

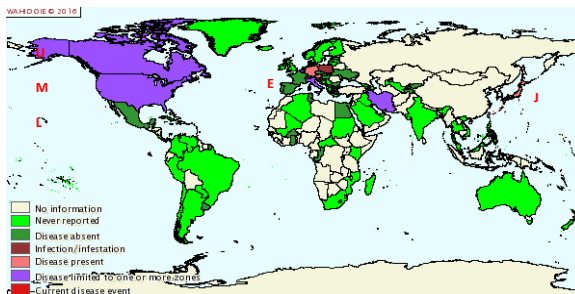


## IHNV Worldwide and in EU 1-6 2015



### SUSCEPTIBILITY OF ATLANTIC SALMON TO IHNV E-GENOTYPE AND INTERFERENCE WITH PRV INFECTION

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### IHNV Species-Genogroups



Genogroup	Species	
U	Sockeye salmon	<i>Oncorhynchus nerka</i>
	Chinook salmon	<i>Oncorhynchus tshawytscha</i>
	Steelhead salmon	<i>Oncorhynchus mykiss</i>
M	Mostly Rainbow trout	<i>Oncorhynchus mykiss</i>
L	Mostly Chinook Salmon	<i>Oncorhynchus tshawytscha</i>
E	Rainbow trout	<i>Oncorhynchus mykiss</i>
J	Kokanee/Sockeye salmon	<i>Oncorhynchus nerka</i>
	Chum salmon	<i>Oncorhynchus keta</i>
	Rainbow trout	<i>Oncorhynchus mykiss</i>

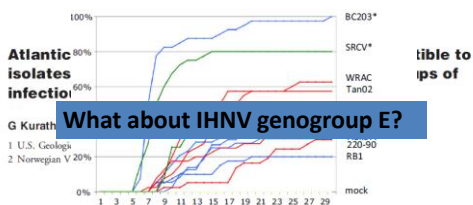
In RT in Europe it is perceived as a pathogen that is increasing pathogenicity

### AS susceptibility?



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What about IHNV genogroup E?

### PRV Prevalence



In Norway

	Prevalence of PRV
SW salmon farms	Very high (close to 100%?)
FW salmon farms	<50%
Wild salmon	13% (Garseth 2013)

PRV reported in Chile, Canada, Denmark (wild salmon)

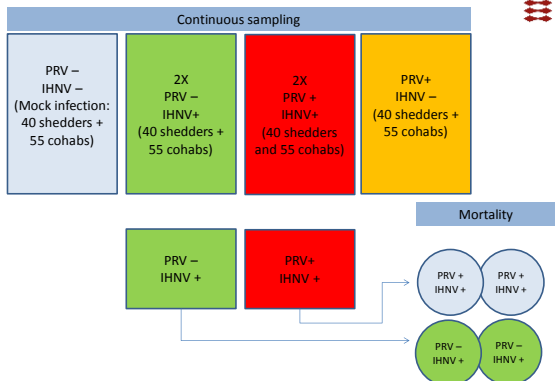
HSMI reported in Scotland SW stage

### PRV / IHNV Infection trial



- Assess the susceptibility of Atl Salmon to IHNV Genotype E;
- Assess the risk and the outcome of a potential IHNV infection in PRV infected Atlantic salmon.
- Experimental infection trial
  - Continuous sampling
  - Disease monitoring

### PRV / IHNV Infection trial



### PRV / IHNV Infection trial



#### • PRV infection

– Forty (40) fish injected IP with 0,1mL of infected blood pellet diluted in L15 media, obtained from the Norwegian Veterinary Institute (Oslo, Norway).

- Monitor viral load by RT-qPCR
- IHNV infection on PRV peak.

#### • IHNV infection

- DF04/99 propagated in EPC;
- $10^6$  TCID<sub>50</sub> ml<sup>-1</sup> for 3h;



### PRV / IHNV Infection trial



#### • Continuous sampling (9 – 10 weeks)

– Monitor PRV and IHNV viral load

– Sampling:

- Spleen (qPCR)
- Heart (H&E)
- Blood (Hct-Hgb)
- Head kidney (Immune gene)



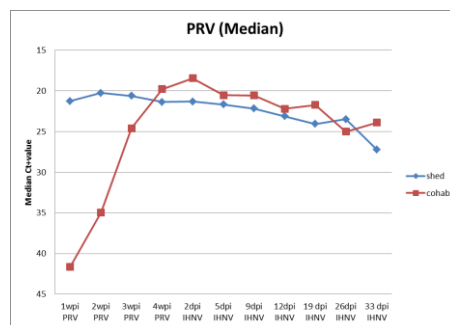
#### • Disease monitoring

– Moribund fish – after IHNV infection

### PRV / IHNV Infection trial

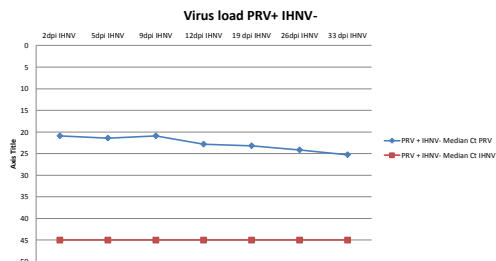


PRV Load in cohabs. model



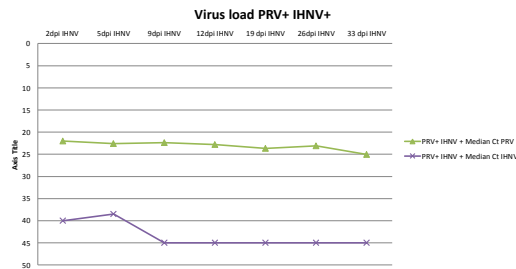
### PRV / IHNV Infection trial

Comparative viral load

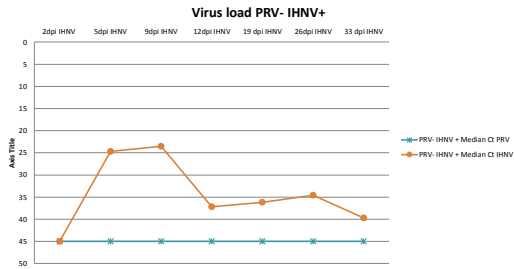


### PRV / IHNV Infection trial

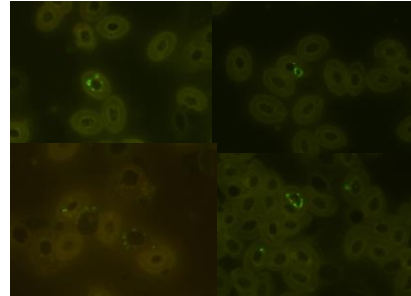
Comparative viral load



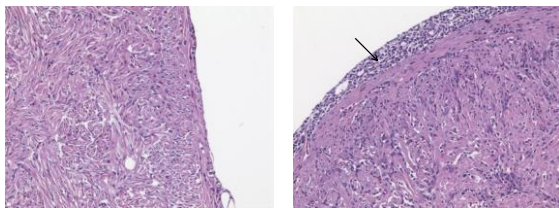
**PRV / IHNV Infection trial**  
Comparative viral load



IFAT on blood smears for PRV



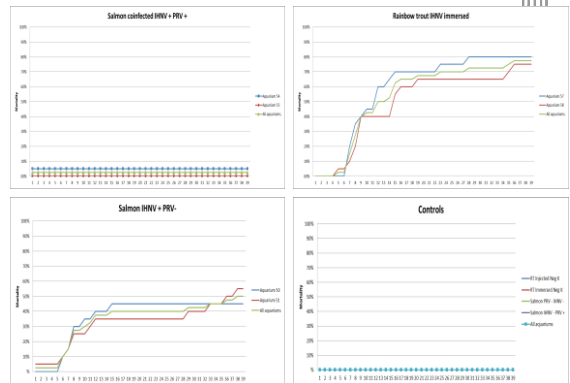
Histopathology on PRV + IHNV-  
Pictures-Tine Iburg



Negative control

Shedder, 4-5wpi

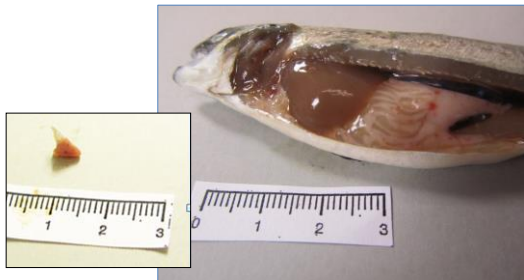
PRV / IHNV Infection trial Morbidity rate



**Experiment 2**  
PRV / IHNV Infection trial



- Mortality / Disease monitoring



- Mortality / Disease monitoring



## Experiment PRV / IHNV Infection trial



- Model for PRV well established;
  - PRV as ‘chronic’ infection;
- Atlantic salmon is susceptible to IHNV E genotype; 50% mortality
- PRV+ IHNV+ group;
  - Unlike other studies;

Thanks for your attention

## Outlook



- RT-qPCR on the hearts;
- Histopathology;
- Immune response on head kidney? Spleen?
- Write!!

G. Kurath and others

Table 2. Features of IHNV genogroups in the mid-G sequence phylogeny

(a) Biological

Genogroup	No. of virus isolates	No. of different mid-G nt sequence types	No. of different mid-G aa sequence types	Isolation year range	General host type(s)
U	180	39	16	1971–2000	Sockeye, chinook, steelhead
M	107	42	31	1978–1998	Mostly rainbow trout
I	36	12	11	1966–2001	Mostly chinook

## Overview



- PRV AS
  - Reoviridae*;
  - *Orthoreovirus*;
  - Non enveloped, 9-12 segments of linear dsRNA;
- PRV – Heart and Skeletal Muscle Inflammation (HSMI)
  - PRV is ubiquitous in farmed Atlantic Salmon.

## DCV Screening for PRV

- 181 hearts from farmed Atl Salmon;
- RT-qPCR: L1 segment (Palacios et al, 2010);



Positive samples:

Sample nr	Location	C <sub>t</sub> value
14-15550-2	Randers	29,82
14-15958-4	Randers	30,66
14-16407-1	Skjern	31,7
14-16407-3	Skjern	26,36

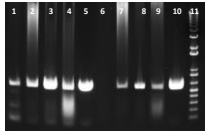
Suspected samples:

Sample nr	Location	C <sub>t</sub> value
14-15550-3	Randers	35,63
14-16407-4	Skjern	36,87
14-46407-5	Skjern	37,19
14-16407-10	Skjern	38,26
14-16408-16	Skjern	38,73

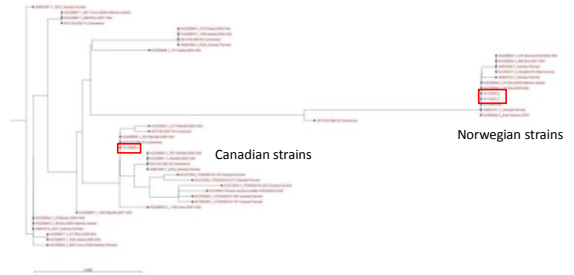
## DCV Screening for PRV



- Three positive samples were subjected to nucleotide sequencing;
- Two primers sets targeting two overlapping fragments (Garseth et al., 2013).



## DCV Screening for PRV



## Experiment PRV / IHNV Infection trial



- Results
  - Continuous sampling

