

***Sepia grahami* Reid, 2001**

Sepia grahami Reid, 2001b, *Proceedings of the Linnean Society of New South Wales*, 123: 160 [type locality: Australia: New South Wales, 29°33'S 153°25'E to 29°32'S 153°25'E].

Frequent Synonyms: None.

Misidentifications: *Sepia mestus* Gray, 1849; *Sepia rozella* (Iredale, 1926).

FAO Names: **En** – Ken’s cuttlefish; **Fr** – Seiche de Ken; **Sp** – Sepia de Ken.

Diagnostic Features: Mantle oval. Fins wide, rounded posteriorly. Male and female arms **subequal in length**; protective membranes narrow; distal arm tips not attenuate. Arm suckers **tetraserial**. **Hectocotylus absent**. Club short, slightly recurved, sucker-bearing surface flattened, with **4 or 5 suckers in transverse rows (usually 4, rarely 5)**; suckers differ only slightly in size: **3 or 4 suckers slightly enlarged**. Swimming keel of club extends well proximal to carpus; dorsal and ventral protective membranes not joined at base of club; dorsal membrane extends proximal to carpus along stalk, ventral membrane terminates at proximal end of carpus. Gills with 23 to 26 lamellae per demibranch. Cuttlebone oval; dorsal surface creamy white, with slight pinkish tinge; dorsal median rib absent, lateral ribs indistinct. Spine with **ventral keel**. Striated zone concave, sulcus **shallow, narrow, indistinct**. Anterior striae are **inverted U-shape**; last loculus flat. Inner cone limbs are narrow strap-like anteriorly, broaden posteriorly. Inner cone limbs are **raised into rounded ledge posteriorly, ledge thickened, yellowish or ochre coloured**. Dorsal mantle with longitudinal rows of up to 6 ridges along each side, close to fins; prominent ear-shape lobe dorsal to eye and 2 lobes ventral to eye, anteriormost lobe largest. **Colour:** Pinkish brown. Mantle with **dorsal ‘eyespot’**.

Size: Males up to 66 mm mantle length; females up to 82 mm mantle length.

Geographical Distribution: Southwestern Pacific: Australia, New South Wales, from southeast of Yamba area (29°32' 153°25'E) to off Tathra (36°44'S 150°05'E) (Fig. 141).

Habitat and Biology: Depth range from 2 to 84 m.

Interest to Fisheries: There is no official information on this species but it is commonly confused with *S. rozella* (Iredale, 1926) and *S. mestus* Gray, 1849. *Sepia rozella* commonly appears in fish markets in Sydney.

Literature: Reid (2001b).

Fig. 140

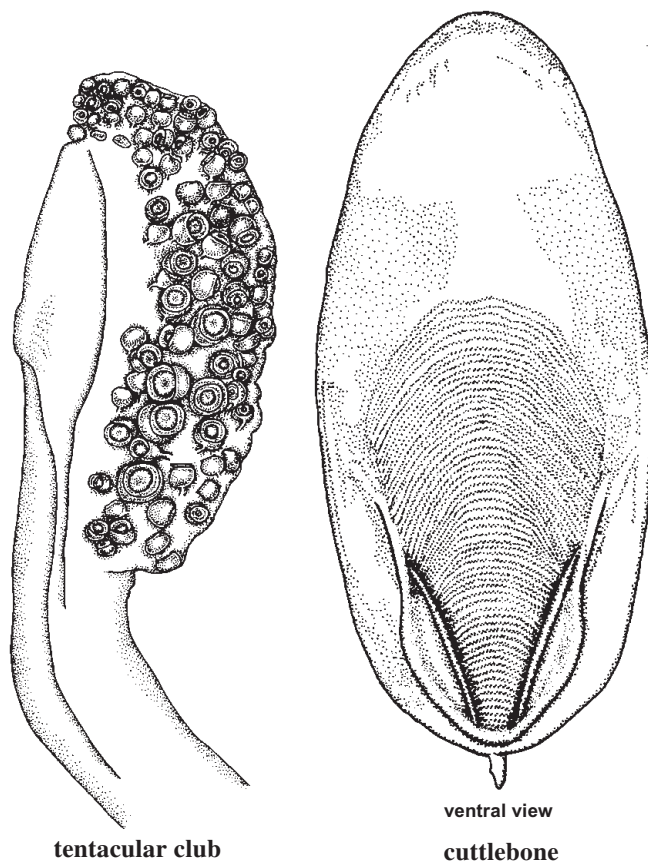


Fig. 140 *Sepia grahami*

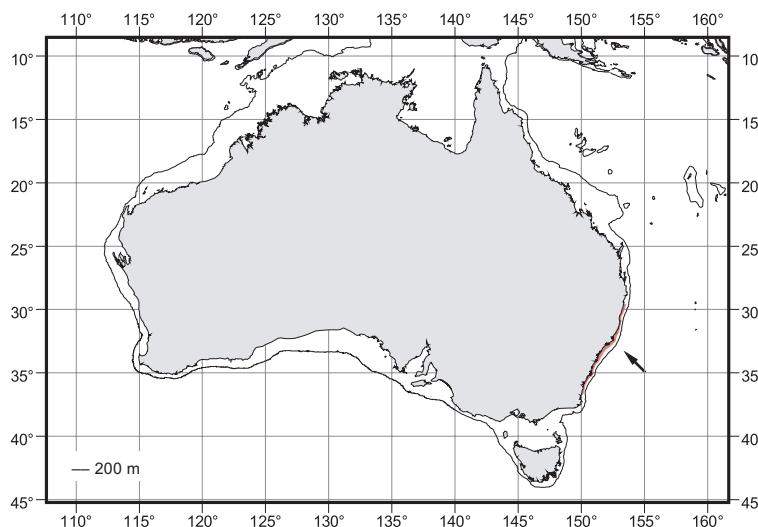


Fig. 141 *Sepia grahami*
█ Known distribution

Sepia hedleyi* Berry, 1918*Fig. 142**

Sepia hedleyi Berry, 1918, *Biological Results of the Fishing Experiments carried on by the F.I.S. "Endeavour" 1909–14*, 4(5): 258 [type locality: South Australia, Investigator Strait area (35°25'S 137°22'E), south of Kangaroo Island (35°50'S 137°15'E)].

Frequent Synonyms: *Sepia dannevigii* Berry, 1918; *Decorisepia rex* Iredale, 1926.

Misidentifications: *Sepia vossi* Khromov, 1996 (as *S. rex*).

FAO Names: **En** – Hedley's cuttlefish; **Fr** – Seiche d'Hedley; **Sp** – Sepia de Hedley.

Diagnostic Features: Mantle broad, oval. Fins widest in posterior third, rounded posteriorly, with narrow gap between them. Head short, broad, narrower than mantle. Male and female **arms subequal in length**; protective membranes narrow. Arm suckers **tetraserial**; male non-hectocotylied arm suckers smaller than female arm suckers in diameter. Hectocotylus present on left ventral arm: **6 to 8 rows of normal size suckers proximally, 9 or 10 rows of reduced suckers medially**. Suckers of hectocotylus in **2 dorsal series are much smaller than those in 2 ventral series**; oral surface of modified region wide, swollen, fleshy, with transversely grooved ridges; 2 dorsal and 2 ventral series of suckers **displaced laterally**, with gap between; **suckers in 2 ventral series aligned in a single row**. Club crescent-shaped, moderate length, sucker-bearing surface flattened, with **9 to 12 suckers** in transverse rows; all club suckers of similar, small, size. Swimming keel of club **extends well proximal to carpus**; dorsal and ventral protective membranes **not joined at base of club** but are fused to tentacular stalk. Dorsal and ventral membranes same length; extend proximal to carpus along stalk. Gills with 29 or 30 lamellae per demibranch. Buccal membrane without suckers; in females extends ventrally with 2 spermathecae. Spermatophores 5.8 to 7.9 mm long. Eggs spherical, 2.5 to 3.1 mm diameter. Cuttlebone outline oblong; acuminate, **acute**, anteriorly and posteriorly; dorsal surface creamy white; dorsal surface evenly convex; granulose; spine and posterior tip of bone covered with smooth glaze-like substance. Dorsal median rib **distinct**; sides approximately parallel; ribs bordered laterally by distinct grooves; lateral ribs indistinct. Chitin surrounds entire margin of cuttlebone. Spine short, pointed, straight, parallel to bone, **keel(s) absent**. Striated zone flat; last loculus convex; sulcus shallow, narrow, extends entire length of cuttlebone. Anterior striae are **inverted U-shape**. Inner cone limbs are **uniform width, narrow V-shape** posteriorly, thickened, shiny; outer cone calcified, narrow anteriorly, broadens posteriorly. Dorsal mantle has longitudinal row of up to 6 ridge-like papillae along each side, adjacent to base of each fin. **Colour:** Buff pinkish brown. Arms without markings. Dorsal ridges orange-pink in colour.

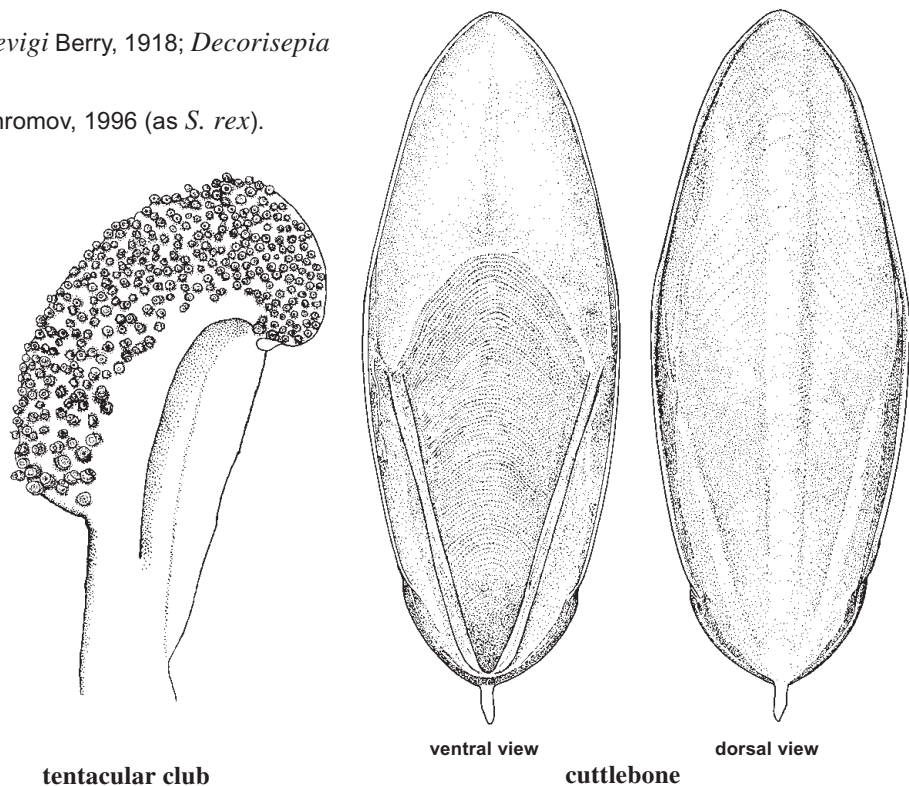
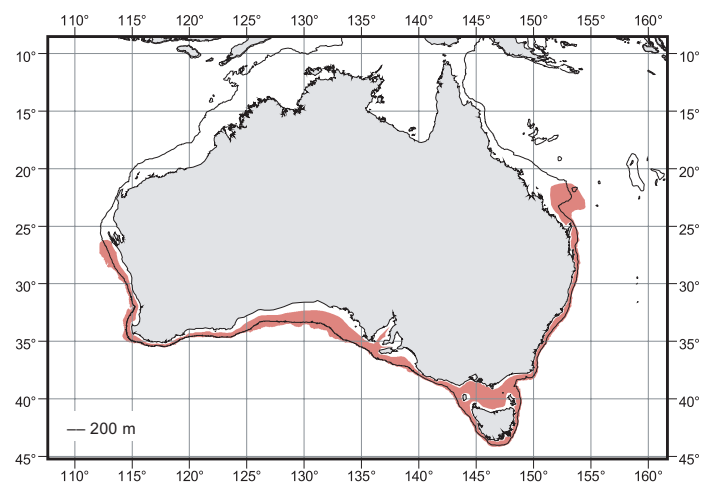
Size: Males up to 83 mm mantle length; females up to 108 mm mantle length.

Geographical Distribution: Southern Indo-Pacific: Australia, Queensland, from off the Great Barrier Reef, 22°35.3'S 153°46.7'E, southwards around southern Australia to Western Australia, southwest of Shark Bay, 27°07'S 112°49'E. Australian endemic (Fig. 143).

Habitat and Biology: Depth range from 47 to 1 092 m.

Interest to Fisheries: *Sepia hedleyi* is taken as bycatch of prawn and mixed species trawl fisheries.

Literature: Lu (1998a), Reid (2001a).

**Fig. 142** *Sepia hedleyi***Fig. 143** *Sepia hedleyi*

■ Known distribution

Sepia hierredda* Rang, 1835*Fig. 144**

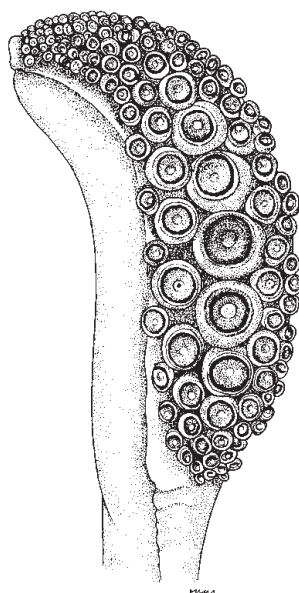
Sepia hierredda Rang, 1835, (in Férussac and d'Orbigny 1834–1848), *Histoire naturelle générale et particulière des Céphalopodes Acétabulifères vivants et fossiles*, pl. 13 [type locality: western Africa].

Frequent Synonyms: None.

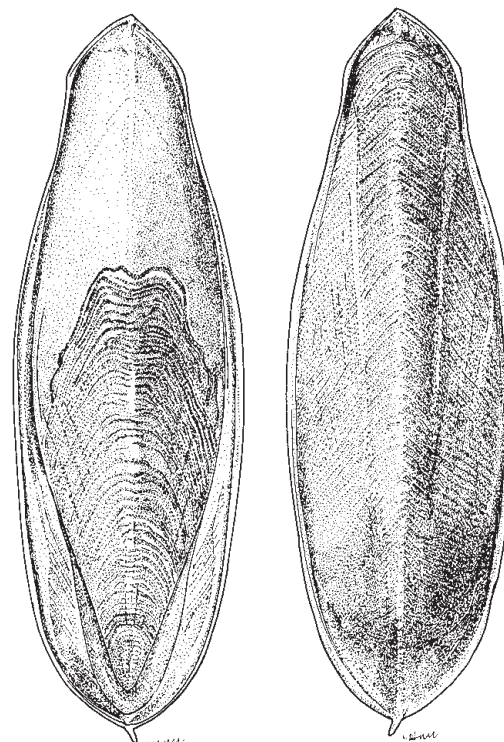
Misidentifications: None.

FAO Names: **En** – Giant African cuttlefish; **Fr** – Seiche géante africaine; **Sp** – *Sepia gigante africana*.

Diagnostic Features: Hectocotylus present on left ventral arm: **6 rows of normal size suckers proximally, 8 to 14 rows of reduced suckers distally**. Club long, slightly recurved, with **5 or 6 suckers in transverse rows**; suckers differ in size: **5 or 6 median suckers twice diameter of rest**; club swimming keel extends slightly proximal to sucker-bearing surface. Cuttlebone outline oblong, lateral margins concave in anterior third; acuminate, acute, anteriorly; bluntly rounded posteriorly; dorsal median rib present, broadens anteriorly; median rib bordered laterally by distinct grooves; lateral ribs present. Spine present. Anterior striae **shallow m-shape**. Inner cone limbs are narrow anteriorly, broaden posteriorly; outer cone broadens posteriorly. **Colour:** Pattern very similar to that of *Sepia officinalis*.

**tentacular club**

(after Adam, 1952)

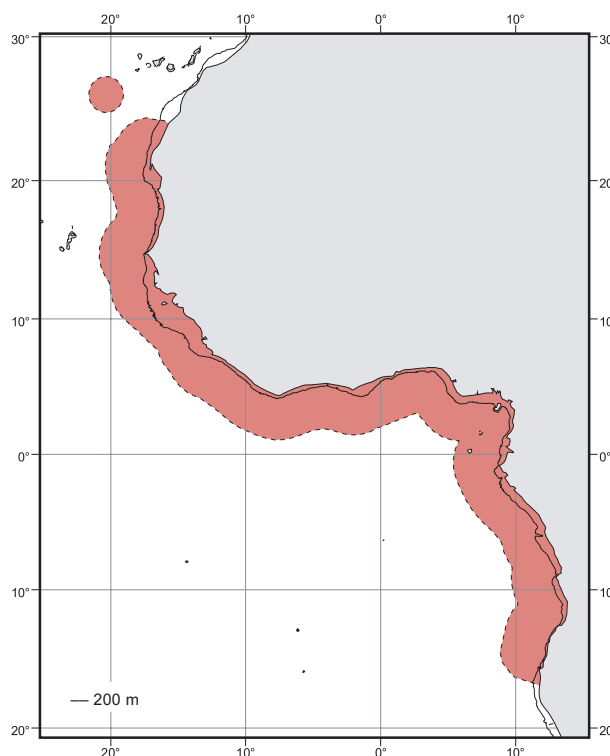
**ventral view****dorsal view****cuttlebone****Fig. 144 *Sepia hierredda***

Size: Up to nearly 500 mm mantle length; total weight over 7 500 g.

Geographical Distribution: Southeastern Atlantic: Africa, Cape Blanc (21°N), Mauritania (19°N) to Tigres Bay, Angola (16°30'S). Endeavour Bank (Fig. 145).

Habitat and Biology: Spawning occurs from February to September and the lifespan is 24 months. Migrations of *S. hierredda* occur off the west African coast. Females mature at 130 mm mantle length. In those areas where the distribution of *S. hierredda* overlaps that of *S. officinalis*, the former species tends to be restricted to waters shallower than 50 m, while the distribution of *S. officinalis* extends to depths in excess of 100 m.

Interest to Fisheries: *Sepia hierredda* is the most commercially important cuttlefish in the east central Atlantic waters (from Cape Blanc, 21°N, to Cape Bojador, 26°N). It represents the dominant cuttlefish caught off Western Sahara and in Mauritania waters. Specific statistics are not available, but *S. hierredda* made up 90 and 65%, respectively, of the cuttlefishes caught in these areas by the Spanish fishery in recent years.

**Fig. 145 *Sepia hierredda***
Known distribution

Remarks: *Sepia hierredda* often was considered to be a subspecies of *S. officinalis* Linnaeus, 1758. However, the results of recent morphological and allozyme analyses strongly support the fact that *S. officinalis* and *S. hierredda* are different species. The 2 species can be distinguished as follows: the number of transverse rows of suckers is higher in *S. hierredda* than in *S. officinalis*; for animals with the same mantle length, the length of the striated zone on the cuttlebone is shorter in *S. officinalis* from the northeastern Atlantic than in *S. hierredda* (for animals from the Canary Islands (central eastern Atlantic), however, this character is not useful since the striated zone is of the same length in both species); the mantle is narrower and the arms are shorter in *S. hierredda* than in *S. officinalis*. The 2 species also differ at 13 allozyme loci. *Sepia hierredda* and *S. officinalis* are sympatric off the northwestern coast of Africa.

Literature: Hatanaka (1979), Bakhayokho (1983), Khromov *et al.* (1998), Guerra *et al.* (2001).

***Sepia kobiensis* Hoyle, 1885**

Fig. 146

Sepia kobiensis Hoyle, 1885, *Annals and Magazine of Natural History*, (series 5)16: 195 [type locality: Japan: Yokohama market (as var. *S. andreanoides*) and Bay of Kobe for *S. kobiensis*; Toyama Bay (as var. *toyamensis*); Beppu, Oita Prefecture (as var. *beppuana*); Enoura, Shizuoka Prefecture (as var. *crassa*); Korea Strait (as var. *albatrossi*)].

Frequent Synonyms: *Sepia andreanoides* Hoyle, 1885.

Misidentifications: *Sepia andreana* Steenstrup, 1875.

FAO Names: En – Kobi cuttlefish; Fr – Seiche kobi; Sp – Sepia kobi.

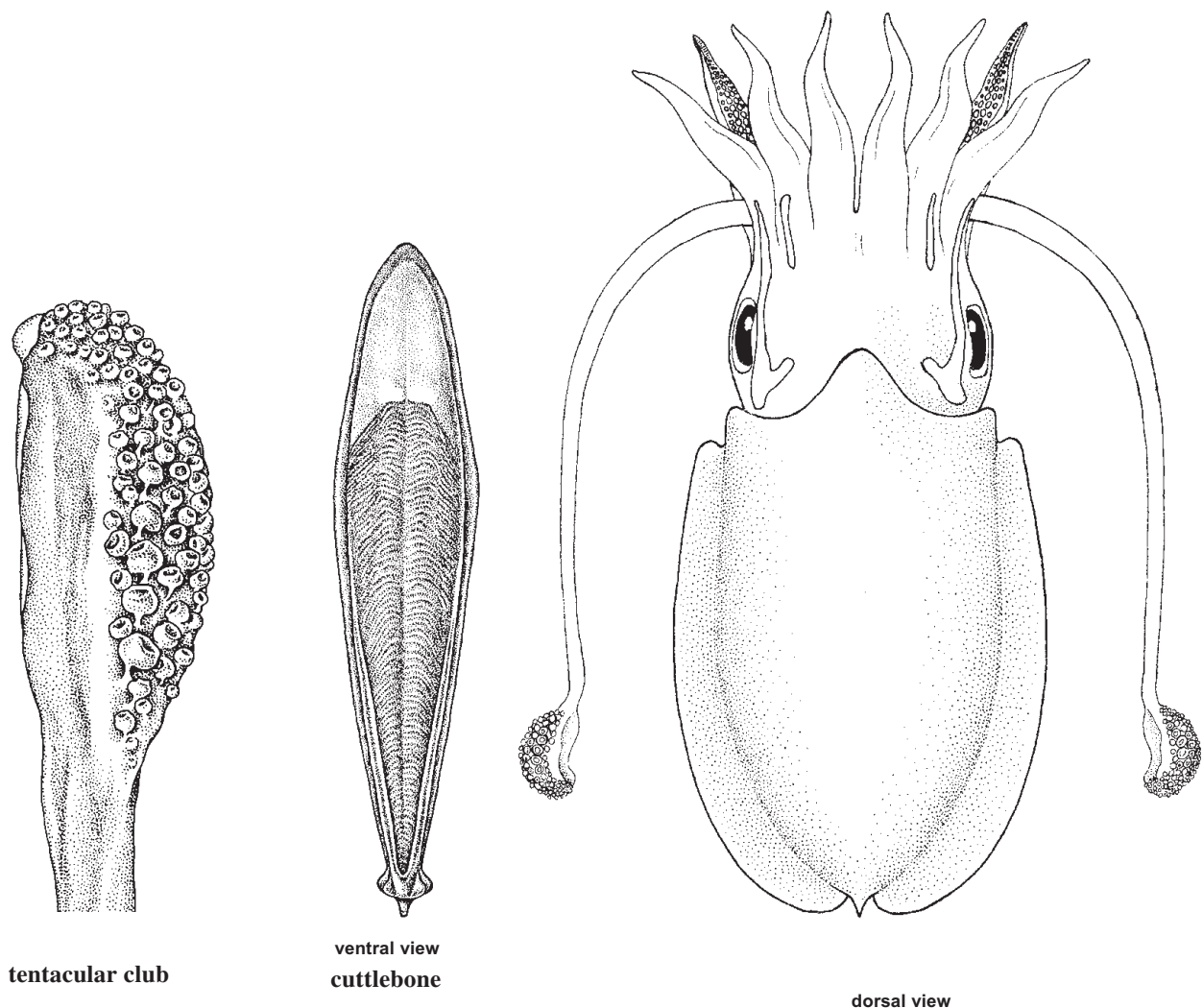


Fig. 146 *Sepia kobiensis*

Diagnostic Features: Small species. Mantle oblong; dorsal anterior margin triangular, acute. Male and female arm lengths subequal, short. Arm suckers tetraserial, median rows larger than marginal rows; **suckers displaced laterally, with gap between on arms I to III**. Hectocotylus present on left ventral arm: **6 to 12 rows of normal size suckers proximally, 7 to 10 rows of greatly reduced suckers medially**, then normal size suckers to arm tip; oral surface of modified region **wide, swollen, fleshy, with transversely grooved ridges and deep median furrow**; suckers in **2 dorsal and 2 ventral series displaced laterally**, with gap between them. Club crescent-shaped, narrow; with **4 or 5 suckers in transverse rows**; suckers differ slightly in size: 4 or 5 suckers toward proximal end of club slightly larger than others. Swimming keel of club extends proximally slightly beyond carpus; dorsal and ventral protective membranes not joined at base of club. Cuttlebone **outline lanceolate**; acuminate anteriorly and posteriorly; dorsal surface pinkish, or yellowish; entire surface calcified with very fine granulose sculpture partly arranged in irregular longitudinal ridges and bordered laterally by 2 narrow calcareous ridges; dorsal median rib indistinct, broadens anteriorly. Chitin (trace only) borders lateral margins of cuttlebone. Spine long, pointed, directed dorsally. Striated zone and last loculus convex; sulcus shallow, narrow, extends entire length of cuttlebone. Anterior striae are inverted **m-shape**. Inner cone limbs are uniform width, narrow, U-shape posteriorly, thickened; outer cone calcified; limbs are **expanded posteriorly into 2 short 'wings'**, directed ventrally, to form a recurved cup-like structure. **Colour:** Reddish brown. Head with **V-shape reddish stripe on dorsal margins of eye orbits** and with **orange stripes extending from posterior end of head to basal portions of arms I to III**. Dorsal mantle has reddish spots.

Size: Up to 90 mm mantle length (usually 70 mm mantle length) and 80 g total weight.

Geographical Distribution:

Indo-Pacific: off Japan, from southern part of Hokkaido, south to Kyushu (both coasts), Yellow Sea, East China Sea, Taiwan Province of China, Gulf of Tonkin, South China Sea, Philippines, Gulf of Thailand and the northern part of the Indian Ocean from the Persian Gulf, Arabian Sea and Bay of Bengal, Myanmar. Possibly the Banda Sea (Fig. 147).

Habitat and Biology: Depth range subtidal to 200 m.

Interest to Fisheries:

Sepia kobiensis is taken in small quantities between 80 and 160 m in the Hong Kong area, and it is also taken as bycatch in small-scale fisheries off southern Japan

and in the Inland Sea, mainly with fixed nets, trawls and beach seines. It is an object of fisheries in China where it is abundant in shallow waters and locally utilized.

Local Names: JAPAN: Hime-kouika.

Remarks: *Sepia kobiensis* is probably a species complex. This requires investigation, particularly considering its significance in fisheries. This species has been confused with *S. andreana* Steenstrup, 1875, from which it is distinguished by several characters. All arms in adult *S. kobiensis* are similar in length, while in adult male *S. andreana*, the second pair of arms is greatly elongate and bears biserial, rather than tetraserial suckers. The hectocotylus sucker arrangement in *Sepia kobiensis* follows a pattern of normal, reduced, then normal-sized suckers from the proximal to distal end of the arm, while in *S. andreana*, some normal-sized suckers occur at the base of the hectocotylus, and the rest are reduced and very rudimentary. The club suckers differ markedly in size in *S. andreana*, while those of *S. kobiensis* differ only slightly in size.

Literature: Adam and Rees (1966), Okutani *et al.* (1987).

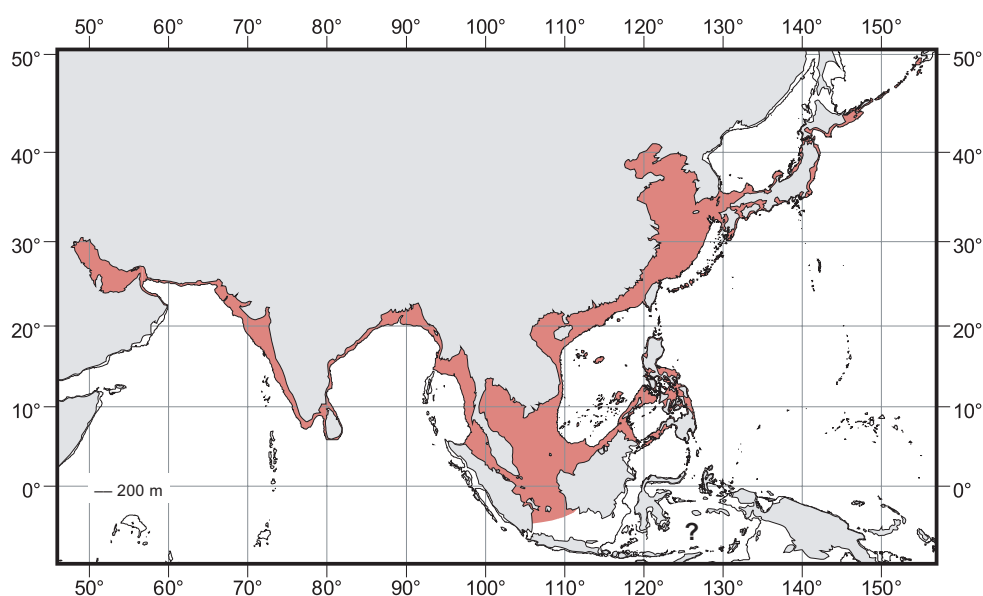


Fig. 147 *Sepia kobiensis*

Known distribution