Dottorato Nazionale - Biodiversity

Università degli Studi di Palermo - Ciclo XXXIX

Interactions between micro- and macroorganisms in chemosynthetic marine ecosystems

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Introduction

At marine chemosynthetic ecosystems, **microbes** are fundamental for the entire life spectrum, habitat formation and ecosystem functioning

PRIMARY PRODUCTION

MICROBIOMES

HABITAT FORMERS

See more on microbial habitats and their ecological functions

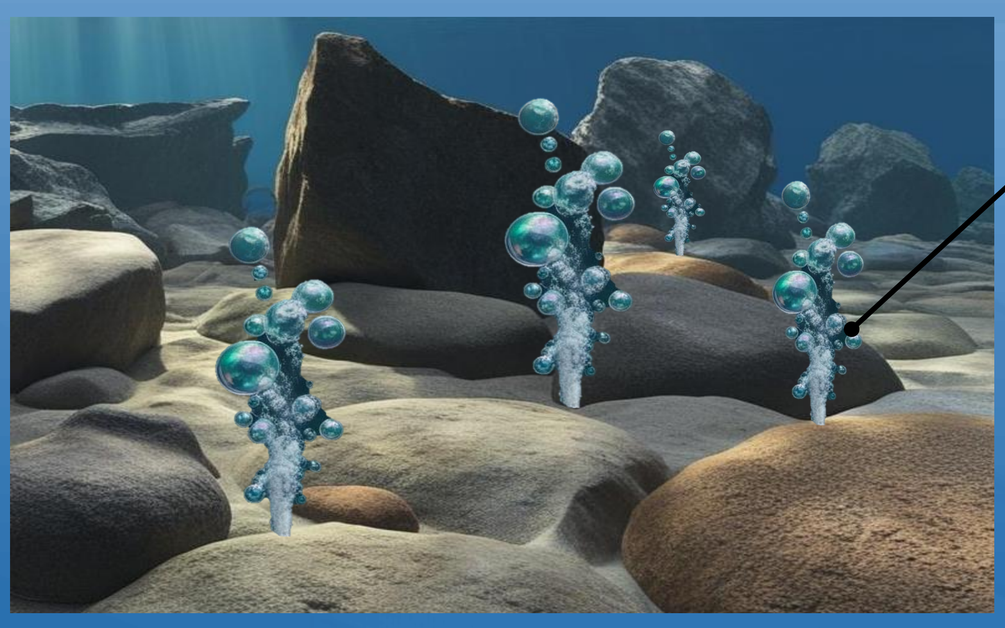
AIMS:

- ✓ Distribution and biodiversity of chemosynthetic ecosystems
- ✓ Description of the roles of microbes
- ✓ Microbial habitats, their associated biodiversity and ecological functions
- ✓ Biology and microbiomes of chemo-symbiotic fauna

Materials and Methods

- DNA extraction and sequencing
- Microbial abundances and diversity
- Meiofauna sorting
- SEM and TEM
- Biochemical analyses
- Gas chromatography
- Microbiomes

Environment characterized by the presence of seepage



CO_2
CH_4
S-reduced compounds
Minerals-enriched seawater

Microbial exploitation of the seepage

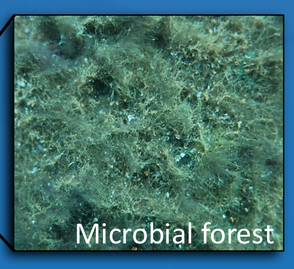
CHEMOSYNTHESIS

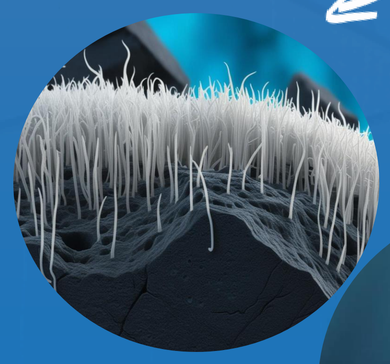
DIRECT INTERACTIONS WITH MACROORGANISMS

PRIMARY PRODUCTION

Microbial-driven food webs

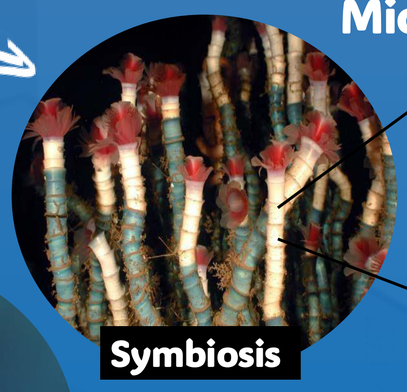
Microbial habitats



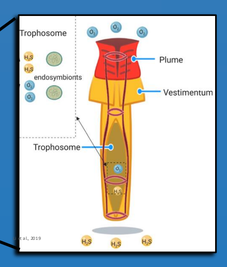


- Ecological volume
- Substrate
- Food
- Refuge
- Nursery and reproduction

Microbiomes

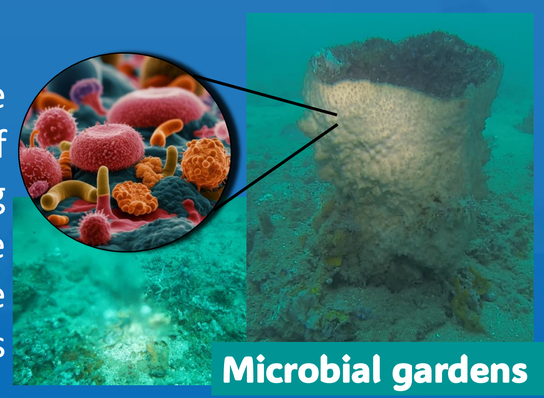


Symbiosis



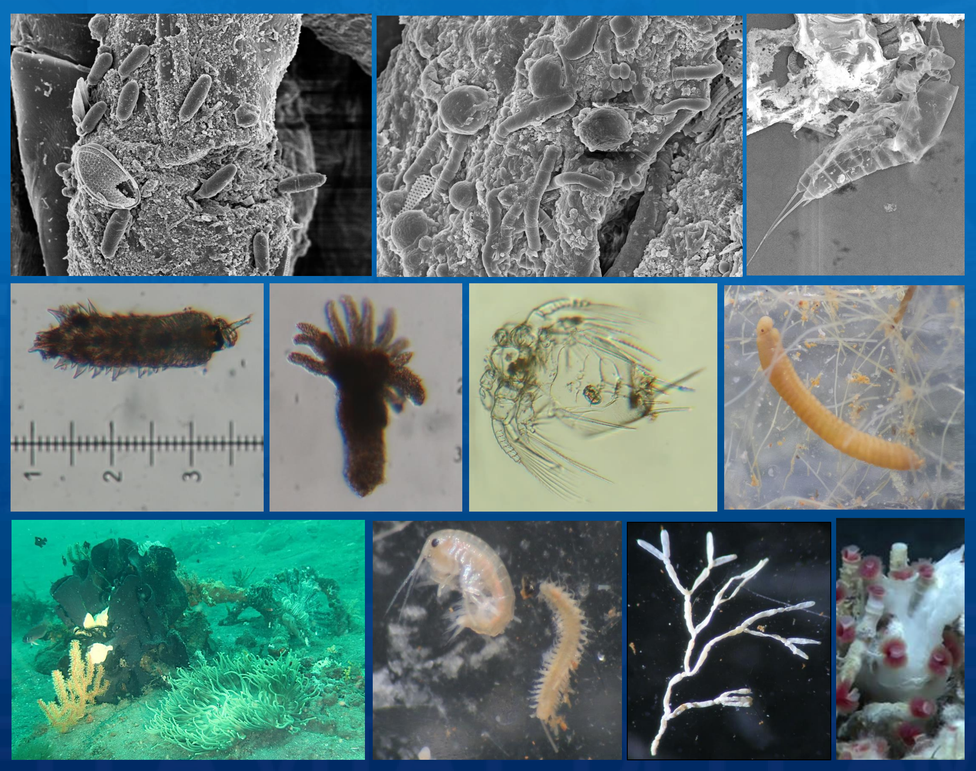
Chemosymbiotic fauna metazoans living associated to the seepage thanks to endosymbiotic microbes that replace feeding

Microbes living on the external surface of metazoans and exploiting the seepage, allowing the benthic fauna to set and live close to the emission spots



Microbial gardens

BIODIVERSITY SUPPORT



At chemosynthetic ecosystems, microbes play **several roles**, such as **primary production** through both photo- and chemosynthesis (depending on the depth) and the **development of habitats** that provide **new ecological volumes** for other organisms. These roles, together with the **symbiotic relationship** they establish with some metazoans, determine **BIODIVERSITY HOTSPOTS** at chemosynthetic systems. The associated biodiversity include other microbes (bacteria, protists, fungi), micro- and macroalgae, metazoans (benthic and pelagic), and larval stages of different taxa.