



## Slow-release GnRHa therapy prevented atresia during vitellogenesis and induced ovulation of captive wreckfish (*Polyprion americanus*).

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### Introduction:

The world-wide distributed wreckfish (*Polyprion americanus*) is a good candidate for aquaculture for its rapid growth. In the wild, puberty occurs at a total length (TL) of 60-90 cm and spawning takes place at depths of 450-850 meters. The description of gametogenesis and sex steroid levels may allow defining an appropriate hormonal stimulation of reproduction in captivity.

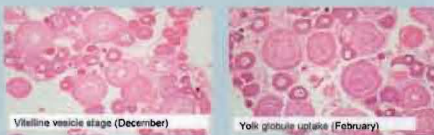
### Sex determination

17 wild-caught wreckfish (11.7±3.7 kg) had been maintained in tanks or cages in natural conditions in Brest (France) and in controlled conditions in tanks in Iraklion (Greece) for 4 years with an average increase of 3kg per year. The stock was biopsied (when possible) and sampled for blood monthly.



- Gonadal biopsy and sperm availability allowed sexing only 5 females and 3 males out of the 17 individuals
- Estradiol showed seasonal variations in all sexed females
- 11-Ketotestosterone showed variations with no relation to sex

### Oogenesis



- E2 and oocyte size varied seasonally in 3 females larger than 85 cm TL.
- Both parameters peaked during spring
- A rapid drop of E2 occurred in May followed by the onset of atresia in vitellogenic oocytes.

Puberty is reached but breeding conditions are not met in captivity

### GnRHa treatment



Arrowheads 20 µg.kg<sup>-1</sup>; opened arrow implant 3 mg.kg<sup>-1</sup>; long arrow injection 33 µg.kg<sup>-1</sup>

Slow release GnRHa implants of 100µg kg<sup>-1</sup> provided to females before atresia or E2 drop, supported vitellogenesis for 1.5 month up to its end (diameter: 1400µm).

➤ In Brest, a last injection of 33 µg kg<sup>-1</sup> GnRHa triggered

- a peak of E2 up to 4 ng ml<sup>-1</sup>, followed immediately by a rapid hydration,
- final oocyte maturation and ovulation within 7 days without any spawning.

➤ in Iraklion. A GnRHa implant induced spontaneous spawning in 7 days of a female but fertilization was very poor, as was embryo survival

### Embryogenesis



15 h post-fertilization 13°C, 30 h P.F. 13°C, 54 h P.F. 13°C, 140 h P.F. 13°C, Hatching Day 6.5 P.F. 15°C.

• Contrary to spontaneous spawning in captivity, GnRHa implantation, followed by strip-spawning resulted in the collection of about 100 ml of eggs with 86% fertilization success. The hand-stripped eggs (diameter: 2300 µm) were translucent and showed several oil droplets.

• Fertilized either with homologous sperm in Iraklion or with heterologous sperm (hake) in Brest, the eggs develop. The embryos hatched 6.5 days after artificial fertilization at 15°C. (Iraklion). The hybrids hatched after 5 days at 13°C (Brest) but did not survive anymore.

### Conclusion:

Puberty in captive wreckfish does occur in captivity, but in larger individuals than in wild specimens (Papandroulakis et al., 2004), suggesting that the rearing conditions did not fulfil the requirements for complete gametogenesis. As proposed by Zohar & Mylonas (2001) a neuroendocrine (GnRHa) therapy not only triggered FOM but also sustained completion of vitellogenesis by prevention of spontaneous atresia, and was effective in producing viable gametes and embryos.

### References:

- PAPANDROULAKIS N., SUQUET M., SPEDICATO M.T., MACHIAS A., FAUVEL C. & P. DIVANACH, 2004. Feeding rates, growth performance and gametogenesis of wreckfish (*Polyprion americanus*) kept in captivity. *Aquaculture International* 3: 1-13.
- ZOHAR, Y. and C.C. MYLONAS, 2001. Endocrine manipulations of spawning in cultured fish: from hormones to genes. *Aquaculture*, 197: 99-136.