



AquaVac ERM*

Immersion vaccination,
a practical guide for understanding,
planning and Implementation.

Vaccine management guide for the control of Enteric Redmouth Disease (ERM) in trout.

Enteric Redmouth Disease (ERM) is a bacterial disease caused by *Yersinia ruckeri* and is endemic globally. In many countries it is the most common disease affecting trout farms. ERM is economically damaging, considerably disrupting optimum productivity through:

- High mortality
- Poor feed conversion rates
- Lower growth rates
- Requirement for antibiotic treatment

When combined with the increased labour requirement to manage and treat the disease, the total costs of an ERM outbreak are significant. Due to the consequence of the disease many growers now insist on only purchasing trout fry from hatcheries that have been vaccinated for ERM.

As part of their Total Protection Strategy, Intervet/Schering-Plough Animal Health provides a tailored vaccination programme to protect farms from ERM using AquaVac ERM immersion and AquaVac ERM Oral for booster vaccination. Over 1 billion doses of AquaVac ERM have now been used in Europe.

Vaccination with AquaVac ERM immersion provides protection for up to 6 months when a booster vaccination with AquaVac ERM oral is then recommended. This early period of cover is particularly important as fry and growing trout will

be exposed to seasonal temperature changes that are stressful and can lead to ERM outbreaks in un-vaccinated fish.

The immune system of trout fry is relatively weak, but a well prepared vaccination programme with AquaVac ERM will provide early, comprehensive protection and convey the necessary immunity for healthy and economic growth. The immersion vaccination enables trout to develop immunity while the fry are still in the hatchery. This eliminates the likelihood of early disease outbreaks and minimises the risks of carrier fish spreading infection. This bulletin is designed to assist with planning and implementing the primary vaccination AquaVac ERM Immersion.



Immersion vaccination with AquaVac ERM

When planning the immersion vaccination the following background points are important:

Understanding Immunity

- Vaccine protection is relatively short lived in small fish.
The objective of a successful vaccination is to provide the strongest and longest period of immune response possible.
- Immersion vaccine is absorbed primarily through the gills so vaccinating healthy fish which have healthy gills is key to a successful vaccination.
- Limiting stress greatly increases the chances of a successful immersion vaccination by maximising the immune response.

Application of an Immersion vaccine:

The case of AquaVac ERM

- Trout fry should receive their immersion vaccination at 2 grams or above. Optimum protection is achieved at 5 grams or above.
- To minimise the stress on the fish, immersion vaccination should use water from the hatchery, which would ideally be at 10°C±.
- 1 litre of AquaVac ERM immersion per 9 litres of water will vaccinate up to 100kgs of trout fry.
- The solution should be oxygenated, but not overly so that there is not too much froth at the top of the solution.
- The fish should be immersed in the solution for a period of 30 seconds.
- So as to minimise stress but to insure that only 100Kg of fish are vaccinated per litre of vaccine (or 10 litres of water / vaccine dilution), the following method is suggested;
 - Only immerse up to 4Kg of fry at any one time
 - Do NOT dry weigh the fry
 - Place a container of water (hatchery water) on a set of scales and zero the scales
 - Then place the netted fry in the container and record the increase in weight
 - Maintain records of the cumulative weight of fry vaccinated.
 - When the total accumulated weight reaches 100Kg a new vaccine solution must be prepared.

- To allow immunity to develop effectively, trout fry should not be moved for 10-14 days post vaccination
- This system can be scaled up to more than 10 litres for example 3 litres of vaccine can be mixed with 27 litres of water (30 litre solution) to allow vaccination of a total 300Kg of fry. Up to 12Kg can then be immersed at any one time but as general rule only dip as many fish at a time so as to ensure the fish are not overcrowded and can breathe freely whilst in the vaccine solution

As with all effective vaccination programmes, maintaining accurate records (especially dates) is important, especially if the immersion vaccination is to be followed up with the recommended booster vaccination as part of the Total Protection Strategy.

In recent years vaccination machines have become a popular option for immersion vaccination. They allow for automatic calibration of vaccine volume by registering the correct batch weight of the fry. These machines provide immersion vaccination in a less stressful way. They are highly accurate and are labour saving.

Planning for an Immersion vaccination

- The following sections in this bulletin provide further information and background to three key aspects to immersion vaccination.

1. Fish Health
2. Fish Size
3. Water quality and temperature

If you would like any further information please contact your local fish vet or Intevet/Schering-Plough Animal Health specialist.



Fish Health

The over-riding principle is to only vaccinate clinically healthy fish. The immune system in trout fry is sensitive. Fish that are diseased or have a clinical infection will also suffer suppression of their immune system. Therefore fish that are vaccinated when diseased will not be able to initiate an effective immune response to the vaccine.

Bacterial Diseases

If the trout fry are suffering a clinical outbreak of a bacterial disease such as rainbow trout fry syndrome (RTFS) then they should be treated first with an approved antibiotic. Once the fish are clear of disease and the antibiotic treatment is finished, the vaccination can then take place.

Viral Diseases

If the trout fry are suffering a clinical outbreak of a viral disease, the immersion vaccination should be put back until the outbreak has finished and the mortalities have reduced to a background level.

The vaccine is absorbed into the trout system through the gills so it is especially important that the trout fry are healthy and free from bacterial gill disease.

Stress is a major factor in the effectiveness of immersion vaccination. The following areas of stress can affect successful vaccine uptake and should be avoided as much as possible.

1. Over stocking
2. Incorrect or stressful handling of the trout fry
3. Water temperature extremes
4. Poor water quality – see section 3



Fish Size

Fish size is important and can determine the success of the immersion vaccination. This is for two reasons.

1. The development of the trout's immune system is related to its size. A trout fry of 5g is considered to have a fully developed immune system. The smaller the fish the less developed the immune system is considered to be. Consequently the ability of the developing immune system to process vaccine and provide the necessary protection to ERM is affected. The smaller the fish (under 5g) the shorter the duration of immunity provided by the vaccine.
2. Dose rates for vaccination are calculated on the basis of the total batch weight. Too little vaccine will not allow sufficient immune response to be produced and thereby limit immunity. Under dosing with the vaccine (vaccinating higherweight of fish than 100kg with 1 litre of vaccine) will reduce the level of protection provided by the vaccine.

In general the ideal size for trout fry at vaccination by immersion is 5 grams.

Vaccination at the minimum size should be adopted where the fry are exposed to ERM at an early stage of the production cycle. In this case the booster vaccination will need to be brought forward in time to ensure full protection is maintained. In all other cases the most cost effective vaccination program is to immersion vaccinate at the optimum size of 5 grams allowing protection lasting 6 months to develop and the oral booster vaccination to be administered 4-6 months after the primary vaccination.

If a farmer were following a total protection strategy, this would then require an earlier booster vaccination to extend the immunity provided by vaccination than a fish that had been immersion vaccinated when slightly larger. Depending on the size at which the fish will be harvested this could mean a second booster would be required thereby increasing overall vaccination costs despite the savings made by immersion vaccinating smaller fish.



Water quality and temperature

Water temperature and quality both have a significant impact on the trout fry's ability to process the ERM vaccine. The immune response mechanism in the trout fry is sensitive to environmental conditions. Both poor water quality and also low water temperatures can greatly affect the ability of the trout fry to initiate an immune response to the immersion vaccine.

Temperature

It is generally considered that 10°C is the recommended water temperature for vaccination. Whilst vaccination can be successful at temperatures as low as 8°C, the trout fry's ability to initiate an immune response to the vaccine greatly as the temperature lowers.

Water temperature control is especially important at the time of vaccination.

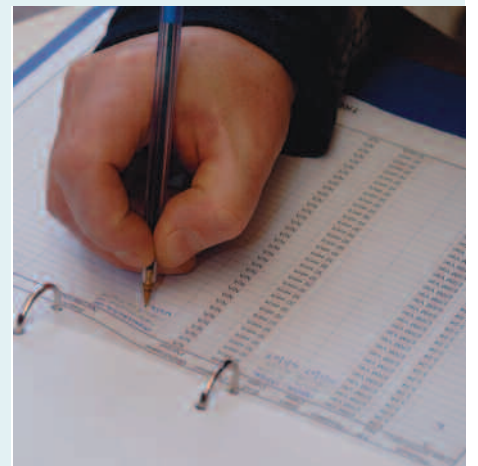
The supply tank and the receiving tank water should ideally be from the same source and therefore be at the same temperature. This limits stress during and after vaccination, at a time that is very important for trout fry as they start processing the vaccine and are at the early stages of developing immunity.



Quality

The water used in immersion vaccination should come directly from the tanks from which the trout fry have been taken. This means that the quality is suitable for the fry and thereby minimises the stress the trout fry undergo during the process. This maximises the potential immune response.

The water should be oxygenated during vaccination. This maintains its suitability for the trout and allows an appropriate immune response to the vaccine.





As with all pharmaceutical products please follow the label directions and advice provided by your veterinarian

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