through which water is ejected from the mantle, propelling the animal through the water
Ligula	membranous spatula or spoon shaped structure on the end of the arm modified for sperm transfer in octopods
Loculus	small chamber, cavity or compartment
Luminous organs	specialised structures that glow; often near the liver and ink sac
Mantle	the muscular sheath or body wall surrounding the mantle cavity containing the internal organs
Mantle length	length from the posterior tip of the mantle to the most anterior projection, measured along the dorsal surface
Neritic	inhabiting the waters over the continental shelf
Nuchal folds	folds in nuchal cartilage around neck beneath mantle; used as a diagnostic feature - not present in all squid
Oceanic	inhabiting the waters beyond the continental shelf
Papilla	a small, fleshy extension
Pelagic	inhabiting the ocean, not associated with the bottom
Posterior	at or near the tail-end
Proximal	in direction, toward the centre of the body
Sucker ring	a chitinous ring, often serrated or toothed, that encircles the suckers of squid and cuttlefish
Tentacles	long, paired appendages usually consisting of a slender stalk and a distal club, found between the third and fourth pairs of arms in cuttlefish and squid
Total length	length from the posterior tip of the animal to the most anterior part, usually the fully-extended tentacles, measured along the dorsal surface
Tubercle	thickened ridge of cartilage
Ventral	lowermost or belly surface of a cephalopod; the surface on which the funnel is sited; opposite the dorsal surface

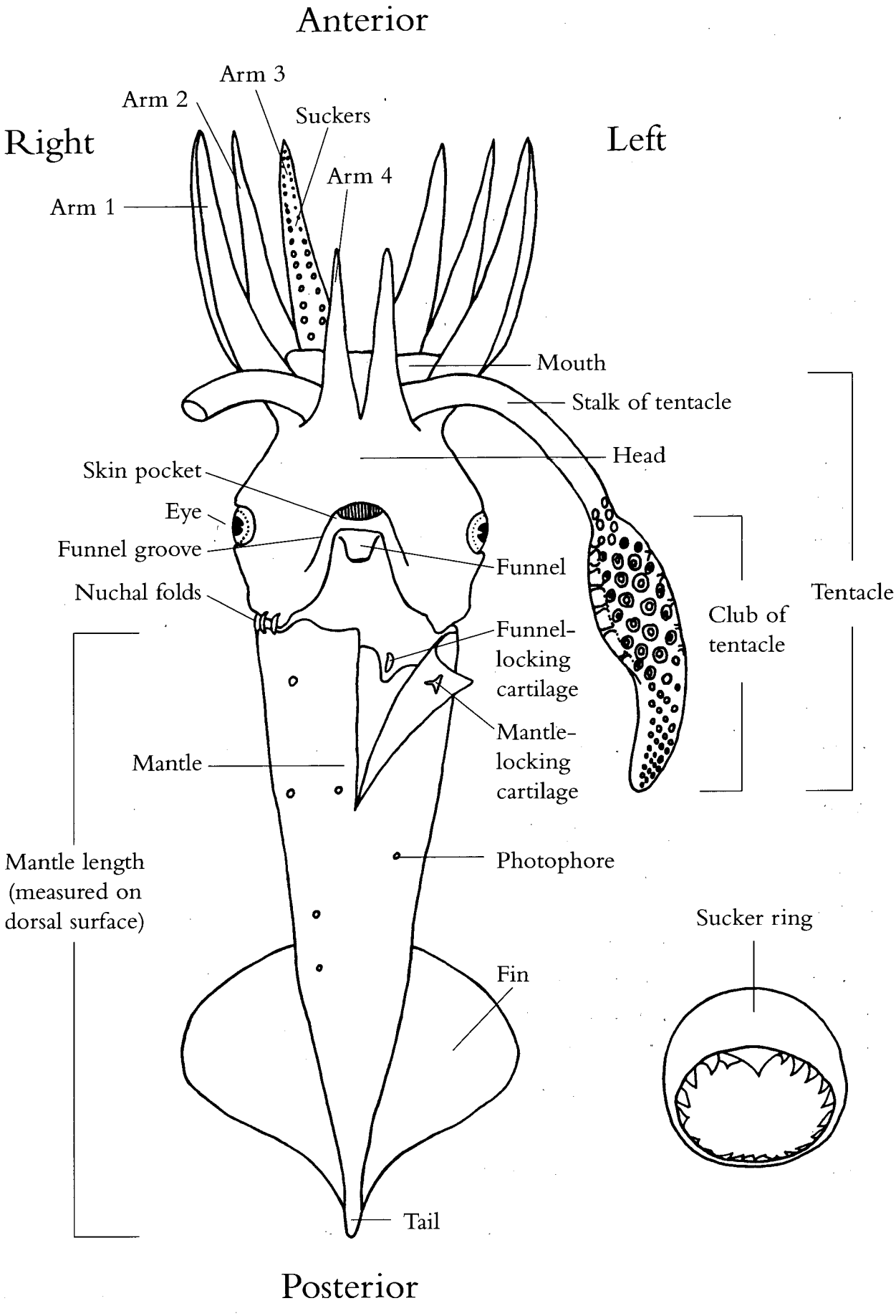


Figure 1.

Squid terminology, illustrated on the underside of the animal, with an enlargement of its sucker ring (after Lu and Dunning, 1982).

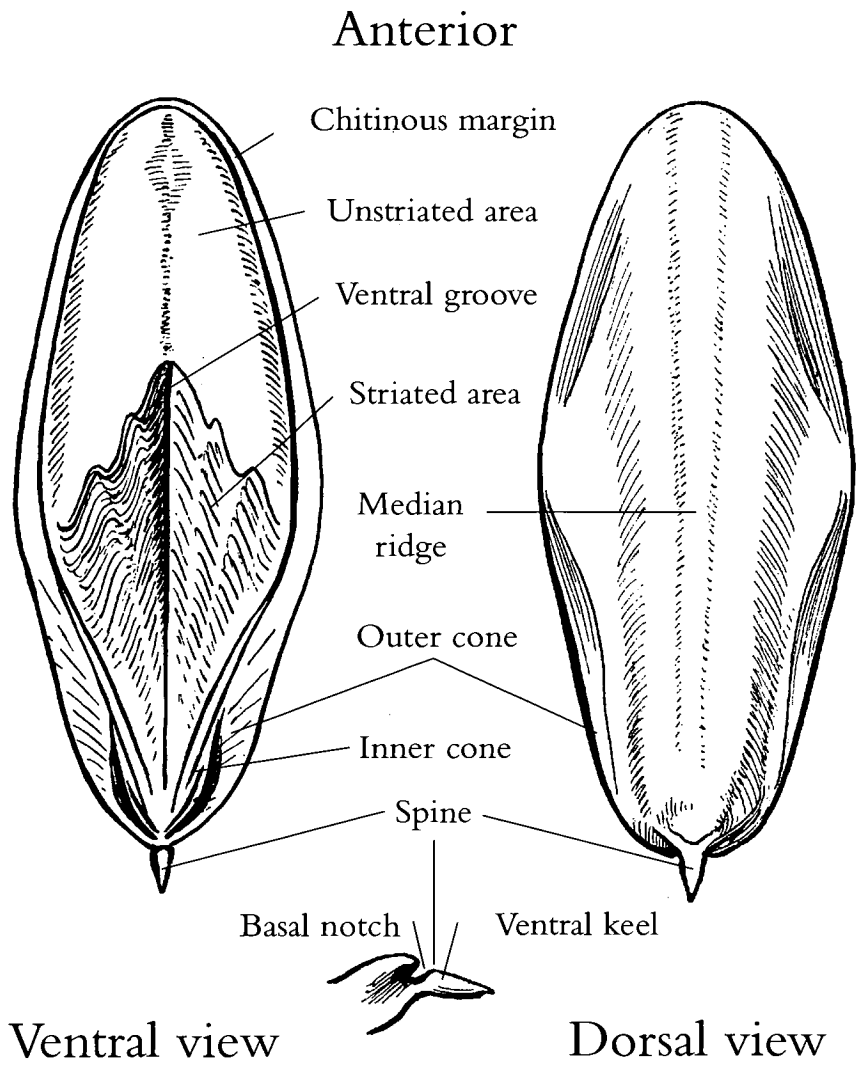


Figure 2.

Cuttlefish bone terminology, illustrated from the underside (left) and upper view (right) of the bone, removed from the animal. The side view of the tail spine is shown below (after Macpherson and Gabriel, 1962).

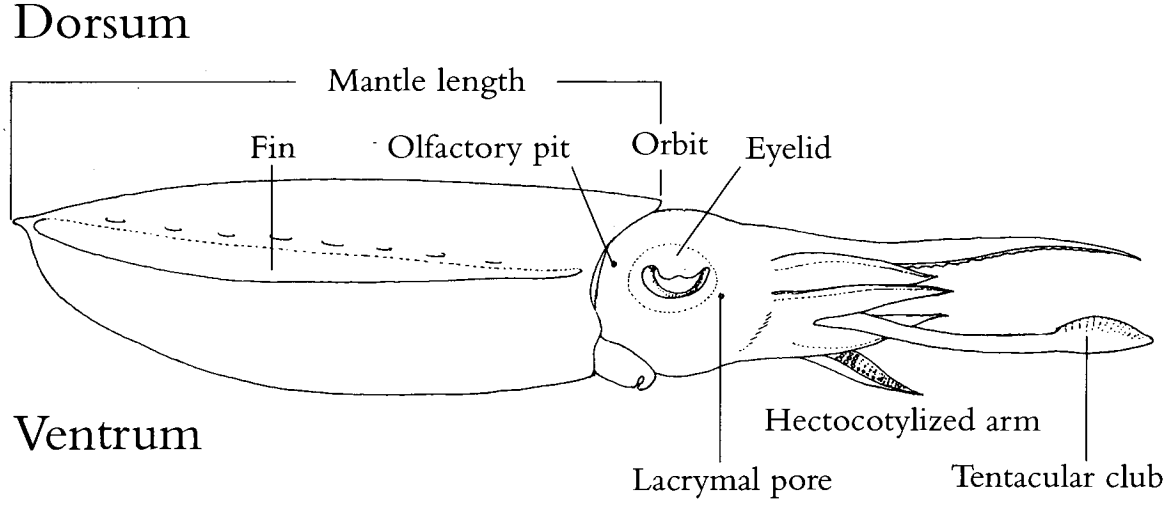


Figure 3.

Cuttlefish terminology, illustrated from the right side (after Okutani *et al.*, 1987).

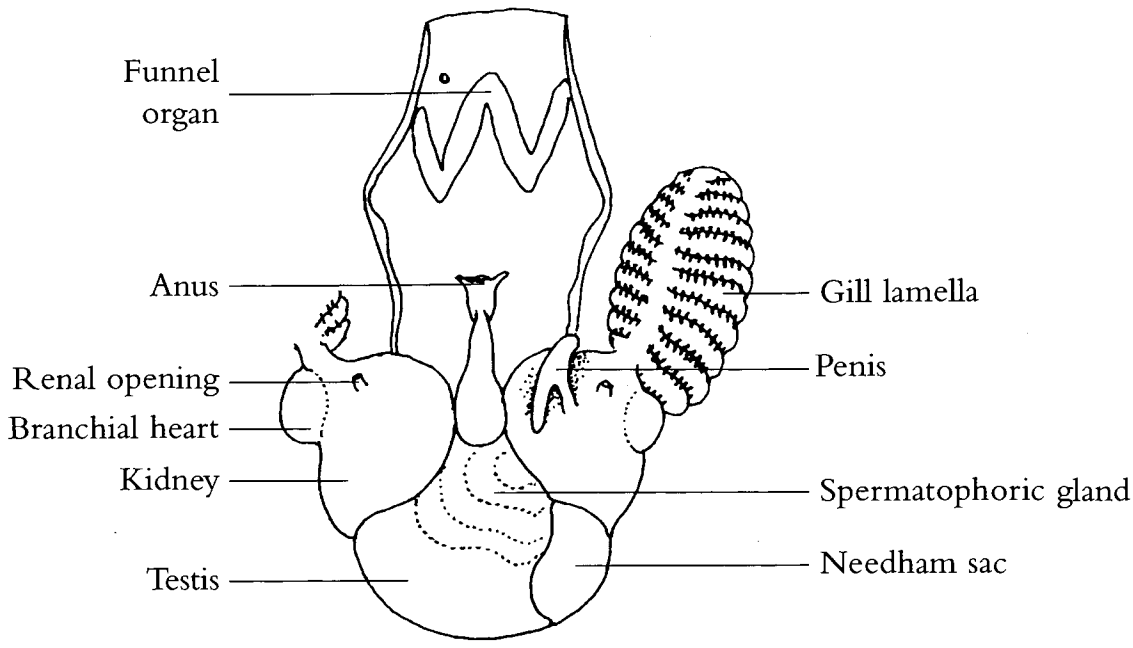


Figure 4.

Male octopus internal terminology, illustrated from the underside with part of the funnel removed (after Okutani *et al.*, 1987).

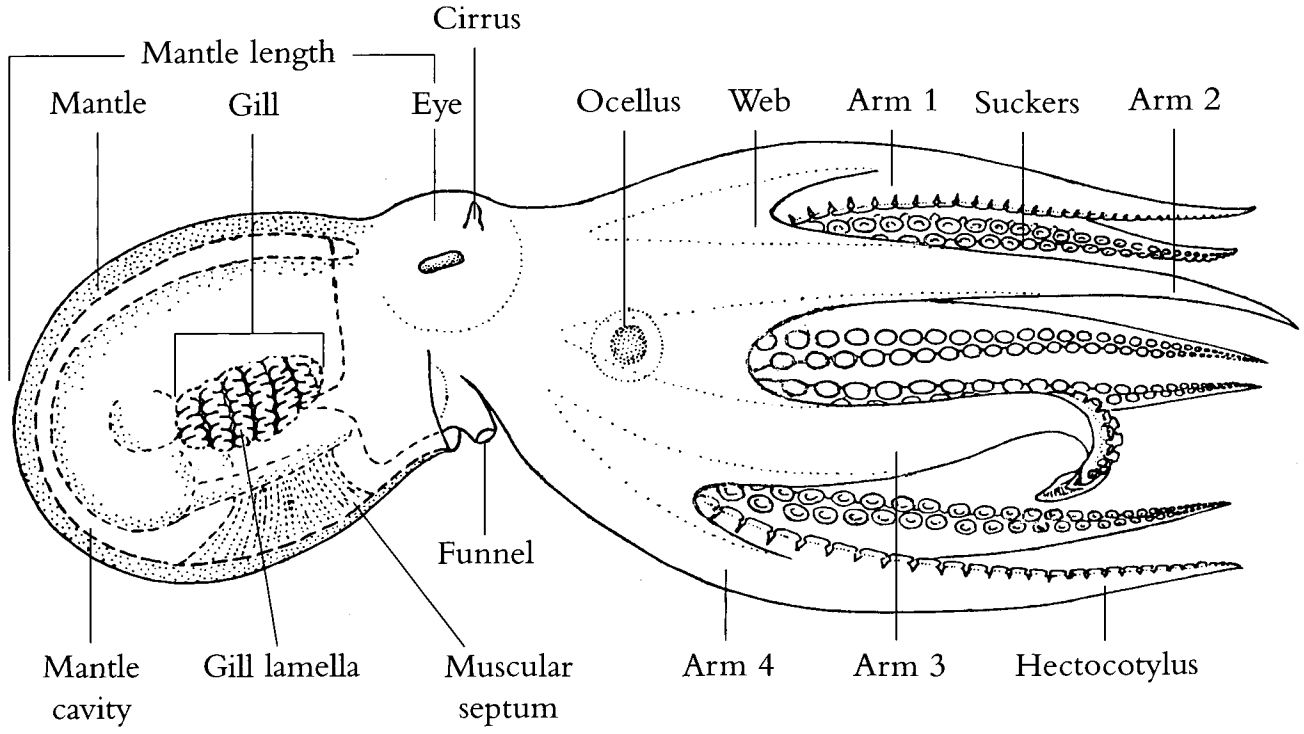


Figure 5.

Octopus terminology, illustrated from the right side of the animal (after Voss and Williamson, 1971).

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Illustration Details

Species	Collector	Illustration
Sepia apama	V. Wadley	G. Davis—cuttlebone; Roper *et al.*, 1984
Sepia cultrata	V. Wadley	G. Davis
Sepia elliptica	V. Wadley	G. Davis—cuttlebone; Hoyle, 1886
Sepia novaehollandiae	V. Wadley	G. Davis
Sepia opipara	M. Dunning	G. Davis
Sepia papuensis	M. Dunning	G. Davis—cuttlebone; Hoyle, 1886
Sepia pharaonis	D. Ramm	G. Davis—cuttlebone; R. Swainston
Sepia rex	V. Wadley	FAO (in prep.)
Sepia rozella	V. Wadley	FAO (in prep.)
Sepia whitleyana	M. Dunning	FAO (in prep.)
Rossia species 1	D. Evans	R. Swainston
Nautilus pompilius	R. Jackson	R. Swainston
Octopus australis	V. Wadley	Stranks & Norman, 1992
Octopus berrima	V. Wadley	Stranks & Norman, 1992
Octopus maorum	V. Wadley	Stranks, 1988a
Octopus pallidus	V. Wadley	Stranks, 1988b
Octopus "tetricus"	V. Wadley	R. Swainston
"Photololigo chinensis"	M. Dunning	ABRS
"Photololigo edulis"	T. Carter	R. Swainston
Sepioteuthis australis	V. Wadley	R. Swainston
Sepioteuthis lessoniana	M. Dunning	Lu & Tait, 1983—hectocotylus; FAO (in prep.)
Nototodarus gouldi	D. Wright	R. Swainston
Nototodarus hawaiiensis	B. Wallner	R. Swainston
Ommastrephes bartramii	V. Wadley	Roper *et al.*, 1984
Ornithoteuthis volatilis	V. Wadley	R. Swainston
Sthenoteuthis oualaniensis	R. Jackson	R. Swainston
Todarodes filippovae	M. Dunning	Roper *et al.*, 1984
Todaropsis eblanae	D. Wright	R. Swainston
Moroteuthis loennbergi	D. Evans	R. Swainston

Sepia pharaonis

Plate i

Rossia species 1

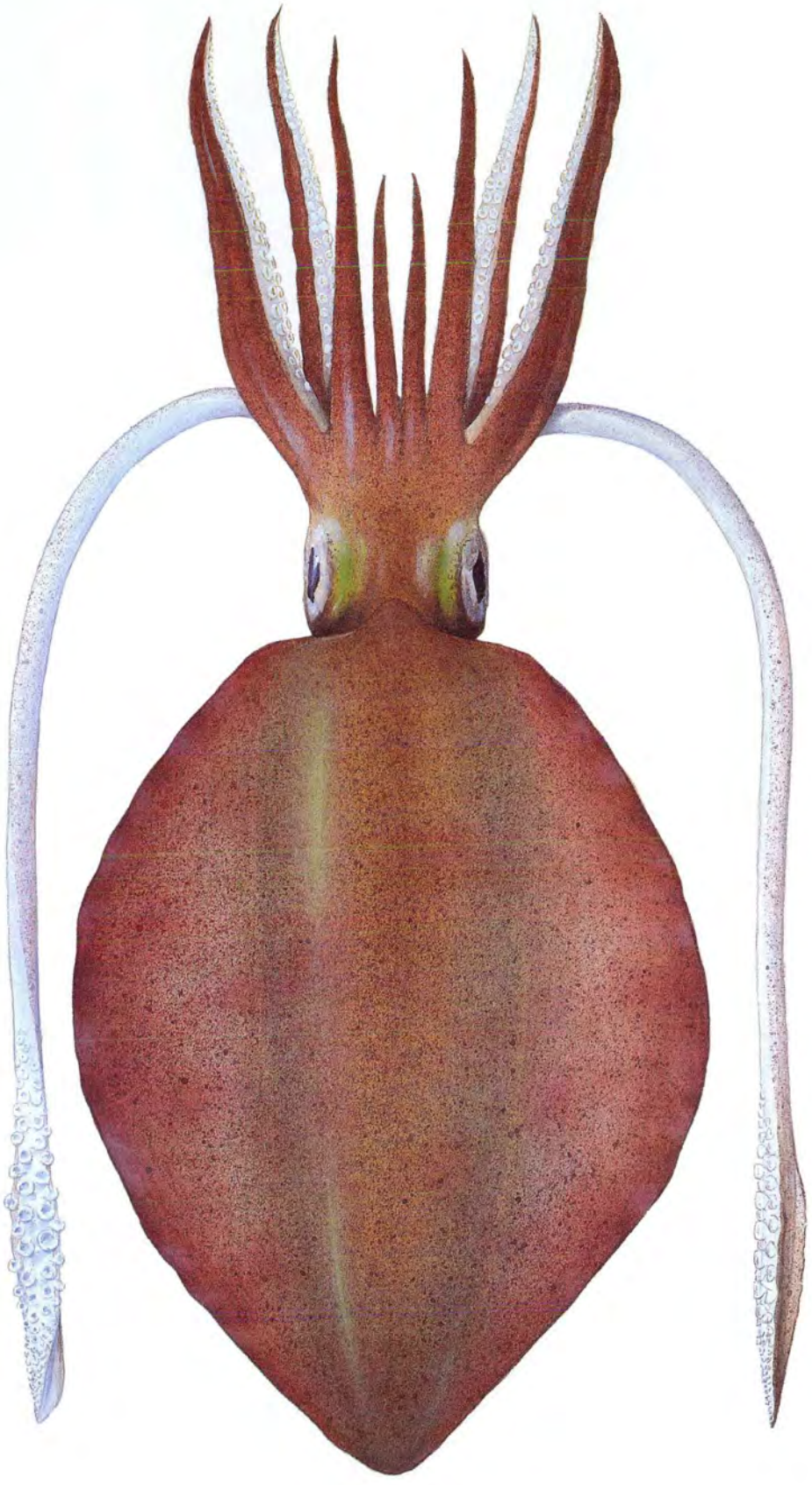
Nautilus pompilius

Octopus "tetricus"

Plate iv

"Photololigo edulis" complex

Plate 9



Sepioteuthis australis

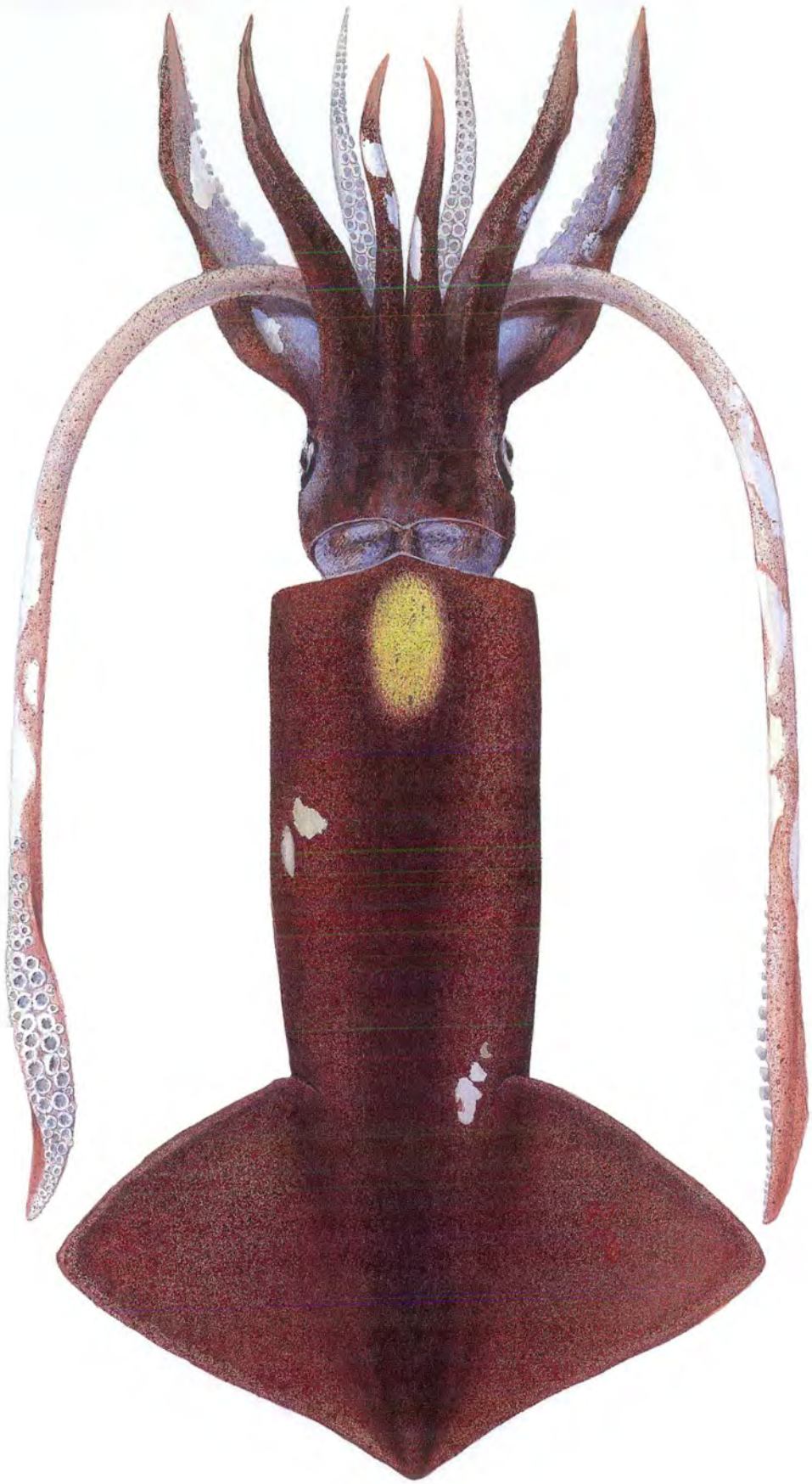
Nototodarus gouldi

Plate vii

Nototodarus hawaiiensis

Plate viii

Ornithoteuthis volatilis



Sthenoteuthis oualaniensis

Plate x

Todaropsis eblanae

Moroteuthis loennbergi

Plate xii

Cephalopods

of Commercial Importance in Australian Fisheries

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