Parasitology of one of the world's foremost aquaculture fish species lacks a One Health Approach

Miriam I. Shigoley[1,2*] Nicolas Antoine-Moussiaux[2], Maarten P.M Vanhove[1]

[1]Research Group Zoology: Biodiversity & Toxicology, Centre for Environmental Sciences, Hasselt University, BE-3590 Diepenbeek, Belgium

[2]Fundamental and Applied Research for Animals and Health, Faculty of Veterinary Medicine, University of Liège, Belgium

INTRODUCTION

- Widespread cultivation in >140 countries
- 3rd most farmed finfish
- 4,590,292 tonnes (USD 2000/t) (FAO, 2020)
- Semi-intensive and intensive farming systems

Barría et al. 2020

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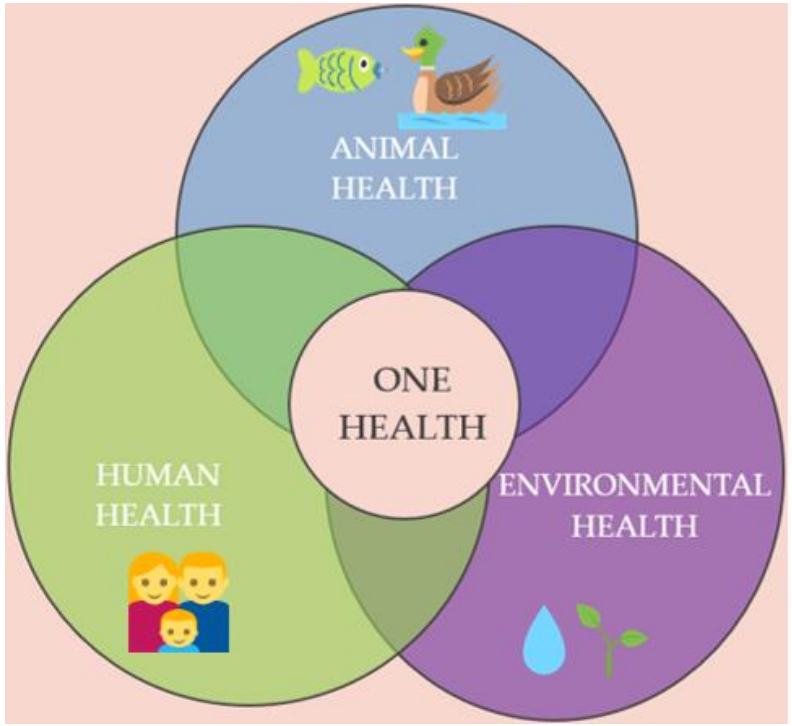
Fish parasitology and One Health



Focus on three topics

1. Fish health
2. Environmental health
3. Human health

Parasitology of *Oreochromis niloticus*

Reported parasite species (Shinn et al. 2023)

- 23 Trematodes
- 20 Monogeneans
- 7 Nematodes
- 2 Cestodes
- 2 Acanthocephalans

Problem statement

“tilapia AND parasite”
(1989-2022)

→

~350
papers

Aquat. Living Resour., 1989, **2**, 117-126

Pathology of tilapias

Christian Michel

INRA, Laboratoire d'Ichthyopathologie, Station de Virologie et d'Immunologie, 78350 Thiverval-Grignon, France.

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ca. 35 yrs

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REVIEW

REVIEWS IN Aquaculture

A global review of problematic and pathogenic parasites of farmed tilapia

Andrew P. Shinn[1,2] | Annemarie Avenant-Oldewage[3] |
Melba G. Bondad-Reantaso[4] | Armando J. Cruz-Laufer[5] |
Adriana García-Vásquez[6] | Jesús S. Hernández-Orts[7] | Roman Kuchta[7] |
Matt Longshaw[8] | Matthijs Metselaar[9] | Antoine Pariselle[10,11] |
Gerardo Pérez-Ponce de León[12] | Pravata Kumar Pradhan[13] |
Miguel Rubio-Godoy[6] | Neeraj Sood[13] | Maarten P. M. Vanhove[5] |
Marty R. Deveney[14]

Web Search

Data sources

Clarivate Web of Science™ (https://www.webofknowledge.com/)

PubMed® (https://pubmed.ncbi.nlm.nih.gov/)

Protocol

- PRISMA Extension for Scoping Reviews (PRISMA-ScR)

1. Fish Health

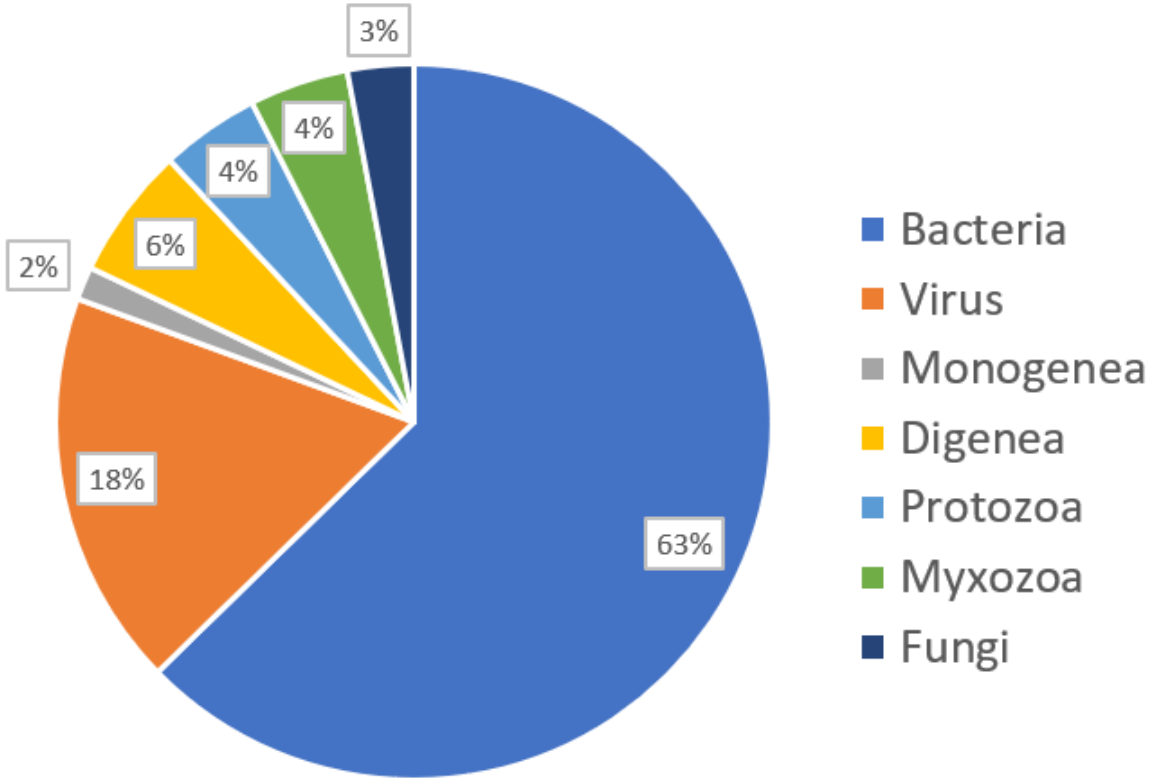
Fish health	**((Nile tilapia OR *Oreochromis niloticus*) AND (parasit* OR bacteria OR fung* OR virus OR prion OR pathogen* OR helminth)) AND (loss* OR econ* OR impact OR mortality OR risk OR disease)**

- Identified 3,006 papers
- Included **78** in review

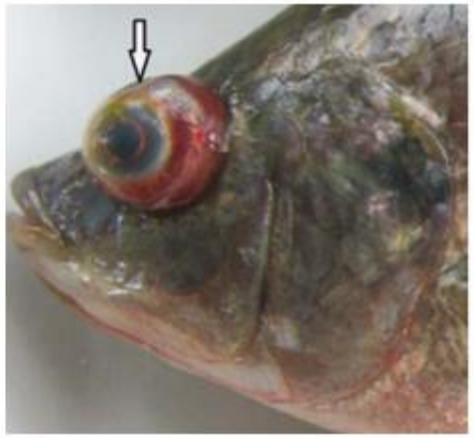
Inclusion criteria

- Papers that checked the actual effect of the parasites

Parasite taxa and impacts



El Deen et al. 2018



Li et al. 2014

Charo-Karisa et al. 2021

Panchai et al. 2015

2. Environmental health

Environmental health	**(((Nile tilapia OR *Oreochromis niloticus*) AND (parasit* OR bacteria OR fung* OR virus OR prion OR pathogen* OR helminth)) AND (ecosystem* OR environment* OR biodiversity OR water)) AND (indicator OR sentinel OR marker OR tag)**

- Identified 306 papers
- Included **8** in review

- Parasites as early warning system

→Increase in numbers (low & medium conc.)

→Disappear (high conc.)

→Exception (metal sinks)

Correlation of physico-chemical parameters and parasite indices

- 14 parasite species

(+) Increase or (-) decrease in parasite abundance

Considerably low number of parasite species used as indicators

Species of *Acanthogyrus* as a pollutant sink

- Acanthocephalans accumulate various trace metallic elements

→Decrease Pb levels in infected hosts

→Pb levels (988 times) more relative to ambient water

Only 1 parasite as a pollutant sink

Estaño Leonardo, 2020

3. Human health

Human health	**((Nile tilapia OR *Oreochromis niloticus*) AND (parasit* OR bacteria OR fung* OR virus OR prion OR pathogen* OR helminth)) AND (zoono* OR human health OR public health)**

- Identified 854 papers
- Included **8** in review

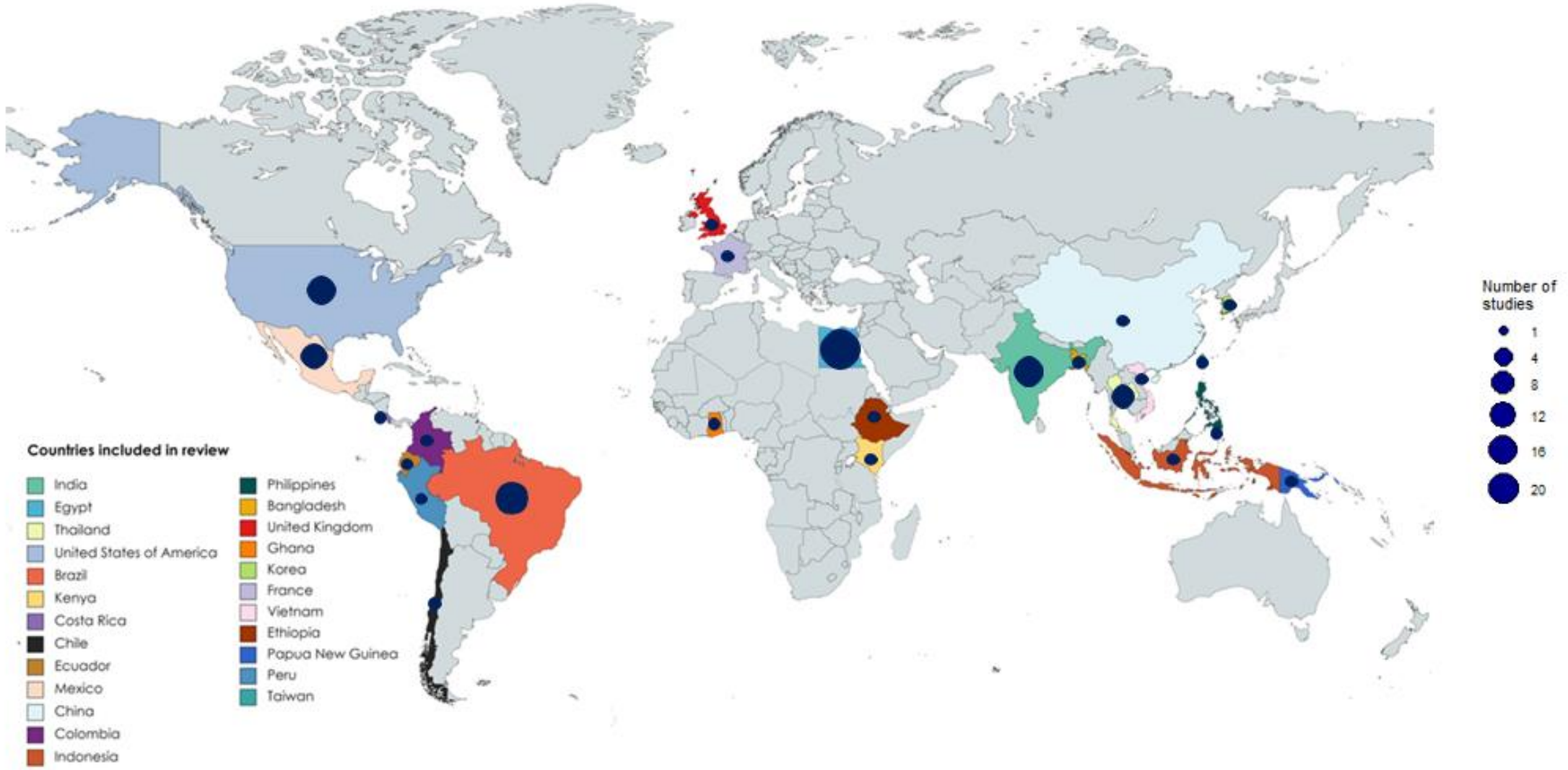
Is the parasite being studied explicitly as zoonotic in the paper?

FBZP in Nile tilapia

Parasite species	Prevalence	Locality
Haplorchis pumilio	12.5%	Vietnam
Cryptosporidium parvum	2.4%	Papua New Guinea
Contracaecum sp.	54.4%	Ethiopia
Heterophyes sp.	30%	Egypt*
Haplorchis pumilio	-	Taiwan

Only 4 parasites species

Conclusion


Countries included in review
India
Egypt
Thailand
United States of America
Brazil
Kenya
Costa Rica
Chile
Ecuador
Mexico
China
Colombia
Indonesia
Philippines
Bangladesh
United Kingdom
Ghana
Korea
France
Vietnam
Ethiopia
Papua New Guinea
Peru
Taiwan
Number of studies
1
4
8
12
16
20

A One Health Approach will inform sustainable production of Nile tilapia that considers environmental integrity, fish health and welfare and consumer health

THANK YOU FOR LISTENING

miriam.shigoley@uhasselt.be