

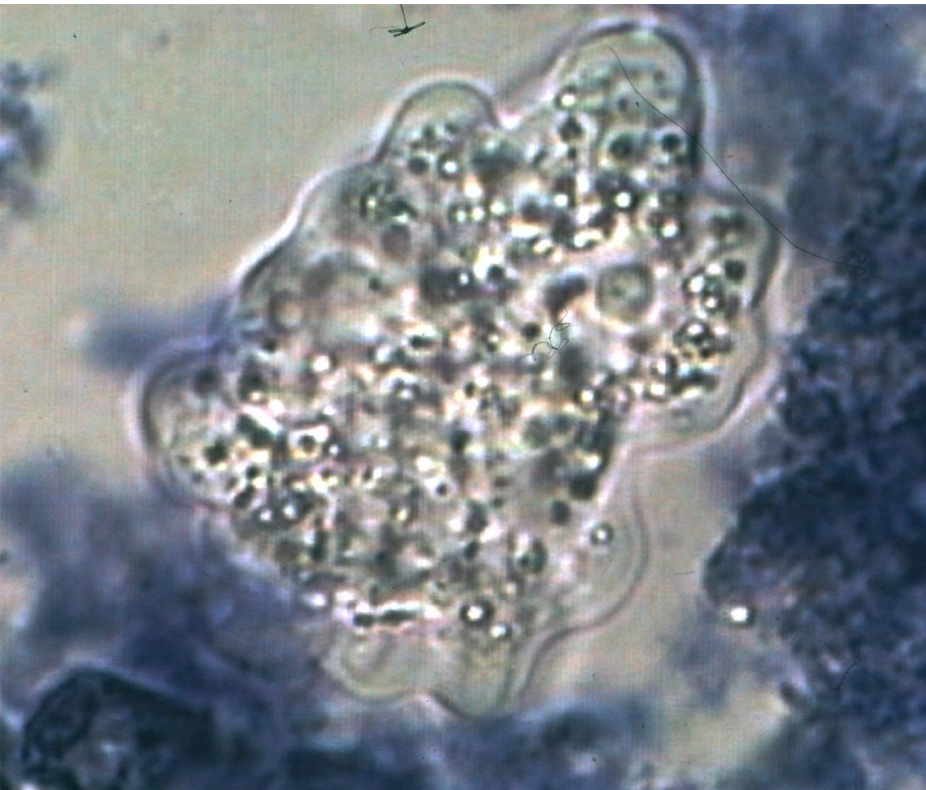
AGD research at the University of Tasmania



Barbara Nowak

Amoebic Gill Disease

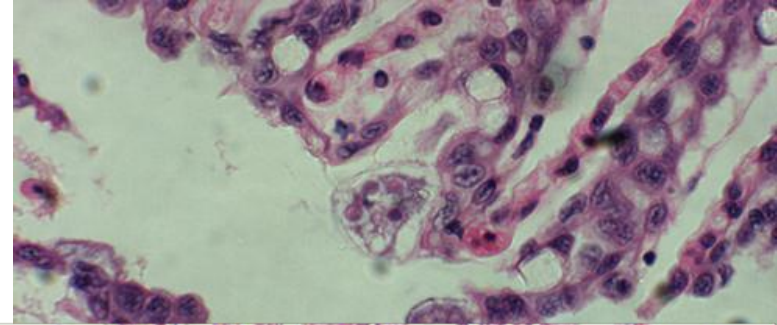
- Caused by *N. perurans*
- Gross AGD lesions

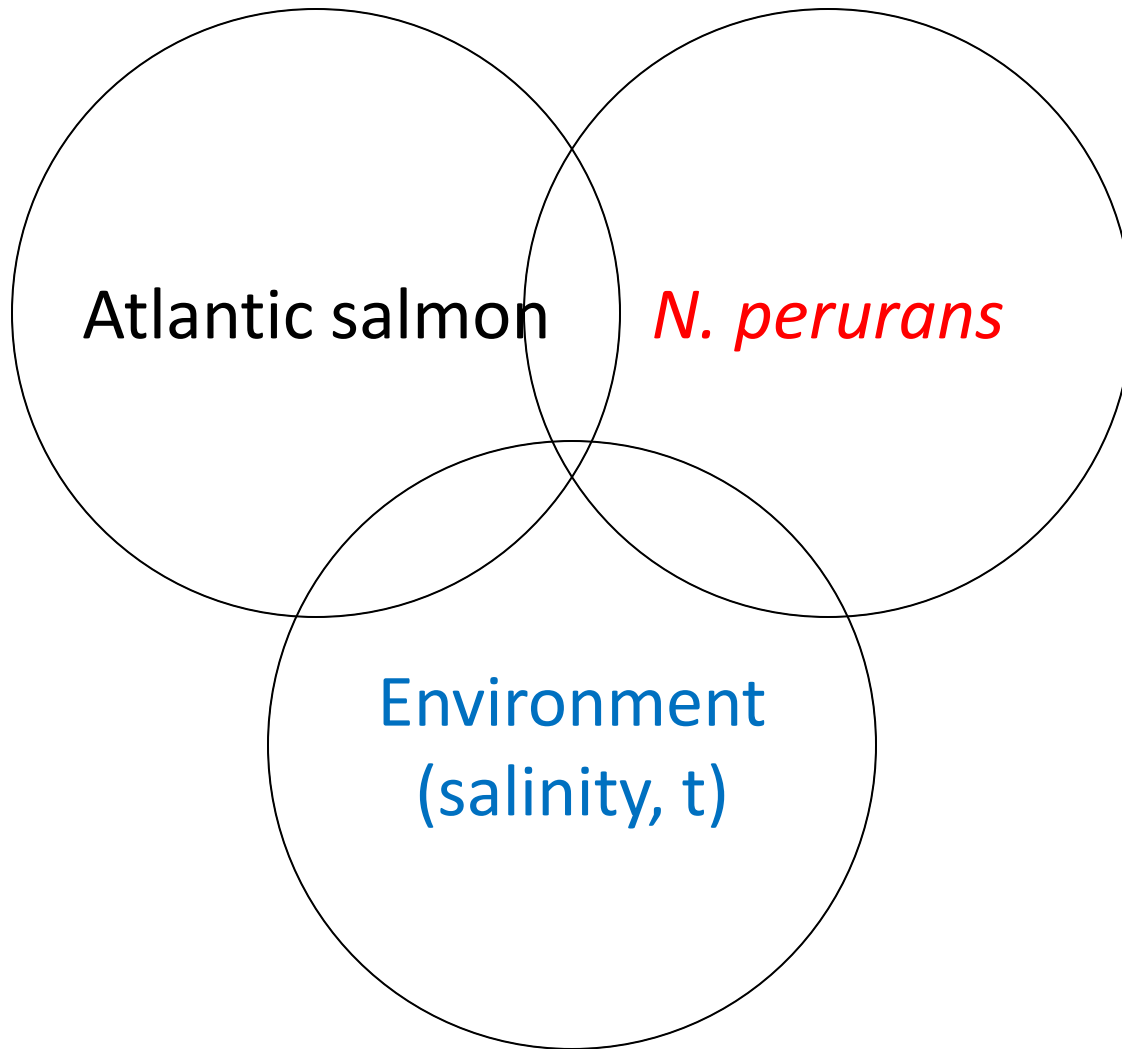


Amoebic Gill Disease

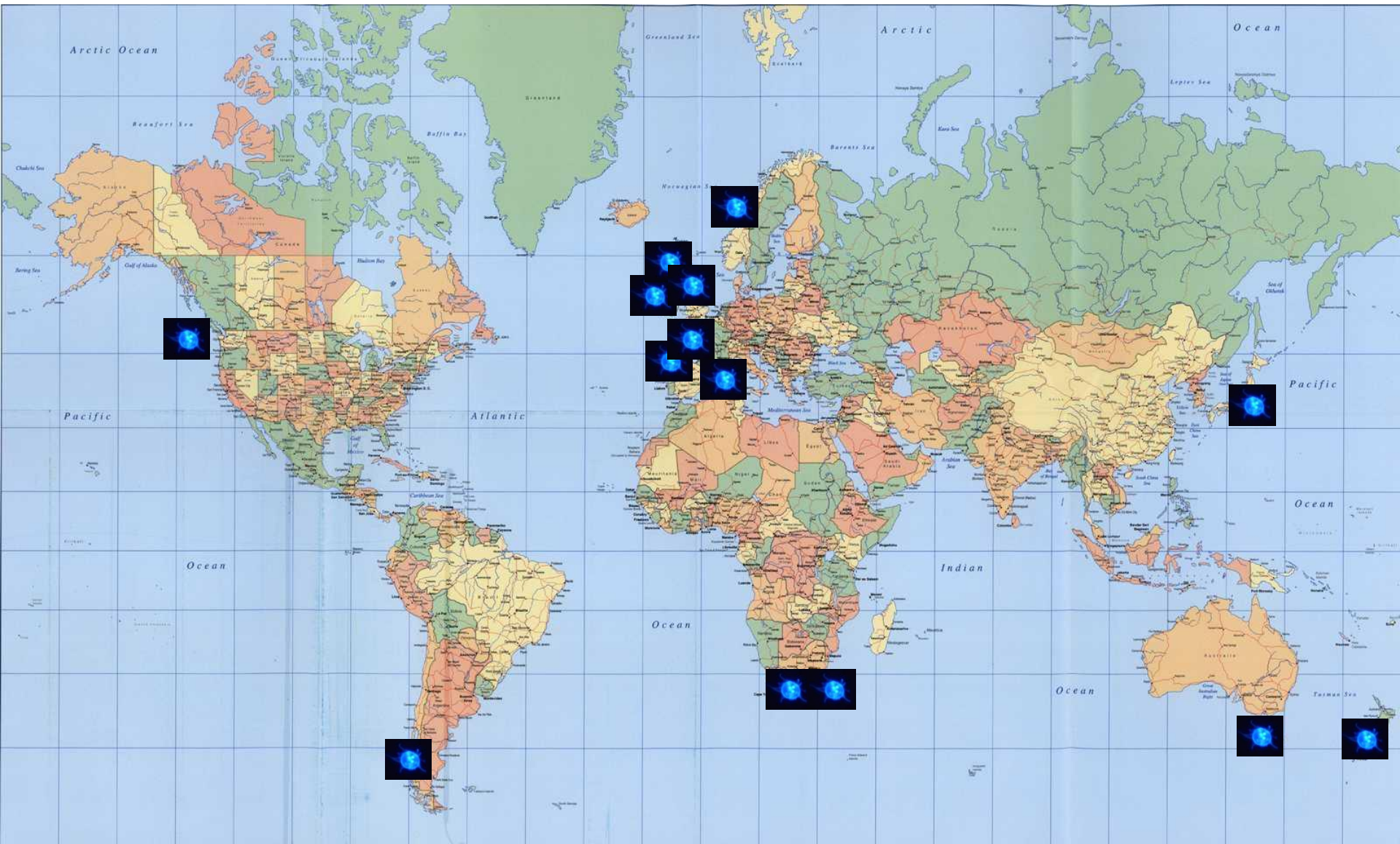
Case definition based
on histology:

Presence of
hyperplastic lesions
and associated
neoparamoebae





AGD – current world distribution



Significance of *N.perurans* concentrations in water

Concentrations of *N. perurans* in water

Farm

- Measured using PCR on farms affected by AGD in Tasmania and Scotland
- Low - often 1 amoeba/L

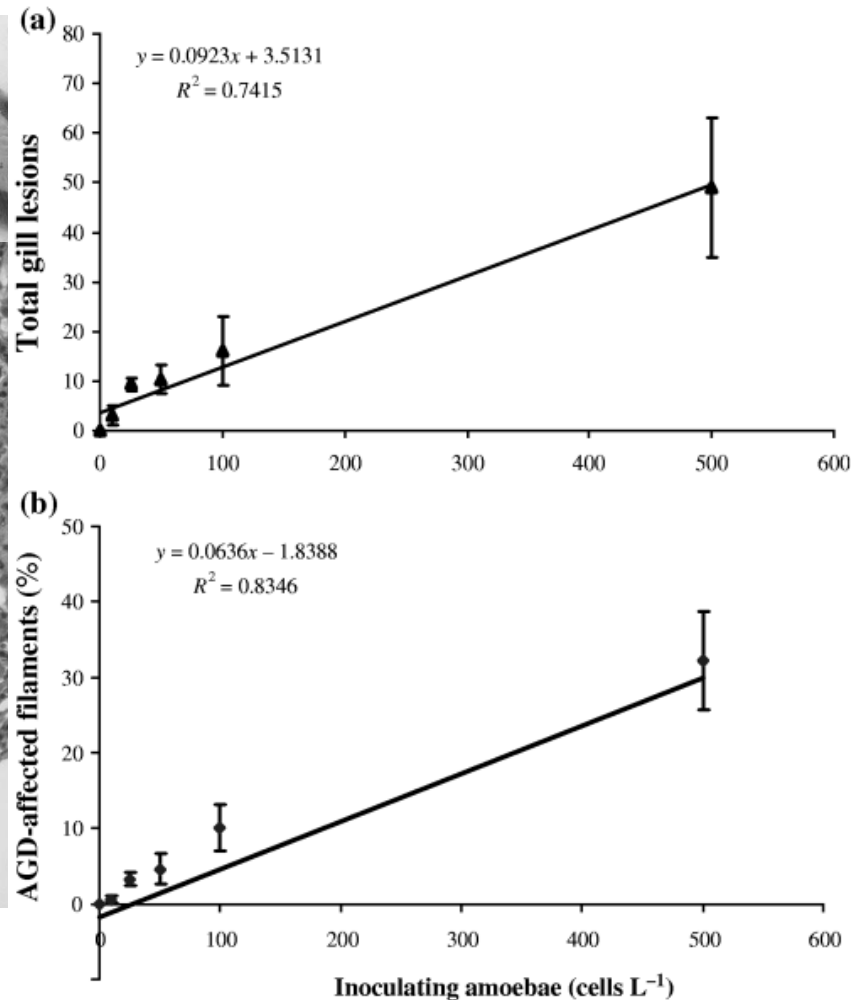


Experimental challenge

- Counted or measured using PCR in water in the experimental system
- Usually 500 amoebae/L or higher



Severity of AGD increases proportionally to the number of amoebae present in water in a 14 days challenge (Morrison et al 2004)



Exposure to low concentrations

- 0.1, 1.0 and 10 amoeba/L
- 60 days challenge
- 15°C, 35 ppt salinity, pH of 8.0

Low concentrations of *N. perurans* cause AGD

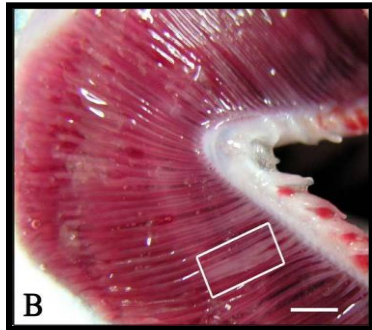
- Experimental exposure of Atlantic salmon to 0.1 cell L⁻¹ of *Neoparamoeba perurans* resulted in AGD (all fish +ve)
- No relationship between the exposure concentration of *N. perurans* (0.1 cell L⁻¹ – 10 cell L⁻¹) and severity of lesions at 60 days post-infection
- Percentage of filaments affected P=0.2142 (range 8.1% - 98.5%)
- Size of lesions P=0.5379 (range 2-74 ILU within one individual)

Low concentrations of *N. perurans* cause AGD - implications

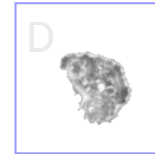
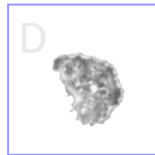
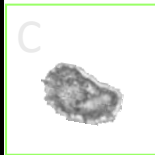
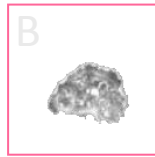
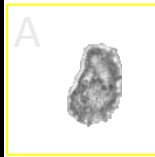
- Concentrations in water most likely irrelevant
- Previous experimental challenges most likely unrealistic
- Potential for previously unsuccessful mitigation methods to work at lower *N. perurans* concentrations

Experimental evidence for loss of virulence in culture

Koch's postulates fulfilled for *N. perurans* as an aetiological agent of AGD

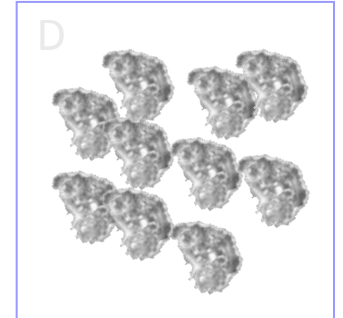


Non-cultured gill derived amoebae
(primary isolates)



MYA

marine yeast agar

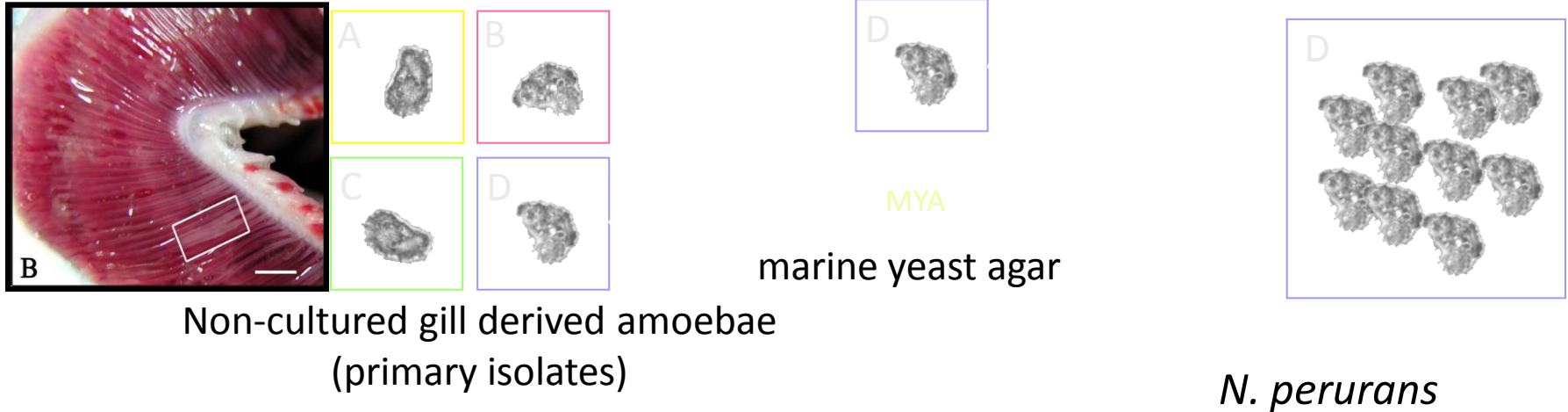


N. perurans



Clonal culture (clone 4) infectious after 70 days
(Crosbie et al 2012)

N. perurans – loss of virulence in culture



Clonal culture (clone 4) non infectious after 1095 days
– 200 passages (Bridle et al submitted)

Loss of virulence in culture

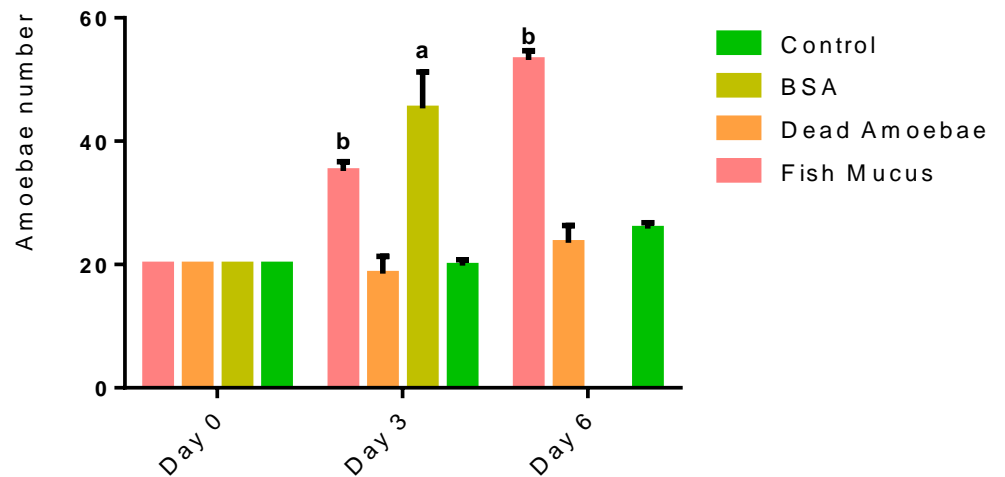
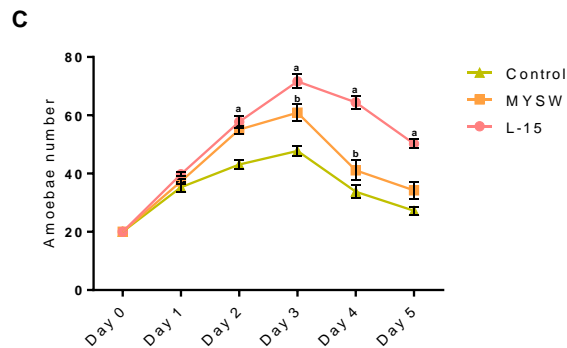
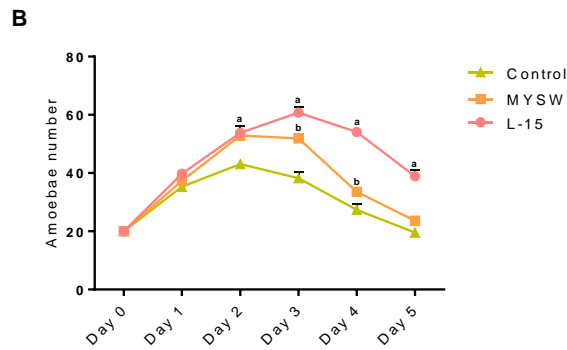
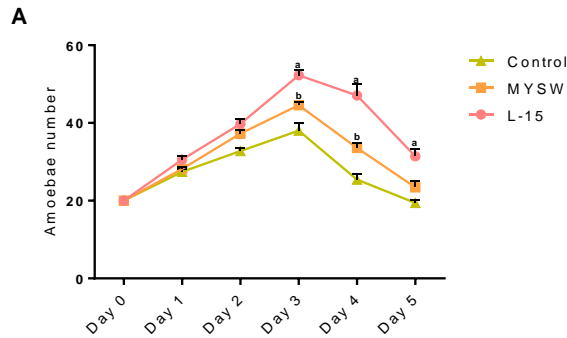
- *Neoparamoeba perurans* clone 4 non virulent after 3 years in culture
- *Neoparamoeba perurans* unable to cause AGD after 3 years in culture
- Two potential virulence factors/mechanisms proposed for *Neoparamoeba perurans*
 - ECP
 - attachment

Loss of virulence in culture

- Variability for time to the loss of virulence between clones and isolates?
- Potential for the restoration of virulence?

PhD projects progress

N. perurans – culture and virulence



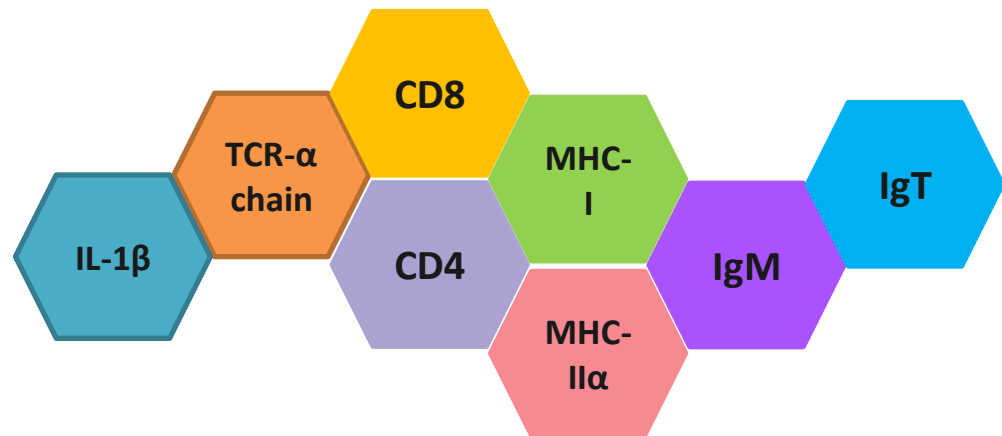


Immune response

Reinfection study

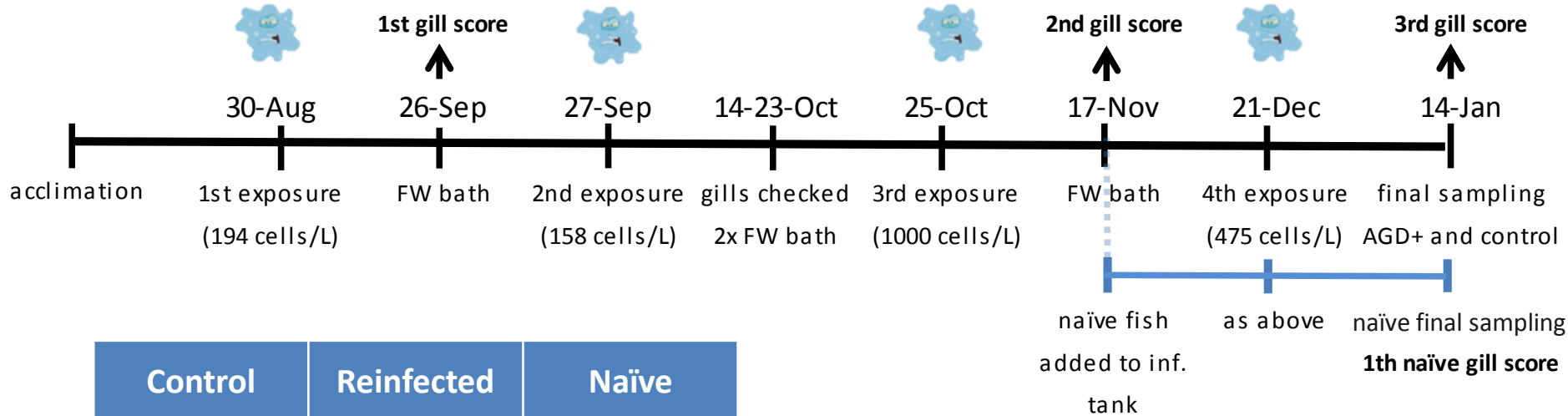


Investigate the Atlantic salmon immune response to *N. perurans* following reinfections



Immune response

Reinfection study



Control	Reinfected	Naïve
X	4 exposures	1 exposure
4 FW baths	4 FW baths	No FW bath
3 gill scores	3 gill scores	1 gill score

Immune response

Reinfection study

- 5 categories (7 fish each):
 - Control
 - Clear (last score)
 - Light (all scores)
 - Moderate (all scores)
 - Naïve moderate

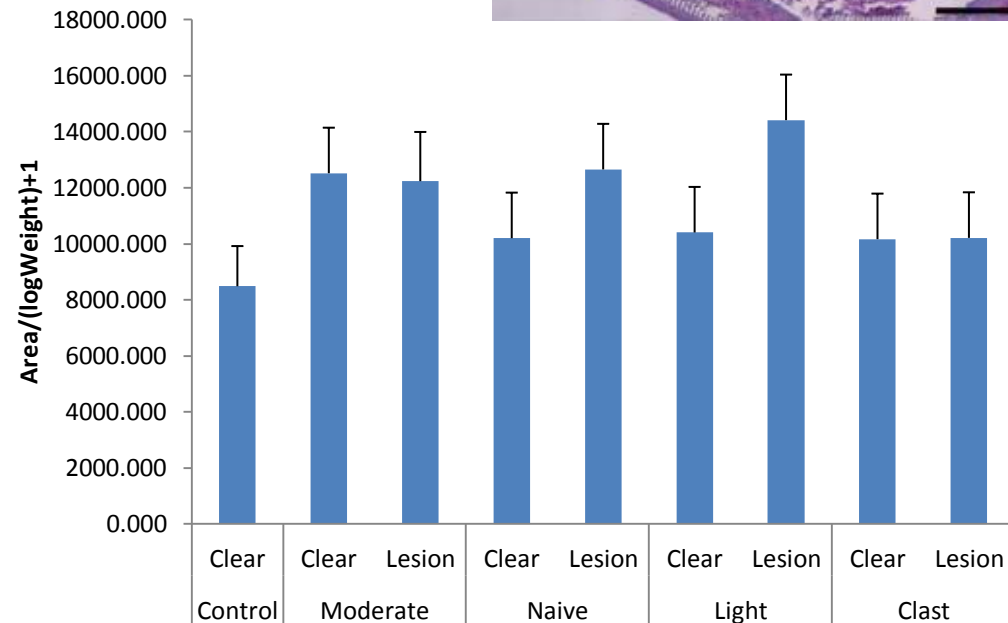
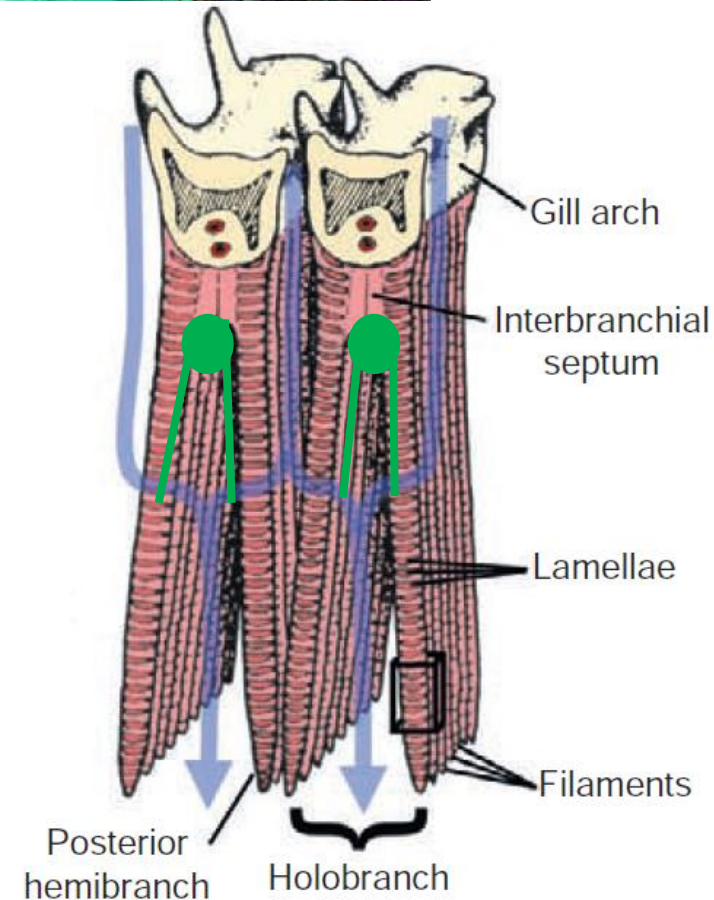
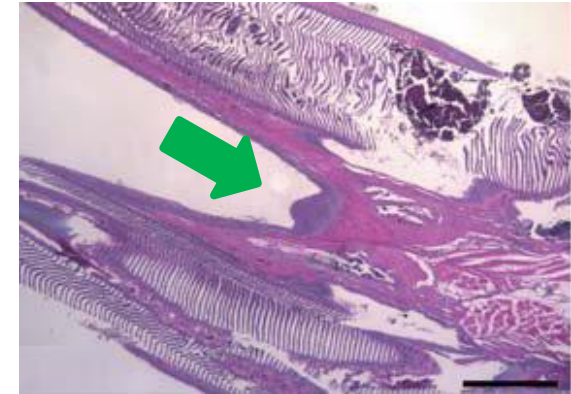
- Scoring system

Infection level	Gross pathology
Clear	no lesions observed
Light	less than 50% hemibranchs affected by lesions
Moderate	more than 50% hemibranchs affected by lesions with limited coverage
Heavy	almost 100% hemibranchs affected by lesions with substantial coverage

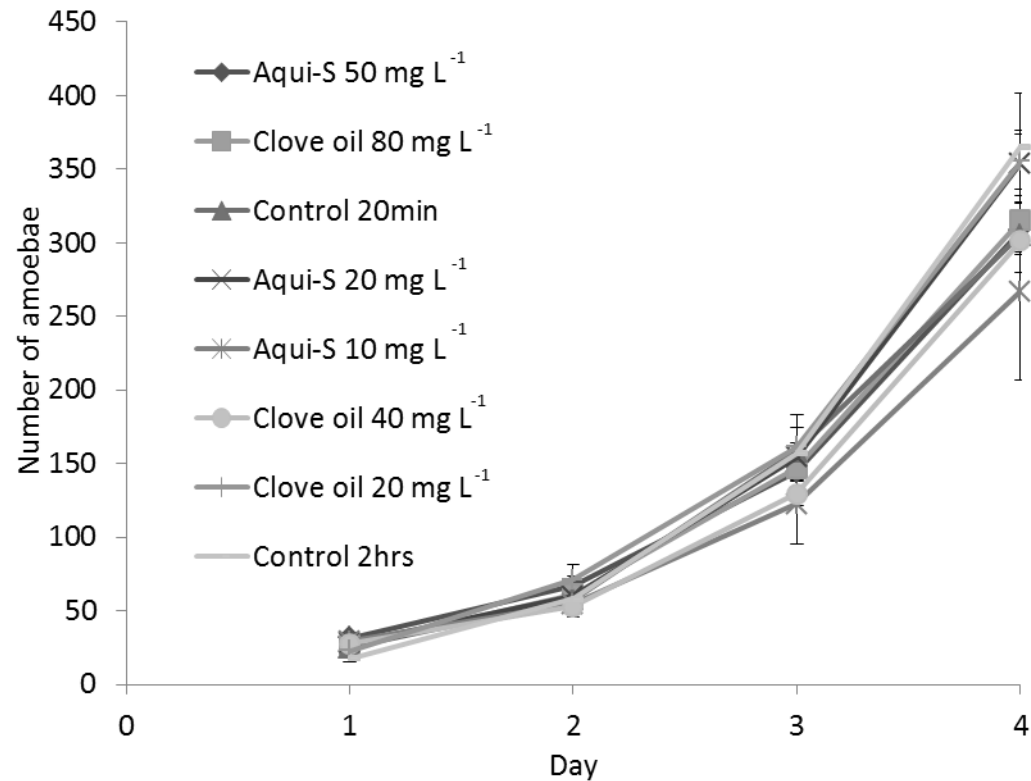
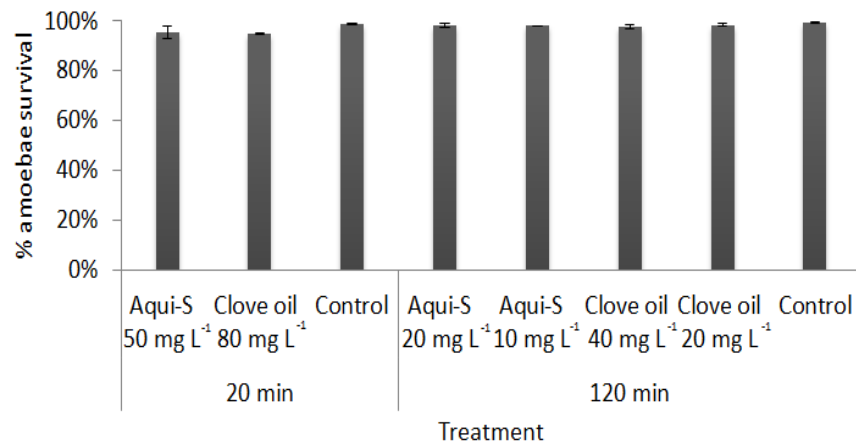
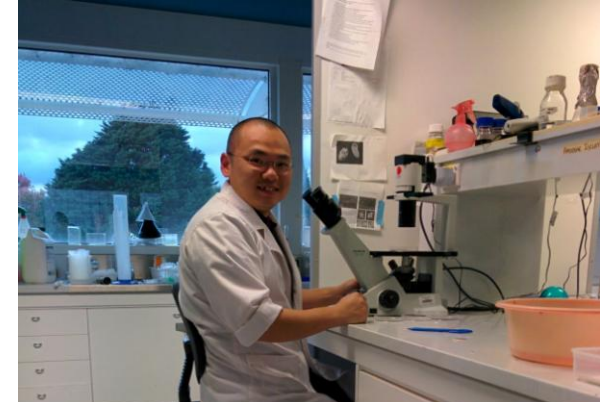
Lesions severity	Clinical AGD severity			
	Clear	Light	Moderate	Naïve moderate
% filaments with hyperplastic lesions	35.9	36.6	39.5	35.7
% filaments with lesions colonised by amoebae	2.4	15	13.7	14.1
% lesions colonised with amoebae	5.7	40.9	36.8	44.3
Mean lesion size (ILUs)	7.5 ±	13.3 ±	17.4 ±	21 ± 8.3
	3.7	3.2	3.7	



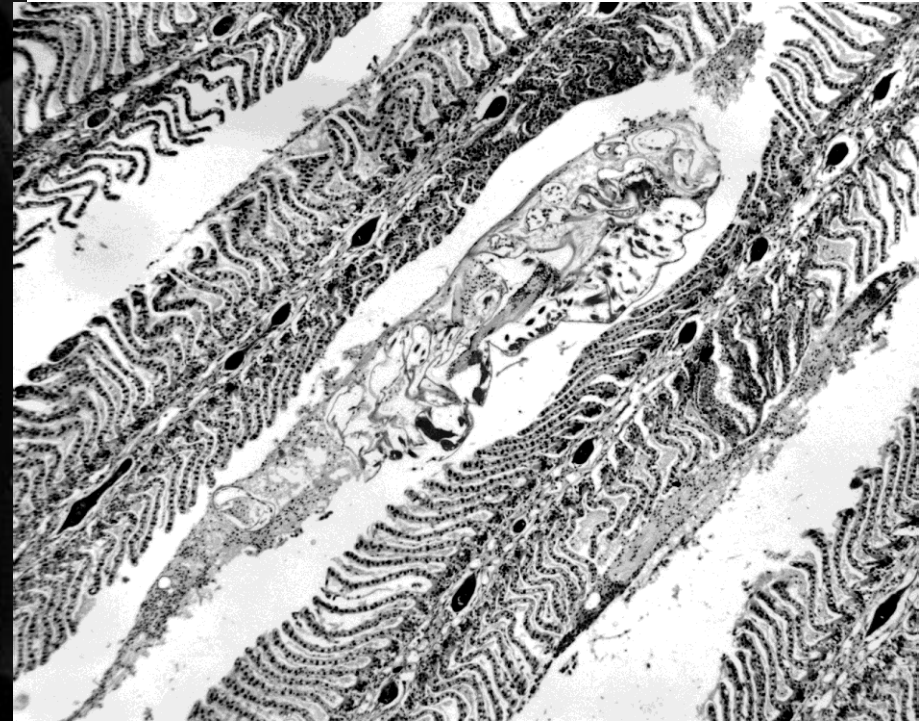
No effect of reinfection on size of interbranchial lymphoid tissue



Treatments



Isopod *Ceratothoa banksii*



Ceratothoa banksii not a significant reservoir of *N. perurans*

(Gonzales et al in prep.)



- No relationship between *N. perurans* on gills and on/in isopod
- Very low levels of *N. perurans* on/in isopod
- No infection with the isopod unless fish not bathed for long time

Current AGD research

- Challenge dynamics
- Treatments
- Immune response
- Clone 4 – characterisation and virulence
- Culture methods
- AGD/DO interactions
- Management through behaviour manipulation

2015 EAFP conference

- AGD workshop

Hamish Rodger and Barbara Nowak

- Fish Histopathology workshop

David Bruno, Diane Elliott, Barbara Nowak, Patricia Noguera, Stephen Feist





<http://www.eafp2015.es/welcome.html>


<http://eafp.org/students-awards/>

Browser address bar: eafp2015.es

Navigation links: Apple, iCloud, Yahoo, Bing, Google, Wikipedia, Facebook, Twitter, LinkedIn, The Weather Channel, Yelp, TripAdvisor

Second Announcement — European Association of Fish Pathologists | 17th International Conference on Diseases of fish and shellfish

Menu: WELCOME | INFORMATION | STUDENT AWARDS | CALL FOR PAPERS | PROGRAM | REGISTRATION | LOCATION



17th International Conference on Diseases of Fish and Shellfish

Las Palmas

September 7-11, 2015

Venue: Canary Islands Convention Centre

Save the dates

Extended Deadline for Abstract Submission:
17th April 2015

Early registration closing date
15th May 2015

Late registration closing date
15th August 2015

deadline for students awards: 30th April 2015

Welcome

Dear Sir/ Madam,

European Association of Fish Pathologists (EAFP) has shown a great interest in the upcoming 17th International Conference on Diseases of Fish and Shellfish. The Association, based in Europe, has a goal to promote and exchange the knowledge on fish and shellfish diseases. Research in the field of Ichthyopathology. Research of diseases characteristic for aquaculture has been especially accentuated by the Association. Aquaculture as a cultivation of organisms in the aquatic environment today is an industry showing exceptional growth at the World level, since it is believed that in a decade, more than half of the food coming from the sea will be from aquaculture. Spain has excellent conditions and already a long tradition in aquaculture. In respect to this, it is obvious that a conference on fish and shellfish diseases that attracts top national and World acknowledged scientists in the field, would add value to comprehension of pathogen emergent, spread as well as prophylaxis and therapy of fish diseases. Such conditions would enable free transfer of cutting-edge knowledge on Ichthyopathology between Spain and the World.

The Local Organizer, Institute for Animal Health and Food Safety at the University of Las Palmas de Gran Canaria was established by the Government of the Canary Islands in 2002. The purpose for which the Institute is created is "to serve as a useful tool to

REGISTRATION

