Chapter 14
Testis Development, Sperm Quality Evaluation and Cryopreservation in the European Eel

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14.1 Introduction

Since the European eel *Anguilla anguilla* L. cannot be bred in captivity, eel farms base their annual production on the capture of glass eels from river mouths in autumn and winter. This species has suffered a dramatic reduction in its populations, due to intensive capture of both glass eels and adults, resulting in increased cost for the annual renewal of glass eel stocks. Moreover, populations have been decreasing owing to several other factors (Feunteun 2002), such as massive exportation to other countries, the deterioration of their natural habitats and the importation of allochthonous parasites (*Anguillicola crassus* Kuwahara, Niimi and Itagaki 1974) from the Asian species (Koops and Hartmann 1989; Kennedy and Fitch 1990). Therefore, the development of methods for the reproduction of this species is necessary not only from an economical point of view, to meet the demands of fish farms, but also from an ecological point of view, to reduce the pressure on natural populations. In view of this, our group has centred its research since 1997 on trying to develop several techniques to help in the production of this species in captivity. Firstly, some experiments were carried out to develop maturation-inducing hormonal methods for males. The second step was the use of different techniques to evaluate the quality of the gametes, looking for fast and accurate results. At the same time, the development of hormonal induction protocols and the induction of spawning in the females made necessary the synchronization of gamete production. With the intention of solving this problem, we tackled sperm cryopreservation. Study of the physico-chemical characteristics of seminal plasma in good quality sperm samples was the basis for the design of cryopreservation media. Later, different factors such as the ionic composition, pH, cryoprotectants, or the presence of protective proteins, as well as different freezing-thawing methods, have been considered to try to improve spermatozoa survival post-cryopreservation.

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