

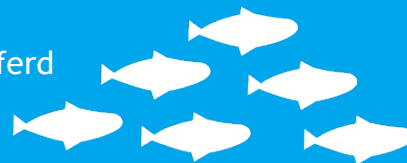


Veterinærinstituttet
Norwegian Veterinary Institute

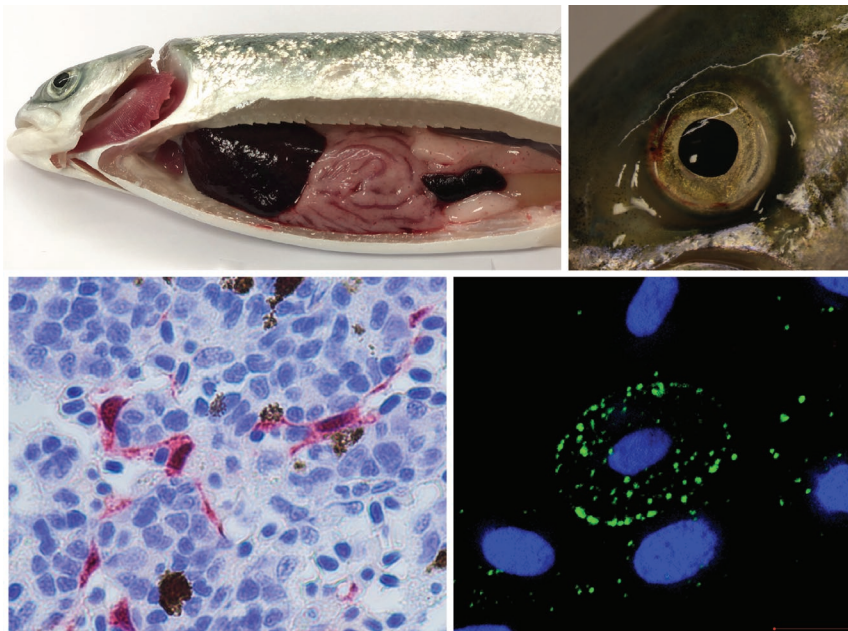
ILA-situasjonen i dag

Webinar, 17. september 2024

Torfinn Moldal, fagansvarlig fiskehelse/veterinær, seksjon for havbruk, villfisk og velferd



Kliniske tegn og patologi ved ILA



Bleike gjeller pga. anemi
Sirkulasjonsforstyrrelser

- Blødninger i øyne, hud og indre organer
- Ødemer
- Væske i kroppshulen
- Vevshenfall



EURL- og WOAH-manualer for ILA

European Union Reference Laboratory
for Fish and Crustacean Diseases

NATIONAL INSTITUTE OF AQUATIC RESOURCES, TECHNICAL UNIVERSITY OF DENMARK



DIAGNOSTIC METHODS FOR THE
SURVEILLANCE AND CONFIRMATION
OF INFECTION WITH HPR-DELETED
INFECTIOUS SALMON ANEMIA VIRUS
(ISAV)
v2022.3

CHAPTER 2.3.4.

INFECTION WITH HPR-DELETED OR HPR0 INFECTIOUS SALMON ANAEMIA VIRUS

1. Scope

Infection with infectious salmon anaemia virus (ISAV) means infection with the pathogenic agent highly polymorphic region (HPR)-deleted infectious salmon anaemia virus (ISAV), or the non-pathogenic HPR0 (non-deleted HPR) ISAV of the Genus *Isavirus* of the Family *Orthomyxoviridae*.

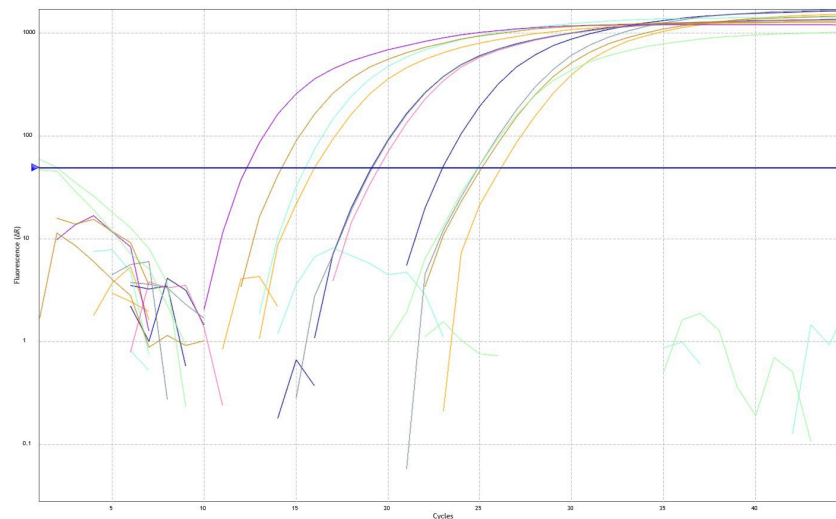
HPR-deleted ISAV may cause disease in Atlantic salmon (*Salmo salar*), which is a generalised and lethal condition characterised by severe anaemia, and variable haemorrhages and necrosis in several organs. The disease course is prolonged with low daily mortality (0.05–0.1%) typically only in a few cages. Cumulative mortality may become very high for a period lasting several months if nothing is done to limit disease dissemination (Rimstad *et al.*, 2011).

Detection of HPR0 ISAV has never been associated with clinical signs of disease in Atlantic salmon (Christiansen *et al.*, 2011). This virus genotype replicates transiently and has mainly been localised to the gills. A link between non-pathogenic HPR0 ISAV and pathogenic HPR-deleted ISAV, with some outbreaks potentially occurring as a result of the emergence of HPR-deleted ISAV from HPR0 ISAV has been suggested (Cardenas *et al.*, 2014; Christiansen *et al.*, 2017; Cunningham *et al.*, 2002; Gagné & Leblanc, 2017; Mjaaland, *et al.*, 2002).

Påvisning med real-time RT-PCR



Foto: Harrieth Lundberg



Påvisning med andre metoder

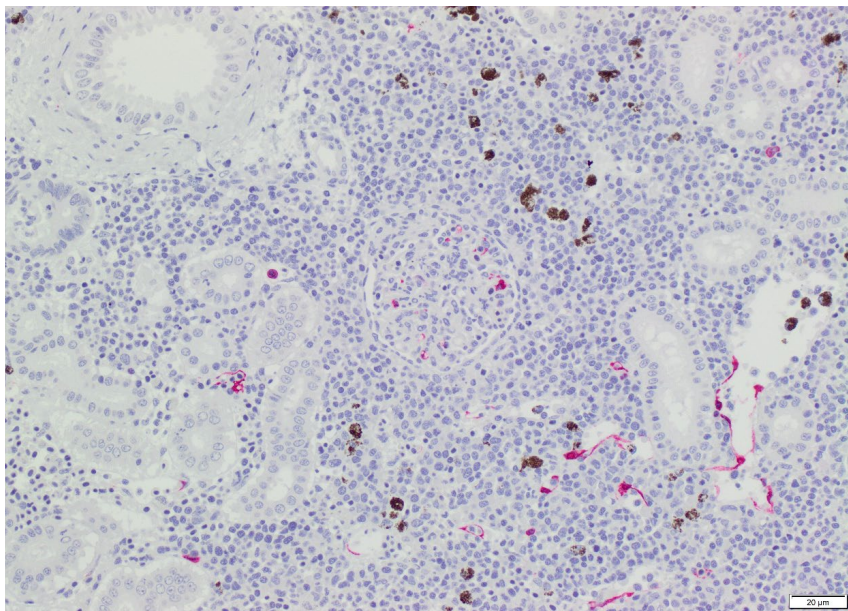


Foto: Toni Erkinharju

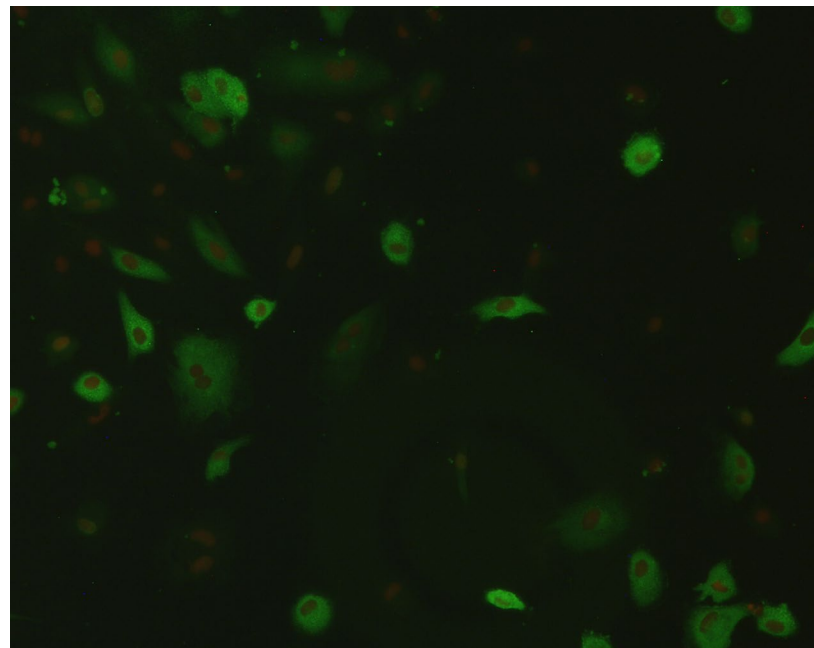
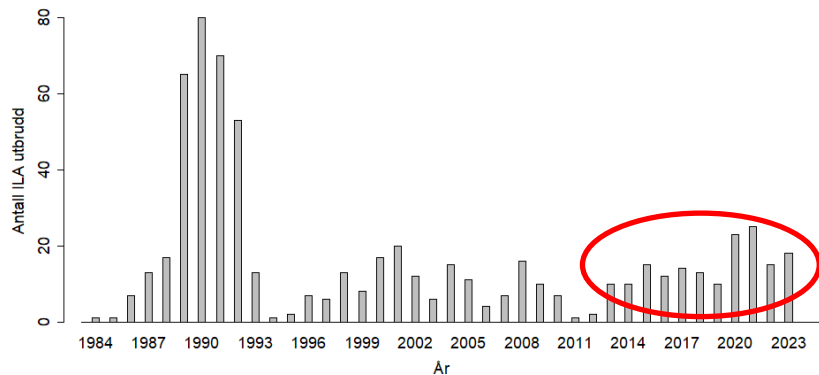
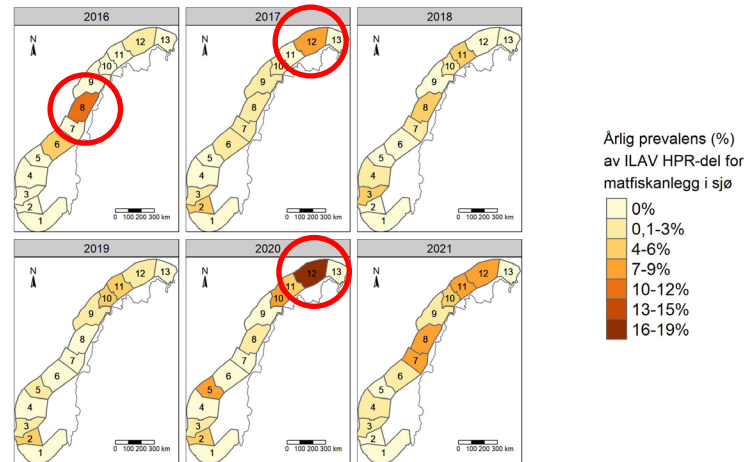


Foto: Hilde Sindre

Antall stadfesta utbrudd per år

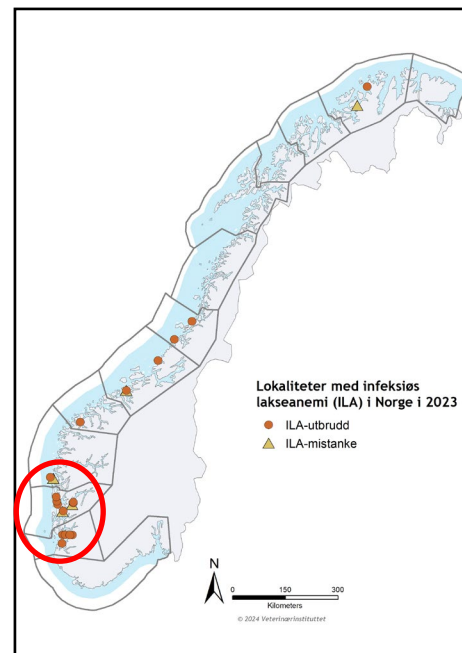
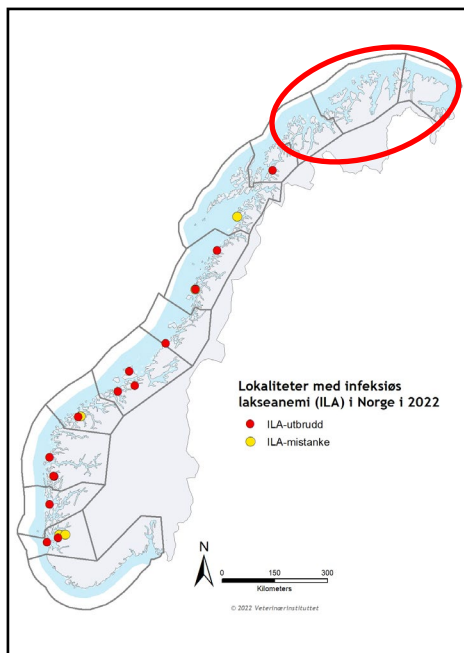


Fra Fiskehelserapporten 2023

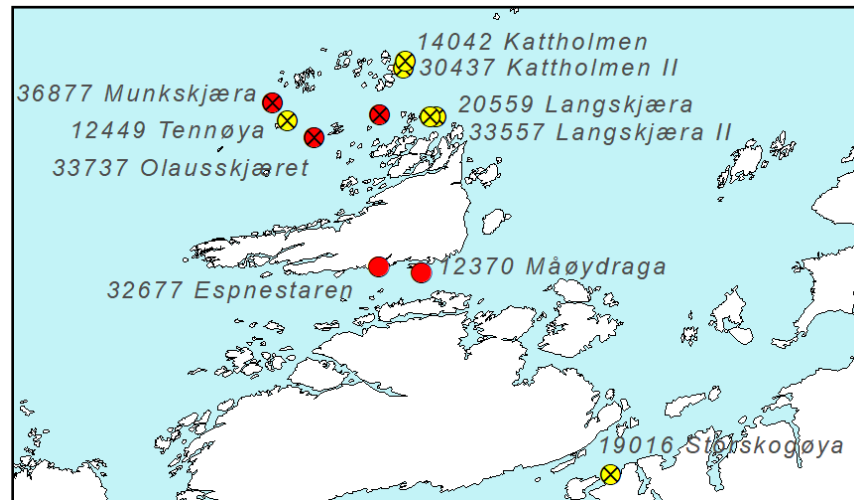
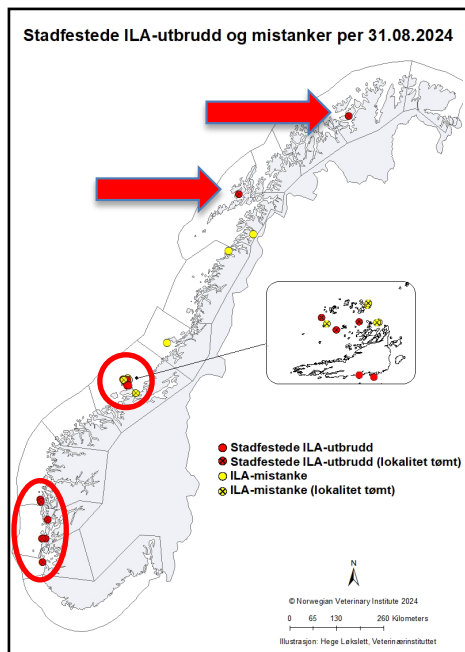


Fra Fiskehelserapporten 2021

ILA-utbrudd og mistanker i 2022 og 2023



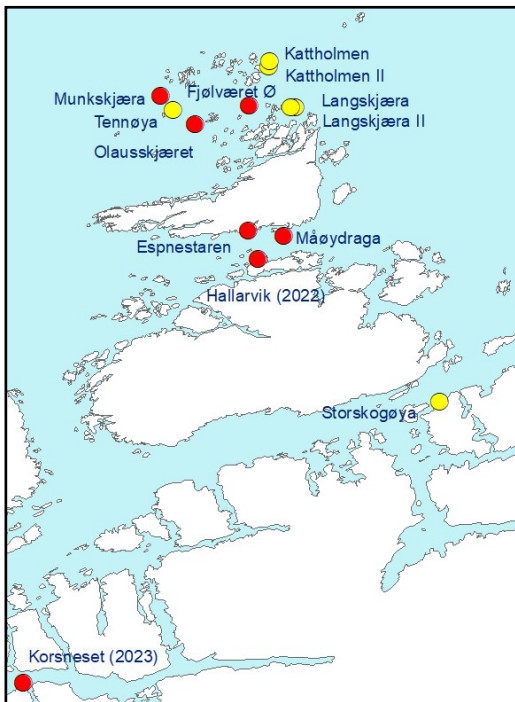
ILA-utbrudd og mistanker så langt i år



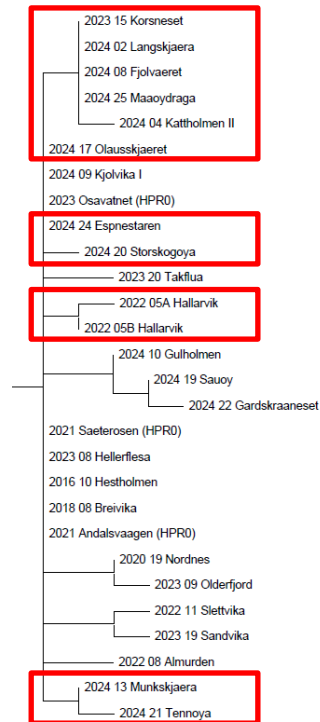
Kart: Hege Løkslett



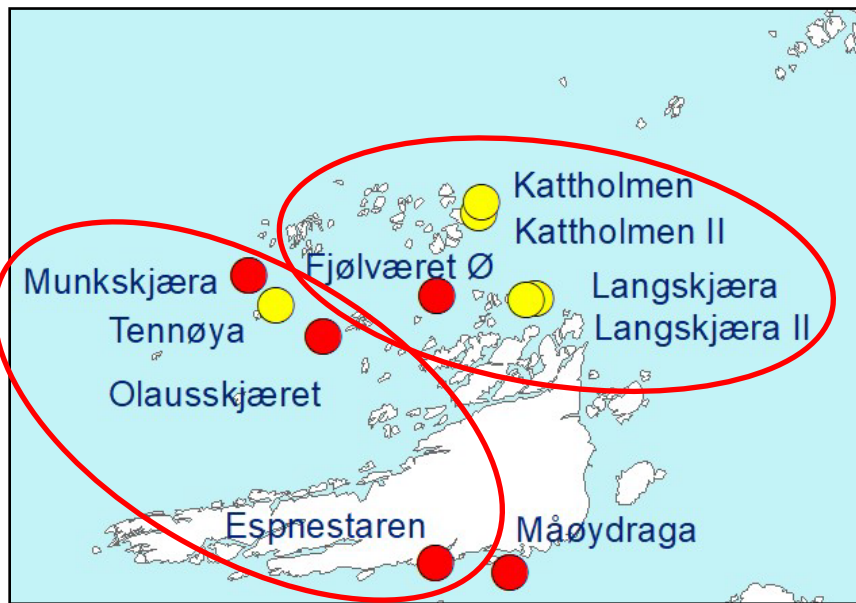
Fylogenetisk tre for segment 6



Kart: Hege Løkslett



Større diversitet for segment 5



To grupperinger

Måøydraga ligger for seg sjøl



Insertsjon i kløyvingssetet på segment 5

191. 2024_02_Langskjæra	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
192. 2024_03_Grimsholmen_1	C A T G G A T G G T C C A A A T A C A A C T T C A A C	.....	.....	C G A G A G C T T T C C C A G
193. 2024_03_Grimsholmen_11	C A T G G A T G G T C C A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
194. 2024_04_Kattholmen II	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
195. 2024_07_Sandnes_1	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
196. 2024_07_Sandnes_12	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
197. 2024_08_Fjølvaeret	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
198. 2024_09_Kjølsvika I	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
199. 2024_10_Gulholmen	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
200. 2024_11_Hestholmen	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
201. 2024_13_Munskjæra	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
202. 2024_16_Stora Kufjord	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	C A G A G A G C C C T G A T G A A C A	C G A G A G C A T T C C C A G
203. 2024_17_Olausskjæret	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	A T G G C G G A G G A G A A G A C G A T G T T G A A G G A C C T G A A G A C A A T G C T A C A C C	A G A G A G C A T T C C C A G
204. 2024_18_Anda1	C A T G G A T G G T C C A A A T A C A A C T T C A A C	.....	.....	C G A G A G C T T T C C C A G
205. 2024_18_Anda1_8	C A T G G A T G G T C C A A A T A C A A C T T C A A C	.....	.....	C G A G A G C T T T C C C A G
206. 2024_19_Sauoy	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
207. 2024_20_Storskogoya	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
208. 2024_21_Tennoya	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
209. 2024_22_Gardskraneset_10	C A T G G A T G G T C T A A A T A C A A C T T C A A C	A C T G G A C A A C G C G G C A A G A G A G C T G T A C C T G G G A G C A T G C A G G G G A G A C G T G A G A G T G A C G C C T A C C	A G A G A G C A T T C C C A G	
210. 2024_22_Gardskraneset_8	C A T G G A T G G T C T A A A T A C A A C T T C A A C	A C T G G A C A A C G C G G C A A G A G A G C T G T A C C T G G G A G C A T G C A G G G G A G A C G T G A G A G T G A C G C C T A C C	A G A G A G C A T T C C C A G	
211. 2024_24_Fosnestjøen	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G
212. 2024_25_Maaoydraga	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	C A G A G A G C A A T T C C T A G G A C T G G T T A T G T T A G G A G T G C A T T C C C A G	A G A G A G C A T T C C C A G
213. 2024_Foldvik (HPR0)	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	A G A G A G C A T T C C C A G
214. 2024_Rylandsvaag (HPR0)	C A T G G A T G G T C T A A A T A C A A C T T C A A C	.....	.....	C G A G A G C A T T C C C A G

Aminosyresammensetninga i HPR

ILAV HPRO	TDV	KIRVDAI	PPQL	NQT	FNTN	QVEQ	PA	TSVL	SNI	FISM	GVA
Korsneset (2023)	TDV			QT	FNTN	QVEQ	PA	TSVL	SNI	FISM	GVA
Langskjæra	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA
Kattholmen II	TDV	KIRVDAI	PPQL	NQT	F						GVA
Fjølværet Ø	TDV	KIRVDAI	PPQL	NQT						M	GVA
Munkskjæra	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA
Olausskjæret	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA
Storskogøya	TDV	KIRVDAI	PPQL	NQT					NI	FISM	GVA
Tennøya	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA
Espnestaren	TDV	KIRVDAI	PPQL	NQT	FN					ISM	GVA
Måøydraga	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA

Aminosyresammensetninga i HPR

ILAV HPRO	TDV	KIRVDAI	PPQL	NQT	FNTN	QVEQ	PA	TSVL	SNI	FISM	GVA
Korsneset (2023)	TDV			QT	FNTN	QVEQ	PA	TSVL	SNI	FISM	GVA
Langskjæra	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA
Kattholmen II	TDV	KIRVDAI	PPQL	NQT	F						GVA
Fjølværet Ø	TDV	KIRVDAI	PPQL	NQT						M	GVA
Munkskjæra	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA
Olausskjæret	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA
Storskogøya	TDV	KIRVDAI	PPQL	NQT					NI	FISM	GVA
Tennøya	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA
Espnestaren	TDV	KIRVDAI	PPQL	NQT	FN					ISM	GVA
Måøydraga	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA

Aminosyresammensetninga i HPR

ILAV HPRO	TDV	KIRVDAI	PPQL	NQT	FNTN	QVEQ	PA	TSVL	SNI	FISM	GVA	
Korsneset (2023)	TDV			QT	FNTN	QVEQ	PA	TSVL	SNI	FISM	GVA	
Langskjæra	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA	
Kattholmen II	TDV	KIRVDAI	PPQL	NQT	F						GVA	
Fjølværet Ø	TDV	KIRVDAI	PPQL	NQT						M	GVA	
Munkskjæra	TDV	KIRVDA				N	QVEQ	PA	TSVL	SNI	FISM	GVA
Olausskjæret	TDV	KIRVDA				N	QVEQ	PA	TSVL	SNI	FISM	GVA
Storskogøya	TDV	KIRVDAI	PPQL	NQT					NI	FISM	GVA	
Tennøya	TDV	KIRVDA				N	QVEQ	PA	TSVL	SNI	FISM	GVA
Espnestaren	TDV	KIRVDAI	PPQL	NQT	FN					ISM	GVA	
Måøydraga	TDV	KIRVDA				N	QVEQ	PA	TSVL	SNI	FISM	GVA

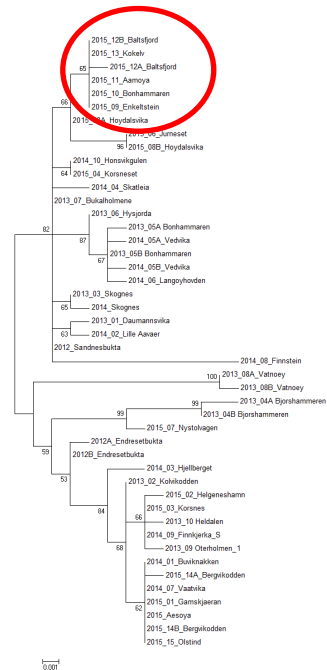
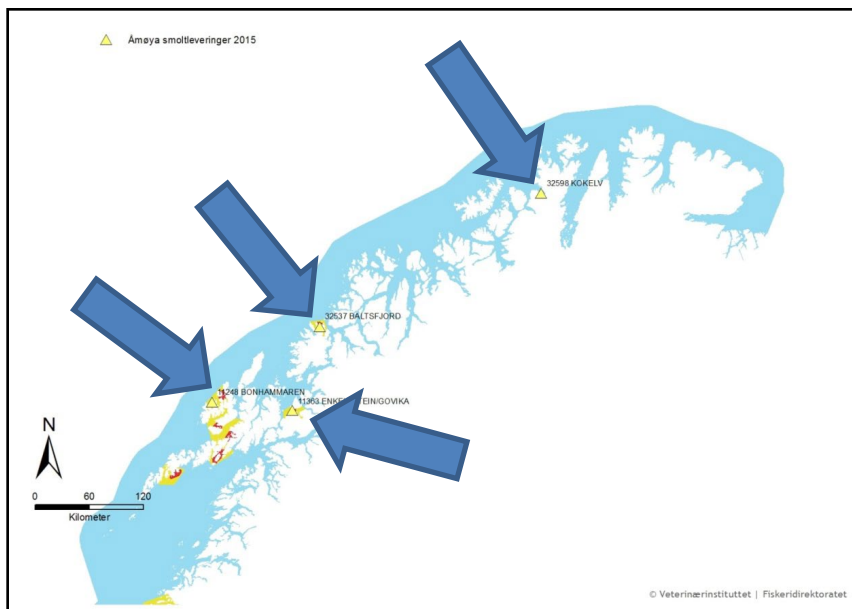
Aminosyresammensetninga i HPR

ILAV HPRO	TDV	KIRVDAI	PPQL	NQT	FNTN	QVEQ	PA	TSVL	SNI	FISM	GVA	
Korsneset (2023)	TDV			QT	FNTN	QVEQ	PA	TSVL	SNI	FISM	GVA	
Langskjæra	TDV	KIRVDA			N	QVEQ	PA	TSVL	SNI	FISM	GVA	
Kattholmen II	TDV	KIRVDAI	PPQL	NQT	F						GVA	
Fjølværet Ø	TDV	KIRVDAI	PPQL	NQT	M						GVA	
Munkskjæra	TDV	KIRVDA				N	QVEQ	PA	TSVL	SNI	FISM	GVA
Olausskjæret	TDV	KIRVDA				N	QVEQ	PA	TSVL	SNI	FISM	GVA
Storskogøya	TDV	KIRVDAI	PPQL	NQT					NI	FISM	GVA	
Tennøya	TDV	KIRVDA				N	QVEQ	PA	TSVL	SNI	FISM	GVA
Espnestaren	TDV	KIRVDAI	PPQL	NQT	FN					ISM	GVA	
Måøydraga	TDV	KIRVDA				N	QVEQ	PA	TSVL	SNI	FISM	GVA

Aminosyresammensetninga i HPR

ILAV HPRO	TDV	KIRVDAI	PPQL	NQT	FNTN	QVEQ	PA	TSVL	SNI	FISM	GVA
Korsneset (2023)	TDV			QT	FNTN	QVEQ	PA	TSVL	SNI	FISM	GVA
Langskjæra	TDV	KIRVDA				N QVEQ	PA	TSVL	SNI	FISM	GVA
Kattholmen II	TDV	KIRVDAI	PPQL	NQT	F						GVA
Fjølværet Ø	TDV	KIRVDAI	PPQL	NQT						M	GVA
Munkskjæra	TDV	KIRVDA				N QVEQ	PA	TSVL	SNI	FISM	GVA
Olausskjæret	TDV	KIRVDA				N QVEQ	PA	TSVL	SNI	FISM	GVA
Storskogøya	TDV	KIRVDAI	PPQL	NQT					NI	FISM	GVA
Tennøya	TDV	KIRVDA				N QVEQ	PA	TSVL	SNI	FISM	GVA
Espnestaren	TDV	KIRVDAI	PPQL	NQT	FN					ISM	GVA
Måøydraga	TDV	KIRVDA				N QVEQ	PA	TSVL	SNI	FISM	GVA

ILA på nylig utsatt smolt i 2015



Påvisning av ILA-virus i settefiskanlegget

DNA Sequences		Translated Protein Sequences	
Species/Abbrv	Group Name	*****	*****
1. P343_HPR_F		AGATGTAAA GATCAGGGTAGCGCAATCCCACTCAGCTGAAACAAA CATTCAA TACAAA CCAAGT TAGAGCAACC TGGC CATCTGGTTTGA GTAAACA	
2. P351_HPR_F		AGATGTAAA GATCAGGGTAGCGCAATCCCACTCAGCTGAAACAAA CATTCAA TACAAA CCAAGT TAGAGCAACC TGGC CATCTGGTTTGA GTAAACA	
3. P352_HPR		AGATGTAAA GATCAGGGTAGCGCAATCCCACTCAGCTGAAACAAA CATTCAA TACAAA CCAAGT TAGAGCAACC TGGC CATCTGGTTTGA GTAAACA	
4. P354_HPR		AGATGTAAA GATCAGGGTAGCGCAATCCCACTCAGCTGAAACAAA CATTCAA TACAAA CCAAGT TAGAGCAACC TGGC CATCTGGTTTGA GTAAACA	
5. P355_HPR		AGATGTAAA GATCAGGGTAGCGCAATCCCACTCAGCTGAAACAAA CATTCAA TACAAA CCAAGT TAGAGCAACC TGGC CATCTGGTTTGA GTAAACA	
6. P357_HPR		AGATGTAAA GATCAGGGTAGCGCAATCCCACTCAGCTGAAACAAA CATTCAA TACAAA CCAAGT TAGAGCAACC TGGC CATCTGGTTTGA GTAAACA	
7. P358_HPR		AGATGTAAA GATCAGGGTAGCGCAATCCCACTCAGCTGAAACAAA CATTCAA TACAAA CCAAGT TAGAGCAACC TGGC CATCTGGTTTGA GTAAACA	
8. P401_HPR		AGATGTAAA GA	----- CATCTGGTTTGA GTAAACA
9. P402_HPR		AGATGTAAA GA	----- CATCTGGTTTGA GTAAACA
10. P403_HPR		AGATGTAAA GA	----- CATCTGGTTTGA GTAAACA

ILAV HPR0 som ble påvist i februar 2015 er nært beslekta med ILAV HPRΔ som ble påvist i juni 2015



Veterinærinstituttet
Norwegian Veterinary Institute



Veterinærinstituttet
Norwegian Veterinary Institute

OK-2019: Kartlegging av ILAV HPR0 i norske settefiskanlegg

Formål

Målet med programmet er å kartlegge forekomst av ILAV HPR0 i norske settefiskanlegg.

Kartlegging av ILAV HPR0 i settefiskanlegg

Gjellevev fra 90 fisk i ti kar

Ett uttak hvert annet år

Forekomst underestimert

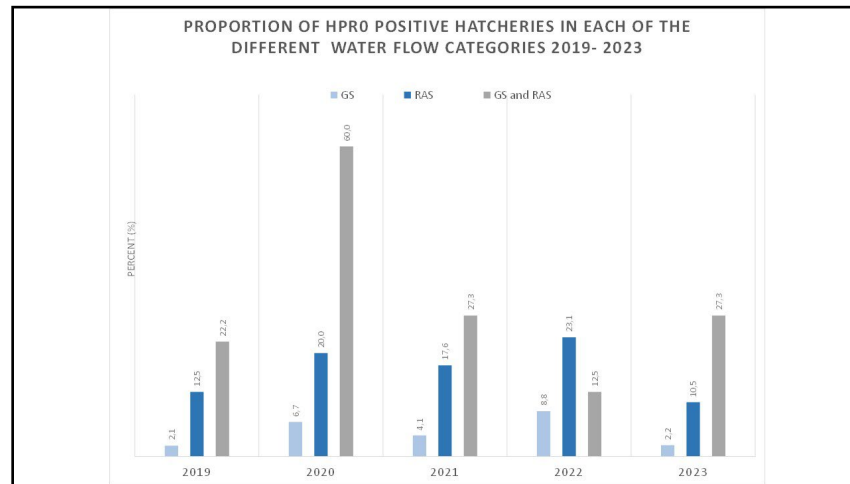
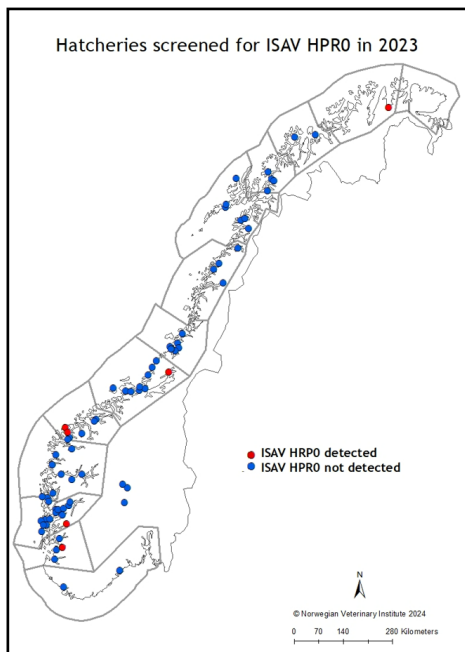
- Forbigående infeksjon
- Kun prøver fra et utvalg kar
- Ett prøvetakingspunkt

Påvist ILAV HPR0 på flere anlegg
over tid>«husstammer»

År	# anlegg	# positive	%
2019	74	5	7
2020	42	6	14
2021	78	8	10
2022	78	9	11,5
2023	75	6	8
2024*	64	7	11

*Per 17. september 2024

Kartlegging av ILAV HPR0 i settefiskanlegg



Figur: Hege Løkseth

Oppsummering

Mange utbrudd og mistanker på Frøya så langt i år

- Flere virusvarianter
- Noen tilfeller av sannsynlig nabosmitte

ILAV HPR0 er påvist på omkring ett av ti settefiskanlegg

- RAS-anlegg dominerer
- «Husstammer» synes å være etablert på flere anlegg

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



Veterinærinstituttet
— *Norwegian Veterinary Institute*

www.vetinst.no