Global biotic interactions of seagrasses: a systematic review of epibiont and epiphyte relationships

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Introduction

One of the main factors influencing the distribution and abundance of species worldwide is the **interactions** between organisms[1]. Among those, the relationship between **habitat-forming** species and other **organisms** plays a key role in the ecosystem functioning[1,2]. **Seagrasses** are **highly productive habitat-forming** plants found worldwide, creating densely populated meadows that offer a variety of important **ecosystem services**, including:

a) **raising the pH and O_2** levels in the water column[3,4,5];
b) **protecting the coast** from erosion due to wave attenuation[3];
c) providing a variety of **feeding and nursery areas**[3];
d) **absorbing nutrients** like N and P[3];
e) efficiently **sequestrating and fixing carbon** into the sediment[3].

This **systematic review** aimed to synthesize the **potential biotic interactions** between **seagrasses** and **epibionts-epiphytes** on a global scale. Understanding the various types of biotic interactions and studying **how they can influence the performance of the species involved** is of vital importance in the **current and future context of climate change.**

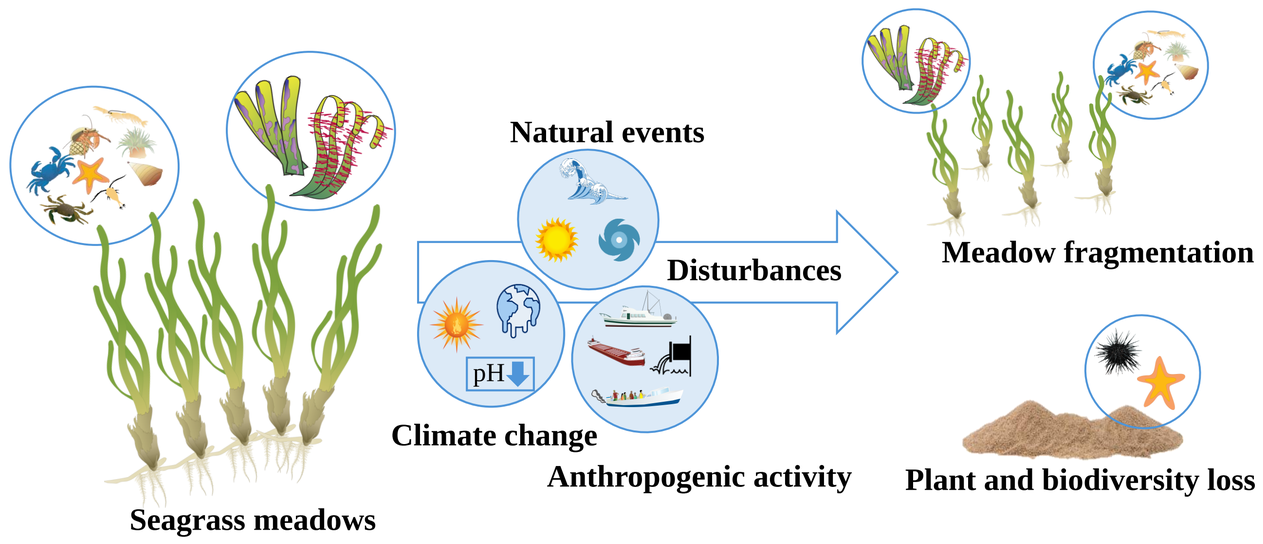

Figure 1: Potential impacts of disturbance events on the structure of seagrasses meadows and the associated consequences for epifaunal communities associated with those habitats.

Materials and Methods

Main research question:

*What are the **biotic interactions** between **epibionts-epiphytes** and **seagrasses**?*

Search String[6]:

(biotic OR interaction OR commensalism OR mutualism OR symbiosis) AND (epiphyt OR epibiont* OR "sea anemon*" OR anemon*) AND (seagrass* OR phanerogam*).*

Results

Seagrasses and their epibionts

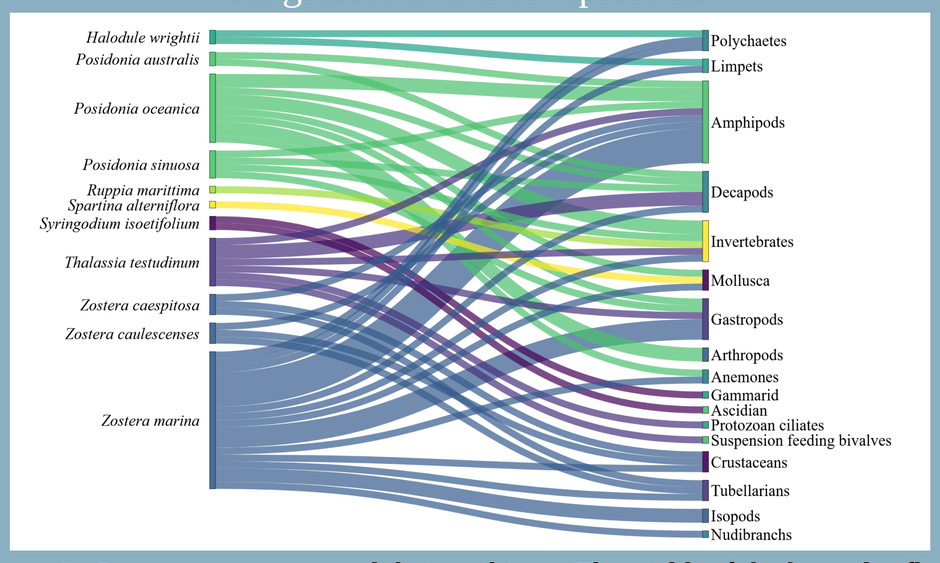

Figure 2: Seagrasses species and their epibionts.The width of the bars plot fluxes is representative of the number of studies.

Positive interactions between seagrasses and their epibionts

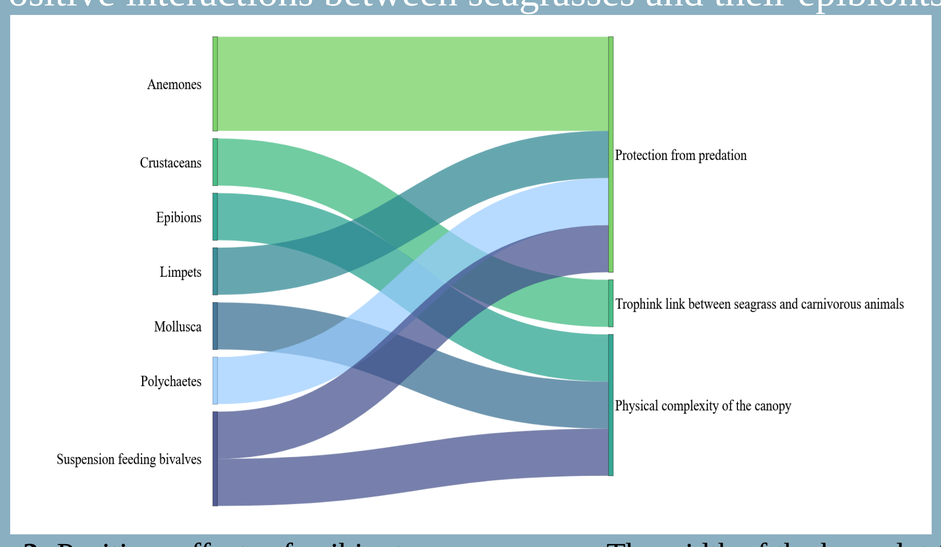

Figure 3: Positives effects of epibionts on seagrasses. The width of the bars plot fluxes is representative of the number of studies.

Seagrasses and their epiphytes

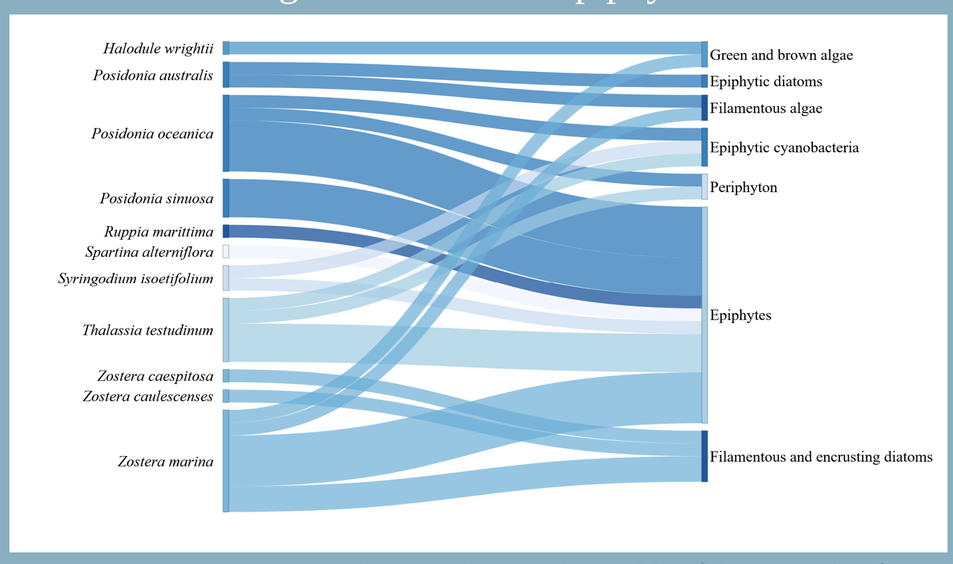

Figure 4: Seagrasses species and their epiphytes.The width of the bars plot fluxes is representative of the number of studies.

Positives and negatives interactions between seagrasses and their epiphytes

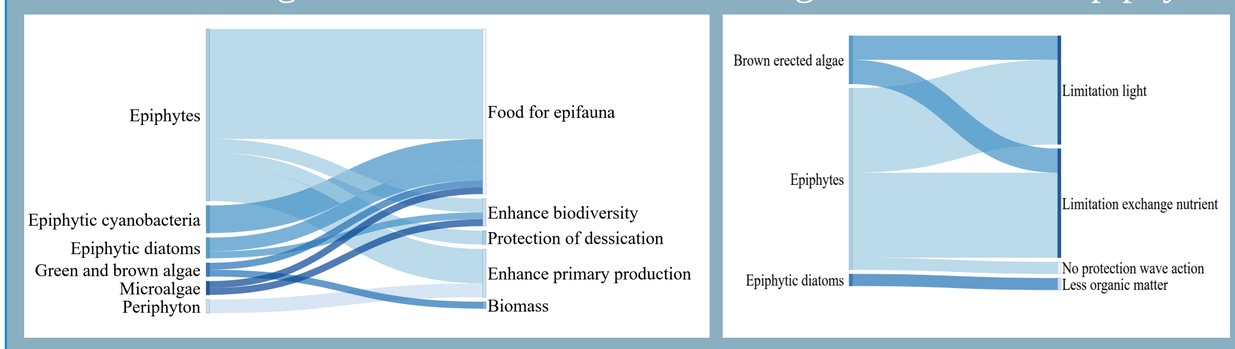

Figure 5: Positives and negatives effects of epiphytes on seagrasses. The width of the bars plot fluxes is representative of the number of studies.

Take home messages

Seagrasses: play a crucial role for their hosts by providing refuge and offering strategic leaf positions that enhance access to food and light.

Epiphytes: are sensitive indicators of natural and long-term environmental changes, with their biomass reflecting shifts in nutrient conditions.

Epibionts: the composition of epibiont communities can serve as a predictor of environmental factors and water quality.

References

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