

University of Prince Edward Island

Faculty of Veterinary Medicine
Summary of Dissertation

Submitted in Partial Fulfilment
of the Requirements for the

DEGREE OF MASTER OF SCIENCE

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**Effects of Co-infection of Atlantic Salmon (*Salmo salar*) with
Lepeophtheirus salmonis and *Moritella viscosa* on Gene
Expression and Phenotype**

Aquaculture is an important aspect of providing sustainable food sources globally, however the industry remains at risk to disease outbreaks. Atlantic salmon (*Salmo salar*) are exposed to multiple pathogens on fish farms and are at risk of developing co-infections (infection with more than one pathogen at the same time). Although there is relatively little information on the impact of co-infection in Atlantic salmon, co-infection has been shown to influence disease progression and outcome in other species. The aim of this thesis was to assess the impact of co-infection with *L. salmonis* (a parasite), and *Moritella viscosa* (a bacterium) on Atlantic salmon health markers, including weight, infection load, and immune-related gene and protein expression.

Atlantic salmon (n = 40 per tank; 4 tanks per group) were challenged with *L. salmonis*, alone, prior to, or following *M. viscosa* exposure. Skin samples were taken for routine histology, and real time quantitative polymerase chain reaction (RT-qPCR). When comparing the co-infected groups, the *L. salmonis* then *M. viscosa* infected group showed significantly higher mortality, while the *M. viscosa* then *L. salmonis* infected group had significantly higher *L. salmonis* abundance. The transcript expression levels of interleukin-1 beta, hepcidin antimicrobial peptide, and complement c3 were significantly upregulated in the *L. salmonis* then *M. viscosa* infected group at *M. viscosa* lesion sites which was not the case in the other co-infected group. *L. salmonis* then *M. viscosa* infected group had significantly downregulated major histocompatibility class II expression at *M. viscosa* lesion sites as compared to the control. This transcript expression pattern may indicate greater inflammation in the *L. salmonis* then *M. viscosa* infected group without a corresponding upregulation of the adaptive immune response. These results have important implications for the understanding and management of co-infection in Atlantic salmon aquaculture.

Presentations

Graduate Studies and Research Days 2019
44th Annual Eastern Fish Health Workshop 2019

Biographical Data

Born in St. John's Newfoundland

Awards

Graduate Studies and Research Days Top Presentation
Session E, 2019