THE APPLICATION OF ULTRASOUND AS CAGE ANTIFOULING METHOD AND ITS IMPACT ON EUROPEAN SEA BASS, *DICENTRARCHUS LABRAX*

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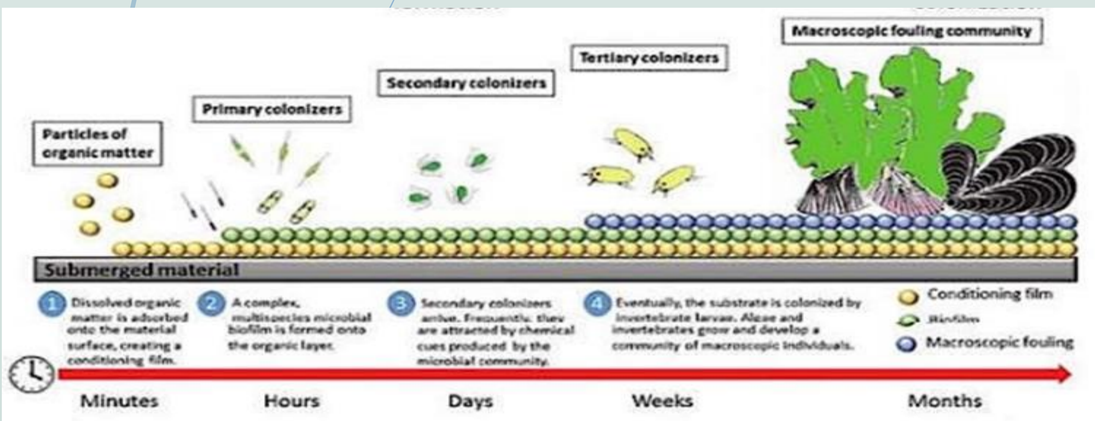
Introduction

Aquaculture faces a major issue to reach its full potential, due to biofouling, which is affecting products quality, quantity and environment- labor- equipment integrity. According to market experts, current treatment measures represents from 10 to 20% of farm exploitation costs. This study aims to prevent micro-fouling layers apparition on offshore aquaculture fish farm cage nets with ultrasonic (US) waves to increase not only the aquaculture productivity and operational efficiency but also to verify the implementation and performance in the field. Knowledge about the impact of US application on fish growth, feeding behavior and health will facilitate the adoption of this technology. In this study, we determined and defined the maximum level of power and frequency after an adequate trial period with US to get the most effective anti-fouling system without harming the commercially important European sea bass (*Dicentrarchus labrax*).



Methods

Field trial 1: conducted in offshore mini-cages (diameter: 3 m, depth: 5 m) without fish.

Goals: 1)cost-effect analysis of US treatment; 2) evaluate biofilm formation for 1-month under full continuous ultrasound signaling and pulse/intermittent fire; 3) evaluate effectivity as anti-biofouling on cage nets.

Field trial 2: conducted in offshore cage system (diameter: 20 m, depth: 8 m, stocking density: 30.000 to 50.000 fish) with various (full-fire/intermittent fire) configurations.

Goals: 1) evaluate effectivity as anti-biofouling on cage nets, 2), assessment of impact on fish (mortality / behavior).

Field trial 3: will be conducted in operational cages (diameter: 30 m, depth: 20 m, stocking density: >50.000) with US treatment (fixed frequency and operational mode full or pulsed fire selected from previous trials.

Goals: 1) impact on animal welfare with sampling at d0; before US application, and after 7, 30, 60 and 90 days of continuous application.

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Results

Field trial 1: offered an initial glance on the impact of different frequencies on biofilm formation on the mini-cages and allowed improvements in terms of transducers position

Field trial (2) showed that algae do not grow near the transducers and high frequency transducers are more effective for preventing biofouling. No stress response was observed on the fish during US application. Improvements on system set up (power and performance) still required.

Expected results of Field Trial 3: Innocuity frontiers for US application being tested under commercial production conditions. Standardized US application to prevent biofouling on rearing cages of offshore farms. Background information on stress response to be extended to other commercially important species and to different size/age cohorts.