

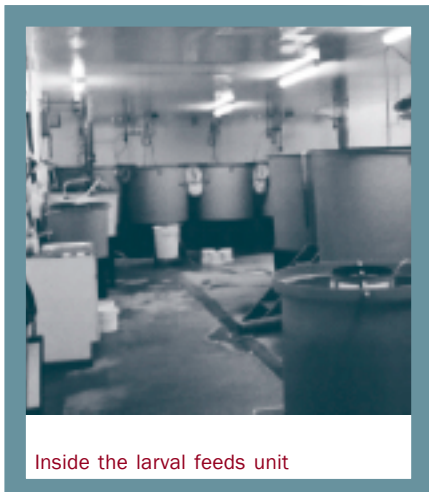
Machrihanish Marine Farm Ltd

Derek Robertson, Director of External Facilities and Chief Executive MMF Ltd.

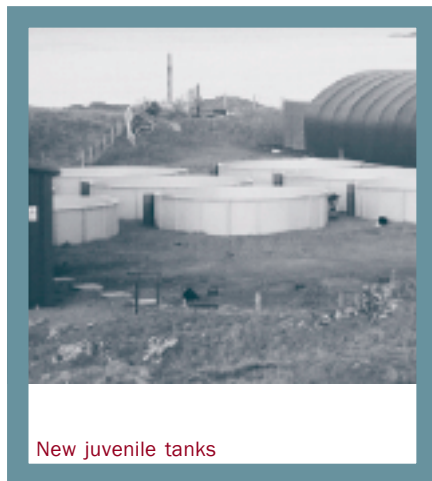
Life at Machrihanish has certainly changed recently with the construction of a large cod hatchery as a joint venture between the University and Marine Farm Technology Ltd. The hatchery will trade as Machrihanish Marine Farms Ltd and is one of the first large-scale cod hatcheries in Europe.

Building of Phase 1 of the Cod Hatchery started in January 2002 and was completed in August 2002. Phase 1 is the Hatchery building and consists of a large live feeds room, an algal room, a small but well equipped laboratory, a computer room, a very large larval rearing room, an egg incubation room and 4 broodstock rooms which are light and temperature controlled. Separate from these facilities is a plant room housing the chillers, blowers and UV systems. Outside the hatchery are the boiler room and the water treatment plant. Last but not least is a canteen, which provides eating facilities for the staff of the hatchery.

All incoming water is filtered to 10 microns through a series of belt and drum filters; the water to the live feeds and larvae is then filtered to 1 micron through bag filters. Water temperatures can be manipulated up or down to match the optimum requirement for eggs, larvae and broodstock.



Inside the larval feeds unit



New juvenile tanks

Following commissioning, a trial batch of 25,000 cod juveniles was produced to test out the systems. The quality of this batch has been exceptional and all of these fish have now been allocated to customers in Shetland and Wester Ross.

Following the successful pilot run the first major commercial production run started in February using 3-year-old light-manipulated broodstock. Egg production from this stock has been enormous and at the time of writing we have in excess of 8 million larvae of various ages in the larva room. Rotifer production is running at around 1 billion per day supplied from a mix of batch and continuous culture systems. Larvae and rotifers are supplemented with algae paste and live algae produced from our two Continuous Algae Production System (CAPS).

The juveniles are weaned from live feeds from around day 30 and we are currently using Nutreco Gemma diets with very good results.

The target from this current batch is 500,000 juveniles and these will be moved into phase 2 at around 0.5 gram.

Work on Phase 2 started in December 2002 and is expected to be completed by Mid May 2003. Phase 2 consists of nine 6 metre GRP circular tanks and eight 10 metre D-ended tanks housed in a very large polytunnel. A new sea water supply is being installed that will pump up to 1000 cubic metres of

seawater per hour. Incoming water is filtered to 100 microns and injected with oxygen through oxygen cones supplemented by oxygen stones controlled by an Oxyguard Commander system.

Juveniles will be pumped to the D-ended tanks from the hatchery and ongrown to around 5 grams before being pumped to the 6 metre tanks for final growth before delivery. The system has been designed with minimal physical handling of the fish in mind and passive grading will take place in the D-ended tanks. Phase 2 has been designed to hold between 300-500,000 depending on customers preferred size. All fish will be vaccinated against *Vibrio* before being delivered by helicopter to a wellboat lying offshore from Machrihanish. From here, codlings will be delivered to their final growout destinations on the West Coast of Scotland; the Northern Isles or even further afield.

Our plan is to produce 3 crops per annum and therefore production is expected to be around 1.2-1.5 million juveniles per annum.

The entire 2003 crop has been pre-sold to Wester Ross Salmon, Lakeland Marine Farm and Johnston Seafarm in Shetland. The latter have recently signed an agreement to purchase 80% of the MMF crop in 2003 as part of their ambitious plans to become the largest producer of cod in the UK, if not the world.

Currently five staff work at the hatchery under the watchful eye of Julian Pajak the MMF manager with another 2 members of staff being recruited at the time of writing. Derek Robertson and Richard Prickett of Marine Farm, our partner in the project, jointly oversee the whole operation. Through Marine Farm Technology Ltd MMF also have access to the expertise of Elizabeth Sweetman of Ecomarine and Nick Fullerton of Fish Tech on a consultancy basis should any technical problems arise. Overall this team has produced more cod juveniles world-wide than any other group and will help ensure the success of the projects.