Survey for PRV in Atlantic salmon in Iceland

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Introduction

- Increased interest in screening for PMCV and PRV in Iceland
  - Increase in net-pen culture of salmonids in Icelandic fjords
  - Export of live salmon material (eggs and fry)
  - For epidemiological reasons, screening of wild fish is necessary to establish whether these viruses are present in wild salmon in Iceland
- Neither disease has been suspected in Iceland

HSMI

- Heart and skeletal muscle inflammation (HSMI)
  - First described in Norway in1999 (Kongtorp et al., 2004)
  - The disease usually appears 5-9 months after transfer to sea
  - Various damages are seen in heart and muscle necrosis is prominent
  - Closely linked to PRV

First study

- Screening for PRV and PMCV in Atlantic salmon (2013-2014)
  - Pilot study
  - Set up and run detection assays for two recently identified RNA viruses that can cause diseases in Atlantic salmon
  - Wild brood fish
  - Farmed brood fish (land-based)
  - Adult fish in net pens

Second study

- Screening of viruses in Atlantic salmon, farmed and wild (2015-2017)
  - PRV and PMCV
  - Samples from Atlantic salmon at different age and place
    - Samples taken from smolts, spring 2015
      - Smolts for release into rivers, reared from wild fish
      - Smolts for release into net pens, reared from cultured fish
    - Samples taken from brood fish, returning to the rivers after one year at sea
    - Samples taken from production fish in net pens
      - After 8-9 months at sea
      - When slaughtered

Material and methods

- Atlantic salmon
  - Tissue samples from heart, kidney and gills, on average 30-35 mg
- RNA extraction with Rneasy mini kit (Qiagen) and the RNA tested in “One Step RT-qPCR“
- Positive control samples containing PMCV or PRV were tested in One Step RT-qPCR reactions with primers and probes according to Lövoll et al., 2010 and Haugland et al., 2011
- Reference gene (ELF1A) amplification was according to Moore et al., 2005

Results – first study

- The ELF1A reference gene was amplified in a separate reaction
  - Ct values for ELF1A in all samples were in the range of 16-22
- PMCV was not detected in any samples from the three groups examined
- PRV test showed 100% frequency in farmed Atlantic salmon and 21.9% in wild Atlantic salmon

Sample group		ELF1A	PMCV	PRV		
		Ct. Values	Positive samples	Positive samples	%	Ct. Values
A	Land-based farm	16-22	0	32	100	26,38-33,68
B	Net-pens in sea water	16-22	0	32	100	25,02-32,26
C	Wild Atlandic salmon	16-22	0	7	21,9	19,84-43,86

Screening of viruses in Atlantic salmon, farmed and wild (2015-2017)

- Smolt samples: collected in Spring 2015
  - Hatcheries
    - Producing smolts for release into rivers or into net pens
    - Located in North Iceland, South Iceland and Southwest of Iceland
    - 347 samples

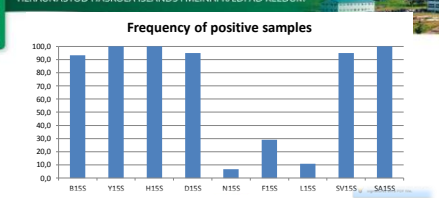
- Atlantic salmon in net pens at sea, Vestfjords
  - Samples collected from Atlantic salmon after 8 months at sea
  - 80 samples

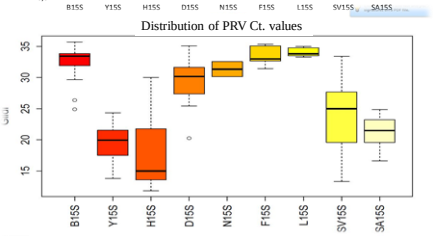
Preliminary results, smolts

- Smolt samples from three hatcheries
- 72% tested positive for PRV

Fiskræktarstöð á SV-landi - Land-based hatchery Southwest of Iceland
Fiskræktarstöð á N-landi - Land-based farm North of Iceland
Fiskræktarstöð á S-landi - Land-based farm South of Iceland

Hópur	Samtals sýni	Jákvæð sýni	Tíðni jákvæðra sýna	Ct. gildi < 15	Ct. gildi 15-20	Ct. gildi 20-25	Ct. gildi 25-30	Ct. gildi 30-35	Ct gildi 35-40
SV15S	40	38	95,0	3	7	9	14	5	0
SA15S	41	41	100,0	0	12	29	0	0	0

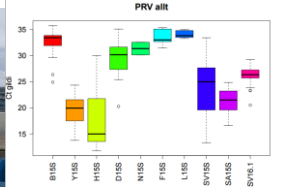




Preliminary results, net pens

- Salmon after 8 months at sea
  - Vestfjords
  - Around 500 grams and 35 cm

Hópur	samtals sýni	jákvæð sýni	Ct. gildi < 15	Ct. gildi 15-20	Ct. gildi 20-25	Ct. gildi 25-30	Ct. gildi 30-35	Ct gildi >35
SV16mars	80	80	0	0	5	75	0	0



Next steps

- Follow up Vestfjords generation
  - Samples from fish at slaughtering
- Take samples from smolts that will be released into net pens at sea in the Eastfjords of Iceland
  - Follow up
- Follow up of wild fish
  - Samples from fish returning for spawning

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