

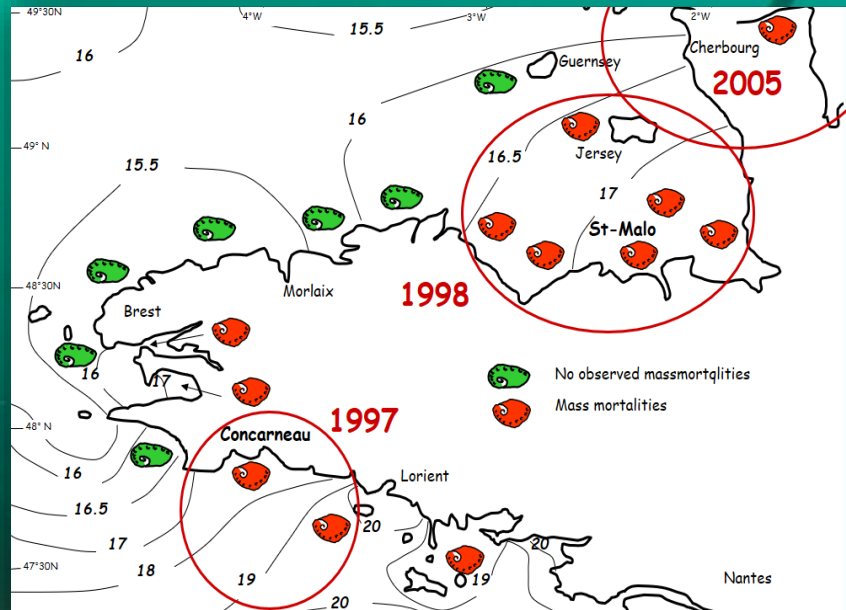


# Starvation and pre-seeding procedures Implications for stock enhancement programs for the European abalone

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## MASS MORTALITY DUE TO *VIBRIO HARVEYI*



## OBJECTIVES

**Restoration**

**Re-establish populations in historical range**

**Stock enhancement**

**Increase fisheries catch and/or naturally recruiting stock**

**Ranching**

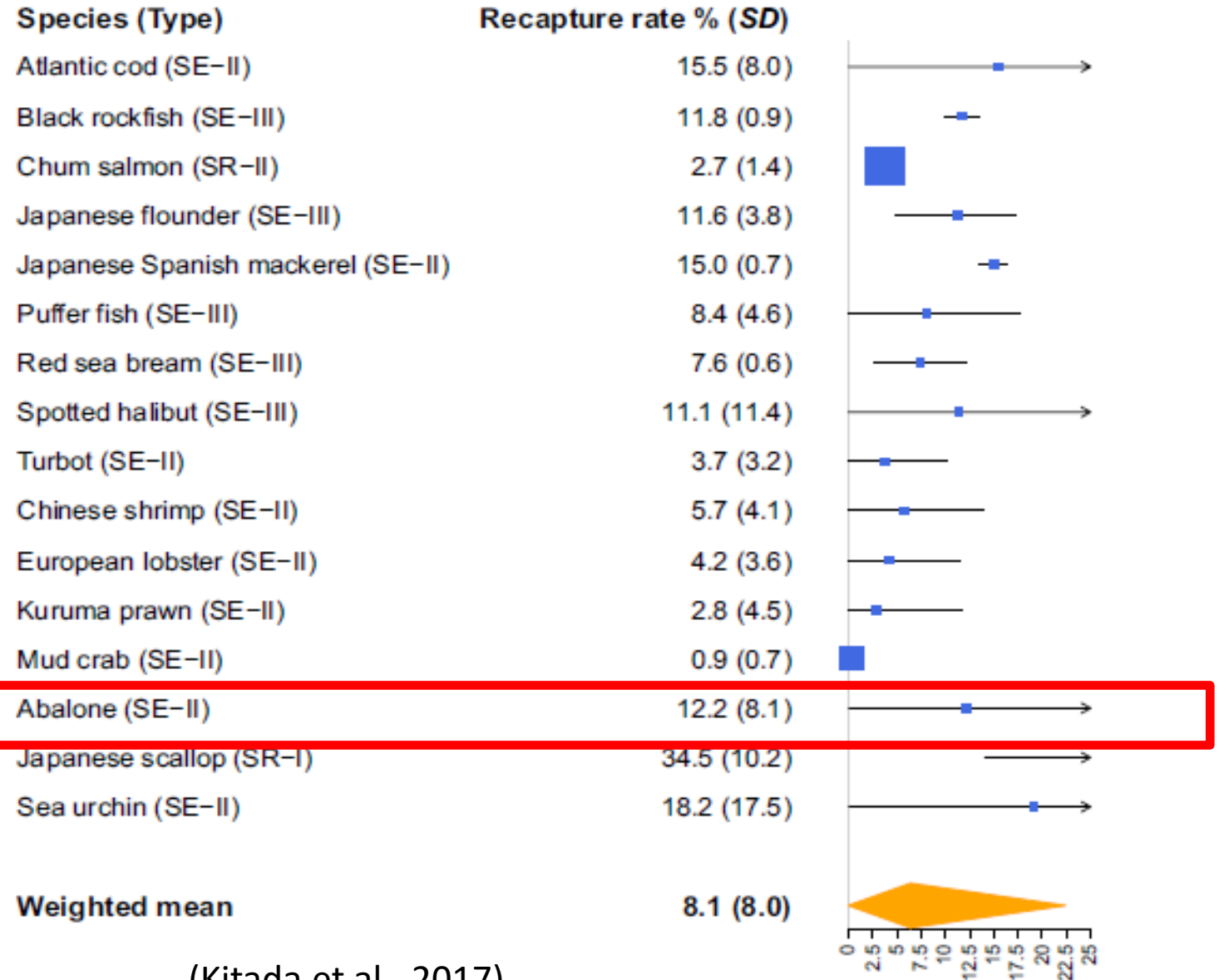
**Increase fisheries catch**



## A LARGE MORTALITY POST- IMPLANTATION

= high variability depending  
on the studies

### Full-scale stock enhancement and sea ranching programs



Consequences of the **stressors** experienced during the **pre-seeding period** (preparation, transport and reduced food) on :

- ➔ the post-seeding behaviour
- ➔ the survival of *H. tuberculata* juveniles

Introduction

Objective

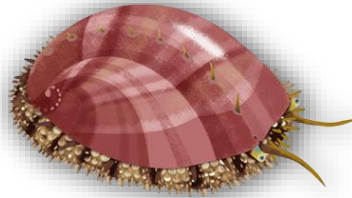
M&M

Results and discussion

Conclusion

## JUVENILE REARING

- ❖ Juveniles from wild broodstock
- ❖ 23 months of age
- ❖  $3 \pm 0.43$  cm



n = 20 cages containing  
100 abalone each



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## PRE-SEEDING TREATMENTS

### NUTRITIONAL STATUS

feed



no feed during 10  
days



X

### STRESS PROCEDURE

**mild**

**severe**

DAY 1 preparation	Removed + air exposure 30 min	Removed + shaken 20 min + air exposure 1.5h
DAY 2 transport	Air exposure 1h	Air exposure 5h + shaken twice 2 min

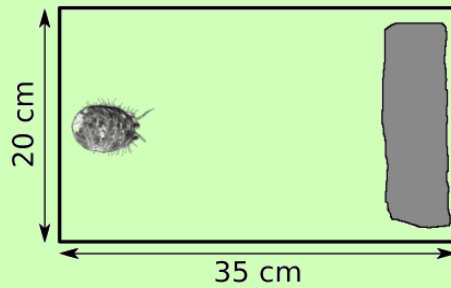
## MEASURES « post-seeding »

## Short term tests (&lt; 5 min)

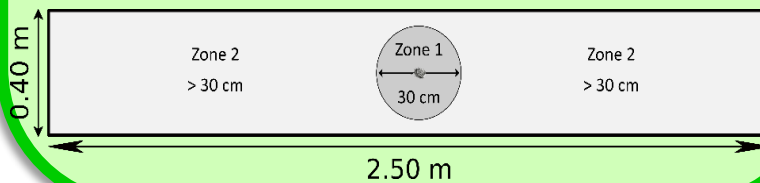
## Righting test



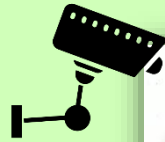
## Hiding test



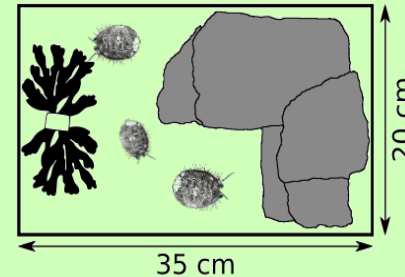
## Predator test



## Diurnal rhythm (10 days)



Video recording  
24h/24



## Survival in mesocosms (10 days)



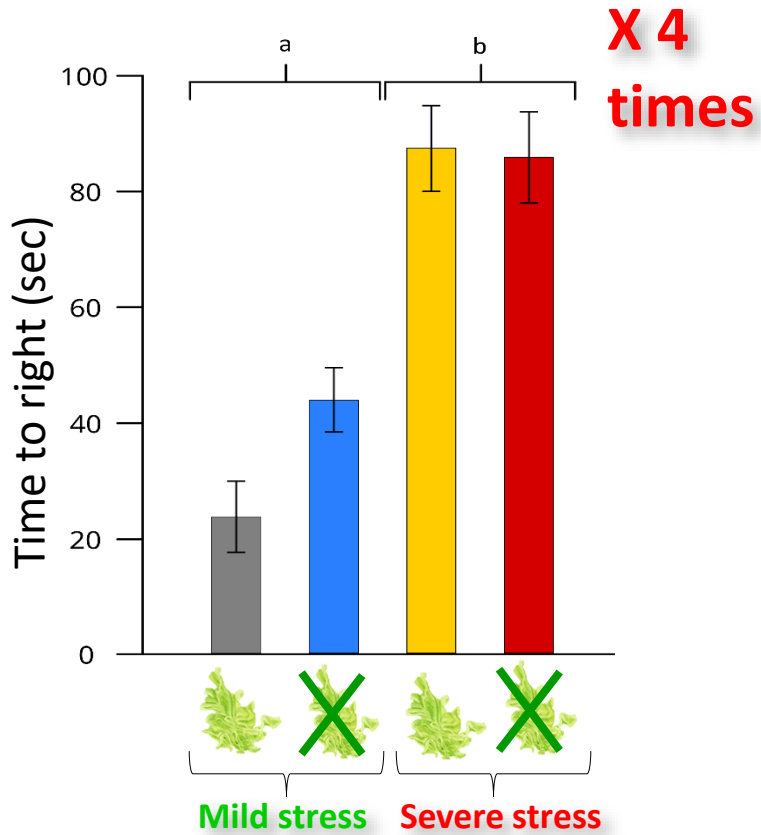
- 260 l mesocosms
- 2 layers of rocks



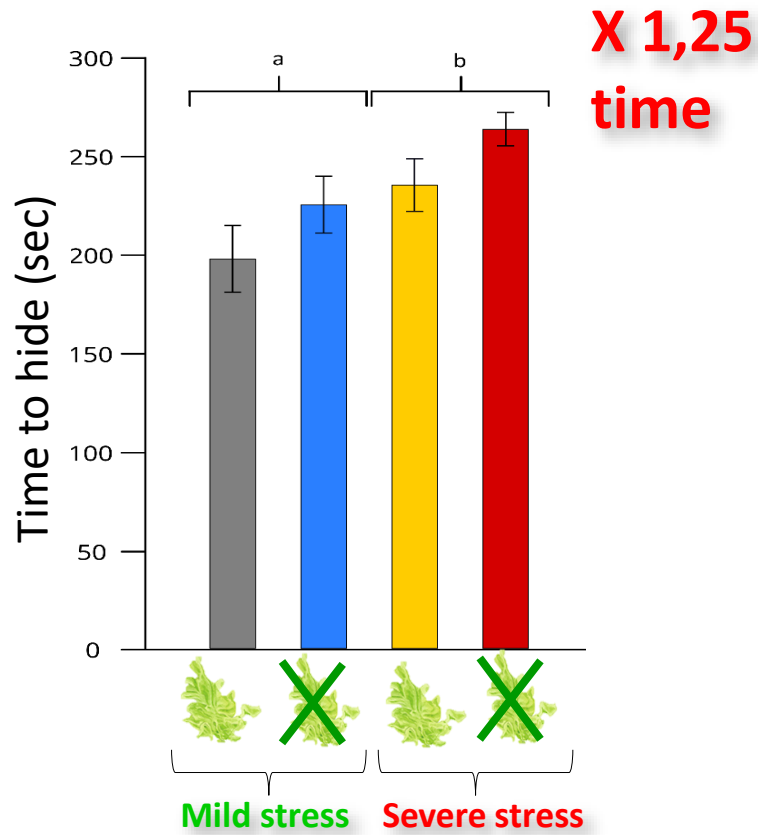
# A **severe stress** impairs short term behavioural responses of juveniles



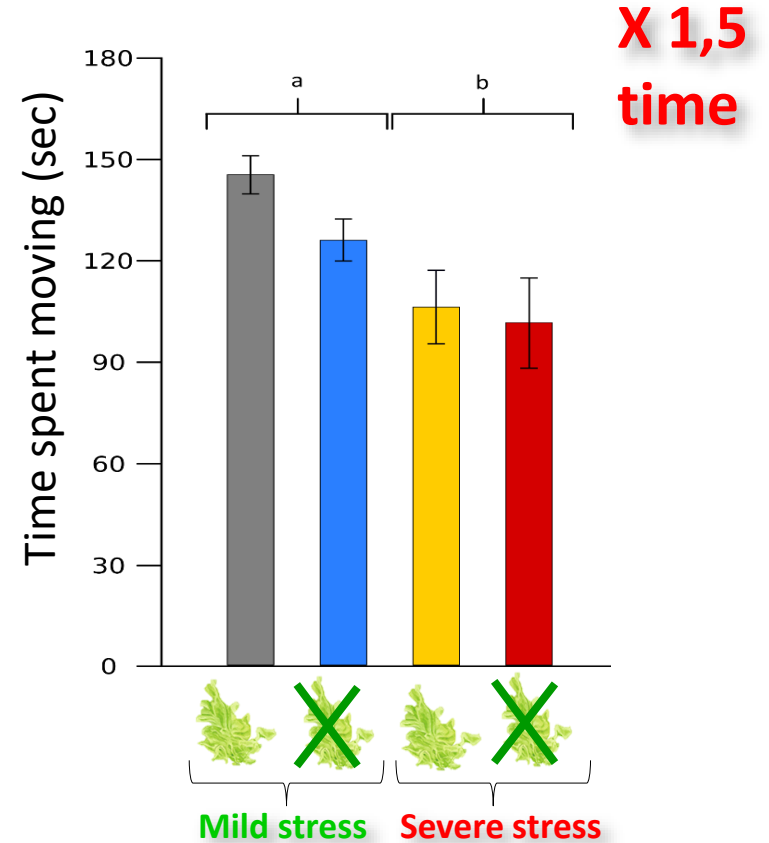
**RIGHTING TEST**



**HIDING TEST**



**PREDATOR TEST**

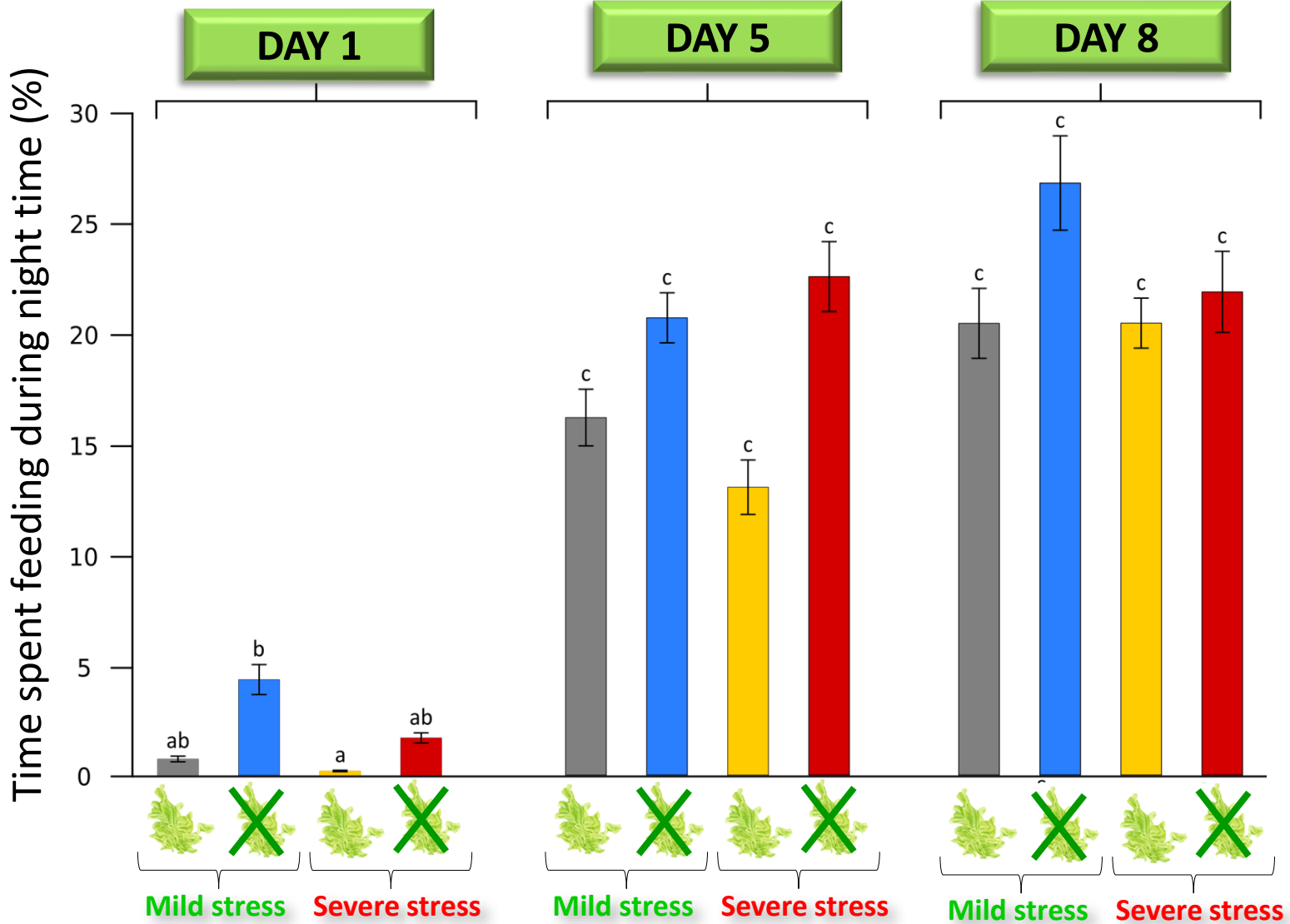


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CAM01

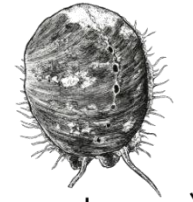
**DIURNAL RHYTHM**



~~Restricted in feed~~



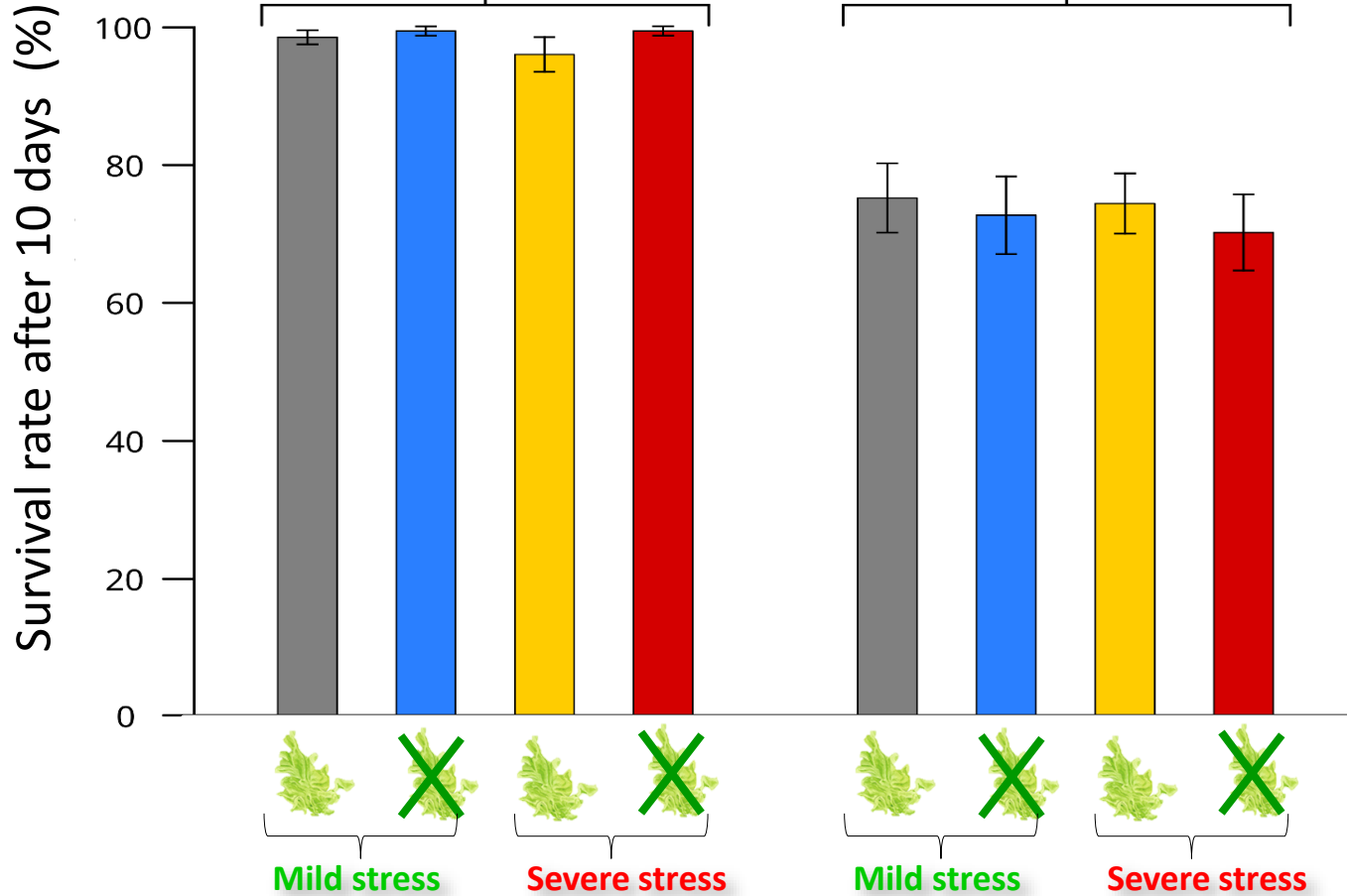
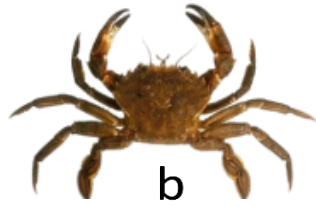
**The first night : feed more, hide less**



**More exposure to predators ?**



**SURVIVAL IN MESOCOSM**



No effect of the feeding and stress severity



Strongest effect: **the predator**



*Necora puber*



**STARVATION and  
STRESS PRE-SEEDING**

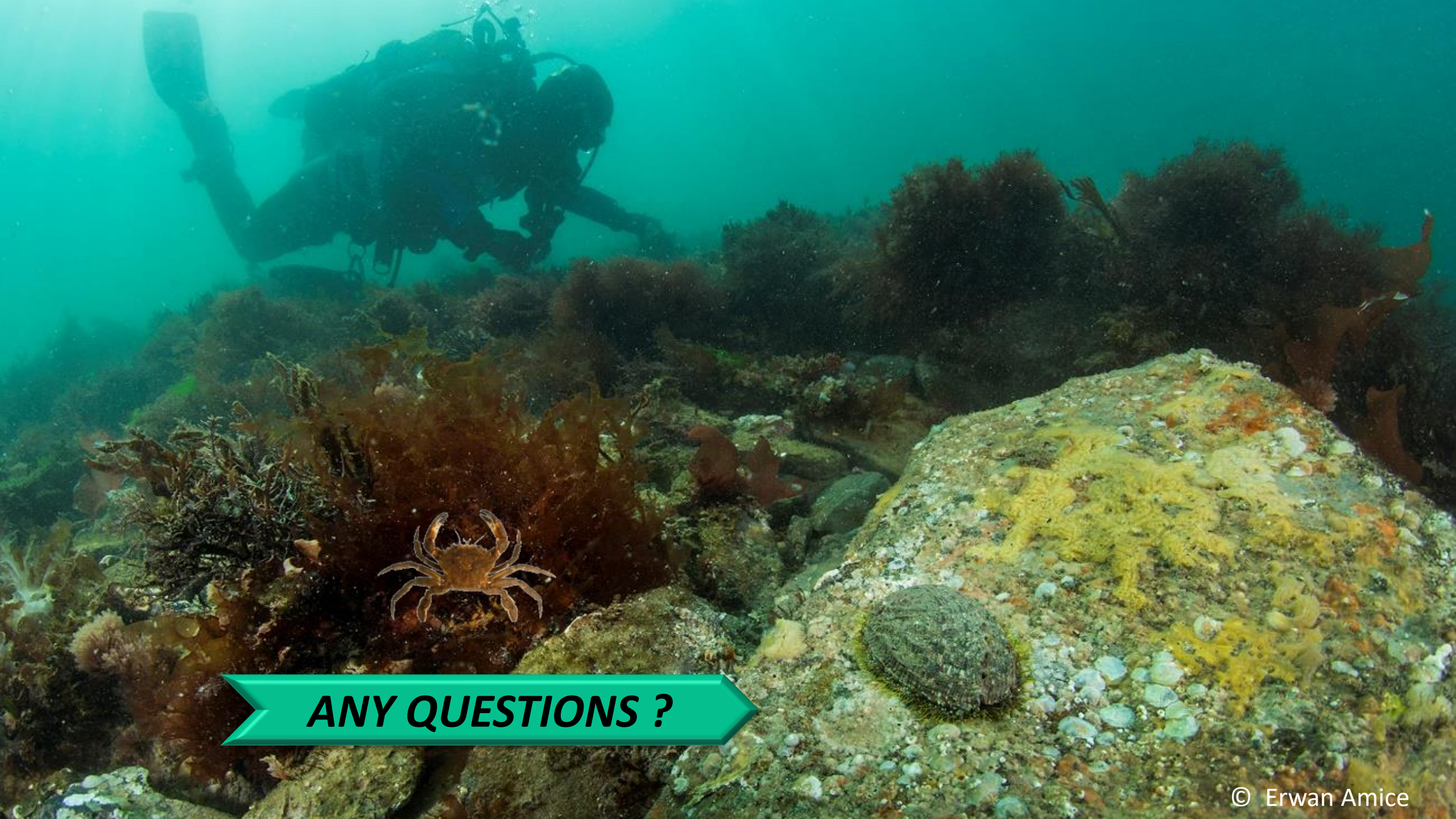


**Short term  
behavioural  
consequences**



**Probably the main  
factor explaining  
initial mortality**





**ANY QUESTIONS ?**