

Response actions to aquatic animal disease emergencies:

Wageningen Bioveterinary Research, NL

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Introduction: Wageningen Bioveterinary Research of

Wageningen UR at Lelystad:



Government veterinary institute

Tasks NRL for Fish, Crustacean and Shellfish Diseases:

- Notifiable task (EU and OIE)
 - Diagnosis at suspicion fish, shellfish & crustacean diseases
 - Active monitoring shellfish diseases
- Multidisciplinary diagnosis fish & shellfish diseases
- Consultancy on fish, crustacean and shellfish diseases (national, EU, EFSA, OIE, FAO, ...)
- Research: eel, carp & goldfish viruses, oyster parasites, contact zoonotic bacteria



Introduction: My team: WBVR: NRL for Fish, shellfish and Crustacean Diseases since 1985

Michal Voorbergen, Dr. Olga Haenen, Rianka Vloet, and Betty van Gelderen

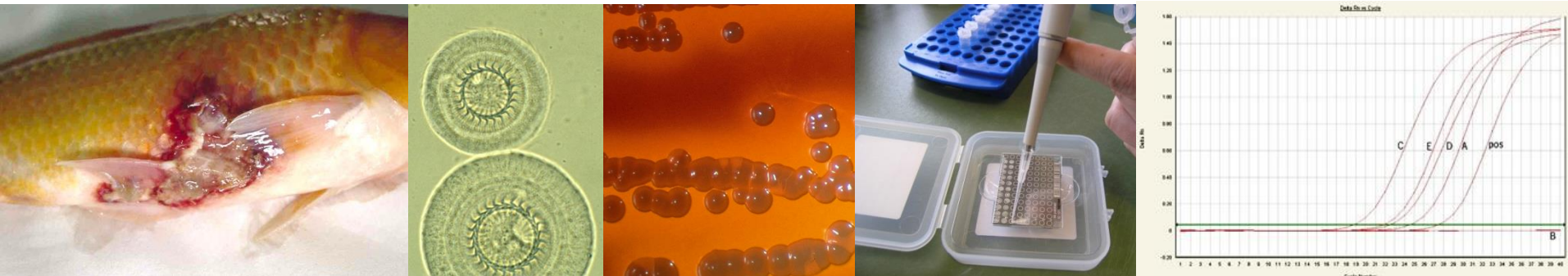


Shellfish & molecular tests:
Dr. Marc Engelsma



Our aquatic diagnostic service

- **Clients:** fish farms, vets, zoos, Vet Authority (for export), wild fish boards, ornamental fish traders, private fish owners, fish experimental facility keepers, spa's...
- **Multidisciplinary diagnosis:** necropsy, parasitology, bacteriology, virology, molecular techniques, histopathology (ISO 9001/17025)



Lectureship healthy and safe insect culture



- At HAS University of Applied Sciences
- Since Jan 2018, for 4 years
- Aim: healthy and contact safe (bact) insect culture for (fish) feed and food, and BSc education

www.has.nl



INVIS

Role/mandate and structure of **WBVR** regarding aquatic mass mortality events : 2006/88/EC / Animal Health Law /OIE



Ministerie van Landbouw,
Natuur en Voedselkwaliteit

Ministry of Agriculture, Nature and Food Quality: Minister, Directorates, CVO



Nederlandse Voedsel- en
Warenautoriteit
Ministerie van Economische Zaken

Veterinary Service (NVWA) of the
Ministry of Agr., Nature and Food Quality
Practice: Registration, Notification, Sampling &
transport samples to WBVR, Interventions

Wageningen
Bioveterinary
Research



WBVR : Notification, Diagnostics at suspicion and confirmation, Advice

Fish farmer : Notification, Control, on own costs

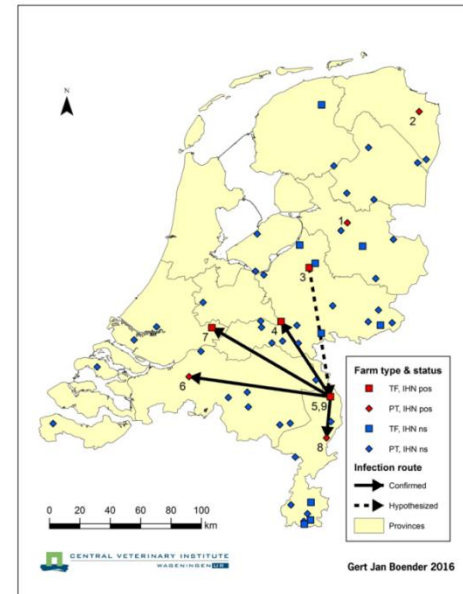
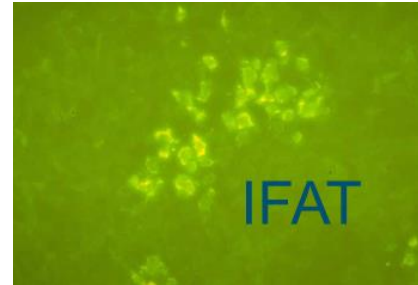
Vet : Notification, Regular sampling, Control

EXAMPLE 1: **IHNV** (Infectious Hematopoietic Necrosis Virus) disease outbreaks in NL

- April 2008 – Nov 2011 :
 - 8x in rainbow trout from 6 **put and-take fisheries** (symptomatic and asymptomatic), and
 - 4x in rainbow trout from 3 **rainbow trout farms** (of which two co-infected by infectious pancreatic necrosis virus, IPNV)
- Aug 2016: 1x at **put and-take fisheries**



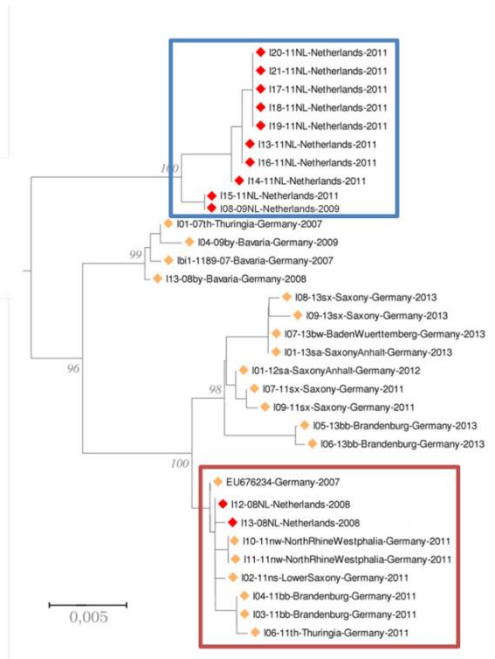
Epidemiology of **IHNV** in NL



Journal of Fish Diseases 2016, 39, 971-979 doi:10.1111/jfd.12434

2008 - 2011 (and ... in 2016)

Origin: probably Germany



First evidence of infectious hematopoietic necrosis virus (IHNV) in the Netherlands

O L M Haenen¹, H Schuetze², M Cieslak², S Oldenburg³, M A H Splerenburg³, I Rozenburg-Hengst⁴, M Voorbergen-Laarman¹, M Y Engelsma¹ and N J Olesen⁴

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³ Netherlands Food and Consumer Product Safety Authority NVWA, Utrecht, The Netherlands
⁴ Fish Diseases Unit (EURL), Section for Virology, DTU National Veterinary Institute, Frederiksberg C, Denmark

Abstract

In spring 2008, infectious hematopoietic necrosis virus (IHNV) was detected for the first time in the Netherlands. The virus was isolated from min-

Keywords: epidemiology, infectious hematopoietic necrosis virus, rainbow trout, the Netherlands.

- Haenen et al., 2016 (*J. Fish Dis.*)
- poster at Oslo Aquatic Epid. Conference, Sept 2016

Measures taken against IHN (2006/88/EC)

- NL: No active surveillance for fish diseases, no IHNV-free farms
- Farms all have status *unknown*
- Mortality/signs => Suspicion, sampling by **NVWA**, and halt on transport => samples to WBVR
- Testing RT-qPCR at **WBVR** => IHNV **+**, in parallel virus isolation & IFAT => confirmed
- Notification to **CVO** => notification to EU and OIE
- In some cases culling, not always possible (too deep water)
- Status *infected*, and in time again status *unknown*, no compensation.

Example 2: **Schiphol**: mortalities in imports of ornamental fish (2015)



- Globally: billions ornamental fish transported
- 50% from all tropical ornamental fish originates from SE-Asia
- The Netherlands important import- and transfer port: billions of ornamental fish per year
- In thousands of Dutch households 11 billion ornamental fish are kept in aquaria

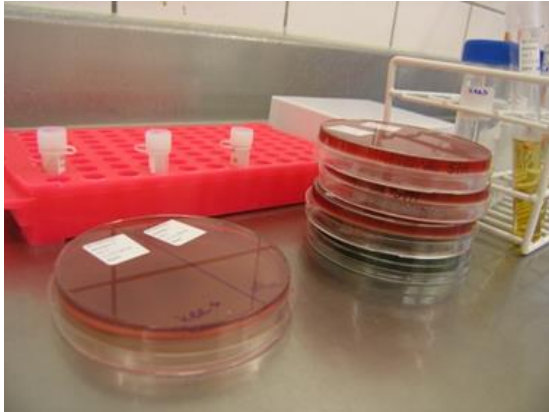
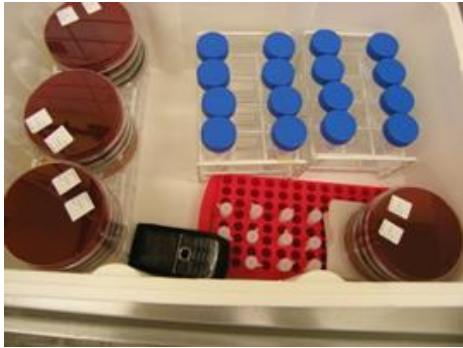


Schiphol: import of ornamental fish

- Transport of live ornamental fish → stress → immune suppression → susceptible to bacterial infections...
- Fish long time underway => mortality
- **NVWA** veterinarian at Schiphol checks bags
- In case of sick or dead fish, whole bag discharged



Project at **WBVR** of Schiphol fish (36 species/ genera from 13 countries): Necropsy, bacteriology, virology, a.o.



One issue: Goldfish showing clinics: Virology for **CyHV-2** (goldfish herpes virus)



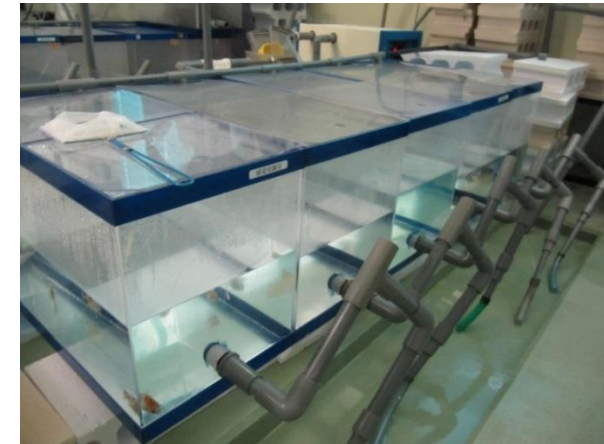
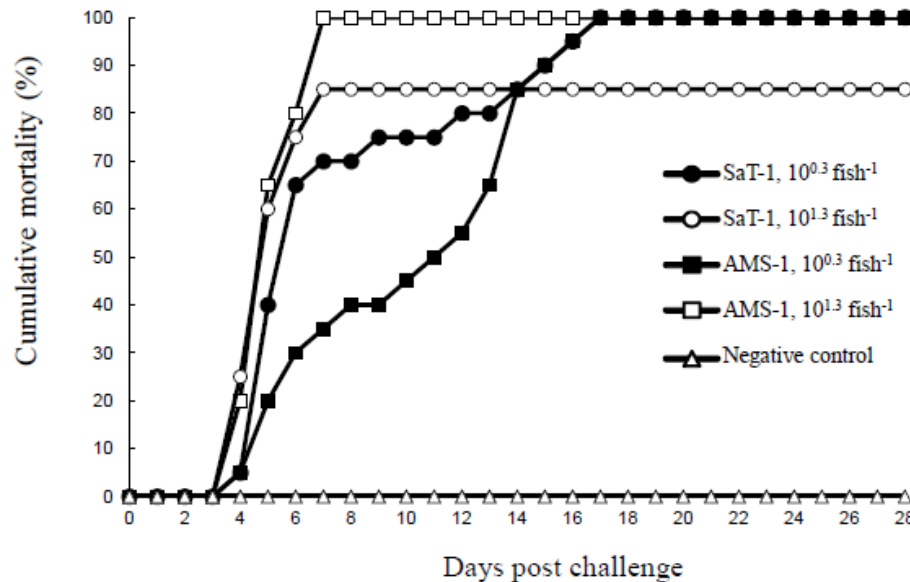
Kidney at -80°C → CyHV-2 virus isolation, PCR, and sequencing, and pathogenicity tests

(at lab NRIA, Japan, in kind cooperation with T. Ito *et al.*)

Some goldfish imports from **Israel** and **Singapore** contained **CyHV-2** (in 2018 also found in goldfish imported from **China**).

Results infection trial with CyHV-2 (*Ito et al., 2017*): Imported CyHV-2 was highly virulent

Group	Infectious dose (TCID ₅₀ fish ⁻¹)	Cumulative mortality (%)	Dead fish		Surviving fish	
			PCR	Virus re-isolation	PCR	Virus re-isolation
SaT-1	10 ^{0.3}	100	20/20	20/20	-	-
	10 ^{1.3}	85	17/17	17/17	3/3	0/3
AMS-1	10 ^{0.3}	100	20/20	20/20	-	-
	10 ^{1.3}	100	20/20	20/20	-	-
Negative control		0	-	-	0/20	0/20



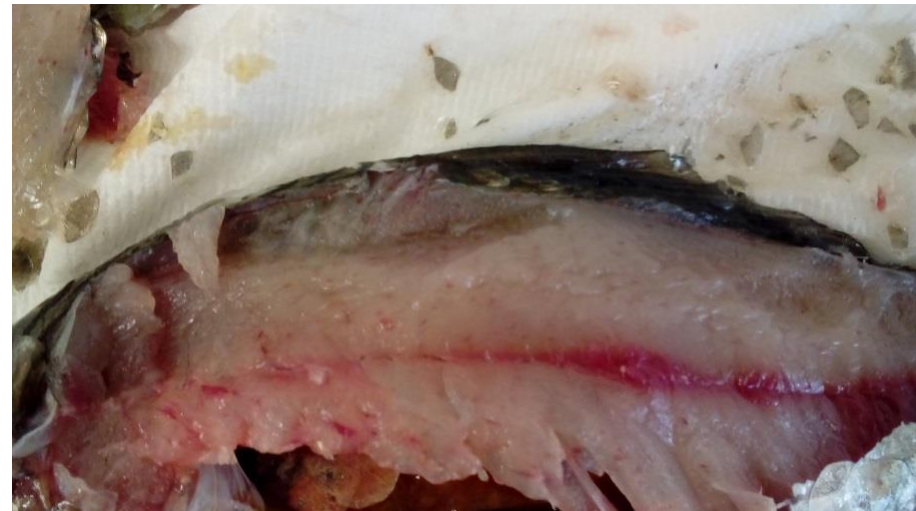
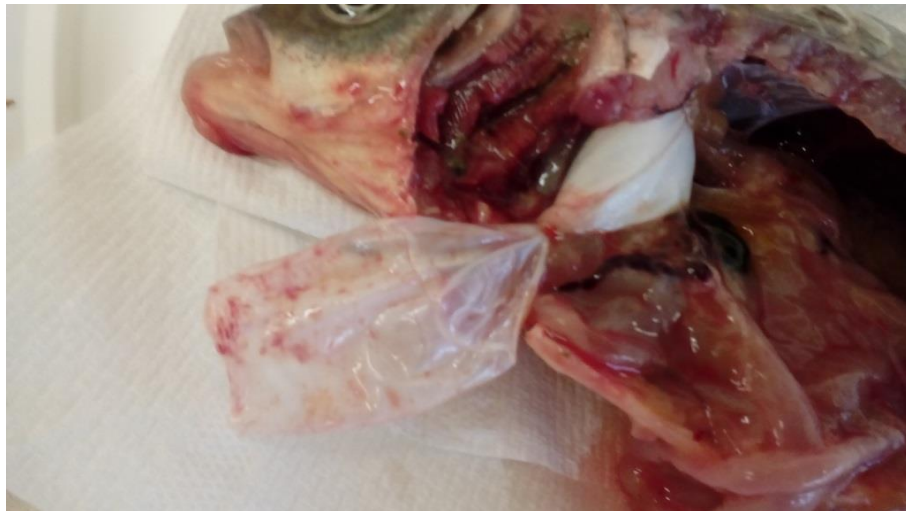
at NRIA in Matsusaka City, Japan,
with Dr. T. Ito and coworkers



CyHV-2 mass mortality in Dutch gibel carp, *Carassius gibelio*, Aug 2016



No measures taken,
as gibel carp is an invasive fish species
in the Netherlands.



Gibel carp production 7 x 10⁶ tons/year in China

With courtesy Prof.dr. Lingbing Zeng, **China**, 2017, via prof. N.J. Olesen:

Prussian carp spleen and kidney necrosis (CyHV-2)



Carassius gibelio



Lessons learnt and improvements

■ IHN:

- As diseases like IHN spread occurs across borders, epidemiologists in Europe should actively cooperate to understand and prevent the spread of IHNV.
- Moreover, accurate notification by fish farmers seeks financially compensation. Must have been longer in NL, but was not notified, as farms get closed and farmers get no compensation.

■ CyHV-2 Schiphol:

- There is a risk of aquatic animal disease via imports of (ornamental) fish to wild fish - in this case gibel carp - populations.
- All involved persons, including fish importers should be aware of this, and appropriate prevention, hygiene, and waste water treatment should be in place.

A warm **thank you** to the organizers of
this meeting: Dr. Melba and colleagues!



Dutch painting by
Jan van Kessel, appr. 1650

A high-angle photograph of a cobblestone pavement. The pavement is composed of dark, irregularly shaped stones. Overlaid on this surface are several concentric white-painted circles, creating a circular pattern that recedes into the distance. The lighting is bright, casting soft shadows between the stones.

Thank you for your attention!

Our publications on fish & shellfish diseases: please see www.wur.nl/bvr