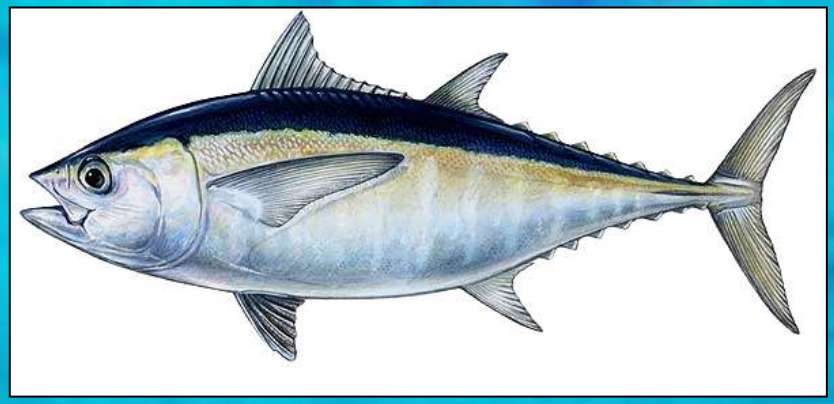
Reproduction of blackfin tuna (*Thunnus atlanticus*) : preliminary results



Cédric Pau *, Christian Fauvel, Clément Dromer,
Julien Timor , Héloïse Mathieu and Lionel Reynal

FAD Working group, St Vincent, 9-11 decembre 2013

l'Europe s'engage avec les Antilles-Guyane dans la Grande Caraïbe
PROGRAMME INTERREG CARAÏBES
Impact Mer Cabinet d'études et de conseil
Ifremer

Objectives

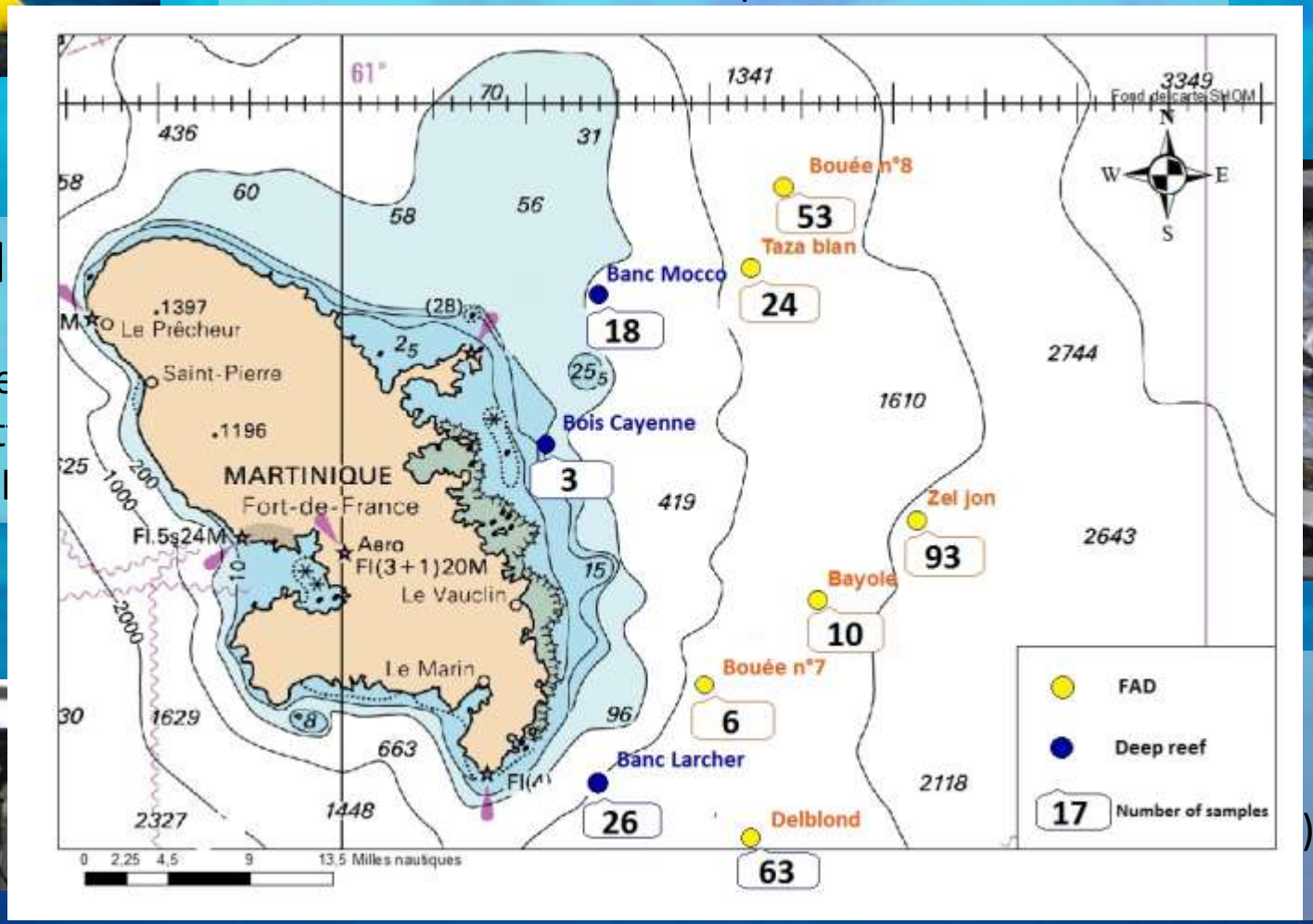
We studied different aspects of the reproduction of blackfin tuna in Martinique in order to:

1. Differentiate stages of maturity
2. Describe the size of reproductive individuals
3. Identify the periods of reproduction
4. Identify the site of reproduction

Sampling protocol

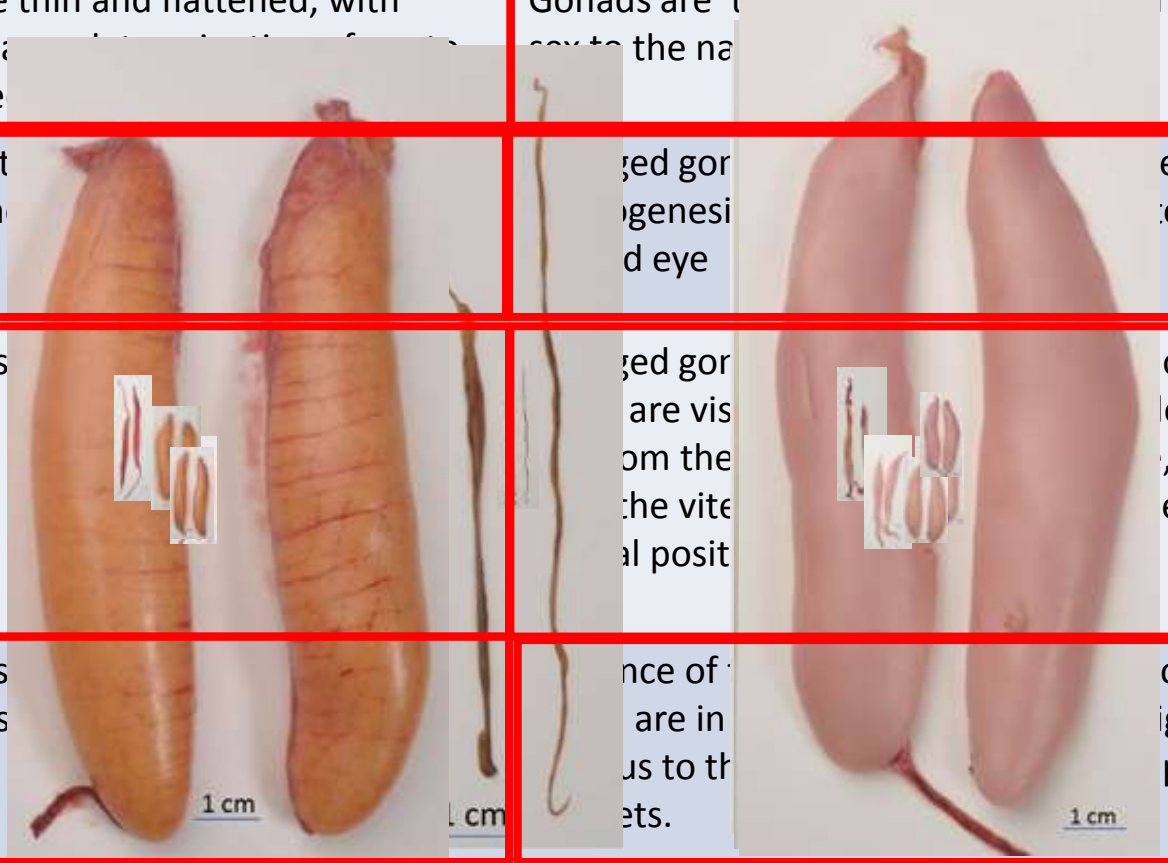
1- Samplings at sea

- 22 fish trips from the 28th Feb to the 4th Sept 13
- 299 individuals captured
- Atlantic coast of Martinique



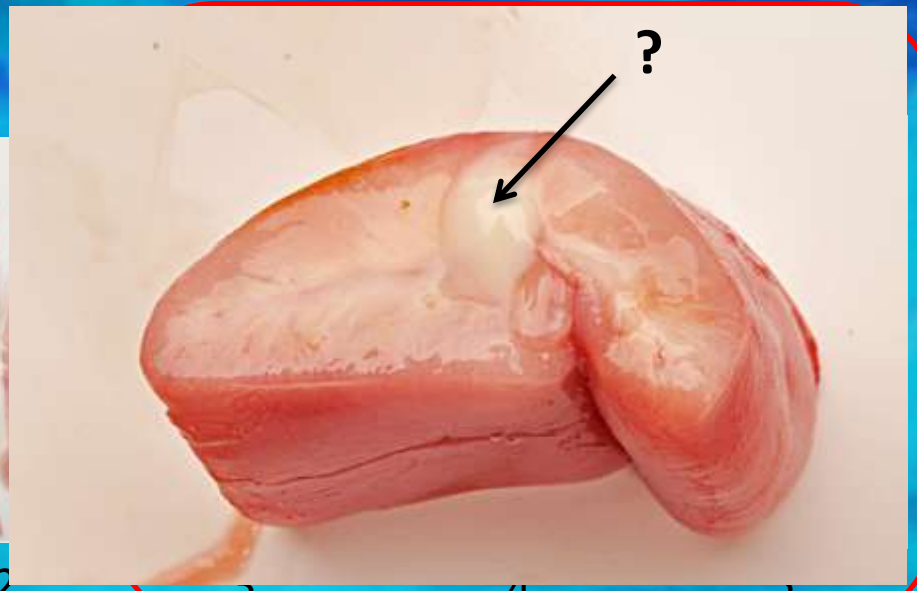
Differentiation of the stages of maturity

		Male	Female
IMMATURES	**Stage I**	Gonads with small-ribbon shape, determination of sex to the nacked eye is not possible	
	Stage 1	Testes are thin and flattened, with ribbon sha… the nacke…	Gonads are t…ination of sex to the na…
	Stage 2	Enlarged t… section, n…	…ged gor… …er been in …genesi… …o the …d eye
IN MATURATION	**Stage** 3	Milt flows … length	…ged gor… …of ovary), are vis… …odging or …om the… …, they …he vite… …eus in …l posit…
MATURES	**Stage** 4	Milt flows … on the tes…	…nce of … …ovary. are in … …gration of …us to th… …pid …ets.
POST SPAWN	**Stage** 5	Testes are lightly flabby, few or no milt in the central canal.	Ovary contains ovum in degradation, with possible regression of the ovary mass .



Differenciation to the nacked eye?

♂

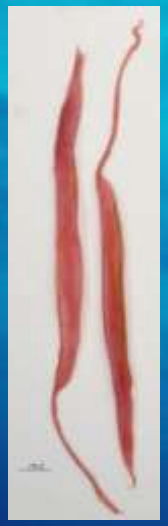


1 2 3 4 5

YES

Gonad section

♀



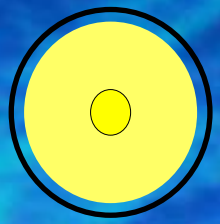
1 2 3 4 5

NO

Gonad section

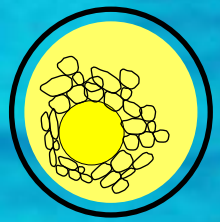
Observation with a binocular magnifier

Stage 3



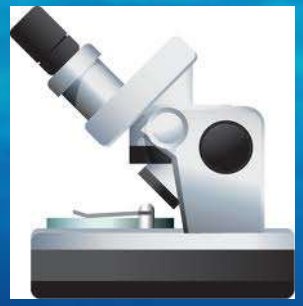
Vitellogenesis

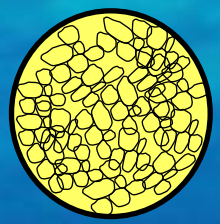
Stage 4



Pre-ovulation

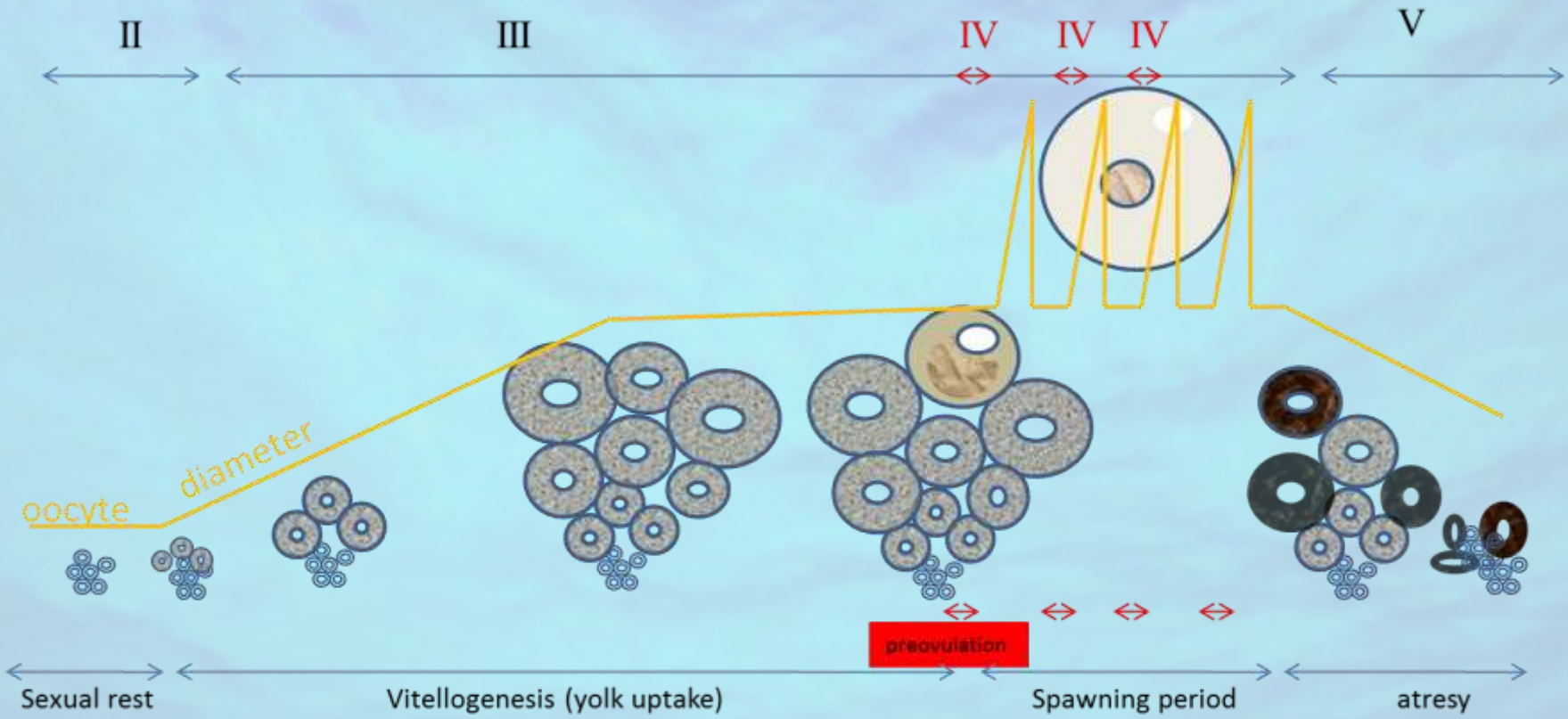
Stage 5





Atresia

Proposed stages based on ovarian functionality:



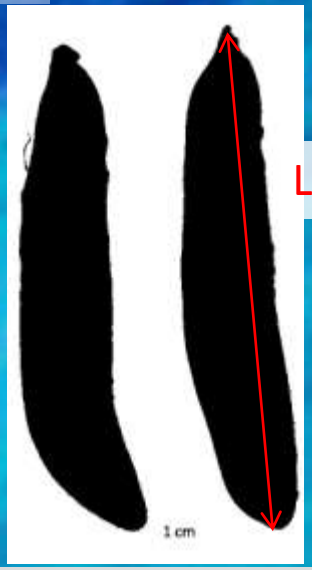
Stage IV is transient (only some hours?)

Identification of maturity stages (♀) using pictures ?

+

ImageJ

=



Length

	Area	Length
1	26.006	13.149
2	25.459	12.765

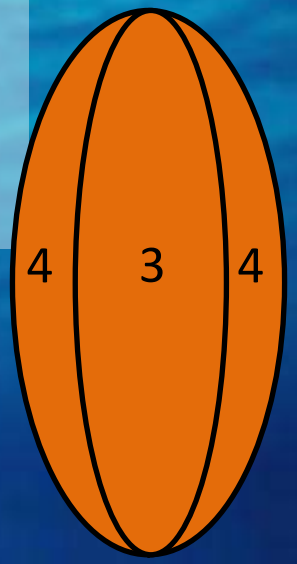
ANOVA :

1. **Surface (cm^2)** function to the stages 3, 4 and 5 → NS
2. **Length (cm)** function to the stages 3, 4 and 5 → NS
3. **Surface/Length** function to the stages 3, 4 and 5 → * between stage 3 and 4

* = p value < 0,05

Stage 3 : mean value of Surface/Length = **1.78**
Stage 4 : mean value of surface/Length = **1.98**

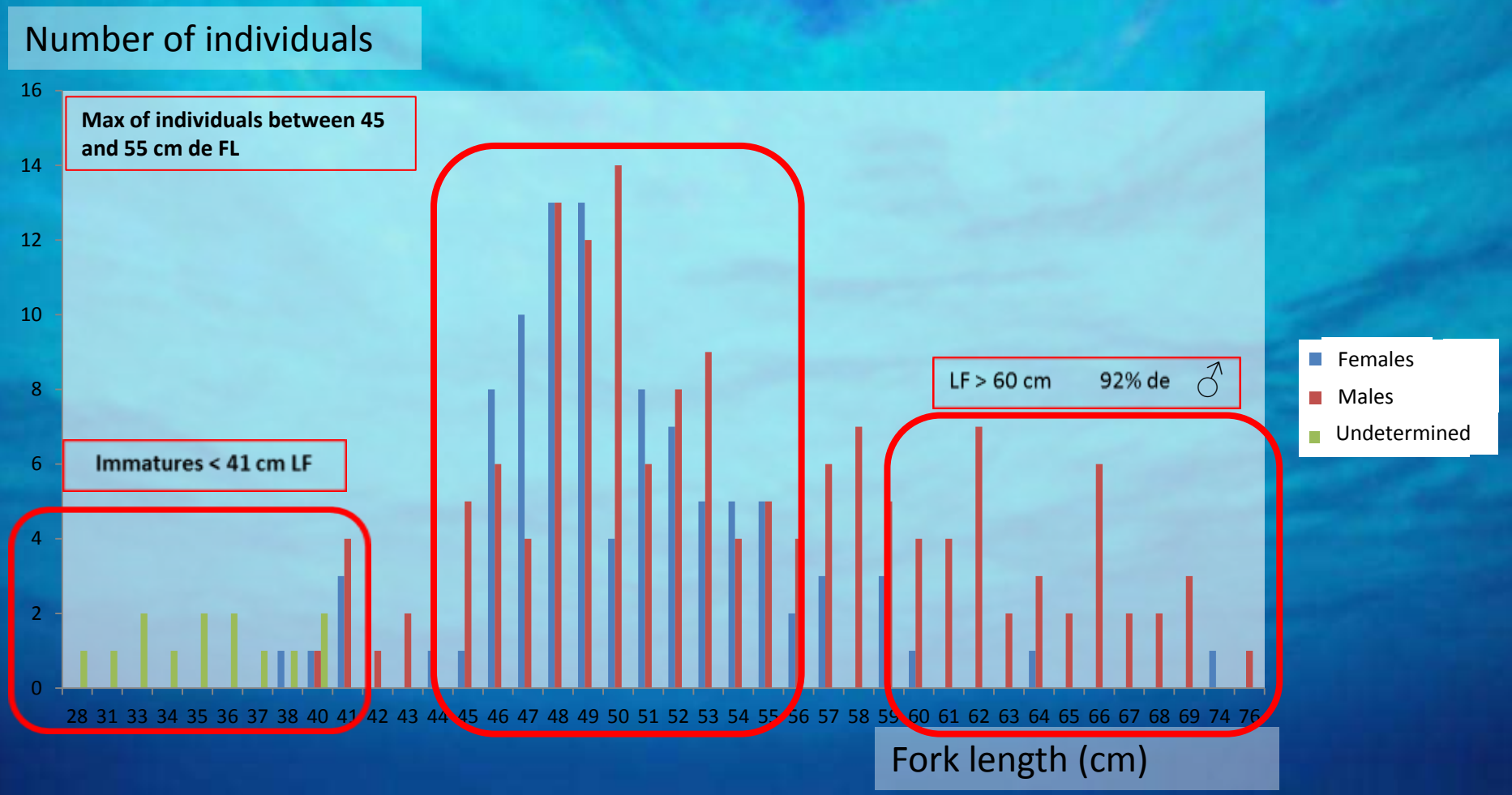
→ 3<4 →



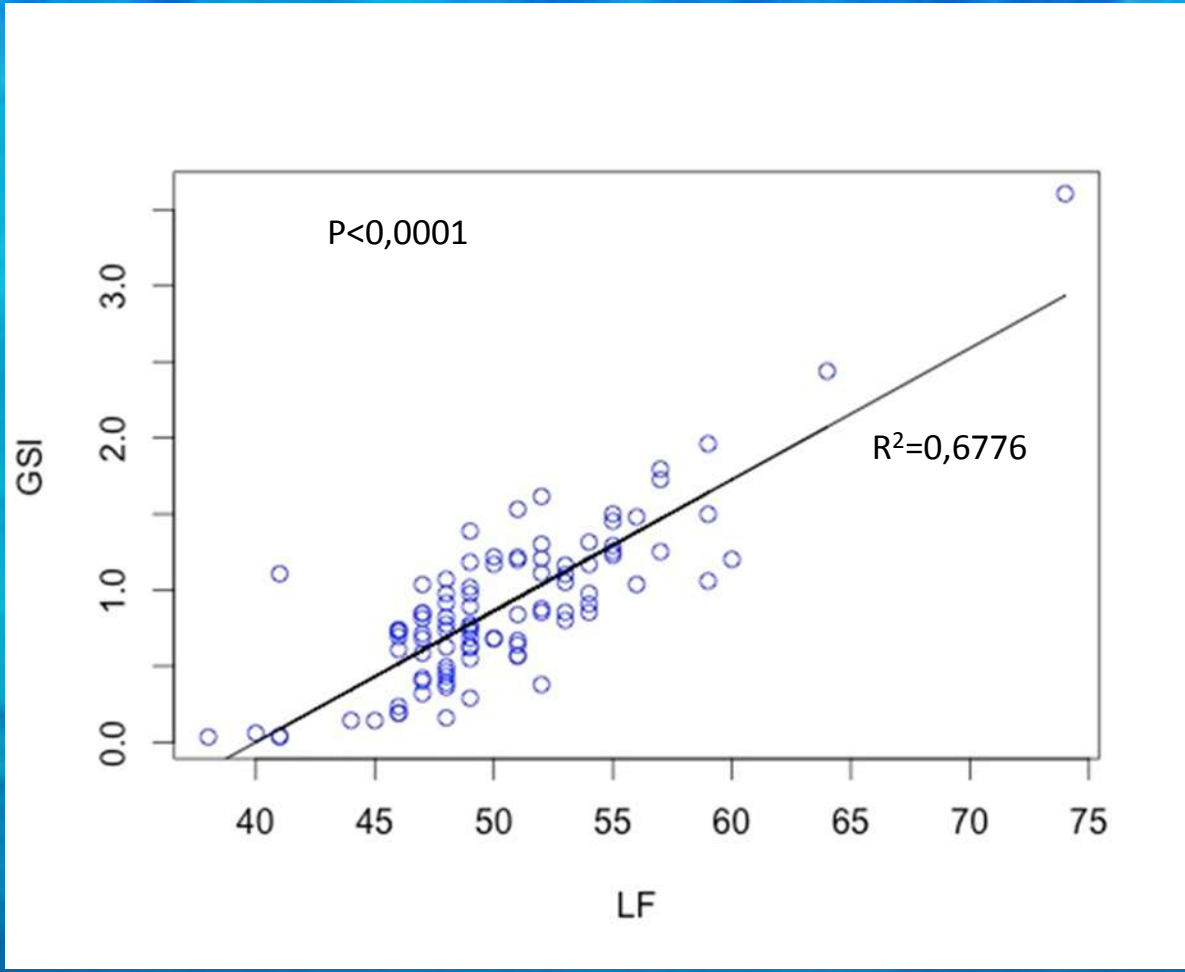
Size of reproductive individuals

Few samples (13.5 individuals per sea trip in average) , results presented below only show trends and orientations for further studies.

- Size of first maturity : 41 cm (♀ et ♂)
- Sex ratio : 1,6♂:1♀



Gonado Somatic Index (GSI) = Gonad weight/size of the individual



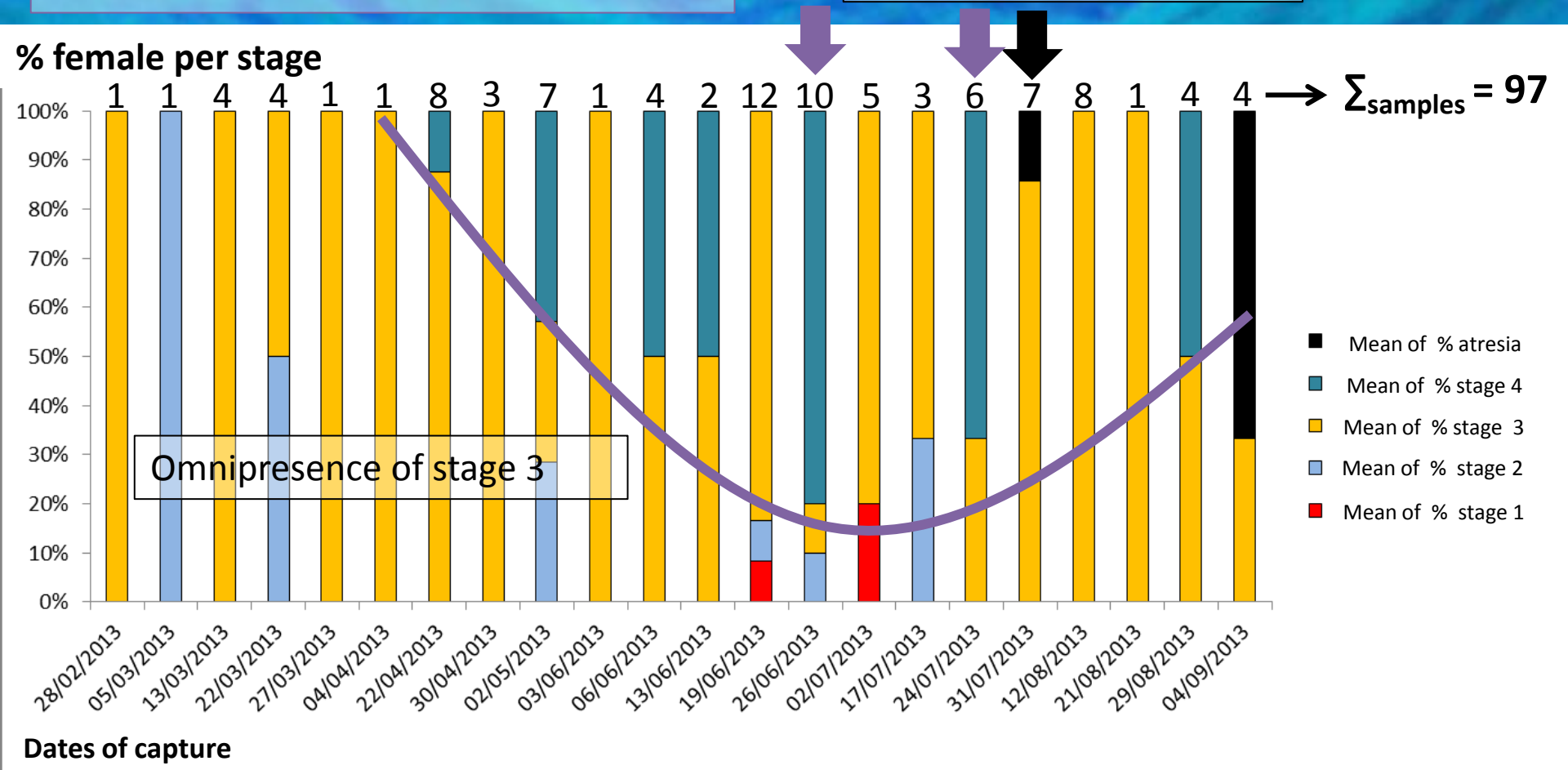
GSI increases with the individuals size: **more individuals are big, more its gonads (so its fecondity) are proportionally important in size.**

Periods of reproduction

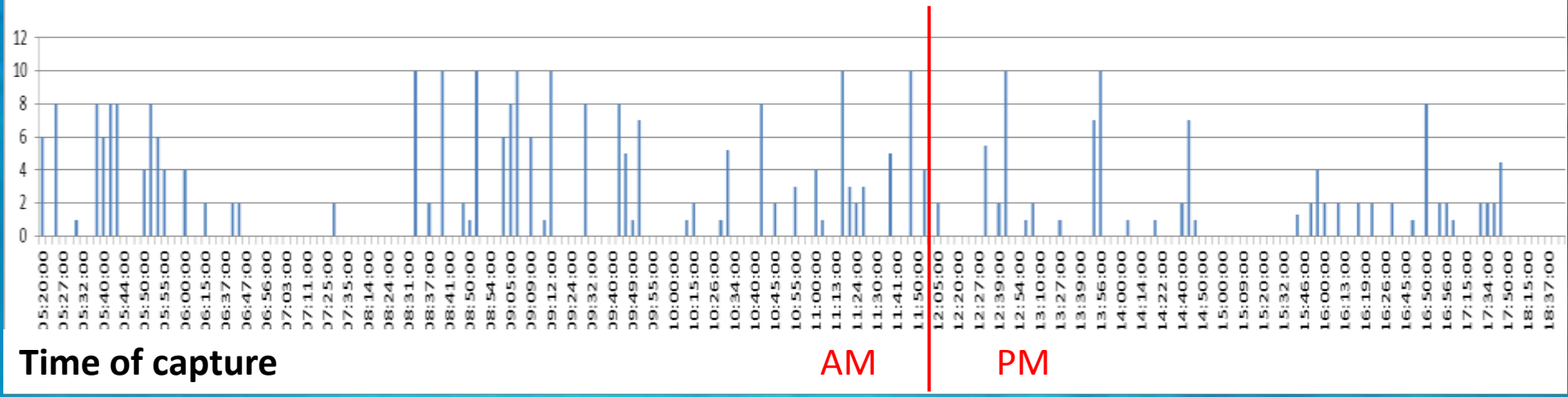
Few samples (13.5 individuals per sea trip in average) , results presented below only show trends and orientations for further studies.

Mature females were found between April and September (**peak end of June and end of July**)

First appearance of atresia at the end of July



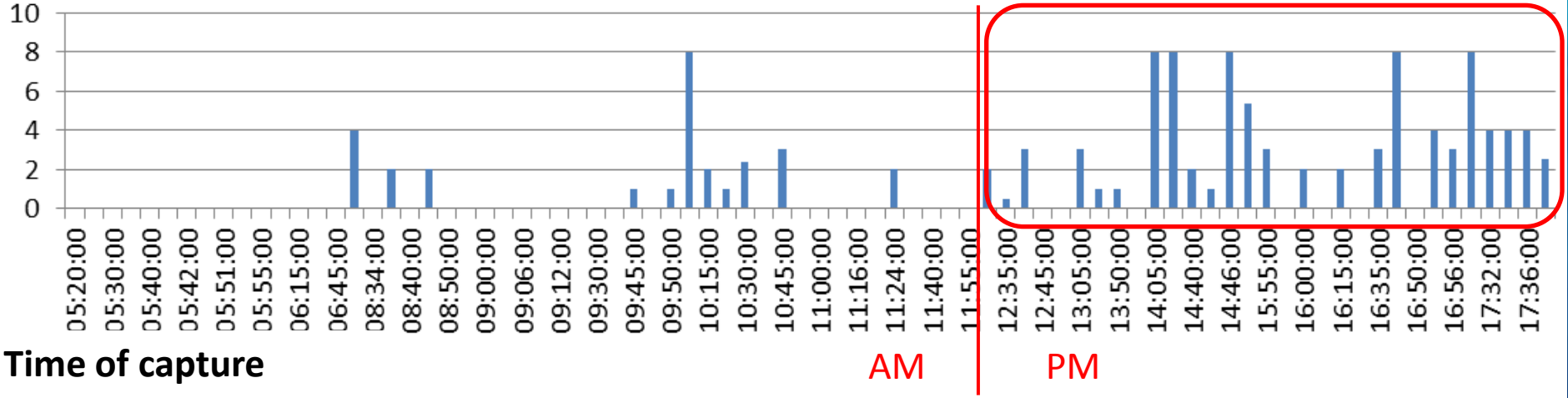
Number of females at stage 3



Time of capture

AM PM

Number of females at stage 4



Time of capture

AM PM

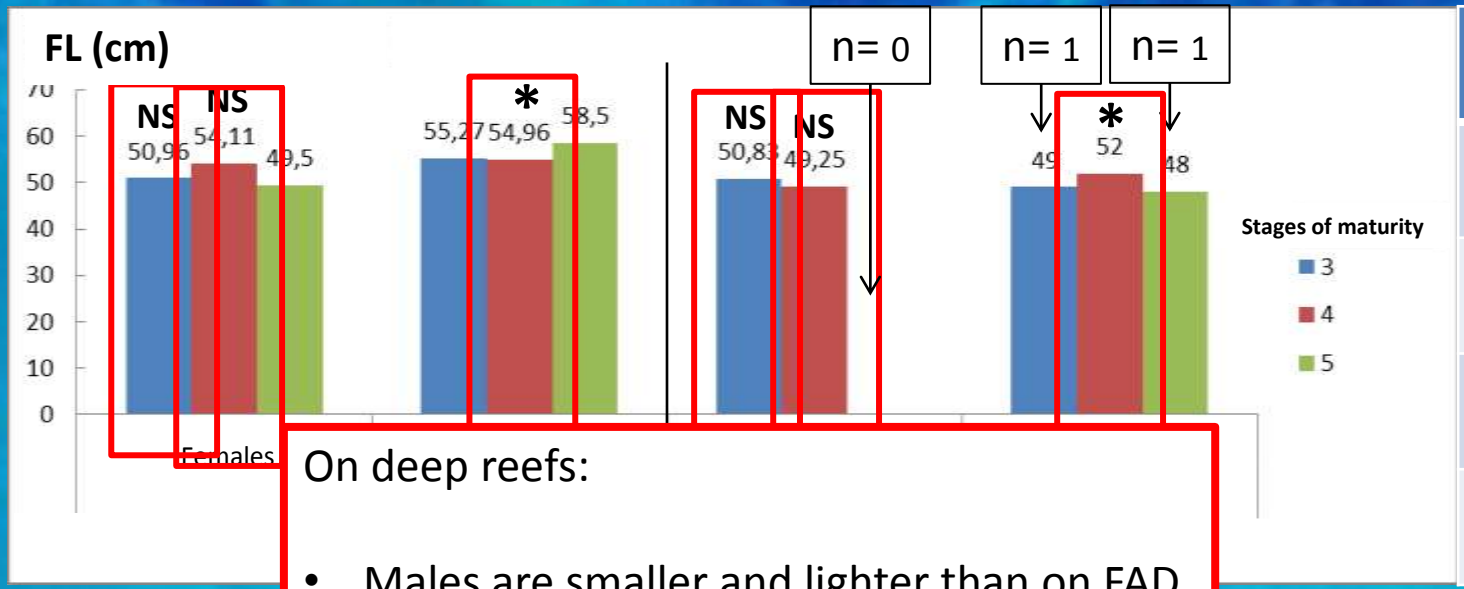
Mature females at the end of the day: nocturnal clutch during some hours

Sites of reproduction

Few samples (13.5 individuals per sea trip in average) , results presented below only show trends and orientations for further studies.

FAD vs Deep reef :

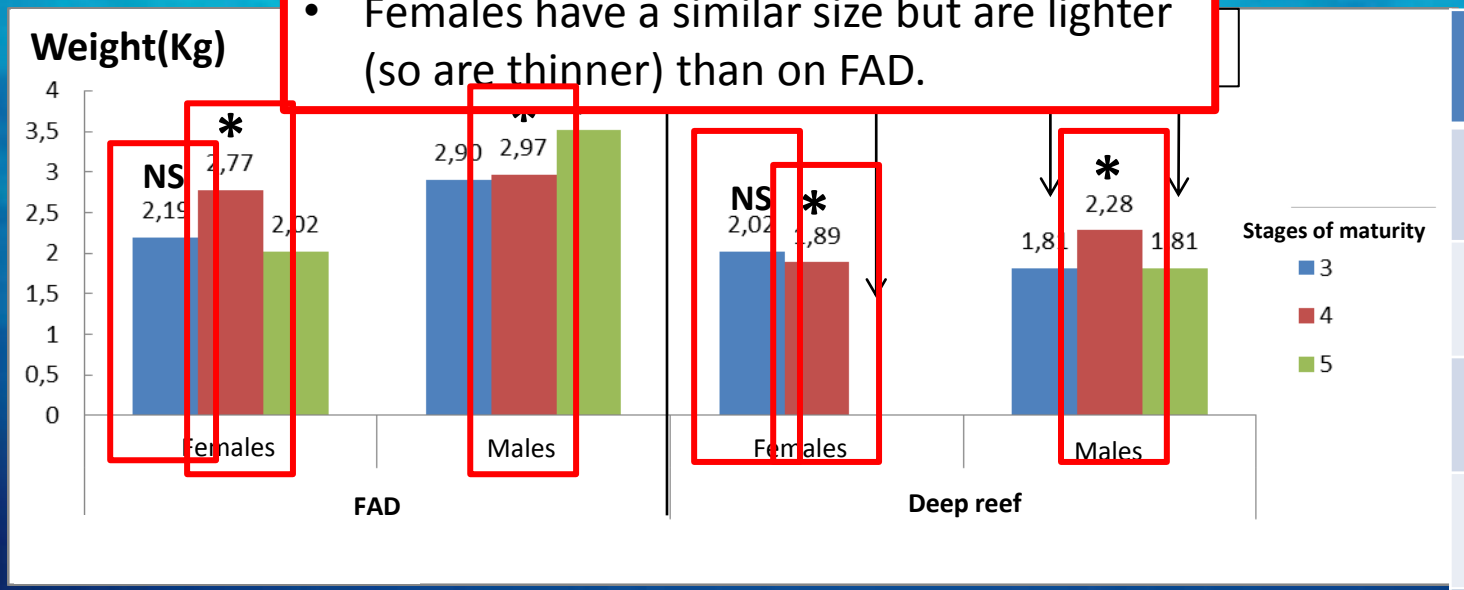
∗ = p value < 0,05



On deep reefs:

- Males are smaller and lighter than on FAD
- Females have a similar size but are lighter (so are thinner) than on FAD.

FAD vs D.reef	♀	♂
Stage 3	=	?
Stage 4	=	≠
Stage 5	?	?



FAD vs D.reef	♀	♂
Stage 3	=	?
Stage 4	≠	≠
Stage 5	?	?

Recommendations :

- **Collect more samples to increase the database and the statistical power of results;**
- **Describe an indice to determine the stages of maturity of the gonads based on pictures observations only;**
- **Realize a long-term sampling (2-3 years) to clearly identify the period of reproduction (peak of clutch) and describe eventual interannual variations in clutch.**

Thank you for your attention