Corso di Dottorato Nazionale in Biodiversity Università degli studi di Palermo
Ciclo XXXIX

Study of phytoplankton communities and their long term interannual variability through traditional and innovative tools

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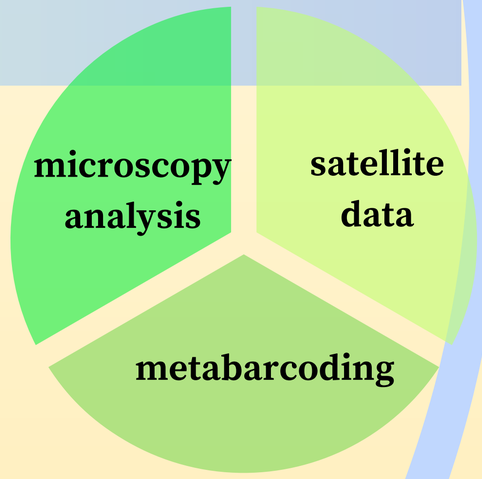
1.Why is important study phyoplankton?

- **Oxygen production**
- **Carbon cycling and climate regulation**
- **Indicator of environmental/ climate change**
- **Hamful algal blooms**

2. Aims of the project

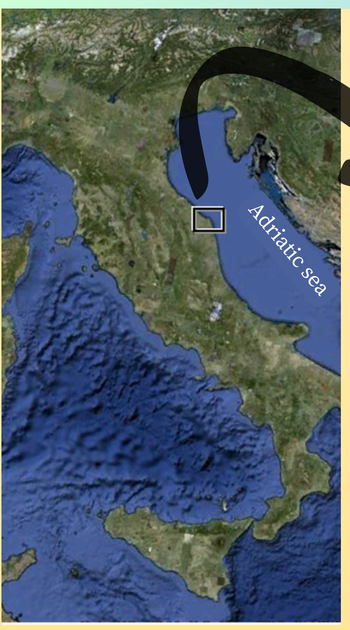


Study 1: Investigate the phytoplankton communities integrating results obtained from **metabarcoding** with those obtained by **microscopy analysis**, with focus on cryptic species, small species and potentially toxic algae not detectable with microscopy

Study 2: Expand and validate molecular sequences present in the **database**, with focus on the potentially toxic microalgal species

Study 3: Validate data obtained from **satellite** sensors, e.g., functional types, through the study area

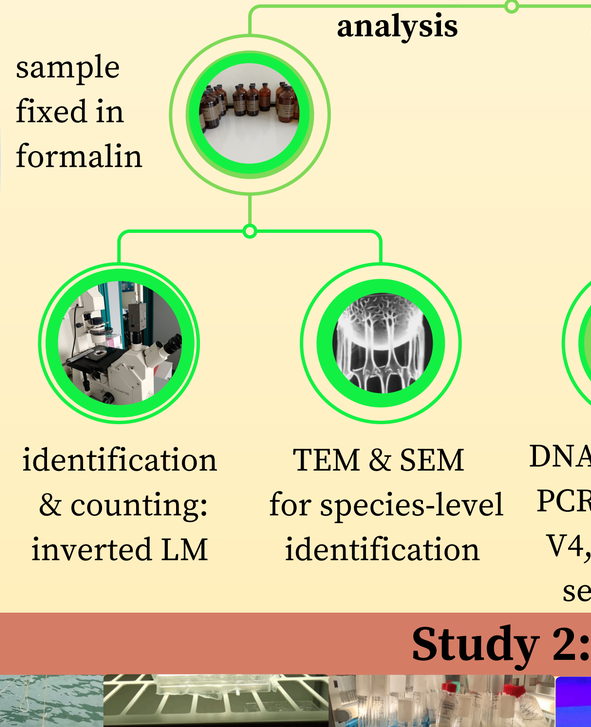
3. Study area



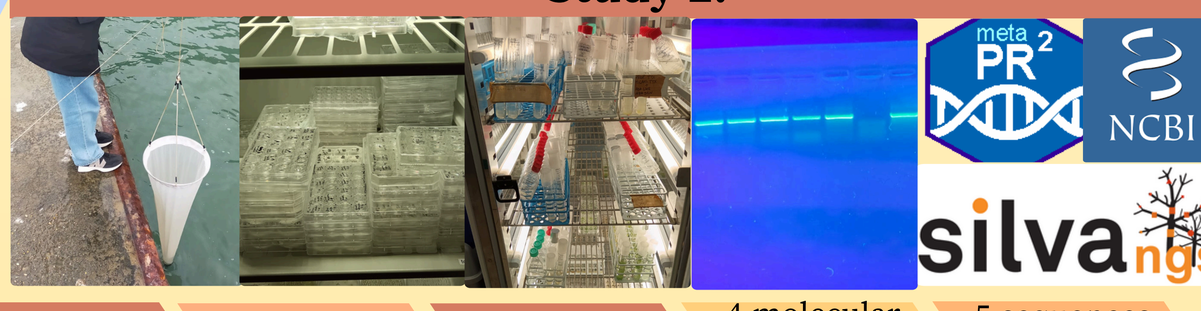
SG1: coastal station of the **LTER Senigallia -Susak transect (SST)** where samples have been collected monthly since 1988

4. Material and methods

Study 1:



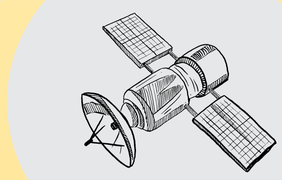
Study 2:



1.sampling: phytoplankton net → 2.microalgal strains isolation → 3.culture growth & maintenance → 4.molecular analysis: (LSU, V4, V9 & rbcL) → 5.sequences compared or inserted in databases

Study 3:

validate Phytoplankton Functional Types with observational data



test the quality of the satellite information (statistical approaches)

5. Expected results

Study 1:
- Overcoming the limitations of each method
- Improve resolution in analysis
- Find optimal taxonomic marker

Study 2:
- Add sequences to reference databases
- Validate molecular sequences
- Enhance metabarcoding approach

Study 3:
- Assess the quality of satellite information
- Validate satellite phytoplankton data
- Monitoring phytoplankton through satellite data

WORK IN PROGRESS

- Until now **155 strains of microalgae** have been isolated and cultured
- Sanger sequencing (LSU and 18S) was performed on 65 strains, identifying species such as:
  Biecheleriopsis adriatica, Scripsiella trochoidea, Thalassiosira profunda, Chaetoceros socialis, Emiliania huxleyi, Skeletonema marinoi and *Dicrateria inornata*
- **Next step** will be to obtain the rbcL sequence for those species that lack the sequences in the database

Frame the QR code and watching the video of unidentified algal cultures

next steps: DNA extraction and TEM for identification

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