PREVALENCE OF INFECTIOUS HEMATOPOIETIC NECROSIS VIRUS (IHNV) IN SEAWATER-CULTURED RAINBOW TROUT *ONCORHYNCHUS MYKISS* AND AMAGO TROUT *O. MASOU* ISHIKAWAI IN JAPAN

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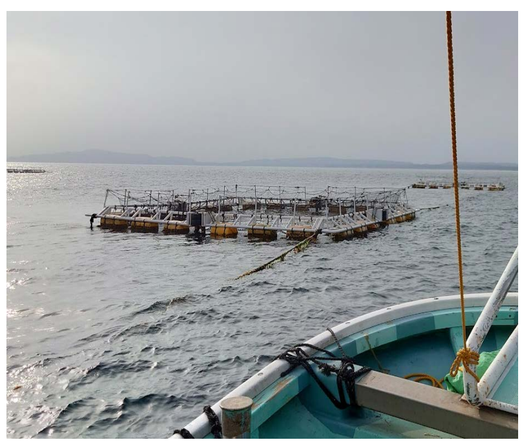
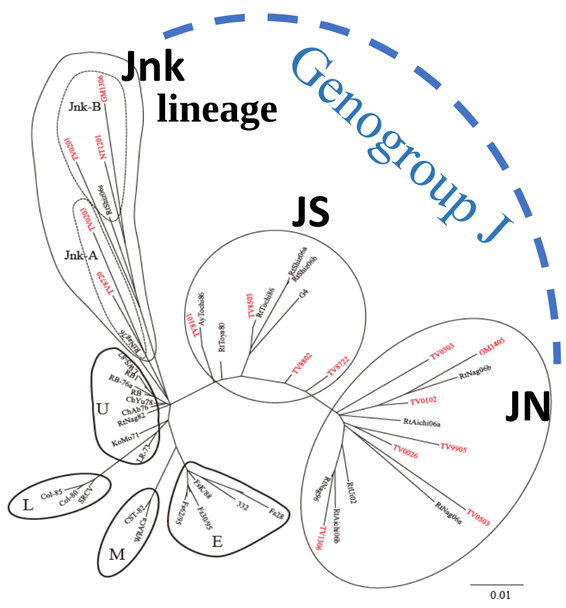
Worldwide, the market for farmed salmon and trout has experienced growth. The popularity of marine-cultured rainbow trout in Japan is as high as in other countries. In general, approximately 300 to 500 g rainbow trout are acclimated to the sea before winter and then reared until the spring of the following year.

Infectious hematopoietic necrosis virus (IHNV) is known as causative agent of heavy mortality in farmed rainbow trout in Japan. According to phylogenetic analyses of IHNV isolates based on the complete G gene sequence, 3 genetical lineages in the genogroup J was defined: Nagano (JN), Shizuoka (JS) and North Kanto (Jnk) lineages (Namba *et al*., 2021). However, there is limited information on its virulence for marine salmon and trout. In the present study, therefore, we conducted an epidemiological survey of IHNV in rainbow trout *Oncorhynchus mykiss* and amago *O. masou* at marine aquaculture farm. The tolerance and pathogenicity of IHN viruses in seawater were also investigated.





Rainbow trout marine farm (A) and molecular phylogenetic tree of IHNV isolates (B) in Japan (Namba *et al*., 2021) .

Namba *et al*. (2021): Fish Pathology. 56(2), 35-42.

1. Epidemiological survey

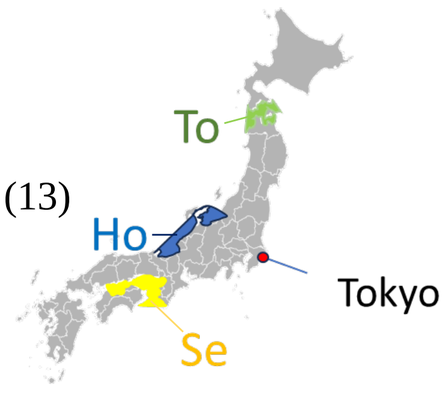
✓ Year: 2019-2023

✓ Investigated sea area (number of fish farms): 3 areas (13)

✓ Detection method of IHNV (target organs):

Tissue culture and RT-PCR, Direct RT-PCR

(kidney, spleen, liver and intestine)



Epidemiological survey for IHNV in marine salmon and trout farms of Japan

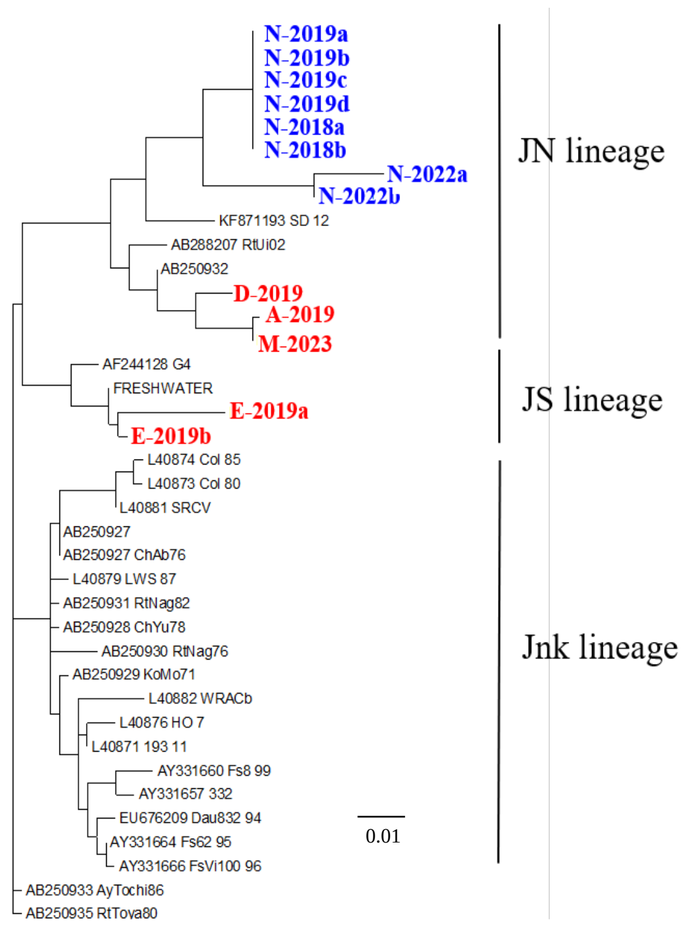
Year	Sea area	Farm	Month	Fish species	Average BW(g)	Condition of examined fish*	Number of positive fish for IHNV /number of examind fish (Unique sequenece No.)	Lot of seed
2019	HO	A	Jan	*O. mykiss*	498	DF	1/6 (A-2019)	M-18
		B	Apr		388	NF	0/5	O-18
		C	May		364	NF	0/9	N-18
	SE	D	Jan		442	DF	4/4 (D-2019)	N-18
		E	May		560	NF	0/5	P-18, Q-18
		F			520	NF	1/5 (ND)	N-18
		G			360	NF	0/5	N-18
2020	HO	C	May	*O. mykiss*	417	NF	0/7	N-19
		B			873	NF	0/4	O-19
2021	HO	C	May	*O. mykiss*	770	NF	0/7	N-20
		B			1,355	NF	0/4	O-20
	SE	E			683	NF	2/5 (E-2021)	S-20
		F			603	NF	0/5	S-20
		H			1,043	NF	0/5	O-20
2022	SE	F	May	O. mykiss	798	NF	0/5	N-21, O-21
	HO	B			848	NF	0/5	O-21
	KI	I			690	NF	0/5	N-21
	TO	J			1,458	NF	0/9	O-21
2023	HO	B	May	*O. mykiss*	1,151	NF	0/5	O-22
	HG	I			286	NF	0/5	N-22
	TO	J			441	NF	0/6	O-22
		L	Jun		859	NF	0/8	U-22
	SE	K	May		753	NF	0/5	T-22
		K			778	NF	0/5	T-22
		M		*O. masou*	219	NF	1/5 (M-2023)	V-22
		K	Jun	*O. mykiss*	671	NF	0/5	N-22

DF: fish showing clinical sign. ND: not down.

Detection of IHNV from seed in freshwater farm and during sea acclimation

Seed lot	Year	Month	Rearing environment*	Average BW(g)	Number of positive fish for IHNV /number of examind fish (Unique sequenece No.)
N-18	2018	May	F	6	6/6
N-19	2019	May	F	5	4/5 (N-2019a-d)
	2019	Dec	AC	541	3/5 (ND)
O-19	2019	Nov	F	610	0/5
	2019	Dec	AC	384	0/5
N-21	2021	Sep	F	541	0/7
	2021	Dec	AC	462	2/7 (ND)
N-22	2022	May	F	10	3/15 (N-2022a, b)

*F: fresh water. AC: acclimation to sea water. ND: not down.



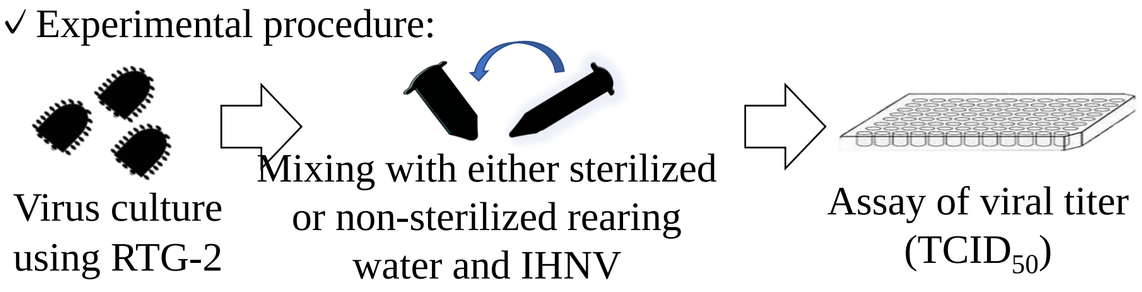
Phylogenetic analysis of unique sequences among IHNV G-gene detected in this study.

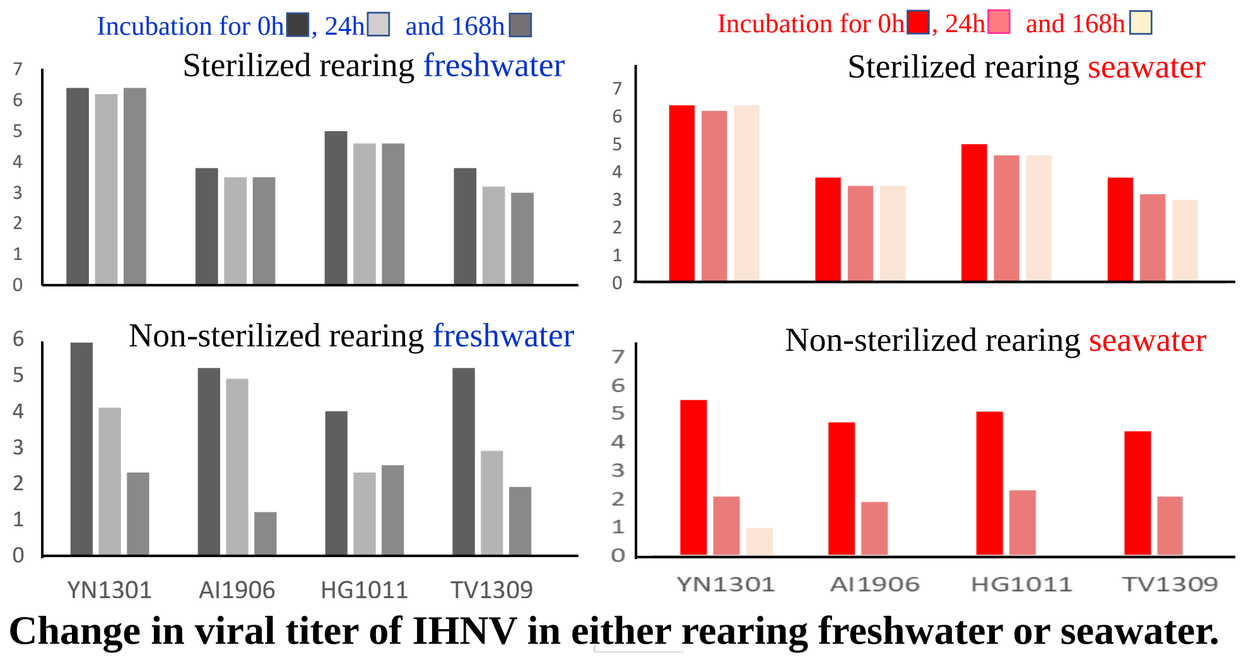
2. Salinity tolerance of IHNV

✓ Virus strain: YN1301, AI1906, HG1011, TV1309

✓ Rearing water: rearing fresh- or seawater in rainbow trout

✓ Experimental procedure:

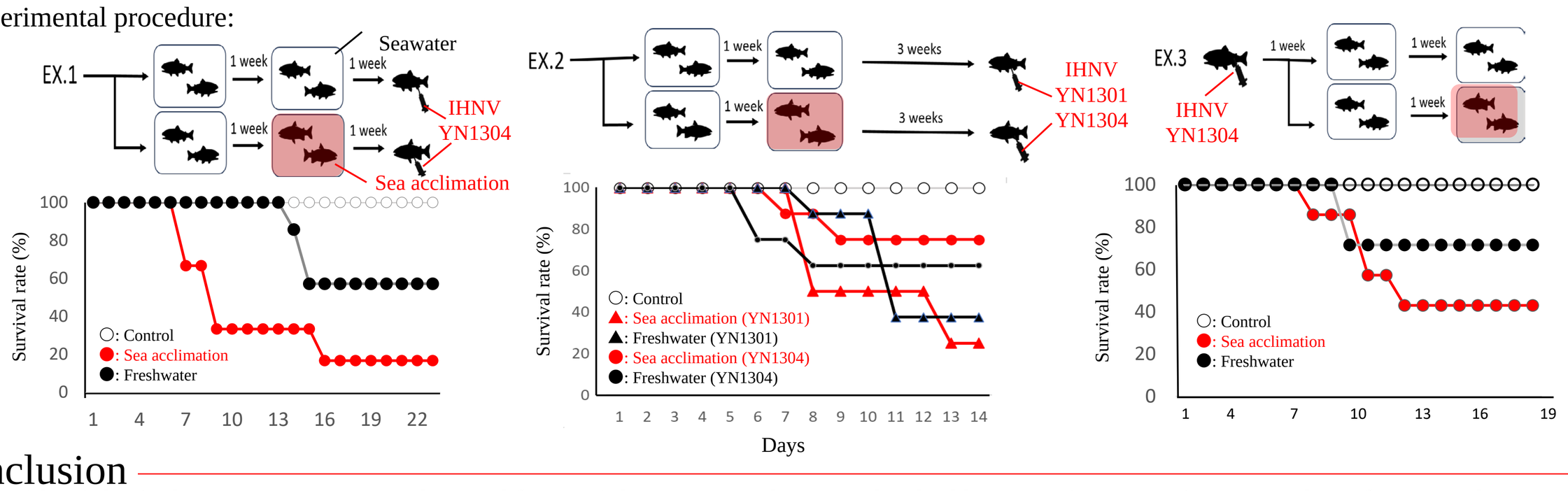




Change in viral titer of IHNV in either rearing freshwater or seawater.

3. Experimental infection of rainbow trout

✓ Experimental procedure:



Conclusion

In the epidemiological survey, IHNV were detected from rainbow trout and amago that had been rearing at marine aquaculture farm. Furthermore, IHNV isolates were able to survive in seawater environment for at least 24 hours and had pathogenic capability to rainbow trout acclimated in seawater. These results indicate that there is a risk of IHNV infection in trout/salmon marine aquaculture.

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