

## A Pre-Leptocephalus Larva of *Conger myriaster* (Family Congridae) Collected from Suruga Bay, Central Japan

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**Abstract** One specimen of leptocephalus larva, measuring 16.0 mm in total length, was collected from the northern part of Suruga Bay (34°56'N, 138°39'E) by the T/V Bosei Maru II of Tokai University on November 7, 1982. This larva is identified as *Conger myriaster* because of having melanophores under the eye, simple gut with melanophores, 142 total number of myomeres and the position of the last vertical blood vessel at the 52nd myomere. Judging from the body length, appearances of teeth and fins, and disposition of the anus, the present larva belongs to the pre-leptocephalus stage. The presence of this early larva in this area suggests that one of the spawning grounds of *C. myriaster* exists in or near Suruga Bay in autumn.

The leptocephalus larvae of *Conger myriaster* (Brevoort) appear commonly in the coastal waters of the southern Korean Peninsula and from western Kyushu to southern Hokkaido in Japan, during December to July (Fujita, 1932; Uchida, 1932; Kamohara, 1940; Takai, 1959; Kubota, 1961; Hiroshima Pref. Fish. Exp. Stn., 1964; Okayama Pref. Fish. Exp. Stn., 1964; Kitajima et al., 1967; Uchida et al., 1968; Asano et al., 1978; Tokyo Metro. Fish. Exp. Stn., 1980; Mochioka, 1988; Mochioka, unpublished). However, all of them so far collected were more than 84 mm in body length (BL) and belonged to the latest leptocephalus stage or metamorphic stage. Furthermore, the mature adult of this species has not been collected (Kubota, 1961; Ochiai and Tanaka, 1986). The spawning ground and spawning season of the fish, and the morphology and ecology of leptocephali less than 84 mm BL remain unknown.

At the beginning of November 1982, a pre-leptocephalus larva, measuring 16.0 mm in total length (TL), was collected in the northern part of Suruga Bay, central Japan. The authors give here description and collection data of the present larva and estimate the spawning ground of the fish.

The specimen was preserved in 5% neutralized formalin solution. Measurements were made to the nearest 0.05 mm using an ocular micrometer in a binocular dissecting microscope for the parts less than 10 mm. Measuring and counting procedures described by Jespersen (1942) and Castel (1963) were adopted.

### Description

**Specimen examined.** IORD (Institute of Oceanic Research and Development, Tokai University) No. 82206 (Fig. 1). One specimen, 16.0 mm TL, collected at St. 2 (34°56'N, 138°39'E), 1,200–1,500 m in depth, in Suruga Bay, central Japan (Fig. 2), using the T/V Bosei Maru II (Cruise No. BO-82-17) on November 7, 1982 (20:00–21:00). In this station, four larva nets (mouth diameter 1.6 m, net length 7.5 m, mesh aperture 2.0 mm) were towed horizontally at the same time at the average layers of 5, 112, 220 and 810 m depths at a speed of 1.2–2.0 knots. The present specimen was found in the sample from the average towing layer of 112 m depth. Water temperature, salinity and dissolved oxygen of the station from where the present specimen was collected are shown in Fig. 3.

Measurements in mm: TL 16.0, head 1.60, snout 0.45, eye 0.75, cleft of mouth 1.05, preanal 15.0, depth at pectoral fin base 1.15, at anus 1.25, at midpoint between pectoral and the anus 2.10, maximum depth 2.20. Total myomeres 142, preanal 100, last vertical blood vessel at 52nd myomere, anterior margin of gall bladder at 38th myomere. Each fin membranous. Teeth 1+1+1+5 / 1+1+1+2.

Body elongate, compressed and rather high, 13.8% of TL, deepest just behind the midpoint of the body. Head relatively short, 10.0% of TL, dorsal profile concave. Snout round, lower jaw longer than upper jaw, gape oblique, reaching below the pupil; nasal capsule unformed. Eye oval, its vertical diameter 46.9% of head length.

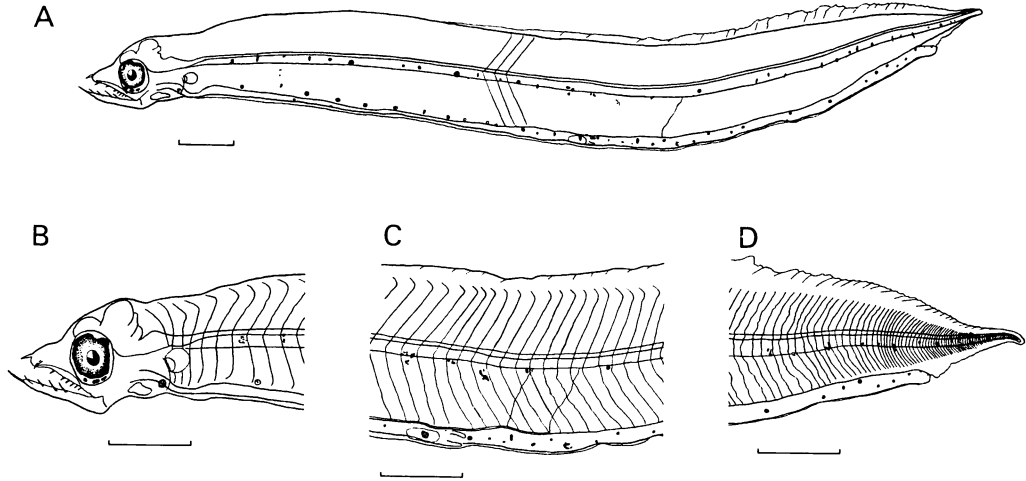


Fig. 1. Pre-leptocephalus larva of *Conger myriaster*, IORD 82206, 16.0 mm TL. A, lateral view; B, anterior region; C, last vertical blood vessel region; D, tip of caudal region. Scales indicate 1 mm.

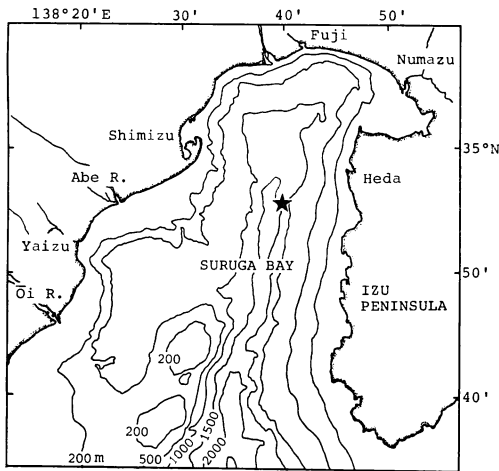


Fig. 2. Station locality (★) from where the present specimen of *Conger myriaster* was collected. Depth contour in meter.

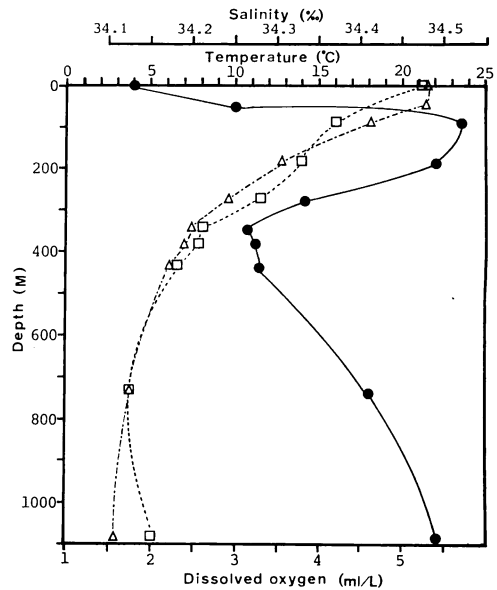


Fig. 3. Vertical distribution of water temperature ( $\Delta$ ), salinity ( $\bullet$ ) and dissolved oxygen ( $\square$ ) at the station where the present specimen of *Conger myriaster* was collected.

Brain constricted, differentiated into olfactory lobe, optic lobe, medulla, etc. Teeth needlelike, sprouting irregularly. Caudal skeleton unformed. The gut straight, without swellings nor festoons, but with a flexion and two elongate tubercles just behind the flexion which formed blind sacs at almost midpoint of the body. The esophagus threadlike; the intestine expanded with contents.

Pigmentation on specimen preserved in formalin: the melanophores on the choroid, and three minute melanophores under the eye; one

almost round spot beneath the base of the pectoral fin; a row of minute melanophores of various shape from the 7th myomere to the caudal tip along the lateral midline; similar minute melanophores just on the upper or side of the gut from the 8th myomere to the anus.

### Discussion

The present specimen is identified as *Conger myriaster* because of having melanophores under the eye, simple gut over three-fourths total length with melanophores, 142 total number of myomeres and the position of the last vertical blood vessel at the 52nd myomere (Takai, 1959; Mochioka, 1988). Each of the myomeres of the larva was clearly recognized and it was considered that the total number of myomeres come to a certain value.

Asano (1984) described four species of the genus *Conger* from the coastal waters of Japan: *C. myriaster*, *C. japonicus*, *C. cinereus* and *C. erebennus*. The larvae of *C. japonicus* were distinguishable from the present larva by the absence of melanophores on the lateral midline from the anterior to the caudal region of the body (Ochiai et al., 1978; Mochioka, 1988). The larvae of both *C. cinereus* and *C. erebennus* were not described. However, the adult of *C. cinereus* is distributed from Kagoshima Pref., southern Japan, to the Indo-Pacific (Asano, 1984), and has not been recorded from Suruga Bay. *C. erebennus* is distributed from Sagami Bay southward to Hakata Bay, northern Kyushu and the Korean Peninsula (Asano, 1984), but only one specimen of this species has been recorded from Suruga Bay (Kanazawa, 1958). According to the check lists of the fishes in Suruga Bay, *C. myriaster* is a very common species among the genus *Conger* as in the Seto Inland Sea or Ise Bay (Kuroda, 1951; Aoki and Yasuhara, 1966; Sawada and Oonishi, 1977).

Four species of congrid leptocephali which have melanophores on the lateral midline from the anterior to caudal region of the body as in the present larva were found from the Kuroshio waters in the western North Pacific (Mochioka, 1988; Mochioka, unpublished). All these leptocephali have more than 160 in total number of myomeres; in other words, no leptocephali of *C. myriaster* were collected from the open sea. Socolovskii (1975) described the larvae of *Conger myriaster*, measuring 83–139 mm (16 specimens), from the Kuroshio waters (20–40°N, 138–152°E), but information about the detailed localities were lacking.

Judging from the body length, appearances of teeth and fins, and disposition of the anus, the

present larva belongs to the pre-leptocephalus stage, the engyodonic stage (Leiby, 1979; Tabeta, 1988a), and is the smallest ever recorded. The present observation showed that there is no difference in the pattern of pigmentation between pre-leptocephalus and leptocephalus stages in *C. myriaster*.

Tanaka et al. (1987) observed the microstructure of the otoliths of the leptocephali of *C. myriaster* collected from the Seto Inland Sea. It showed that if the minute rings on the otoliths had been formed daily, the birthdates of these larvae were estimated from the end of October to December. The present pre-leptocephalus larva supports this estimation.

The present larva was collected from the northern part of Suruga Bay at the average towing layer of 112 m depth (bottom depths of 1,200 to 1,500 m) together with two leptocephali, *Gnathophis nystromi nystromi* (Congridae) (Mochioka, 1988) and *Saurenhelys lateromaculatus* (Nettastomatidae) (Tabeta, 1988b). In this station, the following leptocephali were captured at each average towing layer: *G. nystromi nystromi* (3 specimens) and Ophichthyidae spp. (4) at the layer of 5 m depth, and *G. nystromi nystromi* (2) at the layers of 220 m and 810 m depth. The present station was the deepest recorded for the larva of *C. myriaster*. Suruga Bay is considerably affected by the oceanic waters because of its wide frontage (56 km wide in frontage and 65 km in length) and has the canyon over 1,000 m depth stretching from the mouth to the inner part. The water of the area where the present larva was collected is considered to correspond to the surface water (the Water Mass B<sub>2</sub> of Nakamura, 1982), or the offshore water (the Water Mass C) originated from the Kuroshio water.

Mr. H. Fujita, Seikai Regional Fisheries Research Laboratory, Nagasaki, fished a gravid *Conger myriaster*, about 75 cm TL, together with *Argyrosomus argentatus* (Sciaenidae) with rod and line at Miho Beach, Suruga Bay, in June or September of 1979 or 1980, when he was a staff member of the Far Sea Fisheries Research Laboratory, Shimizu (pers. comm.). This conger eel had an ovary which filled up her body cavity.

From the evidence of the collections of the present pre-leptocephalus larva and the gravid conger eel, it was estimated that one of the spawning grounds of *C. myriaster* exists in or near Suruga

Bay.

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#### 駿河湾から採集されたマアナゴの前葉形仔魚

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1982年11月7日に駿河湾の北部、戸田沖(34°57'N, 138°39'E)から東海大学の望星丸II世によって1個体の葉形仔魚が採集された。この仔魚の全長は16.0mm、総筋節数は142、胆嚢前筋節数は38、最終垂直血管の位置は第52筋節で、消化管は直線状であった。小黒色素胞は眼および眼の下方、喉部、体側正中線付近、消化管にあり、体側正中線付近では体の前方から尾部まで1列をなしてみられた。以上の特徴より、マアナゴ(*Conger myriaster*)と同定され、幼歯の形態、肛門の体節上の位置等により、前葉形仔魚期に属するものと判断された。この仔魚は夜間(20:00–21:00)に稚魚ネット(口径1.6m、目合2.0mm、平均曳網水深112m)で採集された。採集点の水深は1,200–1,500m、表層の水温は21.5°C、90m層は18.1°C、表層の塩分濃度は34.1‰、90m層は34.5‰であった。この仔魚の出現によって、マアナゴの産卵場の1つが駿河湾またはその隣接海域にあり、産卵期は秋であると推定された。

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