Situation of PD, HSMI & CMS in Shetland Isles, Scotland

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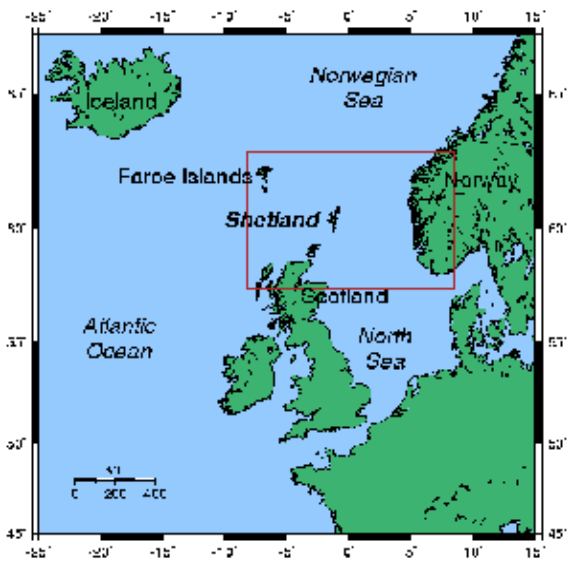
Shetland



- 110 km (70 miles) long, 1400 km² area,

1400 km coastline. 60º North. Aberdeen, Bergen and Faroe Islands roughly equidistant

- Water temperature 6 – 7ºC winter, 13ºC in summer
- Salmon – 2014 production ~ 40,000 tonnes – 25% Scottish production on around sixty sites
- Sea sites - three main producers, two smaller producers .
- Also mussels – 2014 - 5,919 tonnes (77% Scottish production).

Pancreas Disease

- Salmon production started 1982. By 1990, Pancreas Disease major problem.

Outbreaks usually started in August after transfer. Fish went off food, hung around the surface. Susceptible to lice infestation. Mortality not high initially, long thin fish.

First generation of furunculosis vaccines reduced severity.

Disease slowly crept back.

Pancreas Disease (2)

- Fish go off their feed, hang about near the surface, but signs usually milder now.
- Peak month August. None in January, February or March
- Number of outbreaks seen varies from none in some years to nine in 2008
- Both S1s & S0s.
- Age at on set five months – 15 months+.

Pancreas Disease (3)

- Yellow casts, caecal petechiae
- Histology – pancreatic, heart muscle and skeletal muscle (red and white) affected.
- SAV 2 predominant serotype
- Seroconversion in up to 35% for SAV
- Susceptible to other diseases (sea lice, damage etc.)
- HSMI or CMS diagnosed later in the cycle in some fish.

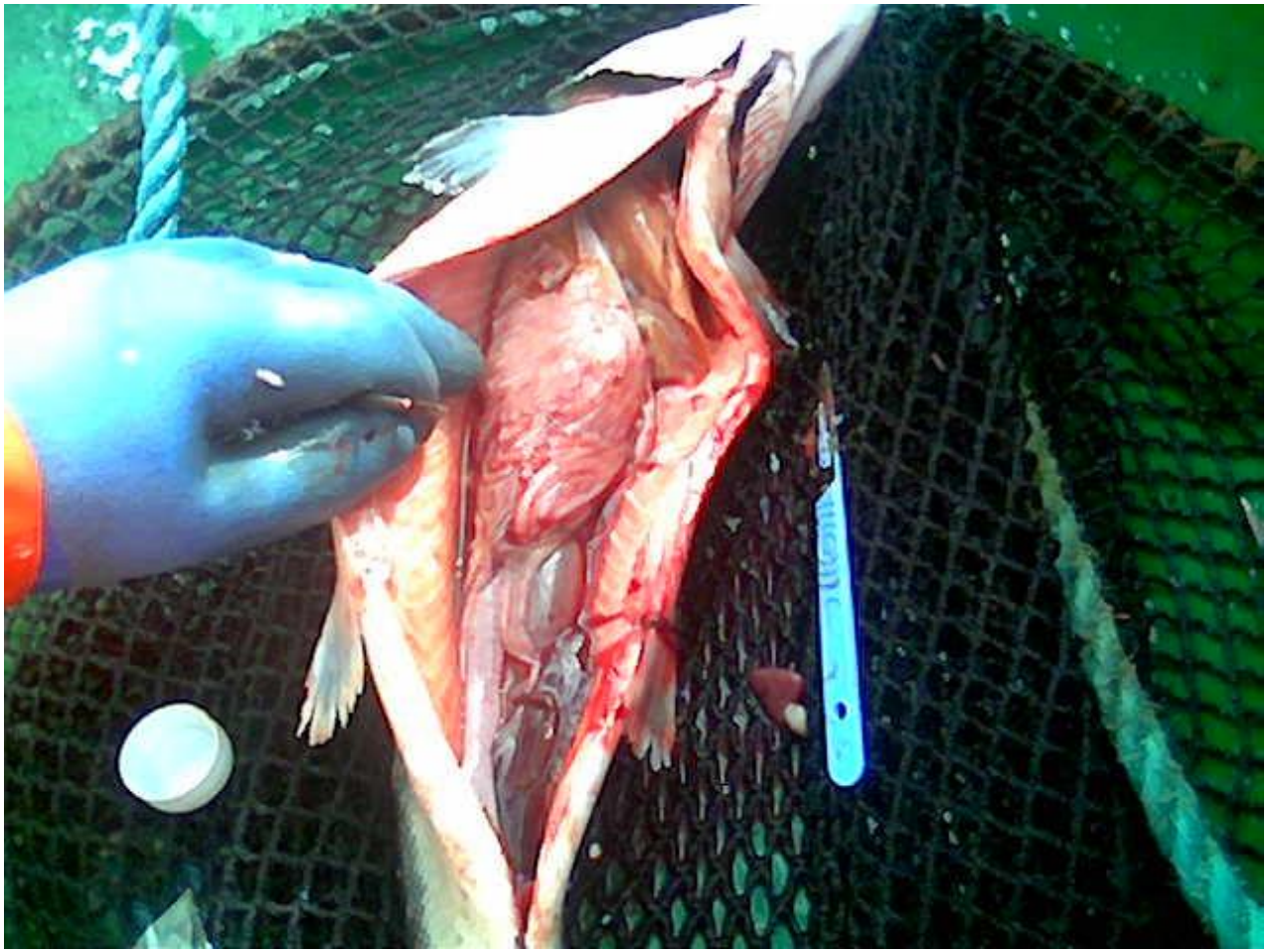
Vaccination against PD

- 2008 S1 generation – salmon stocked on six sites. PD diagnosed on four sites by serology and histology
- 2010 generation – all fish on all six sites vaccinated with Norvax Compact PD®. PD was not diagnosed on any of the sites. Regular serology (two fish per cage throughout lifecycle) of fish was negative, apart from viraemia in one fish on one site at last round of testing
- 2012 Generation – ten sites stocked with S1s, not vaccinated for PD. PD diagnosed by serology and histology on three sites.
- Conclusion – vaccination with Norvax Compact PD was successful!

HSMI

- First diagnosis 2005. Since then, we have encountered zero-four cases annually, with an average one per year.
- Most cases in August, but seen in winter as well
- Some areas more susceptible than others (East> North-west)
- Time from input to diagnosis 5 – 15 months (average eight)
- Signs – lethargy, increased mortality
- Internally – no food in the gut, casts. Pale liver, some ascitic fluid, (enlarged spleen) pale, floppy heart
- Mortality <1 – 35% (but factor in two other cases)
- Outbreak lasts about two months, and surviving fish
- Both S1s & S0s affected

HSMI (2)



HSMI (3)

- One case of PD and HSMI on one site simultaneously.
- Fish stocked spring 2011. Diagnosed with IPN virus and then Pancreas Disease in September.

Six fish sampled for histology and SAV serology in October

-two had changes suggestive of PD (one SAV antibody +ve, one -ve) . CPK 2400 & 4800

- third fish - Heart pathology, but pancreas normal (SAV +ve) CPK 800

- one fish, & maybe two, histology HSMI (SAV –ve, CPK 100 & 800)

- sixth fish IPN or PD.

- Mortality returned to normal in November

CMS

- Zero – five outbreaks per year (average 1.5)
- Peak month January, most first half of year.
- Time of onset 7 – 21 months post transfer (average 15)
- Both S1s & S0s.
- Occurs all over Shetland, but some sites more susceptible than others.

CMS (2)

- Signs – poor fish hanging about the surface, death associated with stress (harvest, feeding, lice counts)
- Internally – blood clots around the heart, dark congested liver, serosanguinous ascites, enlarged spleen
- Mortality – single fish to skip full
- Outbreak lasts about two months
- Histology – spongy and compact layers of heart muscle affected, liver and spleen necrosis
- PCR 13 – 19 (average 17)

Summary

- Pancreas Disease, HSMI and CMS all occur in Shetland, and have occurred for some time.
- PD first occurred in 1980s. The main serotype is SAV 2. Mortality is low, but causes fish to go off their feed and lethargy, leading to susceptibility to other diseases, including sea lice.
- PD vaccination has successfully reduced morbidity and mortality
- HSMI causes variable mortality
- CMS mainly occurs toward end of production cycle