



Status PD Norway

Tri-nation, April 15, 2010

Cato Lyngøy

Chair of The Steering Group



- Short review
- Status & Results
- Contributors to decline
- Focus going forward



The PD industry organisation

Vestnorsk
Havbrukslag / FHL



PD Contingency
Steering Group



Paul Negård

PD Co-ordinator

Secretariat
Vestnorsk Havbrukslag

Regional teams
(6 total)



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The PD Steering Group

1. Terje Moss, Bolaks
2. Gerhard Alsaker, Alsaker Fjordbruk
3. Alexander Knutsen, Grieg Seafood
4. Rolv Haugarvoll, NRS
5. Leif Rune Pedersen, Salmon Group
6. Nils Viga, Marine Harvest
7. Nils Arve Eidsheim, Sjøtroll Havbruk
8. Willy Berglund, Lerøy Seafood
9. Hans-Inge Algrøy, Vestnorsk Havbrukslag
10. Solveig Willis, Havdyrkerne
11. Geir-Magne Knutsen, Bremnes Seashore
12. Carl Erik Arnesen, Firda Management
13. Cato Lyngøy, Marine Harvest (chair)

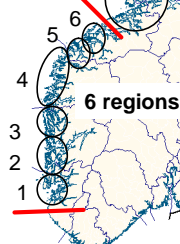
•The perspective of the work is three years (2007-2010) and the targets set for the period are:

1. Stop further spread of PD outside endemic area
2. Reduce annual number of outbreaks
3. Reduce loss per outbreak

- Cost associated with the Steering Group will be split per concession
- All companies is urged to commit to NOK 10 000, - per concession hereof NOK 3 000,- to be paid now
- The money will be managed by The Steering Group
- Vestnorsk Havbrukslag will be organising the account, financing statements and request payment in due time

PD-zone

Mid Norway
Stop PD
campaign

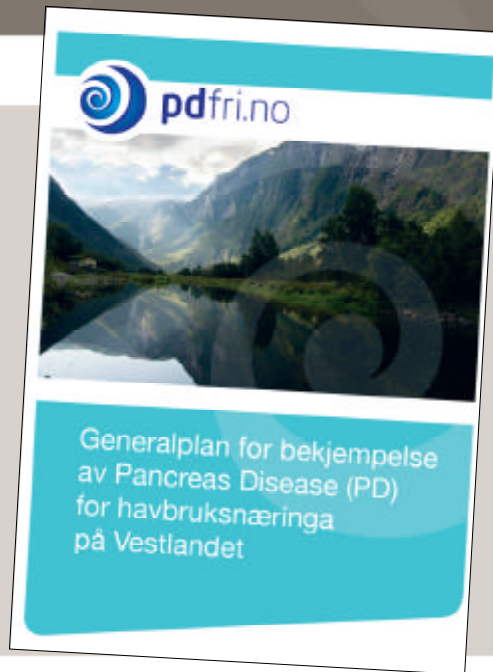




Industry Master Plan for the contingency of Pancreas Disease (PD) in Western Norway

Agreed general and specific husbandry and biosecurity principles

Principal part I submitted to the NFSA, Dir. of Fisheries and Dep. F&CA, 10th of November 2008

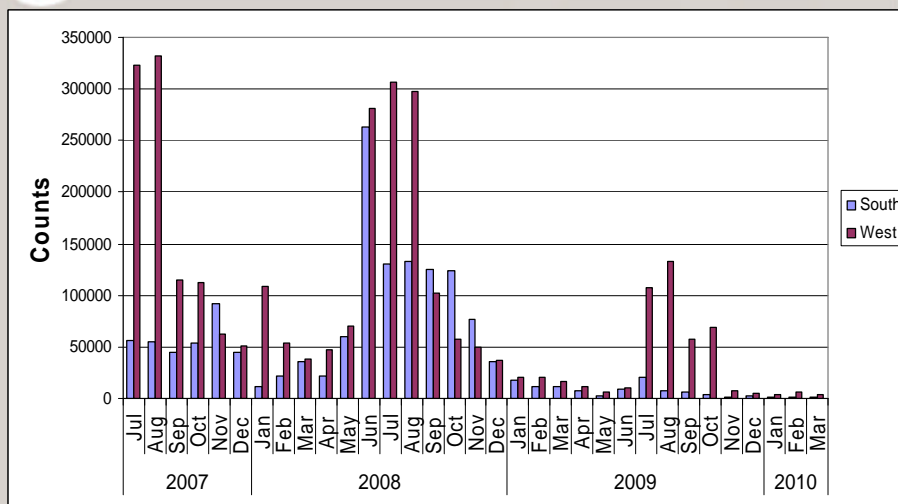


Status & Results

- 2 in Nordland and 3 in Finnmark (2008)
- 3 PD diagnoses in Møre & Romsdal (2009)
- 1 in South Trøndelag (2009)
- 1 in Troms (2009)

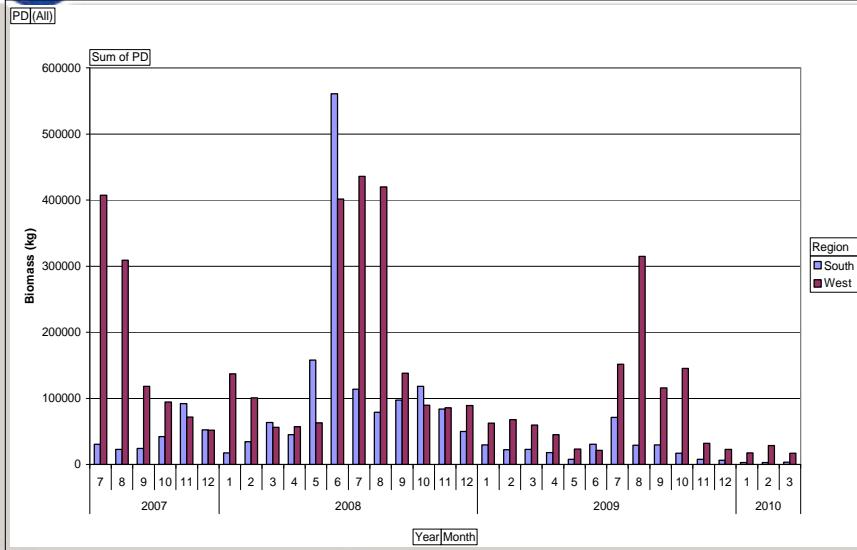
- All either accelerated harvest or stamping out
- Surveillance program by Food Safety Authority North of PD zone
- Sealice challenge 2009 had likely negative impact on PD and also going forward if not controlled properly

PD mortality trend (counts)



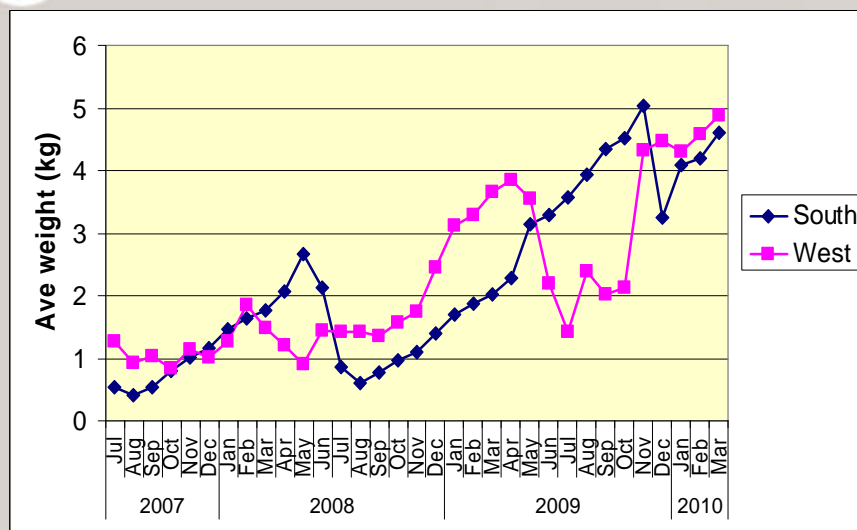
Source: Marine Harvest Norway

PD mortality trend (biomass)



Source: Marine Harvest Norway

Development of average weight of PD mort's

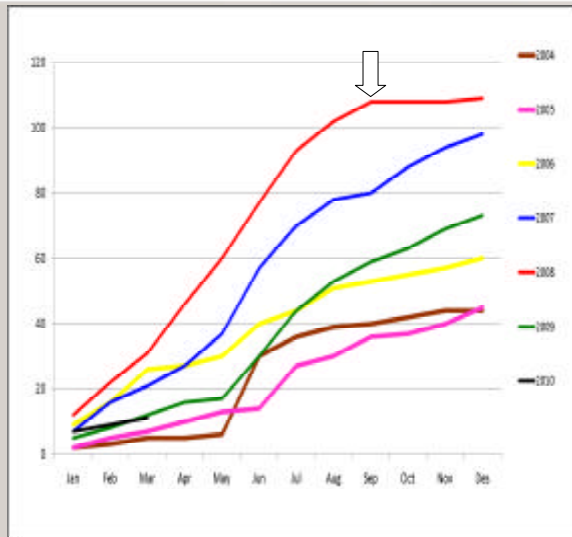


Source: Marine Harvest Norway

- Number of diagnoses and suspects in the PD zone has dropped with 35% since 2008
- In a representative part of the production, mortality due to PD has dropped significantly both measured by counts and biomass
- YoY average weight of fish dying of PD has increased,
- Fish either attract the disease later i production cycle, or the ability to withstand the SPDV is improved
 - lower challenge pressure
 - improved immune response
 - better environmental conditions
 - Other unknown factors?

Contributors to decline

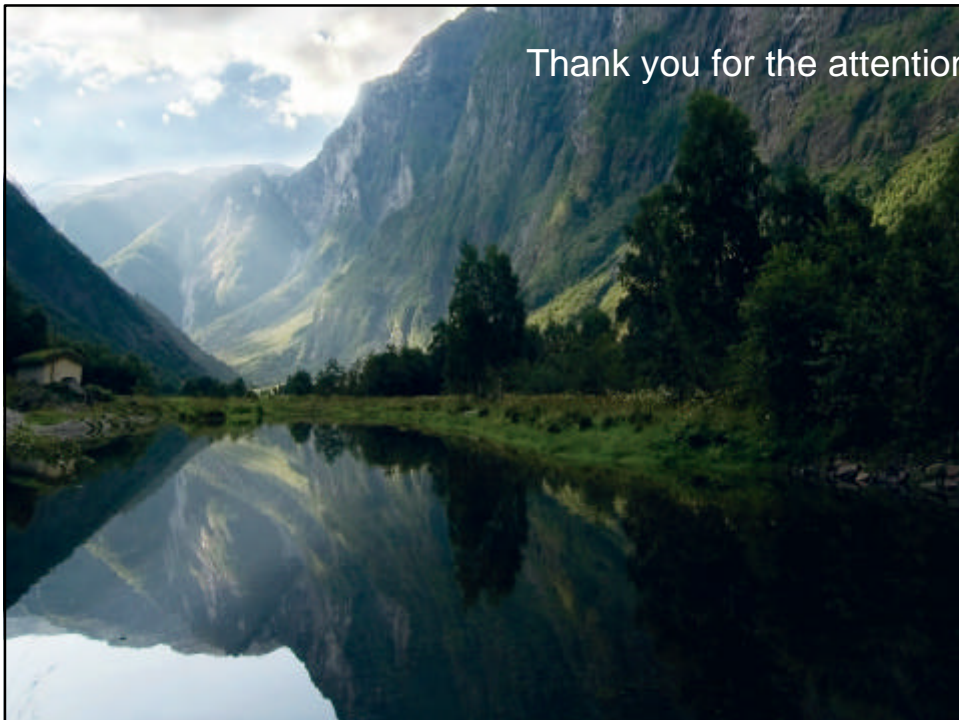
- 40% of Spring 08 were vaccinated
- 98% of Fall 08 were vaccinated
- 98% of 09G vaccinated
- Decline of PD started August 08 ~ 13% of fish in sea vaccinated
- January 09 ~ 35% of fish in sea vaccinated
- August 09 ~ 85% of fish in sea vaccinated



- The number one reason to decline is united efforts from industry on improved husbandry and biosecurity standards – The PD Master Plan
- This plan builds on well established biosecurity principles and Tri-nation outcomes
- Willingness to take radical actions to avoid further spread (Legislation and industry)
- Enhanced awareness and standards also in wellboat sector
- PD-vaccine – primarily first year in the sea
- Better surveillance and diagnostic services
- Better communication between farms and companies

- PD Master Plan part II – Continued implementation – i.e. bigger and more effective zones
- Continued restructuring of sites
- Collection and analysing of production data to conclude on contributing factors as well as loss per outbreak 2007 versus 2010

- In parallel, run joint industry initiative against sealice "Lusalaus" which by its outcome will have significant contribution also to PD
- Continued efforts to reform and renew framework regulation which, in part, counteracts sustainable development



Field experiments with PD-diets containing Macrogard™ Marine Harvest Norway - Region West



Testing of PD- diets in MHN



PARTNERS:

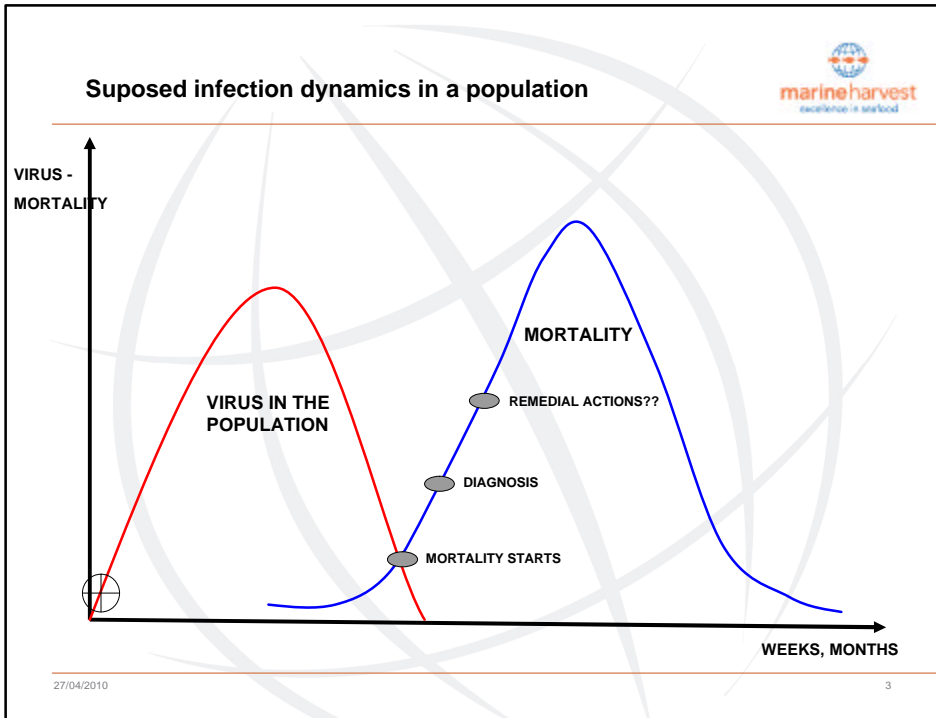
Skretting
Biorigin
Marine Harvest Norway
Patogen


PARTICIPATING FARMS:

2007 > Sandvika: S0 2006 – 896 846 stk
2007 > Slettevika: S1 2007 – 836 287 stk
2008 > Røysa: S0 2007 – 1 700 000 stk
2008 > Kråkeneset: S0 2007 – 818 036 stk

No vaccinated groups

The farms are situated close to Patogen's laboratory in Ålesund



 **marine harvest**
excellence in seafood

Judging the PD out breaks by using Real time PCR

- By counting virus before and after feeding the PD-diets, we wanted to get a better understanding of how far the out break had developed
- Patogen gave priority to our samples and analysed virus levels
- Our interpretation of the numbers:
 - CT < 15 - 20 The fish is diseased – high representation of this levels in the samples indicate high virus level in the population
 - CT = 20 – 25 Sub clinic phase – mostly found in the early phase of an infection and towards start of mortality
 - CT > 25 Just infected or a carrier of the virus

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PD-diets

Differenses in digestable energy against main grower diet:

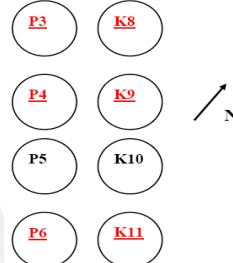
- Optiline S 2500 - 21,8 MJ DE – grower diet
- Protec 2500 - 21,4 MJ DE – 1000 ppm Macrogard™
- React PD1 2500 - 20,4 MJ DE – 500 ppm Macrogard™
- React PD1 2500 - 20,4 MJ D2 – 1000 ppm Macrogard™

Note: Fish fed React PD is supposed to have weaker growth than control groups fed normal diets.

2007 > Sandvika: S0 2006 – 896 846 stk

Smolt released	15. September 2006
PD-diagnosis	May 2007
Four test cages	Cages 3,4,6,5
Four control groupes	Cages 8,9,10,11
First PCR	20th og August 2007
Second PCR	9th of October 2007
Days feeding PD-diet	40 days

SANDVIKA
SA
1 prøvetaking 21.08.07
2 prøvetaking tirsdag 09.10.07 (kl 08.00)



SANDVIKA - REAL TIME PCR

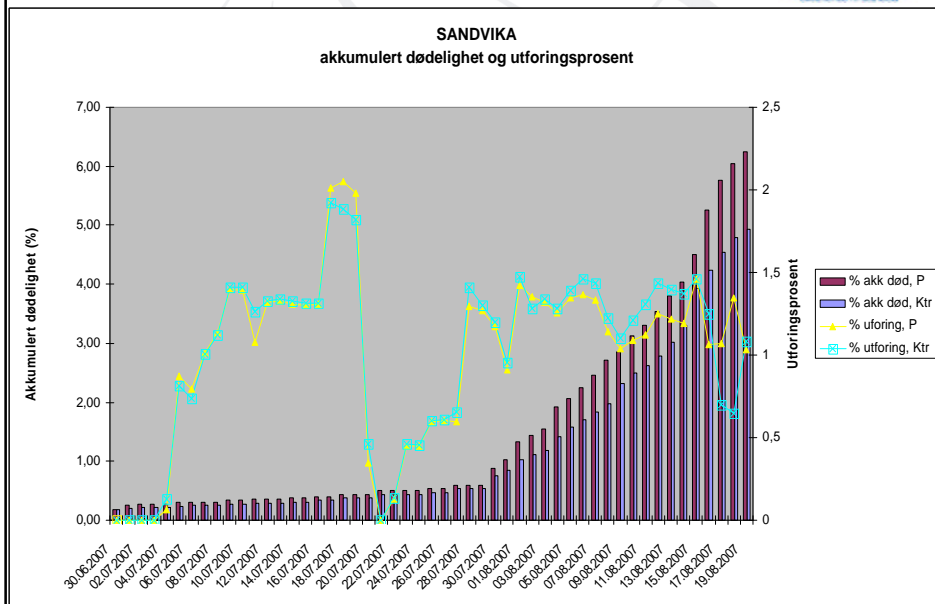


		NUMBER OF POSITIVES	CT - MEAN VALUES	RANGE	NOT DETECTED
PCR at start of feeding PD-diet	Test cages	38	25,77	15,13 - 36,98	6
	Control cages	34	26,31	14,7 - 36,99	11
PCR at end of feeding PD-diet	Test cages	29	30,66	16,82 - 36,85	16
	Control cages	29	29,69	19,00 - 37,22	16

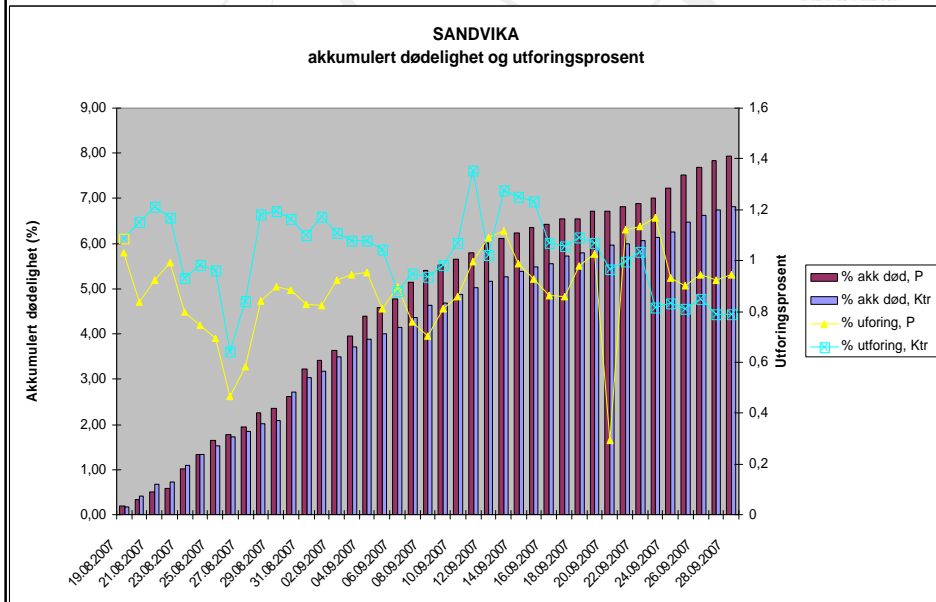
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Mortality and feeding level at Sandvika before PD-diet



Mortality and feeding level at Sandvika after PD-diet



Slettevika > S1 2007 – 836 287 stk

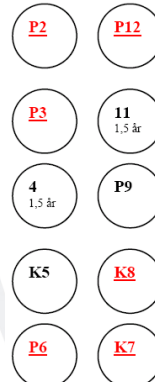


Smolt released
 PD-diagnosis
 Four test cages
 Four control groupes
 First PCR
 Second PCR
 Days feeding PD-diet

11th of April 2007
 July 2007
 Cages 2,3,12,9
 Cages 5,6,7,8,
 22th og August 2007
 9th of October 2007
 35 days

SLETTEVIKA

SL
 1 prøvetakning 22.08.07
 2 prøvetakning tirsdag 09.10.07 (ca kl 13.00)



SANDVIKA - REAL TIME PCR

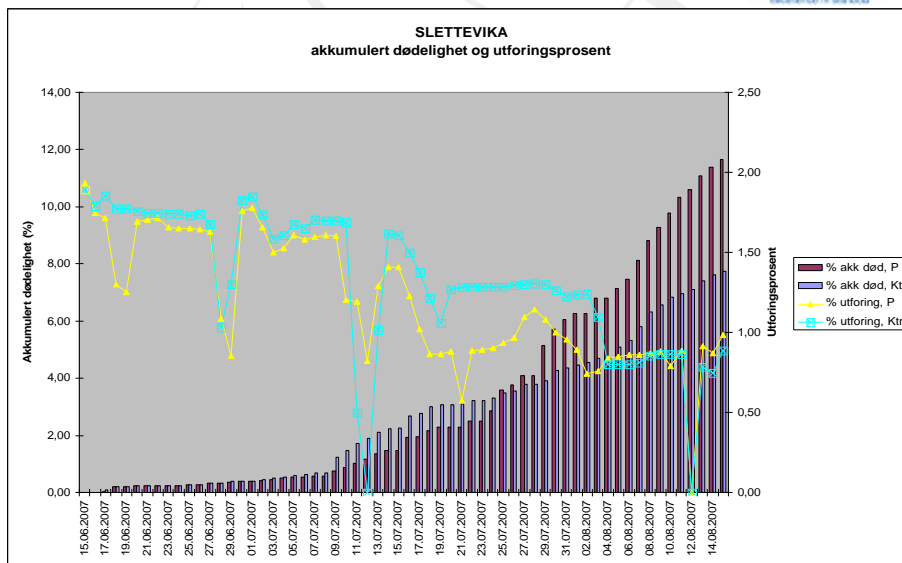


		NUMBER OF POSITIVES	CT - MEAN VALUES	RANGE	NOT DETECTED
PCR at start of feeding PD-diet	Test cages	41	24,91	15,01 – 32,02	3
	Control cages	41	28,49	17,21 – 35,96	3
PCR at end of feeding PD-diet	Test cages	3	33,40	29,77 – 35,43	41
	Control cages	7	34,50	31,73 – 38,12	38

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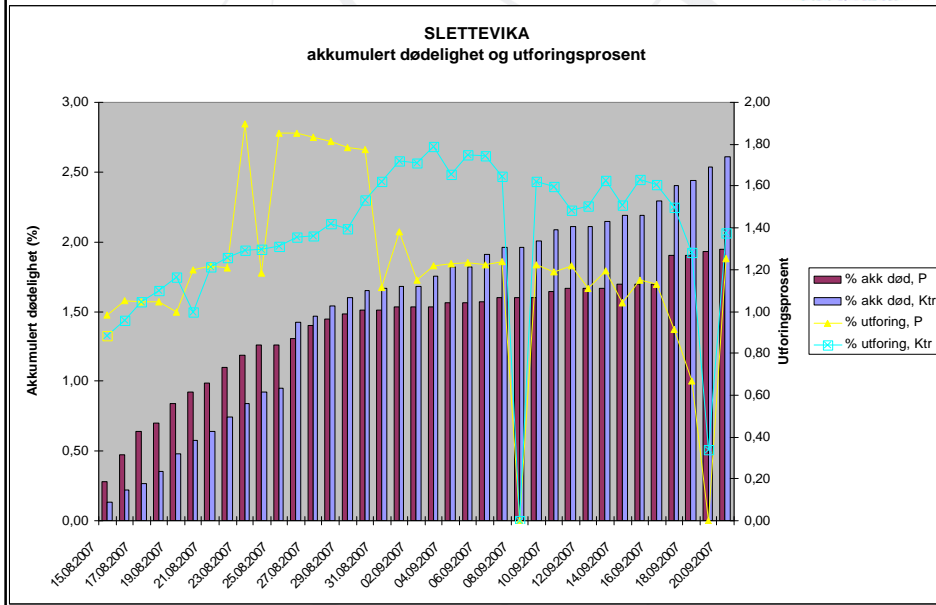
Mortality and feeding level at Slettevika before PD-diet



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Mortality and feeding level at Slettevika after PD-diet



2008 > Røysa: S0 2007 – 1 700 000 stk



The Farm Røysa was initially stocked with smolts for two farms. The reason for this was that we were short of farm locations during a period where we rearranged the system for following periods in the region.

Unfortunately PD spread into the area and infected the farm during the production period.

As an extra measure for reducing mortality the entire farm were fed a PD-diet with 2000 ppm Macroguard™ for four months.

Smolt released	October 2007
PD-diagnosis	10th January 2008
Test cages	All cages fed PD-diet with 2000 ppm Macroguard™
Control groups	No control groups
First PCR	29th January 2008
Second PCR	12th June 2008
Graded and split	August 2008

Røysa - real time PCR at start of feeding PD-diet



PCR1 - 29th January 2008

CAGE NUMBER	NUMBER OF POSITIVES	CT - MEAN VALUES	NOT DETECTED
1	2	25,6	8
2	2	31,9	9
3	2	36,4	8
9	2	36,6	8
4	3	30,7	7
7	5	29,9	5
5	10	24,7	0
6	10	22,5	0
10	10	22,5	0

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Røysa – real time PCR at end of feeding PD-diet



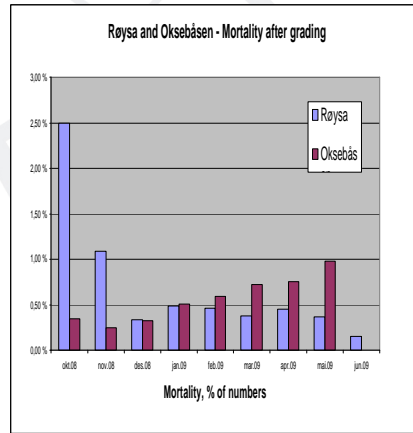
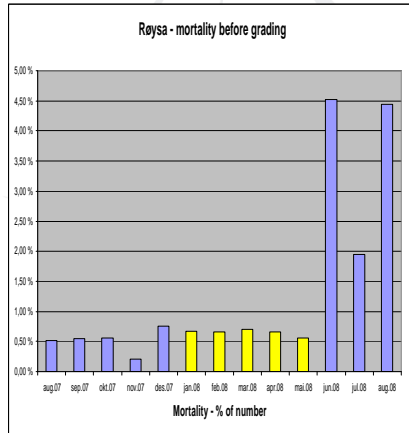
PCR2 - 12th June 2008

CAGE NUMBER	NUMBER OF POSITIVES	CT - MEAN VALUES	NOT DETECTED
9	2	28,5	8
10	3	31	7
6	7	28,4	3
5	8	28,1	2
1	9	20,4	1
2	9	18,6	0
4	9	28,9	1
7	9	27,7	1
3	10	23,8	0

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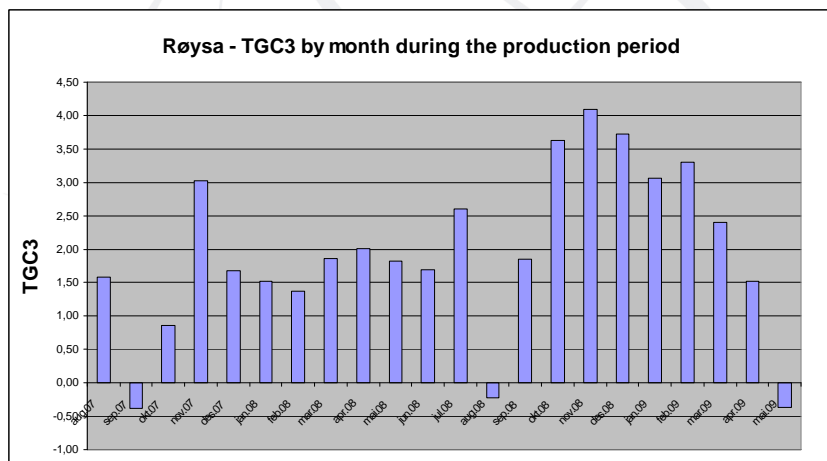
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Development of mortality at Røysa



Accumulated mortality during the production period was 22,3% (numbers)

Growth – TGC3 at Røysa



2008 > Kråkeneset: S0 2007 – 818 036 stk

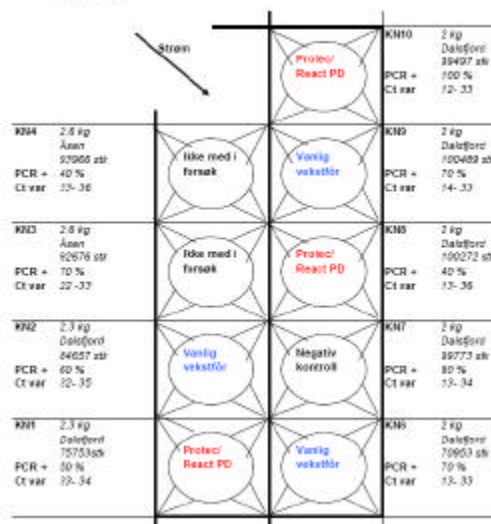


- April: 60 morts were screened for SAV, 1 positive in cage 7 (PCR)
- Mai: New sample (30 fish which apparently looked healthy): 2 positive (Ct ~ 30).
- We assumed that we were in an very early phase and set up a feeding experiment
- 3 cages with PD-diet, 3 controls ,
- Size at start of the experiment was ca 2 kg.

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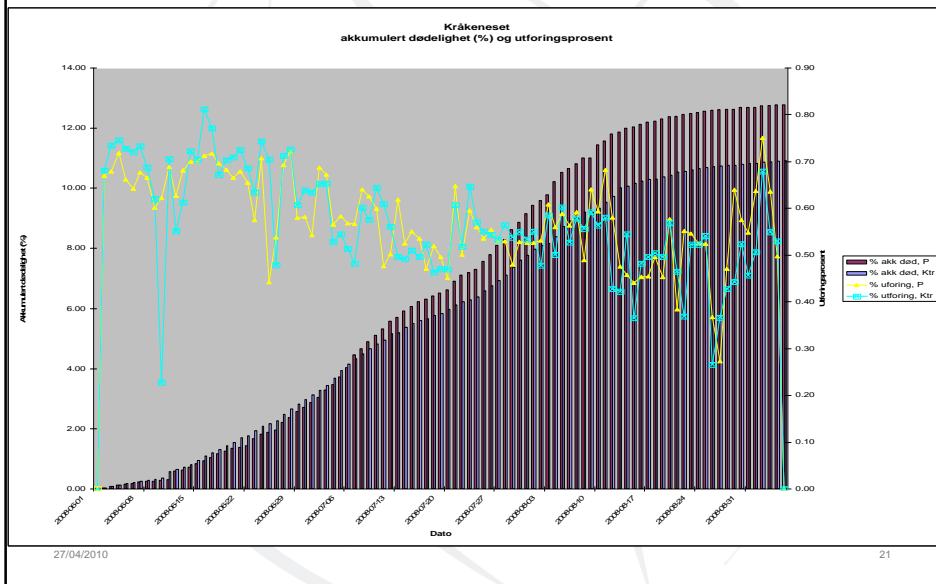
PCR PRØVER (0 uttak): 15.06.09
10 per cage



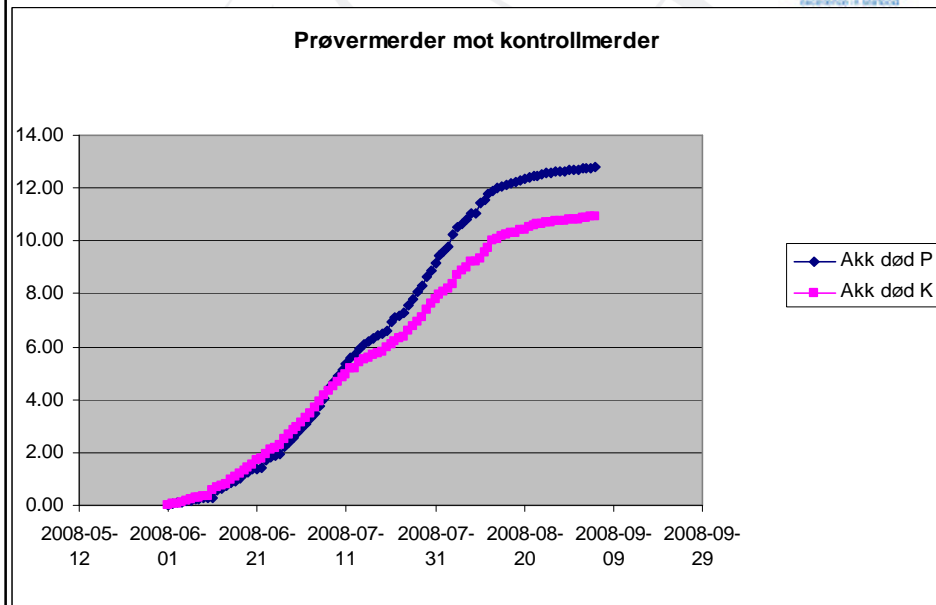
- Current variable
- - 400 T feeding barge
- - 120 m circle cages
- - Kråkeneset
- - Protec: 6- 25.06 (22%)
- - React PD 1: 27.06- 14.07.
- - React PD 2: 15.07- 08.09
- - PCR2 June: High degree positive

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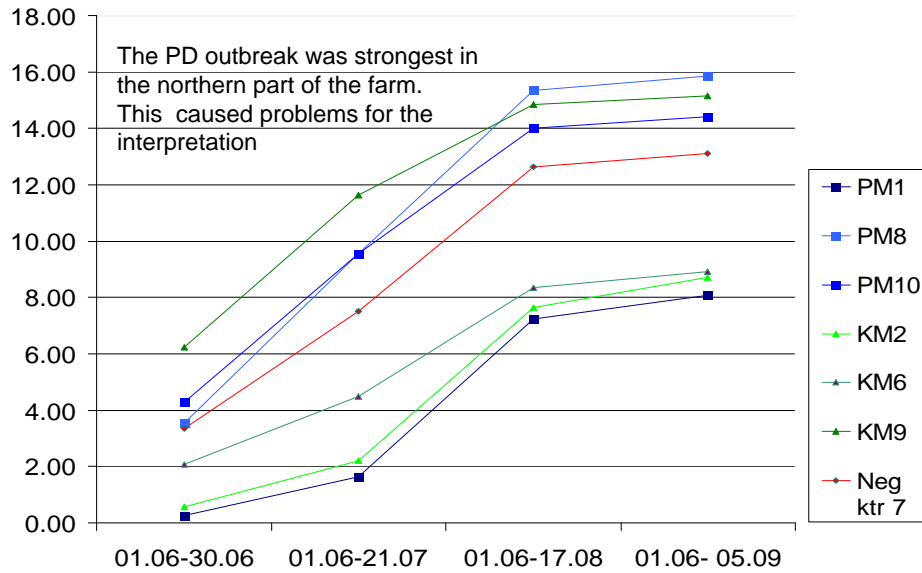
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Accumulated mortalities, test cages against control cages



Accumulated mortalities for cages in the experiment



Conclusions



- We do not have safe results supporting the use of PD-diets based on the diets used
- We can observe positive tendencies indicating an effect of the PD-diets
- Field experiments are not suitable for disclosing effects in the scale observed
- We need additional parameters for assessing the effect of health promoting diets than growth and mortality
- In general feed suppliers and suppliers of the effective compounds must supply the market with better documentation

A field evaluation of PD associated mortality and vaccination

Anja Bråthen Kristoffersen
Hildegunn Viljugrein
Peder A. Jansen
Edgar Brun



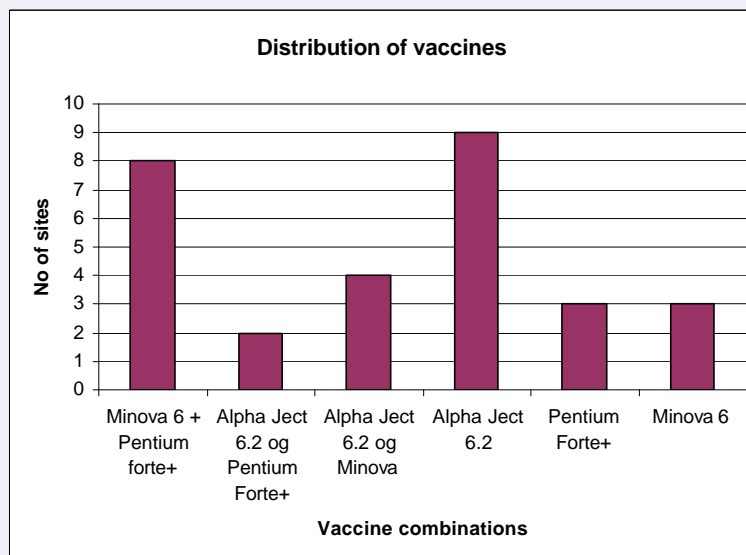
Aim

- look for overall effect of PD-vaccine on mortality
- Any differences between
 - 0 and 1 year smolt
 - between salmon and rainbow trout
 - the various vaccines

Material available

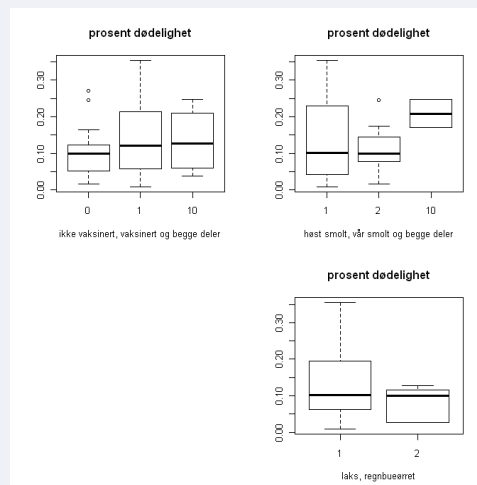
- All information provided by FHL
- Only data from PD-positive sites
- Mortality on cage level
- Vaccine status on site level
- None-PD vaccinated: 131 cages/15 sites
- PD vaccinated: 117 cages/18 sites
- Both: 4 sites

Distribution of vaccines

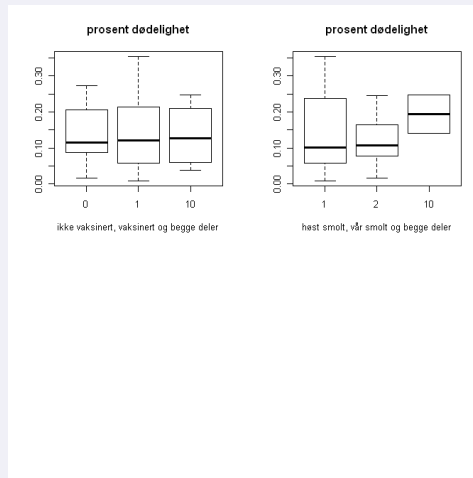


Method

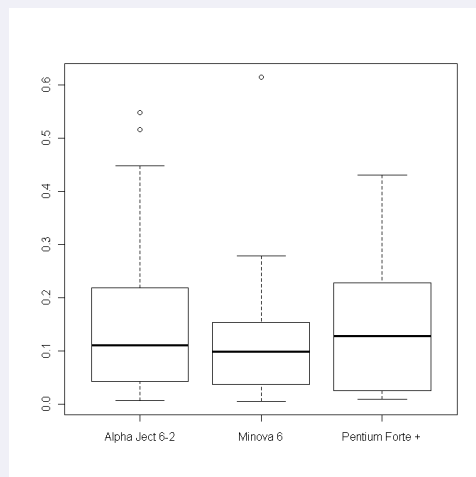
1. Mortality explained by vaccine status, type of smolt, site (number of cages) and species
- ? Mortality explained by vaccines on cage level (adjusting for site)
(Alpha Ject 6.2 in 83 cages, Minova 6 in 47 cages
Pentium Forte + in 61 cages)



Mortality according to vaccine status, smolt category, and species.



Mortality according to vaccine status and smolt category (salmon only)



Mortality in cages vaccinated with different vaccines. Minova 6 significant different from the rest

Thank you