Received June 9; accepted August 23, 1976.

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Cultivation of larvae of Japanese eel

ALTHOUGH the breeding place of the European eel has been detected[1], the morphology and ecology of their larvae, especially in pre-leptocephalus stages, still remain to be investigated. We have, however, succeeded[2-4] in obtaining some pre-larvae of the Japanese eel, *Anguilla japonica*, following artificial induction of maturation and spawning in aquaria. The larvae survived for only 6 d; their teeth characteristic of muraenoid larvae were merely in the state of anlagen and their eyes were completely devoid of retinal pigment. Further information of the early development of the eel is therefore required to enable elucidation of their life history. Here, we describe the larvae of Japanese eel developing for up to 14 d in the laboratory.

Silver eels were collected in the Hiranuma and Mabuchi Rivers in Aomori prefecture (Japan) in September 1975. Females and males were matured with repeated injections of chum salmon pituitary homogenate and Synahorin (Teikoku Zoki), respectively[5,6]. Eggs were stripped from the females, placed into glass dishes and inseminated by the dry method with the sperm of 2 or 3 males. The eggs were kept in seawater at 23 °C until they hatched. The larvae were reared at 23 °C on the day of hatching. Subsequently the larvae were maintained at 19 °C.

The larvae survived for 14 d. The following description is based on the observation of the larvae from days 7 to 14 after hatching. Since larvae of that period of development are very weak and their tail is liable to shrink a little during microscopic observations, the measured values of body length and the myomere number of larvae may be approximate. On day 7, the mean body length was ~6.2 mm, and on day 14, ~7.0 mm. The number of myomeres was 53–54 + 50 (pre- + postanal myomeres) 7–10 days after hatching and 54 + 55–60 in those 11–14 days after hatching.

The larvae on day 7 had well developed tooth anlagen on the jaws and a large ventriculus cerebri in the brain. A broad embryonic fin enveloped the compressed body continuously from the posterior region of the head to the caudal margin of the vent. There was no trace of pigmentation except in the caudalmost part of the membraneous fin. By day 8, some black retinal pigment began to appear in both eyes (Fig. 1*a*) and after a further 12 h pigmentation of the eyes was fully developed. During that time the ventriculus cerebri became smaller. These larvae, unlike the earlier stages[4], were seen to swim in a horizontal position and to rest suspended in the water in a head-down attitude. From days 9 to 11 after hatching, both the upper and lower jaws developed considerably, and the tooth anlagen came to differentiate into definite teeth, which lengthened gradually, one after another. By day 12, sharp teeth were observed to protrude obliquely from the jaws (Fig. 1*b*). An oil drop near the cranial end of the yolk sac became extremely small. On day 14 after hatching, black pigmentation was still seen in the larvae, but only in the eyes and on the caudalmost tip of the membraneous fin (Fig. 1*c*). A pair of pectoral fins were present. The mouth which was directed downwards during the foregoing stages took a forward direction. The upper jaw had three pairs of shorter teeth in addition to the longest, grasping tooth, while the lower jaw had four pairs of teeth (Fig. 1*d*). The lower jaw moved occasionally, but the mouth did not close perfectly.

The most advanced larvae obtained seem to resemble closely the smallest European eel larvae collected by Schmidt[7] in the Atlantic Ocean. From these findings on both the European and the Japanese eel, a clearer outline of the morphological changes of the eel during the initial stage of its life cycle has been obtained.

We thank Professor Emeritus K. Yamamoto, Hokkaido University, for advice. This work was supported in part by a grant from the Japanese Ministry of Education.

K. YAMAUCHI
M. NAKAMURA
H. TAKAHASHI
K. TAKANO

Department of Biology,
Faculty of Fisheries,
Hokkaido University,
Hakodate, 040, Japan

Received June 25; accepted August 9, 1976.

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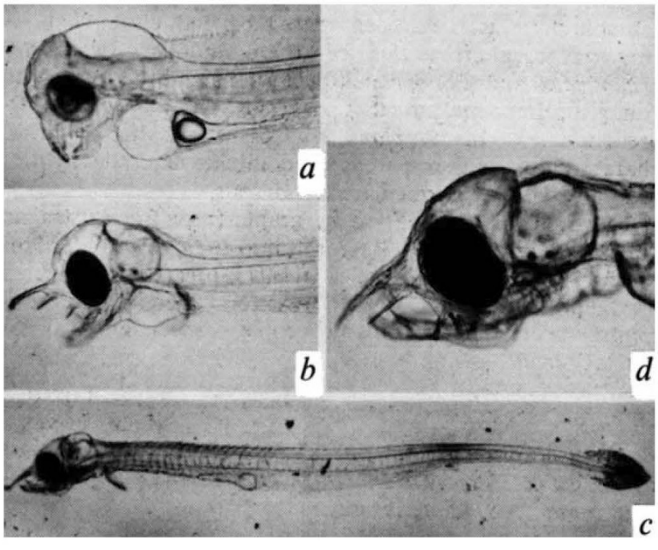
Fig. 1*a*, Head of larva, day 9 after hatching, × 25; *b*, head of larva, day 12 after hatching, × 22; *c*, larva, day 14 after hatching, × 13.5; *d*, head of larva, day 14 after hatching, × 38.5.



Genetics of expression of xenotropic virus and autoimmunity in NZB mice

CERTAIN retroviruses (RNA tumour viruses) have been implicated in the autoimmune disease of New Zealand mice[1]. These mice produce large numbers of xenotropic retroviruses[2,3] and contain high concentrations of the retroviral envelope antigen gp 69/71 in their serum and tissues[4]. Moreover, gp 69/71 and the corresponding antibodies contribute to the immune deposits in the nephritic kidneys of NZB and (NZB × NZW)F_1 mice[4]. Nevertheless, it is not established that xenotropic viruses are the primary cause of the autoimmune disease of NZB mice. Conceivably, these agents may be involved only secondarily. The presence of RNA viruses in NZB mice may explain neither the production of antibodies against DNA, nucleoproteins, and erythrocyte antigens nor the anomalies of T- and B-lymphocyte function[5]. Transmission of autoimmunity has not been achieved