Case No: 2022-0481 Date of visit: 06/10/2022

Time spent on site: 5 Hours Main Inspector: [redacted]

Site No: FS0865 Site Name: Marulaig Bay
Business No: FB0119 Business Name: Mowi Scotland Ltd

Case Types: 1 DIA 2 VMD 3 4 5 6

Water Temp (°C): 12.7 Thermometer No: T309 FHI 045 completed N/A

Observations: Region: WI Water type: S CoGP MA W-20

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:

Additional Case Information:

Remote inspection carried out by [redacted] on 05/10/2022.

Mortalities reported to FHI - 2022

Week 36 1.05% (8,666)
Week 37 3.18% (22,972)
Week 38 21.22% (139,023)

Gill health, jellyfish insult although nothing observed over trigger levels.
230,000 moved to Grey Horse Channel week 36/37 to thin site down. Freshwater wellboat (about 4,500 lost in transport). Risk assessment checked. Grey Horse Channel was fallow at the time of movement. The fish that were moved have improved dramatically. Mortalities were down to about 10 per pen 2 days after transfer.
Week 37 freshwater and peroxide treatments. Pens that were treated improved but those that weren't treated then spiked in week 38. Whole site completed in week 38. Mortalities have improved in week 39.

Lumpfish farmed from Dorset Cleaner fish Ltd.
Cleaner fish mortality not counted in the past 3 weeks due to Salmon mass mortality. Lumpfish mortality in week 36 (last recorded) was 0.31%.

Physical site inspection and sampling conducted by [redacted] supervised by [redacted] on 06/10/2022. F1-F5 samples by [redacted], supervised by [redacted]. VMD samples collected by [redacted].
From the physical inspection of the stock, fish were observed to be quite lethargic in most pens. Few moribund fish were observed across the site. 5 fish were sampled for diagnostic purposes, fish were also removed for VMD sampling. The gills from the fish removed for sampling were observed to be very pale with shortened and ragged filaments.

Case No: 2022-0481 Site No: FS0865

Date of Visit: 06/10/2022 Inspector(s): [redacted]

Registration/Authorisation Details

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

Site Details (include cleaner fish for all sections)

Total No facilities		12	Facilities stocked		7	No facilities inspected		12
Species	SAL	LUM						
Age group	Q4 2021	21 Farmed						
No Fish	385,480	111,000						
Mean Fish Wt	2.6kg	Mixed						
Next Fallow Date (Site)		May 2023	Next Input Date (Site)			November 2023		
Recent (last 4 wks) disease problems?			Y	Any escapes (since last visit)?				N
If yes, detail:	AGD, PGD, Jellyfish insult.							

Movement Records

1. Movement records available for inspection?	Y
2. Date of last inspection:	22/06/2021
3. Are records complete and correctly entered?	N
4. Are movement records available for dead fish and waste?	Y
5. Are records complete and correctly entered?	Y
6. Are health certificates for introductions (outwith GB) available?	N/A

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?	Y
2. How are mortalities disposed of?	Other (detail)
If other detail:	Fish kept whole in bins, picked up by White shore Cockles.
3. Mortality records complete and correctly entered?	Y
4. Recent mortality (last 4 wks):	Salmon - Week 39 1.42%, week 38 21.22%, week 37 3.18%, week 36 1.05% LUM - Week 36 0.31% (See Additional information)
5. Evidence of recent increased/atypical mortalities?	N
If yes, facility nos/no mortality per facility/no stock per facility/reason:	
6. Any other peaks in mortality during period checked?	N
If yes, detail:	
7. Have increased (unexplained) mortalities been reported to vet or FHI?	N/A
If yes, detail action:	
8. Have 'mortality events' been reported to FHI? If no, enter details on mortality events sheet.	Y

Treatments and Medicines Records

1. Recent treatments (see comment)?	Y
If yes, detail:	H2O2
If other, detail:	Peroxide
2. Medicines records available for inspection?	Y
3. Are records complete and correctly entered?	Y
4. Are fish in a withdrawal period?	N
5. If yes, what treatment(s)?	
If other, detail:	
6. Are medicines stored appropriately?	Y

Biosecurity Records

1. Biosecurity records available for inspection?	
2. Has the manner and frequency of mortality removal, recording and safe disposal been considered?	
3. Has the manner and period in which the APB will notify Scottish Ministers or veterinary professional of any *increased* (*unexplained)* mortality at the site been included?	
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 *how* and *when* that will be notified to Scottish Ministers?	
5. Has the health status of aquaculture animals being stocked on the farm site been covered (equal or higher health status, certification if required)?	
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.)?	
7. Is documentation available regarding the measures in place to maintain the physical containment of aquaculture animals held on site?	
8. Have the biosecurity procedures been adequately implemented on site?	
If no, detail:	

Results of Surveillance

1. Has any animal health surveillance been carried out by, or on behalf of, the business?	Y
2. If yes, are results available for inspection?	Y
3. Any significant results?	Y
If yes, detail (if not detailed under recent disease problems).	Gill issues
Pathogen report positive for Branchiomonas, Paranucleospora, AGD, Piscichlamydia, Poxvirus, Tenacibaculum	
Records checked between:	22/06/2021 - 06/10/2022

Case no:	2022-0481	Site No:	FS0865	Date of visit/ Sampling:	06/10/2022	06/			
Priority samples:	VI		BA		PA		MG		HI
Time sampling starts/ends:	11:30:00	13:30:00	Inspector:		VMD No.	20			
Environmental conditions:	1	Indoors	2		3		4		5
Summary samples	HIST	Y	BA	Y	MG	Y	VI		PA

Total Samples

Add Fish/Pools - click

	Pool/Fish No	F1	F2	F3	F4	F5							
	Fish nos	1	2	3	4	5	6	7	8	9			
	Pool Group												
Stock Details	Species	SAL	SAL	SAL	SAL	SAL	SAL	SAL	SAL	SAL			
	Average weight	1.7Kg	2Kg	2.5Kg	2.5Kg	2.2Kg	2.5kg	2.5kg	2.5kg	2.5kg			
	Sex	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
	Water Type	SW	SW	SW	SW	SW	SW	SW	SW	SW			
	Stock Origin	Glenfinnan	Glenfinnan	Glenfinnan	Glenfinnan	Glenfinnan	Loch Ness	Glenfinnan	Glenfinnan	Glenfinnan			
	Facility No	12	11	10	12	8	7	8	9	10			

10/2022 Additional Sample Information:

5 Total Tests assigned 3

Case no: 2022-0481 Site No: FS0865 Method of killing: Percussive

Date of visit: 06/10/2022 Inspector(s): [redacted] Sheet Relevant: Y

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

Fish Number		F1	F2	F3	F4	F5					
Time sampled after death (if > 45 minutes)		40min	55min	110min	125min	140min					
External Signs											
Behaviour	Moribund										
	Lethargic	M	M	M	M	M					
	Hanging vertical										
	Spiralling										
	Flashing										
	Loss of equilibrium										
Body	Dark				M						
	Distended abdomen										
	Anorexic										
	Scale Oedema										
Opercula	Shortened										
	Flared										
Haemorrhaging	Throat										
	Ventrum										
	Base of fins										
	Elsewhere										
Eyes	Exophthalmic										
	Enophthalmic (sunken)										
	Cataract										
	Haemorrhagic										
Gills	Pale	S	S	S	S	S					
	Zoned										
	Necrotic	M		M		W					
Lesions	Flank										
	Elsewhere										
Vent	Inflamed										
	Trailing faeces										
Lice Load	Estimate numbers	10	0	15	3	5					
Internal Signs											
Ascites	Clear										
	Bloody	M	W		M	S					
Oedema	In tissues										
Heart	Pale/anaemic										
	Granulomas										
	Deformed										
Liver	Petechial haem										
	Gross haem										
	Tissue breakdown										
	Enlarged										
	Colour number(s)	3	5	6	6	5					
	Granulomas										
	Lesions										
Pyloric caeca	Petechial haem										
	Tubules mauve										
	Lack of fat										
Spleen	Enlarged										
	Granulomas										
Gut	No food present										
	Yellow pseudo-faeces		S	M	S	S					
	External haem										
	Internal haem										
Body wall	Haemorrhaging										
Swim bladder	Haemorrhaging										
	Fluid filled										
Kidney	Swollen										
	Grey										
	Granular										
	Liquefied										
General	Parasites present										
	Anaemia										

Case no: 2022-0481

Date of visit: 06/10/2022

S for strong presence: **M** for medium presence: **W** for w

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

Additional comments:

Gills from F1, F3 and F5 were ragged with shortened filaments. See photos.

Site No: FS0865

Case No: 2022-0481

Nature of non-compliance:

Action taken (FHI):

Non-compliance relevant to (delete): VirologyMolGen/Bacteriology/Histology/Parasitology

Case No: 2022-0481 Date of visit: 06/10/2022

Site No: FS0865 Inspector:

Results Summary	Freq.	Date of Notification						
		Database	Insp	Phone	Insp	Writing	Insp	2nd Insp
MG - IPN	1/5	13/10/2022		13/10/2022		03/11/2022		
MG- PARA THER	5/5	13/10/2022		13/10/2022		03/11/2022		
MG - SAL POX	5/5	13/10/2022		13/10/2022		03/11/2022		
MG - SAV	3/5	13/10/2022		13/10/2022		03/11/2022		
MG - AGDQ	5/5	13/10/2022		13/10/2022		03/11/2022		
MG-IHN	0/5	13/10/2022		13/10/2022		03/11/2022		
MG-ISA	0/5	13/10/2022		13/10/2022		03/11/2022		
MG- PMCV	0/5	13/10/2022		13/10/2022		03/11/2022		
MG-VHS	0/5	13/10/2022		13/10/2022		03/11/2022		
VSPE (Isolate A)	2/5	20/10/2022		20/10/2022		03/11/2022		
VSPE (Isolate B)	2/5	20/10/2022		20/10/2022		03/11/2022		
MG - PRV	1/1	02/11/2022		02/11/2022		03/11/2022		
GPAT	5/5	02/11/2022		02/11/2022		03/11/2022		
AMGD	4/5	02/11/2022		02/11/2022		03/11/2022		
CGDH	5/5	02/11/2022		02/11/2022		03/11/2022		
HPAT	3/5	02/11/2022		02/11/2022		03/11/2022		
LPAT	4/5	02/11/2022		02/11/2022		03/11/2022		
PMCH	1/5	02/11/2022		02/11/2022		03/11/2022		

Report Summary			
Case Type	Date	Insp	2nd Insp
VMD	20/10/2022		
DIA	03/11/2022		

FISH HEALTH INSPECTORATE VISIT REPORT

SUMMARY FOR INFORMATION OF SITE OPERATOR

BUSINESS NO	FB0119	**DATE OF VISIT**	06/10/2022
SITE NO	FS0865	**SITE NAME**	Marulaig Bay
CASE NO	20220481	**INSPECTOR**	[redacted]

Section 1: Summary

The site was inspected due to sustained mortality reports above the reporting criteria attributed to gill issues. Five fish were selected for diagnostic sampling.

Histopathology examination revealed mild to marked, multifocal to diffuse, chronic hyperplasic branchitis associated with complex gill issues and vascular disturbance. Amoebic gill disease was also observed. The fish also displayed myocarditis. Mild to moderate, multifocal to coalescence hepatic necrosis was observed.

Two separate *Vibrio* spp. were identified on plates taken from kidney material of fish 2 and 5. The level and purity of growth would not suggest they would be implicated as the primary source of morbidity.

Samples tested positive for salmonid alphavirus (3/5), infectious pancreatic necrosis virus (IPNV) (1/5) and piscine reovirus (1/1).

Samples also tested positive for gill related pathogens: *Paranucleospora theridion* (5/5), salmon gill poxvirus (SGPV) (5/5) and *Neoparamoeba perurans* (AGD) (5/5).

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

The site was inspected due to sustained mortality reports above the reporting criteria attributed to gill issues and a suspected jellyfish bloom. At the time of the visit the site was stocked with 2021 Q4 Atlantic salmon at an average weight of 2.6kg and farmed lumpfish. Lethargic fish were observed deep in the water in the majority of pens on site. Five fish were selected for diagnostic sampling.

All five fish sampled displayed lethargic behaviour prior to removal from the pens. Externally, all five fish had pale gills, with necrotic patches and shortened filaments on the gills in F1, F3 and F5. F4 had a dark body colour. Lice load was 10 lice all stages for F1, 0 for F2, 15 lice all stages for F3, 3 lice all stages for F4 and 5 lice all stages for F5.

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Website - www.gov.scot/Topics/marine/science

Internally, bloody ascites was evident in F1-F2 and F4-F5. The liver in F1 was pale and F2-F5 had yellow pseudo-faeces.

Samples

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

Fish number	Facility number	Species	Stage	Origin
F1 & F4	12	Atlantic salmon	2021 Q4, 2.6kg	Glenfinnan
F2	11	Atlantic salmon	2021 Q4, 2.6kg	Glenfinnan
F3	10	Atlantic salmon	2021 Q4, 2.6kg	Glenfinnan
F5	8	Atlantic salmon	2021 Q4, 2.6kg	Glenfinnan

Results

Bacteriology: Kidney and gill material from five fish was inoculated onto appropriate media for the isolation of bacteria.

The following bacteria were isolated :

- *Vibrio* sp. (Isolate A) found in fish: F2 &F5 (Kidney)
- *Vibrio* sp. (Isolate B) found in fish: F2 &F5 (Kidney)

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	-	-	-	-	Negative
F2	-	-	-	-	Negative
F3	20.03	36.85	35.94	37.06	POSITIVE
F4	-	-	-	-	Negative
F5	-	-	-	-	Negative

Salmonid alphavirus (SAV)

Fish Number	**Endogenous control Cp value**	**Cp Values**			**Reported Result (PCR)**
F1	20.36	35.51	34.27	34.88	POSITIVE
F2	19.80	35.36	34.85	34.77	POSITIVE
F3	-	-	-	-	Negative
F4	-	-	-	-	Negative
F5	20.36	30.83	30.82	30.87	POSITIVE

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Salmon gill poxvirus (SGPV)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	18.58	31.81	31.92	32.02	POSITIVE
F2	18.69	32.16	32.22	32.45	POSITIVE
F3	19.19	29.18	28.85	28.84	POSITIVE
F4	19.27	28.15	28.39	28.31	POSITIVE
F5	18.66	24.32	24.42	24.33	POSITIVE

Piscine reovirus (PRV)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	19.90	30.69	30.67	31.08	POSITIVE

The samples tested negative for infectious haematopoietic necrosis virus (IHNV), infectious salmon anaemia virus (ISAV), piscine myocarditis virus (PMCV) and viral haemorrhagic septicemia virus (VHSV).

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

Neoparamoeba perurans (AGD)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	18.58	28.27	28.52	28.54	POSITIVE
F2	18.69	30.45	30.69	30.78	POSITIVE
F3	19.19	30.88	30.66	30.62	POSITIVE
F4	19.27	28.56	28.83	28.77	POSITIVE
F5	18.66	29.76	29.89	29.53	POSITIVE

Paranucleospora theridion

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	18.58	28.23	28.42	28.35	POSITIVE
F2	18.69	26.96	27.11	26.99	POSITIVE
F3	19.19	27.25	27.45	27.33	POSITIVE
F4	19.27	24.27	23.98	24.01	POSITIVE
F5	18.66	23.37	23.25	23.28	POSITIVE

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

Histopathological examination by light microscopy revealed the following:

Gill: Lamellar epithelial hyperplasia, hypertrophy and lamellar fusion marked, diffuse (F1) and F2-F5 mild, multifocal. Filament fusion observed in F1. F1 also exhibited foci of dark pink amorphous material (likely fibrin) surrounded by fibrous tissues. F1 & F2 displayed foci of necrosis and

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haemorrhage on the hyperplasic plaques and lamellar thrombi. Hypertrophic globlet cells and moderate inflammatory cell infiltrate at the centre of gill filament observed in all fish. Few amoeboid cells resembling *Neoparamoeba perurans* observed in F1, F3-F5. F3 reading hindered by autolysis artefacts.
Skin & Muscle: Mild, multifocal inflammatory cell infiltrated and few scattered fibre degeneration observed in the skeletal red muscle (F1).
Heart: F1 displayed foci of cellular infiltration and fibre degeneration at the compact layer and F3 also extended to the atrium. F3 exhibited a focally extended area of fibre degeneration and an increase of collagen accumulation (likely fibrosis) in the ventricle. F3 & F5 displayed a mild epicarditis.
Gut and pyloric caeca: Mild peritonitis (F5). Cell sloughing (potentially associated with post-mortem artefacts) F5.
Pancreas: Within the normal range.
Liver: Hepatocellular necrosis, mild to moderate, multifocal to coalescence (F2 & F5) and foci of haemorrhage noted in F5, some foci hepatocellular vacuolation (macrovisicules) (F1, F3).
Kidney: Within the normal range.
Spleen: Within the normal range.

Signed: [redacted] Date: 03/11/2022

Fish Health Inspector

The Fish Health Inspectorate Service Charter detailing standards of service is available on the Marine Scotland website at https://www.gov.scot/publications/fish-health-inspectorate-service-charter/

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FISH HEALTH INSPECTORATE VISIT REPORT

SUMMARY FOR INFORMATION OF SITE OPERATOR

BUSINESS NO	FB0119	**DATE OF VISIT**	06/10/2022
SITE NO	FS0865	**SITE NAME**	Marulaig Bay
CASE NO	20220481	**INSPECTOR**	[redacted]

Inspection under the Animals and Animal Products (Examination for Residues and Maximum Residue Limits) (England and Scotland) Regulations 2015

The above site was visited in accordance with the Animals and Animal Products (Examination for Residues and Maximum Residue Limits) (England and Scotland) Regulations 2015.

Samples were taken to be analysed for veterinary residues.

In addition, samples were taken for diagnostic purposes. A separate report will be issued detailing the results of these tests.

Records

The information required for the public record of aquaculture production businesses regarding this site was verified and where necessary updated.

Medicine records were inspected and found to be adequately maintained.

Aquaculture animal and aquaculture animal product movement records were inspected and found to be inadequately maintained.

Mortality records were inspected and found to be adequately maintained.

The following points were raised with the site representative during the inspection:

- FS numbers must be recorded in the source/destination section of the movement record book, to allow for better traceability of stocks. It was discussed with the site manager that this would be recorded in future. No further action is required.

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

Signed: [redacted] Date: 20/10/2022

Fish Health Inspector

R20

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Website - https://www.gov.scot/policies/fish-health-inspectorate/

The Fish Health Inspectorate Service Charter detailing standards of service is available on the Marine Scotland website at https://www.gov.scot/publications/fish-health-inspectorate-service-charter/

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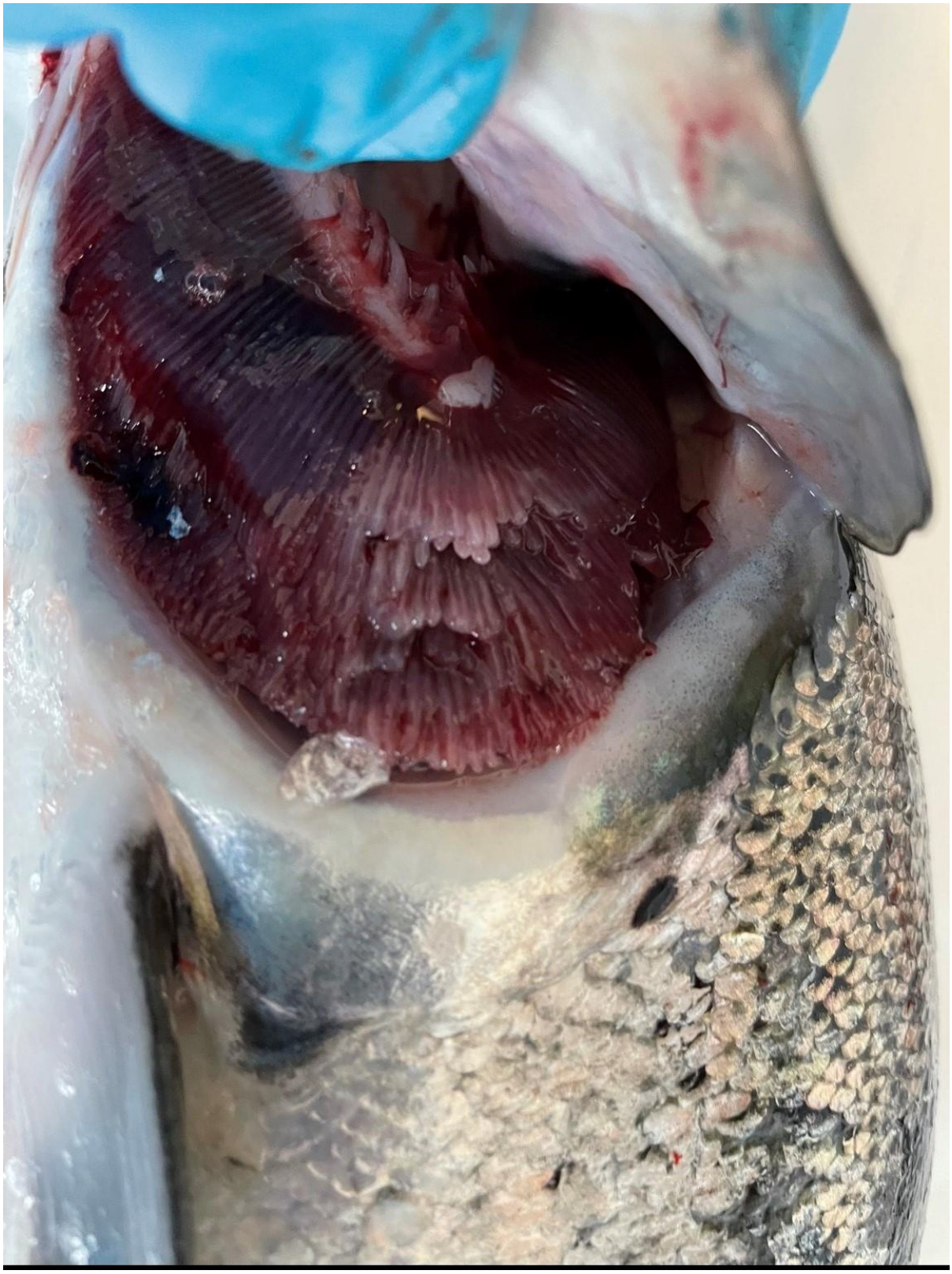
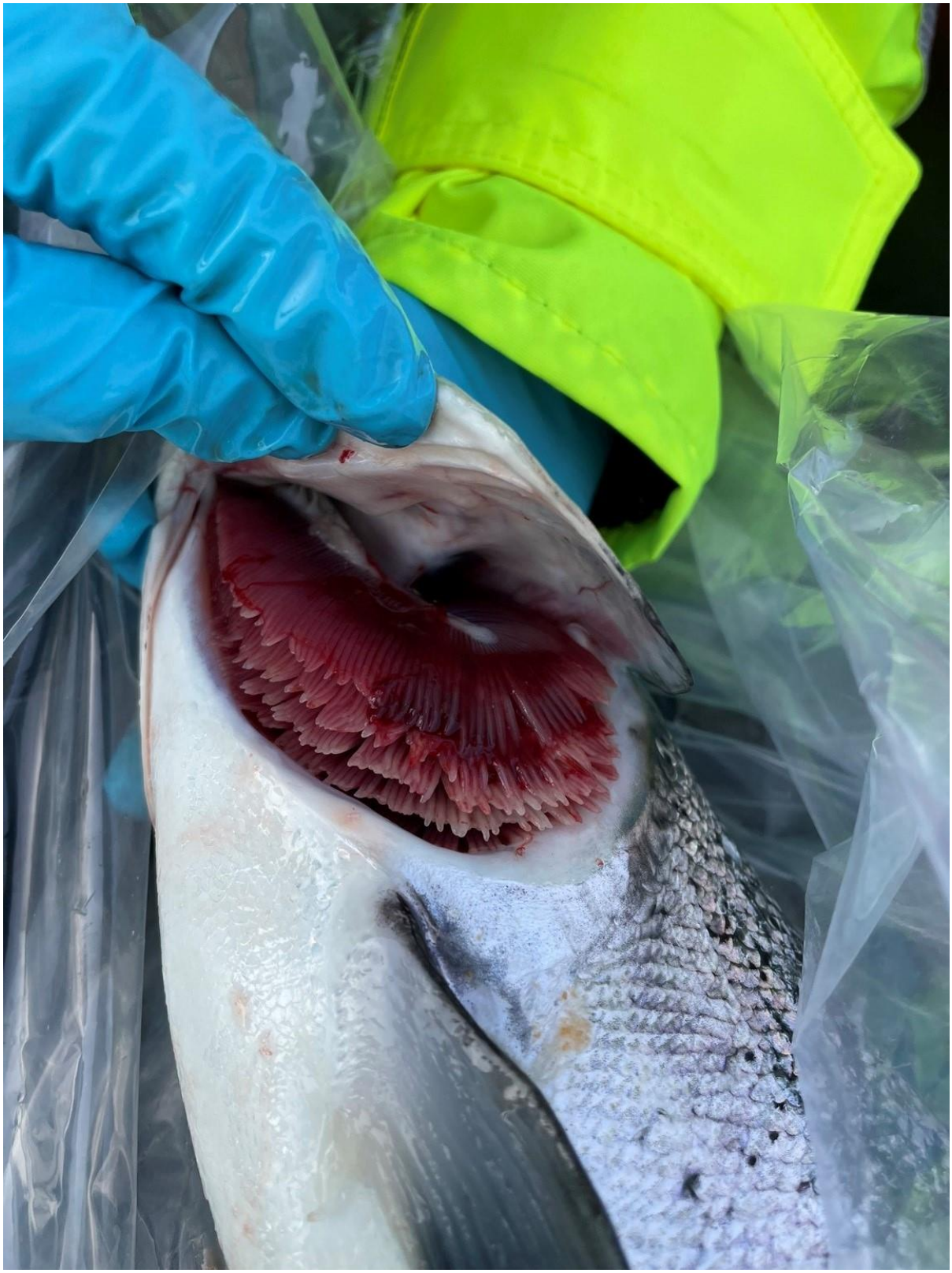
Marulaig Bay DIA 2022-0481

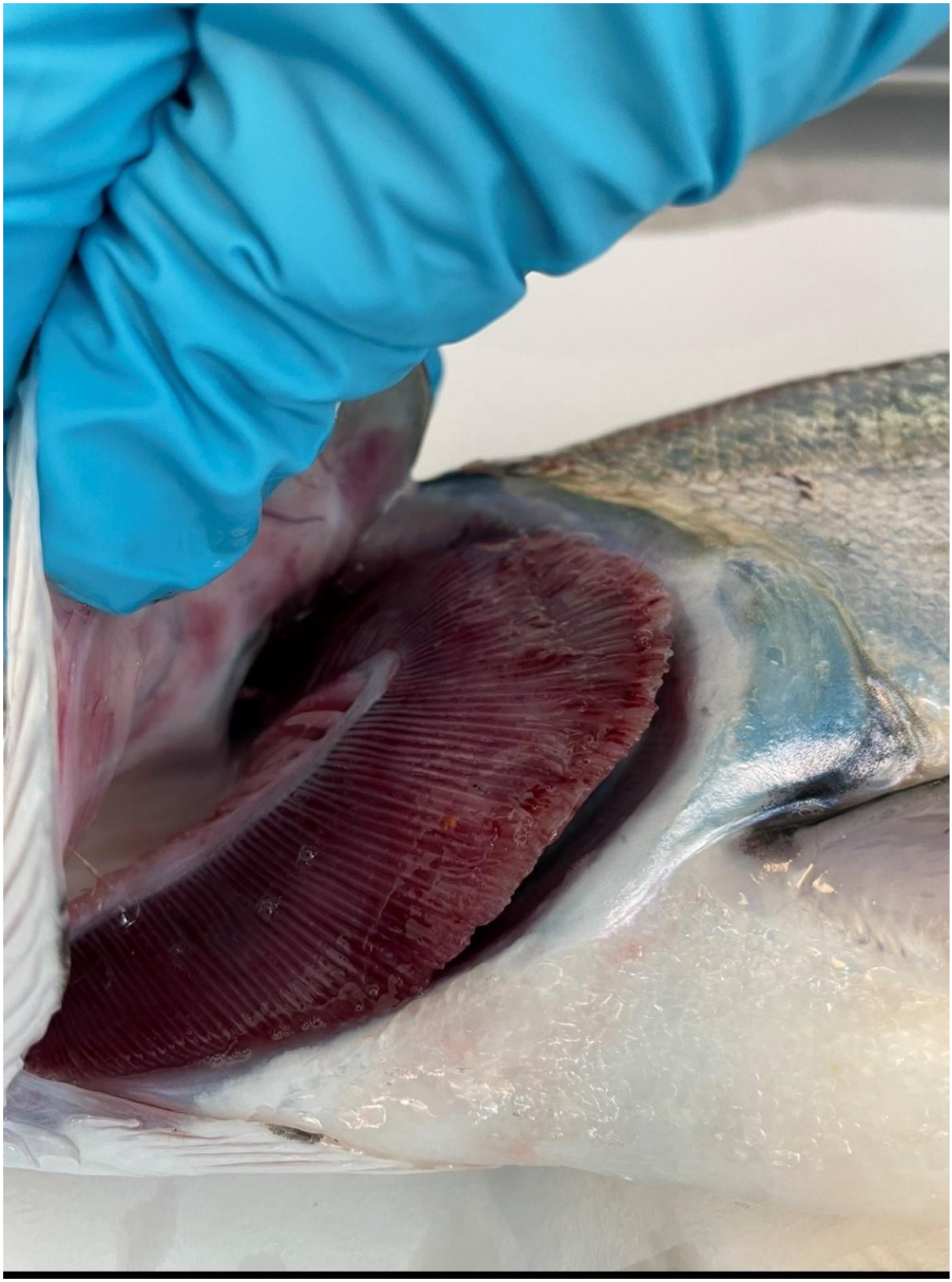
F1

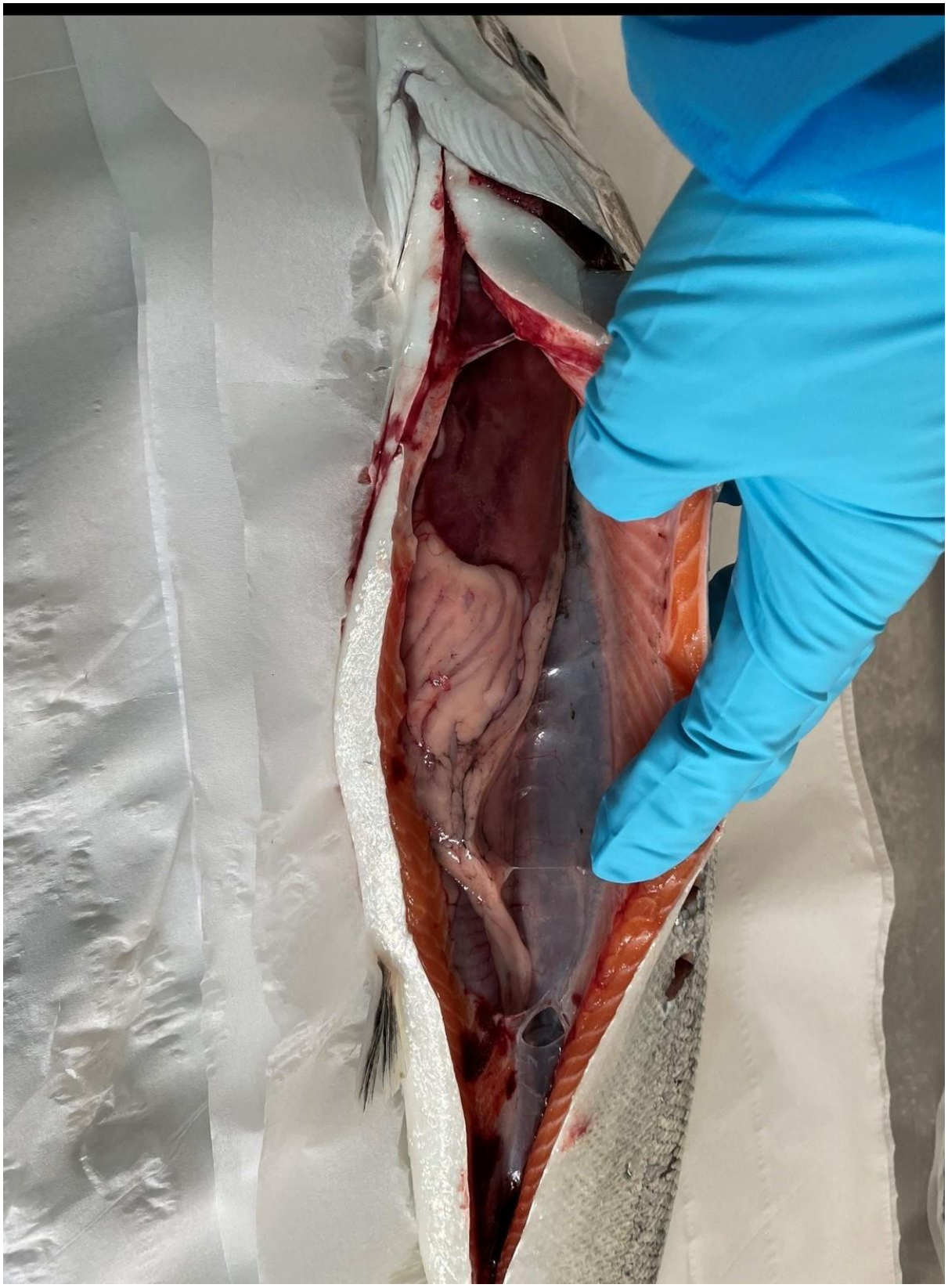




F1
Pen 12

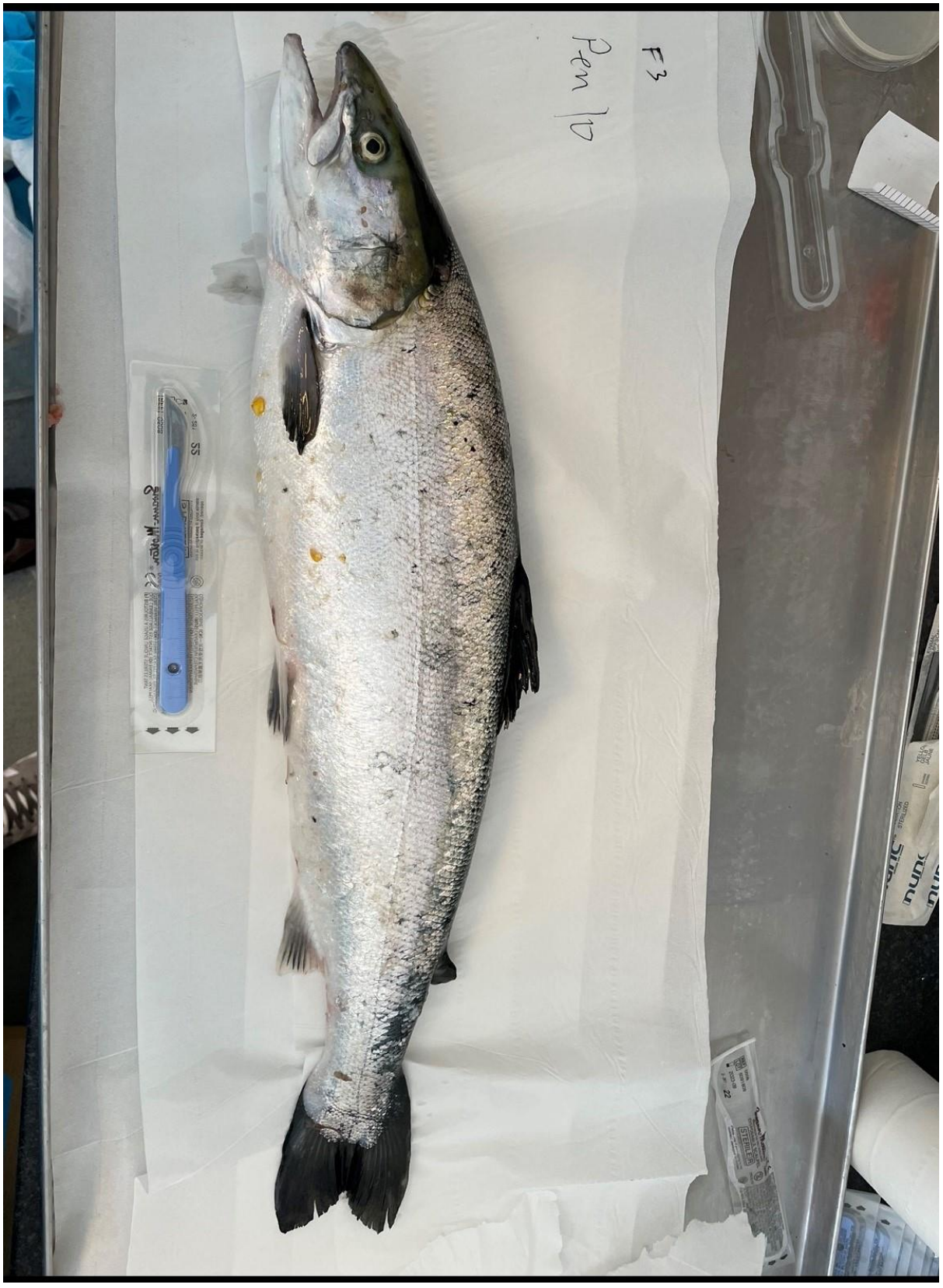
F2

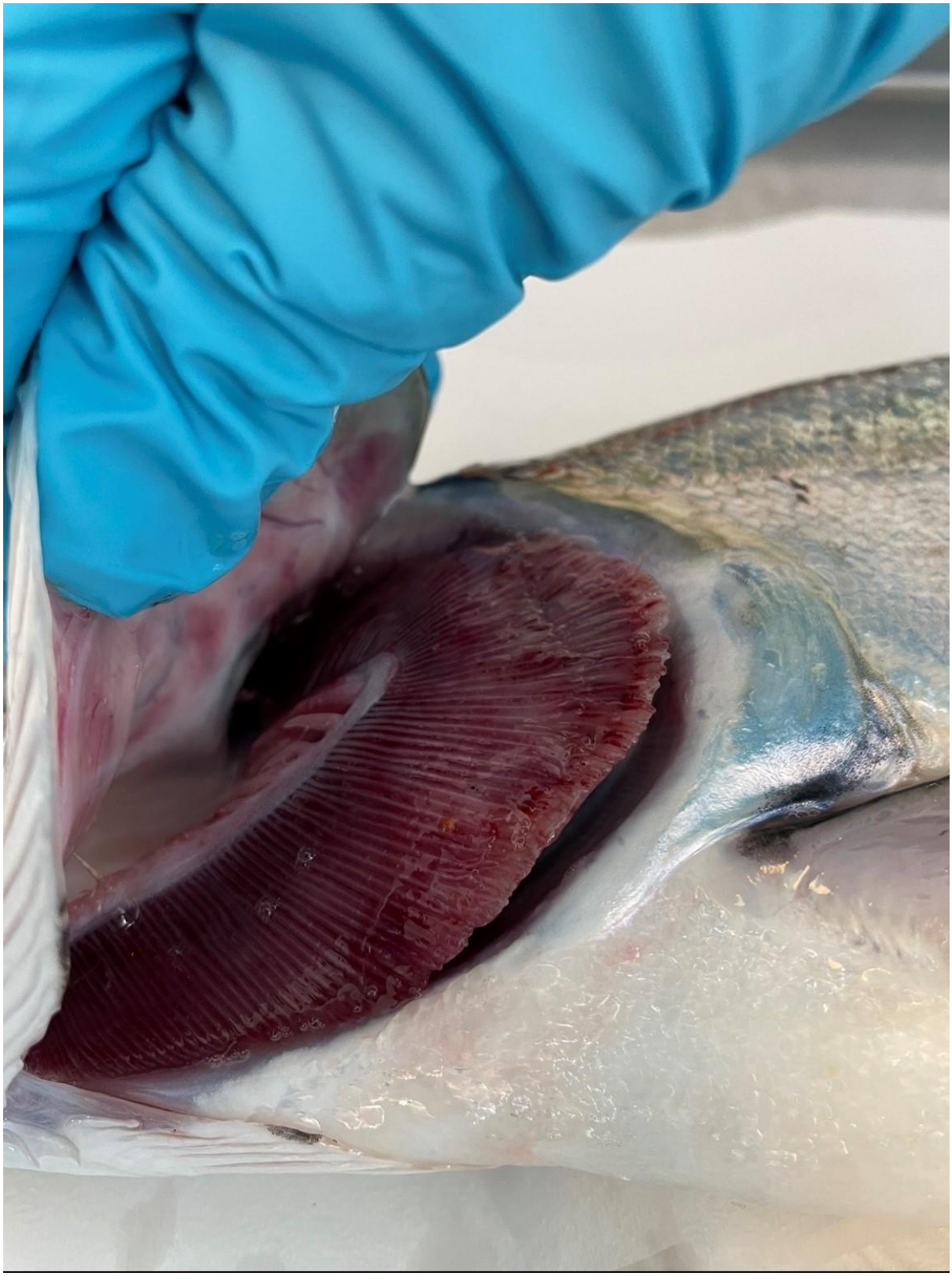




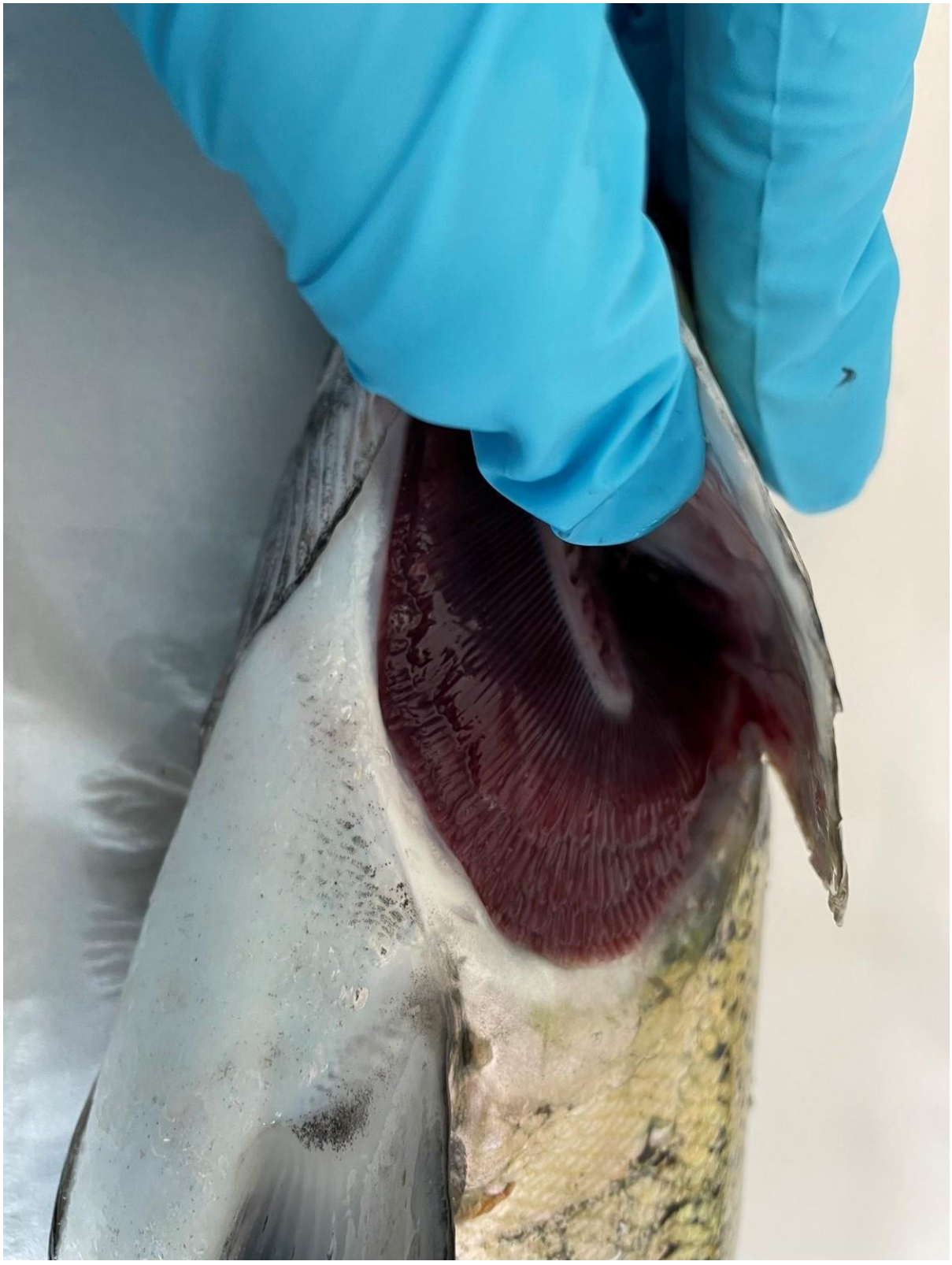
F2
R4 17

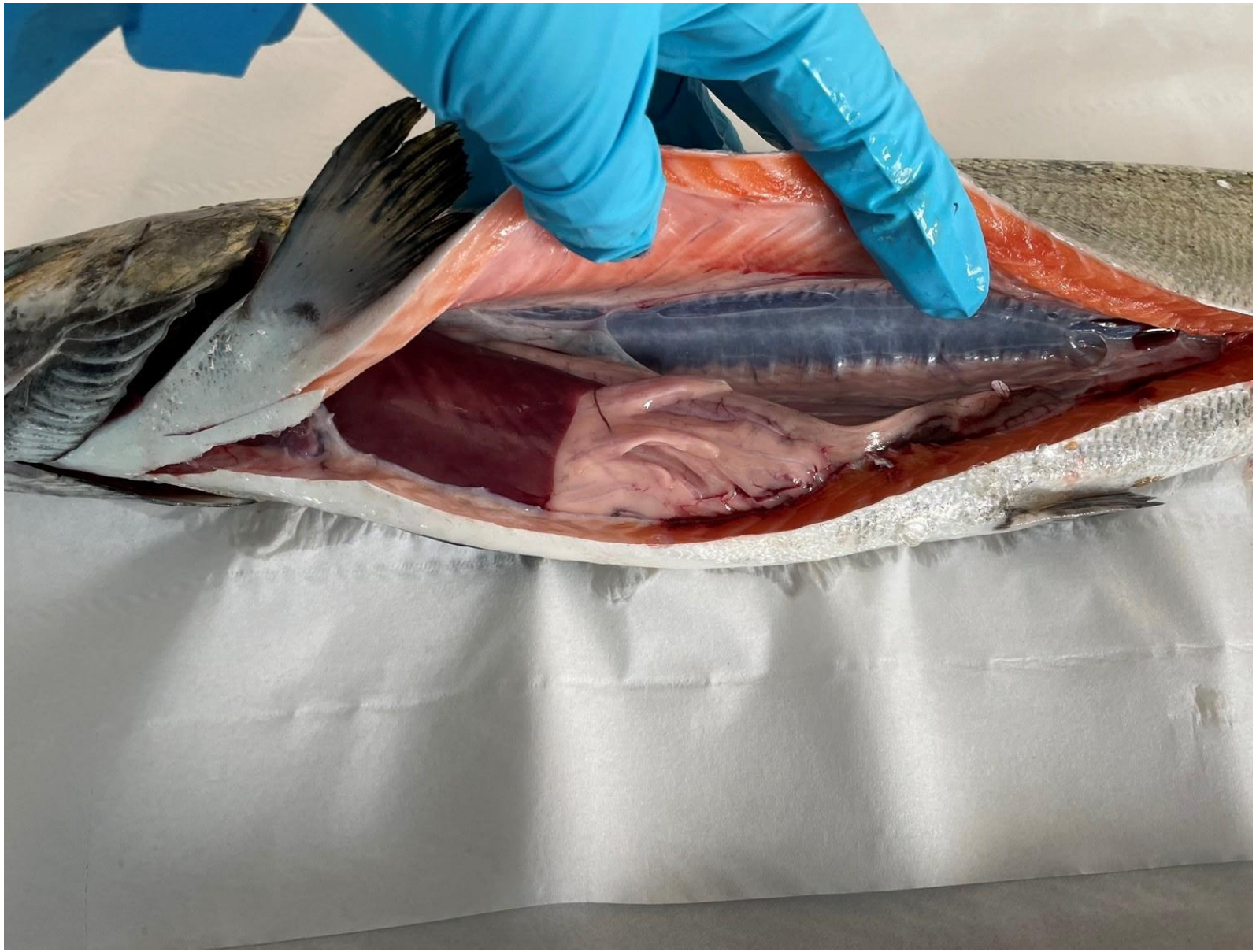
F3





F4





F4
Pen 12

F5