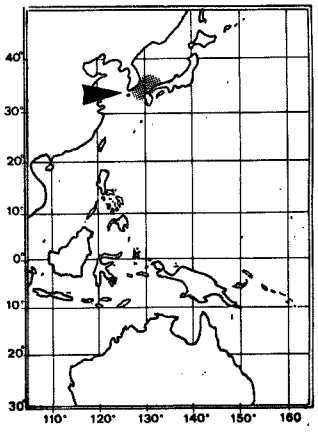
Geographical Distribution : Western Pacific in southwestern Japan Sea.



Habitat and Biology : Neritic in shallow waters, known to perform seasonal migrations. In spring, immature squids migrate inshore; mating occurs throughout summer and in early fall, while spawning takes place shortly afterwards in deeper waters. Thousands of oval-shaped eggs embedded in gelatinous tubes are attached in clusters to various substrates.

Size : Maximum mantle length 25 cm.

Interest to Fisheries : It is the object of local fisheries in the western Japan Sea, using trawl or set nets. Separate statistics are not reported. The flesh is of excellent quality and processed into Shiro-Surume.

Local Names : JAPAN: Budouika, Shiroika.

Literature : Tomiyama & Hibiya (1978); Okutani (1980).

Loligo forbesi Steenstrup, 1856

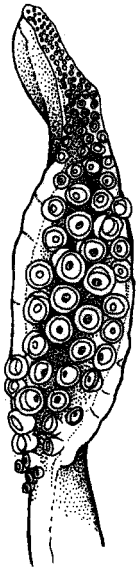
LOLIG Lolig 2

Loligo forbesi Steenstrup,1856, OanskeVidensk.Selsk.Skrift., (5)4:189.

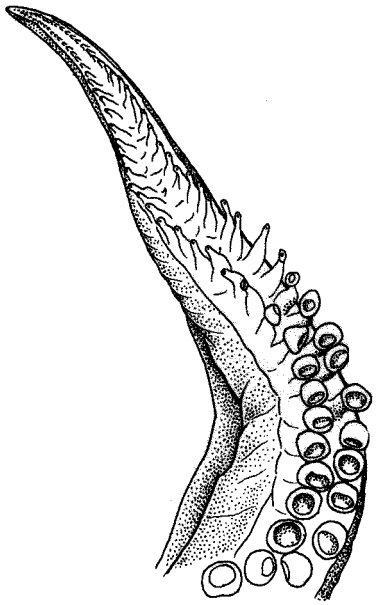
Synonymy : None.

FAO Names : En - Veined squid
Fr - Encornet veiné
SP - Calamar veteado

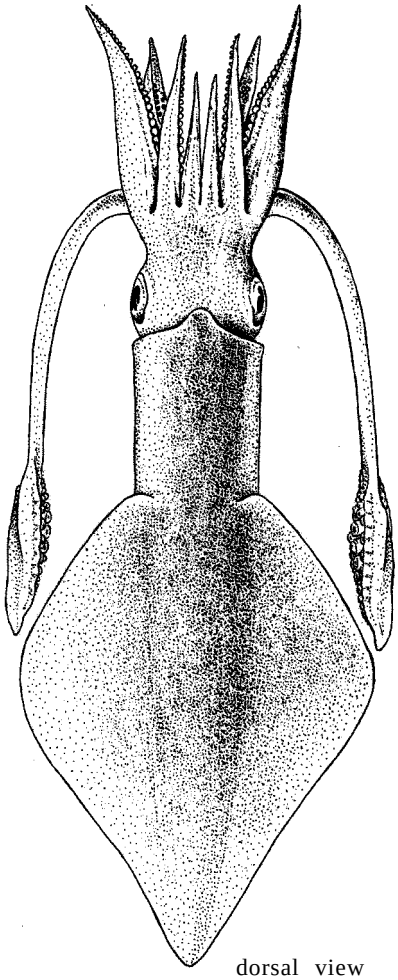
Diagnostic Features : Mantle long, moderately slender, cylindrical; fins rhomboid, their length three quarters that of mantle, their posterior borders slightly concave. Suckers on manus of tentacular club subequal in size; sucker rings with 13 to 18 sharp, conical teeth; left ventral arm (IV) hectocotylized in its distal third by modification of suckers into long papillae which gradually decrease in size distally; largest arm sucker rings with 7 or 8 teeth.



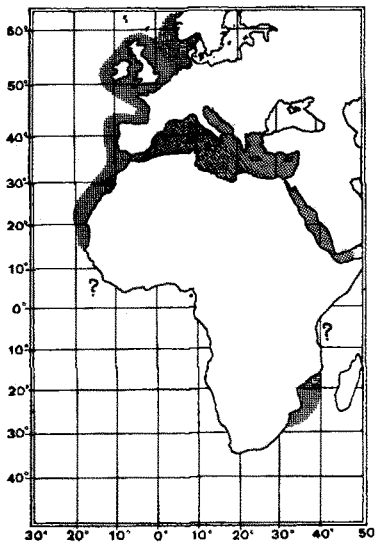
tentacular club



left arm IV of male hectocotylized



dorsal view



Geographical Distribution : Eastern Atlantic: 20°N to 60°N (excluding the Baltic Sea), on the Azores Islands, and along west African coast South to the Canary Islands; its southern boundary is unknown; Mediterranean Sea and Red Sea; East Africa?

Habitat and Biology : A species of subtropical and temperate waters (it avoids temperatures below 8.5°C) occurring over the shelf in the temperate part of its distributional range, but found in deeper waters in subtropical areas; the entire depth range extending from about 100 to 400 m. The population in the northeastern Atlantic is known to carry out seasonal migrations, spending the summer in the North Sea and the eastern part of the English Channel and overwintering in the western part of the Channel. In daytime squids aggregate near the bottom, dispersing at night throughout the water column. Spawning occurs almost throughout the year in the English Channel, showing a peak in winter (December and January, at temperature of 9 to 11 °C) and another one in summer. The eggs are attached to hard objects on sandy or muddy bottoms; hatching occurs after 30 to 40 days. Juveniles hatched in January and February attain sizes of approximately ll.5 cm in June; by August, the females measure about 14 cm, the males about 15 cm mantle length, and in November about 25 to 30 cm respectively. Both sexes are then mature (the males since October). Males outnumber females in the adult stage. Postspawning mortality is very high and the life-span does not exceed 1½ years.

L. forbesi feed on small and juvenile fishes, and to a minor extent on other cephalopods, crustaceans, and polychaetes; cannibalism is common. Off the Azores, the most important fish species in their diet is blue jack mackerel (Trachurus picturatus). Other fishes preyed upon include bogue (Boops boops), and silver scabbardfish (Lepidopus caudatus).

Size : Maximum mantle length 90 cm in males and 41 cm in females. Off the Azores, length at first maturity is 56.5 cm in males and 33.5 cm in females (Martins, 1982). In the English Channel, the size of summer-spawning females is 20.2 cm and 28.6 cm in winter spawning females.

Interest to Fisheries : Taken as bycatch in deeper-water trawl-fisheries throughout its range, in winter and fall in northern waters, and in winter off Madeira and the Azores. The English Channel trawl-fishery operates at daytime in depths between 10 and 110 cm. The Azores artisanal fishery captures L. forbesi on locally manufactured jigs in periods of great abundance in depths ranging from 200 to 270 m in the central islands but from 130 to 200 m in the eastern groups. In 1979, an exceptionally good year, 146.5 metric tons of this species were reported from the Azores. This squid is highly appreciated for human consumption and as bait. It is marketed fresh, frozen and canned (small quantities in the Azores).

Local Names : PORTUGAL: Azores: Lula.

Literature : Holme (1974, biology, English Channel); Roper & Sweeney (1981, Species Identification Sheets, eastern central Atlantic, fishing areas 34/47 in part); Martins (1982, biology, length-weight relationship, Azores).

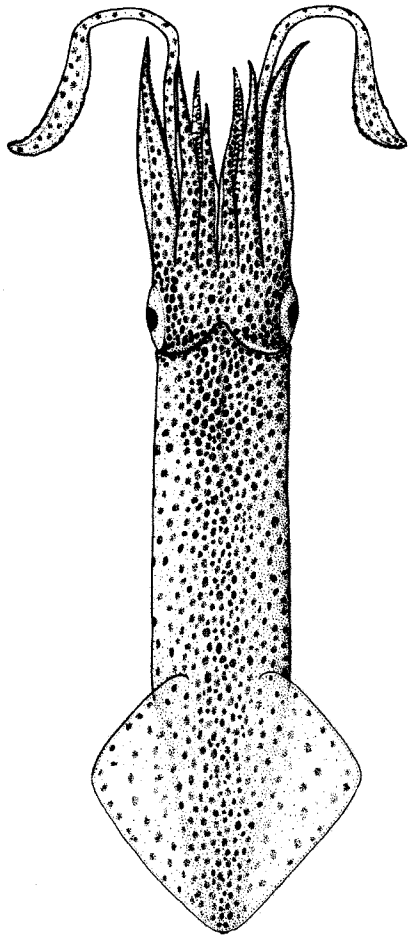
Loligo gahi Orbigny, 1835

LOLIG Lolig 4

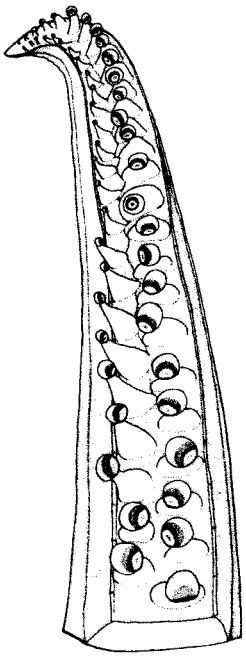
Loligo gahi Orbigny, 1835, in 1834-1846, Voy.Amer.Merid., 5(3):60.

Synonymy : Loligo patagonica Smith, 1881.

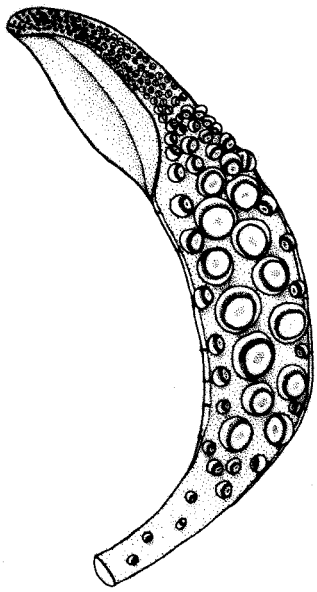
FAO Names : En - Patagonian squid
Fr - Calmar patagon
SP - Calamar patagónico.



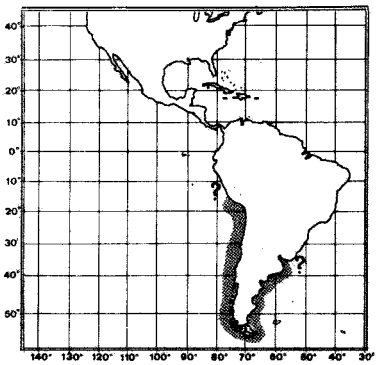
Diagnostic Features : Mantle moderately elongate. Fins rhomboidal, short, their length about 40 to 45% of mantle length. Tentacles long, slender: tentacular clubs narrow, unexpanded, with relatively small suckers on manus, the median ones about 2 times the diameter of the marginal ones; teeth on club sucker rings pointed, very numerous: 25 to 35 (possibly 45). Arms elongate, especially III and IV; arm sucker rings with 6 or 7 broad, flat teeth in distal half, proximal half smooth; left arm IV hectocotylized in distal 1/3: suckers on dorsal row greatly reduced in size and set on elongated, triangular, swollen pedicles that grade smaller distally; ventral row unmodified.



left arm IV of male
hectocotylized



tentacular
club



Geographical Distribution : Eastern Pacific Ocean from southern Peru to southern Chile; reported in the South Atlantic from the Gulf of San Matias, Argentina to Tierra del Fuego. The northern limits on both coasts are unknown.

Habitat and Biology : A neritic species occurring from the surface to 350 m depth but usually only to 285 m. Its biology is little-known.

Size : Maximum mantle length 28 cm.

Interest to Fisheries : Widely distributed along the Pacific coast of South America where it is caught in trawls incidental to other species. Peru landed 200 tons in 1969. Taken off Argentina as bycatch in trawl fisheries.

The squid fishery on the Patagonian shelf off Argentina started only recently as an exploratory operation, but soon developed into a directed fishery operated mostly by Polish vessels with annual yields of 4 to 5 000 metric tons of 10 to 16 cm squid. A small part of this catch is exported to Spain.

Local Names : ARGENTINA, CHILE, PERU : Calamar.

Remarks : The systematics, biology and fisheries of this species are poorly known. Much information is needed.

Loligo japonica Hoyle, 1885

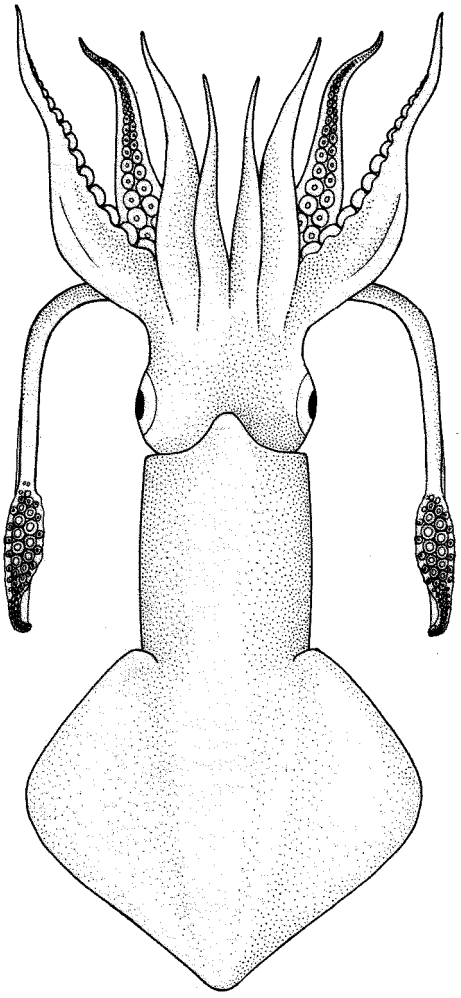
LOLIG Lolig 12

Loligo japonica Hoyle, 1885, Ann.Mag.Nat.Hist., (5)16:187.

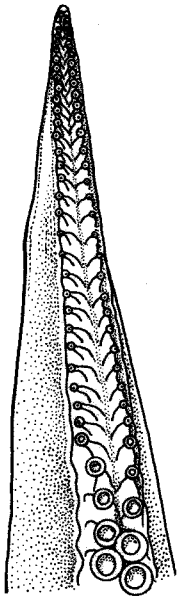
Synonymy : None.

FAO Names : En - Japanese squid
Fr - Calmar japonais
SP - Calamar japonés

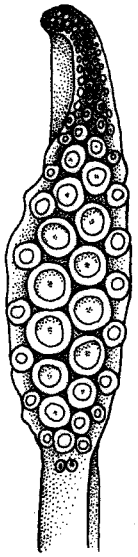
Diagnostic Features : Mantle relatively small, stout. Fins rhomboidal, about 50% of mantle length. Tentacular clubs expanded, lanceolate, the 12 enlarged medial mana1 suckers 2 or 3 times the diameter of marginal ones, with 20 to 25 closely set, low, rounded teeth. Arms II and III enlarged, thickened, largest sucker rings large with 10 to 13 low, broad, blunt teeth; left arm IV hectocotylized in distal 1/2 to 2/3 by sucker stalks modified into papillae, most with minute, rudimentary suckers on tips; papillae of ventral row especially swollen, somewhat flattened, particularly the proximal 7 or 8; papillae of dorsal row more elongate, separate, conical.



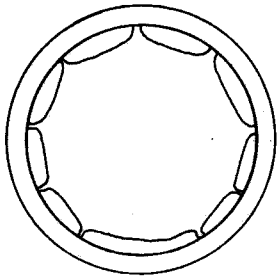
dorsal view



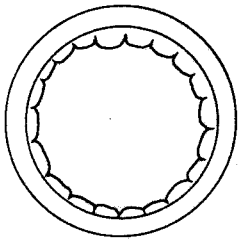
left arm IV of male hectocotylized



tentacular club

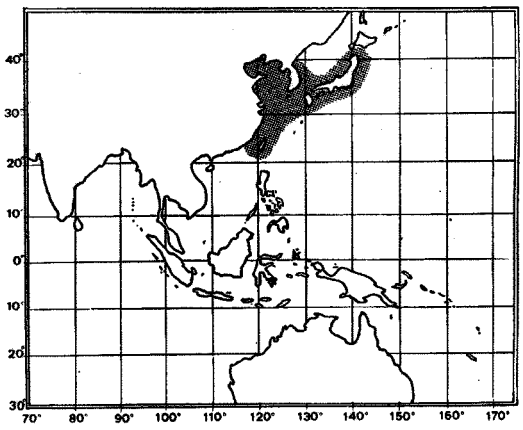


arm III sucker ring



tentacular club sucker ring

Geographical Distribution : Western Pacific: East China Sea and around Japan, excluding northern Hokkaido.



Habitat and Biology : A neritic, semipelagic species most abundant in shallow coastal waters. Spawning takes place during summer and fall in depths between 1 and 10 m. In this period the squid form large aggregations.

Size : Maximum mantle length 12 cm.

Interest to Fisheries : Loligo japonica supports local fisheries during spring and summer north of mid-Honshu, and is one of the 4 loliginid species entering Chinese catches reported to amount to several thousand tons per year (Dong, 1981). It is taken with set nets and small trawls, but it is uncertain whether small individuals can be attracted with light and jigged. The squid is marketed fresh and frozen. The flesh is of excellent quality and often eaten raw.

Local Names : JAPAN: Bouzuika, Hiika, Jhindouika, Koika.

Literature : Tomiyama & Hibiya (1978); Okutani (1980); Dong (1981, cephalopod resources western Pacific).

Loligo kobiensis Hoyle, 1885

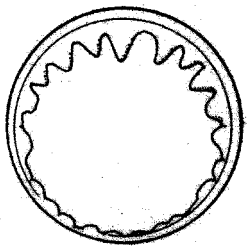
LOLIG Lolig 13

Loligo kobiensis Hoyle, 1885, Ann.Mag.Nat.Hist., (5)16:184.

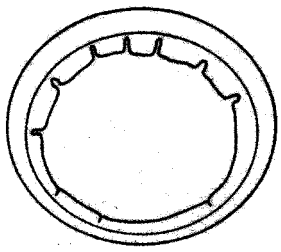
Synonymy : None.

FAO Names : En - Kobi squid
Fr - Calmar kobi
Sp - Calamar kobí

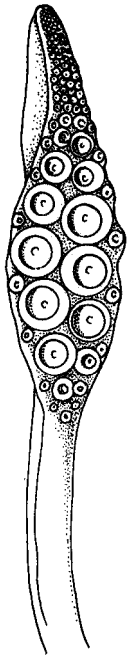
Diagnostic Features : Mantle short, slender. Fins rhomboidal with round lateral angles, their length about 65% of mantle length. Tentacular clubs expanded, lanceolate; protective membranes very broad; club suckers in 4 rows; 6 to 8 medial manal suckers enormously enlarged - 4 or 5 times the diameter of lateral suckers - with entirely smooth rings; other rings with 6 to 15 triangular or quadrangular teeth. Suckers on arms II and III especially enlarged; sucker rings with about 9 (5 to 10) very low, broad, squared, teeth.



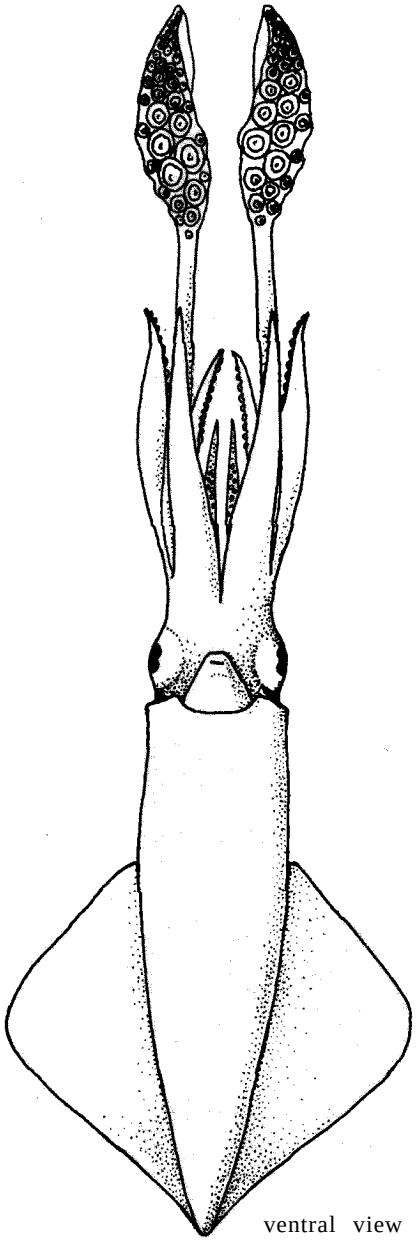
tentacular club sucker ring



arm III sucker ring

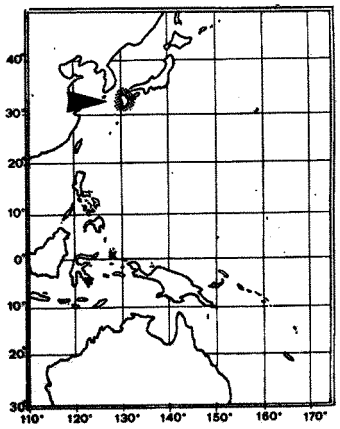


tentacular club



ventral view

Geographical Distribution : Western Pacific: Southwestern Japan.



Habitat and Biology : A neritic species commonly found in coastal waters, most abundant in the upper 10 m of the water column during spring.

Size : Maximum mantle length 10 cm.

Interest to Fisheries : Taken as bycatch in fisheries for other squids in southwestern Japan.

Local Names : JAPAN: Queen squid.

Literature : Okutani (1977).

Loligo ocula Cohen, 1976

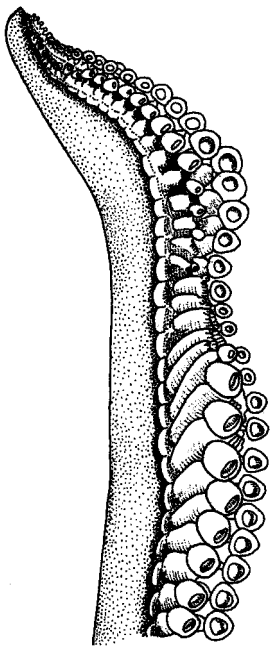
LOLIG Lolig 14

Loligo ocula Cohen, 1976, Malacologia, 15(2):330.

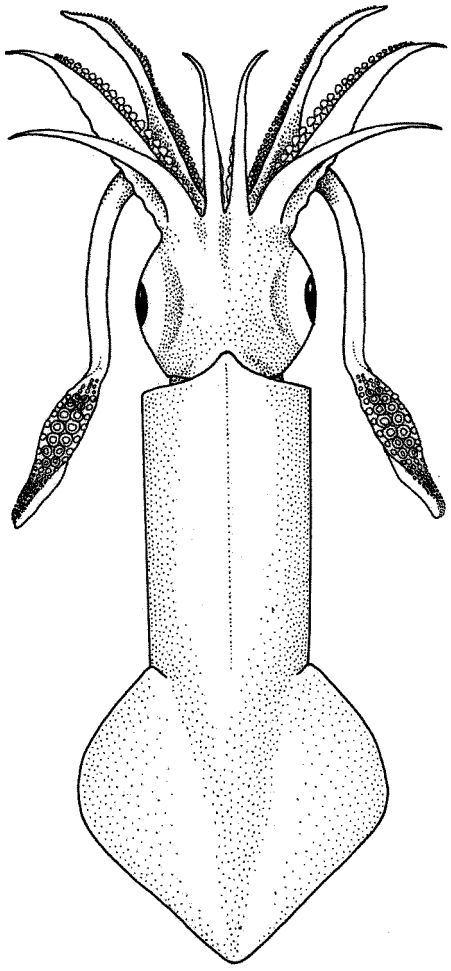
Synonymy : None.

FAO Names : En - Bigeye inshore squid
Fr - Calmar à gros yeux
Sp - Calamar ojigrande

Diagnostic Features : Mantle bluntly pointed posteriorly. Fins subrhomboidal, their lateral angles rounded, length about 45 to 55% of mantle length. Eyes very large, visible part 15 to 21% of mantle length; left arm IV hectocotylized, modified in distal 1/3 to 1/4 but not to tip; 10 to 12 suckers in dorsal row less than 1/2 the diameter of ventral partners; the 2 to 5 suckers proximal to these are enlarged; all modified suckers are set on swollen, triangular bases (stalks).



left arm IV of male hectocotylized



dorsal view

Geographical Distribution : Western Atlantic: Caribbean Sea around Cuba.

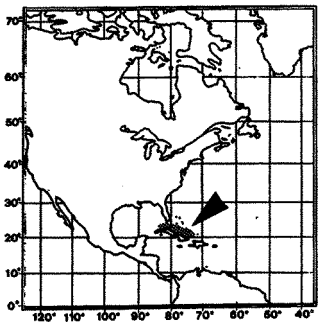
Habitat and Biology : A demersal to semipelagic species taken close to the bottom in depths from 250 to 360 m. Its biology is unknown.

Size : Maximum mantle length 13 cm.

Interest to Fisheries : Fisheries potential undetermined.

Local Names :

Literature : Cohen (1976).



Loligo opalescens Berry, 1911

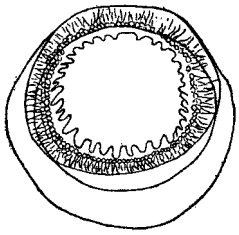
LOLIG Lolig 5

Loligo opalescens Berry, 1911, Proc.U.S.Nat.Mus., 40:591.

Synonymy : Loligo stearnsi Hemphill, 1892.

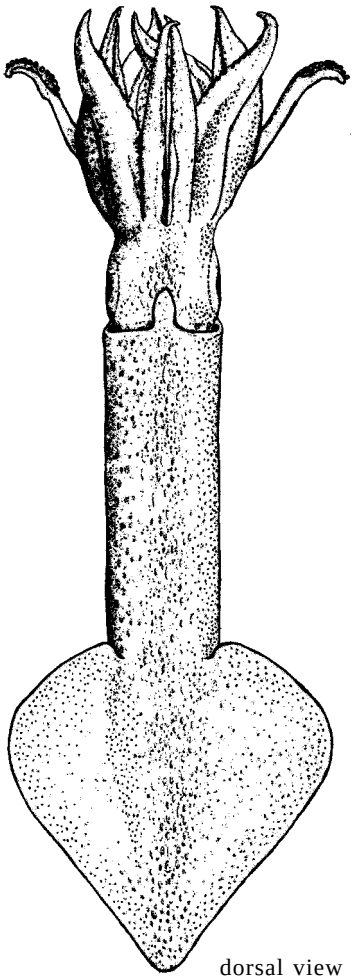
FAO Names : En - Opalescent inshore squid
Fr - Calmar opale
SP - Calamar opalescente

Diagnostic Features : Mantle slender, head and arms compact, arms short. Tentacular clubs narrow, unexpanded; sucker rings with about 30 blunt teeth. Arm sucker rings with 9 to 12 blunt teeth. Left arm IV hectocotylized along dista1 1/3 by great reduction in sucker size and enlargement of stalks into papillae.



tentacular club sucker ring

tentacular club



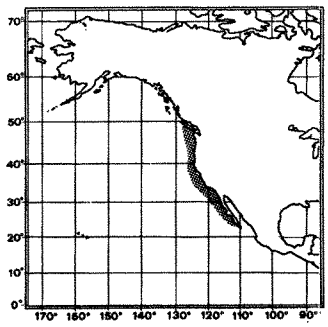
dorsal view

Geographical Distribution : Eastern Pacific: 25°N to 50°N, particularly in the waters of the California Current.

Habitat and Biology : This species schools by sizes and occurs primarily in water temperatures from 10 to 16°C, but is most abundant (and vulnerable to the fishery) after the end of the upwelling season in correlation with the increase in water temperatures when spawning aggregations are formed in 25 to 35 m depths off the Channel Islands and in 20 to 55 m depth in the Monterey Bay; mass spawning in Monterey Bay usually occurs between April and December with peaks in May or June and in November, but takes place progressively later northwards.

The egg masses are deposited on the bottom in big patches of severa1 meters in diameter, usually in relatively shallow water, but in some cases down to 180 m depth; larvae hatch after 21 to 28 days at water temperatures of 16°C and in 30 to 35 days at 13.6°C. Growth is strongly seasonal: squid hatched in early summer will grow rapidly and reach adult size in about 1 year, while late broods subjected initially to low winter temperatures (and hence having low initial grow rates) will take 1 1/2 to 2 years (Spratt, 1978). Post-spawning mortality is high in both sexes.

Market squid of all sizes feed predominantly on euphausids, except on the spawning grounds where they prefer crab larvae (megalopa). Futhermore, their diet includes other crustaceans (such as copepods, mysidacea and cumaceans), molluscs (particularly cephalopods and gastropods) and fish (Karpov & Caillet, 1978). Cannibalism is common.The daily feeding rate is estimated at 14% of the biomass. On the other hand, the species is an important food item in the diet of numerous finfishes (salmon, flatfishes and others), sharks, marine mammals and sea birds.



Size : Maximum size 19 cm dorsal mantle length and 130 g weight in males, 17 cm and 90 g respectively in females; average total length about 30 cm. Minimum size at spawning ranges between 8 and 12 cm in females, and between 7 and 11 cm in males. Males grow larger than females.

Interest to Fisheries : Initially, market squid was fished in only two areas, Channel Island and Monterey Bay, but recently the stocks are exploited all along the Californian coast and northward into Oregon and Washington, particularly in nearshore waters. Annual catches fluctuate around 10 000 metric tons. Most of the catch is taken by US vessels, but small quantities are also landed in Mexico. There is growing interest in the USA in further developing this fishery.

Spawning aggregations of market squid are fished with brails and night lights, pumps and night lights or purse seines from December to April in the Channel Island area, and with lampara nets, between April and September in and around Monterey Bay.

The squids are marketed fresh, frozen or canned for human consumption. The production is aimed primarily at the US and other consumer markets, but the species is used also for bait.

Local Names : JAPAN: Kariforunia yariika; USA: Market squid, Opalescent inshore squid.

Literature : Fields (1950, 1965, biology and life history, fishery); Hurley (1976, food and feeding, growth and respiration; 1977, school structure); Okutani (1977); Recksiek & Frey (eds, 1978, collection of papers on the biology); Tomiyama & Hibiya (1978).

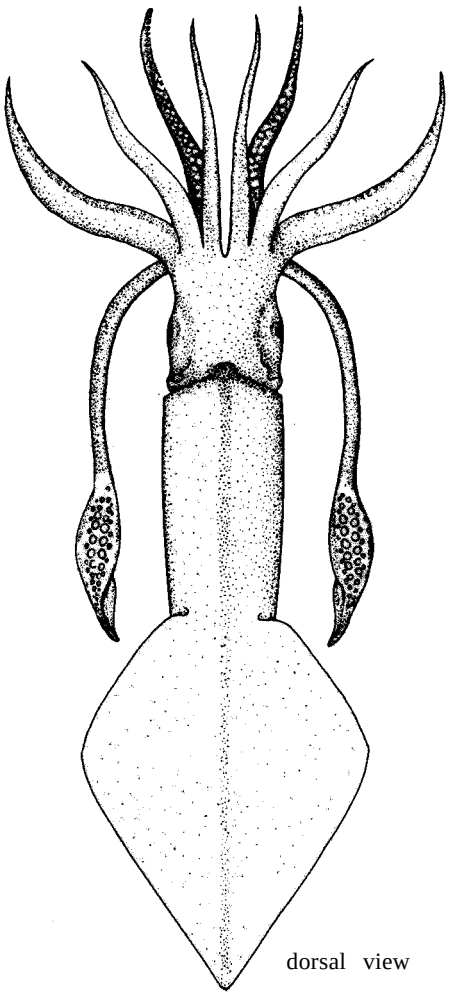
Loligo pealei LeSueur, 1821

LOLIG Lolig 6

Loligo pealei LeSueur, 1821, J.Acad.Nat.Sci.Phila, 2(1):92.

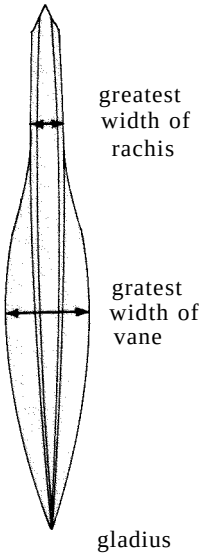
Synonymy : Loligo pallida Verrill, 1873.

FAO Names: En - Longfin inshore squid (= Common squid SIS Area 31)
Fr - Calmar totam
Sp - Calamar pálido

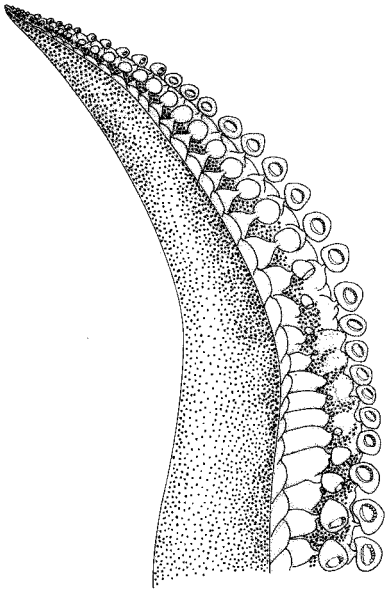


dorsal view

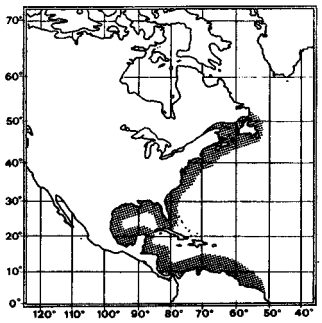
Diagnostic Features : Mantle long, moderately slender, cylindrical, the posterior end bluntly pointed. Eyes not unusually large, diameter of externally visible eyeball 8 to 18% of mantle length, and diameter of dissected lens 2 to 6% of mantle length. Fins rhomboidal, their sides nearly straight. Left ventral arm IV hectocotylized in mature males by modification of the dista1 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 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.



gladius



left arm IV of male hectocotylized



Geographical Distribution : Western Atlantic: 5°N to 50°N, including Gulf of Mexico and Caribbean Sea.

Habitat and Biology : A neritic species occurring over the continental shelf and upper slope from the surface down to about 400 m depth, but rare or absent around islands. Optimum water temperatures for this species fluctuate between 10 and 14°C. Adults are demersal in daytime but disperse into the water column and many appear at the surface (in summer or in warm waters) at night. Longfin squid are known to effect seasonal migrations. They overwinter in dense concentrations in offshore areas at depths between 100 and 200 m, and move thereafter to the near shore feeding and spawning areas where they are found from late spring through fall. Mature squids are encountered almost throughout the year, but two peak spawning periods generally are observed: the first and more important in spring, and the second, less intense, in late summer and fall this leading to the differentiation of multiple cohorts each year. Eggs are laid in gelatinous, finger-like strands, many of which are attached together in large masses (‘sea mops”) to solid

substrates (i.e. rocks, shells, shipwrecks) in depths between 10 and 250 m. The eggs hatch after approximately 27 days (at temperatures at 12 to 18°C) or after 11 days (at 21.5 to 23°C) (McMahon & Summers, 1971). Planktonic larvae and juveniles are abundant in surface waters and resemble adults in appearance (no metamorphosis). Squid originating from the spring spawn reach maturity in summer of the following year (after about 14 months, while individuals hatched in early autumn will spawn only in spring of the second successive year, at about 20 months of age. This overcrossing of the life-cycles of two life successive groups of hatchlings is a phenomenon also observed in other squid and cuttlefish species. Postspawning mortality is very high, particularly in females, a fact that is reflected in the smaller maximum size of females.

Longfin squid prey on euphausids, fishes and other squids. Cannibalism is common. The species is in turn preyed upon by yellowfin tuna (Thunnus albacares), toothed whales and other pelagic predators.

Size : Maximum mantle length 50 cm in males, approximately 40 cm in females off the southern New England States of the USA; common length in catches ranges between 10 and 20 cm. Maturity is attained at about 15 cm in males and 13 or 14 cm in females.

Interest to Fisheries : Longfin squid was formerly taken only as bycatch to the shrimp and scale-fish trawl fishery, but in recent years an international fishery was developed, specifically for this species. The world catch of longfin squid fluctuated irregularly between about 10 700 metric tons in 1978 and 23 600 metric tons in 1980. In 1981 catches were back on the 1978 level. This can be explained by the absence of Spanish and Mexican vessels from Fishing Area 21 (northwestern Atlantic) where almost the entire catch is taken. The major exploiting countries are Japan, Italy and USA (FAO, 1983). Fishing operations are most intensive from November to March along the outer continental shelf of the New England and mid-Atlantic states where the overwintering stock is exploited. The identified longfin squid catch from the Gulf of Mexico and the Caribbean in 1981 was reported as only 40 metric tons but it is suspected that this species accounts for part of the catch identified as Loligo spp. which amounted to almost 1 600 metric tons in the same year (FAO, 1983). The flesh of longfin squid is of excellent quality and marketed fresh and frozen.

Local Names : JAPAN: Amerika kensakiika; USA: Bone squid, Common squid, Long-finned squid, Winter squid.

Literature : Summers (1968, 1971, growth and size distribution); McMahon & Summers (1971, temperature effect on development rate); Serchuk & Rathjen (1974, abundance in relation to temperature); Cohen (1976, systematics); Roper (1978, Species Identification Sheets, western central Atlantic, fishing area 31); Tibbets (1977, fishery); Tomiyama & Hibiya (1978); Rathjen, Hixon & Hanlon (1979, fishery).

Remarks : Medical research, primarily in neurophysiology is conducted on the giant nerve fibres.

Loligo (Doryteuthis) plei Blainville, 1823

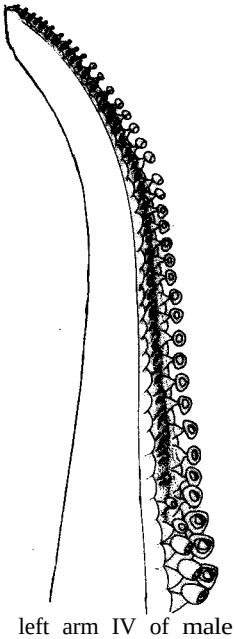
LOLIG Lolig 3

Loligo plei Blainville, 1823, J.Phys.Chim.Hist.Nat., 96:132.

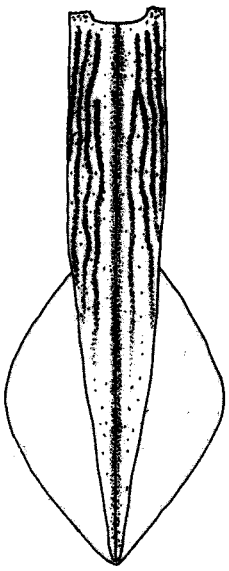
Synonymy : Loligo brasiliensis Blainville, 1823; Doryteuthis plei (Blainville, 1823).

FAO Names : En - Slender inshore squid
Fr - Calmar fleche
SP - Calamar flecha

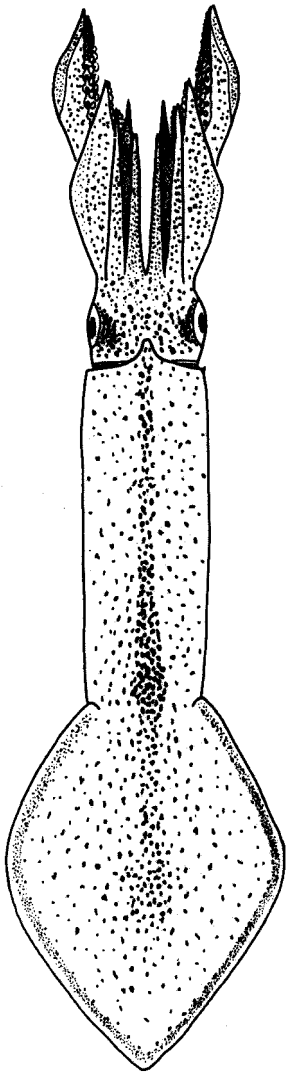
Diagnostic Features : Mantle long, slender, cylindrical, the posterior end acutely pointed. Fins rhomboid, their sides fairly straight. Eye not unusually large, diameter of externally visible eyeball 14 to 19% of mantle length, diameter of dissected lens 2 to 7% of mantle length. Tentacular clubs with marginal suckers on manus of tentacular club relatively small. Left ventral arm IV hectocotylized in mature males by a modification of dista1 1/2 to fourth of arm that extends to arm tip; one half to 3/4 (42 to 82) of the suckers in dorsal row much smaller than half the size of their ventral counterparts; modified (small) suckers on small, narrow triangular pedicels. Gladius 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).



left arm IV of male hectocotylized

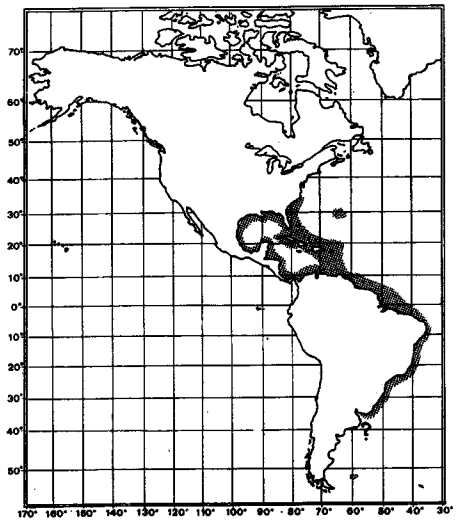


ventral view of male showing midline ridge and colour pattern



dorsal view

Geographical Distribution : Western Atlantic: Southern Brazil, northern Argentina (southern limit unconfirmed) to 35°N, including Caribbean Sea, Gulf of Mexico and Bermuda.



Habitat and Biology : A neritic, semipelagic species most abundant over the shelf but with a lower depth range of 370 m. The squids concentrate near the bottom during the day but disperse into the water column at night.

Some spawning may occur almost throughout the year with two peaks: March and September through October in the Caribbean Sea, between June and August and from December to March off Brazil. Mass spawning takes place in shallow waters. There is some exchange between the spring and autumn spawning groups even though squids of different site may be morphometrically diverse. Males grow larger than females.

Size : Maximum mantle length 35 cm males, 22 cm in females.

Interest to Fisheries : Taken as bycatch to shrimp trawling and other directed fisheries throughout its range. Small trawl or light and dip-net fisheries for this species exist in Progreso, Yucatan. Also taken as bycatch (identified as Loligo brasiliensis) in shrimp fisheries between Buenos Aires and Mar del Plata (Argentina). The main fishing period extends from February through August, the catches drop sharply thereafter. Best catches are obtained between 20 and about 75 m depth. Gears used include the "raùo" or beam trawl and the "red de portones" or otter trawl. Arrow squid is used for food and bait.

Local Names : USA: Arrow squid, Slender inshore squid.

Literature : Okutani (1977, 1980); Roper (1978, Species Identification Sheets, western central Atlantic, fishing area 31); Rathjen, Hixon & Hanlon (1979, fishery resources).

Loligo reynaudi Orbigny, 1845

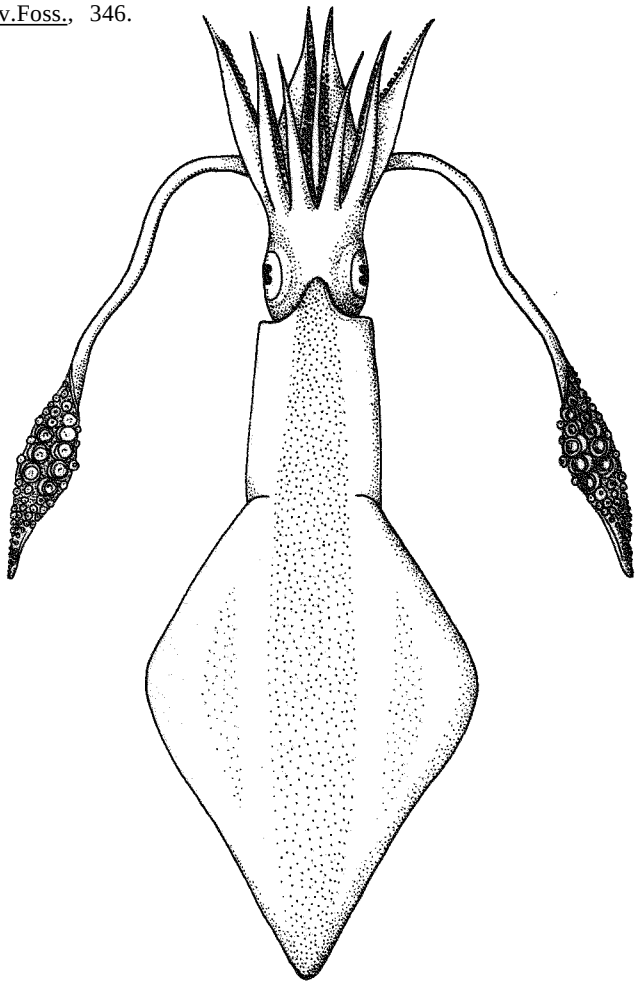
LOLIG Lolig 15

Loligo reynaudi Orbigny, 1845, in 1845-1847, Moll.Viv.Foss., 346.

Synonymy : None.

FAO Names : En - Cape Hope squid
Fr - Calmar du Cap
SP - Calamar del Cabo

Diagnostic Features : Mantle narrow, elongate. Fins long, 65% of more of mantle length. Tentacles long; clubs expanded; club suckers on the manus (medial rows) greatly enlarged. Arms short (in comparison with L. vulgaris).



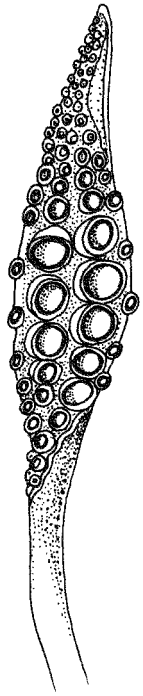
dorsal view

Geographical Distribution : Eastern central Atlantic: From South Africa at least to Angola, but actual limits of geographical range unknown.

Habitat and Biology : A neritic, semipelagic species occurring over the continental shelf; the upper and lower limits of the depth range are undetermined.

Size : Maximum mantle length 40 cm, weight more than 1 kg.

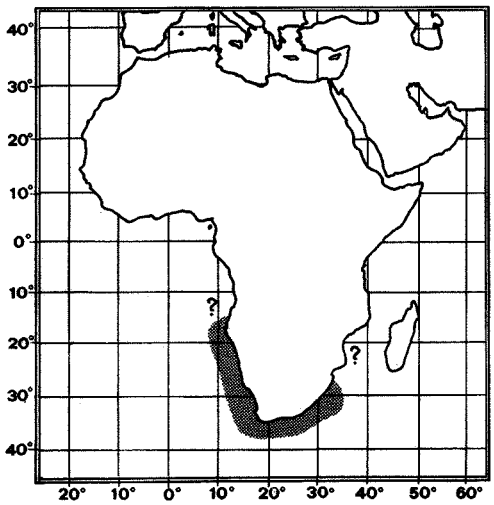
Interest to Fisheries : Japanese and South African multispecies trawl fisheries are each catching around 3 000 tons of this squid per year, between Cape Town and Durban on the Agulhas Bank at depths of less than 200 m. Currently marketed in France and Italy.



tentacular club

Local Names :

Literature : Cooper (1979, length-weight relationship).



Remarks : May be synonymous with L. vulgaris or a subspecies of L. vulgaris. This is a very poorly known species and specimens are needed to verify its systematic position.