

Enteric Redmouth Disease (ERM)

I. Causative Agent and Disease

Enteric redmouth disease (ERM) or yersiniosis is caused by Gram-negative, motile bacteria known as *Yersinia ruckeri*. The name ERM is derived from the inflammation and petechial hemorrhages of the lower hind gut and inside and around the mouth of infected fish that are not unique signs of infection by this bacterium. ERM is an acute septicemia in salmonids with bacterial foci, necrosis and inflammation in all tissues. In Alaska, two serotypes of the bacteria, known as O1 and O2, can cause the disease. The two serotypes are differentiated from each other based on biochemical and/or serological tests. The virulence varies considerably within each serogroup but *Y. ruckeri* O1 has been more pathogenic in Alaskan salmonids and elsewhere. The bacteria are found worldwide where salmonids are cultured and there are a total of 6 serotypes with several subgroups.

II. Host Species

Rainbow trout are the most sensitive host, but all salmonids and several other fish species are susceptible to infection. ERM is a major concern in the Norwegian Atlantic salmon industry causing fish mortality in both fresh and seawater pens.

III. Clinical Signs

Externally, clinical signs can be similar to other bacterial septicemias. Infected fish are often lethargic and dark in color. Inflammation and petechiation are prominent in and around the mouth, the isthmus and on the opercula. Petechial hemorrhages are commonly at the base of the fins. Fish often exhibit exophthalmia and a distended abdomen. Internally, the stomach is often filled

with watery fluid and petechiation may be present in the musculature and visceral organs, most notably in the hind gut and liver.

IV. Transmission

The bacterium is horizontally transmitted from fish to fish via the fecal oral route and often becomes localized in the lower intestine of fish surviving a disease outbreak. Bacteria can remain viable for a limited time in ambient water to infect susceptible fish. Other reservoirs of the bacteria include fish-eating birds reported near aquaculture facilities.

V. Diagnosis

Presumptive diagnosis is made by the cultivation of a Gram-negative, oxidase negative, motile bacterial rod from blood, kidney, or lesions when inoculated onto bacteriological media. Diagnosis is confirmed with biochemical tests or fluorescent antibody tests specific for *Yersinia ruckeri* Types O1 and O2. Type O1 includes subgroups a and b while Type O2 is composed of 3 subgroups (a,b,c). The remaining serotypes are O3, O5, O7 and O8. The majority of epizootics in salmonids are caused by motile serotype O1a. That said, the current serotyping scheme is inconsistent and not as helpful as genetic sequencing in determining relatedness in clonal clustering that may influence epidemiological differences.

VI. Prognosis for Host

Under aquaculture conditions, diseased fish generally die if there is no antibiotic intervention. Prognosis for the population is good if the condition is recognized early so that antibiotic therapy can be initiated.

VII. Human Health Significance

There are no human health concerns associated with *Yersinia ruckeri*.



Petechial hemorrhages of the liver present in enteric redmouth disease.



Diffuse internal petechial hemorrhaging (arrow) typically present with bacterial septicemias like enteric redmouth disease.