Fish health: Prevention is better than cure

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Common themes in different industries (bass/bream & salmon)
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  Need for change
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Common theme no.1: Pathogen cyclicity

**Mediterranean**
- 1985-1995 bacterial diseases (Vibrionacae)
- 1996 – 2001 – Viral diseases
- 2002 – 2005 Bacterial skin diseases
- 2005 – 2008 Parasites
- 2009 – Viral pathogens

**Salmon**
- 1985-1991 bacterial diseases (Vibrios, Aeromonas)
- 1993 – 2000 Parasites
- 2001 - 2009 Viral pathogens
- 2009- Subclinical or low level viral infections
- 2011- Amoebas and gill pathologies

Common theme no.2: Losses of > 20% in ongrowing for last 20 years
How do Vets work with this?

REACTION is usually rapid and efficient:
New diagnostic tools, new medicines, new monitoring procedures

FIREFIGHTING

Disease Management or Fish Health Management?

Why are the average % losses still the same after 20 years?

ARE YOU ANY GOOD TO THE INDUSTRY?
... back to basics
• **Fish Health:** Health is a state of complete physical well-being and not merely the absence of disease – not about fish coping but performing too.
Understand Production

• Welfare = WQ FIRST & not just temp and oxygen!
  • CO₂, heavy metals etc.
  • Volumes, Carrying capacity, Water supply & Renewal rates
  • Support systems – oxygen supply, boreholes, reservoirs

• Husbandry
  • Nutritional requirements and feed patterns
  • Type of feed (nutritional profile, pellet size, feed management)
  • Skills and learning/training capacity of husbandry personnel
Common theme no.3

Pathogens with low prevalence/subclinical effects:
• Salmon: PD, CMS, IPN etc.
• Bass: Aeromonads, Bream: Vibrios and Nodavirus in juvenile populations
CAN YOU MANAGE THESE WITHOUT HUSBANDRY MEASURES???

Common theme no.4

Veterinary diagnostic approach often involves “experts” who have little or no connection with production…. doesn’t provide preventative health/welfare management
Case Studies:

1. Salmon Transport: Hatchery to Cage Site via Wellboat
Transfer to sea
"Stress profile of a good transport"

Mortality 1.8%

Stress levels reduced (50%)

Iversen *In prep*
When something goes wrong, everything goes wrong (Murphys law)

Refused to leave the tanks. Over 7 h loading time.

Result: 28% mortality after 90 d in sea

Iversen In prep
Stress levels during transport
Different well boats used in Norway in 2009

Iversen *In prep*
Stress levels during transport: Effects of transport time and weather

Iversen *In prep*
Stress levels during unloading “dividing the fish or not at the sea site”

Average mortality after 30 and 90 days at sea was 7.3 and 9.4 % (divided) and 4.5 and 6.9 % (not divided), respectively. Over 2 % difference in mortality based on 2009 production, which is approx. a loss of 200,000 individual.

Iversen In prep
Stress levels at the sea site.
"The effect of "bad" management on the sea site

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<td>6</td>
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Iversen *In prep*
Case Study 2: Pancreatic Disease

- 40% - 50% mortality at vulnerable sites prior to action plan being in place
- 0% - 1% with action plan
Case Study 3: Costs & Benefits of CO2 reduction in Hatcheries

Kadri et al. eds (2013) Special Issue of Aquaculture Economics & Management
High CO$_2$ affects growth

The effect of CO2 levels upon the growth of salmon smolts
The effect of CO2 levels upon FCR of salmon smolts
Poor water quality increases susceptibility to diseases (IPN challenge test)
Welfare Interventions – Diverging Economic Utilities

Noble et al. 2013
CO2 stripping – Economic Utility at farm level

Noble et al. 2013

Utility for the average farm (Euro per kg)

Welfare intervention
- Use stripping to reduce CO2 level from 27.3 to 12.7
- Use stripping to reduce CO2 level from 12.7 to 5.4

Noble et al. 2013
Conclusions

- The Industry needs to reduce losses to grow sustainably
- This requires a paradigm shift in veterinary/health care:
  - Move towards greater involvement with production
  - Allowing preventative health/welfare management
- Effects of stress upon fish health are real and demonstrable
  - Time for change