

The Connection Between Mechanical Delousing and ISAV Outbreaks in Salmon Aquaculture Farming

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Introduksjon

Infectious salmon anemia virus (ISAV) – causes Infectious salmon anemia (ISA)

- ▶ Non-virulent ISAV present at all time
- ▶ Since 2015 -> Mechanical delousing has been utilized as an alternative
- ▶ Mechanical delousing
 - ▶ Requires cramming and pumping of the fish
 - ▶ Physical stress and rubbing
 - ▶ A situation like this will stimulate an increase in slime production.
- ▶ ISAV HPR0 is replicating in skin epithelial cells and shedded in the mucus
- ▶ Higher rate of mutation ?
- ▶ Could an increase in mechanical delousing positively corelated with an increase in ISA outbreaks.

Methods

- ▶ Collected all data from Barentswatch
 - ▶ The number of salmon aquaculture farm-locations in Norway with virulent ISAV outbreaks and frequency of mechanical delousing of the farms (year 2012 - 2021)
 - ▶ The frequency of outbreaks and mechanical delousing were plotted, using R-studios, and compared to see if any correlation could be found between the two.
- ▶ Randomly chose 18 aquaculture farms with confirmed ISAV-outbreaks and 18 farms without ISAV outbreaks (control)
 - ▶ Collected data of frequency of mechanical delousing over the period of one year prior to the date of reporting the ISAV outbreak
 - ▶ Compared the data of delousing with the Norwegian national average of mechanical delousing frequency for the same period

Results

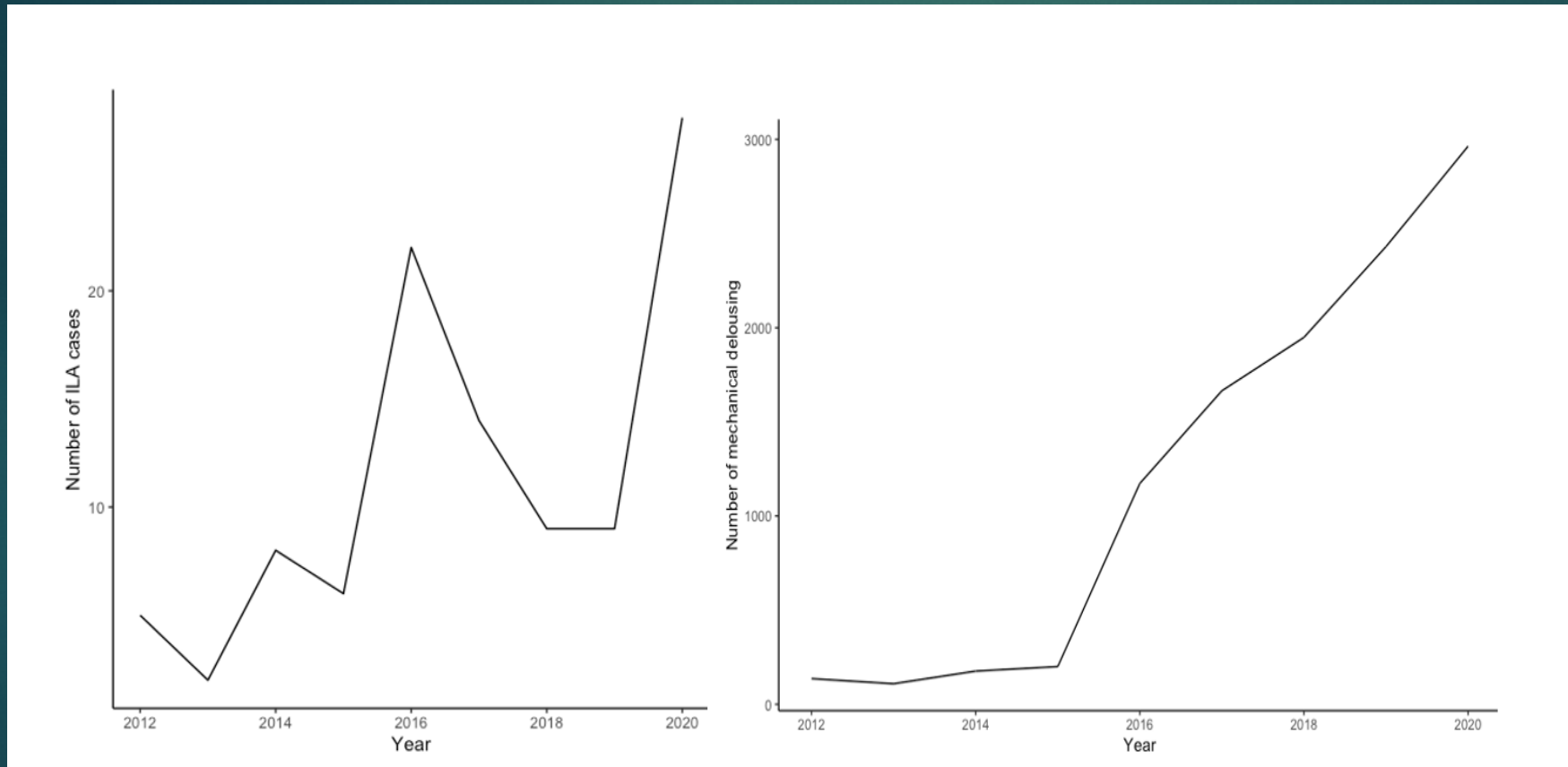


Figure 1

A: The number of reported ISAV cases in Norwegian aquaculture farms from 2012-2021

B: The number of reported mechanical delousing procedures from 2012 to 2021.

Results

Table 1:

A: Shows the reported mechanical delousing strategies for randomly selected farms reporting ISAV outbreaks, one year prior to the confirmed outbreak. This is compared with reported national Norwegian mechanical delousing average

B: Shows the reported mechanical delousing strategies for randomly selected farms not reporting ISAV outbreaks, one year prior to the confirmed outbreak. This is also compared with reported national Norwegian mechanical delousing average

A

Locations with confirmed ISA

Location	Location nr.	Date, proven ILA	Date, mechanical delousing	Mechanical delousing frequency, one year back	National delousing frequency
Skognes	30117	28.05.2013	28.05.2013 - 28.05.2012	0	0,07
Bonhammaren	11248	26.06.2013	26.06.2013 - 26.06.2012	0	0,06
Skatleia	19635	07.05.2014	07.05.2014 - 07.05.2013	0	0,07
Våtvika	13047	03.10.2014	03.10.2014 - 03.10.2013	0	0,12
Åmøya	26375	19.01.2015	19.01.2015 - 19.01.2014	0	0,1
Juranaset	13783	05.05.2015	05.05.2015 - 05.05.2014	0	0,11
Stangholmen	28896	16.02.2016	16.02.2016 - 16.02.2015	0	0,14
Digermulen	11076	11.04.2016	11.04.2016 - 11.04.2015	0	0,16
Nebbo	24937	18.05.2017	18.05.2017 - 18.05.2016	0	0,87
Tinnlandet	15517	16.06.2017	16.06.2017 - 16.06.2016	1	0,9
Bakjestranda	13341	09.05.2018	09.05.2018 - 09.05.2017	0	0,92
Altanaset	13227	11.06.2018	11.06.2018 - 11.06.2017	3	0,62
Aukrasanden	12988	16.04.2019	16.04.2019 - 16.04.2018	0	1,22
Fjellbukt	10803	18.06.2019	18.06.2019 - 18.06.2018	3	1,23
Voldnes	13246	17.01.2020	17.01.2020 - 17.01.2019	8	1,44
Björga	31738	19.05.2020	19.05.2020 - 19.05.2019	0	1,56
Øksneset	30559	16.06.2021	16.06.2021 - 16.06.2020	2	1,72
Stabben	34297	29.07.2021	29.07.2021 - 29.07.2020	0	1,75

B

Locations without confirmed ISA

Location	Location nr.		Date, mechanical delousing	Mechanical delousing frequency, one year back	National delousing frequency
Åkre	10331	--	28.05.2013 - 28.05.2012	0	0,07
Øksneset	30559	--	26.06.2013 - 26.06.2012	0	0,06
Vassvika	17595	--	07.05.2014 - 07.05.2013	0	0,07
Brattavika	11488	--	03.10.2014 - 03.10.2013	1	0,12
Krossholmen	11633	--	19.01.2015 - 19.01.2014	2	0,1
Ringja	11964	--	05.05.2015 - 05.05.2014	0	0,11
Austneståa	11800	--	16.02.2016 - 16.02.2015	1	0,14
Ørnes	17235	--	11.04.2016 - 11.04.2015	0	0,16
Fuglåsen	31437	--	18.05.2017 - 18.05.2016	2	0,87
Indre Skjervøy	12599	--	16.06.2017 - 16.06.2016	6	0,9
Ådnekvammen	30196	--	09.05.2018 - 09.05.2017	0	0,92
Hosenøyen	33218	--	11.06.2018 - 11.06.2017	0	0,62
Andalsvågen I	38037	--	16.04.2019 - 16.04.2018	2	1,22
Josommarset	25736	--	18.06.2019 - 18.06.2018	1	1,23
Kvamme	13831	--	17.01.2020 - 17.01.2019	4	1,44
Bogelva	11399	--	19.05.2020 - 19.05.2019	0	1,56
Lamøya	12993	--	16.06.2021 - 16.06.2020	28	1,72
Hallsteinhamn	38037	--	29.07.2021 - 29.07.2020	0	1,75

Conclusion

- ▶ Although we thought mechanical delousing a promising factor in ISA disease outbreaks, however we did not find statistically significant results.
- ▶ Other connections:
 - ▶ Poor biosecurity
 - ▶ High prevalence of avirulent mutate into virulent strains
 - ▶ Salmon lice as vector
 - ▶ Vertical transmission – brood fish