

# Salmon vaccination – setting the standard

Report of mini-conference sponsored by Aqualife and held in Institute of Aquaculture, University of Stirling, 11<sup>th</sup> June 2014

## Section 1: Summaries of individual presentations:

### Jorge Navarro, Pharmaq

There have been different views on correct vaccination procedure within the company, particularly between countries, but combining these different opinions has come up with a standard based on a point one pelvic fin length (PFL) in front of the pelvic cartilage.

However, fish fins can be very variable so a point 5 – 10mm in front of the cartilage appears a practical compromise.

However, other factors are as important as the point of needle entry, including

- Fish size
- Needle length (ideally protrudes 1mm into body cavity)
- Operator training
- Decision making

Although focussing on Atlantic salmon it is worth noting that trout are different in important ways and that the size range is often greater in trout vaccinations.

The flow and continuity of the vaccination process is important and so any auditing needs not to unacceptably interfere with the process.

Pharmaq are confident that a good vaccination process leads to the lowest level of side-effects.

### Sara Picon Camacho, Novartis Aqua

The preparation of fish is important to successful vaccination; this includes their general health, grading, feed withdrawal and anaesthesia.

According to the Summary of Product Characteristics (SPC) of Novartis licenced product in the UK the recommended vaccination point is on the midline, one pelvic fin length ahead of the pelvic girdle. Some Scottish salmon producers, which agrees with experience in the field, are currently using a tolerance range of +/- 1mm latitudinally (sideways) and +/- 3mm longitudinally.

There should be 1mm needle clearance internally (which depends, and needs to be confirmed at each vaccination, with the bevel size and needle manufacturer) and the angle of injection should be at 90 degrees to the body wall.

### Liam Doherty, MSD Animal Health

Using audit information is important in determining correct vaccination procedure. The “PD Monitor” programme involves immediate post-vaccination monitoring of a 30 fish destructive sample with follow-up including a similar sample of smolts at the pre-transfer stage.

MSD use pictorial vaccination point recommendations and score against local reaction and melanisation (at the later audit).

Successful vaccination depends on a number of factors including

- Tight grading
- Needle size and changes (at least every 10,000 fish)
- Temperature
- Fish size
- Regular checks on the whole system
- Suitable equipment (including “fish-friendly” tables and pumps)
- Hygiene

Poor standards can result in lack of efficacy, stress (leading to other disease problems) and identifiable side-effects, either immediate or later.

The company has introduced an on-site audit data-capture tool, the “MSD Vaxx” app, to allow rapid sharing of data and traceability. This includes diagrammatic recording of the vaccination point via a touch screen.

### **Kathy Taylor, Salmovac**

There appears to be general agreement that the optimal vaccination point is midline, 1 PFL in front of the pelvic girdle.

The significant question is therefore what is the tolerance or acceptable deviation from this optimum?

The percentage compliance and measuring technique used in vaccination audits has to relate to fish size (and species).

A manual vaccinator has about 1.5 seconds to decide on the vaccination point; they use fin length because that is what they can see. However, proportions vary with size – small fish have relatively larger fins.

This leads to the following proposal

fish size	lateral tolerance	longitudinal tolerance	penetration into cavity
< 25g	1mm	+/- 3mm	-0.5 to 0mm
25 - 90g	1.5mm	+/- 5mm	0 to +1mm
> 90g	2mm	+/- 7mm	+1 to 1.5mm

The current standards are difficult to understand, measure, calculate and achieve so we need

- A written standard (for the whole vaccination process)
- Auditing to this standard
- Agreed corrective actions where there is deviation from the standard

### **Phil Brown, Aqualife**

There are already a number of quality standard systems within aquaculture (eg Freedom Foods, GlobalGAP) into which we can fit a vaccination standard.

We have to take account of the vaccine suppliers’ individual standards and consider the situations in which vaccines are used “off-label”, ie outwith the terms of their Marketing Authorisation, as set out in Data Sheets.

Vaccination companies rarely get to see the end results of their work, yet vaccination is the one time in the production process that live fish are handled individually.

The aim of vaccination is simply to get the right amount of vaccine in the right place but there are different techniques for carrying out the procedure.

Successful vaccination is judged on

- The external mark
- Any internal marks
- The area of vaccine deposition
- Any organ damage
- Vaccine usage

The control points are

- The vaccination point
- Timing
- Needle penetration
- Angles of needle introduction
- Dose

The environment can have effects on the fish, the vaccine and the people involved.

We need to be certain of the correct vaccine deposition point – is this variable with fish factors?

For the future, education, training and data usage will be very important.

### **Meritxell Diez Padrisa, Marine Harvest Scotland**

Tolerance of deviation from the optimal vaccination point is the important consideration but there appear to be no specification in Scotland and a Norwegian standard of no more than 0.1% deviation appears to have been dropped.

Marine Harvest look for vaccination 1 PFL ahead of the pelvic girdle, with a tolerance of +/- 3mm, no more than 1mm from the midline and with a needle penetration of 1mm. No excessive pressure should be applied on the fish and needles must be sharp and not move sideways.

On-site Health Observers carry out external checks on vaccinated fish every 1-2 hours and internal checks twice daily. These are measured audits – “by eye” inspections are not accepted. In addition, a Health Manager will try to check each job weekly and there are checks by vaccine company representatives.

MH wants humane vaccination with appropriate hygiene and biosecurity, resulting in minimal side-effects at the time or subsequently.

Grading and anaesthesia are important in successful vaccination.

It is recognised that vaccinators are not machines and the long hours involved can be problematic. The current reward mechanisms may promote speed over accuracy.

Vaccination is a complex process and the following questions remain

- Should the window of tolerance relate to fish size?
- How do the visceral organs grow with overall body growth?
- How does the thickness of the body wall increase with fish size?
- Should tolerance vary with other risks?

### **Matthijs Metselaar, Fish Vet Group**

The vet responsible for vaccination provides a prescription but this may reflect the manufacturer's labelling rather than the fish anatomy.

The removal of runts and deformities is an important part of the vaccination process, so welfare at euthanasia is a significant concern.

The cost of speed must be considered in relation to any perceived benefits.

FVG vets now rarely see major side-effects (high Spielberg scores).

In considering standardisation, it is important to include provision for vaccines used under Special Import Certificates and Special Treatment Certificates.

### **Richard Hopewell, Dawnfresh**

In bringing comparisons from trout vaccination and from previous salmon vaccination experience, the questions raised were "What does correct vaccination mean?" and "What is possible?" Emphasis was placed on the importance of working together to agree the vaccination process.

In post-vaccination checks of trout, 0.7 PFL was found to be the best average needle placement to deliver the vaccine into the "pocket" or correct place (biologically) for the vaccine to sit, but this did not necessarily mean that this was the best place to vaccinate for each individual fish, as this would often imply vaccination very close to the pelvic girdle where the body wall was very thick.

This would often bring "correct" (or least worst) vaccination point to 0.7 to 1.0 PFL. The tolerance averaged 0.3 PFL. The thickness of the body wall within the "correct" vaccination area could vary by over 100% of the needle bevel length.

To get the best standard for an individual vaccination job, it was necessary to check the population of fish, carry out appropriate measurements and reach agreement with all stakeholders prior to the start of the job.

The important points were

- Work together
- Assess each fish group
- Train together
- Gather data

Various people have input but the site manager should have ultimate responsibility for the job.

Training and agreement before starting are therefore crucial but a question remains over whether the current reward system for vaccinators is correct – should farms pay more for quality/accuracy, not speed ?

### **Alex MacInnes, Aquascot (speaking from the floor)**

Processors see the end result of vaccination; Aquascot have been gathering data since 2008 and have seen vaccine-related downgrading decrease from 13% then to around 3% now. However, the volume of fish has increased four-fold in that time.

The damage is not really seen until fish are split during processing, and not all damage results in total wastage (fillets can be used at the low end of the Spielberg scale).

## **Section2: Discussion**

There is general agreement that there should be a standard to cover vaccination. Further, there appears to be agreement on the optimal vaccination point – midline, one pelvic fin length (1 PFL) ahead of the front edge of the pelvic cartilage.

It should be possible to agree the standard quite quickly but then monitor and adjust it in accordance with data. Data needs to be stored and shared for this to happen.

Currently, there is a lack of a data trail correlating vaccination to the end result (as seen by processors) and it is difficult to relate findings in processed fish to vaccination, as opposed to the many other factors which may affect growing fish. All melanisation has historically been blamed on vaccination but this is not necessarily true. Traceability from vaccination to harvest should be possible, if difficult.

The setting of a standard should not interfere with legal responsibility. Any “off-label” use of vaccines must be under veterinary prescription but it is not practical to always get the prescribing vet’s authority to make changes to the process on a day-to-day basis.

It is crucial that on-site decision-making authority is clear on the day, and there should be formal sign-off of any deviation from the agreed standard. Critical Control Points should be written in.

Could the standard be a procedure rather than an over-arching specification? The process by which a standard is set for each individual job might become the standard. If so, the standard could be set for all farmed fish, as the specifics for the job would be agreed in the standard process.

Auditing in such a case would be against the standard agreed for the individual job, and therefore much more meaningful.

Above all, the standard has to be achievable and relevant to all vaccination methods. Reward systems (for individuals and companies) should relate to the standard.

### **Section 3: Agreed outcome**

The standard should be:

- Practical – to deal with real life
- A process rather than a set of criteria
- Flexible – again to take account of real life.
- Audited against an agreed process
- Contain same process for all species but with differences at level of detail
- Contain clear lines of responsibility and decision making in line with existing legal responsibilities.

The standard should include:

- Pre-vaccine checks including grading, temperature, health and size of fish
- Training, suitable for all those involved
- Vaccine handling and storage
- Actual vaccination – all aspects
- Post vaccination audit
- Deviations from standard practice (recording who made decisions)
- Data capture
- Data analysis/synthesis
- Data and analysis sharing
- Identification of issues and corrective actions

#### **Section 4: Next steps**

A working group will be formed under the stewardship of the SSPO to discuss, consider and agree the details of the Scottish vaccination standard. Setting a timeframe will be an initial goal of the Working Group.

John Webster has offered to chair the WG and will issue an invitation to a first meeting.

Volunteer members are

- Alex MacInnes, Aquascot
- Jorge Navarro, Pharmaq
- Kathy Taylor, Salmovac
- Liam Doherty, MSD Animal Health
- Malcolm Johnstone, Freedom Foods
- Matthijs Metselaar (or a colleague), Fish Vet Group
- Meritxell Diez Padrisa, Marine Harvest Scotland
- Phil Brown, Aqualife,
- Richard Hopewell, Dawnfresh
- Sara Picon Camacho, Novartis Aqua

In addition, Ronnie Soutar will act as a link to Norway where this topic is also under discussion.