First research results of perch sperm cryopreservation at the research facility Born a. Darß- a pilot experiment

Author(s)

F. Buhrke ¹, S. Rakers ², R. Bochert ³

Main author(s): F. Buhrke ¹, S. Rakers ²

1. Mecklenburg-Vorpommern Research Centre for Agriculture and Fisheries (LFA MV)
   Institute of Fisheries, Südstraße 8, 18375 Born a. Darß, Germany
   Corresponding author: f.buhrke@lfa.mvnet.de
2. Fraunhofer Research Institution for Marine Biotechnology and Cell technology (EMB), Moenkhofer Weg 239a, 23562 Lübeck, Germany
   sebastian.rakers@emb.fraunhofer.de

Short CV:

F. Buhrke
He has studied agricultural science (B.Sc.) at the University of Hohenheim (Stuttgart, Germany) and studied aquaculture (M.Sc.) at the University of Rostock (Germany). Beside his studies he has gathered experiences with different aquaculture species. Since 2011 he is working for Mecklenburg-Vorpommern Research Centre for Agriculture and Fisheries (LFA MV) in different projects. In 2013 he has started to concentrate on European perch. Now our team is collecting information and experiences for the establishment of a potential perch aquaculture in the federal state Mecklenburg-Vorpommern.

S. Rakers
He has studied Marine Biodiversity (Diploma) at the Carl-von-Ossietzky University in Oldenburg, Germany. After his stay abroad at Capetown University in South Africa he did his PhD at the Fraunhofer Research Institution for Marine Biotechnology and Cell technology (EMB) in Lübeck. He finished his thesis on the application of fish skin cell cultures in 2012. Since then he was working in different projects dealing with cryopreservation and cell technologies. Currently he is the responsible project leader for the KHV-Vacc project (2015-2018) focusing on new cell cultures for Koi-Herpesvirus diagnostics and vaccine development.

Abstract

The Institute of Fisheries (LFA MV) has been given the task to translate scientific results made in the aquaculture sector into practice. The main purpose is to establish aquaculture operations relevant for potential partners and investors. For this reason the Ministry of Agriculture and the Environment of M-V. started a project to improve perch production in the federal state Mecklenburg-Vorpommern.

One of the main tasks is optimizing the reproduction of European perch (Perca fluviatilis) in our facility. To achieve this goal, one important approach is a successful cryopreservation of high quality perch sperm for seasonally independent reproduction. Furthermore, with this technology it would be possible to collect and store the sperm of different high quality males and preserve the genetic information of our broodstock.

It is known that a successful cryopreservation of perch sperm is possible as for example Bernath et al (2015) demonstrated. Tests were necessary to evaluate methods which practically work in our facility. One main issue of the pilot experiments was the test of two different extenders and methods for the cryopreservation of perch sperm. Therefore, a successfully established method and extender used by the Fraunhofer EMB for carp sperm (Irawan et al. 2010) was tested for the first time on its suitability
for the cryopreservation of perch sperm and compared with the Tanaka-extender, which demonstrated promising results for perch sperm in an earlier study by Bernath et al (2015). In spring 2017 sperm of 20 males (376 g ± 86.5 g) was used for cryopreservation. Every sperm sample was divided into two parts to use both extenders for every sample. After addition of the cryoprotectants Methanol or Dimethylsulfoxid (DMSO) all samples were transferred in cryostraws, sealed and frozen above and in fluid nitrogen (-178 °C). The samples were stored in a LN-storage tank for several days or longer, until they have been used for thawing experiments. Samples were thawed for 10 sec in a 40 °C water bath and activity as well as motility tests were carried out. It was found that no motility appeared in samples that were mixed with the Tanaka-extender. While different sperm samples which were mixed with the Irawan-extender showed motilities up to 70 sec after the thawing process. The results of this pilot experiment demonstrated that the Irawan-extender may be an alternative for the cryopreservation of perch sperm. Further experiments are planned to define a common standard for a cryopreservation protocol in practical perch aquaculture.

Literature:
