Dynamics and Factors Associated With *Caligus rogercresseyi* Infestation, Under Current Conditions of Chilean Salmon-industry

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Introduction

Currently, sea lice infestation (*Caligus rogercresseyi* Boxshall & Bravo, 2000) is one of the major health problem for the Chilean salmon-industry. Although the copepod is controlled by chemotherapy, there is an increasing concern over the possible development of resistance to the main drug in use (emamectin benzoate ©SEALICE).

Also, there is a lack of understanding on risk factors associated with parasite load, under conditions of Chilean salmon-industry.

Objectives

✓To describe dynamics of parasite load.

✓To find factors (management, hydrological, treatment characteristics) associated with changes in parasite load, under current treatment conditions.

Material and Methods

✓Information collected from 22 centres located in Southern Chile (X region), distributed along salmon' production area; during April 2006 to July 2007.
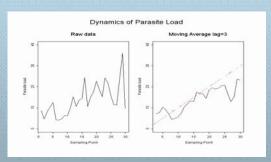
✓Every 2 weeks, the following information was taken:
 ✓Counts for developmental stages of the parasite (chalimus, males, females (with/without eggs) from 660 salmon (10 salmon per cage, 3 cages per centre)
 ✓Information over geographical and production characteristics of the centre, hydrological changes between reports, treatments and treatment conditions, occurrence of other disease outbreaks.

✓Seasonal trends were assessed by moving averages.

✓Statistical analysis by Poisson regression model for repeated measures (first-order auto regressive error structure) using SAS V.9.1.

✓Unit of analysis was the cage.

Conclusions

⚜ There is a steady increase in the parasite load that suggest possible tolerance to the drug used.

⚜ Although possible tolerance is associated with increased parasite load, there are other factors like management practices and environmental conditions that plays a role as well.

Results

The following graphs resume the seasonal variation in parasite load, during the study period:

Dynamics of Parasite Load

After inspecting interactions, the final model contains 5 variables that are shown in the following regression equation (SE in brackets):

$$Y_i = a - 0.458\,(0.112) * \text{Year}_{2007} - 0.026\,(0.010) * \text{Farm Time in Operation (months)} + 0.447\,(0.280) * \text{Area}_{Puerto\ Montt} - 1.763\,(0.270) * \text{Area}_{Hornopiren} - 0.351\,(0.244) * \text{Area}_{Ancud\ Castro} - 0.266\,(0.085) * \text{Season}_{Autumn} - 0.298\,(0.097) * \text{Season}_{Winter} - 0.025\,(0.164) * \text{Season}_{Spring} + 0.003\,(0.002) * \text{Time Since last Treatment (days)}$$

Where $a = 3.051\,(0.231)$