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PHYSIOLOGICAL RESPONSES OF *CERASTODERMA EDULE* UNDER SALINE STRESS: THREAD DRIFTERS *VS.* SEDENTARY SETTLERS

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INTRODUCTION

The cockle *Cerastoderma edule* shows low tolerance to oscillations of salinity and mass mortality events are often linked to torrential rains. Nonetheless information on salinity thresholds and consequences of sudden drops in salinity for post-settlers and juveniles of *C. edule* is still lacking, even when torrential rains are more frequent during spring (right after cockle settlement) and fall (≈3 months old settlers).

Fig. 1 Sedentary juveniles and thread drifters.

Our **objective** is to determine differences in physiological responses to saline stress between recently settled cockles (thread drifters) and sedentary juveniles which might explain differential habitat requirements during development and their consequences for the maintenance of adult populations.

MATERIALS AND METHODS

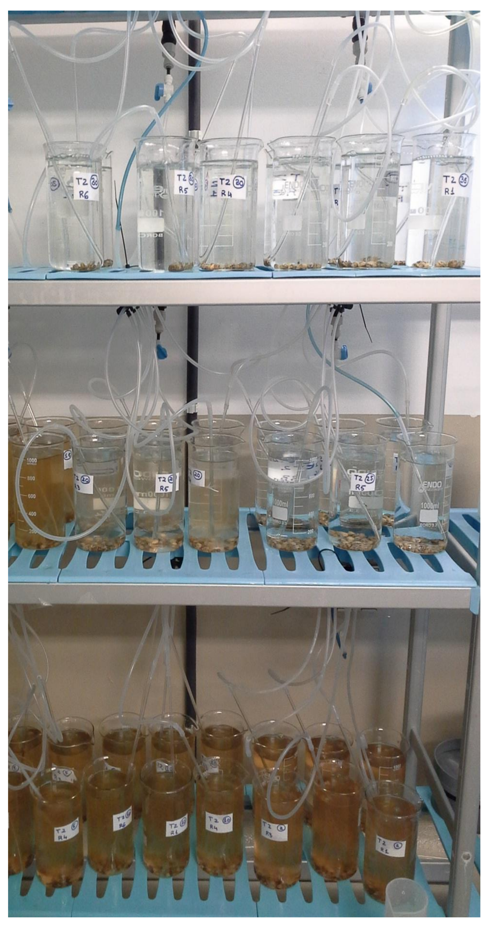

Fig. 2 Experimental set up

Four replicated beakers (1 l) per Salinity treatment (8 levels: 2, 5, 10, 15, 20, 25, 30 and 35) and Age (2 levels: thread drifters (L≈4mm) and sedentary juveniles (L≈10mm)) were maintained during 7 days in a controlled temperature room at 14°C.

Physiological rates (oxygen consumption, ammonium excretion and clearance rates) were measured on day 2 and 7 of the experiment following [1].

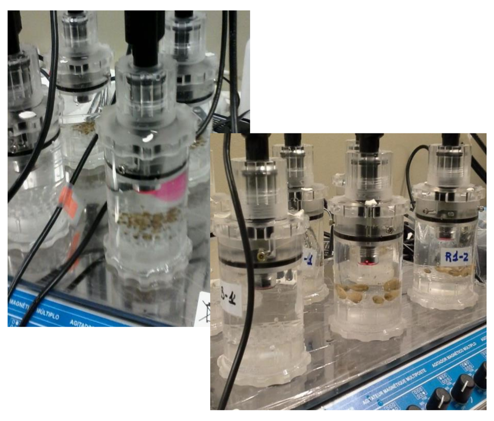

Fig. 3 Oxygen consumption measurements on thread drifters and sedentary juveniles.

RESULTS

Day 2

- **S < 15** induce **isolation reflex**: continuous valves closure and almost complete inhibition of respiration, clearance or excretion rates (Fig. 4A, 4B, 4C).
- **S ≥ 15** Physiological rates progressively **increase with salinity** (Fig. 4A, 4B, 4C)

Day 4

- **S < 15 100% mortality**

Day 7

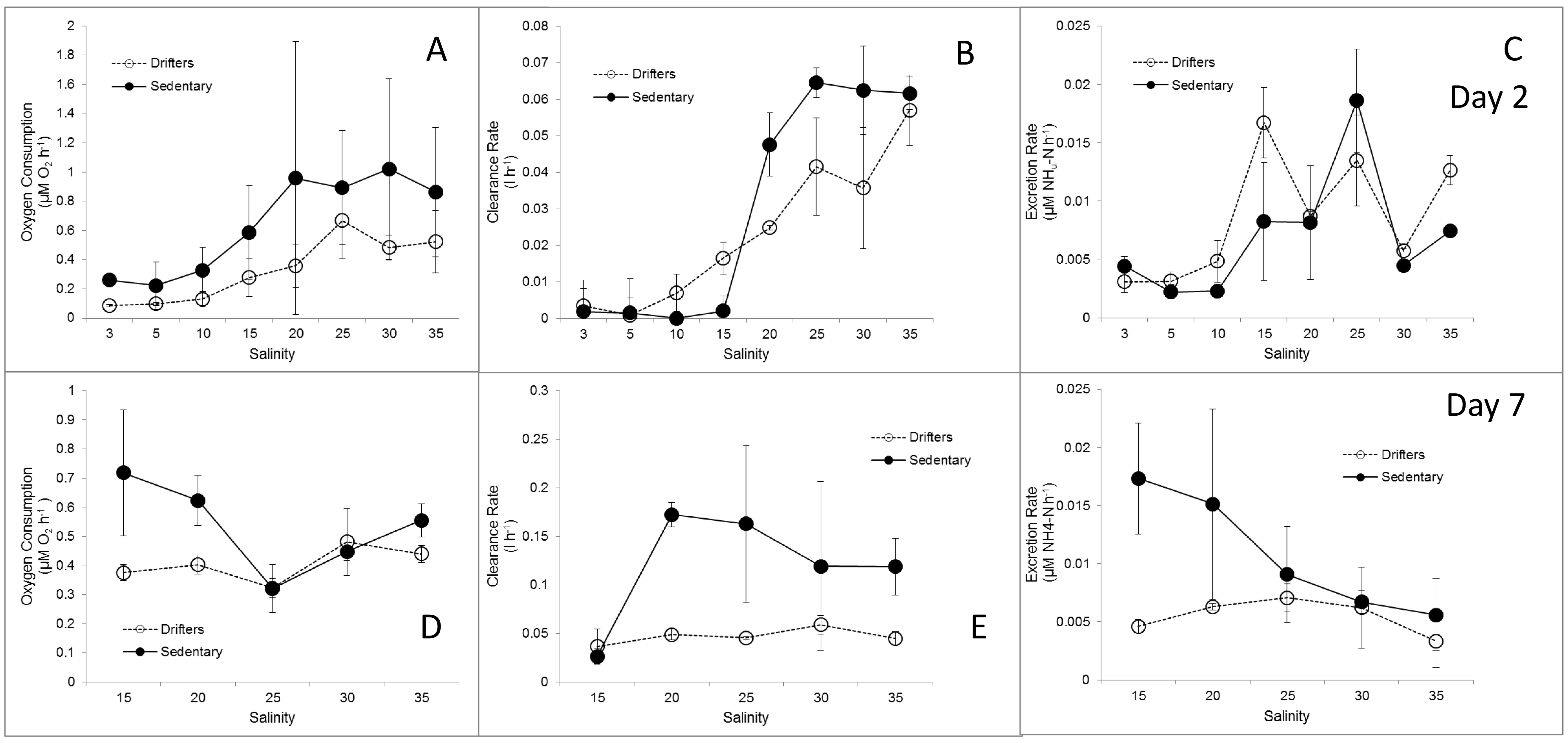

Fig. 4 Oxygen consumption (A, D) Clearance (B, E) and Excretion rates (C,F) for thread drifters and sedentary junvelies measure after 2 (A, B, C) and 7 days (D, E, F) of exposure to the different salinity treatment. Physiological rates standarized to the averaged tissue weight of both age clases (4 mg), following [2].

- Significant **interactions** between **Age and Salinity** were detected for all the physiological rates measured (factorial ANOVA; $F_{4,30}$=5.9 p<0.005 Fig. 4D; $F_{4,30}$=3.7 p<0.05 Fig. 4E; $F_{4,18}$=4.9 p<0.05 Fig. 4F).
- For **sedentary juveniles** clearance rate drops at salinity 15 while oxygen consumption and excretion rate decrease progressively with salinity.
- For **thread drifters** all the salinity treatments show similar physiological rates.

CONCLUSIONS

- **S < 15 initiate the isolating reflex [3] in cockles. Upon that threshold activity progressively increase although with differences between age levels.**
- **Continuous exposure to S < 15 are lethal because of prolonged asphyxia and accumulation of anaerobic metabolism products [3].**
- **After 7 days thread drifters are acclimated to the new salinity but sedentary juveniles show lower intake of energy (CR) and higher wastage (respiration and excretion rates) at low salinity treatments.**
- **Thread drifters are more euryhaline than sedentary juveniles. Changes on physiological performance during development might explain migrations of thread drifters from the high intertidal where they settle to deeper waters where saline conditions are more stable and adults more abundant [4].**

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