

**Nototodarus sloani** (Gray, 1849)

OMMAS Noto 4

*Ommastrephes sloani* Gray, 1849, *Cat.Moll.Brit.Mus.*, 61.

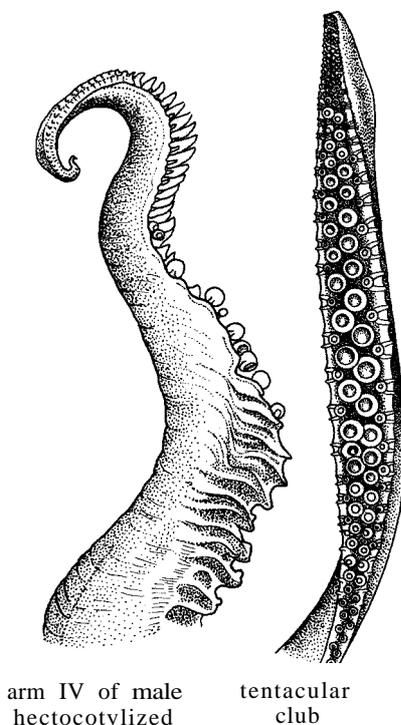
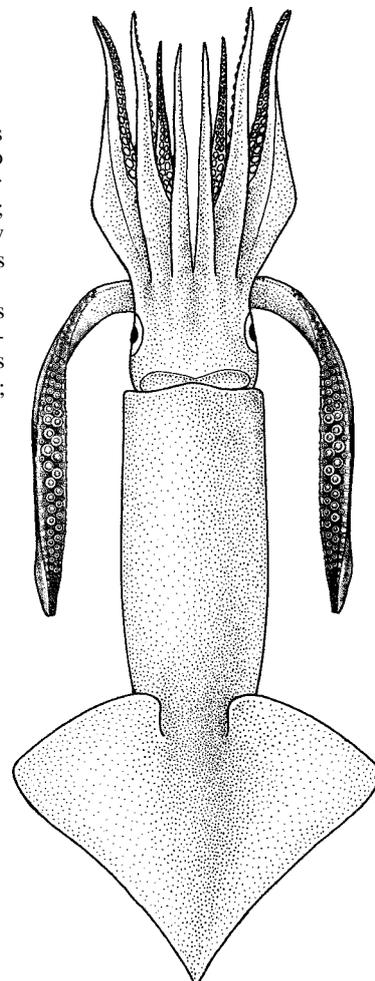
**Synonymy** : *Notodarus sloani sloani* (Gray, 1849); *Ommastrephes sloani* Gray, 1849; *Nototodarus insignis* Pfeffer, 1912.

**FAO Names** : En - Wellington flying squid  
Fr - Encornet minami  
SP - Pota neozelandesa

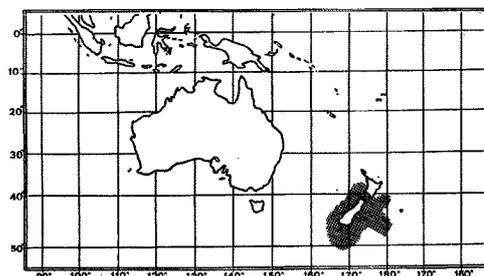
**Diagnostic Features** : Mantle muscular tapers to pointed tail. Fins broad, sagittate length 42 to 48% of mantle length; single fin angle 44° (40 to 50°). Funnel groove with foveola and 10 to 13 longitudinal ridges. Tentacular club occupies much of tentacle length; protective membranes very low, weak; largest sucker rings with 11 to 13 conical teeth all around interspersed with low truncated platelets; distal central tooth not enlarged. Arm sucker rings smooth proximally, grading to truncate teeth laterally and about 11 to 15, short, triangular teeth distally, the central one enlarged; both arms IV in males hectocotylized basally with modification of protective membranes and trabeculae into large, ridged, saw-tooth processes; suckers absent; stalks remnants only; right arm IV distally with sucker stalks enlarged, comb-like, conical; suckers and trabeculae lost.

**Geographical Distribution** : Limited to New Zealand waters.

**Habitat and Biology** : A neritic and oceanic species occurring from the surface to about 500 m depth, occasionally forming large aggregations down to 300 m. It occurs over a broad range of temperatures but seems to be either more abundant or more vulnerable in colder waters. Two groups, possibly species, are distinguished by morphometric features, one north of the subtropical convergence zone and one within or south of the convergence. Within the northern group clearly identified as *N. sloani*, the western population occurs in an upwelling area and grows to larger sizes than the eastern population. The group south of the convergence has a growth pattern similar to that of the northwestern population. Growth rates vary inversely with size and directly with temperature (Roberts, 1983). The life-span of this species exceeds one year. Each of the two northern populations has 2 peak spawning season: autumn (March and April) and spring (September to November) for the northwestern population, and July and December for the northeastern population.

arm IV of male  
hectocotylizedtentacular  
club

dorsal view



**Size** : Maximum mantle length about 42 cm, maximum weight 1.8 kg in western New Zealand, but 32 cm and 0.6 kg in the warmer waters of northeastern New Zealand.

**Interest to Fisheries** : Apart from the exceptionally good landings in 1980 (63 000 metric tons reported from Japan (more than 90% of the total catch) and the Republic of Korea), annual catches of this species averaged about 29 000 metric tons in recent years (FAO, 1983). Japanese and South Korean jigging vessels, operating under joint-venture schemes with New Zealand, take about half the catches, but they land only a fraction in this country. This squid is also taken in trawling operations of foreign licensed vessels from USSR, Japan and the Republic of Korea. The fishery is regulated through a quota system. The quotas for the 1981/1982 trawling season for all fishing grounds were allocated as follows: Republic of Korea: 1 600 tons, Japan: 9 900 tons, USSR: 11 500 tons, and joint venture operations 27 000 tons (Mattlin, 1982). So far, only the western and southern groups of *N. sloani* are being exploited. The vessels usually operate during a 90 to 120 day fishing season extending from December to April.

Frozen and processed squids are exported to various countries. Domestically caught squid are marketed fresh or processed.

**Local Names :** JAPAN: Minamisurumeika, Nyujirando - minamisurumeika, Nyujirandosurumeika; NEW ZEALAND: New Zealand arrow squid.

**Literature :** Roberts (1978, New Zealand squid resources;1983, biology and fishery); Kawakami & Okutani (1981, identity); Matlin (1982, fishery).

**Remarks :** Two species of Nototodarus are now believed to exist in New Zealand, a southern form and a western and northeastern form, but their nomenclature has not been clarified or published.

**Ommastrephes bartrami** (LeSueur, 1821)

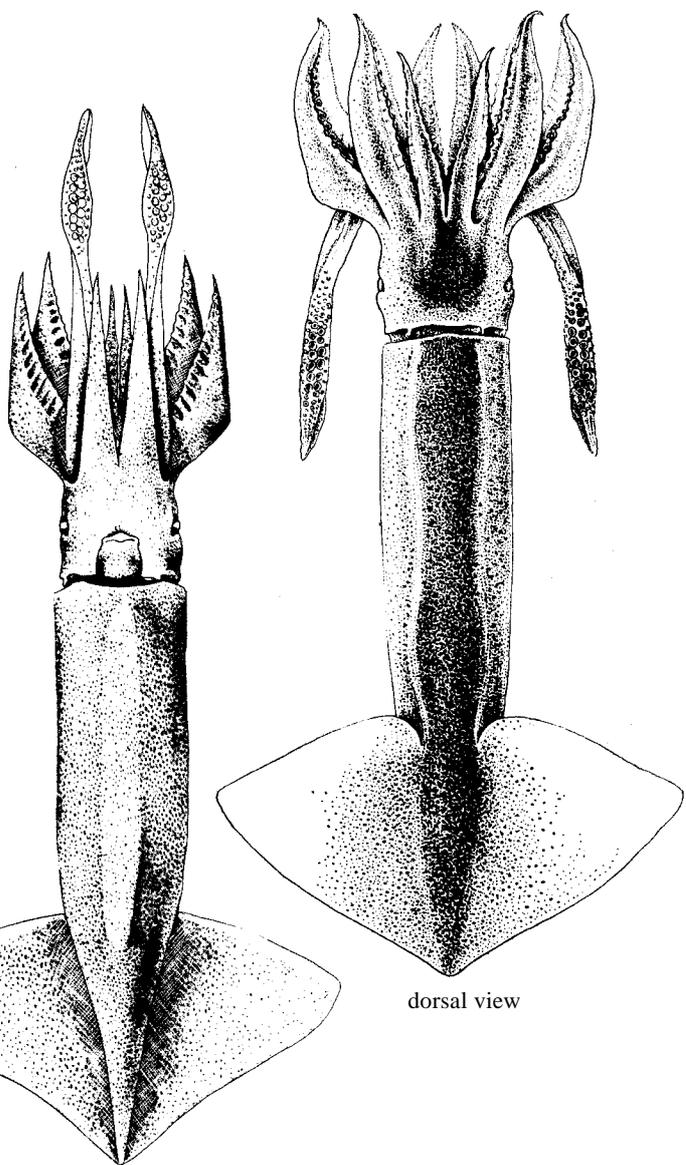
OMMAS Ommas 2

Loligo bartrami LeSueur, 1821, J.Acad.Nat.Sci.Phila., 2(1):90.

**Synonymy :** Loligo bartrami LeSueur, 1821; Sthenoteuthis bartrami - invalid generic name.

**FAO Names :** En - Neon flying squid  
Fr - Encornet volant  
Sp - Pota saltadora

**Diagnostic Features :** Mantle muscular, robust, not drawn out posteriorly into a pointed tail. Fins muscular, length 40 to 45% of mantle length, width about 60% of mantle length, single fin angle 45 to 50°. 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 arms (IV); 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 to head. Four to six small suckers on the tentacular stalk proximal to the first smooth knob of the fixing apparatus.

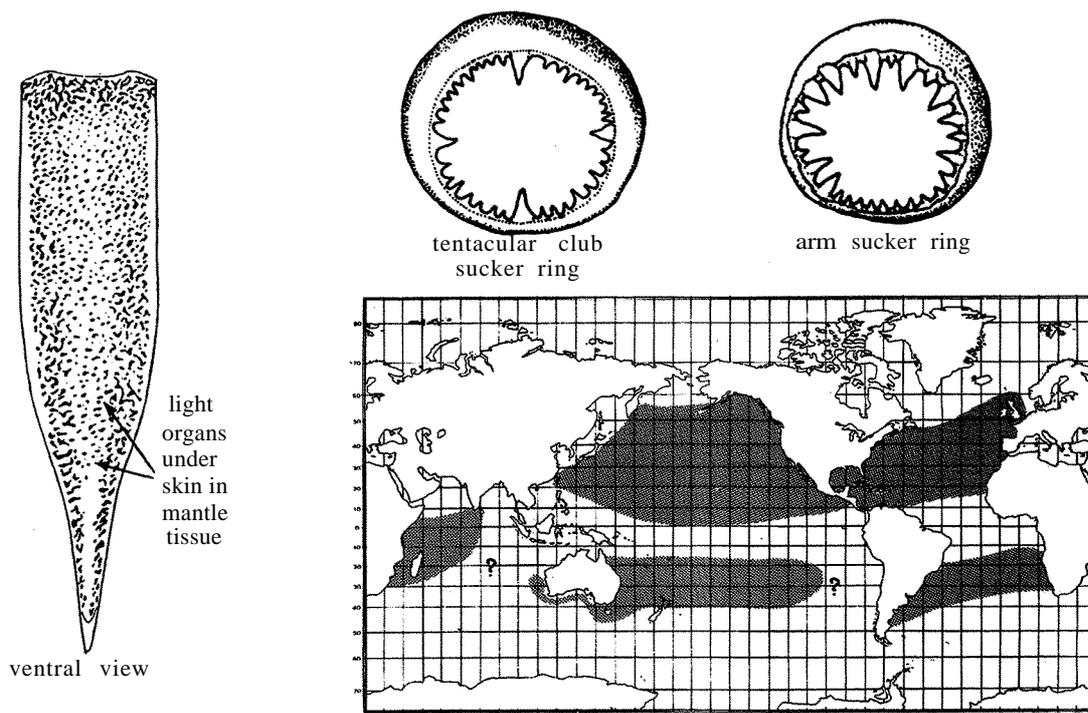


arms IV of male  
hectocotyized

enlargement  
of base  
tentacular club

ventral view

dorsal view



**Geographical Distribution :** Worldwide in subtropical and temperate oceanic waters, but distribution discontinuous (apparently non-tropical, absent in equatorial waters).

**Habitat and Biology :** An oceanic species occurring from the surface to approximately 1 500 m depth. In the northwestern Pacific, population densities are highest in the boundary zone between warm and cold waters, particularly from July to August (water temperature gradient 15 to 24°C) and from end of September to December (10 to 22°C). This species avoids waters of less than 10°C. It carries out seasonal migrations. Throughout summer and fall, dense schools are encountered associated with the movements of the Kuroshio current, feeding in surface waters, which migrate to deeper waters and disperse during winter and spring. During the feeding season, diurnal vertical migrations have been observed between nearsurface waters at night and deeper layers in daytime. From July through October most individuals are immature; both sexes mature between January and April, the males about 3 months earlier than the females. The spawning season is rather extended (January to May off Japan) and hence it is possible to distinguish a "fast"-growing and a "slow"-growing group, depending on the environmental conditions at hatching and in the initial juveniles stages. Growth rates are directly correlated with temperature and inversely with size. The lifespan is about 1 year. Food of flying squid consists predominantly of fishes, such as lanternfishes, sardines, mackerel larvae, and sauries. Other squids account for up to 30% of the stomach contents, including a high percentage of cannibalism, while pelagic crustaceans form a highly variable, but usually minor fraction (particularly in adult squids).

**Size :** Maximum mantle length 50 cm in females; males somewhat smaller; maximum weight 1.8 kg. Off Japan, females mature at little less than 40 cm, males between 29 and 32 cm.

**Interest to Fisheries :** With the decline of the stocks of *Todarodes pacificus*, the effort of the Japanese squid fishery has been increasingly shifting towards the exploitation of flying squid, and since 1974 catch and effort levels for this species have gone beyond the exploratory fishing stage. Landings increased from 17 000 tons in 1974 to about 150 000 tons in 1978 and 187 000 tons in 1980, primarily as a result of the eastward expansion of the fishing grounds. An annual 'fishery forecast' is prepared in Japan for the fishing grounds in the Japan Sea and the Pacific. During its northward migration in early summer, the species is fished off northeastern Honshu, between the surface and about 150 m depth with jigging machines, while in the Tasman Sea, off New Zealand and in the North Pacific, it is caught with drift gillnets. Although it is abundant in other oceans, there are currently no fisheries directed at this species outside the Pacific. The current level of exploitation is suspected to exceed the optimum sustainable yield. The flesh is of good quality for human consumption, although somewhat tough in mature individuals. It is marketed fresh and frozen.

**Local Names :** AUSTRALIA: Red ocean squid; JAPAN: Akaika, Bakaika, Medama, Murasakiika; USA: Neon flying squid.

**Literature :** Ishi (1977, growth, northwestern Pacific); Murata & Ishi (1977, biology, northwestern Pacific); Roper & Sweeney (1981, Species Identification Sheets, eastern central Atlantic, fishing areas 34/47 in part).

**Onmastrephes caroli** (Furtado, 1887)

OMMAS Ommas 1

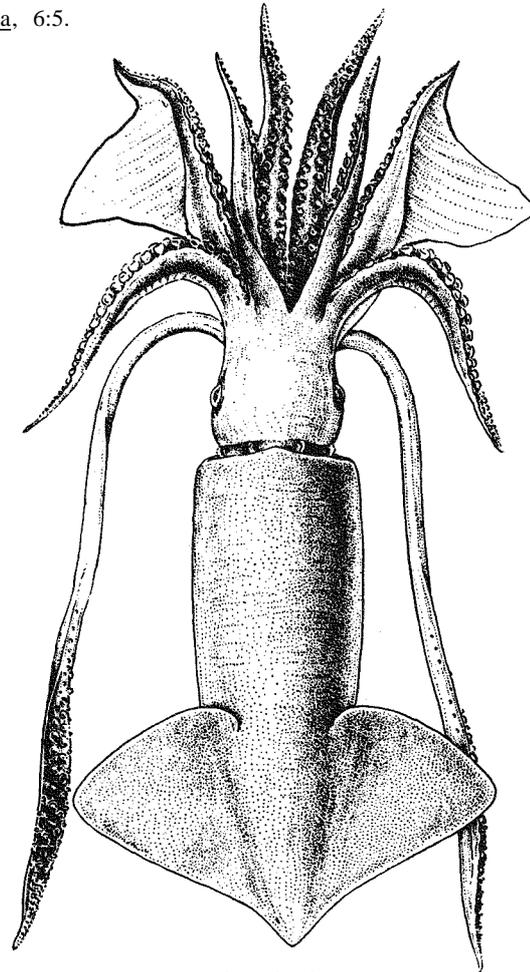
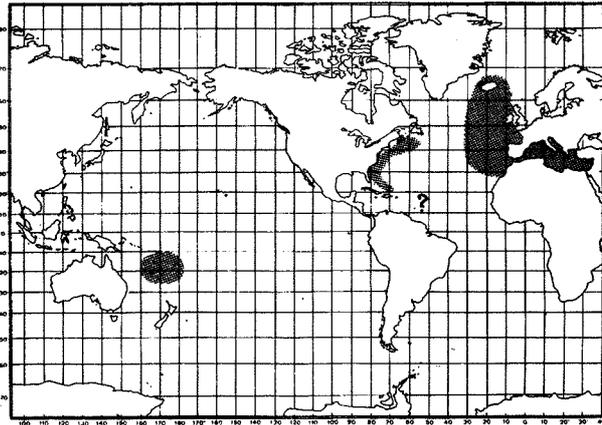
*Ommatostrephes caroli* Furtado, 1887, Mem.Acad.Sci.Lisboa, 6:5.

**Synonymy** : *Ommatostrephes caroli* Furtado, 1887.

**FAO Names** : En - Webbed flying squid  
Fr - Encornet carol  
Sp - Pota velera

**Diagnostic Features** : A large squid. Mantle very muscular, robust. Fins large, muscular, broad, width about 90% of mantle length, length about 45 to 50% of mantle length; fin angle broad, single fin angle 60 to 65°; ventral protective membrane on arm III of adults very greatly enlarged into a broad triangular web.

**Geographical Distribution** : Northeastern Atlantic (excluding the North Sea), Mediterranean Sea; western North Atlantic, southwestern Pacific.



dorsal view

**Habitat and Biology** : An oceanic species occurring between the surface and 1 500 m depth and carrying out diel vertical movements (near the surface at night and in deeper waters in daytime). It is also known to migrate seasonally in relation to the temperature conditions of the water bodies in the northeastern Atlantic. By about July, small individuals of both sexes appear in Madeiran waters where they form numerous schools of up to 50 similar-sized individuals. These schools become smaller as the individuals grow in size.

Spawning takes place in late summer and autumn. A large female may carry up to about 360 000 eggs. The species feeds on fishes and other squids. Cannibalism is common. It is in turn preyed upon by tunas, cod and other finfishes.

**Size** : Maximum mantle length 70 cm in females, somewhat smaller in males. Length at first maturity is about 40 cm in females, 30 cm in males.

**Interest to Fisheries** : In Madeira, the species is locally fished for human consumption and bait. It is believed to have some potential for an expanded fishery. Its size and muscular consistency appear most desirable.

**Local Names** : USA: Webbed flying squid.

**Literature** : Clarke (1966, biology).

**Remarks** : The larval stage sometimes referred to as Rhynchoteuthis and is easily confused with O. pteropus.

**Ommastrephes pteropus** Steenstrup, 1855

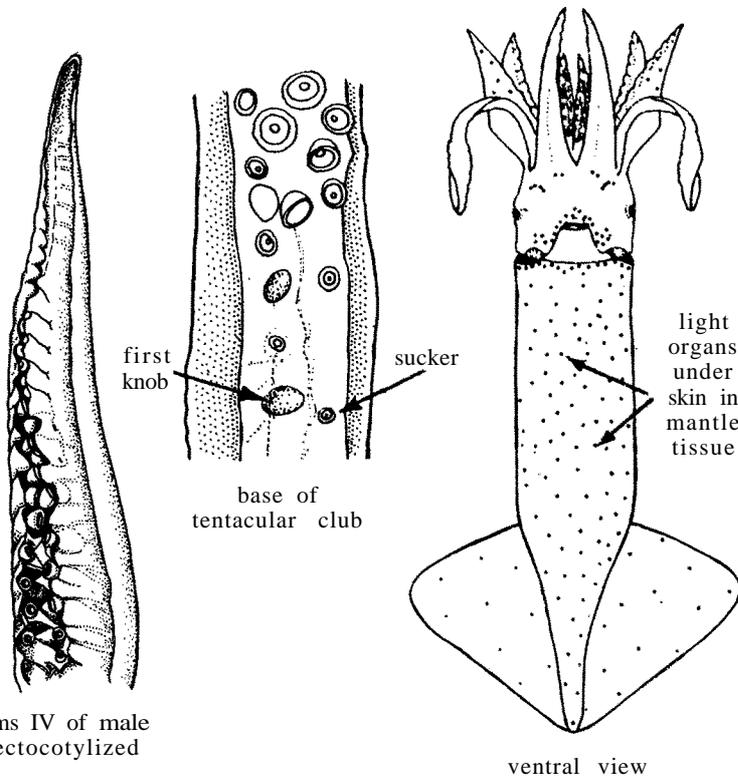
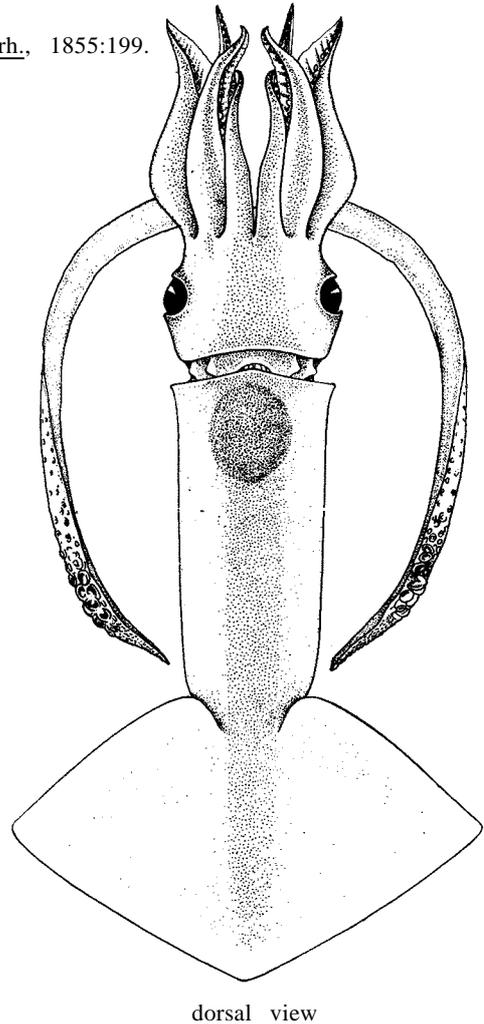
OMMAS Ommas 3

Ommastrephes pteropus Steenstrup, 1855, Over.Oanske Vidensk.Forh., 1855:199.

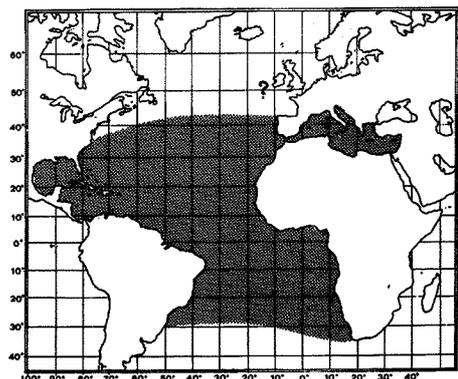
**Synonymy** : Ommastostrephes pteropus - invalid generic name.

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

**Diagnostic Features** : Mantle muscular, robust, not drawn out posteriorly into a pointed tail. Fins muscular, length 45 to 50% of mantle length, width 75 to 80% of mantle length; single fin angle 55 to 60°. 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 arms IV. Zero to 2 small suckers on the tentacular stalk proximal to the first smooth knob of the fixing apparatus.



arms IV of male hectocotylyzed



**Geographical Distribution** : Pan-Atlantic in tropical and warm-temperate waters; limits of distribution unknown; the 25°C surface isotherm has been suggested as the southern limit, the 22°C surface isotherm as the northern limit.

**Habitat and Biology** : An oceanic species occurring from the surface to about 1 500 m depth, known to carry out diel vertical movements between the surface at night and deeper waters in daytime. During periods of bright moonlight or rough seas, however, it does not appear at the surface.

Every year, around August, schools of maturing females (hardly any males) migrate northward into Madeiran waters in coincidence with the shifting of the 22° C surface isotherm, which seems to determine the northern range limit of the species. The size of schools decreases as individuals grow in size. Spawning areas are unknown; the eggs are laid in large, gelatinous, sausage-shaped masses that float at or near the water surface and contain up to several hundred thousand embryos.

The species is an active predator on fishes, crustaceans and squids. Cannibalism is common. It is in turn preyed upon by tunas, billfishes, cod and other finfishes.

**Size :** Maximum mantle length 40 cm in females, males somewhat smaller; length at first maturity about 30 cm in females.

**Interest to Fisheries :** Around Madeira this species is locally dipnetted or jigged at night, and utilized for human consumption. It is believed to be very abundant, although no assessment of the actual population size has been made. It may have sufficient potential to also support a fishery in the Caribbean. The flesh is of excellent quality, and hence, well suited for human consumption, either fresh or frozen.

**Local Names :** COLOMBIA, CUBA, MEXICO: Lomo anaranjado; USA: Orangeback flying squid; VENEZUELA: Lomo anaranjado.

**Literature :** Clarke (1966, biology); Roper (1978, Species Identification Sheets, western central Atlantic, fishing area 31); Roper & Sweeney (1981, Species Identification Sheets, eastern central Atlantic, fishing areas 34/47 in part).

**Symplectoteuthis luminosa** Sasaki, 1915

OMMAS Symp 2

*Symplectoteuthis luminosa* Sasaki, 1915, *J.Coll.Agric., Tohoku Imp.Univ.*, 6(6):144.

**Synonymy :** *Eucleoteuthis luminosa* Berry, 1916 - invalid generic name.

**FAO Names :** En - Luminous flying squid  
Fr - Encornet lumineux  
Sp - Pota luminosa

**Diagnostic Features :** Mantle muscular, conical, tapering to moderately sharp tail. Fins sagittate, length about 50% of mantle length, width about 50% of mantle length; single fin angle 40° (35 to 50°); mantle and funnel fused at locking cartilages; two sets of vivid longitudinal stripes along ventral surface of mantle (are photophores); a large photophoric patch at base of each arm IV. Left arm IV hectocotylyzed at distal end with absence of suckers; paired papillae are remnants of sucker stalks.

