

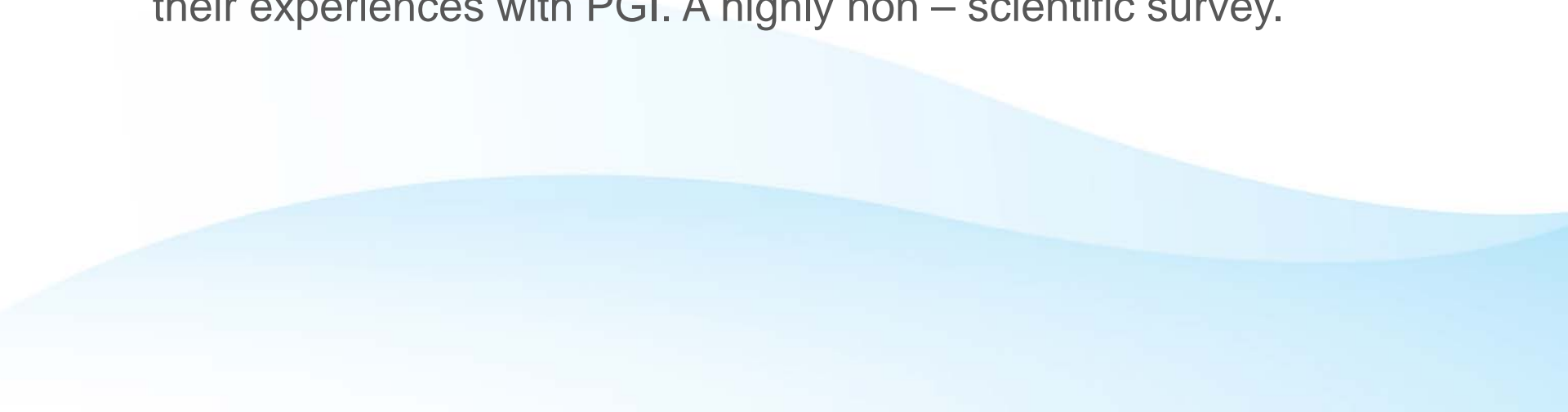
PGI in Norwegian Salmon farms

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Presentation; Havbruksstjenesten AS



Background

- Limited personal experience with PGI – not qualified to present «the national perspective»
 - One case 2003, extreme mortality (in combination with *Moritella viscosa*)
 - Three cases in our practice area 2011, very severe outbreaks – that is why I accepted to join «the steering group» for this PGI project
 - I have asked some colleagues along the Norwegian coast about their experiences with PGI. A highly non – scientific survey.
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Earlier surveys on PGI and epitheliocystis:

Agnar Kvellestad m.fl. – 1990's

Solveig Nygaard, FoMAS Fiskehelse og miljø AS

- 2002 (Norsk fiskeoppdrett) Gjellesykdommen epitheliocystis i sjø
- 2004 (Norsk fiskeoppdrett) Kartlegging av epitheliocystis i sjø



Kunnskapsformidling fra Intervet Norbio

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Epiteliocystis og Proliferativ gjellebetennelse - Feltefaringar

Av fiskehelsebiolog Cand.scient. Cecilie F. Myklebust og biolog Cand.real. Jan Arne Holm, Fjord-Lab AS

Epiteliocystis og Proliferativ gjellebetennelse medfører store tap for oppdrettsnæringa. Sjukdommen har likevel fått mindre merksemd enn omfanget skulle tilseie, og kunnskapen er fortsatt mangelfull. *Atlantic salmon paramyxovirus* (ASPV) og epitheliocystis-bakterien er i det minste medverkande årsaker, samtidig som også andre organsimar kan finnast. Meir kunnskap om årsaksforhold er grunnlaget for gode diagnostiske metodar og mottiltak mot sjukdommen utover vanleg god drift.

Contributions from colleagues (from south to north):


- Eirik Hoel, Marine Harvest Norway AS, region South
- Tom Chr. Tonheim, FoMAS Fiskehelse og Miljø AS
- Siri Giskegjerde, FoMAS Fiskehelse og Miljø AS
- Solveig Nygaard, FoMAS Fiskehelse og Miljø AS
- Anne Berit Olsen, National Veterinary Institute
- Solveig Gaasø, Marine Harvest Norway AS, region Midt
- Harriet Romstad, AquaKompetanse AS
- Adina Svedberg, AquaKompetanse AS
- Martin Næs, Vesterålen fiskehelsetjeneste AS
- Per Anton Sæther, Marin Helse AS

Differential diagnoses:

Different diagnoses – different diseases?


- Epitheliocystis
- Epitheliocysts – with or without tissue responses / inflammation
- Irritated gills («gjelleirritasjon»)
- Gill inflammation – with or without bacteria / parasites / fungi
- Gill bleedings
- Costia / trichodina
- Proliferative gill inflammation PGI

Season:

- PGI is an autumn disease
 - Period from August to November (December)
 - High water temperatures and partly marginal O₂ saturation
 - Most common 1+ first autumn in sea, 0+ second autumn in sea
 - Annual variations in prevalence and severity
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Geography:


- Previous years- mostly known from southern parts of the coast
 - Mid – Norway have experienced some cases, but mostly low mortality
 - Less common in Northern Norway

 - 2011: 3 severe cases in Mid – Norway
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Clinical signs and pathological findings:

- Can be sub-clinical
- Loss in appetite
- Moribund fish in water surface
- Fish close to net wall swimming against water current, heavy ventilation
- Mortality
- Poor fish / cachexia in chronic stages
- Operculae widened- gaping
- Gross lesions on gills (epitheliocysts?)
- Pale gills
- Non – specific macro - findings except from gills
- Parasites – «costia» / trichodina ...

Mortality:

- 0 – 20 % on average (estimated, not well documented)
 - Up to 90 % at cage level
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Vestlandet (Southern and Western Norway).


- Variation in prevalence between years and generations
- One fish health service: on average 40 % of sites affected but huge variations between generations
- 2011: low mortality in general
- 2012: few PGI diagnoses, more common «irritated gills»
- Southern parts and fjord sites mostly affected?
- Some sites considered high risk for PGI / epitheliocystis
- Mortality can be increased until January
- Some fish groups can be severely affected while other groups at same site can have moderate mortality or subclinical diagnosis

- National Veterinary Institute, Bergen: More severe cases in previous years?
- 2011 and 2012 - not particularly many cases (do not have information on severity / losses)

Nord – Norge (Northern Norway):

- Some cases in Nordland county 2011 and 2012
 - Mortality 0,1% – 1,1% / week (= significant)
 - Fjord sites
 - MOM-B status 2 and 3 (may indicate poor sites or production above natural capacity of the site?)
- Troms and Finnmark:
 - No PGI diagnoses reported

Mid – Norway:

- Few cases with severe clinical signs and mortality
 - Frequent gill diagnoses (irritated gills, gill inflammation, gill bleedings, costia)
 - Some sites seem to have higher risk for gill diseases
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First case:

- 2003, 1+
- 900.000 salmon
- PGI diagnosis 4th October 2003
- *Moritella viscosa* «winter ulcer» diagnosis
- Accumulated mortality > 50 % (for both conditions)

3 cases in 2011:

- Nordmøre / Sør – Trøndelag / Nord – Trøndelag
- 2010 – generation 0+
- August – September – October – November 2011
- No severe health problems prior to outbreak
- Fish weight 2 – 3 kgs
- Sudden onset of signs and mortality
- Long duration, > 1 month
- Mortality 18 - 20 % in average - huge loss of biomass
- 90% mortality in one cage

- Sheltered sites
- At least one site with higher biomass than natural capacity of the site, gas bubbles
- O₂ values OK when monitored

Risk (predisposing) factors – for discussion:

- Water temperature
- O₂ saturation
- Site quality
- More prevalent in fjords than in open waters?
- More prevalent in sheltered than on exposed sites?
 - Water exchange and O₂ saturation are likely to be essential for severity and mortality
 - 24 hours logging of O₂ saturation should be standard procedure
- Fish density?
- Benthic environment / overproduction / gases from sediments
 - Toxic gases (H₂S, methane, ...)?
 - Chronic stress to gill epithelium?
 - Easier access for pathogens?
- Algae, jelly fish

Measures:

- Site evaluation
 - Production within natural capacity
 - Avoid fjord sites?
 - More exposed sites?
 - Avoid MOM-B > 3
- O₂ logging
- Clean nets
- Sediment surveillance