



## Aquatic Animal Health

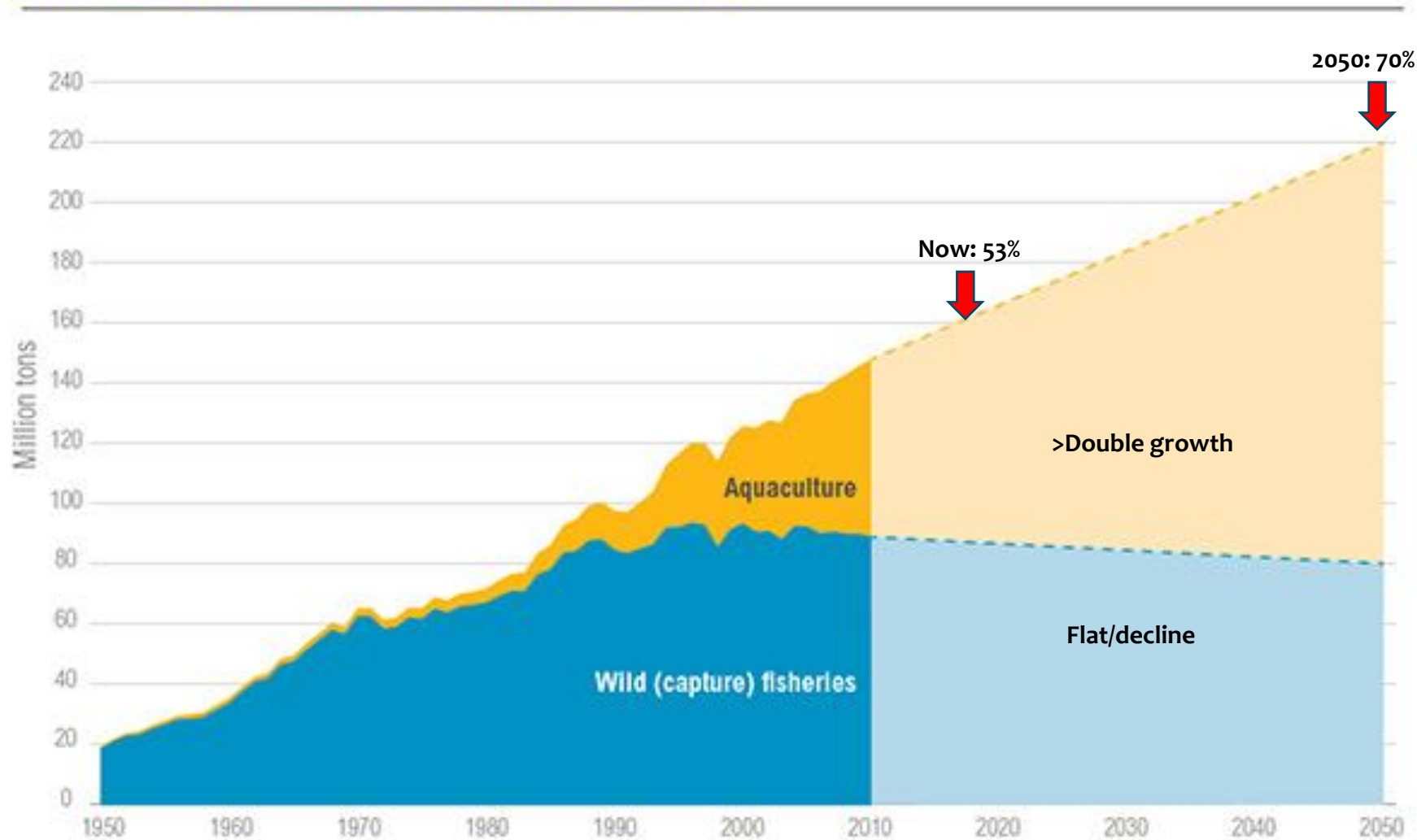


OIE Collaborating Centre for  
Emerging Aquatic Animal Diseases

Dr Kelly Bateman



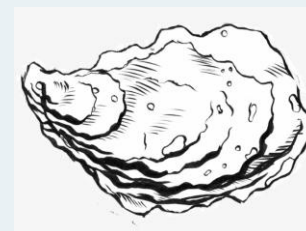
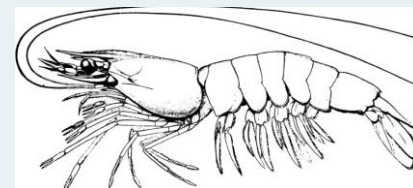
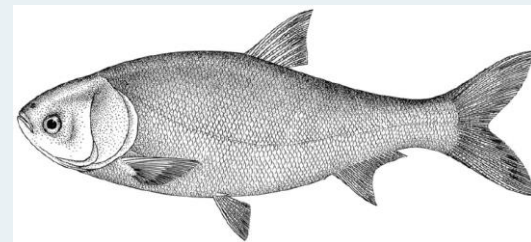
## Aquaculture Is Expanding to Meet World Fish Demand



Source: Historical data 1950–2010: FAO. 2014. "FishStatJ." Rome: FAO. Projections 2011–2050: Calculated at WRI, assumes 10 percent reduction in wild fish catch between 2010 and 2050, and linear growth of aquaculture production at an additional 2 million tons per year between 2010 and 2050.

See [www.wri.org/publication/improving-aquaculture](http://www.wri.org/publication/improving-aquaculture) for full paper.

 WORLD RESOURCES INSTITUTE

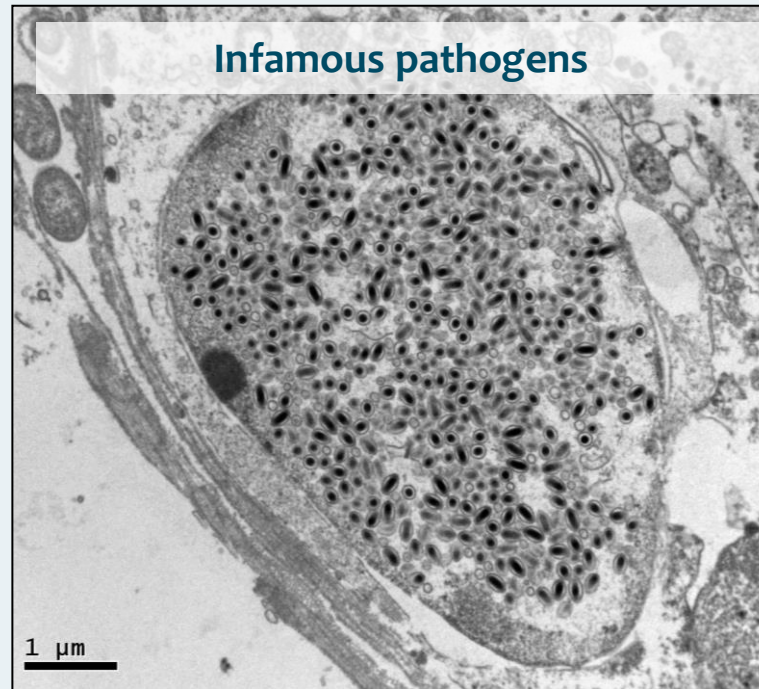


- Fastest growing food sector
- 90% in developing nations
- Highly traded

# Disease is the #1 issue in limiting yield, reducing profit and preventing investment



Emergence rate is high



Deficit in trained professionals/AH investment



Dispersed industry. 90% in Asia

# What is an emerging disease?

'a new infection resulting from the evolution or change of an existing pathogen resulting in a change of host range, vector, pathogenicity or strain; or the occurrence of a previously unrecognized infection or disease'

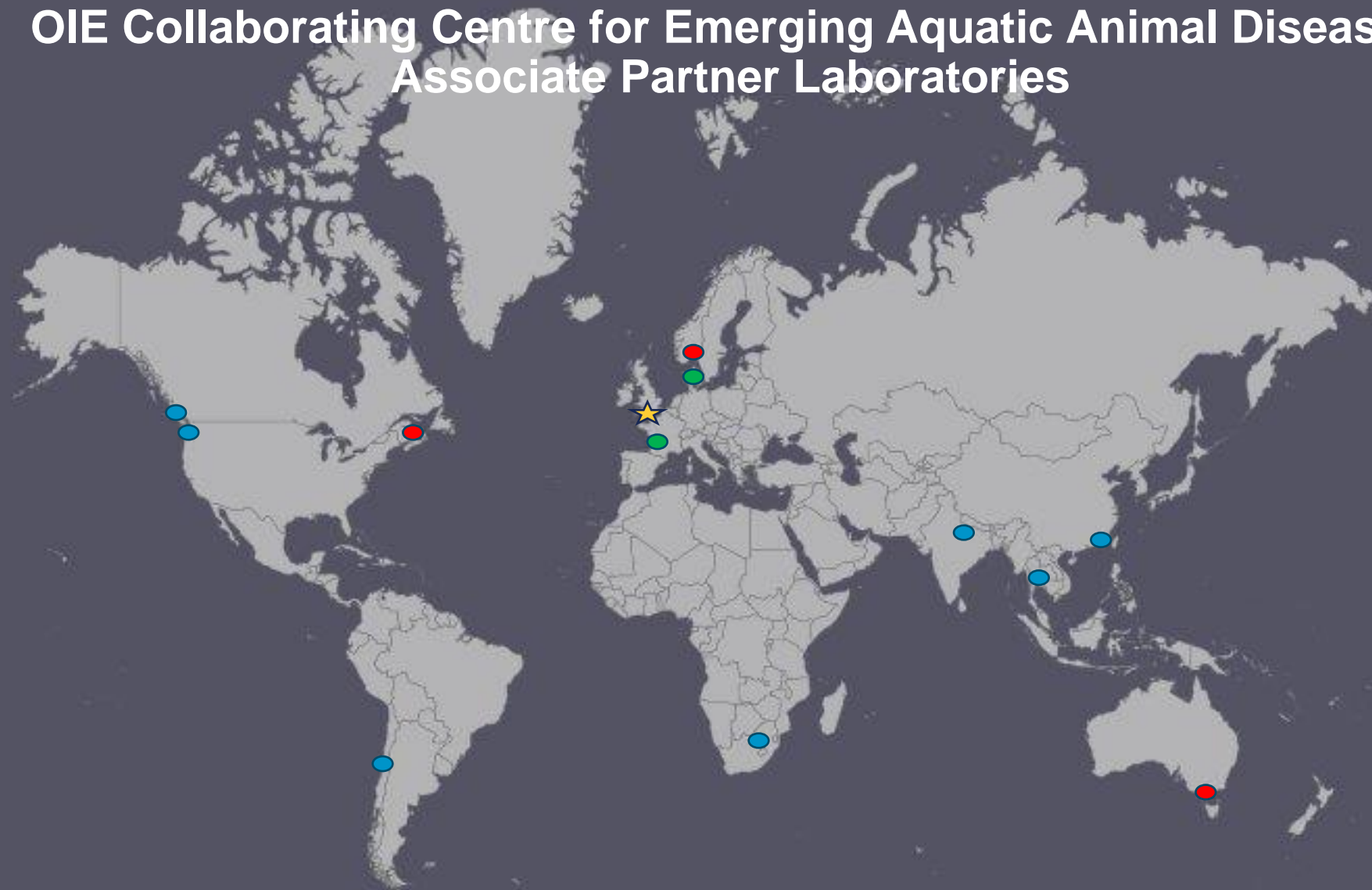
A re-emerging disease is considered an already known disease that either shifts its geographical setting or expands its host range, or significantly increases its prevalence.



# Emerging Diseases in Aquaculture

- High Emergence Rate
- Rapid detection and response to an emerging (or re-emerging) disease is crucial
- From the time a new disease develops until it is detected, a critical time period elapses
- Systematic workflows allow for rapid ID of pathogens
- Key role for Cefas, provision of timely and pragmatic advice to UK Government
- OIE Collaborating Centre for Emerging Aquatic Animal Diseases

# OIE Collaborating Centre for Emerging Aquatic Animal Diseases Associate Partner Laboratories



★ Cefas

• EURLs

• Associate Laboratories

• Collaborating Centres



Centre for Environment  
Fisheries & Aquaculture  
Science



Aquatic Animal Health



OIE Collaborating Centre for  
Emerging Aquatic Animal Diseases



Cefas

- Research
- Diagnostics
- Surveillance
- Modelling
- Policy and advice



## Collaborating Centre for Emerging Aquatic Animal Diseases



The Centre for Environment, Fisheries and Aquaculture Science (Cefas) has been designated by the World Organisation for Animal Health (OIE) as the **Collaborating Centre for Emerging Aquatic Animal Diseases (CCEAAD)**.



Crustacean Health



Fish Health



Molluscan Health

The emergence of disease in farmed and wild aquatic animals poses one of the most significant threats to sustainable food production and to the stability of natural systems.

Rapid detection, characterisation and reporting of the causative agents of disease provide a crucial first step in their control. For this reason the efficient, accurate and prompt reporting of emergent disease threats is the main aim for this OIE Collaborating Centre.

The CCEAAD is a global resource for research, diagnostics, standardisation of techniques and dissemination of knowledge in the field of aquatic animal health.

Cefas is the lead laboratory for the CCEAAD, with a network of Associate Laboratories located in key aquaculture producing regions around the world. Working alongside the collaborating centre, the associate laboratory network will use their expertise in region to identify emerging disease issues and work with the CCEAAD to facilitate rapid diagnosis and characterisation of aetiological and associated factors.

**Grant Stentiford - Head of the  
Collaborating Centre**

**grant.stentiford@cefas.co.uk**

For issues relating to Crustacean Health: **kelly.bateman@cefas.co.uk**



For issues relating to Fish Health: **richard.paley@cefas.co.uk**



For issues relating to Molluscan Health: **frederico.batista@cefas.co.uk**



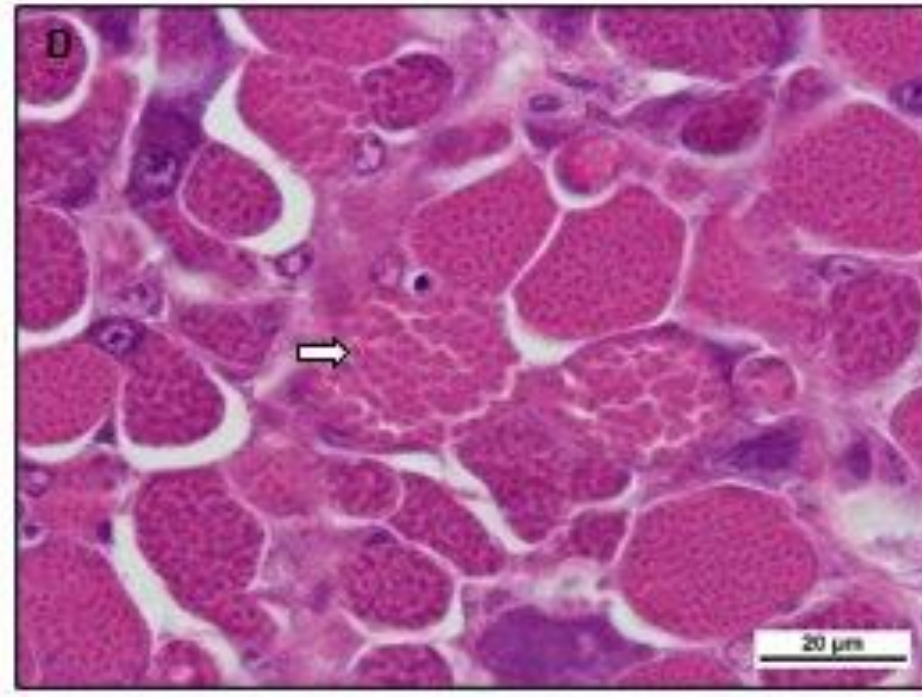
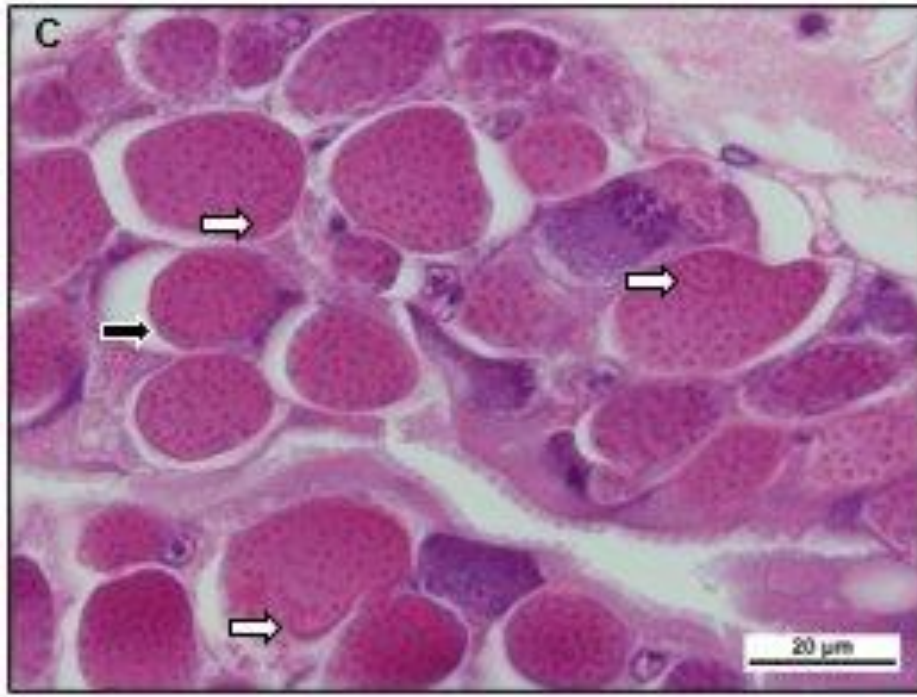
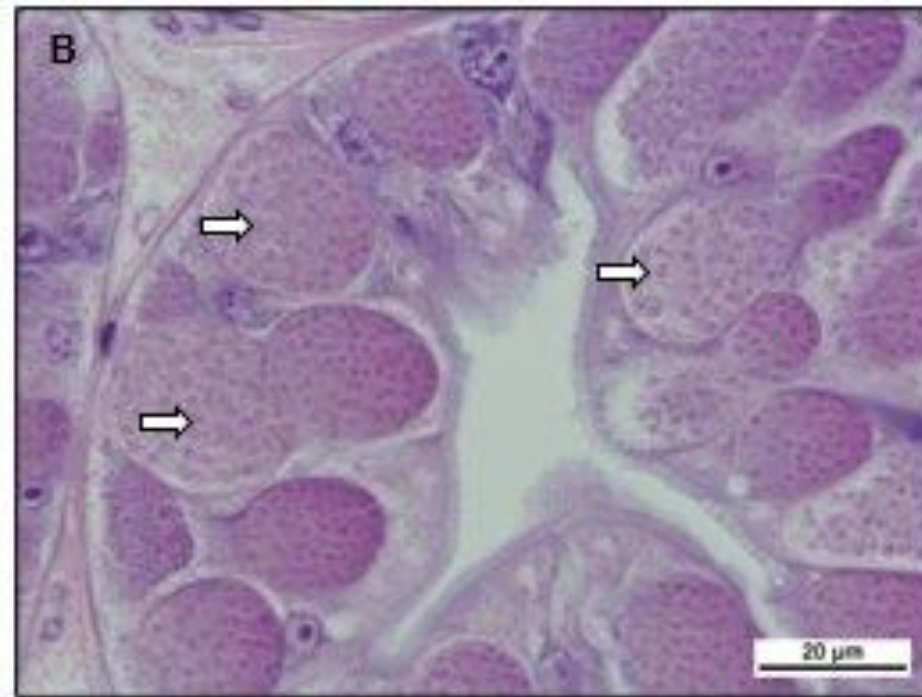
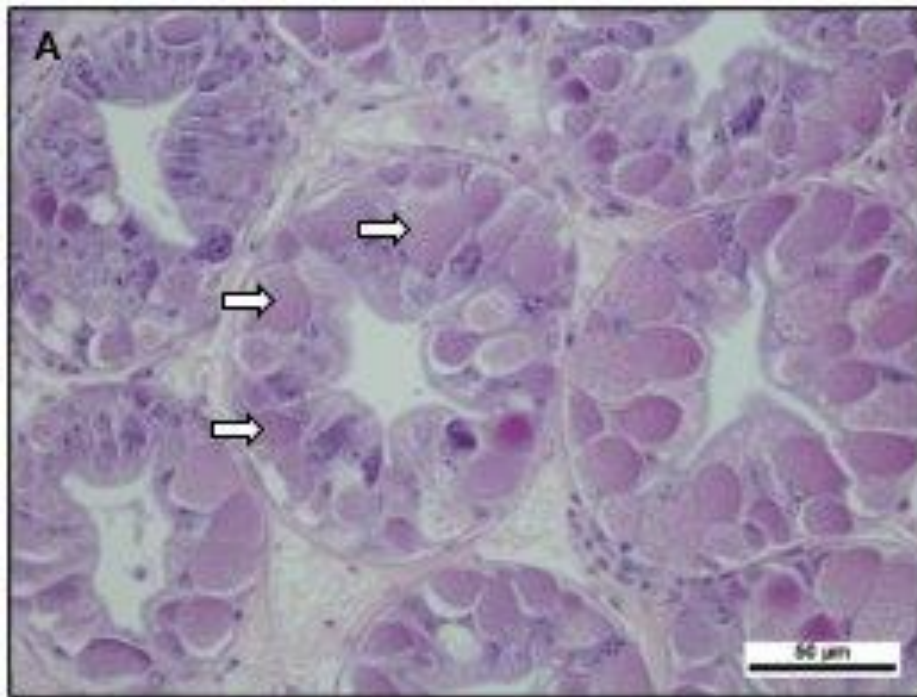


# Jelly shrimp (*Acetes sibogae australis*)

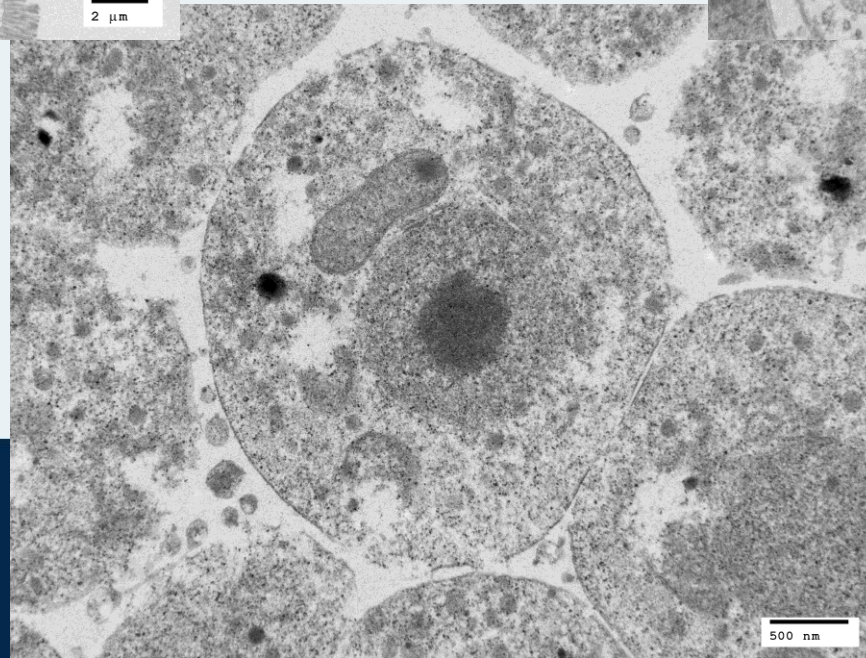
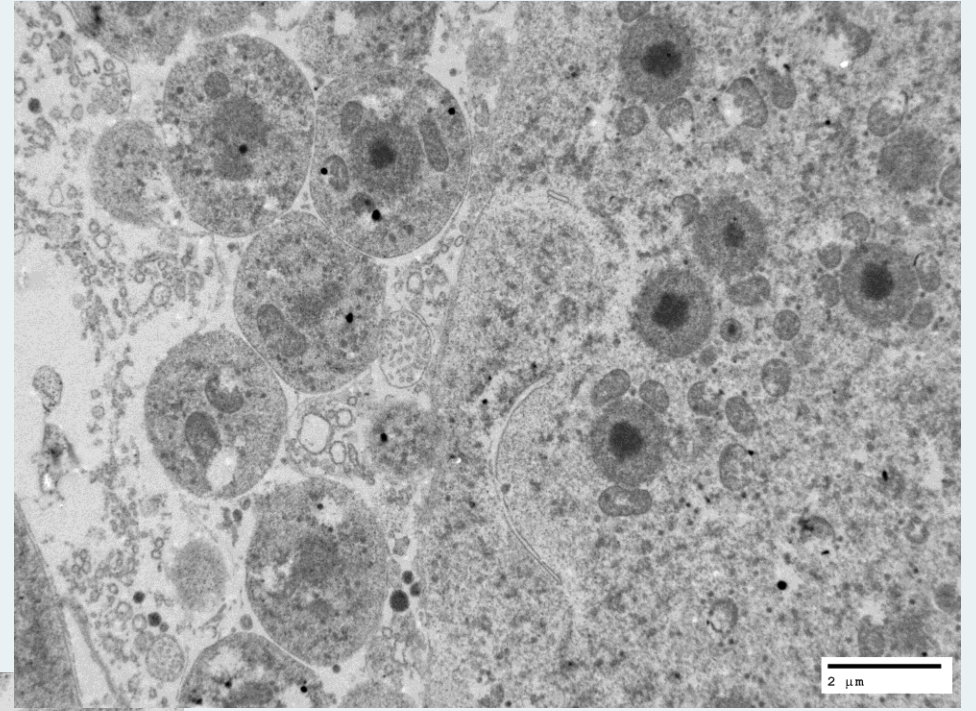
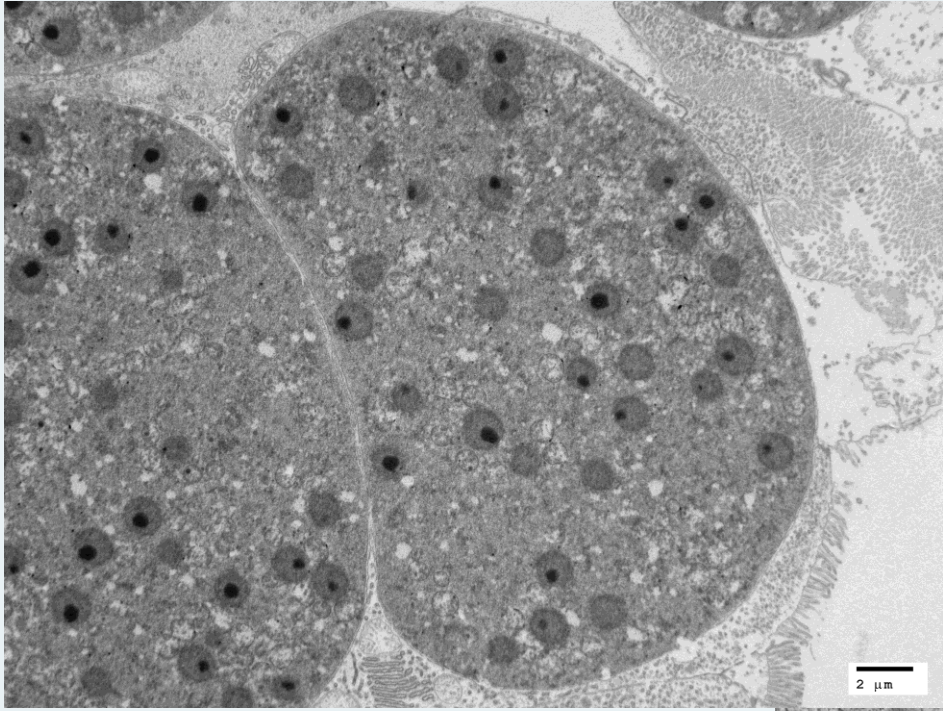


- Contacted by Dr Ben Diggles in Australia to provide assistance with pathogen identification and classification
- Normal jelly shrimp are translucent
- Approx. 5% of shrimp displayed opaque body colouration
- Opaque/white hepatopancreas

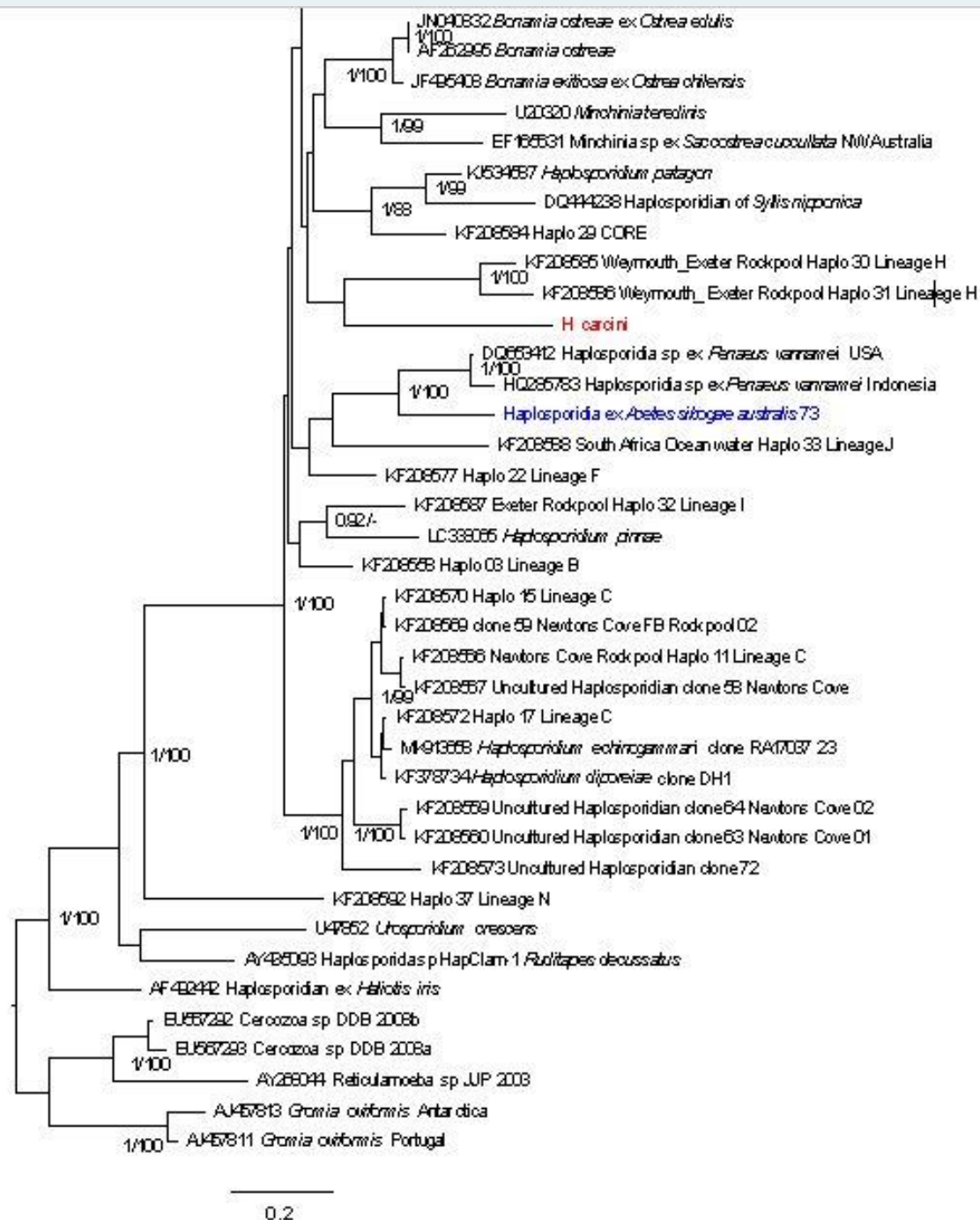




# TEM



# Molecular



- Novel Haplosporidian parasite
- Consensus sequence most closely matched to Haplosporidia ex. *Penaeus vannamei* (100% coverage and 86.67% identity)

# Discovery of novel RNA virus linked to mass mortalities of *Macrobrachium rosenbergii* larvae in Bangladesh



The freshwater prawn, *Macrobrachium rosenbergii* is an attractive aquaculture species due to its fast growth, large size and high export value.

An alternative to marine shrimp, which are susceptible to diseases and have environmental impacts due to the use of salt water.

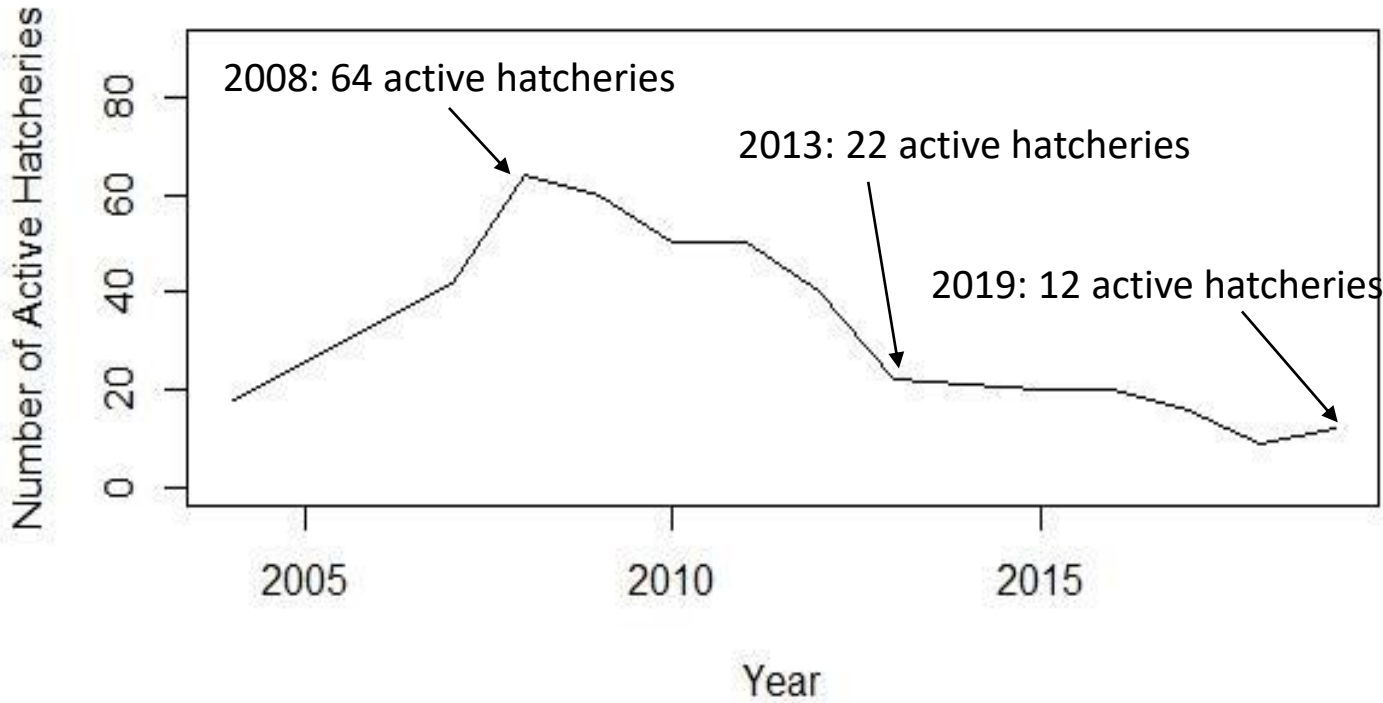
In 2017, worldwide production was >287,000 tonnes.

In 2017 Bangladesh was the World's second largest producer of *M. rosenbergii* producing >48,000 tonnes.





# Discovery of novel RNA virus linked to mass mortalities of *Macrobrachium rosenbergii* larvae in Bangladesh



High mortalities in hatcheries

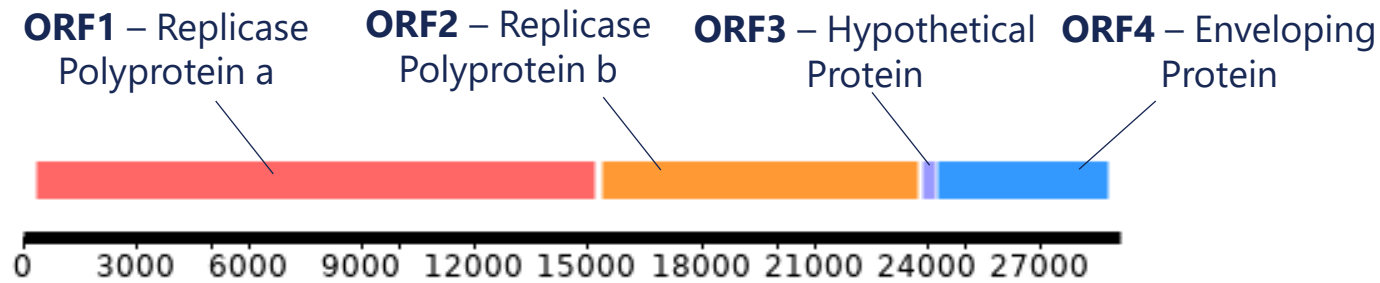
Decline in numbers of hatcheries

Screened for all known pathogens – negative

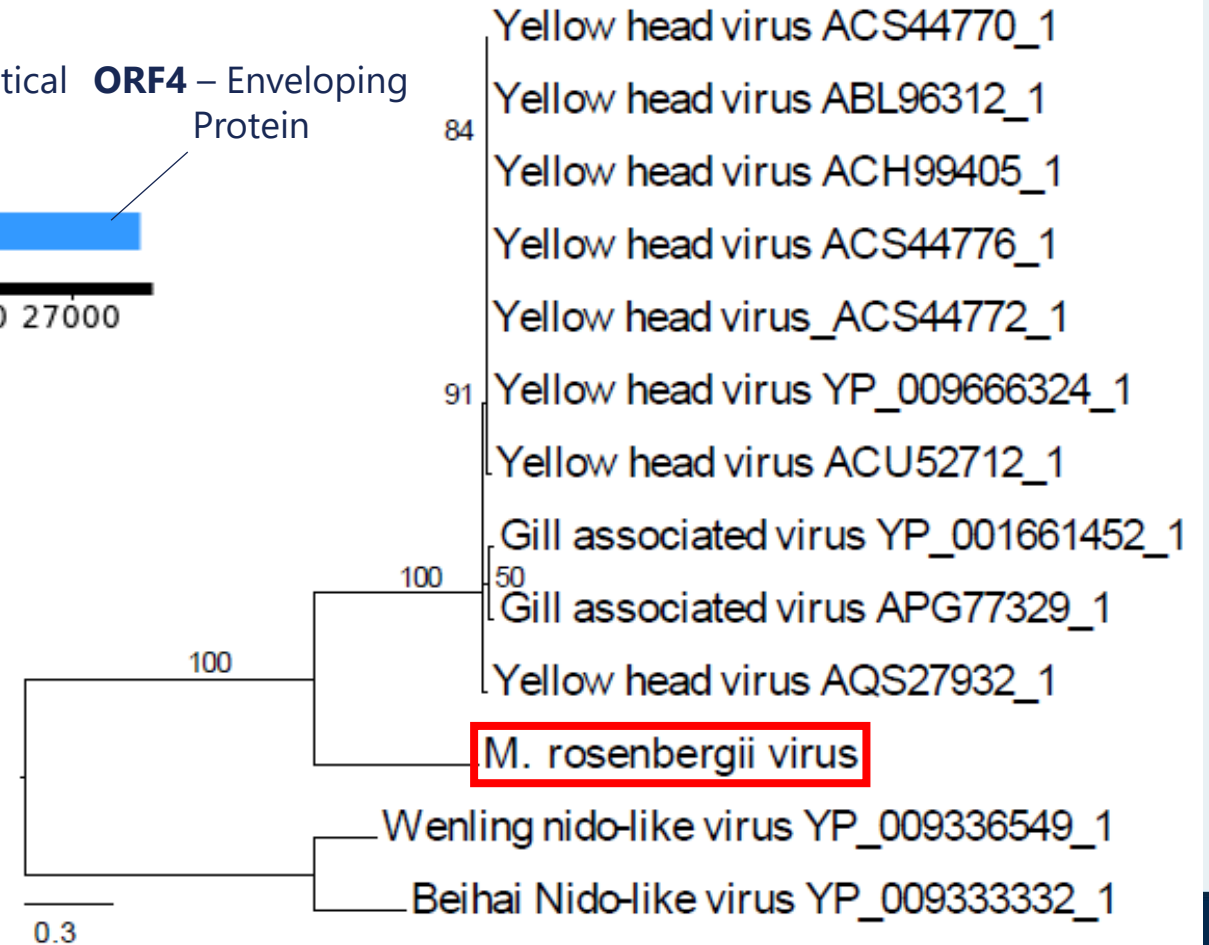
Samples taken for further testing



# Discovery of novel RNA virus linked to mass mortalities of *Macrobrachium rosenbergii* larvae in Bangladesh



A novel 29 kb virus found in larval RNA metagenomic sequence data.





# Discovery of novel RNA virus linked to mass mortalities of *Macrobrachium rosenbergii* larvae in Bangladesh

Novel virus belongs to *Nidovirales* order

*Macrobrachium rosenbergii* Golda Virus (MRGV)

Diagnostic PCR test has been developed and validated

Working with hatcheries to control stocks

Ongoing monitoring of the health of wild *M. rosenbergii* stocks



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Aquatic Animal Health



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Cefas



Article

## A Novel RNA Virus, *Macrobrachium rosenbergii* Golda Virus (MrGV), Linked to Mass Mortalities of the Larval Giant Freshwater Prawn in Bangladesh

Chantelle Hooper <sup>1,\*</sup>, Partho P. Debnath <sup>2,\*</sup>, Sukumar Biswas <sup>3</sup>, Ronny van Aerle <sup>1,4</sup>, Kelly S. Bateman <sup>1,4</sup>, Siddhawartha K. Basak <sup>2</sup>, Muhammad M. Rahman <sup>2</sup>, Chadag V. Mohan <sup>5</sup>, H. M. Rakibul Islam <sup>6</sup>, Stuart Ross <sup>1</sup>, Grant D. Stentiford <sup>1,4</sup>, David Currie <sup>3</sup> and David Bass <sup>1,4,7</sup>

- <sup>1</sup> International Centre of Excellence for Aquatic Animal Health, Centre for Environment, Fisheries and Aquaculture Sciences (Cefas), Weymouth, Dorset DT4 8UB, UK; ronny.vanaerle@cefas.co.uk (R.V.A.); kelly.bateman@cefas.co.uk (K.S.B.); stuart.ross@cefas.co.uk (S.R.); grant.stentiford@cefas.co.uk (G.D.S.); david.bass@cefas.co.uk (D.B.)
- <sup>2</sup> WorldFish Bangladesh, Dhaka 1213, Bangladesh; sidhubau1989@yahoo.com (S.K.B.); muhammad.rahman@gjar.org (M.M.R.)
- <sup>3</sup> Winrock Bangladesh, Dhaka 1212, Bangladesh; sukumar.biswas@winrock.org (S.B.); david.currie@winrock.org (D.C.)
- <sup>4</sup> Centre for Sustainable Aquaculture Futures, University of Exeter, Stocker Road, Exeter EX4 4QY, UK
- <sup>5</sup> WorldFish, Penang 11960, Malaysia; v.chadag@gjar.org
- <sup>6</sup> Bangladesh Fisheries Research Institute, Shrimp Research Station, Bagerhat 9300, Bangladesh; rakib.bfri@gmail.com
- <sup>7</sup> Department of Life Sciences, the Natural History Museum, London SW7 5BD, UK
- \* Correspondence: chantelle.hooper@cefas.co.uk (C.H.); p.debnath@gjar.org (P.D.)

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**Abstract:** Mass mortalities of the larval stage of the giant freshwater prawn, *Macrobrachium rosenbergii*, have been occurring in Bangladesh since 2011. Mortalities can reach 100% and have resulted in an 80% decline in the number of hatcheries actively producing *M. rosenbergii*. To investigate a causative agent for the mortalities, a disease challenge was carried out using infected material

Hooper *et al.* 2020. A novel RNA virus, *Macrobrachium rosenbergii* Golda virus (MrGV), linked to mass mortalities of the larval giant freshwater prawn in Bangladesh. *Viruses*. 12 (10), 1120; <https://doi.org/10.3390/v12101120>



# Acknowledgements

*Nidovirus in Macrobrachium rosenbergii*

Chantelle Hooper, Partho Debnath, Sukumar Biswas, Ronny van Aerle, Siddhawartha Basak, Rakibul Islam, David Bass



Jelly shrimp haplosporidian

Ben Diggles, Rose Kerr, Grant Stentiford, David Bass





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# Thank you