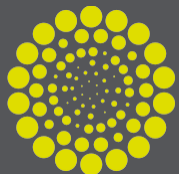


Health status of farmed cyprinids in the Czech Republic

Lubomír Pojezda
Veterinary Research Institute, Brno



VRI

30. 5. 2022
Kgs. Lyngby

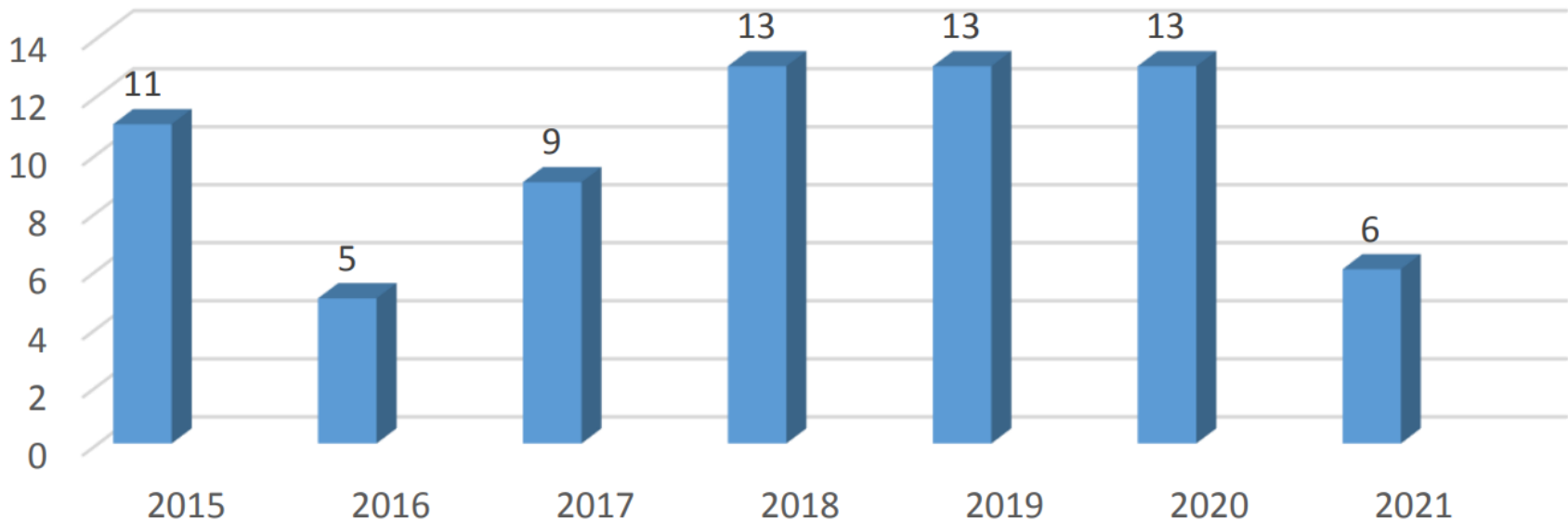
Cyprinids in Czechia

- 20 000 tones annually
- 90 % of local aquaculture
- common- grass- bighead- carp

Environmental* factors

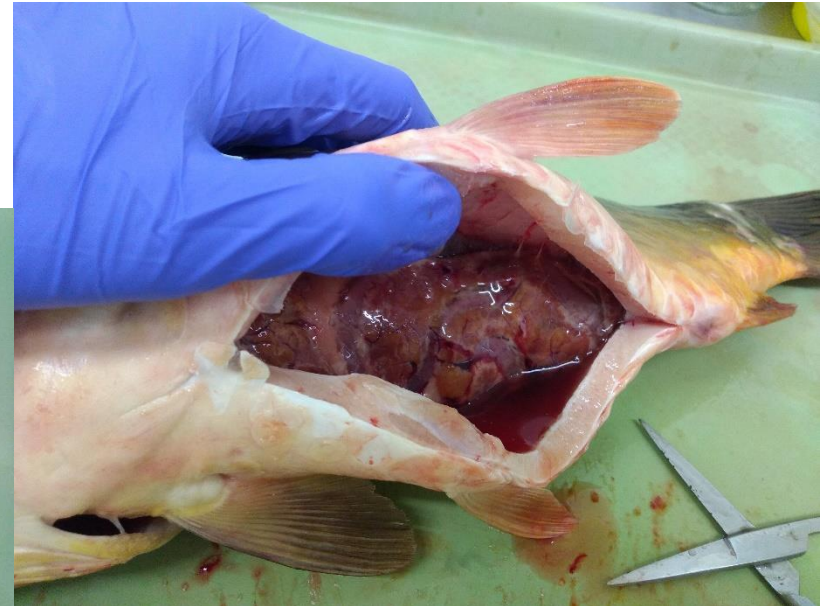
- rainfall down, temperatures up
- eutrophication
- O₂ depletion
- *industrial accidents

Mass mortality events of fish, environmental causes. Source: svscr.cz



Bacterial diseases

- *Aeromonas hydrophila*
- ATB resistance
 - oxytetracycline, florfenicol
 - amoxicillin...



Parasites

- surveillance was done along with KHV in 2018
- 5 fish per location, 100+ locations per year
- summer months
- wide spectrum of genera and species
- mostly low abundance
- mostly low impact

Parazit	Počet nálezů z celkem 844 vzorků	%	Intenzita 1*	Intenzita 2*	Intenzita 3*
Apiosoma	23	3,7	13	3	7
Argulus	37	5,8	26	11	0
Atractolytocestus	52	8,1	35	10	7
Dactylogyrus	92	14,4	79	13	0
Eudiplozoon	25	3,9	24	1	0
Chilodonella	1	0,2	1	0	0
Gyrodactylus	92	14,4	64	20	8
Ichthyophthirius	58	9,4	52	6	0
Myxobolus	4	0,6	1	2	1
Sphaerospora	3	0,5	0	0	3
Trichodina sp.	152	23,7	110	24	18
Trichodinella	26	4,1	21	3	2
Trypanoplazma	21	3,3	15	4	2
Cappilaria	3	0,5	3	0	0
Khawia	9	1,4	6	3	0
Piscicola	9	1,4	9	0	0
Caryophyleus sp.	1	0,2	1	0	0
Philometroides	4	0,6	4	0	0
Proteocephalus	1	0,2	1	0	0
Trypanozoma	11	1,7	6	0	5
Hemiclepsis	4	0,6	4	0	0
Ergasilus	1	0,2	1	0	0
Tetraonchus	2	0,3	2	0	0
Ichthyobodo	1	0,2	1	0	0
Lernaea	5	0,8	5	0	0
Aspharyngostrigea	1	0,2	0	0	1

Parasites 2

Diplostomum spathaceum metacercaria

Grass carp juveniles – eye lens

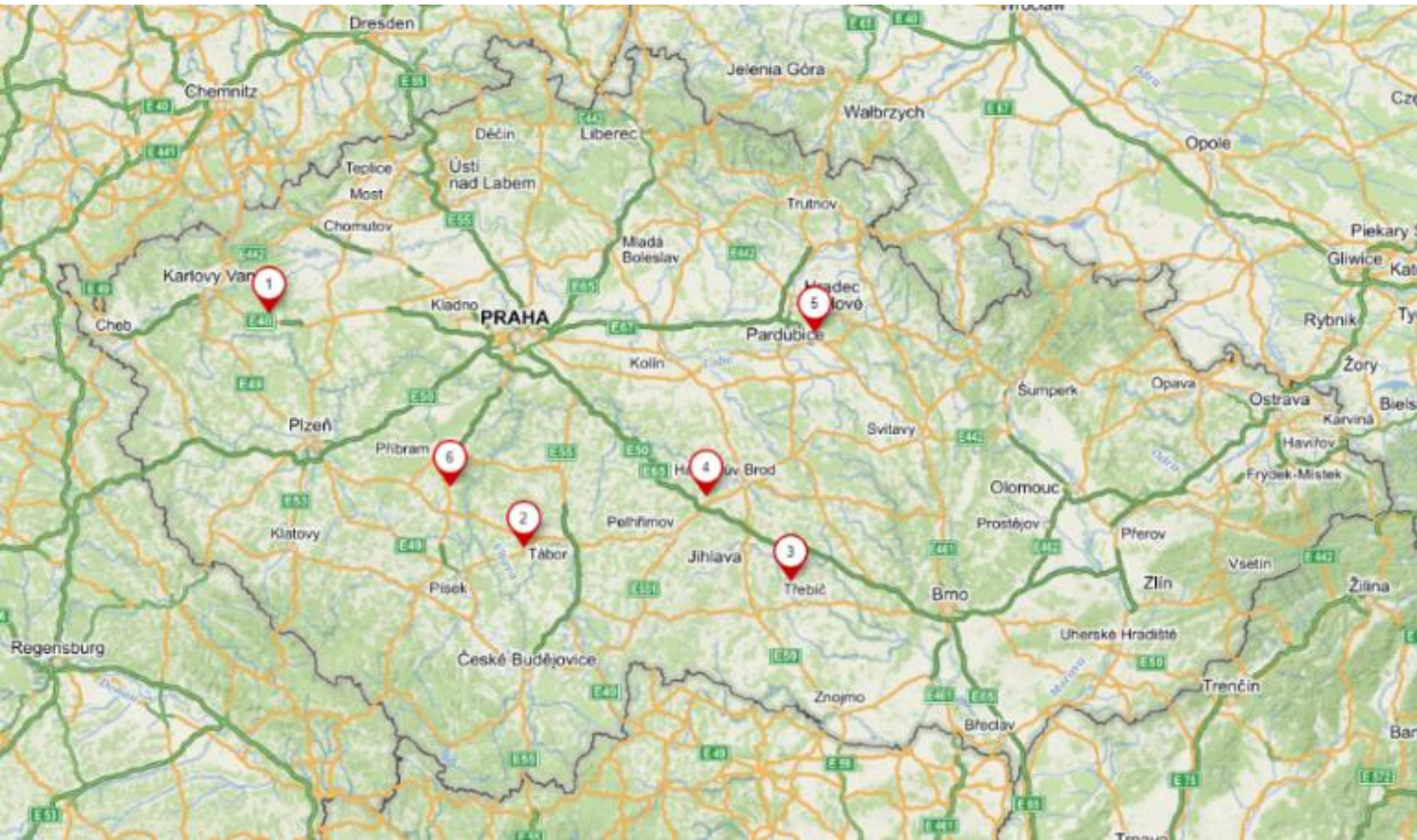
Viral pathogens

- CEV – cases down but still important
- SVCV – low impact
- CyHV-1 – present, local importance
- CyHV-2 – prussian carp mortalities



KHV

- end of active surveillance
- 6 outbreaks in 2021



KHV – Pardubice region 2019

- increase of cases
- limited geographic area
- 3 years
- 19 ponds
- 263 tonnes



Rok	Počet vyšetřených hospodářství v rámci monitoringu	Počet ohnisek
2009	190	5
2010	184	1
2011	101	1
2012	95	0
2013	93	0
2014	104	0
2015	102	0
2016	97	2
2017	99	2
2018	103	2
2019	107	11
2020	105	4
2021	94	6

Conventional epidemiology

- movement of fish – trade, winter storage
- fishing equipment
- waterways
- predatory birds?
- unregistered ponds?



Pardubice Region

2017

- introduction?

2018



- 2 sites

2019



- 6 sites – 1 repeated

2020



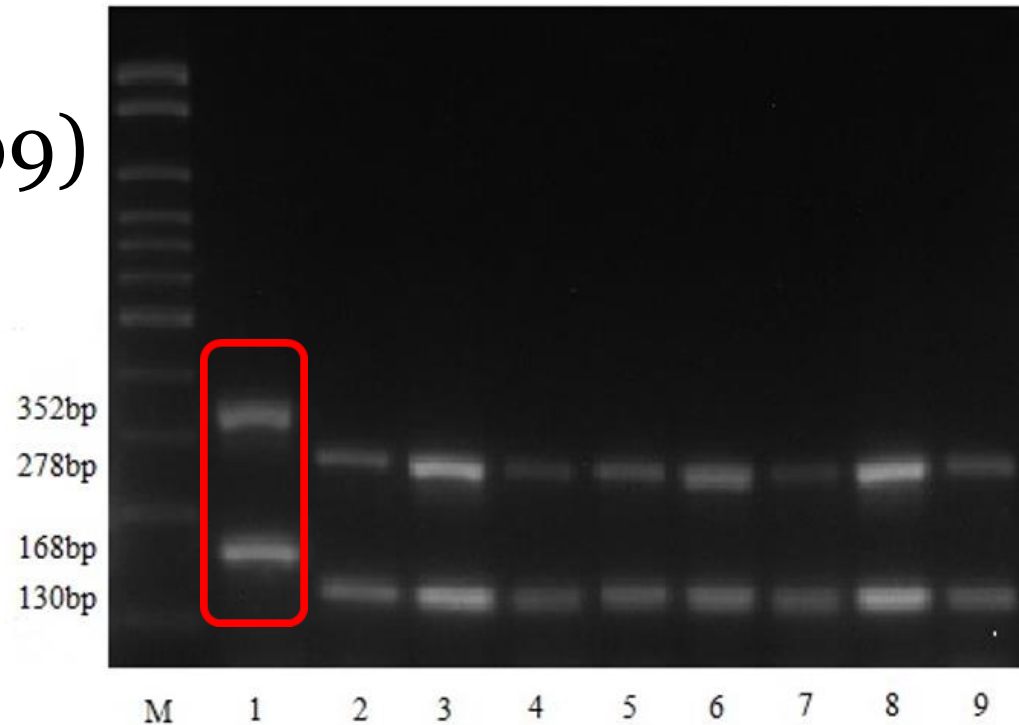
- 4 sites – new, no connection
1 koi pond

Virus characterisation: Asian/European

- Duplex PCR
- Bigarré et al. (2009)

□1 CyHV3-J

□2-9 CyHV3-U/I



Molecular epidemiology

- PCR + Sanger sequencing
- SphI-5 610 bp - too conservative
- 9/5 661 bp - too conservative
- TK 1001 bp - valuable information

NCBI Multiple Sequence Alignment Viewer, Version 1.22.0

Sequence ID	Start	Alignment	End
consensus	(+) 1	CCCGTCGGTGCAGCCCGCTCCACCTCGTTCTTGTAACATATCTATCCTGTGATGGTGTGTGTGGAACCAATAAAAT--TGTGCGACTTGAATATGGTTGTACGGGTTTTTTTT-AAC	1,117
ON323484	(+) 1		1,114
ON340590	(+) 1		1,114
ON340591	(+) 1		1,114
ON340592	(+) 1		1,114
ON340593	(+) 1		1,114
ON340594	(+) 1		1,114
ON340595	(+) 1		1,114
ON340596	(+) 1		1,114
ON340597	(+) 1		1,114
ON340598	(+) 1		1,115
ON340599	(+) 1		1,114
ON340600	(+) 1		1,114
ON369372	(+) 1		1,111
ON340601	(+) 1		1,115

TK gene analysis - conclusions

- Isolates from the Pardubice region identical for 2018 and 2019 = spread and re-infection
- All 4 isolates from 2020 were different – no connection to 2019 epidemiologically nor molecularly
- isolate from koi carp confirmed Asian lineage

Conclusions

- KHV still important – national legislation
- end of active surveillance – KHV, CEV, (parasites)
- reliance on reports from farmers
- increased impact of climate change
- ATB resistance present/rising

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