

# BIOFOULING IN AQUACULTURE

## What is Biofouling?

Biofouling is a complex and recurring problem in the European aquaculture industry. Surfaces immersed in the aquatic environment become biofouled when unwanted aquatic organisms such as barnacles, tubeworms and seaweed settle and grow on those surfaces.



## The effects of biofouling

Biofouling greatly reduces the efficiency of materials and equipment in aquaculture. The problem can physically damage equipment (abrasion, brittleness, increased load) and increase drag. Water flow can be significantly lessened - directly reducing food supply. Biofouling can also accelerate corrosion and bio-deterioration problems.

The selling of biofouled shellfish can be affected on aesthetic grounds, or because the fouling is not compatible with product processing or packaging methods.

## Infrastructure

Immersed structures such as cages, netting and pontoons; equipment and structures such as pipelines, pumps, filters and holding tanks.

## Stock Species

Farmed species, particularly shellfish such as mussels, scallops and oysters.

## Economic Impact

Current estimates based on figures from the industry and the FAO suggest biofouling on fish cages and shellfish costs the European industry between 5 and 10% of the industry value (up to €260 million/year).

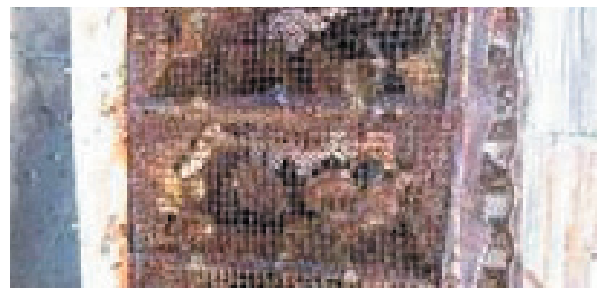


## Current Methods to Control Biofouling

### Mechanical Cleaning Air/Sun Drying

This method involves brushing, scraping or cleaning the shellfish or infrastructure by hand or with high power water jets on site. Washing of biofouling will kill most of the fouling organisms but may increase organic loading of the sites.

This method involves drying nets or oysters. The heat or desiccation kills the unwanted aquatic organisms but does not remove fouling completely.



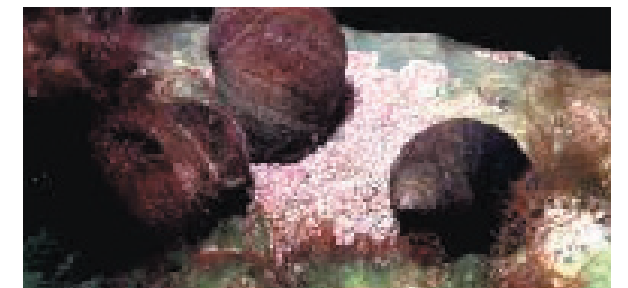
### Biocidal Coating

Applying a biocidal coating (mostly based on copper oxide Cu<sub>2</sub>O) on the surface of nets is widely used in aquaculture. The lifetime of the coating is limited to one season while the costs for treating nets are high. Such antifoulants are known sources of pollution if not treated properly.



### Possible New Methods

Other methods exist such as biological control using grazers, new materials (silicone based fouling-release coatings), electrical antifouling, new cage designs and spraying with an antifouling solution such as acetic acid.



## CRAB - COLLECTIVE RESEARCH ON AQUACULTURE BIOFOULING

*Providing the European marine aquaculture with low cost practical solutions to control biofouling*

The CRAB project is a Collective Research project, funded by the EC (Framework 6, Contract COLL-CT-2003-500536). The objective of this 3-year project is to develop effective biofouling management strategies for the aquaculture industry. The project will review current fouling control techniques and then select and optimise suitable strategies to combat biofouling in aquaculture. The CRAB consortium is composed of 23 partners in 7 countries.

Key deliverables include best practice guidelines, training courses and materials for industry workers on biofouling and suitable control techniques, and sustainable antifouling strategy management and decision support tools.

[www.crabproject.com](http://www.crabproject.com)



### Associations

European Aquaculture Society  
Federation of European Aquaculture Producers  
Irish Salmon Growers Association  
Norwegian Seafood Federation - Aquaculture Division

### RTD Providers

Global AquaFish SL (ES)  
Materials Innovation Center (NL)  
Netherlands Organization for Applied Scientific Research TNO (NL)\*  
University College Cork (IRE)  
University of Newcastle upon Tyne (UK)

### SMEs

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