3.2.2 Subfamily ROSSIINAE Appellöf, 1898

Rossia macrosoma (Delle Chiaie, 1830) **Fig. 261**

Sepiola macrosoma Delle Chiaie, 1830, *Memoire sulla storia e notomia degli Animali senza vertebre del Regno di Napoli*. 4 volumes, atlas. Napoli, pl. 17 [type locality: Tyrrhenian Sea].

Frequent Synonyms: *Sepiola macrosoma* Delle Chiaie, 1829.

Misidentifications: None.

FAO Names: En – Stout bobtail squid; **Fr** – Sépiole melon; **Sp** – Globito robusto.

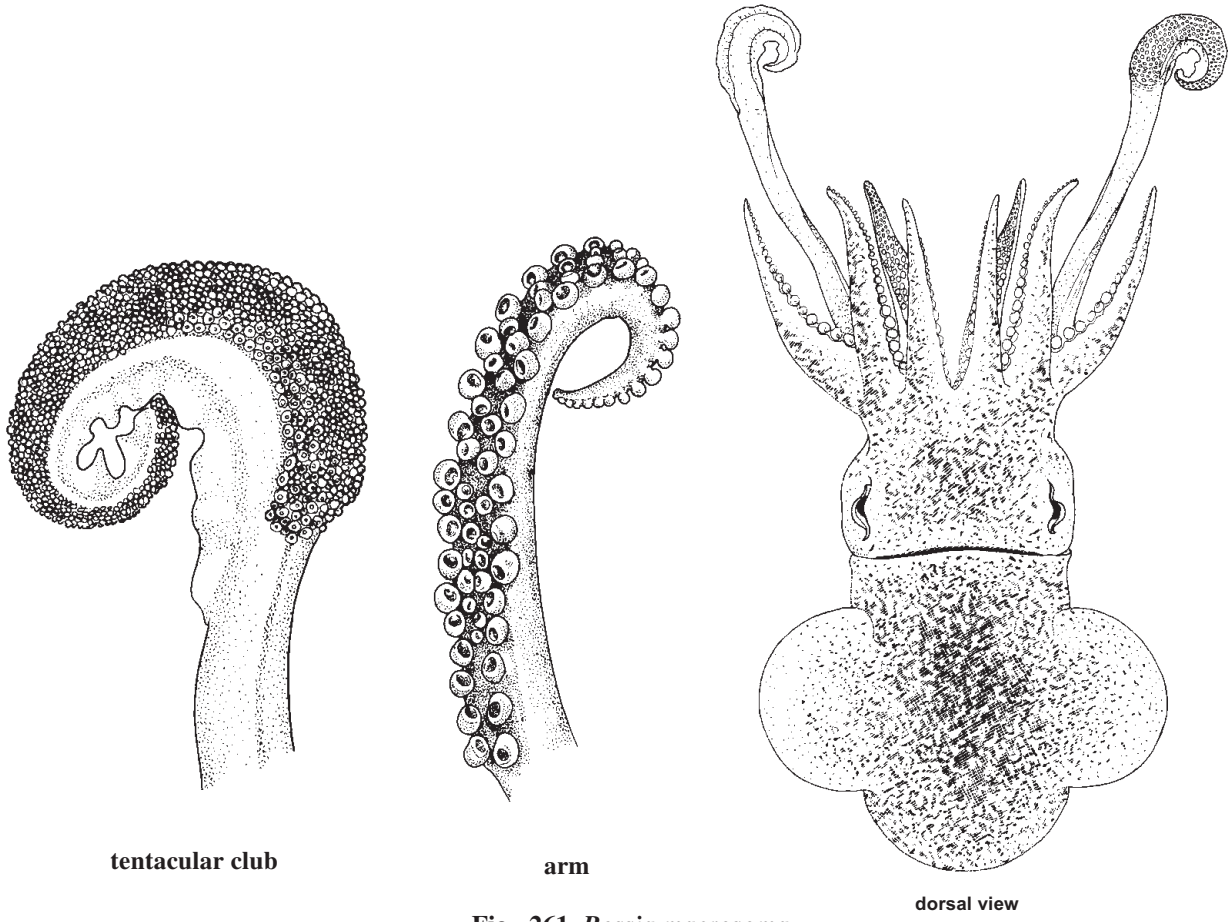


Fig. 261 ***Rossia macrosoma***

Diagnostic Features: Body smooth, soft. Males mature at smaller sizes and do not grow as large as females. Mantle dome-shaped. Dorsal mantle free from head (not fused to head). **Nuchal cartilage oval, broad**. Fins short, do not exceed length of mantle anteriorly or posteriorly. Arm webs broad between arms III and IV. Non-hectocotylized arm sucker arrangement same in both sexes: **arm suckers biserial basally, tetraserial medially and distally**. Dorsal and ventral sucker rows of arms II to IV of males enlarged; ventral marginal rows of arms II and III with 1 to 3 greatly enlarged suckers basally (diameter 8 to 11% mantle length); dorsal and ventral marginal sucker rows of arms II to IV with more than 10 enlarged suckers (diameter 4 to 7% mantle length); suckers on median rows in males smaller than female arm suckers in size. Hectocotylus present; both dorsal arms modified: ventrolateral edge of proximal oral surface of hectocotylized arms bordered by swollen glandular crest, inner edge of which forms a deep furrow; glandular crest extends over entire arm length; suckers decrease in size from proximal to distal end of arms; biserial proximally, tetraserial distally (marginal and medial suckers similar in size, smaller than on rest of arm); arms with deep median furrow and with transversely grooved ridges. Tentacular club expanded, broader than stalk, with **8 to 12 suckers in transverse rows**; suckers small, **very similar in size**; protective membrane borders entire club; **swimming keel equal to club length**. Anal flaps well developed. Ink sac well developed. **Epirenal bodies absent; anal pads absent**. **Colour:** Light yellowish brown with greenish tinge to dark reddish brown.

Size: Up to 85 mm mantle length, usually between 20 to 60 mm mantle length.

Geographical Distribution: Eastern Atlantic and Mediterranean Sea: Greenland Sea, off Greenland and Iceland, Norway, Faeroe Islands, North Sea, Britain to the Azores, Morocco and Senegal; Mediterranean Sea except northern Adriatic Sea and southeastern Levantine Sea (Fig. 262).

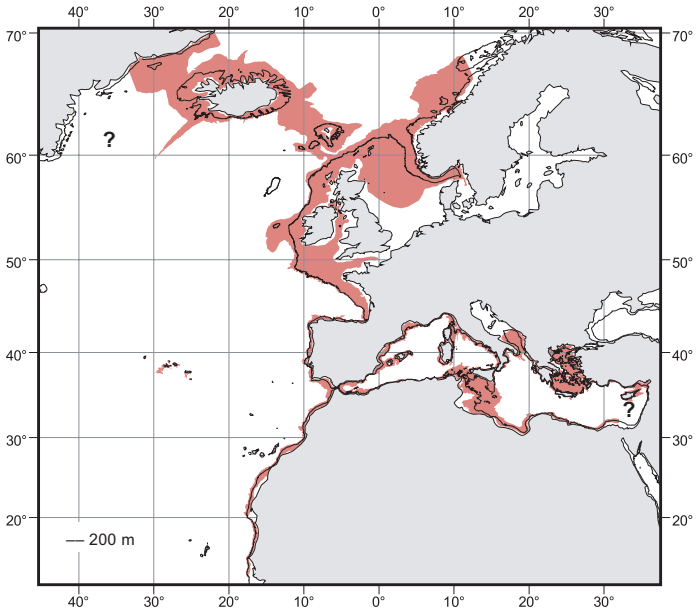


Fig. 262 ***Rossia macrosoma***
Known distribution

Habitat and Biology: Sandy and muddy substrate. Demersal, depth range 32 to 899 m; animals have been collected between the surface and 500 m at night. This species is common at depths between 200 and 400 m in the Mediterranean Sea, where it is associated with the wide transitional zone (100–600 m) representing a region of overlapping shelf and slope faunas. It usually prefers deeper waters, especially in winter, ascending to shallower waters to spawn. It is fairly frequent in catches but generally never abundant, thus information on its biology and ecology is still poor. Most of the present knowledge is based on the observations made in the western Mediterranean and studies in the laboratory. In the western Mediterranean ***Rossia macrosoma*** carries out seasonal migrations between deeper offshore waters in winter and shallower coastal zones for the rest of the year. This migration is partitioned by size such that the largest individuals arrive first in spring, followed by smaller animals in summer. Mature males, aged 7 to 8 months carry 85 to 100 spermatophores; females, 8 to 11 months, have about 120 to 150 eggs in their ovaries. The spawning season probably extends throughout the year throughout the whole Mediterranean, with peaks in spring and autumn. Mating takes place when the male grasps the female's 'neck' region and then inserts the hectocotylus into her mantle cavity. Spermatophores have been found attached to the oviducal openings in this species. ***Rossia macrosoma*** is polytelic, each individual spawning several times. Eggs, measuring 7 to 8 mm in diameter, are laid in small clusters of 30 to 40, and covered by a violet-red hard coat. They are deposited on bivalve shells e.g. of *Pinna* sp., or other solid substrates. Hatching occurs after 45 days at temperatures of about 16ºC. Females grow larger than males, and longevity is about 12 months. Smallest mature males are 30 mm mantle length; smallest females 35 mm mantle length.

Interest to Fisheries: ***Rossia macrosoma*** is a species of relatively minor commercial importance, taken as bycatch in bottom trawls, mostly between 200 and 400 m. Its commercial value varies among Mediterranean countries. The flesh is tasty but difficult to preserve. Separate statistics are not reported for this species, which, however, is rather common in fish markets and sold fresh and frozen.

Local Names: FRANCE: Sépiole; ITALY: Seppiola grossa, Babbunedda, Cape e chiuove, Capo di chiodo, Purpo seccia, Vurpascele; MOROCCO: Sepiole; SPAIN: Choco, Chopito, Globito.

Literature: Joubin (1895, 1902b), Naef (1923), Mangold-Wirtz (1963), Boletzky and Boletzky (1973), Roper *et al*. (1984), Bello (1990b), Guerra (1992), Bello (1995), Jereb and Di Stefano (1995), Okutani (1995), Sartor and Belcari (1995), Volpi *et al*. (1995), Wurtz *et al*. (1995), D'Onghia *et al*. (1996), Jereb *et al*. (1998), Belcari and Sartor (1999b), Quetglas *et al*. (2000).

Rossia pacifica pacifica Berry, 1911 **Fig. 263**

Rossia pacifica pacifica Berry, 1911a, *Proceedings of the United States National Museum*, 40(1838): 591 [type locality: Alaska].

Frequent Synonyms: None.

Misidentifications: None.

FAO Names: En – North Pacific bobtail squid; **Fr** – Sépiole du Pacifique boréal; **Sp** – Globito del Pacífico boreal.

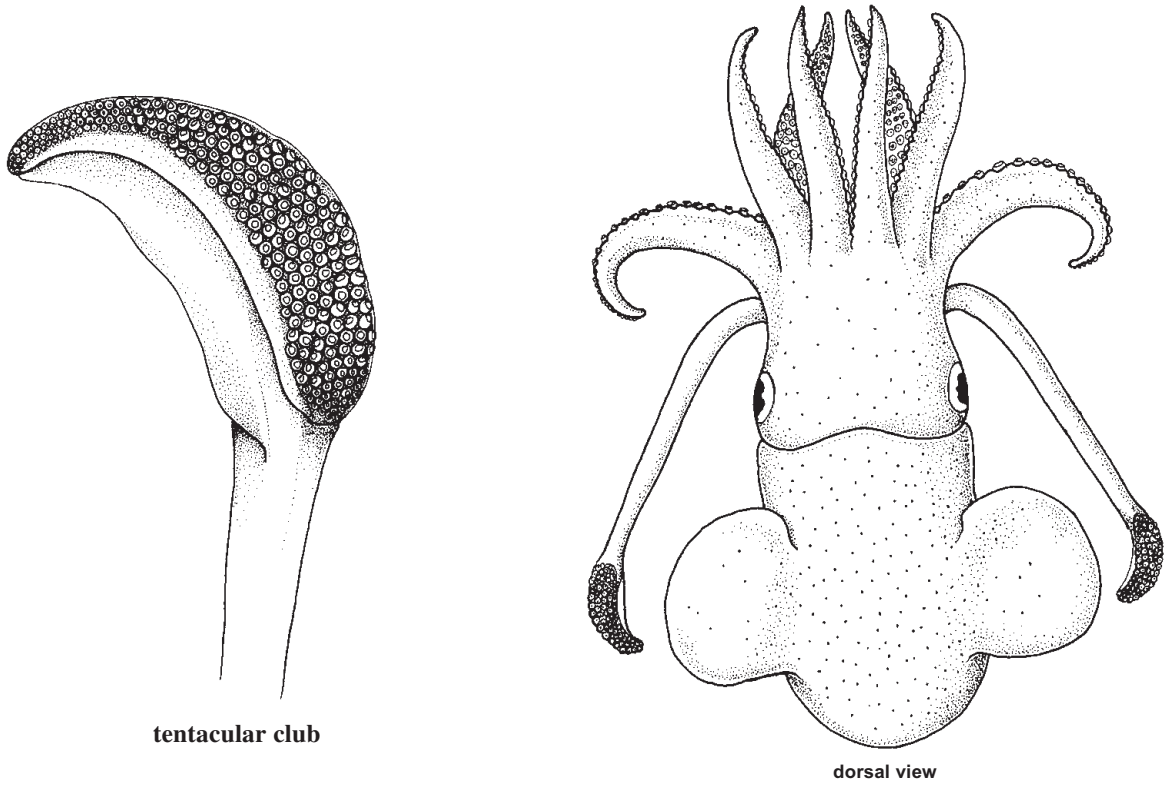


Fig. 263 ***Rossia pacifica pacifica***

Diagnostic Features: Body smooth, soft. Males mature at smaller sizes and do not grow as large as females. Mantle dome-shaped. Dorsal mantle free from head (not fused to head). **Nuchal cartilage oval, narrow**. Fins ear-shaped. Male and female arms short, stout; not united by deep webs. Non-hectocotylized arm sucker arrangement same in both sexes: suckers biserial basally, tetraserial medially and distally; male arm suckers enlarged on arms II to IV, larger than female arm suckers. Hectocotylus present; both dorsal arms modified: ventrolateral edge of proximal oral surface of hectocotylized arms bordered by swollen glandular crest, inner edge of which forms a deep furrow; **glandular crest extends over 2/3 arm length**; suckers smaller than on sessile arms (about 1/3 the size of those on lateral arms). Tentacular club expanded, broader than stalk; sucker-bearing face flattened, with **6 to 8 suckers in transverse rows proximally**, 4 rows distally; suckers differ slightly in size, dorsal suckers largest; protective membrane borders entire club. Lower beak with tooth on shoulder. Anal flaps well developed. Ink sac well developed. **Epirenal bodies and anal pads absent**. Internal gladius present, chitinous; gladius spoon-shaped, short.

Size: Males up to 45 mm mantle length; females up to 90 mm mantle length.

Geographical Distribution: Northern Pacific: Bering Sea, Sea of Okhotsk, Kamchatka, Kuril Islands, Japan to Korea, Aleutian Islands and Gulf of Alaska south to British Columbia, San Diego and California (to about 28°N off Baja California) (Fig. 264).

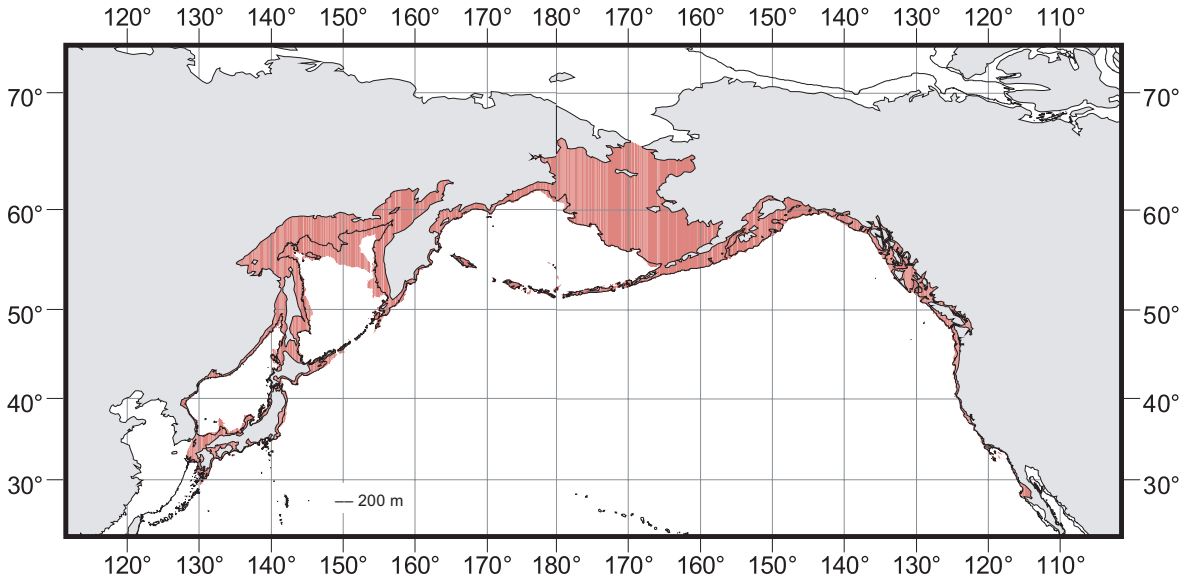


Fig. 264 ***Rossia pacifica pacifica***
Known distribution

Habitat and Biology: Neritic; depth range 30 to 310 m (possibly to 550 m) in the western Pacific; 10 m and deeper in the eastern Pacific (maximum depth undetermined). This species is night active; it remains buried in sand and mud during the day, then emerges at night to forage. Shrimps, crabs, small fishes and cephalopods comprise over 80% of the diet of this species in its natural environment. Females are polytelic: ova ripen in small clusters, each individual spawning several times, probably throughout the year. In the northeastern Pacific, eggs are attached singly, or in small groups, to seaweed and other objects on the sea floor. Egg masses are found in the Greater Puget Sound Region in calm water, with little tidal flow, attached to smooth, hard, surfaces protected from siltation by overhanging rocks. The eggs are about 1 cm in diameter and ovoid, with a flattened area of attachment; they are usually found at depths from 15 to 30 m, but are reported from 250 m depth (1.6°C) in the Bering Sea. This species has been reared successfully in captivity; egg development took nearly 5 months both in an open seawater system, with temperatures ranging between 6° and 15°C reflecting the ambient temperature, and in a temperature controlled environment at 10°C (± 1°C). The time of embryonic development, however, seems linked to the lunar cycle. Because this species is known to occur over a wide depth range and lacks a planktonic juvenile stage, hatching of eggs laid far below the photic zone would be out of synchrony with those laid at shallow depths based on light effects alone. Growth in captivity is strongly dimorphic, with females growing much faster than males after a first phase of rather slow growth common to both sexes. The lifespan from hatching to death is 18 to 19 months. Accordingly, the time taken for embryonic development was recently estimated to be about 5 months for animals of the Bering, Okhotsk (Russia) and northern seas of Russia and the Polar Basin. However, results obtained from statolith microstructure in a few specimens of ***Rossia pacifica*** from the northwest Bering Sea, would suggest a much shorter lifespan (i.e. 4–5 months).

Interest to Fisheries: ***Rossia pacifica*** often is trawled in large quantities off the Sanriku-Hokkaido coasts of Japan and other subarctic Pacific regions. It is believed to have inferior meat quality and therefore has low economic value, even though the resource is large. Separate statistics are not reported for this species.

Local Names: JAPAN: Bouzuika.

Remarks: This species seems most closely related to the Arctic ***R. moelleri*** Steenstrup, 1856, suggesting its possible origin by isolation during the Tertiary elevations of the Bering Strait. ***Rossia pacifica diegensis*** Berry, 1912 is found at greater depths than ***R. pacifica pacifica***; it is smaller and more delicate in structure, and it has relatively larger fins and arm suckers, predominantly in 2 rows. Some large ***Rossia*** eggs (14–18 mm) have been found in 1 204 to 1 222 m (4.1ºC) depth in Santa Catalina Basin. These may belong to ***R. pacifica diegensis,*** or it may be that ***R. pacifica pacifica*** produces larger eggs at lower temperature in this location. Alternatively, another ***Rossia*** taxon may exist in these waters, and ***R. pacifica pacifica*** may actually be a cold water, large-egged form, with the second taxon an unnamed smaller-egged species found in shallower water.

Literature: Sasaki (1920), Sasaki (1929), Mercer (1968), Boletzky (1970), Brocco (1971), Hochberg and Fields (1980), Roper *et al*. (1984), Okutani *et al*. (1987), Summers and Colvin (1989), Summers (1992), Anderson and Shimek (1994), Arkhipkin (1995), Okutani (1995), Mangold *et al*. (1998), Nesis (1999).

Rossia tortugaensis Voss, 1956

Fig. 265

Rossia tortugaensis Voss, 1956, *Bulletin of Marine Science of the Gulf and Caribbean*, 6(2): 103 [type locality: Caribbean Sea].

Frequent Synonyms: None.

Misidentifications: None.

FAO Names: En – Tortuga bobtail squid; **Fr** – Sépiole de la Tortue; **Sp** – Globito de Tortugas.

Diagnostic Features: Body soft, fleshy. Males mature at smaller sizes and do not grow as large as females. Dorsal mantle free from head (not fused to head). Fins ovate, short. Male and female arms long. Non-hectocotylized arm sucker arrangement same in both sexes: arm suckers biserial. Suckers elongated, barrel-shaped, without dentition. Hectocotylus present, both dorsal arms modified: **glandular crest extends over entire arm length**. Club large; sucker-bearing face flattened; tentacular club expanded, broader than stalk, with **10 suckers in transverse rows**; suckers finely toothed; swimming keel of club extends slightly proximal to carpus. Anal flaps reduced. Ink sac well developed. **Epirenal bodies and anal pads absent**.

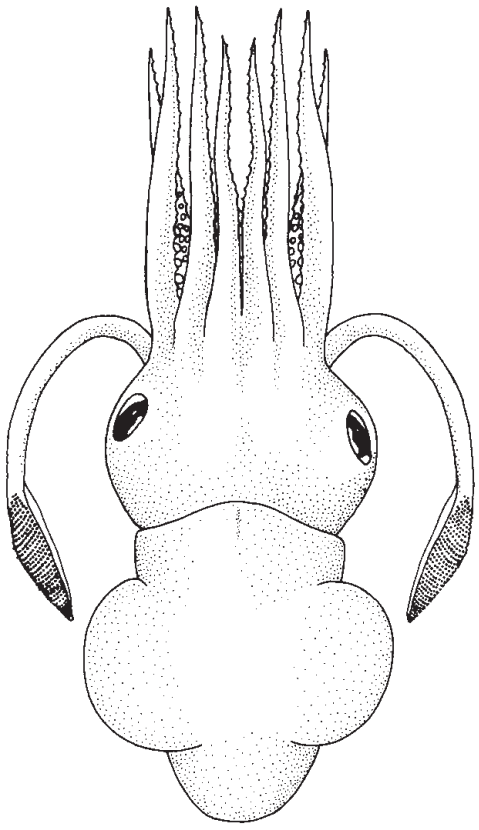
Size: Up to 50 mm mantle length.

Geographical Distribution: Tropical western Atlantic: Gulf of Mexico, Dry Tortugas, Florida and off Suriname (Fig. 266).

Habitat and Biology: Depth range 520 m (Dry Tortugas) to 760 m (Suriname). These are the only known records. This species is polytelic: ova ripen in small clusters, each individual spawning several times, probably throughout the year.

Interest to Fisheries: Undetermined.

Literature: Roper *et al*. (1984), Okutani (1995).



dorsal view

Fig. 265 ***Rossia tortugaensis***

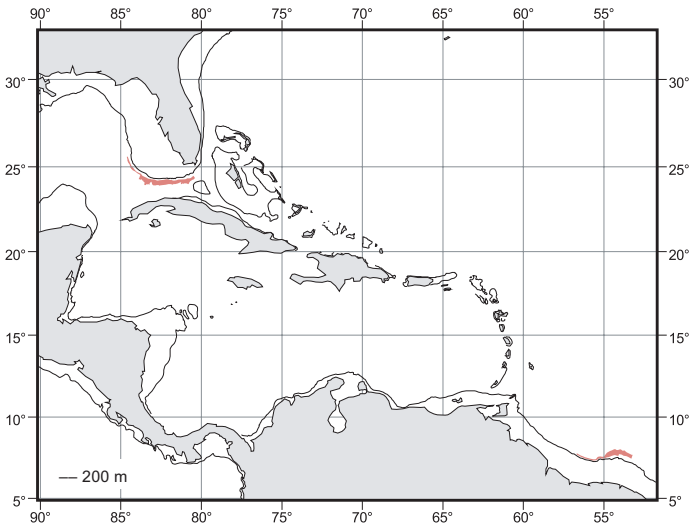


Fig. 266 ***Rossia tortugaensis***
Known distribution

Semirossia equalis (Voss, 1950)

Fig. 267

Rossia (Semirossia) equalis Voss, 1950, *Revista de la Sociedad Malacológica "Carlos de la Tarre"*, 7(2): 73 [type locality: Caribbean Sea].

Frequent Synonyms: None.

Misidentifications: None.

FAO Names: En – Greater shining bobtail squid; **Fr** – Sépiole cracheuse; **Sp** – Globito reluciente.

Diagnostic Features: Fins wide, ovate, short, do not exceed length of mantle anteriorly or posteriorly; anterior fin lobes prominent. Male and female arms long, slender. Non-hectocotylized arm sucker arrangement same in both sexes: arm suckers biserial, widely spaced; median arm suckers enlarged. Suckers globular, barrel-shaped with untoothed rings. Hectocotylus present, left dorsal arm modified: suckers normal proximally, reduced distally; broad lateral membrane present, extending from **third sucker pair for about 3/4 of arm length**; sucker arrangement from proximal to distal end of arm: **10 series of normal suckers, 4 series of reduced suckers**; oral surface of modified region swollen, fleshy, sucker pedicels form palisade effect, with transversely grooved ridges. Club moderate length, expanded, broader than stalk, with **7 or 8 suckers in transverse rows**; suckers differ in size, dorsal suckers largest, those in two dorsalmost rows larger than rest; length of swimming keel of club equal to length of carpus. Light organs present inside mantle cavity on ink sac. **Colour:** Deep purple; fins pigmented over basal half.

Size: Up to 50 mm mantle length.

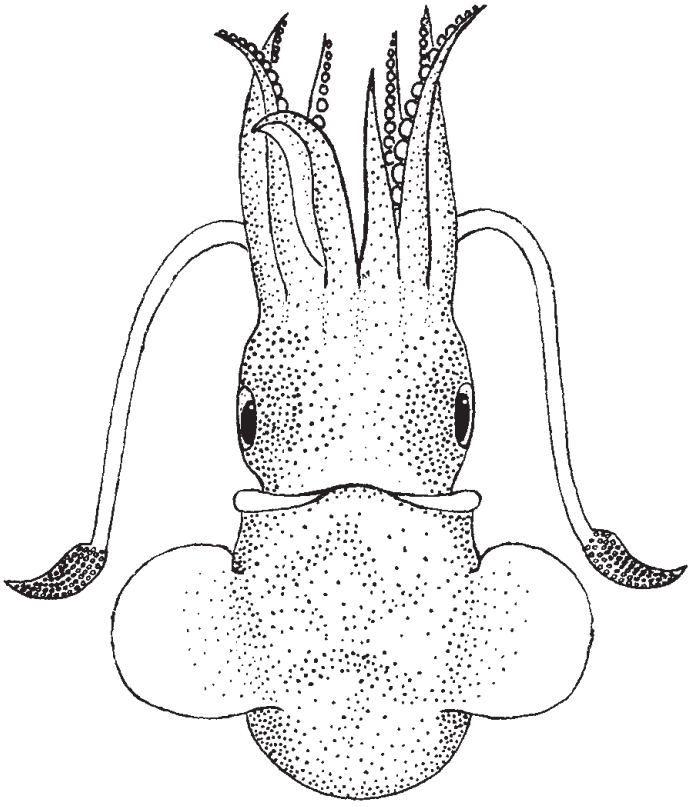
Geographical Distribution: Tropical western Atlantic: eastern Gulf of Mexico to Florida, Cuba, the Caribbean Sea and Suriname (Fig. 268).

Habitat and Biology: Muddy substrates. Benthic; depth range from 130 to 260 m, but specimens have been collected in the water column between the surface and 115 m at night.

Interest to Fisheries: No specific information available, but it is likely to be used as food locally.

Remarks: Differs from ***S. tenera*** (Verrill 1880) in its larger size, smaller arm suckers and slightly enlarged suckers on the dorsal side of the club.

Literature: Roper *et al*. (1984), Okutani (1995).



dorsal view

Fig. 267 ***Semirossia equalis***

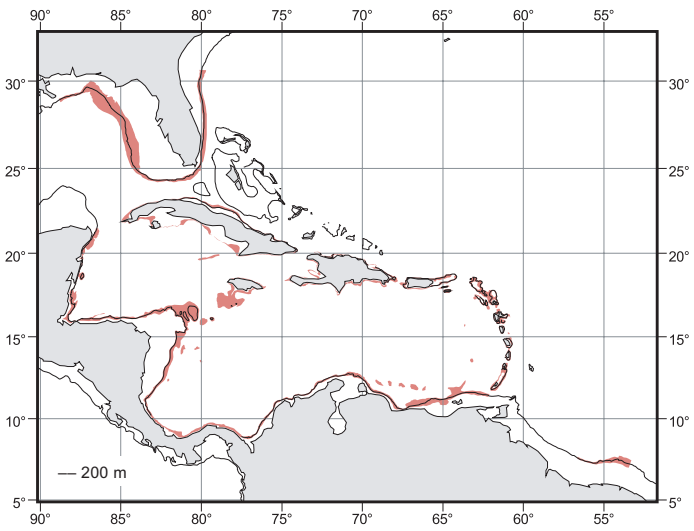


Fig. 268 ***Semirossia equalis***
Known distribution

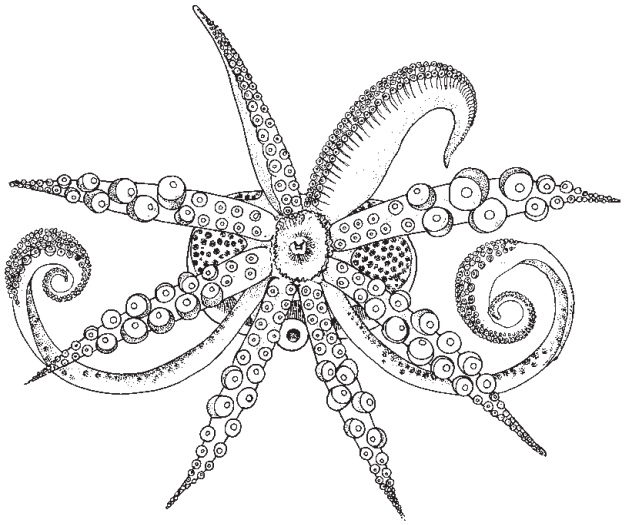
Semirossia tenera (Verrill, 1880) Fig. 269

Heteroteuthis tenera Verrill, 1880, *American Journal of Science*, (series 3) 20(41): 392 [type locality: northwestern Atlantic Ocean].

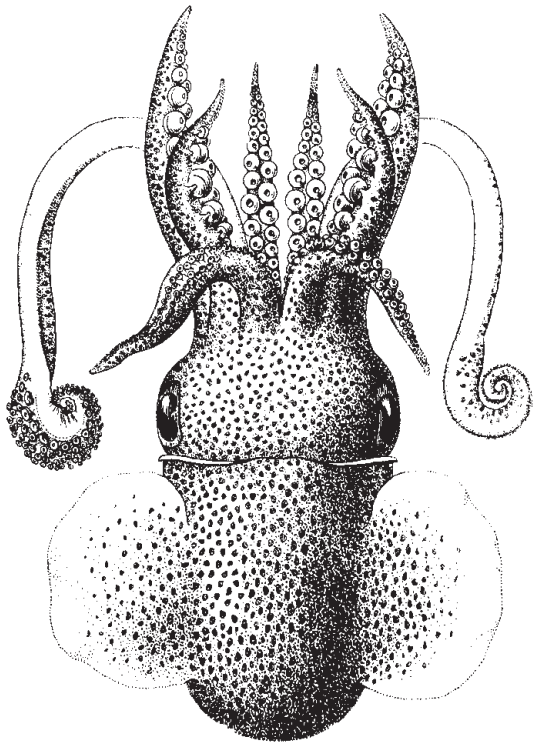
Frequent Synonyms: *Rossia tenera* (Verrill, 1880); *Heteroteuthis tenera* Verrill, 1880.

Misidentifications: None.

FAO Names: En – Lesser shining bobtail squid; **Fr** – Sépiole calamarette; **Sp** – Globito tierno.



oral view of male



dorsal view, male

Fig. 269 *Semirossia tenera*

Diagnostic Features: Small; body soft, fleshy. Mantle dome-shaped, broad. Dorsal mantle free from head (not fused to head). Fins ovate. Male and female arms moderate length. **Arms III and IV united by a web**. Arm suckers greatly enlarged in middle section of arms in males, abruptly decrease in size distally near arm tip. Hectocotylus present; left dorsal arm modified: suckers normal proximally, reduced distally; broad lateral membrane present ventrally, and extends distally for about **3/4 of arm length from third basal pair of suckers**; sucker arrangement from proximal to distal end of arm: **7 series of normal suckers, 4 series of reduced suckers**; oral surface of modified region swollen, fleshy, sucker pedicels form a pallisade effect, with transversely grooved ridges. Tentacular club moderately expanded, broader than stalk; club with **6 or 7 suckers in transverse rows**; suckers differ in size, **dorsal suckers twice as large as rest**; suckers toothed around entire margin; length of club swimming keel equal to length of carpus. Light organs present inside mantle cavity, on ink sac.

Size: Up to 50 mm mantle length.

Geographical Distribution: Western North Atlantic: widespread around the eastern coast of North America, from Nova Scotia, the northern Gulf of Maine to the Gulf of Mexico and the Caribbean Sea; possibly also present in the southwestern Atlantic, along the coasts of Suriname, French Guiana, Brazil and Uruguay (latter records questionable). (Fig. 270).

Habitat and Biology: Sandy and muddy substrates. Demersal; depth range from 85 to 135 m in New England area (USA).

Fig. 270 *Semirossia tenera*
Known distribution

Interest to Fisheries: Reported to be fished in the Gulf of San Matias and some localities on the south coast of Argentina (though species identification needs to be verified).

Local Names: ARGENTINA: Calamarcito.

Literature: Joubin (1902b), Voss (1956), Roper *et al*. (1984), Okutani (1995).

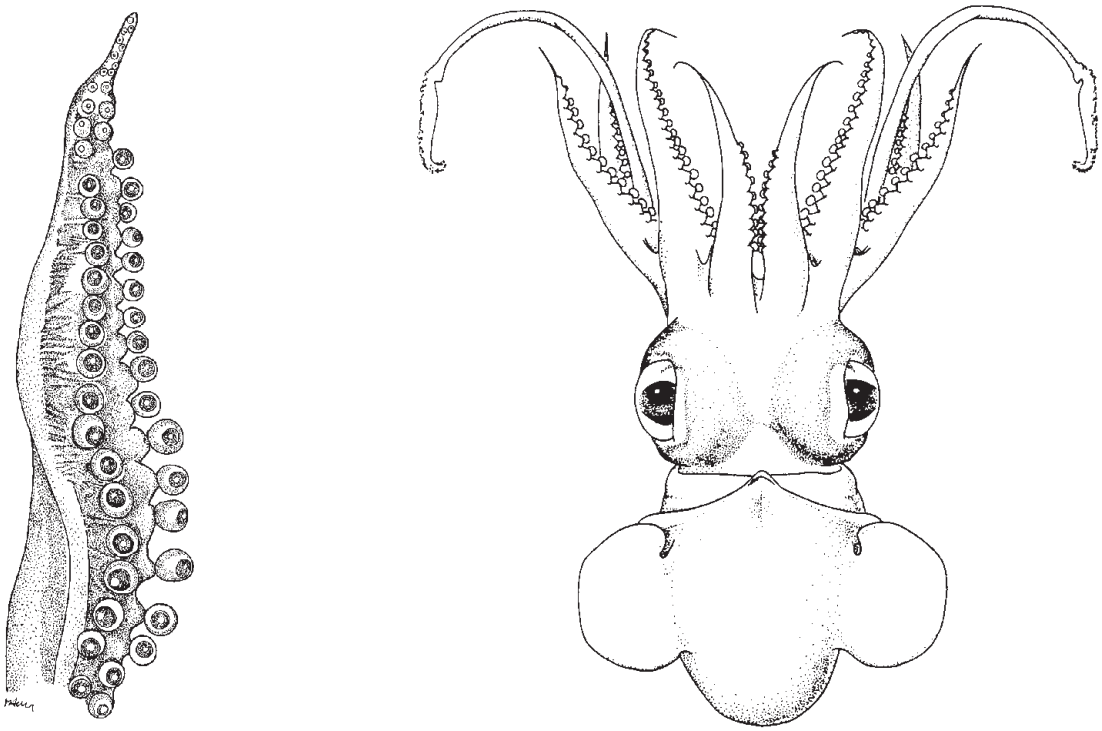
Neorossia caroli (Joubin, 1902) **Fig. 271**

Rossia caroli Joubin, 1902b, *Bulletin de la Société Zoologique de France*, 27: 138 [type locality: Eastern Atlantic: Azores Islands].

Frequent Synonyms: None.

Misidentifications: None.

FAO Names: En – Carol bobtail squid; **Fr** – Sépiole de Carol; **Sp** – Globito de Carol.



hectocotylus **dorsal view**

Fig. 271 ***Neorossia caroli***

Diagnostic Features: (Based on type and specimens from the eastern Atlantic.) Body soft, fleshy. Mantle broad, oval; dorsal anterior margin slightly convex; posterior mantle margin rounded. Dorsal mantle free from head (not fused to head). **Nuchal cartilage oval**. Fins wide, rounded, semicircular; anterior origin almost at mantle margin. Funnel organ dorsal elements inverted V-shaped with small anterior papilla, median limbs with broad, blunt lobes; ventral elements oval with acute anterior tips. Mantle-locking cartilage a simple straight ridge; funnel-locking cartilage a simple, straight depression. Head slightly broader than mantle; eyes large. Male and female arms similar in relative lengths; arm formula 3,4,2,1, or 3,2,4,1. Non-hectocotylized arm sucker arrangement same in both sexes: arm suckers biserial; **largest suckers on arms II and III larger than those on arms I and IV in both sexes**. Hectocotylus present, both dorsal arms modified: ventrolateral edge of proximal oral surface of hectocotylized arms bordered by swollen glandular crest, inner edge of which forms a deep furrow; inside crest fleshy, with transverse grooves; oral surface broad, fleshy; suckers smaller than on remaining arms; glandular **crest extends over sucker rows 3 to 18**. Club slightly recurved, sucker-bearing face convex with 8 to 11 suckers in transverse rows; all suckers of similar size; swimming keel of club extends well proximal to carpus. Anal flaps present, reduced. Ink sac greatly reduced, non functional. **Epirenal bodies present in males only**. Internal gladius present, chitinous; gladius elongate, slender, diamond-shaped anteriorly, tapers posteriorly; length approximately equal to mantle length; rachis extends posteriorly for 2/3 length of vane; **vane present only on posterior half of gladius**.

Size: Males up to 51 mm mantle length; females up to 83 mm mantle length.

Geographical Distribution: Eastern Atlantic and Mediterranean Sea: from southwestern Iceland and Ireland southward to the Gulf of Guinea and Namibian coast of southern Africa; in the Mediterranean Sea, from the northwestern Mediterranean eastward to the Ligurian Sea, northern and southern Tyrrhenian Sea, Strait of Sicily, Adriatic Sea, northern Aegean Sea, Levantine Sea and Algerian Sea. Doubtful records from the southern slope of the Great Newfoundland Bank, the slope off Nova Scotia, and the Gulf of Mexico. Southwestern Atlantic: (subspecies ***N. c. jeannae*** Nesis *et al*. (2001)) Patagonian slope north of Falkland Islands (Fig. 272).

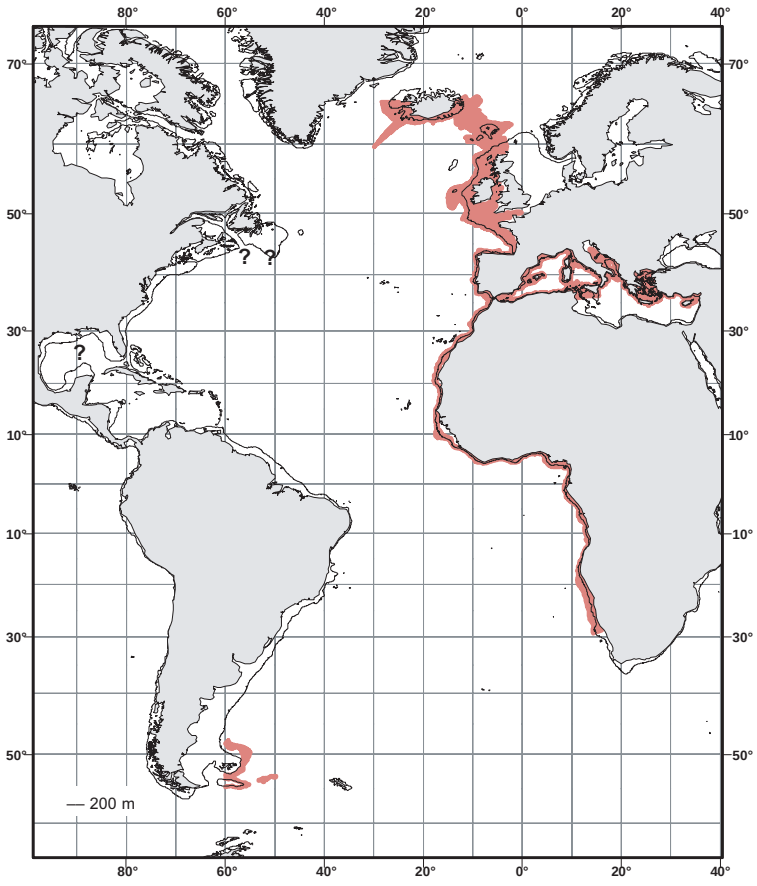


Fig. 272 ***Neorossia caroli***
Known distribution

Habitat and Biology: Depth range from 40 to 1 744 m. ***Neorossia caroli*** is the most bathyal among the species belonging to the family Sepiolidae, collected down to the greatest depths in the western Mediterranean basin (1 744 m) and in the eastern Atlantic (1 535 m). It is a demersal species living preferentially on deep muddy bottoms characterized by *Isidella elongata* populations, often overlapping with ***Rossia macrosoma*** in the upper level of its distributional range and frequently associated with ***Sepietta oweniana*** and ***Rondeletiola minor***. In the western Mediterranean, it is the most common cephalopod captured between 1 000 and 2 000 m, along with ***Bathypolypus sponsalis***. The occurrence of small individuals of both ***N. caroli*** and ***B. sponsalis*** at greater depths than larger individuals, suggests there may be an upslope ontogenetic migration. ***Neorossia caroli*** is most abundant between 400 and 600 to 700 m both in the western and eastern Mediterranean, although it is also present on the upper slope (200–400 m), and there are sporadic records of its occurrence in shallower waters (less than 100 m). ***Neorossia c. jeannae*** has been collected between 474 and 670 m. Mature individuals are found throughout the year, suggesting an extended spawning season, probably with peaks in summer and/or autumn. The smallest mature males are 35 mm, and the smallest mature females 50 mm mantle length. Lower sizes at first maturity have, however, been reported for specimens from the central Mediterranean (i.e. Strait of Sicily: 30.5 mm for males and 35 mm for females). Eggs are large (8–10 mm diameter), covered by a hard violet-coloured coating and are attached to hard substrates at various depths. The lifespan is probably between 12 and 24 months.

Interest to Fisheries: Of minor commercial importance, it is taken usually as trawl fishery bycatch. Separate statistics are not reported for this species. It is sold fresh and frozen in fish markets with ***Rossia macrosoma*** and other bobtail squids.

Local names: ITALY: Seppiola grossa di fondo.

Remarks: Differs from its congener, ***N. leptodons*** Reid, 1992, in the shape of the radula teeth. The rhachidian teeth and first lateral teeth have broad, rather than narrow, bases and the base usually is strongly indented. ***Neorossia c. jeannae*** differs from ***N. c. caroli*** only in the shape of the size of the fins and nuchal cartilage (smaller in ***N. c. jeannae***) and shape of the nuchal cartilage. Future study and comparison of specimens from the entire range of ***N. caroli*** will determine the status of the two subspecies, and (possibly) help in revaluating the genus.

Literature: Joubin (1902b), Chun (1913), Joubin (1924), Mercer (1968), Boletzky (1971), Bello (1990b), Salcedo-Vargas (1991), Guerra (1992), Reid (1992), Villanueva (1992), Bello (1995), Jereb and Di Stefano (1995), Sartor and Belcari (1995), Volpi *et al*. (1995), Wurtz *et al*. (1995), D'Onghia *et al*. (1996), Jereb *et al*. (1998), Collins *et al*. (2001), Nesis *et al.* (2001).

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