



# Technical Bulletin

## Mixing & Feeding



**AquaVac\***  
**ERM Oral**

### **Vaccine management guide for the control of Enteric Redmouth Disease (ERM) in Trout.**

Enteric Redmouth Disease (ERM) is a bacterial disease of farmed rainbow trout and is endemic in Europe, North America and Chile. Losses from ERM due to mortality and poor growth can be high and the economic effects severe. This bulletin is designed to assist with effective mixing and feeding of AquaVac ERM oral vaccine with high

quality fish feed. The vaccine is provided by Schering-Plough Animal Health as part of the company's Total Protection Strategy. If you would like any further information please contact your local Schering-Plough Animal Health representative.

# Planning the oral vaccination booster

## Vaccine timing

AquaVac ERM oral vaccine is administered in normal fish feed and is designed for use as a **booster** to immunity, given 4-6 months following the primary vaccination using AquaVac ERM immersion.

When planning the booster vaccination a number of elements must be taken into account to optimise the booster effect:

- 1) The quality of the primary vaccination
  - The primary immersion vaccination (size of fish, water temperature, health status of fish).
- 2) The ERM disease cycle
  - The water temperature and the seasonality of the ERM disease in the specific site being vaccinated.
- 3) Production targets
  - Production cycles on the site being vaccinated.

For further information on vaccine booster timing please refer to your vet or speak with your Schering-Plough Animal health representative.

## On Farm or Feed mill mixing

AquaVac ERM Oral provides the flexibility needed to suit the wide variety of farm sizes and farming practices within the trout farming industry today.

It can be mixed at the location that is most appropriate for the individual farm unit or the site that is vaccinating.

- i) **Feed mill mixing:** When a large biomass or number of fish are to be vaccinated, the vaccine and AquaVac Ergosan can be mixed into the feed at your feed mill and delivered to the site as with normal feed deliveries.
- ii) **On Farm mixing:** For smaller scale use or for farmers vaccinating only a few fish, on farm mixing may be the most appropriate method.

The sections of this technical bulletin on recommendations to determine vaccine feed mix, calculating the feed vaccine mixture, and feed preparation and mixing, are designed for use by farmers who mix the vaccine feed on site. However the following sections on feeding of the vaccinated diet and monitoring of the vaccination sections are applicable to all oral vaccination.

If the mixing is to be done at the feed mill and multiple batches of fish must be vaccinated, please contact your Schering-Plough Animal Health representative to discuss the instructions for calculating the optimum vaccine, feed and oil mix to be used.

## Handling and storage of AquaVac ERM Oral

Prior to use, AquaVac ERM Oral should be kept refrigerated. On the day of use, the correct amount of vaccine should be removed from refrigeration and kept at room temperature (20 - 22 °C) for at least **1 hour** prior to use or until consistency is completely fluid. During this period it is important to avoid exposure to direct sunlight or to direct heat sources.

## Use of AquaVac Ergosan\* and high quality fish feeds.

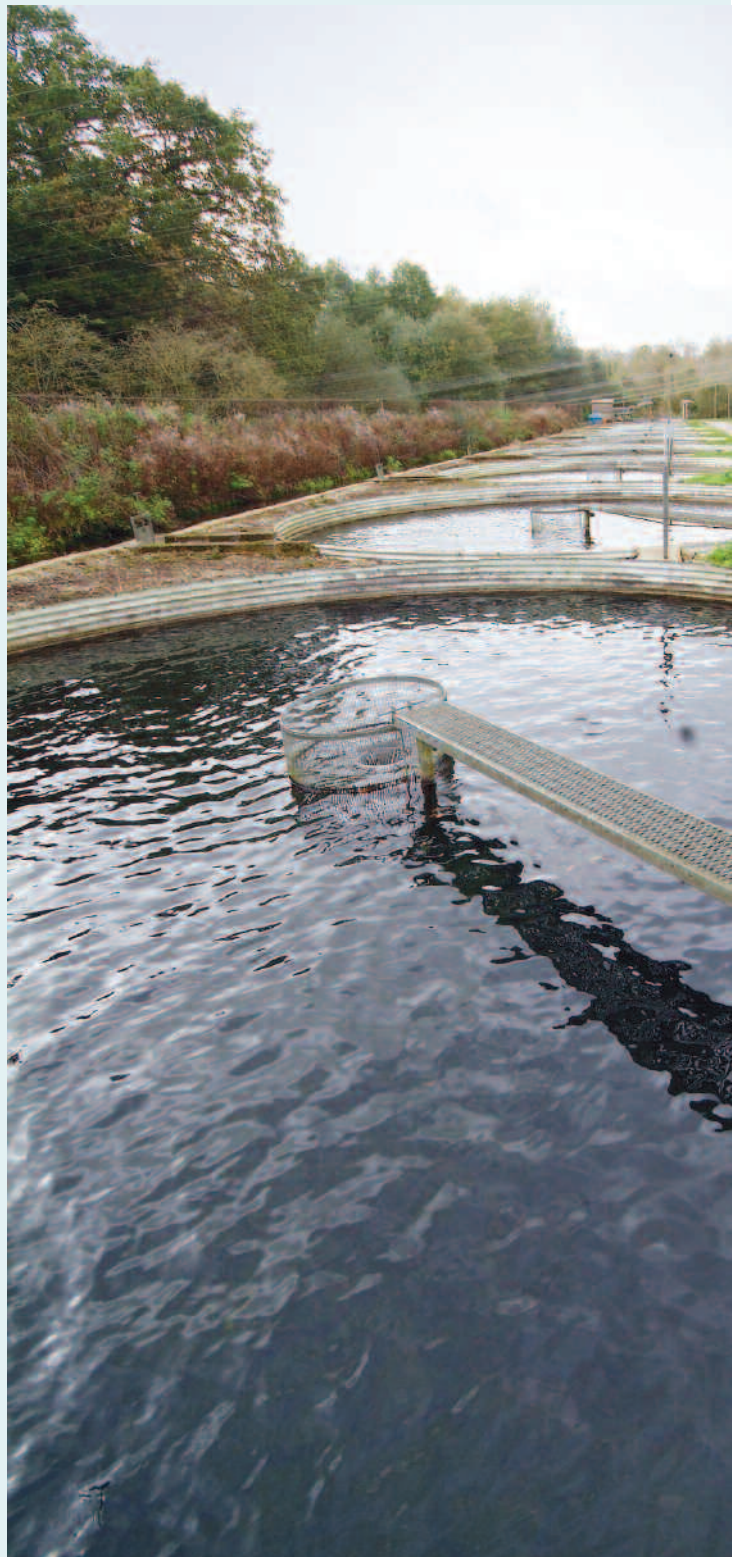
Fish health and nutritional status are important at vaccination to ensure the best possible immune response to the vaccine. To help maintain good health and optimise the nutritional status of fish, a high quality diet should be used and this may be complemented by the use of AquaVac Ergosan.

AquaVac Ergosan is a complementary feedstuff made from seaweed. It is used to optimise the nutritional status of the fish and ensure that the optimal immune response to the vaccine is achieved. Its use is recommended by Schering-Plough Animal Health Aquaculture and is considered to be an integral part of the *Total Protection Strategy*.

## ***Recommendations to determine vaccine feed mix***

There are six recommendations, which determine the correct mix of vaccine in the feed:

1. The vaccine dose = 0.1ml of vaccine per fish - 1 litre of vaccine = 10,000 fish.
2. The vaccine feed should be fed over a period of ten days, split into two periods of five days with a five days break in the middle, as shown below;  
Day 1-5 0.01ml per fish per day + AquaVac Ergosan (0.2% Inclusion)  
Day 6-10 No vaccine  
Day 11-15 0.01ml per fish per day.
3. To ensure the optimum nutritional status of the fish, AquaVac Ergosan should be mixed into the feed (prior to the vaccine being mixed) at a rate of 0.2% (2Kg per tonne of feed). This should be done for the vaccine feed prepared for at least days 1 – 5.
4. To ensure 0.01ml of vaccine is fed to each fish each day, the exact amount of feed to be mixed with the vaccine is determined by the average fish size and the desired average percentage feed rate for the batch of fish being treated.
5. To ensure homogeneity of the vaccine feed, the vaccine inclusion in the feed should be at least 3% (3 litres vaccine: 100Kg feed). If the vaccine to feed ratio falls beneath this level, fish oil can be pre-mixed with the vaccine prior to adding it to the feed to bring the liquid volume up to the 3% minimum level.
6. Feeding of the vaccine feed should commence within 4 days of mixing.



## Calculating the feed vaccine mixture

- The daily amount of vaccine per fish is fixed throughout the program – **0.01ml**
- The length of the program is fixed – **10 days**

### Step 1 Collate data from each batch of fish to be vaccinated

- Fish numbers
- Average fish size
- Feeding rate

### Step 2 Calculate the average fish weight and the suitable average feed rate for each batch to be vaccinated.

This data can then be used to calculate

- How much feed to mix with the fixed amount of vaccine
- How much AquaVac Ergosan should be used
- How much fish oil (if any) must be used to ensure homogeneity.

### Outputs from working example

Feed to be mixed with vaccine  
= 120Kg

Ergosan volume to be mixed for first 5 days  
= 120grams

Volume of vaccine to be used  
= 3 litres

Volume of fish oil to be pre-mixed  
with vaccine = 0.6 litres

### Working Example:

#### Calculating Vaccine inclusion and feed quantity

For 30,000 fish of 40g that are being fed at 1% per day, the following must be calculated:

10,000 fish = 1 litre of vaccine  
therefore

30,000 fish / 10,000 = 3 litres of vaccine  
required

Weight of fish = 30,000 fish x 0.040Kg  
= 1,200Kg

Weight of feed (10 days) = (1,200Kg x 1%) \* 10 days  
= 120Kg

#### Calculating AquaVac Ergosan weight

Remembering that AquaVac Ergosan should be mixed in as well, we can now calculate that from the 60Kg of feed used in the first 5 days of vaccination we would need to add 0.2% of this weight in complementary feed, which equates to 120 grams.

#### Ensuring Homogeneity

If only 3 litres of vaccine were mixed to 120Kg of feed, homogeneity could not be achieved because this is only 2.49% of the volume of feed.

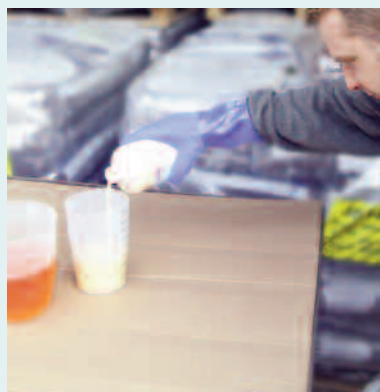
To ensure homogeneity the following is required  
120 Kg of feed x 3% = 3.6 Litres of fluid.

Therefore in this case, only 3 litres of vaccine is used. The additional 0.6 litres of fish oil must be pre-mixed with the vaccine.

Your vet or Schering-Plough Animal Health representative can be contacted to ensure the calculations have been made correctly.

## Feed preparation and mixing

1. As stated, the vaccine should be removed from refrigeration and left at room temperature for **3 hours** or until consistency is completely fluid, and be well shaken prior to mixing with feed.
2. **Special Instructions for the vaccine feed being prepared for the first 5 days of the treatment.** AquaVac Ergosan should be mixed into the feed prior to the vaccine/fish oil. It should be added to a rotating mixer containing the feed and allowed to circulate for 5 minutes ensuring even distribution of AquaVac Ergosan over the feed.
3. Vaccine (or any fish oil and vaccine mixture) should be added to a rotating mixer containing the feed (and containing AquaVac Ergosan if preparing for the first five days of vaccination) and allowed to circulate for 5 minutes ensuring even distribution of the vaccine in the feed.
4. When the mixing cycle is complete, it is important that the feed should then be allowed to absorb the vaccine fully and then dry. The drying process ensures the prescribed vaccine intake is fully maintained. The vaccine feed should not be exposed to direct sunlight or heat source.
5. The vaccine feed should be stored in a cool dry place. It should be clearly marked with the following information:
  - i. the date of preparation
  - ii. the batch of vaccine used
  - iii. the incorporation rate of vaccine on feed
  - iv. the tank or batch of fish for which the vaccine feed has been prepared
  - v. the amount of vaccine feed to be fed per day
  - vi. when the vaccine feed should be fed.



### Mixing of AquaVac ERM oral vaccine

#### Check list?

1. Store vaccine correctly.
2. Warm vaccine to room temperature (20°C - 22°C) prior to mixing with the feed.
3. Calculate the quantity of feed to be mixed with the vaccine.
4. Ensure AquaVac Ergosan is mixed with the feed if preparing the first 5 days of vaccine feed.
5. Ensure the vaccine feed is mixed accurately and to instruction.
6. Allow the vaccine feed to dry and ensure all vaccine is absorbed.
7. Maintain detailed vaccination record.

## *Feeding of the vaccinated diet*

### **Vaccination preparation**

To ensure that the most effective vaccination with AquaVac ERM Oral is achieved, there are a number of principles to observe and practical steps to follow.

1. Trout health is an important factor as it affects the immune response capability of the fish. Also, correct dosing of the vaccine is dependent on feed intake, and unhealthy fish will either not eat or suffer from reduced appetite. Therefore only vaccinate healthy fish.
2. If ponds/raceways contain any diseased trout, treat prior to vaccination, and allow fish to recover fully before vaccinating.
3. Monitor feed intake in the days prior to vaccination to ensure targeted intake levels are achieved.
4. Do not stress, move or mix trout during the vaccination period or in the immune induction period after vaccination. Any factors that depress immune response and feed intake will limit immune induction.
5. Monitor water flow, temperature and quality throughout the vaccine period.

### **Introduction of vaccinated feed**

1. Ensure that you have the required amount of vaccinated feed prepared and AquaVac Ergosan mixed for the first half of the treatment.
2. Keep feed fresh and protected from moisture and sunlight.
3. Maintain your standard daily feeding routine throughout the vaccination.
4. Check that the dosing levels are correct for the trout population.
5. Vaccinated feed should be fed at up to 90% of the daily ration over the treatment period; however, farmers can top up with regular feed at the end of each day. The objective is to ensure the vaccine feed is completely consumed during each day but that no growth is lost.
6. When feeding the vaccinated feed, ensure even distribution to the trout population.
7. Do not over feed. Ensure that all feed is consumed at each feeding point.



## Monitoring the vaccination

1. Observe trout behaviour and general health at feeding.
2. Make sure any major deviation in feed intake is recorded so that your vet or Schering-Plough Animal Health representative can give you the best practical advice to ensure the best alternative vaccination strategy.
3. Check that there is enough vaccine feed prepared in advance to ensure continuous vaccination.
4. Ensure that the correct amount of vaccine feed is fed to each separate tank or holding unit.
5. Ensure that the interval days are correct – **No vaccination days 6-10.**
6. Maintain complete records of vaccination dates and rates for each tank.

### AquaVac ERM Oral vaccination feeding – Check List

1. Monitor the fish (feeding, behaviour & health).
2. Water quality checked
3. Vaccinated feed prepared and fresh
4. Feed intake levels monitored
5. Correct cut off and restart days (Days 6-10)
6. Vaccination records updated.





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

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