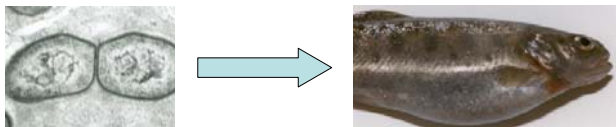


Surveillance indicates a difference in the prevalence of *R. salmoninarum* infected salmon and trout farms in Scotland

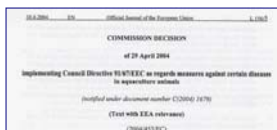


Introduction

Renibacterium salmoninarum is an infectious, intracellular, gram positive bacteria which infects both Atlantic salmon (*Salmo salar*) and rainbow trout (*Oncorhynchus mykiss*). The pathogen is a necessary cause of Bacterial Kidney Disease (BKD) and can persist subclinically in an individual for at least many months and possibly years.



The United Kingdom was granted 'additional guarantees' for BKD between 2004 and 2010 by the European Union on condition that an approved control and eradication programme was implemented.



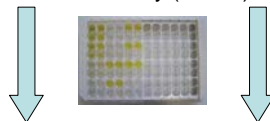
The control and eradication programme included active surveillance for *R. salmoninarum* and, for affected farms, contact tracing and movement restrictions. The resulting data has been used to estimate the prevalence of *R. salmoninarum* infected Atlantic salmon and rainbow trout farms.

Active surveillance for infected farms

All farms cultivating salmonids throughout Scotland were inspected by the Fish Health Inspectorate for signs of BKD every year, and kidney tissue from 30 fish representing all the populations on each farm were sampled every two years.



The kidney samples from each farm were tested for the presence of *R. salmoninarum* in pools of five fish using an enzyme linked immunosorbent assay (ELISA).



If there was suspicion of a *R. salmoninarum* infection further tests were carried out. On confirmation statutory movement controls were imposed on the farm until this infection was eradicated.



ELISA results have been analysed by the Epidemiology Group to estimate the prevalence of *R. salmoninarum* infected farms.

Apparent farm period prevalences

	Atlantic salmon	rainbow trout
Number of sampling visits	927	130
Number of farms sampled	413	52
Number of ELISA positive farms	3	9
Apparent period prevalence	0.7%	17.3%

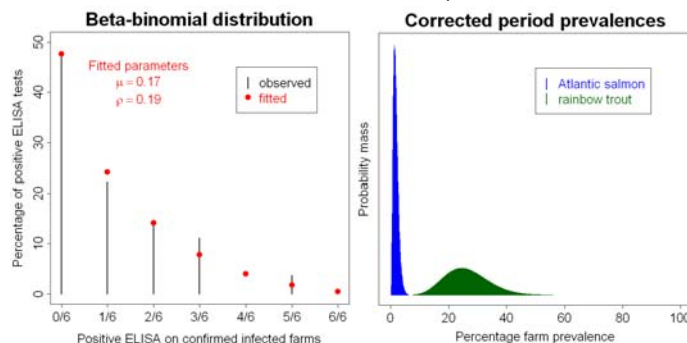
Corrected farm period prevalences

From previous research carried out by the Epidemiology Group on a subclinically infected rainbow trout farm we know that ELISA has a high operational specificity, that it can have a low operational sensitivity, and that the within farm prevalence of infection can be low.

Therefore:

one or more positive ELISA strongly indicate an infected farm
but
all negative ELISA do not necessarily indicate an uninfected farm.

We corrected for false negative ELISA results by fitting a beta-binomial distribution to the number of ELISA positives from farms with confirmed *R. salmoninarum* infections, and used this to estimate the probability masses for a range of prevalences conditional on the observed number of farms with at least one positive ELISA result.



Corrected farm point prevalences

The corrected period prevalence is the percent of farms infected with *R. salmoninarum* for at least some time between 2004 and 2010. It is unlikely that all these farms were infected throughout all this period. Corrected point prevalences were therefore estimated.

	Percentile		
	10%	Median	90%
Atlantic salmon	0.5%	0.8%	1.4%
rainbow trout	12.2%	18.4%	25.9%

Assumptions of the analysis

These include:

- the prevalence of *R. salmoninarum* infected farms was in steady-state;
- the parameters of the beta-binomial distribution are applicable to Atlantic salmon and rainbow trout farms;
- ELISA test performance for farms with unconfirmed and unknown infections is the same as that for farms with confirmed infections;
- the batch production system utilised for Atlantic salmon breaks the cycle of *R. salmoninarum* infection on farms;
- the continuous production system utilised for rainbow trout results in more persistent infections on farms.

Conclusion

The prevalence of *R. salmoninarum* infected rainbow trout farms is higher than the prevalence of *R. salmoninarum* infected Atlantic salmon farms.