INVESTIGATION OF ABNORMAL MASS MORTALITY (AMM) OF MUSSELS IN FRANCE

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Background

- France is one of the major mussel producers in Europe and its production is around 61,219 tons in 2020
- Since 2014, abnormal mass mortality of mussels (Fig.1) were reported along French coast but its cause is still unknown

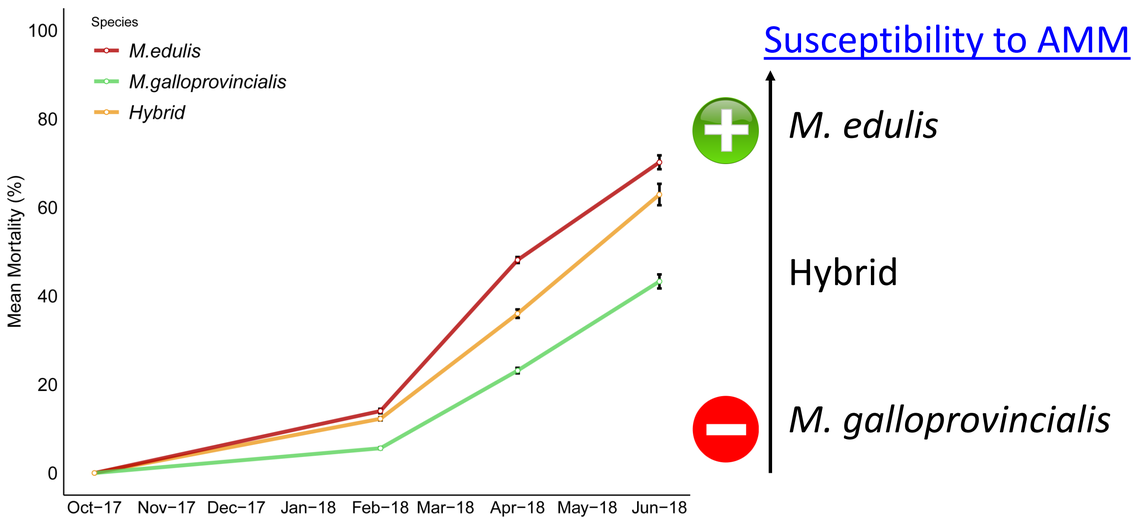

Fig.1: Abnormal mass mortality pattern for mussel species at Maison Blanche in 2017-2018

Objectives

- Mimic the field mortality pattern under laboratory condition
- Estimate the response to selection against AMM

Methodology

Species: *M. edulis*, *M. galloprovincialis* and hybrid

Year	Progress
2016	80 full sib production from five wild populations (▲) (Fig.2)
2017-18	Evaluation of the families for their susceptibility to AMM outbreaks at Maison Blanche
2021	Production of resistant/susceptible/unselected lines against AMM in hatchery
Feb-Oct'22	Cohabitation experiment – 1 (Fig.3)
Apr-Oct'22	Cohabitation experiment – 2 (Fig.3)

- Cohabitation => Resistant/susceptible/unselected mussels + mussels from Maison Blanche (hereafter donors) , where AMM occurs every year

- Control => Resistant/susceptible/unselected mussels without donors

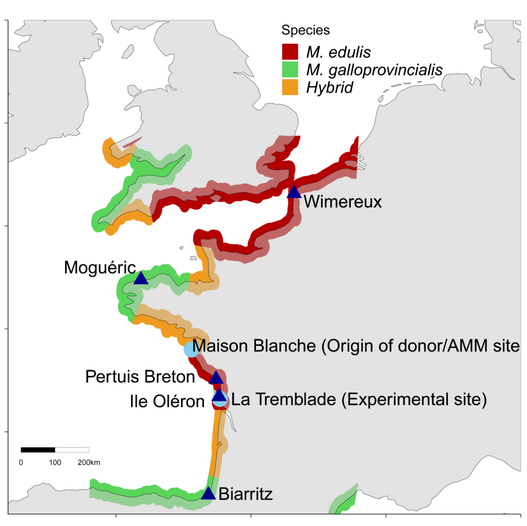

Fig.2: Origin of the contrasted lines (▲) and donors (●) used for cohabitation experiment under laboratory condition in La Tremblade (●)

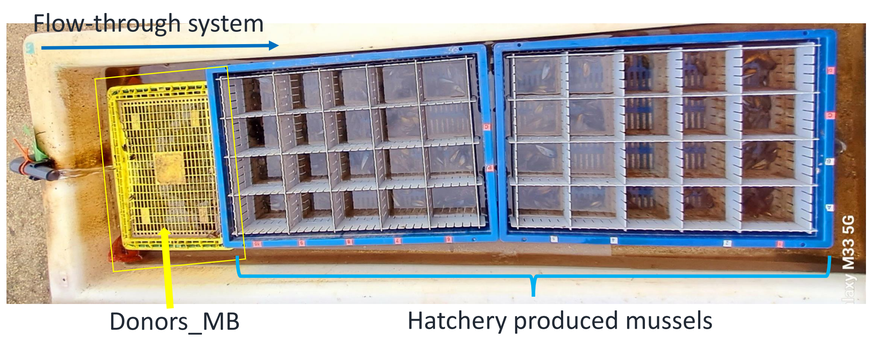

Fig.3: The cohabitation experiment involved donors and 30 mussels deployed in each of the compartments for the selected species, and this was carried out in triplicate

Main Results

Both cohabitations able to trigger mortality (Fig.4)

Control => no mortality

} Suggest an horizontal transmission of pathogen(s) from donors to hatchery produced mussels

- Overall, *M. galloprovincialis* shows higher mortality than *M. edulis* (Fig.4)

- At endpoint, no significant difference in mortality between resistant and susceptible lines for all mussel species (Fig.5)

- We were unable to mimic AMM outbreaks under laboratory conditions, as a consequence, response to selection can't be calcualted

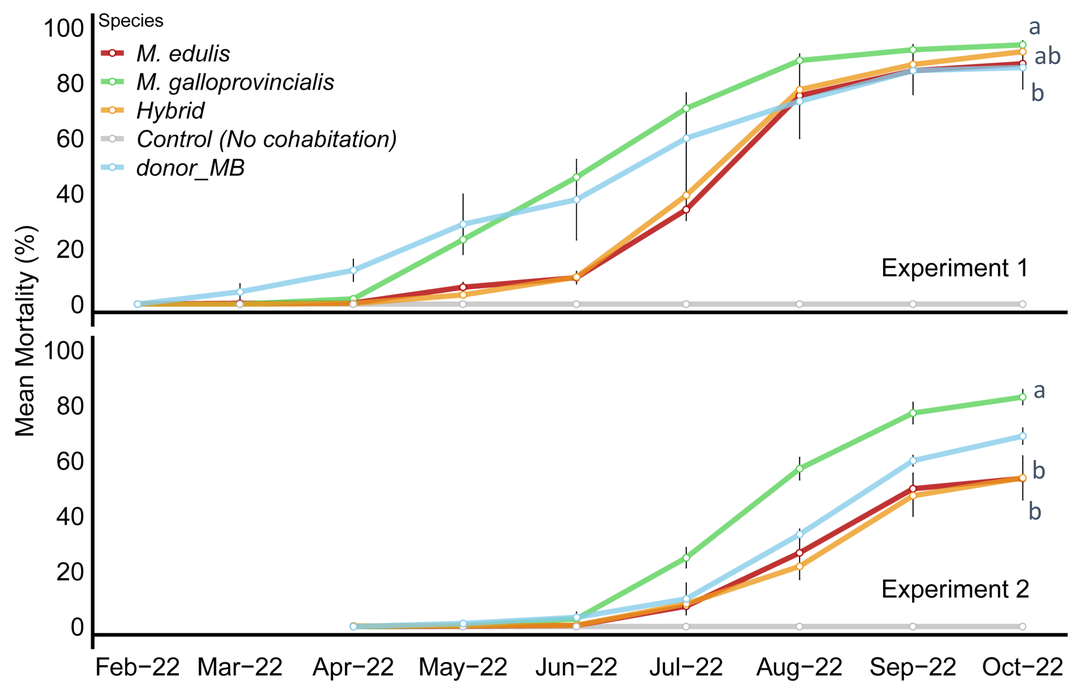

Fig. 4: Cumulative mean mortality per species (% ± SE among replicates) at endpoint under laboratory condition. Letters denote significant differences among species; Control = without donors

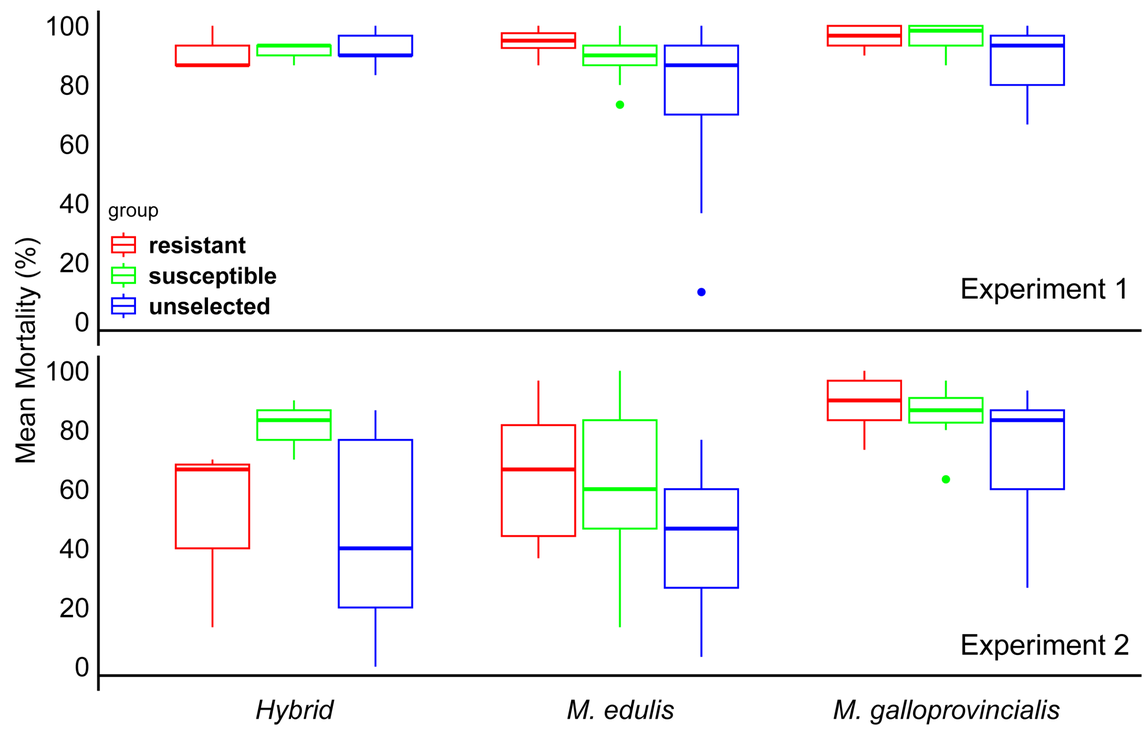

Fig. 5: Final mortality for resistant, susceptible and unselected mussels per species at endpoint. No significance differences between lines observed.

Key takeaways

- Mortality in laboratory: *M. edulis* = Hybrid < *M. galloprovincialis*
- The etiology of mortality in laboratory condition different from field

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