

# Estimating spawning interval as the ratio of oocyte growth period to the number of oocytes cohorts

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Small Pelagic Fish: New Frontiers In Science and Sustainable Management

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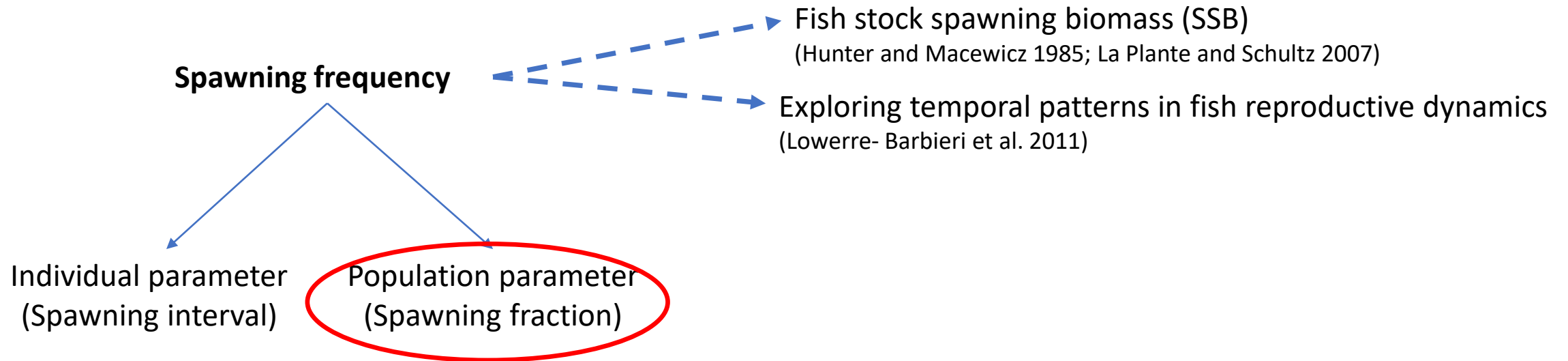


Επιχειρησιακό Πρόγραμμα  
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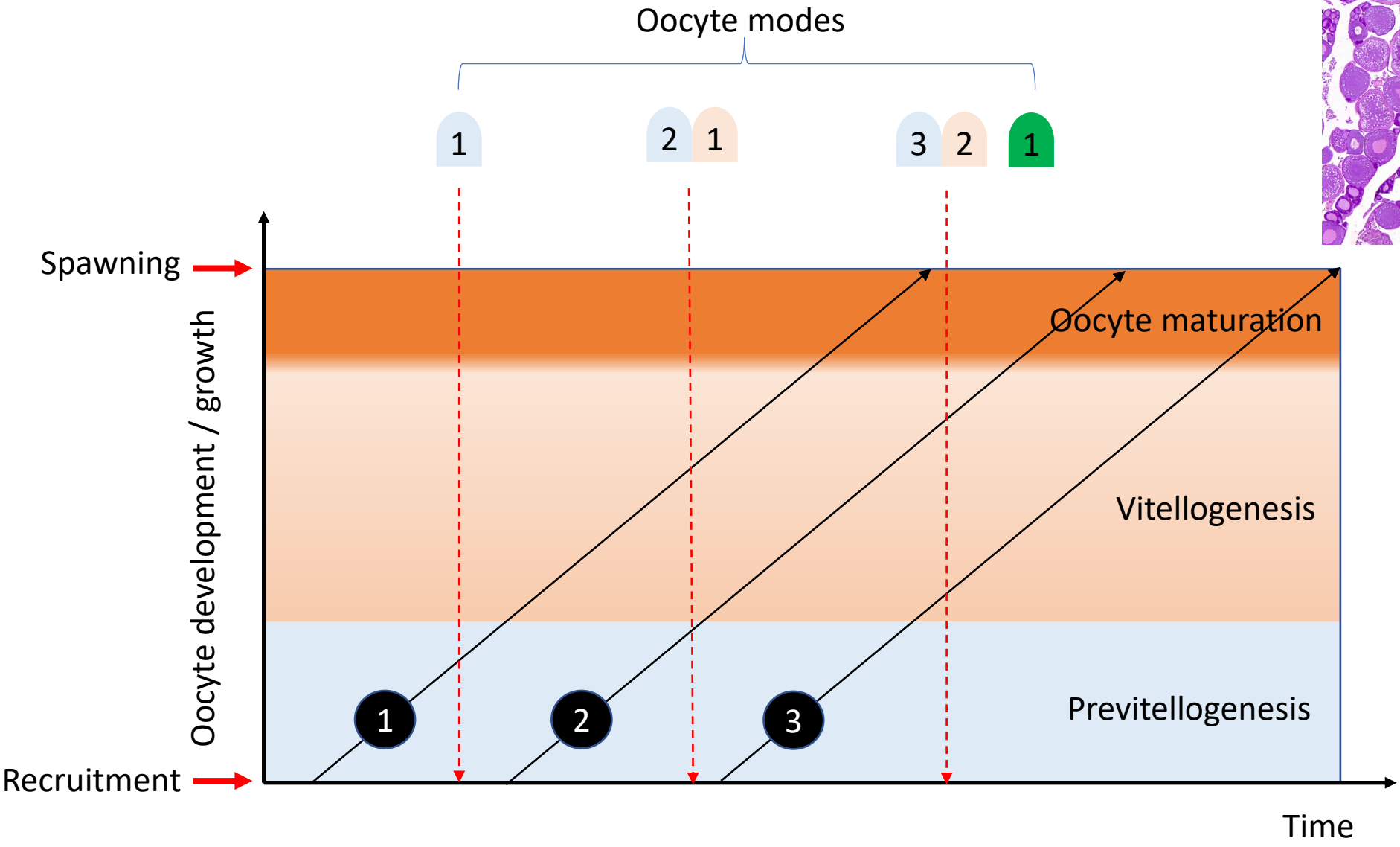
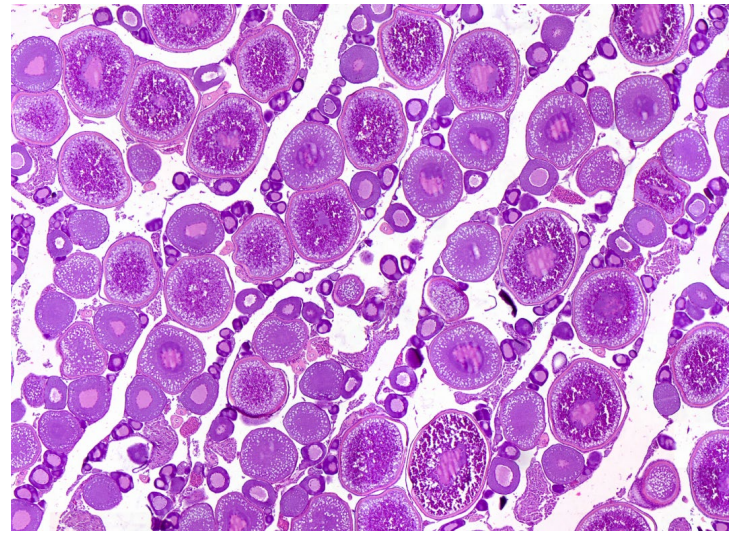
Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης

# Introduction



- Spawning frequency is mainly estimated through the spawning fraction (population parameter), but it faces obstacles (spawning aggregations, oocyte stages occur within short time windows).
- Alternative methods needs to be developed based on the individual parameter (spawning interval)

# Conceptual model of oocyte modality in multiple spawners



# Conceptual model of oocyte modality in multiple spawners

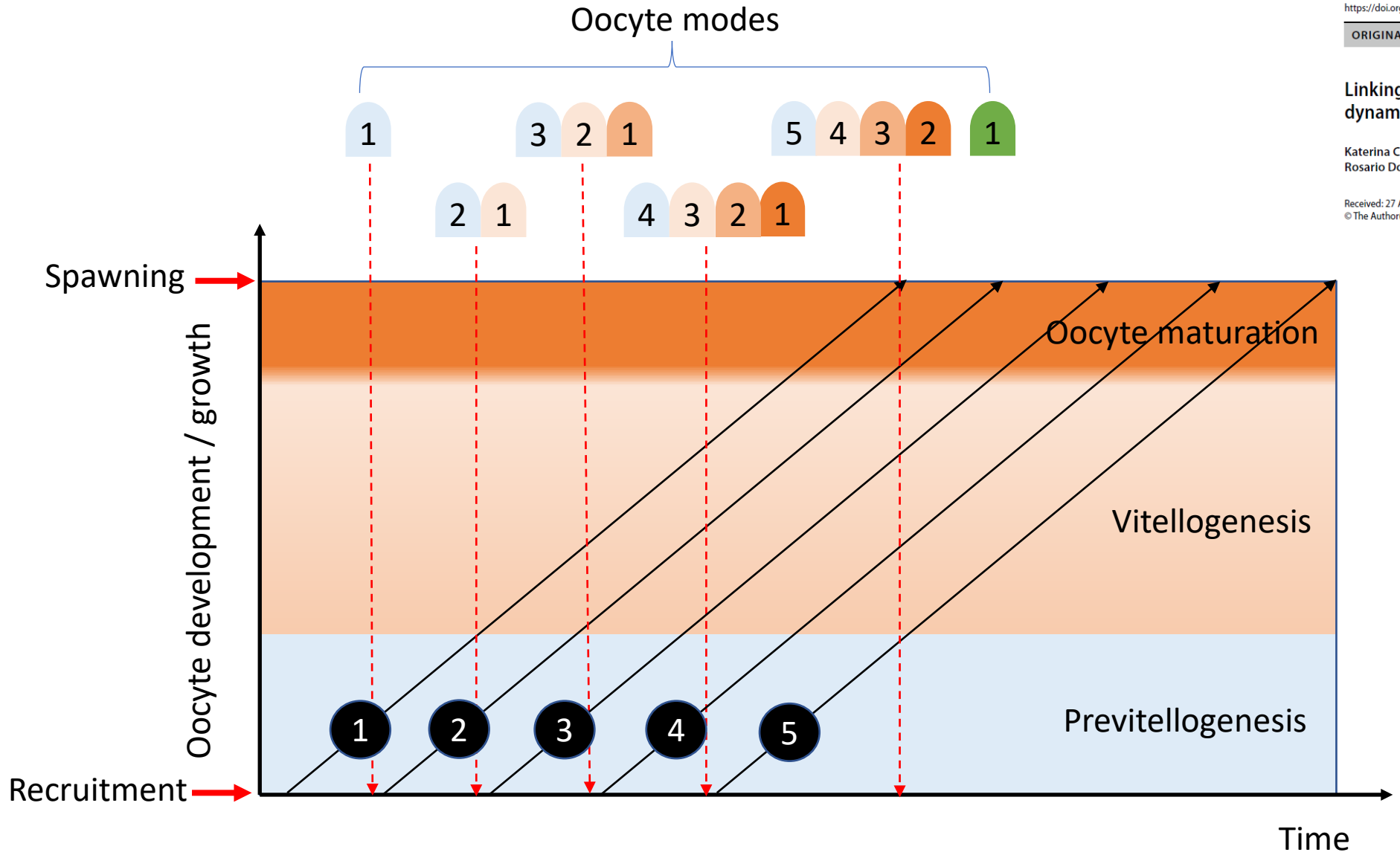
Marine Biology (2022) 169:47  
<https://doi.org/10.1007/s00227-022-04032-z>

ORIGINAL PAPER

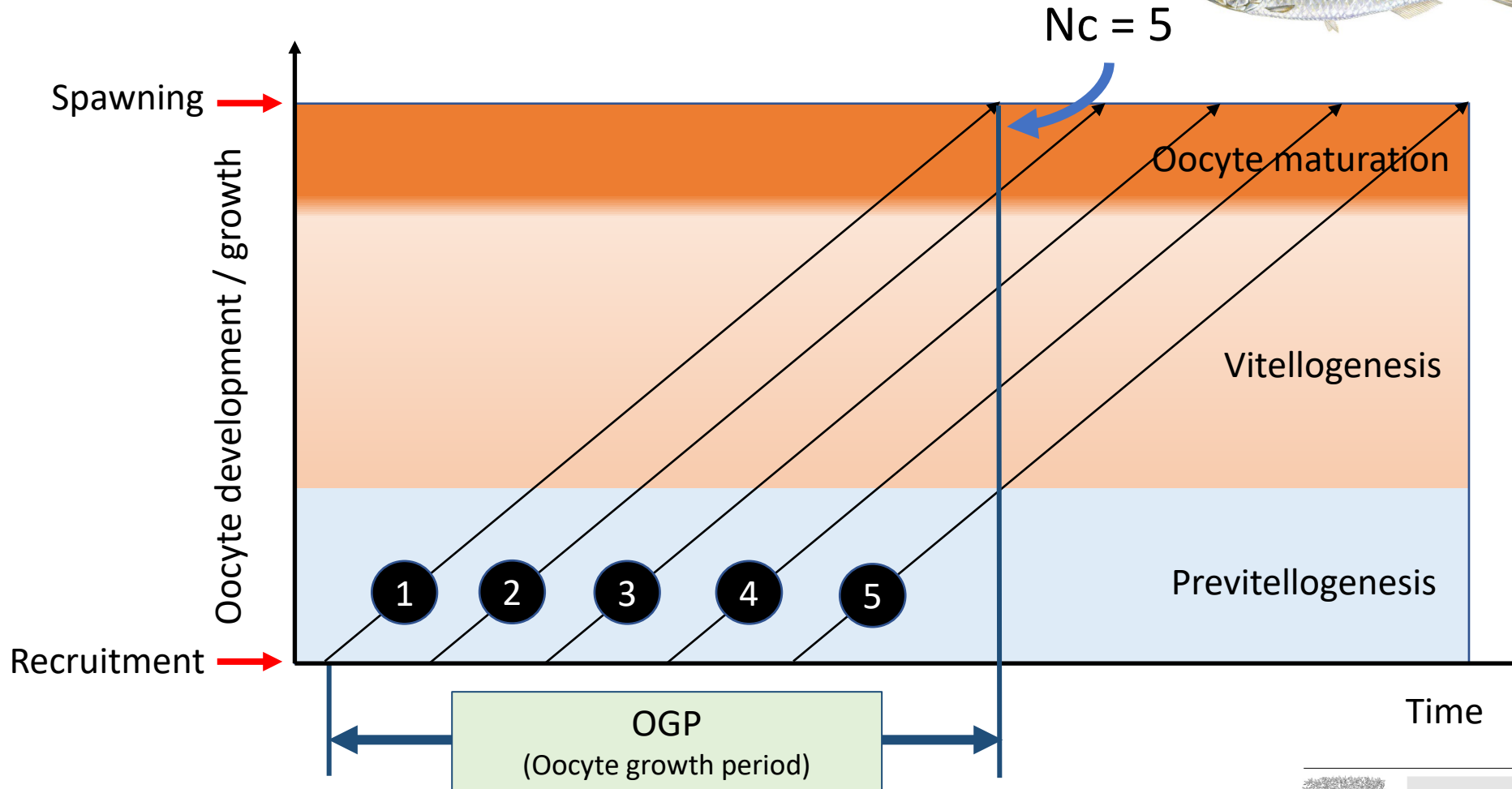
## Linking the dynamic organization of the ovary with spawning dynamics in pelagic fishes

Katerina Charitonidou<sup>1</sup> · Olav Sigurd Kjesbu<sup>2</sup> · Cristina Nunes<sup>3</sup> · Maria Manuel Angélico<sup>3</sup> · Rosario Dominguez-Petit<sup>4</sup> · Dolores Garabana<sup>5</sup> · Konstantinos Ganias<sup>1</sup>

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# Estimating spawning interval from OGP and $N_c$



**Spawning Interval = OGP / Number of oocyte cohorts ( $N_c$ )**

?

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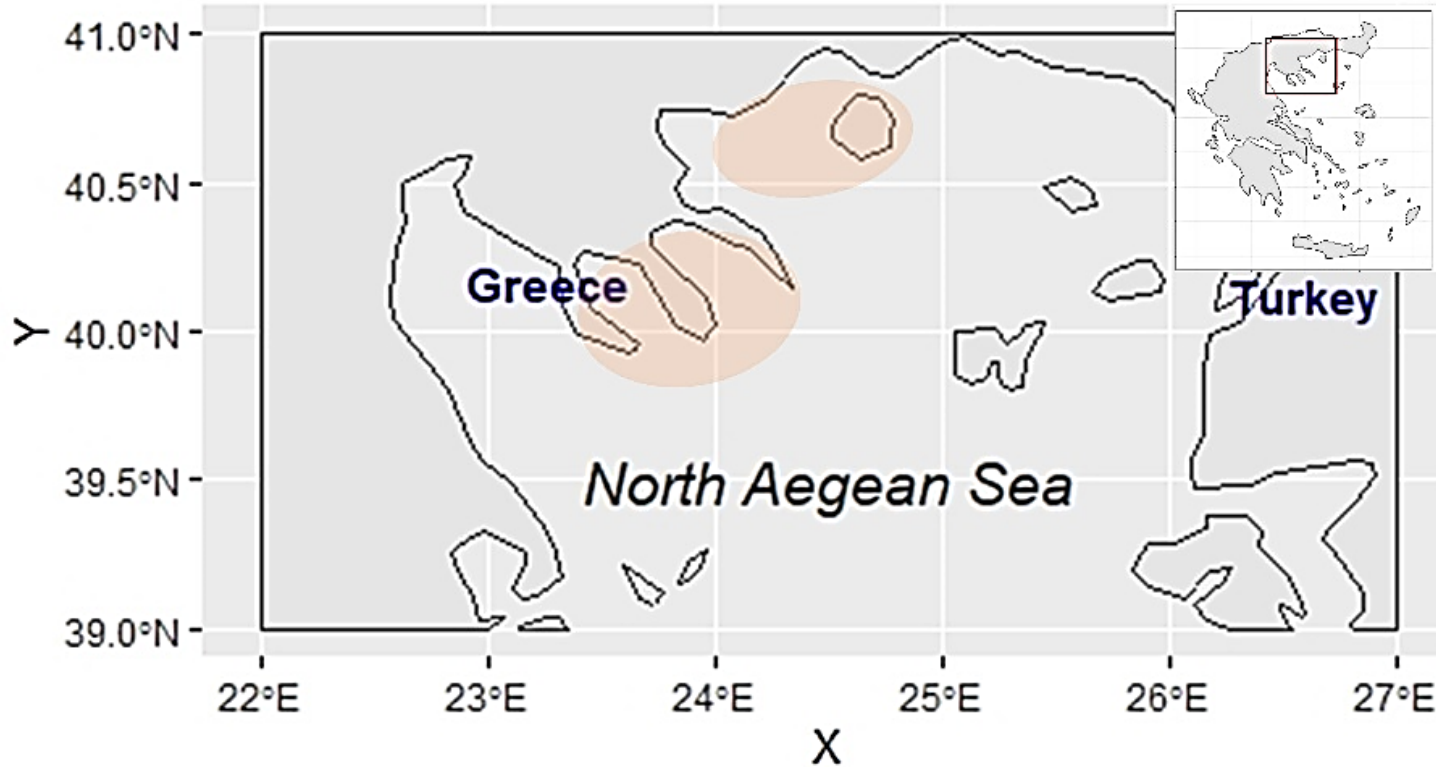
Using clustering algorithms for identification of fish oocyte cohorts based on the characteristics of cytoplasmic structures

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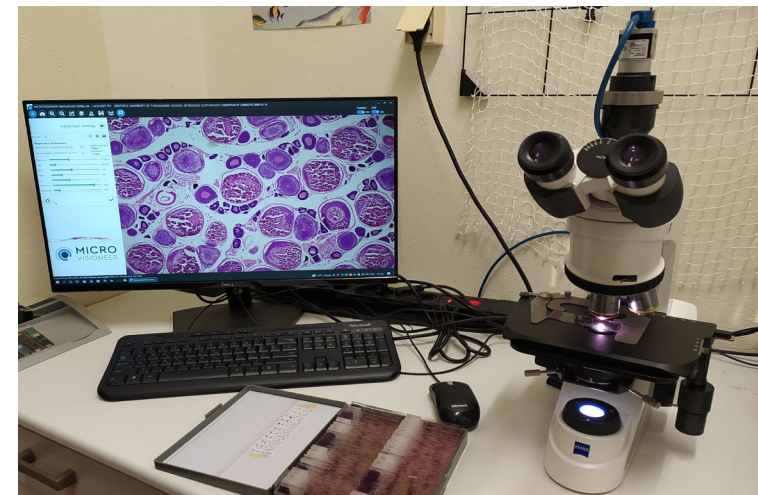
## Materials and methods

*Sardina pilchardus* 

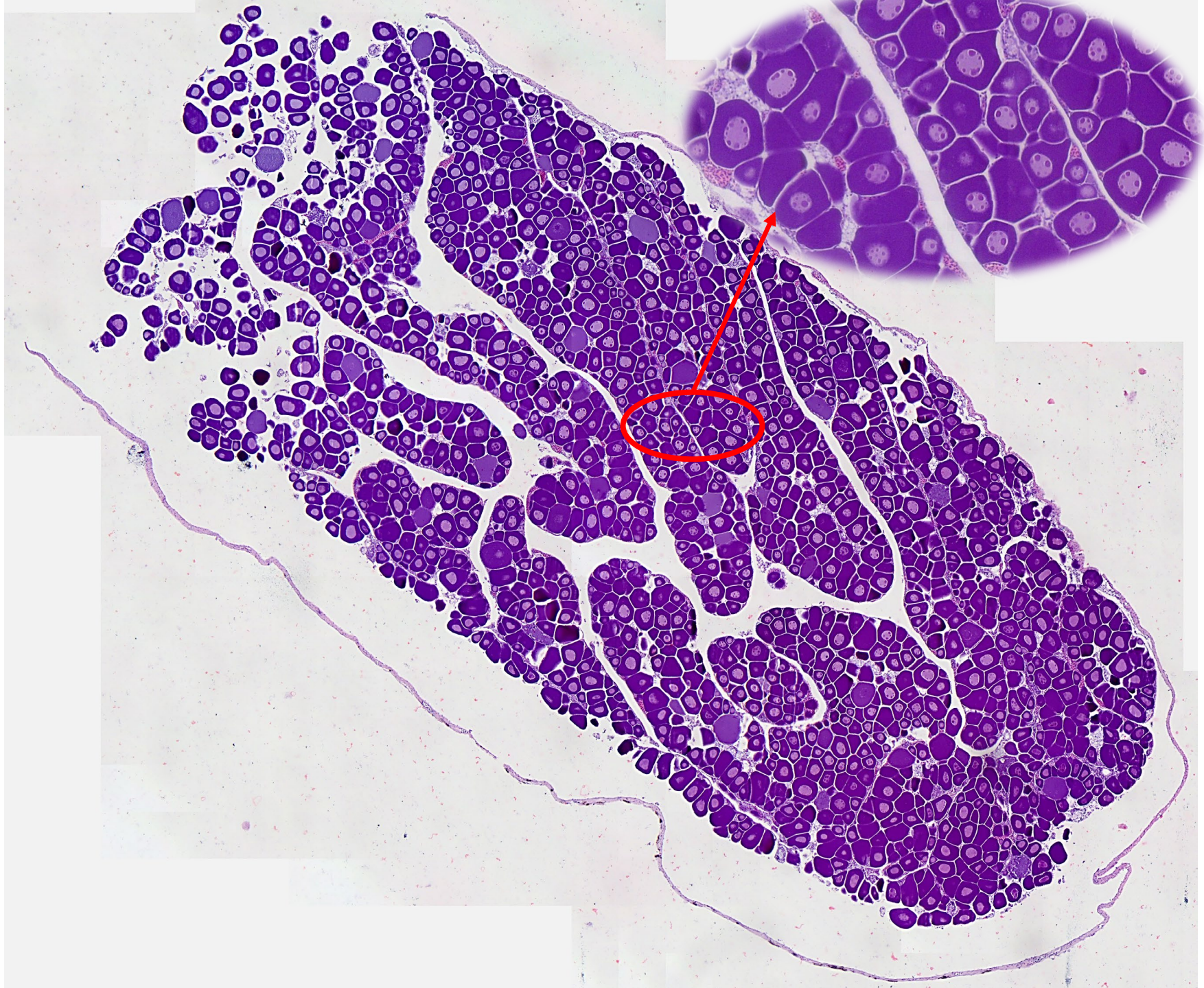


- Sampling -> late summer to winter in the North Aegean Sea, from the local commercial purse seine fishery.

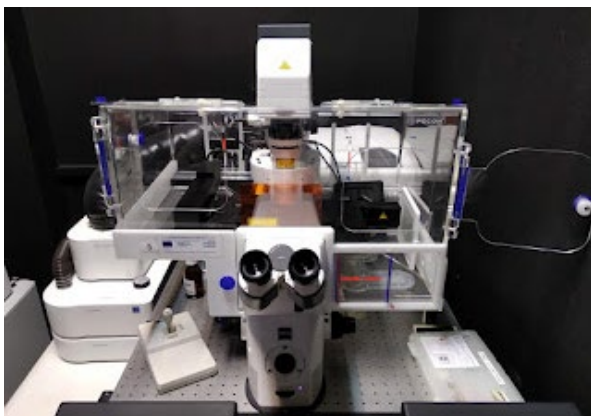
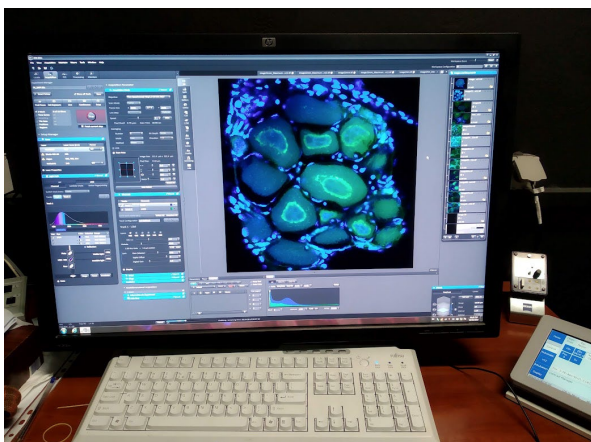




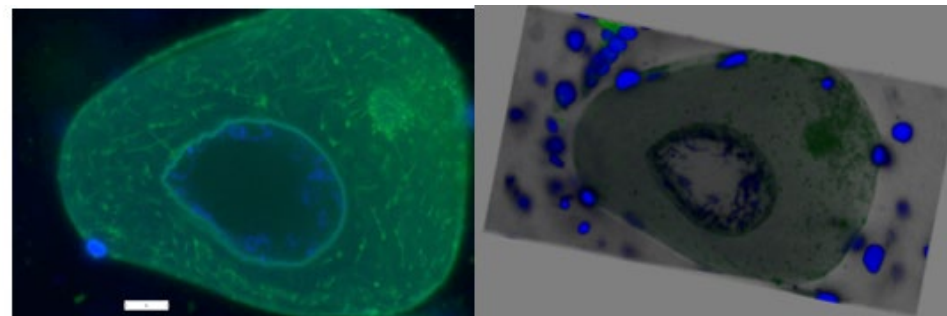
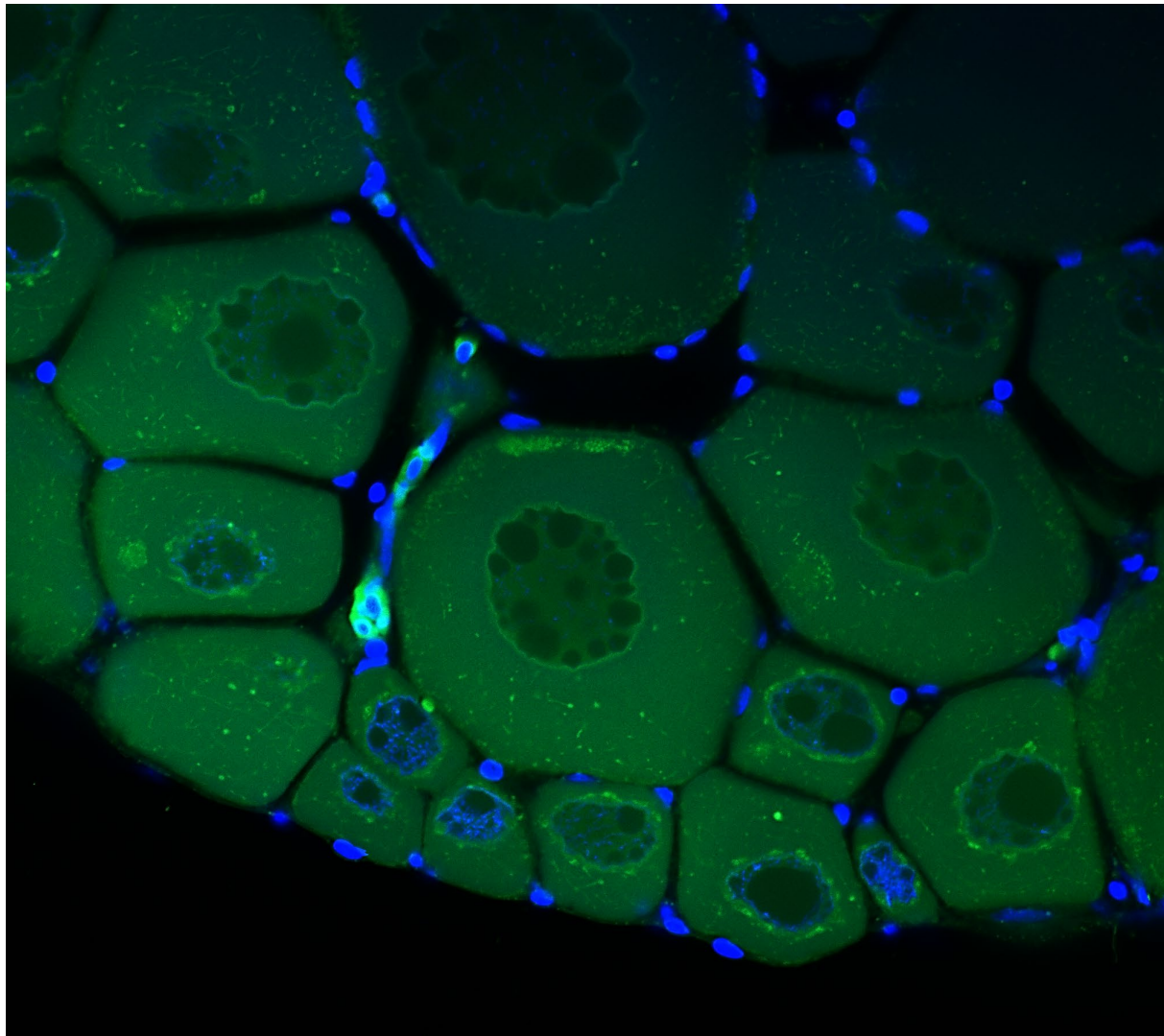
Manual microscope slide scanner







Confocal laser scanning microscopy

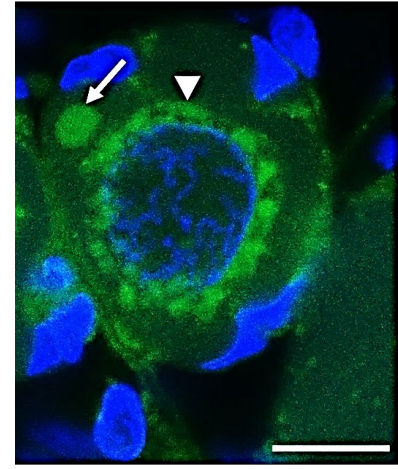




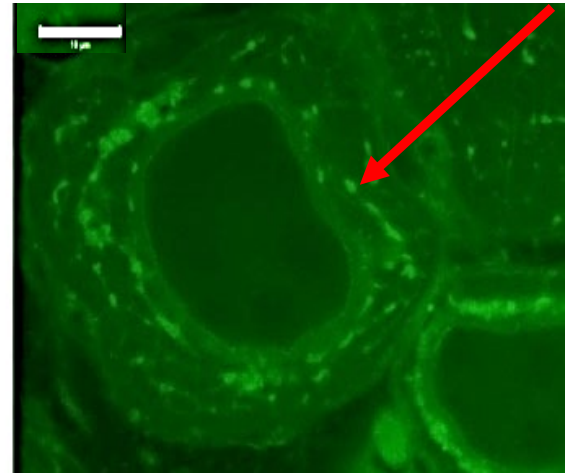


# Markers of the onset of the reproductive period

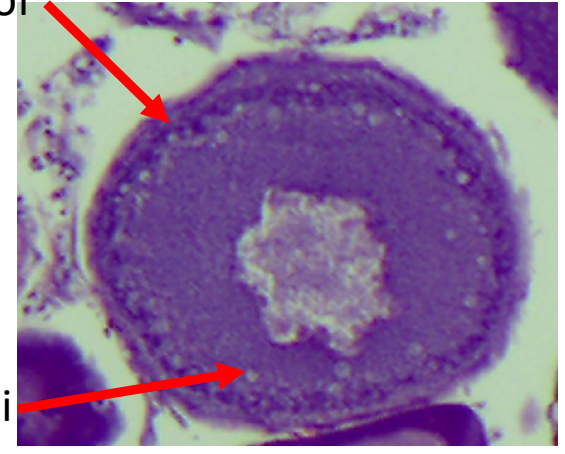
Primary growth oocyte



Early secondary growth oocyte



circumnuclear compartment of Balbiani body



Cortical alveoli

# Markers of the onset of the spawning period

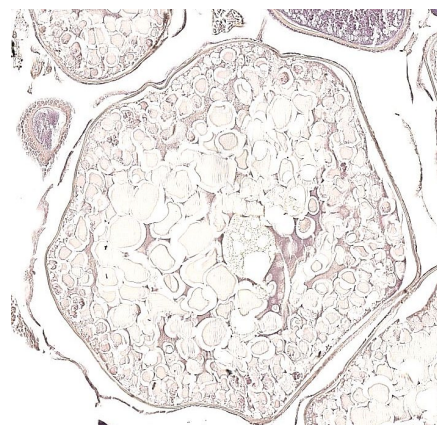
GVM1



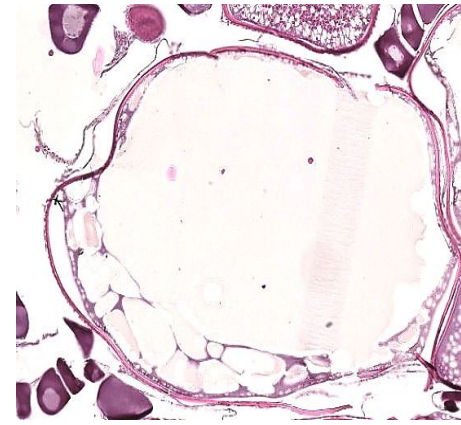
GVM2



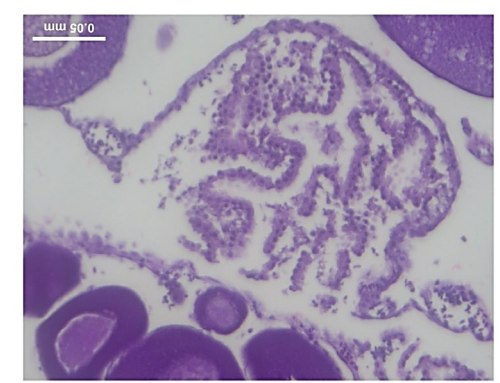
GVBD



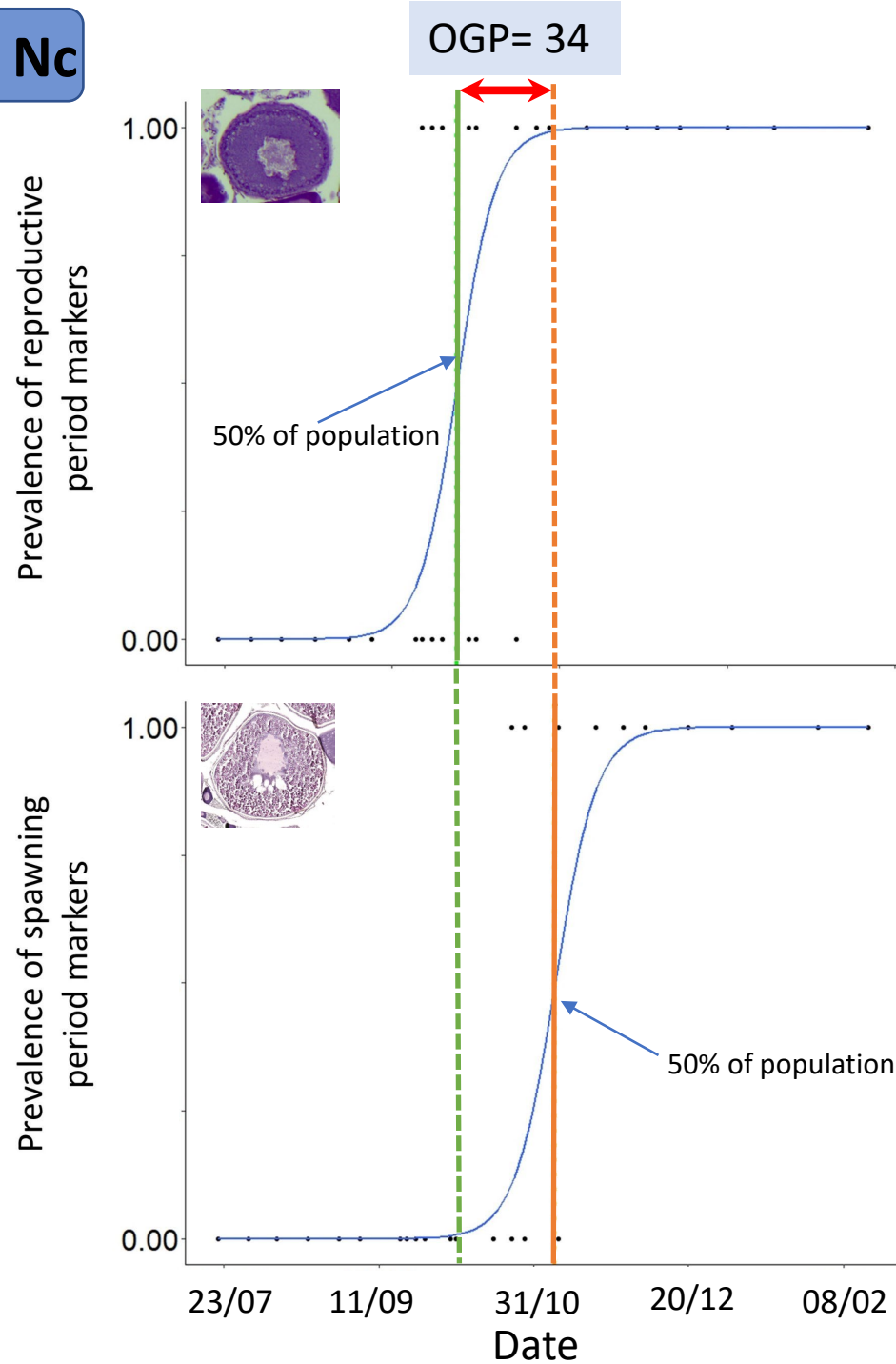
HYD



POFS



# Estimating SI from OGP and $N_c$



**$OGP = 34$  d**

**$N_c = 5$**

**$SI = 7$  d**

**$S = 0.14$**

Year	% inactive	$S$	$S_a$
1997	25	0.07	0.09
1999	6	0.10	0.11
2002	18	0.05	0.06
2005	14	0.08	0.09
2008	6	0.08	0.09

Ganias [2011] Mar Coast Fish

## FUTURE PLANNING

Implementation of this method including:

- ➔ more species (ongoing work on European anchovy)
- ➔ Samples from different years
- ➔ Samples from different locations