PRESENT STATE AND FUTURE EXPECTATIONS OF MEDITERRANEAN AQUACULTURE: ENVIRONMENTAL CONCERN AND BENEFITS OF COPPER ALLOY NETTINGS FOR A SUSTAINABLE HIGH VALUE AQUACULTURE INDUSTRY

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ABSTRACT

Seabass and seabream are the two main species dominating Marine Aquaculture in the Mediterranean. Turkish and Greek Aquaculture Industries, with 194.000 tons of production (marine, fresh water and diadromous fishes), are in a rapid growth period among Mediterranean countries. The aquaculture production amount of the other main producers in the Mediterranean (Spain, Italy or Portugal) has been stable, while aquaculture production in France showed a serious decline during the last ten years.

There are different regulations between Mediterranean countries in terms of aquaculture and environmental legislations. The Ministry of Environment and Forestry in Turkey has amended a new Environmental Law in year 2006 to exclude marine cages from environmentally sensitive areas, enclosed bays and near shore areas. Criteria for sensitive areas where cage aquaculture farms are not allowed have been determined as minimum 30 m of water depth, 0.6 miles distance from coastline and a current speed of 0.1 m/sec. There is no doubt that moving off-shore may reduce conflicts between coastal zone users, increase production capacity while reducing environmental concerns, or improve productivity and profitability. However, with these new regulations offshore farmers had to face technical challenges, such as new investment costs, legislative and administrative regulations, environmental impact assessment (EIA) procedures, and new applications, skill and management. After a short time these new regulations have made positive effects on the Turkish mariculture industry, not only from aquaculture production standpoint but also from environmental point of view.

As the Aquaculture industry looks to feed the world with its 9 billion people in 2050 in a sustainable way, fish farmers worldwide need to be given the ability to safely produce high yields of fish while protecting the environment. Biofouling is one of the main problems in marine aquaculture. Minimizing biofouling in marine systems would be a great interest to fish farmers because of reducing maintenance costs. Biofouling causes serious problems in terms of blockage of water flow through the net mesh and decreasing oxygen content in the water. Reducing biofouling on nettings may have overall benefits in terms of better fish growth induced by increased feeding rate, reduced stress from net changes, improved fish health due to a more sanitary environment, and also labor costs due to less work for changing the net periodically. Copper alloy nettings are antimicrobial and stay naturally clean. Preventing any biofouling on the marine system, it can be considered as a new material and candidate to promote high value sustainable aquaculture industry.

During a field study conducted at Canakkale University in cooperation with University of New Hampshire (USA), very limited biofouling was recorded, very limited net deformation was observed on the copper-alloy net material, bioassay analyzed showed no significant differences with fish cultured in copper alloy nettings and those grown in traditional nylon nettings. These findings presented copper alloy nettings as a promising alternative material for the sustainability of cage aquaculture industry.

Keywords: Mediterranean aquaculture, Aquaculture regulations, Cage aquaculture, Copper alloy nets