

STANDARD OPERATION PROCEDURE

Lumpfish Vaccination





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NEED

Parasitic sea-lice are the biggest threat facing sustainable salmon production in the world with an annual cost to industry of £500 million.

Using lumpfish as cleaner fish offers an attractive alternative to the use of chemicals or medicines.

As lumpfish are being cultured for deployment with Atlantic salmon there is a risk of disease spread between both species. There is therefore a need to ensure that any lumpfish deployed to salmon cages are disease free.

Vaccinating lumpfish prior to deployment ensures that they are immune to several diseases that could otherwise be contracted in the cages and passed between the two species.

NOVELTY

Lumpfish vaccinations have previously been carried out using vaccination baths, which require a large amount of vaccine and only provide a low level of protection and duration of immunity. However, the vaccination delivery method for lumpfish reared at CSAR has now changed to intraperitoneal vaccination injection by hand.

This method is highly efficient in generating both humoral (antibody) and cellular cytotoxic response and requires a much smaller dose of the vaccine.

This SOP guides the user on the best practice method for vaccinating lumpfish.

EQUIPMENT USED

- Disposable gloves
- 2 x 500 ml vaccine bottle with tubing
- Vaccination table
- 2 submersible pumps and piping
- Waterproof box
- Extension lead
- Oxygen & airlines
- Dissolved oxygen meter
- 100/150mm flexible ducting
- 1 x 400L white sump
- 1 x 100L white sump
- 2 x orange baskets
- 2 x metal/plastic pole (1m min length)
- Large and small nets
- Headtorches
- Weighing Scales
- System water

PROCEDURE

1.0 Preparation

- 1.1 Ensure that all tanks to be vaccinated have an average weight of over 10 g and have been starved for 24 hrs.
- 1.2 Ensure that there are enough empty tanks to transfer the fish and make a plan of which tank(s) the vaccinated fish will be transferred into.
- 1.3 Set up the vaccination table, ensuring that the pumps and piping are connected correctly and securely, and that the electricals are safely contained in a waterproof box.
- 1.4 Position the 100 L sump next to the inflow end of the table and the 400L sump next to the outflow end of the table.
- 1.5 Place one submersible pump into each of the sumps, fill the tubs with system water, and turn the pumps on to ensure that the table is running correctly.
- 1.6 Ensure the oxygen bottle and blue oxygen tubing are ready for use.
- 1.7 Connect two airstones to the blue oxygen tubing, place one in the 400 L white sump (keep oxygen off until it is required).
- 1.8 Connect another airstone to the main air supply and place into the sump to aerate the water.
- 1.9 Fill 2 10 L buckets with system water and place either side of the vaccination table ready for any fish that are rejected on the table.

2.0 Vaccination

- 2.1 Ensure that the vaccine bottle has been brought up to room temperature
- 2.2 Provide vaccine to vaccinators and set up vaccine table as they prepare the vaccine
- 2.3 Place one orange basket into the 400 L sump, balancing it over the edges with the pole (slotted through the handles on either side) to ensure that it is not entirely submerged
- 2.4 Ensure that the fish shoots are flowing into the basket
- 2.5 Once vaccinators are ready, begin netting fish onto the vaccine table

- 2.6 Ensure that the vaccination table is not over-loaded at any one time (based on judgement -always consider fish welfare).
- 2.7 Keep an eye on the number of fish on the table and continue to add nets of fish as and when needed.
- 2.8 Once a basket is full of fish (roughly 2 nets – do not overfill) lift the basket from the vaccination sump and move fish into their new tank. Replace full basket with empty basket.
- 2.9 Continue this process until the tank is empty.
- 2.10 Ensure that the vaccination table (including both sumps) is thoroughly searched for any fish that may have been missed/escaped.
- 2.11 Ensure that the vaccinators provide the number of vaccinated fish once the tank is empty.
- 2.12 The water in the sumps should be replaced after every 2 tanks that are vaccinated.
- 2.13 Once all tanks are complete, the table should be disassembled and all equipment hosed down.

Considerations:

- 2.14 Keep an eye on the flow rate for the table inflow – ensure that the fish are fully submerged while on the table, but the water should not overflow. If the table does overflow, reduce the flow rate using the valve on the submersible pump in the 100 L sump. Ensure that this sump is kept topped up throughout the vaccination process.
- 2.15 Regularly check the oxygen level in the vaccination sump, use oxygen from cylinder to boost oxygen level as and when needed (when O₂ conc. Drops below 80%).
- 2.16 Regularly check the floor for any fish that may have fallen off the table.
- 2.17 Keep an eye on the number of fish in the 'reject' buckets – if they become crowded, it may be necessary to empty them before the tank is complete. Ensure that you note the number of fish that have been returned to a non-vaccinated tank, and note the tank number.
- 2.18 Keep an eye on the level of the RAS B sump – particularly when tanks are being drained/filled.
- 2.19 Fish may be rejected at the table due to deformities. Any fish that have been rejected should be checked for deformities and euthanized if necessary.

3.0 Post-vaccination monitoring

- 3.1 Following vaccination, there may be mortalities due to stress/injury. Tanks should therefore be checked daily for mortalities
- 3.2 If mortalities are found, they should be removed from the tank, counted, and the number recorded on the tank sheet. Mortalities due to vaccinations mostly occur within 72 hrs.

PHOTOS OF TABLE SET UP?

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