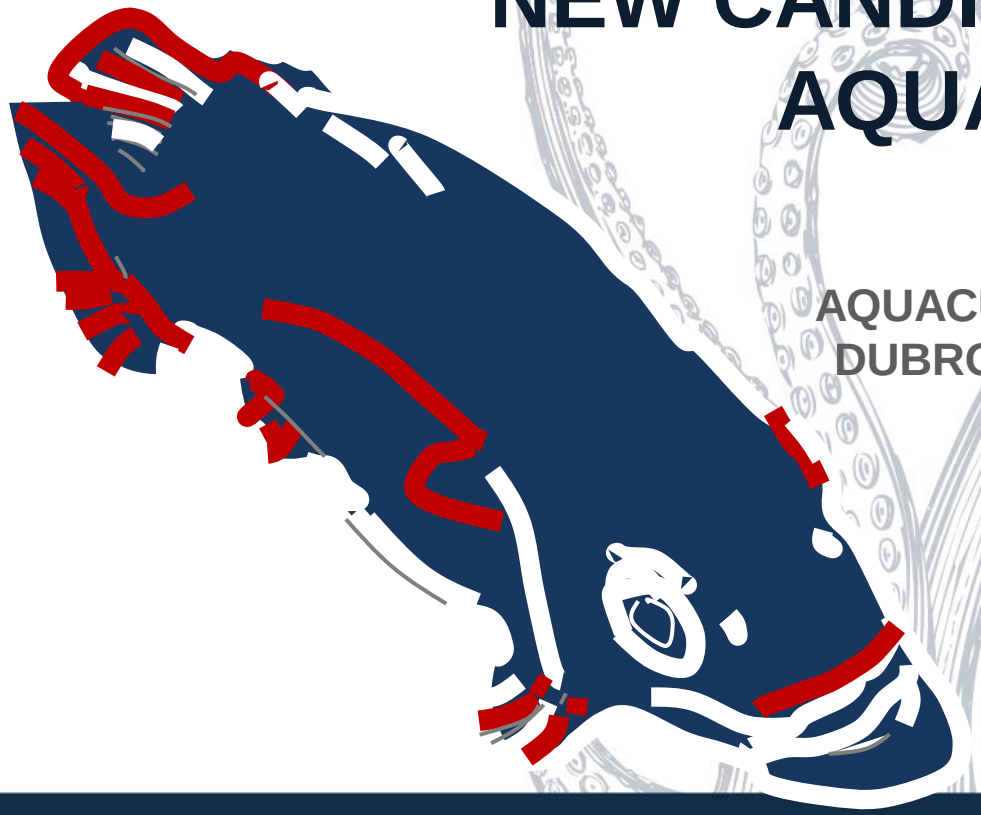
INSTITUTO ESPAÑOL DE OCEANOGRAFÍA

# PROGRESS IN THE WRECKFISH (*Polyprion americanus*) INTENSIVE CULTURE. NEW CANDIDATE SPECIES FOR AQUACULTURE



**AQUACULTURE EUROPE 2017**
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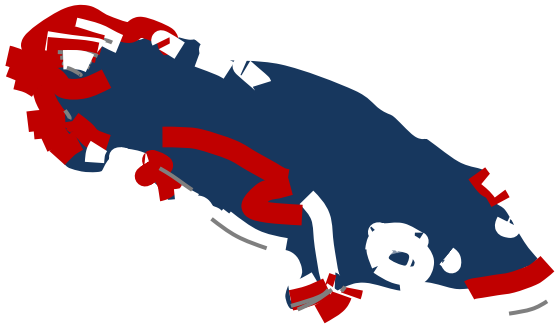
Instituto Español de Oceanografía
Centro Oceanográfico de Vigo

# What did we know about wreckfish?



- Demersal fish worldwide distribution
- 100 Kg - fast growth
- Limited fishery landings
- Late reproductive maturation
- High market price

# Wreckfish broodstocks

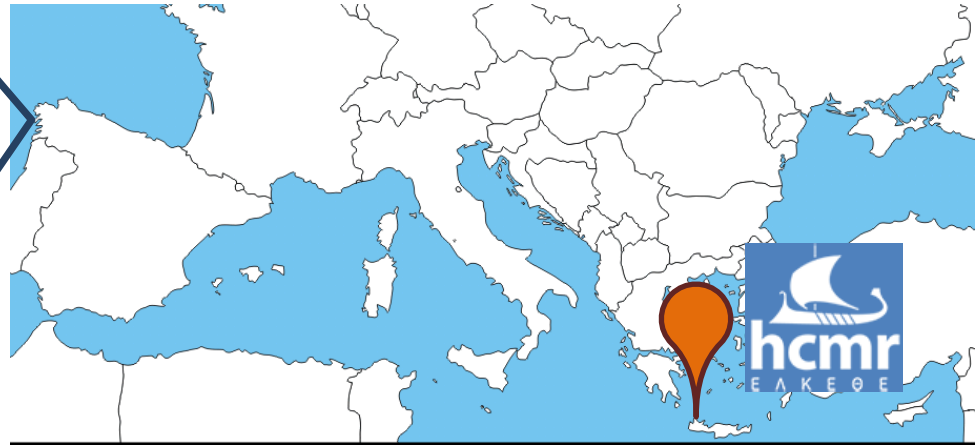
MC2

CMRM

IEO

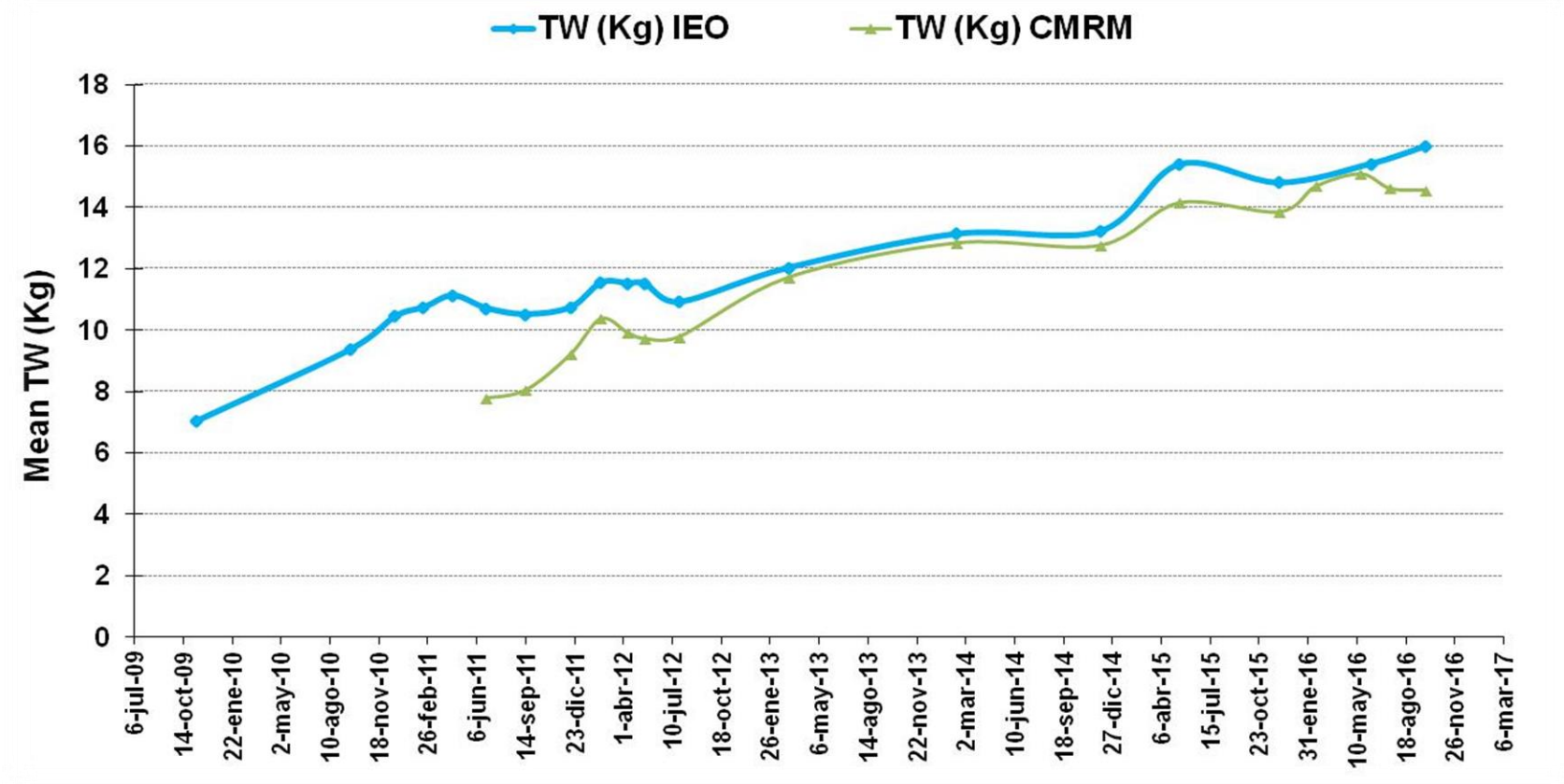
- **MC2.** Exhibition tank (3500m$^3$) and auxiliary tank for breeders (33m$^3$). Natural T$^a$ and simulated natural photoperiod
- **CMRM.** Two tanks (40m$^3$). Natural T$^a$ and photoperiod
- **IEO.** Two tanks (110m$^3$). Natural T$^a$ and photoperiod
- **HCMR.** One tank (15m$^3$). Constant T$^a$ and simulated natural photoperiod

Companies interested in wreckfish

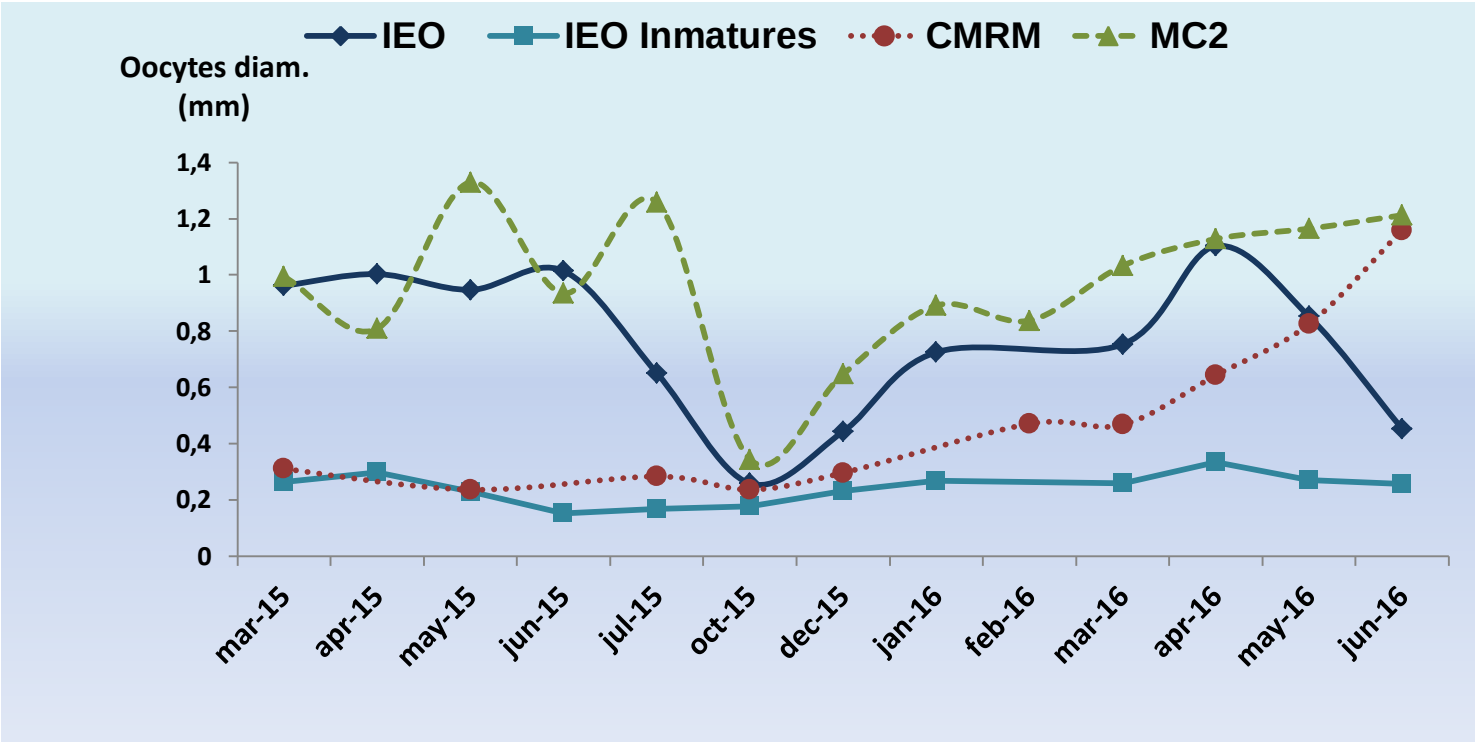


# Behaviour in captivity

- Easy manipulation
- Low mortality
- High growth / low feed



# Reproduction cycle

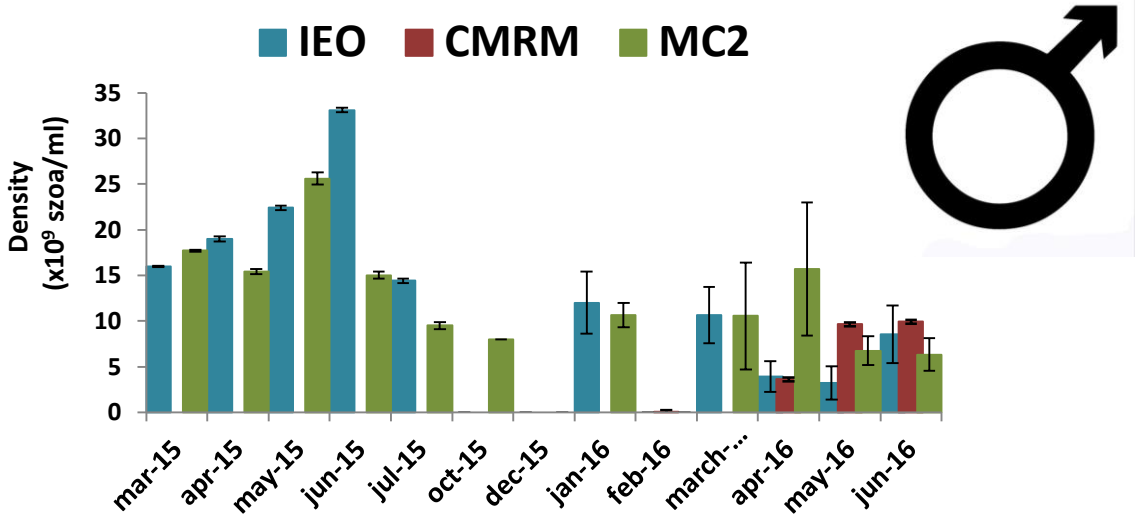


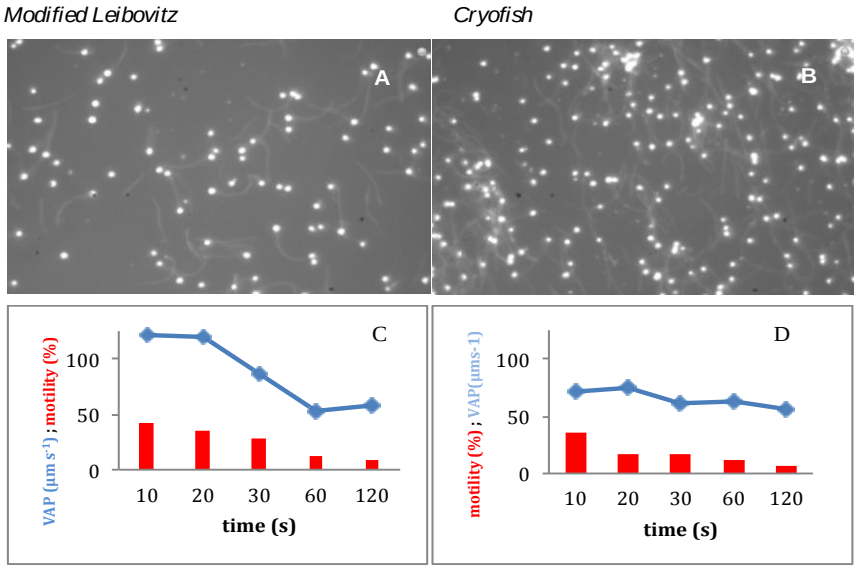

• Gonadal maturation in ♀ begins in autumn, but the main part of vitellogenesis takes place in winter (Dec-Feb).

• Oocyte maturation in captivity begins in March with peaks between April and June.

• Vitellogenesis continues until the oocytes reach a size of 1.2-1.4 mm in diameter when oocyte maturation begins.

# Evaluation of sperm quality




• Sexual maturation of ♂nd ♀e place during the same period. Maximum: April and June, with concentrations of 25-35 x $10^9$ szoa/mL.

**Test of 2 diluents**

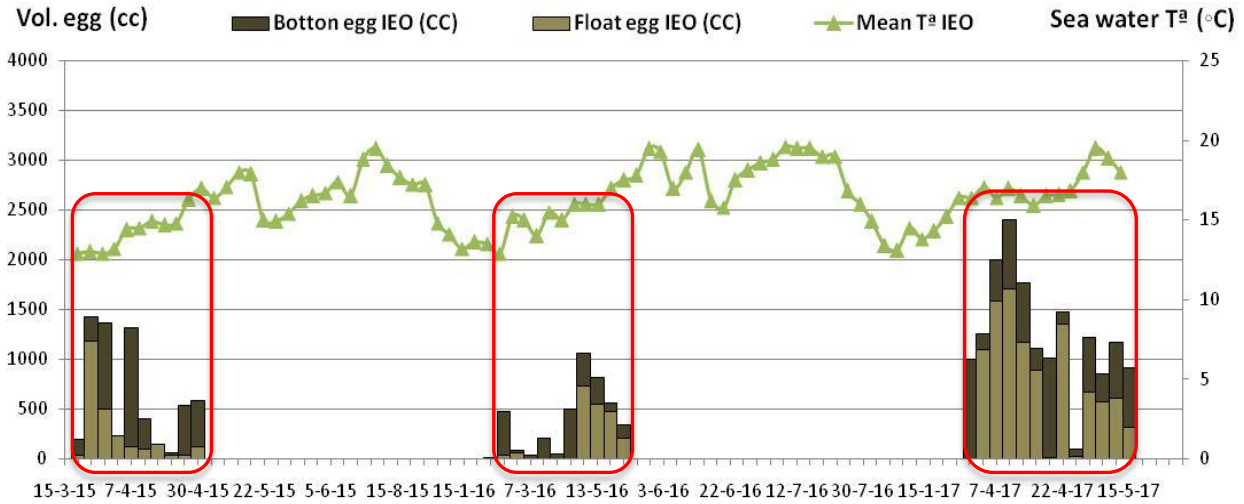
• Patented CryoFish

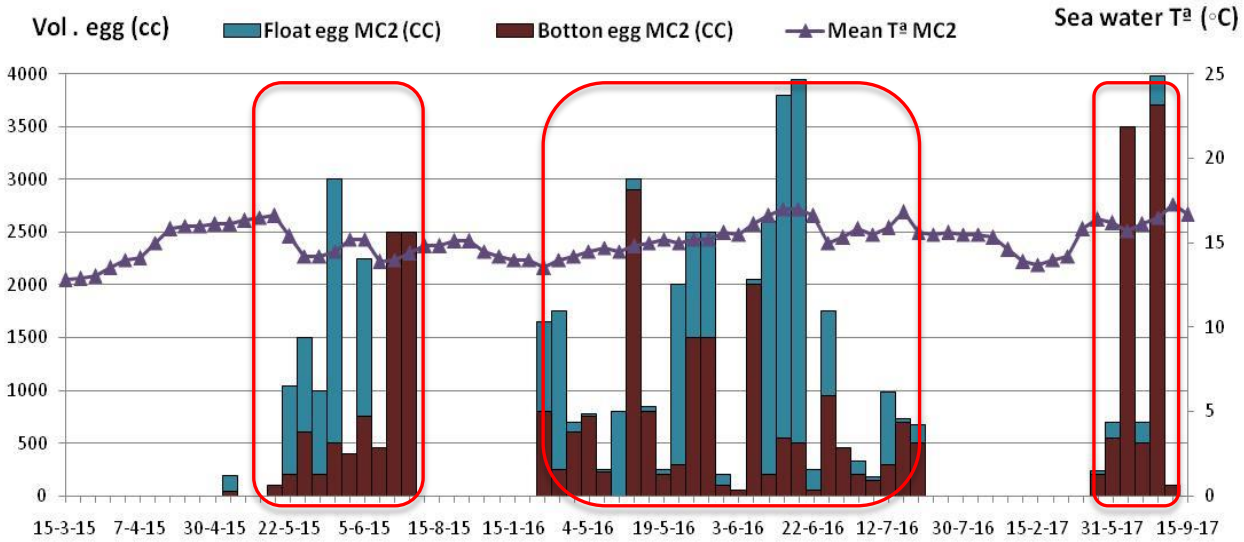
• Modified Leibovitz L15 (published formula)

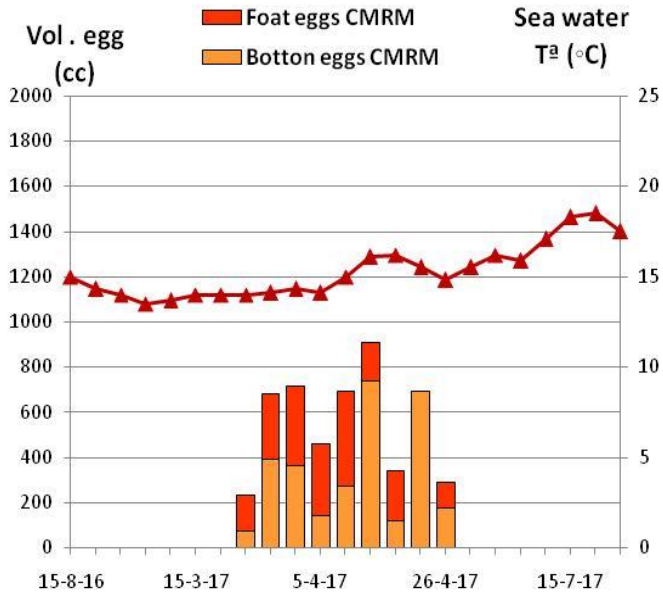
• The motility ratio is high

• The average survival of sperm at 4ºC was 4 days.

# Natural and spontaneous spawning




Spawns between March 2015 and August 2017.

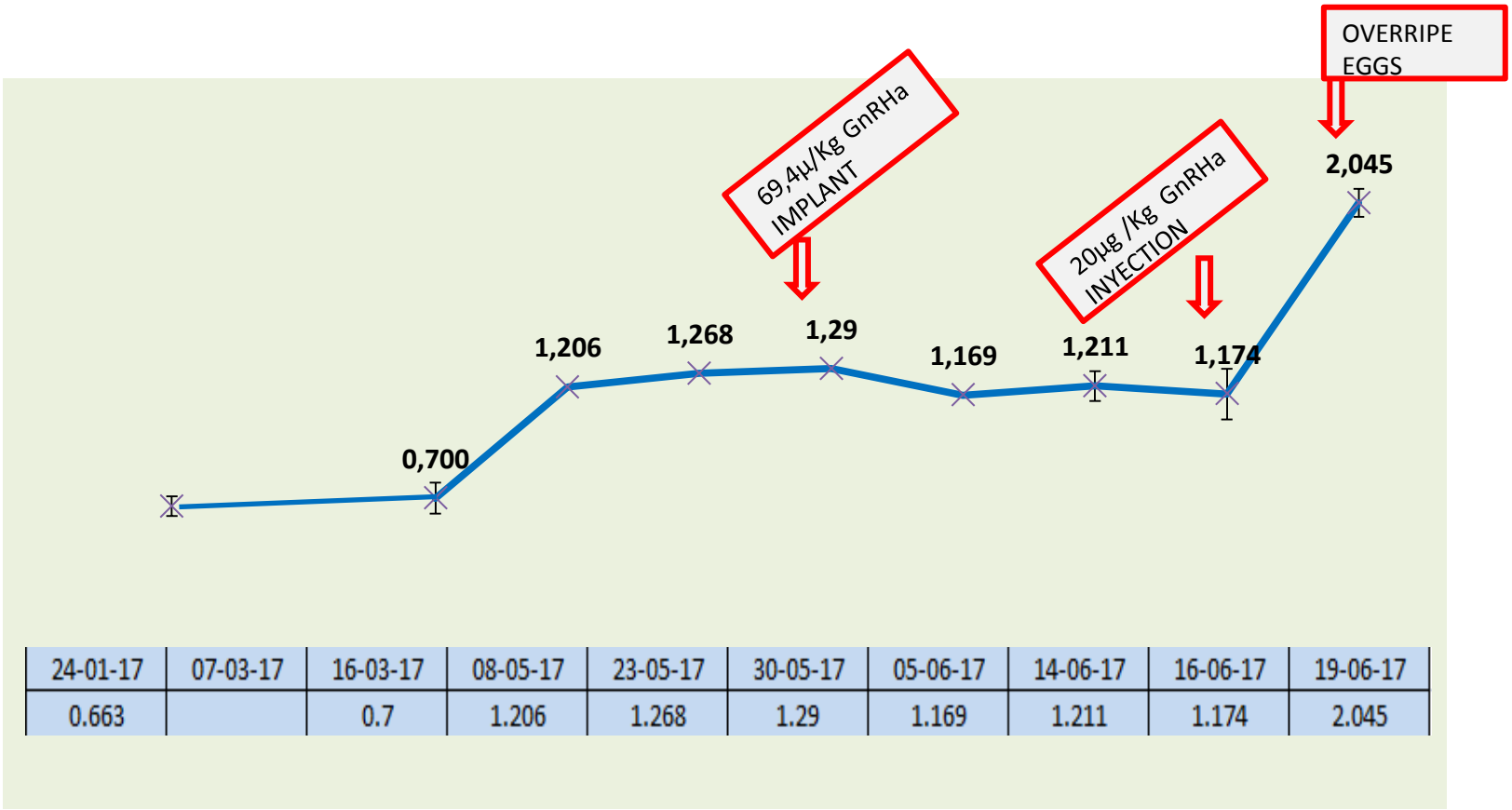
The gap between spawns was of 3-4 days (Tª)

# Induced reproduction

Important advances

Spawns by stripping were obtained in the four stocks.

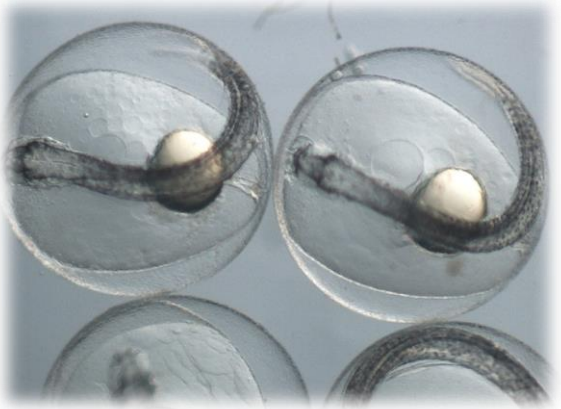
The treatment of females with GnRHa implants and injections induce oocyte maturation and ovulation

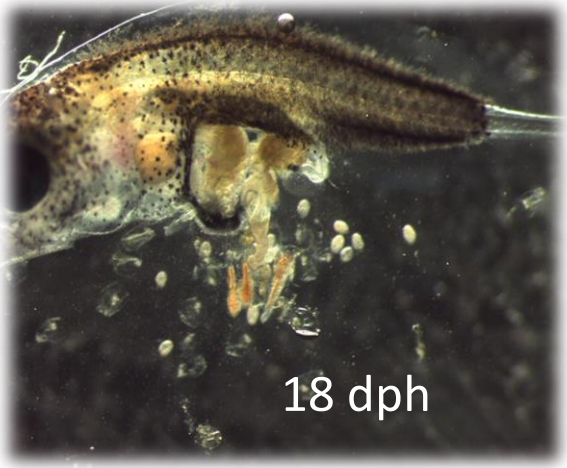



| 24-01-17 | 07-03-17 | 16-03-17 | 08-05-17 | 23-05-17 | 30-05-17 | 05-06-17 | 14-06-17 | 16-06-17 | 19-06-17 |
|---|---|---|---|---|---|---|---|---|---|
| 0.663 | | 0.7 | 1.206 | 1.268 | 1.29 | 1.169 | 1.211 | 1.174 | 2.045 |

# Incubation and Larval rearing

- Fecundation rate was between 50 and 100%
- Experiments at different incubation temperatures showed that the optimal temperature was 16 ± 0.8ºC, with the best results in embryonic development and hatching rates (until 65%).
- At 16ºC larvae survived until 27 dph feeding rotifers and Artemia.

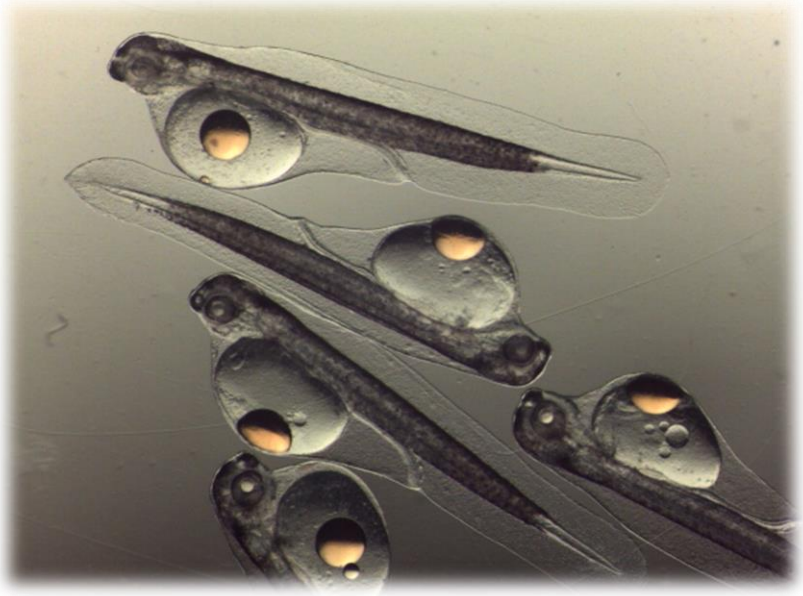




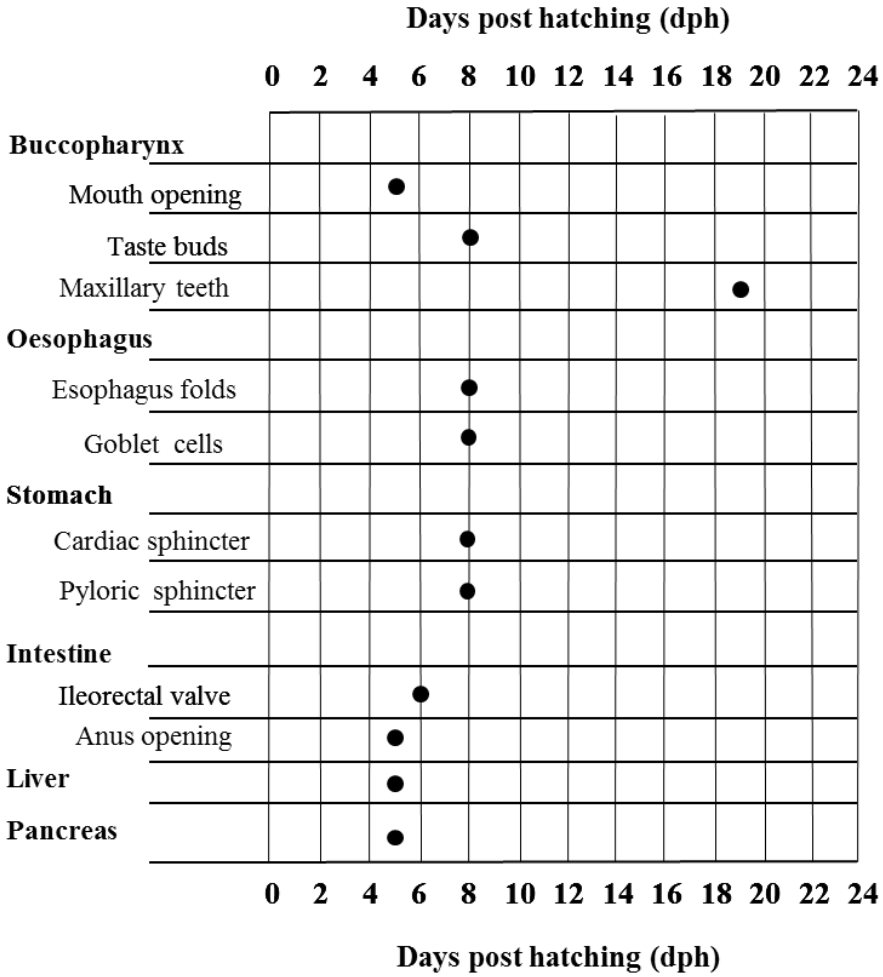
# Larval development

Larvae total length was 4.70 ± 0.27 mm at 1 dph.

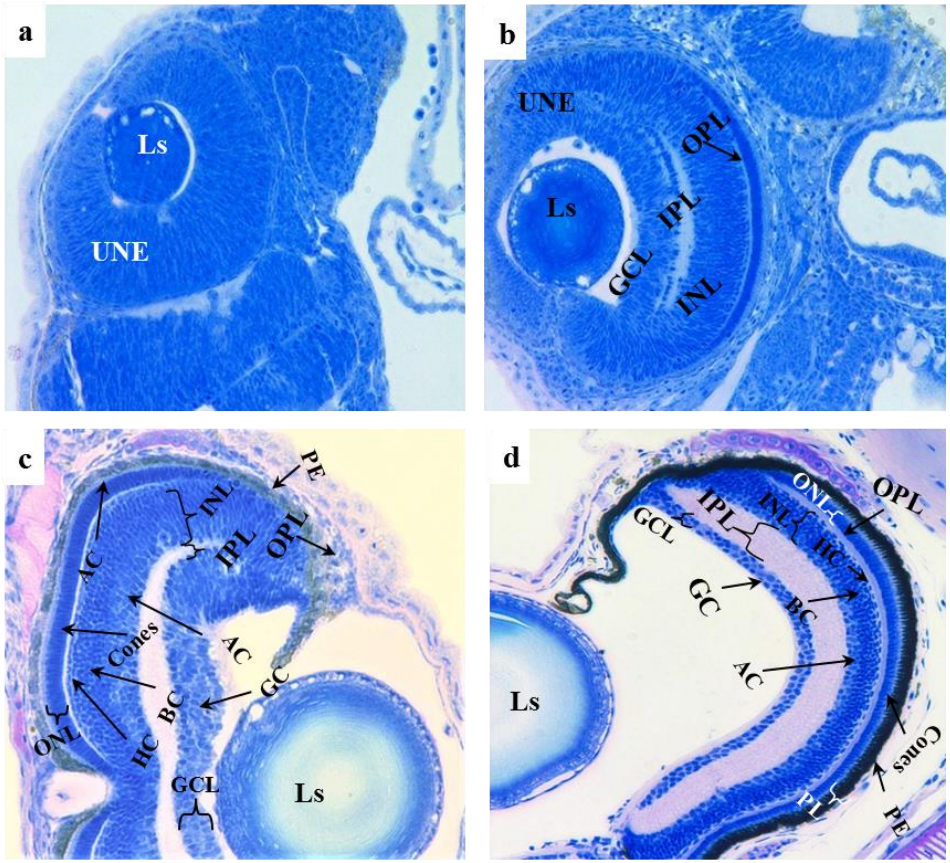
| Temperature | Mouth opening (dph) | Yolk sac consumption (dph) |
|---|---|---|
| 14-17°C | 7 | 11 |
| 17-20°C | 4 | 8 |



# Ontogeny of the digestive and visual systems



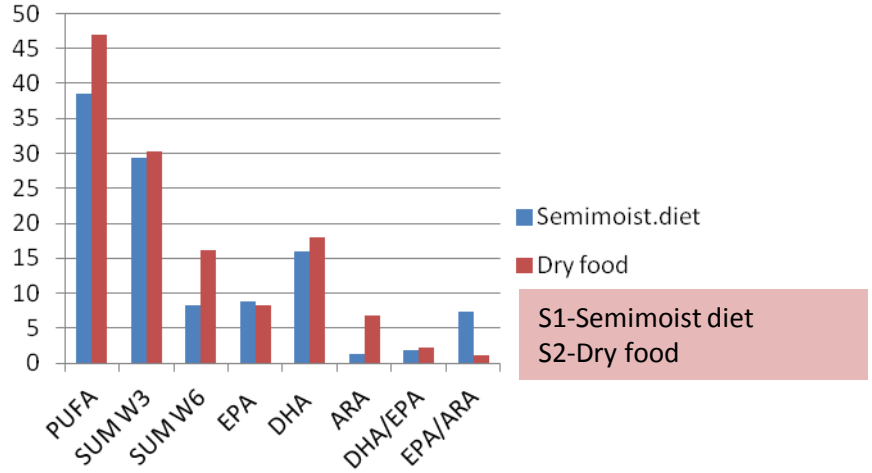

Schematic representation of the main structures of the digestive system



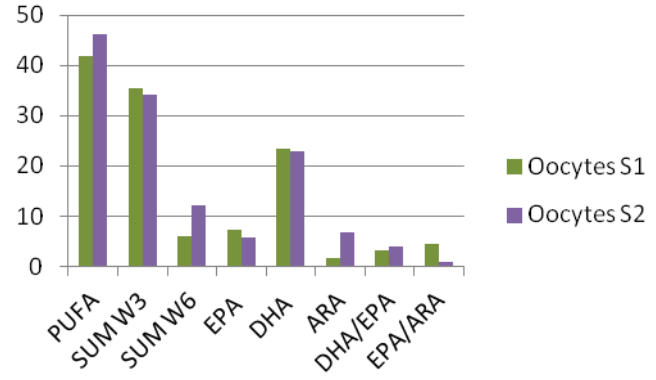

Histological sections of wreckfish larvae (a) at hatching, (b) 3 dph, (c) at 6 dph and (d) at 23 dph showing the structure of the retina

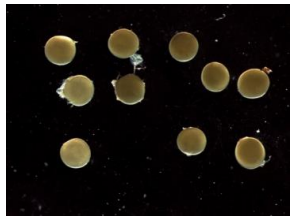
# Nutrition

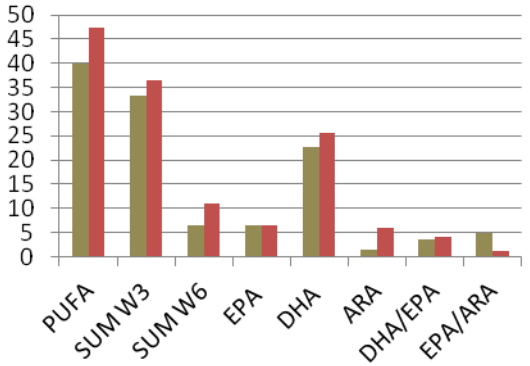
Fatty acids (% total) in broodstock diets, oocytes and larvae of wreckfish




A clear relationship between the fatty acid profiles of broodstock diet, oocytes and larvae was found.






New enrichments for larvae were designed on the basis of gonads and eggs biochemical profile

# To-do list

- Increase the size of the broodstock with wild wreckfish
- Improve the incubation system. Adapted tanks design
- Improve larvae culture system. New tanks design
- Text the new enrichments for larval wreckfish

# Thanks for your attention!

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# CENTRO OCEANOGRÁFICO DE VIGO

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una vida en el mar

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