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HEALTH SCREENING OF WILD ATLANTIC SALMON (*Salmo salar*) FROM THE OSTERFJORDEN-AREA, WESTERN NORWAY.

By

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ABSTRACT

Wild Atlantic salmon (*Salmo salar*) were captured in four rivers in western Norway in 1989 and 1990. These were used as broodstock fish in a sea ranching project. In 1989 virological and bacteriological examinations of the fish were negative for Infectious Pancreatic Necrosis Virus, *Renibacterium salmoninarum*, *Aeromonas salmonicida* var. *salmonicida* and *Yersinia ruckeri*. In 1990 three fish were positive for IPNV and one fish was positive for *Aeromonas salmonicida* var. *salmonicida*. The results supply the mapping of the introduction of furunculosis at the Norwegian west coast in 1989-90, indicate a low prevalence of Infectious Pancreatic Necrosis Virus in the wild salmon stocks and states that the broodstock fish used in the sea ranching project in 1989 and 1990 were tested in accordance with the demands for a satisfactory health control.

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INTRODUCTION

During the autumns of 1989 and 1990 wild Atlantic salmon were captured in the rivers Loneelva, Daleelva and Vosso, all situated in the Osterfjorden-area in western Norway (Fig.1), and in 1990 also in the river Onarheimselva in Tysnes, western Norway. In 1989 a total of 66 fish which were judged truly to belong to the native wild stocks (41 from Loneelva, 9 from Daleelva and 16 from Vosso) were caught. In 1990 the numbers were 45 from Loneelva, 25 from Daleelva, 11 from Vosso and 21 from Onarheimselva. The fish were used for production of smolts for "Sea ranching with Atlantic salmon", a research and developmental program at the Norwegian Ministry of Fisheries.

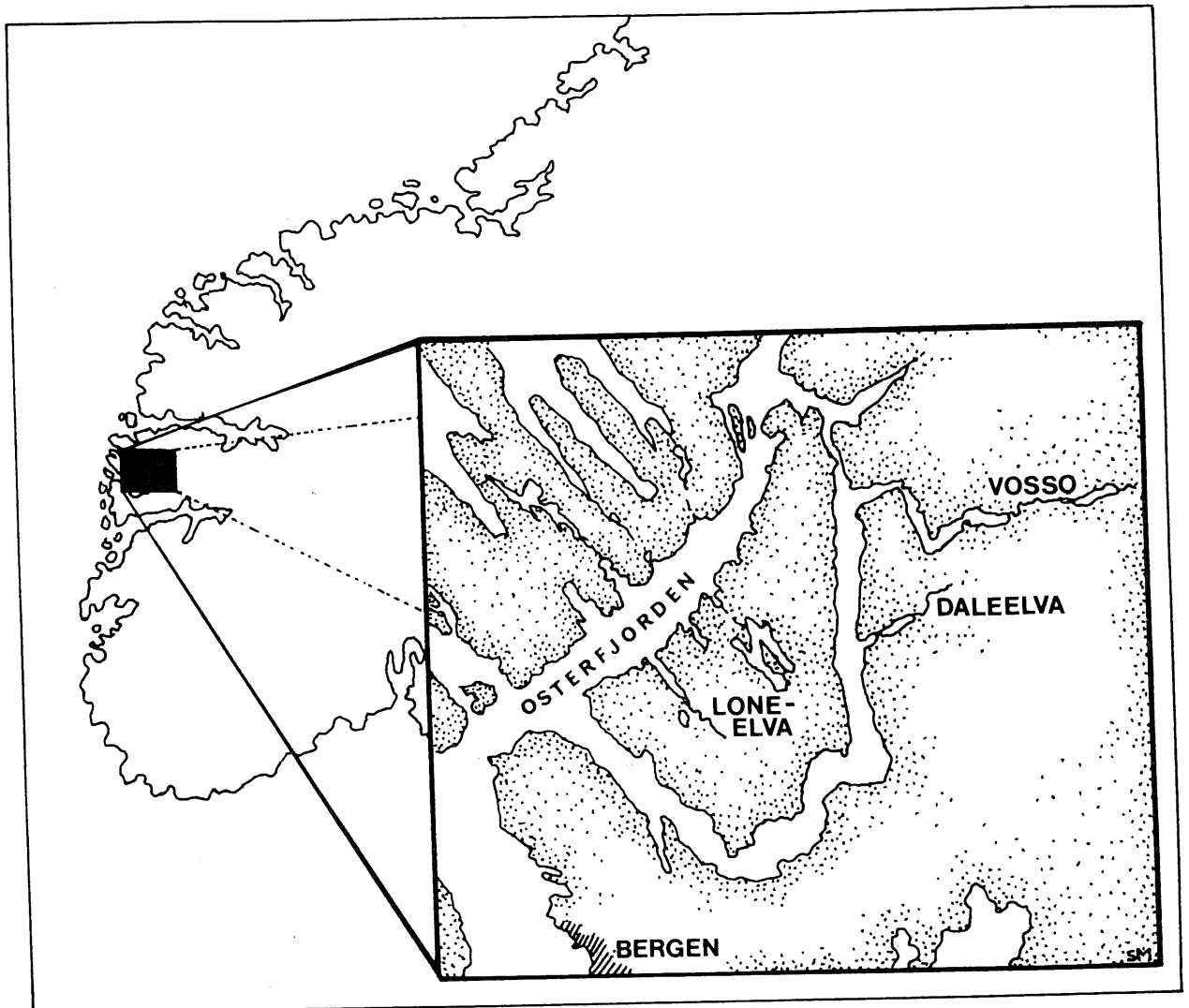


Figure 1: Maps showing the western coast of Norway, and the Osterfjorden region with the rivers; Loneelva, Daleelva and Vosso.

It is of vital importance for the sea ranching project to produce disease free smolts for release. Each batch of eggs was therefore kept separate. Broodstock fish were killed after spawning, and kidney samples for virological and bacteriological examinations were taken from each individual.

MATERIALS AND METHODS

IPNV - ASSAY: Pieces of kidney were homogenized in EMEM cell culture medium. Homogenates were filtered through 0.22 µm disc filters, inoculated onto CHSE-214 cell culture monolayers and incubated at 20°C. Supernatants from culture bottles were passed onto new cell cultures twice, with one week intervals.

BACTERIAL - ASSAY: For detections of *Renibacterium salmoniarum* kidney tissue was homogenized in phosphate buffered saline (PBS). Homogenate supernatants were used in an enzyme linked immunosorbent assay (ELISA) using monoclonal antibodies against *Renibacterium salmoniarum* as primary antibody (O.B.Dale, in prep.).

Bacterial cultivations from the kidneys were performed on Tryptone Soya Agar (TSA) and on TSA with 5% sheep blood cells and 1.5% NaCl added. Plates were incubated at 20°C.

RESULTS

1989: After three passages on cell cultures no cytopathic effect was observed in any sample during virus detections. All assays for *Renibacterium salmoniarum* were negative. Some bacterial cultivations showed moderate growth of bacteria, but neither brown pigment producing nor cytochrome oxidase negative colonies were observed.

1990: Positive virus samples were obtained from 2 fish from Onarheimselva and 1 fish from Loneelva. The positive samples were verified by ELISA. The samples contained Infectious Pancreatic Necrosis Virus (IPNV), serotype N1. All other virus samples were negative. All assays for *Renibacterium salmoniarum* were negative. *Aeromonas salmonicida* var. *salmonicida* was detected in one fish from Loneelva. Egg batches which originated from infected fish were removed and destructed.

DISCUSSION

Knowledge on the health status of wild salmon is scarce. There are several salmon farms in the Osterfjorden-area, and disease transmission between wild and farmed fish has been discussed.

During autumn 1989 furunculosis was registered in several salmon farms in nearby coastal areas. Furunculosis appeared in salmon farms in this region for the first time during spring 1990. The disease was also for the first time detected in salmon returning from the sea in the rivers Vosso and Daleelva during summer and autumn 1990.

Our results, together with recordings from the rivers and nearby salmon farms, indicate that furunculosis was introduced to this area with migrating fish during 1989. The results may thus be valuable in the mapping of the spreading of furunculosis on the Norwegian west coast in 1989-90.

It has been shown that a high percentage of the farmed Norwegian salmon are carriers of Infectious Pancreatic Necrosis Virus (Annual report, National Veterinary Institute, Oslo, Norway 1989). Despite this fact, the low prevalence of Infectious Pancreatic Necrosis Virus recorded in the collected wild salmon is in accordance with the results from other investigations of wild salmon stocks in Norway (T. Lindstad, pers. comm.). It seems that broodstock fish, free from IPNV, may well be selected from this region for future breeding programs.

Fish which will be released during the sea ranching project is expected to interact with wild fish both on the grazing areas as well as on the way back to the spawning grounds. A satisfactory health control of all fish which will be released is therefore necessary. Our screenings of salmon may be valuable both as a documentation of the health status investigation, and as information for epidemiological surveys of the different river populations. In the future we might gain valuable information on the health status of released cultivated fish when they are returning to the rivers. Due to the fact that furunculosis seems to have been introduced to the Osterfjorden-area with migrating salmon, we suggest that all broodstock fish from this area selected for future breeding programs have to be screened after the same standards.

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