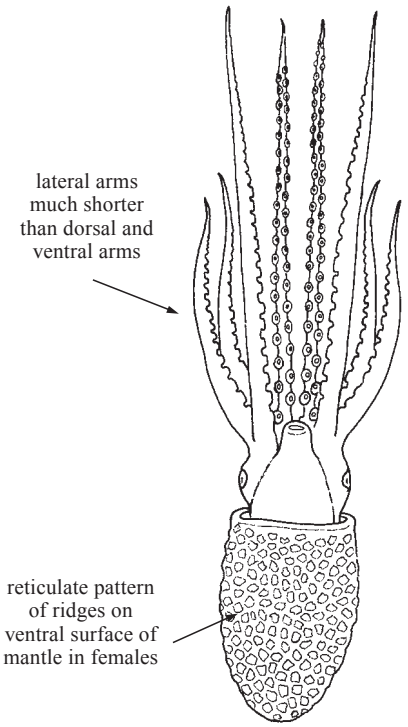
OCYTHOIDAE

Football octopods

Diagnostic characters: The females are large with mantle length up to 31 cm. Males are dwarfs with mantle length of about 3 cm. **Lateral arms much shorter than dorsal and ventral arms**. Water pores present at bases of ventral arms in both sexes. **Reticulate pattern of ridges on ventral surface of mantle in females. Funnel locking apparatus formed by permanent, turgid and strongly recurved corners of funnel**. Hectocotylus lacks papillate lateral fringes; contained in stalked sac extending from base of right ventrolateral arm. **Colour:** not distinctive.



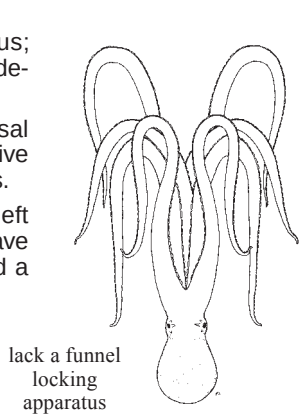
Habitat, biology, and fisheries: This family contains a single recognized species found throughout the temperate latitudes of the world's oceans. This pelagic species occupies near-surface waters at least at night. The mantle is muscular and the octopod, presumably, is an excellent swimmer. Females of *Ocythoe* are the only known cephalopods with a swimbladder (Packard and Wurtz, 1994) and the only known cephalopods that give birth to live young that hatch internally (Naef, 1923). The pair of water pores leads to extensive water-filled spaces between the eyes and arms. Males are sometimes found inhabiting the tests of salps as are young females (Naef, 1923; Okutani and Osuga, 1986). Little is known about this relationship.

Similar families occurring in the area

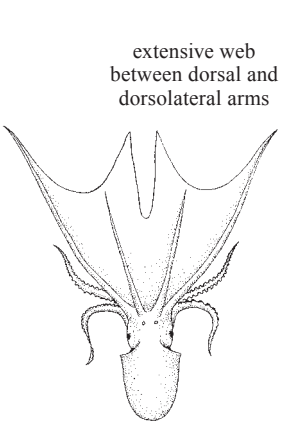
Octopodidae: lacks a funnel locking apparatus; males are not dwarves; their hectocotyli do not develop in a sac.

Tremoctopodidae: has water pores on both dorsal and ventral sides heads; females have an extensive web connecting the dorsal and dorsolateral arms.

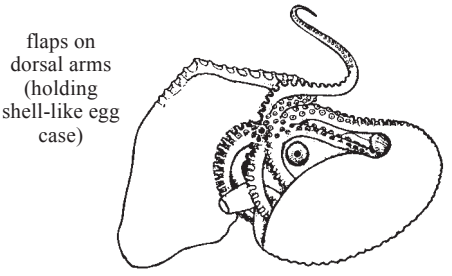
Argonautidae: males are hectocotylized on the left side; hectocotylus pouch not stalked; females have flaps on the dorsal arms which secrete and hold a shell-like egg case.



Octopodidae



Tremoctopodidae



Argonautidae

List of species occurring in the area

Ocythoe tuberculata Rafinesque, 1814.

References

Naef, A. 1923. Die Cephalopoden. *Fauna e Flora de Golfo di Napoli*. Monograph 35, 1(2):150-863.

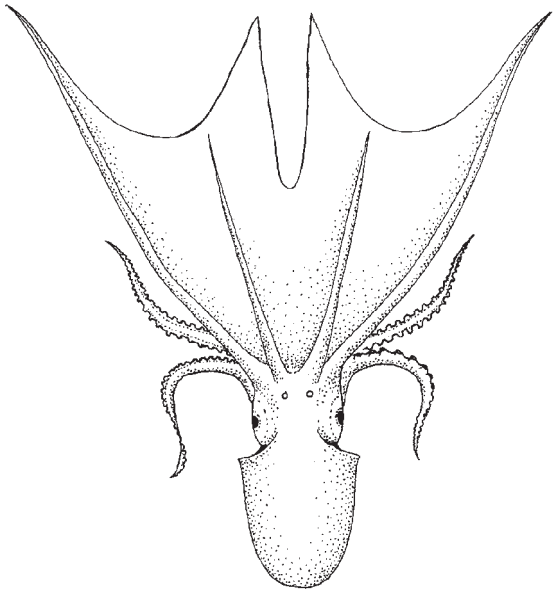
Okutani, T. and K. Osuga. 1986. A peculiar nesting behavior of *Ocythoe tuberculata* in the test of a gigantic salp, *Tethys vagina*. *Venus*, 45:67-69.

Packard, A. and M. Wurtz. 1994. An octopus, Ocythoe, with a swimbladder and triple jets. *Phil. Trans. R. Soc. Lond. B*, 344:261-275.

TREMOCTOPODIDAE

Blanket octopods

Diagnostic characters: Females are up to 1 m in total length and are muscular. **Dorsal 4 arms much longer than ventral 4 arms; deep, thin web present between dorsal four arms. Water pores present at base of dorsal and ventral arms**. Dwarf males develop hectocotylus (right ventrolateral arm) in a pocket below the eye; proximal half of hectocotylus with papillate lateral fringes. **Colour:** not distinctive.



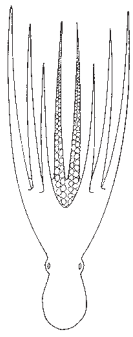
Habitat, biology, and fisheries: The more common species (*Tremoctopus violaceus*) occupies surface waters of tropical and subtropical oceans and seas. *Tremoctopus gelatus* is a deep-living, presumably mesopelagic, species that is cosmopolitan in tropical and temperate seas. In females of both species the dorsal and dorsolateral arms are distinctly longer than ventral and ventrolateral arms and are connected by an extensive web. Large ocelli can be displayed on the dorsal web. A web is lacking between the ventral four arms. This web and the slender tip of the arms can, apparently, be autotomized along transverse lines that are visible on the web. Young individuals carry broken tentacles of the Portuguese man-of-war siphonophore between the suckers of the dorsal arms (Thomas, 1977).

Similar families occurring in the area

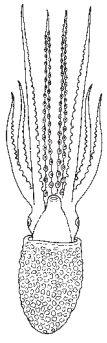
Octopodidae: lack a funnel locking apparatus and males are not dwarves, nor do their hectocotyli develop in a sac.

Ocythoidae: have water pores only on the ventral sides their heads.

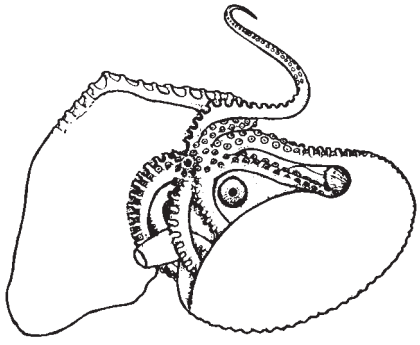
Male argonautids: are usually hectocotylized on the left side and female argonautids have flaps on the dorsal arms which secrete and hold a shell-like egg case.



Octopodidae



Ocythoidae



Argonautidae

List of species occurring in the area

Tremoctopus gelatus Thomas, 1977.
Tremoctopus violaceus Chiaie, 1830.

Reference

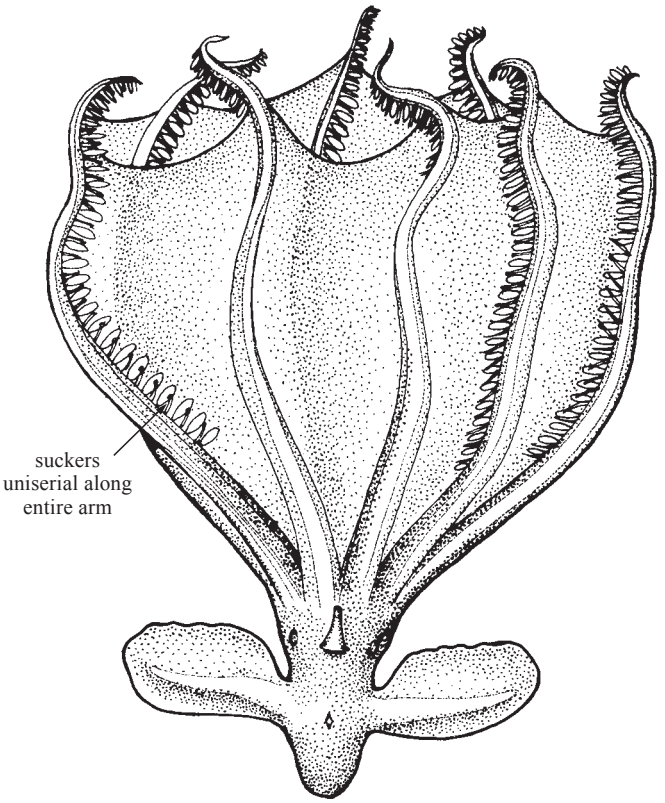
Thomas, R.F. 1977. Systematics, distribution, and biology of cephalopods of the genus *Tremoctopus* (Octopoda: Tremoctopodidae). *Bull. Mar. Sci.*, 27:353-392.

CIRROTEUTHIDAE

Cirroteuthids

Diagnostic characters: Fins present. Cirri on arms. Suckers uniserial along entire arm. No filamentous appendages in pouches between bases of dorsal and dorsolateral arms. No light organ at base of each fin. **Contractile intermediate membrane (secondary web) present between each arm and the primary web. Shell (cartilaginous fin support) complex, with expanded fin-attachment areas (saddle-shaped). Gills sepioid. Colour:** not distinctive.

Habitat, biology, and fisheries: Species in the family are entirely pelagic and have a very fragile, gelatinous structure and small to degenerate eyes. They are usually found at great depths (greater than 1 000 m). No interest to fisheries.

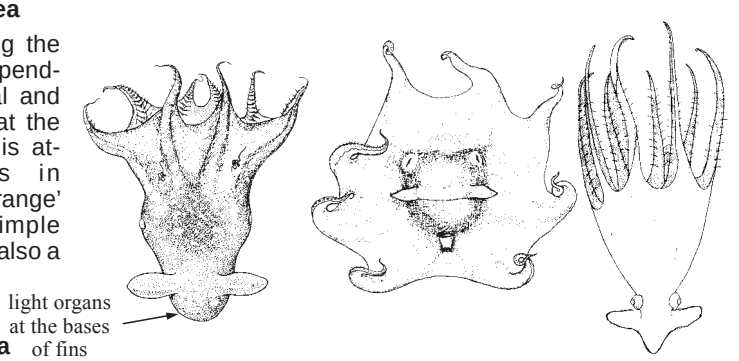


Similar families occurring in the area

Vampyroteuthidae: lack suckers along the proximal arms, have filamentous appendages in pouches between the dorsal and dorsolateral arms, and light organs at the bases of the fins; the primary web is attached directly to the arms in opisthoteuthids, the gills have a 'half-orange' appearance, and the shell is a simple U-shape; in stauroteuthids the shell is also a simple U-shape.

List of species occurring in the area

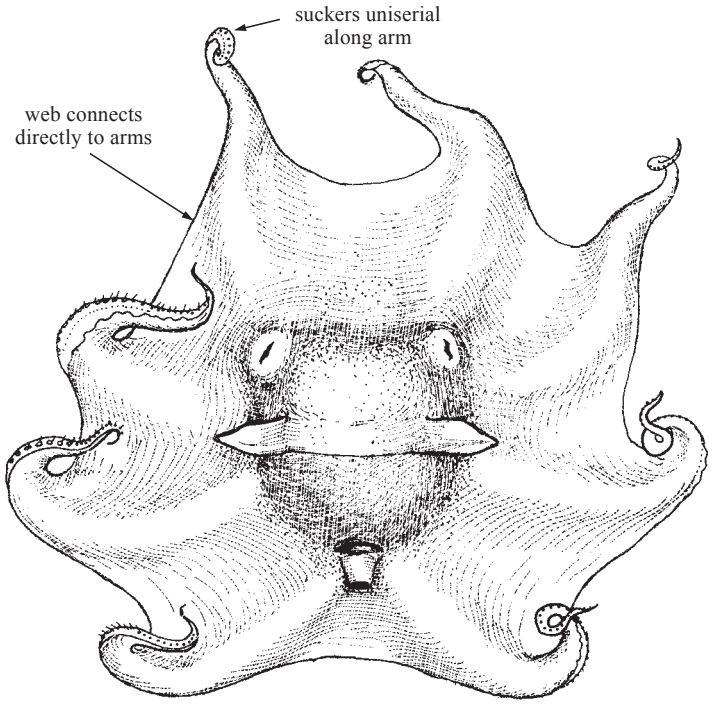
Cirroteuthis sp.



Vampyroteuthidae **Opisthoteuthidae** **Stauroteuthidae**

OPISTHOTEUTHIDAE

Opisthoteuthids



Diagnostic characters: Body of these octopods is foreshortened along the anterior / posterior axis. The foreshortening is extreme in *Opisthoteuthis* which is known as the 'flapjack devilfish'. **Fins present. Cirri on arms. Suckers uniserial along entire arm**. No filamentous appendages in pouches between bases of dorsal and dorsolateral arms. No light organ at base of each fin. **Web connects directly to arms**; no contractile intermediate membrane ("secondary web") between each arm and the primary web. **Shell (cartilaginous fin support) simple U-shape. Gills very foreshortened, appearing like a 'half-orange'. Colour:** not distinctive.

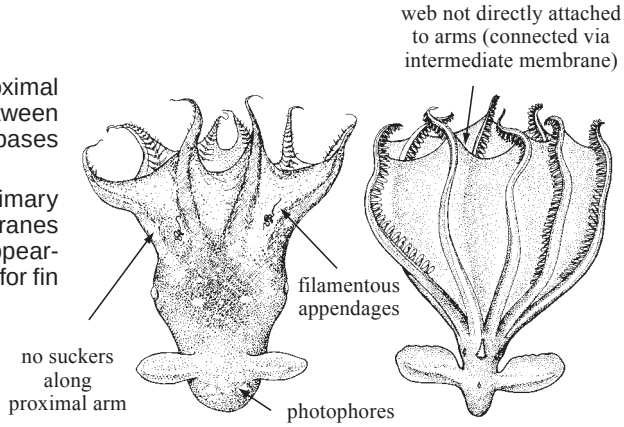
Habitat, biology, and fisheries: Sit on the ocean floor and swim just above it. *Opisthoteuthis* swims mainly by contraction of the arm-web complex (Vecchione and Roper, 1991) while *Grimpoteuthis* primarily uses powerful fin strokes to swim (Vecchione and Young, 1997).

Remarks: The generic composition of the family is not stable at present and the genera are not adequately defined.

Similar families occurring in the area

Vampyroteuthidae: lacks suckers along the proximal arms, has filamentous appendages in pouches between dorsal and dorsolateral arms; and light organs at bases of the fins.

Cirroteuthidae and Stauroteuthidae: cirri long; primary web is attached to the arms via contractile membranes termed secondary webs and gills have a sepioid appearance; shell a complex shape with expanded areas for fin attachment in cirroteuthids.



Vampyroteuthidae **Cirroteuthidae**

List of species occurring in the area

Grimpoteuthis megaptera (Verrill, 1885).

Opisthoteuthis agassizi Verrill, 1883.
Opisthoteuthis grimaldii (Joubin, 1903).

References

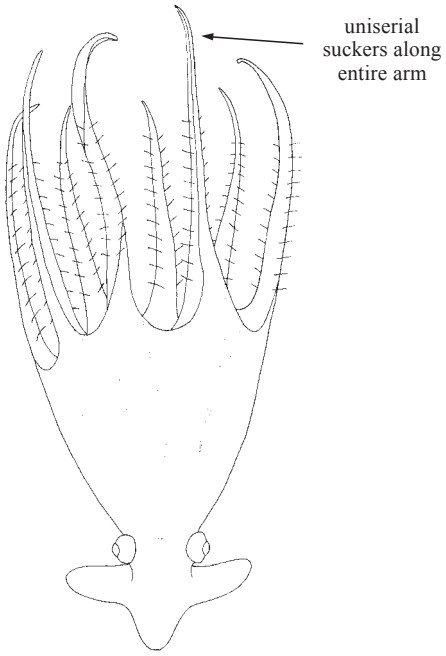
Vecchione, M. and C.F.E. Roper. 1991. Cephalopods observed from submersibles in the western North Atlantic. *Bull Mar. Sci.*, 49:433-445.

Vecchione, M. and R.E. Young. 1997. Aspects of the functional morphology of cirrate octopods: locomotion and feeding. *Vie et Milieu*, 47:101-110.

STAUROTEUTHIDAE

Stauroteuthids

Diagnostic characters: Fins present. Cirri on arms. Suckers uniserial along entire arm. No filamentous appendages in pouches between bases of dorsal and dorsolateral arms. No light organ at base of each fin. **Contractile intermediate membrane ('secondary web') present between each arm and the primary web. Shell (cartilaginous fin support) simple U-shape. Gills 'sepioid'. Colour:** not distinctive.



Habitat, biology, and fisheries: A pelagic, continental slope species. *Stauroteuthis syrtensis* has recently been shown to have luminescent organs associated with its suckers (Johnsen et al., 1999), a very unusual characteristic.

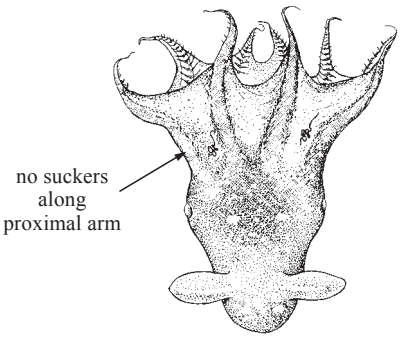
Remarks: Only a single species is currently recognized in the family but comparisons between widely distributed specimens have not been made.

Similar families occurring in the area

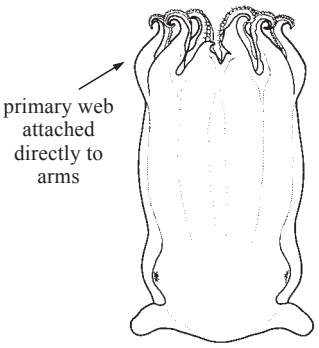
Vampyroteuthidae: lack suckers along the proximal arms, have filamentous appendages in pouches between the dorsal and dorsolateral arms, and light organs at the bases of the fins.

Opisthoteuthidae: primary web is attached directly to the arms; gills have a half-orange appearance.

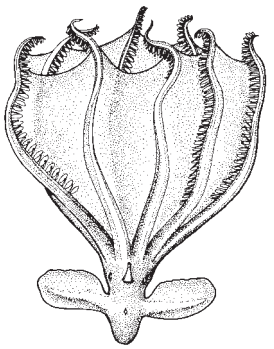
Cirroteuthidae: shell is a complex saddle-shape with broad fin attachment areas.



Vampyroteuthidae



Opisthoteuthidae



Cirroteuthidae

List of species occurring in the area

Staurotheuthis syrtensis Verrill, 1879.

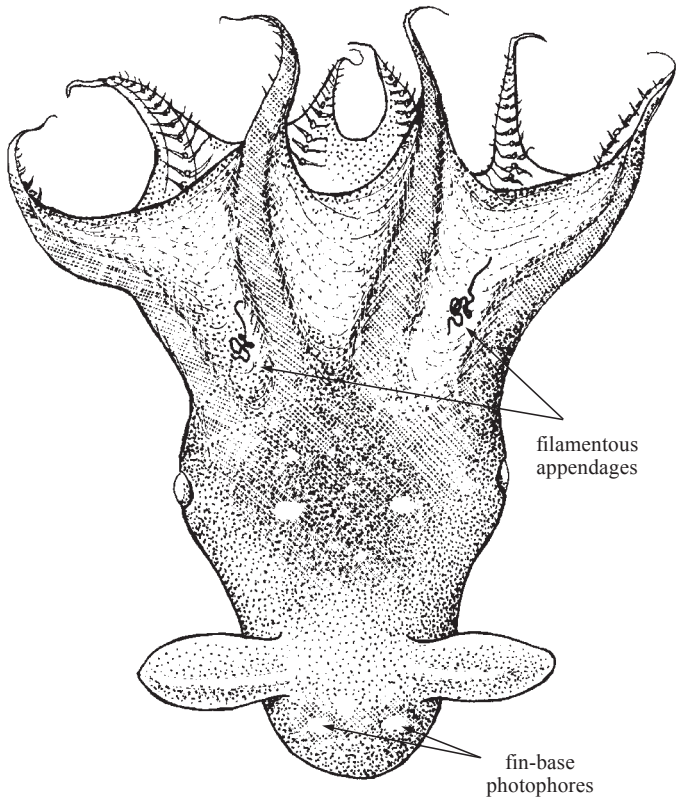
Reference

Johnsen, S., E.J. Baker, E.C. Fisher, and E.A. Widder. 1999. Bioluminescence in the deep-sea cirrate octopod *Staurotheuthids syrtensis* Verrill (Mollusca: Cephalopoda). *Biol. Bull.*, 197:26-39.

VAMPYROTEUTHIDAE

Vampire squids

Diagnostic characters: Moderately small, reaching a maximum of 13 cm mantle length; very gelatinous. **Retractile filaments extend from pockets between dorsal and dorsolateral arms. Fins present. Large circular, lidded photophores present posterior to each adult fin (fin-base organs)**; numerous small photophores distributed over ventral surfaces of mantle, funnel, head and aboral surface of arms and web (skin-nodule organs). **Gladius present with broad median field and broad conus. Cirri present over entire arm length**; suckers, without cuticular lining, present only on distal half of arms. **Colour:** black chromatophores with reddish brown ones interspersed; these chromatophores, however, have lost the muscles that enable rapid colour change in other coleoids and are probably incapable of changing shape. A few normal chromatophores associated with photophores are still present.

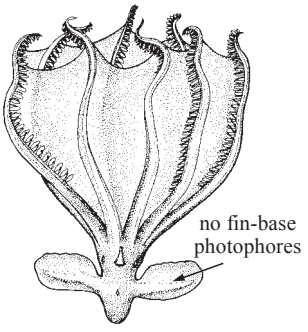


Habitat, biology, and fisheries: Occupies meso- to bathypelagic depths throughout the tropical and temperate regions of the world's oceans. The filaments are actually the second pair of arms; these are modified to extend well in excess of the total length of the animal and are retractile into pockets within the web.

Remarks: This species possesses features of both octopods and decapods. In addition, it has many features that are probably adaptations to the deep-sea environment. Among these are the loss of the ink sac and most active chromatophores, development of photophores and the gelatinous consistency of the tissues. Development of the fins in the vampire is unique among cephalopods. One pair is present at hatching and is eventually resorbed and replaced by a more anterior pair as development proceeds. At one stage in development, therefore, the vampire has 2 pairs of fins.

Similar families occurring in the area

Cirrate octopods (Cirroteuthidae, Stauroteuthidae, and Opisthoteuthidae): superficially resemble vampire squids but differ in several important characters, including (1) lack of retractile filaments in pockets between dorsal and dorsolateral arms, (2) lack of fin-base photophores, (3) cartilaginous fin supports instead of a gladius, and (4) suckers along entire length of arms.



Cirroteuthidae