

An Elver of *Anguilla japonica* Found in the Northern Part of the South China Sea*

By

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Despite intensive efforts to explore the spawning ground of the Japanese eel, only two cases of leptocephali, one collected in the waters south of Taiwan and the other in the Ryukyu Deep^{1,2)} and five cases of offshore capture of elvers in the East China Sea³⁻⁵⁾ have been reported. Much of its early life-history remains unsolved. A 3 year project, started in 1973 by the Ocean Research Institute, University of Tokyo, has been carrying out biological studies of the larval stage of the Japanese eel as a co-operative work on board the R/V Hakuho-maru. During the first cruise of the study in March 1973, an elver of the Japanese eel was collected at a point midway between the southernmost tip of Taiwan and Hong Kong in the northern part of the South China Sea. This seems to be the first record of an offshore capture of an elver of *Anguilla japonica* TEMMINCK et SCHLEGEL in this marginal sea. It indicates an ecological aspect of the elver stage.

Results

The collectoin was made with a net measuring 4 meters in diameter at the mouth and 12 meters in length, on the evening (18:46-19:24) of March 10, 1973. The locality (Fig. 1) and towing methods of the net are given below:

Position:	Lat. 21°56.5' N., Long. 116°42.0' E. (KH-73-2, St. 39-1)
Depth:	89 m
Wire length of the net:	75 m
Wire angle of the net:	69°
Towing duration:	30 min.
Ship speed:	1.5 knots

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Depths and water temperatures recorded with BT in this position were:

0 m	23.3°C	30 m	23.2°C
10	23.3	50	22.1
20	23.3	75	20.1

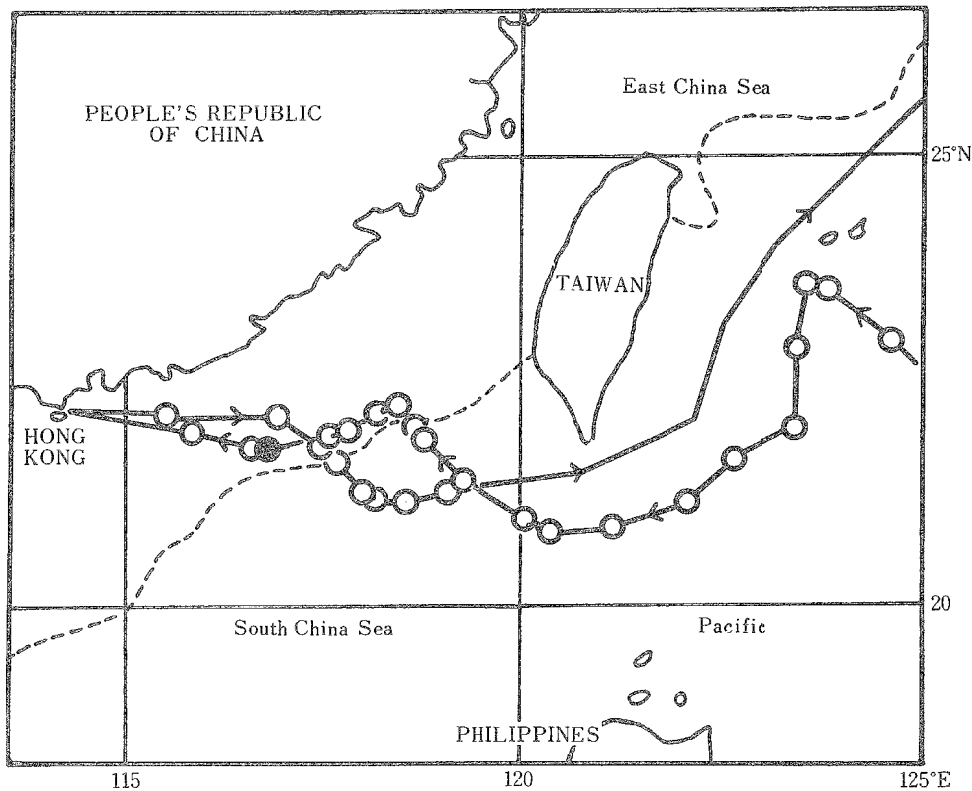


Fig. 1. Station location of the R/V Hakuho-maru in the South China Sea and its adjacent waters during Feb. - Mar., 1973. Solid circle, positive station; open circle, negative station.

An elver was found in a plankton sample with two specimens of leptocephali: Ophichthyidae and a damaged, unidentified Apodes. This elver is elongated and has a protruding lower jaw (Fig. 2); its pectoral fin is well developed and has a count of 18 rays. The specimen when taken on board from the net was entirely colorless except for black pigment confined to the chorioid of the eye and minute pigment faintly scattered on the caudal region. These minute chromatophores, however, completely disappeared during three months preservation in a solution of 10% neutralized formalin with borax. The body measurements and vertebral counts determined by means of X-ray photograph (Fig. 3) are shown in Table 1.

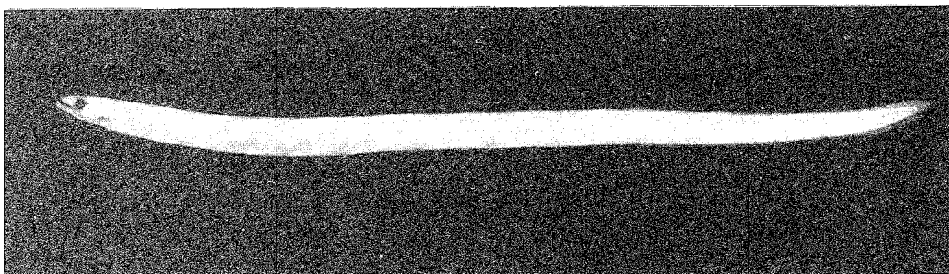


Fig. 2. The elver of *Anguilla japonica* found at St. 39-1 of KH-73-2: 54.2 mm in total length.

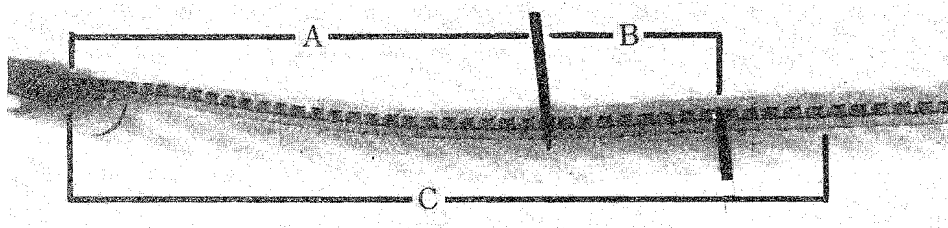


Fig. 3. X-ray photograph of the elver. A, predorsal vertebrae; B, ano-dorsal vertebrae; C, abdominal vertebrae.

Table 1. Measurements and vertebral counts of the elver. Vertebral counts are determined by means of X-ray photograph.

Total length	54.2 mm
Body length*	53.1
Predorsal length	15.2
Preanal length	20.0
Body height at dorsal origin	2.4
Head length	5.6
Total vertebrae	114
Predorsal vertebrae	28
Ano-dorsal vertebrae	8
Abdominal vertebrae	42

* From the tip of lower jaw to the end of hypural.

Following this collection, plankton tows were made with the same net in the surface (3 times), middle (3) and deep (1) layers of this station. 103 leptocephali and glass eel belonging to Congridae 54 specimens, Echelidae & Ophichthyidae 32, Nettastomidae 13, Muraenidae 2, Xencongridae 1 and Elopina 1 were obtained. But no specimens of leptocephalus or elver referable to *Anguilla* were obtainable.

Consideration

EGE recognized 19 species and subspecies of eels around the world, of which the larvae of *A. japonica*, *A. marmorata*, *A. celebesensis* and *A. bicolor pacifica* possibly migrate into these waters⁶⁾. Recent investigation indicates that the elvers of these 4 species are easily distinguishable from each other on the basis of vertebral counts: predorsal, ano-dorsal, abdominal and total vertebrae, and / or relationship between them⁷⁾. The vertebral counts in each part of the elver coincide with those of *A. japonica*. Body proportions and color pattern agree well also with those of the elver captured in the offshore waters of the East China Sea⁴⁾. EGUSA divided the process of pigmentation in the elver of the Japanese eel into 9 stages and substages⁸⁾. As stated before, the elver had no cutaneous pigmentation except in the caudal region; this is nearly equal to his Stage IV-a, passing over his Stage III which indicates cephalic cutaneous pigmentation above the skull and in the snout. The difference in pigmentation seems to indicate that this elver does not belong to the Japanese population but the Chinese population of *A. japonica*.

The specimen was captured during the night at a level less than 30 meters in depth on the basis of the wire length and wire angle of the net, similar to the five cases of offshore capture recorded between December and March in the East China Sea³⁻⁵⁾. On the other hand, the anadromous elvers appear from October to April in the rivers of Taiwan⁹⁾ and Mainland China*. This specimen may be a member of the last anadromous population of the rivers, and completes the metamorphosis in the offshore waters, probably in the marginal waters of the continental shelf in the course of a long journey from the spawning ground. At the station, 13 specimens of a glass eel belonging to Echelidae were collected besides an anguillid elver. In the series of stations of this cruise, the authors could not find such a station as this (St. 39) except for St. 41 (Lat. 22°13.4' N., Long. 115°32.0' E.), where an Echelidae glass eel was found. This may suggest the existence of a station where the elvers or glass eels aggregate under certain conditions in the waters on the continental shelf in question.

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*Personal communication with the fish culturists in Hong Kong in March 1973.

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