

Gill Diseases: Scottish Salmon's Dirty Big Secret (November 2012)

Data obtained by GAAIA via Freedom of Information reveals that Scottish salmon farming is being ravaged by infectious gill diseases led by Salmon Transmitted Diseases (STDs) including: Chlamydia, Amoebic Gill Disease (AGD), Epitheliocistis, Proliferative Gill Inflammation (PGI) and Proliferative Gill Disease (PD). Scottish salmon is farmed and dangerously diseased.

AGD has swept up the West coast of Scotland and over to the Western Isles and the Orkney Isles since the first case – '[ground zero](#)' - was reported at Lamlash Bay off the Isle of Arran in October 2011. The parasitic killer is suffocating the industry's profits with Marine Harvest, Scottish Sea Farms and the Scottish Salmon Company reporting mass mortalities of up to 70%.



AGD is Scottish salmon's dirty big secret. Official data from the Scottish Government reveals that Amoebic Gill Disease was first reported at Lamlash Bay in October 2011 killing 279,000 farmed salmon. By April 2012 the deadly disease had spread to 15 sites including Loch Roag in the Western Isles, the Firth of Lorne, Seil Sound, the Sound of Mull, Loch Kishorn, the Isle of Gigha and the Orkney Isles:

Reported cases of AGD (October 2011 to April 2012) as detailed by Marine Scotland in September 2012 via a Freedom of Information request from GAAIA (read the FOI documents in full [online here](#)):

Reported and known cases of AGD

| MSS MA | Site name | Site number | Business | Date of visit / info. | Case number | Management Area |
|-------------------|-------------------------|------------------------|---------------------------------|--------------------------------------|------------------------|-------------------------------|
| 20 | Lamlash | FS0423 | The Scottish Salmon Company | 25/10/2011 | 20110032 | Arran |
| 6a | Vulabeag | FS0411 | The Scottish Salmon Company | | N/A | Loch Roag |
| 6a | Eughlam | FS1233 | The Scottish Salmon Company | | N/A | Loch Roag |
| 15b | Fishnish A | FS0427 | Scottish Sea Farms Ltd | 15/02/2012 | 20120882 | Linnhe, Lorne & Sound of Mull |
| 15b | Fishnish B | FS0694 | Scottish Sea Farms Ltd | 15/02/2012 | 20120063 | Linnhe, Lorne & Sound of Mull |
| 15b | Scallastle | FS0209 | Scottish Sea Farms Ltd | 16/02/2012 | 20120034 | Linnhe, Lorne & Sound of Mull |
| 15b | Bloody Bay | FS0964 | Scottish Sea Farms Ltd | 14/02/2012 | 20120081 | Linnhe, Lorne & Sound of Mull |
| 16d | Ardmaddy | FS0464 | Lakeland Marine Farm Ltd | 06/12/2011 | 20110723 | Seil Sound to Loch Craignish |
| 16d | Port Na Cro | FS0859 | Lakeland Marine Farm Ltd | 06/12/2011 | 20110600 | Seil Sound to Loch Craignish |
| 16d | Kames Bay West | FS0871 | Kames Marine Fish Farming | 12/12/2011 | 20110626 | Seil Sound to Loch Craignish |
| 18b | Drumyeon Bay | FS0336 | The Scottish Salmon Company | 25/10/2011 | 20110507 | Gigha |
| 18a | Ormsary Broodstock Unit | FS0090 | Landcatch Natural Selection Ltd | 23/11/2011 | 20110494 | Loch Caolisport |
| 8b | Quanterness | FS0908 | Northern Isles Salmon Ltd | 21/02/2012 | 20120104 | Central Orkney |

| | | | | | |
|-----|---------------------|---------------------|------------------------|----------------|-------------------|
| 11c | Kishorn | A or B DJT to visit | Scottish Sea Farms Ltd | 04/04/2012 | Carron, Kishorn |
| 16c | Loch Speive A and B | FS253 ,FS654 | Scottish Sea Farms Ltd | 04/04/2012 N/A | Loch Speive, Mull |

Read in full [online here](#)

Missing Millions:

Marine Harvest and the Scottish Salmon Company – both listed on the Oslo Stock Exchange – reported significant losses to shareholders and investors in their financial reports. Marine Harvest, Scotland’s and the world’s largest salmon farming company, predicted further losses in Q4 2012 as gill diseases eat into profits. Marine Harvest’s Q3 2012 [presentation](#) (26 October) included:



Scotland

Adverse effects from the presence of gill amoeba

- Reduced seawater growth and increased mortality
- Accelerated harvest has reversed planned volume increase for 2013

Costs relating to the gill amoeba likely to be high going forward

- Technical team cannot rule out recurring issues

Outlook

Cost increases expected going forward

- Feed costs rising
- Gill amoeba in Scotland

Read more via [Marine Harvest's Salmonopoly Loss - Q3 \\$\\$\\$\\$\\$s drop 86%!](#)

The Scottish Salmon Company – which is listed on the Oslo Stock Exchange and whose shareholders include a who’s who of Norwegian banks - disclosed to investors via their [Q2 2012](#) financial report in August 2012:

NOTE 7: EVENTS FOLLOWING THE CLOSE OF THE QUARTER

Through the second half of July and continuing into August the Company has seen a rise in the level of AGD. There has been some success in the treatment of the fish to remove the amoeba but despite these best efforts there has been a raised level of mortality especially within the smaller generations. Whilst harvest volumes remain unaffected for 2012 there is a reduction in the guidance for 2013 to 24,000T. Q3 2012 will suffer with the cost of these mortalities with an increased cost through the quarter of approx £1m.

Secret Scotland:

Thanks to Scotland's powerful Freedom of Information laws the truth is finally coming out with [STV News](#), [The Scotsman](#), [BBC News](#), [Daily Mail](#) and [Hebrides News](#) all reporting in the last few months on the Scottish salmon farming industry's embarrassing STD problem (scroll down to the end of this report for a media archive).



Yet, Scotland's disease time-bomb has been kept under wraps for years. [The Arran Voice](#) newspaper reported on gill disease problems at Marine Harvest's salmon farm in Lamlash Bay back in 2007. Following the take-over by Pan Fish, then Lighthouse Caledonia and now the Scottish Salmon Company the gill disease problem persisted.

"I find it impossible to believe that this is not the same disease which killed a large number of fish at Pan Fish's Arran site a number of years ago (and indeed was the cause of my parting company with them, as I was not prepared to lie to journalists like [Nick Underdown](#) about the extent of the mortalities)," wrote Fiona Cameron (the former director of public relations for Pan Fish and Lighthouse Caledonia at the time of the 2007-2008 disease outbreak at the Lamlash Bay site) following an [article](#) on AGD in The Daily Mail (14 October 2012).

“In these days they called it PGD (Proliferative Gill Disease), and apparently it was caused by a form of chlamydia virus,” wrote Cameron who used to work for BBC News and the Norwegian trade newspaper Intrafish. “They had the same thing in some of the more southerly farms in Norway, where they called it something that translated as PGI (proliferative gill inflammation). No-one knew exactly how it was carried, but the symptoms were the same across both countries, and sound exactly the same as the one mentioned in the article: it gets into the gills which get inflamed, so the fish suffocates, in effect. Presumably a slow, painful death. If it’s not exactly the same, then it must be very similar. Not sure why they’re saying it’s a new phenomenon. I guess they don’t want to frighten the horses (a.k.a. the shareholders!).”

For more background [listen](#) to an interview (4 November 2012) with Alison Prince, the editor of the Voice for Arran, who admits the publication of [photos](#) of maggot-infested diseased farmed salmon from the Lamlash Bay site “caused a bit of a stushie”:



The photos published by the [Arran Voice](#) included:





Read more via “[‘Stushie’ for Scottish Salmon!](#)” (Green Around the Gills, 4 November)

“The ‘Scottish’ salmon farming industry would have the gullible public believe that Scotland’s #1 food export is a picture of health,” said GAAIA’s Don Staniford who visited the Lamlash Bay salmon site – dubbed ‘[ground zero](#)’ on 2 & 3 November. “The ugly truth, however, is that Scottish salmon farming - an industry which is 90% foreign-owned with over 65% controlled by Norway - is being choked to death by a parasite attacking the gills. Scottish salmon farming is now looking decidedly green around the gills with mass mortalities piling up in the millions. The Norwegian-owned salmon farming industry is dead in the water.”



“Amoebic Gill Disease was first reported in Norway in 2008 and in Scotland officially in 2011 although there’s strong evidence prior to suggest it has been suppressed since at least 2007,” continued Staniford. “This lethal parasite could be the death knell for the Scotland’s predominantly Norwegian-owned industry. You can hear the screams from investors and shareholders in Norway.”



For more details read: [“Ground Zero in Scotland’s Salmon Wars!”](#)

[Fishyleaks](#) revealed in July 2012 that Scotland’s ‘mort mountain’ towered at nearly 7 million dead farmed salmon during 2011. Lurking on Scottish salmon farms are some real-life horrors including [Epitheliocystis](#) which is associated with [Chlamydia](#) and [Proliferative Gill Inflammation](#); and [Yersinia ruckeri](#) which is in the same family of pathogens as *Yersinia pestis* – the disease agent behind the [Black Death](#) or [Bubonic Plague](#)!



Read more via [“‘Stushie’ for Scottish Salmon!”](#) and watch the video report [“Salmon Farm Disease Disaster in Lamlash Bay, Arran”](#)

A History of Disease:

Diseases reported on Scottish salmon farms since 2008 include Infectious Salmon Anaemia, Infectious Pancreatic Necrosis, Haemorrhagic smolt syndrome, Ichthyobodo, Vibrio, Cardiomyopathy syndrome, Moritella viscosa, Yersinia ruckeri, Saprolegnia, Epitheliocystis, Salmonid alphavirus, Nephrocalcinosis, Tenacibaculum maritimum, Exophiala, Pasteurella skyensis, Renibacterium salmoninarum, Piscirickettsia salmonis, Capriniana, Proliferative kidney disease, Nocardia, Aeromonas hydrophila, Aeromonas salmonicida, Pseudomonas, Flavobacterium, Gyrodactylus derjavinoideis, Gyrodactylus truttae and Amoebic Gill Disease.



Read disease data on infectious diseases on Scottish salmon farms operated by companies including the Norwegian companies Marine Harvest, Hjaltland (Grieg), Scottish Seafarms (Leroy/SalMar) and the Scottish Salmon Company:

- 2012 disease data: [online here](#)
- 2011 disease data: [online here](#)
- 2010 disease data: [online here](#)
- 2009 disease data: [online here](#)
- 2008 disease data: [online here](#)

Data on infectious diseases on Scottish salmon farms for the period 1980 to 1997 is also available [online here](#). Data from 1998 to 2006 is [online here](#) and company specific data is also available for [2006](#) and [2007](#). The main diseases were:

Types of Disease Identified on Scottish Salmon Farms 1980 - 2006

Over 70 different diseases and disease agents were reported on Scottish salmon farms

The top 5 (by # of occurrence) since 1980 are:

- *Vibrio* spp (occurred in 21 years)
- *Pseudomonas* spp (19 years)
- *Aeromonas salmonicida* (17 years)
- Infectious Pancreatic Necrosis (17 years)
- *Yersinia ruckeri* (12 years)

The list also included:

The Types of Diseases and Disease Agents Present on Scottish Salmon Farms (1980-2005)

| Disease/Condition | # Yrs | Disease/Condition | # Yrs | Disease/Condition | # Yrs |
|--------------------------------|-------|---|-------|--|-------|
| <i>Aeromonas caviae</i> | 2 | <i>Gyrodactyloides</i> | 2 | Proliferative gill syndrome | 0 |
| <i>Aeromonas hydrophila</i> | 13 | <i>Gyrodactylus derjavini</i> | 1 | Proliferative Kidney disease (PKD) | 7 |
| <i>Aeromonas salmonicida</i> | 17 | <i>Gyrodactylus</i> spp (not <i>salaris</i>) | 5 | <i>Pseudomonas</i> spp | 19 |
| <i>Aeromonas sobria</i> | 9 | Haemorrhagic smolt syndrome | 0 | <i>Pseudoterranova</i> | 1 |
| Alphavirus | 1 | <i>Hafnia alvei</i> | 2 | Red mark syndrome | 0 |
| Bacterial Gill Disease | 1 | <i>Hoferellus cyprinid</i> | 0 | <i>Renibacterium salmoninarum</i> | 10 |
| BKD | 5 | <i>Ichthyobodo</i> species | 8 | <i>Rhabdomyoma</i> | 2 |
| Capriniana | 5 | <i>Ichthyophonus hoferi</i> | 4 | Salmon pancreas disease virus | 11 |
| Cardiomyopathy syndrome (CMS) | 4 | <i>Ichthyophthirius multifiliis</i> | 3 | Salmonid papillomatosis | 5 |
| <i>Chilodonella</i> species | 3 | Infectious pancreatic necrosis virus (IPN) | 17 | <i>Saprolegnia</i> species | 3 |
| Cocci | 1 | Infectious salmon anaemia virus | 1 | Sea lice species | 2 |
| <i>Costia</i> species | 4 | Koi herpes virus | 0 | <i>Serratia liquefaciens</i> | 2 |
| <i>Cotylorus</i> | 2 | <i>Listonella anguillarum</i> | 1 | <i>Serratia</i> sp. | 1 |
| <i>Cryptocaryon irritans</i> | 0 | <i>Loma brachialis</i> | 1 | Sleeping disease | 1 |
| <i>Cryptocotyle</i> | 1 | <i>Microsporidium</i> | 1 | SRS | 3 |
| <i>Dermocystidium</i> species | 3 | <i>Moritella viscosa</i> | 9 | Strawberry disease | 0 |
| <i>Diphylobothrium</i> species | 7 | <i>Mycobacterium</i> | 1 | <i>Streptococcus iniae</i> | 0 |
| <i>Diplostomum</i> species | 3 | <i>Mycobacterium chelonae</i> | 2 | <i>Tenacibaculum maritimum</i> | 2 |
| <i>Discocotyle</i> species | 1 | <i>Mycobacterium marinum</i> | 0 | <i>Trichodina</i> species | 6 |
| <i>Enterobacter aerogenes</i> | 1 | <i>Mycobacterium</i> sp. | 1 | <i>Trichophyra</i> species | 4 |
| <i>Epitheliocystis</i> | 5 | <i>Myxobolus cerebralis</i> | 1 | <i>Vibrio (Listonella) anguillarum</i> | 3 |
| <i>Eubothrium</i> species | 4 | Nematodes | 1 | <i>Vibrio salmonicida</i> | 3 |
| <i>Exophiala</i> | 8 | <i>Nephrocalcinosis</i> | 13 | <i>Vibrio</i> spp | 21 |

Read more via “[Scottish Farmed Salmon Exposed](#)”

For more background read ‘[Fish Farmageddon: The Infectious Salmon Aquacalypse](#)’ and ‘[Farmed Salmon Exposed: Global Statistics](#)’

The [mort mountain](#) was headed by the Norwegian-owned companies Hjaltland (Grieg) and Marine Harvest:

Scotland's Mort Mountain – 6.9 million in 2011

| | |
|-----------------------------------|-----------|
| Hjaltland (Grieg): | 1,588,722 |
| Marine Harvest: | 1,486,650 |
| Meridian (Morpol): | 1,305,423 |
| Scottish Salmon Company: | 1,234,975 |
| Scottish Seafarms (Leroy/SalMar): | 667,683 |
| Loch Duart: | 339,398 |
| Kames: | 67,135 |
| Dawnfresh: | 48,592 |
| Balta Island Seafare: | 40,535 |
| Wester Ross Fisheries: | 25,140 |

Scotland's salmon farming industry is now scraping the bottom of the barrel and is losing millions due to infectious diseases – with AGD the #1 killer.

Diary of Disaster: Amoebic Gill Disease in Scotland

November 2007:

The Arran Voice (9 November) [reported](#) Proliferative Gill Disease (PGD) at a salmon farm in Lamlash Bay - also known as St. Molios - on the Isle of Arran (the site was owned by [Marine Harvest](#) but the ownership was subsequently transferred to [Pan Fish](#) who then became [Lighthouse Caledonia](#) and are now known as the [Scottish Salmon Company](#)):



the arran voice

the Isle of Arran's weekly newspaper.

Fish Farm Disease

📅 November 9, 2007

Lorry loads of dead fish were seen leaving the St Molio's fish farm site near Kings Cross on Arran's eastern shore last week. Fiona Cameron, spokesperson for Pan Fish, who have recently taken operational control of the site, said, 'We will get it under control.' She admitted that a 'small batch of fish' had been affected by Proliferative Gill Disease (PGD), but the scale of the disease seems considerable. Three separate lorry trips were made on separate days to remove the fish that had suffered from the poorly-understood disease, a water-borne organism which attacks the gills of fish.

Scale of disease not disclosed

When pushed to disclose the number of fish affected by the disease, Fiona Cameron initially said that 'no number can be put on it, because it is a situation that we are still dealing with.' However, subsequent to a further enquiry, she admitted that 'the numbers are known, but that is a number that is not available.' Pan Fish continue to withhold information on the extent of the outbreak, claiming that the number of fish affected is 'commercially sensitive information.'

The article by Nick Underdown [continued](#):

Disease not fully understood

Because the disease is in Pan Fish's own words 'still not fully understood,' there are numerous questions of science that are yet to be answered. It is not a notifiable disease according to the Fisheries Research Services — which begs the question of whether it should be. There are some concerns that it could affect the mussel farm located nearby and it is not known whether the disease could affect the water course, and hence infect the wild stock, which at this time of the year is beginning its breeding run up Arran's rivers.

The recent outbreak comes at an awkward time for Pan Fish. Having just assumed control of the site from sister company Marine Harvest, an application is presently being considered by SEPA to increase the number of fish that can be legally farmed at the St Molios. The disease outbreak 'will not affect a recent application to increase the volume of fish stocks', says Steve Bracken, press officer for Marine Harvest.



The Arran Voice (16 November) [reported](#):



Marine Harvest overstocking in St Molio's

 November 16, 2007

Figures released under Freedom of Information laws have revealed consistent overstocking at St Molio's fish farm site during the course of 2007. Marine Harvest has exceeded the legal 'discharge consent' in every month between February and June by as much as 20%. The 'discharge consent' is the maximum allowable biomass of farmed salmon permitted by the Scottish Environmental Protection Agency (SEPA) on the site. In April, Marine Harvest was farming 239 tonnes of fish more than it was allowed by law. The previous month the farm suffered 1,455kgs of mortalities.

The article [continued](#):

Overstocking and disease?

Since the outbreak of Proliferative Gill Disease (PGD) at the St Mollo's fish farm two weeks ago, Pan Fish, which operates the site, has been working to keep the disease under control. Mortality figures are still being withheld by the company and probably won't be available until March 2008. In the meantime...

... Pan Fish have said they are unsure what has caused the outbreak. The farm's biomass figures (published below) have led to speculation that the disease is the result of consistent over-stocking throughout this year.

In February 2006, 25,000 farmed salmon died at St Mollo's, according to SEPA data. Pan Fish say the recent fish mortalities are the result of PGD. But it remains open to question whether the PGD at the St Mollo's site has been caused or exacerbated by overstocking at the farm. Amanda Walker of the Fisheries Research Service (FRS), says that 'as the Pan Fish farm in question is a sea water farm another bacterium may be implicated.' She explains that 'similar if not identical' symptoms can result from other 'opportunistic bacteria' or a more 'highly pathogenic bacterium' in different conditions. 'The disease is found more often where fish are held in crowded conditions or where gill irritation or damage may be present,' she said, and added that 'other factors contributing to the occurrence include low oxygen, high turbidity and high ammonia levels.' These bacteria can occur in the natural environment, but wild fish as well as mussels can harbour them without developing any disease.

The Arran Voice (30 November) [reported](#):

Disease on-going as local fish farm re-brands

November 30, 2007

Lighthouse Caledonia, the new name for Pan Fish, the company that owns St Mollo's fish farm, is declining to disclose any further information about the local outbreak of Proliferative Gill Disease (PGD), despite further lorry-loads of fish being trucked off the island.

Disposal

After repeated requests for information about the 150 tonnes of dead fish, Lighthouse Caledonia eventually disclosed that they are being taken for incineration at an approved plant in Widnes, Lancashire. 'Those fish will be boufing by the time they get there,' said one Whiting Bay resident. There have been reports of noxious smells emanating from the transportation lorry on the CalMac car-deck. Lighthouse Caledonia still admit only to a 'rounded figure' of 150 tonnes of dead and diseased fish, though further loads have been transported off the island.

Lighthouse Caledonia (which was [re-branded](#) as the Scottish Salmon Company in 2010) [claimed](#) that this was an isolated incident:

Isolated incident?

Lighthouse Caledonia has said that the outbreak of PGD is an isolated incident. The company has admitted that the affected fish were transferred from a Pan Fish Scotland Kyles of Bute site, although a spokesperson for the newly-formed aquaculture company said on Tuesday this week that 'at this present moment, to the best of my knowledge, there are no further cases of the disease at other Lighthouse Caledonia sites.' The picture is clouded by a complicated restructuring of Marine Harvest Global (MH), the parent company of Lighthouse Caledonia (LC). Its spokesman Steve Bracken confirmed that remaining Scottish fish farms belonging to MH do experience instances of the disease PGD.

Documents obtained via Freedom of Information from the Scottish Government in April 2008 revealed that:

On 20 November 2007, the Argyll District Salmon Fishery Board [name blacked out but believed to be Jane Wright] wrote to the Scottish Government stating:

“A fish farm on Arran has PGD (clamidia) with the loss of four out of eight cages. You may not be aware of this as it is a non notifiable disease. The Argyll District Salmon Fishery Board asks for your help in informing on the implications for wild fish from this disease....This year appears to be particularly bad for clamidia – other farmers have reported having problems with it.”

Dr David Mackay, Chairman of the Sea Trout Group, subsequently wrote to the Scottish Government’s Environment Minister Mike Russell on 1 March 2008 raising the issue of “greatly increased incidence of “Proliferative Gill Disease” (caused by a Chlamydia-like bacterium) in Scotland during the autumn and early winter of 2007.”

Hand-written notes by the Fish Health inspector who visited the Lamlash Bay farm on 21 November 2007 reported: “So far over 40% lost”, “4,000 per day morts at worst period” and “22.8 tonnes of waste fish and water sent every few days”. The dead farmed salmon (called ‘morts’ by the industry) were transported and reportedly incinerated by Granox Ltd in Nuneaton.

An email dated 5 December 2007 in reply to the Argyll District Salmon Fishery Board’s email raising the issue of clamidia [sic] from the FRS Marine Laboratory Aberdeen (name blacked out) stated:

“We were aware the fish farm on Arran has been suffering from Proliferative Gill Disease but are not aware Chlamydia is the bacterium involved. We have had an inspector on site investigating the case.....More specific information on Chlamydia has been supplied by our pathologists; Chlamydia or a Chlamydia-like organism is the causative agent of epitheliocystis a term used loosely to describe gill infection”.

A FRS Marine Laboratory Histopathology Report dated 13 December 2007 stated:

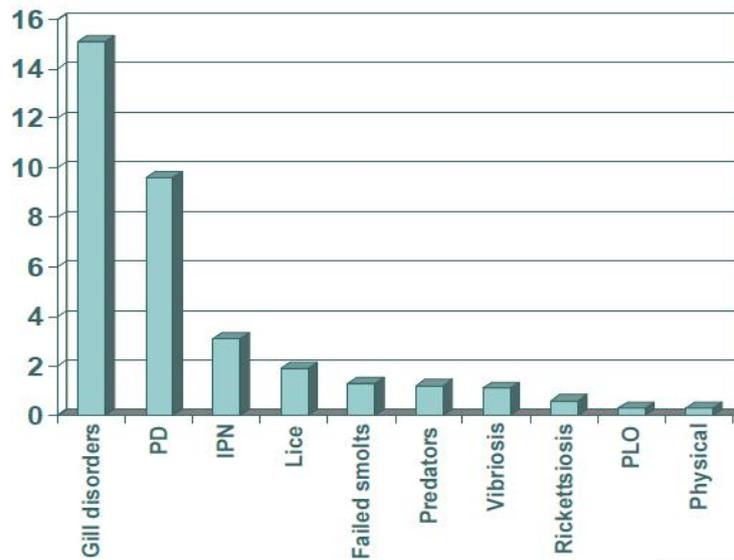
“Some fish have epitheliocystis, characterized by the presence of intracytoplasmic, granular inclusions in the epithelial cell (Chlamydia like infection)”.

A FRS record sheet (reviewed on 10 January 2008) listed the diagnosis as “Gill pathology, Chlamydia and parasites”. In addition to Chlamydia, the FRS Fish Health inspection reports detail problems with epitheliocystis, ichthyobodo, trichodina, amoeboid protists, a bacterial infection, focal haemorrhaging in the liver and pyloric caeca.

Read more via “[Chlamydia and Disease backgrounder: Scottish Farmed Salmon Killed by The Clap \(Chlamydia\) –World’s Largest Salmon Farmer \(Marine Harvest\) Affected](#)”

A ‘Tri-Nation’ seminar in November 2007 (sponsored by Marine Harvest) was held in Ireland on the issue of Pancreas Disease and SAV diseases – involving Norway, Scotland and Ireland. In Ireland, ‘gill disorders’ were identified as the single largest cause of mortality on Irish salmon farms in 2005 and 2006 (read the presentations [online here](#)).

Causes of mortality 2006 (%)



Another Tri-Nation Seminar took place at the Marine Institute, Galway, in May 2008. The Tri-Nation Initiative is a voluntary group consisting of personnel from the salmon farming industry, private veterinary practices, state agencies and third-level institutes from Ireland, Scotland and Norway. During this meeting there was an extra session, chaired by Dr Gordon Ritchie of Marine Harvest, on “Gill Pathologies”. The [agenda](#) stated that: “An extra session will be included to discuss the issues related to gill pathologies and interest in developing a similar Tri-Nation approach to dealing with the problem will be sought”.

January 2008:

The Arran Voice (4 January) [reported](#):

Fish farm signs Arran AMA as disease persists

 **January 4, 2008**

Reports persist that disease and fish mortalities have persisted at St Molio's fish farm site well into December. As recently as the 12th of December — a full month after the original outbreak of Proliferative Gill Disease was admitted — a lorry load of dead fish was carted from the site near Kings Cross, Whiting Bay.

When the outbreak of the disease was initially confirmed, Pan Fish sources said that it was a 'small batch of fish' that had been affected. It would now appear that larger numbers of fish have been killed by the disease.

Lighthouse Caledonia, the company which has sprung from a massive restructuring of the Marine Harvest group, and is now responsible for the St Molio's site, decline to discuss the disease problem, but have recently confirmed their signing of a new Arran Area Management Agreement which took place before Christmas.

March 2008:

The Journal of Fish Diseases [reported](#) AGD in Norwegian salmon farms for the first time.

Journal of **Fish Diseases**

J Fish Dis. 2008 Mar;31(3):205-14.

First cases of amoebic gill disease (AGD) in Norwegian seawater farmed Atlantic salmon, *Salmo salar* L., and phylogeny of the causative amoeba using 18S cDNA sequences.

Steinum T, Kvellestad A, Rønneberg LB, Nilsen H, Asheim A, Fjell K, Nygård SM, Olsen AB, Dale OB.

Section for Fish Health, National Veterinary Institute, Oslo, Norway.

Abstract

Amoebic gill disease (AGD) was observed in seawater farmed Atlantic salmon at four geographically distant locations on the western coast of Norway. To the best of our knowledge, these are the first detected AGD outbreaks in Norway. The outbreaks lasted for 7-12 weeks in late autumn 2006 and were for the most part concurrent. The crude, cumulative mortality was in the range of 12-20% at three farms and 82% at a fourth. The histopathology showed uniform parasomal amoebae in lesions characteristic for AGD. Another gill disease, proliferative gill inflammation (PGI), was also present to a variable degree and the distinction between the two gill problems is discussed. Seawater temperatures were 3.5 degrees C higher than average before disease outbreaks, which subsided in early winter. The geographical and time pattern of these outbreaks strongly indicates simultaneous infection from the marine environment. Two contiguous 18S cDNA sequences, obtained by reverse transcriptase PCR from gill tissue with AGD-related lesions, showed highest similarity (99.2%) to a newly recognized species designated *Neoparamoeba perurans* and maximum likelihood analysis demonstrates that they represent Norwegian strains of this *Neoparamoeba* lineage.



May 2008:

The Arran Voice (2 May) [reported](#):

Fish farm disease disclosed

 **May 2, 2008**

Case documents disclosed under a Freedom of Information Act request have revealed that St Molio's fish farm in Lamlash Bay suffered high mortality rates during the outbreak of a 'Chlamydia-like' disease in October last year.

Lorry-loads of dead fish were seen leaving Arran during October and November 2007, but due to ongoing investigations, full details of the disease have been unavailable until now. Voice research found that the reported symptoms matched those suffered by fish infected with Proliferative Gill Disease, but the fish-farm owners would not confirm this.

Over 40% of the salmon in the St Molio's fish farm were killed due to the outbreak. Pan Fish site staff (then operators of the farm, which has since been rebranded as Lighthouse Caledonia) were removing 8,000 to 10,000 fish per day from the badly affected cages. A report from the Fisheries Research Service (FRS) also noted that 'many moribund fish were observed on site in every cage, swimming uptide with snout against the uptide net.' The disease is non-notifiable, but the FRS inspected the site after receiving reports about the high mortalities. Further laboratory examination of the affected fish identified 'Chlamydia, gill pathology, parasites, amoeboid protists, a bacterial infection and focal haemorrhaging in the liver and pyloric caeca.'

The article [continued](#):

Disease and mortalities are a normal occurrence at fish farms and mortalities are deemed by the industry to be an inevitable part of aquaculture. But the recent information may point to a rising problem in Scottish fish farms. A new report by the Norwegian National Veterinary Institute (Norway is a leader in fish farming) confirms the Voice suspicions in stating that one of the largest commercial companies considers Proliferative Gill Inflammation (PGI) to be the disease responsible for most losses of fish. It refers to 'considerable problems' in Scotland and Ireland and says that an initiative has been taken to coordinate international research on the condition.

The Chlamydia-like infection noted at St Molio's and other Scottish farms has prompted councillors and fisheries trusts to call for action. Dr Michael Foxley has urged the Scottish Government to establish a new reporting category for PGD (proliferative gill disease) and Jane Wright of the Argyll Fisheries Trust agrees. She commented, 'If the disease has the potential to affect wild fish, it should be reported, whatever the EU rules say,' and went on, 'We know very little about the possibilities of wild fish being vectors for disease. The Government does not seem to know what effects farmed fish diseases have on wild fish populations.'

Read more via [“Chlamydia and Disease backgrounder: Scottish Farmed Salmon Killed by The Clap \(Chlamydia\) –World’s Largest Salmon Farmer \(Marine Harvest\) Affected”](#)

The Arran Voice (9 May) [reported](#):

Marine Harvest supports new reporting category for PGI

 **May 8, 2008**

Aquaculture company Marine Harvest has said that it has 'no issue' with creating a new reporting category for Proliferative Gill Inflammation (PGI or PGD), a disease which has reportedly ravaged Scottish fish farms over the past year, including the Lighthouse Caledonia-operated St Mollo's fish farm near Kings Cross.

Unclear

The significance of PGD for the Scottish fish farm industry is still not clear. A recent report states that one of the largest fish farming companies in Norway believes PGI is the single biggest cause of farmed fish mortalities, but Marine Harvest deny that the disease is responsible for the majority of losses within their own Scottish operations.

'This is a seasonal problem occurring in the autumn,' said a spokesman, Steve Bracken. He added, 'The impacts of PGI are fairly well understood but the causes are not. We believe that PGI is not particularly contagious as it seems to affect individual pens within a site and does not seem to spread throughout.'

The article [continued](#):

However, the prospectus of Lighthouse Caledonia states that a site acquired from Fjord Seafood Scotland, located in East Loch Roag in the Western Isles 'has suffered severe mortalities due to PGD. It is anticipated that as much as 60% of the fish in this site could be lost as a result of disease.' A Canadian website consulted by The Voice was emphatic that the disease was almost certain to recur unless the whole site was thoroughly cleaned up, as it is caused by an intermediate host, a parasitic worm that lives in the detritus below the pens.

An international seminar on the specific issue of another fish pathology ('pancreas disease') took place earlier this week at Galways' Marine Institute, signaling that disease in farmed fish is a very live problem. Cato Lyngoy of Marine Harvest suggests that 'radical change is inevitable to combat pancreas disease.'

Steve Bracken adopts a more cautious approach. 'As salmon farming is a relatively new industry we do not claim to have all the answers, but as a priority we closely monitor the health of all our fish stocks both in fresh and sea water. Diseases found in wild salmon are the same as those found in farmed salmon, so it makes sense to continually inspect our stocks to minimize any impact.' Representatives of fisheries trusts maintain that neither the industry nor the government knows precisely what impact the recent outbreaks of PGD have had on wild stocks.

September 2008:

A front page article in The Arran Voice (18 September) [reported](#):



FISH FARM DEATH TOLL — THE FACTS

Our front page features new photos of dead fish at the St Molio's fish farm, Lamlash Bay, and exposes the true story of the disease and death that has been affecting the fish stocks.

FRONT PAGE STORY

Written by **Alison Prince**
Thursday, 18 September 2008

690 views 1 comment



Last week, eight large containers of maggot-ridden dead salmon stood waiting for disposal on the slipway at St Molio's fish farm in Lamlash Bay. The photographs printed here were taken less than a week ago, as their digital date confirms, and they offer direct evidence that mortalities among the penned fish are still occurring. A disease epidemic ravaged stocks last year, and statistics obtained from SEPA under the Freedom of Information Act confirm that from October to December 2007, a shocking total of over 300,000 fish died.

The Arran Voice also published photos of maggot-infested mortars from the Lamlash Bay salmon farm:



[As an aside, this photo was used by GAAIA's '[Salmon Farming Kills](#)' campaign via mock cigarette packet "Salmon Farming Spreads Disease", "Salmon Farming is Sickening" and "Salmon Farming is Rotten Business":



During a subsequent [lawsuit](#), the Norwegian Government-owned corporation Cermaq sued for defamation and attempting to secure a [gagging order](#) – in September 2012, Cermaq lost the case but appealed in October 2012 with GAAIA also filing a [cross-appeal](#)]

October 2011:

Data obtained from the Scottish Environment Protection Agency via Freedom of Information by the Salmon & Trout Association [revealed](#) Amoebic Gill Disease (AGD) at the Scottish Salmon Company’s Lamlash Bay site on the Isle of Arran:

| | | | |
|------------|-----------------------------|---------|---|
| 25/10/2011 | The Scottish Salmon Company | Lamlash | Site lost 179083 fish in last week - amoebic gill disease |
|------------|-----------------------------|---------|---|

Data disclosed by Marine Scotland following a [Freedom of Information request](#) included:

From: Duguid S (Sonia) (MARLAB) on behalf of MS FishHealth
Sent: 24 October 2011 15:19
To: Allan C (Charles) (MARLAB); Fraser D I (David) (MARLAB); Gray P (Patrick); Johnston S (Sandra) (MARLAB); Mayes A (Andrew) (MARLAB); McAlister J (Jacqueline) (MARLAB); McKay P (Paul) (MARLAB); Purvis N (Neil) (MARLAB); Sandilands J (Jeanna); Slessor KA (Katy) (MARLAB); Smith K (Kate); Smith R (Ronald) (MARLAB); Stewart D (Daniel) (MARLAB); Tomlinson D (David) (MARLAB); Walker A (Amanda) (MARLAB); Warwick A (Andrea) (MARLAB)
Subject: FW: AGD at Lamlash, Arran

For info see below – I received call from [REDACTED] a short while ago regarding this. They have lost approximately 50% of the stock over the last 10 days.

Charles – have discussed with Dave and trying to get hold of Mandy to divert her to take diagnostics.

Sonia Duguid
Senior Fish Health Inspector
Marine Scotland - Science

The FOI data disclosed also included:

Email sent to Marine Scotland, 12/10/11

Dear Rachael,

[REDACTED] forwarded a copy of your email regarding the use of chemotherapeutants for treatment of amoebic gill disease at Lamlash, so I wanted to update Marine Scotland with what's presently going on. I accompanied [REDACTED] (a veterinary colleague here at Fish Vet Group) on a site visit to Lamlash on 2.10.11., where there was a rising pattern of mortality in all cages and very high numbers of amoebae parasitising the gill tissue of all fish we examined. Given the severity of losses experienced in previous years, we expect this outbreak to go on and cause similar severe mortality and welfare problems without therapeutic intervention.

Following your email we plan to examine further using hydrogen peroxide (Paramove 35) as an in-situ bath treatment. Based on clinical examination and histopathology the fish may be too compromised to wait for the availability of a wellboat, and may not survive such a treatment. At present we are trying to arrange delivery of an IBC to the site in order to perform a small field trial on affected fish- probably in harvest bins- to assess the effects of 3 different concentrations on severely AGD-compromised fish. We intend to draft a trial protocol with the input of the product distributors (Aquapharma). In addition, considering the therapeutic efficacy of Paramove 35, availability in terms of timescale and sufficient quantities to go on and potentially treat the site still need to be established.

Should treatment with hydrogen peroxide prove non-efficacious or practically impossible, at that point it may warrant consideration of alternative treatments not presently licensed for use such as formalin.

Regards,
[REDACTED]

[REDACTED] BVM&S MSc MRCVS
Veterinary Surgeon

 **FishVet Group**

Mobile: +44(0)7769 266156

The documents detailed 279,000 morts at the Scottish Salmon Company's Lamlash Bay site on the Isle of Arran – with the previous 'site history' listed as chlamidia, gill problems, costia, IPN and epitheliosistis:

Reported and known cases of AGD

| MSS MA | Site name | Site number | Business | Date of visit / info. |
|-------------------|------------------|------------------------|--------------------------------|--------------------------------------|
| 20 | Lamlash | FS0423 | The Scottish Salmon Company | 25/10/2011 |

**Health history of
stock**

| Previous site history | Total losses to AGD | % losses |
|---|----------------------------|-----------------|
| PD; gill problems; chlamidia; <i>Vibrio</i> ; AGD; liver path; epitheliosistis; Costia; Trichodina; cestode; IPN | 279,000 | 70% |

Another case of AGD at a Scottish Salmon Company farm in Loch Roag in the Western Isles was also detailed:

From: [REDACTED]
Sent: 26 October 2011 12:00
To: Duncan R (Rachael) (MARLAB)
Cc: Megginson C (Colin) (MARLAB); [REDACTED]
Subject: Amoebic Gill Disease at East Loch Roag, Lewis

Follow Up Flag: Follow up

Flag Status: Red

Further to our recent correspondence regarding amoebic gill disease at Lamlash, Arran (dated 20.10.11) [REDACTED] and myself visited the site (14.10.11) to perform a very small-scale initial treatment with hydrogen peroxide at 500mg/L for 20 minutes on ten fish in a clean harvest bin. The dose rate was based on the lowest dose thought to have an anti-amoebic effect *in vitro* from as-yet unpublished work provided to us by Tasmanian colleagues.

Subsequently, amoebic gill disease has been diagnosed at a Scottish Salmon Company site at East Loch Roag, Lewis. This was detected on histopathological samples sent by the site (split between two groups of caged at Taranaish and Eughlam) and subsequently confirmed by myself on a clinical visit on 20.10.11. At the time of visit, the site staff were reporting a decline in feeding rates in some cages (similar to early signs reported in Arran), although over this weekend mortalities have risen. Our limited experience in Scottish amoebic gill disease cases is that observation of amoebae on histopathological sections does not always mean that severe AGD will develop; however given the signs at East Loch Roag (amoebae present in all cages, inappetance and rising mortality pattern) we expect to see considerable mortality in this case also.

The email – which has been blacked out by Marine Scotland – concludes by requesting to use the toxic and [carcinogenic](#) chemical Formalin:

Based on the results of the treatment at Arran with hydrogen peroxide, we do not believe it to be an appropriate treatment at East Loch Roag at this point. We note that while hydrogen peroxide as a treatment for amoebae is the subject of some interest in the Tasmanian industry, previous studies have found equivocal results and high toxicity (Powell and Clark [2004] *Aquaculture Research* 35 112-123). Furthermore, the huge variation in dose rates believed to be efficacious (based on the extremely limited published data and discussions with veterinary colleagues) makes it difficult to confidently advise our clients on hydrogen peroxide or any other oxidative agents such as chloramine T.

By contrast, the correct dosage for use of formalin as a topical anti-protozoal is better understood. Based on the unavailability of a freshwater treatment protocol, following discussion amongst the clinical staff here at Fish Vet Group, we suggest that strategic treatment of worst-affected pens at East Loch Roag using formalin at 200ppm for 45minutes in a well boat be considered. Should consent be granted by Marine Scotland, the final decision to treat would need to be a clinical judgement between the senior company biologist and ourselves as veterinary surgeons based on the health status of the fish and their likely ability to tolerate treatment. By treating the worst-affected pens (alongside the natural decrease in [REDACTED]) we would hope to reduce the infective burden on the site in order to avoid the severity of losses observed at Arran.

Obviously we understand that this matter requires a period of consideration, but we'd greatly appreciate your response [REDACTED]

Best wishes,
[REDACTED]

Read FOI documents in full [online here](#)

Photos provided by Marine Scotland in August 2012 following a Freedom of Information request by GAAIA relating to infectious gill diseases included the following:

Lamlash 2012



November 2011:

The Arran Banner (5 November) [reported](#):

THE ARRAN BANNER

SATURDAY, 5 NOVEMBER, 2011

Thousands of fish wiped out

Rare disease in Lamlash Bay hits Kings Cross farm stocks

A rare disease appears to have wiped out thousands of fish at the Scottish Salmon Company farm at Kings Cross.

On Tuesday, October 25, the *Banner* received reports of 'dozens of industrial skips full of dead fish' at the site on the shores of Lamlash Bay.

At 5pm on the same day a large red tanker from an environmental waste company was witnessed coming out of the site and heading for Brodick pier. At least another two tankers have been seen removing material from the site and leaving on the ferry for Ardrossan.

It is believed that the dead fish were taken to Widnes, in

REPORT

by **HOWARD DRIVER**
editor@arranbanner.co.uk

Lancashire, for incineration. Apparently a proportion of each cage was infected, some more than others, and the loss was described as 'a substantial volume'.

Stewart McLelland, chief operating officer of The Scottish Salmon Company, said: 'The Scottish Salmon Company has been faced with a loss of fish at our site at Lamlash Bay on Arran, as a result of a naturally occurring water-borne amoeba which irritates the gills of the salmon.'

'This incidence of the rare

condition, called Amoebic Gill Disease, was quickly spotted by site managers and has been monitored throughout by our fish vets.

'This does not affect the surrounding eco-system.

'We have also informed relevant government agencies of the situation and will continue to work with them. To remove the fish quickly and efficiently, they were placed in skips ready for uplift.

'Staff working at the site in Arran take their responsibilities for fish management very seriously, and have responded as quickly and professionally as possible.'

Continued on page 2

Dead fish taken off Arran by tanker

From page 1

A spokeswoman for the Scottish Environment Protection Agency (SEPA) said: 'This is not a pollution incident; it's a matter for Animal Health.'

George King, duty vet with the Department of Environment and Rural Affairs, said: 'We can't divulge information about individual incidents unless a case comes to court.'

A spokesperson for North Ayrshire Council Environmental Health added: 'The disposal of animal by-products is a role for SEPA.'

'It appears that things are being handled properly.'

Sally Campbell of the Community of Arran Seabed Trust (COAST) told the Banner: 'Dead fish were being taken away on the ferry on Monday



Uncovered skips of dead fish at the fish farm site on Sunday. 01_b44fs01

and the smell on board was awful.

'The fish are closely packed in the cages in Lamlash Bay

and this disease is very contagious. They run out of oxygen and die for the want of air.'

On Sunday afternoon uncovered skips of dead fish were clearly visible at the fish farm site.

Read more via ["Diseased Farmed Salmon Causes Stink in Scotland"](#)

Data disclosed by Marine Scotland following a [Freedom of Information request](#), also revealed problems with Proliferative Gill Inflammation (PGI) at Marine Harvest and Scottish Sea Farms:

From: Walker A (Amanda) (MARLAB)
Sent: 16 November 2011 09:17
To: Allan C (Charles) (MARLAB); Fraser D I (David) (MARLAB)
Cc: Smith R (Ronald) (MARLAB); Purvis N (Neil) (MARLAB); Pendrey D (Daniel)
Subject: Amoebic Gill Disease



Mortality_Dump_20Mortality_Dump_20
1111151559(1)... 1111151547(1)...

Following information from Danny about AGD being a problem in the Sound of Mull and Sunart I contacted [REDACTED] at MH and [REDACTED] at SSF.

Camas Glas

[REDACTED] informed me that there have been significant mortalities in Sunart at Camas Glas which started in October. [REDACTED] has taken samples and diagnosed "mild" Proliferative Gill Inflammation. Site staff estimate they have lost 80,000 fish. Fish on site are 2011 Q1 and Q2 (currently a mean weight of about 1kg). The site manager has said mortality levels are improving. Mort figures attached. Peak appears to be 5th November in cage AAB-0003 when 3,800 fish lost to Proliferative Gill Inflammation in a day. I note they have treatment losses on the 11th and 12th November and mort figures for the 13th November appear to be low.

Invasion Bay

Fish on site 2011 Q1s. Site staff have reported "grumbling" mortalities. From mortality figures (attached) the peak morts from Proliferative Gill Inflammation appears to be 210 in cage AAC-0010 on 21st October and 200 from cage AAC 0016 on 6th November . Larger loses have been attributed to treatment losses.

SSF

██████████ reported increasing mortality at Scallastle and Fishnish (about 2,000 morts at each site attributed to the issue but increasing). The fish on these sites have severe gill pathology with amoeba on the gills. Today they are carrying out a well boat treatment with fresh water at Scallastle and hope to carry out a treatment with hydrogen peroxide tomorrow at Fishnish. Bloody bay has also has gill pathology which is less severe and appears to be improving.

██████████ stressed that this information if confidential.

Read FOI documents in full [online here](#)

Photos provided by Marine Scotland in August 2012 following a Freedom of Information request by GAAIA relating to infectious gill diseases included the following:

Invasion Bay



The Scottish Salmon Company reported in their [Q3 2011 financial report](#):

The Scottish Salmon Company Third Quarter Report 2011

30 November 2011

The Company has an exceptional biological track record, resulting from single loch stocking and strict bio-security. From time to time there are some inherent risks in aquaculture and at the start of Q4 2011 losses of approximately 300,000 fish were suffered at one site due to Amoebic Gill Disease. These fish were due to be harvested in the second half of 2012. Guided volumes for 2012 have therefore been reduced slightly from 23,000T to 22,500T with approximately 8,000 tonnes harvested in the first half.

During October the Company suffered losses of fish at one of its sites due to Amoebic Gill Disease. The loss accounted for approximately 70% of the fish on site. The net loss after recovery of insurance values will be approximately £400,000 and will be reflected in the Q4 report.

December 2011:

Disease data obtained via Freedom of Information from Marine Scotland [revealed](#) the following cases of Amoebic Gill Disease and Bacterial Gill Disease during 2011:

| Business | Site | Result |
|-----------------------------|---------------|----------------------|
| The Scottish Salmon Company | Druimyeon Bay | Amoebic gill disease |

| | | |
|-----------------------------|---------|----------------------|
| The Scottish Salmon Company | Lamlash | Amoebic gill disease |
|-----------------------------|---------|----------------------|

| | | |
|---------------------------|------------------|----------------------|
| Kames Marine Fish Farming | Kames Bay (west) | Amoebic gill disease |
|---------------------------|------------------|----------------------|

| Business | Site | Result |
|-------------------------------|--------------------|------------------------|
| Marine Harvest (Scotland) Ltd | Grey Horse Channel | Bacterial gill disease |

The Community of Arran Seabed Trust (COAST) [reported](#) in their December 2011 newsletter:

December 2011 Newsletter

Fish farm outbreak highlights selective use of facts by industry



Salmon mortalities at St Molios fish farm in 2008

In late October an estimated 800-900 tonnes of farmed salmon died at The Scottish Salmon Company's St Molios fish farm in Lamlash Bay. Each fish weighed about 1kg, so up to 100,000 fish may have died, although numbers have not been officially disclosed.

The fish have since been removed by tankers off the island to Widnes in Cheshire for incineration and the Marine Science Fish Health Inspectorate in Aberdeen has confirmed the cause of death to be a severe and relatively uncommon outbreak of amoebic gill disease (AGD).

The Fish Inspectorate has also disclosed that it is tracking two other cases of AGD in fish farms across Scotland, one on the west side of Harris and one near Gigha.

Phil Thomas, chair of the Scottish Salmon Producers Organisation claim the disease outbreak is a naturally occurring event. "That claim is a good example of selective information by the aquaculture industry," explains COAST's Dr Sally Campbell. "The fact is that over-concentration of animal populations magnifies the infection risk often beyond the ability of humans to control. It is only a 'naturally occurring event' in as much as tuberculosis in humans is a naturally occurring event when pathogen (in that case a bacterium), host, (in that case human beings, often in large numbers), and environment (insanitary conditions, close proximity of people and people already susceptible due to overcrowding, poor diets and so on)."

AGD in fish is caused by an imbalance of host, pathogen (in this case several species of Amoeba) and the environment. There is direct link between the concentration of biomass and the ease of infection.

The Fish Inspectorate has confirmed that although the disease is controlled, the outbreak is not completely resolved. In other words the remaining fish are not in peak condition. Sometimes the gills of the farmed fish can become damaged by an algal bloom, which contains a lot of silicate (sharp edges) phytoplankton. These can damage the gills, which are very fragile and may make them more susceptible to AGD.

The well boat (or should we say sick boat) was in last week dosing the remaining fish to kill sea lice. To do this the remaining fish were pumped into the well boat for dosing with anti sea lice medication and then emptied back into pens, plus the seawater with the dosing chemicals.

Marine Scotland also [revealed](#) "some Amoebic Gill Disease" at a site operated by Loch Duart in Loch Maddy in the Western Isles:

| Year | Species | Site Name | Company Name | Region | No. Escaped | Water Type | Date of Incident | Size | Cause of Escape | Disease Information |
|------|-----------------|------------|----------------|---------------|-------------|------------|------------------|-------|-------------------|--|
| 2012 | Atlantic Salmon | Loch Maddy | Loch Duart Ltd | Western Isles | 20 | SW | 17/01/2012 | 2.0kg | Equipment Failure | Some amoebic gill disease noted on site December 2011, otherwise the fish are healthy. |

February 2012:

The Scottish Salmon Company reported in their [Q4 2011 financial report](#):

The Scottish Salmon Company Fourth Quarter Report 2011

24 February 2012

In addition the Company has suffered elevated losses at a number of sites due to Amoebic Gill Disease which have been absorbed in the quarter's results. This challenge was prevalent across the West Coast of Scotland during Q4 with the Company suffering losses at two separate production areas, both of which will start harvesting in the second half of 2012. This resulted in a net cost of approximately £0.8m in the quarter.

The Fish Site published two articles on AGD in Scotland (since deleted from their web-site but available [online here](#)):

AGD in Scotland - Avoid Stress to Mitigate Effects

Date: 20 Feb 2012

Link: <http://www.thefishsite.com/fishnews/16511/agd-in-scotland-avoid-stress-to-mitiga...>

SCOTLAND, UK - Amoebic gill disease (AGD) is a gill disorder found in marine fish, but primarily affecting salmon. At the end of 2011 the disease was recognised for the first time in Scotland, after the industry suffered a number of losses. Charlotte Johnston, TheFishSite editor reports.

The first cases in Scotland were seen in September 2011, says Fish Vet Group vet, Chris Matthews. In Ireland the disease has been recognised since summer 2010, and it is thought that Tasmania has dealt with the disease for over 20 years.

Whilst the discovery of the disease in Scotland has been a particular problem in recent months, Mr Matthews says that seasonal gill disorders (of which AGD is one) can be common in the autumn and early winter, triggered by peak water temperatures at the end of summer.

The AGD agent has been identified in most of Scotland's salmon farming areas, however clinical disease has only developed on individual farms. Fish Vet Group is currently working to identify the risk factors for developing gill problems.

"Gill diseases, including AGD, are always a significant challenge for the industries in Scotland, Ireland and Norway. Because losses due to other infectious diseases are improving due to vaccination and advances in husbandry techniques, the relative importance of losses due to gill disorders like AGD has increased," he says.

AGD Hard to Control, Says Marine Harvest

Date: 22 Feb 2012

Link: <http://www.thefishsite.com/fishnews/16527/agd-hard-to-control-says-marine-harves...>

SCOTLAND, UK - With cases of Amoebic gill disease (AGD), Charlotte Johnston, TheFishSite editor speaks with Marine Harvest Scotland to see how the disease has affected them and what precautions are being taken.

Marine Harvest Scotland has said that there have been no greater losses to gill disease than usual for this time of year. However, a spokesperson for the company told TheFishSite that the clinically significant gill disease observed so far this year has largely been AGD.

Marine Harvest said that their major concern is that the disease is hard to predict or contain. So far it appears that when winter temperatures don't drop low enough for long enough, the disease appears to flair up as a clinical condition in significant scattered outbreaks across Scotland.

Marine Harvest Scotland is surveying all their sites and monitoring whether the agent appears to be persisting through the lowest temperatures. Treatments may be needed for any sites where it appears persistent.

Out of the 30 sea farms, Marine Harvest Scotland has only had two clinical cases and one sub clinical detection.

Data disclosed by Marine Scotland following a [Freedom of Information request](#) listed 13 cases of AGD from the first case (Lamlash Bay) reported in October 2011 to February 2012:

Reported and known cases of AGD

| MSS MA | Site name | Site number | Business | Date of visit / info. | Case number | Management Area |
|--------|------------|-------------|-----------------------------|-----------------------|-------------|-------------------------------|
| 20 | Lamlash | FS0423 | The Scottish Salmon Company | 25/10/2011 | 20110032 | Arran |
| 6a | Vuiabeag | FS0411 | The Scottish Salmon Company | | N/A | Loch Roag |
| 6a | Eughlam | FS1233 | The Scottish Salmon Company | | N/A | Loch Roag |
| 15b | Fishnish A | FS0427 | Scottish Sea Farms Ltd | 15/02/2012 | 20120882 | Linnhe, Lorne & Sound of Mull |

| | | | | | | |
|-----|-------------------------|--------|---------------------------------|------------|----------|-------------------------------|
| 15b | Fishnish B | FS0694 | Scottish Sea Farms Ltd | 15/02/2012 | 20120083 | Linnhe, Lorne & Sound of Mull |
| 15b | Scallastle | FS0209 | Scottish Sea Farms Ltd | 16/02/2012 | 20120034 | Linnhe, Lorne & Sound of Mull |
| 15b | Bloody Bay | FS0964 | Scottish Sea Farms Ltd | 14/02/2012 | 20120081 | Linnhe, Lorne & Sound of Mull |
| 16d | Ardmaddy | FS0464 | Lakeland Marine Farm Ltd | 06/12/2011 | 20110723 | Seil Sound to Loch Craignish |
| 16d | Port Na Cro | FS0859 | Lakeland Marine Farm Ltd | 06/12/2011 | 20110600 | Seil Sound to Loch Craignish |
| 16d | Kames Bay West | FS0871 | Kames Marine Fish Farming | 12/12/2011 | 20110626 | Seil Sound to Loch Craignish |
| 18b | Drumyeon Bay | FS0336 | The Scottish Salmon Company | 25/10/2011 | 20110507 | Gigha |
| 18a | Ormsary Broodstock Unit | FS0090 | Landcatch Natural Selection Ltd | 23/11/2011 | 20110494 | Loch Caolisport |
| 8b | Quanterness | FS0908 | Northern Isles Salmon Ltd | 21/02/2012 | 20120104 | Central Orkney |

Moreover, the following mortalities were detailed for the first four cases – including 279,000 morts at Lamlash Bay (Scottish Salmon Company):

Total losses to AGD (average weight (kg) mass lost (ton) % losses

| | | | |
|-----------------------|---------|--------|----------------|
| 279,000 | 1 | 279 | 70% |
| 90,318 | 0.909 | 82.178 | |
| 15,885 | 0.858 | 13.604 | |
| 14,309 wk40-wk51 2011 | 0.653kg | 9.344 | 4.2%/12wk/site |

Read FOI documents in full [online here](#)

Photos provided by Marine Scotland in August 2012 following a Freedom of Information request by GAAIA relating to infectious gill diseases included the following:

Fishnish A



March 2012:

Data disclosed by Marine Scotland following a [Freedom of Information request](#) included the following document:

Amoebic gill disease

This was presented by [REDACTED] (Vet-Aqua International, Ireland) at the Fish Veterinary Society March 2012.

AGD has moved from a seasonal to a 'all year round' problem in Australia where it is recognised as a primary pathogen. AGD also occurs in USA, Ireland, France and Spain.

A recent survey of Scottish farms was carried out by Vet-Aqua International for the SSPO. This was conducted by direct contact to the Scottish industry by phone and email and colleagues in Norway. The survey identified 26 sites affected by AGD in Scotland in 2011 as opposed to 2 sites in the period 2006-2007, 12 of which were linked with mortality. Analysis of reports and outbreaks confirms that AGD can be both primary or secondary pathogen. The risk factors identified by the industry are high salinity (>32ppt), biofouling, blooms / swarms, prior gill disorders, smolt size and quality, elevated temperature, farming areas and vicinity to other infected farm/area. Losses increased when AGD and PD were present. There may also be a link with strain of fish.

Amoeba can persist in sea water and spread > 1km for a period of 14 days. These have also been detected in sea lice.

Outbreaks peaked in October in fish weighing 150g-5kg, mean 1.6kg at 11C (range 7.5-13.5C). Fish were infected for up to two months with a range from 1 week to 4 months.

Many (15) of the Scottish sites reported gill disease prior to the presence of AGD.

Treatments were undertaken in 16/26 sites, 4 used freshwater, 10 used hydrogen peroxide, 2 used formalin. Treatment with fresh water is performed every 4-6 weeks (13 times in every 15 months cycle) adding ~10-20% to production costs.

Vet-Aqua International, Ireland has collected data from 26 sites highlighting the lack of detail of our records and should therefore form the basis of our current understanding of AGD.

In Norway temperature is a risk factor and it is possible that increasing sea lice, gill pathologies and AGD will be reflected in increased losses in the spring?

We were made aware that Industry (farms and services providers) are holding a meeting this Friday on gill issues including AGD but it was clear that they were reluctant to have FHI staff involved. Patricia and I had a discussion with [REDACTED] from Aqua Pharma who is

Read FOI documents in full [online here](#)

Disease data obtained via Freedom of Information from Marine Scotland [revealed](#) the following case of Amoebic Gill Disease during the first three months of 2012:

| Business Name | Site Name | Results Type Name |
|------------------------|--------------|----------------------|
| Scottish Sea Farms Ltd | Fishnish (A) | Amoebic gill disease |

A [report](#) published by the Tasmanian salmon farming company Tassal and the [Australian Seafood Cooperative Research Centre](#) in October 2012 referred to a visit to Scotland and Ireland in March 2012:



**Amoebic Gill Disease (AGD) in Scotland
and Ireland – Impact, Control Procedures
and Investigations
Project No. 2012/712**

In recent years, AGD has started to emerge in salmon farming operations worldwide, causing significant stock losses. This presents a unique opportunity for the Tasmanian industry to conduct collaborative research with our international counterparts to speed up our understanding of *N. perurans* and investigate alternative treatment options. By visiting the Northern Hemisphere in March, we will have the opportunity to influence the direction of their research and investigations for the upcoming Northern Hemisphere summer which will hopefully be beneficial to the Tasmanian industry.

The [report](#) detailed the following:

RESULTS

Discussions were held with technical experts from Scotland, Ireland and the USA, representing Marine Harvest, Scottish Seafarms, Meridian, Scottish Salmon Company and a number of independent farms. Strategies, farming practices and treatments were compared and evaluated for effectiveness in the Australian industry.

In total, eight farms were visited in Scotland and Ireland. The AGD prevalence and management practices were examined.

In Ireland 12/23 marine farms were affected by AGD, all experienced stock losses. Nine sites used freshwater in wellboats, which proved to be successful. Two of the nine had to re-treat. Six sites used peroxide in either a wellboat or in a tarp at concentrations ranging from 720 – 1250ppm for 15 – 20 minutes at a temperature range of 9 – 11° C. Two of these sites needed to re-treat. Hydrogen peroxide under field conditions was shown to be effective at controlling AGD

AGD was reported in 26 farms in Scotland, all in the south of Scotland. Thirteen of these used in-situ net washers. Eleven of these farms treated, using either peroxide, freshwater or formalin. Formalin did not appear to be successful.

And thanked the following staff at Marine Harvest in Scotland and Ireland:

ACKNOWLEDGEMENTS

We would like to thank Karl Scott, David MacGillivray and David Cockerill from Marine Harvest Scotland for taking time to show us their farms, also to Marine Harvest Scotland for providing us with accommodation whilst in Fort William.

We would also like to thank Hamish Rodger for organising our farm visits whilst in Ireland, also to Liam Doherty from Marine Harvest Ireland and Noel Lee for allowing us to visit their farms. Thanks also to Skretting for providing us with accommodation whilst in Galway.

April 2012:

Data disclosed by Marine Scotland following a [Freedom of Information request](#) included details of AGD problems at Scottish Sea Farms in Scallastle and Bloody Bay on the Isle of Mull:

From: [REDACTED] [mailto:[REDACTED]]
Sent: 03 April 2012 17:50
To: Purvis N (Neil) (MARLAB) @scottishseafarms.com
Subject: RE: Amoebic Gill Disease

Hi Neil,

I've attached some data for the tail end of 2011 for the sites you expressed interest in. We became aware of AGD around weeks 42-43 and there was little clinically to indicate an issue prior to this. Scallastle West group (2 cages) and Fishnish A (5 cages) had late summer smolts/S0s placed alongside the established S1s. The small fish were much more severely affected and we think jaw damage and deformity occurring in freshwater significantly compromised those at Fishnish A, making their AGD experience much worse. The very significant mortalities posted at Fishnish A and Scallastle West cage group are largely confined to these small fish and there was a significant loss of these during treatment - I don't think this is separated from the AGD

Scallastle, Fishnish A and Fishnish B have all been retreated with peroxide by wellboat during Feb 2012 at 1400ppm. Motivation was to try and reduce the numbers of remaining amoebae as far as possible while the temperature was at its lowest (in the hope that we might not have to do this again later in the year at higher temperatures). These were judged as successful, but a few amoebae remain along with slight gill pathology. Pre-treatment mortality confined to the most compromised small fish and treatment/immediate post treatment mortality very low overall <0.7% and largely confined to the small fish. BB remains untreated.

Hope this is of some use. Let me know if you need more. We are aware of AGD among harvest sized fish at Kishorn, although low numbers and more of an incidental finding. Not possible to say if they suffered low level clinical AGD last autumn. We have gill pathology and some amoebae at Spelve just discovered. No clinical AGD at this time. Status elsewhere unknown.

Regards,

(See attached file: *Bloody Bay morts data 041011-251211.xls*)(See attached file: *Fishnish A morts data 041011-251211.xls*)(See attached file: *Fishnish B morts data 041011-251211.xls*)(See attached file: *Scallastle morts data 041011-251211.xls*)

---28/03/2012 15:03:56---Hi Hope all is well with you.

Two further cases of AGD were disclosed:

| | | | | | |
|-----|---------------------|---------------------|------------------------|----------------|-------------------|
| 11c | Kishorn | A or B DJT to visit | Scottish Sea Farms Ltd | 04/04/2012 | Carron, Kishorn |
| 16c | Loch Speive A and B | FS253 ,FS654 | Scottish Sea Farms Ltd | 04/04/2012 N/A | Loch Speive, Mull |

The following details were also provided:

| | | |
|-------------------|--|-----|
| Carron, Kishorn | Staff aware of AGD among harvest sized fish, although low numbers and more of an incidental finding. Not possible to say if suffered low level clinical AGD last autumn. | |
| Loch Speive, Mull | Gill pathology and some amoebae just discovered at site. Affecting damaged fish mainly. No clinical AGD at this time. No mortalities and no treatments | N/A |

Read FOI documents in full [online here](#)

May 2012:

The Scottish Salmon Company reported in their [Q1 2012 financial report](#):

Biological performance overall is good with higher than average water temperatures contributing to better growth in both the current generation and the generation to be harvested in the first half of 2013. Unfortunately higher water temperature also contributed to an increased level of amoeba in some sea areas which has resulted in two significant occurrences of Amoebic Gill Disease in Q4 2011. This challenge has resulted in both a mortality event and a dip in performance of the surviving fish in the two clusters affected. These fish are due to be harvested in Q3 and Q4 of 2012. Harvest volume for the year is still guided at 22,500T.

Data disclosed by Marine Scotland following a [Freedom of Information request](#) included details of AGD problems at Marine Harvest's farm in Loch Hourn:

From: Allan C (Charles) (MARLAB)
Sent: 02 May 2012 10:06
To: Young A (Ally); Weatherston R (Robin)
Cc: Haddon P (Paul); Pendrey D (Daniel); Bland M (Michael) (MARLAB); Walker A (Amanda) (MARLAB); Warwick A (Andrea) (MARLAB)
Subject: RE: 2008781B - Marine Harvest - Loch Hourn - Salmon Deaths

Hi Ally

We've been in touch with the company and they have been experiencing some losses associated with Amoebic Gill Disease (AGD).

The large grade of fish from the site have been harvested through Mallaig, the small grade of one of the stocks on site displayed increased mortality at the beginning of April. These were treated with hydrogen peroxide, in the wells of the Ronja Pioneer. (Licensed, Mike?) approx 4,800 (3.1%) of the 155,000 fish treated died following treatment and were removed on Saturday 28th.

Read FOI documents in full [online here](#)

July 2012:

The Daily Mail (17 July) reported on millions of mass mortalities at Scottish salmon farms with companies "losing almost a fifth of their salmon to fatal diseases and parasites" (read data online via '[Fishyleaks](#)').

Fear for fish industry as one in five salmon dies

By Victoria Allen

FISH farms are losing almost a fifth of their salmon to fatal diseases and parasites.

Around 6.8 million salmon died last year in underwater cages – an estimated 17.6 per cent of the farmed population, figures show.

The death rate has been blamed on outbreaks of disease among captive fish, including heart failure, pancreatic necrosis and sea lice – parasites that eat the fish alive.

These diseases are also spreading through wild salmon populations, prompting criticism of the multi-million pound 'aquaculture' industry.

The sector was worth £563million in 2010 but has a mortality rate which has seen as many as one in four salmon die at some farms.

Freedom of Information (FOI) responses by Marine Scotland and the Scottish Environmental Protection Agency (SEPA) show the number of salmon killed soared by almost a third from 5,322,096 in 2010 to 6,870,577 last year.

Read article in full [online here](#)

Marine Harvest's Q2 2012 [report](#) (19 July) included:



marine harvest
excellence in seafood

Q2/2012

SECOND QUARTER
MARINE HARVEST GROUP

Scotland

The biological situation in Scotland remains favourable. The quality of harvested fish is very good. The unit experienced low mortality in the period, but an increase was recorded towards the end of the quarter related to gill amoeba which could influence the cost level going forward. Favourable seawater temperatures contributed to good growth.

Data disclosed by Marine Scotland following a [Freedom of Information request](#) included another request to use the toxic and [carcinogenic](#) chemical Formalin:

From: [REDACTED]
Sent: 16 July 2012 13:37
To: Duncan R (Rachael) (MARLAB)
Subject: Amoebic Gill Disease
Follow Up Flag: Follow up
Flag Status: Red

We had some correspondence last year regarding amoebic gill disease treatment- unfortunately as you may be aware it has reared its head again as a serious issue in Scottish salmon farms over the past few months. Since the spring, most affected farms have been treating with hydrogen peroxide with reasonable success, although my experience is that as water temperature increases a few sites are finding that they need to re-treat- we expect this shortening of treatment intervals to continue until water temperatures peak in the autumn.

While we're not presently keen to use formalin for AGD, and it seems that the opinion amongst the very few vets who have used it for this purpose is that the results are ambiguous, I wondered if it would be possible to get comment from Marine Scotland (from a licensing perspective) regarding the use of formalin in wellboats for AGD. As you're aware, permission was granted for its use by the Scottish Salmon Company at Loch Roag last year. While I did not attend the treatment myself, the opinion of the attending biologist was that it was beneficial, severely diseased fish coped remarkably well with it, and it interrupted the mortality pattern on the site. Unfortunately the chance wasn't taken to collect detailed efficacy results at the time. We expect that as the weeks go on our practice (and also Marine Scotland) may well receive inquiries from salmon producers regarding the feasibility of using formalin to treat AGD cases if hydrogen peroxide becomes unacceptably hazardous to fish. I should add that formalin also becomes more hazardous at higher temperatures, and our advice to our clients is likely to remain that peroxide is the best understood treatment presently (excluding fresh water), but it would be good to have comment from Marine Scotland regarding formalin at this point.

Lastly, one of our clients has indicated that if MS were prepared to consider permission for an isolated treatment of one or two cages with formalin (perhaps during site treatment with peroxide), they'd be pleased to co-operate with any attempt to compare or benchmark the two treatments- perhaps this might be of interest to the MS pathologists etc?

Kind regards

VM&S MSc MRCVS
Veterinary Surgeon

 FishVet Group

Mobile: +44(0)7769 266156

Read FOI documents in full [online here](#)

August 2012:

Marine Scotland 'published' a topic sheet on Amoebic Gill Disease including: "Experience in Scotland suggests mortalities are typically 10-20%, but losses as high as 70% have occasionally been reported. In chronic cases low but ongoing mortalities can persist for up to three months"

marinescotland
TOPIC SHEET NO. 96 V1

// AMOEBIC GILL DISEASE



FIGURE 1
FARMED ATLANTIC SALMON SUFFERING FROM AMOEBIC GILL DISEASE SHOWING PALE GILLS, PATCHES OF WHITE SWOLLEN TISSUE AND FUSION OF FILAMENTS.

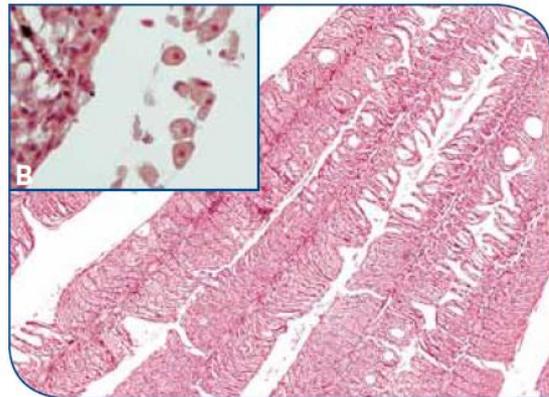


FIGURE 2
(A) GILL PATHOLOGY ASSOCIATED TO AGD.
(B) CLOSE UP FROM FIGURE 2A SHOWING AMOEBAE PRESENT IN THE LESIONS.

Download in full [online here](#)

The Scottish Salmon Company [reported](#) via their Q2 2012 and first half year [financial report](#):

The Scottish Salmon Company



- Increased cost going forward due to the Amoebic Gill Disease challenge affecting the Scottish Industry

The Scottish Salmon Company Second Quarter and First Half Year Report 2012

31 August 2012



SUMMARY HIGHLIGHTS AND OUTLOOK

The last quarter and half year results for the Scottish Salmon Company Plc (“SSC” or the “Company”) reflect the Company’s structural volume imbalance, as low volumes have had a negative impact on cost efficiency especially through the harvesting and processing operations.

The West Coast of Scotland has enjoyed a mild winter followed by an unusually dry spring and summer and whilst these environmental conditions have aided growth there has also been an increase in the biological challenge to the fish. This has become evident post the quarter end with raised mortalities across a number of sites due to Amoebic Gill Disease (AGD) and other associated issues. At two sites these losses have been significant with losses of 17% and over 20% of the stock. The challenge is mainly within the new generation fish and whilst the cost of the mortality will affect EBIT this year, the volume effect will not be seen till 2013. Accordingly guidance for 2013 is reduced by 1,000 tonnes to 24,000 tonnes.

The [Q2 2012 report](#) also stated:

The warmer sea temperatures have, however, resulted in biological challenges - in common with other producers in Scotland. As a result the Company has experienced significant losses of new generation fish in the first part of Q3. The cost of this loss along with the implementation of remedial measures and continued pressure on feed costs will result in higher expenditure in H2 2012.

As explained in the Report the Company is exposed to biological risk. With the unusually high water temperatures and prolonged periods without significant rainfall on the West Coast of Scotland, there is an increase in biological risk particularly with occurrences of AGD which is affecting the Scottish industry as a whole.

Finally, the report noted:

NOTE 7: EVENTS FOLLOWING THE CLOSE OF THE QUARTER

Through the second half of July and continuing into August the Company has seen a rise in the level of AGD. There has been some success in the treatment of the fish to remove the amoeba but despite these best efforts there has been a raised level of mortality especially within the smaller generations. Whilst harvest volumes remain unaffected for 2012 there is a reduction in the guidance for 2013 to 24,000T. Q3 2012 will suffer with the cost of these mortalities with an increased cost through the quarter of approx £1m.

The Scottish Salmon Company has published financial reports for 2011 and 2012 ([online here](#)). Financial reports from their subsidiary Lighthouse Caledonia from 2010 and 2009 are also available [online here](#).

September 2012:

Marine Harvest wrote to residents in the Western Isles (read letter [online here](#)):



marine harvest
excellence in seafood

Marine Harvest (Scotland) Ltd
Blar Mhor Industrial Estate
Fort William PH33 7PT

Telephone +44 (0)1397 701550
Fax +44 (0)1397 715004

www.marineharvest.com

Registered in Scotland No. 138843
Registered Office, Ratho Park,
88 Glasgow Road, Ratho Station, Newbridge, EH26 8PP

Dear resident

MARINE HARVEST

There has been some interest locally in our recent activities in the Outer Hebrides and I wanted to take the chance to explain what we're doing and reassure people we are operating safely and responsibly.

As you know, in June and July our weather conditions in the Western Isles were very unusual. As a result we have experienced much higher seawater temperatures and higher salinity levels than is the norm.

This has led to an increase in an amoebae that irritates salmon gills but is harmless to humans. If left untreated the amoebae multiply and would eventually suffocate the fish.

Small amounts of gill amoebae (*Neoparaamoebae*) are present in seawater all over the world, including Scotland but the levels we are seeing this year are unprecedented and normally only found in warmer places such as Tasmania.

Gill amoebae is treated using either freshwater or hydrogen peroxide, a substance which is often used in toothpaste and shampoo. In the salmon pens it rapidly breaks down naturally into water and oxygen.

Because it is an oxidising agent it has to be transported in specialist tankers. We take every care to ensure it is transported safely on our roads. We have a hard working and incredibly competent team of skilled staff in the Western Isles who care about their local environment. They also care deeply about operating in a safe way and we know we can rely on them to deal with this challenging situation brought about by exceptional weather conditions. Our team are, in turn, grateful for the ongoing support they receive from their local communities.

During the remainder of the year we will continue to treat our salmon with freshwater and hydrogen peroxide and you may continue to see tankers on the roads or on the ferry and we hope we can continue to rely on your support.

If you have any questions about our work in the Western Isles, please get in touch with me on 01397 715032 or at (ben.hadfield@marineharvest.com)

Yours faithfully

Ben Hadfield (Production Manager)
Marine Harvest Scotland Ltd
Farms Office
Blar Mhor Industrial Estate
Fort William
PH33 7PT



The Scottish Salmon Producers' Organisation (SSPO) also [published](#) a statement on AGD (3 September 2012):



3rd September 2012

Marine Amoeba

There are many types of marine amoeba which now colonise our marine environments as a result of changes to our climate. These are opportunist single-cell organisms which take advantage of favourable environmental conditions to spread across the ocean on host species such as fish.

Amoeba can affect the fish gills and this reduces the amount of oxygen a fish can take in. Amoebic Gill Disease (AGD) is a condition which affects many types of marine fish across the world, including Atlantic salmon (*Salmo salar*). AGD has been found on farmed salmon species across the world, most notably Tasmania, Chile and more recently France and Ireland. It is also commonly found in other wild fish species such as Mackerel (*Scomber scombrus*).

In 2012 there has been a greater presence in Scottish waters, probably due to the changing climate. This may have been exacerbated by lower rainfall in the normally high rainfall regions in the West of Scotland along with higher salinity levels in the sea. Farmers are managing the problem by washing the gill with either fresh water or *hydrogen peroxide (H₂O₂) and the industry is working to develop methods to further reduce its impact in Scotland.

This is a fish husbandry matter with no effect on food safety or food quality.

*hydrogen peroxide (H₂O₂) is an oxidising agent which is used to clean the amoeba from the gills and when diluted into the sea changes to become water and oxygen which has no effect on the marine environment.

The West Highland Free Press (13 September) [reported](#):



13th September 2012

Salmon farm giant blames weather for disease outbreak

Following another outbreak of the disease, this time at a salmon farm on Skye, Marine Harvest have admitted that Amoebic Gill Disease is an issue across most of its farms this year.

With millions of fish lost to AGD — where tiny organisms cause deterioration of gill tissue — the firm has been pouring a hydrogen peroxide solution into the affected farms, most recently at Bailemeanach near Braes. Tens of thousands of litres of the chemical has also been used at farm sites off Harris.

Residents in Bailemeanach told the Free Press that they had to keep their doors and windows closed last month, even though the temperature was in the 20s, because of the smell of dead fish.

Steve Bracken, a manager with Marine Harvest Scotland said: “We’ve had an issue with Amoebic Gill Disease across most of our farms this year because of the weather which has led to higher sea temperatures and, more importantly, higher levels of salinity.

“Outbreaks of AGD occur all over the world, although it’s mainly a problem in Tasmania. The amoeba occurs naturally in the environment but usually at very low levels that don’t create an issue.

“We treat affected fish with either fresh water or a weak solution of hydrogen peroxide.

“The salmon from Sconser fish farm at Bailemeanach Bay have recently been harvested, but this was programmed and not the result of AGD.”

The RSPCA’s Freedom Food (19 September) [issued](#) a “reactive statement” on AGD:



Amoebic Gill Disease in Salmon

Press release - 19.09.12

Reactive Statement: Amoebic Gill Disease in Salmon.

Amoebic Gill Disease in Salmon

- We are aware that there is an outbreak of Amoebic Gill Disease on salmon farms in Scotland.
- This disease is caused by a parasite (*Neoparamoeba perurans*) normally found living amongst marine life which can proliferate under certain conditions, typically in late summer to early winter. The parasite attacks fish's gills, making it difficult for them to breathe.
- We are taking advice from Marine Scotland and any Freedom Food members who have an outbreak of the disease on their farm are asked to notify them.
- All Freedom Food approved salmon producers are required under the RSPCA standards to treat any sick animals appropriately and swiftly, seeking the advice of their vet where necessary.
- Unfortunately it is a sad reality of the farming of any species that disease outbreaks can occur from time to time and it is essential that sick animals are treated appropriately.

Political commentator John MacLeod, [writing](#) in the Daily Mail (22 September), reported that in August Marine Harvest “resorted to pouring thousands and thousands of litres of hydrogen peroxide into the sea, in a desperate bid to stop an outbreak of amoebic gill disease” (Read article in full [online here](#) and [online here](#)).



The West Highland Free Press (28 September) reported via “[Salmon farms ravaged by disease](#)” that: “Both the Scottish Salmon Company and Marine Harvest have lost hundreds of thousands of fish to Amoebic Gill Disease across most of their Scottish sites”.

naidheachdan ■ news

Salmon farms ravaged by disease

BY MICHAEL RUSSELL
michael.russell@whfp.co.uk

Salmon farm sites in Harris are being devastated by a parasite that breeds inside fish gills and the number of mortalities is such that the landfill site in Stornoway can no longer cope.

Both the Scottish Salmon Company and Marine Harvest have lost hundreds of thousands of fish to Amoebic Gill Disease across most of their Scottish sites, including the Braes area of Skye and the east coast of Harris. They are treating the parasite by pouring thousands of litres of hydrogen peroxide into

In the most recent incident, an articulated lorryload of dead fish was diverted from the Bennadette landfill site near Stornoway to Uist, where it was due to be buried.

Angus Campbell, owner of Tarbert-based Kilda Cruises, said people were forced to abandon their cars at Leverburgh pier on Thursday last week because of the stench of rotting fish on the lorry.

In response, a spokeswoman for SSC said: "We are using the facilities available, which at the moment are sites at Stornoway and Uist, to deal with AGD in the most effective way."

Mr Campbell added: "How can this be sustainable production and why are our seas suffering now with all the chemicals that are

more applications on the east side of Harris from the Scottish Salmon Company for sites which is more displacement for fishermen who are fishing sustainably.

"I recently took the wife and kids down to a bay, Camas na Roidh, South of Plockropool where I was born and brought up where we were taken by our dad to fish for caddies and pollock when we were wee. It is one of the last unspoilt bays on the east coast of Harris.

"At a fishermen's association meeting last week I was horrified to hear that it is also one of the next to be targeted by the Scottish Salmon Company, resulting in a loss of places to fish for wild fish as all the small bays of Harris will then have a fish farm in it. My son Roddy found tourists throwing back wild fish

for the first time here this year as they were eat them due to the amount of farms pulling their gills."

Steve Beckett, business support manager Marine Harvest, acknowledged that AGD is a problem in most of their farm sites.

In a letter to the Free Press this week said that in June and July weather conditions the Western Isles were very unusual.

"As a result, we have experienced higher seawater temperatures and higher salinity levels than in the norm," Mr Beckett added. "This has led to an increase in amoeba that irritates salmon gills but harmless to humans. If left untreated amoebae multiply and would eventually suffocate the fish."

BBC News (28 September) [reported](#):

The screenshot shows the top navigation bar of the BBC News website. It features the BBC logo on the left, followed by 'News', 'Sport', and 'Weather' in white text on a dark red background. Below this is a large white 'NEWS' logo, followed by the text 'NE SCOTLAND, ORKNEY & SHET'. A secondary navigation bar contains links for 'Home', 'UK', 'Africa', 'Asia', 'Europe', 'Latin America', 'Mid-East', 'US & Canada', and 'Business'. A third bar contains regional links: 'England', 'Northern Ireland', 'Scotland' (highlighted in orange), 'Wales', 'UK Politics', and 'Education'.

28 September 2012 Last updated at 07:05 GMT

Salmon disease hits Orkney farms

An infectious salmon disease has struck some of Orkney's fish farms.

A Scottish government spokesman said that the Fish Health Inspectorate had received reports of increased farmed fish mortalities on farms in Orkney.

Amoebic Gill Disease is reported to be causing mortality at sites around the coastline.

It is understood that a treatment was being applied to the affected stock and the dead fish were being removed from cages.

Following a Freedom of Information request by GAAIA, Marine Scotland provided the following photos in September 2012:

AGD 1



AGD 2



October 2012:

STV News (11 October) [reported](#) that 20% of stock at salmon farms in the Western Isles was being lost due to AGD. Creel fisherman Angus Campbell said: “The reports on Sepa indicate that there are hundreds of tonnes of fish dying in these sites. Last week we saw a load of 26 tonnes heading down to Uist to get buried. It’s just incredible the amount of dead fish coming out of these sites.”

Fishermen in Western Isles losing up to 20% of stock as disease spreads



Watch STV News reporting from the Western Isles [online here](#)

Hebrides News (12 October) [reported](#): “AGD is rife in virtually all sea farms across Lewis, Harris and Uist. It is also affecting Skye, Argyll, Shetland and Orkney.”

Marine Harvest spokesman Steve Bracken said: “In June and July weather conditions in the Western Isles were very unusual. As a result we experienced much higher seawater temperatures and higher salinity levels than is the norm which has led to an increase in amoebic gill disease (AGD).

A spokesperson for The Scottish Salmon Company said: “Amoebic Gill Disease (AGD) is a naturally occurring water-borne amoeba which irritates the gills of the salmon but does not affect the surrounding eco-system. It is normally a short term event caused by unseasonably warm water temperatures. Once present, AGD can take hold and cause significant loss of fish and there have been instances of AGD affecting fish health across the industry recently.”

“At The Scottish Salmon Company we take the health and wellbeing of our fish very seriously and work rigorously to protect the natural environment and eco-systems in which we operate. We undertake daily health checks and where an incidence of AGD is discovered we act quickly in accordance with industry best practice guidelines, our own exacting veterinary procedures and Government regulation through our Marine Scotland licence.”

Hebrides News (12 October) [reported](#): “Some farms are losing up to 20% of fish which are being choked to death by a parasite. Incidents of Amoebic Gill Disease (AGD) appeared in Loch Roag on Lewis last summer and is now rife across the islands. Millions of fish are dying. The disease is widespread across Scotland’s fish farms and has hit virtually every sea farm in the islands. The Western Isles-based Scottish Salmon Company reckons it could lose

1,000 tonnes of fish, which, if replicated across the industry, would mean a loss of nearly £17 million at wholesale prices.”

“£17 million loss threatens the salmon industry,” [reported](#) the Daily Mail (13 October). “The parasite only appeared in Scotland last year, but has colonised farms from Shetland to Argyll” (read article in full [online here](#)).

£17m loss threatens the salmon industry

SCOTLAND'S lucrative salmon industry is facing a multi-million-pound threat from a parasitic disease outbreak, experts have warned.

Worried fishermen said the spread of the disease in farms has seen hundreds of tons of fish being killed.

There are fears a recent outbreak of the parasite could have cost the industry as much as £17million. Some farms claim they are losing up to 20 per cent of stocks.

Yesterday, fishermen in the Western Isles said the disease is devastating stocks of farmed salmon.

Warmer and saltier waters are being blamed for the recent outbreak, which occurs naturally and is difficult to control.

The parasite only appeared in Scotland last year, but has colonised farms from Shetland to Argyll.

Critics say the over-expansion of

By **Julie-Anne Barnes**

farms and the overcrowding of salmon has encouraged the disease to flourish.

But the Scottish Salmon Producers Organisation (SSPO) maintained that 'the treatment being used to kill the parasite is entirely safe for both fish and the marine environment'.

Exports of fresh Scottish salmon have leapt to record levels, according to the latest figures. Emerging and well-established markets helped boost exports by 22 per cent during 2011, rising to 95,638 tons.

Seven of the top ten markets have grown in volume and fresh Scottish salmon now reaches 64 countries worldwide. Exports of Scottish salmon have almost doubled in the past decade.

But the Scottish Salmon Company, an independent supplier, estimated it could lose 1,000 tons

The article [continued](#):

Amoebic Gill Disease (AGD) attacks the gills, causing swelling and mucus and suffocating the fish.

A spokesman for the Scottish Salmon Company said: 'We take the health and wellbeing of our fish very seriously and work rigorously to protect the natural environment and eco-systems in which we operate. We undertake daily health checks and where an incidence of AGD is discovered we act quickly.'

Following the Daily Mail [article](#), Fiona Cameron (the former director of public relations for Pan Fish and Lighthouse Caledonia at the time of the 2007-2008 disease outbreak at the Lamlash Bay site) emailed GAAIA and the Salmon & Trout Association:

From: Fiona Cameron [mailto:fiona@cameron-stark.co.uk]

Sent: 14 October 2012 15:07

To: 'Don Staniford'; 'Guy Linley-Adams'

Subject: RE: Daily Mail on disease: "£17 m loss threatens the salmon industry"

Hi Don

I find it impossible to believe that this is not the same disease which killed a large number of fish at Pan Fish's Arran site a number of years ago (and indeed was the cause of my parting company with them, as I was not prepared to lie to journalists like Nick Underdown about the extent of the mortalities). In these days they called it PGD (Proliferative Gill Disease), and apparently it was caused by a form of chlamydia virus. They had the same thing in some of the more southerly farms in Norway, where they called it something that translated as PGI (proliferative gill inflammation) No-one knew exactly how it was carried, but the symptoms were the same across both countries, and sound exactly the same as the one mentioned in the article: it gets into the gills which get inflamed, so the fish suffocates, in effect. Presumably a slow, painful death.

If it's not exactly the same, then it must be very similar. Not sure why they're saying it's a new phenomenon. I guess they don't want to frighten the horses (a.k.a. the shareholders!). It's been bad in the northern isles too this year, have had calls from BBC Orkney trying to find out more about it. Unusual for these diseases usually associated with warm water to hit Orkney. Maybe Malthusian economics works for fish too – if you get too many of them, and there are no conveniently timed fish wars to keep numbers down, you get pestilence?

Best fishes

Fiona

Hebrides News (17 October) [reported](#): “All sea farms around Harris are affected by a deadly parasite which causes Amoebic Gill Disease (AGD) said to be due to saltier-than-normal sea water. It has also struck at a new controversial fish farm Plockropool, in the Bays of Harris, which was only stocked recently after bitter opposition from villagers. Locals are not convinced that disposing vast quantities of hydrogen peroxide, a fish treatment chemical often used as bleach, into sea lochs is harmless..... A spokesperson for The Scottish Salmon Company said AGD does not affect the surrounding eco-system. A spokesman for the Scottish Salmon Producers Organisation (SSPO) said the increased production meant major capital investment and new opportunities in the Scottish economy.”

Marine Harvest's CEO Alf-Helge Aarskog admitted the company had a growing problem with Amoebic Gill Disease during Marine Harvest's Q3 2012 [presentation](#) (26 October 2012).

“Something hits in Scotland,” reported Marine Harvest's CEO during the [web-cast](#) live from Oslo (26 October). “This time it's Amoebic Gill Disease. This amoeba is not active when the temperature is cold. We see it has an effect. We are on top of the situation and learning. There's uncertainty. We are much better prepared for next summer than when it hit this summer.”

Marine Harvest's Q3 2012 [presentation](#) (26 October) included:



Scotland

Adverse effects from the presence of gill amoeba

- Reduced seawater growth and increased mortality
- Accelerated harvest has reversed planned volume increase for 2013

Costs relating to the gill amoeba likely to be high going forward

- Technical team cannot rule out recurring issues

Outlook

Cost increases expected going forward

- Feed costs rising
- Gill amoeba in Scotland

Marine Harvest's Q3 2012 [report](#) (26 October) included:

Q3 | 2012

THIRD QUARTER
MARINE HARVEST GROUP



marineharvest
excellence in seafood

Biological issue increased costs in MH Scotland

Amoebic Gill Disease (AGD): High presence of a microscopic amoeba named *Neoparamoeba perurans*, has caused Amoebic Gill Disease, elevated mortality and reduced performance at several farms in Scotland and Ireland in the period. The amoeba is free living and the densities of amoeba and the response in the gills of the fish are significantly influenced by water temperature and water salinity. Accelerated harvest has been initiated at some sites due to the observed gill damage. As the amoeba only can thrive in salt water, fresh water is used as the predominant source of treatment. Reduced sea water temperatures and good treatment practices will reduce the challenge in the coming two quarters.



Accelerated harvest of some sites affected by AGD contributed to increased volume in the period, which will negatively influence the harvested volume in the fourth quarter and in 2013.

Costs and operations

Treatment costs, mortality and loss of feeding days contributed to higher biological cost for fish harvested in the quarter compared to the same period last year. Non-seawater costs were further negatively affected by the reduction in harvest volume and accounting for exceptional mortality in the amount of NOK 4 million (nil).

Growth and mortality was significantly affected by AGD in the period, which will negatively influence the cost level of fish to be harvested in the fourth quarter. Reduced sea water temperatures and improved operational procedures to handle AGD will mitigate further losses during the winter.

Read more via [“Marine Harvest's Salmonopoly Loss - Q3 \\$\\$\\$\\$\\$s drop 86%!”](#)

The Press & Journal (27 October) reported:

Disease adds to costs at Scots salmon farms

27.10.12
 Fish-farming giant Marine Harvest said yesterday a deadly disease affected third-quarter growth and mortality rates in its Scottish salmon operations.

The firm said amoebic gill disease (AGD) had contributed to higher harvesting costs at the Scottish sites, but added: "Reduced seawater temperatures and improved operational procedures to handle AGD will mitigate further losses during the winter."

Some 12,982 tonnes - gutted - of salmon were har-

vested by Marine Harvest Scotland (MHS) during the three months to September 30, against 14,037 tonnes a year earlier.

MHS operational earnings before interest and taxes (ebit) totalled £3.12million in the latest period, down from £15.72million previously.

Norway-based Marine Harvest said group ebit fell by 84% to £7.86million. It reported third-quarter operational revenue and other income of £392.6million, slightly ahead of a year ago.

News Archive:

["‘Stushie’ for Scottish Salmon!"](#) (Green Around the Gills, 4 November)

["Ground Zero in Scotland’s Salmon Wars!"](#) (Green Around the Gills, 3 November)

["Salmon Farm Disease Disaster in Lamlash Bay, Arran"](#) (GAAIA, 3 November)

["GAAIA goes to Scotland’s diseased fish farms on Arran"](#) (GAAIA, 3 November)

["Disease adds to costs at Scots salmon farms"](#) (Press & Journal, 27 October 2012)

["Marine Harvest's Salmonopoly Loss - Q3 \\$\\$\\$\\$\\$s drop 86%!"](#) (Green Around the Gills, 26 October 2012)

["Salmon farming expansion threatens fishermen livelihoods"](#) (Hebrides News, 17 October 2012)

["£17m loss threatens the salmon industry"](#) (Daily Mail, 13 October 2012)

["Parasite kills hundreds of tonnes of fish across the Western Isles"](#) (The Scotsman, 13 October 2012)

[“Vast numbers of salmon dying from major disease outbreak”](#) (Hebrides News, 12 October 2012)

[“Unprecedented spread of salmon disease”](#) (Hebrides News, 12 October 2012)

[“Fishermen in Western Isles losing up to 20% of stock as disease spreads”](#) (STV News, 11 October 2012)

[“Salmon disease hits Orkney farms”](#) (BBC News, 28 September 2012)

[“Salmon farms ravaged by disease”](#) (West Highland Free Press, 28 September 2012)

[“Amoebic Gill Disease in Salmon”](#) (RSPCA Freedom Food, 19 September 2012)

[“Salmon farm giant blames weather for disease outbreak”](#) (West Highland Free Press, 13 September 2012)

[“Fear for fish industry as one in five salmon dies”](#) (Daily Mail, 17 July 2012)

[“AGD hard to control says Marine Harvest”](#) (The Fish Site, 22 February 2012)

[“AGD in Scotland – avoid stress to mitigate effects”](#) (The Fish Site, 20 February 2012)

[“Fish farm outbreak highlights selective use of facts by industry”](#) (COAST, December 2011)

[“Diseased Farmed Salmon Causes Stink in Scotland”](#) (The Arran Banner/Superheroes 4 Salmon, 6 November 2011)

[“Fish farm death toll – the facts”](#) (Arran Voice, 18 September 2008)

[“Marine Harvest supports new reporting category for PGI”](#) (Arran Voice, 9 May 2008)

[“Fish farm disease disclosed”](#) (Arran Voice, 2 May 2008)

[“Fish farm signs Arran AMA as disease persists”](#) (Arran Voice, 4 January 2008)

[“Disease on-going as local fish farm rebrands”](#) (Arran Voice, 30 November 2007)

[“Marine Harvest overstocking in St. Molios”](#) (Arran Voice, 16 November 2007)

[“Fish Farm Disease”](#) (Arran Voice, 9 November 2007)

For more background on the global spread of infectious salmon diseases read:

[“Fish Farmageddon: The Infectious Salmon Aquacalypse”](#)

[“ISA: Diary of Disease Disaster”](#)

More details coming soon via the forthcoming report:

[“Smoke on the Water, Cancer on the Coast”](#)

