Chapter 13
Artificial Maturation and Reproduction of the European Eel

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13.1 Introduction

Mature eels cannot be obtained from the wild situation since nobody has ever observed migrating and spawning silver eels in the ocean. Our existing knowledge comes from the artificial induction of maturation by hormonal injections with carp or salmon pituitary extract (CPE/SPE; Fontaine et al. 1964) in female European eels and with human chorionic gonadotropin (hCG) in males (Fontaine 1936). In 1974, Yamamoto and his colleagues continued their investigations on artificially induced maturation in Japanese eels and were able to produce larvae but these died within a few days (Yamamoto and Yamauchi 1974; Yamauchi et al. 1976). In the 1990s, efforts resulted in fertilized eggs and non-feeding larvae.

Research on the induction of maturation and larval rearing of the Japanese eel, *Anguilla japonica*, is mainly conducted at the National Research Institute of Aquaculture (Nansei, Japan). The maturation procedure for females involves injection of salmon pituitary extract (20 mg per week) for 8–13 weeks (Kagawa et al. 2005). At 24-h after the last injection, 17, 20 β-dihydroxy-4-pregnen-3-one (DHP) is injected (2 μg g^{-1} body weight) to stimulate final maturation and induce ovulation within 14–23 h (Ohta et al. 1996). On the other hand to mature male eels, 10 to 14 weekly injections of human chorionic gonadotropin (1 IU g^{-1} body weight) are sufficient to induce spermiation (Kagawa et al. 2005). Up to 89.6% fertility and 47.6% hatchability was obtained (Ohta et al. 1996). Because of the difficulty of achieving simultaneous ovulation and spermiation, particular attention has been paid to finding an optimum diluent for cryo-preservation of spermatozoa (Ohta and Izawa 1996).

The main emphasis now is on larval rearing. Getting larvae past the first 9 days proved thus far impossible with live food (rotifers), so a complex artificial diet was developed in the form of a paste. The initial problem was to get the larvae to feed at all. Now that this has been achieved, the problem is to find an optimum diet to ensure

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