

Keynote Presentation

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Bacterial Skin Ulcer in Farmed Fish; Preventive Effect of Vaccines and Probiotics

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Ulcers and fin rot has been recognized as an animal welfare problem and as a cause of both acute and chronic mortality in various farmed fish species like carp, eel, flounder, goldfish, and salmonids. In farmed Atlantic salmon *Moritella viscosa* was included in the intraperitoneal vaccines from the last half of the mid-90's to control winter ulcer disease in farmed Atlantic salmon. Vaccines with *M. viscosa* antigens reduced the acute outbreaks of winter ulcer in the cold periods of the year. However, there has still been chronic mortality caused by ulcer disease ever since and at least half of the mortality in the marine phase of the salmon production is connected to ulcer and fin rot disease.

Challenge and vaccine trials have documented that *A. wodanis* can cause ulcer disease and septicemic mortality. It is known that *A. wodanis* can produce a bacteriocin that reduces the growth and metabolism of itself and a number of other bacteria in its vicinity including *M. viscosa* at physiological salt levels. The bacteriocin production is not activated at higher salt concentrations in the marine water. The bacteriocin production by *A. wodanis* explains the chronic character of many winter ulcer outbreaks compared to the peracute mortality observed when *M. viscosa* is the single challenge organism in bath or injection challenge. During the last ten years four other novel ulcer pathogens have been discovered in addition to *M. viscosa* that are potentially controlled by the bacteriocin produced in *A. wodanis* during the infection.

Probiotic approaches have demonstrated some protective effects against ulcer development in farmed Atlantic salmon. Experimental vaccine trials also demonstrate a potential to improve the vaccine protection against ulcer disease.



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