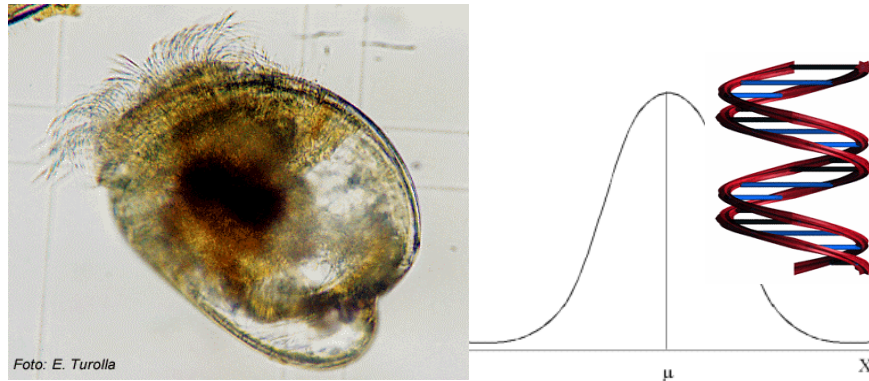


Genetic impact of intensive rearing practices in oyster hatcheries: selective processes and loss of genetic variability



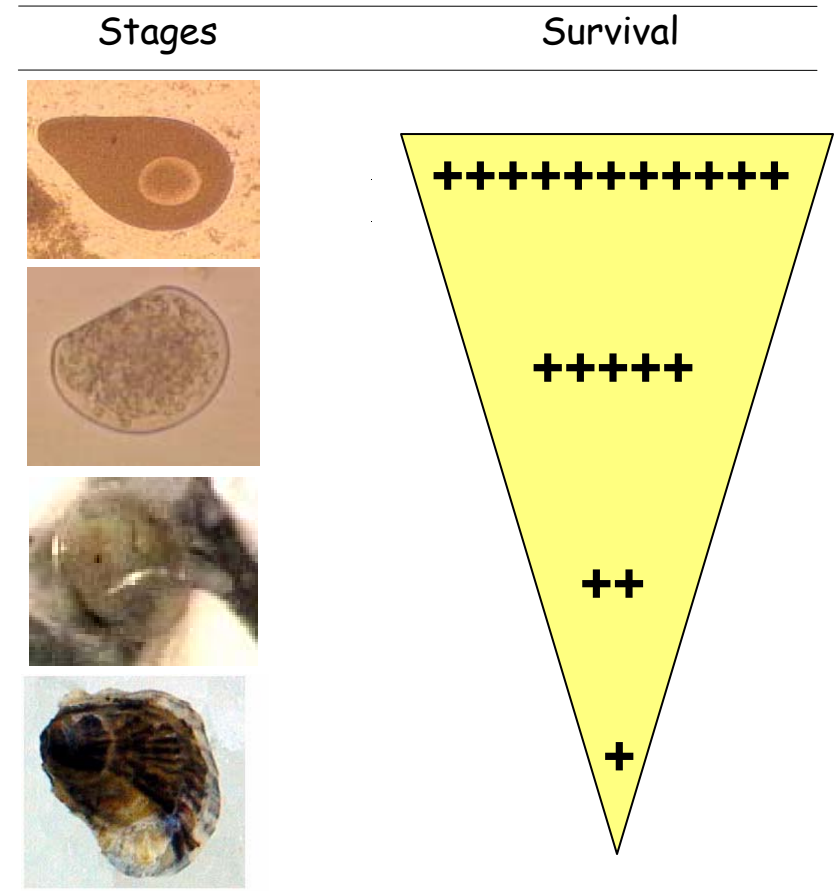
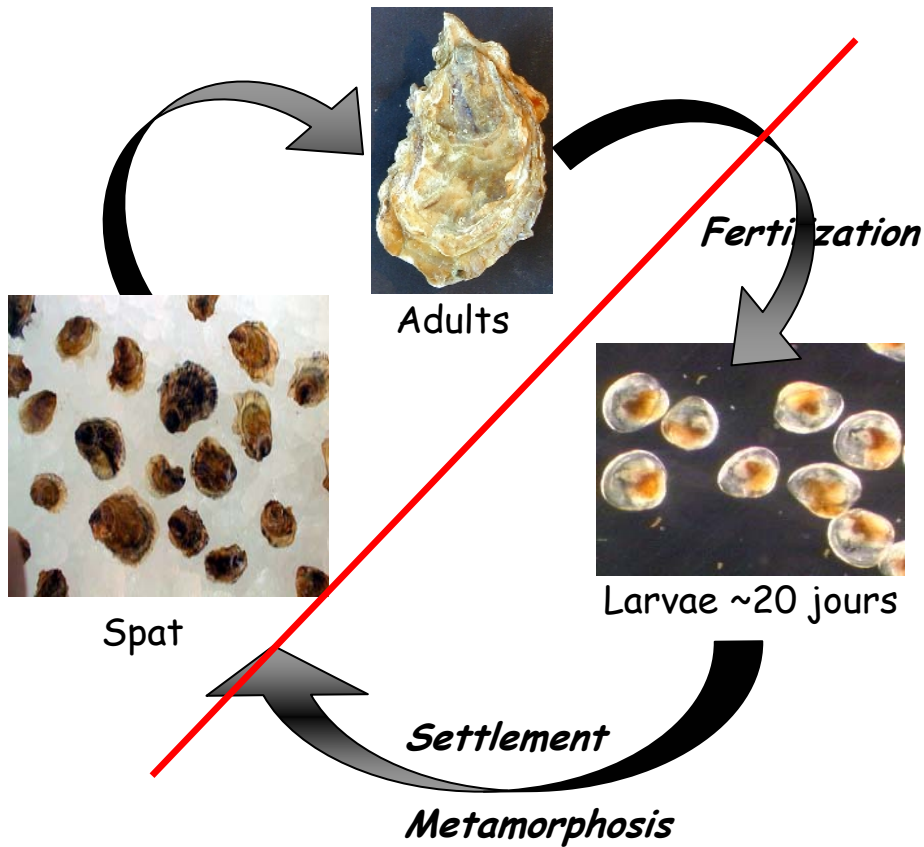
Nicolas Taxis, Christopher Sauvage and Pierre Boudry

Laboratoire IFREMER de Génétique et Pathologie, 17390 La Tremblade

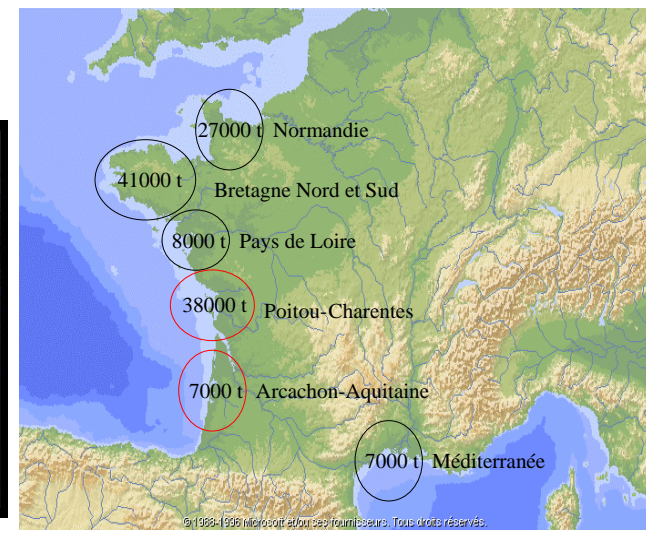
C. gigas life cycle

"elm-oyster model"

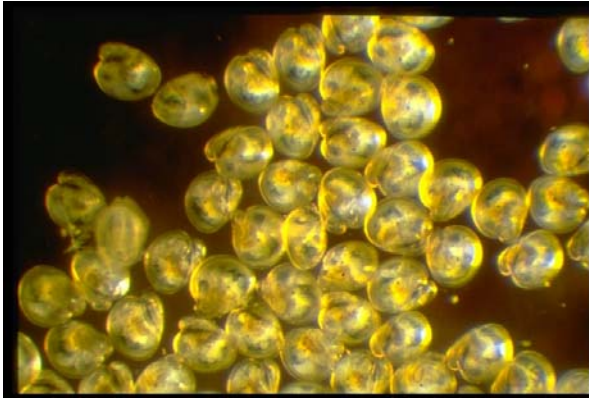
G. C. Williams 1975



(1) Natural recruitment in the wild

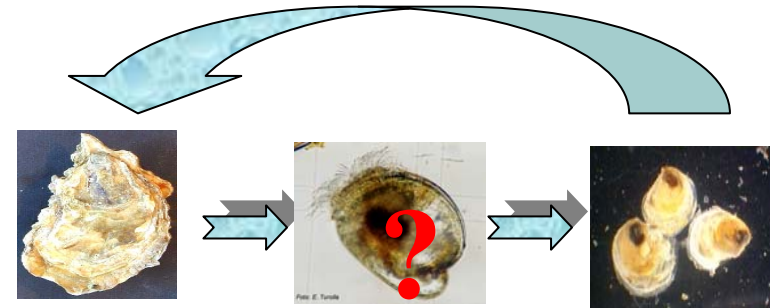


(2) Hatcheries



French production
~ 900 millions
(2003)

Specific selective pressures in hatcheries (*i.e.* domestication)?



Different larval development strategies ?

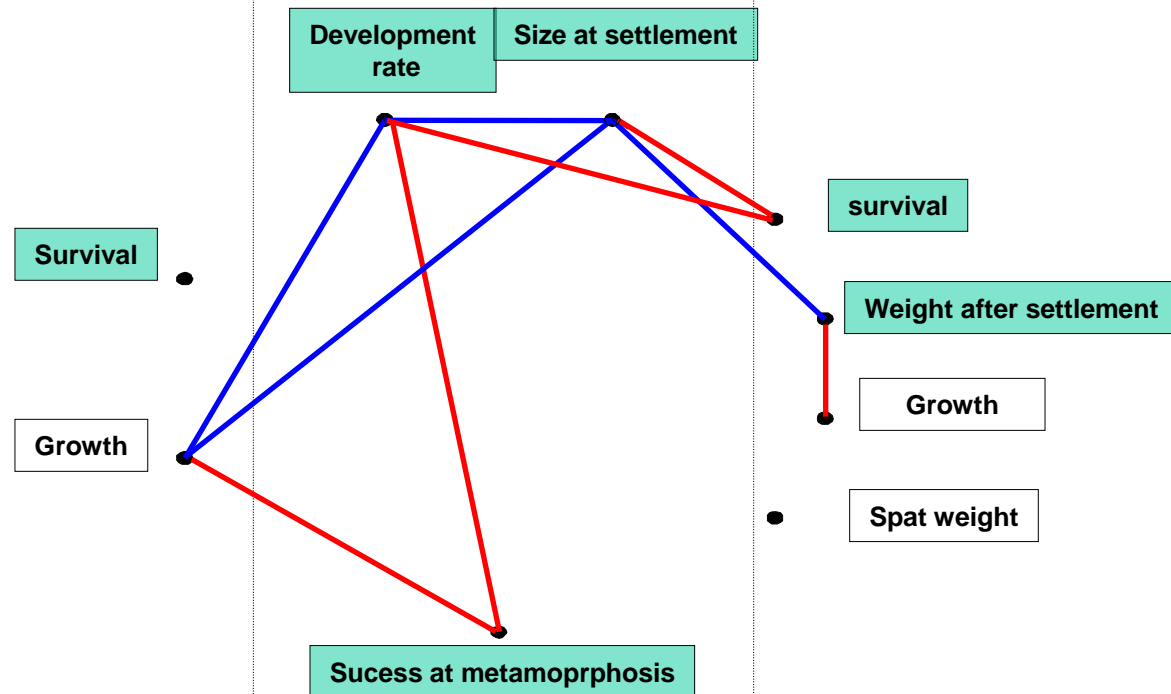
Two extreme “strategies” :

- High larval growth rate and larval size at settlement but low settlement success, growth and survival after settlement
- Lower larval growth rate and larval size at settlement but higher settlement success, growth and survival after settlement

Larval traits

Metamorphic traits

Post-metamorphic traits



Main objective :

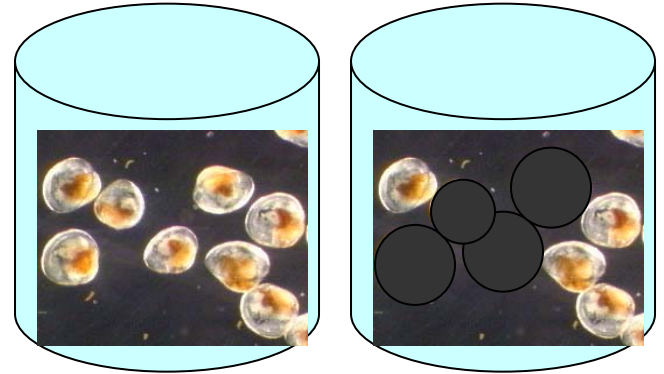
Evaluate the potential impact of common rearing practices in oyster hatcheries (culling, high temperature...) on genetic diversity at larval stage

Method :

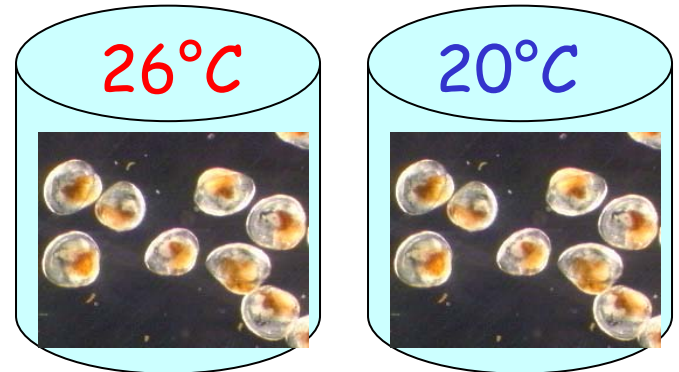
Study the genetic components of larval growth and survival using a mixed-family approach and microsatellite-based parentage analysis

Studied effects

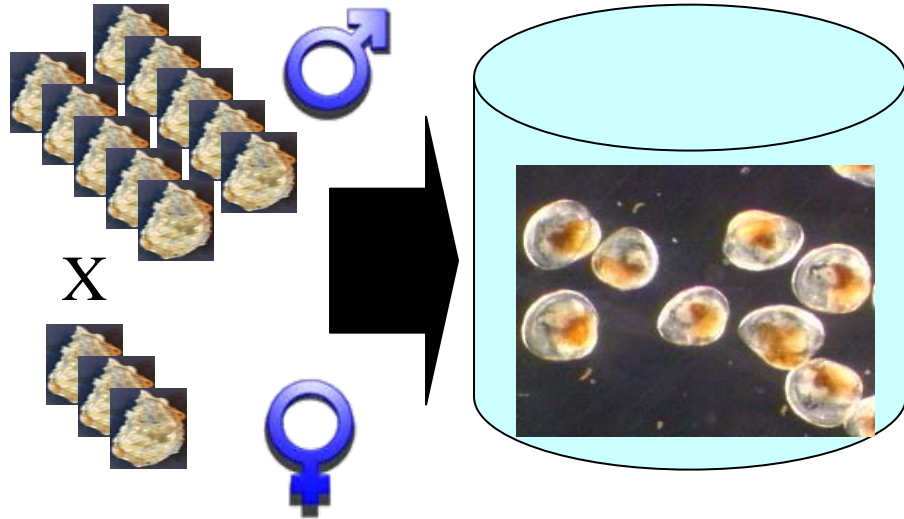
(1) Selective sieving
(« culling »)



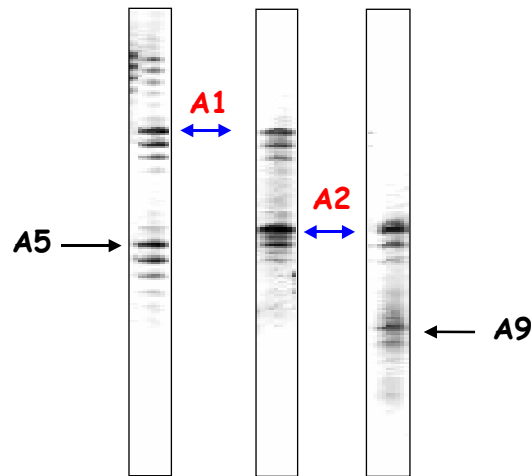
(2) Temperature



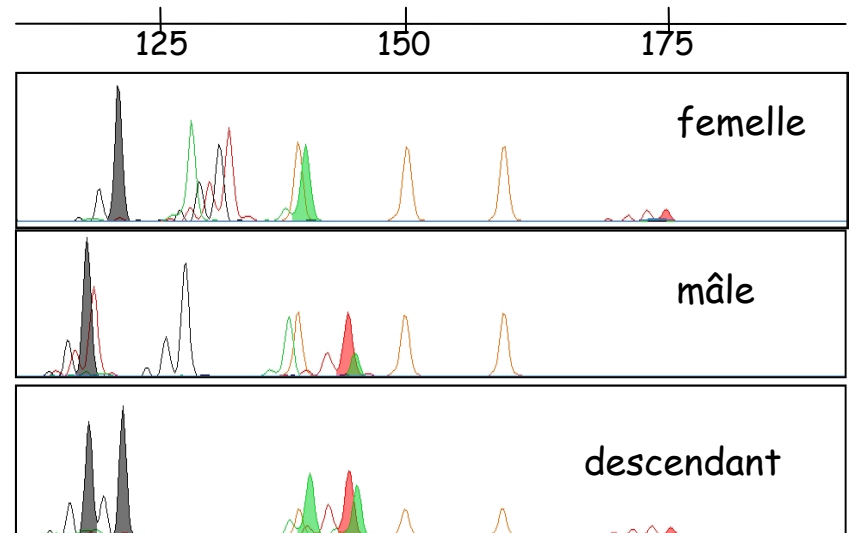
Mixed-family Approach



Microsatellites-based parentage analysis

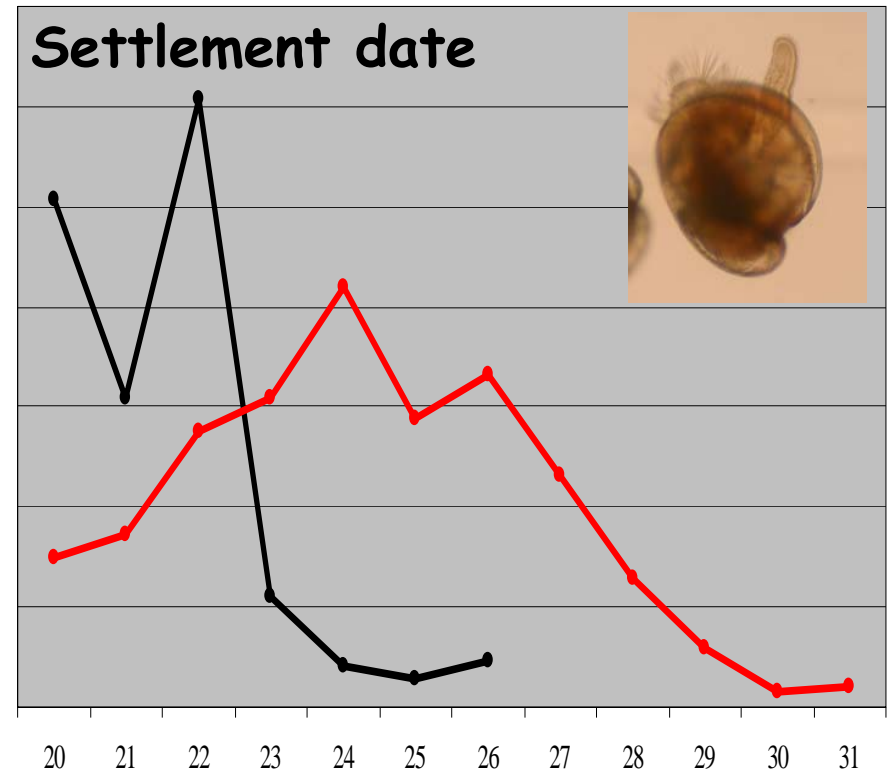
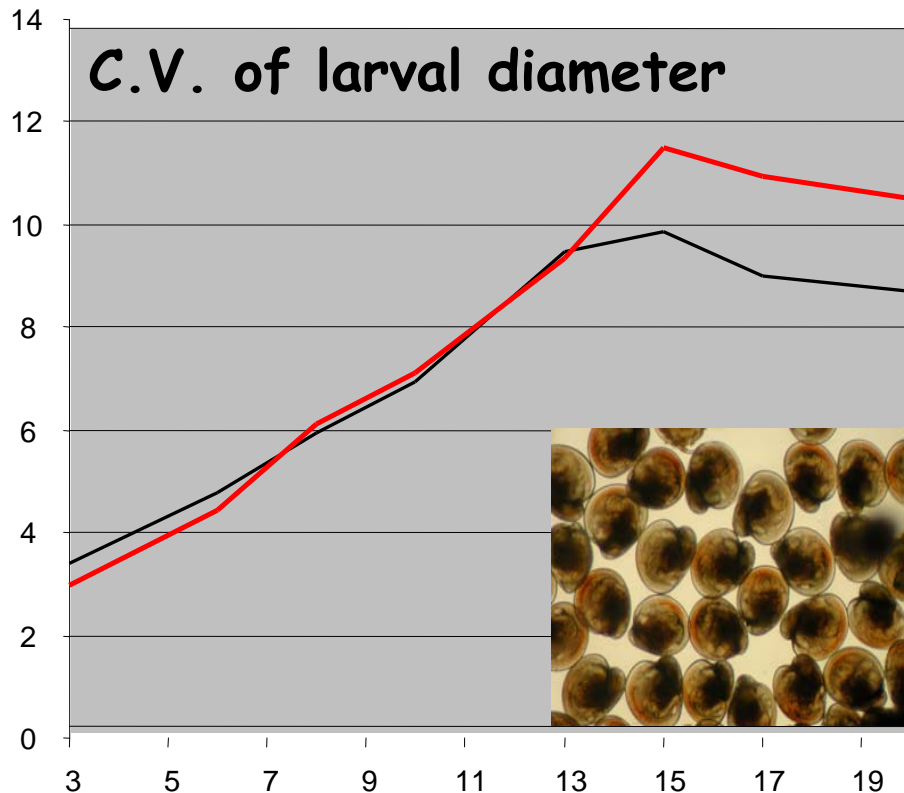
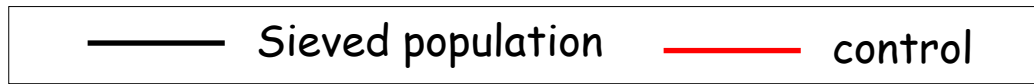


Male offspring Female
A1 A5 A1 A2 A2 A9



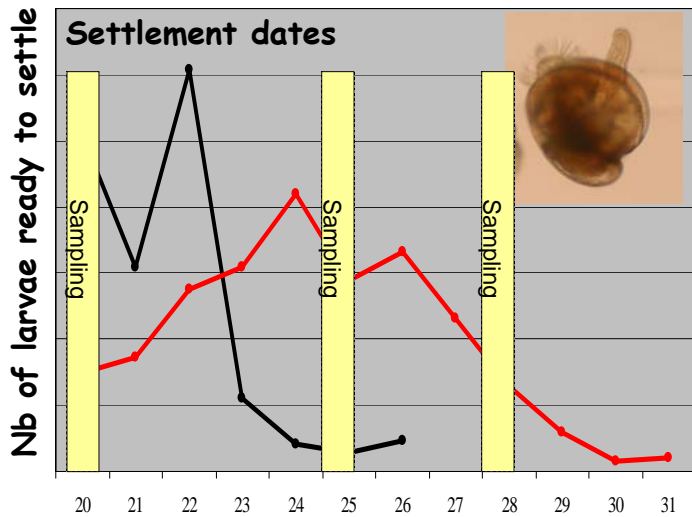
(1) Effect of culling

Common practice in hatcheries: culling of the slow growing (i.e. small) larvae by sieving



(1) Effect of culling

Parentage analysis in the progeny of a 3 females x 10 males factorial cross



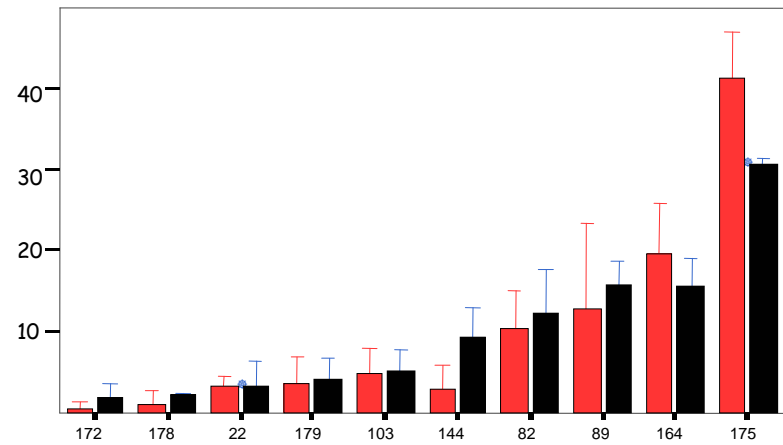
A

B

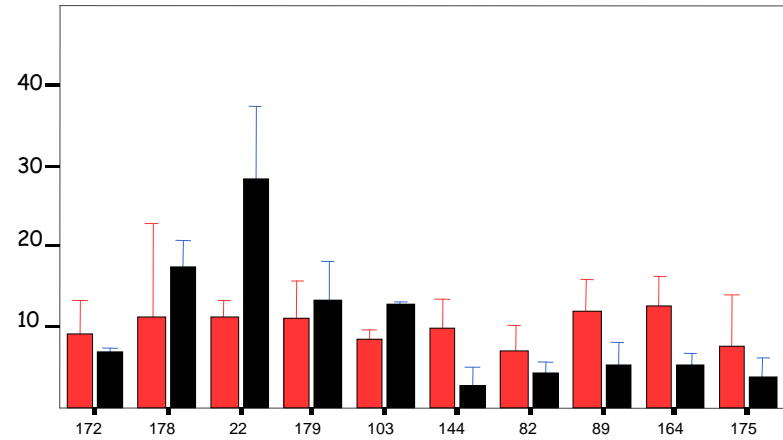
C

— Sieved population
— control

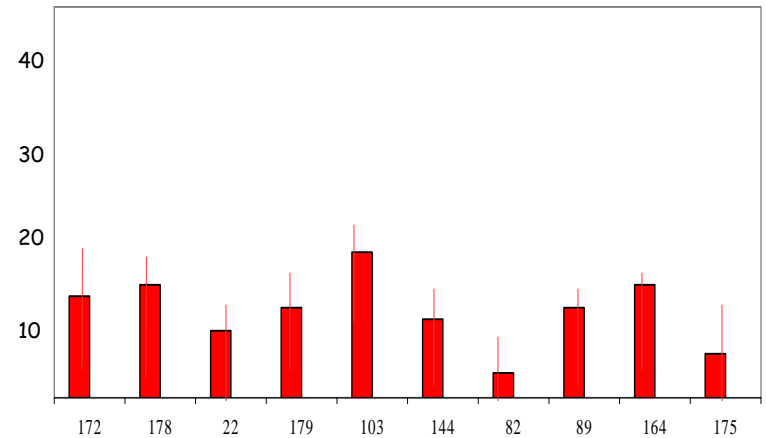
A



B

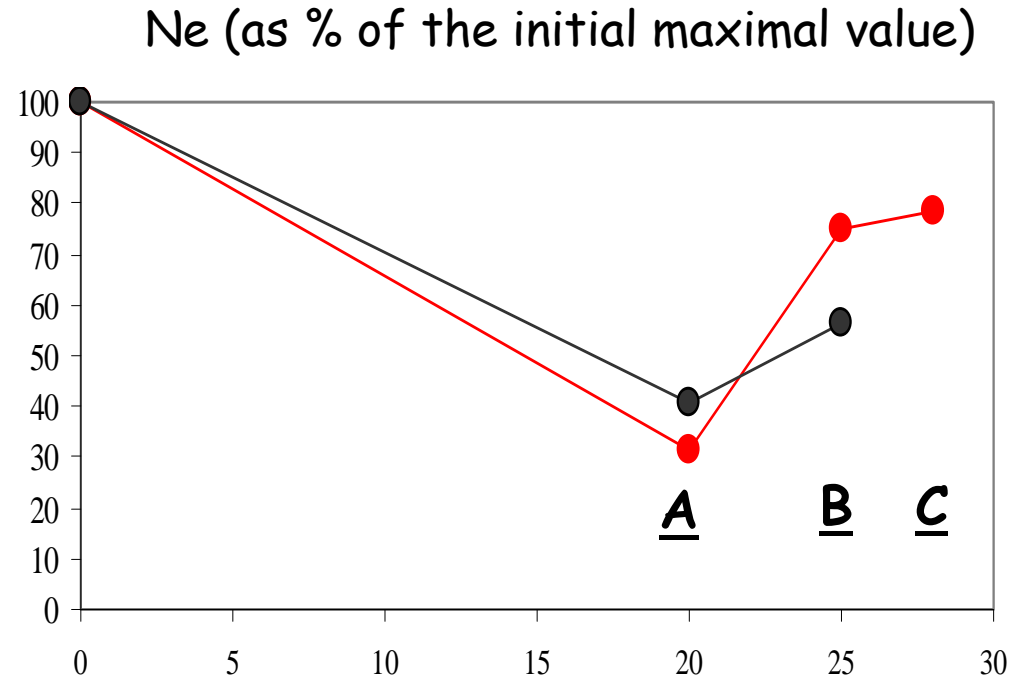
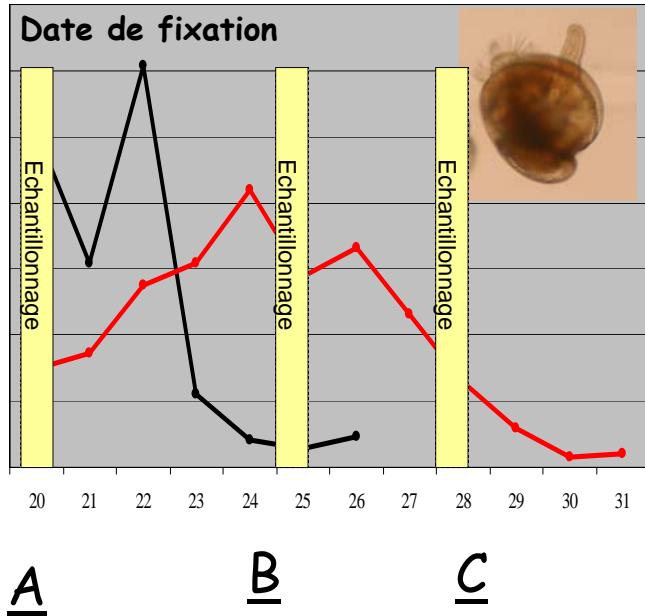


C

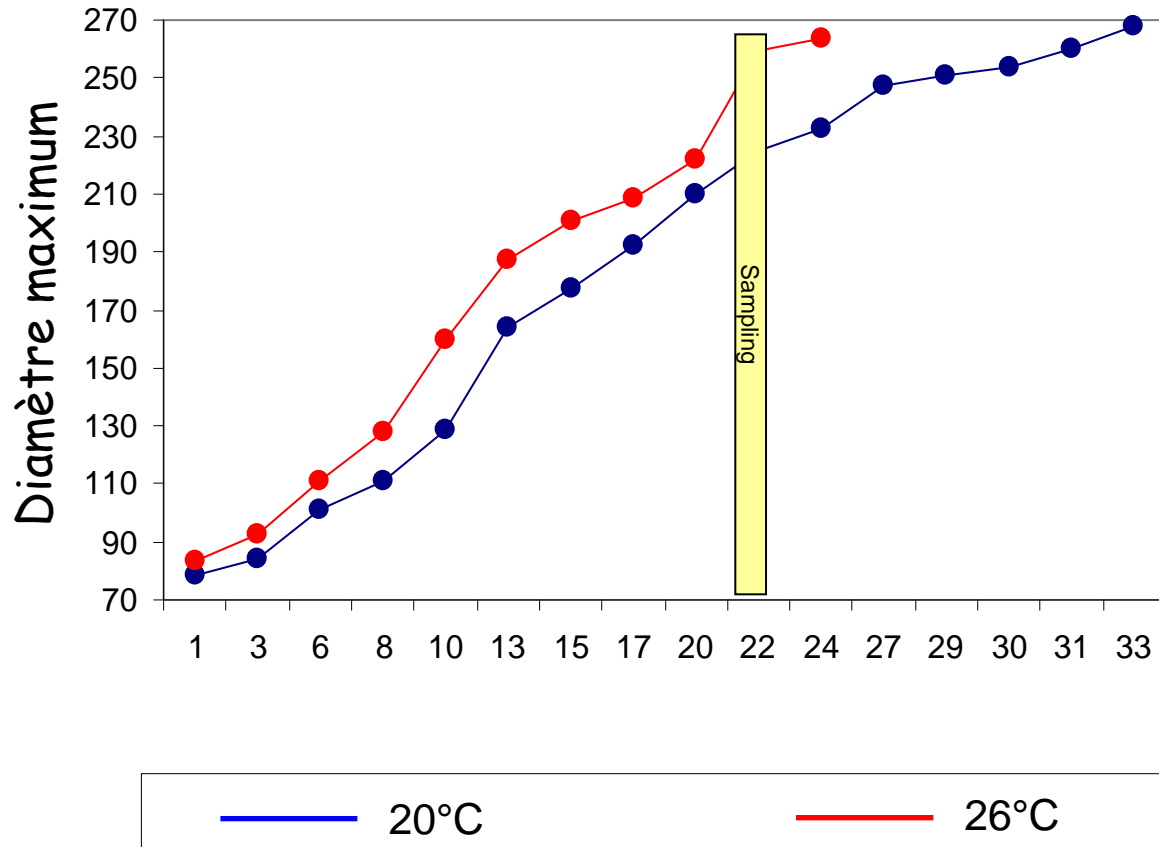


males

(1) Effect of culling



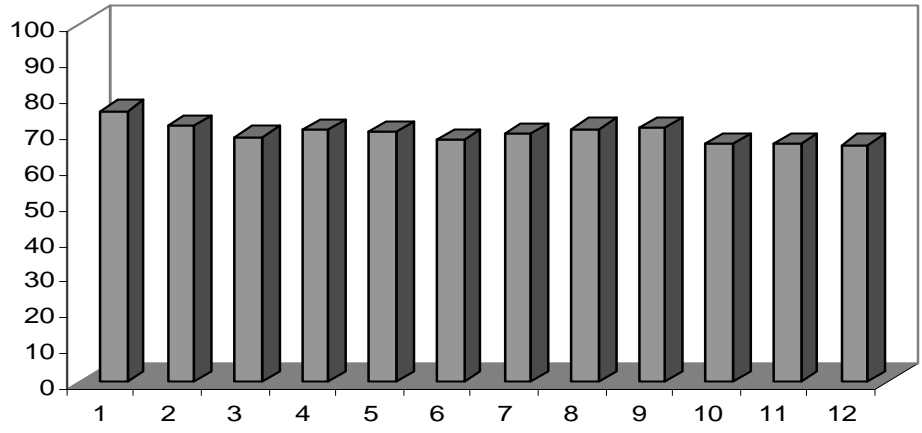
(2) Effect of temperature



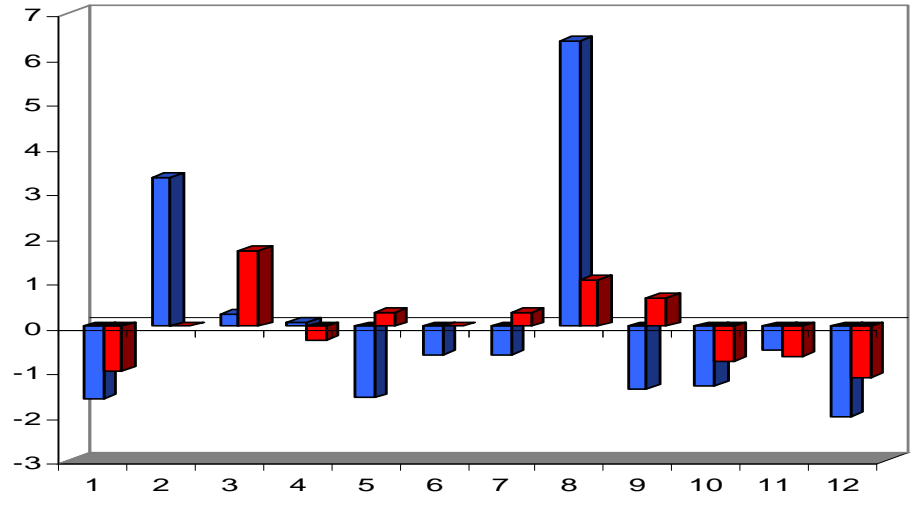
(2) Effect of temperature

Survival

Mean hatching %
/ males
(24h post fertilization)

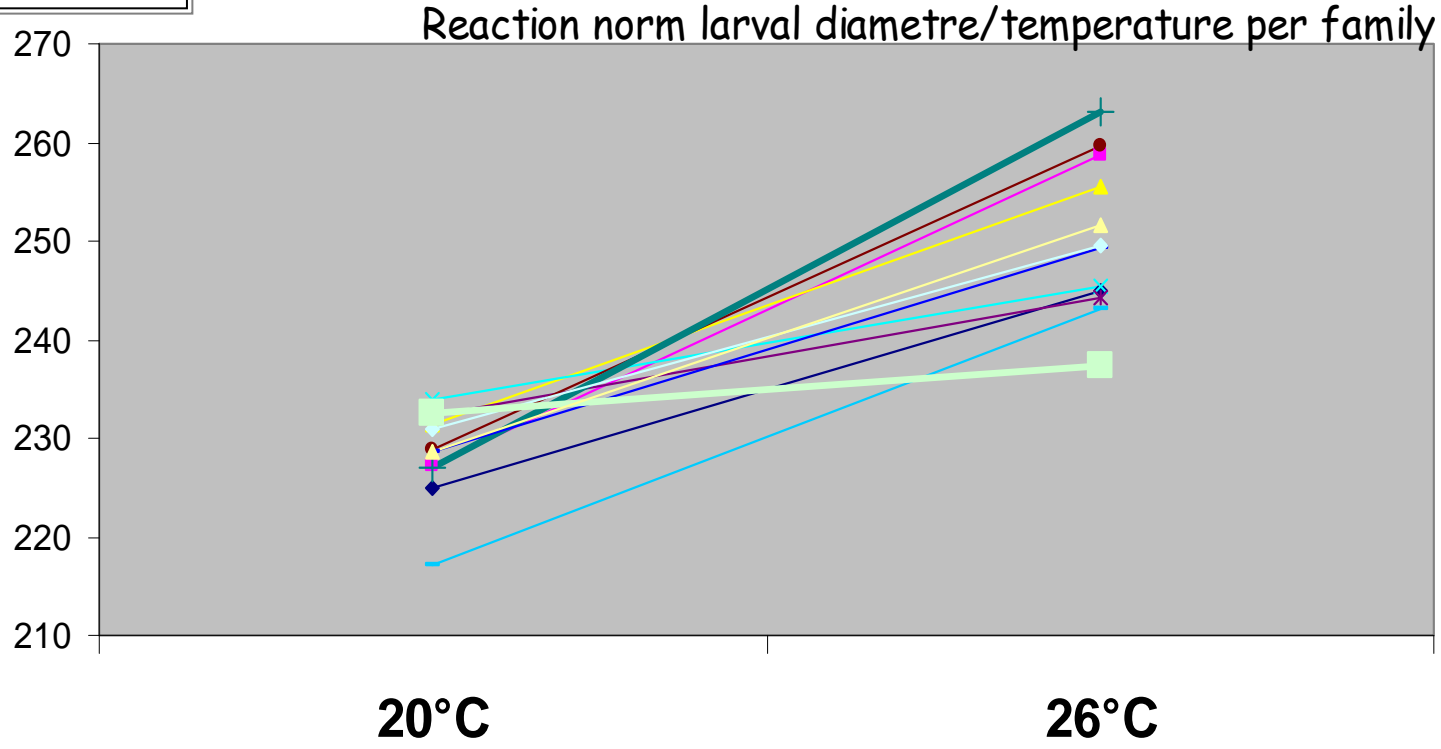


Observed male
reproductive
success at D22
/ expected at
24h



(2) Effect of temperature

Growth



Male	ns	p<0.05
Female	ns	p<0.05

First conclusions

Selective pressures related to common hatchery practices :

- effect of culling on genetic diversity
- effect of temperature :
 - Survival: GxE interaction
 - Growth: GxE interaction

