

Case No: 2024-0177 Date of visit: 20/06/2024

Time spent on site: 4.5hrs Main Inspector: [REDACTED]

Site No: FS0500 Site Name: Applecross Smolt Unit
Business No: FB0169 Business Name: Bakka frost Scotland

Case Types: 1 REP 2 DIA 3 4 5 6

Water Temp (°C): 12 Thermometer No: Site FHI 045 completed N/A

Observations: Region: HI Water type: F CoGP MA:

Dead/weak/abnormally behaving fish present? Y If yes, see additional information/clinical score sheet.
Clinical signs of disease observed? Y If yes, see additional information/clinical score sheet.
Gross pathology observed? Y If yes, see additional information/clinical score sheet.
Diagnostic samples taken? Y

UNI/REG only - if unable to carry out intended visit detail reason below:
[REDACTED]

Additional Case Information:

Timeline of mortality events:

A review of the biosecurity on site was undertaken prior to the transfer of fish into the smolt unit, where the farm was zoned off and additional biosluices were put in place to minimize horizontal contamination.

Fish were vaccinated into the smolt unit which ended on 11/05/2024. Pre-transfers tests showed that positive results for furunculosis were reported on 14/05/2024 in S04 (VHWP inspected on 20/06/2024 which showed timeline of testing and mitigation measures noted). Feeding rates had reduced following vaccination (15/05/2024) and it was suspected that treatment may be required. Mortality began to significantly increase on 16/05/2024. Aquatet (oxytetracycline) was administered on 15/05/2024 to 24/05/2024. As a result, mortality and moribund removal was increased to 24hr shift. Extra staff has also been brought in to support the mortality and moribund removal. A second rise in mortalities was noted on 01/06/2024, with a second round of Aquatet administered on 04/06/2024. Due to stock shortages Florocol was only administered on 12/06/2024 (10 day treatment; end on 21/06/2024).

Health team inspected the fish on 04/06/2024 and subsequently on 10/06/2024, where latterly many moribunds were observed, with a significant majority population seen to be healthy and feeding well. Third party health report from the 11/06/2024 (bacteriology) confirmed sensitivity results, which highlighted that aquatet was partially effective but fully sensitive to Florocol.

Currently, there is an 8 week window between next crop in the smolt unit; plans are to clean and disinfect for two weeks and the reboot the biofilter for 6 weeks.

Business is currently reviewing procedures and planning future mitigation. Additional immunity is being considered for future populations but require further research and work with additional vaccines. There is also a focus on biosecurity, where procedures involve a cleaning protocol between populations, swab for pathogens and if there is evidence of specific pathogen, killing of the biofilter will occur. The biofilter will be cleaned with caustic soda, which will be added in circulation, followed by AquaDes (periacetic acid). To ensure removal of gross biofilms, pressure washing will be conducted. Also, business used an ATP swabs, which will confirm if any living material still present in the biofilter.

Peak mortality noted for the 1st cluster of experience mortality on 19/05/2024 with ~4.50%, specifically in tank 1 and 5. The second cluster of mortality had a peak rate of ~3.50%, where tank 2 and 6 saw the majority of the mortality.

Treatment Withdrawal: Aquatet (remaining 774 degree days as of 20/07/2024); Florocol (150degree days; prescription seen); SLICE (treatment began 17/06/2024; withdrawal period 200 degree days)

Site thermometer used due to biosecurity, thermometers are regularly checked against a mercury thermometer.

Site and paperwork inspection conducted 20/06/2024. During site inspection, fish in smolt unit observed to be swimming well and actively feeding. Very few moribund or lethargic fish observed in the tanks. Mortalities that were observed were found to have haemorrhaging on bellies and some exophthalmia. Some fish were observed to be swimming well but had evidence of large healed lesions. 5 fish lethargic and moribund fish were removed for diagnostic sampling.

Case No: 2024-0177

Site No: FS0500

Date of Visit: 20/06/2024

Inspector(s): [Redacted]

Registration/Authorisation Details

- 1. Business/site details summary checked by site representative?
- 2. Changes made to details?

Site Details (include cleaner fish for all sections)

Total No facilities	7	Facilities stocked	7	No facilities inspected	7
Species	SAL				
Age group	SF July				
No Fish	607,190				
Mean Fish Wt	81g				
Next Fallow Date (Site)	Wk27 2024		Next Input Date (Site)	Potentially Wk35 2024	
Recent (last 4 wks) disease problems?		Y	Any escapes (since last visit)?		N
If yes, detail:	Furunculosis; Positives for Flavobacter and Salmon gill pox;				

Movement Records

- 1. Movement records available for inspection?
- 2. Date of last inspection: 04/03/2024
- 3. Are records complete and correctly entered?
- 4. Are movement records available for dead fish and waste?
- 5. Are records complete and correctly entered?
- 6. Are health certificates for introductions (outwith GB) available?

Transport Records

- 1. Are any movements carried out by (or on behalf) of the business (not using a STB)?
- If yes, is there a system in place for maintenance of transportation records?

Mortality Records

- 1. Mortality records available for inspection?
- 2. How are mortalities disposed of? Biogas - Barkip
- If other detail: Mortalities are also disposed off via Billy Bowie at Dundas Chemicals. Down to the capacity of facility at time of uplift.
- 3. Mortality records complete and correctly entered?
- 4. Recent mortality (last 4 wks): 2024: WK24; 157565, 20.11%; Wk23, 258701, 24.82%; Wk22, 38295, 3.54%; Wk21, 136380, 11.21%
- 5. Evidence of recent increased/atypical mortalities?
- If yes, facility nos/no mortality per facility/no stock per facility/reason: wk19, 17149, 1.20% (Furunculosis); Wk20, 192609, 13.67% (Furunculosis) (Tank S01, 65420, 29.80%, smallest grade on site at the time; tank S05, 42958); Wk23, tank S06, 68280, 35.22%
- 6. Any other peaks in mortality during period checked?
- If yes, detail: [Redacted]
- 7. Have increased (unexplained) mortalities been reported to vet or FHI?
- If yes, detail action: [Redacted]
- 8. Have 'mortality events' been reported to FHI? If no, enter details on mortality events sheet.

Treatments and Medicines Records

1. Recent treatments (see comment)?	<input type="checkbox"/>	Y
If yes, detail: <input type="text" value="Aquatet, Florocol, SLICE"/>		
If other, detail: <input type="text"/>		
2. Medicines records available for inspection?	<input type="checkbox"/>	Y
3. Are records complete and correctly entered?	<input type="checkbox"/>	Y
4. Are fish in a withdrawal period?	<input type="checkbox"/>	Y
5. If yes, what treatment(s)?	<input type="text" value="Aquatet, Florocol, SLICE"/>	
If other, detail: <input type="text"/>		
6. Are medicines stored appropriately?	<input type="checkbox"/>	Y

Biosecurity Records

1. Biosecurity records available for inspection?	<input type="checkbox"/>
2. Has the manner and frequency of mortality removal, recording and safe disposal been considered?	<input type="checkbox"/>
3. Has the manner and period in which the APB will notify Scottish Ministers or veterinary professional of any <i>increased (unexplained)</i> mortality at the site been included?	<input type="checkbox"/>
4. Has the action that will be taken in the event that the presence or suspicion of the presence of a listed disease is detected been included and <i>how</i> and <i>when</i> that will be notified to Scottish Ministers?	<input type="checkbox"/>
5. Has the health status of aquaculture animals being stocked on the farm site been covered (equal or higher health status, certification if required)?	<input type="checkbox"/>
6. Have the husbandry and biosecurity measures implemented between each epidemiological unit to minimise transmission of disease been covered (movement of staff, visitors, equipment, live or dead fish etc.)?	<input type="checkbox"/>
7. Is documentation available regarding the measures in place to maintain the physical containment of aquaculture animals held on site?	<input type="checkbox"/>
8. Have the biosecurity procedures been adequately implemented on site?	<input type="checkbox"/>
If no, detail: <input type="text"/>	

Results of Surveillance

1. Has any animal health surveillance been carried out by, or on behalf of, the business?	<input type="checkbox"/>	Y
2. If yes, are results available for inspection?	<input type="checkbox"/>	Y
3. Any significant results?	<input type="checkbox"/>	Y
If yes, detail (if not detailed under recent disease problems). <input type="text" value="Furunculosis; see additional information"/>		

Records checked between:	<input type="text" value="04/03/2024-20/06/2024"/>
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Case no: Site No: Date of visit/
Sampling:

Priority samples: VI BA PA MG HI

Time sampling starts/ends: Inspector: VMD No.

Environmental conditions: 1 2 3 4 5

Summary samples HIST BA MG VI PA Total Samples

Add Fish/Pools - click

Pool/Fish No	F1	F2	F3	F4	F5							
Fish nos	1	2	3	4	5							
Pool Group	P1	P2	P3	P4	P5							
Species	SAL	SAL	SAL	SAL	SAL							
Average weight	81g	81g	81g	81g	81g							
Sex	N/A	N/A	N/A	N/A	N/A							
Water Type	FW	FW	FW	FW	FW							
Stock Details	Stock Origin	Applecross Hatchery (FS1336)	Applecross Hatchery (FS1336)	Applecross Hatchery (FS1336)	Applecross Hatchery (FS1336)	Applecross Hatchery (FS1336)						
	Facility No	3	6	5	5	7						

Case no: 2024-0177

Site No: FS0500

Method of killing: Anaesthetic

Date of visit: 20/06/2024

Inspector(s):

Sheet Relevant: Y

S for strong presence: M for medium presence: W for weak presence

Fish Number		1	2	3	4	5				
Time sampled after death (if > 45 minutes)										
External Signs										
Behaviour	Moribund		W	W	W					
	Lethargic	M	M	M	M	S				
	Hanging vertical									
	Spiralling									
	Flashing									
	Loss of equilibrium					W				
Body	Dark									
	Distended abdomen									
	Anorexic									
	Scale Oedema									
Opercula	Shortened									
	Flared									
Haemorrhaging	Throat									
	Ventrum									
	Base of fins									
	Elsewhere									
Eyes	Exophthalmic				S	W				
	Enophthalmic (sunken)									
	Cataract									
	Haemorrhagic									
Gills	Pale					M				
	Zoned									
	Necrotic									
Lesions	Flank	W				S				
	Elsewhere		M	W						
Vent	Inflamed									
	Trailing faeces									
Lice Load	Estimate numbers									
Internal Signs										
Ascites	Clear									
	Bloody									
Oedema	In tissues									
Heart	Pale/anaemic									
	Granulomas									
	Deformed									
Liver	Petechial haem					W				
	Gross haem									
	Tissue breakdown									
	Enlarged									
	Colour number(s)	7	6	6	6	4				
	Granulomas									
	Lesions									
Pyloric caeca	Petechial haem					W				
	Tubules mauve									
	Lack of fat									
Spleen	Enlarged	S	S	S	S	S				
	Granulomas									
Gut	No food present									
	Yellow pseudo-faeces	M	M	M	M	M				
	External haem									
	Internal haem									
Body wall	Haemorrhaging					M				
Swim bladder	Haemorrhaging									
	Fluid filled									
Kidney	Swollen									
	Grey									
	Granular									
	Liquefied									
General	Parasites present									
	Anaemia									

Additional comments:

Site No: FS0500
Case No: 2024-0177
Nature of non-compliance:
Action taken (FHI):
Non-compliance relevant to (delete): VirologyMolGen/Bacteriology/Histology/Parasitology



FISH HEALTH INSPECTORATE VISIT REPORT

SUMMARY FOR INFORMATION OF SITE OPERATOR

BUSINESS No	FB0169	DATE OF VISIT	20/06/2024
SITE No	FS0500	SITE NAME	Applecross Smolt Unit
CASE No	20240177	INSPECTOR	██████████

Section 1: Summary

The site was inspected following notification from the business of increased mortality above the reporting threshold for four weeks.

Histopathology examination revealed features consistent with *Aeromonas salmonicida* (furunculosis) and confirmed by qPCR. *Aeromonas salmonicida* was also identified and isolated from plates taken from kidney material and lesion material of all sampled fish. The level and purity of growth would suggest this bacterium would be present as a primary pathogen and linked to morbidity.

Infectious pancreatic necrosis virus was detected by qPCR.

Please contact myself or the duty inspector should you require any further information, have any queries regarding this report or if any problems develop.

Section 2: Case Detail

Observations

Fish were vaccinated into the smolt unit, which ended on 11/05/2024. Pre-transfer tests showed that results were positive for furunculosis in S04 and subsequently were reported on 14/05/2024. Feeding rates had reduced following vaccination (15/05/2024) and it was suspected that treatment may be required. Mortality began to significantly increase on 16/05/2024. Aquatet (oxytetracycline) was administered on 15/05/2024 to 24/05/2024. A second rise in mortalities was noted on 01/06/2024, with a second round of Aquatet administered on 04/06/2024. Due to stock shortages, Florocol was only administered on 12/06/2024; 10 day treatment which ended on 21/06/2024.

During site inspection, fish in smolt unit observed to be swimming well and actively feeding. Very few moribund or lethargic fish observed in the tanks. Mortalities that were observed were found to have haemorrhaging on bellies and some exophthalmia. Some fish were observed to be swimming well but had evidence of large healed lesions. Five lethargic and moribund fish were removed for diagnostic sampling.

Behaviourally all fish were lethargic with F5 showing signs of the loss of equilibrium. Three fish were also observed to be moribund. F4 and F5 showed signs of exophthalmia. Pale gills were observed in F5. Skin lesions on the flanks of F1 and F5 were observed, with F2 and F3 showing lesions under the pectoral fins.

Internally, the liver of F5 was observed to have slight petechial haemorrhaging. The spleens of all five fish were enlarged. Moderate haemorrhaging was also observed in the body wall of F5. Pseudo-faeces was present in the guts of all five fish.

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Samples

Samples were collected from five fish according to the table below:

Fish number	Facility number	Species	Stage	Origin
F1	3	Atlantic salmon	July 2023, 81g	Applecross Hatchery (FS1336)
F2	6			
F3-F4	5			
F5	7			

Results

Bacteriology: Kidney, spleen and skin lesion material from five fish were inoculated onto appropriate media for the isolation of bacteria.

The following bacteria were isolated:

- *Aeromonas salmonicida*: F1, F3, F4, F5 (Kidney); F2, F3, F5 (Lesion)
- *Sphingomoas paucimobilis*: F1 (Lesion); F2 (Kidney)
- *Enterobacter* sp.: F1 (Lesion); F2 (Kidney)

The level and purity of growth would not suggest that *Sphingomoas paucimobilis* and *Enterobacter* sp. would be implicated in fish morbidity.

From the tests conducted for *Aeromonas salmonicida*, we have evidence which may indicate some resistance to oxytetracycline but no evidence of resistance to florfenicol, amoxicillin or sulphamethoxazole/trimethoprim.

Tissue samples were tested for segments of nucleic acid indicative of the presence of the pathogens specified below using real-time PCR (qPCR).

Aeromonas salmonicida

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	18.18	25.94	25.95	26.04	POSITIVE
F2	23.19	30.62	30.74	30.98	POSITIVE
F3	18.73	26.48	26.16	27.48	POSITIVE
F4	18.78	22.27	21.99	20.69	POSITIVE
F5	19.35	20.22	20.56	20.35	POSITIVE

Virology: Tissue samples were tested for segments of nucleic acid indicative of the presence of the pathogens specified below using real-time PCR (qPCR).

Infectious pancreatic necrosis virus (IPNV)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	15.61	36.88	36.83	36.15	POSITIVE
F2	16.13	36.22	36.60	36.73	POSITIVE
F3	15.95	36.26	36.06	35.63	POSITIVE
F4	16.37	37.16	38.83	37.99	POSITIVE
F5	16.35	39.12	38.14	38.03	POSITIVE

The samples tested negative for infectious haematopoietic necrosis virus (IHNV), salmonid alphavirus (SAV) and viral haemorrhagic septicaemia virus (VHSV).

Parasitology: Fins were collected to determine the presence of *Gyrodactylus salaris* using light microscopy.

No *G. salaris* parasites were detected in the samples examined.

Histology: Tissue samples of gill, skin and skeletal muscle, heart, pyloric caeca, pancreas, hind gut, liver, spleen and kidney were taken from F1-F5. The tissue samples were fixed in 10% neutral buffered formalin.

The following histopathological changes were observed:

Gill: Lamellar hyperplasia and fusion, multifocal, (F1, F2, F4, F5) with small areas of necrosis and presence of dense aggregates of Gram-negative rod-shape bacteria (F1, F2, F4 & F5).

Skin & Muscle: Focal area of skeletal muscle haemorrhage and musculature necrosis with presence of dense aggregates of Gram-negative rod-shape bacteria (F2, F5).

Heart: Presence of several aggregates of Gram-negative rod-shape bacteria with some fibre necrosis surrounding the aggregates (F1, F2, F4, F5).

Gut and pyloric caeca: Peritonitis (F2, F5) with haemorrhage (F2).

Pancreas: Within the normal range.

Liver: Small foci of aggregates of Gram-negative rod-shape bacteria (F2). Small foci of cellular inflammation (F1).

Kidney: Some interstitial cell (haemopoietic) necrosis with few small aggregates of Gram-negative rod-shape bacteria, (F1, F2, F4, F5).

Spleen: Mild necrosis with few aggregates of Gram-negative rod-shape bacteria (F2, F4, F5). Some cuffing (F4).

Please contact myself or the duty inspector should you require any further information or have any queries regarding this report.

Signed:



Date: 10/07/2024

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Fish Health Inspector

The Fish Health Inspectorate Service Charter detailing standards of service is available on the Scottish Government website at [Fish Health Inspectorate Service Charter - gov.scot](https://www.gov.scot/policies/fish-health-inspectorate/)
(www.gov.scot)

Diagnostic sampling: 20240177 Photos



Figure 1 Overview of F1-F4 with tank numbers.

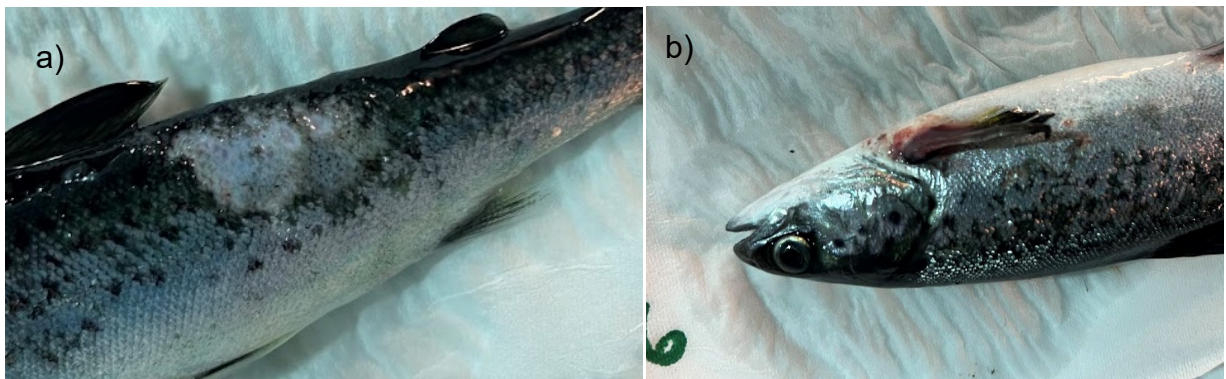


Figure 2 a) picture of lesion sampled from F1; b) lesion sampled on F2

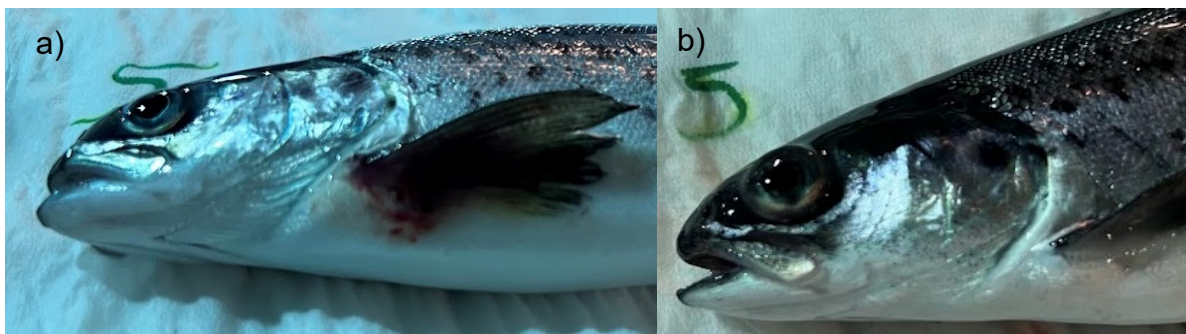


Figure 3 a) picture of lesion sampled on F3; b) picture of exophthalmia on F4



Figure 4 Internal view of F1



Figure 5 Internal view of F4



Figure 6 Internal view of F3



Figure 7 Internal view of F4



Figure 8 Overview of F5



Figure 9 Picture of lesion sampled o F5. Note slight exophthalmia on F5

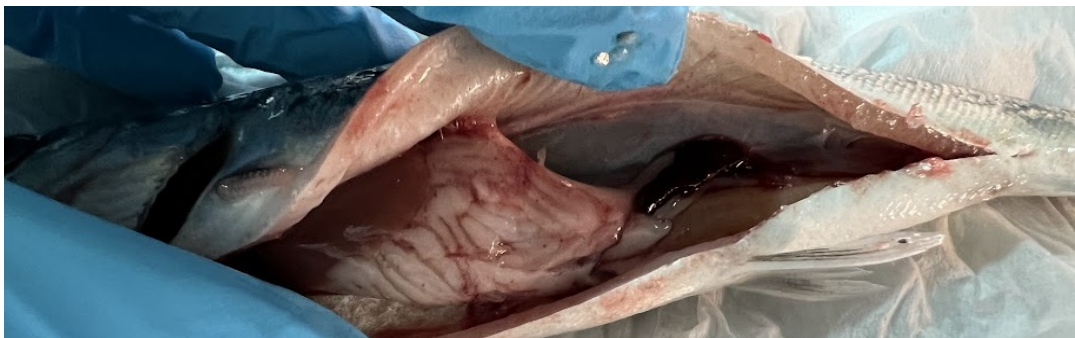


Figure 10 Internal view of F5