

Study of biofouling communities in Damietta water



Submitted By

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What is biofouling ?



What are the types of biofouling?



conditioning film



anemones



tubeworms

minutes hours days weeks months

100 nm 1 μ m 100 μ m 1 mm 1 cm

proteins



bacteria



sponges

soft foulers



tunicates

hard foulers

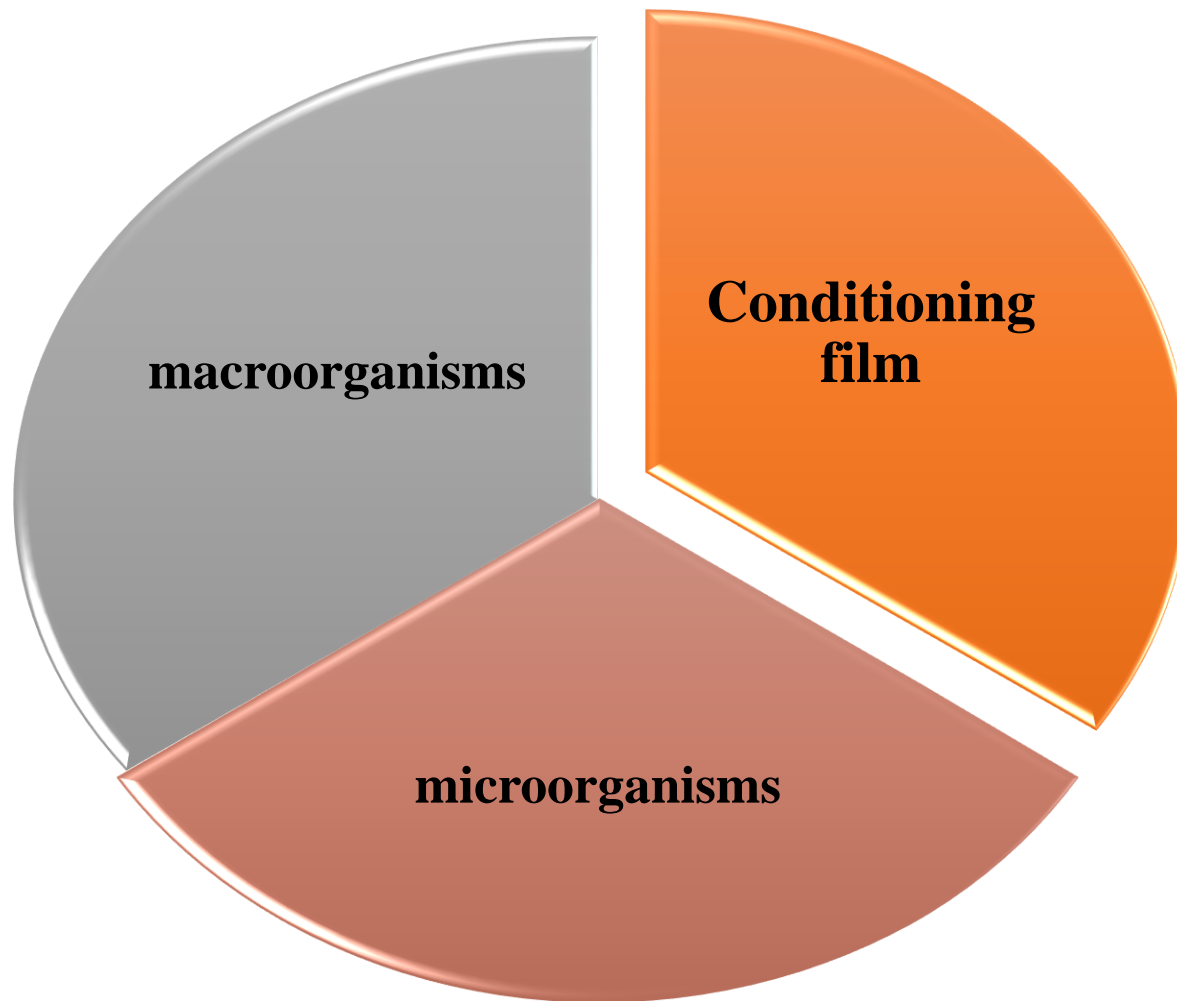


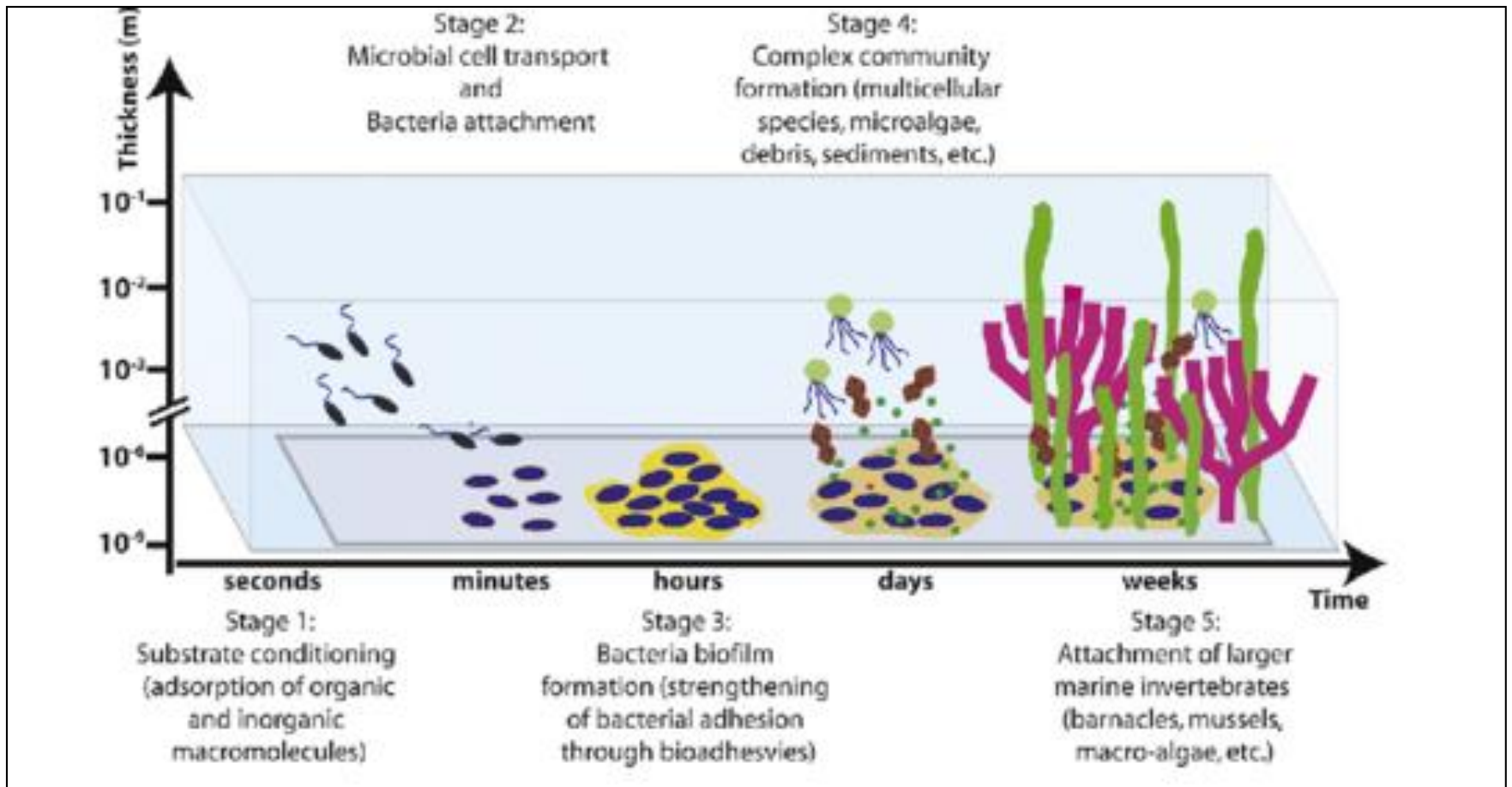
bryozoans



mussels

How is fouling community formed?

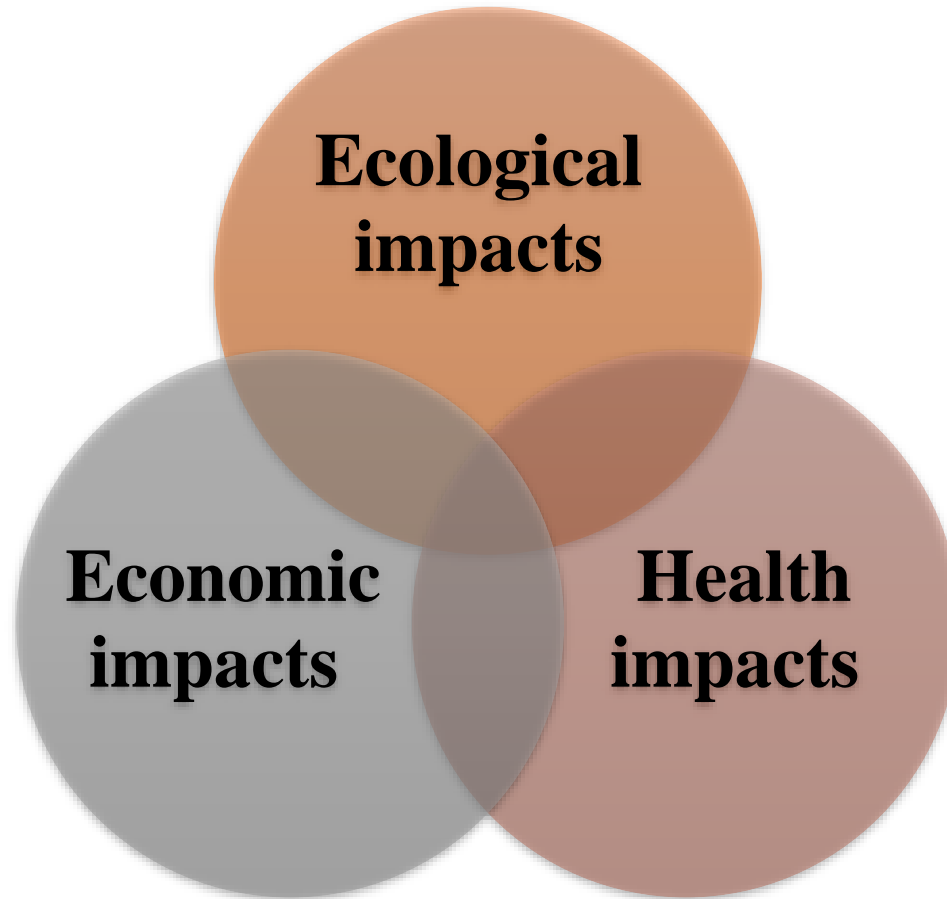




How Biofilms Form



What are the effects of biofouling?



Biofouling organisms found in Damietta water

- Damietta Governorate is located on the coast of the Mediterranean Sea.
- It is located north of the Delta on the eastern bank of the Nile. It is a peninsula embraced by the Mediterranean Sea to the north and Lake Manzala to the east, and the Nile is divided into two halves in the southwest. The Delta farms and plains
- Therefore, we consider the coasts of Damietta a main source of income for its residents
- Therefore, it is an important priority to reduce biofouling, which threatens the income of fishermen in Damietta Governorate
- It causes:
 - **Affecting manoeuvrability and reducing speed by up to 50%**
 - **Even the presence of biofilm alone may be able to change total resistance and increase fuel consumption and decrease vessel speed**

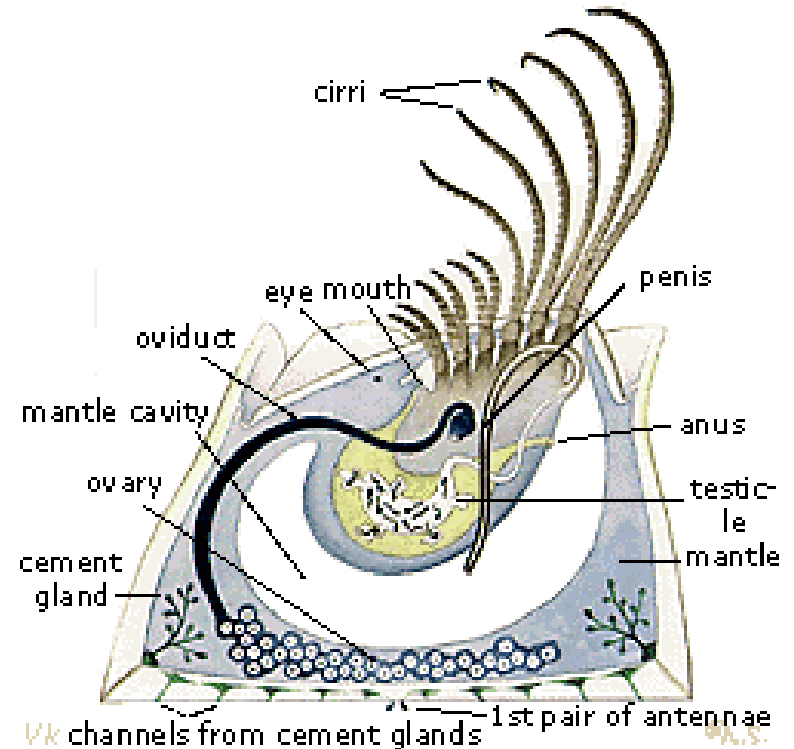
Cost of biofouling on vessel hulls



Modified from Selim et al. (2017). Image by Biofouling Solutions Pty Ltd

Barnacle

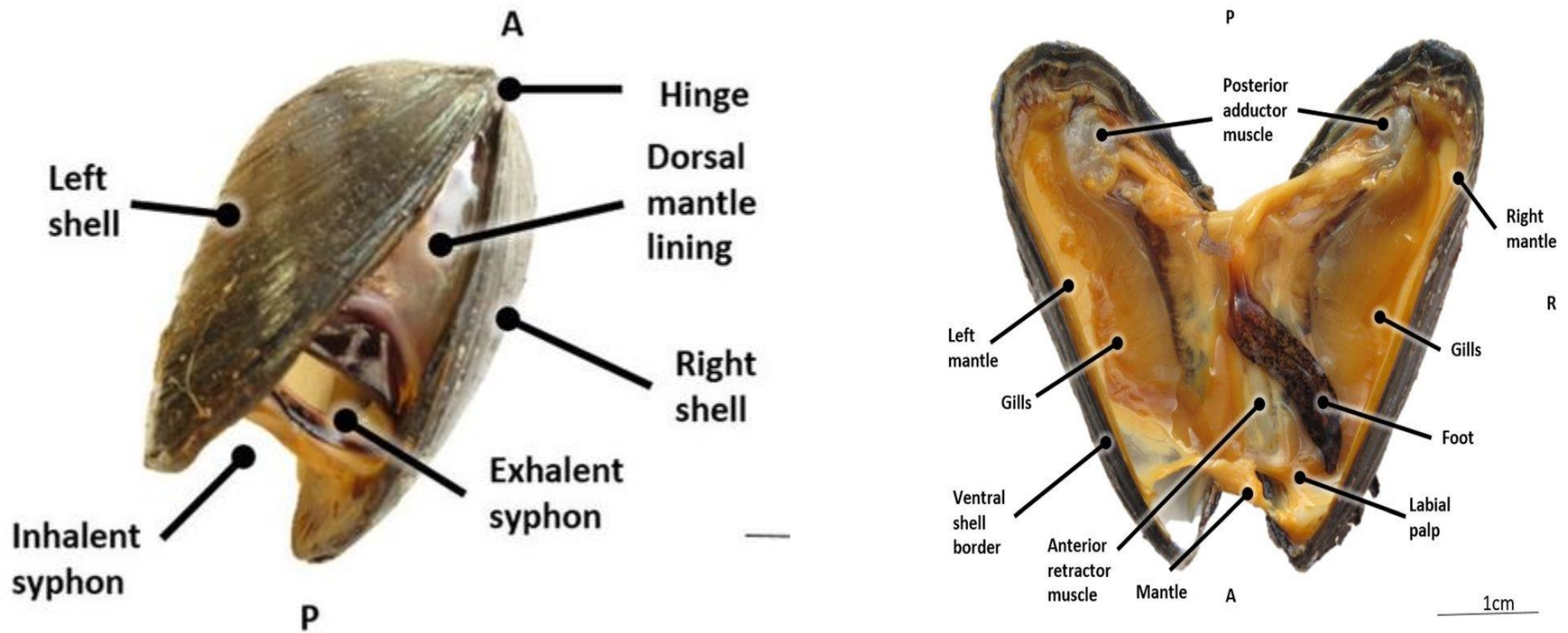
Balanus balanoides



- **Hermaphrodites**
- **Calcareous plates**
- **The body is oriented in an upside down posture with the anterior or head end attached to the anterior pair of valves**

Freshwater mussels

Mytilus edulis



- The shell is in equilateral and roughly triangular in outline
- *Mytilus edulis* is a filter feeding organism

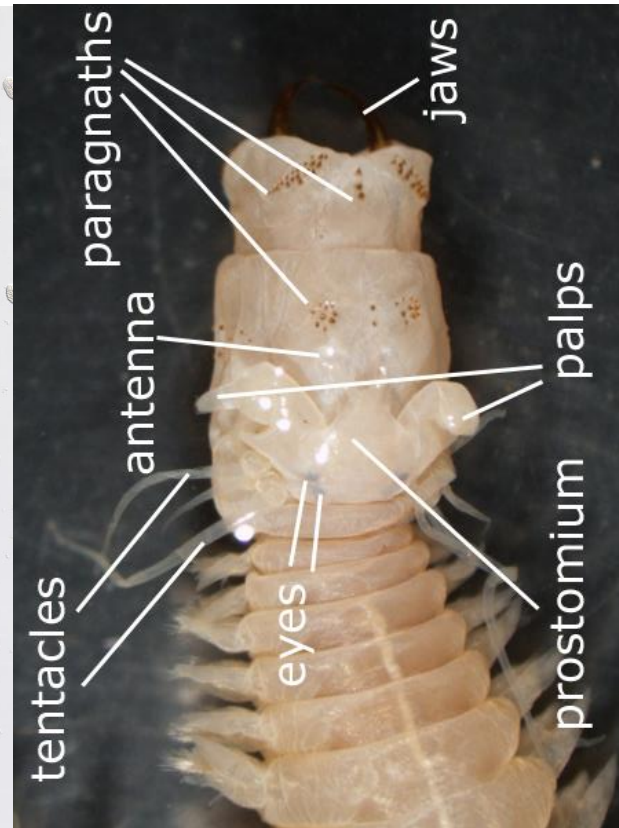
Marine worms

A / *Hediste diversicolor*



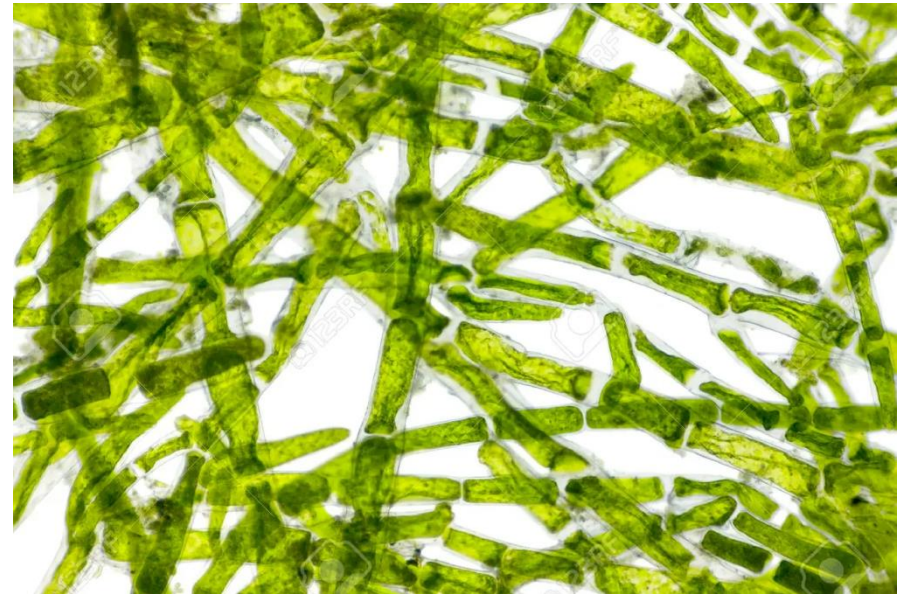
Marine worms

B / *Alitta succinea*



cladophora

- Cladophora is a cosmopolitan alga and can be found in huge masses of a variety of marine and fresh Waters
- Cladophora belongs to the group of macroscopic green algae
- The cell wall surface in Cladophora species is usually smooth, not covered by mucus, and can be overgrown by epiphytic alga



How can we face the biofouling?

**Antifouling
methods**

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graph TD; A[Antifouling methods] --- B[Biological antifouling methods]; A --- C[Chemical antifouling methods]; A --- D[Physical antifouling methods];
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**Biological
antifouling
methods**

**Chemical
antifouling
methods**

**Physical
antifouling
methods**

