

# Which strategy to mitigate aquaculture biofouling?



CRAB

COLLECTIVE RESEARCH ON  
AQUACULTURE BIOFOULING



The geographical and species variability within European aquaculture means that providing « best practice » to manage biofouling is not an easy task. The CRAB consortium is, however, addressing exactly this issue.

The CRAB approach is based upon the

- Modification and further development of antifouling strategies used in aquaculture and related industries (e.g. shipping)
- Testing of strategies under real working conditions at CRAB farm sites by SMEs in the production sector
- Testing of Material Performance

The European baseline study (see Biofouling News Number 1) is developing the background knowledge required to assess the extent of the problem at different sites and at different times of the year. The combination of this new knowledge with the further development and testing of selected strategies within the CRAB consortium, will allow European producers to have a clearer idea of the options open to them. Furthermore, an indication of the environmental and economic impact of the strategies will compliment this choice.

***"it is recognised that no one strategy used alone will be successful"***

***But better understanding of the value and application of the current and new strategies WILL have an impact on the industry.***

The testing of strategies within the CRAB initiative is based upon the following technologies applicable to the aquaculture sector:

- ***Fouling-release coatings***, generally in combination with cleaning
- Other non-toxic coatings, such as ***spiky coatings***
- ***Biological control*** using grazers
- ***Avoidance*** when cultures are removed or repositioned during fouling settlement
- ***Natural antifoulants*** (net cages, shellfish)
- New ***infrastructure designs*** to limit fouling (shellfish, net cages)
- ***Electrical antifouling***
- ***Remove settling stages from the water***

For each strategy (and the products or current practices associated with it), CRAB has developed performance criteria that take it through the various stages of evaluation. These are linked with a thorough literature review of existing knowledge and currently-available products on the market. The criteria are many and varied, and include antifouling efficacy, application to materials, coating integrity, durability, economic efficiency, sustainability and compatibility with other methods.

One thing remains clear: the current strategies used to combat biofouling are different in various locations and no one strategy will

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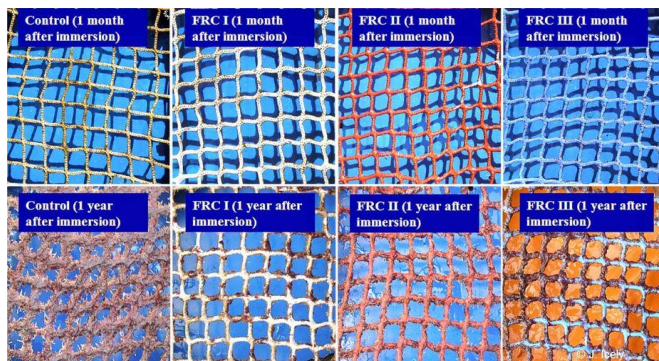
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The selection phases are based on

- **Analysis of performance criteria** of candidate antifouling strategies.
- **Performance criteria matrix** for the specific antifouling strategy under evaluation.
- **Introduction to antifouling solutions** that meet acceptable performance targets.

New, **non-toxic coatings** for equipment and nets, such as **fouling release coatings** have been one focus of CRAB. As the aquaculture sector moves away from the use of biocidal coating products, such as those based on copper, it is likely that future antifouling strategies be 'environmentally neutral' in nature.



**"fouling-release coatings show promise for the future"**

As the testing of these coatings (and the appraisal of their economic feasibility) continues in CRAB, it is becoming clearer which of them merit further RTD resources to develop them into products for the market.

The objective of CRAB is to develop and implement effective biofouling prevention and management strategies for the aquaculture industry.

The CRAB consortium is composed of 4 RTD organisations, 4 industry associations and 14 small-medium enterprises, including 5 shellfish farms and 5 finfish farms.

**Biological control** using grazers has proved an area of investigation where there is much interest, and this has been reported in the last CRAB newsletter.

**Natural antifoulants** and **Electrical antifouling** are also potential strategies for the future. The first strategy is not being tested in CRAB due to the high costs associated with the registration of such coatings on the market. The second approach has shown promise but presents practical difficulties with up-scaling.

Of the potential new **infrastructure designs** to limit fouling (shellfish, net cages), the colour of materials has been shown to have an impact.

**Avoidance** when cultures are removed or repositioned during fouling settlement, or even the **removal of settling stages from the water** are important husbandry strategies that can be effectively applied with cleaning strategies and based upon the knowledge of species and seasonality identified in the CRAB baseline study.

In both finfish and shellfish sectors, the avoidance of costly and/or labour-intensive cleaning of equipment or cultured species is the objective. Clear recommendations on the combination of these strategies will be the main practical outcome of the CRAB initiative.

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