Ireland's Seafood Development Agency

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BENEFICIARY:	BORD IASCAIGH MHARA
PROJECT REFERENCE NUMBER:	19/KGS/STS/007.1
NAME OF PROJECT:	AGD (Amoebic Gill Disease) Treatments for the Salmon Farming Industry
IMPLEMENTATION PERIOD:	1st JANUARY -31st DECEMBER 2019

Project Scope

Amoebic Gill Disease (AGD) is a naturally recurring health issue on marine salmon farms. If untreated high mortalities can occur resulting in millions of Euros of losses. The preferred treatment method is bathing the salmon in fresh water. This project was designed to help improve this process and make it more efficient.

Transporting and obtaining fresh water to treat salmon for AGD at marine sites is problematic. Well boats have historically been used to transport fresh water, but this is extremely expensive. Open tarpaulins have also been used to tow water out to the cages, but this can only be done in very calm weather otherwise sea water can contaminate the fresh water. Obtaining fresh water has become increasingly difficult due to consenting difficulties surrounding abstraction.

Objectives

This project addressed two main issues. The first is to produce and test a commercial scale prototype of a freshwater tow bag that can hold 500 cubic meters of fresh water. This tow bag is closed to seawater contamination and is safer to tow and handle than open tarps. The second is to continue trials of a desalination unit to produce fresh water. The desalinated water seems to work better in treatments than normal fresh water as it has retained the buffering capacity of the water and is of a known quality. Further tests are required to verify this positive outcome and to do final economic models for the production and transport of fresh water.

Budget

Maximum approved expenditure on the project totaled €128,000 corresponding to the following headings:

- Rental of desalination unit (outsourced).
- Fuel and generator hire for desalination unit (outsourced).
- Water testing (outsourced).
- Technical consultant and reporting (outsourced).
- Veterinary services and reporting (outsourced)

Achievements / Spend

A desalination unit with a capacity of 1500m^3/day was hired along with additional equipment that was required for the trials. The desalination unit was used in multiple trials (10 minimum) of a commercial scale. The unit was also used in smaller trials with more specific monitoring. This project aimed to establish the benefits of desalinated water versus traditionally sourced freshwater on various sea lice stages.

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Currently, the preferred treatment for amoebic gill disease (AGD) is a 3-hour freshwater bath, with a salinity of less than 3 ppt (parts per thousand). Although the salinity of the nano filtered water used during these case studies was higher (4.1-7.0 ppt), this water was successful in the treatment of AGD. The 3-hour treatment with a salinity of 6.2 ppt reduced average AGD gill scores from 3.6 pretreatment to 0.4 one-week post-treatment. 87% of PCR samples taken one-week post treatment were negative for *Neoparamoeba perurans*. In all three case studies, no amoeba was observed on gill smears taken immediately post-treatment. Several gill smears sampled from fish after a treatment time of only 3 hours, however had cyst-like circles present which were possibly pseudocysts formed by amoeba in response to changing salinity. Further investigations are needed around the possible formation and viability of amoebic pseudocyst during and post treatment.

Results from this series of case studies showed that the use of nano filtered water was successful in the treatment of amoebic gill disease (AGD). An added advantage to the lack of suspended solids in the filtered water was the ease in maintaining dissolved oxygen at an adequate level throughout the treatment.
We have also seen that desalinated water is more effective against sea lice than traditionally sourced freshwater. We have assessed survivability of sea lice that are detached and the rates of detachment of the various life stages in traditional freshwater versus desalinated water against a control of seawater.
Following the trials last year on assessing the economic feasibility of using desalination units, three complete units have been purchased by the industry with a further one on order. Our recent studies strengthen the case further for using desalinated water.

Total Approved	
Total Eligible Expenditure	€128,000.00
Total Drawdown	€127,488.49
EU – 50%	€63,744.25
Exchequer – 50%	€63,744.25

Report: Geoffrey Robinson
Date: May 2020

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