

Zostera noltei as a rehabilitation tool for degraded estuarine ecosystems (Ria de Aveiro)

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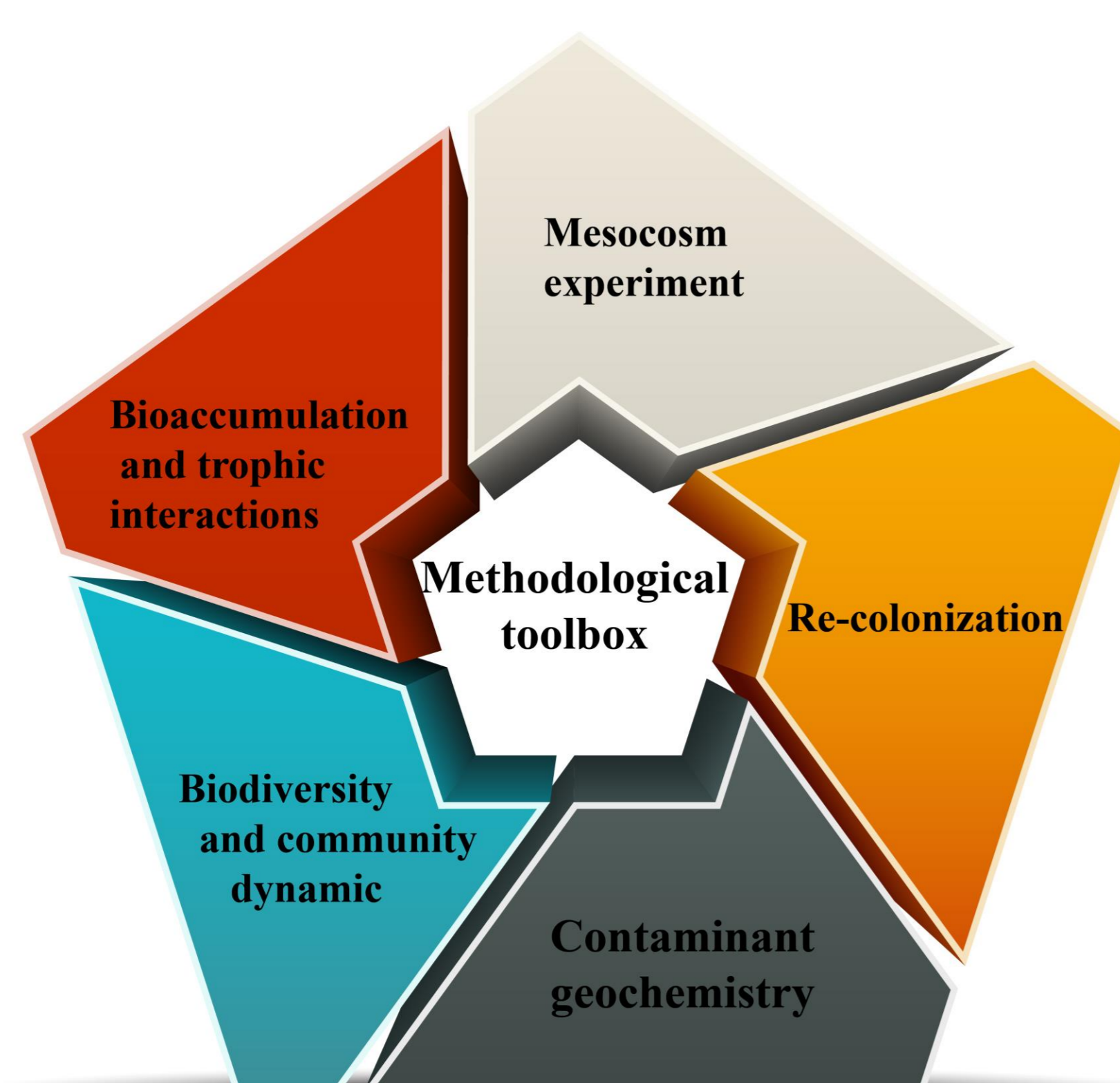
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Framework and General Goal :

With the recent declaration of the 2021-2030 UN Decade on Ecosystem Restoration, seagrass restoration efforts are in the spotlight, given the ecosystem functions that support the vital services they provide (e.g., carbon and nutrient sinks, biodiversity enhancement and coastal erosion prevention). Within this framework, seagrass re-colonization is currently being tested as a blue-green infrastructure for restoring historically contaminated ecosystems. The overarching goal of this work is to evaluate the use of *Zostera noltei* as a remediation tool in the Ria de Aveiro (Portugal).

Tasks:

- 1- Determine the most favourable conditions for the survival of *Zostera noltei* transplants, through laboratory growth experiments with different Hg concentrations in sediments
- 2- Perform a pilot *Zostera noltei* transplant experiment in the Largo do Laranjo area of the Ria de Aveiro
- 3- Evaluate the effect of seagrass cover on the contaminant geochemistry
- 4- Evaluate the effect of the transplant experiment on the biodiversity and annual production of macrobenthic communities
- 5- Evaluate the contaminant bioaccumulation and trophic transfer in flora and fauna



More info: remedigress.web.ua.pt

Goals:

- Biomass and coverage area
- Photosynthetic activity
- Physiological response
- Elemental composition



Life Support System with tidal simulation

Task 1

Goals:

- *Zostera noltei* transplant
- *Zostera noltei* monitoring
- Biomass and coverage area
- Photosynthetic activity
- Elemental composition



Zostera noltei transplant experiment

Task 2

Goals:

- Sediment accretion/erosion
- Contaminant and nutrient fluxes at the sediment water interface
- Vertical metal profiles
- Contaminants sequestration by *Zostera noltei*



Geochemical monitoring in sediments

Task 3

Goals:

- Taxonomical and functional biodiversity
- Annual biological production
- Elemental composition in fauna
- Physiological response in fauna
- Energy pathways
- Contaminant transfer
- Contaminant trophic magnification factors



Sample collection and screening

Tasks 4 and 5

Preliminary results:

In the laboratory: When transplanted into sediments with different mercury concentrations, no mortality of seagrass transplants was observed during the extent of the experiment (8 months). Moreover, seed production was recorded both in control and experimental tanks, suggesting that re-colonization with *Z. noltei* can therefore be a viable restoration strategy for historically contaminated coastal systems.

In the field: Six months after the transplant process, a 70% increase in vegetation cover in the transplanted area was verified, indicating the success of the transplant

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