



Reduced levels of salmon lice found during wild salmon migration in 2009

When the Atlantic salmon migrate to the sea during spring and early summer, the levels of salmon lice are recorded in selected fjord systems. In 2009, in both the Hardangerfjord and the Hjeltefjord, the levels of salmon lice were the lowest ever recorded, and in the Hardangerfjord much lower than in 2008.

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The level of salmon lice was very high in the outer parts of the Hardangerfjord during spring 2008. At the same time, the level in the Hjeltefjord was much lower and showed no significant change from previous years.

Many factors influence variation in salmon lice levels. One factor is the mean sea temperature, which during winter of 2009 was 2 °C lower than the annual average. Salmon lice develop slower at lower temperatures. Another contributing factor is successful synchronized treatments in the salmon farms.

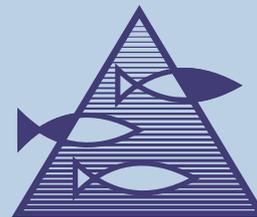
SENTINEL CAGES FIND SALMON LICE LARVAE

Salmon lice are parasites using salmonid hosts to conclude their life cycle. The most abundant number in Norwegian waters are found in fish farms containing Atlantic salmon. The levels of lice on the farmed fish

are kept very low and do not constitute a problem as such. But the pelagic larvae dispersed by these lice can still represent a problem for the wild salmonids, especially to the smaller migrating salmon on their way to the open sea.

It is almost impossible to collect salmon lice larvae in the open waters in Norway. One feasible way to get an understanding of the situation is to offer the lice a salmon host. This is achieved by using sentinel cages stocked with 20 to 30 small farmed salmon. After two to three weeks, the salmon is checked for occurrence of salmon lice. Another method is to catch migrating salmon with a specially designed trawl. Since 2004, both methods have been used to assess the level of salmon lice on wild, migrating salmon. Comparable levels of lice have been found, and we regard the results from sentinel cages as representative for the level of lice experienced by wild salmon.





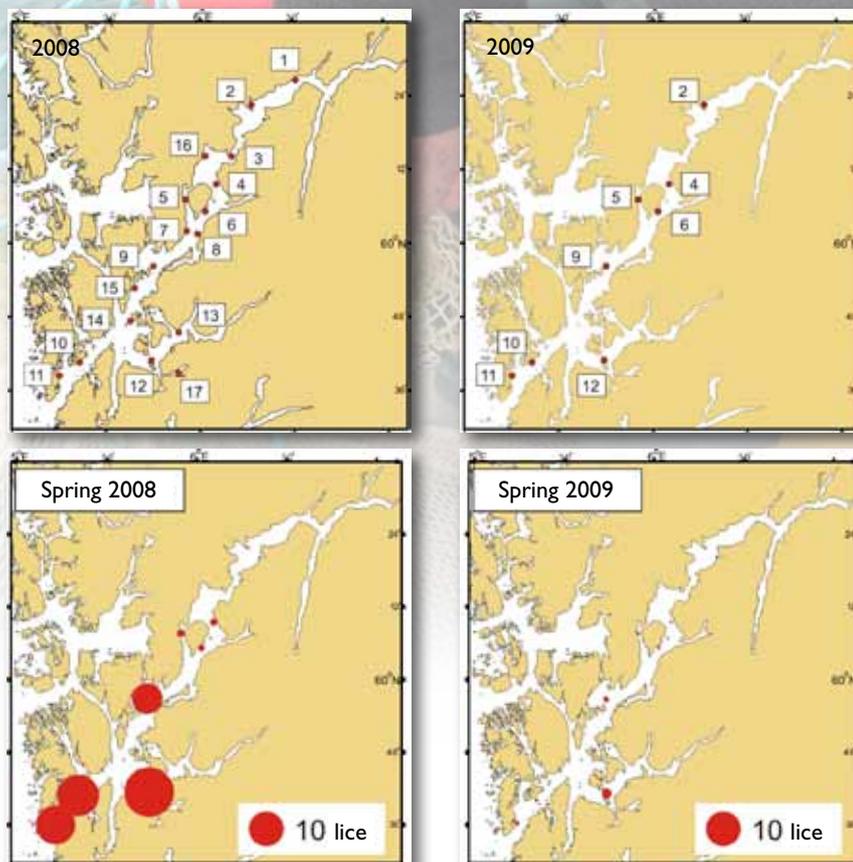
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Figure 1:

The maps on top shows positions of the sentinel cages in the fjord.

The lower maps shows levels of sea lice found.



Sentinel cages are positioned along the whole length of a fjord system to map geographical distribution (see Figure 1). Salmon lice are a marine parasite which requires seawater to survive. In the inner parts of a fjord, the surface water can be too brackish to allow high amounts of lice. Wind, currents and amount of fresh water runoff are also factors that might cause significant variations in the levels of lice.

WHAT DID WE FIND?

In the Hardangerfjord, the innermost sentinel cages have always shown few lice, probably due to the brackish water. The concentration of salmon lice increases as we travel outwards, and the highest levels are found in the Ølen/Etne-basin as well as south of Tysnes. In the spring 2008, the levels of salmon lice were four times higher than any of the previous years since the study was initiated in 2004. From an average of 0.5 to 4 lice per fish the previous years, the numbers increased up to 20 lice per fish in these areas in 2008 (see Figure 1).

When the first reports of resistance towards the most common lice treatment came in the summer of 2008, we feared that the situation might get out

of hand in 2009. However, we registered very low numbers of lice during the survey period from mid May to the beginning of June 2009.

In the Hjeltefjord, the levels of lice found in 2009 were comparable to earlier years.

WHY?

Eggs of salmon lice can hatch at temperatures down to 2 °C, but it then takes very long for the lice to develop into the copepodid that can infect the salmonid host. The optimal temperature is probably between 10 and 16 °C. As the spring temperature rises, the developmental pace quickens. After a cold winter, the increase in numbers starts later and takes longer. The relatively cold winter of 2009 resulted in a slower development of the lice population, thus partly explaining the low levels of salmon lice found this spring.

Another factor is the number of lice which can produce eggs. Synchronised delousing in salmon farms in Hardanger over the winter has helped keeping the starting level as low as possible.

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