AMPHORE: a new program to combine the restocking of natural flat oyster (*Ostrea edulis*) beds through genetic selection and the development of new oyster farming practices

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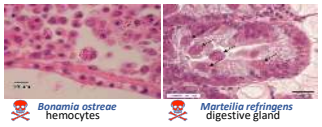
Oysters are good for your health and for Ocean health !
… but oysters health is threatened.

Presence of bonamiasis & marteiliasis
Degradation of natural environments .

➔ Economical interest:
in Brittany, present production is limited to < 1000 tons/year.
- restore natural oyster beds

➔ Ecological interest:
subtidal flat oyster beds shelter a high biodiversity



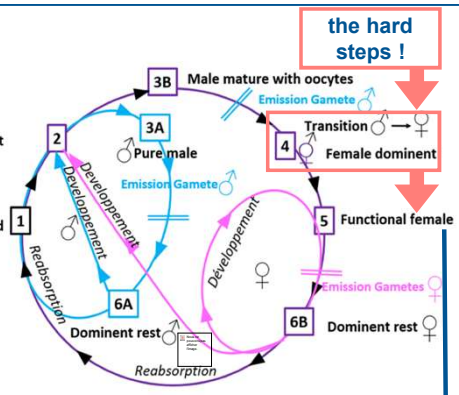
With a fully sequenced genome at chromosomal level available, we can now use this tool for various targets from basal physiology to genetic selection

Mastering the complex life cycle of the flat oyster

Ostrea edulis **is a protandrous hermaphrodite species exhibiting a particular reproductive cycle that leads to a low reproductive success *in natura*.**

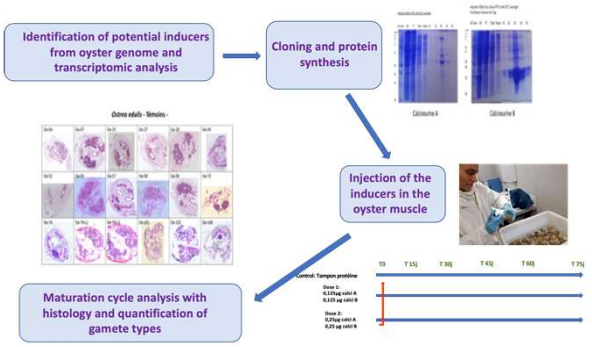
➔ **impossible to predict the sex and the maturation stage of an individual.**

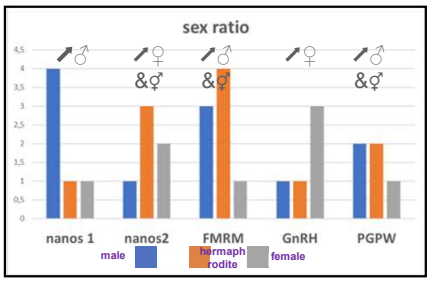
➔ **transcriptomic profiles at each stage helped us select markers & choose a dozen natural inducers, allowing ↴**



Alternative life cycles over one season

Forcing sex maturation to improve hatchery yield





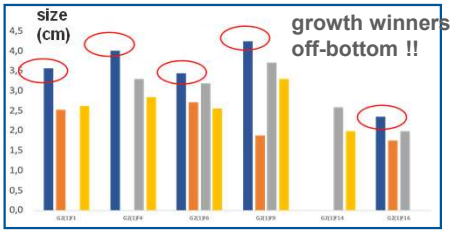
Action on sex ratio of some *Ostrea*-derived inducers 45 days following injection

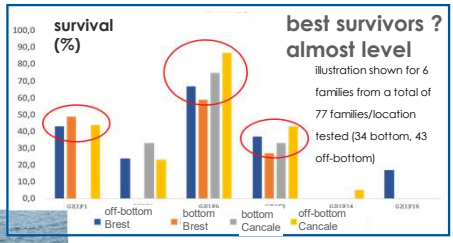
Selecting resistant families in the field

Over 80 families have been tested for growth & survival during 2 years *in situ* using traditional (bottom, subtidal) and innovative (off-bottom, intertidal) cultural practices.

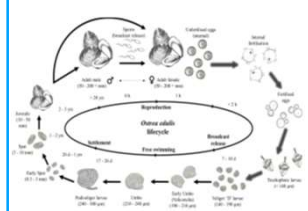
Genotyping by RADseq

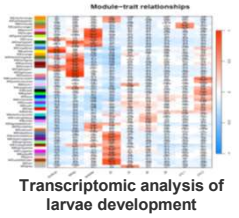
Production of 1-2 new generations per year



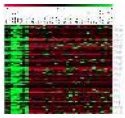


Larvae production improvement





Transcriptomic analysis of larvae development



Identification of potential key genes in larvae development and fixation

Ecdysone receptor (EcR): steroids receptor involved in molting and metamorphosis

FMRF receptor: contribute to larvae motility

Cholecystokinin receptor: involved in regulation of food digestion

Dopamine receptor: involved in metamorphosis

Enhancing natural oyster reefs restoration

Reefs concept and realization by Builders École d'Ingénieurs

Differential growth and survival of oysters families after larval fixation on artificial reef structures in hatchery after only 5 months on site.

Culture of *O. edulis* on the foreshore

Evaluation of foreshore survival and growth as a potential alternative to traditional production.