

SPERM CRYOPRESERVATION AS A TOOL FOR CONSERVATION AND SELECTION IN AQUACULTURE

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Sperm cryopreservation

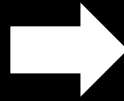


- Developed since the 1950-ies
- 1953: Frosty, the first calf born from insemination with frozen semen
- A multi-million dollar business in livestock
- In aquaculture only isolated cases

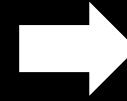
Sperm cryopreservation



Sperm collection



Dilution with extenders
and cryoprotectants



Loading into straws



Freezing in the vapor
of liquid nitrogen



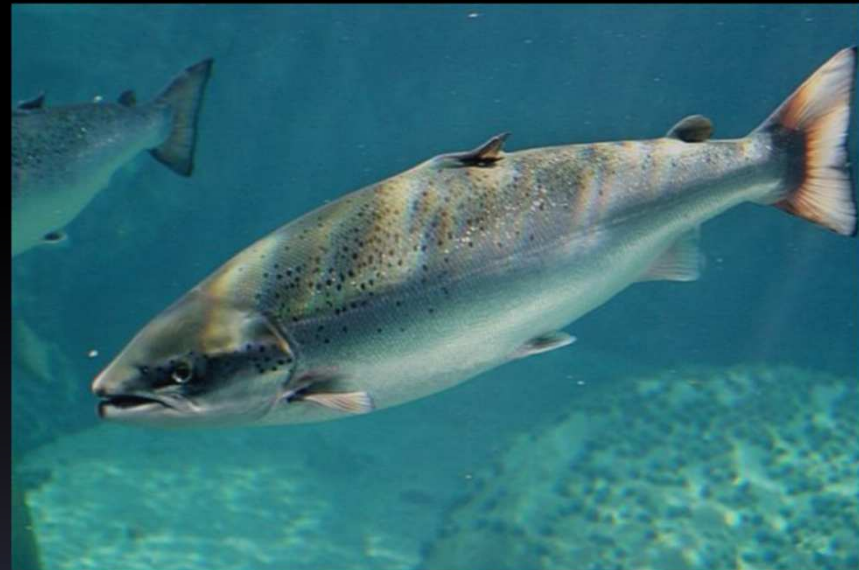
Storage



Fertilization following
thawing

Possibilities

- Atlantic salmon (*Salmo salar*)
 - Commercial application
 - Genetic improvement
 - The only fish sperm cryopreservation company – Cryogenetics



Possibilities



- Sturgeons and paddlefishes (Acipenseriformes)
 - Conservation of genetic resources
 - Preservation of sperm when females are not available or difficult to capture (*A. sturio*)

Possibilities

- Catfishes (Siluriformes)
 - Sperm cannot be stripped
 - Sexes difficult to determine
 - Cryopreservation
 - Allows reduction of male broodstock
 - Prevents unnecessary killing of females



Possibilities

- Common carp (*Cyprinus carpio*)
 - Frozen gene banks
 - Hungary: HAKI
 - Created in 2005
 - Sperm from 25 varieties is stored
 - Used in 2013 for genetic improvement of the live gene bank



Possibilities

- Protandrous species
 - *Lates calcarifer*
 - *Sparus aurata*
 - Production of highly inbred lines by self-fertilization
- Protogynous species
 - Groupers (*Epinephelus spp.*)
 - Males are rare



Problems

- Very few cases of commercial application
- Mostly gene banks
 - Costly:
 - If never used: waste of resources and funds
 - Will sperm alone save the species?
- Eggs and embryos cannot be cryopreserved
 - High volumes of yolk make it difficult
 - High chilling sensitivity of embryos

Commercial application problems

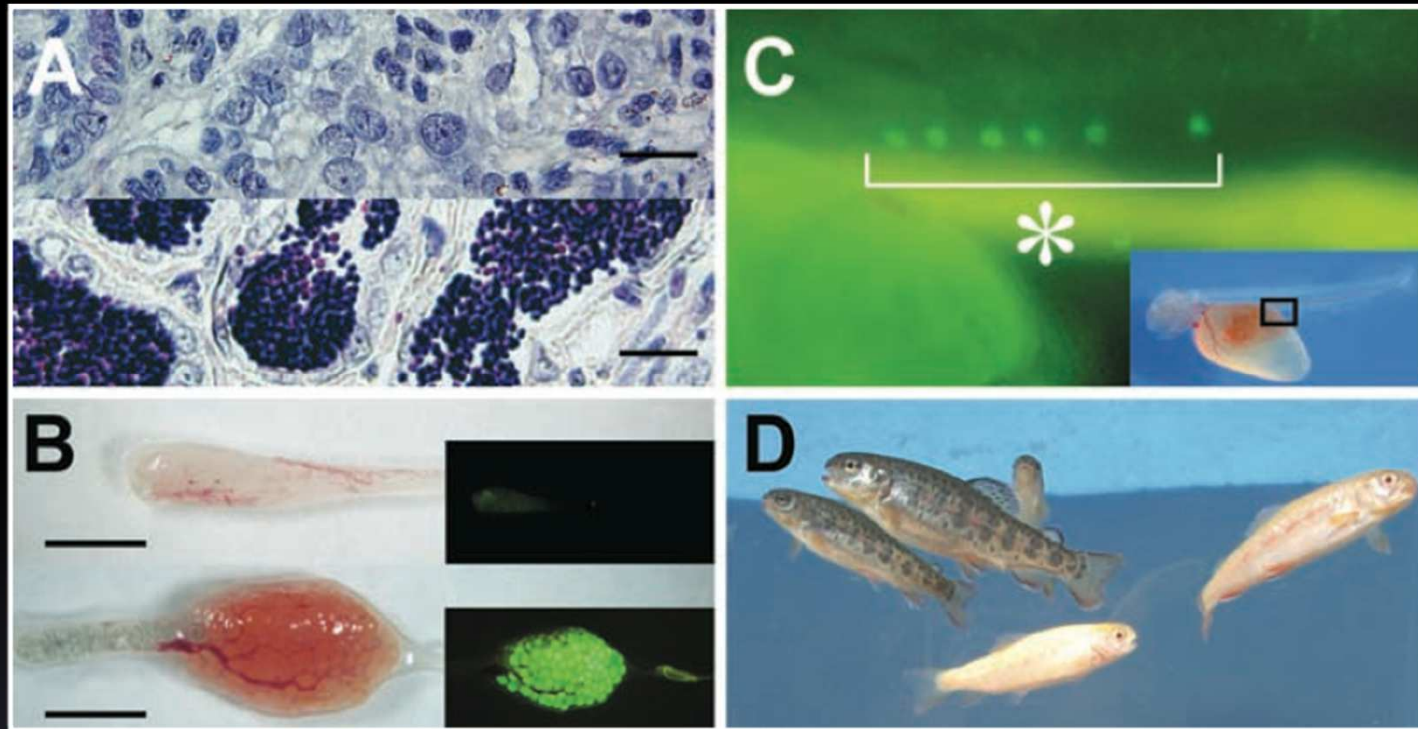


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Males have no individual value in aquaculture

New research directions



Cryopreservation and interspecific transplantation of primordial germ cells (PGC-s) or undifferentiated type A spermatogonia

Thank you for your attention!!!

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