3.3 Family SEPIADARIIDAE Fischer, 1882 *in* 1880–1887

by Amanda Reid

Sepiadariidae Fischer, 1882, *Manuel de Conchyliologie et de Paléontologie Conchyliologique ou histoire naturelle des Mollusques vivants et fossiles*, 1369 pages, 23 plates, London.

FAO names: En – Bottletail squids, bottle squids; **Fr** – Sépiolettes; **Sp** – Sepiolillas.

Diagnostic Features: Small. Dorsal mantle fused to head. Nuchal cartilage absent. Fins narrow, or short; ear-shaped, with pronounced anterior lobes, or 'earlets'; fin attachment long. Mantle and funnel-locking cartilages absent in ***Sepiadarium*** (mantle and funnel permanently fused) or with 2 components in ***Sepioloidea***. Non-hectocotylized arm sucker arrangement same in both sexes: biserial, sometimes tetraserial at middle and distal tips of arms. Hectocotylus present, left ventral arm modified: distal end of hectocotylus without suckers, pedicels modified forming series of transverse lamellae. Tentacle stalk held in deep sheath or web between bases of arms III and IV, web encircles base of tentacles on outside and inside forming cutaneous sac. Internal gladius absent. Light organs absent. Dorsal mantle surface covered with large, white leucophores surrounded by smaller red-brown chromatophores.

Size: Up to 40 mm mantle length.

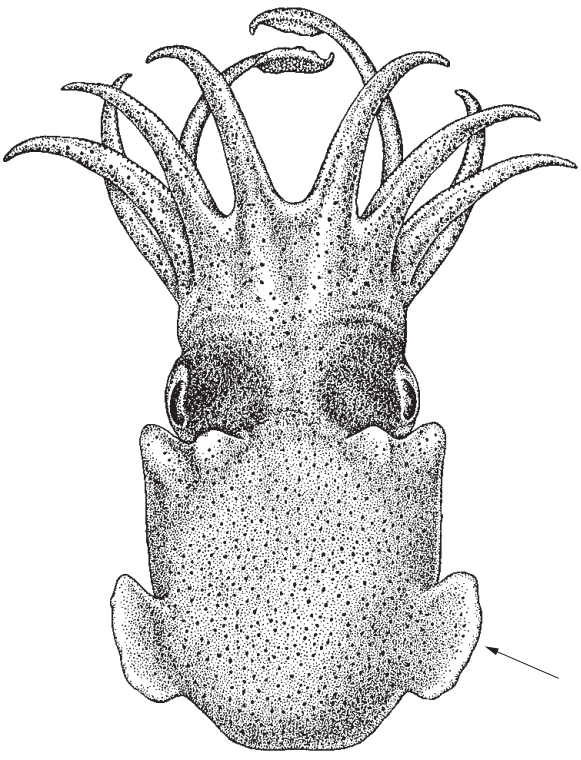
General Distribution: Found only in the western central Pacific, including Australia and New Zealand.

Habitat and Biology: Benthic. All species bury in the sand during the day and emerge at night to feed. All produce mucous from the underside of the body when disturbed.

Key to genera in the family Sepiadariidae

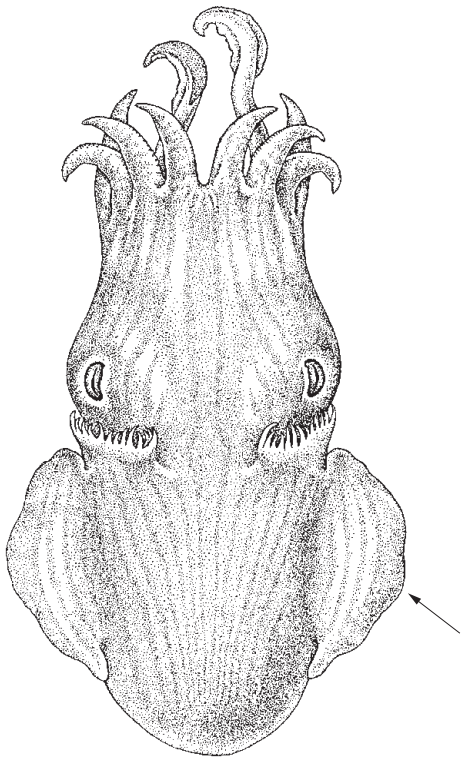
1a. Ventral mantle permanently connected to funnel by wide muscular band, funnel-locking apparatus absent; fins positioned in posterior half of mantle (Fig. 285) . . . . . ***Sepiadarium***

1b. Ventral mantle not permanently connected to funnel, funnel-locking apparatus present; fins extend along most of mantle length (Fig. 286) . . . . . ***Sepioloidea***



dorsal view

Fig. 285 *Sepiadarium*



dorsal view

Fig. 286 *Sepioloidea*

Sepiadarium austrinum Berry, 1921

Fig. 287; Plate VII, 42–44

Sepiadarium austrinum Berry, 1921, *Records of the South Australian Museum*, 1(4): 354 [type locality: South Australia: St Vincent Gulf].

Frequent Synonyms: None.

Misidentifications: None.

FAO Names: En – Southern bottletail squid; **Fr** – Sépiolette du sud; **Sp** – Sepiolilla sureña.

Diagnostic Features: Dorsal mantle fused to head. Mantle cavity divided by thin septum. Ventral mantle fused to each side of proximal end of funnel. Fins short, do not exceed length of mantle anteriorly or posteriorly; attached within posterior half of mantle. Head broad, as wide as mantle. Male and female arms differ in relative lengths: arms I and II longer than III and IV. Non-hectocotylized arm sucker arrangement same in both sexes: **biserial, sometimes tetraserial at middle and distal tips of arms**. Hectocotylus present, left ventral arm modified: base of hectocotylus with **9 or 10 pairs of normal suckers; suckers replaced by single series of conical lamellae on distal end of hectocotylized arm**; arm grooved at distal tip, recurved dorsally, without protective membrane. Club with **6 suckers in transverse rows**; club with wide keel, not bound by distinct folds or continuous membranes. **Colour: Body transparent, yellow or orange, with large ovoid leucophores**.

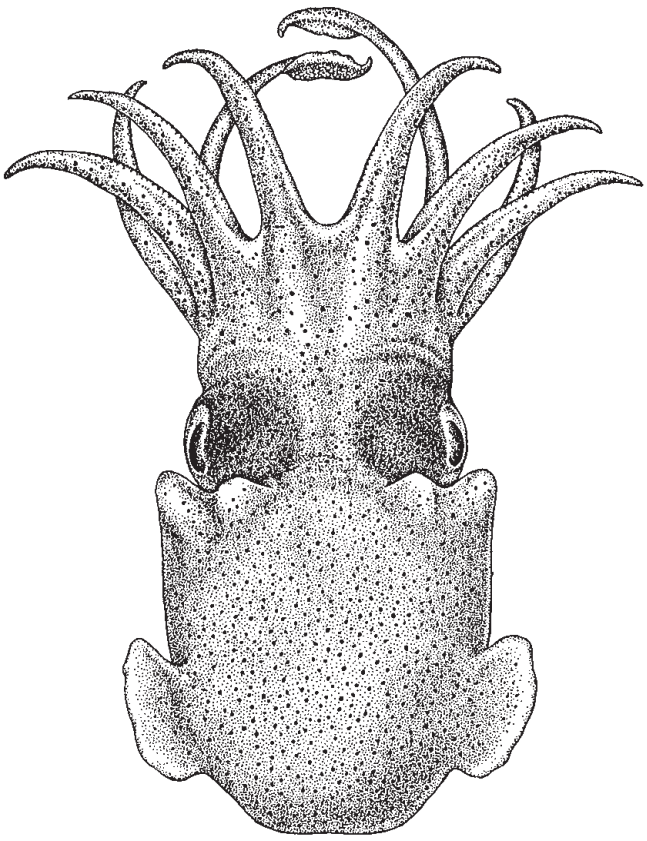
Size: Up to 30 mm mantle length.

Geographical Distribution: Southern Indo-Pacific: southern Australia (Fig. 288).

Habitat and Biology: This species is found in sandy habitats in sheltered waters. They bury in the sand during the day, with only the eyes showing; they emerge at night to feed over the sand and near seagrass beds. They can be maintained easily in aquaria, fed on amphipods, isopods and other small crustaceans. They are able to produce slime from glands on the ventral surface of the body. Both sexes mate from an early age, with immature females able to store sperm in a buccal pouch. Sand-coated eggs are attached to the base of seaweed or seagrass. The young settle soon after hatching.

Interest to Fisheries: Undetermined. This species may have a certain economic interest due to its easy survival in aquaria.

Literature: Lu and Dunning (1998), Norman (2000).



dorsal view

(illustration: K. Hollis)

Fig. 287 ***Sepiadarium austrinum***

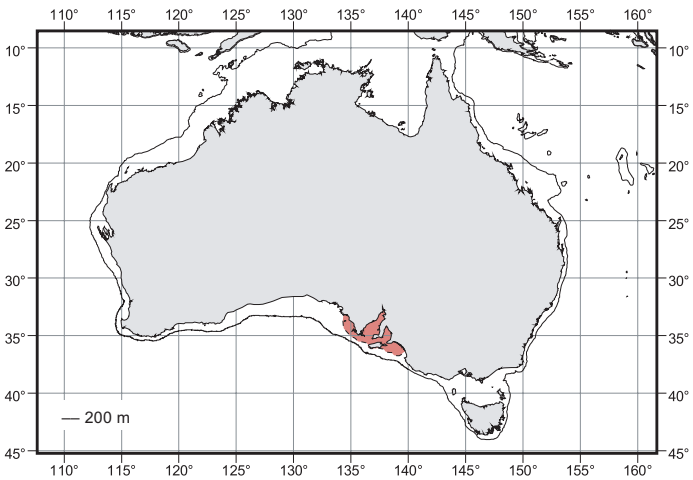


Fig. 288 ***Sepiadarium austrinum***
Known distribution

Sepiadarium kochii Steenstrup, 1881 **Fig. 289**

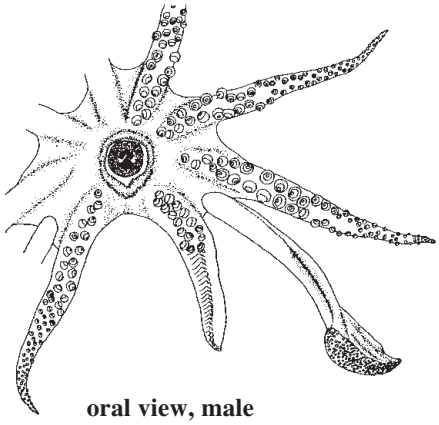
Sepiadarium kochii Steenstrup, 1881, *Danske Videnskabernes Selskabs Skrifter, 6 Raekke, Naturvidenskabelig og Mathematisk*, 1(3): 218 [type locality: Hong Kong, probably Deepwater Bay].

Frequent Synonyms: None.

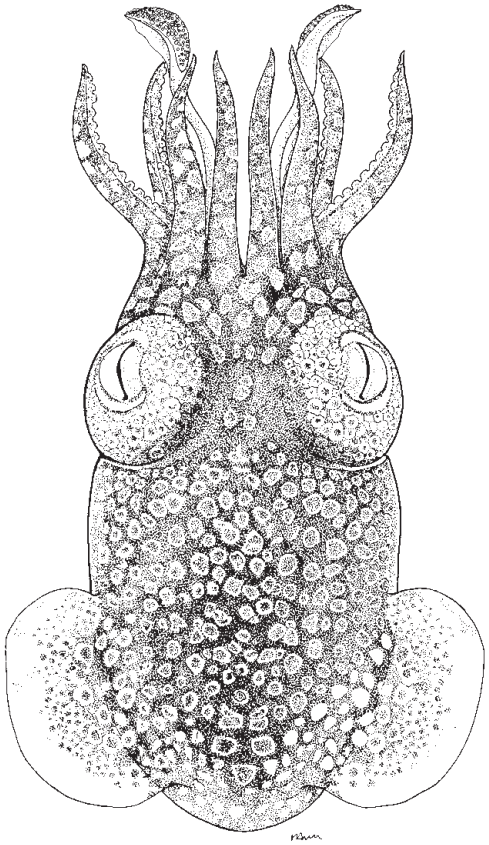
Misidentifications: None.

FAO Names: En – Koch's bottletail squid; **Fr** – Sépiolette de Koch; **Sp** – Sepiolilla de Koch.

Diagnostic Features: Small, mantle dome-shaped. Dorsal mantle fused to head; length of fused portion approximately 1/4 mantle length. Mantle cavity divided by thin septum. Ventral mantle fused to each side of proximal end of funnel. Fins narrow; oblong; short, do not exceed length of mantle anteriorly or posteriorly; posteriorly with wide gap between them; attached along posterior half of mantle. Male and female arms subequal in length; arms I and II longer than III and IV. Non-hectocotylized arm sucker arrangement same in both sexes: **biserial basally, tetraserial over distal 20 transverse rows**. Hectocotylus present; left ventral arm modified: base of hectocotylus suckers normal, not modified; **18 to 20 fleshy lamellae over distal 2/3 of arm**, bordered by fold-like membrane; lamellae thick, longitudinally grooved transverse pads. Club with **8 suckers in transverse rows**; all suckers of similar minute size; very densely set. **Colour:** Dorsal mantle surface covered with **large, white leucophores surrounded by smaller red-brown chromatophores**.



oral view, male



dorsal view

Fig. 289 *Sepiadarium kochii*

Size: Up to 30 mm mantle length.

Geographical Distribution: Indo-Pacific: throughout Indo-Malayan waters from Japan (Tokyo Bay, Pacific side and Toyama Bay (Japan Sea side), Taiwan Province of China and the South China Sea to India; southern Indonesia to New Guinea and northern Australia. The species has been reported from South Australia, though this record is unconfirmed (Fig. 290).

Habitat and Biology: Upper sublittoral; depth range to 60 m. Inhabits soft sediments. Remains buried during the day, then emerges at night to feed, primarily on small crustacea.

Interest to Fisheries: Undetermined.

Literature: Roper *et al*. (1984), Okutani *et al*. (1987), Okutani (1995), Lu (1998), Lu and Dunning (1998), Norman and Reid (1998).

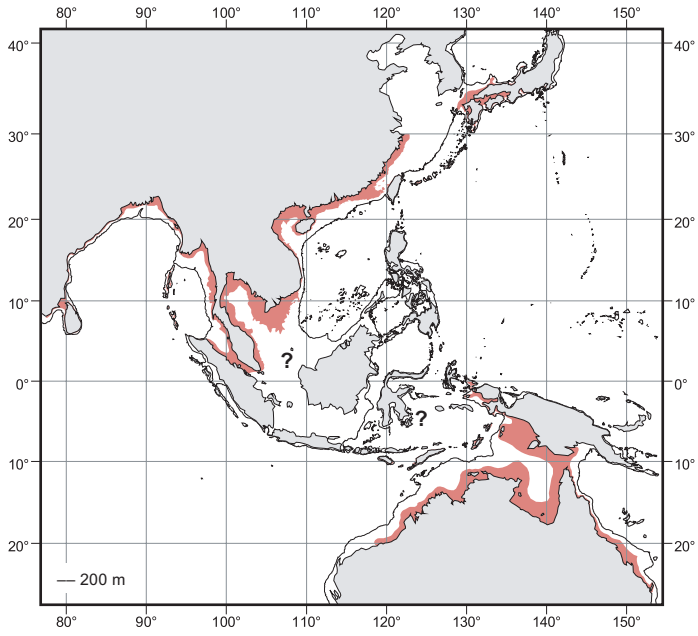


Fig. 290 *Sepiadarium kochii*
Known distribution

SPECIES OF NO CURRENT INTEREST TO FISHERIES, OR RARE SPECIES FOR WHICH ONLY FEW RECORDS EXIST TO DATE

Sepiadarium auritum Robson, 1914

Sepiadarium auritum Robson, 1914, *Proceedings of the Zoological Society of London*, 1814: 678 [type locality: Western Australia: Monte Bello Islands, Hermite Island].

Size: Type specimen, 11 mm mantle length.

Geographical Distribution: Eastern Indian Ocean: northwestern Australia.

Literature: Robson (1914).

Sepiadarium gracilis Voss, 1962

Sepiadarium gracilis Voss, 1962a, *Proceedings of the Biological Society of Washington*, 75: 170 [type locality: Philippines].

Geographical Distribution: Indo-Pacific: South China Sea, Western Philippines.

Literature: Voss (1962a).

Sepiadarium nipponianum Berry, 1932

Sepiadarium nipponianum Berry, 1932, *The Philippine Journal of Science*, 47(1): 42 [type locality: Japan].

Geographical Distribution: Western Pacific: Japan, southern Honshu, Shikoku, Kyushu.

Literature: Berry (1932).

Sepioloidea lineolata (Quoy and Gaimard, 1832) **Plate VII, 45–46**

Sepiola lineolata Quoy and Gaimard 1832, *Mollusques. Voyage de decouvertes de l'Astrolabe pendant les annees 1826–1827–1828–1829, Zoologie*, 2(1): 82 [type locality: southeastern Australia: Jervis Bay].

Size: Up to 50 mm mantle length.

Geographical Distribution:. Southern Indo-Pacific: eastern, southern and western Australia.

Literature: Norman and Reid (1998), Okutani (1995) Norman (2000).

Sepioloidea pacifica (Kirk, 1882)

Sepiola pacifica Kirk, 1882, *Transactions and Proceedings of the New Zealand Institute*, 14(42): 283 [type locality: New Zealand].

Geographical Distribution: Southern Pacific: New Zealand (western Pacific) and the Nazca and Sala y Gomez submarine ridges (eastern Pacific).

Literature: Parin *et al*. (1997), Lu and Dunning (1998).

3.4 Family IDIOSEPIIDAE Appellöf, 1898

Fig. 291 by Amanda Reid

Idiosepiidae Appellöf, 1898, Cephalopoden von Ternate, 2: Untersuchungen über *Idiosepius*, *Sepiadarium* und verwandte Formen. Ein Beitrag zur Beleuchtung der Hektokotylisation und ihrer systematischen Bedeutung. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft*, 24(4): 570–637.

FAO names: En – Pygmy cuttlefishes; **Fr** – Seiches pygmées; **Sp** – Sepias pigmeas.

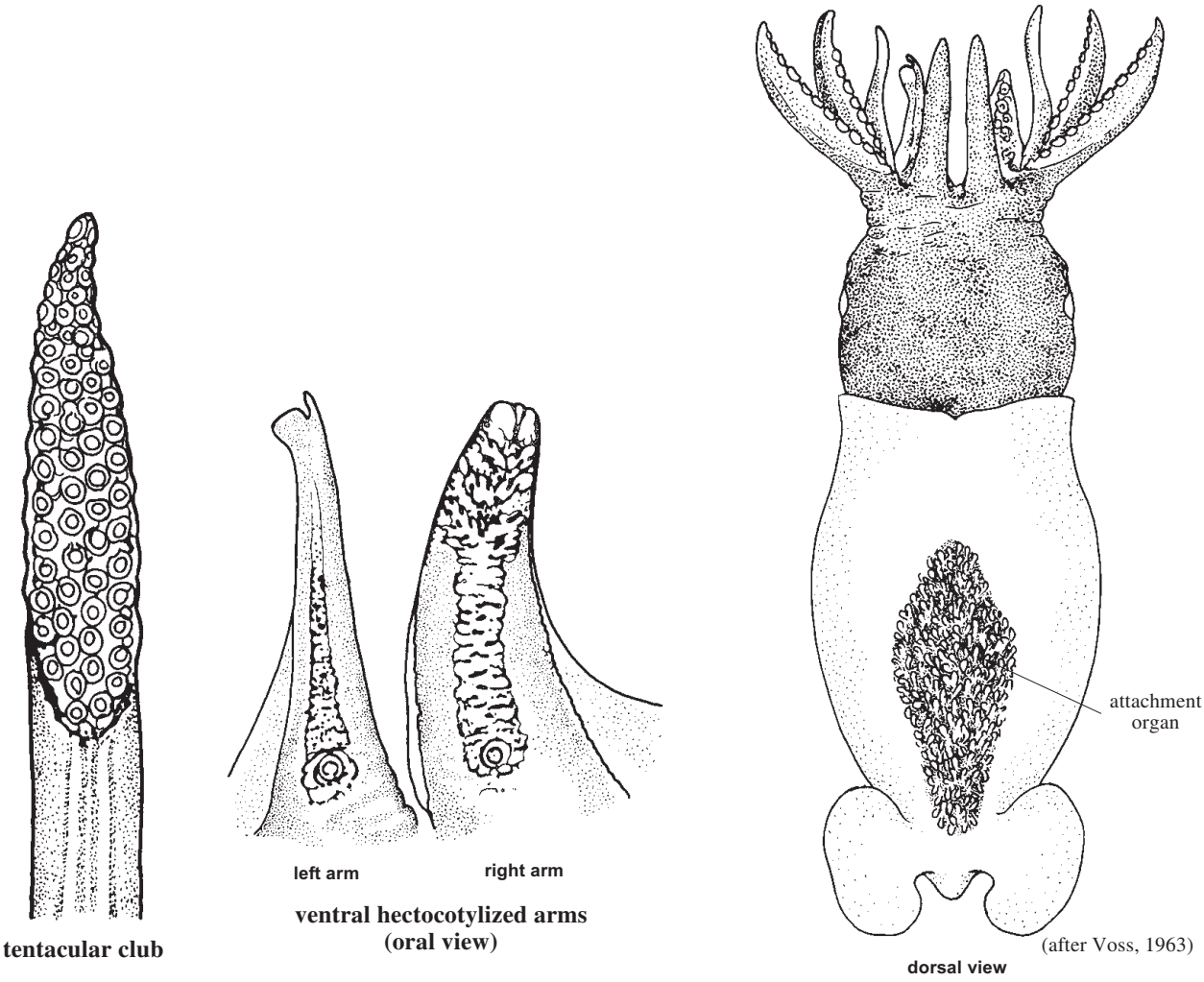


Fig. 291 Idiosepiidae

Diagnostic Features: Small animals (less than 25 mm mantle length). Mantle elongate, obovate; posterior mantle margin bluntly pointed at distal tip. Fins small, kidney-shaped, attached laterally to posterior end of mantle. Dorsal mantle not fused to head. Nuchal cartilage absent. Glandular oval attachment organ on dorsal posterior end of mantle. Arms short; arm suckers biserial. Arm suckers enlarged in males. Hectocotylus present, both ventral arms modified: right arm flattened, wide, with protective membranes, sometimes with transverse ridges and grooves, distal tip of left ventral arm bilobed; both arms mainly without suckers. Club with 2 to 4 suckers in transverse rows. Gladius absent. In females, right oviduct non-functional; eggs small, benthic. Development includes pelagic stage, but no metamorphosis occurs. All live near the coasts in shallow beds of seagrass or algae.

Interest to Fisheries: None.

Literature: Nesis (1987).

SPECIES OF NO CURRENT INTEREST TO FISHERIES, OR RARE SPECIES FOR WHICH ONLY FEW RECORDS EXIST TO DATE

Idiosepius biserialis Voss, 1962

Idiosepius biserialis Voss, 1962b, *Transactions of the Royal Society of South Africa*, 36(4): 258 [type locality: South Africa].

Size: Females up to 10.5 mm mantle length.

Geographical Distribution: Southwestern Indian Ocean: southern Africa. Records from Andaman Sea, Thailand probably refer to ***I. thailandicus*** Chotiyaputta *et al*. (1991). Shallow waters inshore.

Literature: Hylleberg and Nateewathana (1991a), Okutani (1995), Norman and Lu (2000).

Idiosepius macrocheir Voss, 1962

Idiosepius macrocheir Voss, 1962b, *Transactions of the Royal Society of South Africa*, 36(4): 259 [type locality: South Africa].

Geographical Distribution: Southwestern Indian Ocean: Southern Africa. Shallow waters inshore.

Literature: Voss (1962b).

Idiosepius minimus (Orbigny, 1835)

Cranchia minimus Orbigny, 1835 (*in* Férussac and d'Orbigny, 1834–1848), Histoire Naturelle Générale et Particulière Céphalopodes Acétabuliferes Vivants et Fossiles, pl. 1, figs 4–5 [type locality: unreported].

Size: Up to 15 mm mantle length.

Geographical Distribution: 'Coast of Africa' fide (Berry 1932). Shallow, inshore waters.

Literature: Berry (1932).

Idiosepius notoides Berry, 1921

Idiosepius notoides Berry, 1921, *Records of the South Australian Museum*, 1(4): 361 [type locality: South Australia: Goolwa].

Size: Males up to 15.8 mm mantle length; females up to 25 mm mantle length.

Geographical Distribution: Southwestern Pacific: southern and eastern Australia. Shallow, inshore waters.

Literature: Burn (1959), Norman (2000).

Idiosepius paradoxus (Ortmann, 1888)

Microteuthis paradoxus Ortmann, 1888, *Japanische Cephalopoden. Zoologische Jahrbucher, (Systematik)*, 3: 649 [type locality: Japan: Bay of Tokyo, Kadsiyama].

Size: Up to 16 mm mantle length.

Geographical Distribution: Western Pacific: Japan, southern Hokkaido, Honshu, Kyushu. South Korea, northern Australia. Shallow, inshore waters.

Literature: Joubin (1902a), Natsukari (1970), Dong (1992), Okutani (1995), Norman and Lu (2000).

Idiosepius picteti (Joubin, 1894)

Loligo picteti Joubin, 1894, *Revue Suisse de Zoologie et Annales du Museum d'Historie Naturelle de Genève*, 2: 60 [type locality: Indonesia: Amboina].

Size: Up to 17 mm mantle length.

Geographical Distribution: Indo-Pacific: eastern Indonesia.

Literature: Joubin (1894).

Idiosepius pygmaeus Steenstrup, 1881

Idiosepius pygmaeus Steenstrup, 1881, *Danske Videnskabernes Selskabs Skrifter, 6 Raekke, Naturvidenskabelig og Mathematisk*, 1(3): 219 [type locality: South China Sea and 04°20'N 107°20'E].

Size: Up to 20 mm mantle length.

Geographical Distribution: Indo-Pacific: Japan, South China Sea, Philippines, Palau Islands, Indonesia, northern and northeastern Australia. Shallow, inshore waters.

Literature: Allan (1945), Moynihan (1983b), Jackson (1986, 1989), Yamamoto (1988), Hylleberg and Nateewathana (1991b), Lewis and Choat (1993), Okutani (1995), Semmens *et al*. (1995), Pecl and Moltschaniwshyj (1997), Reid and Norman (1998), Norman and Lu (2000).

Idiosepius thailandicus Chotiyaputta, Okutani and Chaitiamvong, 1991

Idiosepius thailandicus Chotiyaputta *et al*., 1991, Venus, 50(3): 167 [type locality: Gulf of Thailand].

Geographical Distribution: Indo-Pacific: Thailand.

Literature: Okutani (1995), Nabhitabhata (1998).

3.5 Family SPIRULIDAE Owen, 1836

by Amanda Reid

Spirulidae, Owen 1836, Descriptions of some new and rare Cephalopoda, collected by Mr. George Bennet, Corr. Memb. Z. S. *Proceedings of the Zoological Society of London*, 37: 19–24

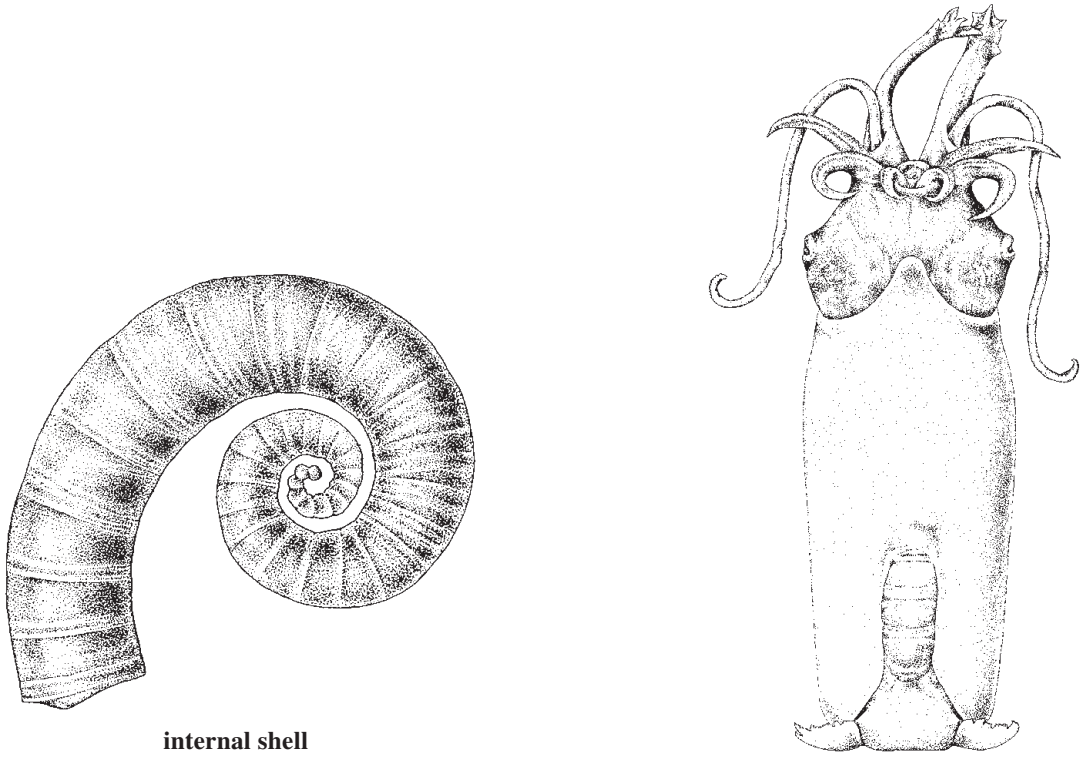
Spirula spirula (Linnaeus, 1758) Fig. 292

Nautilus spirula Linnaeus, 1758, *Systema Naturae per Regna tria Naturae, Secundum Classes, Ordines, Genera, Species cum Characteribus, Differentiis, Synonymis, Locis*, 710.

Frequent Synonyms: None.

Misidentifications: None.

FAO Names: En – Ram's horn squid; **Fr** – Spirule; **Sp** – Espírula.



(illustration: K. Hollis/ABRS)

Fig. 292 ***Spirula spirula***

Diagnostic Features: Mantle cylindrical, thin, muscular; dorsal anterior margin triangular, acute, free from head (not fused to head). Ventral mantle with 2 tongue-like projections from between which funnel protrudes. Fins narrow, ovate, with fringed anterior margins; short, do not exceed length of mantle anteriorly or posteriorly; attached dorsolaterally on posterior end of mantle (almost perpendicular to longitudinal axis of body). Mantle-locking cartilage a simple straight ridge; funnel-locking cartilage a simple, straight depression. Eyes large; ventral eyelids present. Arms increase in length dorsally to ventrally, with arms I short, arms IV longest. All arms except fourth pair united by broad webs. Non-hectocotylized arm sucker arrangement same in both sexes: arm suckers tetraserial, or in 6 rows. Hectocotylus present, both ventral arms modified: **right hectocotylized arm grooved, concave, with spoon-like expansion, pointed tip and 2 finger-like outgrowths; left hectocotylized arm round in cross-section with 2 spoon-like and one finger-like outgrowth with soft papillae at distal tip**. Tentacular club straight, slender; not expanded, same width as stalk; with 12 to 16 suckers in transverse rows; all suckers of similar small size. Radula absent. Buccal membrane in females with spermathecae. **Spirally coiled internal shell** present, located in posterior end of animal; shell comprised of over 30 chambers in adults. Large photophore present between fins, surrounded by annular fold of skin. **Colour:** Dark reddish brown. Luminescent.

Size: Rarely exceeds 45 mm mantle length.

Geographical Distribution: Tropical and subtropical oceanic waters worldwide, where the water temperature at 400 m is 10ºC or warmer (Fig. 293).

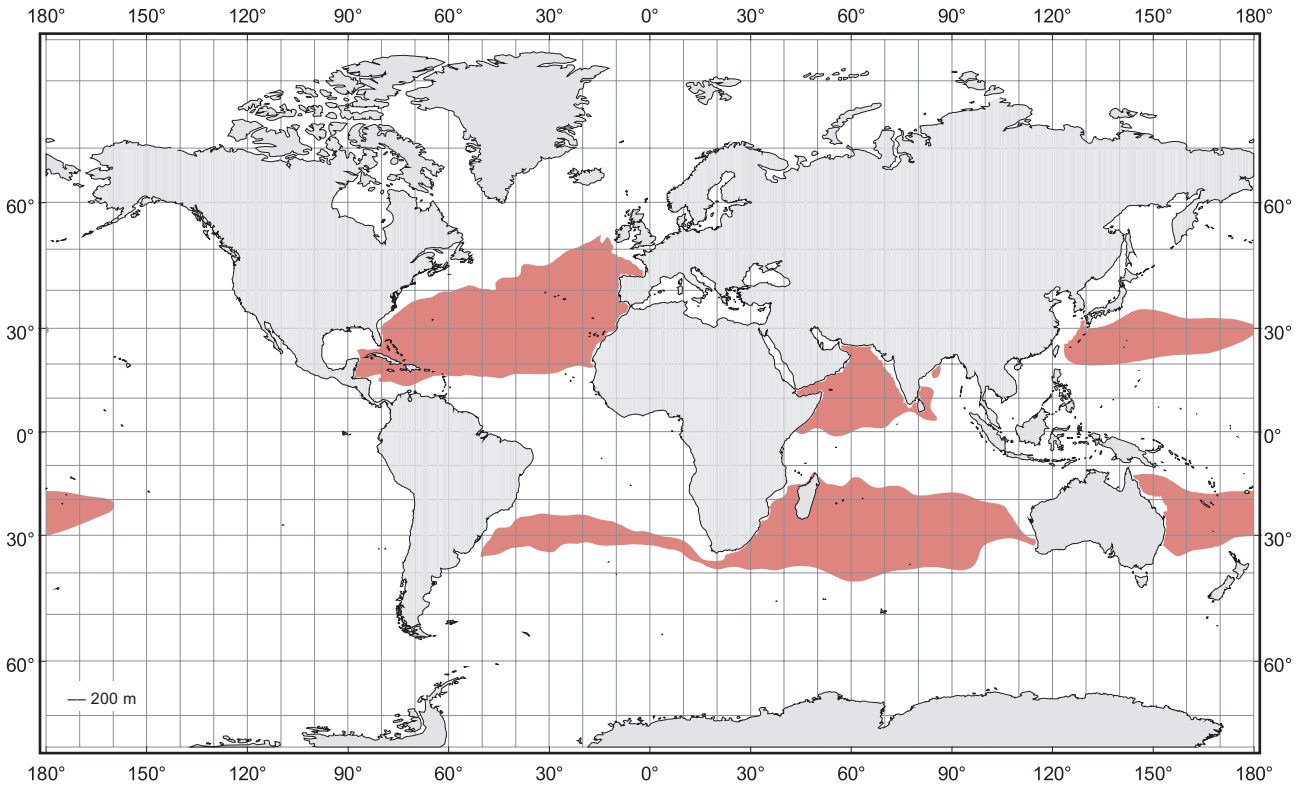


Fig. 293 ***Spirula spirula***
Known distribution

Habitat and Biology: This is a mesopelagic species, inhabiting from 600 to 700 m during the day and found in depths less than 300 m at night. Its common name is derived from the coiled shell, numbers of which are frequently washed ashore. The capture of young at depths between 1 000 and 1 750 m suggests that females possibly lay eggs on the bottom of continental slopes. Eggs are small and the smallest known paralarva has a 1.5 mm mantle length with two shell chambers. The species attains sexual maturity at about 30 mm mantle length (after 12 to 15 months of life), and the life span is estimated to be about 18 to 20 months. ***Spirula spirula*** is normally covered in a red-brown to silvery skin, which is often lost in trawled animals. Live animals have been seen to retract their head and arms into their mantle and close the opening with the pointed 'flaps' formed by the mantle. They take up a vertical position, head downwards, when at rest.

Interest to Fisheries: No direct interest to fishery exists, but the shells collected on the beach are sold in the shell trade.

Literature: Bruun (1943, 1955), Clarke (1970), Nesis (1987), Lu *et al*. (1992), Reid and Norman (1998).

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