Use of Slaughter Plant Data for Detection of Health Risk Indicators in Atlantic Salmon Production

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Introduction

Salmon production is the largest animal industry in Norway. Around 1000 localities along the coast are producing a total of about 600 000 000 kg of salmon each year. All salmons are transported to slaughter plants for slaughter.

Objective
The objective of the research was to study the feasibility of using slaughter plant data for detection of risk indicators health in observational studies, using skeletal deformity as sample response variable.

Methods

This study was carried out on salmons hatched in 2000 and put to see in 2000 (0 yearling) or in 2001 (1 yearling). The unit of interest in our study was a "net pen" i.e. a group of up to 120 000 salmons kept in one net pen in sea.

In collaboration with 7 fish health veterinarians associated with 10 slaughter plants, a total of 268 net pens, originating from a 36 localities (Fish farms), were "randomly" selected when slaughtered. The prevalence of downgrading of from "Superior" (top quality) to "Ordinary" and to "Production" in the net pens were estimated based on a systematic random sample at the slaughter line from within each net pen. The reason for downgrading of individual salmons was recorded as one of 8 possible categories: Skin wounds, Skeletal deformities, Other deformities, Vaccine associated lesions, Sexual maturity and discolouring, Lesions from slaughter process, Skinny, and Other reasons.

Data about breed stock, hatchery, vaccination, other early life conditions, as well as data on sorting in the sea phase were collected by the same veterinarians in a total of 45 variables.

Log of prevalence of Skeletal deformities was used as response variable and tested against all 45 variables in univariate analysis. Significant variables ($P<0.10$) that were considered biologically meaningful were included in multivariable models using the procedure reg in STATA with random effect including Fish farm as cluster.

Results

The final model included Hatching- and start feeding locality (23 levels), Smolt type (0 yearling vs 1 yearlings), Vaccination period (winter phase vs summer phase), Sorting in sea (unsorted or small vs medium or large), Vaccine type (14 levels). It explained more than close to 60% of the total variation (Adj R-squared).

Discussion

Our study shows that slaughter plant data are potentially very useful for identification of risk factors in commercial salmon production. By a small extra input of resources, the quality of routinely collected data on degrading can be efficiently used for detection for health risk indicators. The study detected several early life time factors as being of major importance for Skeletal disorders. Even

though a factor like Hatching- and start feeding locality does not tell which risk factors that are involved, it clearly indicates where one should look closer for causal factors. Even if the presented model is not final the best/true model, it points to where further research is needed.