

OIE Collaborating Centres Reports Activities

Activities in 2021

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Title of collaborating centre:	Emerging Aquatic Animal Diseases
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Name of Director of Institute (Responsible Official):	Dr Rachel Hartnell
Name (including Title and Position) of Head of the Collaborating Centre (formally OIE Contact Point):	Prof Grant D Stentiford
Name of writer:	Prof Grant Stentiford and Dr Kelly Bateman

ToR: To provide services to the OIE, in particular within the region, in the designated specialty, in support of the implementation of OIE policies and, where required, seek for collaboration with OIE Reference Laboratories

ToR: To identify and maintain existing expertise, in particular within its region

1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by the OIE

Disease control	
Title of activity	Scope
Provision of dedicated Fish Health Inspectorate (FHI) to fulfill statutory responsibilities regarding aquatic animal health.	The FHI is responsible for the delivery and enforcement of aquatic animal health legislation in England and Wales.
Epidemiology, surveillance, risk assessment, modelling	
Title of activity	Scope
Provision of aquatic animal health epidemiological surveillance service	Provision of advice for aquatic animal health policy, risk assessment and modelling: design and assessment of surveillance plans.
Training, capacity building	
Title of activity	Scope
Provision of training in sampling and histological analysis of crustacean diseases.	Training participants in sampling techniques for crustacean tissues and histological analysis at the 'Introduction to histopathology in fish and crustacean diseases' training workshop ran by the European Union Reference Laboratory for fish and crustacean diseases.
Contribution to Regional online seminar for the OIE Aquatic Animals Focal Points (organised by OIE), 1-2 December 2021	Four presentations provided by the OIE Collaborating Centre team covering process of utilisation of the Centre (Stentiford), aquatic animal health investigations (Gubbins), new approaches to molecular diagnostics, systematics and pathobiomes (Bass) and the Cefas Virtual Pathology platform for aquatic animal health (Bignell). All presentations made available to the OIE regional team.
Zoonoses	
Title of activity	Scope
National Reference Laboratory for Anisakis.	Maintain capacity and knowledge base for zoonotic nematode parasites. Provide advice to industry, government and other stakeholders as required.
Wildlife	
Title of activity	Scope

Monitoring of health and disease of wild fish, crustaceans and molluscs	Samples of fish, crustacean and mollusc tissues were assessed for disease and samples collected for reference materials.
Aquatic animal diseases	
Title of activity	Scope
International Database on Aquatic Animal Diseases (IDAAD)	Complete review of the disease data, accessions added and updated as required.
OIE experts available for Koi Herpesvirus (KHV) and Spring Viraemia of Carp (SVC).	Provision of expert advice on these disease conditions, their diagnostics, host range, pathogenicity and characterisation, including pathogen testing when required.
Investigation into health of Edible crab stocks (<i>Cancer pagurus</i>)	Following reports of increased mortality in the edible crab fishery in the English Channel the CCEAAD were contacted by colleagues in France and Netherlands to provide assistance and advice with sampling protocols and reference materials.
Provision of advice and materials to the Spanish National Reference Laboratory	Provision of histological materials
Investigation into mortality event of trout	Provision of positive control materials and advice in response to mortality event in trout in Sikkim province. Co-authored publications
Analysis of Red Skin Disease	Analysis of samples of Red Skin Disease (RSD) from affected wild Atlantic salmon for paired histological and metagenomic analysis
Analysis of gonad maturity in spiny lobsters in St Helena	Provision of advice and sampling protocols
Characterise novel pathogen of edible crab in UK waters	Pathogen identified and characterised, paper submitted for publication.
Study to review diseases of freshwater prawn <i>Macrobrachium rosenbergii</i>	Paper due for submission after internal QA checks
Characterisation of novel pathogen in jelly shrimp (<i>Acetes sibogae australis</i>) from Australia	Novel pathogen identified and characterised, paper submitted for publication
Investigation into health issues in mud crab populations and slow growth syndrome in shrimp farms in Sri Lanka	Provision of advice and sampling protocols
Collaboration on description of novel microsporidian infecting oligochaete worms in carp farms in China	Paper due for submission after internal QA checks
Studies to investigate shrimp health and microbiome of shrimp in India	Collaboration on shrimp health and microbiome studies with ICAR India (associate partner laboratory to OIE CC). ICAR funded by British High Commission India
Analysis of Blue crab (<i>Callinectes sapidus</i>) microcell parasite	Assistance provided to complete ultrastructural analysis of a microcell parasite in blue crab tissues
Advice on histological assessment of Herring tissues	CCEAAD provided advice on the histological assessment of testes tissues, following the 2021 Herring Survey in the Gulf of St. Lawrence Atlantic region of Canada. Images were examined and advice provided.

ToR : To propose or develop methods and procedures that facilitate harmonisation of international standards and guidelines applicable to the designated speciality

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the surveillance and control of animal diseases, food safety or animal welfare

Proposal title	Scope/Content	Applicable area
Not Applicable	Not Applicable	<input type="checkbox"/> Surveillance and control of animal diseases <input type="checkbox"/> Food safety <input type="checkbox"/> Animal welfare

ToR: To establish and maintain a network with other OIE Collaborating Centres designated for the same speciality, and should the need arise, with Collaborating Centres in other disciplines

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

3. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same speciality, to coordinate scientific and technical studies?

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
Australian Centre for Disease Preparedness (ACDP)	CSIRO, Australia	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East	Participation in proficiency test for fish and crustacean diseases
EURL for Fish and Crustacean Diseases	DTU, Denmark	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	Sharing of information on fish and crustacean health, participation in interlaboratory proficiency tests, assistance with reviewing "Diagnostic methods and procedures for the surveillance and confirmation of WSSV" and attendance at National Reference Laboratory meetings.
EURL for Mollusc Diseases	Ifremer, France	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	Sharing of information on mollusc health, participation in interlaboratory proficiency tests and attendance at National Reference Laboratory meetings.

OIE Reference Laboratory for AHPND, IHNV, NHP, TSV, WSSV	University of Arizona, USA	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East	Participation in histological proficiency test and acquisition of reference materials.
Antimicrobial Resistance (AMR) Reference Centre	Cefas, UK	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	Provide services in identifying AMR risks to aquatic animals and to help develop and assess the effectiveness of alternatives to use of antibiotics for control of diseases of farmed aquatic animals (particularly in finfish and shrimp).
International Council for the Exploration of the Seas (ICES). Expert group Pathology and Diseases of Marine Organisms	Denmark	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	Reporting of disease emergence and trends in marine fish and shellfish (wild stocks and aquaculture).
International Council for the Exploration of the Seas (ICES). Expert group on crab	Denmark	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	Reporting of disease emergence and trends in wild shellfish stocks
Worldfish	Malaysia	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East	Coordination of Cefas activities and those of Worldfish.
Indian Council of Agricultural Research (ICAR)	India	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East	Provision of positive control reference materials. Collaboration with ICAR (an Assoc Partner laboratory) in India on a British High Commission funded piece of work on shrimp health.
ASEAN Aquatic Animal Health Network	Thailand	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East	Collaboration with Mahidol University and BIOTEC (Thailand) on shrimp health work involving emergency harvests relating to YHV outbreaks
NIWA New Zealand/Biosecurity NZ	New Zealand	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East	Collaboration to investigate health issues in mussels, the presence of Francisella haliotica and vibrios in Ostrea chilensis and Perna sp. samples and the occurrence and genetic typing of Bonamia ostreae. Discussions to establish Associate Partner Lab in New Zealand.

Emerging Pathogens Institute, University of Florida	USA	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East	OIE CC Director to provide keynote at EPI Research Symposium to cover One Health Aquaculture. Inward visit to UK by Professor Behringer from EPI to discuss collaboration in aquatic animal health
EvaG	Various	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	An international group of 25 laboratories that represent an extensive range of virological disciplines, generating and distributing diagnostic materials and protocols globally.
National Agricultural Research Organization (NARO)	Uganda	<input checked="" type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East	Establishment of MOU, advice provided on screening for tilapia viral diseases including Infectious Spleen and Kidney Necrosis Virus (ISKNV), tilapia lake virus (TiLV), tilapia parvovirus (TiPV), nodavirus and herpesvirus (TLEV).

4. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
OIE Collaborating Centre for Epidemiology and Risk Assessment of Aquatic Animal Diseases	Canada and Norway	<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	Discussions with OIE (Stian Johnson) and OIE CCs on provision of online e-learning Co-provision of materials for the Regional online seminar for the OIE Aquatic Animals Focal Points (organised by OIE, 1-2 December 2021)
OIE Collaborating Centre for Economics in Animal Health	UK	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East	Discussions on collaboration and extension of the GBAD approach to cover wider aquatic hazards which impact yield and safety of products arising from aquaculture

ToR: To place expert consultants at the disposal of the OIE.

5. Did your Collaborating Centre place expert consultants at the disposal of the OIE?

Yes

Name of expert	Kind of consultancy	Subject
Prof Grant Stentiford	Advice	Expert pathologist for investigation of aquatic animal diseases. Head of the OIE Collaborating Centre for Emerging Aquatic Animal Diseases. Advocate for One Health Aquaculture
Dr Ed Peeler	Advice	Epidemiology and Risk. Dr Peeler is currently Vice President of the OIE Aquatic Animal Disease Commission.
Dr Kelly Bateman	Advice	Expert in crustacean diseases and coordinator for the OIE Collaborating Centre for Emerging Aquatic Animal Diseases.
Dr Richard Paley	Advice	Expert virologist and member of the ICES Expert Group on Pathology and Diseases of Marine Organisms.
Dr Frederico Batista	Advice	Expert in molluscan diseases and emerging molecular diagnostic tools
Dr David Bass	Advice	Molecular parasitologist with emphasis on pathogen diversity and life cycles; and molecular systematics of novel/emergent pathogens
Dr David Verner Jeffreys	Advice	Expert aquatic animal bacteriologist with specific expertise in antimicrobial resistance. Director of FAO AMR Centre at Cefas
Dr David Stone	Advice	OIE expert on Koi Herpesvirus (KHV) and Spring Viraemia of Carp (SVC)
Mr Michael Gubbins	Advice	Head of the Fish Health Inspectorate, responsible for the National control of aquatic animal diseases in England and Wales.
Mr Christopher Evans	Advice	UK OIE Focal point for Aquatic Animals, Senior Fish Health Inspector

ToR: To provide, within the designated specialty, scientific and technical training to personnel from OIE Member Countries

6. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by the OIE, to personnel from OIE Member Countries?

Yes

- a) Technical visits: 1
- b) Seminars: 1
- c) Hands-on training courses: 1
- d) Internships (>1 month): 8

Type of technical training provided (a, b, c or d)	Content	Country of origin of the expert(s) provided with training	No. participants from the corresponding country

a	A short online workshop on sampling requirements and methodology was provided for St. Helena Government scientists to undertake routine gonadal development analysis and preparation for ad hoc sampling of fish disease events	St Helena	4
b	Presentations at OIE Regional online seminar for Aquatic Animals Focal Points	Various (Europe region)	40
c	Online training course in Histopathology of crustacean tissues	Various (Europe region)	25
d	PhD students in various aspects of shellfish health and pathogen systematics	Various	8

ToR: To organise and participate in scientific meetings and other activities on behalf of the OIE

7. Did your Collaborating Centre organise or participate in the organisation of scientific meetings on behalf of the OIE?

Yes

National/International	Title of event	Co-organiser	Date (mm/yy)	Location	No. Participants
International	OIE Regional online seminar for Aquatic Animals Focal Points	OIE	12/21	Online	50

ToR: To collect, process, analyse, publish and disseminate data and information relevant to the designated specialty

8. Publication and dissemination of any information within the remit of the mandate given by the OIE that may be useful to Member Countries of the OIE

a) Articles published in peer-reviewed journals: 18

- Anderson, L.G., Bojko, J., Bateman, K.S., Stebbing, P.D., Stentiford, G.D., Dunn, A.M. (2021) Patterns of infection in a native and an invasive crayfish across the UK. *Journal of Invertebrate Pathology*, <https://doi.org/10.1016/j.jip.2021.107595>

- Bass, D., Rueckert, S., Stern, R., Cleary, A.C., Taylor, J.D., Ward, G.M., Huys, R. (2021) Parasites, pathogens, and other symbionts of copepods. *Trends Parasitol.* 2021 Jun 19:S1471-4922(21)00115-X. doi: 10.1016/j.pt.2021.05.006.

- Bateman, K.S., Kerr, R., Stentiford, G.D., Bean, T., Hooper, C., Van Eynde, B., Delbare, D., Bojko, J., Christiaens, O., Taning, C.N.T., Smaghe, G., van Oers, M.M. and van Aerle, R. (2021) Identification and full characterisation of two novel crustacean infecting members of the family Nudiviridae provides support for two subfamilies. *Viruses*, 13, 1694. <https://doi.org/10.3390/v13091694>

- Bojko, J., Clark, F., Stewart-Clark, S., Stentiford, G.D. (2021). *Panopeispora mellora* n. gen. n. sp. (Microsporidia) infecting Say's crab (*Dyspanopeus sayi*) from the Atlantic shoreline of Canada. *Journal of Invertebrate Pathology* 184, 107652. <https://doi.org/10.1016/j.jip.2021.107652>
- Collins, E., Ward, G.M., Bateman, K.S., Cheslett, D.L., Hooper, C., Feist, S.W., Ironside, J.E., Morrissey, T., O'Toole, C., Tully, O., Ross, S.H., Stentiford, G.D., Swords, F., Urrutia, A., Bass, D. (2022). High prevalence of *Paramarteilia canceri* infecting velvet swimming crabs *Necora puber* in Ireland. *Diseases of Aquatic Organisms* (in press).
- Cottier-Cook, E.J., Nagabhatla, N., Asri, A., Beveridge, M., Bianchi, P., Bolton, J., Bondad-Reantaso, M.G., Brodie, J., Buschmann, A., Cabarubias, J., Campbell, I., Chopin, T., Critchley, A., De Lombaerde, P., Doumeizel, V., Gachon, C.M.M., Hayashi, L., Hewitt, C.L., Huang, J., Hurtado, A.Q., Kambey, C., Kim, G.H., Le Masson, V., Lim, P.E., Liu, T., Malin, G., Matoju, I., Montalescot, V., Msuya, F.E., Potin, P., Puspita, M., Qi, Z., Shaxson, L., Sousa Pinto, I., Stentiford, G.D., Suyo, J., Yarish, C. (2021). Ensuring the sustainable future of the rapidly expanding global seaweed aquaculture industry – a vision. United Nations University Institute on Comparative Regional Integration Studies and Scottish Association for Marine Science Policy Brief. ISBN 978-92-808-9135-5
- Foster, R., Peeler, E., Bojko, J., Clark, P.F., Roy, H.E., Stebbing P., Tidbury, H., Wood, L., Bass, D. (2021) Pathogens co-transported with invasive non-native aquatic species: implications for risk analysis and legislation. *NeoBiota* 69:79-102 doi.org/10.3897/neobiota.69.71358
- Itoiz, S., Derelle, E., Metz, S., Reñé, A., Garcés, E., Bass, D., Soudant, P., Chambouvet, A. (2021) A new era of emerging parasitic protists: the case of Perkinzoozoa? *Frontiers in Microbiology*, in press
- Kooloth Valappil, R., Anand, D., Kulkarni, A., Mahapatra, M., Kumar, S.H., Bedekar, M.K., Kollanoor, R.J., Mulloorpedikayil, R.G., Mohideenpitchai, M.M., Muthumariappan, S., Panchavarnam, S., Devaraj, K., Bass, D., van Aerle, R. (2021) Three Draft Genome Sequences of White Spot Syndrome Virus from India. *Microbiol Resour Announc.* 2021 Aug 26;10(34):e0057921. [doi: 10.1128/MRA.00579-21](https://doi.org/10.1128/MRA.00579-21). Epub 2021 Aug 26.
- Knipe, H., Temperton, B., Lange, A., Bass, D., Tyler, C.R. (2021) Probiotics and competitive exclusion of pathogens in shrimp aquaculture. *Reviews in Aquaculture* 13: 324-452
- Millard, R.S., Bickley, L.K., Bateman, K.S., Farbos, A., Minardi, D., Moore, K.A., Ross, S.H., Stentiford, G.D., Tyler, C.R., van Aerle, R., Santos, E.M. (2021). Global mRNA and miRNA analysis reveals key processes in early White Spot 2 Syndrome Virus (WSSV) infection. *Viruses* 13, 1140 <https://doi.org/10.3390/v13061140>
- Minardi, D., Ryder, D., del Campo, J., Fonseca, V.G., Kerr, R., Mortensen, S., Pallavicini, A., Bass, D. (2021) Improved high throughput protocol for targeting eukaryotic symbionts in metazoan and eDNA samples. *Molecular Ecology Resources*, [doi: 10.1111/1755-0998.13509](https://doi.org/10.1111/1755-0998.13509)
- Paillard, C., Gueguen, Y., Wegner, K.M., Bass, D., Pallavicini, A., Vezzulli, L., Arzul, I. (2021) Recent advances in bivalve-microbiota interactions for disease prevention in aquaculture. *Current Opinion in Biotechnology*, 73, 225-232 doi.org/10.1016/j.copbio.2021.07.026
- Rajendran K.V., Stentiford, G.D., Bass, D. (2020). The rise of the syndrome – sub-optimal growth disorders in farmed shrimp. *Reviews in Aquaculture* <https://doi.org/10.1111/raq.12550>
- Rueckert, S., Henriquez, F., Bass, D., Tsaousis, A. (2021) The increase in global aquaculture and the associated protists: opportunities and threats. *Microbiology Today*, May 2021.
- Stentiford, G.D., Peeler, E.J., Tyler, C.R., Bickley, L.K., Holt, C., Bass, D., Turner, A., Baker-Austin, C., Ellis, T., Lowther, J., Posen, P., Bateman, K.S., Verner-Jeffreys, D., van Aerle, R., Stone, D., Paley, R., Trent, A., Katsiadaki, I., Higman, W., Maskrey, B., Devlin, M., Lyons, B.P., Hartnell, D., Younger, A., Bersuder, P., Warford, L., Losada, S., Clarke, K., Hynes, C., Dewar, A., Greenhill, B., Huk, M., Franks, J., Dal-Molin, F., Hartnell, R. (2022). A seafood risk tool for assessing and mitigating chemical and pathogen hazards in the aquaculture supply chain. *Nature Food* (in press).
- Urrutia, A., Mitsi, K., Foster, R., Ross, S., Carr, M., Ward, G.M., van Aerle, R., Marigomez, I., Leger, M.M., Ruiz-Trillo, I., Feist, S.W., Bass, D. (2021) *Txikispora philomaios* n. sp., n. g., a micro-eukaryotic pathogen of amphipods, reveals parasitism and hidden diversity in Class Filasterea. *J Eukaryot Microbiol.* 2021 Nov 2:e12875. [doi: 10.1111/jeu.12875](https://doi.org/10.1111/jeu.12875).

- Vaultot, D., Geisen, S., Mahé, F., Bass, D. (2021) pr2-primers: an 18S rRNA primer database for protists. Molecular Ecology Resources, published online 12 July 2021. <https://doi.org/10.1111/1755-0998.13465>

b) International conferences: 10

- Dr Frederico Batista represented the CCEAAD at the 2021 Annual Meeting and Workshop of the National Reference Laboratories for Mollusc Diseases, Online meeting, 16 -17th March 2021.

- CCEAAD colleagues attended the 'UK-INDIA AQUACULTURE PARTNERSHIPS FOR RESEARCH AND INNOVATION' workshop between 8-11 March 2021. The event involved a series of presentation and bilateral workshop/breakouts.

- CCEAAD colleagues co-organised and presented talks/chaired sessions in the 2 day workshop 'Embedding One Health in Aquatic Food Production during Covid19' on 22-23rd March 2021.

- CCEAAD colleagues contributed to a 2-day workshop with Responsible Authorities, WorldFish and other stakeholders focussed on introduction of the One Health Aquaculture concept and prioritisation of animal and human health priorities relating to aquaculture in-country. Topics included emerging aquatic animal diseases, diagnostic competence, seafood safety, anti-microbial resistance (AMR) and water quality.

- Dr Richard Paley attended the 25th Annual Workshop of the National Reference Laboratories for Fish Diseases, Online meeting, 1st June 2021.

- Dr Kelly Bateman attended the 12th Annual Workshop of the National Reference Laboratories for Crustacean Diseases, Online meeting, 2nd June 2021.

- Dr Kelly Bateman was an invited speaker presenting in the Pathological advances in carcinology symposium at the Society for Invertebrate Pathology, online meeting 28th June - 2nd July 2021.

- The CCEAD director presented a keynote presentation on 'One Health Aquaculture' at the Flemish Aquaculture Symposium 2021 (Belgium, 29th October 2021).

- Dr Kelly Bateman was invited to speak at ICES WG CRAB meeting which was held online 9th-11th November 2021. Relevant permissions were obtained from Defra customers to present the recent work on "Amoebic Crab Disease in edible crabs (*Cancer pagurus*) from UK waters".

- The CCEAD director presented a keynote presentation on 'Sustainable aquaculture through the One Health lens' at the European Association of Fish Pathology meeting, online on 21st September 2021.

c) National conferences: 0

d) Other

(Provide website address or link to appropriate information): 0

9. Additional comments regarding your report:

Limited laboratory work was progressed due to COVID-19 restrictions, essential work such as confirmatory testing for notifiable disease and maintenance of culture collections being prioritised. Most of the work completed in this period was desk-based activities.