

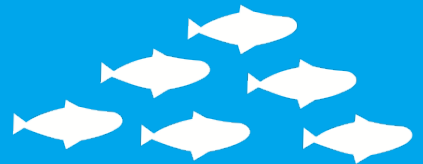


Veterinærinstituttet  
*Norwegian Veterinary Institute*

# ISAV HPR0 in hatcheries

27<sup>th</sup> Annual Workshop of the National Reference  
Laboratories for Fish Diseases, Kgs. Lyngby, 30<sup>th</sup> of May 2023

Torfinn Moldal, Veterinarian, PhD, Scientific coordinator for fish health  
Hilde Sindre, Senior researcher, PhD, Project leader



# Infectious salmon anemia virus (ISAV)

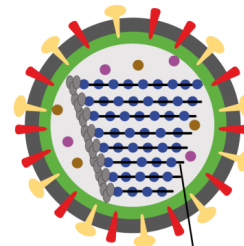
Segmented genome

Two main types:

- ISAV HPR0 (non-virulent)
- ISAV HPR $\Delta$  (virulent)

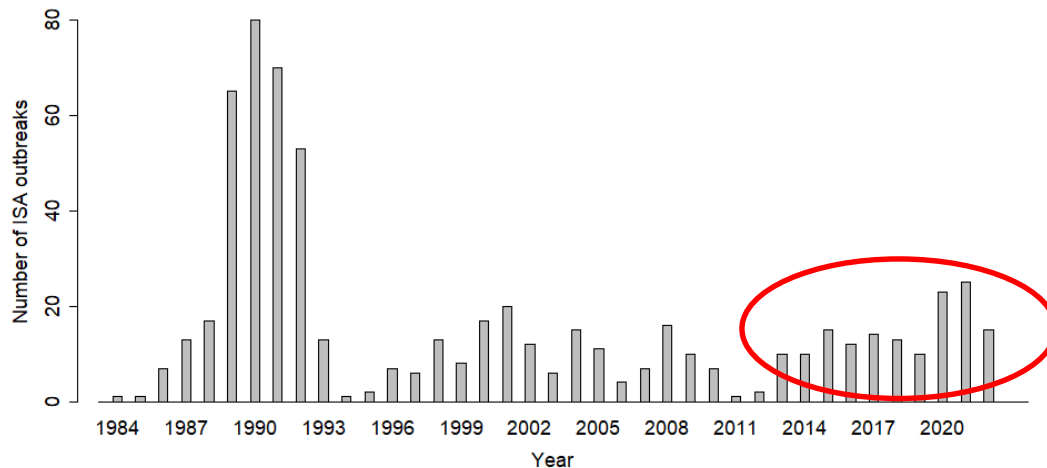
ISAV HPR0 > ISAV HPR $\Delta$

ISAV particle



Encoded amino acids	
HPR0	KLQRNITDVKIRVD AIPPOLNOTFNTNOVEOPATSVLSNIFISM
	KLQRNITDVKIRVDA-----NQVEQPATSVLSNIFISM
	KLQRNITDVK-----PATSVLSNIFISM
	ELRRNITDVGIGVD AIPPQL-----NIFISM
	KLQRNITDVKIRVD AIPPQLNQT-----M
	KLQRNITDVK-----TSVLSNTFISM
Selected	KLQRNITDVKIRVD AIPPQLNQT-----L
HPRs	KLQRNITDVKIRVD AIPPQLNQT-----M
	KLQRNITDVKIRVD A I-----QVEQPATSVLSNIFISM
	KLQRNITDVKIRVD AIPPQLNQT-----FISM
	KLQRNITDVKIRVD AIPPQL-----ISM
	KLQRNITDVKIRVD AIPPQL-----SNIFISM

# Annual number of ISA outbreaks



# Surveillance of ISAV HPR0

Gill tissue from 90 fish

One sampling every second year

The prevalence is likely underestimated

- Transient infection
- Samples from only some tanks
- One sampling point

Year	# sites	# positive	%
2019	74	5	7
2020	42	6	14
2021	78	8	10
2022	78	9	11,5

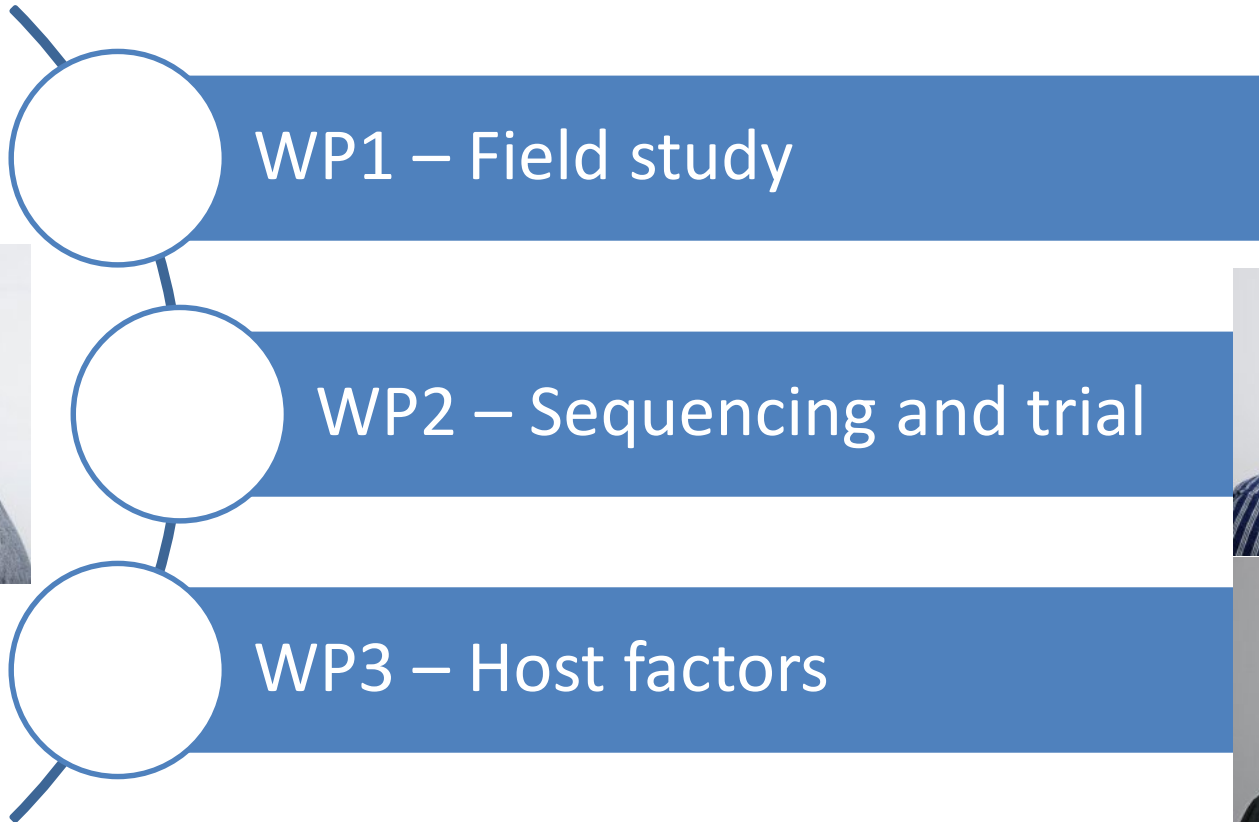
# Biosecurity measures against ISA in smolt

**Objective:** Increase the knowledge about the distribution and impact of ISAV HPR0 in Norwegian hatcheries

Funded by the Norwegian Seafood Research Fund

Project period 01.01.2021-30.06.2024

Collaboration between academia and companies





# WP1 – Field study

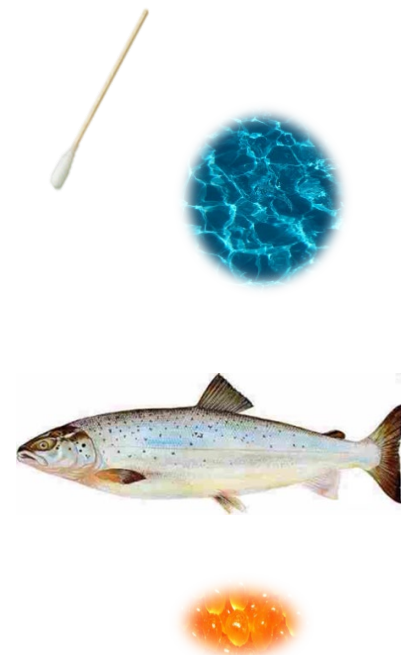
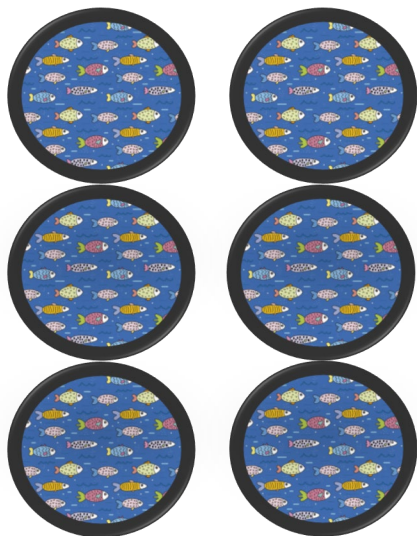
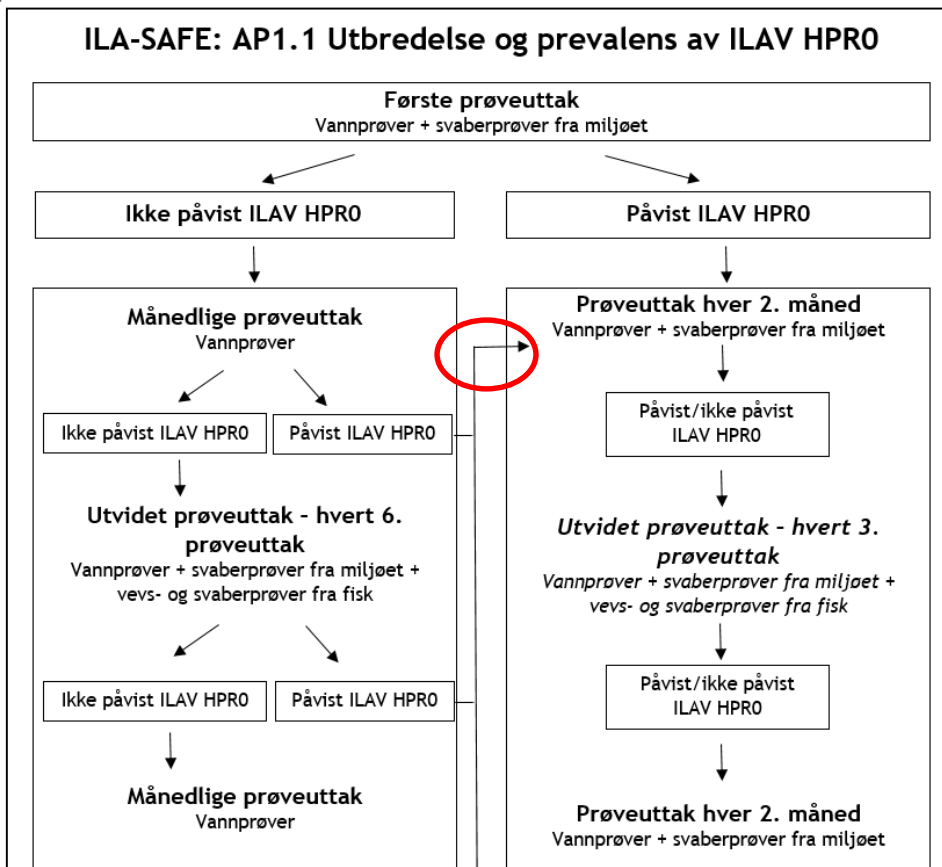
Distribution and prevalence

Detection in parr>sea transfer

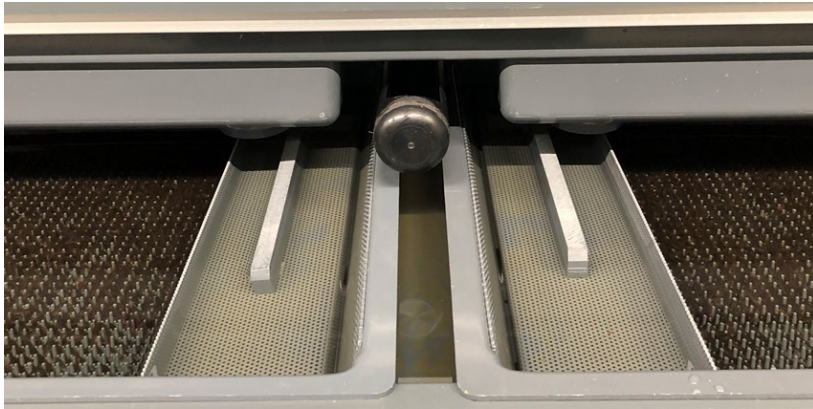
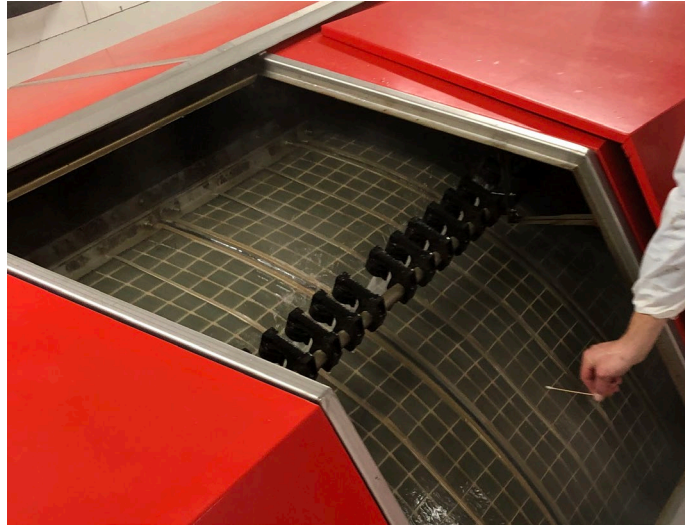
Effect of sanitization

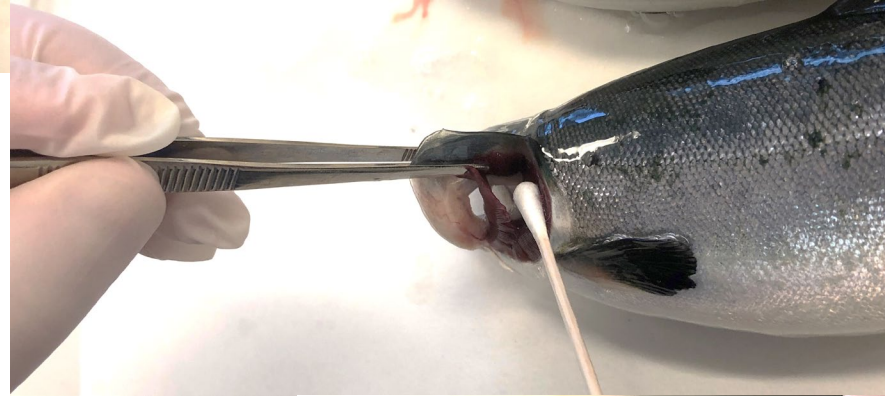
Characteristics of the sites

## ILA-SAFE: AP1.1 Utbredelse og prevalens av ILAV HPRO









Photos: Mona Dverdal Jansen



Vet



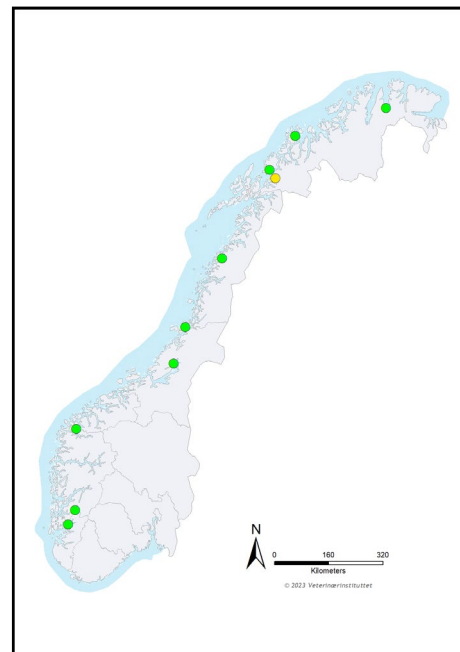
Photo: Hilde Sindre

# Ten hatcheries are included

ISA-virus are detected in  
five of these

One hatchery has sanitized

Two fish groups from the  
parr stadium to sea transfer  
in two hatcheries



Map: Attila Tarpai

# Good correlation between matrixes

All matrixes reveal ISAV HPR0 on site level

Some variation between departments

Prevalence and activity?

Water and swabs from surfaces are promising



Vaccination



# WP1 – Field study

Distribution and prevalence

Detection in parr>sea transfer

Effect of sanitization

Characteristics of the sites

# Sampling of parr



Prevalence within a group  
over time

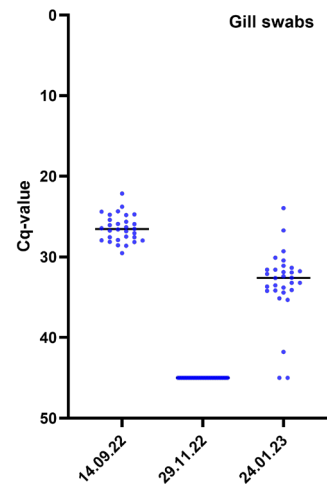
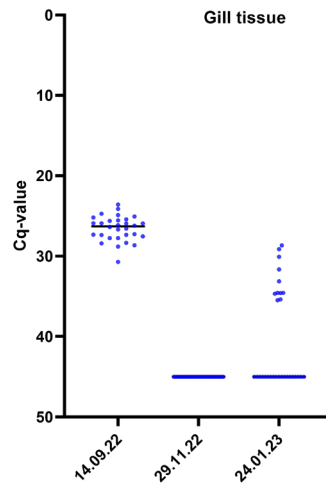
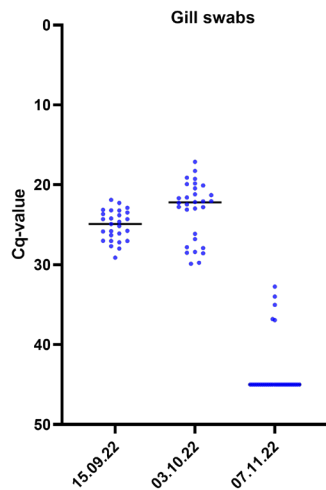
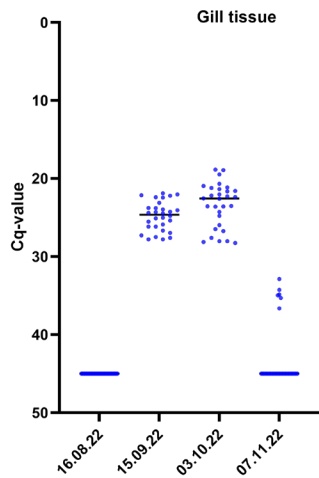
Gill tissue and swabs from  
30 fish every time point

Water and swabs from the  
tank

# Samples from parr from two sites

## Site 1

## Site 2







# WP1 – Field study

Distribution and prevalence

Detection in parr>sea transfer

**Effect of sanitization**

Characteristics of the sites

# The site

Linked to several outbreaks of ISA in 2019 and 2020

Detection of ISAV HPR $\Delta$  in June 2021

The importance of success even higher

Start in December 2020 till February 2022



Photo: Lasse Solgren

# Implementation



Photo: Lasse Solgren

Mechanical dismantling  
Focus on placing of washing points  
and the sequence of washing  
Clean and dirty zones  
Tent for storage of clean equipment  
The choice of method and  
disinfectant based on the material  
and the placing  
Procedures, check lists and  
documentation

# Additional measures



Rebuilding the existing UV unit for seawater and new units in every department

More focus on prediction of the production

Ensure disruption in the production - ideally three weeks

Investigation of the roe by PCR

Photo: Lasse Solgren

## Pros and cons

ISA-virus is not detected again  
The staff was given the chance to understand how the site works

Challenges with the function of the biofilter

Time and resource demanding

High cost and reduced production

Handling waste

Challenging for the customers



Photo: Lasse Solgren

*Faglig ambisiøs, fremtidsrettet og  
samspillende - for Én helse!*



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