Master's Thesis Opportunity n. 1: Recruitment Dynamics and Spatial Distribution of Early Life Stages of the Blue Crab in Mediterranean Coastal Lagoons

Topic

Larval recruitment and juvenile colonization dynamics of *Callinectes sapidus* in Mediterranean costal lagoons.

Project:

The Research is framed within the Project "ZoeAI" – Regione Lazio Codice Intervento 116101 – Azione 1 – Obiettivo Specifico 1.6 – PN FEAMPA 2021/2027., February 2025-February 2026

Background

The blue crab, *Callinectes sapidus*, is an invasive species widely established across several Mediterranean coastal ecosystems, including Italian lagoons. Its presence is associated with significant ecological impacts, including predation on native species, alteration of trophic webs, and economic consequences for fisheries. Understanding the mechanisms regulating larval recruitment and juvenile settlement in transitional environments, such as lagoon-sea interfaces, is crucial for predicting the species spread and supporting effective management strategies. Despite its rapid expansion, knowledge on the spatial and temporal dynamics of early life stages (zoeae, megalopae, and juveniles) in Mediterranean lagoons remains limited. In particular, the role of environmental drivers and lagoon-sea connectivity in shaping recruitment success is still poorly understood.

Objectives

The main goal of the thesis is to investigate the spatial and temporal patterns of larval and juvenile recruitment of the blue crab in Mediterranean coastal lagoons.

Specific objectives include:
a) Quantifying the abundance and distribution of larval (zoeae) and post-larval (megalopae and juveniles) stages.
b) Identifying key environmental drivers influencing recruitment (e.g., salinity, temperature, oxygen, vegetation cover).
c) Assessing the role of lagoon-sea connectivity and hydrodynamics in settlement processes.
d) Developing predictive models of presence and density across space and time.

Expected Outcomes

1. Characterization of spatial and temporal patterns of larval and juvenile distribution.
2. Identification of key periods and microhabitats for recruitment.
3. Quantification of the influence of environmental variables and lagoon-sea connectivity on settlement success.
4. Development of predictive maps to support monitoring and management of Mediterranean coastal lagoons.

Candidate Profile

We are looking for a motivated master's student with a background in Ecology and Biology. Interest in fieldwork, lab work and ecological modelling is essential. Good organizational skills and attention to detail are required. Basic knowledge of statistical analysis in R is preferred.

Additional Information

Start: May 2025

Duration: approx. 8 months
Location: Fieldwork in three Italian coastal lagoons of Central Italy for sampling and ecological characterization of the study sites; laboratory activities at the Laboratorio di Ecologia Sperimentale e Acquacoltura (LESA) – Dipartimento di Biologia

Supervisor: Prof. Eleonora Ciccotti
Co-supervisor: Dr Chiara Leone

Interested candidates are invited to send a short motivation letter to:
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