

# OIE Reference Laboratory Reports Activities

## *Activities in 2020*

**This report has been submitted : 2021-02-02 13:27:57**

<b>Name of disease (or topic) for which you are a designated OIE Reference Laboratory:</b>	Viral haemorrhagic septicaemia
<b>Address of laboratory:</b>	Kemitorvet, Building 202 2800 Kgs, Lyngby DENMARK
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<b>Name (including Title) of Head of Laboratory (Responsible Official):</b>	Fritz Köster, Director of DTU Aqua
<b>Name (including Title and Position) of OIE Reference Expert:</b>	Niels Jørgen Olesen, Professor, head of Unit
<b>Which of the following defines your laboratory? Check all that apply:</b>	Academic

**ToR 1: To use, promote and disseminate diagnostic methods validated according to OIE Standards**

1. Did your laboratory perform diagnostic tests for the specified disease/topic for purposes such as disease diagnosis, screening of animals for export, surveillance, etc.? (Not for quality control, proficiency testing or staff training)

Yes

Diagnostic Test	Indicated in OIE Manual (Yes/No)	Total number of test performed last year	
		Nationally	Internationally
Indirect diagnostic tests		Nationally	Internationally
ELISA	Yes	12	16
RT-PCR	yes	0	0
IFAT	yes	0	0
Direct diagnostic tests		Nationally	Internationally
Cell cultivation BF-2	yes	639	17
Cell cultivation EPC	yes	639	17
RT-qPCR	yes	0	0

**ToR 2: To develop reference material in accordance with OIE requirements, and implement and promote the application of OIE Standards. To store and distribute to national laboratories biological reference products and any other reagents used in the diagnosis and control of the designated pathogens or disease.**

2. Did your laboratory produce or supply imported standard reference reagents officially recognised by the OIE?

No

3. Did your laboratory supply standard reference reagents (non OIE-approved) and/or other diagnostic reagents to OIE Member Countries?

Yes

Type of reagent available	Related diagnostic test	Produced/ provide	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	No. of recipient OIE Member Countries	Region of recipients
BF-2,EPC,CHSE-214 cell culture	virus propagation	yes	0	8x120 ml	2	<input type="checkbox"/> Africa <input type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
other cell lines (CCB, GF, ASK-1, EK-1)	virus propagation	yes	0	8x120	3	<input type="checkbox"/> Africa <input type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
VHS isolates of various genotypes	positive controls/validation of test , etc.	yes	0	3 ampoules, 9 tubes,1 FTA card	3	<input type="checkbox"/> Africa <input type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
Other fish pathogens	For differential diagnosis, controls, validation etc.	yes	0	7 ampoules; 130 tubes, 4 FTA cards, 1841 tubes (fish tissue, fish lood, cell supernatan)	7	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
Monoclonal and polyclonal antibodies agains VHSV	ELISA, IFAT, IHC,Western Blot, etc.	yes	0	1 tube	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East

Other antibodies for differential diagnosis	ELISA, IFAT, IHC, Western Blot, etc.	yes	0	2 tubes	2	<input type="checkbox"/> Africa <input type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
tissue material and slides	histology	yes	0	855 glass slides, 15 beakers,	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to OIE Member Countries?

No

***ToR 3: To develop, standardise and validate, according to OIE Standards, new procedures for diagnosis and control of the designated pathogens or diseases***

6. Did your laboratory develop new diagnostic methods validated according to OIE Standards for the designated pathogen or disease?

No

7. Did your laboratory develop new vaccines according to OIE Standards for the designated pathogen or disease?

No

***ToR 4: To provide diagnostic testing facilities, and, where appropriate, scientific and technical advice on disease control measures to OIE Member Countries***

8. Did your laboratory carry out diagnostic testing for other OIE Member Countries?

Yes

Name of OIE Member Country seeking assistance	Date (month)	No. samples received for provision of diagnostic support	No. samples received for provision of confirmatory diagnoses
UNITED KINGDOM	january	0	6
CROATIA	May	0	6
NORWAY	May, June, September	9	2
NORTH MACEDONIA (REP. OF)	october	0	11
ITALY	november	7	0

9. Did your laboratory provide expert advice in technical consultancies on the request of an OIE Member Country?

Yes

Name of the OIE Member Country receiving a technical consultancy	Purpose	How the advice was provided
FRANCE	definition of suspicion, positive samples detected by qPCR, no clinics, no isolation on cell culture	e-mail communication

***ToR 5: To carry out and/or coordinate scientific and technical studies in collaboration with other laboratories, centres or organisations***

10. Did your laboratory participate in international scientific studies in collaboration with OIE Member Countries other than the own?

Yes

Title of the study	Duration	Purpose of the study	Partners (Institutions)	OIE Member Countries involved other than your country
Investigation of role of atlantic salmon erythrocyte during infection with ISAV isolates of different virulence	2020	determine and document if erythrocyte allow replication of RBC of ISAV isoaltes with different virulence	NVI - Norwegian Veterinary Institute , FVO-Torshavn	NORWAY
PMCV infection in Atlantic salmon and CMS pathogenesis	2019-2020	develop in vivo model to study PMCV infection in atlatic salmon juveniles, study pathogenesis and search for virulence markers of CMS	Marine Laboratory Ireland	IRELAND
Red Mark Syndrome in Rainbow trout: effect of temperature on disease development	2019-2020	To understand how water temperature variation affect development of : 1) disease development 2) pathogen load by qPCR	University of Udine	ITALY
Red Mark Syndrome in Rainbow trout: role of ciliates as vector for disease transmission	2019-2020	to understand the role of common ciliates parasite in the trasnmission of MLO (putative agent of RMS) in experimental conditions	University of Pisa	ITALY

***ToR 6: To collect, process, analyse, publish and disseminate epizootiological data relevant to the designated pathogens or diseases***

11. Did your Laboratory collect epizootiological data relevant to international disease control?

Yes

If the answer is yes, please provide details of the data collected:

we have conducted an annual survey of fish and crustacean diseases in europe. A summary of the findings will be made available in the report of the annual workshop for national reference laboratories for fish and crustacean diseases.

12. Did your laboratory disseminate epizootiological data that had been processed and analysed?

Yes

If the answer is yes, please provide details of the data collected:

The reports were presented and discussed at the 24th AW of the national reference laboratories for fish diseases (3rd and 4th of November) and 11th AW of the national reference laboratories for crustacean diseases (5th of November). Due to travel restrictions both workshops were held virtually

**13. What method of dissemination of information is most often used by your laboratory?  
(Indicate in the appropriate box the number by category)**

a) Articles published in peer-reviewed journals: 17

1. Baillon, L., Mérour, E., Cabon, J., Louboutin, L., Vigouroux, E., Farias Alencar, A. L., Cuenca, A., Blanchard, Y., Olesen, N. J., Panzarin, V., Morin, T., Brémont, M. & Biacchesi, S., 2020 The Viral Hemorrhagic Septicemia Virus (VHSV) Markers of Virulence in Rainbow Trout (*Oncorhynchus mykiss*) In : *Frontiers in Microbiology*. 11, 17 p., 574231. (Novimark)
2. Baron S, Ceccarelli D, Dalsgaard I, Granier SA, Haenen O, Jansson E, Madsen L, Jouy E, Kempf I, Larvor E, Morin T, Testerink J, Veldman K, Mouritsen KK, Van Gelderen B, Voorbergen-Laarman M, Säker E, Blomkvist E & Smith P (2020). Influence of incubation time on antimicrobial susceptibility testing of pathogenic *Vibrio anguillarum* and *Vibrio vulnificus* isolated from fish. *Aquaculture* 524, 735258. <https://doi.org/10.1016/j.aquaculture.2020.735258>
3. Cuenca Argelia, Niccolò Vendramin, Niels Jørgen Olesen (2020) Analytical validation of one-step real-time RT-PCR for detection of infectious hematopoietic necrosis virus (IHNV). *EAFP Bulletin*. (EURL)
4. Cvetkovikj, A., Radosavljevic, V., Cuenca, A., Strojmanovska, B., Maksimovic-Zoric, J., Cvetkovikj, I. & Olesen, N. J., 2020 First detection of infectious haematopoietic necrosis virus in farmed rainbow trout in North Macedonia. , In: *Diseases of Aquatic Organisms*. 140, p. 219-225 (EURL)
5. Hansen MJ, Kudirkiene E, Dalsgaard I. (2020). Analysis of 44 *Vibrio anguillarum* genomes reveals high genetic diversity. *PeerJ* 8:e10451 <https://doi.org/10.7717/peerj.10451> (VAXfisk)
6. Jansson E., Haenen O., Nonnemann B., Madsen L., van Gelderen E., Aspán A., Säker E., Boonstra M., Gulla S., Colquhoun D.J., Roozenburg-Hengst I., Dalsgaard I. (2020). MALDI-TOF MS: a diagnostic tool for identification of bacterial fish pathogens. *Bulletin of the European Association of Fish Pathologists* 40: 240-248.
7. Karami, A. M., Mathiessen, H., Ødegård, J., Marana, M. H., Jaafar, R., Jørgensen, L. V. G., Zuo, S., Dalsgaard, I., Nielsen, T., Kania, P. W., Buchmann, K. (2020). Detecting a major QTL for *Vibrio anguillarum* resistance in rainbow trout. *Frontiers in Genetics* (accepted) (VAXfisk)
8. López-Vázquez Carmen, Isabel Bandín, Valentina Panzarin, Anna Toffan, Argelia Cuenca, Niels J. Olesen and Carlos P. Dopazo 2020 Steps of the Replication Cycle of the Viral Haemorrhagic Septicaemia Virus (VHSV) Affecting Its Virulence on Fish. In *Animals as part of the Special Issue Infectious diseases in aquaculture and fisheries, new and emerging pathogens*. (Novimark)
9. Marana, M., Chettri, J. K., Salten, M. B., Bach-Olesen, N. E., Kania, P. W., Dalsgaard, I., Buchmann, K. (2020). Primary immunization using low antigen dosages and immunological tolerance in rainbow trout. *Fish & Shellfish Immunology* 105: 16-23. [Doi.org/10.1016/j.fsi.2020.06.049](https://doi.org/10.1016/j.fsi.2020.06.049) (VAXfish)
10. Marana M., Jacob Günther Schmidt, Stéphane Biacchesi, Niels Lorenzen, Louise von Gersdorff Jørgensen (2020). J. Fish. Dis. Zebrafish (*Danio regio*) larvae as a model for real-time studies of propagating VHS virus infection, tissue tropism and neutrophil activity. [doi.org/10.1111/jfd.13294](https://doi.org/10.1111/jfd.13294) (DFF Fish)
11. Panzarin, V., Cuenca, A., Gastaldelli, M., Alencar, A. L. F., Pascoli, F., Morin, T., Blanchard, Y., Cabon, J., Louboutin, L., Ryder, D., Abbadi, M., Toffan, A., Dopazo, C. P., Biacchesi, S., Brémont, M. & Olesen, N. J., 2020 VHSV Single Amino Acid Polymorphisms (SAPs) Associated With Virulence in Rainbow Trout. In: *Frontiers in Microbiology*. 11, 17 p., 1984. (Novimark)
12. Pasqualetti Chiara, Jacob Günther Schmidt, Alessandra Cafiso, Leandro Gammuto, Olivia Lanzoni, Dagoberto Sepulveda, Amedeo Manfrin, Lisandro Benedetti Cecchi, Niels Jørgen Olesen, Chiara Bazzocchi, Giulio Petroni 2020 Double trouble: could *Ichthyophthirius multifiliis* be a vehicle for the bacterium associated with red mark syndrome in rainbow trout, *Oncorhynchus mykiss*? *Aquaculture AQUA\_736230* (Aquaexcel2020)
13. Polinski MP, Vendramin N, Cuenca A, KA Garver. 2020. Piscine orthoreovirus: Biology and distribution in farmed and wild fish. *Journal of Fish Diseases*, 43:1331-1352 (PreVent)
14. Stagg, Hannah E. B.; Sigríður Guðmundsdóttir; Niccolò Vendramin; Neil M. Ruane; Heiða Sigurðardóttir; Debes H. Christiansen; Argelia Cuenca; Petra E. Petersen; Eann S. Munro; Vsevolod L. Popov; Kuttichantran Subramaniam; Kamonchai Imnoi; Thomas B. Waltzek; Niels Jørgen Olesen (2020) Characterisation of ranaviruses isolated from lumpfish *Cyclopterus lumpus* L. in the North Atlantic area: proposal for a new ranavirus species (European North Atlantic Ranavirus) *Journal of General Virology* Volume 101, Issue 2 <https://doi.org/10.1099/jgv.0.001377> (EURL)
15. Sørensen, J.; Vendramin, N.; Priess, C.; Kannimuthu, D.; Henriksen, N.H.; Iburg, T.M.; Olesen, N.J.; Cuenca, A. 2020 Emergence and Spread of Piscine orthoreovirus Genotype 3. *Pathogens* 2020, 9, 823.

<https://www.mdpi.com/2076-0817/9/10/823> (PreVent)

16. Schmidt, J. G., Henriksen, N. H. & Olesen, N. J., 2021 Antibiotic treatment alleviates red mark syndrome symptoms in rainbow trout (*Oncorhynchus mykiss*) and reduces load of *Midichloria*-like organism In : *Aquaculture*. 532, 8 p., 736008. <https://www.sciencedirect.com/science/article/pii/S004484862030538X?via%3Dihub> (Henriksens fond og EMFF)

17. Scholz, F., N Vendramin, NJ Olesen, A Cuenca, T Moesgaard Iburg, L Mirimin, I O'Connor, NM Ruane, HD Rodger & E MacCarthy. Experimental infection trials with European North Atlantic ranavirus (Iridoviridae) isolated from lumpfish (*Cyclopterus lumpus*, L). *Diseases of Aquatic Organisms* (submitted) (Aquaexcel2020)

b) International conferences: 2

Annual workshop for fish and crustacean diseases.

Programs available at

<https://www.eurl-fish-crustacean.eu/fish/annual-workshop>

c) National conferences: 0

d) Other:

(Provide website address or link to appropriate information) 0

***ToR 7: To provide scientific and technical training for personnel from OIE Member Countries***

***To recommend the prescribed and alternative tests or vaccines as OIE Standards***

14. Did your laboratory provide scientific and technical training to laboratory personnel from other OIE Member Countries?

Yes

a) Technical visits: 1

b) Seminars: 111

c) Hands-on training courses: 23

d) Internships (>1 month): 0



Type of technical training provided (a, b, c or d)	Country of origin of the expert(s) provided with training	No. participants from the corresponding country
B	australia	2
B/C	Austria	1/1
b	Belgium	1
b/c	Bosnia and Hercegovina	1/1
b/c	Bulgaria	1/1
b/c	Croatia	2/1
b/c	Cyprus	1/1
b/c	Czech Republic	3/2
b	Denmark	13
b	Estonia	2
b/c	Finland	2/1
b	France	5
b	Germany	2
b/c	Ghana	3/2
b	Greece	2
b/c	Iceland; Serbia; Spain; Sweden; Switzerland; Turkey; UK-Scotland, USA	3/1;1/1; 3/1;1/1; 1/1; 2/1; 2/1; 1/1
b	Ireland	2
b	Israel	1
b/c	Italy	8/1
b	Japan	1
b	Lithuania	6
b	Malta	1
b/c	Northern Ireland	2/1
a/b/c	Norway	1/10/1
b	Poland	3
b	Portugal	2

b	Republic of Korea	1
b/c	republic of North Macedonia	2/1
b	Rumenia	1
b	Russia, Slovakia, Slovenia, Tunisia, The Netherlands, UK-England	1,1,7,1,1, 1

***ToR 8: To maintain a system of quality assurance, biosafety and biosecurity relevant for the pathogen and the disease concerned***

15. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)
DS/EN ISO/IEC17025:2005	Akkreditering reg nr 588.pdf
DS/EN ISO/IEC17043:2010	Akkreditering reg nr 515.pdf

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
VHSV Cell cultivation	DANAK 17025:2005
VHSV IFAT	DANAK 17025:2005
VHSV ELISA	DANAK 17025:2005
VHSV RT-PCR	DANAK 17025:2005
IHNV cell cultivation	DANAK 17025:2005
IHNV IFAT	DANAK 17025:2005
IHNV ELISA	DANAK 17025:2005
IHNV RT-qPCR	DANAK 17025:2005
IPNV cell cultivation	DANAK 17025:2005
IPNV ELISA	DANAK 17025:2005
ISA RT-PCR	DANAK 17025:2005
Renibacterium salmoninarum ELISA	DANAK 17025:2005
KHV PCR	DANAK 17025:2005
EHNV cell cultivation	DANAK 17025:2005
EHNV PCR	DANAK 17025:2005
SVCV cell cultivation	DANAK 17025:2005
SVCV ELISA	DANAK 17025:2005
WSSV qPCR	DANAK 17025:2005
Proficiency test for viruses in Fish	DANAK 17043:2010

17. Does your laboratory maintain a “biorisk management system” for the pathogen and the disease concerned?

No

(See *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*, Chapter 1.1.4)

### **ToR 9: To organise and participate in scientific meetings on behalf of the OIE**

18. Did your laboratory organise scientific meetings on behalf of the OIE?

No

19. Did your laboratory participate in scientific meetings on behalf of the OIE?

No

**ToR 10: To establish and maintain a network with other OIE Reference Laboratories designated for the same pathogen or disease and organise regular inter-laboratory proficiency testing to ensure comparability of results**

20. Did your laboratory exchange information with other OIE Reference Laboratories designated for the same pathogen or disease?

Yes

21. Was your laboratory involved in maintaining a network with OIE Reference Laboratories designated for the same pathogen or disease by organising or participating in proficiency tests?

Yes

Purpose of the proficiency tests: <sup>1</sup>	Role of your Reference Laboratory (organiser/participant)	No. participants	Participating OIE Ref. Labs/ organising OIE Ref. Lab.
Inter Laboratory proficiency test 2020 on identification of pathogens causing the exotic and non-exotic fish diseases listed in council directive 2006/88/EC	Organizer	45	6
Inter Laboratory proficiency test 2020 on identification of pathogens causing the exotic and non-exotic fish diseases listed in council directive 2006/88/EC	Participant	45	6

<sup>1</sup> validation of a diagnostic protocol: specify the test; quality control of vaccines: specify the vaccine type, etc.

22. Did your laboratory collaborate with other OIE Reference Laboratories for the same disease on scientific research projects for the diagnosis or control of the pathogen of interest?

Yes

Title of the project or contract	Scope	Name(s) of relevant OIE Reference Laboratories
MoA between National Institute of Aquatic resources (DTU AQUA) of the kingdom of Denmark and the National Fishery products Quality management service of The republic of Korea on cooperative research project for fish diseases control	To enhance and strenghten the bilateral relationship throuhg corroborative research and meetings on the sides for the development and standardization of diagnostic tools; methods to prevent the spread of infectious agents; diseases prevention systems etc. in accordance with basic regulation of the OIE aquatic animal health code	National Fishery Product Quality Management service of the republic of Korea and the National institute of aquatic resources (DTU AQUA) of Denmark
Participation in Interlaboratory proficiency test	To test and assess capability of detection and quantification of fish pathogens	National Institute of Aquati Resources (DTU AQUA) organizer and participants; National Fishery Product Quality Management service of the republic of Korea ; DFO Canada

***ToR 11: To organise inter-laboratory proficiency testing with laboratories other than OIE Reference Laboratories for the same pathogens and diseases to ensure equivalence of results***

23. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than OIE Reference Laboratories for the same disease?

Yes

Note: See Interlaboratory test comparisons in: Laboratory Proficiency Testing at: <http://www.oie.int/en/our-scientific-expertise/reference-laboratories/proficiency-testing> see point 1.3

Purpose for inter-laboratory test comparisons <sup>1</sup>	No. participating laboratories	Region(s) of participating OIE Member Countries
To primarily assess the identification of the fish viruses: viral haemorrhagic septicaemia virus (VHSV); Infectious haematopoietic Necrosis virus (IHNV); Epizootic haematopoietic necrosis virus (EHNV); Spring viraemia of Carp virus (SVCV) AND Infectious Pancreatic necrosis virus (IPNV) by cell culture based methods	45	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East
To assess the ability of participating laboratories to identify the fish pathogens : Infectious salmon anemia virus (ISAV); Salmonid ALphavirus (SAV) and Cyprinid Herpesvirus 3 (KHV) by biomolecular methods PCR based	44	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East
3rd Viral encephalopathy and retinopathy interlaboratory proficiency test 2020	27	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East
Interlaboratory proficiency test 2020 for detection of White Spot Syndrome Virus (WSSV) in shrimp pleopods	25	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
Interlaboratory proficiency test 2020 for detection of Taura Syndrom Virus (TSV) and Yello Head Virus 1 (YHV1) in Shrimp Pleopods	16	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
2020-ILC-01 organized by EU reference laboratory for mollusc diseases, histopathology and cytology	20	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East

**ToR 12: To place expert consultants at the disposal of the OIE**

24. Did your laboratory place expert consultants at the disposal of the OIE?

Yes

Kind of consultancy	Location	Subject (facultative)
OIE aquatic animal health ad hoc working group on susceptible species	OIE, Rue de Prunoy, Paris	Assessment of the species susceptible to the fish diseases listed in the Aquatic Animal Health Code
OIE ref lab for VHS - revision of diagnostic manual	remote working	update of diagnostic manual

25. Additional comments regarding your report: