4.5 FAMILY GONATIDAE Hoyle, 1886

GONA

Gonatidae Hoyle, 1886, Rep.Sci.Results CHALLENGER, 16(44):173.

FAO Names : En - Gonate squids
Fr - Encornets
SP - Gonaluras

General Remarks on the Family : Species in this family belong to 3 genera, Berryteuthis, Gonatopsis and Gonatus. They are cold water forms and are among the most abundant squids in higher latitudes.

Díagnostic Features : This family is characterized by a tetraserial armature on the arms. Arm tips, however, in one species, Gonatopsis octopedatus, are modified and have up to 12 rows of minute suckers. The two medial rows on arms I to III consist of hooks in all species, except Berryteuthis anonychus which has only suckers, except at the bases of some arms in females. All members of the family have a simple straight funnel locking-cartilage which may flare slightly at the posterior end; buccal connectives that attach to the ventral borders of arms IV; numerous irregular rows of suckers on the clubs with additional hooks in some forms (i.e., Gonatus species). Only one species in the family has photophores (Gonatus, new species): oval patches located on the ventral surface of the eyes.

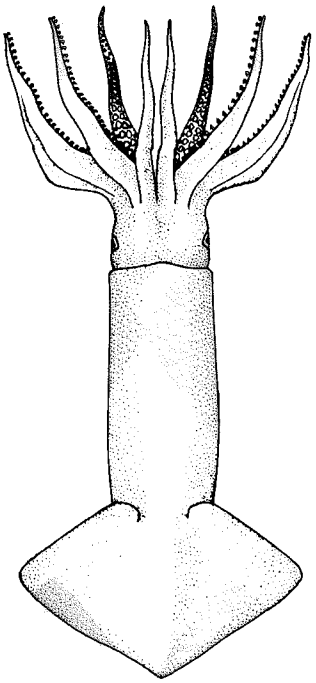
Key to Genera :

1a. Tentacles absent (except in the early larval forms) (Fig. 1) ..... **Gonatopsis**

1b. Tentacles present at all life stages

2a. At least one large hook in the centre of the tentacular club; radula with 5 longitudinal rows of teeth (Fig. 2a) ..... **Gonatus**

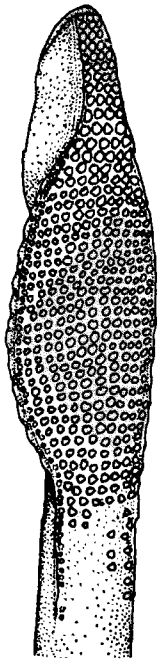
2b. No hooks on the tentacular club; radula with 7 longitudinal rows of teeth (Fig. 2b)..... **Berryteuthis**



Gonatopsis
dorsal view

Fig. 1

a. Gonatus



b. Berryteuthis

tentacular club

Fig. 2

Gonatus fabricii (Lichtenstein, 1818)

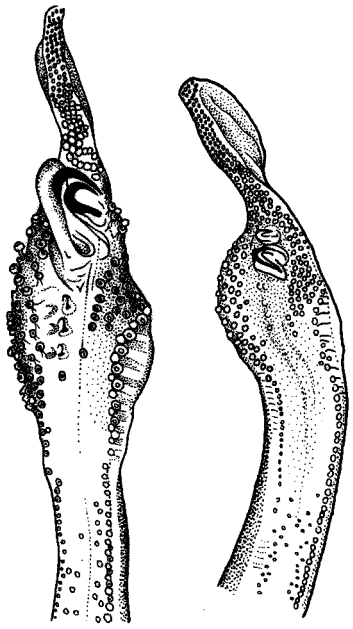
GONA Gonat 1

Onychoteuthis fabricii Lichtenstein, 1818, Abhand.Phys.Kl.Kon.-Preus.Akad.Wiss., 1819:223.

Synonymy : Onychoteuthis fabricii Lichtenstein, 1818.

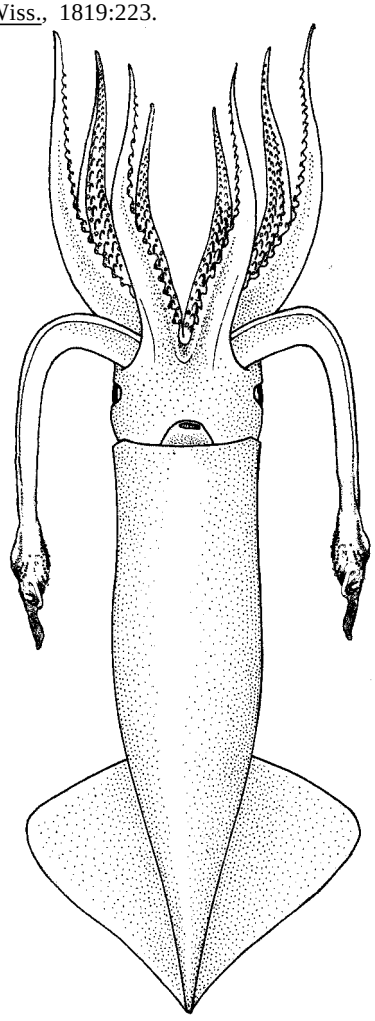
FAO Names : En - Boreoatlantic gonate squid
Fr - Encornet atlantoboréal
SP - Gonalura atlantoboreal

Diagnostic Features : Mantle long, slender conical, slightly wider at midpoint, tapering to a sharp point posteriorly, its muscular part ending at conus, but a fleshy, tapered column extending posteriorly as the tail. Fins saggitate with anterior lobes free, lateral margins rounded, their length less than 50% of mantle length, their width slightly less than the length. Tentacular clubs small, their length about 10 to 20% of mantle length, with 1 very large, central hook followed proximally with 3 small hooks and 1 small sucker, and distally by 1 moderate-sized sucker.



adult juvenile

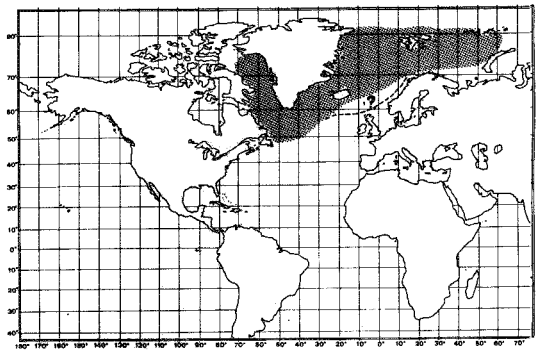
tentacular club



ventral view

Geographical Distribution : Offshore arctic and subarctic waters of the northern North Atlantic from the Newfoundland Basin, around Greenland and eastward to the Barents Sea.

Habitat and Biology : An oceanic species occurring between the surface and 500 m depth. Adults are common in midwater layers in arctic and subarctic waters of the North Atlantic, while juveniles inhabit surface waters in the northwest Atlantic. Spawning seems to extend from mid-April to December with a peak period in late May and June. It is speculated that in the Norwegian Sea spawning occurs from winter to summer and hatching subsequently from late March to June or July. Juveniles feed on copepods, euphausids, amphipods, pteropods, and chaetognaths. Once the hooks have developed (at a mantle length of 2.5 cm), an important part of the diet is made up of fish; and adults can feed on prey larger than themselves. It is preyed upon by the bottlenose whale and hooded seals in the Norwegian Sea and by sperm whales off Iceland and in the North Atlantic. It is also frequently found in stomachs of other marine mammals, of coalfish, various gadoids, the redfish Sebastes marinus and others.



Size : Maximum mantle length 30 cm.

Interest to Fisheries : This species is believed to have some fishery potential. Greenland Eskimos use it as bait in the cod and shellfish (paltus) industry and for human food, Taken as bycatch in shrimp trawls.

Local Names :

Literature : Wiborg (1979, fishery potential Norwegian Sea, biological observations); Okutani (1980).

Gonatus madokai Kubodera & Okutani, 1977

GONA Gonat 2

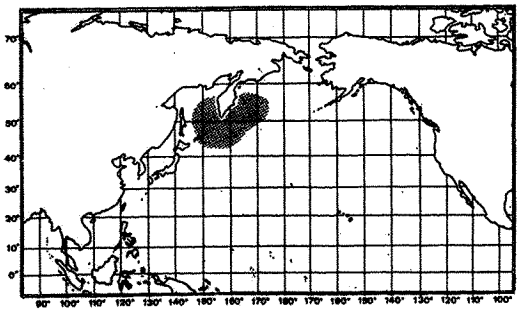
Gonatus madokai Kubodera & Okutani, 1977, Venus, 36(3):124.

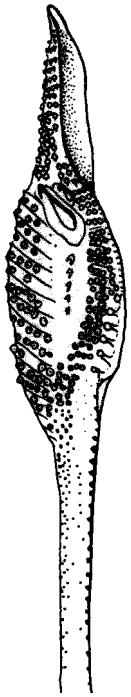
Synonymy : None.

FAO Names : En - Madokai gonate squid
Fr - Encornet madokai
Sp - Gonalura madokai

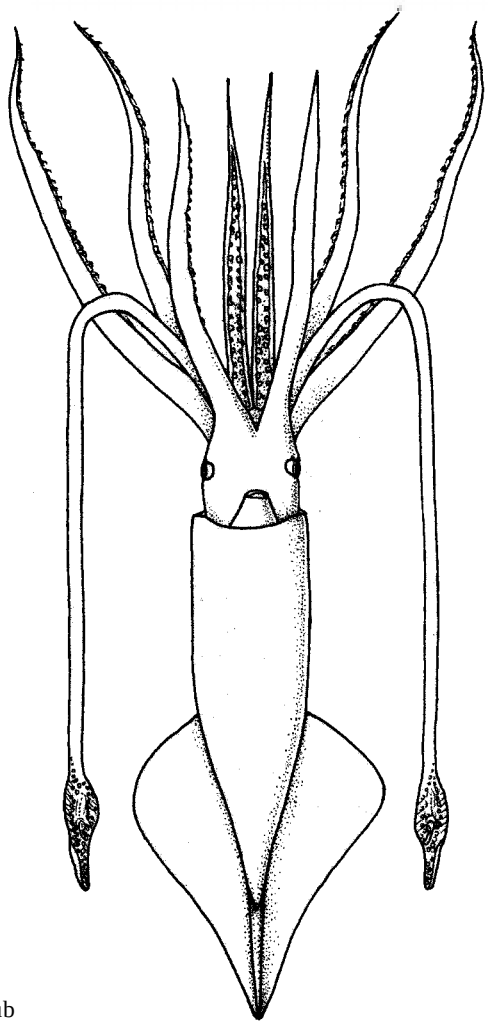
Diagnostic Features : Mantle moderately broad, soft-fleshed, extending posteriorly into a long, pointed tail, the posterior part non-muscular posterior to conus. Fins saggitate, their length 60 to 65% of mantle length, their width 50% of mantle length. Tentacular clubs with 1 very large central hook, 1 moderate-sized hook distally, and 5 very small hooks proximally. Arms very long, the longest (III) equal to mantle length.

Geographical Distribution : Northern northwest Pacific: around the Kamchatka peninsula and the Kurile and Aleutian islands; especially in the Okhotsk Sea.





tentacular club



ventral view

Habitat and Biology : An epipelagic species. The larvae are abundant in the Okhotsk Sea. Adults are heavily preyed upon by toothed whales.

Size : Maximum mantle length 33 cm.

lnterest to Fisheries : Very abundant; believed to have potential for development of a fishery.

Local Names :

Literature : Okutani (1980).

Gonatus middendorffi Kubodera & Okutani, 1981

GONA Gonat 3

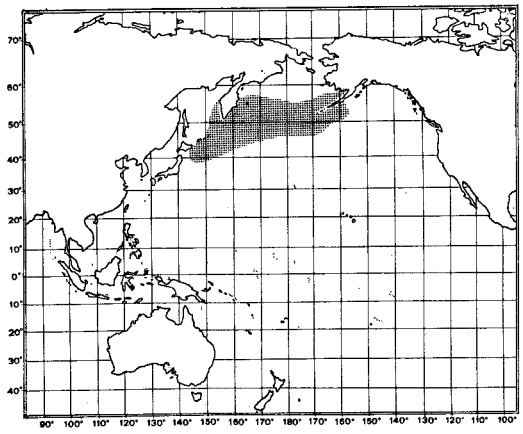
Gonatus middendorffi Kubodera & Okutani, 1981, Bull.Natl.Sci.Mus.Tokyo, 7(1):8.

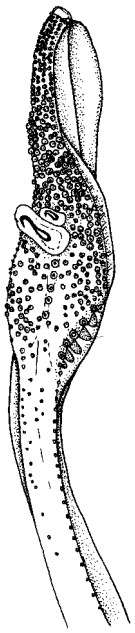
Synonymy : None.

FAO Names : En - Shortarm gonate squid
Fr - Encornet bras courts
SP - Gonalura bracicorta

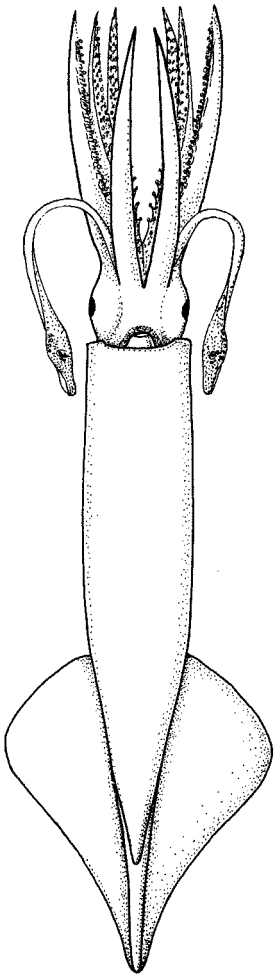
Diagnostic Features : Mantle long, muscular, very slender, its width 18% of mantle length, tapering posteriorly to a sharp, choroidal tail. Fins muscular, relatively long (47 to 52% of mantle length) and narrow (their width 40% of mantle length), sharply pointed; fin angle 25° (50° both fins). Tentacular stalks very small, weakly developed; tentacular clubs very small, their length less than 13% of mantle length; manus with a large central hook, a medium-sized distal hook and 5 small proximal suckers, 2 or 3 of which are sometimes modified into small, immature hooks.

Geographical Distribution : Far North Pacific Ocean, Bering Sea, along the Aleutian and Kurile islands chains.





tentacular club



ventral view

Habitat and Biology : An oceanic species; the larvae are encountered near the surface at night; it is an important food item in the diet of sperm whales and salmon (especially Oncorhynchus nerka and O. kisutch).

Size : Maximum mantle length 30 cm.

Interest to Fisheries : Believed to have a fisheries potential.

Local Names :

Gonatus steenstrupi Kristensen, 1981

GONA Gonat 4

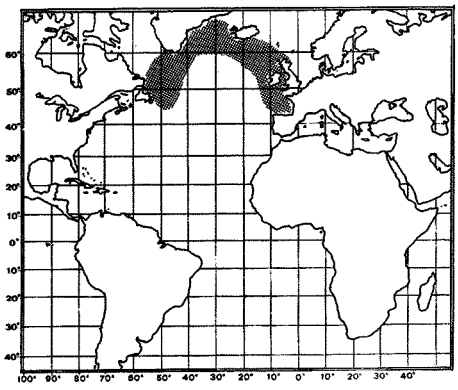
Gonatus steenstrupi Kristensen, 1981, Steenstrupia, 7(4):78.

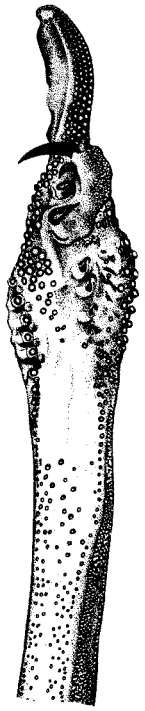
Synonymy : Gonatus fabricii Lichtenstein, 1818, in part.

FAO Names : En - Atlantic gonate squid
Fr - Encornet atlantique
Sp - Gonalura atlántica

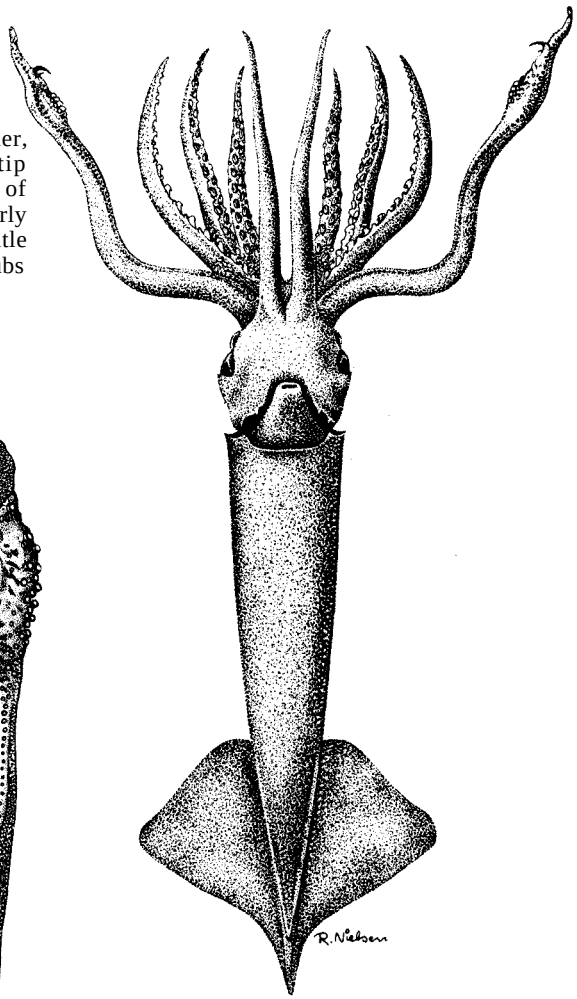
Diagnostic Features : Mantle long, very slender, thick-walled, tapering evenly to the posterior pointed tip (short tail), widest at anterior margin; muscular part of mantle ends at conus, but a fleshy column extends posteriorly as a tail. Fins saggitate, their length about 45% of mantle length, their width 52% of mantle length. Tentacular clubs large, expanded, their length about 25% of mantle length; 1 very large central hook with 1 moderate-sized hook just distal to it and 4 to 5 progressively smaller hooks proximal to it (5th hook sometimes a sucker).

Geographical Distribution : Widely distributed in the temperate (Bay of Biscay) to boreal (Irminger Sea-East Greenland) waters, North Atlantic and east of the Grand Banks of Newfoundland; not entering arctic waters.





tentacular club



ventral view

Habitat and Biology : Oceanic, occurring possibly to 1 000 m depth. It is an important food item in the diet of toothed whales.

Size : Maximum mantle length 15 cm.

Interest to Fisheries : Currently there are no fisheries directed at this species, but its large size and the consistency of its flesh make it a good potential resource.

Local Names :

Remarks : This species was confused with G. fabricii until it was recognized and separated by Kristensen in 1981. It is more boreal/high temperate in distribution, whereas G. fabricii is more arctic/subarctic.

Gonatopsis borealis Sasaki, 1923

GONA Gona 1

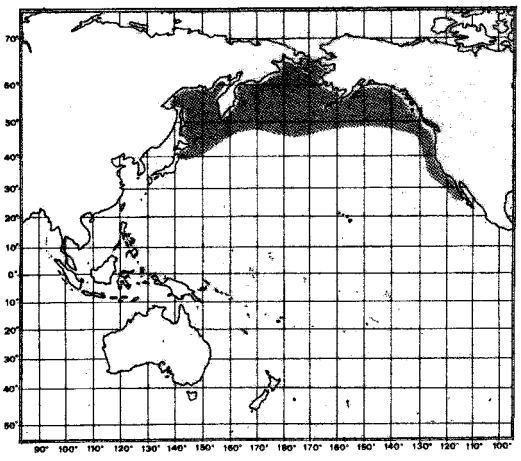
Gonatopsis borealis Sasaki, 1923, Annot.Zool.Japan, 10:202.

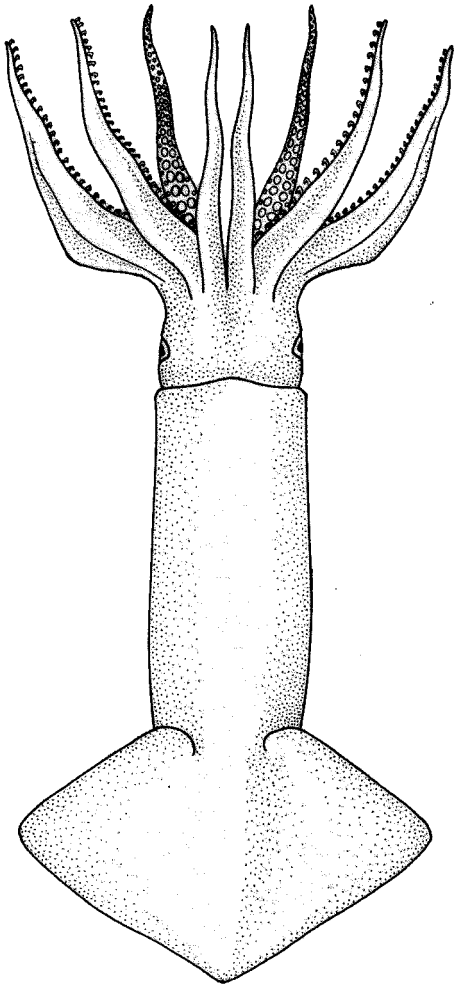
Synonymy : None.

FAO Names : En - Boreopacific gonate squid
Fr - Encornet boréopacifique
Sp - Gonalura pacificoboreal

Diagnostic Features : Mantle stout, thick, muscular. Fins muscular, relatively short (40 to 45% of mantle length) and broad (65 to 70% of mantle length). Tentacles absent (present only in larvae). Arms robust, muscular, 40 to 50% of mantle length; arms I to III with medium rows of hooks and 2 marginal rows of suckers; arm IV with 4 rows of suckers, no hooks.

Geographical Distribution : Northern Pacific: Northern Japan through the Bering Sea, from the Aleutian Islands to California.





dorsal view

Habitat and Biology : An oceanic species in cold temperate waters, encountered in midwaters to about 700 m depth. It is known to undertake diel vertical migrations and to form increasingly large aggregations between April and early autumn, particularly in the eastern and western parts of the north Pacific. It is heavily preyed upon by sperm whales.

Size : Maximum mantle length 30 cm.

Interest to Fisheries : Incidentally taken with jigs and drift gillnets and believed lo have some fishery potential because of its abundance.

Local Names : JAPAN: Takoika.

Literature : Okutani (1980); Tomiyama & Hibiya (1978); Nesis & Shevtsov (1977).

Remarks : A closely related species, Gonatopsis octopodatus, occurs in Japanese waters (northwestern Pacific) and it is distinguished by having 8 to 12 rows of minute suckers on the dista1 1/3 to 1/4 of the arms.

Gonatopis makko Okutani & Nemoto, 1964

GONA Gona 2

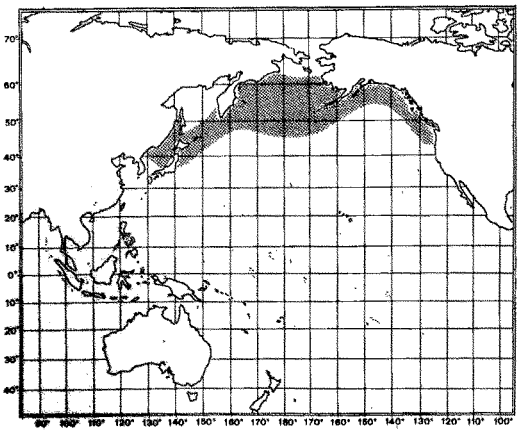
Gonatopsis borealis makko Okutani & Nemoto, 1964, Sci.Rep.Whales Res.Inst., 18:113.

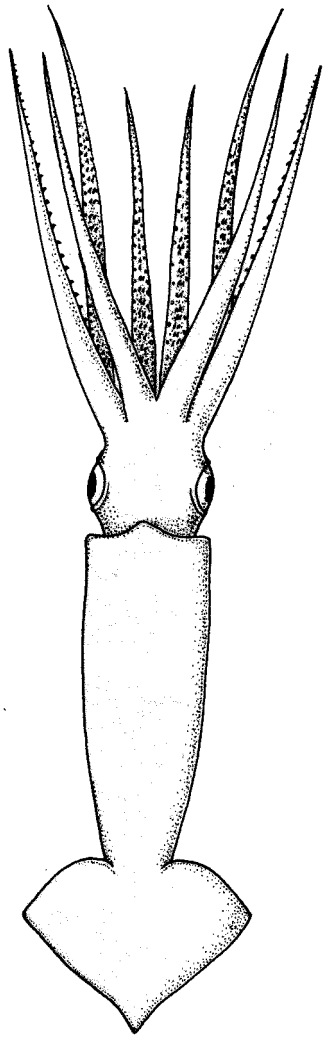
Synonymy : None.

FAO Names : En - Mako gonate squid
Fr - Encornet mako
Sp - Gonalura mako

Diagnostic Features : Mantle long, slender. Fins very small, short (about 33% of mantle length), narrow (their width from 45 to 50% of mantle length). Tentacles absent in adults. Arms very long, attenuate, up to 80% of mantle length.

Geographical Distribution : North Pacific: From Japanese waters to the Bering Sea, but excluding the Sea of Okhotsk, eastwards to the northwestern coast of North America.





dorsal view

Habitat and Biology : An oceanic species; occurring rather frequently in midwater layers in the Japan Sea and the northern North Pacific; usually in lower temperatures than Todarodes pacificus and Ommastrephes bartrami. Two subpopulations are believed to exist showing different growth patterns. It is most abundant between May and July; occasionally preyed upon by sperm whales.

Size : Maximum mantle length 25 cm.

Interest to Fisheries : Taken as bycatch in the bottom trawl fisheries, but at present of no great commercial interest. Separate statistics are not reported for this species.

Local Names : JAPAN: Takoika.

Literature : Okutani (1980); Osako & Murata (in press, biology, distribution).

Remarks : Some authors consider G. makko a subspecies of G. borealis.

Elerryteuthis anonychus (Pearcey & Voss, 1963)

GONA Berry 1

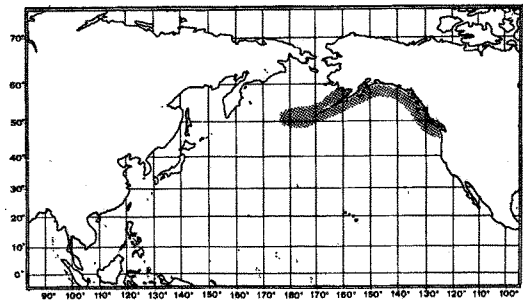
Gonatus anonychus Pearcey & Voss, 1963, Proc.Biol.Soc.Wash., 76:105

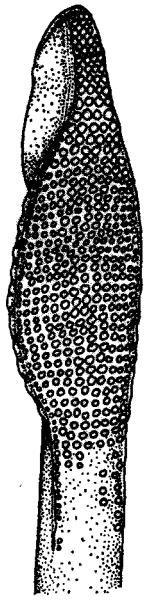
Synonymy : Gonatus anonychus Pearcey & Voss, 1963.

FAO Names : En - Smallfin gonate squid
Fr - Encornet ailes courtes
SP - Gonalura alicorta

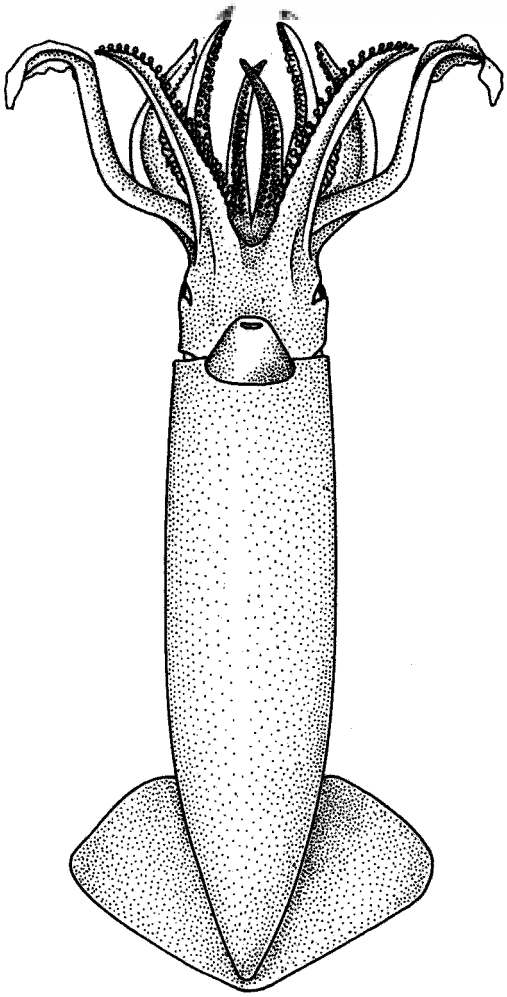
Diagnostic Features : Size small. Mantle muscular, elongate, narrow. Fins very small, short (25 to 30% of mantle length), narrow (width 45 to 50% of mantle length). Tentacular clubs long (about 1/2 of tentacle length), with numerous minute suckers numbering 12 to 15 in the transverse rows, no hooks. Arms with four rows of suckers and very few (about 6) small, weakly developed hooks in the medial 2 rows on the basal part of arms (I) to III in females, the rest suckers; no hooks in males.

Geographical Distribution : Northeastern Pacific: Oregon to the Aleutian Islands; no records from the Bering Sea.





tentacular club



ventral view

Habitat and Biology : An oceanic species occurring from surface (at night) to about 1 500 m depth in offshore waters. The exact distribution pattern is unknown. Mature specimens have a mantle length of 6 cm (females) and 7 cm (males) respectively.

Size : Maximum mantle length 15 cm.

Interest to Fisheries : Undetermined.

Local Names :

Literature : Okutani (1980).

Berryteuthis magister (Berry, 1913)

GONA Berry 2

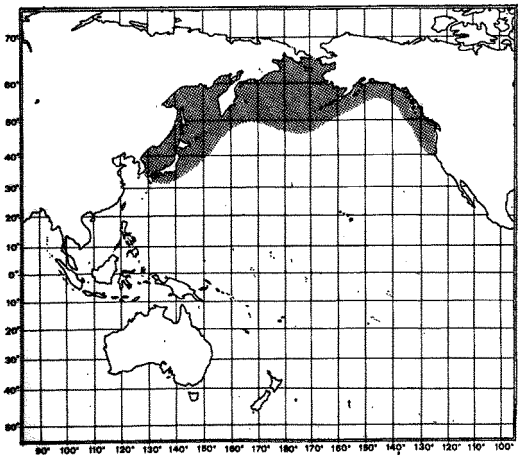
Gonatus magister Berry, 1913, Prov.Acad.Nat.Sci.Phila., 1913:76.

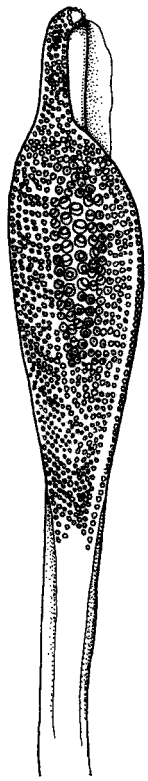
Synonymy : Gonatus magister Berry, 1913; Gonatus septemdentatus Sasaki, 1915.

FAO Names : En - Schoolmaster gonate squid
Fr - Encornet suçoir
Sp - Gonalura magister

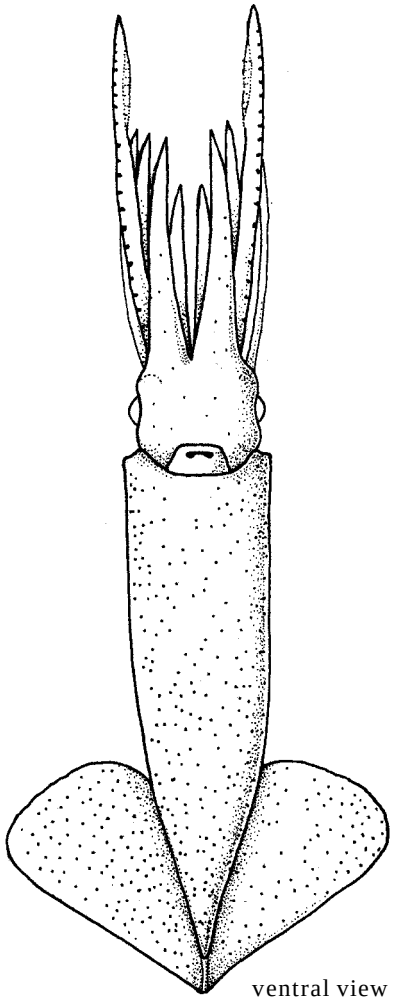
Diagnostic Features : Mantle large, robust, but soft. Fins large, thick, relatively long (up to 55% of mantle length) and broad (their width 70% of mantle length). Tentacles long; clubs expanded, with no hooks but very numerous minute suckers numbering 20 in the transverse rows.

Geographical Distribution : North Pacific: southern Japan, Kurile Islands, Aleutian Islands to northwestern USA.





tentacular club



ventral view

Habitat and Biology : A neritic to oceanic pelagic species; recorded from the surface to about 1 000 m depth; adults are probably associated with the bottom. In Japan, spawning occurs from June to October in depths betwen 200 and 800 m. Particularly abundant in the southern part of the Bering Sea; other concentrations are reported from the Sea of Japan and the Gulf of Alaska. It is preyed upon by sperm whales, northern fur seals and albatrosses (Albatrossia pectoralis); salmonids prey on the larval and juvenile stages.

Size : Maximum mantle length 25 cm.

Interest to Fisheries : Taken seasonally as by catch in the trawl fishery off the northwestern USA; Japanese fisheries have caught 5 000 to 9 000 tons annually since 1977, but it is possible that these catches include negligible quantities of other cephalopod species. The Japanese intend to increase fishing effort on Berryteuthis magister in the near future. This species also is believed to be taken as bycatch in the Soviet redfish fishery operating in the Bering Sea. The value of this resource could be increased through the development of improved processing technique.

Local Names : JAPAN: Dosuika.

Literature : Kasahara et al. (1978, fisheries development in Japan Inland Sea); Okutani (1980); Osako & Murata (in press, fishery).