

Wrasse - a biological control

Genetics & Reproduction Group

Stirling scientists tackle global sealice problem

Sea lice are naturally occurring obligate crustacean ectoparasites of salmon that continue to be one of the most costly and challenging fish health issues for the salmon farming industry, with Scotland alone spending over £30 million per year on mitigation. Despite the



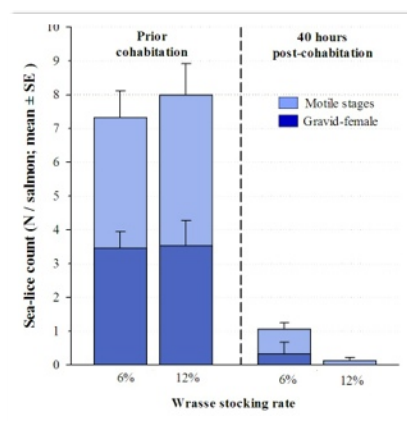
Sea Lice on Salmon

continued focus of the aquaculture industry on the use of integrated pest management, which employs a broad range of strategies to combat sea lice, treatment with approved veterinary medicines remains a core element of parasite control. Alternative approaches that support the industry's integrated pest management strategy are urgently required. The Institute of Aquaculture is at the forefront of the battle against sea lice with research projects on all main strategies, including the deployment of cleaner fish, the development of a vaccine, studies on host/parasite resistance designed to identify the parasite's weak spots and the screening/development of novel products to reduce sea lice burdens. Professor Herve Migaud, Director of Research at the Institute of Aquaculture commented "These projects demonstrate the leading position occupied by the Institute in supporting the Scottish aquaculture sector and underline our strong commitment to solving current problems in sustainable aquaculture in the UK and

The cohabitation of cultured native cleaner-wrasse species with salmon stocks is widely considered as one of the most environmentally friendly and sustainable solutions to pest management. This sustainability is nonetheless only achievable if the wrasse are farmed rather than wild caught. The farming of wrasse is currently in its relative infancy, with limited knowledge on their reproductive physiology, spawning behaviour, larval development and general performance in captivity. Leading Scottish salmon producers, Marine Harvest Scotland (MHS) and Scottish Sea Farms Ltd (SSF), and scientists from the Institute of Aquaculture (IoA) Reproduction & Genetics team have been recently awarded

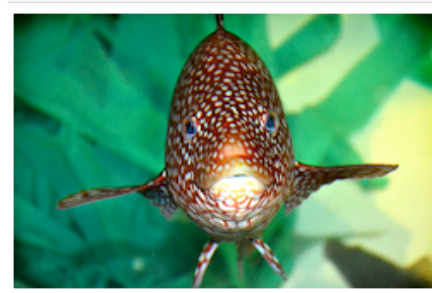
co-funding of £2.1m from the Technology Strategy Board (a UK public body driving innovation) to support their collaborative wrasse initiative. John Webster, Technical Director of the Scottish Salmon Producers' Organisation says "We are delighted that Scottish salmon farming has attracted TSB funding for a project designed to further improve the industry's sustainability. The prospect of biological control of sea lice through the use of cleaner wrasse is exciting and promising". The project started in Jan 2012 with the aim of developing the technologies to breed and grow commercially viable numbers of wrasse in tanks and to deploy these successfully and sustainably in the Scottish salmon industry. Benefiting from extensive expertise in aquaculture ventures and in the use of wrasse as a biological control against sea-lice, the industrial partners are currently running a dedicated wrasse hatchery in University of Stirling premises at Machrihanish (formerly Machrihanish Marine Farm Ltd.), presently holding over 1000 ballan wrasse broodstock under different light and temperature regimes. The project is supported by two dedicated IoA scientists: Bridie Grant (PhD-student) and Dr. Eric Leclercq (Postdoctoral Research scientist) under the supervision of Prof. Herve Migaud and Dr. Andrew Davie.

Achievements in 2012 include, improved spawning quantity and quality, refinement of larval rearing protocols, the testing of custom designed wrasse diets (in collaboration with fish feed companies) and increased understanding of sex identification and manipulation, stress response, behaviour and wild wrasse population dynamic and genetics. One of the most important tasks during this first year was to confirm the efficiency



of wrasse in removing sea lice from salmon. The delousing efficiency of wild wrasse in sea-cages is well documented across Scotland and Norway however this is not the case of their hatchery counterparts that have been reared on dry pellets. A preliminary trial at Machrihanish

Marine Environmental Research Laboratory (MERL) assessed the performance of cohabiting hatchery reared ballan



Ballan wrasse

wrasse (c.30g in weight) in delousing Atlantic salmon (c. 150g in weight). The experiment tested two wrasse/salmon ratios (6% or 12% wrasse by number) with 50 salmon (± 7.5 lice / salmon; *Lepeophtheirus salmonis*). The trial proved to be highly successful, with the total sea-lice burden being reduced by 86% and 98% (6% and 12% treatments, respectively) following 40h of cohabitation with both gravid female and adult/pre-adult stages preyed upon (Figure 1). The wrasse project will assist the aquaculture industry in sustainably farming ballan wrasse as a biological control for sea lice thus reducing the pressure on wild wrasse fisheries.

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