Mitigating Environmental Threats in Marine Aquaculture: Development and Application of a Semi-closed Fish Cage System in Japan

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Résumé

Marine fish aquaculture plays a crucial role in food supply especially high-quality protein. Flexible open-net cage systems are being widely used in the marine fish aquaculture industry, but it faces significant environmental challenges such as red tides, parasites, high water temperatures, etc. This poses significant threat to fish production and the income of farmers. Utilization of a semi-closed cage is expected as a promising solution for those challenges. However, there are currently no practical applications of such systems in Japan. A semi-closed fish cage system was developed, and field experiments were conducted in areas frequently affected by red tides and high water temperature aiming to enhance fish survival rates and reduce economic losses for fish farmers. For future implementation and promotion, the potential areas in Japan for introducing this system were analysed and mapped. The analysis conducts a comprehensive classification and evaluation of regions currently utilizing open-net cage aquaculture, integrating data on the distribution of marine fish farming, occurrences and impacts of red tides, and the geographical conditions of aquaculture areas,. Based on the findings, potential zones for the introduction of semi-closed fish cages will be identified and prioritized. The findings provide valuable insights into the feasibility of this system in Japan's marine aquaculture industry, and offer a potential strategy to ensure more stable production and reduce industry vulnerability to environmental fluctuations.

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Mots-Clés: Marine fish aquaculture, Semi, closed cage system, Red tide mitigation, High water temperature, Sustainable aquaculture in Japan

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