Environmental factors driving benthic macrofauna communities in a tropical seagrass bed (Hermitage-La Saline reef, Reunion island)

Authors: Joséphine Pierrat¹*, Lionel Bigot², Alexis Cuvillier³, Patrick Frouin⁴

¹: josephine.pierrat@univ-reunion.fr, UMR ENTROPIE – University of La Réunion (PhD. Student)
²: lionel.bigot@univ-reunion.fr, UMR ENTROPIE – University of La Réunion
³: alexis.cuvillier@univ-reunion.fr, UMR ENTROPIE – University of La Réunion
⁴: patrick.frouin@univ-reunion.fr, UMR ENTROPIE – University of La Réunion

*: Presenting author

Understudied compared to coral reefs, seagrass meadows offer a large range of ecosystem services, as blue carbon fixation or reduction of wave energy. These habitats have rich and dense communities of benthic macrofauna. At La Réunion, such macrofauna living in the Syringodium isoetifolium meadows have been poorly investigated yet.

This study aims to analyze the structure of benthic macrofauna communities throughout the coral reef of Hermitage-La Saline and to understand the environmental factors shaping their spatial distribution. It was performed at the summer season of 2018 (January to April).

Seagrass and surrounding sediments were sampled by coring at six stations with different levels (grazing, pass, swell or epiphytic load effects). Macrofauna was identified and counted. Seagrass biometrics (lengths of vertical rhizomes, shoot, sheath and leaves) were assessed and biomass of plants and epibionts quantified. Moreover, total organic matter load and mean grain size of sediments were quantified.

In this study 110 taxa were identified. The structure of benthic macrofauna communities across the reef complex was highly variable. The significantly informative variables were: vertical rhizomes length, seagrass aboveground and epibiont biomasses. Results show intense and constant hydrodynamics that seems to decrease abundance and diversity of benthic macrofauna, which are then largely dominated by suspension feeders, especially by Actiniaria sand anemones (406 ± 79 ind/m²). Moreover, herbivory pressure by
turtles has a negative effect on seagrass aboveground biomass and also seems to shift benthic community diversity towards suspension feeding mode, represented by dominant species such as *Phyllochaetopterus herdmani* (1761 ± 60 ind/m²). Finally, nutrient enrichment in two stations may cause an increase in macroalgae epiphytic load and favors benthic herbivore species feeding on epiphytes, as *Cerithium rostratum* (867 ± 218 ind/m²).

In conclusion, this study shows that community structure of benthic macrofauna in seagrass meadows of La Réunion is led, at micro-habitat scale (tens to hundreds of meters), by multiple environmental factors. Further studies should focus on seasonal and inter-annual variability of those communities. Such complex interactions and spatial variability should make management of these protected areas very integrative.

**Key words:** Seagrass meadows, *Syringodium isoetifolium*, Benthic macrofauna, Structure of communities, Environmental factors