The first reported detection of infectious hypodermal haematopoietic necrosis virus (IHHNV) infection in the European Union

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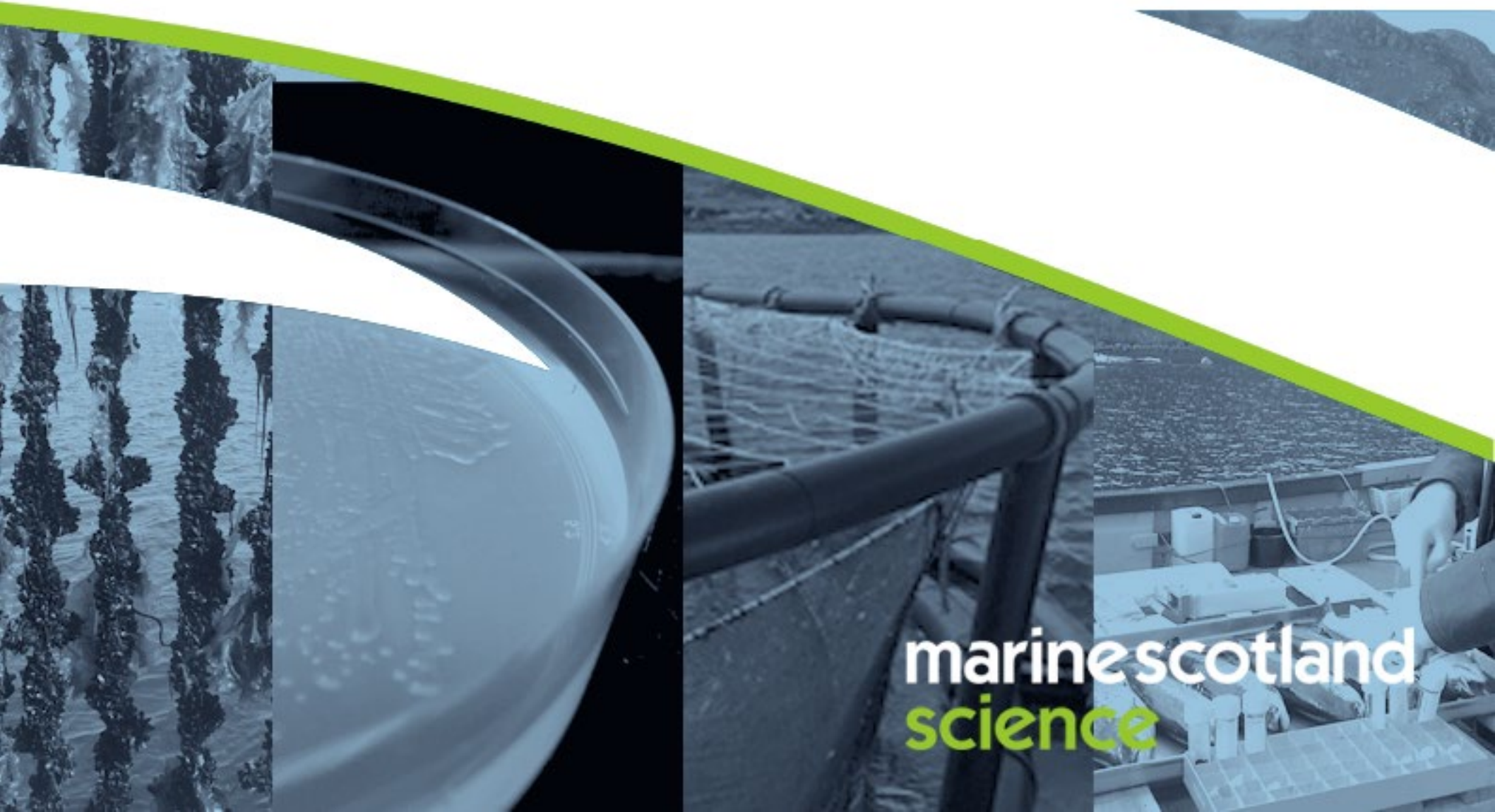
Scottish Government
Riaghaltas na h-Alba
gov.scot



Importation of whiteleg shrimps (*Litopenaeus vannamei*)

- ~ 350,000 post-hatch larval whiteleg shrimps (*Litopenaeus vannamei*) were imported from a hatchery in Texas, USA

18 April 2019

- Veterinary export certificate assigned to the shipment

- ~ 50% mortality during transport to Scotland

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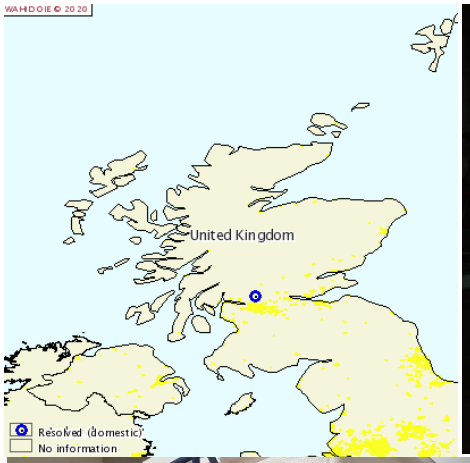
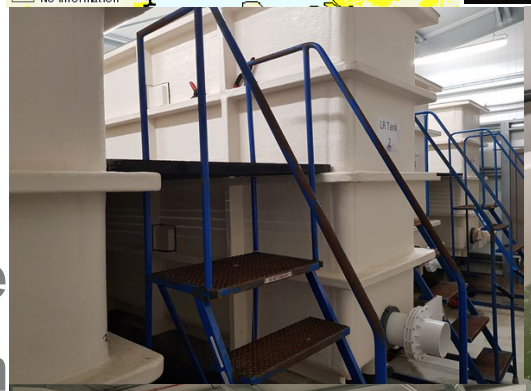
The aquaculture site

- Land based, closed containment tank facility located in central Scotland

- Supplied with artificial heated seawater within recirculation units

- The facility consists of a large building separated into 2 main units 1) Hatchery
  2) Production





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Diagnostic Investigations

- **Extremely poor and variable growth observed**
  - 4.5 month old:- expected weight ~ 25g; average weight ~ 2g
- **~ 43,000 shrimp on site from the initial 350,000 that were imported.**
- **Samples sent to a private laboratory for analyses.**
  - IHHNV detected by conventional PCR.
- **MSS were immediately informed and a FHI attended the site to initiate a disease investigation.**

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Diagnostic Investigations

- 30 individuals were tested histopathology and molecular screening

- Cephalothorax - No clear cases of IHHNV observed No Cowdry type A inclusion body

- 24/30 tested IHHNV +ve by PCR (Tang et al., 2000; 389 F/R)

Tang et al. (2000) Postlarvae and juveniles of a selected line of *Penaeus stylirostris* are resistant to infectious hypodermal and hematopoietic necrosis virus infection. Aquaculture, 190, 203–210

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Diagnostic Investigations

- DNA sequence analysis revealed 100% identity with decapod Penstyldensovirus 1 (IHHNV).

Primer Set	Size	Sequence
IHHNV 389 F/R (Tang et al. 2000)	389bp	389F CGGAACACAACCCGACTTTA 389R GGCCAAGACCAAAATACGAA
IHHNV 392 F/R (Tang et al. 2000)	392bp	392F GGGCGAACCAGAATCACTTA 392R ATCCGGAGGAATCTGATGTG
IHHNV 77012F/ 77353R (Nunan 2000)	356bp	77012F ATCGGTGCACTACTCGGA 77353R TCGTACTGGCTGTTCATC

- Movement records confirmed that no live animal were moved off the site.

Tang et al. (2000) Postlarvae and juveniles of a selected line of *Penaeus stylirostris* are resistant to infectious hypodermal and hematopoietic necrosis virus infection. Aquaculture, 190, 203–210
Nunan et al. (2000) Use of polymerase chain reaction for the detection of infectious hypodermal and hematopoietic necrosis virus in penaeid shrimp. Mar. Biotechnol., 2, 319–328

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Cull of stock and disinfection

- **The company culled the stock in the production unit on 16 July 2019.**

- **In addition, 300 whiteleg shrimp were housed in a physically separated hatchery unit.**
  - They were also imported from the same facility in Texas but at a different time point to the infected population.
  - No clinical signs of disease or significant mortality reported.
  - Company took the decision to cull as a precautionary biosecurity measure.

- **The site was fully disinfected by high test hypochlorite to achieve 500ppm free chlorine in the storage reservoir and pipework.**

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Summary

- **IHHNV detected by conventional PCR at a land based, closed system tank facility in central Scotland.**
  - Distantly located from coastal areas and the waters surrounding the United Kingdom do not contain IHHNV susceptible species.
  - Stock culled, site disinfected and left fallow.

- **IHHNV was subsequently confirmed at the export hatchery in Texas after the transport of shrimp to Scotland.**

- **A site in England also imported from the same hatchery; stock confirmed as infected with IHHNV.**

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First detection of IHHNV in England

Christopher Evans
Fish Health Inspector, Cefas

2019 investigation into IHHNV contact site at a prawn farm in England

Following the IHHNV confirmed positive in Scotland (August 2019), controls were placed on a prawn farm in England which had imported stock from the same site in the USA

Prawn farm -

- Producer of tropical Whiteleg shrimp (*Penaeus vannamei*) for the human consumption market
- Fully enclosed recirculating aquaculture system. Located inland and > 1000m from any natural water course
- Imports post-larval Whiteleg shrimp from the USA

Disease investigation and samples

- Initial Designation (ID) was placed on the site on suspicion of a new and emerging disease in the UK. The disease isn't listed by EU or under national measures
- The ID ensured no live movements of animals off site, the only movements permitted were as product for human consumption
- Site was inspected and samples collected in early August 2019
- None of the clinical signs associated with chronic IHHNV infection were observed, nor any significant mortalities
- 150 *P. vannamei* sampled at Cefas Weymouth laboratory



Disease investigation and samples

- Each animal sampled individually using OIE Standards methods
- Sample was grouped depending on the import source / batch

Molecular diagnostic results:

- All 3 groups within the 150 animal sample were positive for IHHNV using the OIE recommended 389F/R primer set and a product from each was confirmed as IHHNV by sequence analysis sharing 99% nucleotide identity with the published sequence.
- The positive results were confirmed using the 392F/R and 77012F/77353R primers sets, and a product from each group generated when using the 392F/R was confirmed as IHHNV by sequence analysis; sharing 100% nucleotide identity with the published sequence for IHHNV.

Disinfection and follow-up

- Disinfection took place in 3 stages in August, September and December 2019
- Subsequent imports were also sampled for IHHNV in September, October and November
- All subsequent samples were negative for IHHNV by PCR
- IHHNV is OIE listed and so Immediate Notification on confirmation and follow up reports were submitted throughout the process
- By December 2019 the case was resolved. We maintain contact with the site through our routine disease monitoring and compliance inspection programme

Thanks

Any questions?

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