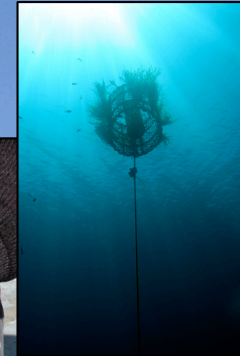


# Long term spatial and temporal variability in catches of common spiny lobster *Palinurus elephas* (Fabricius, 1787) in Corsica (NW Mediterranean): fisheries trends, biological trends or both?



Anthony PERE, Adèle ASTROU, Michela PATRISSI,  
Loïc MICHEL, Corinne PELAPRAT



10th ICWL, May 18, 2014





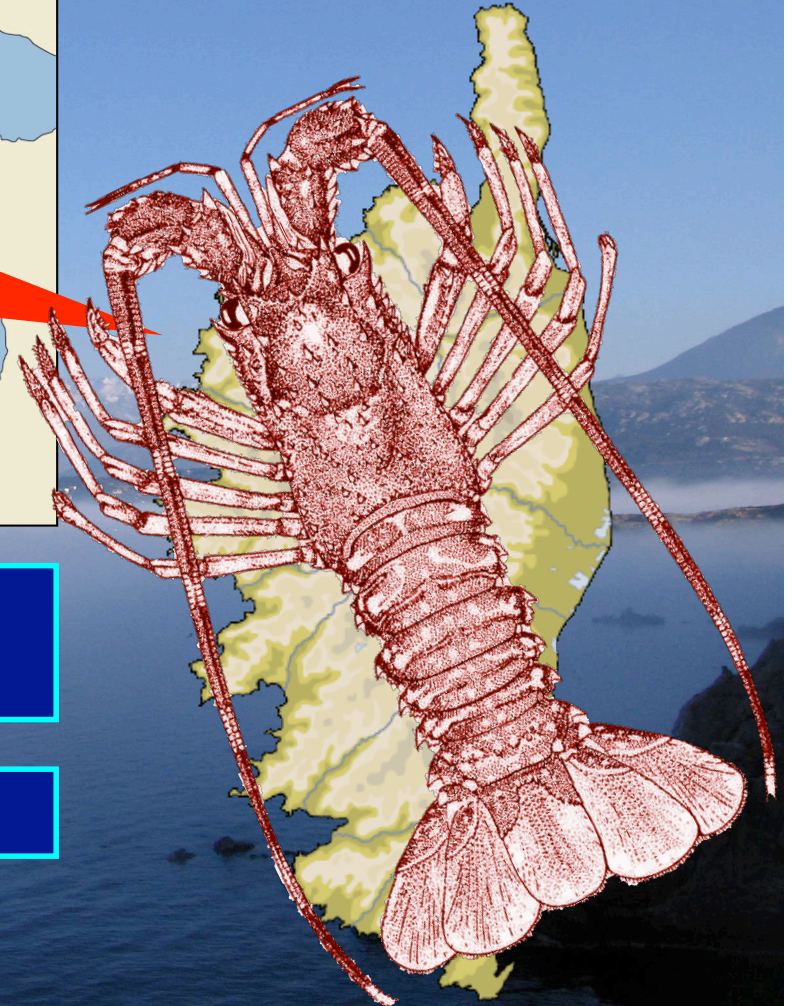
Context and goal of the study

# Corsica : a small-scale fishery



- ↪ 1 000 km of coastline
- ↪ Many rocky bottoms

↪ Target species : *Palinurus elephas*





Context and goal of the study

# Corsica : a small-scale fishery

191 small boats



- ↪ Boat size = 8 meters
- ↪ Capitaine = owner
- ↪ 1 or 2 fishermen per boat
- ↪ Duration of a trip = 7 hours
- ↪ A coastal fishery
- ↪ ...

9 trawlers

- ↪ On the eastern coast
- ↪ Target species : Norway lobster





Context and goal of the study

# Aim of the study

↪ A decrease since the 1950's

Understand if this decline :

↪ could be linked to overfishing

↪ or if other biological, ecological or climatic factors could explain this population drop



# Contents

↪ Catch and effort reconstruction from 1950 to 2011

↪ Micro-regional analyse from 2004 to 2011

↪ Biological and ecological study for spiny lobster & perspectives





Catch and effort reconstruction from 1950 to 2011

# Data source

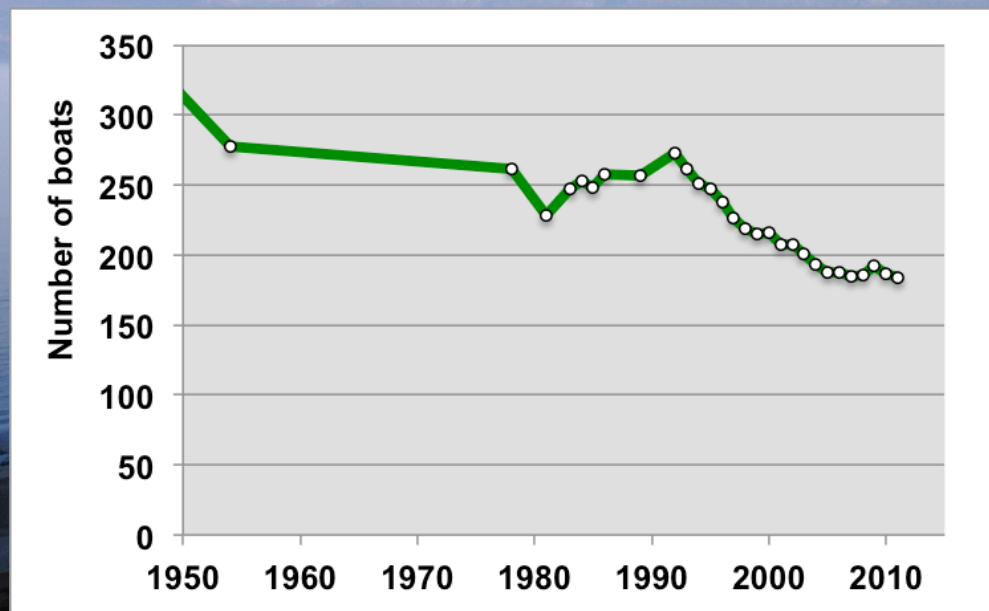
- ↪ Official data from French Administration
- ↪ Grey literature, confidentials reports
- ↪ Published literature
- ↪ Field data





Catch and effort reconstruction from 1950 to 2011

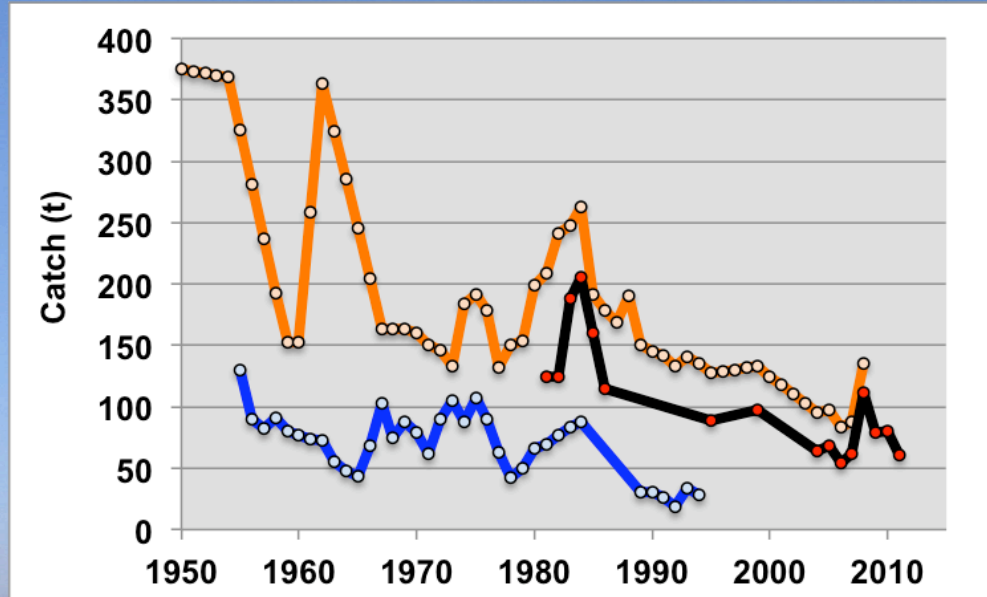
# Fishing effort evolution (number of boats)





## Catch and effort reconstruction from 1950 to 2011

# Evolution of catch



Data source :

↪ Blue: officials statistics

↪ Black: Corsican studies

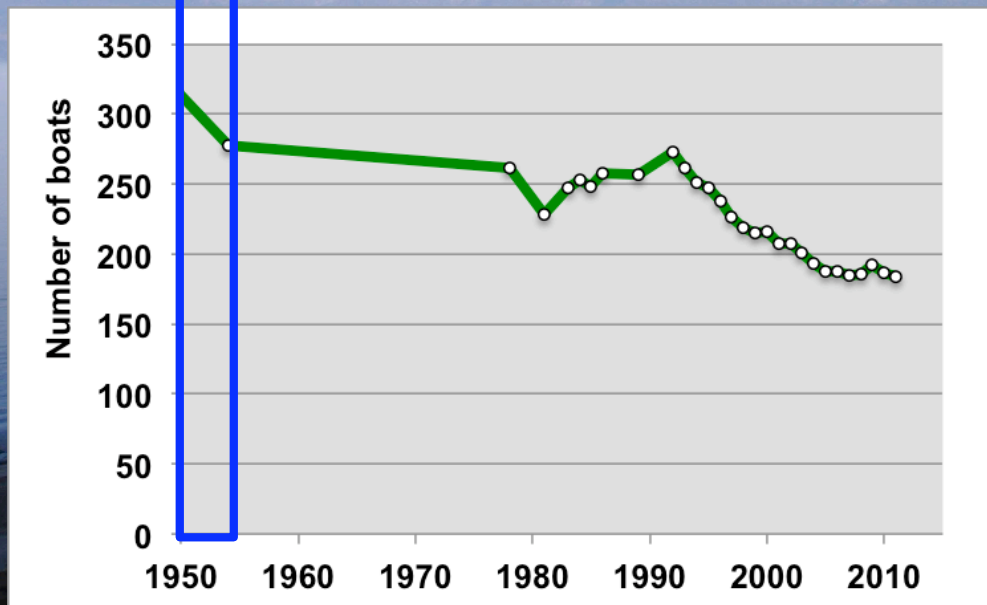
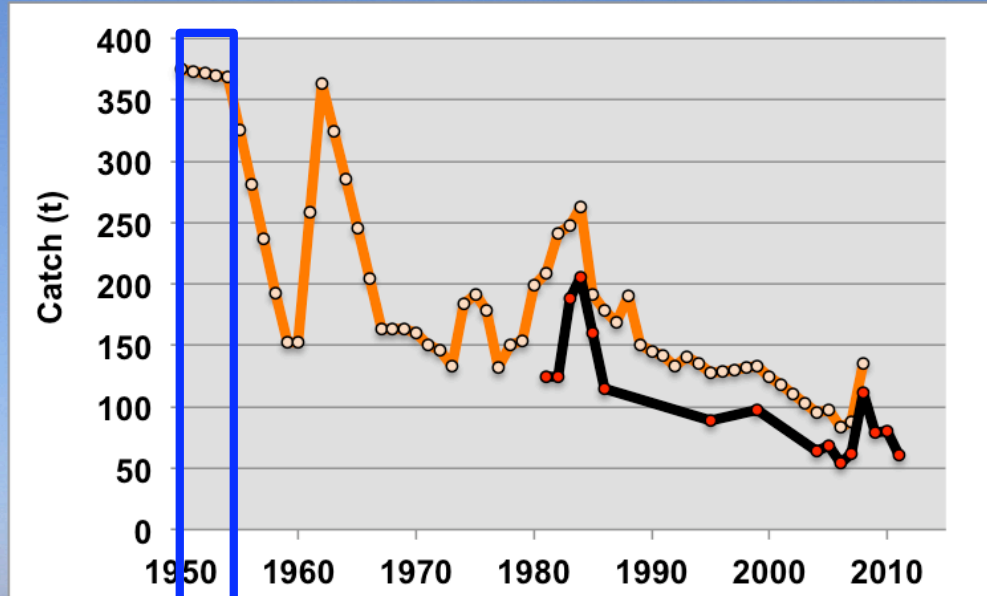
↪ Orange: reconstruction by Pauly's team



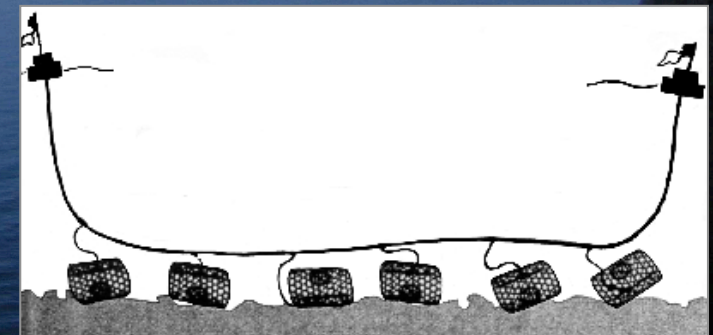
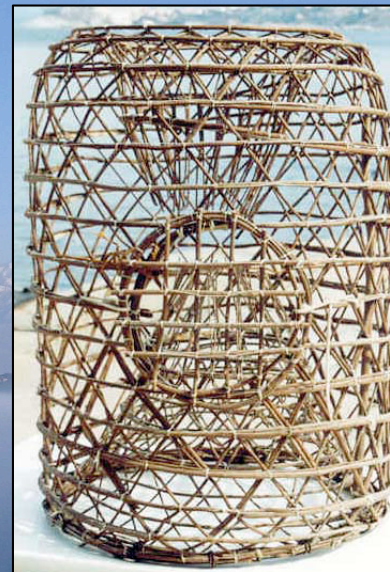


## Catch and effort reconstruction from 1950 to 2011

# The 1950's



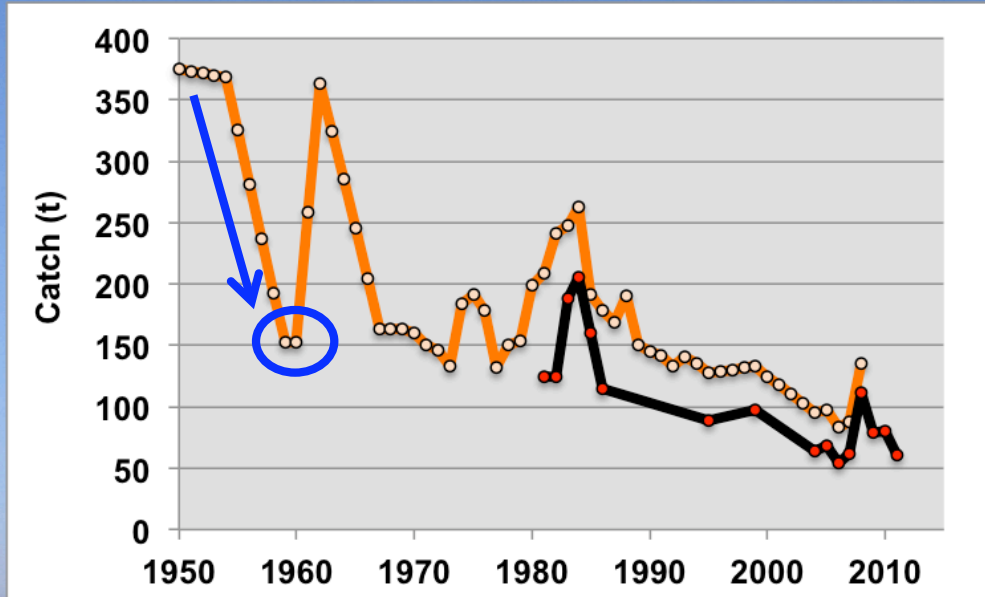
- ↪ 1954 : 278 fishing boats
- ↪ Estimation of catch > 350 t
- ↪ Trap fishing



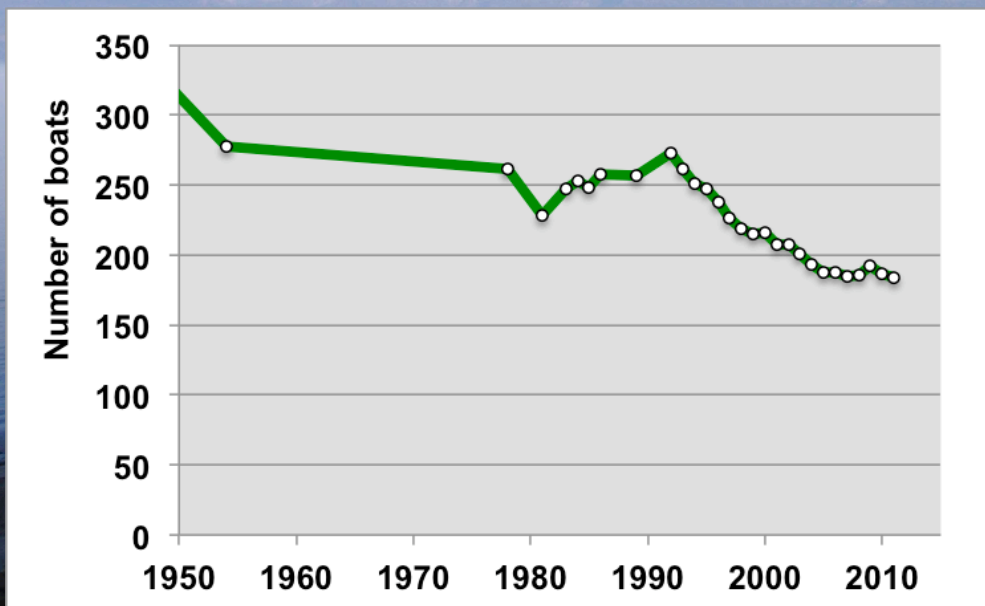


## Catch and effort reconstruction from 1950 to 2011

# The 1950's



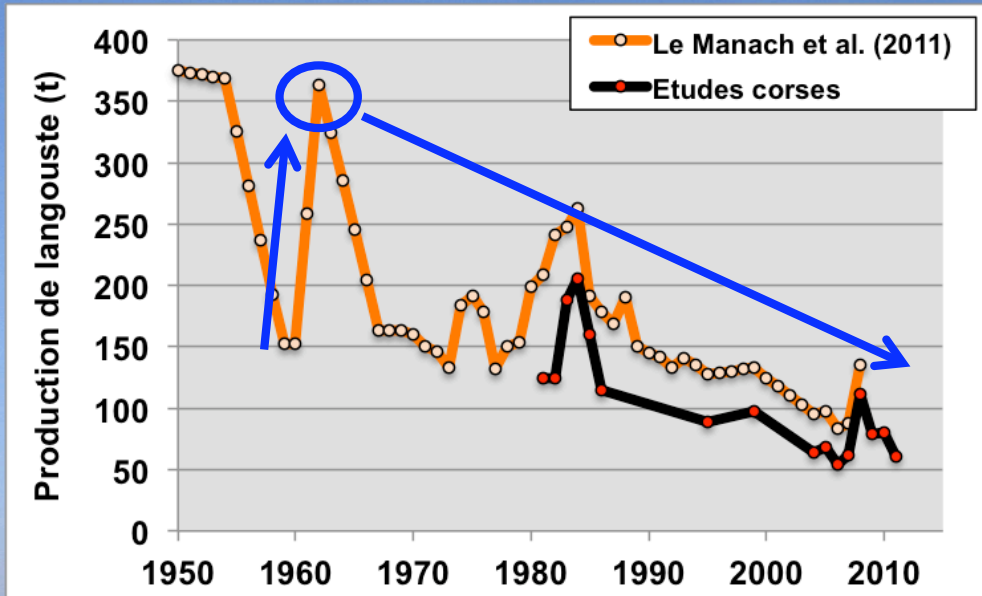
- ↪ 1954 : collapse of catch
- ↪ 1959-60 : 150 t landing
- ↪ Decrease of trap use
- ↪ Generalization of nylon mesh fishing nets





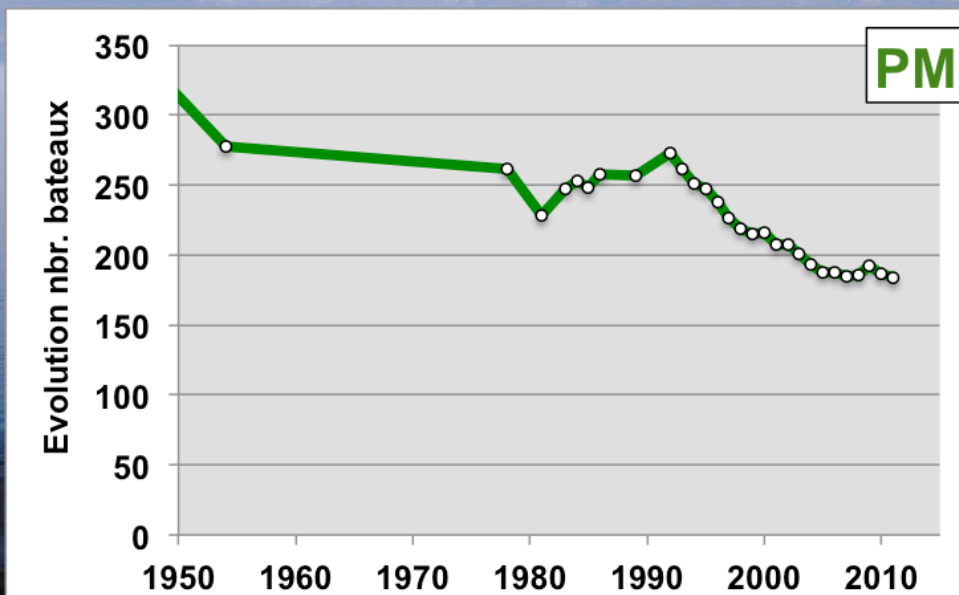
# Catch and effort reconstruction from 1950 to 2011

## The 1960's



- ↪ 1954 : collapse of catch
- ↪ 1959-60 : 150 t landing
- ↪ Abandon of trap
- ↪ Generalization of fishing net in nylon

- ↪ 1965 : 350 t landing...
- ↪ Follow by a rapid decrease
- ↪ Same trend since the 1960's





Catch and effort reconstruction from 1950 to 2011

# Management strategies

8 marine sanctuarises

Fishing cloture (October to February)

Scandola MPA

Bouches de Bonifacio MPA

Effort limitation (5 km of net)

MLS = 24 cm TL

Prohibition of underwater lobster fishing

MLS = 90 mm CL

1960

1970

1980

1990

2000

2010

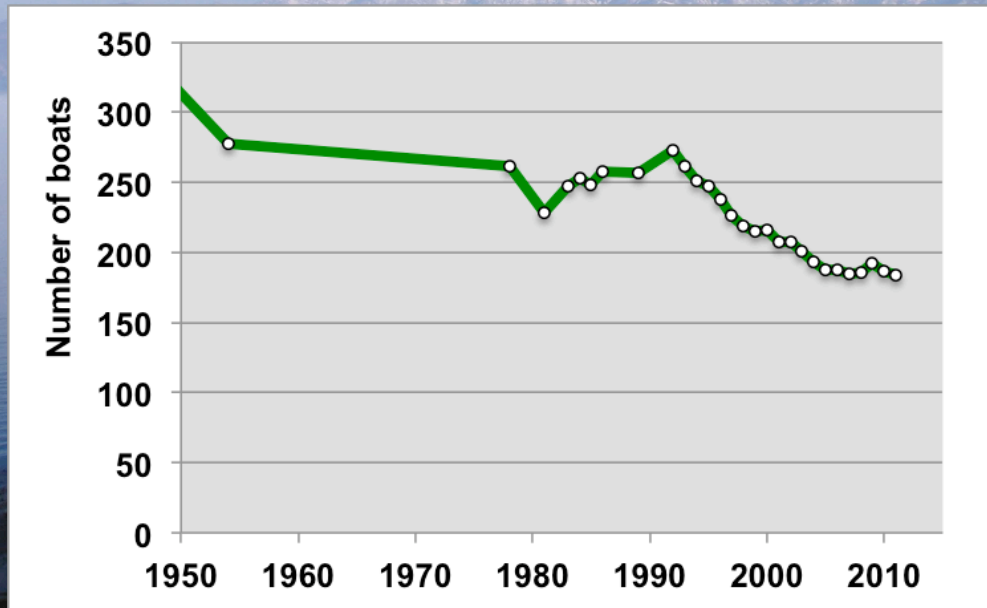


Catch and effort reconstruction from 1950 to 2011

# Fishery evolution

An obvious decrease of the resource, in spite of management measures  
→ increase of fishing effort ?

↪ Number of boats



Declined by 1/3 since 1992



# Fishery evolution

An obvious decrease of the resource, in spite of management measures  
→ increase of fishing effort ?

↪ Number of boats

-

↪ Number of nets

=





# Fishery evolution

An obvious decrease of the resource, in spite of management measures  
→ increase of fishing effort ?

↪ Number of boats

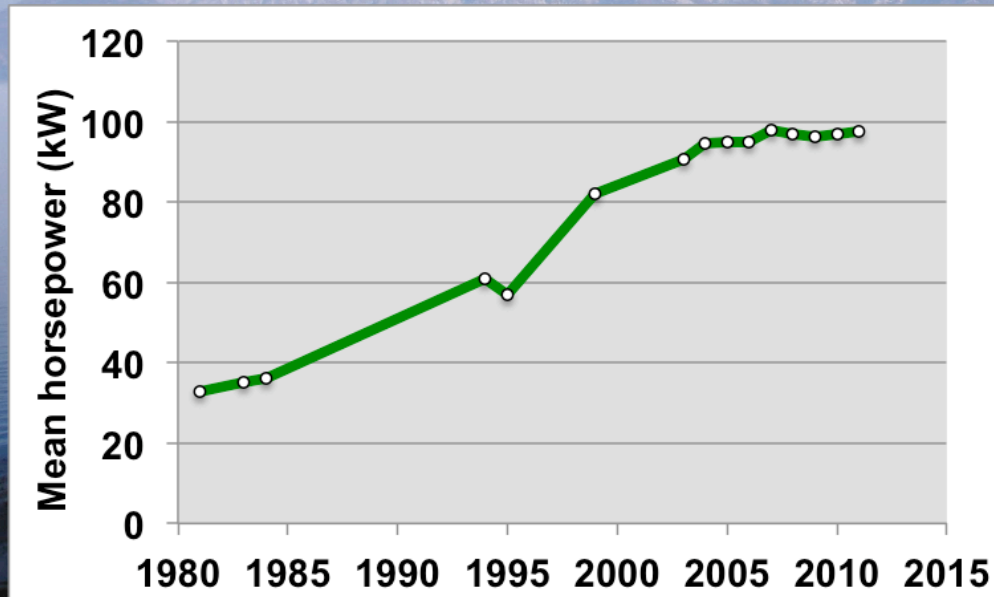
-

↪ Number of nets

=

↪ Horsepower

+



↪ Mean horsepower : 3X higher in 30 years  
↪ New engines on old vessels



Catch and effort reconstruction from 1950 to 2011

# Fishery evolution

An obvious decrease of the resource, in spite of management measures  
→ increase of fishing effort ?

↪ Number of boats



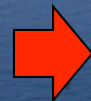
↪ Number of nets



↪ Horsepower



↪ Technical and technological improvements







# Fishery evolution

An obvious decrease of the resource, in spite of management measures  
→ increase of fishing effort ?

↪ Number of boats

-

↪ Number of nets

=

↪ Horsepower

+

↪ Technical and technological improvements

+

↪ Fishing gears improvement

+

A Corsican problem ?

↪ A parallel evolution in Mediterranean Sea

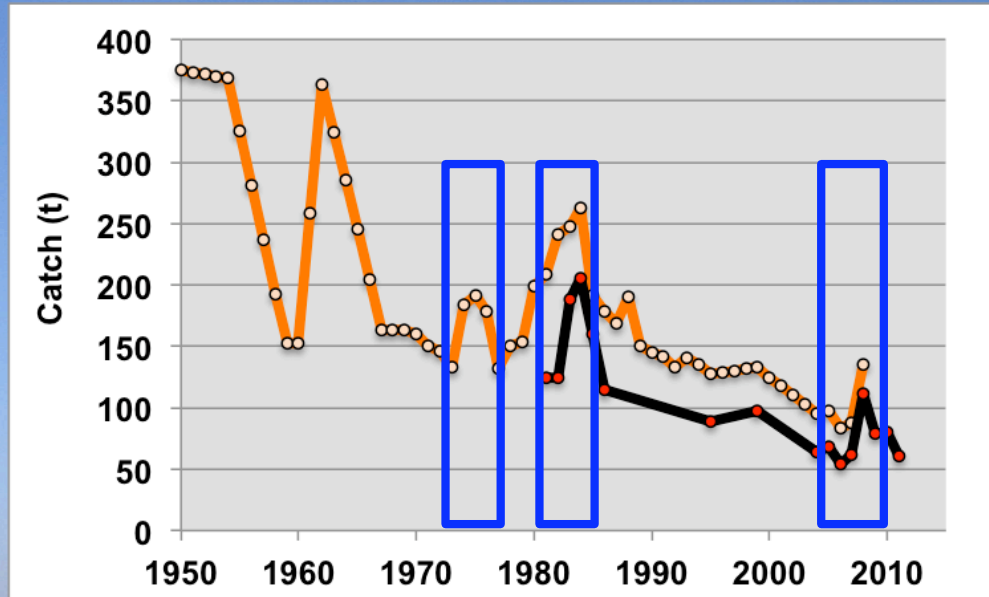
↪ Apparition of nylon nets in Italia, Sardinia, Sicily an Balearic Island in the 1950's

↪ Resource decrease



## Catch and effort reconstruction from 1950 to 2011

# Fishery evolution



↪ An important capture decrease since the 1950's, with occasionally high productions



↪ Need for a more detailed view

# Contents

↪ Catch and effort reconstruction from 1950 to 2011

↪ *Micro-regional analyse from 2004 to 2011*

↪ Biological and ecological study for spiny lobster & perspectives

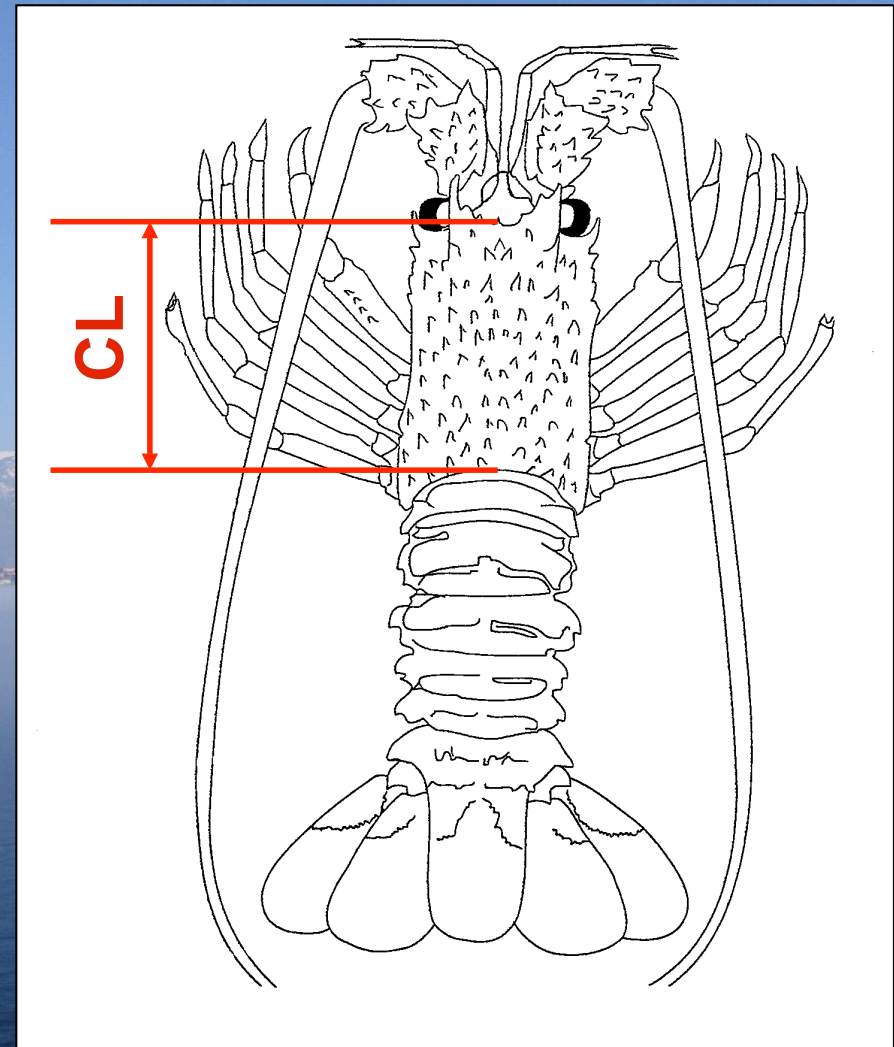




Micro-regional analyse from 2004 to 2011

# Data collection

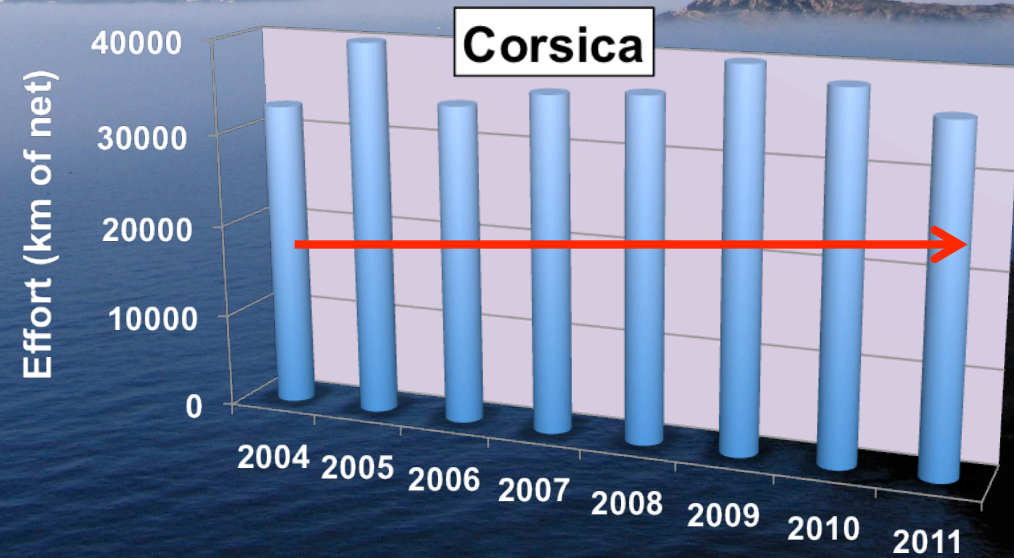
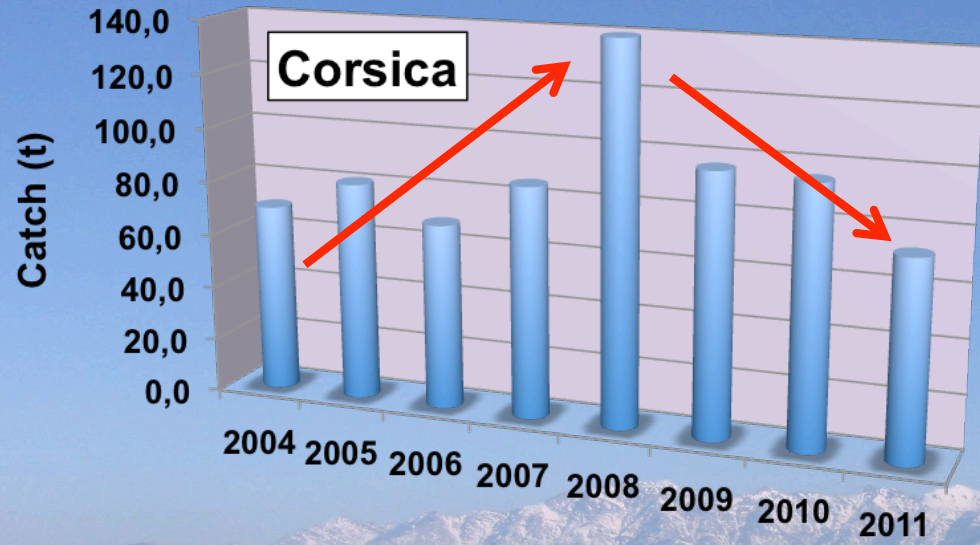
- ↪ On-board monitoring program
- ↪ 4 observers around the island
- ↪ Data:
  - × net length
  - × mesh size
  - × depth
  - × soak time
  - × biological data





## Micro-regional analyse from 2004 to 2011

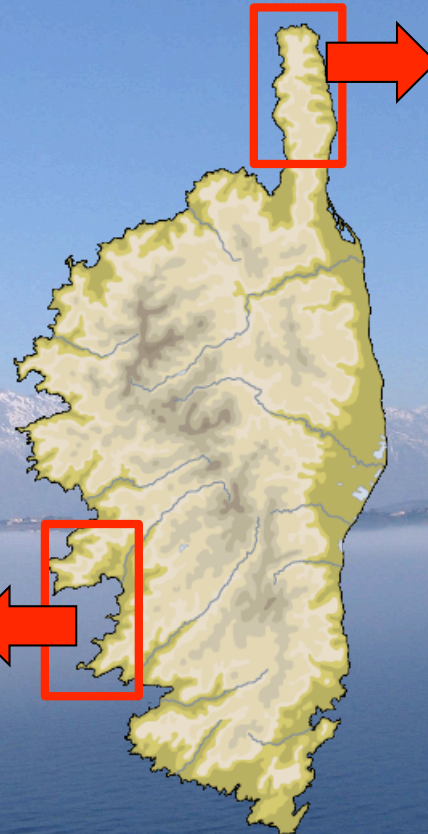
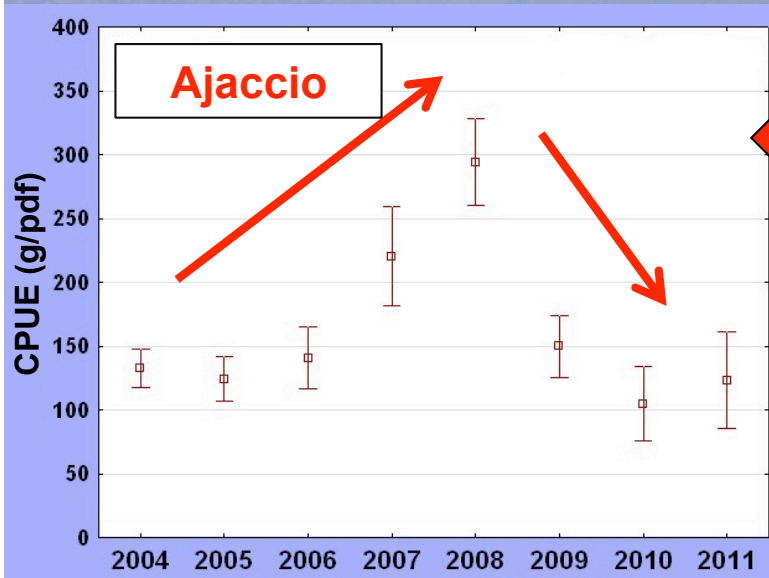
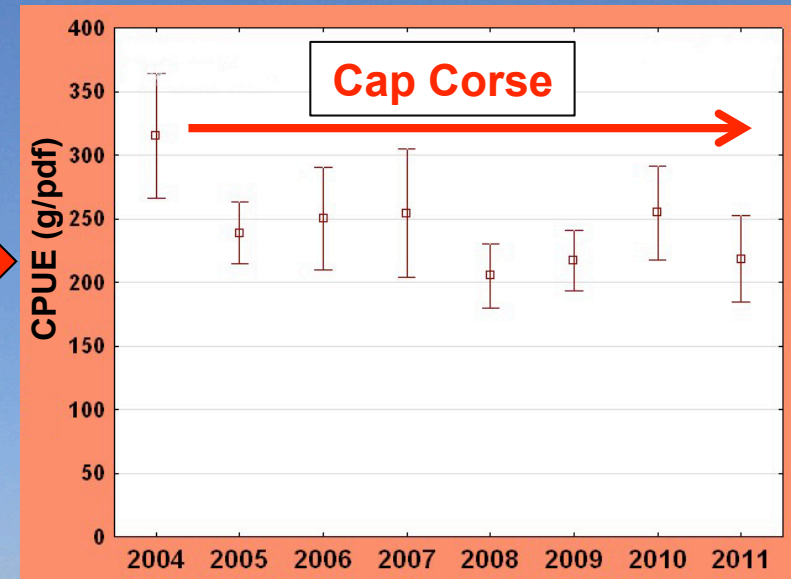
# Catch and effort





# Micro-regional analyse from 2004 to 2011

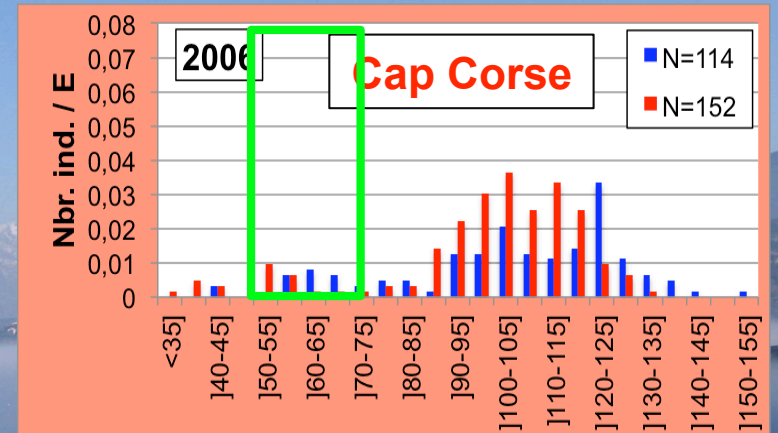
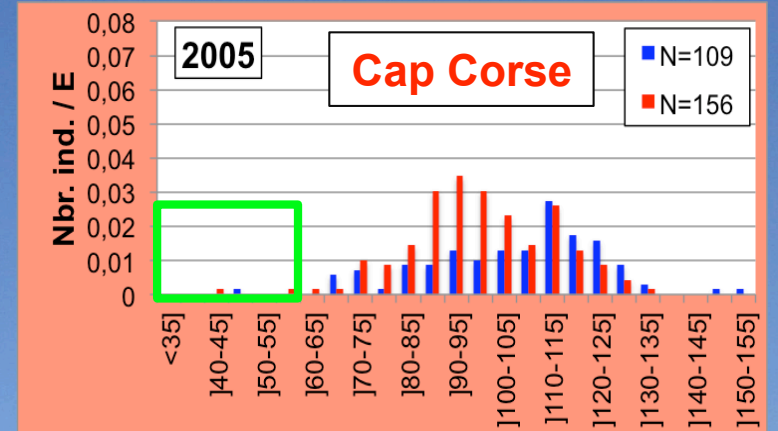
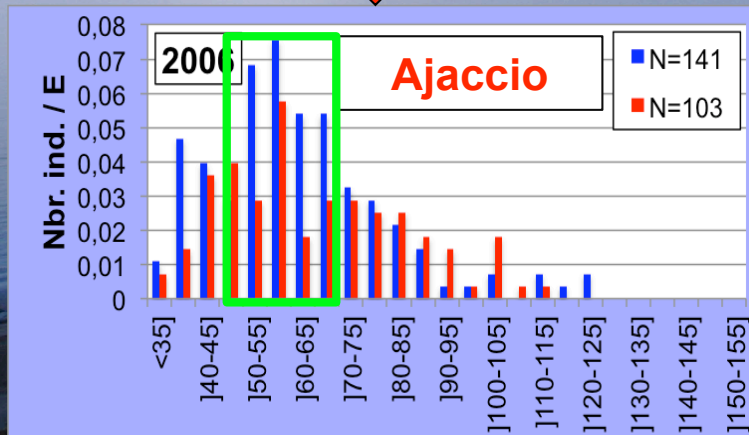
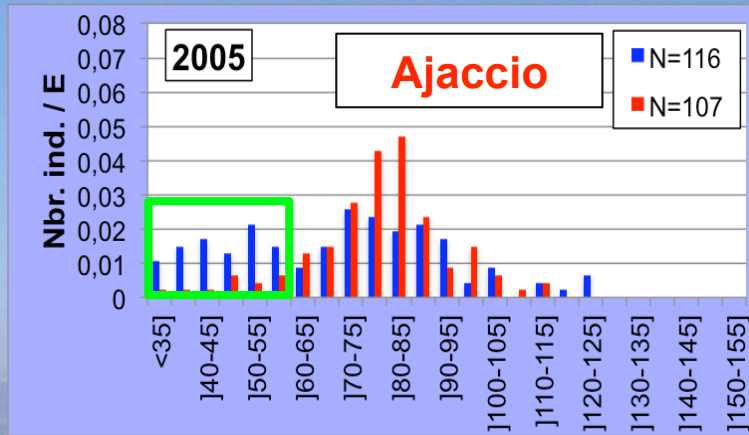
## CPUE





# Micro-regional analyse from 2004 to 2011

## Size distribution





Micro-regional analyse from 2004 to 2011

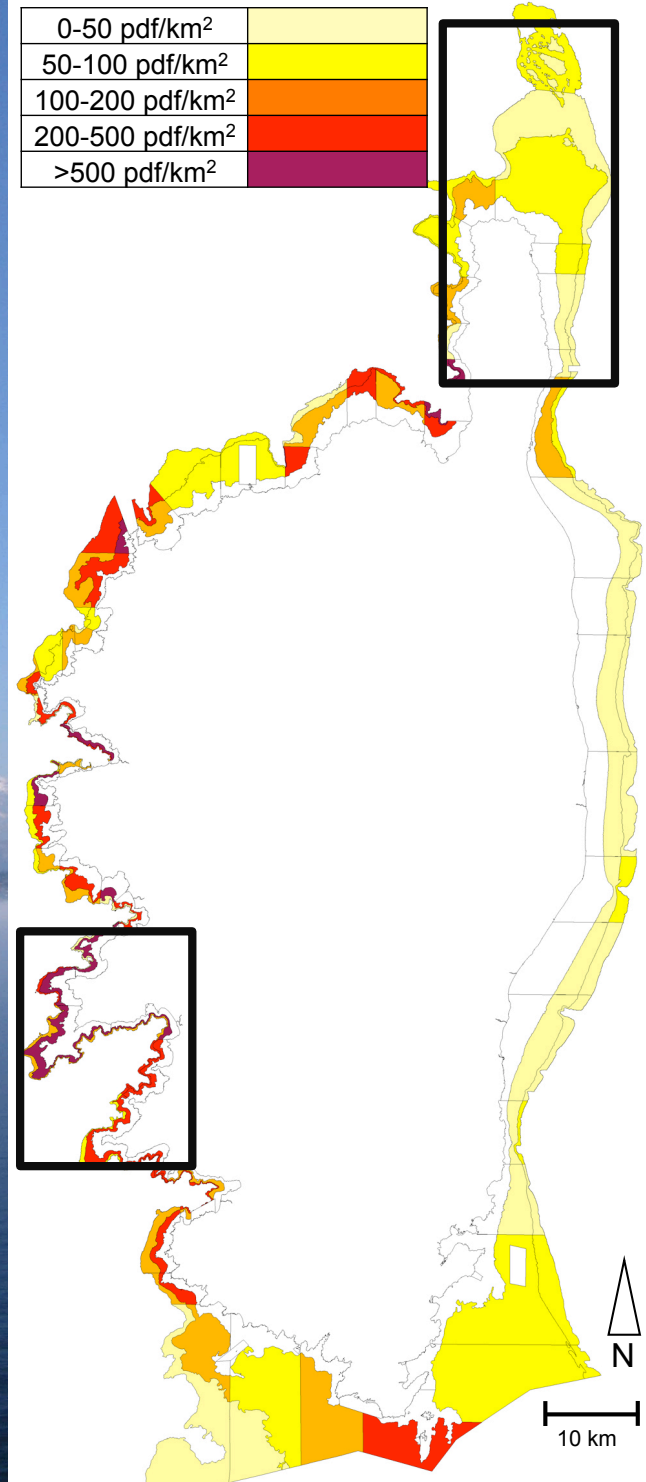
# Distribution of fishing effort

Important effort in Ajaccio

Smaller size in Ajaccio

However, an important recruitment event in Ajaccio

Necessity to integrate **biological**, **ecological** and **oceanographical** parameters





# Contents

↪ Catch and effort reconstruction from 1950 to 2011

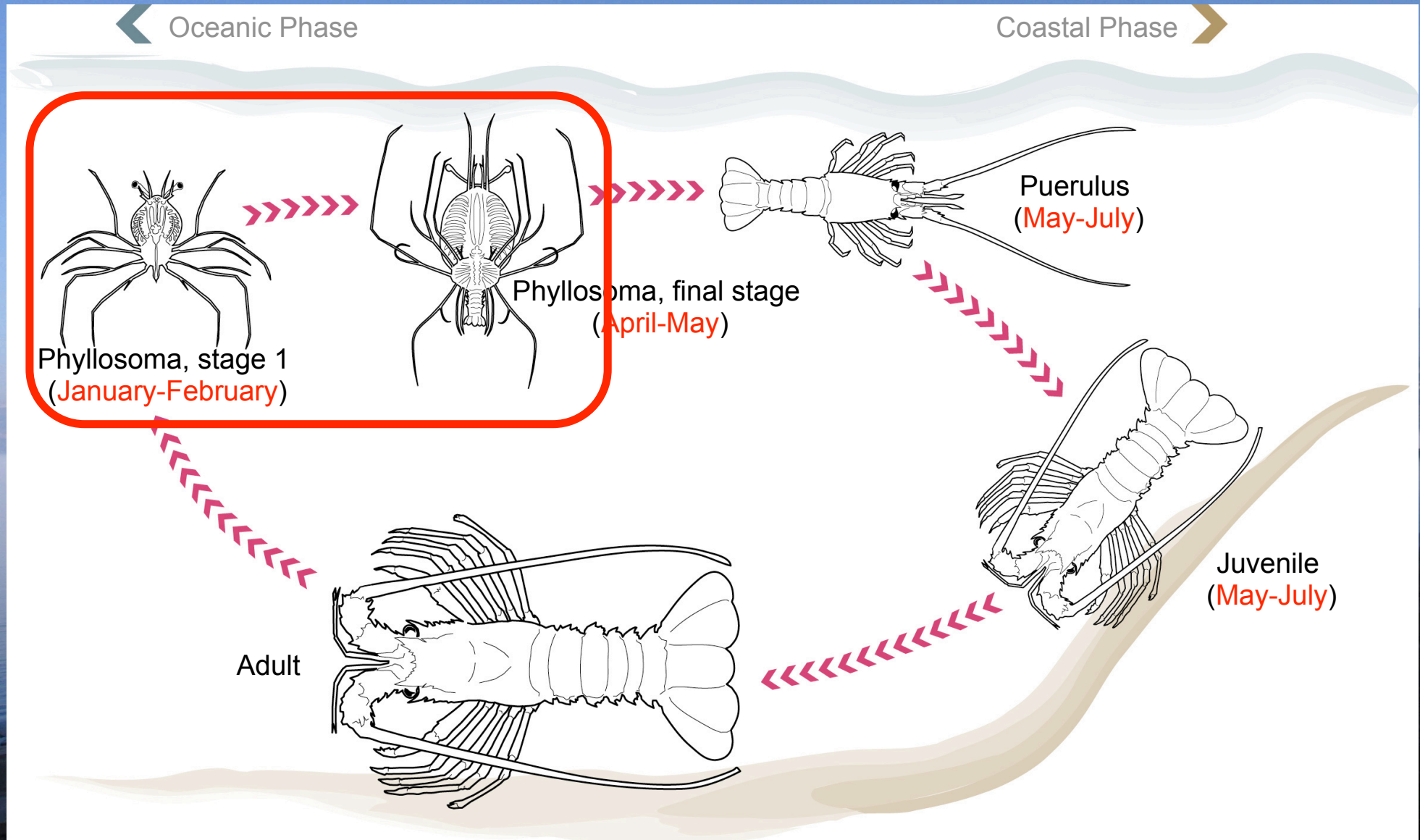
↪ Micro-regional analyse from 2004 to 2011

↪ Biological and ecological study for spiny lobster & perspectives



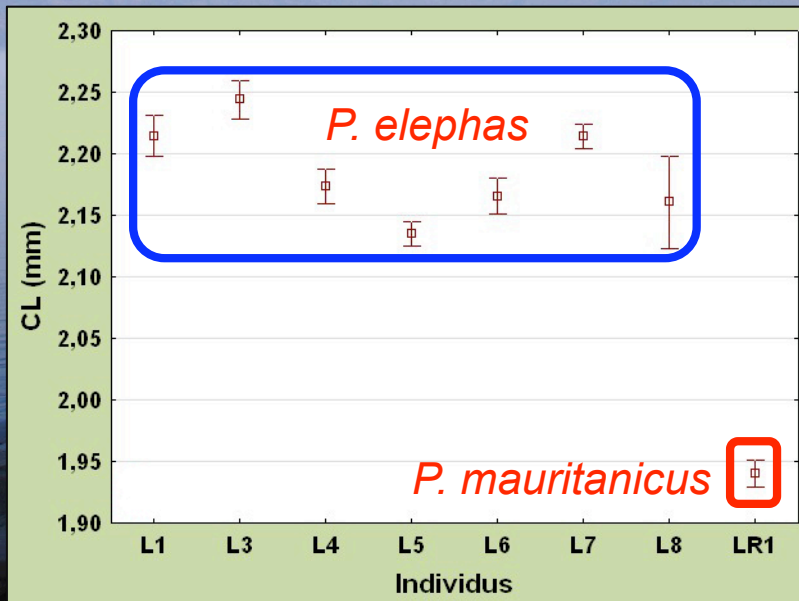
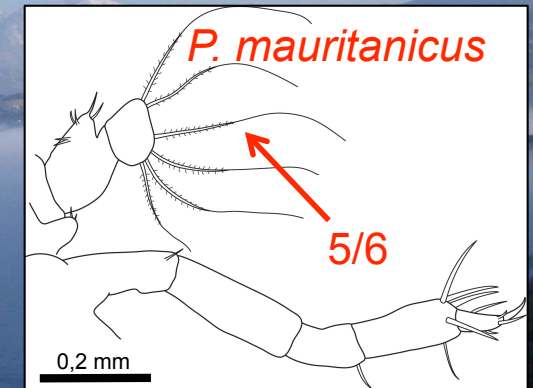
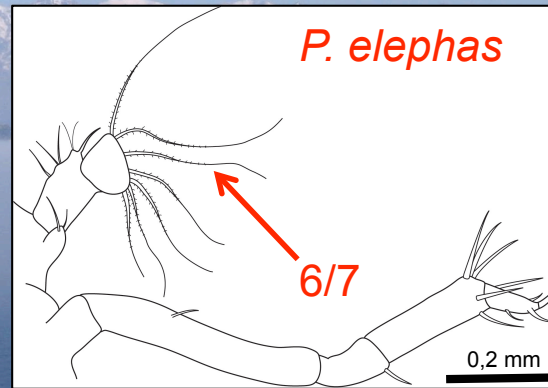
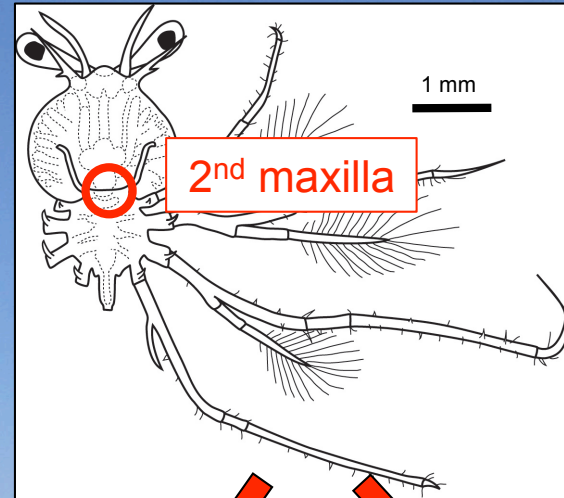
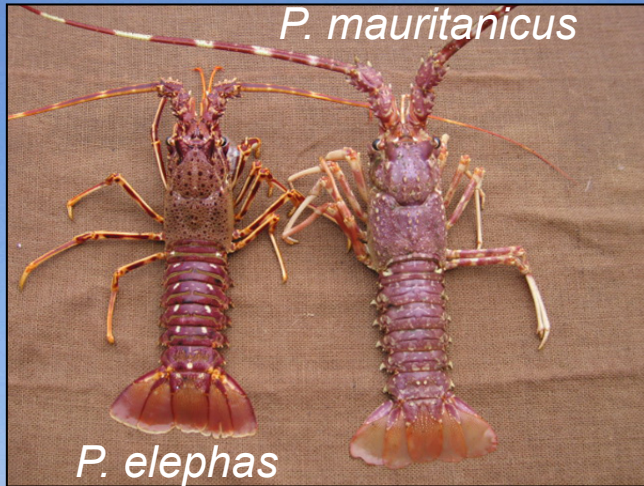


# Life history





# Stage 1 distinction



↪ Difference on 2<sup>nd</sup> maxilla

↪ Difference on phyllosoma size

↪ No data for later stage

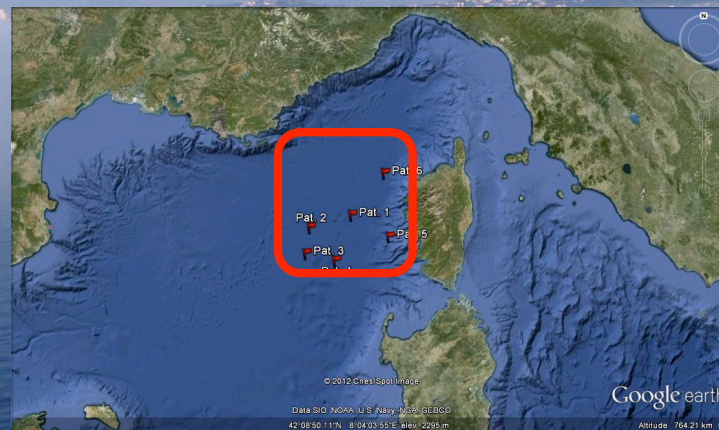
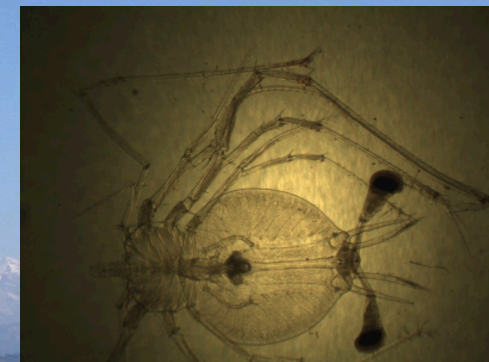
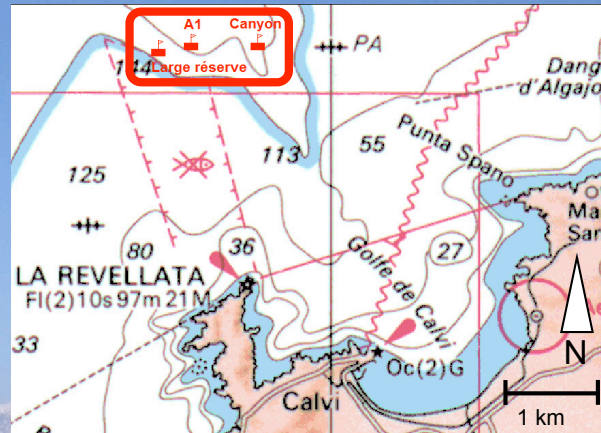


## Biological and ecological study for spiny lobster & perspectives

# Distribution of phyllosoma

Western coast:

- ↳ Early stages were caught
- ↳ 20-30 meters deep



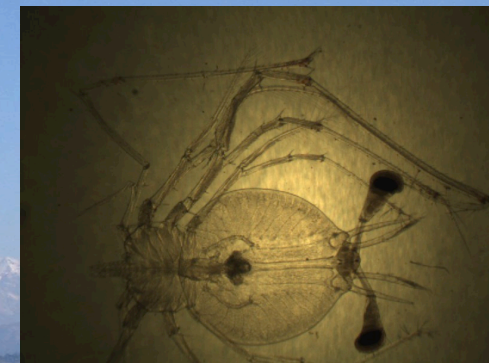
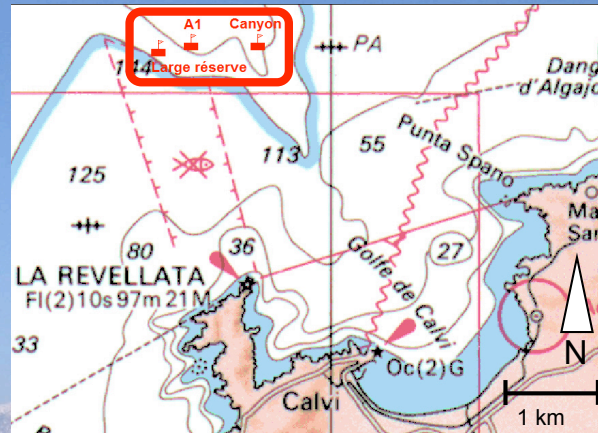


## Biological and ecological study for spiny lobster & perspectives

# Distribution of phyllosoma

Western coast:

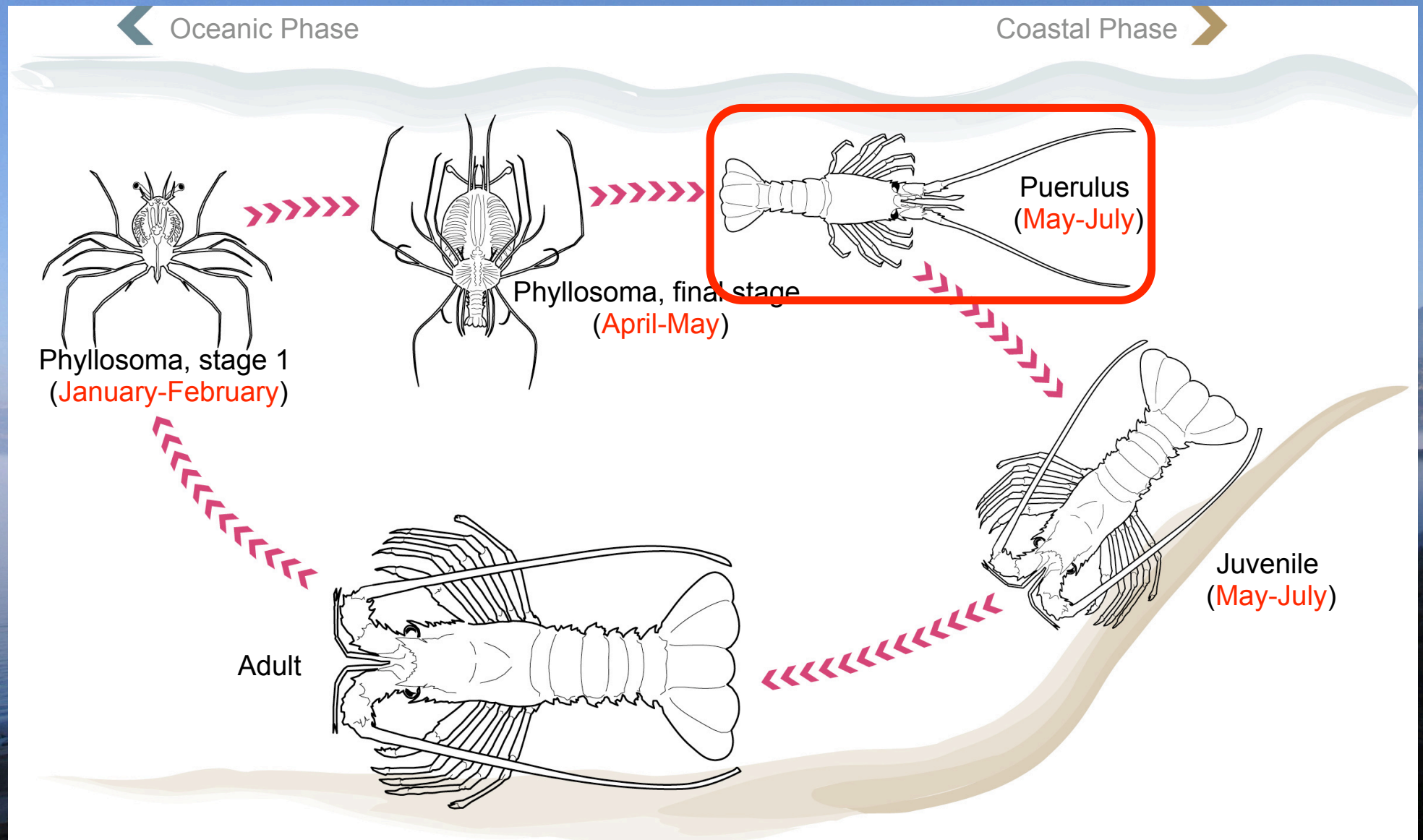
- ↪ Early stages were caught
- ↪ 20-30 meters deep



↪ Failure... we have to persist !



# Life history





Biological and ecological study for spiny lobster & perspectives

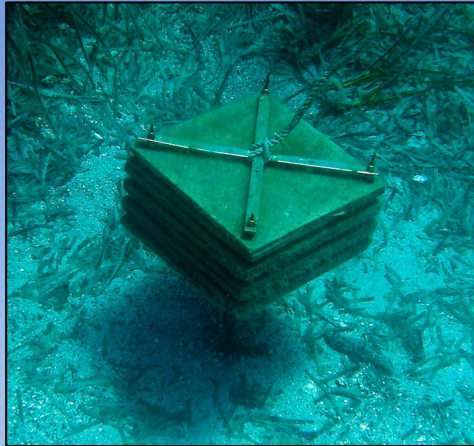
# Puerulus collectors



- ↪ 2008 to 2011
- ↪ 14 sites
- ↪ Different substrates & depths



# Puerulus collectors



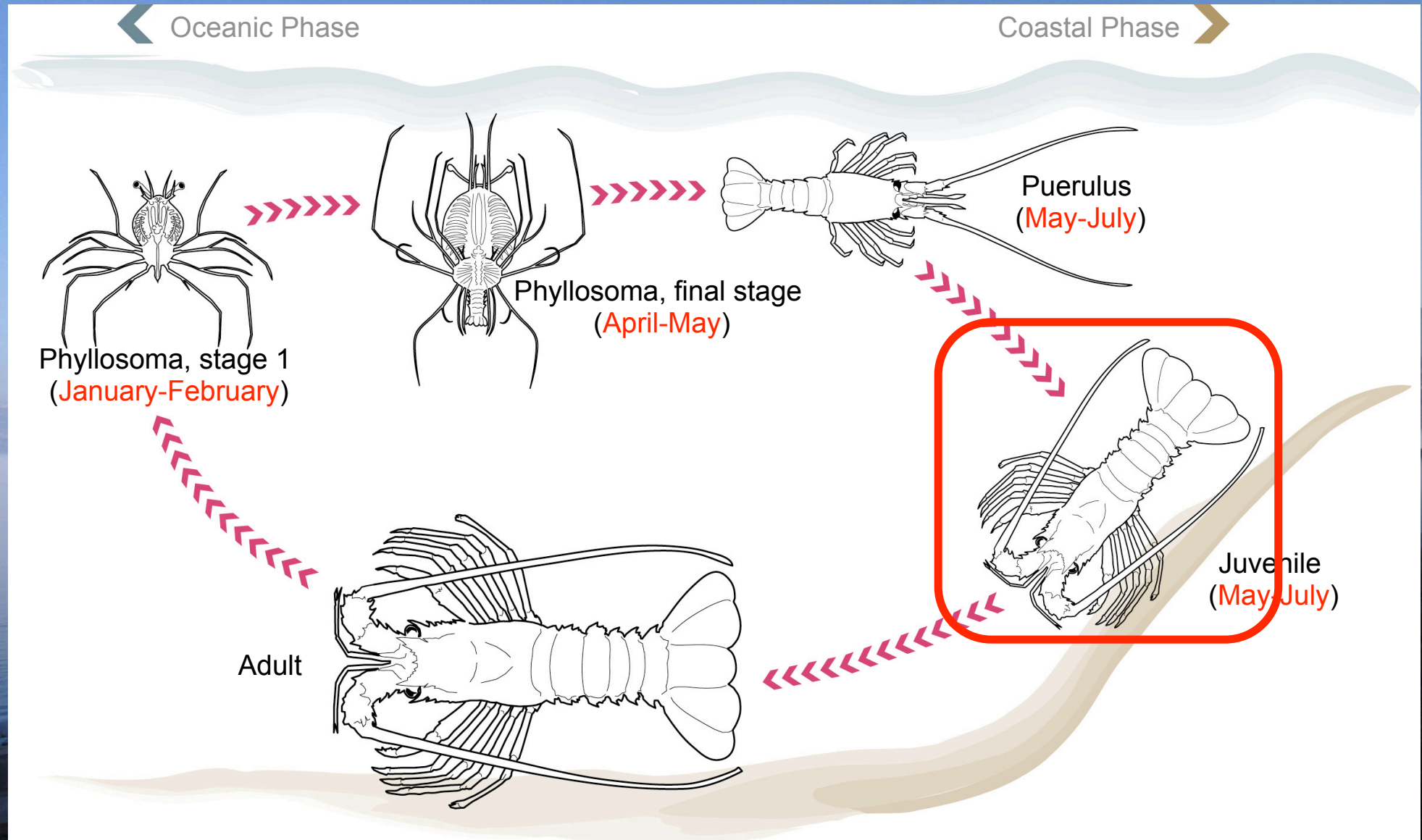
- ↪ 2008 to 2011
- ↪ 14 sites
- ↪ Different substrates & depths

↪ Failure... we have to persist !





# Life history

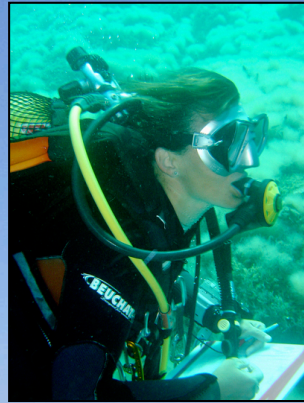




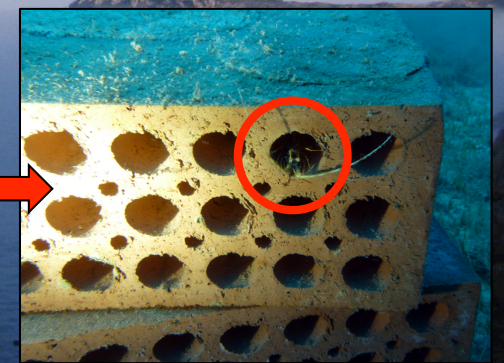
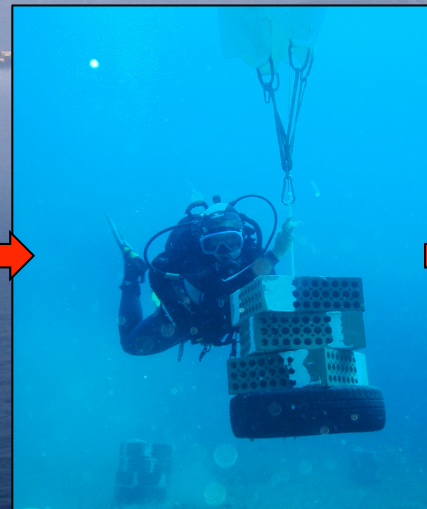
Biological and ecological study for spiny lobster & perspectives

# Recruitment monitoring

↳ Underwater survey – visual census



↳ Collector trial



↳ We have to continue !



# Perspectives

- ↪ Impact of the lobster fishery
- ↪ Importance of oceanographical process and biological, ecological parameters

- ↪ Carry on fishing monitoring
- ↪ Develop biological and ecological research
- ↪ Integrate oceanographical data

- ↪ Larval drift : **where do the « corsican » larvae live ?**
- ↪ **Self-recruitment** or **global** recruitment ?



THANK YOU !

