



# Mortality in farmed salmonid fish



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## INTRODUCTION

Mortality is a considerable problem in the salmon industry, both in Norway and internationally. We aimed to:

- Investigate and describe mortality figures in cohorts with and without a Pancreas Disease (PD) diagnosis based on the mandatory monthly reported figures
- Investigate the different factors influencing mortality in cohorts with and without a PD diagnosis
- Investigate if the reported monthly mortality figures are of sufficient quality to be used in this type of studies

## MATERIALS

According to the Norwegian legislation all fish farmers holding marine salmonids must report water temperature, number of fish, biomass (amount of fish measured in kg) and number of dead fish on a monthly basis to a central governmental database (Havbruksdata). The basis of this investigation was these figures.

The data comprised 1874 cohorts stocked after 1<sup>st</sup> of January 2003 and slaughtered before 31<sup>st</sup> of December 2007. A cohort was defined by fish stocked to a given farm for a given period. A given farm could host several cohorts, minimum separated by a two months following period. And a cohort was defined as PD positive if it had a positive diagnosis registered in the Norwegian Veterinary Institute (NVI) database.

140 cohorts had a positive PD diagnosis, the remaining 1734 cohorts were thus considered negative and comprised the background population.

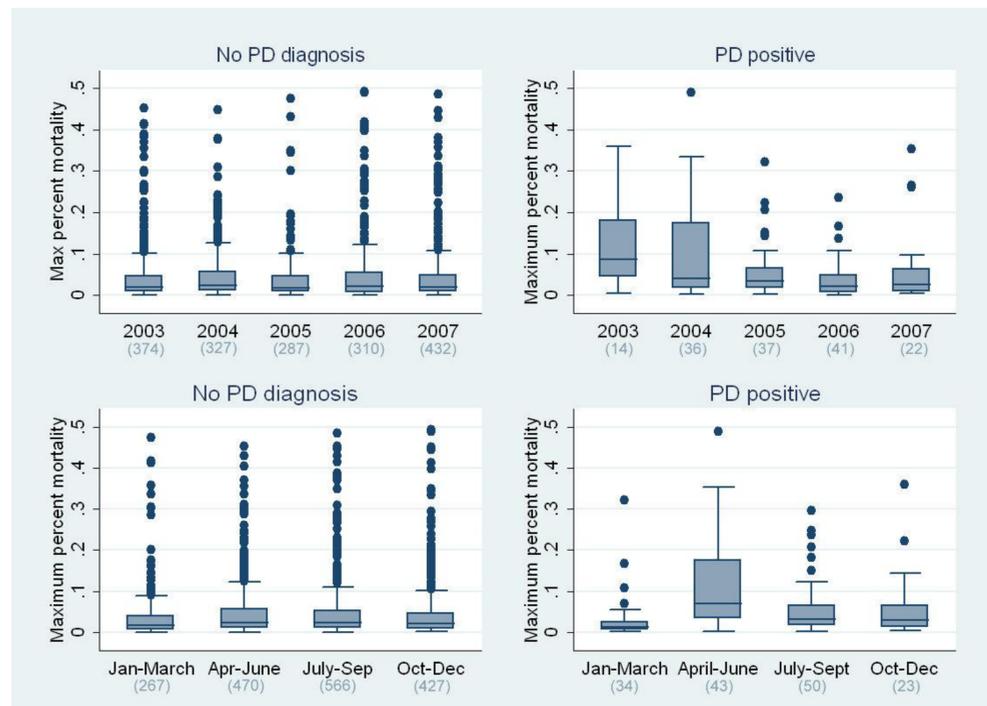
Mortality was reported as the number of dead fish per month, this was recalculated into percent mortality using the reported figures of stocked fish for the same month. The month with the maximum mortality was recorded for all cohorts, but omitted if it occurred during the first two months at sea due to higher chance of unspecific mortality in this period.

## METHODS

The material was analyzed by a linear regression analysis with post-estimation using Stata SE 11 (StataCorp LP, TE).

Factors analyzed were:

- Infection pressure (1)
- Sea temperature at month of PD diagnosis or month of maximum mortality
- Region
- County
- Quarter of year (as a proxy for season)



Box-plot of maximum mortality according to season and year in cohorts with and without a PD diagnosis, number of cohorts in each group is noted in brackets.

## RESULTS

The impact of factors that affected the mortality seemed to vary according to whether the cohort had PD or not.

It was significantly higher mortality in April to June, compared to the other quarters, both in cohorts with and without a PD diagnosis

Sea temperature was significantly associated with mortality in both farms with and without a PD-diagnosis.

Infection pressure was significantly associated with mortality in farms without a PD diagnosis.

No other factors were found.

## CONCLUSIONS

The mortality patterns are not the same in cohorts with and without PD, but some factors affected both groups.

Factors affecting mortality in both groups had different effects depending on whether the fish were sick or not.

The crude monthly mortality figures convey too little information to be used to study risk factors for increased mortality. Registering cause specific mortality as described by Aunsmo et al (2) may increase the information load significantly and help design action plans to lower the overall mortality.

## BIBLIOGRAPHY

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