
Yersiniosis

Enteric Red Mouth Disease (ERM), Red throat Disease, Pink Mouth Disease

Definition "Acute, subacute, and chronic bacterial disease of **Salmonids**, in particularly, cultured ones characterized by septicemia, high mortalities (young fishes), exophthalmia, skin and mouth erythema, and hemorrhages within the visceral organs".

Etiology **Yersinia ruckeri**, one member of the family entrobacteriaceae, Gram negative rods, cytochrome oxidase negative, motile by peritrichous flagella, non-spore forming, non acid fast, non capsulated, doesn't produce pigment. It doesn't survive well outside its host.

The organism grows well on ordinary medium, Nutrient agar (NA), Triple sugar iron agar (TSI), MacConkey agar and Brain heart agar (BHA) at 18-22 °C giving white translucent round small colonies.

On selective medium (contains tween 80, sucrose and bromothymol blue) it grows as small greenish round colonies with a surrounding area of hydrolysis.

Attack glucose and mannitol oxidatively and fermentatively with production of acid only and doesn't other carbohydrates.

Susceptibility Almost all salmonids are the susceptible fish species with a pronounced clinical signs.

The organism could be isolated asymptotically from other fish species such as Carp, goldfish, eels, sea bass, and turbot.

Predisposing Causes (stressors)

- Overcrowding.
- Low dissolved oxygen.
- Presence of large amount of organic matter.
- Nutritional deficiencies.
- Injuries of the skin or gill either by trauma or ectoparasites.
- Temperature variation between seasons (eg. summer & spring).
- Rough handling especially during transportation.

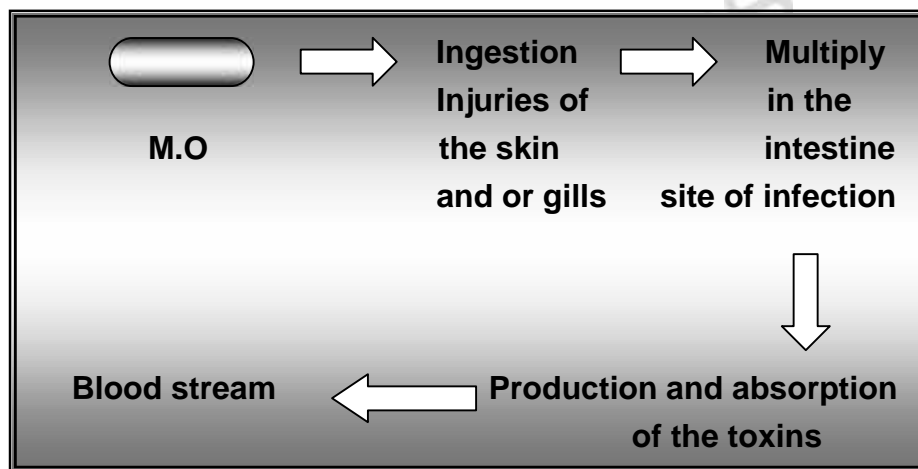
Mode of infection Mainly through ingestion and injuries of skin and /or gills. Shaded microorganisms from infected aquatic animals, infected dead carcasses as well as polluted water with the microorganism act as the source of infection.

transmission The transmission or the spread of the disease is usually horizontal (from infected material to the fish and /or aquatic animals).

Source of infection

- Shaded microorganisms from infected fishes and/or other infected aquatic animals such as crayfish.
- Carriers.

Pathogenesis



Fish with yersiniosis may show one or more of the signs below, but disease may still be present in the absence of any signs.

Disease signs

Acute:

- Onset of rapid fatal septicemia associated with low mortality rate that expand gradually to reach up to 75%. The dying fish are easily to be handled and crowed at the water surface.

Subacute:

- Reddening of corners of mouth, gums, palate and tongue (hence the name of the disease)
- Exophthalmia that may be associated with hemorrhages and “blood spot” on the cornea
- Ascitis, skin rashes sometimes associated with dark pigmentation.



Rainbow trout, *Onchorynchus mykiss*, shows typical signs ERD. Note the redden mouth and tongue.

Rainbow trout, *Onchorynchus mykiss*, shows typical signs ERD., Note hemorrhages on the body surface and eye.



Chronic or ulcerative:

- Darkening of the skin associated with unilateral or bilateral blindness.
- Fish become lethargic and float aimlessly.
- There may or may not erythema at the base of fins, mouth, or operculum.

Rainbow trout, *Onchorynchus mykiss*, shows typical signs ERD. Note hemorrhages at the base of the lower jaw.



Postmortem Findings

- Hemorrhages in the fat, gonads, peritoneum and swim bladder.
- Ascetic fluid together with peritoneal and visceral adhesion.
- Splenomagally and enteric hyperanemia.
- Swollen Kidney and liver become dark in color.



Rainbow trout, *Onchorynchus mykiss*, shows typical signs ERD. Note hemorrhages and visceral adhesion

Microscopic Pathology

- Deep hemorrhages, edema and hyperemia of the liver, kidney, and spleen tissues.
- Necrosis of the intestinal lining epithelia and may be sloughed.
- Colonization of the causative bacterium within the visceral organs.

Most of these pathological alterations are non specific for yersiniosis and could be represented within other septicemic diseases.

Diagnosis

I. Case history revealed that:

- Loss of appetite few mortalities increase day by day.
- Sluggish swimming and fish swim aimlessly.
- Some fish showed some of the clinical signs

II. The disease signs (as mentioned above).

III. P. M. findings.

IV. Laboratory diagnosis:

- Samples: kidney is the best organ for isolation of **Y. ruckeri**.
- Squash smear from the organs and the lower intestine stained with Gram.
- Isolation and identification:
Y. ruckeri could be isolated on NA, BHA, TSA, and MacConkey agar at 18~22 °C from kidney of the fish with hemorrhagic septicemia.
Identification through using biochemical tests, API kits, gel-diffusion test, FAT, ELISA, and PCR (polymerase chain reaction).
- Histopathological findings (as mentioned above).

Therapy & Control

Chemotherapy

- In early stages of infection antiseptic bathes are recommended.
- Oxytetracycline 55mg/Kg fish in the food for 10 days.
- Sulfamerazine 264mg/Kg fish in the food for 3 days followed by 154mg/Kg fish for additional 11 days.
- Sulfaguanidine + sulamerazine combination (1 : 2) 130mg/kg fish for 3days followed by 90mg/Kg fish for 11days
- Oxolinic acid 10~30mg/Kg fish for 10 day.

Morbidity may reach 100%, however, mortalities depends upon the age of the affected fish as well as culture management and may not exceed than 50%.

Control

Good hygiene and removal of all stressors is the proper way for disease control this can be achieved through:

- Prophylactic doses of bactericidal agents are recommended.
- Avoid overcrowding.
- Proper disposal of dead and dying fishes either by burning or

burying.

- Control of aquatic animals such as reptiles and amphibians.
- Hygienic destruction of the carriers.
- Proper disposal of infected fish if in small number.
- Proper drainage, drying, and disinfectant of the pond (quick lime 4 tone/acre.
- Vaccination.

By Dr. Mortada MA Hussein