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Aeromonas salmonicida in Asymptomatic Rainbow Trout

Furunculosis, caused by the bacterium *Aeromonas salmonicida*, produces significant disease and death in a variety of hosts. Although the pathogen is typically isolated from ulcers and systemic organs of clinically diseased fish, detection in asymptomatic fish is more difficult. Apparently healthy, asymptomatic fish often act as reservoirs of contagion to noninfected stocks, and initial studies suggested that the organism sequestered within the kidneys of carrier fish. Most fish health policies recommend kidney samples as the preferred site for detection. Still, the inability to conclusively identify carrier fish is important in the transfer and spread of furunculosis to noninfected populations. Although most examinations for *A. salmonicida* involve the sampling of systemic organs, recent investigations suggest cultivation of the pathogen from external sites. We have reported on the acceptance of mucus as a valid site for the nonlethal recovery of *A. salmonicida*. Here we report of a specific instance in which both mucus and gills were identified as the primary sites for harborage of *A. salmonicida* in asymptomatic rainbow trout (*Oncorhynchus mykiss*).

Latent Furunculosis Detected in Samples of Mucus and Gills

Dilution counts were prepared on bacteriological media from mucus, gill, spleen, liver, heart, kidney, and intestinal samples of 100 asymptomatic rainbow trout (average weight = 227.2 g). Inoculated agar plates were incubated for 48 h at 20°C, and bacteria were quantified as colony-forming units (cfu) in dilutions containing 10 to 30 colonies. Individual colonies were further identified according to standard microbiological procedures and taxonomic schemes. The original dilution of sample was also enriched for 48 h at 20°C before inoculation on agar plates to determine if culture enrichment would enhance the detection of *A. salmonicida*.

Primary dilution counts detected 3.6×10^3 cfu of *A. salmonicida* per gram of spleen from one fish. The bacterium was also detected from this sample after 48 h preenrichment in Tryptic Soy broth. However, *A. salmonicida* was not detected from any other sample assayed by the preenrichment technique nor was it detected from any of the other internal organs sampled by either enriched or direct counts.

The pathogen was detected by direct counts from 15 of the 100 gill samples that were processed and bacterial concentrations were 6.3×10^2 to 1.0×10^4 cfu of *A. salmonicida* per gram of sample. Assay of mucus produced similar results, in which the bacterium was detected in 19 samples with concentrations of 9.1×10^2 to 1.7×10^4 cfu of *A. salmonicida* per gram of mucus. Fifteen of the mucus samples corresponded with positive isolation of the bacterium from the gills and spleen.

Assay Should Include Examination of Systemic and External tissues

Results of the present study further corroborate the observations of other investigators who have indicated that normal bacteriological examination of kidney samples is often inadequate for ensuring reliable detection of *A. salmonicida* among asymptomatic, carrier fish. Indeed, the rainbow trout sampled would have been presumed to be specific-pathogen–free if kidneys were the only material examined. In fact, infection would not have been detected even when heart, liver, and intestinal samples were assayed. The only evidence of systemic infection was based on a single finding of 3.6×10^3 cfu of A. salmonicida from one spleen. Thus, our data indicated an extremely low systemic prevalence of infection.

However, when either mucus or gill samples were examined, substantially higher carrier prevalences (19% and 15%, respectively) were detected. Although these results further suggest that mucus and gills were the primary sites of carriage for *A. salmonicida* within this population of rainbow trout, it is inadvisable to design sampling regimens based solely on these results. In fact, it is most probable that the actual site of carriage is not a steadfast phenomenon but depends on an interplay of several factors, including the route of infection and the relative innate resistance of the species involved.

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