



Veterinærinstituttet  
Norwegian Veterinary Institute

# Overview of the disease situation in Norway

26<sup>th</sup> Annual Workshop of the National Reference Laboratories for  
Fish Diseases, Kgs. Lyngby, 30<sup>th</sup> of May 2022

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Ingunn Sommerset, PhD, Editor of the 'Norwegian Fish Health Report'



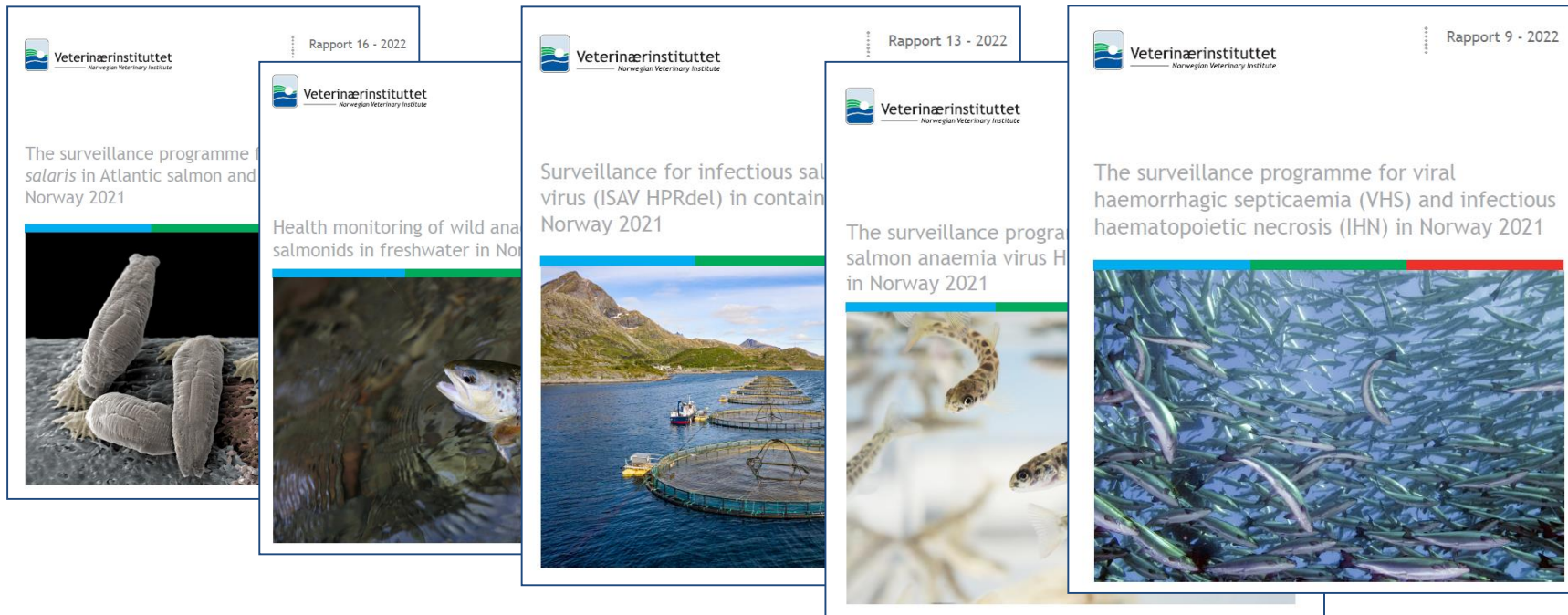
# The Norwegian Fish Health Report



Munnen til en lakselus forstørret 300 ganger. Bildet er tatt med skanning elektronmikroskop og fargelagt.  
Foto: Janrickie Wilk-Nielsen

Published annually since 2003  
Access to data at site level from private laboratories since 2020  
Questback from fish health personell and inspectors in the Food Safety Authority  
Official registers on active sites, biomass, harvest and mortality

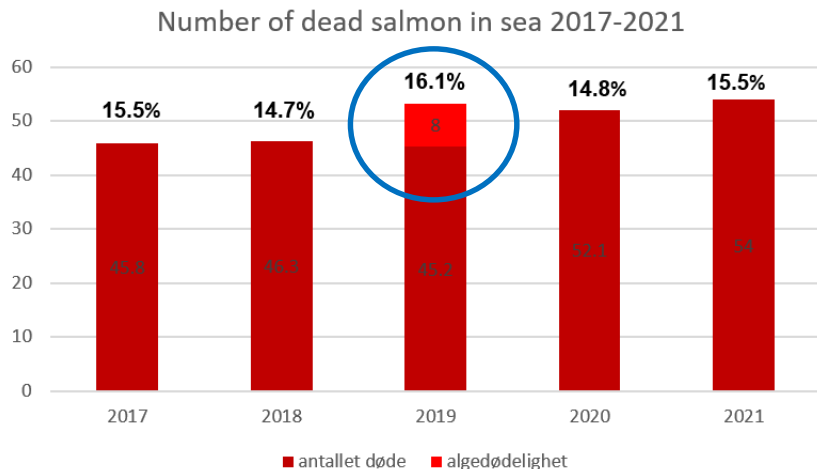
# Separate reports for surveillance programmes



## Some key official production data

	2017	2018	2019	2020	2021
<b>Salmonid juvenile production (concessions)</b>	220	217	221	227	227
<b>Salmonide ongrowing sea sites (active)</b>	986	1015	966	986	990
<b>Marine fish production sites</b>	58	42	64	36	41
<b>BIOMASS at year end (tonns)</b>					
<b>Salmon</b>	797 000	814 000	811 958	896 961	868 693
<b>Rainbow trout</b>	35 700	40 400	47 094	40 625	36 984
<b>HARVESTED (tonns)</b>					
<b>Salmon</b>	1 237 000	1 279 000	1 361 747	1 400 117	1 561 302
<b>Rainbow trout</b>	61 600	66 700	79 600	92 793	84 077

# Mortality in sea farms with salmonids



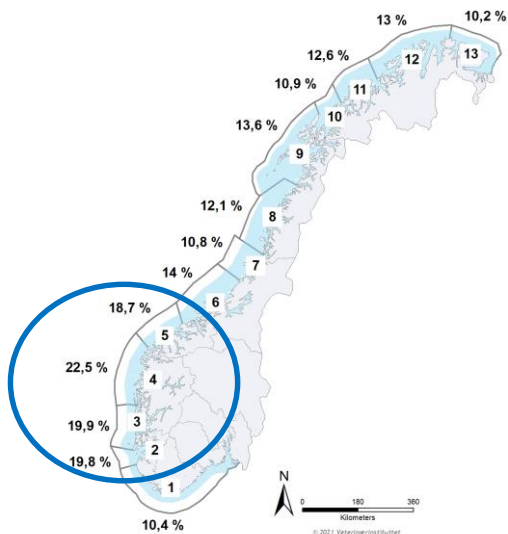
Last year:

- 54 millions salmon (15.5%)
- 3 millions rainbow trout (14.8%)

Median percent mortality of production cycles of commercial farmed salmon ended 2021:

- 17.4% (10.3 - 26.7%)

# Mortality in sea farms with Atlantic salmon



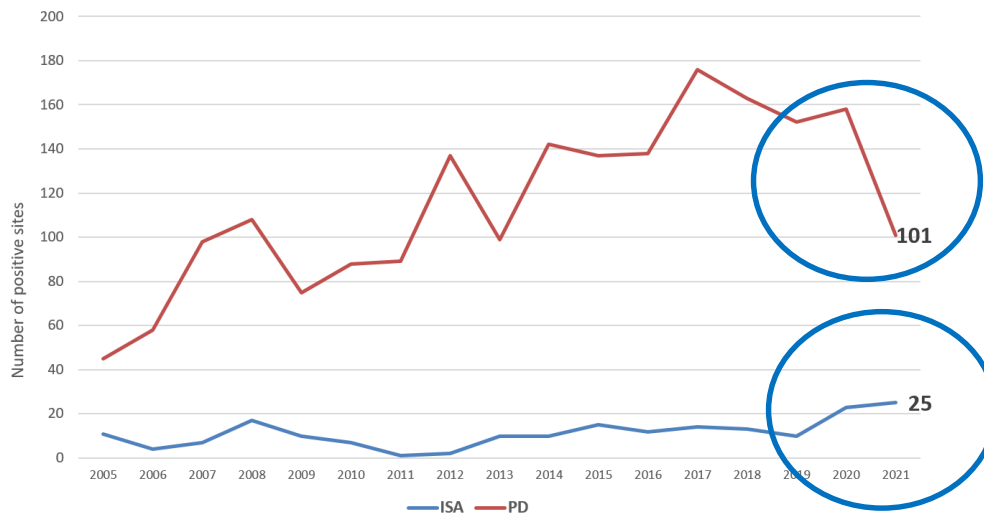
Geographical differences ranging from 10.2% to 22.5%

The reasons are complex - no particular incident last year

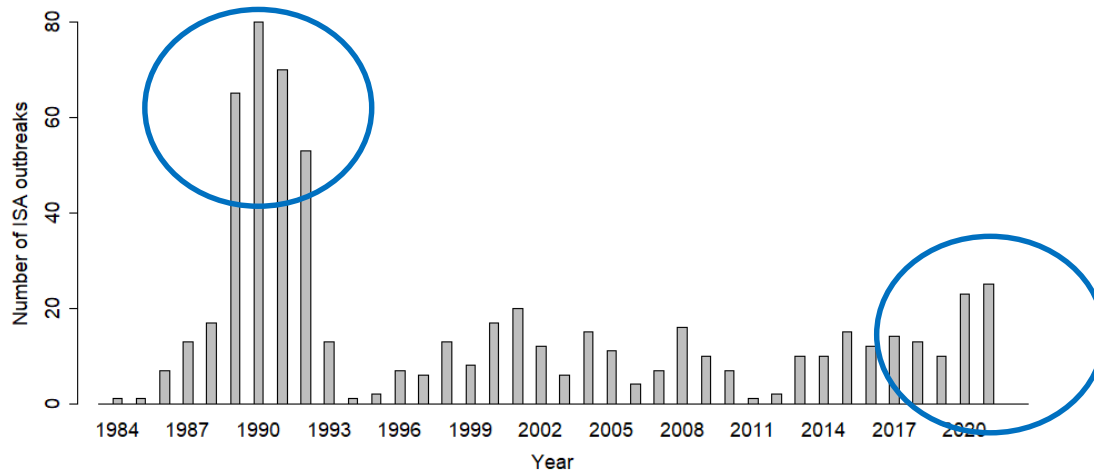
The differences may in part be attributed to diseases and delousing

On-going work for standardisation of categorisation

# Yearly detections of ISA and PD

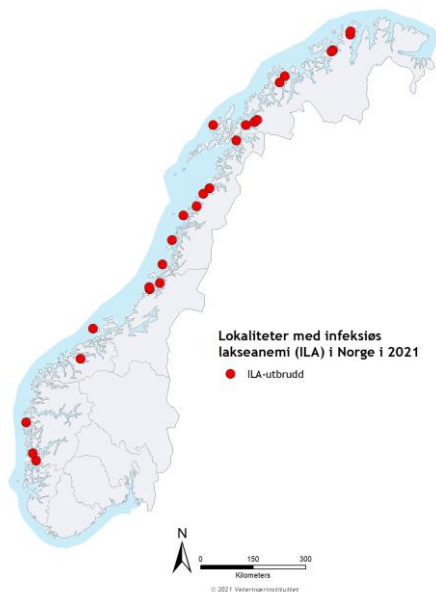


# Infectious salmon anemia (ISA)





# Geographical distribution of ISA outbreaks



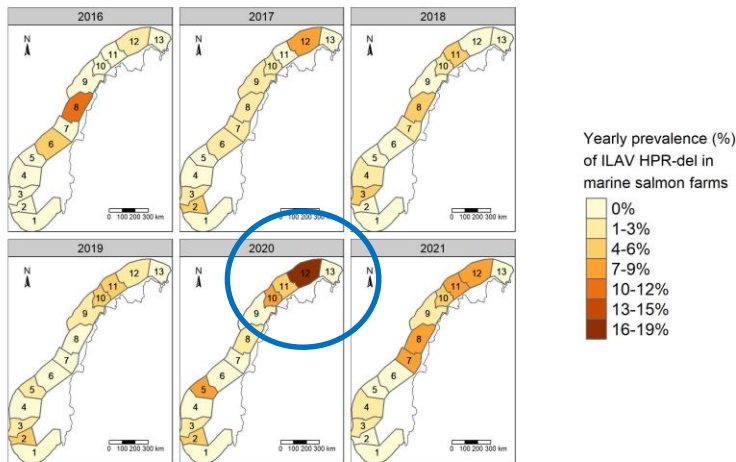
One outbreak in a hatchery and  
one outbreak in broodfish

Also vaccinated fish

Several outbreaks in sea may be  
traced back to hatcheries

Ranked high as an increasing  
problem in all parts of the  
production

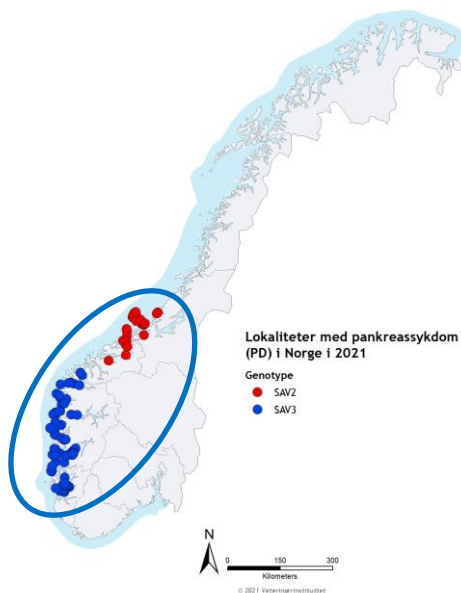
# Prevalence of ISA by production area



Lyngstad *et al.* (2018) identified the following risk factors:

- Occurrence of IPN
- Stocking period longer than 2 months
- High latitude
- High fish density in the first six months after sea transfer

# Pancreas disease (PD)



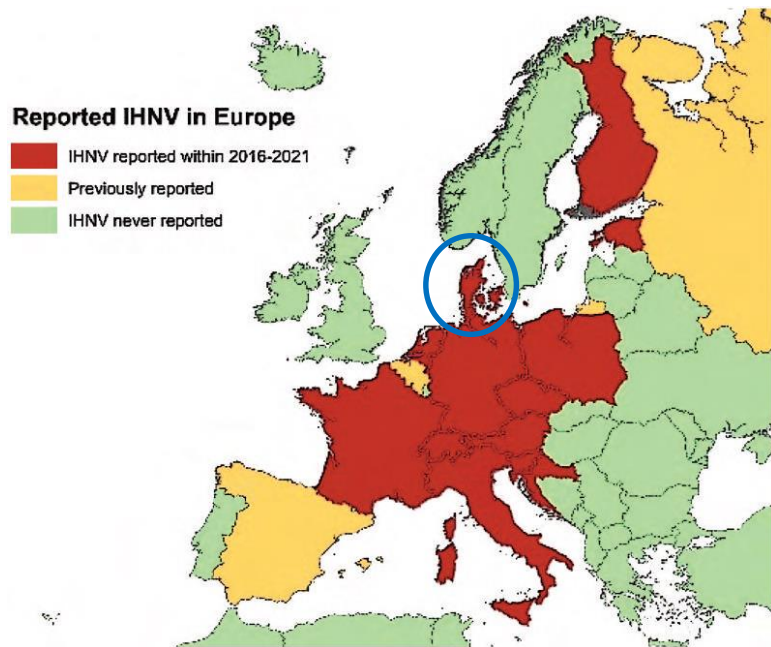
Two epidemics (SAV2 and SAV3)  
Fewer SAV3 cases in production area 5 and fewer SAV2 cases in production area 6

Early detection by monthly sampling since 2017

Vaccination is common in western Norway

No detections in northern Norway

# Surveillance of IHNV and VHSV



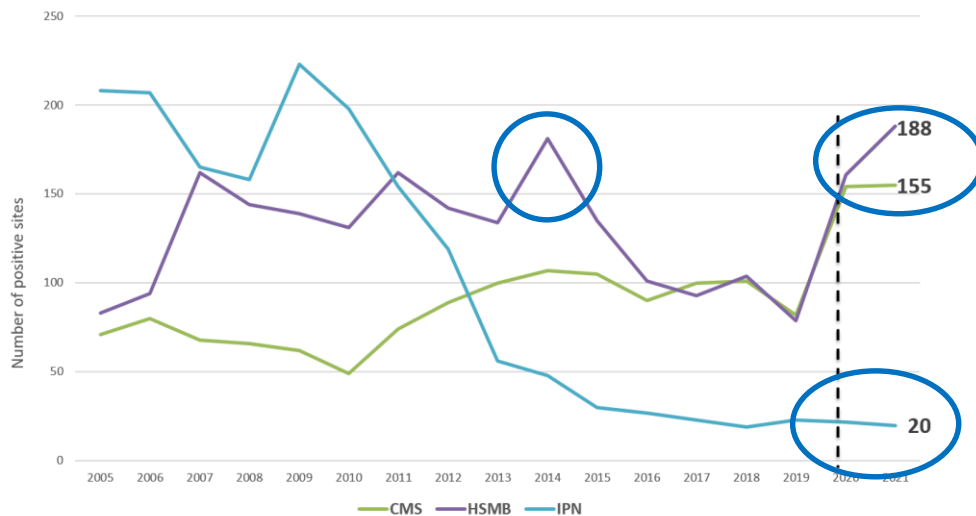
Source: OIE-WAHIS, august 2021

Risk-based surveillance of farmed Atlantic salmon and rainbow trout in sea for many years

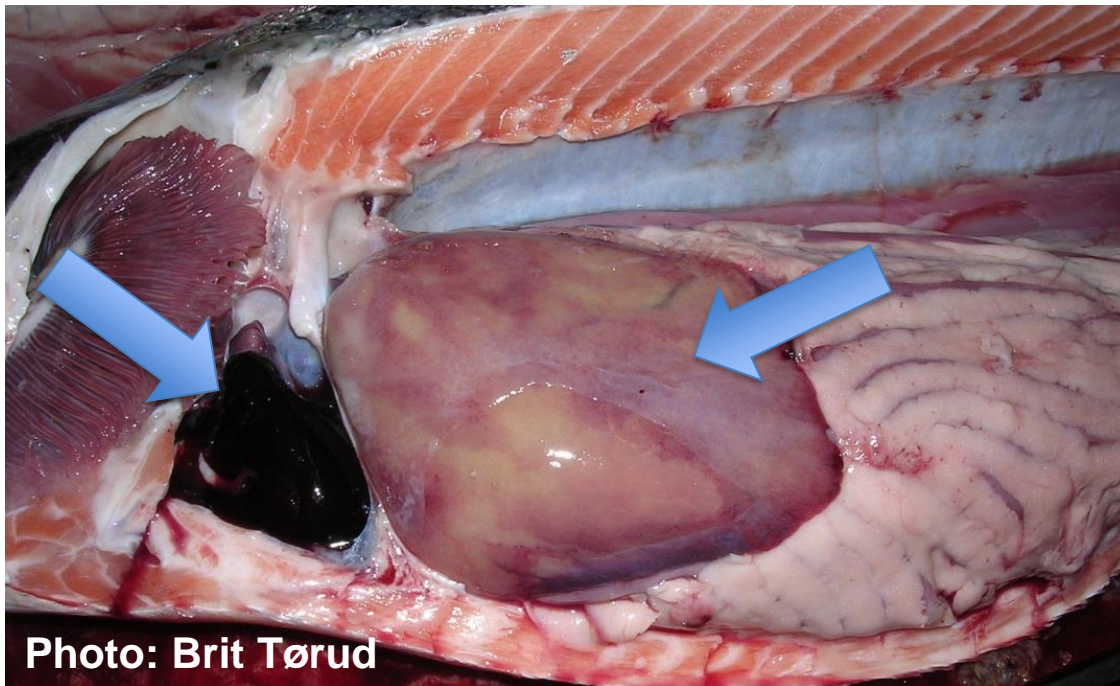
Samples from wild pink salmon, brown trout in cultivation and grow-out sites as well as rainbow trout in inland sites were included in 2021

No detections of IHNV or VHSV

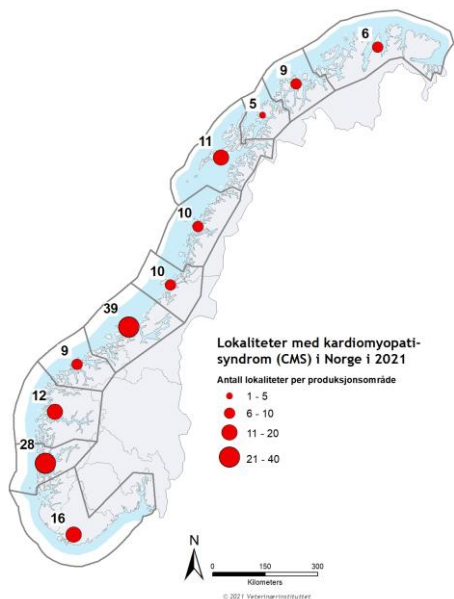
# The prevalence of CMS, HSMB and IPN



# CMS - rupture of the atrium



# Cardiomyopathy syndrome (CMS)

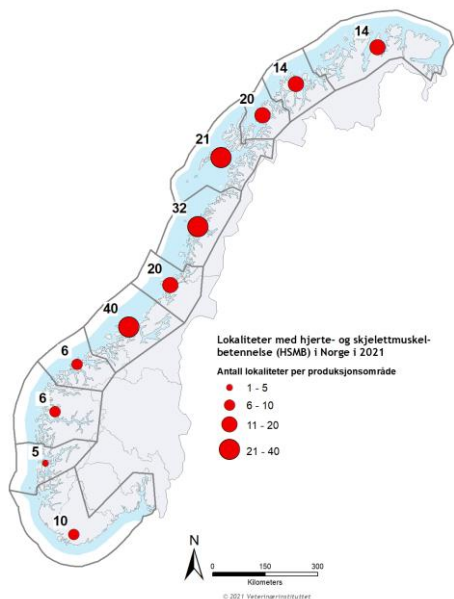


155 positive salmon farms  
(154 in 2020)

Ranged as the most  
important cause of mortality  
in 2021 (as in 2020 and  
2019)

No vaccine available

# Heart and skeletal muscle inflammation (HSMI)



188 positive salmon farms  
2021 (161 in 2020)

Common in Mid- and North-Norway

No vaccine available



# Winter ulcers

Ranked higher than previous years as cause of mortality and reduced welfare

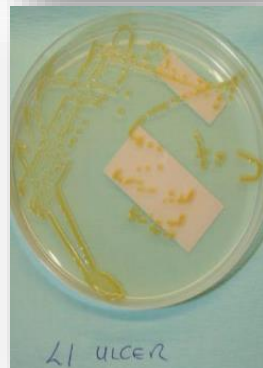
*Moritella viscosa* (classical)

diagnosed at 204 sites

*Tenacibaculum* spp. (atypical)

diagnosed at 159 sites

Easy to diagnose and likely under reported (non-listed diseases)



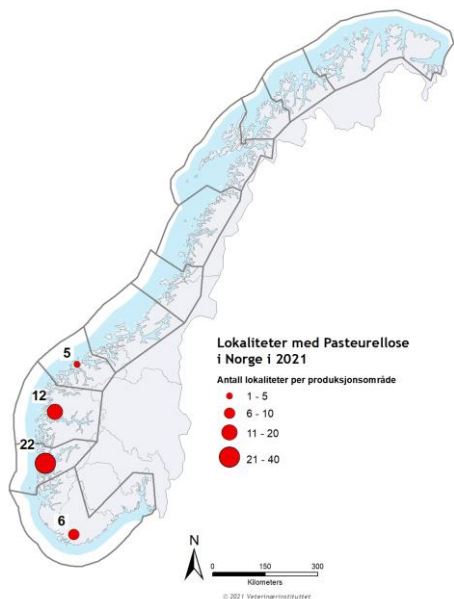
# Pasteurellosis in Atlantic salmon



Photos: Hanne Nilsen



# Pasteurellosis in Atlantic salmon



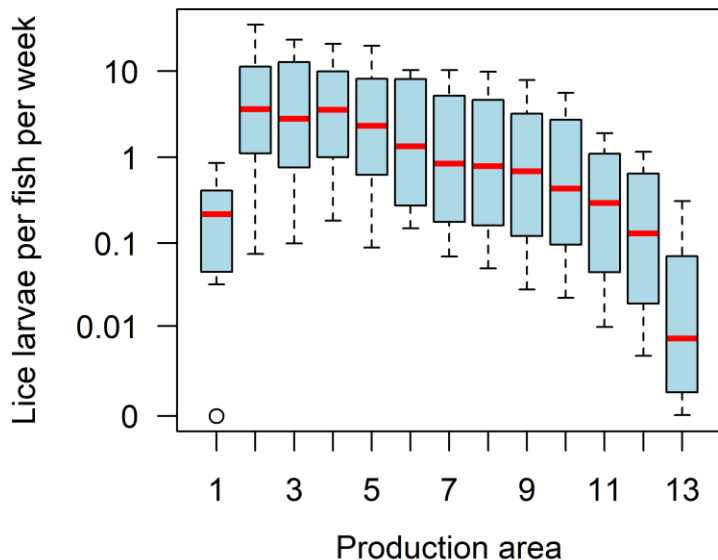
Emerging disease in Norwegian salmon farming since 2018

Severe welfare problem for affected fish (often large salmon)

45 positive salmon farms (57 in 2020)

All outbreaks in western Norway

# Salmon louse



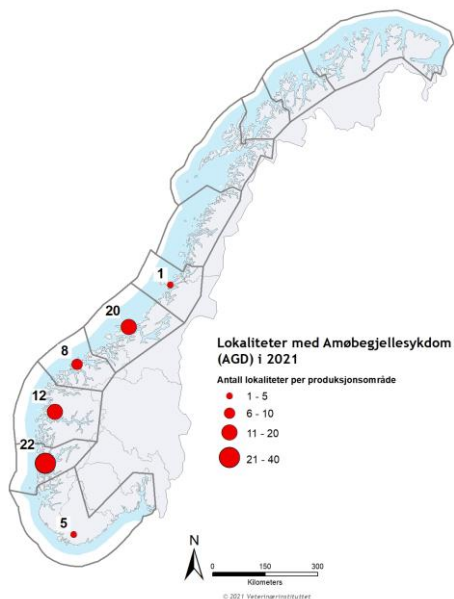
Same (average) lice level as in 2020, but higher production in spring and early summer

Highest production of lice larvae in western Norway

Anti-lice treatments 2021 vs 2020:

- Non-medicinal treatments reduced by 5%
- Thermal treatments reduced by 14%

# Amoebic gill disease (AGD)



*Paramoeba perurans*

Non-listed

Severe losses in Norway  
since 2012

Risk factors:

- High salinity
- High water temperature

# Surveillance of wild pink salmon



Photo: Sander Engeland

More than 100 000 fish (nearly 200 tons) were caught in 2021  
Samples from 181 fish - mostly from the north - were examined by PCR for the presence of IHNV, VHSV, ISAV, PRV-1 and *Renibacterium salmoninarum*  
Detection of PRV-1 in eight fish  
Furunculosis in one fish

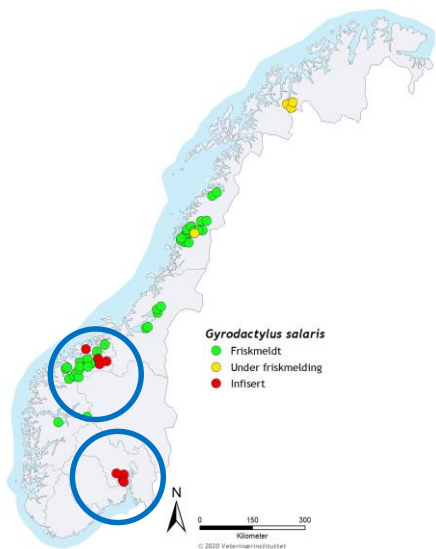
# PRV-3 in brown trout from inland sites



Photo: COLOURBOX

PRV-3 is present in farmed rainbow trout and wild sea trout  
In 2021, PRV-3 was detected in brown trout in a stock enhancement hatchery and in wild brown trout from four lakes  
Virus can be spread by stocking

# Status for *Gyrodactylus salaris*



Introduced to Norway in the 70ies

Detected in 51 rivers

Surveillance and eradication

Only eight rivers left with the parasite in 2021



## Diseases in cleaner fish



Photo: Rudolf Svendsen

40 millions cleaner fish whereof  
22 millions lumpfish were added  
to salmon cages

Atypical furunculosis is the most  
important infectious disease in  
lumpfish and wrasse

Welfare issues during delousing  
procedures and at slaughter  
plants - high mortality

# Diseases in marine species



Photo: COLOURBOX

First detection of nodavirus in Atlantic halibut since 2012

Increased interest for farming of cod

Some cases of bacterial diseases in both halibut and cod

# Summary

Still high mortality, but significant geographical differences

Combination of infectious diseases and stressful delousing procedures

Winter ulcers are ranked higher as health and welfare problem in 2021 than in previous years

Listed viral diseases:

- ISA up/stable (25 confirmed outbreaks and ISAV HPRΔ in four sites)
- PD down (100 farms)

*Thanks for your attention!*



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