CIENCIAS MARIÑAS GALICIA

(RECOBI)

PERFORMANCE of BIVALVES

Pruebas previas al diseño experimental (junio 2023)

EcoCost Universidade Vigo

Centro de Investigación Mariña Universidade Vigo

Financiado por la Unión Europea
NextGenerationEU
FEMP-FEMPA

GOBIERNO DE ESPAÑA | MINISTERIO DE CIENCIA E INNOVACIÓN | Plan de Recuperación, Transformación y Resiliencia | XUNTA DE GALICIA

Experimento de temperatura

5.1 & 5.3. Salinity and temperatura experiments in mesocosms (july 2023)

-Performance curves for recruits and juveniles: constant temperatura without tides, 2 days.

4 Treatments:
- 18 ºC
- 21 ºC
- 24 ºC
- 27 ºC

4 Species:
- Fina
- Babosa
- Japónica
- Berberecho

2 Sizes:
- 2 – 5 mm
- 10 – 12 mm

3 pilot experiments to answer:

1. What is the the experimental unit? ¿1 individual? ¿3? ¿5?
2. Are there significant differences in [O_2] at different temperatures?
3. What volumen do we need to register ammonium signal? ¿20, 40, 60 u 80 ml?

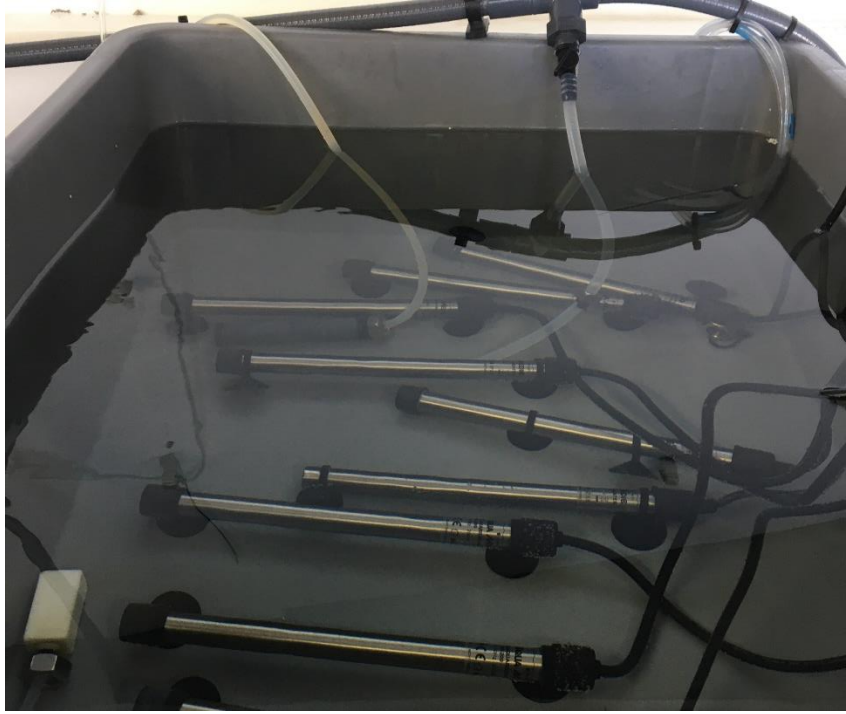
Objectives

Objective 5: Mesocosm experiments to analyze the effect of the changes determined in Objectives 1, 2, 3 and 4.

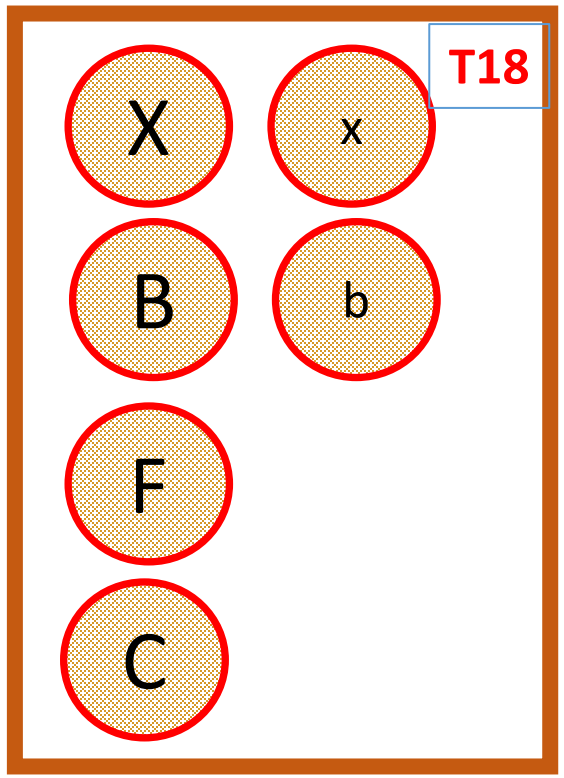
- Task 5.1: Preliminary mesocosm experiments based on bibliographic data to analyze the effect of extreme events on mortality, scope-for-growth and reproduction.
- Task 5.2: Reproducing future extreme sediment alterations in mesocosm experiments to analyze their effect on mortality.
- Task 5.3: Reproducing future extreme low salinity and high temperature conditions in mesocosm experiments to analyze their effect on mortality, scope-for-growth and reproduction.
- Task 5.4: Post processing experimental data.


7

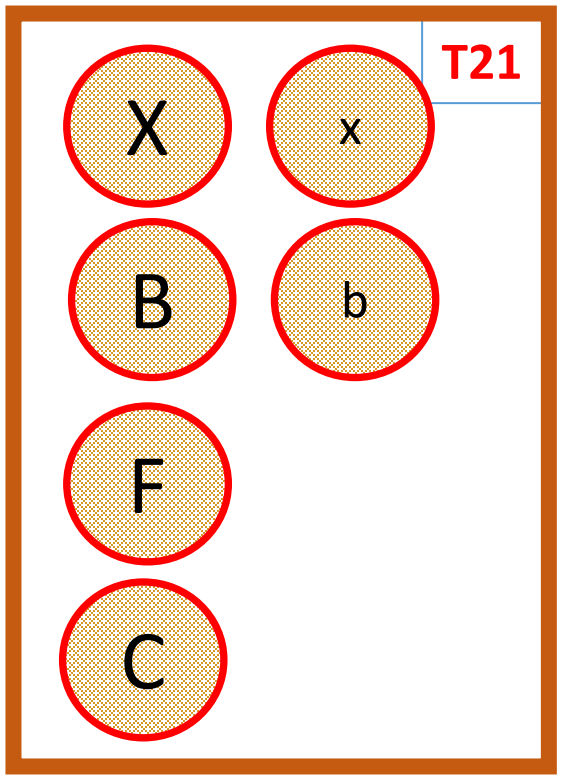

5




teenos
OK
OxyWiFi



x 12



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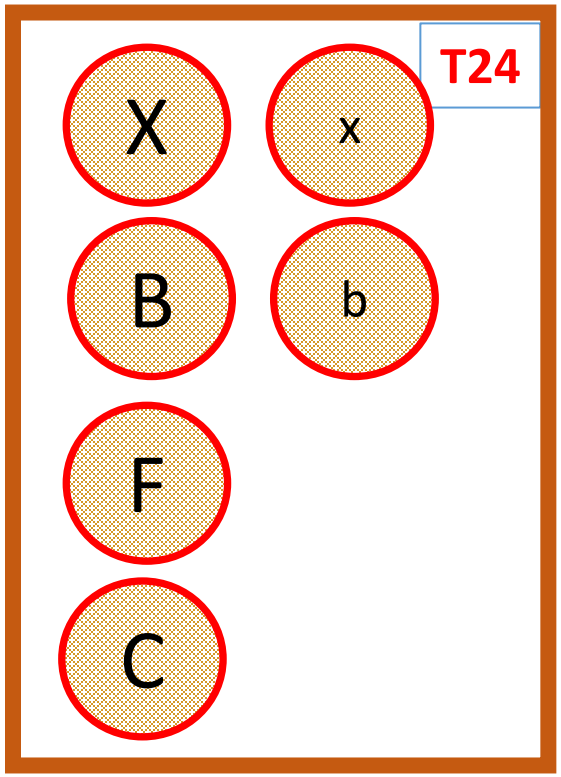

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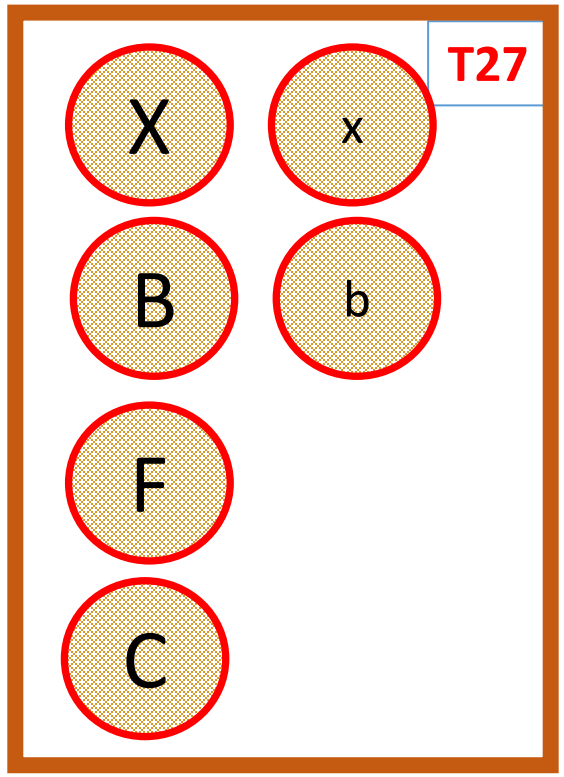
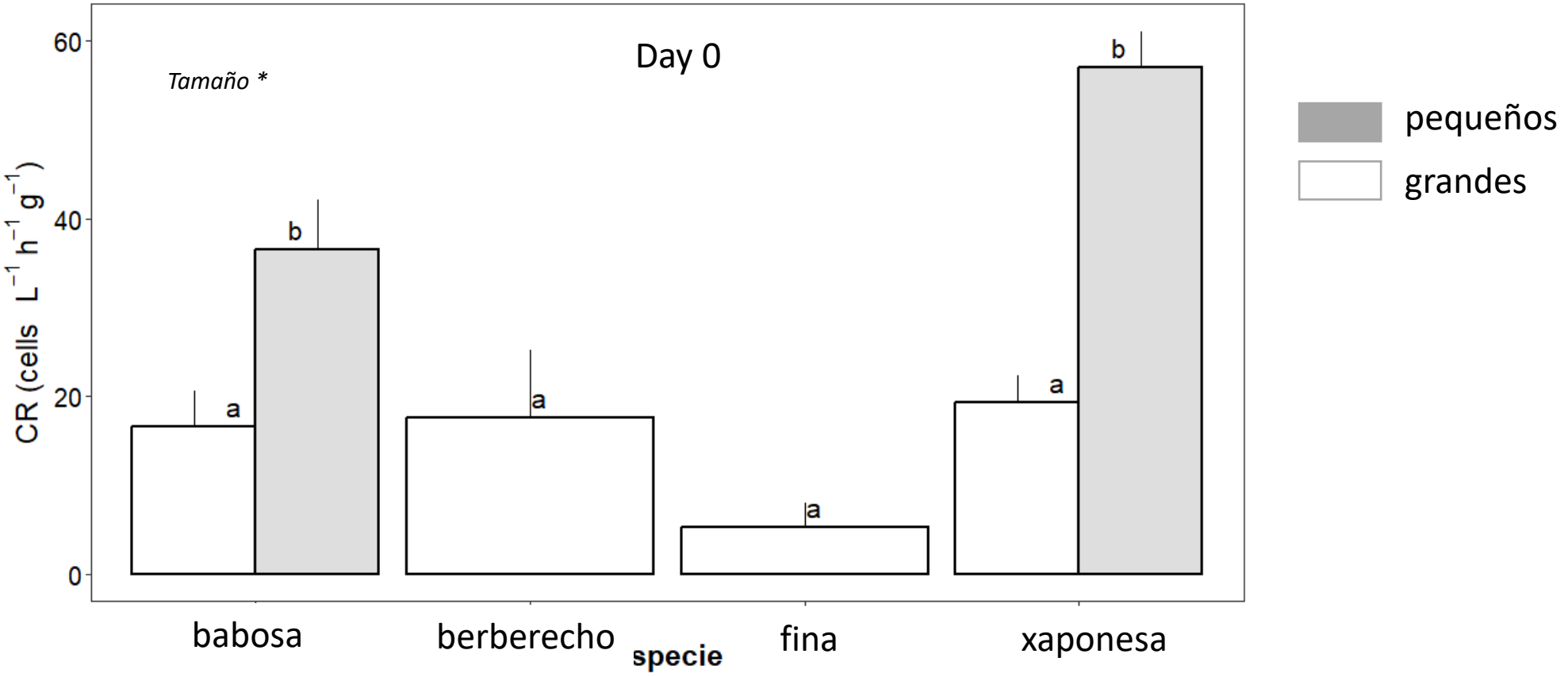


x 12

Cada individuo en un vasito y cada vasito en una maceta

- *Preliminary results*

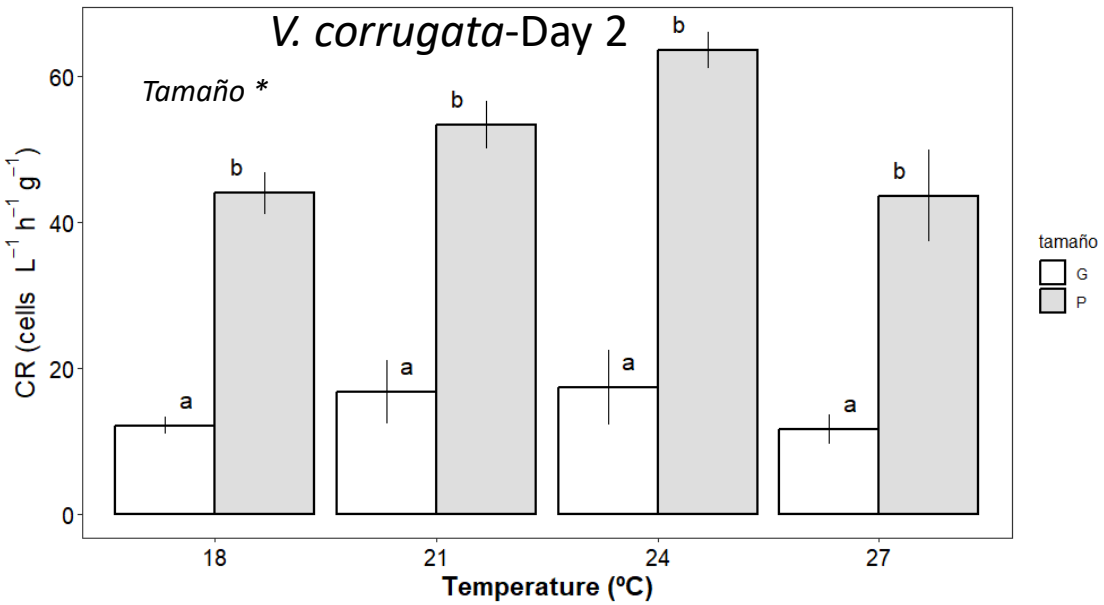
Feeding



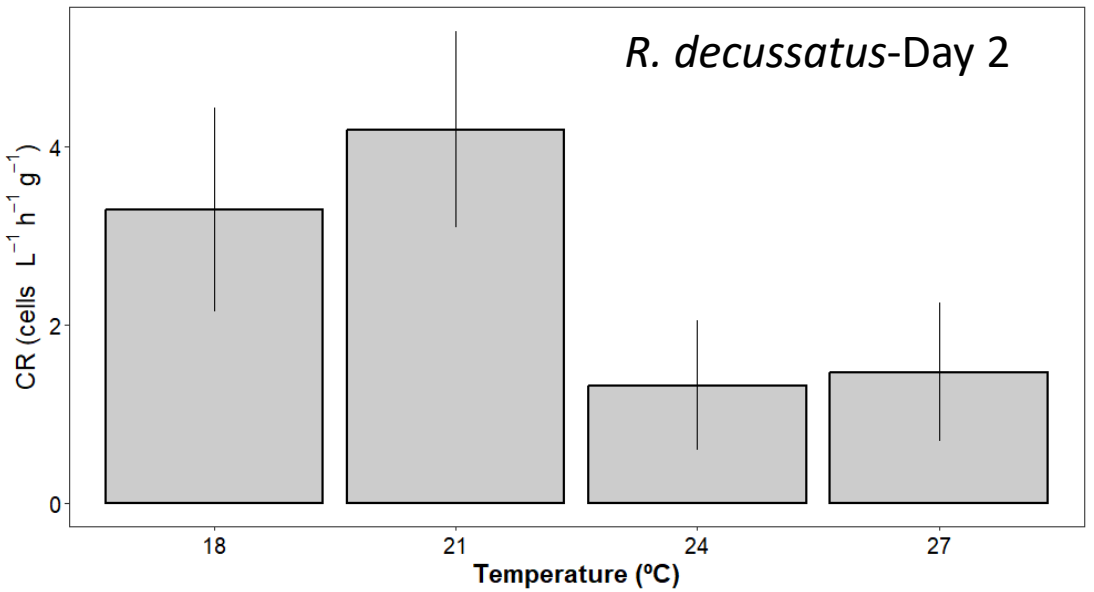
Fina es la que menos come

Feeding

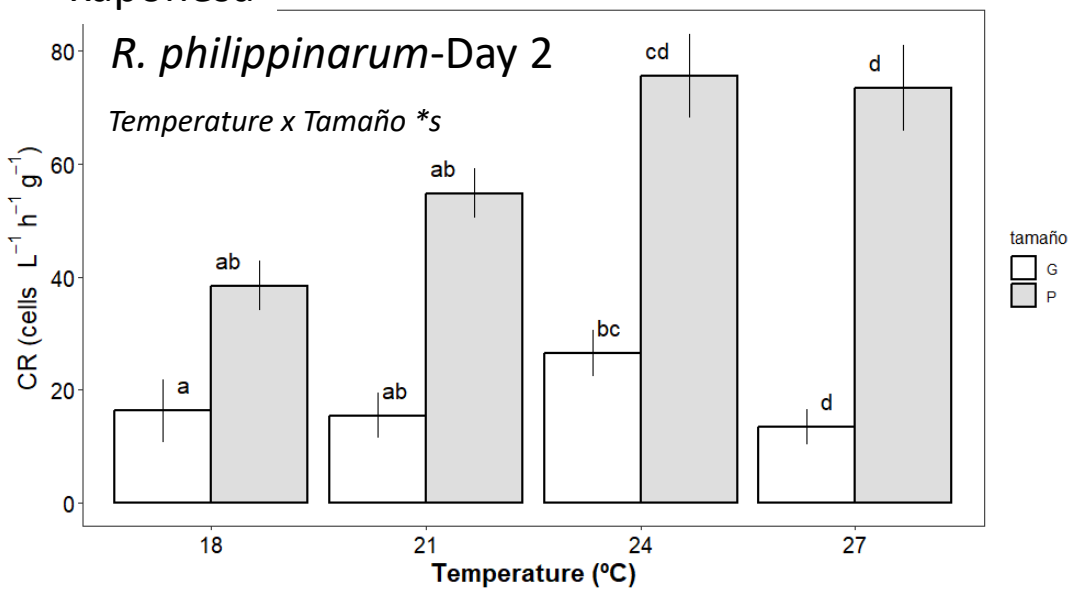
babosa



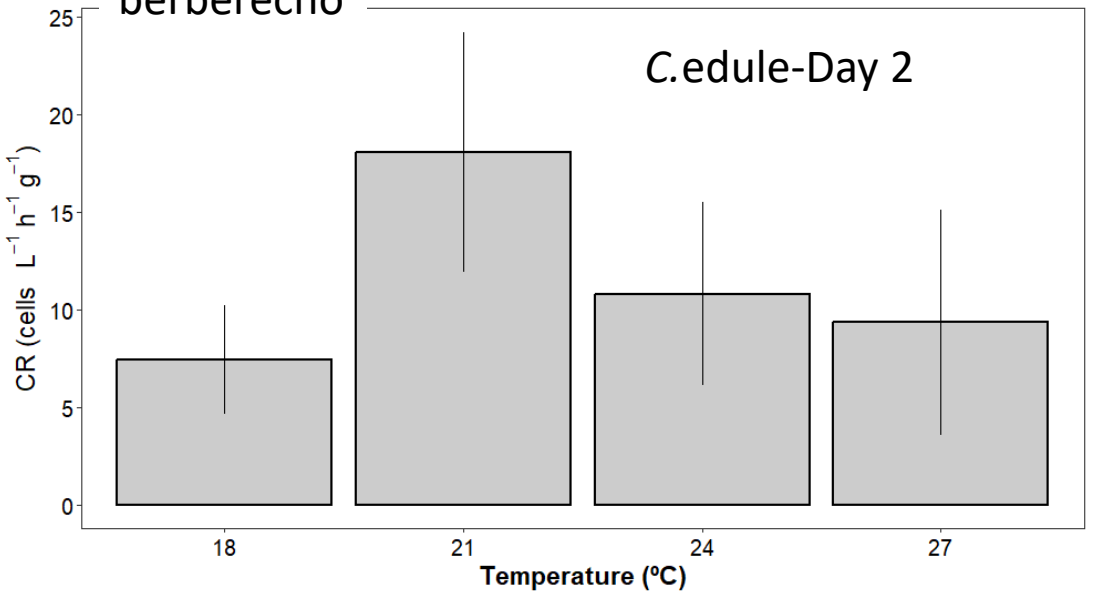
fina



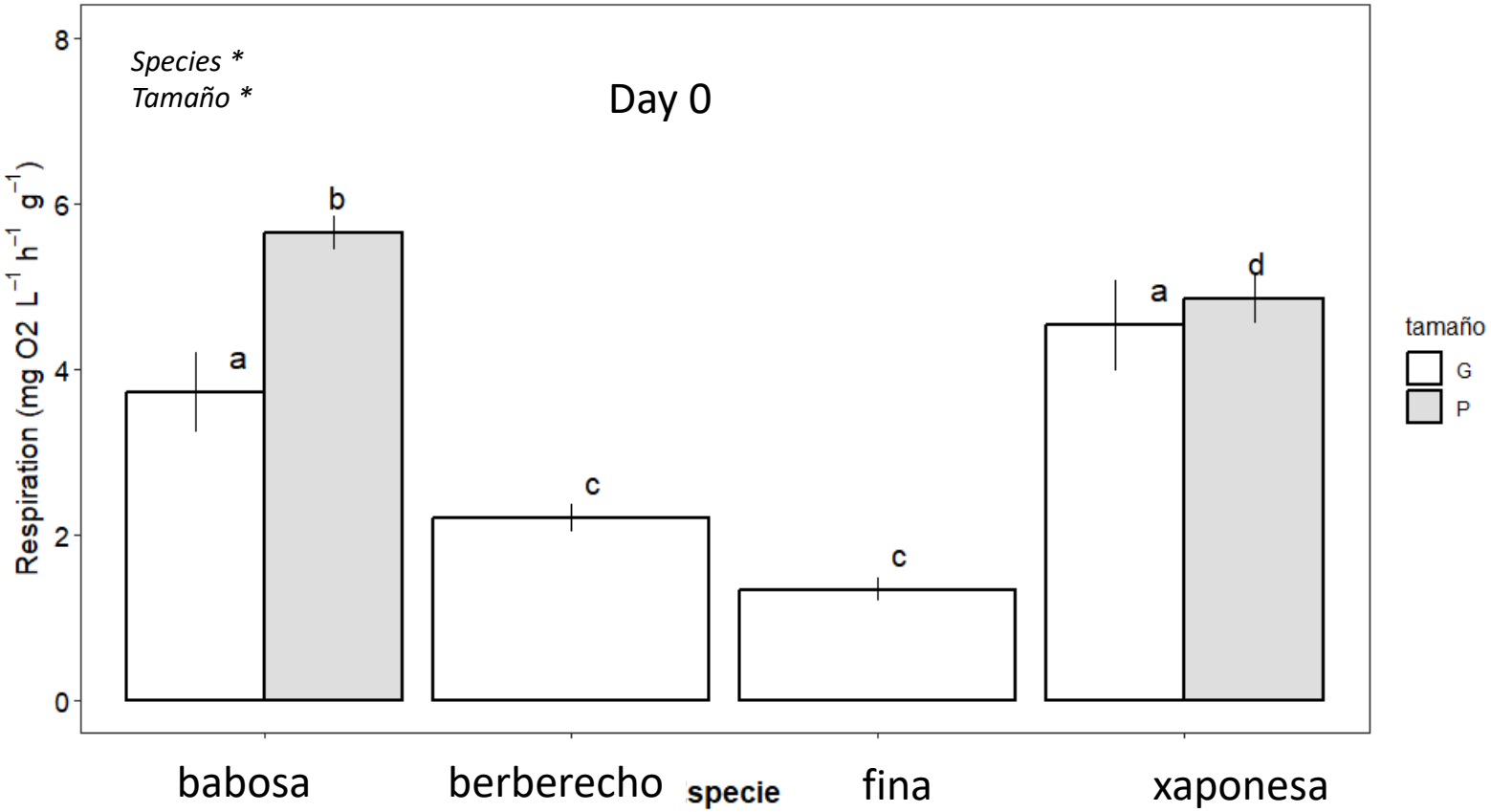
xaponesa



berberecho

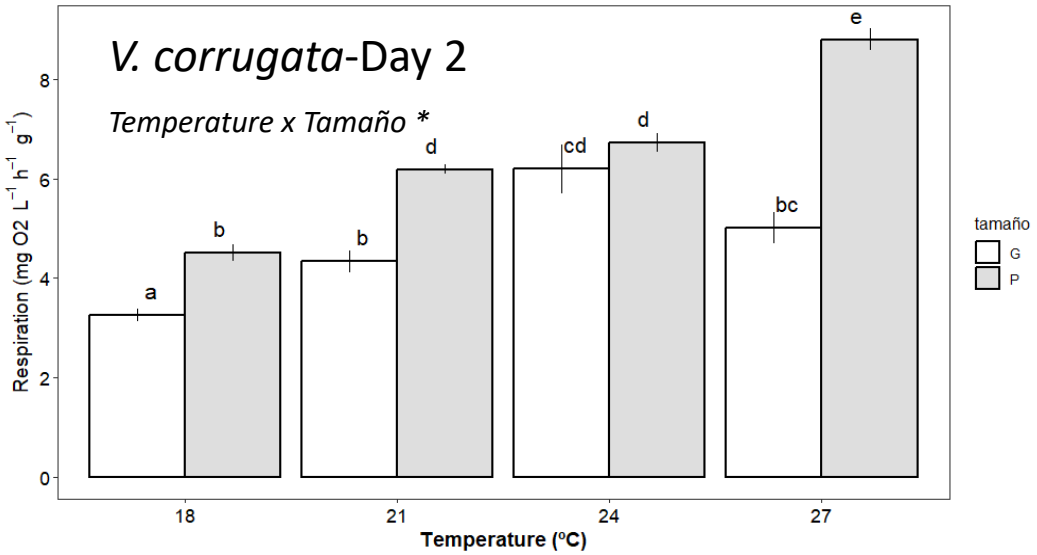


Respiration

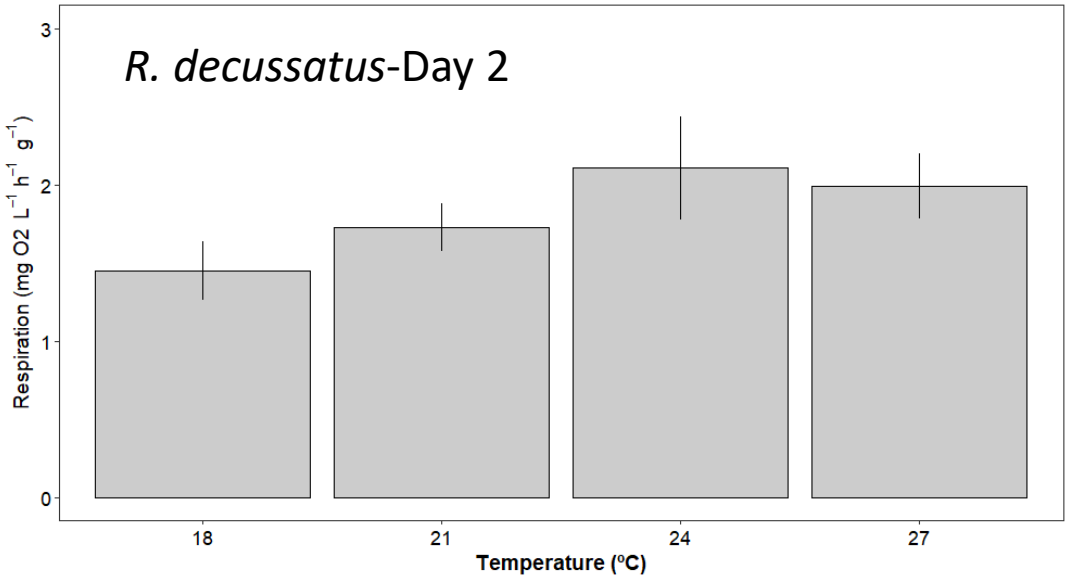


Respiration

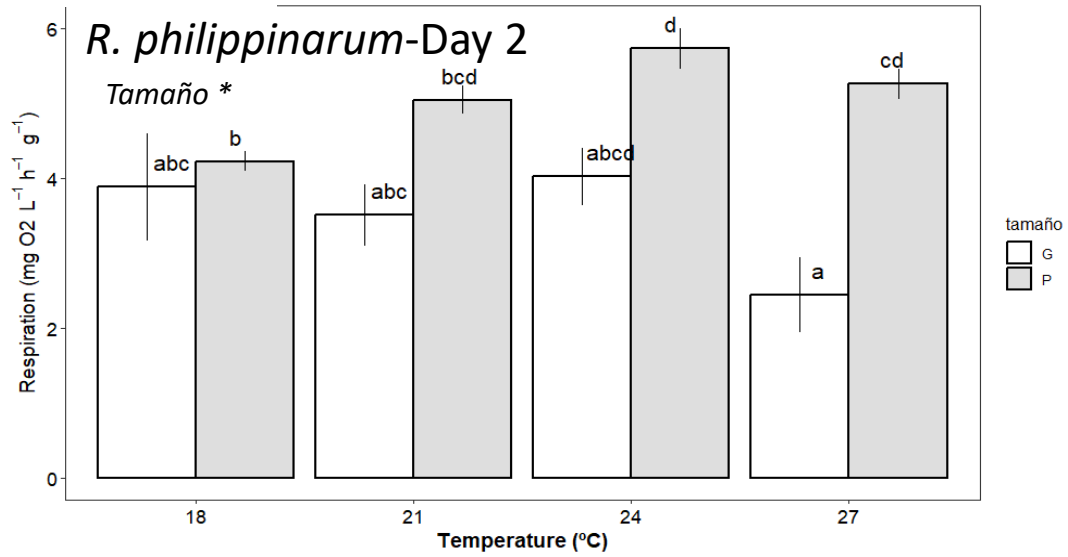
babosa



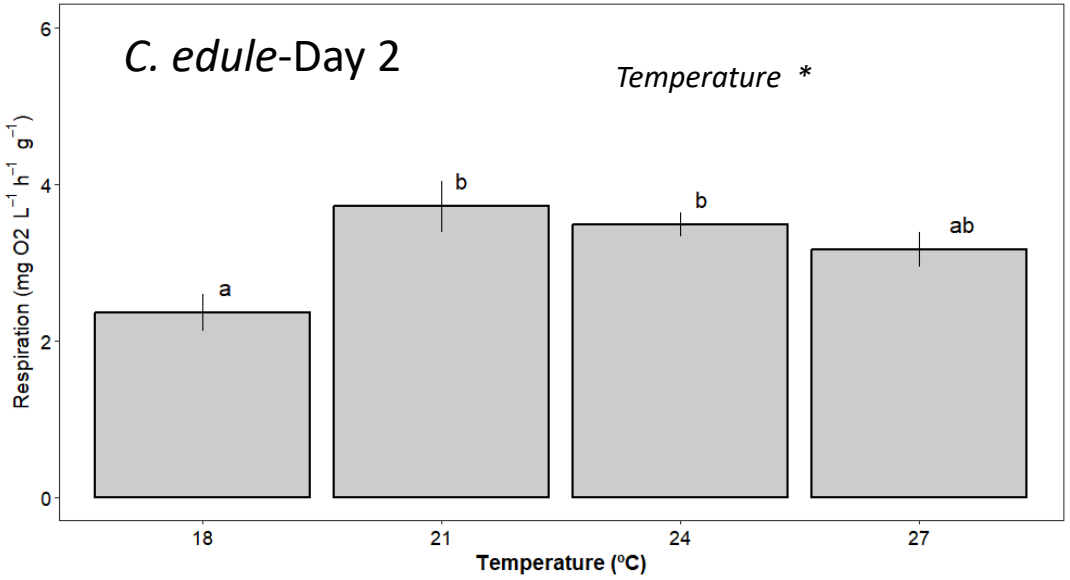
fina



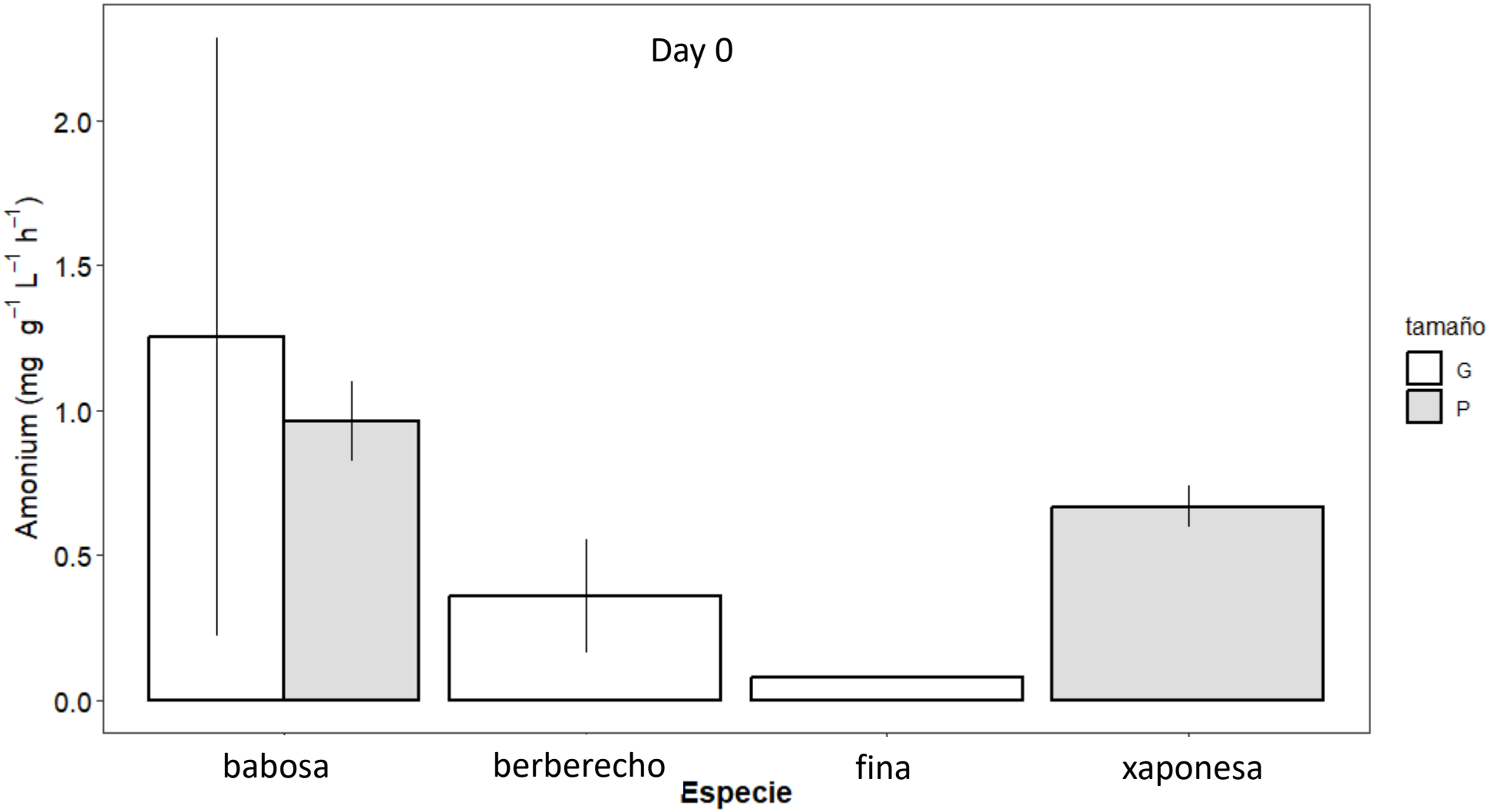
xaponesa



berberecho

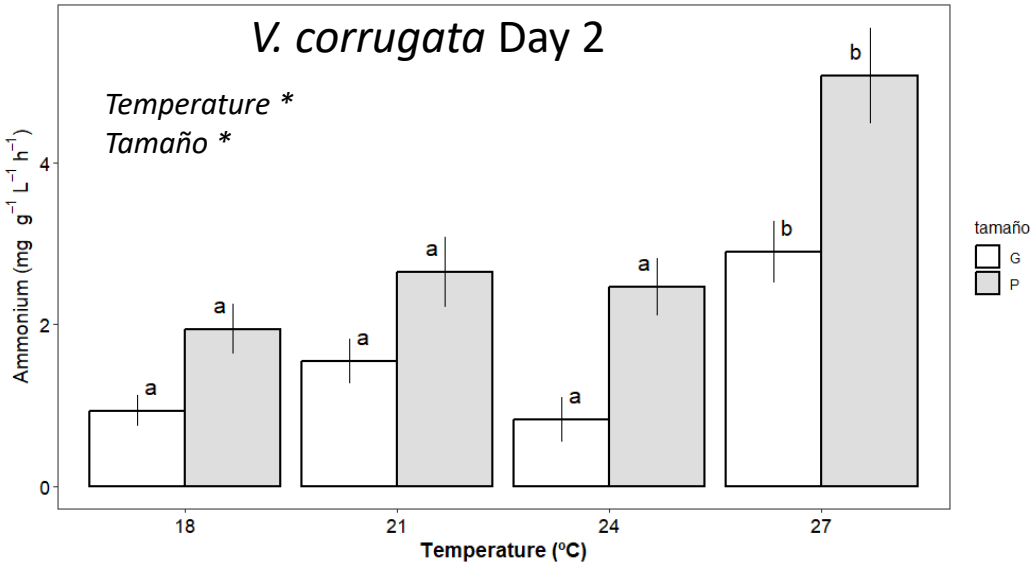


Excretion

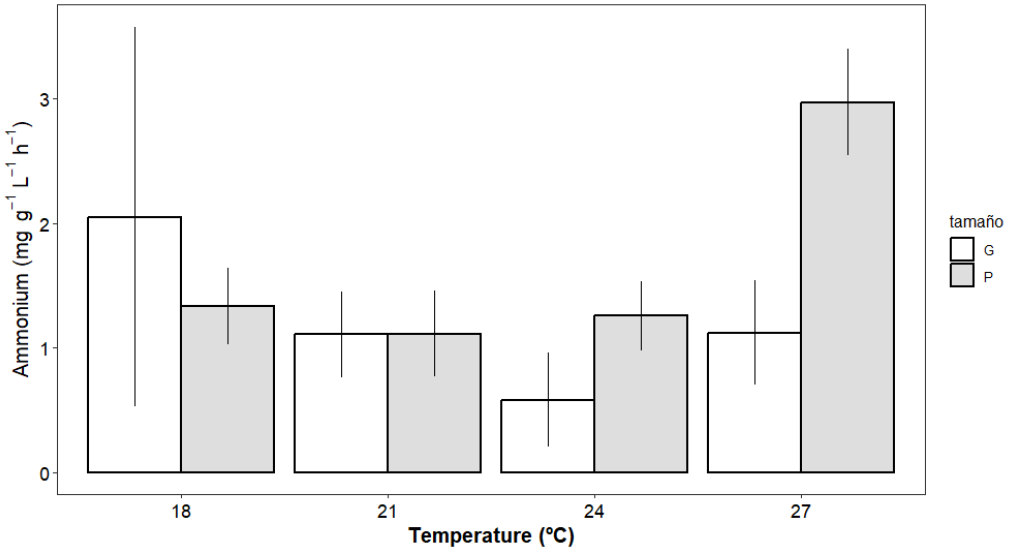

Day 0
Amonium (mg g^{-1} L^{-1} h^{-1})
2.0
1.5
1.0
0.5
0.0
babosa
berberecho
fina
xaponesa
Especie
tamaño
G
P

Excretion

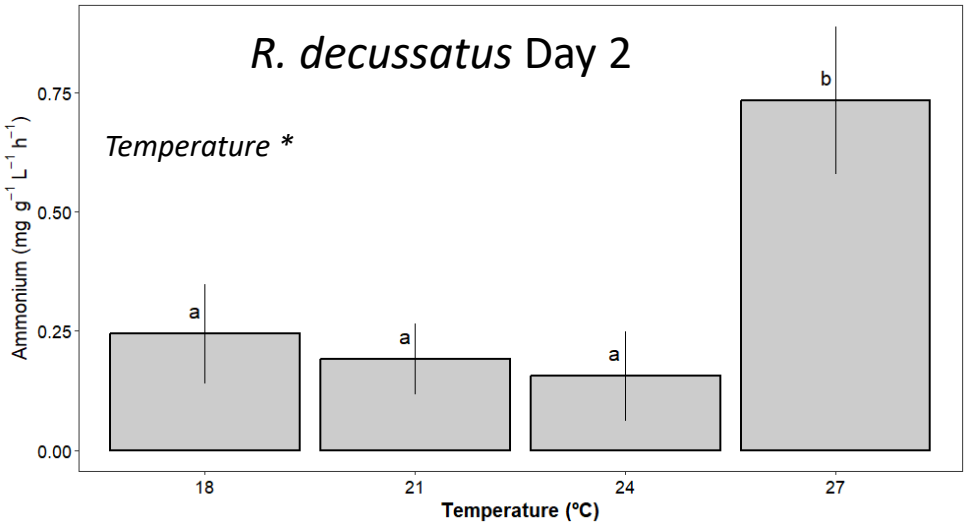
babosa



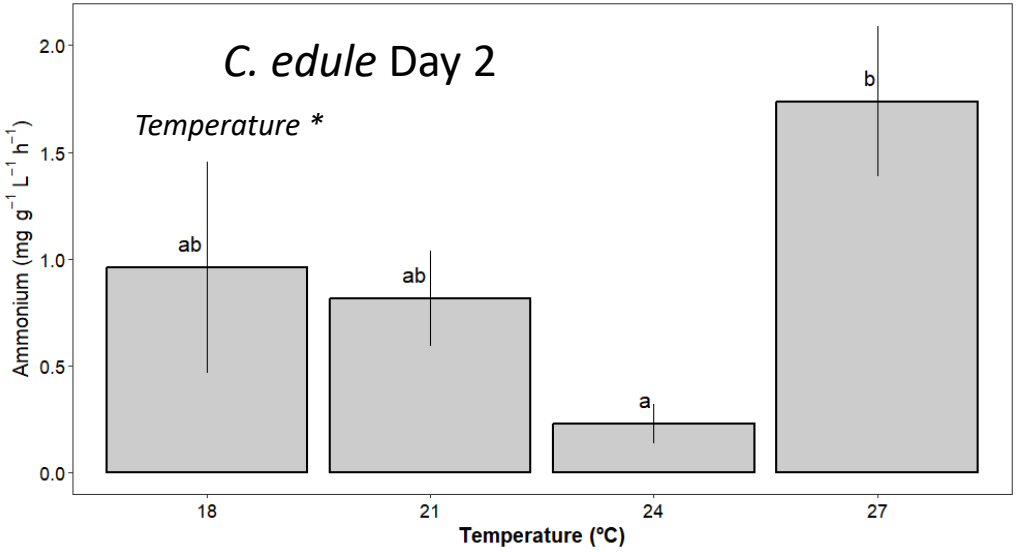
R. philippinarum Day 2 xaponesa



fina



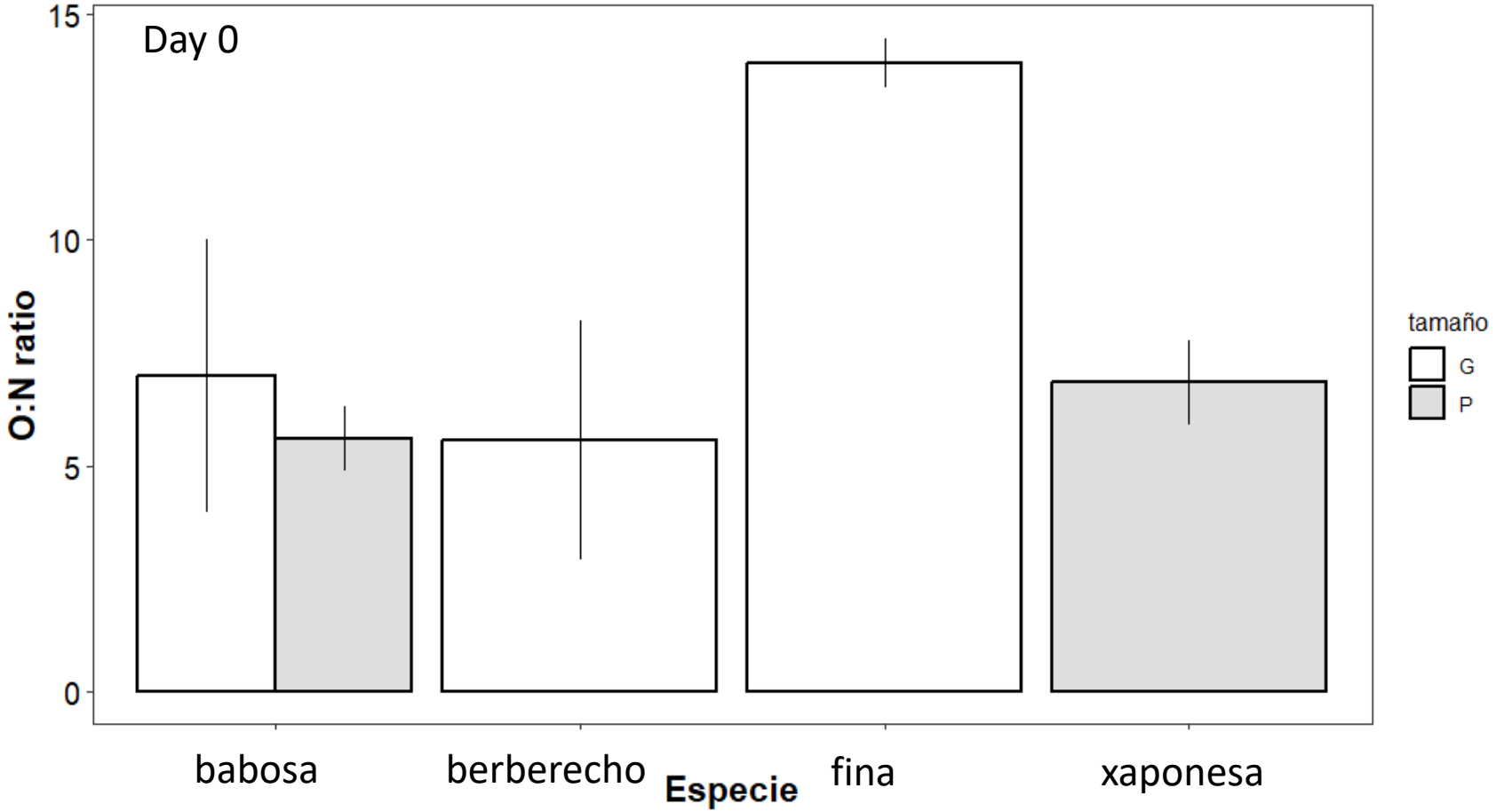
berberecho



O:N ratio

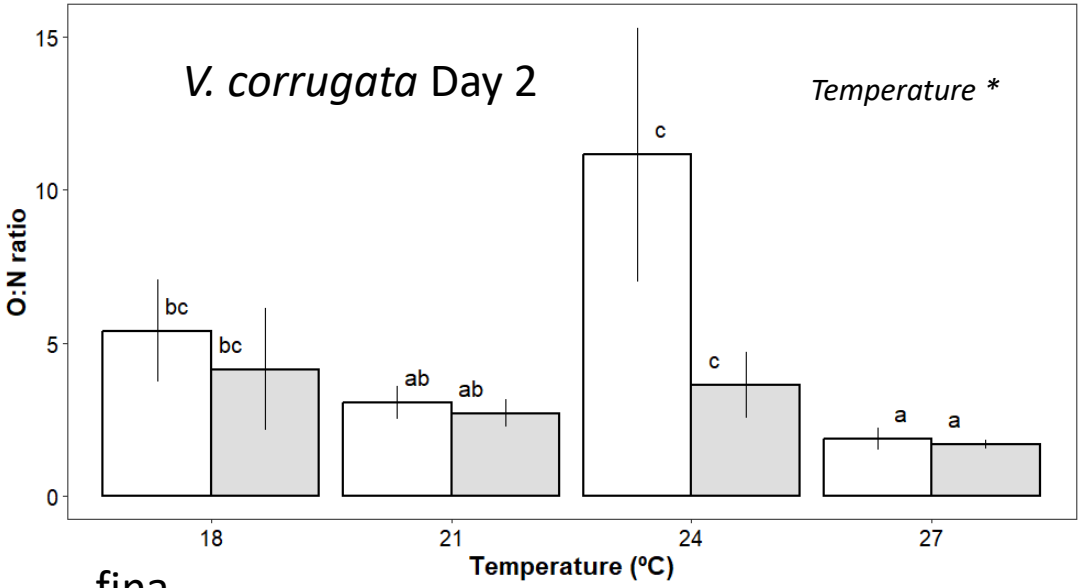
Balanced catabolism would oscillate between 50 and 60 while values below 30–20 are indicative of stress and pure protein catabolism will reach values between 3 and 13

Peteiro et al. 2018: berberechos 9-10 mm valores por debajo de 20 y muchos por debajo de 10 en la respuesta aguda que sería la equivalente a la nuestra. A salinidad 25 está sobre 10 y a salinidad 30 es algo inferior a 20.

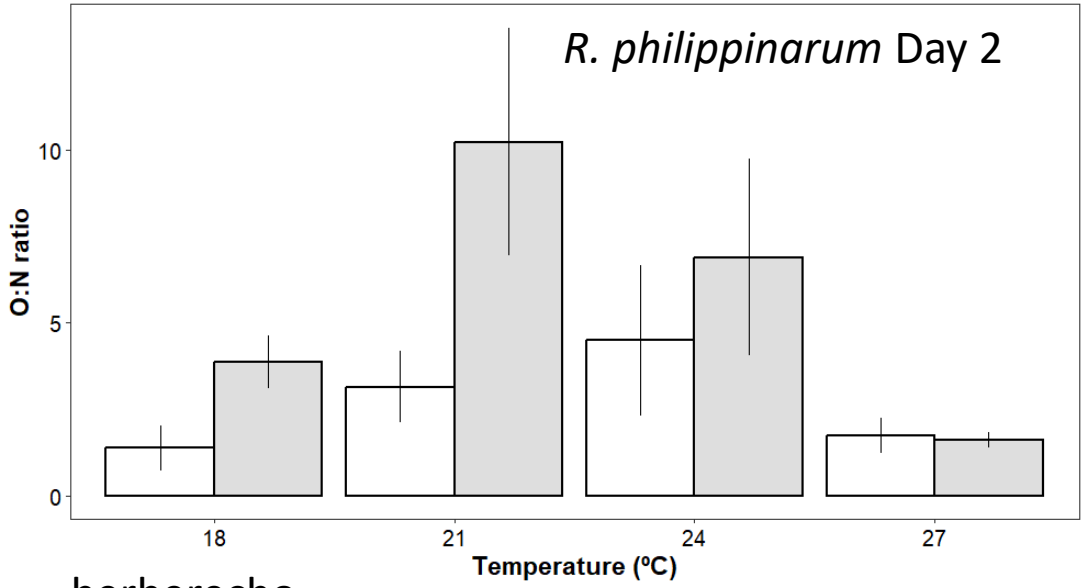


O:N ratio

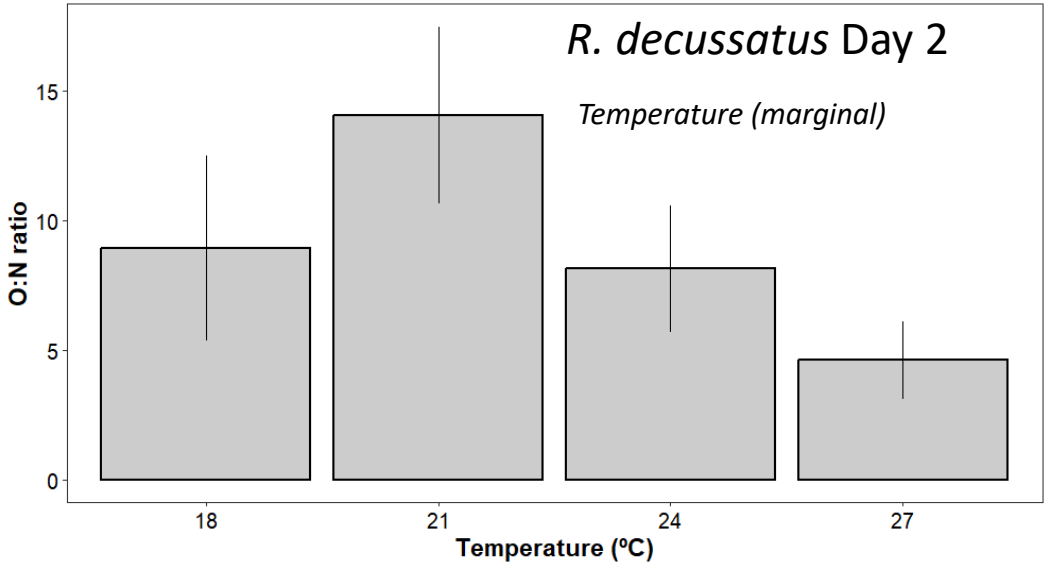
babosa



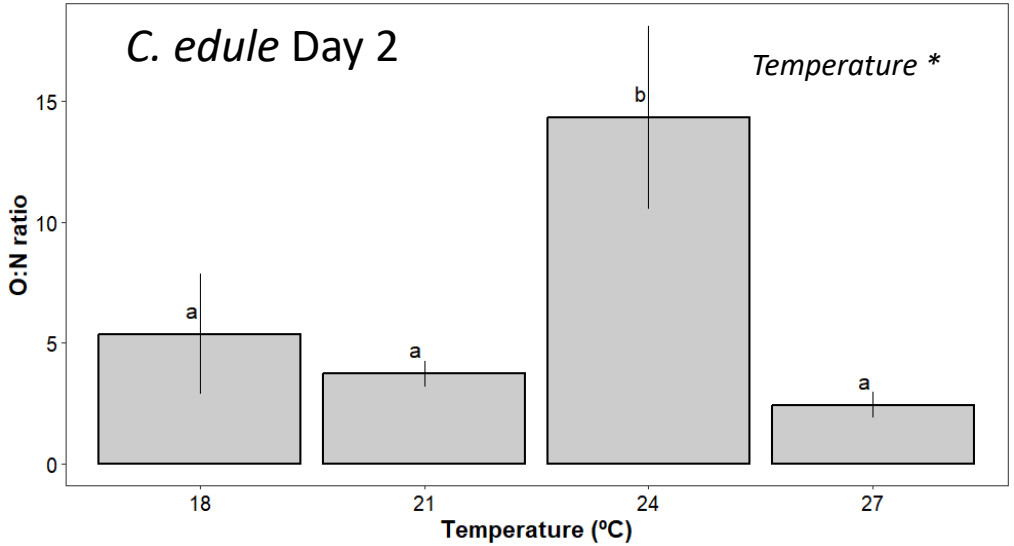
xaponesa



fina



berberecho



Salinity experiment

5.1. Experimentos salinidad (February 2024 & May-June 2024)

-Performance curves for recrutis and juveniles: constant salinity without tides, 4 days

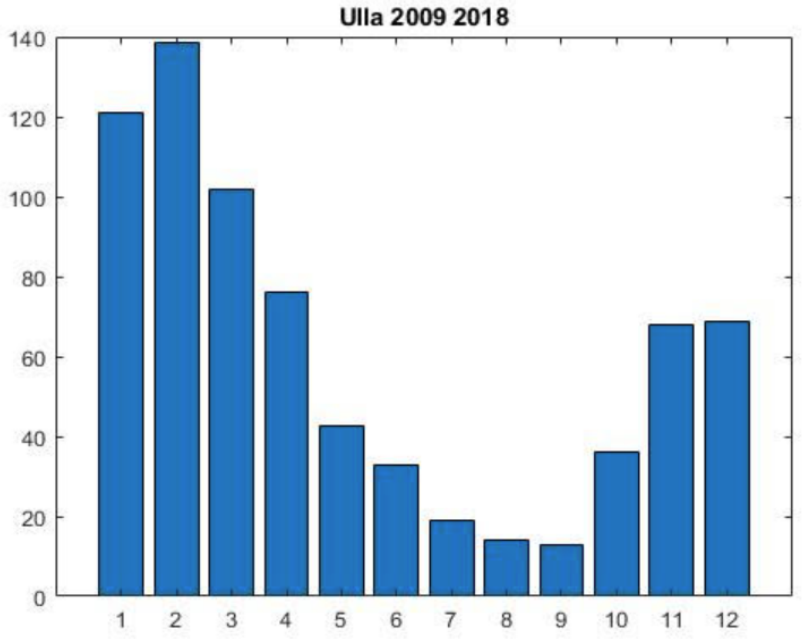
Especies (x4)
Fina
Xapo
Babosa
Berberecho X

Tamaño
<10 mm

Salinidad (x5)
6
9
12
15
35 (control)

x 10 réplicas

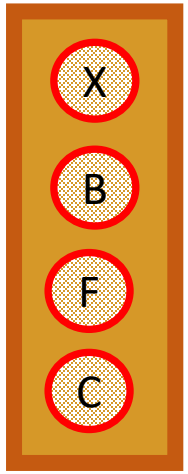
Exposición
4 días
Medidas D0, D4



Variables Respuesta

- ✓ Respiración (30 minutos)
- ✓ Alimentación (Citometría de flujo)
- ✓ Amonio 4h en 100 ml (ECIMAT)
- ✓ Volumen
- ✓ Peso seco

- Respuesta en 4 días
- Sin mareas; a temperatura ambiente
- Aireación suave para evitar evaporación
- Tanques de cabecera (uno por tratamiento) y poca renovación para que se consuma un tanque de cabecera en 24h.
- Cada 24h preparar nuevos tanques de cabecera
- 30 individuos en cada vaso
- Poner malla superior en cada vaso para evitar que salgan de los vasos



x 10 para cada salinidad

June 2024

Objective 4

Task 4.2 :

1. Effects of salinity on physiology of clams in two different sediments
2. The effects of clams on sediment differ under different salinity conditions

35-35 psu **Salinity** 5-15 psu

Sediment

Sand

Mud

We think this species (*Venerupis corrugata*) is the most interesting to test salinity effects

Small-sized adults 20-25 mm, depending on availability

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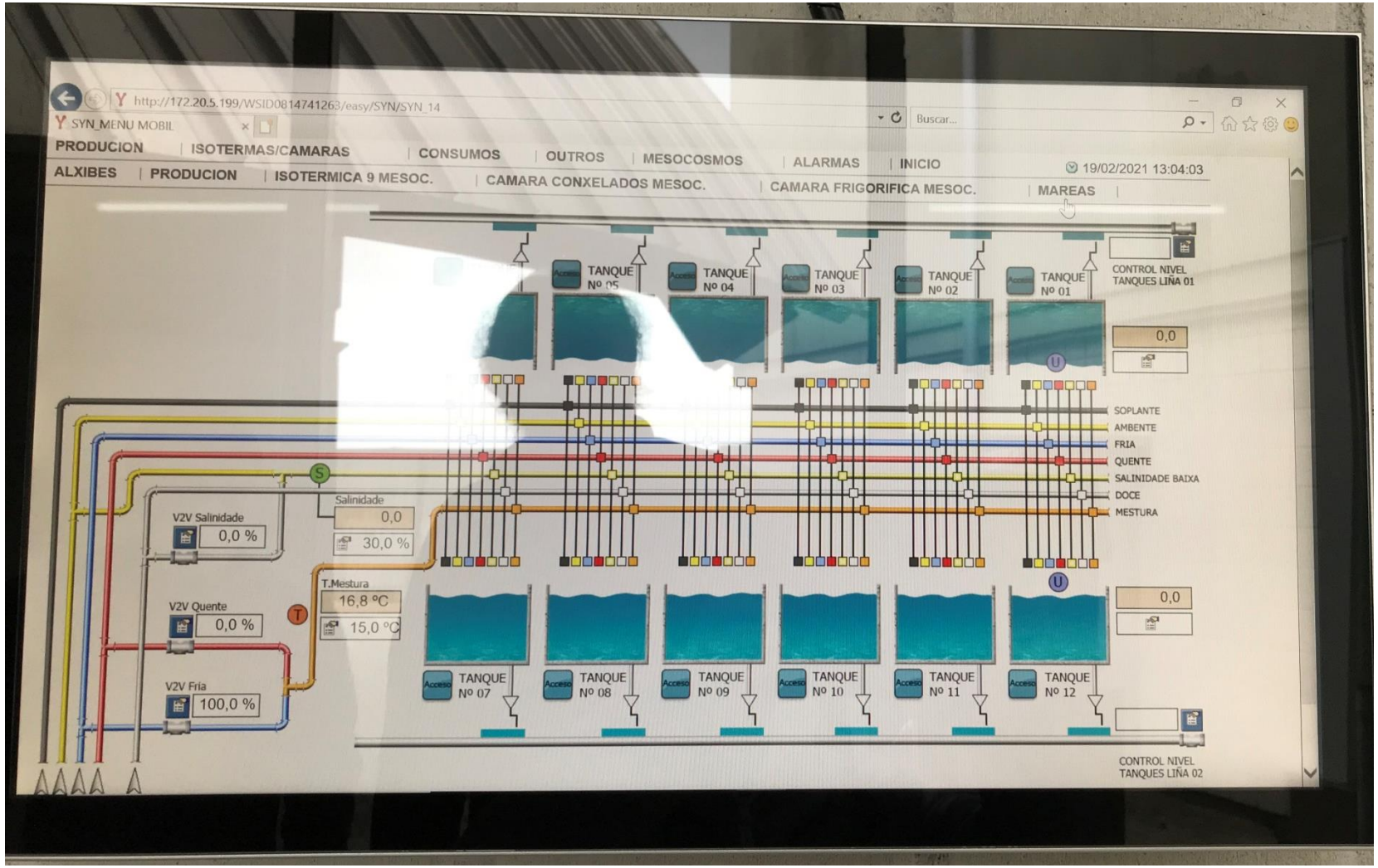
RECOBI

Mesocosms

RECOBI



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12 tanks in each 18 black baskets (0,25 m^2)

Possibility of two different low tides
Possibility of two
different salinities plus control that can be the cold line (without controlling temperature)

4x5=20-2=18 black baskets

25x25x15 cm
0.0625 m^2

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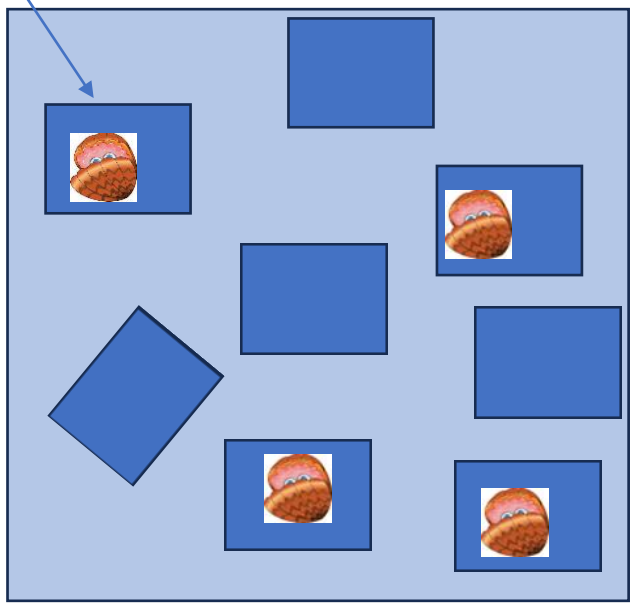
Experimental design

25x25x15 cm
0.0625 m^2

n= 4

Salinity and Sediment are two ortogonal fixed factors: 35-35sand, 35-35 mud, 5-15 sand, 5-15 mud. Each combination of combination of treatments replicated in 3 random Tanks (third factor), with 4 randomly positioned replicates (basket) of each treatment with and without clams (fourth factor). Keeping sediment type separated in different experimental big tanks

Eg: 3 Big tanks per condition Salinity-Sediment: Salinity (35-35)-Sediment (sand)



Keeping densities similar to field:
225 ind/m2 (big adults): 14 individuals/basket, maybe a
Little bit more as they will not be big adults…. 18 individuals
(6 of each species)

One of the most vulnerable to salinity changes is *V. corrugata*, we think it is better to focus on one species.

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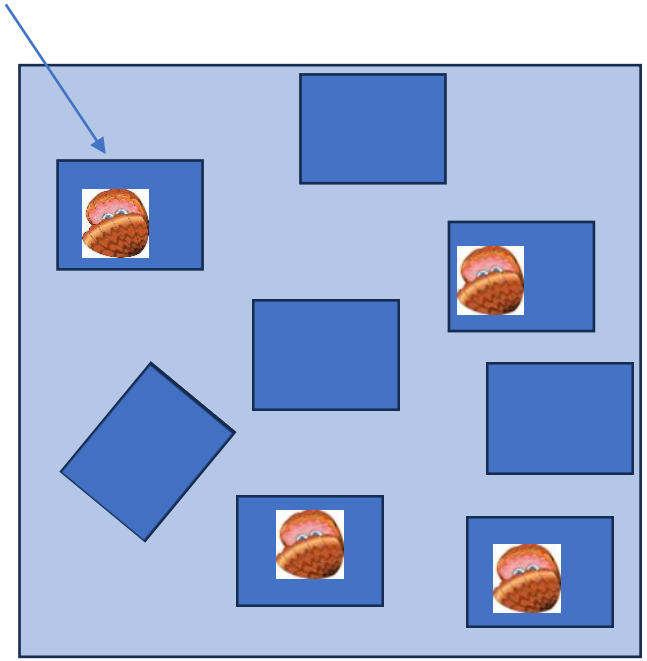
Experimental design- Sediment variables (pH, OM, redox..)

To be defined by Geo team

Eg: 3 Big tanks per condition Salinity-Sediment: Salinity (35-35)-Sediment (sand)



If data of sediment are analysed by ANOVA (MO, redox, etc.)

	df	F-versus
Salinity	1	Tank (Salinity *Sediment)
Sediment	1	Tank (Salinity *Sediment)
Tank (Salinity *Sediment)	8	Residual
Clam	1	Clam x Tank (Salinity * Sediment)
Salinity x Sediment	1	Tank (Salinity *Sediment)
Salinity x Clam	1	Clam x Tank (Salinity * Sediment)
Sediment x Clam	1	Clam x Tank (Salinity * Sediment)
Clam x Tank (Salinity * Sediment)	8	Residual
Salinity *Sediment*Clam	1	Clam x Tank (Salinity * Sediment)
Residual	72	

n= 4

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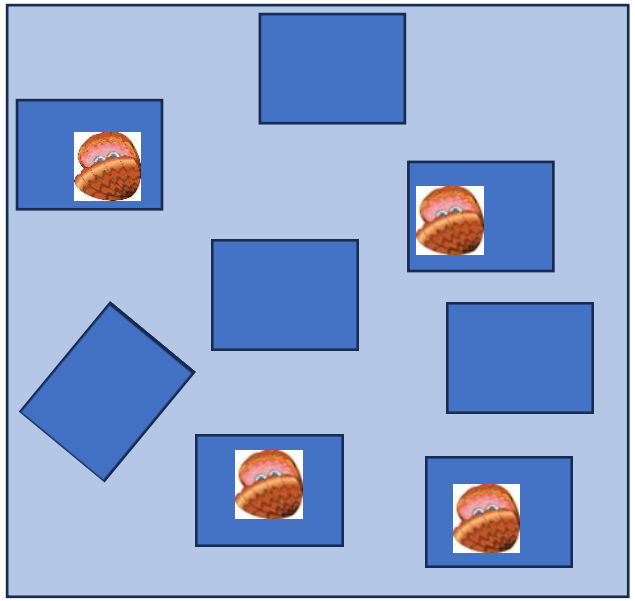
Experimental design- Physiological variables (clams)

Eg: 3 Big tanks per condition Salinity-Sediment: Salinity (35-35)-Sediment (sand)

If data of clams are analysed by ANOVA (feeding, respiration…)

4 baskets each



	df	F-versus
Salinity	1	Tank (Salinity x Sediment)
Sediment	1	Tank (Salinity x Sediment)
Tank (Salinity x Sediment)	8	Basket(Salinity x Sediment x Tank)
Basket(Salinity x Sediment x Tank)	36	Residual
Salinity x Sediment	1	Tank (Salinity x Sediment)
Residual	144	

Animals to measure for physiological ~ 4

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