Using Industry Databases to Estimate the Significance and Chart Emergence of Novel Alphaviral Disease Affecting Scottish Salmon Farms

FISHERIES RESEARCH SERVICES

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Introduction

- **Salmon Pancrease disease (PD) is a serious infectious viral disease of marine phase farmed Atlantic salmon (*Salmo salar*) and was first described in Scotland by Munro *et al*. in 1984.0**

Fig 1. Scottish Atlantic Salmon Farm

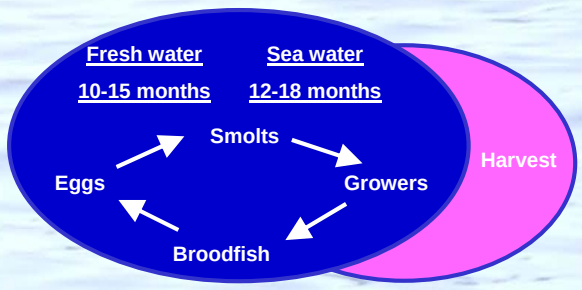
Fig 2. Distribution of PD Infected sites from the West coast of Scotland

- **Causal agent of the disease is an atypical alpahvarius the salmon pancreas disease virus (SAV1).**
- **Normally affects salmon during their first year at sea.**
- **Can cause enormous clinical and sub-clinical losses by reducing weight gain, creating higher feed conversion rates, smaller harvest weights and making fish more susceptible to other diseases.**
- **PD has cost the Norwegian and Irish aquaculture industries over 70m Euros in recent years (H.Rodger, Aquaculture Today 2005)**

FRS production Survey Annual Production Survey 2006:

- **Total production of Atlantic salmon in Scotland in 2006 was 131,847 tonnes.**
- **In 2006 there were 157 producing sites and 32 producing companies.**

Fig 3. Life cycle of Atlantic farmed Salmon of fresh water juvenile and a sea water on-growing phase.



Aim

A database was established to facilitate the monitoring of diseases including suspected PD from one company within the Scottish marine salmon farming community

- **Query and analyse Industry salmon farm data. BusinessObjectsTM Desktop Intelligence database.**
- **Determine the scale of epidemiological patterns of PD in Scottish marine farmed salmon in 2000-2006**

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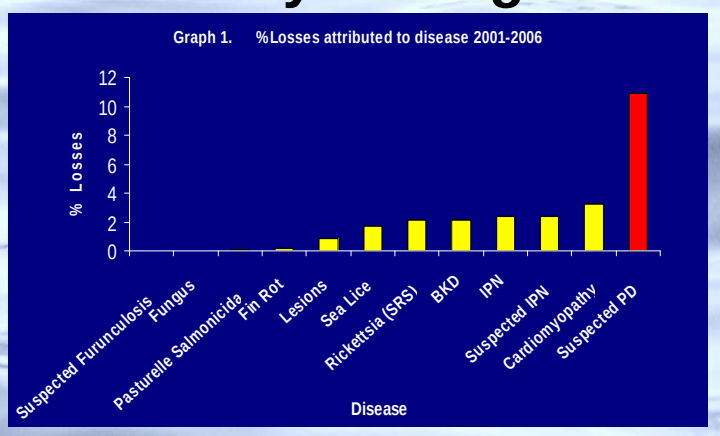
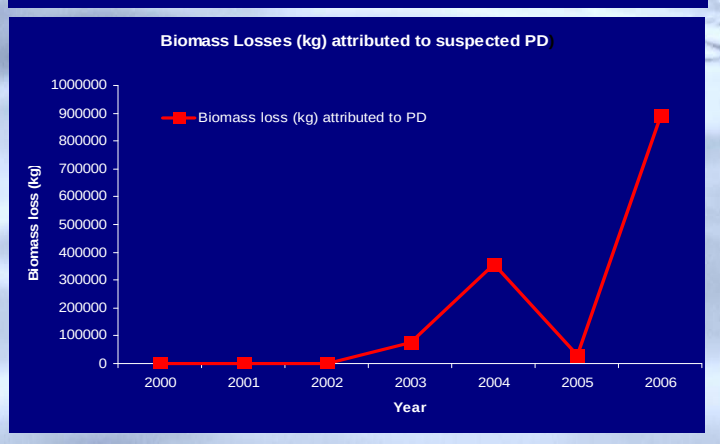
Preliminary findings:



- **Infectious disease accounts for 26% of the losses to production.**
- **11% loss attributed to PD (Graph 1.)**



- **Moderate biomass losses attributed to suspected PD except for 2004 and 2006 when very large losses were seen (Graph 2.)**

Following infection, salmon pancreas disease virus (SPDV) causes sequential pathology of the pancreas, heart and skeletal muscle.

Fig 4. Atlantic salmon smolt infected with PD exhibiting low condition factor (a). Chronically infected Atlantic smolt with PD (b).

Fig 5. Atlantic salmon smolt without PD.

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Clinically infected fish present with:

- **Sudden inappetence**
- **Lethargy**
- **Increased number of faecal casts in cages**
- **Sluggish swimming activities**
- **Increased mortalities**

Fig 6. Scottish marine Loch

Conclusions

- **This data provides us with a key tool for determining the scale of epidemiological patterns of PD in this Scottish salmon farming company.**
- **The system allows data to be stored in a format that allows data to be easily extracted and statistically analysed.**
- **There is a continual upturn in losses attributed to suspected PD.**

Acknowledgments:

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References

1. McLoughlin MF., Graham DA. (2007) Alphavirus infections in salmonids-a review. Journal fo Fish Diseases.30:511-531.
2. Ruane N *et al*. (2005). Research on Pancreas Disease in Irish Farmed Salmon 2004/2005- Current and Future Initiatives. Marine Environment and Health Science. 22: