

TRI-NATION DELEGATES GREETED BY NEW VIRUS.

For once pancreas disease was elbowed from centre stage at the 11th PD (+) Trination Seminar held in Belfast in March of this year by the announcement from PHARMAQ and the Norwegian Veterinary Institute that the virus responsible for Cardio Myopathy Syndrome (CMS) has been characterised. This news was greeted with enthusiasm and interest by the 90 delegates who attended this annual event which was generously sponsored by Intervet-Schering Plough Animal Health and hosted by the Agri-Food and Biosciences Institute of Northern Ireland.

The CMS virus which is now been renamed Piscine Myocarditis Virus (PMV) belongs to the Totiviridae (“O” as in Odeon!) and has been shown to cause typical CMS pathology following co-habitation challenge studies in the laboratory and has not been identified in the field on sites without a history of CMS.

In depth analysis of these challenge studies conducted jointly by PHARMAQ and NOFIMA have revealed that infected fish can be classified as ‘high’ or ‘low’ responders depending upon the severity of the pathology and viraemia following infection. Simply put, the suggestion is that high responders develop a very active cellular immune response whereas low responders do not. These differences in coping styles should not only be of interest to breeders seeking to promote stocks which are “phenotypically appropriate” in the face of CMS challenge but may also pave the way for the discovery of disease markers given that about 60 genes seem to correlate well with virus load.

The molecular genetics theme continued with Bertrand Collett from Marine Scotland who described some interesting findings about differential sensitivities, but this time from the virus’s viewpoint. His work using a novel cell line which ‘over-expresses’ MX protein, has shown that different SAV isolates are differentially sensitive to this particular anti viral mechanism and so may also vary in their sensitivity to host anti-viral mechanisms which they face from the fish which they infect. Thus, some SAVs may be better able to withstand the fish’s innate immune response better than others, which, as we have seen, is itself quite variable. All of which has the makings of an ‘arms race’ - nothing new in biology!

And so it was left to Jenny Guo who is doing her PhD at The Norwegian Veterinary School in Oslo to find the viruses’ Achilles heel. At least I think that that’s what she was alluding to in what was certainly one of the most technically complex presentations during the two days in Belfast! Jenny has identified a gene which appears to be highly conserved across all strains of SAV, and which is indispensable for successful viral replication. Targeting this gene could be a key feature in the development of attenuated vaccines to SAV diseases.

Torsten Tengs from the Norwegian Veterinary Institute continued the theme of complexity with an interesting, if slightly arcane, insight into the world of bioinformatics as used as a tool for the hunt for microbes. Thus, if you are a ‘disease without a cause’, Torsten can use deep sequencing technology as well as the so-called BLAST system to tweak out the microbe within! In fact, it was this very approach which found the elusive piscine reovirus recently attributed as the cause of HSML.

The high level of very sophisticated molecular techniques has revolutionised research in the area of fish disease, a fact which clearly has not been lost on Professor Maria Eugenia Cabrejos. Maria showcased the development of a brand new \$10 million research facility in Lenca, Chile which will be the

result of a joint venture between Aquachile, Universidad de Chile and Biomar under the umbrella of Aquainnovo. This multidisciplinary facility will be acting as a service company to the local Industry offering molecular tools for disease diagnosis, research, as well as for the management of breeding programmes. A number of practical joint venture projects with international partners in these arenas are already underway.

As is always the case, the Tri-nation seminar produced a great deal of information with a direct 'tank and cage-side' application. In this context Charles McGurk illustrated how recent trials had shown that Skretting's range of functional feeds, *Protec* and *React*, not only reduce mortality in PD affected fish but also appear to operate at a more subtle level by reducing levels of creatine kinase, an indicator of muscle damage as well as C-reactive protein an indicator of Inflammation. Charles concluded that functional feeds in conjunction with vaccination and regular blood sampling of stock all helped to mitigate the outcome of SAV infection.

The future of fish vaccination was briefly discussed at the end of Philip Brown's (Aqualife) talk. Having advised the meeting that 91 million doses of PD vaccine were administered in 2010, Philip suggested that from the point of view of those who administer vaccine, the use of mechanically delivered micro dose presentations of polyvalent vaccines was the direction in which the industry should be heading in order to reduce handling and stress. In addition, Philip emphasised the importance of adopting, and sticking to, a correct and approved procedure as the key to vaccination success, the critical points of which are hygiene, accuracy, needle pressure and dose deposition.

Flesh quality, as affected by PD, has been occupying the mind of Torun Taksdal of the National veterinary Institute. It is the smoking industry particularly who appear to be most sensitive to changes in fillet quality resulting from PD. Torun's main finding is the variation between fish which have been exposed to the virus, with paleness and increased firmness of fillets being associated with muscle damage which can be corroborated through histopathological examination. It appears that smoking will amplify poor fillet quality.

Analysing the virus rather than the fish has always been the focus of David Graham who made a brief and welcome comeback from the world of cattle which he now inhabits, to remind the tri-nation group of the physical sensitivities of SAVs which can be exploited to eliminate the virus from the farming environment. These include a poor tolerance of low and high pH making both ensiling and alkaline hydrolysis potentially viable options for the disposal of infected carcasses. Also, the virus can be destroyed through composting as long as the temperature exceeds 60° C. Additionally the usual range of farm disinfectants including Virkon and Halamid will, if used in accordance with the label, destroy the virus. Further details of this information are available directly from AFBI.

No Tri-nation working group meeting would be complete without an update on the impact of the disease over the previous year. In this respect Hamish Rodger was able to confirm that 2010 had seen the lowest reported mortality rate to PD for the past 10 years at a mere 7.1%. Across the Industry it seemed that the PD vaccine had offered some mitigation with a 2.5% mortality rate amongst vaccinated fish compared with 10.1% in non-vaccinates. This effect however was not always so apparent on a case-by-case basis indicating that a holistic approach to prevention remains important.

Hamish also reported a weak correlation between lice infestation and PD impact.

The Norwegian situation with PD seemed to mirror the Irish experience with an improvement in 2010 over 2009 according to Anne Berit Olsen and Brit Bang Jensen both of the Norwegian Veterinary Institute. It seems too that the Hustadvika firebreak continues to corral the PD virus within West and Southern Norway providing further evidence (as if any were needed) that this virus is not vertically transmitted. This also confirms the belief that well boats are top of the list as risk factors in the transmission of this virus given the presence of the disease in the far north of Norway some one thousand kilometres beyond the firebreak.

The improved picture in Norway was well illustrated by the experience of the Lerøy group who farm in the counties of Hordaland and Rogaland or “PDland” to many. Kristian Straum-Lie and Harald Sveier have convinced themselves that by placing good quality vaccinated smolts on sites which are then monitored through blood sampling for both antigens *and* antibodies, they have managed to radically alter the outcome of PD infection which is evident on all of their sites in this area. As a consequence, Lerøy experienced economically significant PD in only three net pens in 2010, a vast improvement over the 100 million NOK which the disease cost them in the previous year.

As mentioned at the beginning, 90 delegates made it to Belfast for this meeting. Whether any of them had only just made it back from last year’s gathering in Bergen was the subject of some debate at the “Ash Cloud” award ceremony put together by Marian McLoughlin during the evening. The *Lehmkuhl Nine* were honoured with a photo of the tall ship in which they escaped from Bergen, whilst Hamish Rodger took the award for first back home. It was left to Alan Dykes of the Scottish Salmon Company to write the ballad marking this, hopefully unique, interruption to this otherwise impeccably smooth annual event.