



CRAB

Collective Research on Aquaculture Biofouling

The Challenge

Surfaces immersed in the aquatic environment become biofouled when unwanted aquatic organisms such as barnacles, tubeworms and seaweed settle and grow on those surfaces. Biofouling is a complex and recurring problem in all sectors of the European fish-farming industry. It 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. Finally, the selling of biofouled shellfish can be affected on aesthetic grounds, or because the fouling is not compatible with product processing or packaging methods. In summary, uncontrolled biofouling leads to significantly increased maintenance costs and production losses (low growth/poorer quality). The cost of changing nets on medium sized salmon farmers is for example €60000 per year.

Project Objective

CRAB is a pan-European initiative that aims to develop effective biofouling management strategies for the aquaculture industry. It reviews current fouling control techniques and technologies and optimizes suitable strategies to combat biofouling in aquaculture. This includes biological control (using natural grazers), new materials such as non-toxic antifouling coatings, electrical methods (generating biocides or pH shifts) and new shellfish handling and immersion techniques. A key ambition of this Collective Research is to increase the knowledge base of the European aquaculture community on biofouling.

Key Points

- CRAB monitored biofouling at aquaculture production sites from Norway to the Canary Isles. A series of standard panels submerged at a depth of 2m on each site were assessed monthly using digital photography to monitor recruitment and succession.



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EATiP Thematic Area of Relevance

TA1: Product Quality, Consumer Safety and Health

TA2: Technology and Systems

TA3: Managing the Biological Lifecycle

TA4: Sustainable Feed Production

TA5: Integration with the Environment

TA6: Knowledge Management

TA7: Aquatic Animal Health and Welfare

TA8: Socio-Economics and Management

Key Words

Aquaculture, effluent, waste management, water quality

Project Information

Contract number:

500536

Contract type:

Collective Research Project

Duration:

36 months (June 2004 – May 2007)

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Output Highlights

Problematic biofouling species have been identified in the first fouling season, and segmented into 6 groups: algae, barnacles, mussels, tubeworms, ascidians and hydroids.

The development of the biofouling community over the season shows the following trends:

- At southern sites soft-tube forming amphipods and polychaetes dominate all year.
- At intertidal sites, diatoms give way to crustose, coralline red algae.
- At northern sites, *Ectocarpus* sp., a brown algae, dominates.
- Blue mussels appear from June and are present at most western sites by September.
- Tunicates are found in Scotland from June and later in northern Norway.
- A series of factsheets on the most frequently occurring species was developed <http://www.crabproject.com/index.php/103/organisms/>

Various materials were tested at the field sites <http://www.crabproject.com/index.php/107/testing-materials/> with silicaone-based and spiky coatings looking the most promising.

Key deliverables included best practice guidelines (<http://www.crabproject.com/index.php/109/best-practice-guidelines/> - available in English and Spanish; training courses and materials for industry workers on biofouling and suitable control techniques; and sustainable antifouling strategy management and decision support tools.

Training courses were delivered to aquaculture managers and workers to make optimal use of the findings of the program.

Next Steps – Suggested Actions/Follow On



RTD

- Further field testing of silicone-based and spiky coatings is required, so as to validate the results obtained and also to 'spread the word'. Commercial applications of spiky-based coatings are, however, now available on the market.

Related Publications/Projects

For a complete list of publications please refer to the website:
<http://www.crabproject.com/index.php/57/publications/>