

Tasmanian Update



Gill Health Initiative- Galway

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Tasmania



- Broodfish imported from Philip River stocks in Canada
- Limited gene pool
- Industry started in the 1980s
- AGD has been a feature since the first year of production
- Current production 52,000MT
- 4 companies

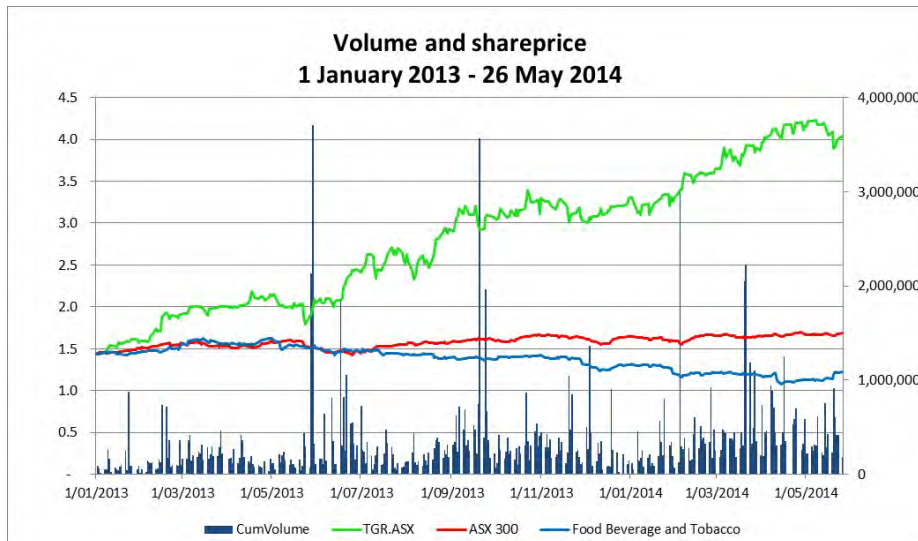
Overview - Tassal

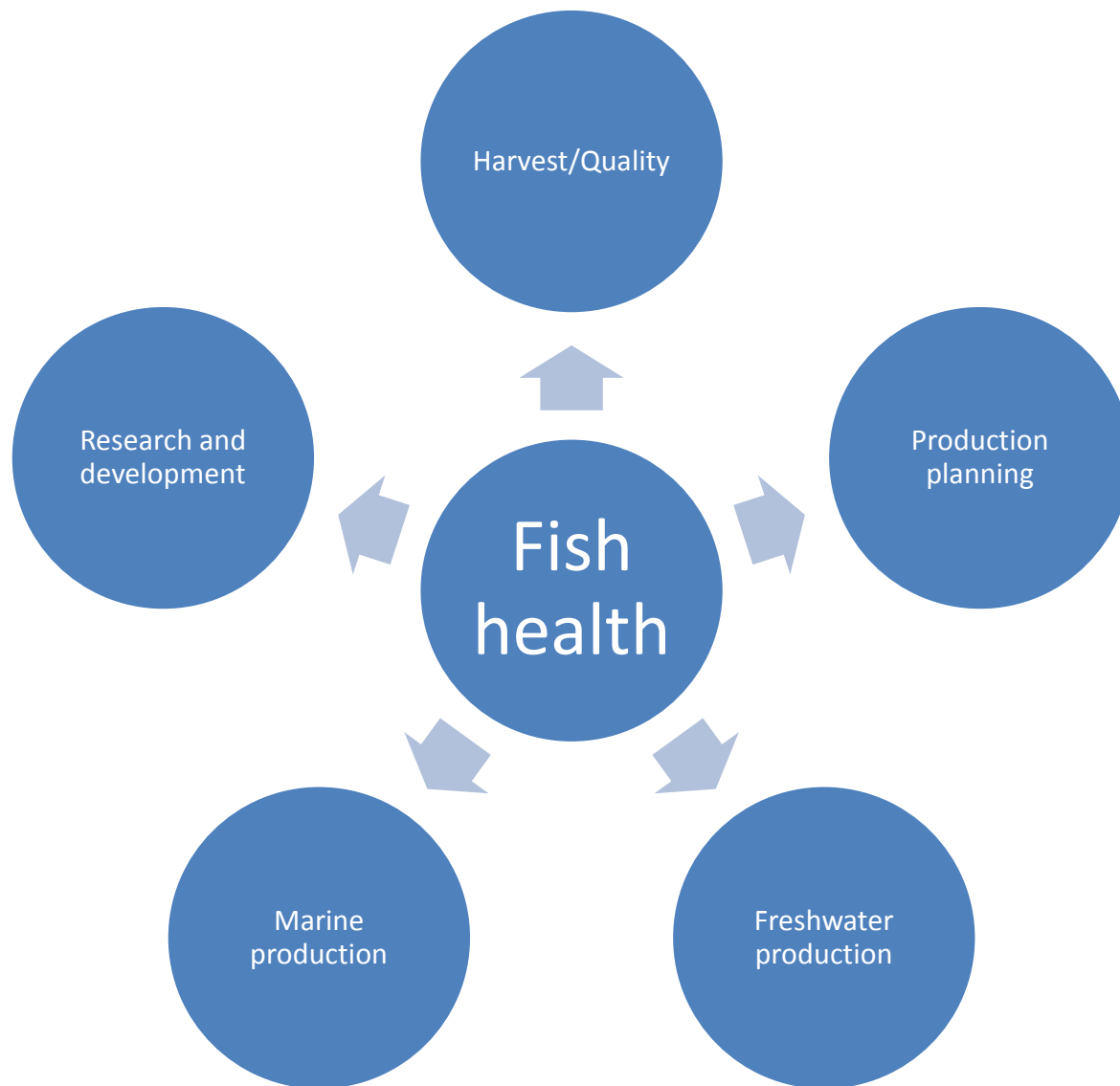


The largest producer of salmon in Australia

- Fully integrated – from egg to plate
- Tasmanian based, with sales predominantly in mainland Australia
- Listed November 2003
- Employ over 900 people in all sectors of the business
- All female production and triploids

Capital structure	26 May 2014
Market Cap	\$590,423,327
Shares on issue	146,507,029
Top 40 holding	86%
Board & Management	<1%
Institutions	55%





Impacts of AGD

Background

- First discovered early on in the Salmon Industry
- Cost of \$1.25 per kilo of production
- Freshwater bathing is used to treat AGD
- Technical officers on site provide gill scores which informs management to schedule baths

Practices

- Surface water is collected in dams
- Donor cages are filled with freshwater and fish pumped through
- Crows can last up to 4-5 hours (including bath time)
- Tarpaulin is removed after 2 hours of treatment



Photo courtesy of Mick Wright

Current status

Complications

- There is increased risk of mortality when handling fish
- Stress may cause reduced feed intake and performance post-bath
- There are risks of equipment failure
- Bathing is a practice that requires good knowledge and observation skills
 - Bath team leaders and technical officers

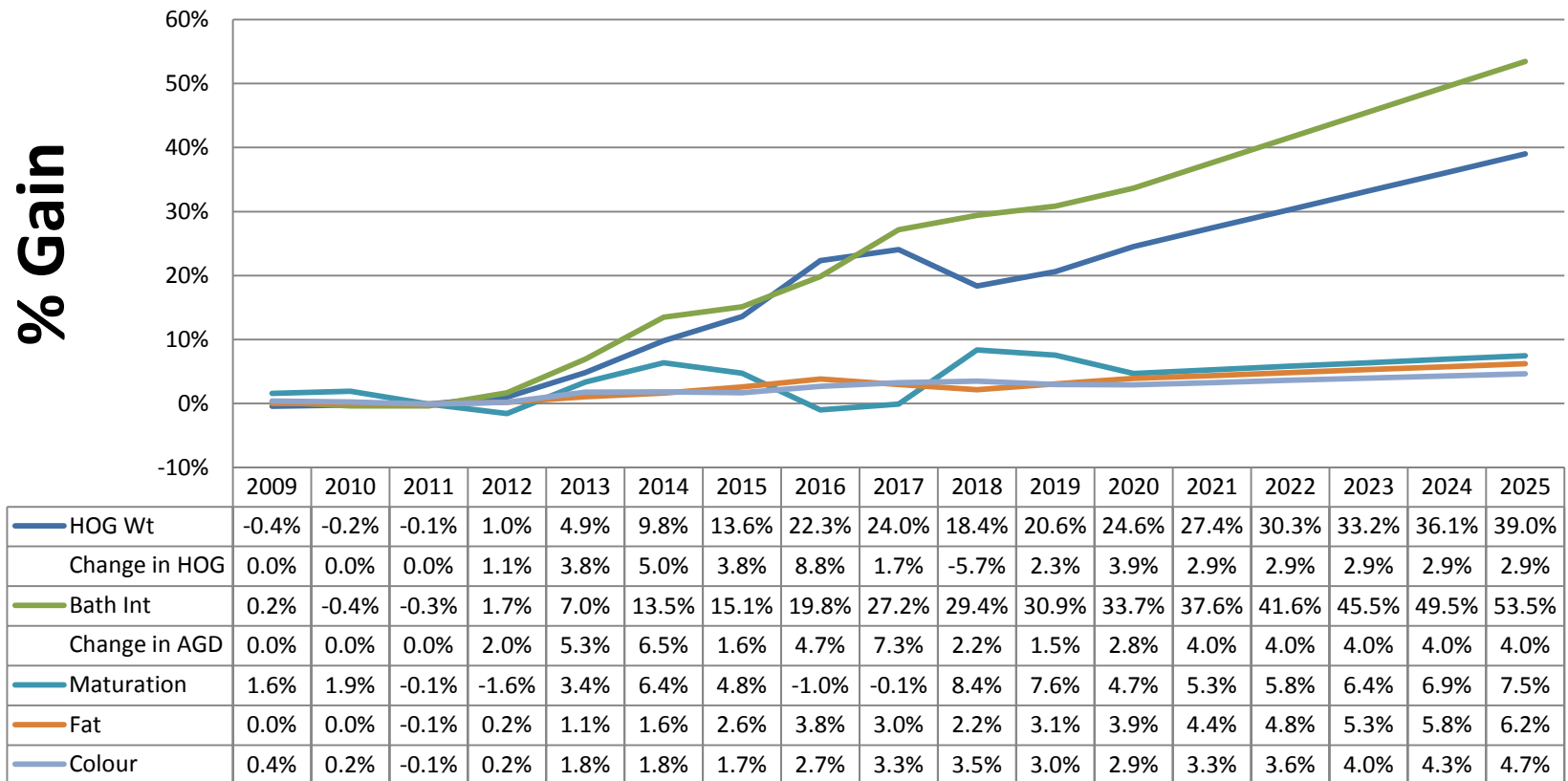
Status

- ~7-8 baths per pen per year class throughout the production cycle
- In summer, baths can increase in frequency to once a fortnight
- We have been seeing some improvements in fish tolerance of AGD through the Selective Breeding Program



Photo courtesy of Mick Wright

Expectations of the SBP



- The gains above will flow into production from the basic operation of the SBP.
- Tassal research will build upon these gains in each year.

Research collaboration- AGD



- R&D funding has steadily increased through the Tasmanian Salmon Growers Association – Businesses recognise that there needs to be a commitment to:
 - Optimising Health and Welfare of fish
 - Higher standards of husbandry
 - Large portions of collaborative funds have been devoted to understanding AGD
 - Industry SBP program targets AGD resistance/resilience
- Collaborative Research Agreement with CSIRO
 - Flexible arrangement with research in AGD Biology and Farm Management
 - International collaboration with Marine Harvest to develop gill scoring guide

CURRENT **TSGA** R&D
PORTFOLIO >\$5MILLION

Gill disease

- Changes to biofouling communities over time – temperatures, plankton availability
- Hydroid colonies make up a large portion of these colonies seasonally
 - Ectopleura spp suspected to cause seasonal damage to gills
- Gill damage is noted in summer months, beginning in November through to April



Obelia spp. - Photo courtesy of B. Yaxley



Ectopleura sp. - Photo courtesy of L. Gershwin

Gill disease

- Lesions are classically white, multi-focal and sometimes coalescing. Affected parts of the gills seem thickened
- Histopathological observations:
 - Multiphasic gill injury
 - Patch fusion of lamellae
 - Mucous cell hyperplasia
 - Moderate multifocal inflammation and fibrosis effacing lamellar architecture and cartilage of multiple filaments
 - Microthrombi
- Suggests that there is ongoing chronic inflammation

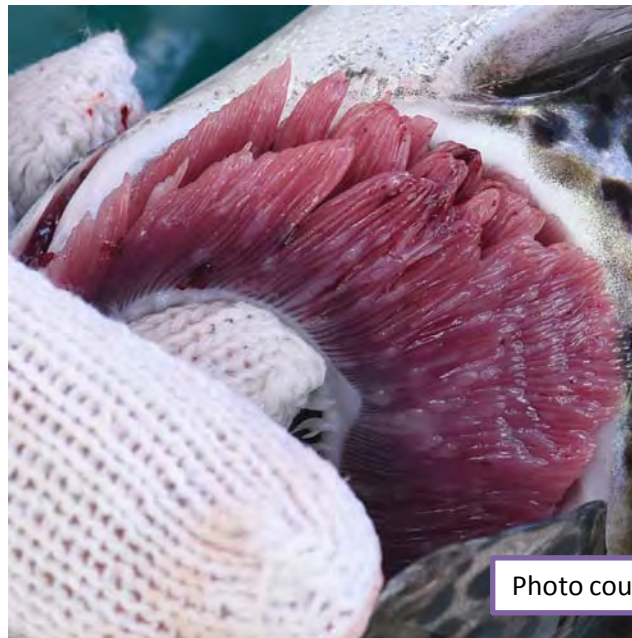
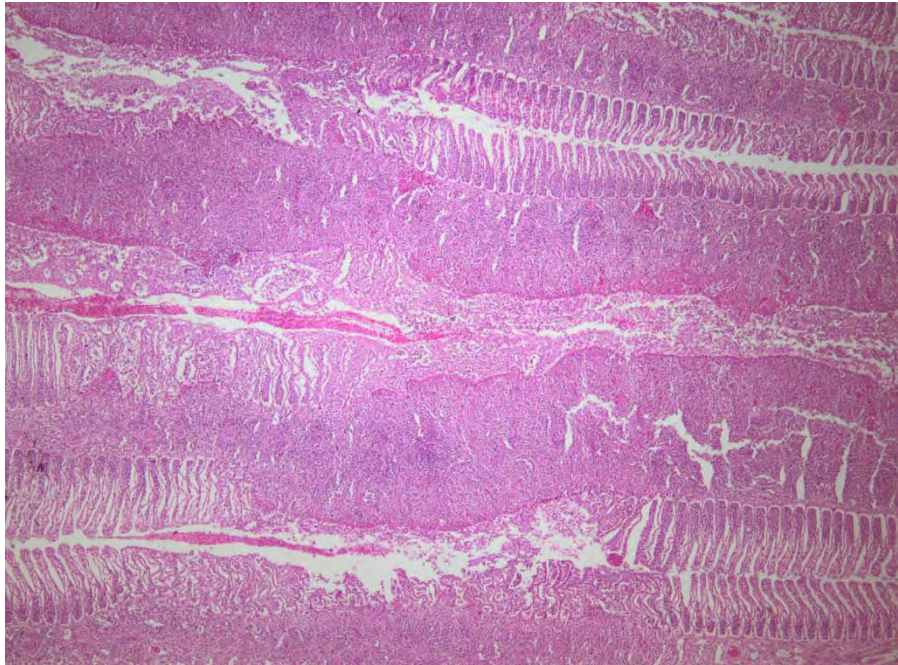
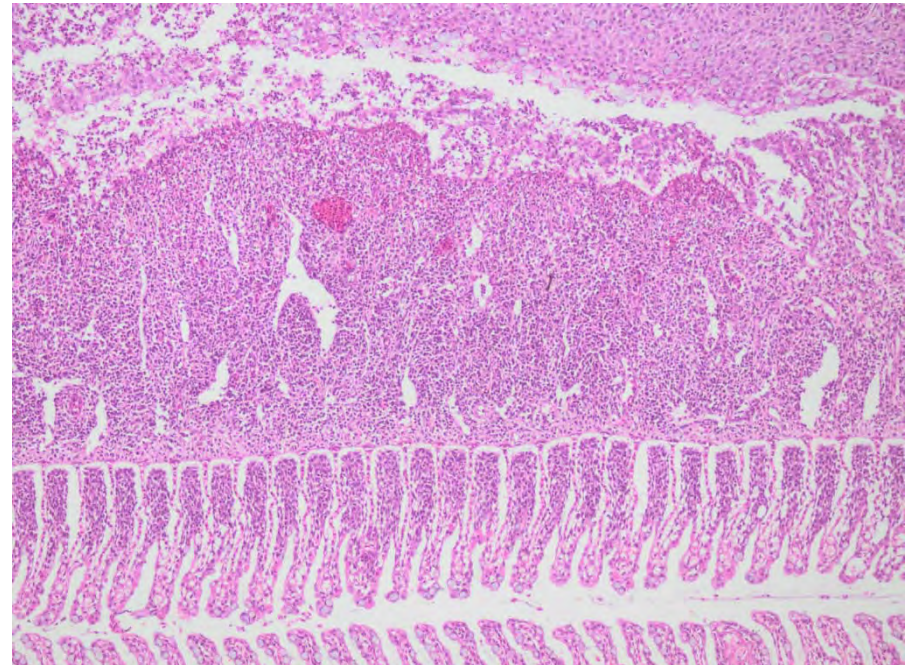


Photo courtesy of Richard Taylor

Histopathology

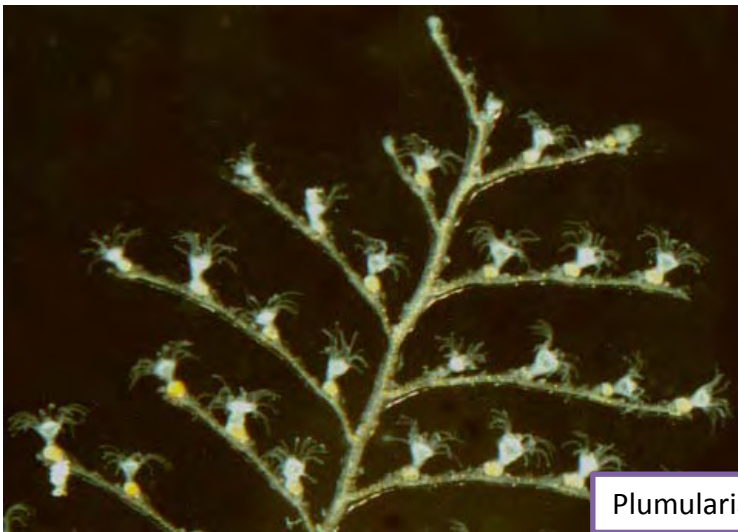


Multiphasic, chronic active branchitis- Photo courtesy of
Graeme Knowles



Gill disease

- Net cleaning is a necessity in Marine production
- Risks Associated with net cleaning:
 - Biofouling organisms are dispersed in the water column and contact fish
 - Blasting of biofouling can agitate hydrozoans and anemones
 - Contact can cause inflammation
- Compounding stressors:
 - Higher temperatures and lower dissolved oxygen
 - Notice higher than baseline mortality rates from January to March
 - Secondary *Tenacibaculum maritimum* spp. infection – opportunistic infection



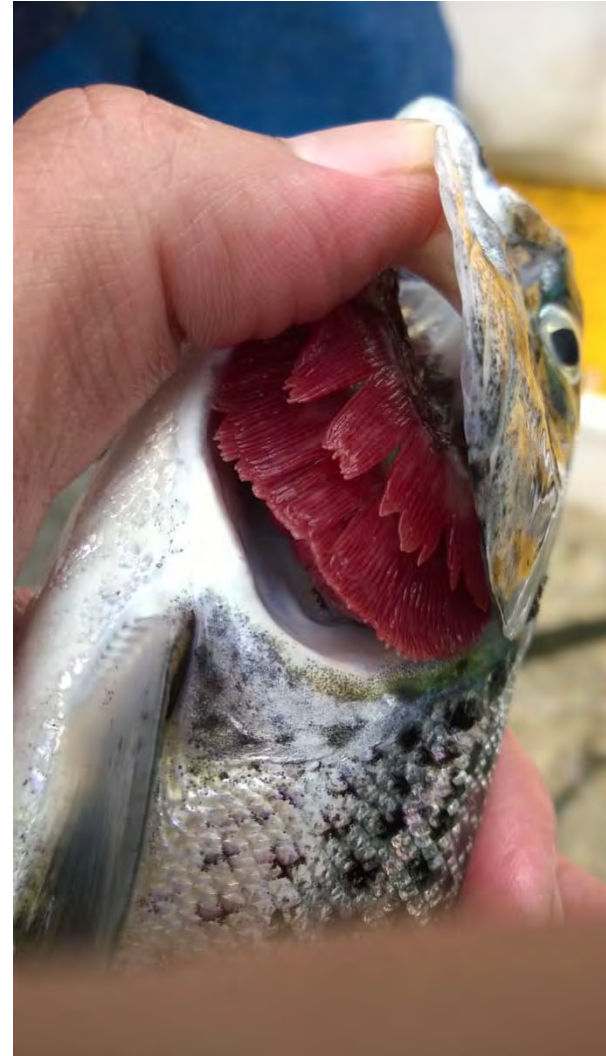
Plumularia sp.

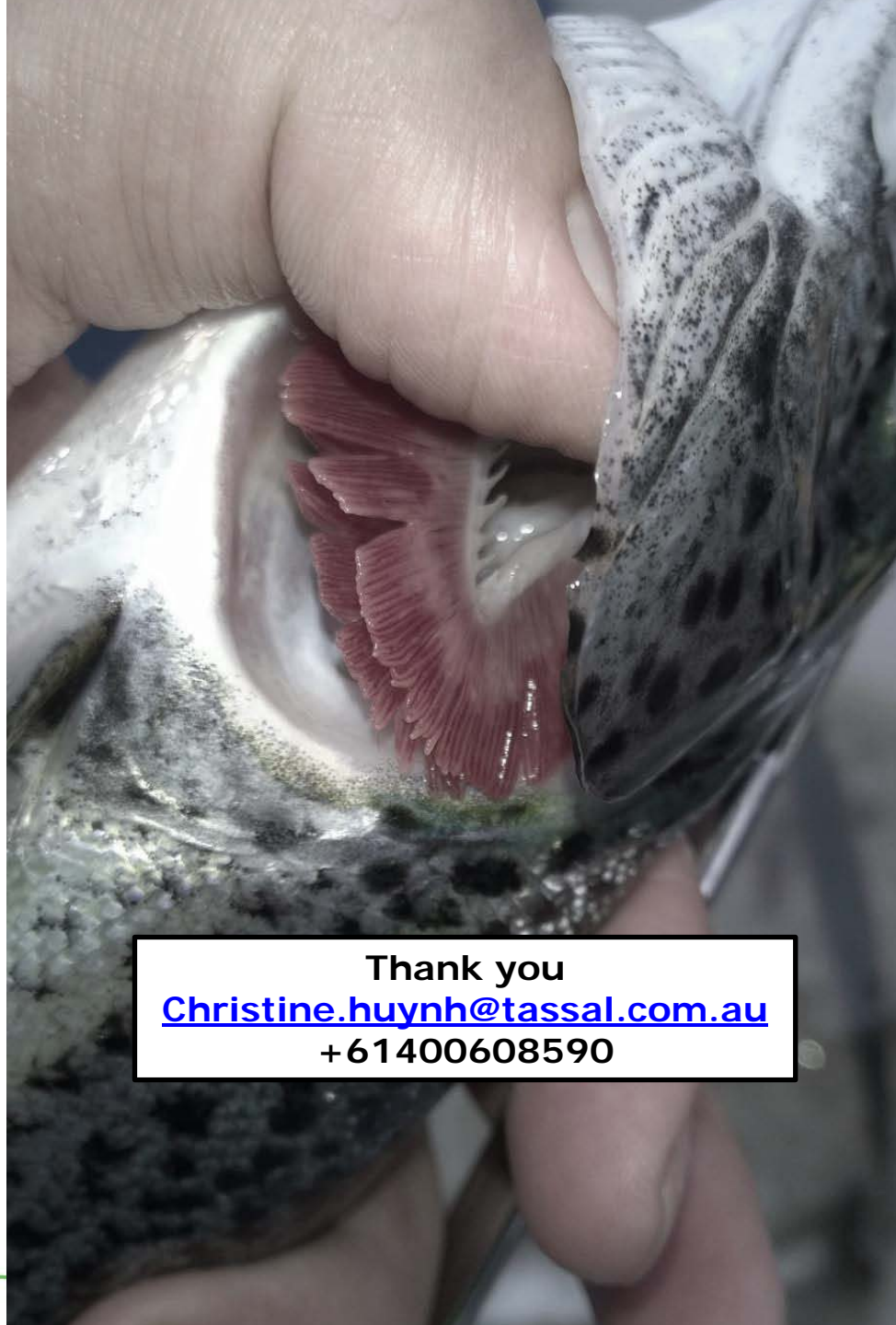


Plumularia sp.

Gill disease

- Does this gill injury make animals more susceptible to disease? How can we better understand what happens?
 - Characterisation of colonies on nets
 - Understanding the effects of these colonies on fish gills and skin
 - Challenge with AGD post-injury?
- Does biofouling act as a reservoir for AGD?





Thank you
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