

# Diagnostic sensitivity and specificity of test procedures for *Renibacterium salmoninarum* in rainbow trout

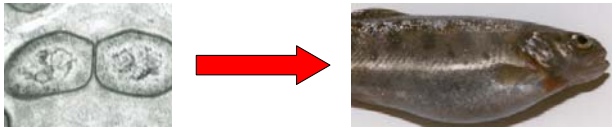
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## Introduction

Bacterial Kidney Disease (BKD) is an infectious, chronic, systemic condition of the salmonids with the potential to cause high mortality. The infectious agent, *Renibacterium salmoninarum*, is an intracellular, Gram-positive bacteria, which can be transmitted vertically and horizontally. Recent surveys in the United Kingdom suggest that both farmed and wild salmonid stocks are infected.



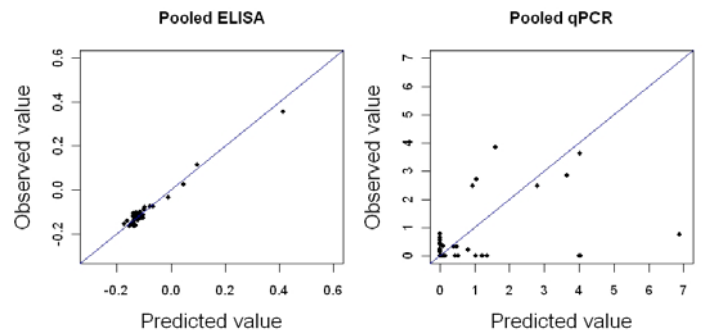
Several laboratory test procedures have been used to screen for *R. salmoninarum* infected populations including bacterial culture, enzyme-linked immunosorbent assay (ELISA) and real-time quantitative polymerase chain-reaction (qPCR).

We report on the performance of tests for screening *R. salmoninarum* infected rainbow trout (*Oncorhynchus mykiss*) populations.

## Diagnostic test sensitivity and specificity

	Individual samples		Pooled samples
	Sensitivity	Specificity	Sensitivity
<b>Culture</b>	5%	>99.9%	Not pooled
<b>ELISA</b>	25%	>99.9%	6%
<b>qPCR</b>	99%	>99.9%	36%

## Relationship between pooled and individual tests



Pooled test results are a consequence of signal dilution.

Pooled test results are unlikely to be a consequence of signal dilution only.

## Materials and Methods

Identified a freshwater rainbow trout culture farm infected with *R. Salmoninarum*.



Sampled kidney tissue from 2700 individual fish and pooled them in groups of five for ELISA and qPCR.



Tested samples using bacterial culture, ELISA and qPCR.



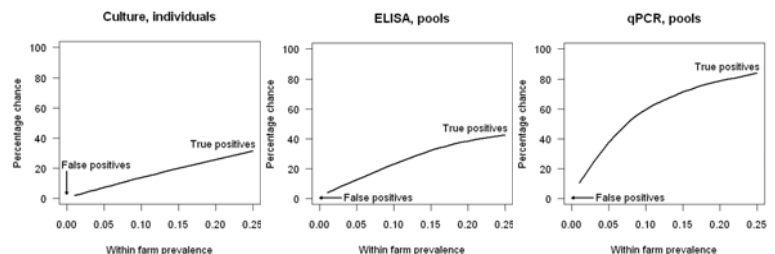
Analysed results using a non-gold standard statistical methodology.



Peer-reviewing results and using to review testing regimes.

## Farm-site test sensitivity and specificity

Assumes thirty rainbow trout are randomly sampled from a site and tested as individuals (culture) or pools of five individuals (ELISA & qPCR). Preferential sampling of moribund individuals (if present) would, most likely, improve test sensitivities.



## Conclusions

### Diagnostic sensitivity and specificity for individual samples

The diagnostic specificities of the three test procedures for individual samples are high. The diagnostic sensitivities of the three test procedures for individual samples differ from low to high.

### Effect of pooling samples

The pooling of samples (used for ELISA and qPCR) has a detrimental effect on diagnostic sensitivities.

The reduction in sensitivity for pooled ELISA can be explained by signal dilution.

The reduction in sensitivity for pooled qPCR is unlikely to be a consequence of signal dilution only.

### Utility of methods for screening populations

The qPCR test procedure is the method most suited to screening small numbers of individuals.

Confirmation using another test procedure is desirable.

These results are being used in a review of the current surveillance programme.