FAO SPECIES IDENTIFICATION SHEETS FOR FISHERY PURPOSES

WESTERN CENTRAL ATLANTIC
(Fishing Area 31)

edited by

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CONTENTS:

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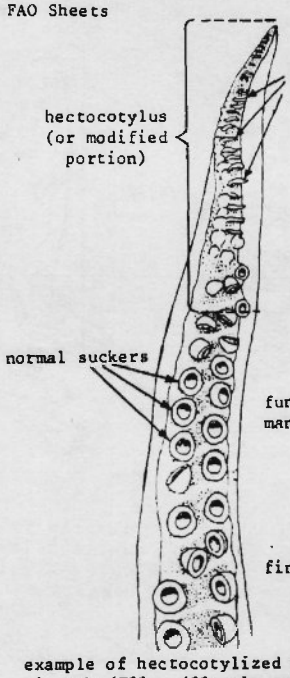
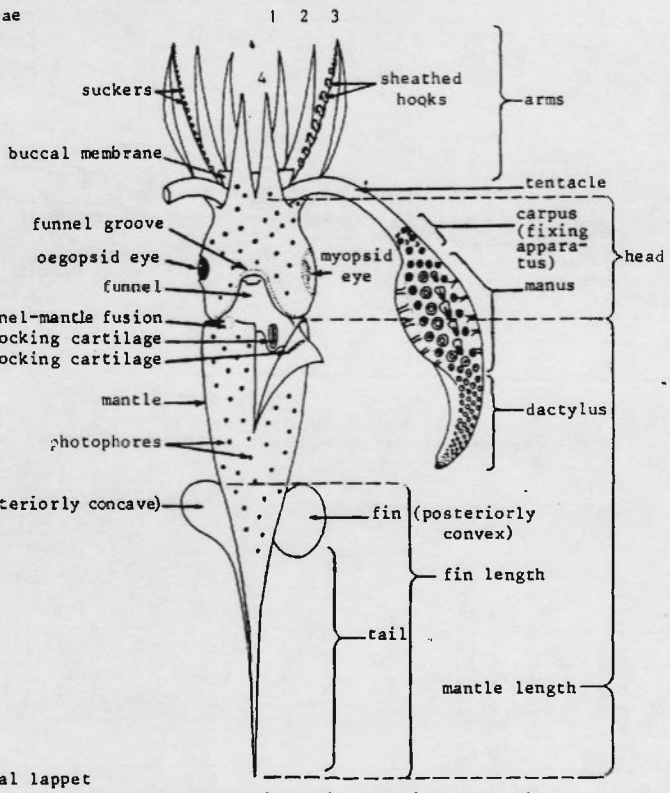
Identification sheets. Taxonomy. Geographic distribution. Fisheries. Vernacular names. Bony fishes. Sharks. Batoid fishes. Lobsters. Shrimps. True crabs. Stomatopods. Molluscs. Sea turtles. ASW.

TECHNICAL TERMS



example of hectocotylized arm in male *(Illex illecebrosus)*



a composite diagram illustrating basic squid (teuthoid) features ventral view

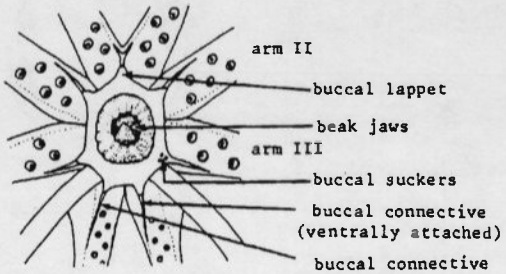
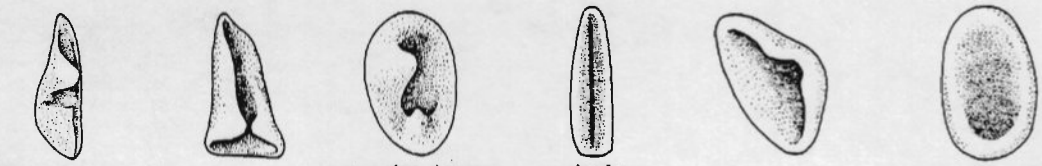
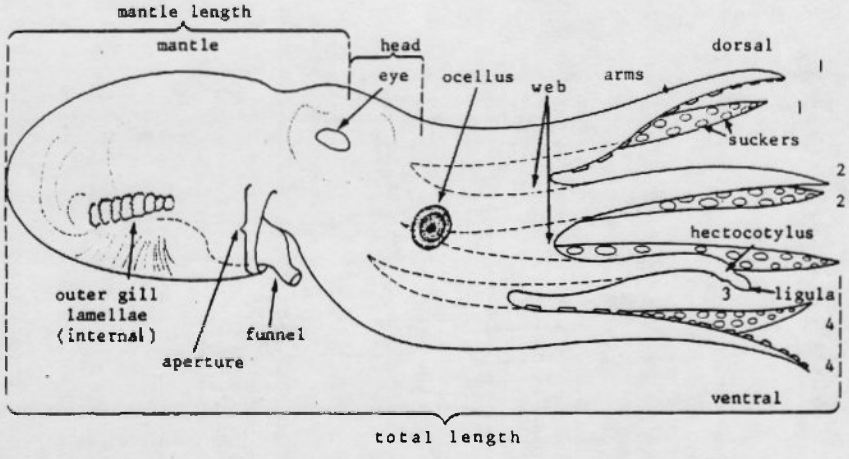


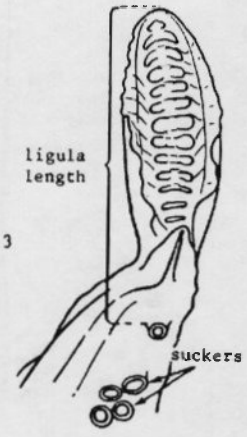
diagram of oral surface of brachial crown and buccal membrane



basic types of funnel locking cartilage
(cartilaginous grooves that lock with corresponding ridges on inner mantle wall to keep base of funnel in position during water expulsion)



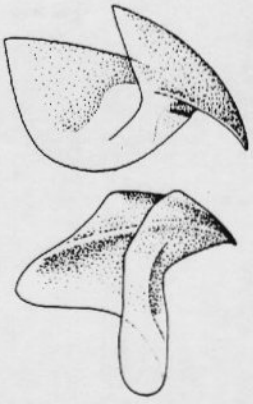
A. diagram of basic octopus features (lateral view)



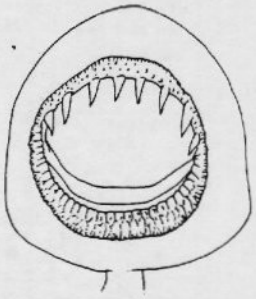
B. diagram of hectocotylus showing ligula measurement

radula

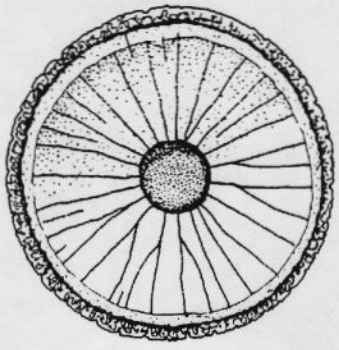
gladius of squid



upper and lower jaws (beak



sucker of squid



sucker of octopus

GENERAL REMARKS

The group known as cephalopods consists of bilaterally symmetrical molluscs with a well developed head that contains a circumoral (surrounding the mouth) crown of mobile arms that bear suckers and/or hooks. The mouth has chitinous beak-like jaws and a chitinous tongue-like radula (band of teeth). The shell is reduced, modified, or absent and is enclosed by the mantle; an external shell occurs only in the primitive form *Nautilus* (restricted to Indo-Pacific). Cephalopods are soft-bodied animals with their primary skeletal features a cranium and, in most forms, a mantle support (cuttlebone or gladius). One pair of ctenidia (gills) is present (two pairs in *Nautilus* only). The central nervous system is highly developed, especially the well-organized eyes. A funnel or siphon (tube) expells water from the mantle(body)cavity providing propulsion and expelling waste products. Coloration is varialbe depending on group and habitat; most forms are provided with numerous chromatophores (pigment sacs) and iridocytes (shiny, reflective platelets) in the skin, so rapid changes in colour and colour patterns are an integral part of their behaviour.

The size of adults ranges from about 2 cm to over 20 m in total length; largest specimens may weigh over 1 ton. Locomotion is achieved by drawing water into the mantle cavity followed by its jet-like expulsion through the funnel, and also by crawling along the bottom on the arms (mostly sepioids and octopods). Fins on the mantle provide balance, steering, and minor locomotion. The sexes are separate, eggs are heavily yolked, and development is direct, without metamorphic stages.

The total number of living species of cephalopods is fewer than 1 000; about 110 species in 31 families occur in the Western Central Atlantic. Cephalopods occur in all marine habitats of the world: benthic on coral reefs, grass flats, sand, mud and rocks; pelagic and epipelagic in bays,seas, and the open ocean. The range of depths extends from 0 to over 5 000 m. Abundance of cephalopods varies (depending on group, habitat, and season) from isolated territorial individuals (primarily benthic octopods) through small schools with a few dozen individuals to huge schools of oceanic species with millions of specimens.

Two groups of cephalopods, squids and octopuses, occur in the Western Central Atlantic waters and they are easily distinguished by external characteristics. The squids have an elongate, torpedo-like body with lateral fins, and 8 circumoral arms, not connected at bases with a web, with 2 rows of stalked suckers bearing chitinous rings (or hooks) running the entire length, plus 2 longer tentacles with an organized cluster (tentacular club) of 2 or more rows of suckers (or hooks) at the distal end. The octopuses have a short, sac-like body with no lateral fins (some deep-sea forms excepted), and 8 circumoral arms only (no tentacles) with bases connected by a membraneous web and unstalked suckers, without chitinous rings, along the length of the arms.

All cephalopods are dioecious (separate sexes) and many, though not all, exhibit external sexual dimorphism, either in structural or size differences. Females generally are larger than males. Males of many forms possess 1 or 2 modified arms (hectocotylus) for mating. The hectocotylus may consist of modified suckers, papillae, membranes, ridges and grooves, flaps, etc., but in any case it functions to transfer the sperm packets or spermatophores from the male's mantle cavity to a locus of implantation on the female, which may occur inside the mantle cavity, around the mantle opening on the neck, in a pocket under the eye, around the mouth, etc. Fertilization takes place in the female as the eggs are laid. Eggs of squids generally are encased in a gelatinous matrix secreted by the nidamental glands and are laid as multi-finger-like masses (sometimes called "sea mops") attached to rocks, shells or other hard substrate on the bottom in shallow waters (inshore squids), or they are extruted as large, singular, sausage-shaped masses that drift in the open sea (oceanic squids). The fingers each may contain from a few to several hundred eggs, while the sausages contain tens or even hundreds of thousands of eggs. The mode of reproduction and egg-laying is unknown for many forms, especially oceanic and deep sea species. Benthic octopuses lay their eggs in great, grape-like clusters and strands in lairs, under rocks and in abandoned mollusc shells, where they brood them until they hatch. The eggs are attached to each other, but they are not encased in a gelatinous matrix. The female of the pelagic octopus *Argonauta* constructs a thin, shell-like egg case in which she resides and lays festoons of eggs, fertilization having taken place from sperm contained in the highly modified hectocotylus that was autotomized (detached) from the male and deposited in the egg case. The life expectancy is about one to two years in most forms, but larger species of squids and octopus, for example, the giant squid (*Architeuthis* spp.) and the giant octopus *(O. dofleini)*, must live for several years. Many species die after spawning, but this phenomenon apparently is not universal.

Cephalopods are active predators that prey upon shrimps, crabs, fishes, other cephalopods, and, in the case of octopuses, on bivalved molluscs. In turn, cephalopods are major food items in the diets of toothed whales, seals, pelagic birds (penguins, petrels, albatrosses, etc.), and both benthic and pelagic fishes (e.g., sea basses, lancetfishes, tunas, billfishes).

Many species of oceanic cephalopods undergo diel vertical migrations, wherein they occur at depths of about 400 to 800 m during the day, then ascend into the uppermost 200 m or so during the night. While shallow-living cephalopods are able to conceal themselves by chromatophore-produced colour patterns and chameleon-like colour changes, many deep-sea forms camouflage themselves by producing bioluminescent light from photophores (light-producing organs) which eliminates their silhouettes against the downwelling light in the dimly-lit mid-depths.

Cephalopod eggs are very yolky and cleavage is thus incomplete, so that typical molluscan spiral cleavage is absent. Development is direct and young hatch as miniatures of the adult (to a greater or lesser extent depending on the species). Thus, no discrete larval stages or metamorphoses occur. Cephalopod eggs may vary in size from about 1.7 cm long in some *Octopus* species to 0.8 mm long in *Argonauta*, both octopods. Time of embryonic development also varies widely, from a few weeks to several months, depending on the species and temperature conditions. Hatching may occur rapidly from a single clutch or be extended over a period of 2 to 3 weeks. At hatching, young animals often inhabit different habitats than the adults. For example, the young of some species of benthic octopuses spend periods of time as planktonic organisms before settling to their bottom habitat, and the "larvae" of many deep-sea forms occur in the upper 100 m of the open ocean, then exhibit an ontogenetic descent, gradually occurring at deeper depths with increasing size.

Cephalopods are extremely important as food for human consumption, and well over 1 million metric tons are caught each year. The fisheries are especially intense in Japan, the Orient and in the Mediterranean/Eastern Atlantic waters. Cephalopods are also important experimental animals in biomedical research with direct application to man. Because of the highly developed brain and sensory organs, cephalopods have a great capacity to learn and remember, rendering them valuable in behavioural and comparative neuroanatomical studies. In addition, cephalopods possess the largest single nerve axons in the animal kingdom, located in the mantle, and these are used extensively in all aspects of neurophysiological research.

Fishing techniques include small traps (octopods), wiers, lures and jigs (some cuttlefishes and squids), lampara nets (nearshore squids), and midwater and otter trawls (squids and octopods). Certain species of squids are attracted to light, then jigged or seined. Occasionally cuttlefishes and octopods are caught in hand-nets or are speared, but it is nearly impossible to capture free-swimming squid in this manner. Caution: the bites of cephalopods, especially octopuses, can be painful at the least, poisonous or secondarily infected, or, rarely, lethal (several human deaths have been recorded in Australia due to blue-ringed octopus, *Hapalochlaena*). So cephalopods must be handled carefully.

The total commercial catch of cephalopods in the Western Central Atlantic is estimated at around 3 000 tons, but the potential for major fisheries for several species is high. The future should bring the development of greater fishery efforts in this area.

The status of the systematics of cephalopods is rapidly changing, as research has increased significantly in the past 25 years. A number of monographic studies on several large, important families currently are being conducted, so greater stability should be achieved soon.

KEY WITH PICTURE GUIDE TO FAMILIES OCCURRING IN THE AREA*

1 a. Animal with 10 circumoral appendages (arms and tentacles); stalked suckers with chitinous, usually toothed, rings

2 a. Internal shell coiled and chambered or rudimentary and straight (Sepioidea)

3 a. Shell calcified, coiled ..... Spirulidae (Fig. 1)

3 b. Shell chitinous or rudimentary ..... Sepiolidae (Fig. 2)

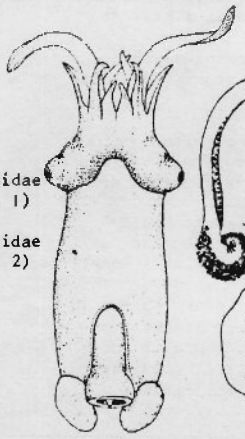
2 b. Internal shell pen-shaped or feather-shaped (Teuthoidea)

4 a. Eye covered by a transparent membrane (cornea) (Fig. 3a) (Myopsida)

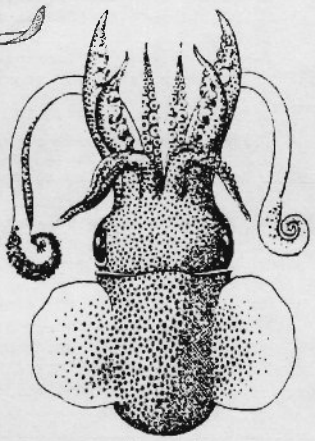
5 a. Four rows of suckers on manus of tentacular club (Fig. 4b); medial posterior border of fins concave (i.e., curves posteriorly toward midline) (Fig. 4a) ..... Loliginidae

5 b. Two rows of suckers on manus of tentacular club (Fig. 5b); medial posterior border of fins convex (i.e., curves anteriorly toward midline) (Fig. 5a) ..... Pickfordiateuthidae

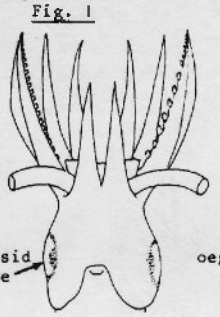
4 b. Eye without cornea and in open contact with seawater (Fig. 3b) (Oegopsida)

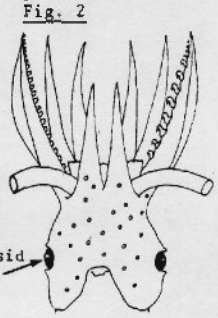


(Spirula) Spirulidae Fig. 1

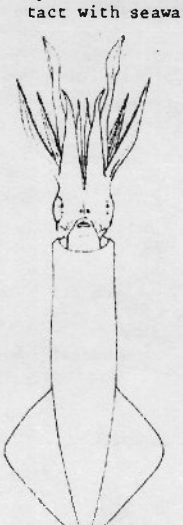


(Rossia) Sepiolidae Fig. 2





a b Fig. 3



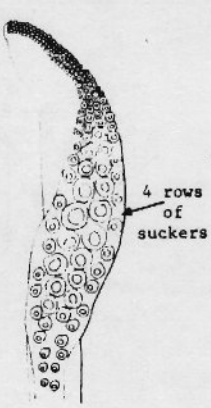
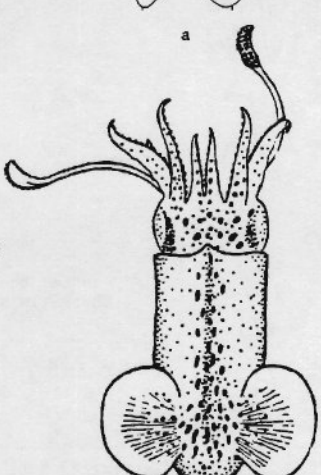
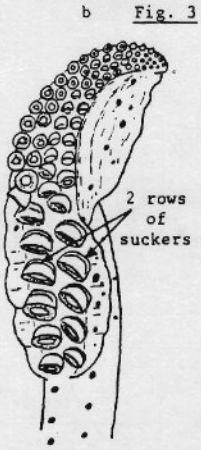


Fig. 4

a. ventral view b. tentacular club
Loliginidae *(Loligo)*





a. dorsal view b. tentacular club
Pickfordiateuthidae *(Pickfordiateuthis)*

Fig. 5

* Illustrations show typical genera of families

6 a. Funnel free from mantle; a funnel-mantle locking apparatus present

7 a. Funnel-mantle locking apparatus a simple, straight groove and ridge* (Fig. 6)

8 a. Arms with hooks or with suckers in 4 rows on the proximal (nearest head) half of the ventral arms

9 a. Tentacles present; fully developed clubs present (Fig. 7) ..... Enoploteuthidae

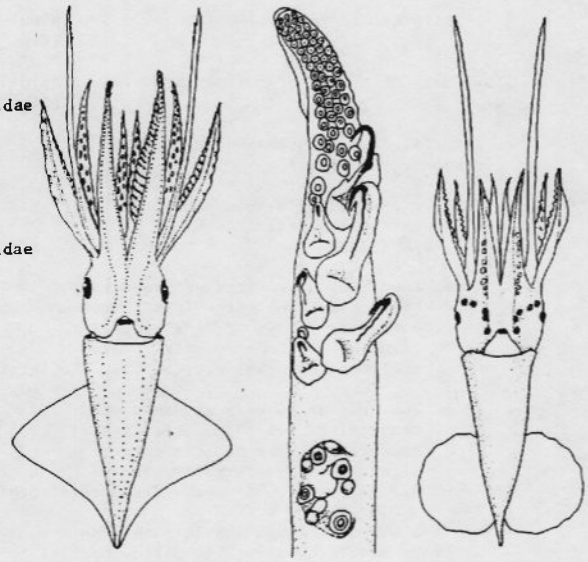
9 b. Tentacles and clubs absent in adults although present in larvae or occasionally juveniles *(Taningia)* but always with rudimentary clubs (Fig. 8) ..... Octopoteuthidae

8 b. Arms without hooks and with suckers in two rows on the proximal half of the ventral arms

10 a. Buccal membrane connectives attach to the ventral sides of arms IV (Fig. 9)

funnel-mantle locking apparatus

Fig. 6



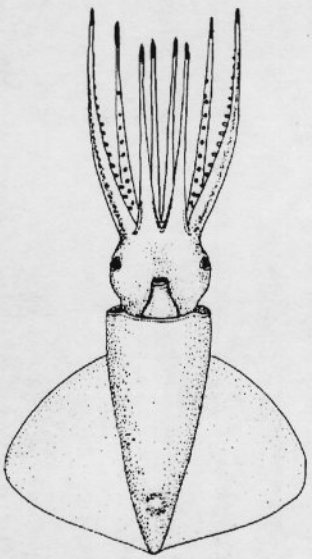
a *Abraliopsis* ventral view

b *Abraliopsis* tentacular club

c *Pyroteuthis* ventral view

Enoploteuthidae

Fig. 7



ventral view

Octopoteuthidae *(Octopoteuthis)*

Fig. 8

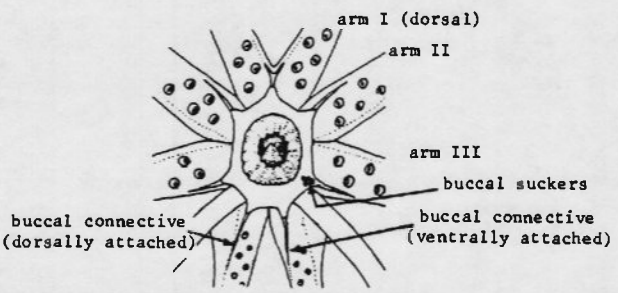


Fig. 9

* The classification "simple and straight" includes some locking apparatuses that show considerable variation. For example, in the Octopoteuthidae and the Histioteuthidae the central groove is fairly broad and may curve slightly. The homogeneity of this classification becomes apparent when this type of locking-cartilage is contrasted with the highly specialized types illustrated on pages 1 and 2

11 a. Hooks present on tentacular clubs (Fig. 10b) (tentacles and clubs unknown in *Chaunoteuthis*) ..... Onychoteuthidae

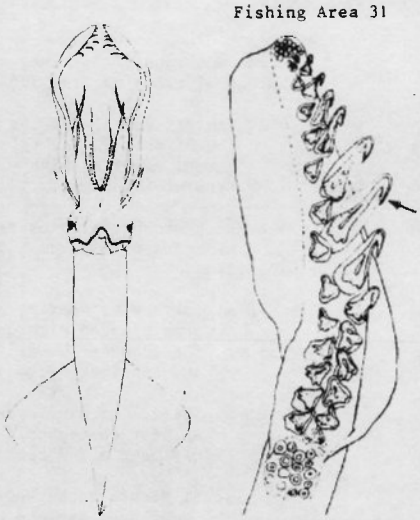
11 b. Hooks lacking on tentacular clubs

12 a. Cartilaginous scales present on mantle (may be minute) (Fig. 11); tentacular clubs with four longitudinal rows of suckers ..... Lepidoteuthidae (Fig. 12)

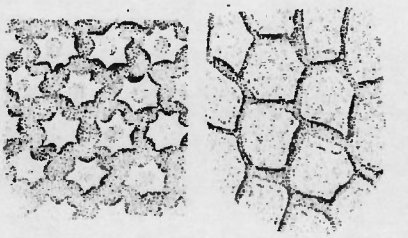
12 b. Cartilaginous scales lacking; tentacular clubs with more than four longitudinal rows of suckers on some areas

13 a. Fins nearly as long as the mantle, supported by strong, transverse, muscular ribs (Fig. 13); minute suckers present on oral surface of buccal lappets (Fig. 9) ..... Ctenopterygidae

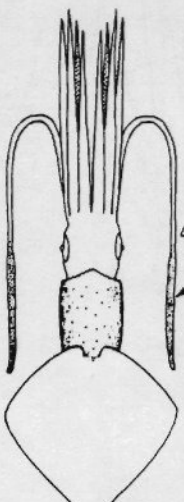
13 b. Fins less than half the body length and without supporting ribs (Fig. 14a); no suckers on buccal lappets; numerous rows of suckers on proximal part of tentacular club (Fig. 14b) ..... Brachioteuthidae



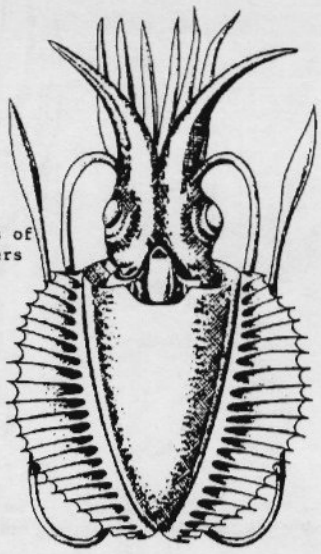
a. ventral view b. tentacular club
Onychoteuthidae *(Onychoteuthis)*
Fig. 10



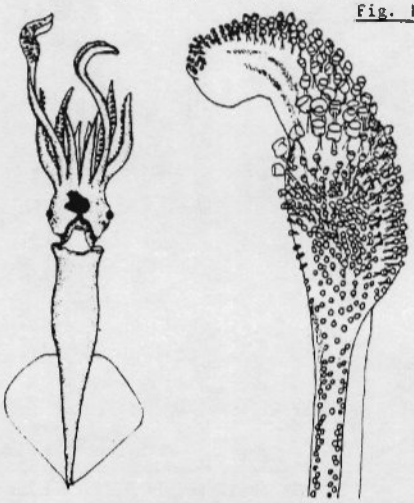
cartilaginous scales on mantle
Fig. 11



dorsal view
Lepidoteuthidae
(Pholidoteuthis)
Fig. 12



ventral view
Ctenopterygidae
(Ctenopteryx)
Fig. 13



a. ventral view b. tentacular club
Brschioteuthidae *(Brachioteuthis)*
Fig. 14

10 b. Buccal membrane connectives attach to the dorsal sides of arms IV* (Fig. 9)

14 a. Ventral surface of eye with a row of photophores (Fig. 15a); buccal membrane with eight separate lappets ..... Lycoteuthidae

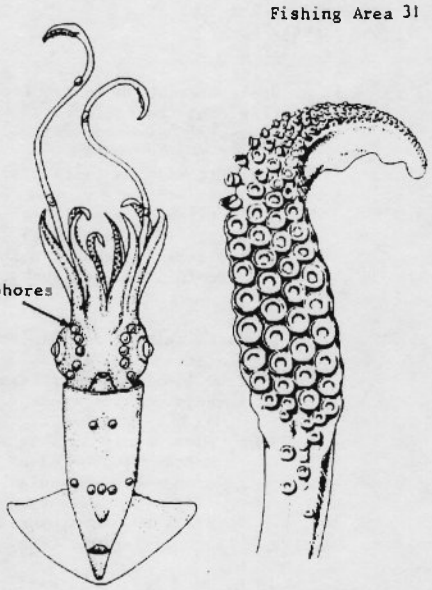
14 b. No photophores on eyes; buccal membrane with seven lappets or less

15 a. Surface of mantle, head and arms covered with numerous photophores, usually large and distinct (Fig. 16a) .. Histioteuthidae

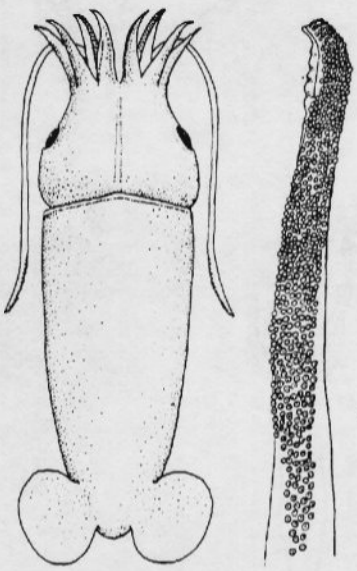
15 b. Surface of mantle and head without photophores (arms may have a few photophores)

16 a. Minute suckers present on oral surface of buccal lappets (Fig. 17c)..... Bathyteuthidae

16 b. No suckers on oral surface of buccal lappets

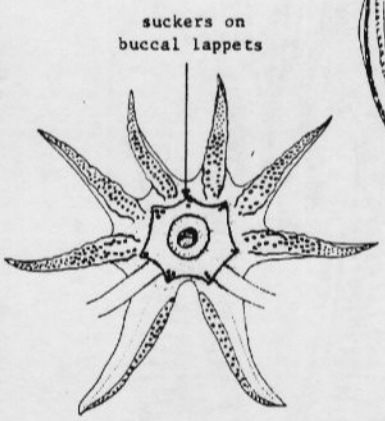


a. ventral view b. tentacular club
Lycoteuthidae *(Lycoteuthis)*
Fig. 15



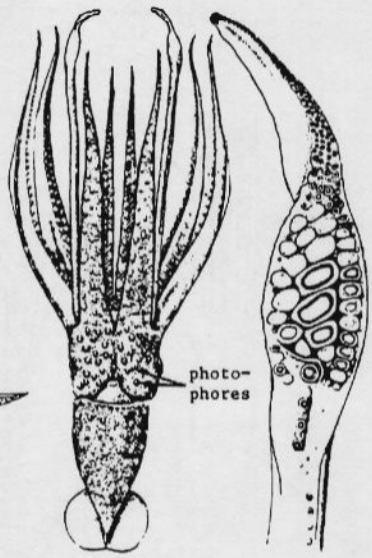
a. dorsal view

b. tentacular club



c. oral view of arms and buccal membrane

Bathyteuthidae *(Bathyteuthis)* Fig. 17



a. ventral view b. tentacular club
Histioteuthidae *(Histioteuthis)*
Fig. 16

* This character is difficult to detect in some histioteuthids because of the development of secondary connectives

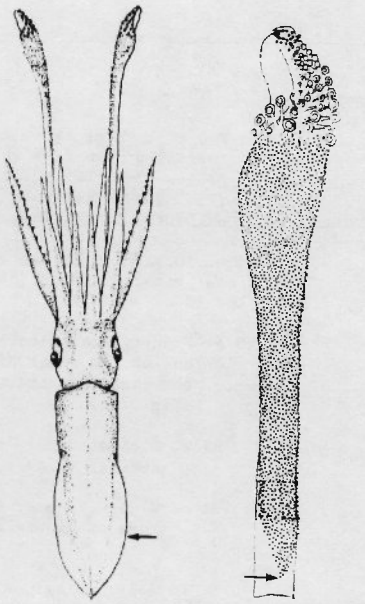
17 a. Medial posterior borders of fins slightly convex (Fig. 18a); carpal knobs in a single dorsal row or absent (Fig. 18b); small size ..... Neoteuthidae

17 b. Medial posterior borders of fins concave (Fig. 19a); carpal knobs in a cluster alternating with carpal suckers (Fig. 19b); attains gigantic size ..... Architeuthidae

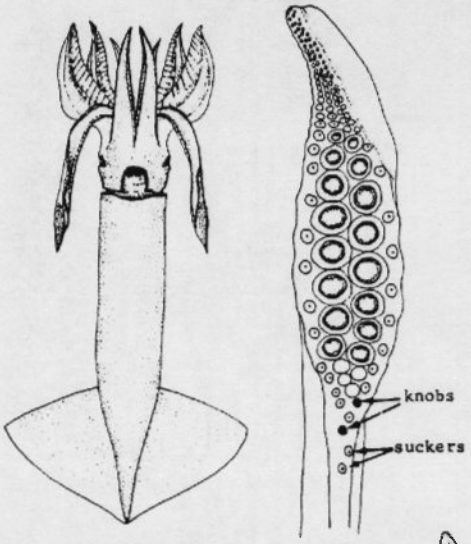
7 b. Funnel-mantle locking apparatus not a simple, straight groove and ridge (Fig. 20 a to e)

18 a. Funnel locking-cartilage with a longitudinal and a transverse groove, ⊥ -shaped or ⊣ shaped (Fig. 20 a and b)

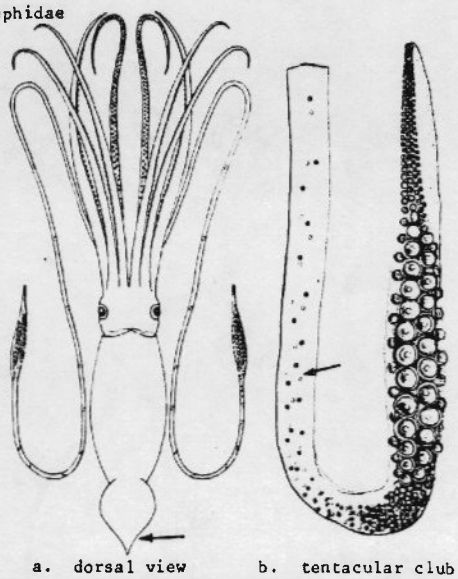
19 a. Funnel locking-cartilage with a longitudinal groove crossed by a transverse groove at its posterior end, ⊥ -shaped (Fig. 20b); fins less than 60 percent of mantle length (Fig. 21) .. Ommastrephidae



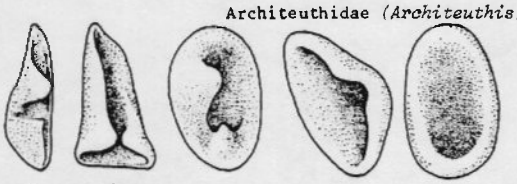
a. dorsal view b. tentacular club
Neoteuthidae *(Neoteuthis)*
Fig. 18



a. ventral view b. tentacular club
Ommastrephidae *(Ommastrephes)*
Fig. 21



a. dorsal view b. tentacular club
Architeuthidae *(Architeuthis)* Fig. 19



a b c d e Fig. 20
types of funnel-locking-cartilages

19 b. Funnel locking-cartilage with a longitudinal groove from which a shorter groove branches medially, ⊣ -shaped (Fig. 20a); fins more than 80 percent of mantle length (Fig. 22) ..... Thysanoteuthidae

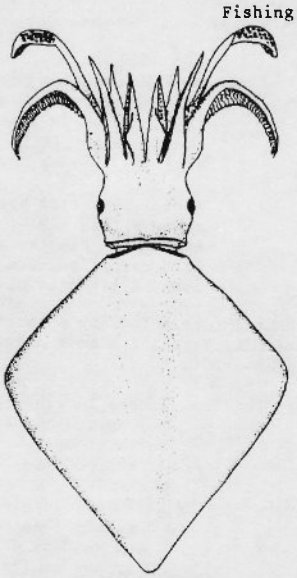
18 b. Funnel locking-cartilage oval, triangular or oval with inward projecting knobs (Fig. 20 c, d and e)

20 a. Funnel locking-cartilage oval with one or two knobs directed toward the centre of the concavity (Fig. 20c)

21 a. Club with only four rows of suckers (Fig. 23b)..... Chiroteuthidae

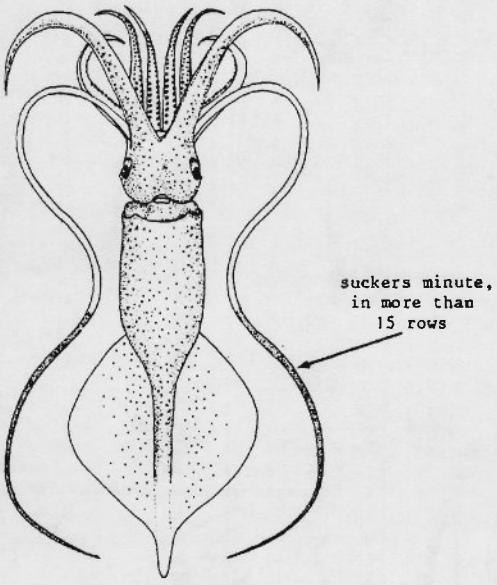
21 b. Club with many (more than 15) rows of minute suckers (Fig. 24) ..... Mastigoteuthidae

20 b. Funnel locking-cartilage oval or subtriangular, without knobs (Fig. 20d and e)



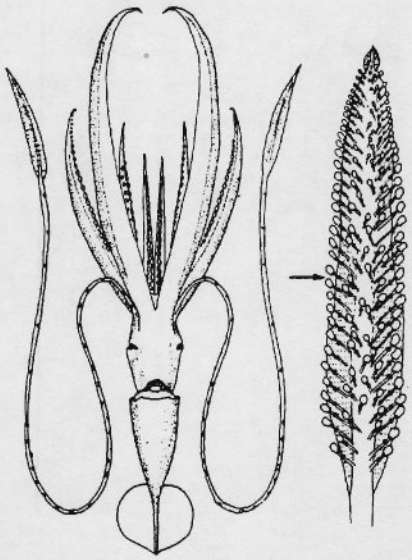
dorsal view
Thysanoteuthidae *(Thysanoteuthis)*

Fig. 22



ventral view
Mastigoteuthidae *(Mastigoteuthis)*

Fig. 24



a b
ventral view tentacular club
Chiroteuthidae *(Chiroteuthis)*

Fig. 23

22 a. Suckers on arms in 4 to 6 rows; tail extremely long, greater than the mantle length (Fig. 25) ..... Joubiniteuthidae

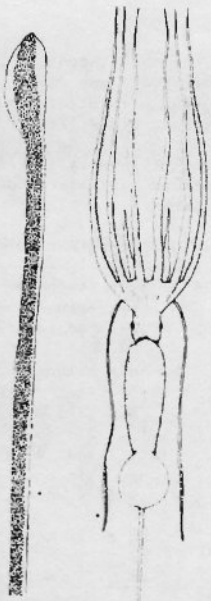
22 b. Suckers on arms in 2 rows; tail short (less than half the mantle length) or absent (Fig. 26) ..... Cycloteuthidae

6 b. Funnel fused to mantle on each side; no funnel-mantle locking apparatus present

23 a. Mantle free dorsally, articulates with head by ridge and groove (Fig. 27) ..... Grimalditeuthidae

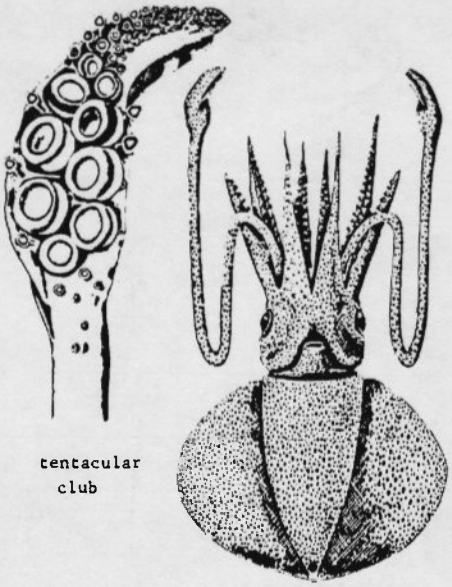
23 b. Mantle fused dorsally with head (Fig. 28) ..... Cranchiidae

1 b. Eight circumoral appendages; sessile suckers (except *Vampyroteuthis*) without chitinous rings



a. tentacular club Joubiniteuthidae Fig. 25

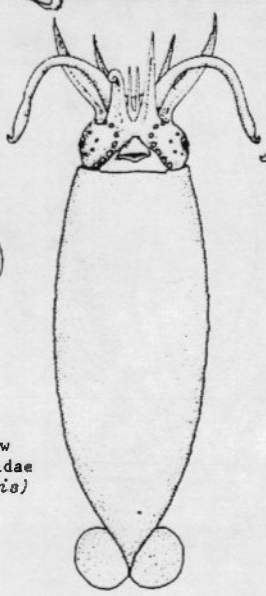
b. dorsal view *(Joubiniteuthis)*



tentacular club

ventral view Cycloteuthidae *(Discoteuthis)* Fig. 26

ventral view Grimalditeuthidae *(Grimalditeuthis)* Fig. 27



a. *(Granchia)* b. *(Caliteuthis)* ventral view Granchiidae Fig. 28

24 a. Filament present in pouch between base of arms I and II on dorsal side; light organ present at base of each fin; colour black (Fig. 29) ..... Vampyroteuthidae

24 b. Both filaments and light organs absent; colour variable to deep maroon, never black

25 a. Cirri present on arms

26 a. Body flattened dorso-ventrally, no prominent mantle and head; fins reduced (Fig. 30) ..... Opisthoteuthidae

26 b. Body oblong; prominent mantle and head; fins prominent (Fig. 31) ..... Cirroteuthidae

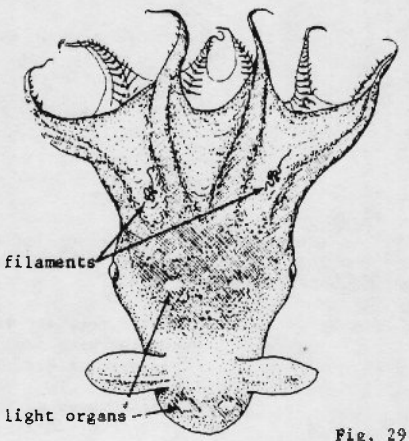
25 b. Cirri absent on arms

27 a. Body gelatinous

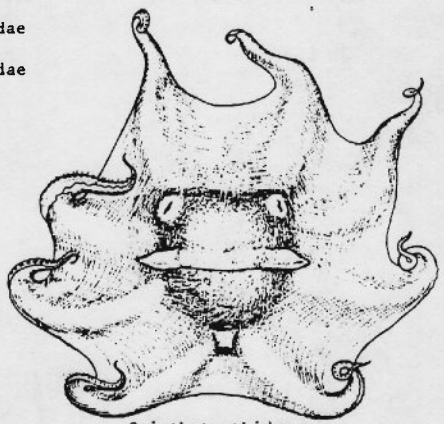
28 a. Suckers biserial (Fig. 32) .... Alloposidae

28 b. Suckers uniserial (Fig. 33) .. Bolitaenidae

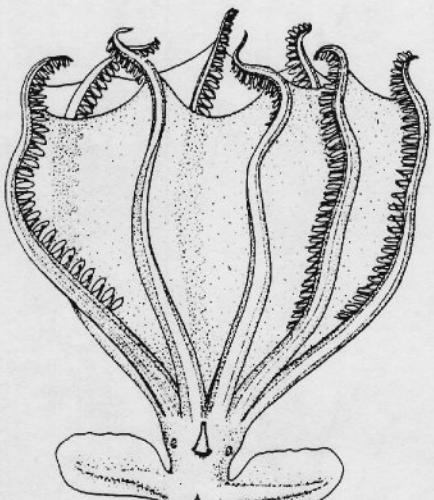
27 b. Body firm



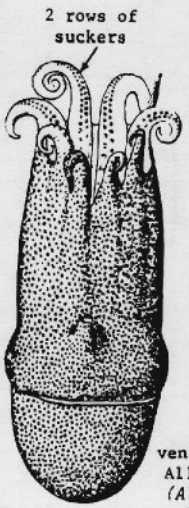
Vampyroteuthidae
(Vampyroteuthis)
Fig. 29



Opisthoteuthidae
(Opisthoteuthis)
Fig. 30



ventral view
Cirroteuthidae
(Cirrothauma)
Fig. 31



ventral view
Alloposidae
(Alloposus)
Fig. 32

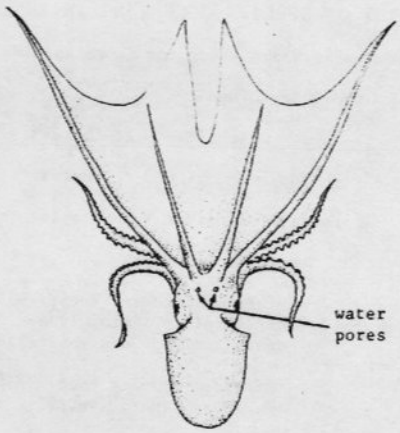
lateral view
Bolitaenidae
(Japetella)
Fig. 33

29 a. Water pores present at base of web, both dorsally and ventrally (Fig. 34) ..... Tremoctopodidae

29 b. Water pores absent

30 a. Males very small (smaller than females); hectocotylus (left third arm) temporarily coiled in sac below eye, with extremely long filamentous tip. Females with dorsal (first) arms each with broad, membraneous flap that secrets and holds a thin, shell-like egg case (Fig. 35) ..... Argonautidae

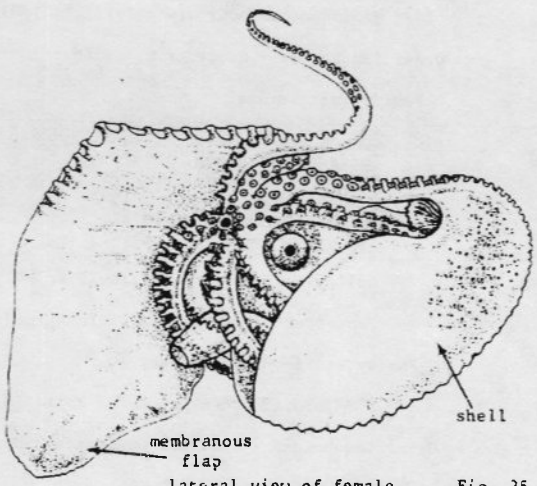
30 b. Males with left or right third arm hectoctylized (never in pocket); with spoon-shaped, non-filamentous tip. Females without dorsal arm flaps; egg case always absent ..... Octopodidae (Fig. 36)



dorsal view
Tremoctopodidae
(Tremoctopus)

Fig. 34

dorsal view
Octopodidae *(Octopus)*
Fig. 36



lateral view of female
Argonautidae *(Argonauta)*

Fig. 35

LIST OF SPECIES OCCURRING IN THE AREA:

Code numbers are given for those species for which Identification Sheets are included

Order Sepioidea

Family Spirulidae - Ram's horn squids

Spirula spirula (Linnaeus, 1758)

Family Sepiolidae - Bob-tailed squids SEPIOL

Subfamily Rossiinae

Rossia antillensis Voss, 1956
Rossia bullisi Voss, 1956
Rossia tortugaensis Voss, 1956

Semirossia equalis Voss, 1956
Semirossia tenera (Verrill, 1880)

Subfamily Heteroteuthinae

Heteroteuthis atlantis Voss, 1955
Heteroteuthis dispar (Rüppell, 1844)

Nectoteuthis pourtalesi Verrill, 1883

Order Teuthoidea - Suborder Myopsida - Inshore squids

Family Loliginidae LOLIG

Loligo brasiliensis Blainville, 1823
Loligo ocula Cohen, 1976
Loligo psalei LeSueur, 1821 LOLIG Lolig 2
Loligo plei Blainville, 1823 LOLIG Lolig 3
Loligo roperi Cohen, 1976
Loligo surinamensis Voss, 1974

Lolliguncula brevis (Blainville, 1823) LOLIG Lolligun 1

Sepioteuthis sepioidea (Blainville, 1823) LOLIG Sepio 1

Family Pickfordiateuthidae

Pickfordiateuthis pulchella Voss, 1953

Order Teuthoidea - Suborder Oegopsida - Oceanic squids

Family Lycoteuthidae

Lycoteuthis diadema (Chun, 1900)

Oregoniateuthis lorigera (Steenstrup, 1875)
Oregoniateuthis springeri Voss, 1956

Selenoteuthis scintillans Voss, 1958

Family Enoploteuthidae

Abralia grimpei Voss, 1958
Abralia redfieldi Voss, 1955
Abralia veranyi (Rüppell, 1844)

Abraliopsis pfefferi Joubin, 1896
* *Abraliopsis* sp.

Enoploteuthis anapsis Roper, 1964
Enoploteuthis leptura (Leach, 1817)

Pterygioteuthis gemmata Chun, 1908
Pterygioteuthis giardi Fischer, 1895
Pyroteuthis margaritifera (Rüppel, 1844)

Thelidioteuthis alessandrinii (Verany, 1851)

Family Octopoteuthidae

Octopoteuthis danae Joubin, 1931
Octopoteuthis megaptera (Verrill, 1885)
Octopoteuthis sicula Rüppell, 1844

Taningia danae Joubin, 1931

Family Onychoteuthidae ONYCHO

Ancistroteuthis lichtensteini (Orbigny, 1839)

Onychoteuthis banksi (Leach, 1817) ONYCHO Ony 1

Onykia carribaea LeSueur, 1821

Family Cycloteuthidae

Cycloteuthis sirventi Joubin, 1919

Discoteuthis discus Young & Roper, 1969
Discoteuthis laciniosa Young & Roper, 1969

Family Lepidoteuthidae LEPIDO

Lepidoteuthis grimaldii Joubin, 1895

Pholidoteuthis adami Voss, 1956 LEPIDO Pholi 1

Tetronychoteuthis dussumieri (Orbigny, 1839)

Family Architeuthidae

Architeuthis dux Steenstrup, 1857

Family Histioteuthidae

Histioteuthis bonnelli (Ferussac, 1835)
Histioteuthis celetaria (Voss, 1960)
Histioteuthis corona (Voss & Voss, 1962)
Histioteuthis dofleini (Pfeffer, 1912)
Histioteuthis elongata (Voss & Voss, 1962)
Histioteuthis meleagroteuthis (Chun, 1910)
Histioteuthis reversa (Verrill, 1880)

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* At least one other species, possibly undescribed, occurs in the northern sector of the area; genus currently being revised by G.L. Voss

Family Neoteuthidae

Neoteuthis sp.

Family Bathyteuthidae

Bathyteuthis abyssicola Hoyle, 1885

Family Ctenopterygidae

Ctenopteryx sicula (Verany, 1851)

Family Brachioteuthidae

Brachioteuthis riisei (Steenstrup, 1882)

Family Ommastrephidae OMMAS

Hyaloteuthis pelagica (Bosc, 1802)

Illex coindetii (Verany, 1837) OMMAS Ill 1
Illex illecebrosus (LeSueur, 1821) OMMAS Ill 2
Illex oxygonius Roper, Lu & Mangold, 1969 OMMAS Ill 3

Ommastrephes bartrami (LeSueur, 1821) OMMAS Ommas 2
Ommastrephes pteropus Steenstrup, 1855 OMMAS Ommas 3

Ornithoteuthis antillarum Adam, 1957 OMMAS Orni 1

Family Thysanoteuthidae THYSANO

Thysanoteuthis rhombus Troschel, 1857 THYSANO Thysano 1

Family Chiroteuthidae

* *Chiroteuthis* spp.

Valbyteuthis danae Joubin, 1931

Family Mastigoteuthidae

Mastigoteuthis agassizi Verrill, 1881
Mastigoteuthis hjorti Chun, 1913
Mastigoteuthis magna Joubin, 1913

Family Grimalditeuthidae

Grimalditeuthis bomplandi (Verany, 1837)

Family Joubiniteuthidae

Joubiniteuthis portieri (Joubin, 1912)

** Family Cranchiidae

Bathothauma lyromma Chun, 1906

Cranchia scabra Leach, 1817

Egea inermis Joubin, 1933

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* Several species occur throughout the area; this deep-sea family currently is being revised by Roper & Young

** This very speciose family currently is being revised by N.A. Voss

Helicocranchia pfefferi Massy, 1907

Leachia cyclura LeSueur, 1821

Liocranchia reinhardti (Steenstrup, 1856)

Taonius pavo (LeSueur, 1821)

Order Octopoda - Octopuses

Family Cirroteuthidae

Cirrotsuthis mulleri Eschricht, 1838

Stauroteuthis syrtensis Verrill, 1879

Family Opisthoteuthidae

Opisthoteuthis agassizi Verrill, 1883

Family Bolitaenidae

Eledonella pygmaea Verrill, 1884

Japetella diaphana Hoyle, 1885

Family Alloposidae

Alloposus mollis Verrill, 1880

Family Octopodidae OCT

Bathypolypus arcticus (Prosch, 1849)

Benthoctopus januari (Hoyle, 1885)

Danoctopus schmidti Joubin, 1933

Euaxoctopus pillsburyae Voss, 1975

Octopus briarius Robson, 1929	OCT Oct 3
Octopus burryi Voss, 1950	
Octopus defilippi Verany, 1851	
Octopus hummelincki Adam, 1936	
Octopus joubini Robson, 1929	
Octopus macropus Risso, 1826	OCT Oct 2
Octopus maya Voss & Solis, 1966	OCT Oct 4
Octopus vulgaris Cuvier, 1797	OCT Oct 1
Octopus zonatus Voss, 1968	

Ptsroctopus tetracirrhus (Delle Chiaje, 1830)

Scaeurgus unicirrhus (Orbigny, 1840)

Tetracheledone spinicirrus Voss, 1955

Family Tremoctopodidae

Tremoctopus gelatus Thomas, 1977
Tremoctopus violaceus Delle Chiaje, 1830

Family Argonautidae

Argonauta argo Linnaeus, 1758
Argonauta hians Solander, 1786

Order Vampyromorpha - Vampire squids

Family Vampyroteuthidae

Vampyroteuthis infernalis Chun, 1903

Prepared by C.F.E Roper, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.

Part of the illustrations provided by author

LEPIDO

1977

FAO SPECIES IDENTIFICATION SHEETS

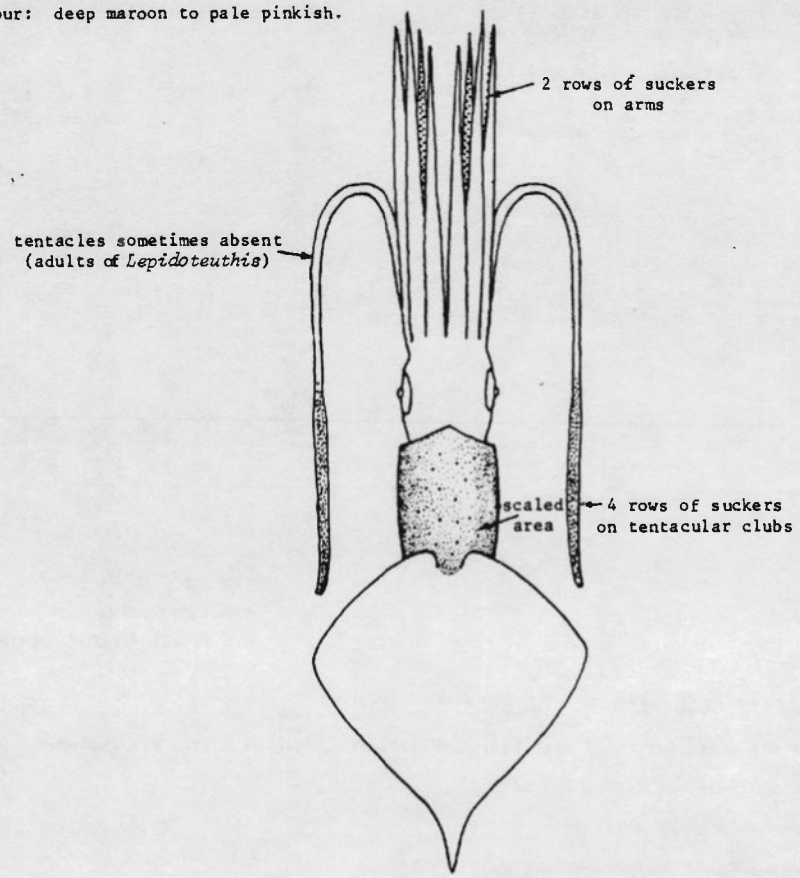
FISHING AREA 31
(W Cent. Atlantic)

LEPIDOTEUTHIDAE

Scaled squids

Distinct "scales" in the integument of the mantle; a simple, straight funnel-locking apparatus; buccal connectives attached to ventral borders of fourth arms; two rows of suckers on arms, four rows on tentacular clubs (adults of *Lepidoteuthis* reportedly lack tentacles).

Colour: deep maroon to pale pinkish.



dorsal view *(Pholidoteuthis)*

Medium to large-sized oceanic squids. Little is known of the biology of members of this family and no commercial fisheries exist to date. The species in the group are entirely oceanic, some pelagic and some, like *Pholidoteuthis*, epibenthic, that is, they spend at least part of the time, e.g. daytime, in association with the bottom, then disperse into the water column, even to the surface, at other times (night). They may occur in huge schools.

SIMILAR FAMILIES OCCURRING IN THE AREA:

Other oceanic squids including species of interest to fisheries: no scales on any part of body.

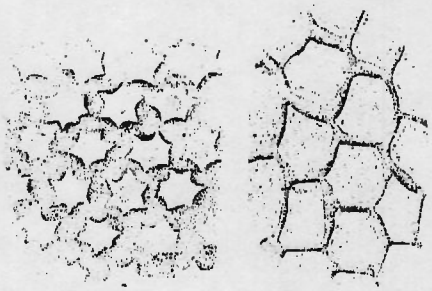
KEY TO GENERA OCCURRING IN THE AREA:

1 a. Scales star-shaped or rounded, with a central boss or pit (Fig. 1a) .... *Tetronychoteuthis*

1 b. Scales round or polygonal (Fig. 1b)

2 a. Fins broad, laterally angled; extend posteriorly to form a sharply pointed tail (Fig. 2a); tentacles present in adults ..... *Pholidoteuthis*

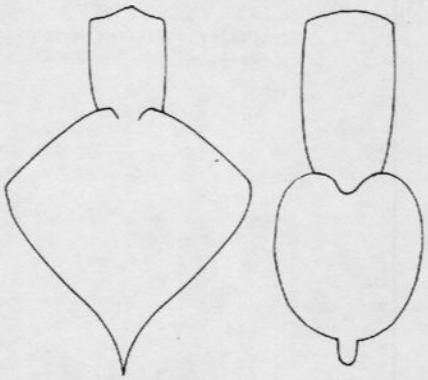
2 b. Fins elliptical, not laterally angled; extend nearly to blunt posterior tip of mantle (Fig. 2b); tentacles unknown ..... *Lepidoteuthis*



a *Tetronychoteuthis* b *Pholidoteuthis*

scales on mantle

Fig. 1



a *Pholidoteuthis* b *Lepidoteuthis*

dorsal view of mantle and fins

Fig. 2

LIST OF SPECIES OCCURRING IN THE AREA:

Code numbers are given for those species for which Identification Sheets are included

Lepidoteuthis grimaldii Joubin, 1895

Pholidoteuthis adami Voss, 1956 LEPIDO Pholi 1

Tetronychoteuthis dussumieri (Orbigny, 1839)

Prepared by C.F.E. Roper, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.

Part of illustrations provided by author

LEPIDO Pholi 1

1977

FAO SPECIES IDENTIFICATION SHEETS

FAMILY: LEPIDOTEUTHIDAE

FISHING AREA 31
(W Cent. Atlantic)

Pholidoteuthis adami Voss, 1956

OTHER SCIENTIFIC NAMES STILL IN USE: None

VERNACULAR NAMES:

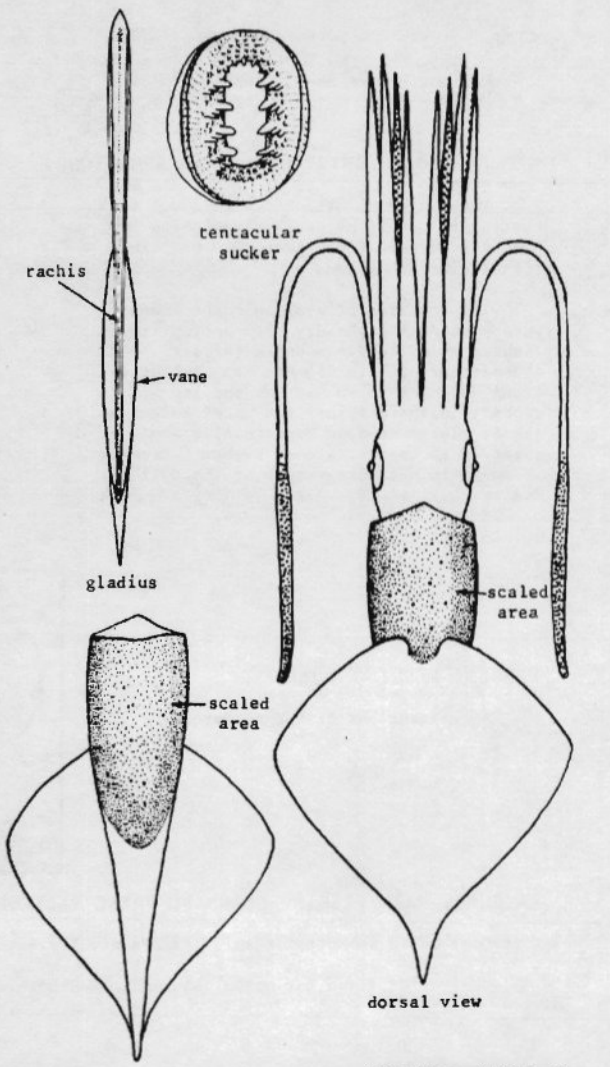
FAO: En - Scaled squid
Fr - Loutène
Sp - Luria escamuda

NATIONAL:

DISTINCTIVE CHARACTERS:

Mantle thick, choroidal, tapering posteriorly to a sharply pointed tail; fins broad, laterally angled, elongate posteriorly to help form the tail; fins occupy about 70 percent of the mantle length; *anterior half of mantle covered with many small, closely-packed, rounded to polygonal, cartilaginous scales; scalation terminates abruptly dorsally at insertion of fins and ventrally in an arc at about the midpoint of fins;* tentacular clubs very long and only a little expanded; *tentacular suckers compressed, oblong;* gladius long and slender, straight-edged with an expanded vane ending in a sharp, conical point.

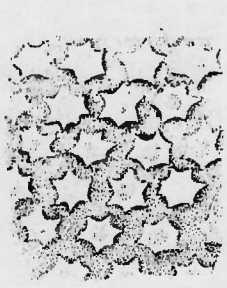
Colour: surfaces of head, arms, and fins pigmented a dark maroon colour, scaled area of mantle pigmented a pale, vinous red with scattered darker brownish chromatophores (colour probably uniform in live specimens).



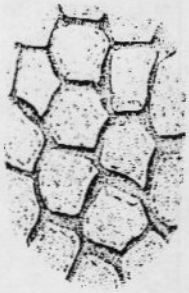
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Tetronychoteuthis species: scales star-shaped or rounded with a central boss or pit (round or polygonal without pit in *P. adami*).

Lepidoteuthis grimaldii: fins large, elliptical, not extending to blunt posterior tip of mantle; tentacles reportedly lacking in adults (present in *P. adami*).



Tetronychoteuthis



Pholidoteuthis

SIZE:

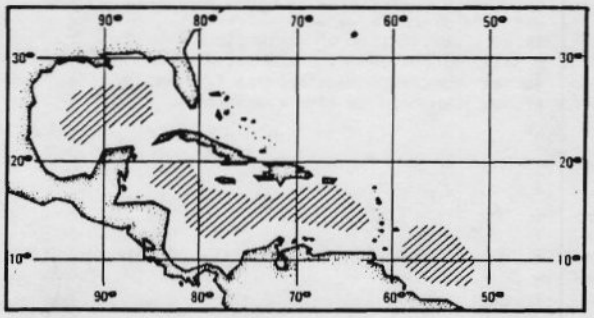
Maximum: 60 cm mantle length.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Western north Atlantic from about 40°N (very rare), Gulf of Mexico, Caribbean Sea, and northeastern South America. Distributional limits unknown.

All captures of available specimens were made during the day with bottom trawls fishing at 85 to 925 m depth (greater abundance at 625 to 750 m); no night-time trawl captures known, so the species probably disperses into the water column at night; large schools occasionally are observed at the surface at night. Extremely abundant in offshore waters of the Gulf of Mexico.

Lepidoteuthis grimaldii
dorsal view of mantle and fins



PRESENT FISHING GROUNDS:

At present not fished commercially.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

Gear would be bottom trawl, lampara net, or seine, if a fishery develops.

Quality of flesh for human consumption unknown.

LOLIG

1977

FAO SPECIES IDENTIFICATION SHEETS

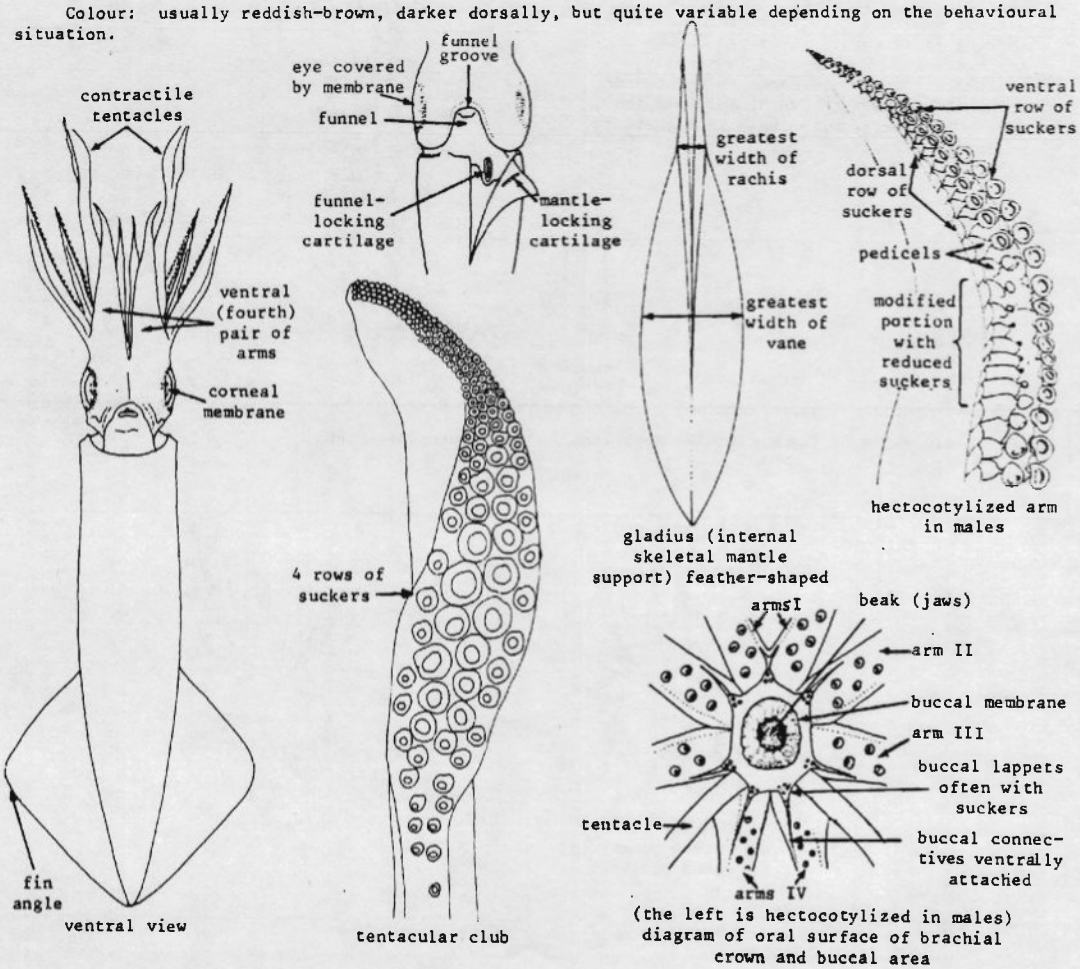
FISHING AREA 31
(W Cent. Atlantic)

LOLIGINIDAE

Inshore squids

Shape variable from short and stout to long and slender; fins terminal or marginal, but always united posteriorly; *funnel-locking apparatus a simple, straight groove; eyes covered with transparent skin (corneal membrane); buccal connectives attached to ventral borders of fourth arms; 7 buccal lappets supplied with small suckers (except in Sepioteuthis);* 8 arms and 2 tentacles around mouth; *2 rows of suckers on arms and 4 rows on tentacular clubs,* hooks never present. Usually the left arm of the fourth (ventral) pair is hectocotylized in males (used to transfer sperm packets from the male to the female); the structure of the modified portion (hectocotylus) of the arm is useful in most species as a diagnostic character (often, the suckers on the hectocotylus are reduced in size or number, or modified into fleshy papillae or flaps, or they disappear altogether).

Colour: usually reddish-brown, darker dorsally, but quite variable depending on the behavioural situation.



The Loliginidae are medium-sized squids (to about 40 cm mantle length) occurring world-wide along the coastal margins and continental shelf, primarily in warmer to temperate waters; they form one of the major groups of commercially utilized cephalopods. Various species occur from very shallow water in bays and estuaries, over grass flats and coral reefs, to water as deep as 400 m (during seasonal offshore migrations). Eggs usually are attached to hard surfaces in large, finger-like masses ("sea-mops") in shallow water; larvae resemble the adults. Certain species support extensive fisheries in several parts of the world, as the flesh is of excellent quality.

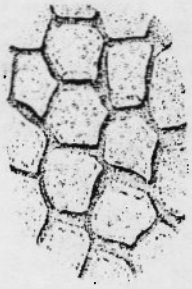
SIMILAR FAMILIES OCCURRING IN THE AREA:

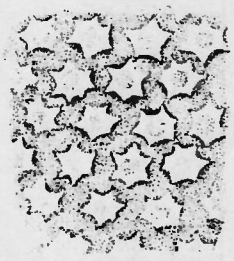
Other teuthoid families which include commercial-sized species of present potential interest to fisheries (Onychoteuthidae, Thysanoteuthidae, Lepidoteuthidae, Ommastrephidae) all lack suckers on the buccal lappets and have eyes open to the sea, not covered by a transparent corneal membrane. Furthermore: the funnel-locking apparatus is ⊥-shaped in Ommastrephidae and ⊣-shaped in Thysanoteuthidae; there are hooks on the tentacular clubs in Onychoteuthidae; and the mantle is covered with small integumentary scales in Lepidoteuthidae.

⊥-shaped Ommastrephidae | ⊣- shaped Thysanoteuthidae | simple, straight *Loliginidae*

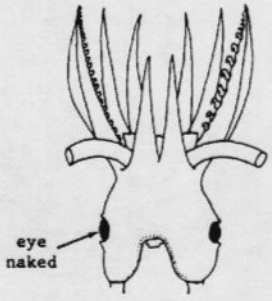
basic types of funnel-locking apparatus

Onychoteuthis tentacular club

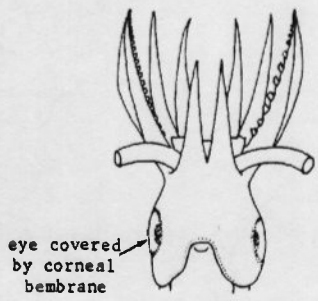




Lepidoteuthidae types of scales



Ommastrephidae, and other commercial squid families



Loliginidae

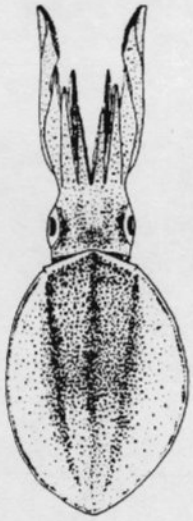
KEY TO GENERA OCCURRING IN THE AREA:

1 a. Fins in adults occupy more than 85 percent of mantle length, broadly elliptical (Fig. 1); buccal lobes without suckers ..... *Sepioteuthis*

1 b. Fins in adults occupy less than 70 percent of mantle length, round or rhomboidal (Figs. 2 and 3); buccal lobes with small suckers

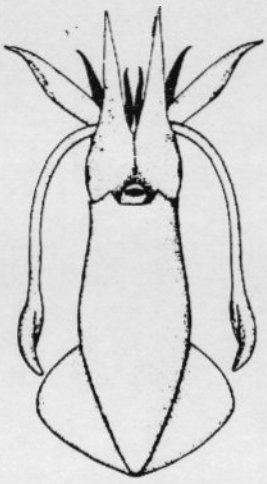
2 a. Fins in adults wider than long, round or suriform, not rhomboidal; mantle short, stout, broadly rounded posteriorly (Fig. 2) ..... *Lolliguncula*

2 b. Fins in adults rhomboidal, longer than broad, not round; mantle elongate, bluntly pointed posteriorly (Fig. 3) ..... *Loligo*



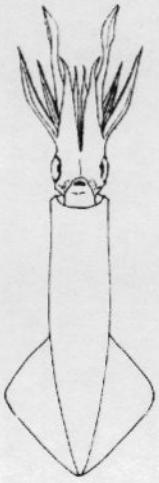
Sepioteuthis Fig. 1

dorsal view



Lolliguncula

Fig. 2



Loligo

Fig. 3

LIST OF SPECIES OCCURRING IN THE AREA:

Code numbers are given for those species for which Identification Sheets are included

Loligo brasiliensis Blainville, 1823	
Loligo ocula Cohen, 1976	
Loligo pealei LeSueur, 1821	LOLIG Lolig 2
Loligo plei Blainville, 1823	LOLIG Lolig 3
Loligo roperi Cohen, 1976	
Loligo surinamensis Voss, 1974	
Lolliguncula brevis (Blainville, 1823)	LOLIG Lolligun 1
Sepioteuthis sepioidea (Blainville, 1823)	LOLIG Sepio 1

Prepared by C.F.E. Roper, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A. Part of the illustrations provided by author

LOLIG Lolig 2

1977

FAO SPECIES IDENTIFICATION SHEETS

FAMILY: LOLIGINIDAE

FISHING AREA 31
(W Cent. Atlantic)

Loligo pealei LeSueur, 1821

OTHER SCIENTIFIC NAMES STILL IN USE: None

VERNACULAR NAMES:

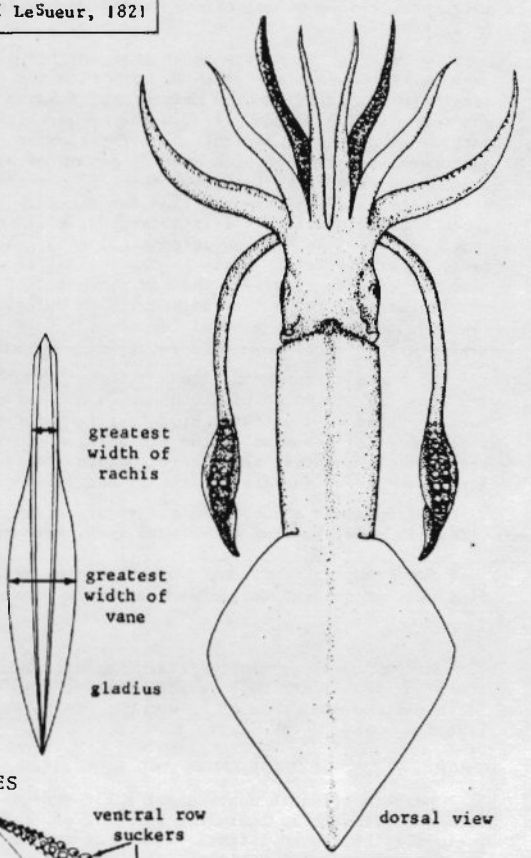
FAO: En - Common squid
Fr - Calmar
Sp - Calamar común

NATIONAL:

DISTINCTIVE CHARACTERS:

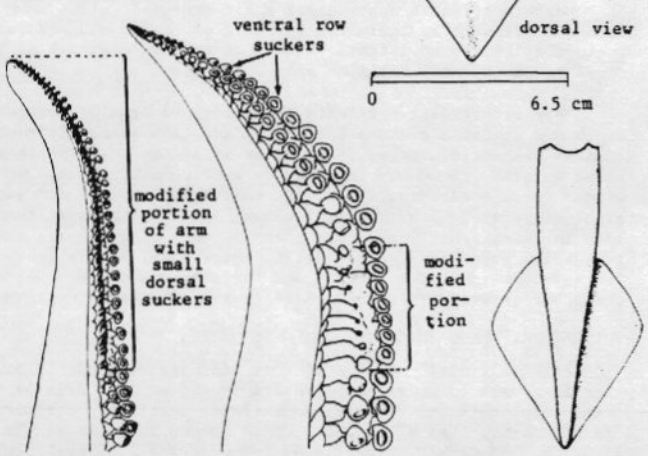
Mantle long, moderately slender, cylindrical, the posterior end bluntly pointed; fins rhomboid, their sides nearly straight; *left ventral (fourth) arm hectocotylized in mature males by modification of the distal third to fourth of arm, but the modification does not extend to arm tip; fewer than 12 of the suckers in dorsal row usually smaller than half the size of their counterparts in the ventral row;* bases or pedicels of some of the modified suckers rounded, narrowly triangular; gladius (skeletal mantle support) long, rather wide, feather-shaped, *ratio of greatest width of vane of gladius to greatest width of rachis 2.7 to 3.7 in females, 2.4 to 2.9 in males;* edge of vane curved (sometimes straight in males), thin, rarely ribbed; eyes not unusually large, *diameter of externally visible eyeball 8 to 18 percent of mantle length, and diameter of dissected lens 2 to 6 percent of mantle length.*

Colour: reddish brown, darker and more vivid dorsally, lighter, less-pigmented ventrally.



DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

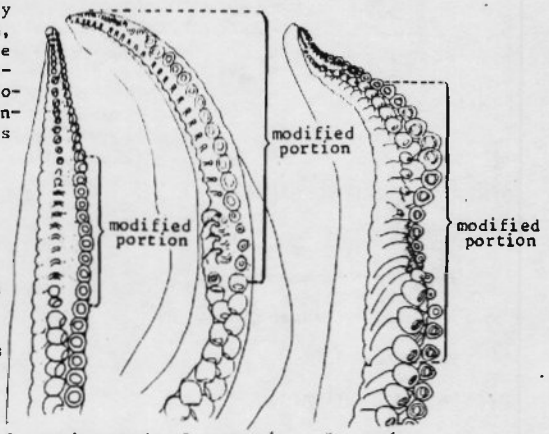
Loligo plei: modified portion of hectocotylized (left ventral) arm occupies one fourth to one half of arm length and extends to arm tip; half to three quarters (42 to 82) of suckers in dorsal row much smaller than half the size of their ventral counterparts; modified (small) suckers on small, narrow, triangular pedicels (pedicels rounded, narrowly triangular in *L. pealei*); ratio of greatest width of vane of gladius to greatest width of rachis 1.5 to 2.4 (2.7 to 3.7 in *L. pealei*); edge of vane straight (often curved in females), thick, and ribbed or rod-like (mature males especially) (curved and thin in *L. pealei*).



L. plei **L. pealei**
hectocotylized arm in males

L. ocula: eyes large, diameter of externally visible eyeball 15 to 21 percent of mantle length, lens diameter (dissected) 6 to 8 percent of mantle length (8 to 18 percent and 2 to 6 percent respectively in *L. pealei*); modified suckers of hectocotylus (left ventral arm) all based on broadly triangular pedicels (some on narrow, triangular pedicels in *L. pealei*).

L. roperi: a small species that matures at about 4.3 to 4.4 cm; maximum known size 7.2 cm mantle length (in *L. pealei* smallest mature male is 6.1 cm and female is 7.3 cm mantle length and maximum size exceeds 31 cm mantle length); modification of hectocotylized arm occupies over 50 percent of arm length and extends to its tip; about 80 percent of suckers on dorsal row modified and minute, suckers based on broadly triangular pedicels; fins short, always less than 50 percent (33 to 39 percent) of mantle length (only *L. pealei* smaller than 5.5 cm have fins less than 50 percent of mantle length); 0 to 6 total suckers on buccal lappets, never any on ventral lappets (35 to 113, always with some on ventral lappets, in *L. pealei*).

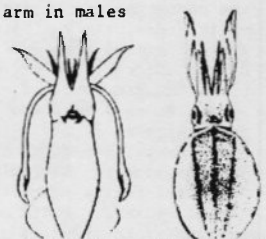


L. surinamensis *L. roperi* *L. ocula*

hectocotylized arm in males

L. surinamensis: modified portion of hectocotylized (left ventral) arm occupies one third of arm and does not extend to tip; modified suckers based on flattened, broadly triangular pedicels that form distinct lappets; suckers of the mid-portion of right ventral arm of males bear sharply pointed teeth (corresponding teeth in *L. pealei* are blunt, square-shaped); suckers on arms II and III of males greatly enlarged.

Lolliguncula brevis: mantle stout, bluntly rounded posteriorly, widest in middle; fins wider than long, very rounded.

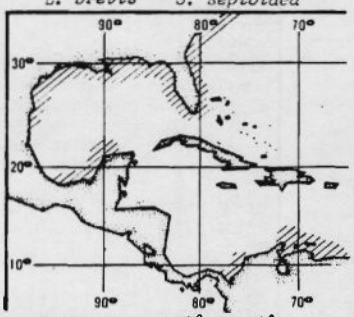


L. brevis *S. sepioidea*

Sepioteuthis sepioidea: mantle broad, bluntly rounded posteriorly; fins oval in outline and extending nearly entire length of mantle.

SIZE:

Maximum: 47 cm mantle length (male); males grow larger than females; sizes in Area 31 are considerably smaller than in northern waters; males: 30 cm maximum, less than 20 cm average; females: less than 13 cm (mantle length).



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Western Atlantic continental shelf and upper slope waters from Nova Scotia to Venezuela, including the Gulf of Mexico and the Caribbean Sea. Not occurring around islands, except as very rare strays at islands close to continental shelf or slope.

Very little data available on biology of Area 31 populations. Optimum temperatures 10° to 14°C, minimum 8°C; North of Cape Hatteras there is a summer, inshore-northerly spawning migration to shallow coastal and shelf waters, followed by an offshore-southerly retreat in fall and winter to continental slope waters; restricted in summer to surface- and shallow water, but grading from 28 to 366 m depth in winter (peak concentrations at 100 to 193 m); adults are demersal during day but leave the bottom at night dispersing into the water column and may appear at the surface (in summer or warm water). Eggs laid in gelatinous finger-like strands, many of which are attached together in large masses ("sea mops") to a solid substrate (rock, shells, shipwrecks) from a few to 250 m; planktonic larvae and juveniles are abundant in surface waters and resemble adults in appearance (no metamorphosis); adults apparently die after spawning. Food includes crustaceans (e.g. euphausids), fishes and squids.

PRESENT FISHING GROUNDS AND FISHERY:

Primarily north of Area 31 from off Cape Hatteras to New England, in shallow continental shelf water in summer to upper slope waters in winter. In Area 31 catches occur in the northern Gulf of Mexico, Yucatán, Colombia and Venezuela. Reliable statistics are unavailable for Area 31, because catch is not separated by species of *Loligo*. Up to 60 000 tons are caught annually along the entire east coast of the U.S.A. and Canada primarily by European and Japanese trawlers. Probably a sizeable portion of the squid caught in Venezuela (1976: 500 t); correspond to *L. pealei* and *L. plei*. Caught principally by otter trawls and inshore trapnets. Utilized as food and for bait; medical research conducted on giant nerve fibres.

LOLIG Lolig 3

1977

FAO SPECIES IDENTIFICATION SHEETS

FAMILY: LOLIGINIDAE

FISHING AREA 31
(W Cent. Atlantic)

Loligo plei Blainville, 1823

OTHER SCIENTIFIC NAMES STILL IN USE: *Doryteuthis plei* (Blainville, 1823)

VERNACULAR NAMES:

FAO: En - Arrow squid
Fr - Calmar flèche
Sp - Calamar flecha

NATIONAL:

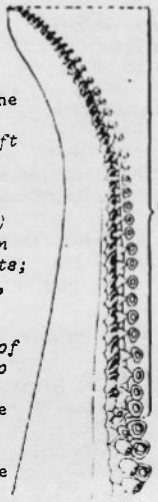
DISTINCTIVE CHARACTERS:

Mantle long, slender, cylindrical, the posterior end acutely pointed; fins rhomboid, their sides fairly straight; *left ventral (fourth) arm hectocotylized in mature males by a modification of distal half to fourth of arm that extends to arm tip; one half to three fourths (42 to 82) of suckers in dorsal row much smaller than half the size of their ventral counterparts; modified (small) suckers on small, narrow, triangular pedicels;* gladius (skeletal mantle support) long, slender, feather-shaped; *ratio of greatest width of vane of gladius to greatest width of rachis 1.5 to 2.4;* edge of vane straight (often curved in females), thick, and ribbed or rod-like (mature males especially); eye not unusually large, diameter of externally visible eyeball 14 to 19 percent of mantle length, diameter of dissected lens 2 to 7 percent of mantle length.

Colour: dark reddish-brown dorsally, darkest along dorsal midline of mantle; lighter, more yellowish background colour ventrally with reddish-brown overlay; often with reddish brown longitudinal stripes on anterior ventro-lateral mantle of males.

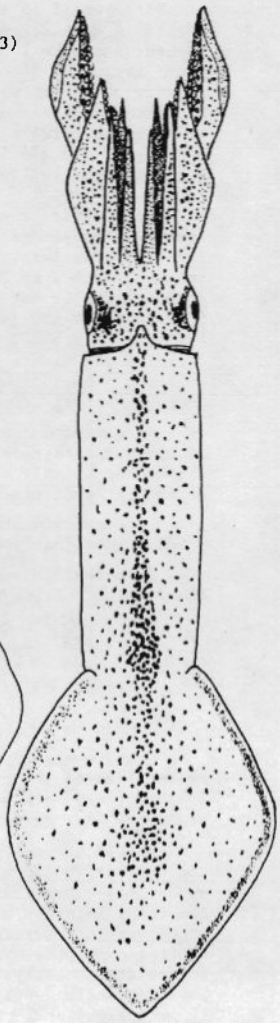
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Loligo pealei: modified portion of hectocotilyzed arm located at distal third to fourth of arm, but does not extend to arm tip; fewer than 12 suckers in dorsal row smaller than half the size of their ventral counterparts; pedicels of some modified suckers rounded, narrowly triangular (small, narrow triangular pedicels in *L. plei*); ratio of greatest width of vane of gladius to greatest width of rachis 2.7 to 3.7

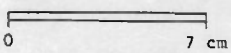


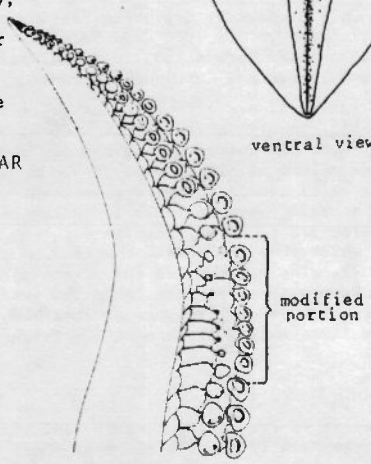
L. plei

ventral view



dorsal view

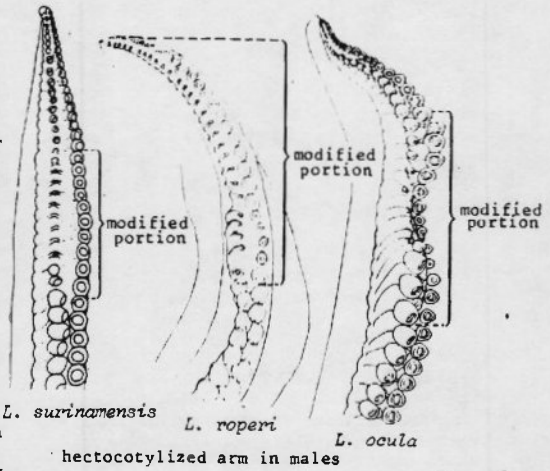




L. pealei
hectocotylized arm in males

(1.5 to 2.4 in *L. plei*); edge of vane curved (sometimes straight in males) thin, rarely ribbed (straight (often curved in females), thick, ribbed or rod-like (mature males especially) in *L. plei*).

L. ocula: eyes large, diameter of externally visible eyeball 15 to 21 percent, lens diameter (dissected) 6 to 8 percent of mantle length (14 to 19 percent and 2 to 7 percent, respectively in *L. plei*); modification of hectocotylized arm does not extend to arm tip; all modified suckers on hectocotylus based on broadly triangular pedicels; ratio of greatest width of vane of gladius to greatest width of rachis is 2.4 to 2.9 (1.5 to 2.4 in *L. plei*); fin width 45 to 59 percent of mantle length (33 to 45 percent in *L. plei*).

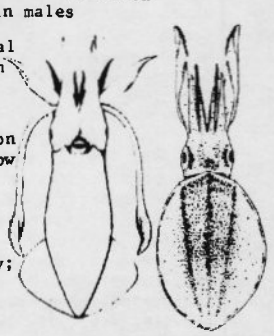


L. roperi: a small species that matures at about 4.3 to 4.4 cm mantle length, maximum size 7.2 cm mantle length (*L. plei* matures at 4 to 35 cm (males) and 4.2 to 21 cm (females) mantle length); modification of hectocotylized arm occupies more than 50 percent of arm length (less than 50 percent in *L. plei*); about 80 percent of suckers on dorsal row modified and minute suckers based on broadly triangular pedicels; 0 to 6 total suckers on buccal lappets, never any on ventral lappets (16 to 66, always with some on ventral lappets, in *L. plei*)

L. surinamensis: modified portion of hectocotylized (left ventral) arm occupies one third of arm and does not extend to tip; modified suckers based on flattened, broadly triangular pedicels that form distinct lappets (small, narrow triangular pedicels in *L. plei*).

Lolliguncula brevis: mantle stout, bluntly rounded posteriorly; fins broad, wider than long, very rounded.

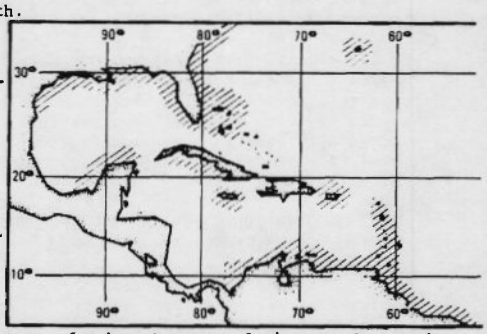
Sepioteuthis sepioidea: mantle broad, stout, bluntly rounded posteriorly; fins oval in outline and extending nearly entire length of mantle.



SIZE:

Maximum: males to 35 cm, females to 22 cm mantle length.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:



Western Atlantic, Gulf of Mexico, Caribbean Sea in continental shelf and upper slope waters from Cape Hatteras (36°N), (very rarely to southern New England) to Fortaleza, Brazil (4°S); Bermuda, Bahamian and Caribbean Islands.

Little biological information available. Occurs from the surface to 366 m depth, mostly shallower than 200 m; apparently concentrates near the bottom during the day and disperses into the water column at night, when it can be dipnetted at the surface; males attain a larger size than females; matures over a broad range of sizes depending on season and locality: males 3.8 to 35 cm, females 4.2 to 20.3 cm mantle length, while they can remain immature up to 14 cm (males) and 9 cm (females); immature and mature specimens of a broad range of sizes may be caught in the same net-haul; gravid specimens are found the year round; all may not die after spawning; eggs are laid in gelatinous, finger-like strands attached together and cemented to a hard substrate (rock, coral, shell) in large masses ("sea mops"). Feeds on crustaceans, small fishes, and probably squids.

PRESENT FISHING GROUNDS AND FISHERY:

A small fishery occurs in Progresso, Yucatan, and probably *L. plei* is caught throughout its range of occurrence, but separate statistics are not kept where it may co-occur with *L. pealei*. In the Bahamian and Caribbean Islands undoubtedly it is the most frequently captured commercial species of Loliginidae. Probably a sizeable portion of the squid caught in Venezuela (1976: 500 t) correspond to *L. plei* and *L. pealei*. The maximum abundance of the species lies in Area 31. Principle gear includes otter trawls and dipnets. Used as food and bait; medical research conducted on giant nerve fibres.

LOLIG Lolligun 1

1977

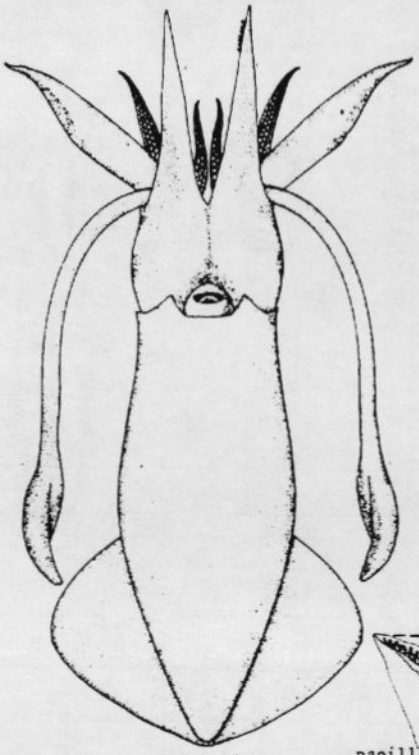
FAO SPECIES IDENTIFICATION SHEETS

FAMILY: LOLIGINIDAE

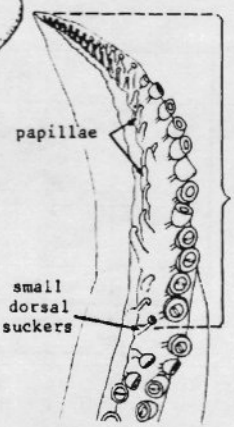
FISHING AREA 31
(W Cent. Atlantic)

Lolliguncula brevis (Blainville, 1823)

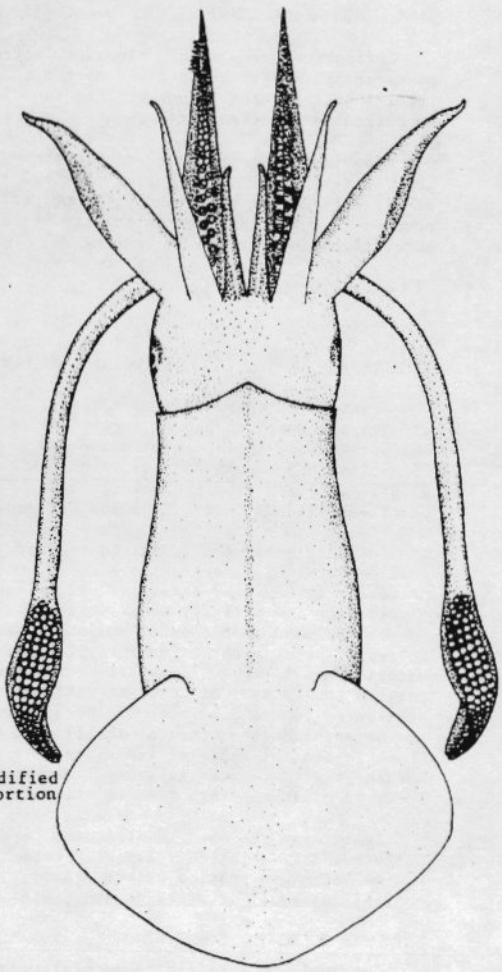
OTHER SCIENTIFIC NAMES STILL IN USE: None



ventral view



hectocotylized arm in males



dorsal view

0 5.5 cm

VERNACULAR NAMES:

FAO: En - Thumbstall squid
Fr - Calmar doigtier
Sp - Calamar dedal

NATIONAL:

DISTINCTIVE CHARACTERS:

Mantle stout, bluntly rounded posteriorly, widest in mid-portion; fins broad, wider than long (fin width 75 percent of mantle length), very rounded, short (50 to 55 percent of mantle length); modified portion of hectocotylized (left ventral) arm occupies distal third of arm and extends to

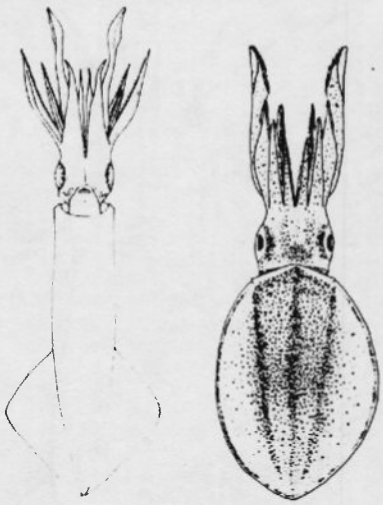
arm tip; about 24 suckers of dorsal row modified, the proximal 1 to 3 being greatly reduced in diameter, the remaining pedicels distally are greatly enlarged with long, slightly flattened papillae that gradually deminish in size distally; no large, puffy, glandular enlargement of basal area of arm between sucker rows.

Colour: dark reddish brown to brownish yellow with dark purple-red chromatophores over nearly entire animal; chromatophores most dense on ventral surface of mantle and head, except in very large specimens, in which the opposite occurs.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Loligo species: mantle elongate, narrow, tapering to a point posteriorly, widest at anterior opening; fins rhomboidal, with lateral angles, usually not broader than long, never wider than 60 percent of mantle length.

Sepioteuthis sepioidea: mantle broad, stout, bluntly rounded posteriorly, widest at anterior opening, fins long, extending nearly entire length of mantle (90 percent in adults, about 75 percent in juveniles), elliptical to weakly rhomboidal, width about 65 percent of mantle length.



Loligo sp. *S. sepioidea*

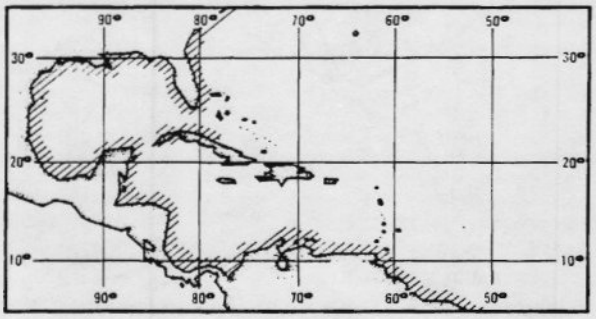
SIZE:

Maximum: females 11 cm, males 8.5 cm mantle length.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Western Atlantic from New Jersey, Delaware Bay and southward to Rio de Janeiro, Brazil; Gulf of Mexico, Caribbean mainland and coast of northeastern South America (about 40°N to 23°S); excluded from the Bahamas and Caribbean Islands except Cuba and Curaçao.

Entirely coastal and limited to very shallow water of less than 18 m depth. Occurs primarily in bays and estuaries and is associated with low salinity water, although it is not excluded from coastal salinities up to 36°/₀₀; lowest recorded salinity 2.4°/₀₀, normal range 17 to 30°/₀₀. The occurrence only on the islands of Cuba and Curacao is attributed to the proximity of these islands to the mainland (co ıtinental shelf) and, in Cuba, to the existence of extensive bays and estuaries with reduced salinity. Temperatures of captures range from 15° to 32°C.



Small eggs are laid in elongate, terminally rounded, gelatinous capsules attached to the bottom in shallow waters. Food consists of small crustaceans and fishes.

PRESENT FISHING GROUNDS:

Currently no specific commercial fisheries exists in spite of the great abundance of this species in several areas. Apparently a high potential for a sustained fishery exists in the northern and eastern Gulf of Mexico.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

Separate statistics are not reported for this species, although it is caught sometimes in large quantities, incidentally in otter trawling fisheries for shrimps and fishes.

Formerly captured in wiers and poundnets along Virginia, Maryland and Delaware coasts. Otter trawls are effective over appropriate bottoms.

Utilized for food and bait.

LOLIG Sepio 1

1977

FAO SPECIES IDENTIFICATION SHEETS

FAMILY: LOLIGINIDAE

FISHING AREA 31
(W Cent. Atlantic)

Sepioteuthis sepioidea (Blainville, 1823)

OTHER SCIENTIFIC NAMES STILL IN USE: None

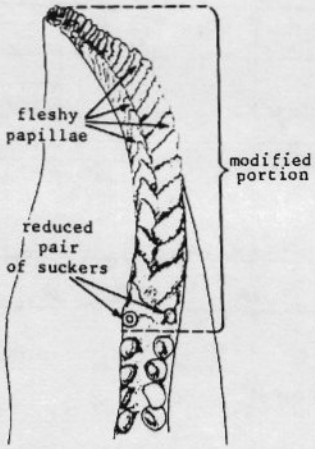
VERNACULAR NAMES:

FAO: En - Reef squid
Fr - Calmar ris
Sp - Calamar de arrecife

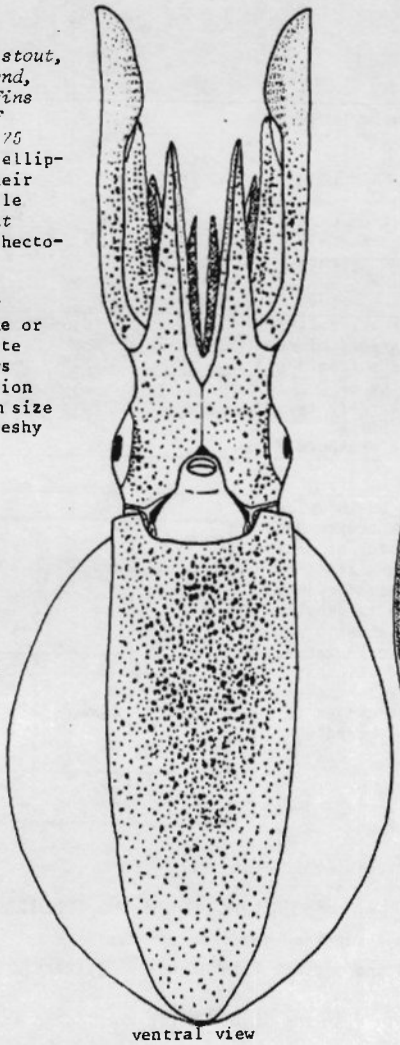
NATIONAL:

DISTINCTIVE CHARACTERS:

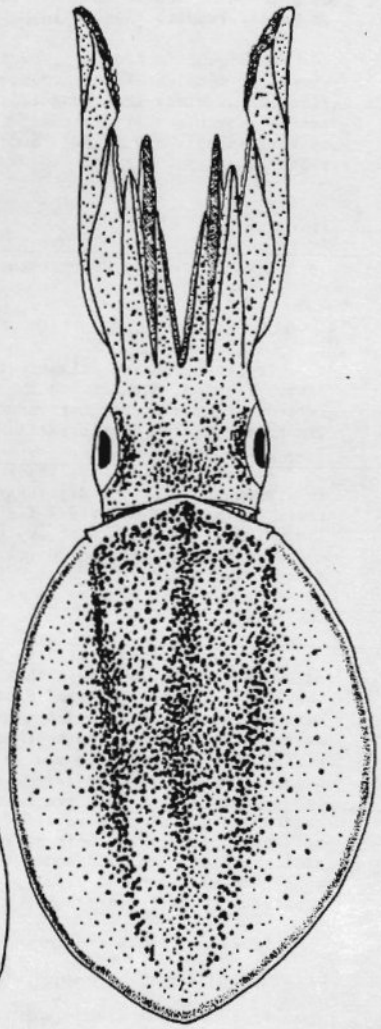
Mantle broad, relatively stout, tapered to a blunt posterior end, widest at anterior opening; *fins occupy nearly entire length of mantle (90 percent in adults, 75 percent in juveniles)* and are elliptical to weakly rhomboidal, their width about 65 percent of mantle length; *buccal lappets without suckers;* modified portion of hectocotylized (left ventral) arm occupies distal fourth of arm length and is characterized by sudden reduction in size of one or 2 pairs of suckers, the complete absence of suckers in both rows from the remaining distal portion of the arm, and the increase in size of the pedicels into large, fleshy papillae.



hectocotylized arm in males



ventral view



dorsal view

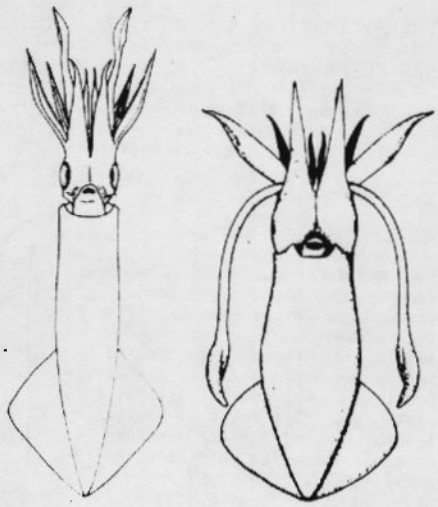
0 6 cm

Colour: quite varied in life from translucent with irredescent sheen, through greenish brown to deep reddish brown, depending on location and situation; may show "eye-spots", bands, stripes on mantle, these sometimes outlined in white.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Loligo species: mantle elongate, narrow, tapering to a point posteriorly; fins rhomboidal with lateral angles, never longer than 65 percent of mantle length; suckers present on buccal lappets (absent in *S. sepioidea*).

Lolliguncula brevis: mantle stout, widest at middle, bluntly rounded posteriorly; fins broad, wider than long (75 percent of mantle length), short (about 50 percent of mantle length), and round; buccal lobes with suckers.



Loligo sp. *Lolliguncula brevis*
ventral view

SIZE:

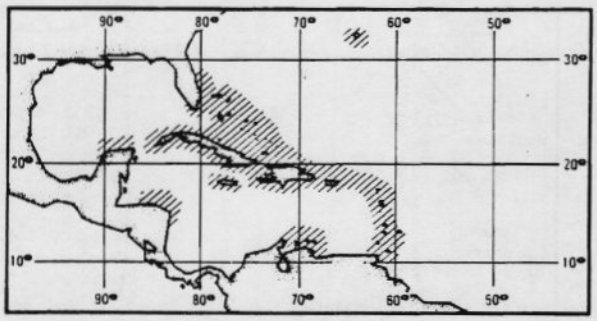
Maximum: 15 to 20 cm (mantle length).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Tropical western Atlantic from Cape Canaveral, Florida, Bermuda and the Bahama Islands, Florida Keys, Caribbean Islands, Campeche, Yucatán to Venezuela.

A truly tropical species that is limited in distribution by the distributions of coral reefs, primarily, and grass flats *(Thalassia testudinum)*. It occurs at depths of 0 to 20 m, mostly 3 to 7 m. As true coral reefs are absent from the Gulf of Mexico proper, *S. sepioidea* also appears to be excluded from the Gulf.

Occurs in schools of 4 to 50 individuals of about equal size-groups that cruise around the reefs or above the reef flats, or grass beds behind the reefs. Specimens are mature at about 9 cm mantle length (hectocotylus visible on males at 3 cm mantle length). Eggs are very yolky and large, about 5 to 6 mm long; only 3 to 4 eggs are laid in large, gelatinous capsules, several of which are attached together at their bases; these small clusters are laid under rocks or in conch shells *(Strombus gigas)*; breeding apparently occurs year-round.



Feeds on fishes and shrimps.

PRESENT FISHING GROUNDS:

Presently not fished commercially in Area 31.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

Separate statistics are not reported for this species.

Attraction by night light and capture with dipnet or liftnet; small purse seine or jigging would be the most effective gear.

Other species of *Sepioteuthis* in the Indo Pacific are fished extensively and are of excellent quality for eating.

OCT
1977

FAO SPECIES IDENTIFICATION SHEETS

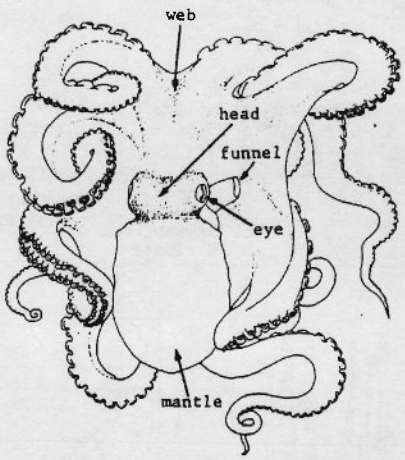
FISHING AREA 31
(W Cent. Atlantic)

OCTOPODIDAE

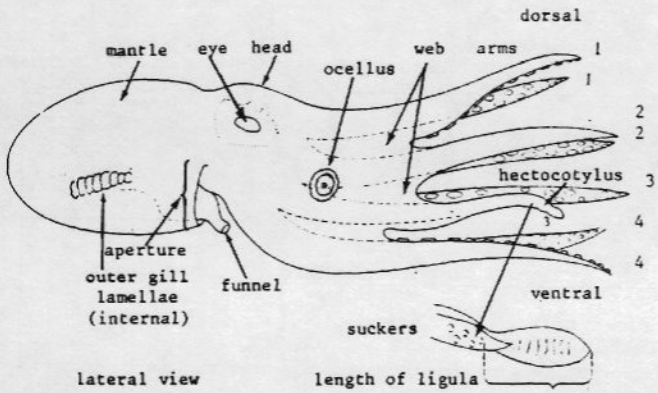
Octopuses

Body short, sac-like, without lateral fins; 8 arms around mouth, *but no tentacles;* mantle with a large aperture; *suckers in 2 rows, without chitinous sucker rings* (the subfamily Eledoninae has 1 row of suckers, but it does not occur in Fishing Area 31). Third (ventral) left arm in males hectotocotylized (used to transfer sperm packets from the male to the female); the shape and structure of the modified distal portion (or ligula) of this arm is often useful as a diagnostic generic or specific character.

Colour: very variable and changeable from mottled brown, green, and white to deep brick red or maroon, to white-spotted or ocellated.



dorsal view



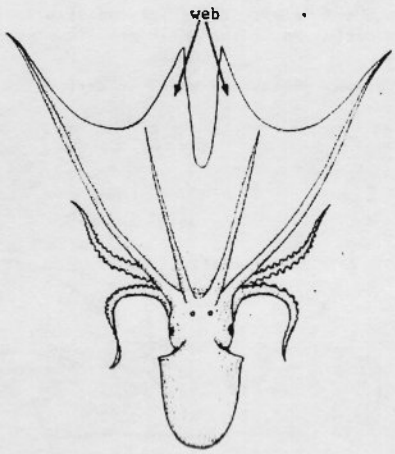
length of ligula
tip of hectocotylized arm (in males)

The family Octopodidae is extremely rich in species. Octopuses occur in all oceans and nearly all habitats. Those under consideration here are the inshore, shallow water forms that support current fisheries or show a potential for fisheries. They occur from 1 to perhaps 50 m depth on sand, mud, grass flat, coral reef or reef-rubble habitats, depending on the species. Most lay eggs in large numbers strung together in strands and attached to a hard substrate, hidden from view of potential predators. Larvae hatch out resembling the adults and they either settle immediately to the bottom to take up the habitat of the adult, or they become planktonic for a period during which time they drift about with the currents before settling out into the adult habitat. Fishing activity ranges from the subsistence level using hooked poles or spears to the commercial level using multiple baited lines or clay pots.

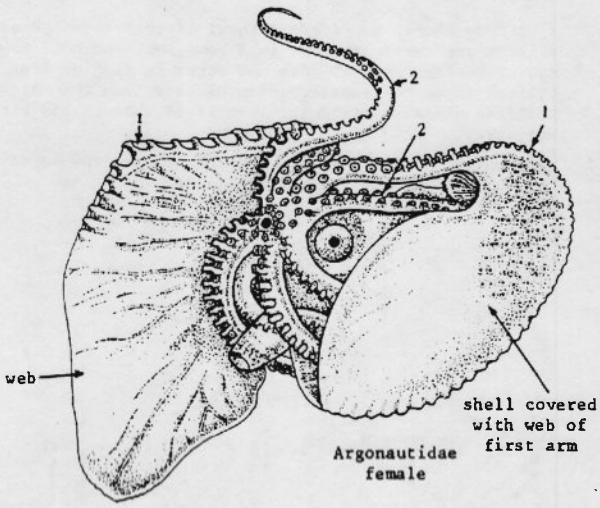
SIMILAR FAMILIES OCCURRING IN THE AREA:

Tremoctopodidae: animals large, semi-gelatinous; dorsal (first) pair of arms much the longest and connected to each other and the second arms by a deep, membranous web; coloration violet.

Argonautidae: animals medium-sized; a very shallow web between the arms; in females dorsal (first) pair of arms with a very broad, flap-like membrane distally that produces and holds the open, white shell that serves as an egg case; males very small.



Tremoctopodidae
dorsal view

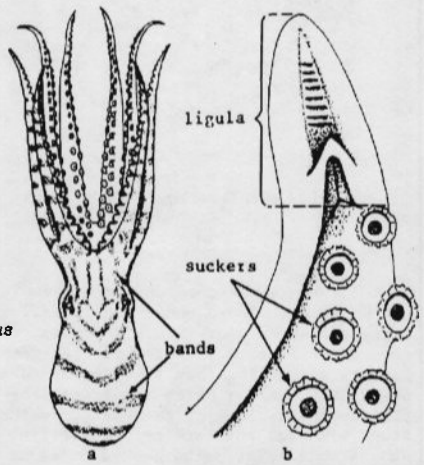


KEY TO SPECIES OCCURRING IN THE AREA*:

1 a. Mantle, head, and arms crossed by broad bands of chocolate brown on a light backgroud (Fig. 1a); animals small; gill lamellae 6 or 7; ligula index** 6 to 9 (Fig. 1b); eggs medium-sized, about 6 mm long ..... *Octopus zonatus*

1 b. No chocolate-brown bars crossing mantle head, and arms

2 a. An ocellus or dark spot or ring on each side of head between eye and base of second and third arms



dorsal view — tip of hectocotylized arm (in males)

O. zonatus

Fig. 1

* After Voss, 1968

** length of ligula expressed in percentage of length of hectocotylized arm; length of ligula is measured from distal (last) sucker to tip of arm; length of hectocotylized arm is measured from mouth to tip of arm

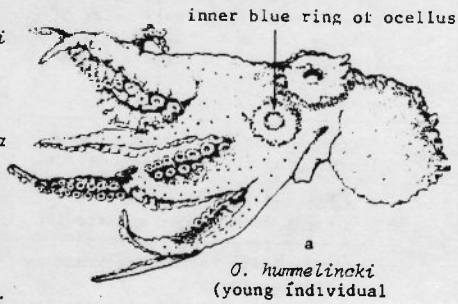
3 a. Ocellus with a narrow blue ring within the spot (Fig. 2a); animals small; gill lamellae 6 or 7; ligula index 4 or 5 (Fig. 3b); eggs small ..... *O. hummelinoki*

3 b. Ocellus without a blue ring (Fig. 2b); animals large; gill lamellae 9 or 10; ligula index 1.4 to 1.9 (Fig. 3c); eggs large, to 17 mm ..... *O. maya*

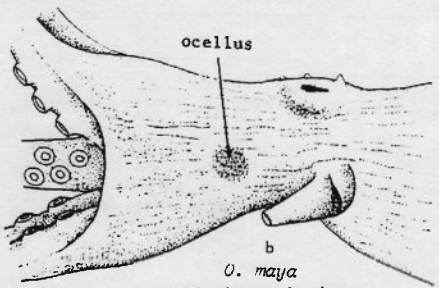
2 b. No ocellus, or dark spot, or ring present

4 a. Mantle, head and arms covered with close-set papillae; a dark purplish or brownish stripe along dorsal side of arms (Fig. 4); size small ..... *O. burryi*

4 b. Mantle, head and arms not covered with close-set papillae; no dark stripe along dorsal border of arms

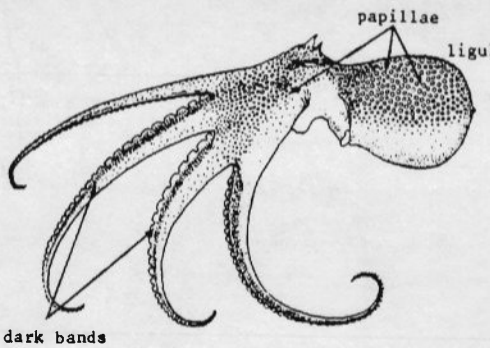


a
O. hummelinoki
(young individual



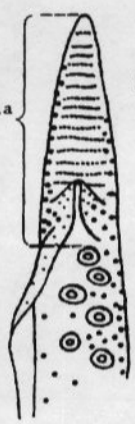
b
O. maya
head, lateral view

Fig. 2

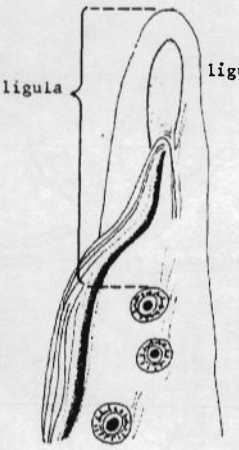


O. burryi
lateral view

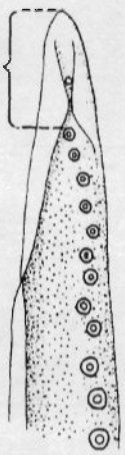
Fig. 4



a
O. burryi



b
O. hummelinoki
tip of hectocotylized arm (in males)



c
O. maya

Fig. 3

5 a. First pair of arms always largest and usually longest, stoutest or coequally stoutest with second pair of arms (Fig. 5a); size of animals medium to large; gill lamellae 9 to 13; ligula index up to 14 (Fig. 5b); eggs small ..... *O. macropus*

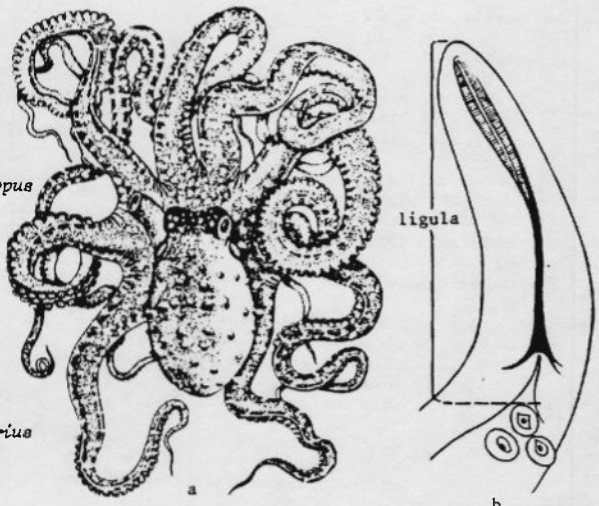
5 b. Second and/or third pair of arms longest, usually conspicuously so

6 a. Second and third pair of arms much longer and stouter than first and fourth pair (Fig.6a); size of animals medium to large; gill lamellae 6 to 8; ligula index 3 or 4 (Fig. 6b); eggs large, from 10 to 14 mm ....*O. briarius*

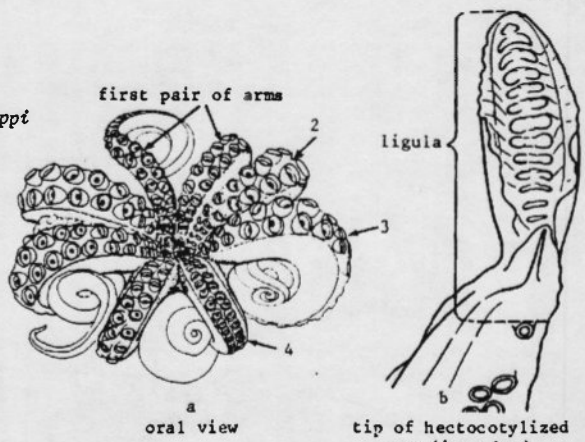
6 b. Second and third pairs of arms not markedly longer and stouter than other arms

7 a. Arms long and slender, asymmetrical in length; mantle small (Fig. 7a); animals small to medium-sized; gill lamellae 11; ligula index 1.8 to 2.5 (Fig. 7b); eggs unknown ..... *O. defilippi*

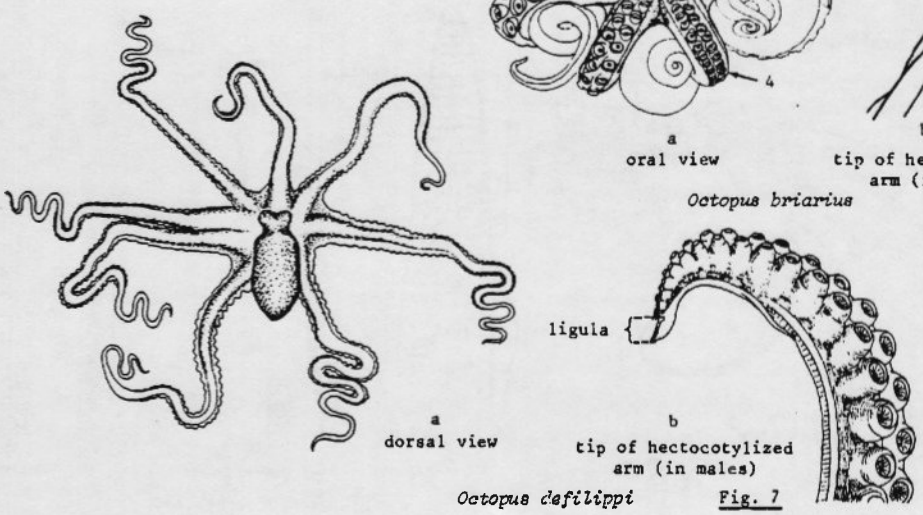
7 b. Arms not conspicuously long and slender; arms symmetrical or nearly so in length



Octopus macropus Fig. 5



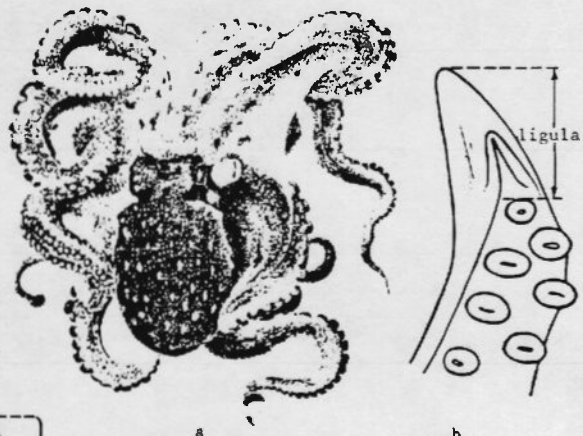
Octopus briarius Fig. 6



Octopus defilippi Fig. 7

8 a. Arms stout, moderately short; animals medium to large-sized (Fig. 8a); gill lamellae 7 to 11; ligula index less than 2.5 (Fig. 8b); eggs small, 3 mm or less ..... *O. vulgaris*

8 b. Arms short (Fig. 9a); animals small; gill lamellae 5 to 7; ligula index 4 to 7 (Fig. 9b); eggs moderately large, 5 to 10 mm ..... *O. joubini*

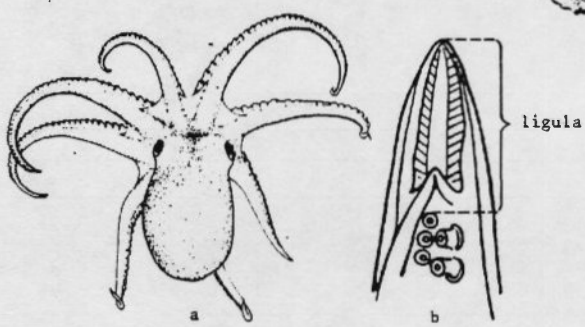


a dorsal view

b tip of hectocotylized arm (in males)

Octopus vulgaris

Fig. 8



a dorsal view

b tip of hectocotylized arm (in males)

O. joubini

Fig. 9

LIST OF SPECIES OCCURRING IN THE AREA:

Code numbers are given for those species for which Identification Sheets are included

Bathypolypus arcticus (Prosch, 1849)

Benthoctopus januari (Hoyle, 1885)

Danoctopus schmidti Joubin, 1933

Euaxoctopus pillsburyae Voss, 1975

Octopus briarius Robson, 1929 OCT Oct 3
Octopus burryi Voss, 1950
Octopus defilippi Verany, 1851
Octopus hummelincki Adam, 1936
Octopus joubini Robson, 1929
Octopus macropus Risso, 1826 OCT Oct 2
Octopus maya Voss & Solis, 1966 OCT Oct 4
Octopus vulgaris Cuvier, 1797 OCT Oct 1
Octopus zonatus Voss, 1968

Pteroctopus tetracirrhus (Delle Chiaje, 1830)

Scaeurgus unicirrhus (Orbigny, 1840)

Tetracheledons spinicirrus Voss, 1955

Prepared by C.F.E. Roper, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A

Part of illustrations provided by author

OCT Oct 1
1977

FAO SPECIES IDENTIFICATION SHEETS

FAMILY: OCTOPODIDAE

FISHING AREA 31
(W Cent. Atlantic)

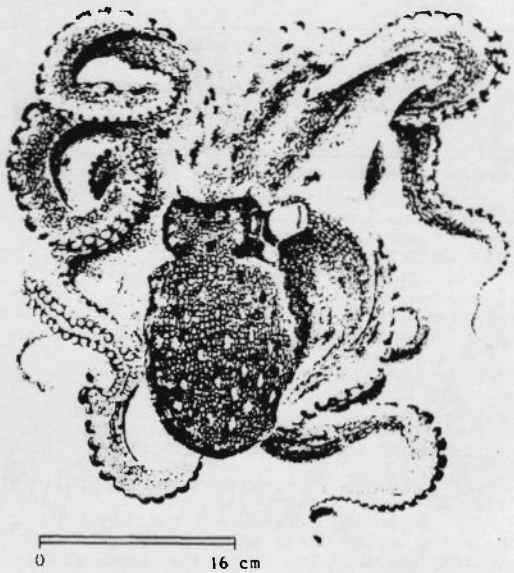
Octopus vulgaris Cuvier, 1797

OTHER SCIENTIFIC NAMES STILL IN USE: None

VERNACULAR NAMES:

FAO: En - Common octopus
Fr - Pieuvre
Sp - Pulpo común

NATIONAL:



DISTINCTIVE CHARACTERS:

Animal chunky in appearance, with stout arms of about equal length and thickness, dorsal (first) pair of arms slightly shorter; shortened third right arm of males hectocotylized by modification of tip into a *very small, spoon-shaped ligula, ligula index* (length of ligula expressed as percentage of length of hectocotylized arm), *less than 2.5; 7 to 11 gill lamellae on outer side of gill,* including terminal lamella; animals medium to large-sized; *eggs small, 3 mm or less.*

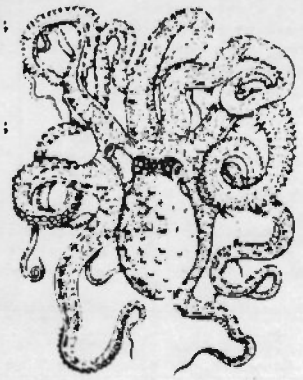
Colour: very variable, commonly mottled brown, white and tan.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

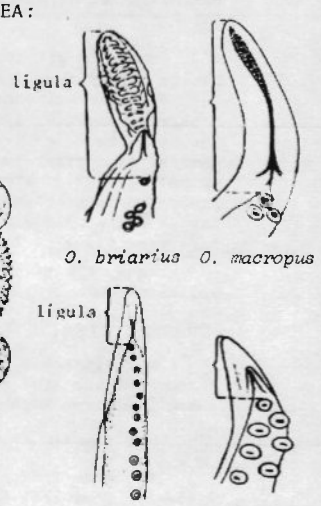
Octopus briarius: second and third pairs of arms much longer and stouter than first and fourth pairs; 6 to 8 gill lamellae (7 to 11 in *O. vulgaris*); a large, conspicuous, ridged and grooved ligula on hectocotylized third right arm; ligula index 3 or 4 (less than 2.5 in *O. vulgaris*); eggs large, 10 to 14 mm (3 mm or less in *O. vulgaris*).

O. macropus: dorsal (first) pair of arms longest, often stoutest (shortest in *O. vulgaris*); third right arm hectocotylized in males, with a long, stout, tubular ligula, ligula index up to 14; 9 to 13 gill lamellae; colour blue-green with large white spots over dorsal surface of mantle, head, and arms; turns brick red, spots intensify, when animal disturbed.

O. maya: a large, round, dark "eyespot" (ocellus) on each side between eye and base of second and third pairs of arms (no ocellus in *O. vulgaris*); short stout third right arm hectocotylized in males, with small ligula with inrolled edges, ligula index 1.4 to 1.9; 9 to 10 gill lamellae; eggs large, to 17 mm.



Octopus macropus
dorsal view



O. briarius *O. macropus*

O. maya **O. vulgaris**
tip of hectocotylized arm in males showing ligula

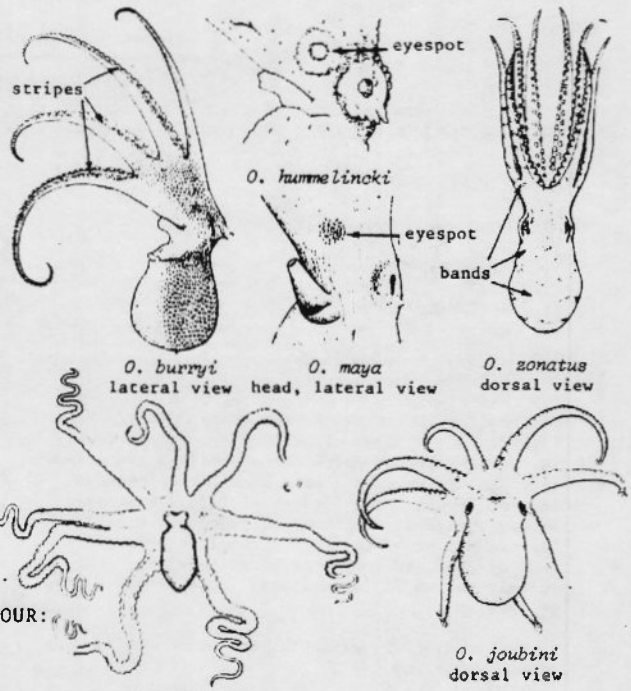
O. zonatus: mantle, head and arms crossed with broad, chocolate brown bands against light background.

O. hummelincki: dark ocellus or eye-spot between eye and base of second and third arms with narrow blue ring within the spot.

O. burryi: mantle, head and arms covered with close-set papillae; dark purplish or brownish stripe along dorsal side of arms.

O. defilippi: arms very long, slender, asymmetrical in length; mantle small, 11 gill lamellae.

O. joubini: arms very short, slender, equal in length and thickness; third right arm hectocotylized with a large conspicuous, ridged ligula, ligula index 4 to 7; gill lamellae 5 to 7; eggs moderately large, 5 to 10 mm.



SIZE:

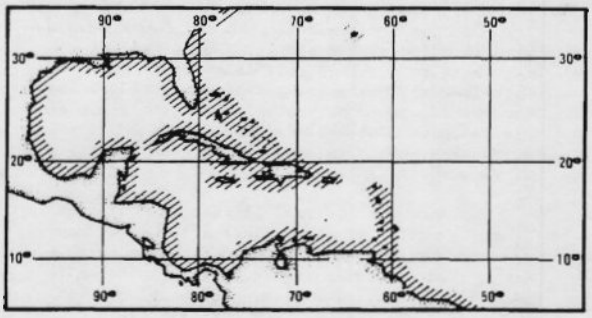
Maximum: 1 m total length (including arms); common to 50 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Worldwide in a great variety of habitats. In the western North Atlantic from about 40°N (off New York) to Florida, Bermuda, the Bahamas, Gulf of Mexico, Caribbean Sea and Guianas.

Occurs on all types of bottoms and inhabits waters from a few meters deep to the edge of the continental shelf. Lives 1 to 2 years. Spawning season from March to October, the males die after mating; females lay large clusters of eggs (150 000) in holes, shells, etc., then, cease feeding, brood the clutch, and die after eggs hatch. Larvae are planktonic for several weeks before settling to the bottom.

Feeds primarily on crabs, shrimps and molluscs.



PRESENT FISHING GROUNDS:

No large-scale commercial fisheries exist in Area 31, but local and incidental catches occur throughout the area and these catches are marketed. Small-scale fisheries currently are conducted in Cuba, Dominican Republic, Puerto Rico and Venezuela; these fisheries are expected to intensify.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

The catch from Fishing Area 31 reported as *Octopus vulgaris* totalled 4 525 tons in 1976 (Mexico, 4 487 t; Dominical Republic, 38 t). It is likely however that other species of *Octopus* are included in these figures. Most of the Mexican catch is, indeed, *O. maya*.

Fishing methods: (1) hooking and spearing by individual fishermen; a hook on a pole is thrust into the octopus hole, twisted and withdrawn with the hooked octopus; spears are used when octopuses are on open bottom (grass flats or reef); primarily a subsistence technique. (2) trapping with fish traps or pots; many clay pots are attached on a line and strung out on bottom where octopuses enter for protection or to lay eggs. Catches can be significant.

Utilized fresh, frozen and canned for food and for bait.

FAO SPECIES IDENTIFICATION SHEETS

FAMILY: OCTOPODIDAE

FISHING AREA 31
(W Cent. Atlantic)

Octopus macropus Risso, 1826

OTHER SCIENTIFIC NAMES STILL IN USE: None

VERNACULAR NAMES:

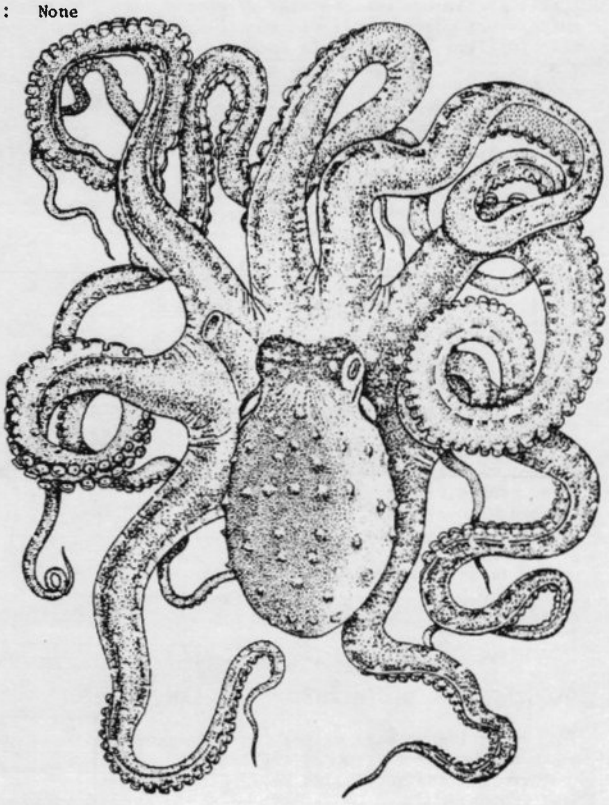
FAO: En - White-spotted octopus
Fr - Poulpe tacheté
Sp - Pulpo manchado

NATIONAL:

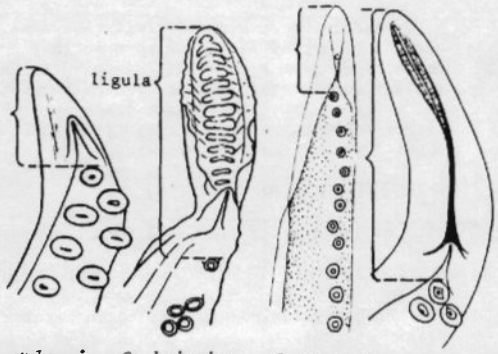
DISTINCTIVE CHARACTERS:

Dorsal (first) pair of arms longest and stoutest (or co-equally stoutest with second pair); third right arm of males hectocotylized by modification of tip to *a large stout, tubular ligula; ligula index* (length of ligula expressed as percentage of length of hectocotylized arm) *up to 14; 9 to 13 gill lamellae* on outer side of gill; animals medium to large; eggs small.

Colour: blue-green with *large white spots over dorsal surface of mantle, head, and arms;* turns *brick red, spots intensify when animal disturbed.*



0 18 cm



O. vulgaris *O. briarius* *O. maya* **O. macropus**

tip of hectocotylized arm (in males)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

O. vulgaris: all arms about equally robust, the first pair shortest (first pair longest, most robust or co-equally robust with second arms in *O. macropus*); tip of hectocotylized arm small, spoon-shaped, ligula index less than 2.5 (large, stout, tubular, ligula index up to 14 in *O. macropus*); 7 to 11 gill lamellae (9 to 13 in *O. macropus*); colour variable, mottled brown, white and tan, no spots.

O. briarius: second and third arms the longest and most robust; hectocotylized srm-tip s large, expanded, ridged and grooved ligula with index 3 to 4; 6 to 8 gill lamellae; eggs large, 10 to 14 mm.

O. maya: large, round dark "eyespot" (ocellus) between eye and base of second and third arms; hectocotylized arm-tip small with inrolled edges, ligula index 1.4 to 1.9; 9 or 10 gill lsmellae; eggs large, to 17 mm.

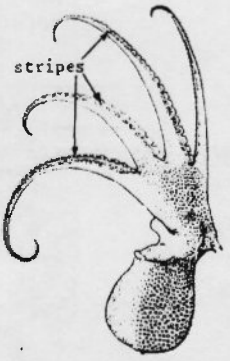
O. zonatus: mantle, head and arms crossed with brosd, chocolate brown bands sgainst light background.

O. hummelincki: dsrk ocellus or eyespot between eye and bsse of second and third arms with narrow blue ring within the spot.

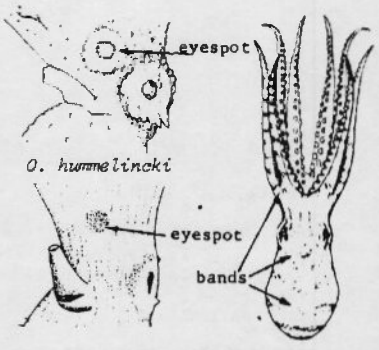
O. burryi: mantle, head and arms covered with close-set papillae; dark purplish or brownish stripe along dorsal side of arms.

O. defilippi: arms very long, slender, asymmetrical in length; mantle small, 11 gill lamellae.

O. joubini: arms very short, slender, equal in length and thickness; third right arm hectocotylized with a large, conspicuous, ridged ligula, ligula index 4 to 7; gill lamellae 5 to 7; eggs moderately large, 5 to 10 mm.

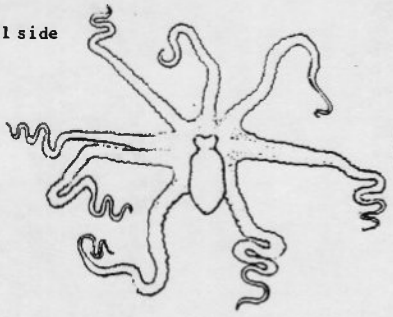


O. burryi
lsteral view



O. maya
head, lateral view

O. zonatus
dorsal view



O. defilippi
dorsal view

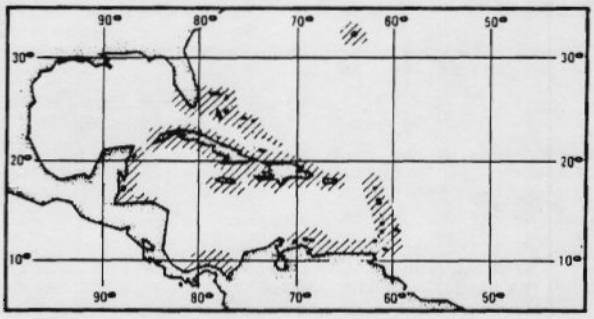
O. joubini
dorsal view

SIZE:

Maximum: 1 m total length (including arms); common to 60 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Worldwide in warm wster; in the western north Atlantic from Bermu'e, the Bahamas, southern Florida and Flo.ida Keys, Caribbean Sea, Pansma.



Associated with coral reefs, but also occurs on reef flsts snd open bottom; depth rsnge from 1 to 20 m; distribution and biology incompletely known; spawns in winter and early spring; larvae sre planktonic before settling on the bottom; life spsn about 1 year; feeds on crustaceans.

PRESENT FISHING GROUNDS:

No large-scale fishery exists; captured in Fishing Area 31 at local and subsistence levels.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

Probably included in the catch reported for *Octopus vulgaris* (4 487 tons from Fishing Area 31, mainly Mexico).

At present, the main fishing gear sre hooks and spesrs. Can be trawled on appropriate bottom.

Used as food and bait.

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FAO SPECIES IDENTIFICATION SHEETS

FAMILY: OCTOPODIDAE

FISHING AREA 31
(W Cent. Atlantic)

Octopus briarius Robson, 1929

OTHER SCIENTIFIC NAMES STILL IN USE: None

VERNACULAR NAMES:

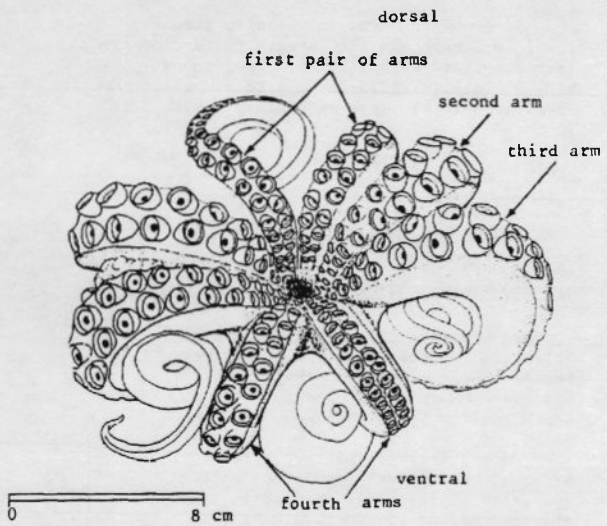
FAO: En - Reef octopus
Fr - Poulpe ris
Sp - Pulpo de arrecife

NATIONAL:

DISTINCTIVE CHARACTERS:

Animal chuncky, with long arms of unequal length and thickness; dorsal (first) pair of arms shortest, the least stout, second and third pairs longest and very stout; third right arm of males hectocotylized by modification of arm tip into *a large expanded, ridged and grooved ligula; ligula index* (length of ligula expressed as percentage of length of hectocotylized arm) *3 or 4; 6 to 8 gill lamellae on outer side of gill;* animals medium to large-sized; *eggs large, 10 to 14 mm.*

Colour: bluish green to greenish brown, mottled, darker when disturbed.

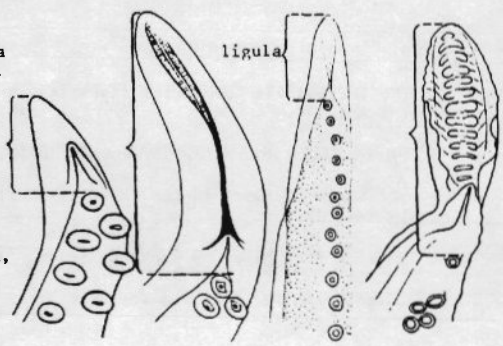


DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

O. vulgaris: all arms about equally robust, first pair slightly shorter than second (second and third pairs much longer and thicker than first pair in *O. briarius*); hectoctotylized arm-tip very small; ligula index less than 2.5 (ligula large, expanded, ridged and grooved. index 3 or 4 in *O. briarius*); 7 to 11 gill lamellae (6 to 8 in *O. briarius*); eggs small, 3 mm or less (large, 10 to 14 mm in *O. briarius*).

O. macropus: dorsal arms longest and stoutest (shortest, often weakest, in *O. briarius*); hectocotylized arm with a large, stout tubular ligula, index up to 14; 9 to 13 gill lamellae; colour blue-green with large white spots over dorsal surface of body, head, and arms (no spots on *O. briarius*).

O. maya: a large, round, dark "eyespot" (ocellus) on each side between eye and base of second and third arms (no ocellus in *O. briarius*); hectocotylized arm-tip small with inrolled edges, ligula index 1.4 to 1.9; 9 or 10 gill lamellae.



O. vulgaris *O. macropus* *O. maya* **O. briarius**

tip of hectocotylized arm in males showing ligula

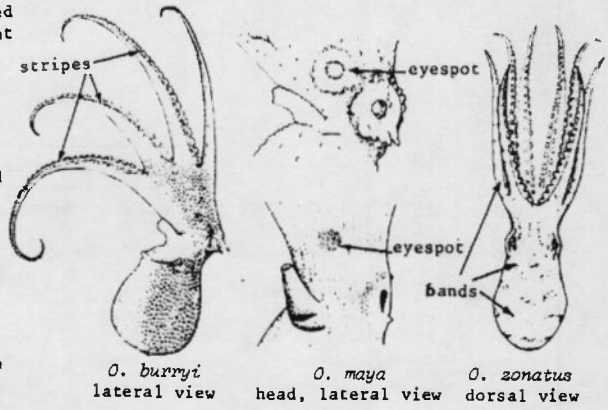
O. zonatus: mantle, head and arms crossed with broad, chocolate brown bands against light background.

O. hummelincki: dark ocellus or eyespot between eye and base of second and third arms with narrow blue ring within the spot.

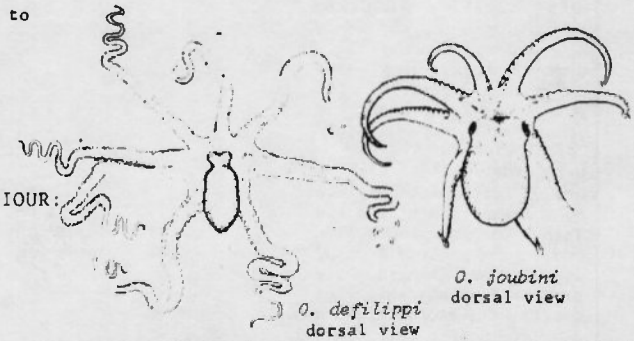
O. burryi: mantle, head and arms covered with close-set papillae; dark purplish or brownish stripe along dorsal side of arms.

O. defilippi: arms very long, slender, asymmetrical in length; mantle small, 11 gill lamellae.

O. joubini: arms very short, slender, equsl in length and thickness; third right arm hectocotylized with a large, conspicuous, ridged ligula, ligula index 4 to 7; gill lamellae 5 to 7; eggs moderately large, 5 to 10 mm.



O. burryi lateral view — *O. maya* head, lateral view — *O. zonatus* dorsal view



O. defilippi dorsal view

O. joubini dorsal view

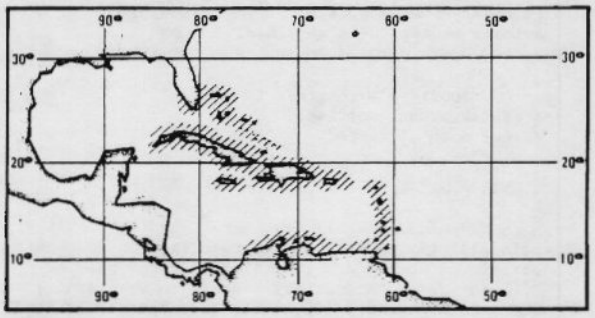
SIZE:

Maximum: 60 cm total length (including arms); common to 40 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Warm waters of the western north Atlantic; southeastern United States, southern Gulf of Mexico, the Bahamaa, Caribbean Islands chain and northern South America to Guianas.

Occurs in very shallow, warm waters of coral reefa, rocky and sandy bottom and grass flats; life span about 1 year; spawning season December to March; males die after mating, females die following egg-lsying (about 500 in small clusters), brooding of clutch, and hatching of larvae; larvae are large, non-planktonic; they settle immediately in the adult habitat; feeds on crabs, ahrimps and molluscs.



PRESENT FISHING GROUNDS:

No large-scale commercial fisheries, but extensive local and subsistence fisheries throughout Fishing Area 31.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

Probably included in the catch reported for *Octopus vulgaris* (4 487 tons from Fishing Area 31, mainly Mexico).

Caught from holes by hooks on poles; speared over open bottom; trapped in clay pots.

Used fresh for food and for bait.

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FAO SPECIES IDENTIFICATION SHEETS

FAMILY: OCTOPODIDAE

FISHING AREA 31
(W Cent. Atlantic)

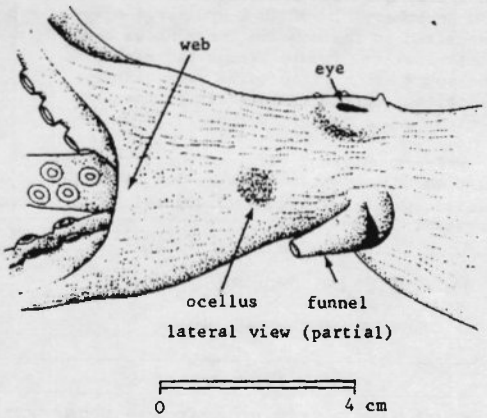
Octopus maya Voss & Solis, 1966

OTHER SCIENTIFIC NAMES STILL IN USE: None

VERNACULAR NAMES:

FAO: En - Mexican four-eyed octopus
Fr - Poulpe mexicain
Sp - Pulpo mexicano

NATIONAL:



DISTINCTIVE CHARACTERS:

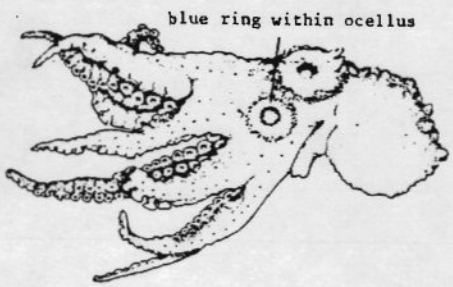
A large, round, dark "eyespot" (ocellus) between the eye and the base of the second and third pair of arms on each side of the head; arms long with attenuate tips; third right arm in males shortened, hectocotylized by modification of tip into a small, smooth spoon-shaped ligula with inrolled edges; *ligula index* (length of ligula expressed as percentage of length of hectocotylized arm) *1.4 to 1.9; 9 or 10 gill lamellae* on outer side of gill; animals large; *eggs large, to 17 mm.*

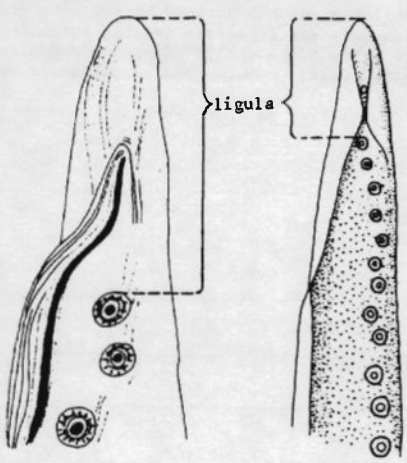
Colour: dark brown; turns to dark reddish brown when animal is alarmed.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

O. hummelincki: dark ocellus or eyespot between eye and base of second and third arms with a narrow blue ring within the spot; ligula index 4 or 5 (1.4 to 1.9 in *O. maya*).

Other *Octopus* species: no ocellus on head.





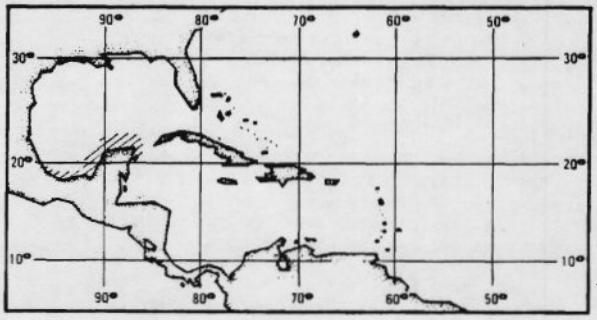
tip of hectocotylized arm in males showing ligula

SIZE:

Maximum: 130 cm totsl length (including arms) weight 5 kg.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Apparently restricted to the coasts of Csmpeche snd Yucatán, Mexico.



. Occurs in shallow wster from 1 to 50 m, on grassy bottom; spawning season November and December; 1 500 to 2 000 large eggs deposited in festoons in rocky holes and empty shells; female broods the clutch; the young hatch in 50 to 65 days, large hatchlings settle immediately on the bottom; life span 1 to 2 years.

Feeds on crabs (e.g. stone crab *Menippe mercenaria*), bivslve molluscs and fishes; preyed upon by grouper (Serranidae) and mackerel (Scombridae).

PRESENT FISHING GROUNDS:

Campeche snd Yucatán, Mexico.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

Doubtless constitutes most of the catch reported as *Octopus vulgaris* (4 487 tons from Fishing Area 31, mainly Mexico). *O. maya* is the dominant species in Mexican octopus cstches. octopus catches.

Captured from June to December from small drifting boats with 25 to 35 nylon or cotton lines trailed along the bottom, baited with crabs; when the lines go taut they are hauled in and the octopuses are dipnetted aboard; occasionally srtificial lures soaked in fish oil are used, as are empty conch shells *(Strombus gigas)* and clay pots into which octopuses crawl for shelter or to lay eggs; hooking and spesring ars done in shallow water.

Utilized ss food and bait.

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FAO SPECIES IDENTIFICATION SHEETS

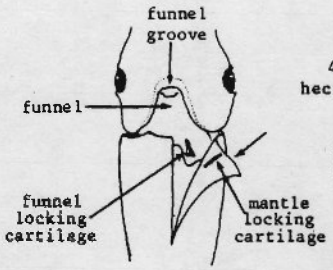
FISHING AREA 31
(W Cent. Atlantic)

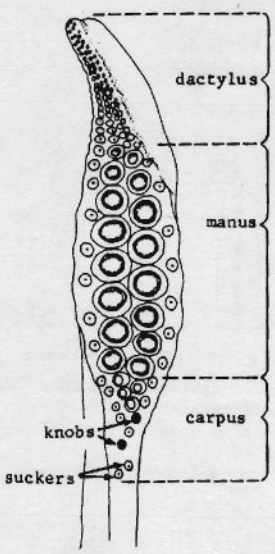
OMMASTREPHIDAE

Flying squids

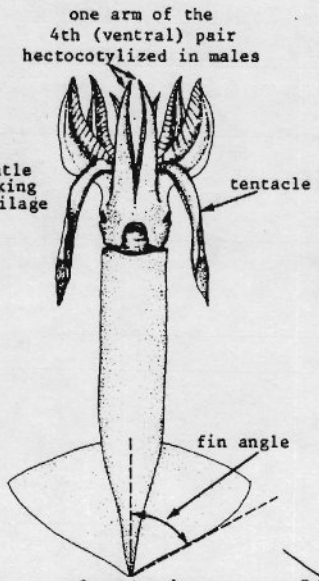
Mantle elongate, torpedo-like, tapering posteriorly; fins large and terminal; *funnel-locking apparatus ⊥ -shaped;* 8 arms and 2 tentacles around mouth; *2 rows of suckers on arms and 4 rows on tentacular clubs, except in Illex which has 8 rows of suckers on the dactylus of the clubs;* hooks never present on arms or clubs; *buccal connectives attached to dorsal borders of fourth arms.* Usually one of the ventral (fourth) pair of arms is hectocotylized in males (used to transfer sperm packets from the male to the female); the structure of the modified portion (hectocotylus) of this arm is useful in most species as a diagnostic character (often, sucker stalks or trabeculae on the hectocotylus are modified into fleshy papillae or flaps; suckers may be reduced in size or disappdisappear altogether, or there may be further modifications).

Colour: deep maroon to pale reddish-brown, or purplish; darkest dorsally.

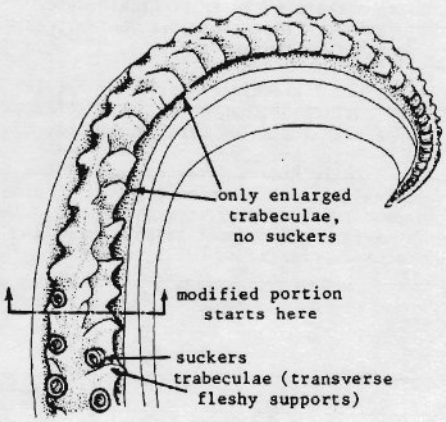




Ommastrephes
tentacular club



Ommastrephes
ventral view



hectocotylized arm
(Illex oxygonius)

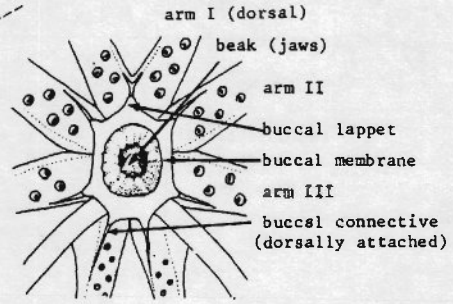


diagram of oral surface of brachial crown
and buccal ares

Medium- to large-sized oceanic and neritic squids. This is one of the most widely distributed and conspicuous families of squids in the world. Most species are exploited commercially and one, *Todarodes pacificus*, makes up the bulk of the squid landings in Japan (up to 600 000 metric tons annually) and may comprise at least half the annual world catch of cephalopods. In various parts of Fishing Area 31, 6 species of ommastrephids currently are fished commercially or have a potential for commercial exploitation. Ommastrephids are powerful swimmers and often occur in large schools. Some neritic species exhibit strong seasonal migrations, wherein they occur in huge numbers in inshore waters where they are accessable to fisheries activities. The large size of most species (commonly 30 to 50 cm total length and up to 120 cm total length) and the heavily muscled structure, make them ideal for human consumption.

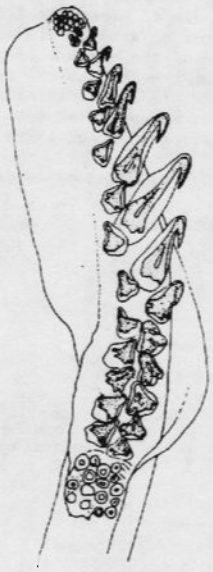
SIMILAR FAMILIES OCCURRING IN THE AREA:

Onychoteuthidae: tentacular clubs with claw-like hooks; funnel-locking apparatus a simple, straight groove.

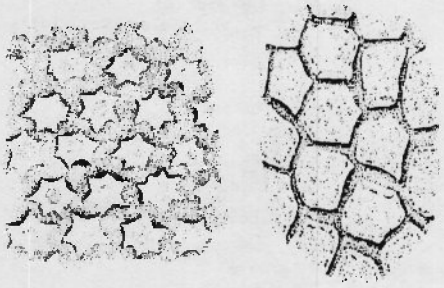
Thysanoteuthidae: funnel-locking apparatus a long, narrow longitudinal groove with a short broad transverse groove, ⊣-shaped; fins broad, rhomboidal, extend nearly full length of mantle.

Lepidoteuthidae: distinct "scales" on the surface of the mantle; funnel-locking apparatus a simple, straight groove.

Loliginidae: eyes covered with a transparent corneal membrane; funnel-locking apparatus a simple, straight groove; small suckers on the buccal lappets (none in Ommastrephidae).



Onychoteuthidae
tentacular club



Lepidoteuthidae
scales on surface of mantle

⊣-shaped simple, straight ⊥-shaped
Thysanoteuthidae Lepidoteuthidae **Ommastrephidae**
Loliginidae
funnel-locking apparatus

KEY TO GENERA OCCURRING IN THE AREA:

1 a. Suckers on tip (dactylus) of tentacular clubs in 8 rows (Fig. 1a) ..... *Illex*

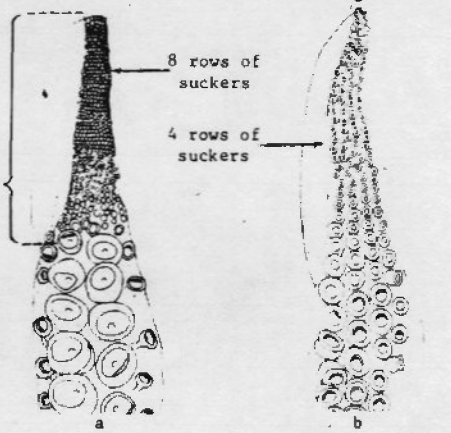
1 b. Suckers on tip of tentacular clubs in 4 rows (Fig. 1b)

2 a. Mantle drawn out posteriorly with a pointed tail; foveola present in funnel groove, side pockets absent (Fig. 2a); a long, thin strip of luminous tissue along ventral midline of viscera posterior to heart ..... *Ornithoteuthis*

2 b. Mantle with bluntly pointed terminus, not drawn out into a pointed tail; foveola and side pockets present (Fig. 2b)

3 a. Nineteen large round light organs on ventral surface of mantle, 4 pairs along ventral surface of fourth arms (Fig. 3a) ..... *Hyaloteuthis*

3 b. A golden stripe of luminous tissue along ventral midline of mantle (*O. bartrami*, Fig. 3b) or a large subcutaneous patch of consolidated luminescent granules on anterodorsal surface of mantle (*O. pteropus*) ..... *Ommastrephea*



distal end of tentacular club

Fig. 1

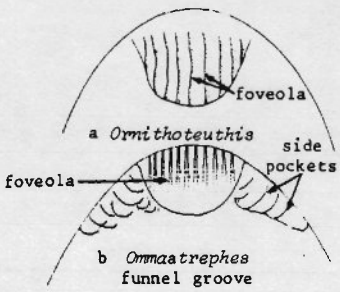
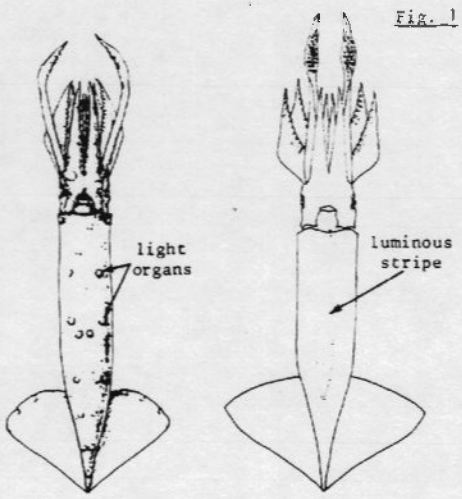


Fig. 2



ventral view

Fig. 3

LIST OF SPECIES OCCURRING IN THE AREA:

Code numbers are given for those species for which Identification Sheets are included

Hyaloteuthis pelagica (Bosc, 1802)	
Illex coindetii (Verany, 1837)	OMMAS Ill 1
Illex illecebrosus (LeSueur, 1821)	OMMAS Ill 2
Illex oxygonius Roper, Lu & Mangold, 1969	OMMAS Ill 3
Ommastrephes bartrami (LeSueur, 1821)	OMMAS Ommas 2
Ommastrephes pteropus Steenstrup, 1855	OMMAS Ommas 3
Ornithoteuthis antillarum Adam, 1957	OMMAS Orni 1

Prepared by C.F.E. Roper, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.

Part of illustrations provided by author

OMMAS I11 1

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FAO SPECIES IDENTIFICATION SHEETS

FAMILY: OMMASTREPHIDAE

FISHING AREA 31
(W Cent. Atlantic)

Illex coindetii (Verany, 1837)

OTHER SCIENTIFIC NAMES STILL IN USE: *Illex illecebrosus coindetii.* Formerly considered a subspecies, such a designation is now unjustifiable (see Roper, Lu & Mangold, 1969)

VERNACULAR NAMES:

FAO: En - Caribbean shortfin squid
Fr - Encornet rouge des Caraïbes
Sp - Pota voladora

NATIONAL:

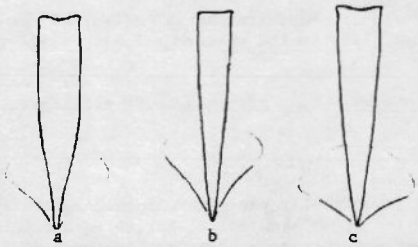
DISTINCTIVE CHARACTERS:

Mantle widest at anterior end (except in fully ripe females), moderately long and narrow; tail pointed, moderately drawn out; *fin angle broad, exceeding 50°;* fin width greater than fin length; *head large and robust,* especially in males, length about equal to width; *arms very long,* especially in males where second and third also are very robust; *hectocotylized arm (in males) longer than the opposite ventral (fourth) arm,* its modified portion about 25 percent of arm length; *distal trabeculae modified to papillose, fringed flaps; 1 to 2 knobs on dorsal row of lamellae of modified arm tip.*

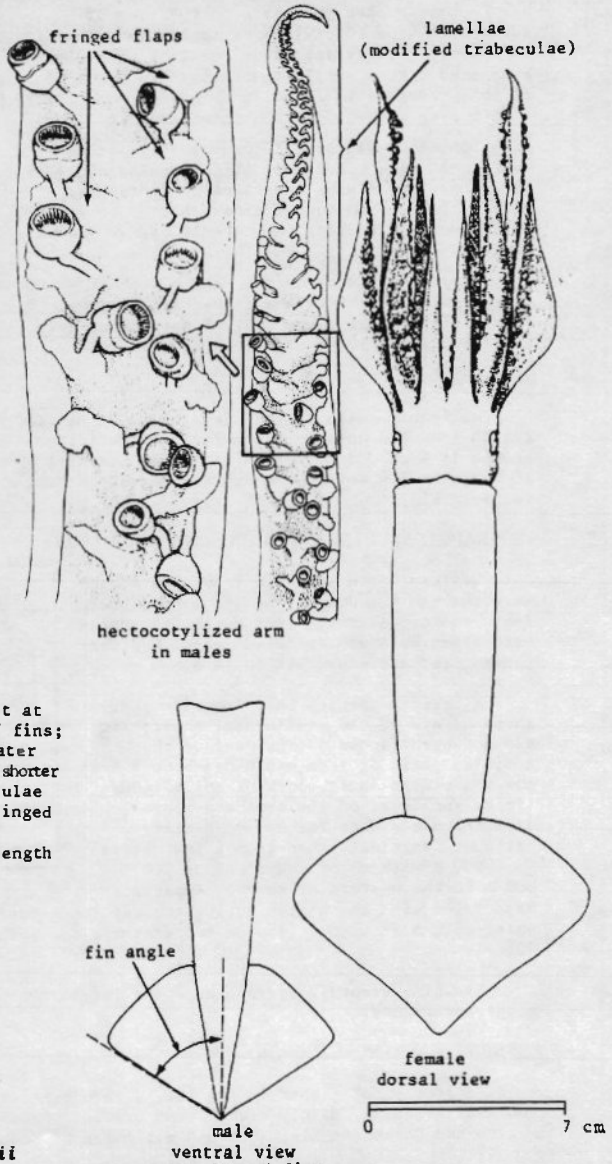
Colour: reddish to reddish brown, more vivid dorsally; paler, more yellowish ventrally.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Illex illecebrosus: mantle robust, widest at midpoint between anterior end and beginning of fins; fin-angle moderate, 40° to 50°, mostly 45° (greater than 50° in *I. coindetii*); hectocotylized arm shorter than the opposite ventral (fourth) arm, trabeculae without papillose, fringed flaps (papillose fringed flaps in *I. coindetii*); head small, short and narrow; arms reltively short, of about equal length in both sexes.



I. illecebrosus *I. oxygonius* ***I.coindetii***
mantle and fins (ventral view)

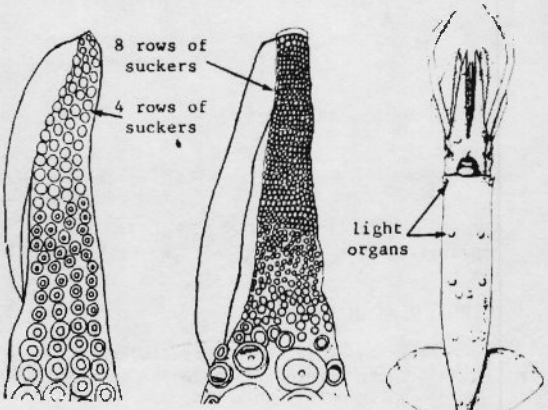


I. oxygonius: mantle widest at anterior end, long, narrow, drawn out into a pointed tail posteriorly; males with sharp, distinct, triangular dorsal lobe at anterior mantle opening; fin angle acute, 25° to 35°, very occasionally 40°; fin width equal to, or slightly greater than fin length; modified portion of hectocotylized arm about 29 percent of arm length; trabeculae without papillose fringed flaps; 3 knobs on dorsal row of lamellae of modified arm tip; head medium-sized, wider than long; arms moderately long, especially in males.

Ommastrephes species: only 4 rows of suckers at tips (dactylus) of tentacular clubs (8 in *Illex*); fixing apparatus on clubs with 0 to 3 knobs and 2 to 4 small, smooth suckers (none in *Illex*); foveola in funnel groove with 5 to 9 folds, 1 to 5 side pockets on each side (none in *Illex*).

Ornithoteuthis antillarum: only 4 rows of suckers at tips (dactylus) of tentacular clubs (8 in *Illex*); no fixing apparatus on tentacular clubs; foveola in funnel groove with 7 to 12 folds, no side pockets (no foveola or side pockets in *Illex*).

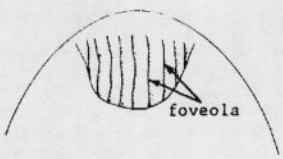
Hyaloteuthis pelagica: mantle with 19 round integumentary light organs on ventral surface; 4 round light organs along ventral surface of each ventral arm (no light organs in *Illex*).



Ommastrephes *Illex*

distal end of tentacular club

Hyaloteuthis pelagica



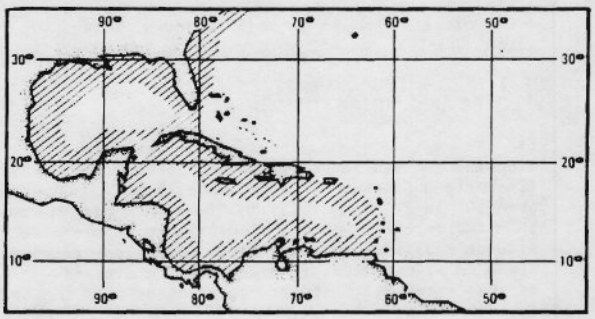
Ornithoteuthis antillarum

funnel groove

SIZE:

Maximum: males 18 cm; females 23 cm mantle length (reached only in the eastern Atlantic); common in Area 31: males 15 to 17 cm; females 16 to 24 cm (in Gulf of Mexico and Caribbean Sea, respectively).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:



Western North Atlantic from 37°N southward through the Gulf of Mexico and Caribbean Sea; eastern Atlantic from North Sea southward along European Atlantic coast, Mediterranean Sea, African coast to 14°S.

A neritic species that inhabits nearshore waters of the continental shelf; it has not been recorded from east of the Antilles chain or from south of about 9°N in the western Atlantic (lack of collections limits knowledge of its southern range). Apparent preference for sandy or silty bottoms; vertical range from a few metres to 1 000 m with major abundance at 200 to 600 m in the western Atlantic. Apparently associated with the bottom during the day (when captures are most frequent), disperses into the water column at night. Bottom temperatures at capture sites in the western Atlantic range from 8° to 13°C.

Spawning grounds, season, eggs and larvae are unknown. Prey presumed to be crustaceans (euphausids) and fishes.

PRESENT FISHING GROUNDS:

Presently not fished in Area 31, although it is commercially exploited in the eastern Atlantic and Mediterranean, mainly with bottom trawls. Potential seems high for fisheries in the Gulf of Mexico and Caribbean Sea, although estimates of commercial abundance have not been made.

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FAO SPECIES IDENTIFICATION SHEETS

FAMILY: OMMASTREPHIDAE

FISHING AREA 31
(W Cent. Atlantic)

Illex illecebrosus (LeSueur, 1821)

OTHER SCIENTIFIC NAMES STILL IN USE: *Illex illecebrosus illecebrosus*. The subspecies designation still may occur, but its usage is incorrect (see Roper, Lu & Mangold, 1969)

VERNACULAR NAMES:

FAO: En - Northern shortfin squid
Fr - Encornet rouge nordique
Sp - Pota norteña

NATIONAL:

DISTINCTIVE CHARACTERS:

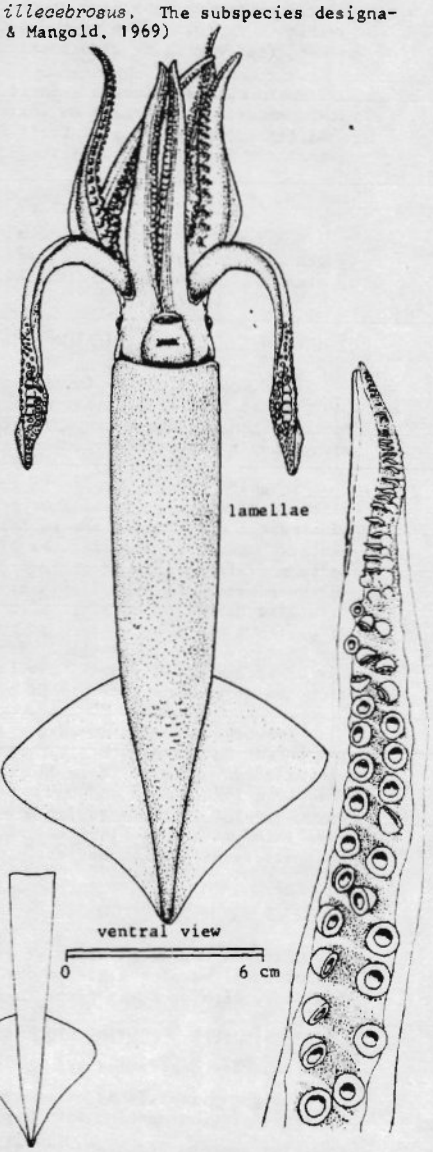
Mantle robust, widest at mid-point between anterior end and beginning of fins; tail not sharply pointed; *fin angle moderate, 40° to 50°, mostly 45°;* fin width greater than fin length; *head small, short and narrow; arms relatively short,* of about equal length in both sexes; *hectocotylized arm (in males) shorter than the opposite ventral (fourth) arm,* its modified portion very short, about 22 percent of arm length; trabeculae (lamellae) without papillose fringed flaps; 1 or 2 knobs on dorsal row of lamellae on modified arm tip.

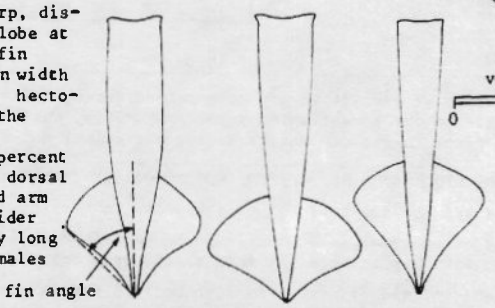
Colour: reddish-brown to deep purple, more intense on head, arms and dorsal surface of mantle and fins; paler on ventral surfaces; a brilliant yellowish-green tint.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Illex coindetii: mantle widest at anterior end; fin angle broad, greater than 50° (mostly less than 50° in *I. illecebrosus*); hectocotylized arm longer than the opposite ventral (fourth) arm; distal trabeculae modified into papillose, fringed flaps (no such flaps in *I. illecebrosus*); head large and robust; arms very long and robust, especially the second and third in males.

I. oxygonius: mantle widest at anterior end, drawn out into a long narrow pointed tail posteriorly; males with a sharp, distinct, triangular, dorsal lobe at anterior mantle opening; fin angle acute, 25° to 35°, fin width about equal to fin length; hectocotylized arm longer than the opposite ventral arm (IV); modified portion about 29 percent of arm length; 3 knobs on dorsal row of lamellae of modified arm tip; head medium-sized, wider than long. Arms moderately long and robust, especially in males (II and III).





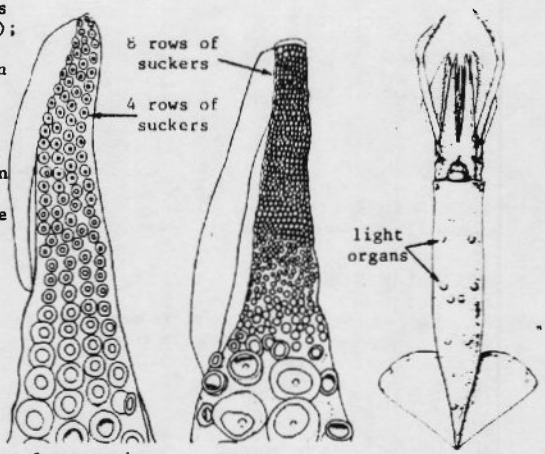
I. illecebrosus *I. coindetii* *I. oxygonius*
mantle and fins (ventral view)

hectocotylized arm
(in males)

Onmastrephes species: only 4 rows of suckers at tips (dactylus) of tentacular clubs (8 in *Illex*); fixing apparatus on clubs with 0 to 3 knobs and 2 to 4 small, smooth suckers (none in *Illex*); foveola in funnel groove with 5 to 8 folds, 1 to 5 side pockets on each side (none in *Illex*).

Ornithoteuthis antillarum: only 4 rows of suckers at tips (dactylus) of tentacular clubs (8 in *Illex*); no fixing apparatus on tentacular clubs; foveola in funnel groove with 7 to 12 folds, 0 side pockets (no foveola or side pockets in *Illex*).

Hyaloteuthis pelagica: mantle with 19 round integumentary light organs on ventral surface; 4 round light organs along ventral surface of each ventral arm (no light organs in *Illex*).



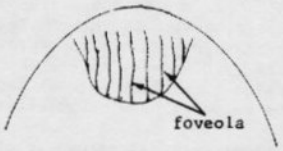
distal end of tentacular club

SIZE:

Maximum: males 27 cm; females 31 cm mantle length (reached only north of Area 31); common in Area 31: males 18 cm; females 20 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

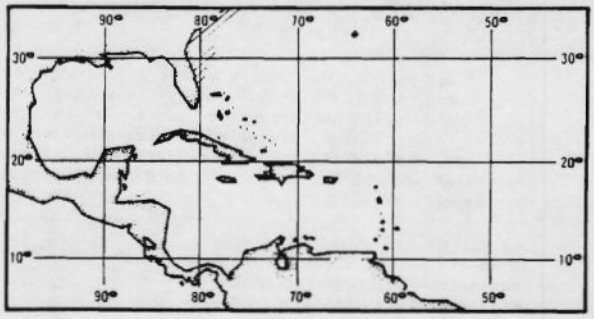
East coast of North America from Labrador to central Florida. Relatively uncommon south of Cape Hatteras; greatest abundance in northern portion of range.



Ornithoteuthis antillarum

Inhabits inshore waters in summer and retreats to deeper, offshore waters of the continental shelf and slope in fall and winter. Occurs in temperatures of 0° to 15°C, optimum 7° to 13°, so it is restricted to northern waters of Area 31. Vertical range extensive depending on size, season, and time of day, but tends to congregate on or near the bottom during the day and disperse into the water column at night. Has been caught from the surface to about 1 000 m depth.

Spawning grounds and season are unknown, but recent data indicate a late fall-early winter spawning in offshore slope water of less than 15°C. Eggs and larvae are virtually unknown. The in-shore summer migration is associated with intensive feeding, primarily on small fishes and euphasids.



PRESENT FISHING GROUNDS:

Extreme northern sector of Area 31 in offshore waters during fall and winter. In the Middle-Atlantic states of the U.S.A. the same fishing situation occurs, while from New England northward to Labrador, fishing takes place in inshore waters during the summer and early fall.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

Separate statistics are not reported for this species in Fishing Area 31.

Caught primarily by otter trawl in Area 31. In Newfoundland it is captured by hand-jigging or by squid-jigging machine with lights at night from small, open boats.

The species has been utilized primarily as fish bait in waters north of Area 31. However, it is of good quality for human consumption and recent years have seen greater demand on the species as a source of food, particularly in eastern Europe and Japan. At present marketed mostly fresh or frozen; however, also suitable dried.

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FAO SPECIES IDENTIFICATION SHEETS

FAMILY: OMMASTREPHIDAE

FISHING AREA 31
(W Cent. Atlantic)

Illex oxygonius Roper, Lu & Mangold, 1969

OTHER SCIENTIFIC NAMES STILL IN USE: None

VERNACULAR NAMES:

FAO: En - Sharptail shortfin squid
Fr - Encornet rouge à pointe
Sp - Pota puntiaguda

NATIONAL:

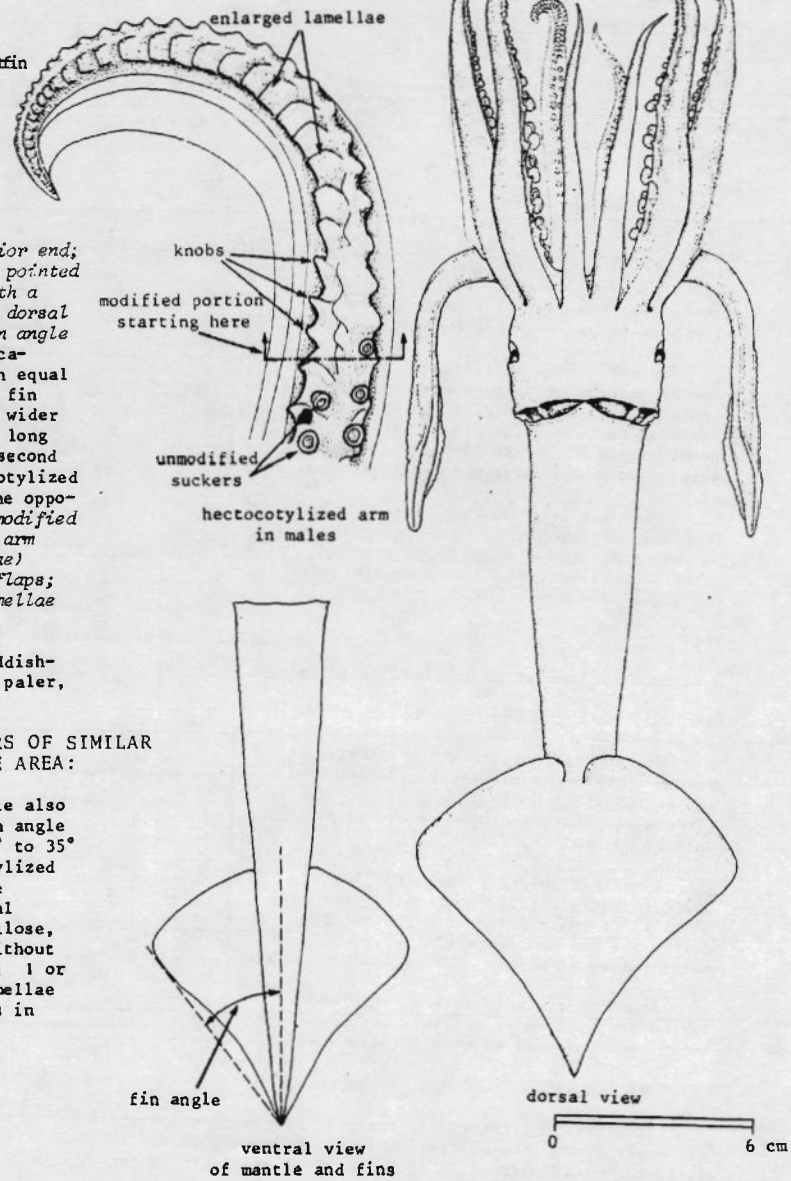
DISTINCTIVE CHARACTERS:

Mantle widest at anterior end; long, narrow, drawn out to a pointed tail posteriorly; males with a sharp, distinct, triangular dorsal lobe at mantle opening; fin angle acute, 25° to 35° (very occasionally to 40°); fin width equal to or slightly greater than fin length; head medium-sized, wider than long; arms moderately long and robust, especially the second and third in males; hectocotylized arm (in males) longer than the opposite ventral (fourth) arm; *modified portion about 29 percent of arm length; trabeculae (lamellae) without papillose, fringed flaps; 3 knobs on dorsal row of lamellae of modified arm tip.*

Colour: reddish to reddish-brown, more vivid dorsally; paler, more yellowish ventrally.

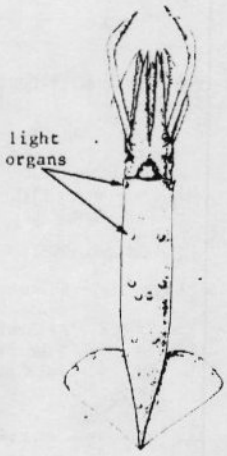
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Illex coindetii: mantle also widest at anterior end; fin angle broad, greater than 50° (25° to 35° in *I. oxygonius*); hectocotylized arm longer than the opposite ventral (fourth) arm; distal trabeculae modified to papillose, fringed flaps (trabeculae without such flaps in *I. oxygonius*); 1 or 2 knobs on dorsal row of lamellae on modified arm tip (3 knobs in *I. oxygonius*).



I. illecebrosus: mantle robust, widest at midpoint between anterior end and beginning of fins, not drawn out into pointed tail posteriorly (pointed tail in *I. oxygonius*); fin angle 40° to 50°, mostly 45°; no distinct triangular dorsal lobe at mantle opening (present in *I. oxygonius*); hectocotylized arm shorter than the opposite ventral (fourth) arm; modified portion short, about 22 percent of arm length (29 percent in *I. oxygonius*); 1 or 2 knobs on dorsal row of lamellae on modified arm tip (3 knobs in *I. oxygonius*).

mantle and fins (ventral view)

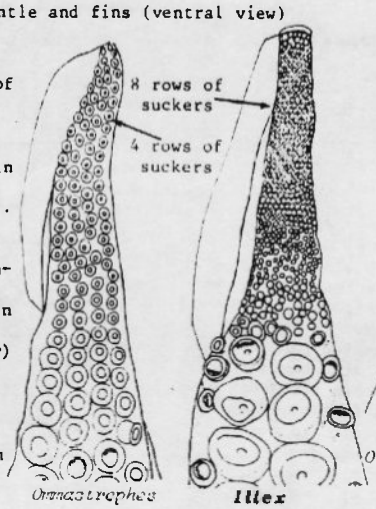


Hyaloteuthis pelagica

Ommastrephes species: only 4 rows of suckers at tips (dactylus) of tentacular clubs (8 in *Illex*); fixing apparatus on clubs with 0 to 3 knobs and 2 to 4 small, smooth suckers (none in *Illex*); foveola in funnel groove with 5 to 9 folds, 1 to 5 side pockets on each side (none in *Illex*).

Ornithoteuthis antillarum: only 4 rows of suckers at tips (dactylus) of tentacular clubs (8 in *Illex*); no fixing apparatus on tentacular clubs; foveola in funnel groove with 7 to 12 folds, no side pockets (no foveola or side pockets in *Illex*)

Hyaloteuthis pelagica: mantle with 19 round integumentary light organs on ventral surface; 4 round light organs along ventral surface of each ventral arm (no light organs in *Illex*).



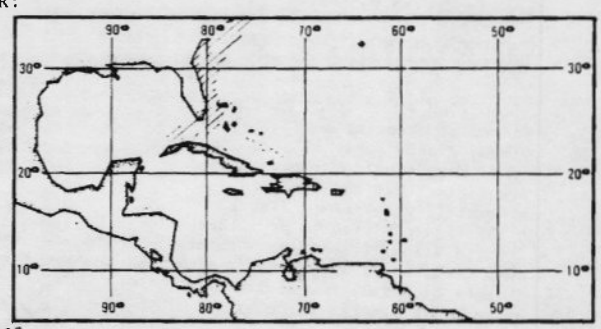
distal end of tentacular club

Ornithoteuthis antillarum funnel groove

SIZE:

Maximum: males 23 cm, females 21 cm mantle length.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:



Western Atlantic from mid-Atlantic States (Chesapeake Bight), Florida Current and southeastern Gulf of Mexico; in the eastern Atlantic, a single record from the Gulf of Guinea.

A neritic species taken from 50 to 550 m in bottom trawls at temperatures of 6° to 13°C; associated with the bottom during the day and dispersed into the water column at night.

Spawning grounds, season, eggs and larvae are unknown at present. Food unknown, but presumed to be crustaceans and fishes.

PRESENT FISHING GROUNDS:

Presently not fished in Area 31; abundance and distribution currently unknown; when concentrations are found, the species would be of commercial use because of its close resemblance to the other currently utilized species of *Illex:* *I. illecebrosus* and *I. coindetii*.

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FAO SPECIES IDENTIFICATION SHEETS

FAMILY: OMMASTREPHIDAE

FISHING AREA 31
(W Cent. Atlantic)

Ommastrephes bartrami (LeSueur, 1821)

OTHER SCIENTIFIC NAMES STILL IN USE: The occasional use of the generic name *Sthenoteuthis* is entirely unjustified and incorrect, and it should be avoided

VERNACULAR NAMES:

FAO: En - Flying squid
Fr - Encornet volant
Sp - Pota saltadora

NATIONAL:

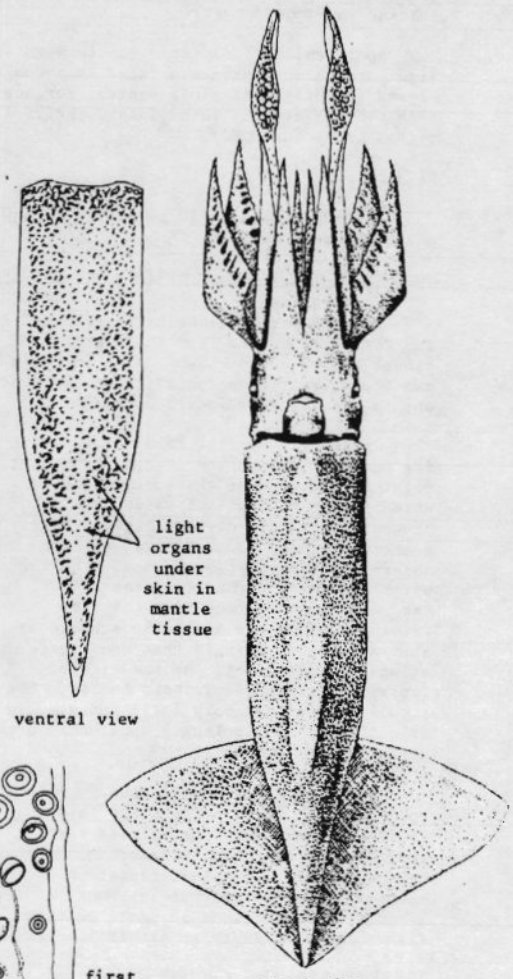
DISTINCTIVE CHARACTERS:

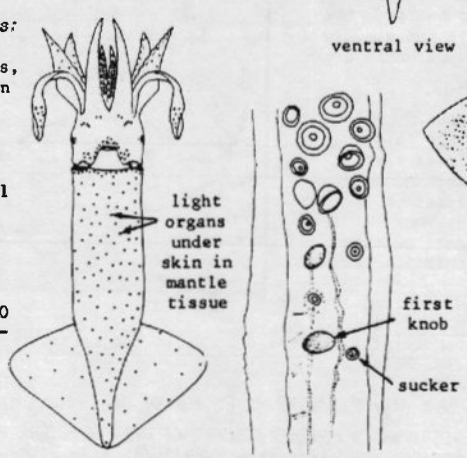
Mantle muscular, robust, not drawn out posteriorly into a pointed tail; *a long golden or silvery stripe along the ventral midline from mantle opening to level of fin-insertion* (this stripe probably is a luminescent organ); *similar golden tissue on ventral surfaces of head and ventral (fourth) arms;* numerous, closely-packed, small, very irregularly shaped, often interconnected, light organs embedded under the skin in muscle of mantle ventrally; similar light organs occur in patches on ventral surface of head; *4 to 6 small suckers on the tentacular stalk proximal to the first smooth knob of the fixing apparatus.*

Colour: deep maroon overall, slightly lighter ventrally, darker along dorsal midline of mantle.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Ommastrephes pteropus: a large, oval light-organ patch composed of numerous, densely-packed granules on antero-dorsal mantle just under the skin (no dorsal light organ patch in *O. bartrami*); numerous small granular, individual light organs in ventral muscles of mantle, head and fourth arms (many irregularly shaped, often interconnected, light organs in *O. bartrami*); 0 to 2 small suckers on tentacular stalk proximal to first smooth knob of fixing apparatus (4 to 6 in *O. bartrami*).

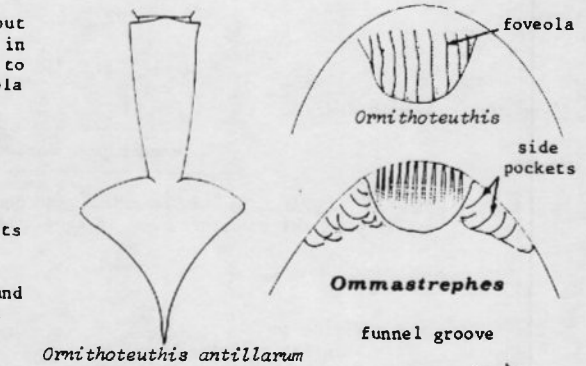




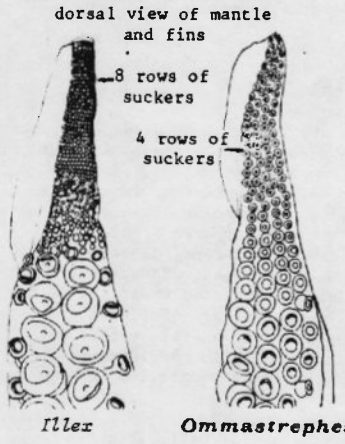
Ornithoteuthis antillarum: mantle drawn out posteriorly into a long, pointed tail (no tail in *O. bartrami*); foveola in funnel groove with 7 to 12 folds, 0 side pockets (5 to 9 folds in foveola and 1 to 5 side pockets on each side in *Ommastrephes*).

Illex species: tip of tentacular club (dactylus) with 8 rows of small suckers (only 4 rows in *Ommastrephes*); no foveola or side pockets in funnel groove (foveola and side pockets present in *Ommastrephes*).

Hyaloteuthis pelagica: mantle with 19 round light organs on ventral surface; 4 round light organs in integument along ventral surface of each ventral arm (no round integumentary light organs in *O. bartrami*).



Ornithoteuthis antillarum
dorsal view of mantle and fins



distal end of tentacular club

Hyaloteuthis pelagica
ventral view

SIZE:

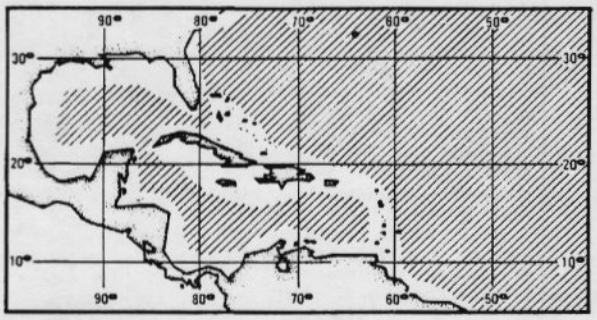
Maximum: females 50 cm mantle length, males somewhat smaller.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Western North Atlantic, in tropical and temperate waters, but the distributional limits are unknown. Also in North and South Transition Zones in the Pacific and in the southern Indian Ocean.

Apparently similar to *O. pteropus* in its oceanic habitat and in behaviour; at night it occurs near the surface and is dispersed throughout the water column to about 1 500 m both day and night. A very powerful swimmer, *O. bartrami* has been observed during daytime to leap from the water and glide for some distance over the surface, thus receiving the name "flying squid". It occurs in schools of similarly-sized animals that congregate around a night light; as the size of individuals increases, their number in the school decreases; very large individuals around 50 cm mantle length apparently are solitary.

Spawning areas and seasons are unknown; up to several thousand eggs are laid in a sausage-shaped, gelatinous, mass that floats at or near the surface; larvae can be very numerous but identification to species is very difficult in *Ommastrephes*. The flying squid feeds on small oceanic fishes and reportedly is cannibalistic.



PRESENT FISHING GROUNDS:

Currently not fished commercially in Area 31. While the species appears to be very abundant, no data on actual stock size are available.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

Readily captured on squid jigs, so jigging machines used at night with electric lamps in the open ocean should be effective and more efficient than hand-jigging or dip-netting.

Flesh of excellent quality for human consumption, either fresh or frozen.

OMMAS Ommas 3

1977

FAO SPECIES IDENTIFICATION SHEETS

FAMILY: OMMASTREPHIDAE

FISHING AREA 31
(W Cent. Atlantic)

Ommastrephes pteropus Steenstrup, 1855

OTHER SCIENTIFIC NAMES STILL IN USE: The occasional use of the generic designation *Stenoteuthis* is entirely unjustified and incorrect, and it should be avoided

VERNACULAR NAMES:

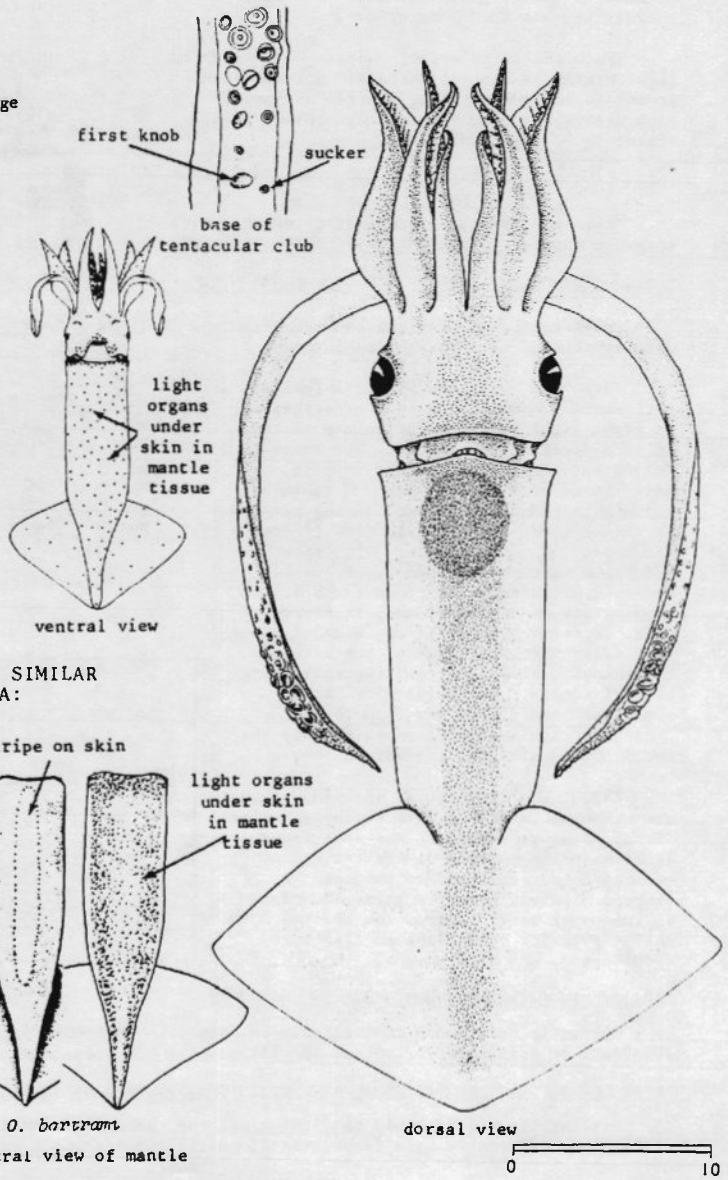
FAO: En - Orangeback squid
Fr - Encornet dos orange
Sp - Pota naranja

NATIONAL:

DISTINCTIVE CHARACTERS:

Mantle muscular, robust, not drawn out posteriorly into a pointed tail; *a large, oval patch on the antero-dorsal part of the mantle just beneath the skin consisting of numerous densely packed, small light organs; small, individual scattered light organs (like short grains of rice) embedded in muscle of ventral surface of mantle, head and fourth arms; 0 to 2 small suckers on the tentacular stalk proximal to the first smooth knob of the fixing apparatus.*

Colour: very dark maroon overall, slightly lighter ventrally; dorsal midline darkest.



DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

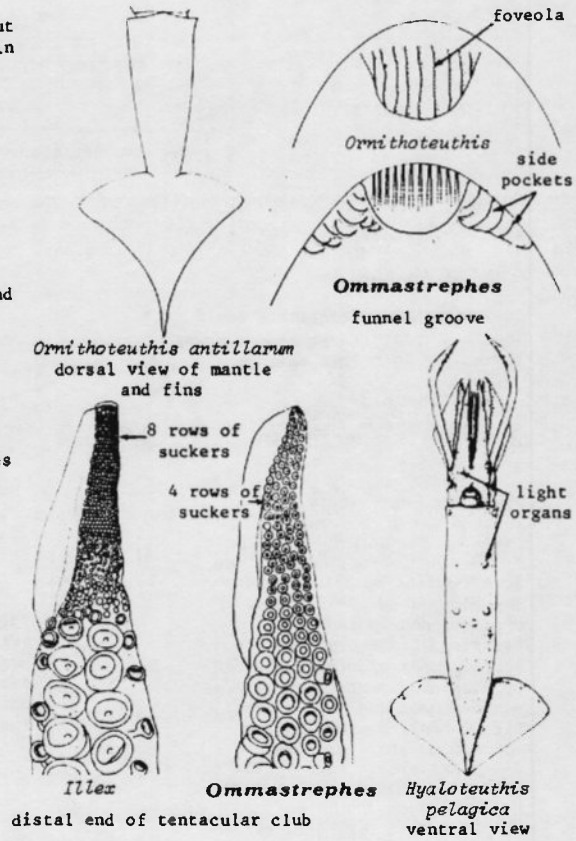
Ommastrephes bartrami: a long, golden or silvery stripe along ventral midline of mantle (no ventral luminescent stripe in *O. pteropus*); numerous, irregularly shaped, often interconnected, light organs under the skin in the muscle of the mantle (fewer, granular individual light organs in *O. pteropus*) 4 to 6 small suckers on tentacular stalk proximal to first smooth knob of fixing apparatus (0 to 2 suckers in *O. pteropus*).

O. bartrami
ventral view of mantle

Ornithoteuthis antillarum: mantle drawn out posteriorly into a long, pointed tail (no tail in *O. pteropus*); foveola in funnel groove with 7 to 12 folds, 0 side pockets (5 to 9 folds in foveola and 1 to 5 side pockets on esch side in *Ommastrephes*).

Illex species: tip of tentscular club (dactylus) with 8 rows of small suckers (only 4 rows in *Ommastrephss*); no foveola or side pockets in funnel groove (foveola and side pockets present in *Ommastrephes*).

Hyaloteuthis pelagica: mantle with 19 round light organs on ventral surface; 4 round light organs in integument along ventral surface of each ventral arm (no round integumentary light organs in *O. pteropus*).



SIZE:

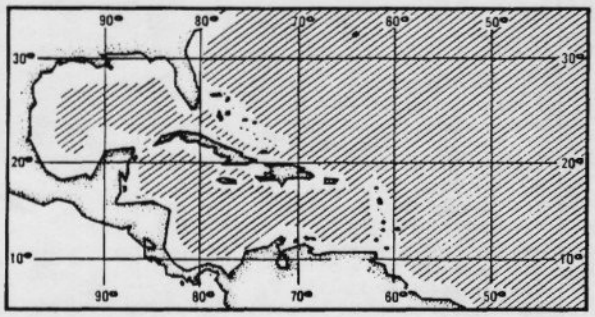
Maximum: females 37 cm mantle length, males somewhat smaller.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Pan-Atlantic in tropical and temperate waters; limits of distribution unknown.

This very abundant, strong-swimming near-surface, oceanic squid congregates at at night light where it can be dip-netted. It is a dominant species at the surface during dark (moonless) nights, but is distributed over a brosd vertical range day and night to about 1 500 m; during periods of bright moonlight or rough seas it does not appear at the surface. With such extensive vertical and geographic ranges, the species tolerates s broad range of temperature conditions. When at the surface, it forms schools of up to about 50 similarly-sized individuals, the size of the school diminishing with increased size of individuals. The vernscular name, orangeback squid, derives from the "orangish" luminescent glow emitted by the dorsal patch of light orgsns.

Extent and location of spawning sress are unknown; eggs are lsid in lsrge, gelatinous, sausage-shsped masses thst flost at or near the surface of the sea and contain up to seversl hundred thousand embryos. Lsrvse occur in great abundance in the upper water layer. The species is an active predator that preys on fishes, cephslopods, and crustaceans.



PRESENT FISHING GROUNDS:

Currently not fished commercially in Area 31. Although *O. pteropus* is considered to be very abundant, no assessment of actual population size has been made.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

Fishing techniques would be jigging machine, hand jigs and dip-net at night using lights for attraction. Currently used in Madeira (locally) for fish bait and human consumption.

THYSANO Thysano 1

1977

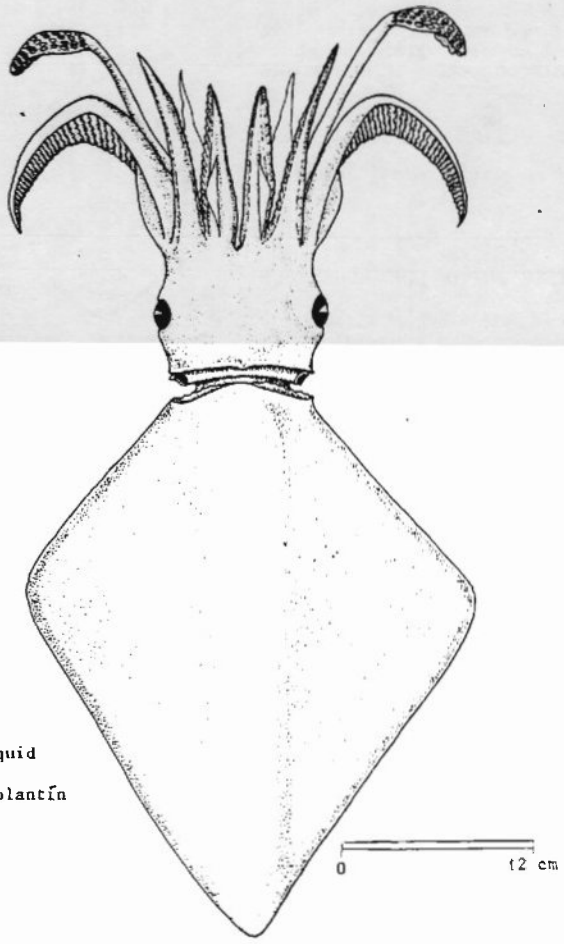
FAO SPECIES IDENTIFICATION SHEETS

FAMILY: THYSANOTEUTHIDAE

FISHING AREA 31
(W Cent. Atlantic)

Thysanoteuthis rhombus Troschel, 1857

OTHER SCIENTIFIC NAMES STILL IN USE: None



VERNACULAR NAMES:

FAO: En - Rhomboid squid
Fr - Chipiloua
Sp - Chipirón volantín

NATIONAL:

DISTINCTIVE CHARACTERS:

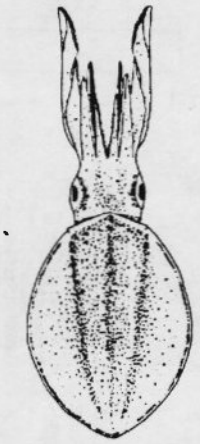
Mantle thick, powerful, tapering to a blunt tip posteriorly; fins long, broad, rhombic (◊) occupying entire length of mantle; mantle-funnel locking apparatus ⊣-shaped; arms with 2 rows of suckers; tentacular clubs with 4 rows of suckers; buccal connectives attached to ventral borders of fourth arms.

Colour: deep maroon overall, darker dorsally.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Sepioteuthis sepioidea: eye covered with clear corneal membrane (eye open to the sea, no covering of skin in *T. rhombus*); funnel locking-apparatus a straight ridge and groove (┤-shaped in *T. rhombus*); fins elliptical in outline (fins rhombic in outline in *T. rhombus*).

Other oceanic squids: fins never as long as mantle except in Ctenopterygidae and Cycloteuthidae (both without species of interest to fisheries).



Sepioteuthis sepioidea

simple, straight
Sepioteuthis

┤-shaped
Thysanoteuthis

funnel-locking apparatus

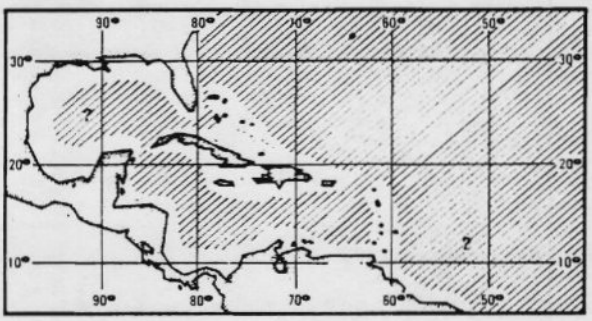
SIZE:

Maximum: 100 cm mantle length; common to 60 cm mantle length.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Cosmopolitan in warm water, latitudinal limits unknown, although it undoubtedly occurs throughout most of Area 31.

Little is known about the biology of this pelagic species; it is clearly oceanic, but in the Japan Sea it migrates to near-shore waters in fall and early winter where it is fished with set nets; catches are greater at night but do occur during the day; young and larvae are taken only in open ocean in near-surface waters; adults known from strandings and predators' stomachs (sperm whale, blue marlin).



PRESENT FISHING GROUNDS:

Not fished in Area 31. Abundance unassessed.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

No statistics available.

Captured in Japan with setnets.

Eaten regularly in Japan.

THYSANO

1977

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREA 31
(W Cent. Atlantic)

THYSANOTEUTHIDAE

Rhomboid squids

A single species in the area; see species sheet for:

Thysanoteuthis rhombus Troschel THYSANO Thysano 1

Prepared by C.F.E. Roper, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.

OMMAS Orni 1

1977

FAO SPECIES IDENTIFICATION SHEETS

FAMILY: OMMASTREPHIDAE

FISHING AREA 31
(W Cent. Atlantic)

Ornithoteuthis antillarum Adam, 1957

OTHER SCIENTIFIC NAMES STILL IN USE: None

VERNACULAR NAMES:

FAO: En - Bird squid
Fr - Encornet oiseau
Sp - Pota pájara

NATIONAL:

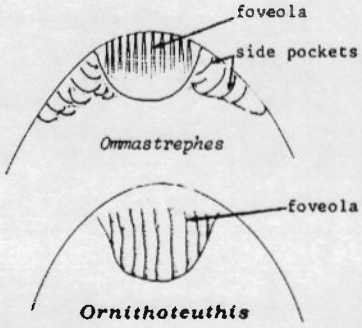
DISTINCTIVE CHARACTERS:

Mantle muscular, narrow, drawn out posteriorly into a long pointed tail; funnel groove with foveola with 7 to 12 very indistinct folds, no side pockets; no external light organs; *a long, thin, usually pinkish stripe of luminescent material along the ventral surface of the viscera from about the level of the heart to the posterior tip of the viscera; discrete light organs on the ink sac and rectum: no distinct fixing apparatus on tentacular stalk.*

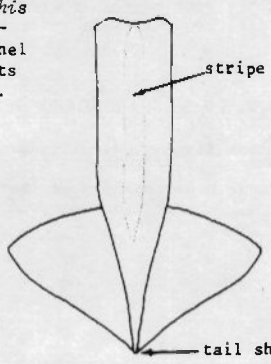
Colour: purplish-maroon, darkest on dorsal surface.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

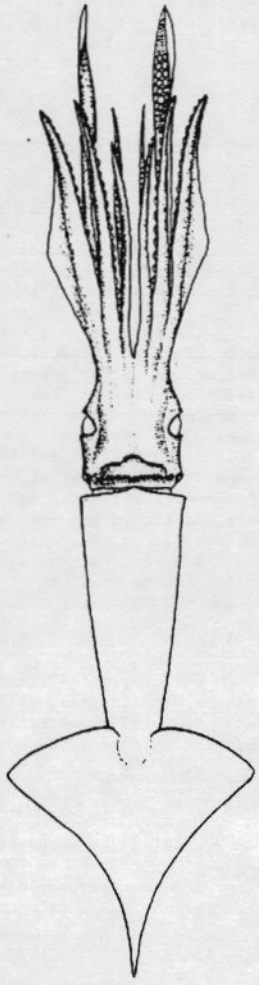
Ommastrephes species: external light organs as an oval patch on antero-dorsal mantle *(O. pteropus)* or as a long stripe along the ventral midline *(O. bartrami)* (no external light organs in *Ornithoteuthis antillarum*); mantle not drawn out posteriorly into a long, pointed tail; funnel groove possesses foveola and side pockets (side pockets absent in *Ornithoteuthis*).



funnel groove



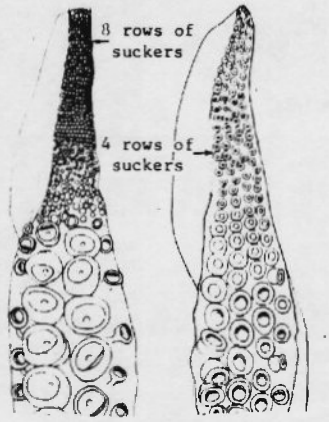
O. bartrami
ventral view of mantle



dorsal view

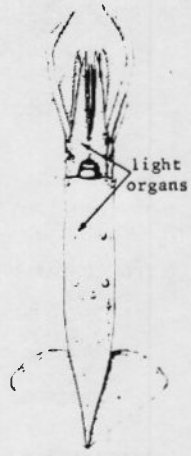
Illex species: tip of tentacular clubs (dactylus) with 8 rows of numerous small suckers (only 4 rows in *Ornithoteuthis*); no foveola and no side pockets in funnel groove (only foveola present in *Ornithoteuthis*).

Hyaloteuthis pelagica: mantle with 19 round light organs on ventral surface; 4 roundish light organs in integument along ventral surface of each ventral arm (no externally visible light organs in *Ornithoteuthis*).



Illex **Ornithoteuthis**

distal end of tentacular club



Hyaloteuthis pelagica
ventral view

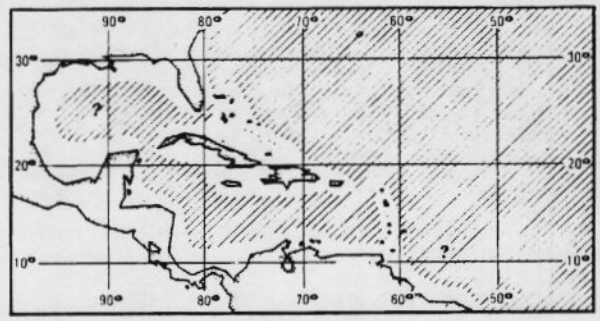
SIZE:

Maximum: up to 20 cm mantle length.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Tropical and subtropical western Atlantic and Caribbean Sea; West Africa, Morocco in eastern Atlantic.

The species is infrequently caught but its rarity in collections undoubtedly is a reflection of the animal's rapid, powerful swimming ability. Specimens have been captured in bottom-fishing with trawls during the day at 585 to 1 100 m (mostly 640 to 825 m); night-time captures were made in large midwater trawls at 100 to 600 m over very deep water and by dipnet at the surface in the open ocean. Thus, *O. antillarum* apparently is associated with bottom during the day and disperses into the water column at night.



PRESENT FISHING GROUNDS:

Not currently fished commercially. May inhabit continental shelf and slope waters or be associated with islands, as major catches were made in bottom trawls in the Atlantic and Caribbean waters (585 to 1 100 m depth). Too few data are available on distribution, abundance, and biology to allow prediction of fishing potential.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

Fishing techniques would include jigging, dipnetting and especially otter and midwater trawling.

The species should be edible, as other members of the family are confirmed to be good.

ONYCHO

1977

FAO SPECIES IDENTIFICATION SHEETS

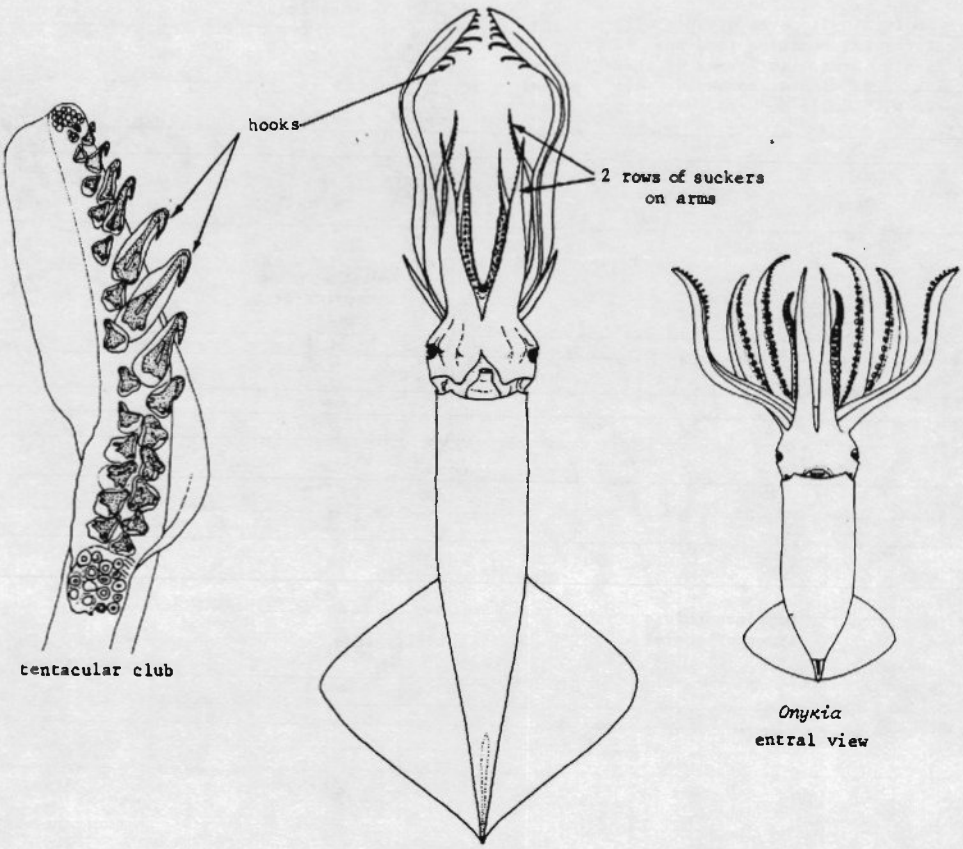
FISHING AREA 31
(W Cent. Atlantic)

ONYCHOTEUTHIDAE

Hooked squids

Body muscular, tail pointed, fins with sharp lateral angles; *funnel-locking apparatus simple, straight;* 8 arms and 2 contractile tentacular clubs around mouth; 2 rows of suckers on arms; *tentacular clubs with 2 rows of hooks and, except in Onychoteuthis, 2 marginal rows of suckers. buccal connectives attached to ventral borders of fourth arms.*

Colour: maroon to brick red, dsrker dorsally.



Medium-sized oceanic squids, widely distributed and generally powerful swimmers. One species supports a moderate fishery in the Pacific, but to dste the family is not widely utilized. Several epipelsgic species are attrscted to night-lights, while other species appear to be epibenthic and are taken only in bottom trawls.

SIMILAR FAMILIES OCCURRING IN THE AREA:

Ommastrephidae: funnel-locking apparatus ⊥-shaped; tentacular clubs usually with 4, exceptionally with 8 *(Illex)* rows of suckers at tips, no hooks; buccal connectives attached to dorsal borders of fourth arms.

Thysanoteuthidae: funnel-locking apparatus ⊣-shaped; 4 rows of suckers on tentacular clubs, no hooks; rhomboidal fins that occupy nearly entire mantle length.

Lepidoteuthidae: surface of mantle covered with small integumentary scales; suckers in 2 rows on arms, in 4 rows on tentacles, no hooks.

Loliginidae: eyes covered with a transparent corneal membrane (eye open in other families); arms with 2 rows of suckers, tentacular clubs with 4, no hooks; all 7 buccal lappets with small suckers (except *Sepioteuthis)*

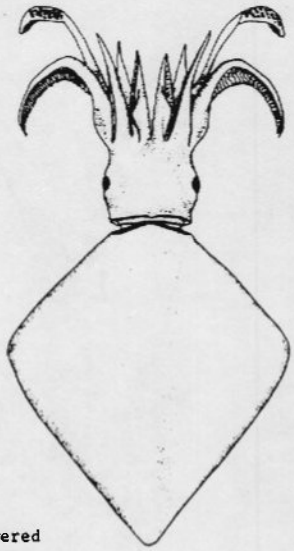
⊥-shaped
Ommastrephidae

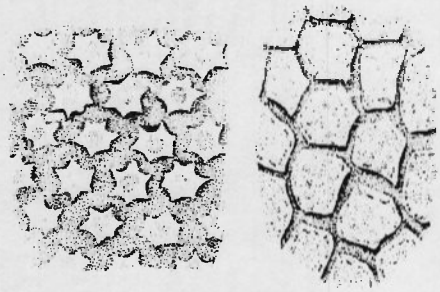
⊣-shaped
Thysanoteuthidae

simple, straight
Onychoteuthidae
Lepidoteuthidae
Loliginidae

basic types of funnel-locking apparatus

Ommastrephidae
tentacular club





Lepidoteuthidae
types of scales

Loliginidae

Thysanoteuthidae

KEY TO GENERA OCCURRING IN THE AREA*:

1 a. Tentacular clubs with 2 rows of large, claw-like hooks, no marginal rows of suckers (Fig. 1a); dorso-latersl neck region with elongate, flap-like folds (Fig. 2a) ..... *Onychoteuthis*

1 b. Tentacular clubs with 2 medial rows of hooks, 2 marginal rows of suckers (Fig. 1b) no neck folds (Fig. 2b) ..... *Onykia*

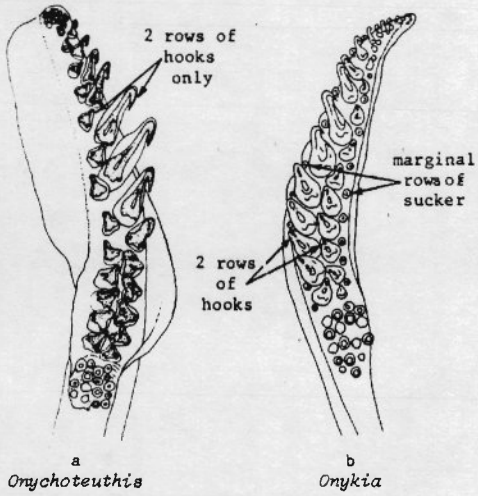


Fig. 1

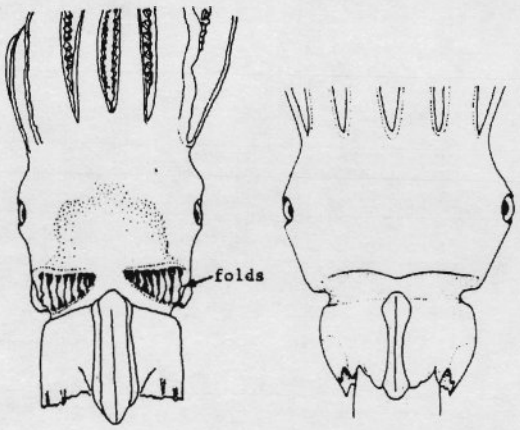


Fig. 2

LIST OF SPECIES OCCURRING IN THE AREA:

Code numbers are given for those species for which Identification Sheets are included

* *Ancistroteuthis lichtensteini* (Orbigny, 1839)

Onychoteuthis banksi (Leach, 1817) ONYCHO Ony 1

Onikia carribaea (LeSueur, 1821)

Prepared by C.F.E. Roper, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.

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* *Ancistroteuthis lichtensteini* is a very rare species. Therefore, the genus has been omitted from the key

ONYCHO Ony 1

1977

FAO SPECIES IDENTIFICATION SHEETS

FAMILY: ONYCHOTEUTHIDAE

FISHING AREA 31
(W Cent. Atlantic)

Onychoteuthis banksi (Leach, 1817)

OTHER SCIENTIFIC NAMES STILL IN USE: None

VERNACULAR NAMES:

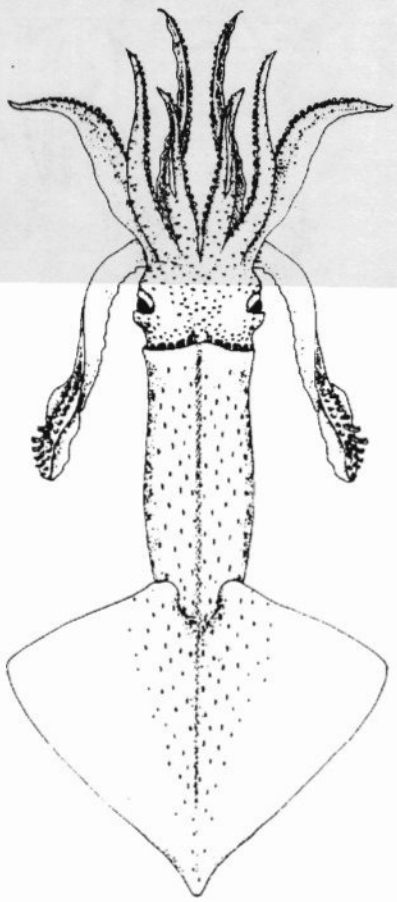
FAO: En - Hooked squid
Fr - Cornet crochu
Sp - Luria ganchuda

NATIONAL:

DISTINCTIVE CHARACTERS:

Tentacular clubs with 2 rows of large, claw-like hooks, no marginal rows of suckers; several elongate, flap-like folds around the dorso-lateral surface of the neck; gladius visible as a dark line through the skin along dorsal midline of mantle; 2 light organs along ventral midline on intestinal tract; *fins with sharp lateral angles; tail pointed.*

Colour: dark reddish-purple to reddish brown, darkest dorsally.

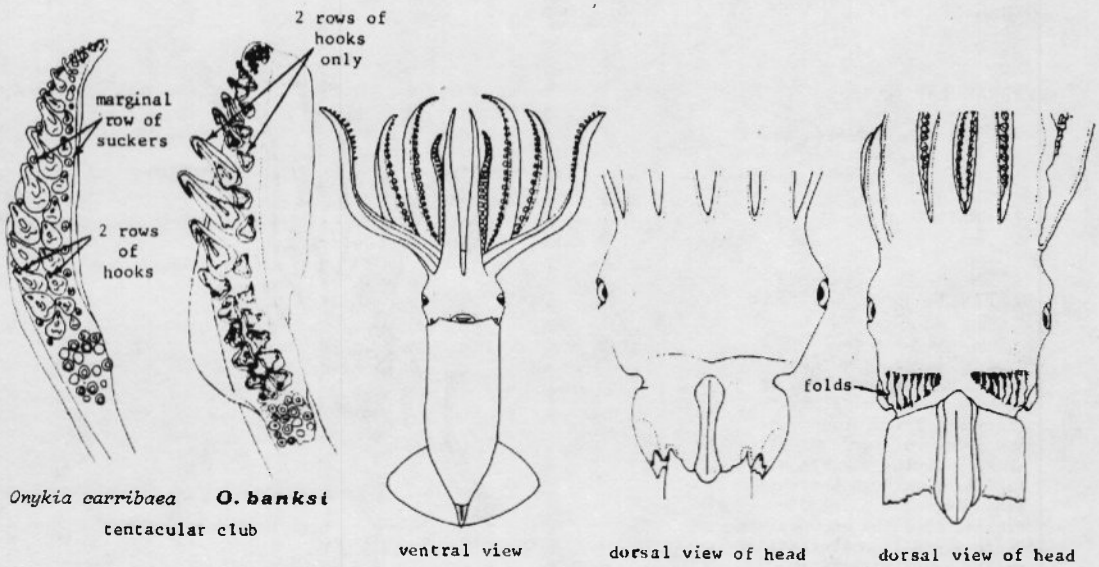


dorsal view

0 6 cm

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Onykia carribaea: animal small, 4 cm mantle length (20 cm mantle length in *O. banksi*); tentacular clubs with 2 middle rows of small hooks and 2 marginal rows of small suckers (2 rows of large hooks, no marginal rows of suckers in *O. banksi*); neck folds absent (several distinct neck folds in *O. banksi*); fins broad, lateral angles rounded, no pointed tail (fins angled and tail pointed in *O. banksi*); light organs absent (present on intestine of *O. banksi*).



Onykia carribaea **O. banksi**
tentacular club

ventral view

dorsal view of head

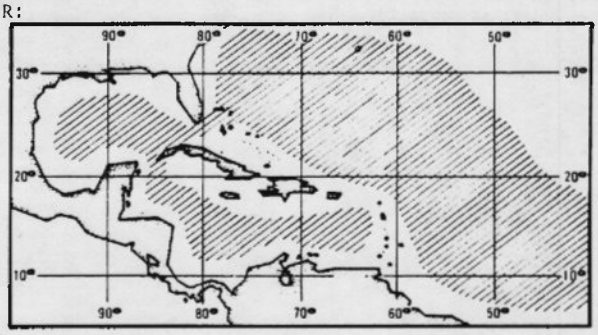
dorsal view of head

Onykia carribaea **O. banksi**

SIZE:

Maximum: 20 cm mantle length.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:



Worldwide in warm and temperate oceanic water, including Fishing Area 31.

This entirely oceanic species commonly comes to the night light in numbers and occasionally is found on the decks of ships in the morning; a powerful swimmer rarely caught in nets; normally lives from the surface to 150 m depth but is capable of much deeper excursions (to 800 m). Nothing is known of its biology in spite of its apparent abundance; spawning, life span, etc., unknown.

Feeds on epipelagic fishes and crustaceans.

PRESENT FISHING GROUNDS:

At present not fished commercially in Fishing Area 31.

CATCHES, MAIN FISHING GEAR AND PRINCIPAL FORMS OF UTILIZATION:

Presumably could be caught in some quantities with night light and jigging machine or liftnet.

Quality as human food judged to be good.

SEPIOL.

1977

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREA 31
(W. Cent. Atlantic)

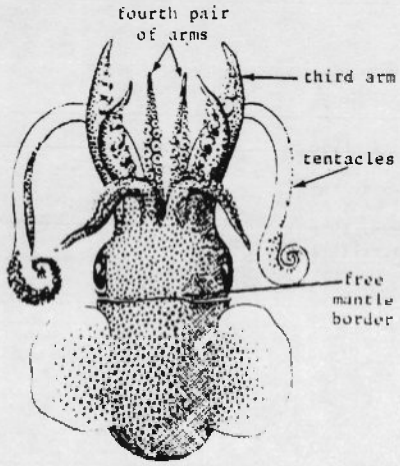
SEPIOLIDAE

[Only subfamily Rossiinae (including *Rossia* spp. and *Sentrossia* spp.) dealt with here]

Bobtail squids

Mantle very short, stout, sac-like; fins lateral, paddle-like, not connected posteriorly; 8 arms and 2 retractile tentacles around mouth; *only third and fourth pairs of arms united by a broad web; orbital pores open; mantle border free from head in dorsal midline.* Benthic.

Colour: pinkish to maroon.

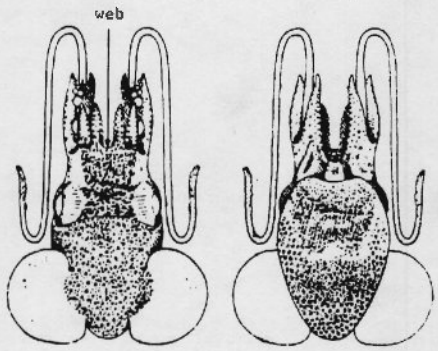


Rossia sp.
dorsal view

About 5 species (their size not exceeding 10 cm in mantle length) occur in various regions throughout Fishing Area 31. They inhabit muddy bottoms of the continental shelf and upper slope from 50 to 750 m depth, with peak abundance around the 400 m; biology and distribution very poorly known; may be locally abundant and may have some future commercial value. Caught in otter trawls fished over mud bottom.

SIMILAR SUBFAMILIES OCCURRING IN THE AREA:

Heteroteuthinae: all arms except that of fourth pair connected by a broad web; orbital pores closed; ventral mantle margin extends anteriorly; pelagic



Heteroteuthis

LIST OF SPECIES OCCURRING IN THE AREA:

Rossia antillensis Voss, 1956
Rossia bullisi Voss, 1956
Rossia tortugaensis Voss, 1956

Semirossia equalis Voss, 1956
Semirossia tenera (Verrill, 1880)

Prepared by C.F.E. Roper, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.

Part of illustrations provided by author