



Responsiveness of polar organisms to multiple environmental stressors

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INTRODUCTION

Polar organisms are adapted to live in extreme environments with stable conditions in terms of temperature, pH and dissolved oxygen, and strong seasonality in solar irradiation, food availability and trace element distribution (1). In this context, any change in such environmental conditions may have high impacts on biological systems of polar organisms, and consequent repercussions on ecological equilibrium. Polar species represent suitable models for investigating the effects of climate change scenario (2), but the technical and logistic difficulties in their availability limit the development of such research and the harmonization of suitable procedures for their use (3).

AIMS

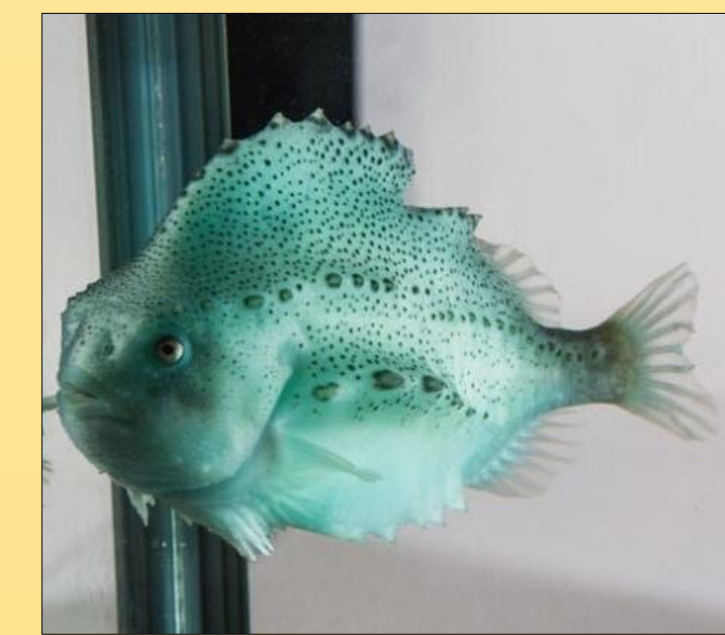
- To set-up a Polar Aquarium within UNIVPM facilities to maintain under the more appropriate conditions key organisms from alpine, Arctic and Antarctic regions.
- To characterize a wide spectrum of biological parameters, including specific molecular and cellular pathways in key polar species under environmental and experimental conditions such as emerging contaminants exposure in a climate change scenario.
- To develop a non-lethal approach and biological methodologies to use polar organism as sentinel species toward climate change and anthropogenic impacts.

WORK PLAN

- Set-up of polar aquarium and optimization of maintenance conditions for polar species.
- Collection, transport and husbandry of organisms from Arctic, Antarctic and Alpine regions.
- Development of digital informative cards on polar species maintained in the polar aquarium and virtual platform for dissemination purpose.
- Characterization of biological responses of main molecular and cellular pathways in polar organisms using molecular, biochemical, and cellular techniques.
- *In-vivo*, *ex-vivo* and *in-vitro* test for evaluating stress responses to exposure with emerging contaminants in a climate change scenario.



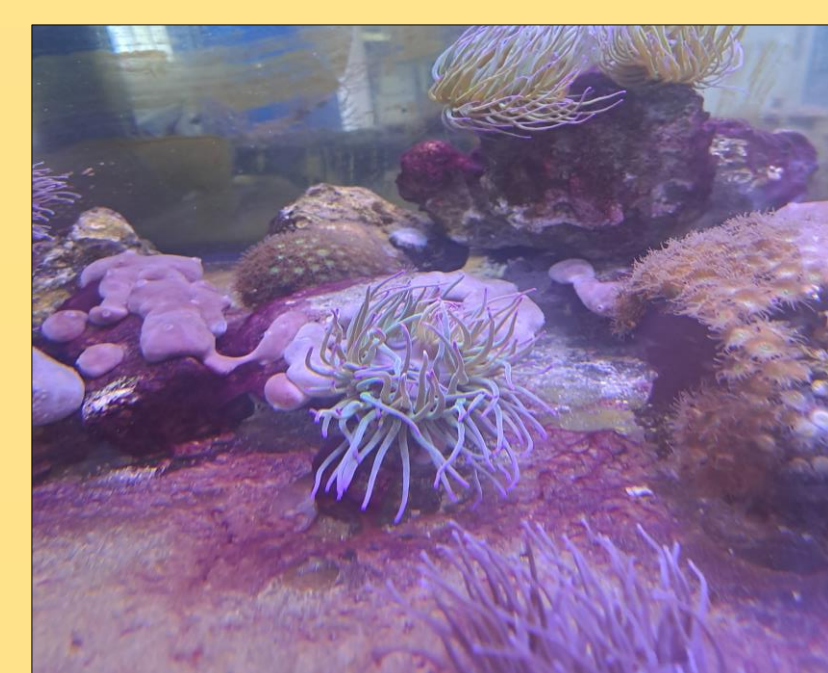
Anarrhichthys ocellatus



Cyclopterus lumpus



Salvelinus fontinalis



Anemonia viridis



Urticinopsis antarctica

EXPERIMENTAL ACTIVITY AND PRELIMINARY RESULTS

- ❖ Comparison of the modulation of stress responses in temperate and polar sea anemone species (*Anemonia viridis* vs *Urticinopsis antarctica*).
- ❖ Development of non-lethal sample techniques for sea anemones by tentacle sampling and asexual reproduction induction.
- ❖ Preliminary results on *A. viridis* have been shown good regeneration capacity in captive specimen (around one week) and good but slow rate of asexual reproduction induced by longitudinal cut of basal body.



Dipartimento di Scienze della Vita e dell'Ambiente

DiSVA

ACQUARIO POLARE

Dipartimento di Eccellenza (Legge n.232/2016)

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References

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