

Mortality of Seaward-Migrating Post-smolts of Atlantic Salmon Due to Salmon Lice Infection in Western Norwegian Salmon Stocks

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Since the early 1990s premature returns due to heavy salmon lice infections have been observed in Norwegian sea trout stocks. Following these observations it was hypothesized that salmon lice could also cause serious problems and mortality for seaward-migrating salmon post-smolts. However, due to the direct migration into the high seas of this species, evidence was hard to secure. In 1998 the Institute of Marine Research, Bergen, Norway in cooperation with the University of Bergen initiated fjordic surveys aimed at estimating the level of salmon lice infection in seaward-migrating post-smolts of western Norwegian salmon stocks and the impact of these infections on their survival. Through the development of a live-capture trawl device, Ocean-Fish-Lift, it has been possible to secure live samples of post-smolt salmon without removing any lice from the fish. Sampling of post-smolts has also taken place in the open ocean later in the season when the salmon lice have grown to their most aggressive stages. It has also been possible to run a controlled experiment to estimate the mortal level of salmon lice infection on wild salmon post-smolts.

The mean infection levels of copepodites and chalimus stages have been observed to vary from 0 to 104 per fish between years and fjords. The hydrographic features of the specific fjord and year seem to be major factors governing the infection level.

The controlled experiment suggested a mortal level of 11 adult salmon lice on wild post-smolts. This number is in close accordance with the oceanic observations, where no salmon taken during a period of 10 years were observed to carry more than 10 adult salmon lice in July.

Based on the observed infection levels and a conservative mortal limit of 15 adult salmon lice, estimates of up to 95% mortality due to salmon lice infection have been observed.

Although the reported mean numbers of adult female lice in fish farms in the area studied have been reduced to close to the allowed level of 0.5 adult females per fish in the spring, salmon lice still appear to be a problem for many wild salmon stocks in western Norway. In particular, rivers draining into the heads of long fjords seem to be adversely affected. As it seems unrealistic that salmon lice levels in fish farms will be further reduced in the near future, an additional measure for critically affected rivers would be to treat the smolts with a protective chemical against salmon lice infection during the migration to sea.