Short Paper

A Fully Grown Leptocephalus of Japanese Eel Collected from the Western North Pacific

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A fully grown leptocephalus of Japanese eel, *Anguilla japonica* was collected during the cruise of R/V Hakuho-Mar (KH-88-4) of Ocean Research Institute, The University of Tokyo, in the western North Pacific. We describe its morphological character and daily age.

Specimen was collected by an oblique tow (towing depth over 0–1,329 m) of a 10-feet IKPT (Isaacs-Kidd plankton trawl with a net of 0.5 mm mesh size) in the western North Pacific (20°59.5'N, 129°52.7'E), 21:40–24:22 on October 21, 1988. Specimen was fixed in 5% buffered sea water formalin immediately after collection for 1 hr and was transferred to 80% ethyl alcohol for preservation. Otolith examination was made 1 mo after fixation. Morphological observations was conducted 3 y after fixation. Myomere counts and measurements followed the method described by Jespersen,¹⁾ Castle,²⁾ and Tabeta and Takai.³⁾ Sagitta was extracted and its diameter was measured. The age was determined by counting otolith increments after Tsukamoto *et al.*⁴⁾ The present specimen was deposited in Ocean Research Institute, The University of Tokyo.

Measurements in mm: TL 55.80 (58.2 at otolith examination), SL 54.90, predorsal length 36.45, preanal length 39.50, body depth 5.84, head length 3.10, snout length 1.10, eye diameter 1.00, upper jaw length 1.75. Total myomeres 116, predorsal 66, preanal 76, ano-dorsal 10, first vertical blood vessel 19, last vertical blood vessel 42, anterior margin of gall bladder 30. Teeth 0+0+2+9/0+0+5+6.

Body elongate, compressed. Head relatively short, 5.5% of TL. No pigment except chorioid of the eye. Thus the present leptocephalus was identified as *A. japonica* from these characteristics of body form, pigmentation and myomere counts (Fig. 1).

Sagitta was translucent, laterally compressed, oval with a structure of 181 μ m in diameter, with a dark opaque core in the center. The age of this specimen was 84 days after hatching, and this was the oldest of all Japanese eel leptocephali whose daily ages were known (25–78 days^{4,5)}). The birth date of the specimen was estimated as 29 July, 1988.

The relationship between TL and age of the pre-leptocephali⁶⁾ and leptocephali^{4,5)} including the present specimen was expressed as the following equation (Fig. 2):

$$TL = 0.56 \text{ age} + 3.31 \quad (r = 0.991)$$

The present specimen was located on the upper side of the growth curve, suggesting that this specimen would

Fig. 1. Fully grown leptocephalus of Japanese eel *Anguilla japonica*, 55.80 mm TL.

Fig. 2. Relationships between TL and the age of Japanese eel. Present specimen (*), leptocephali (●), pre-leptocephali (□), and glass eels and elvers (○).

be a fast-growing individual or that the growth rate of the Japanese eel increases, rapidly at the late developing stage before metamorphosis. In the otolith of glass eel and elver, 18–34 wide increments were observed at 74 ± 6.9 days (mean $\pm$ SD, $N = 300$) after hatching.⁷⁾ Tanaka *et al.*⁸⁾ reported that otoliths of *Conger myriaster* showed wide increments outside about the 140th–150th ring corresponding to the period from the latest developing stage of leptocephalus to the metamorphic stage. No wide incremental zone has been observed in the otoliths of any *A. japonica* leptocephali ever examined,^{4,5)} whereas every glass eel showed a remarkably wide incremental zone near the edge of the otolith.^{7,9)} The present specimen had no wide incremental zone. These facts strongly suggest that the specimen was a fully grown larva at a late developing stage before metamorphosis. The sampling site of this specimen was east of the origin of the Kuroshio Current. This suggests that Japanese eel leptocephali, developing in size till the initiation of metamorphosis, would be transported northwestward after hatching from the spawning area (around 15°N, 140°E)¹⁰⁾ toward the Kuroshio.

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