





HOW OUR KNOWLEDGE OF ALPHAVIRUS INFECTION (PD) IN FARMED SALMON CAN INFORM THE MANAGEMENT OF COVID 19 IN HUMANS?

MARIAN MCLOUGHLIN PD TRINATION MEETING APRIL 2021

AIMS

- Brief comparison of Salmonid Alphavirus (SAV), and SARS-COV-2.
- What Tools and Experience can Veterinary Diagnosticians, and Epidemiologists offer to help Manage and Control this COVID 19 pandemic?
- Lessons for both Human Health & Aquaculture.



WHY AQUACULTURE HAS UNIQUE INSIGHTS INTO INFECTIOUS DISEASE CONTROL?



- As aquaculture veterinarians, epidemiologists, diagnosticians, biologists, we are very experienced in diagnosing, investigating, preventing and dealing with infectious diseases and epidemics in large numbers of individuals.
- As a result, despite SAV infections being endemic in Europe they have not spread around the world.

OIE Alphavirus Chapter:

https://www.oie.int/index.php?id=171&L=0&htmfile=chapitre_alph avirus.htm

 This pandemic also reminds us of our responsibilities to control infectious diseases in our industry.

THE DYNAMICS OF INFECTIOUS DISEASES & EMERGING ZOONOSES





COMPARISON OF SAV & SARS-CO2/COVID 19 -KNOWLEDGE OF THE VIRUS.

SIMILARITIES

- Both enveloped Positive strand RNA Viruses.
- Both transmitted by Direct Contact. (Aerosol vs water)
- Both have variants of differing infectivity.
- Variable host response to infection, asymptomatic, mild or severe infection and disease.
- Lag between infection and clinical disease.
- Both can spread very rapidly in susceptible populations.
- Both can be controlled by vaccination?
- Both have serious direct and indirect economic impact.

DIFFERENCES

- SAV has been contained to salmonid population in Europe, by testing, certification and restricting movement.
- Covid 19 has spread around the world with over 136 million infections and nearly 3 million deaths and we have not reached the peak.
- COVID 19 is a zoonotic disease.
- Stamping out by culling not an option!
- Rapid development & approval of vaccines.
- Possible to give primary and secondary vaccination.
- Cultural and political barriers to effective control.
- Human nature!



TOOLS FOR EPIDEMIC DISEASE CONTROL IN ANIMALS & HUMANS

- Knowledge of the infectious agent (virus) & pathogenesis.
- Specific, Sensitive and Rapid tests.
- Movement control and biosecurity.
- Quarantine, isolation and testing.
- Vaccination & Certification.
- Continuing proactive surveillance.
- RAPID DETECTION & IMPLEMENTATION OF CONTROLS are the Keys to success.

Response interventions	Early Anticipation detect	ion Containment	Control and mitigation	Elimination or eradication
Epidemic phases	Introduction or emergence	Localized transmission	Amplification	Reduced transmission \vec{r}_1 \vec{r}_1 \vec{r}_1 \vec{r}_1 \vec{r}_1 \vec{r}_1 \vec{r}_1

Epidemic phases and response interventions

Specific & Sensitive tests

- Rapid development and sharing of specific and sensitive PCR and antibody tests.
- Rapid development of Point of Care test kits.
- Limited time to validate some of these tests (False positives).
- Use of antibody testing to track infection complements PCR testing.
- Most veterinary diagnostic labs have PCR expertise and equipment- slow to be utilised for covid 19 testing.



Movement controls

- Local control at home, building, street, town & city level. STAY AT HOME!
- Need to protect the most vulnerable, nursing homes etc.
- International movement control in this highly mobile world is very important.
- Only allow access to essential travel plus quarantine & testing.

Biosecurity

- Physical distancing,
- Good Hand and respiratory hygiene
- Mask wearing to cover nose and mouth!
- Limiting number of people gathering both indoors and outdoors. (Cheltenham Horse Races, Super spreader events).



Quarantine

- For those who may have been exposed.
- Quarantine for new arrivals will prevent the spread of new and possibly more virulent or vaccine resistant viral strains.
- Needs to be strictly enforced and monitored.
- Should include testing & symptom monitoring.
- Be a reasonable cost, but significant penalty for breaking quarantine regulations.





WHO DATA FOR THIS WEEK

Country	Cumulative cases	New cases	Deaths	Deaths in last 24hrs
USA	31,311,941	61,306	561,616	758
India	15,061,919	273,810	178769	1619
Brazil	13,900,091	67,636	371,679	2929
UK	4,385,942	2206	127,260	35
Sweden	900,138	0	13,788	0
Norway	106,223	0	708	0
Iceland	6,286	0	29	0
New Zealand	2,240	2	26	0
Global 19-04-21	140,886,773		3,012,251	

SUCCESSFUL COVID 19 CONTROLS

- Countries like Taiwan, Singapore, South Korea, New Zealand & Iceland have been very successful in stopping the spread of Covid 19 because they rapidly:
- Shut their borders.
- Restricted internal movement.
- Carried out intense testing and isolation.
- Strict quarantine.
- RESULT: little or no infection and relatively normal life restored quickly.









COUNTRIES WHO HAVE NOT CONTROLLED COVID 19

- Slow to restrict internal movements and more importantly external access.
- Slow to identify and shield most susceptible population (>70's).
- Slow to adopt good bio security practices, such as mask wearing.
- Lack of planning- shortages of PPE and joined up action.
- Slow to upscale testing and tracing systems.
- Inconsistent and confusing advice. (Masks! No masks!)
- Did not learn from first wave of infections, in such countries as Italy, or countries with experience of SARS resulting stricter and longer lockdowns & economic inactivity.
- Do we need more proactive screening and possibly certification of a highly mobile human population to prevent a recurrence of infectious disease pandemics?

Vaccination & Certification

- Rapid development and production of novel coronavirus vaccines.
- Normally it takes at least 4 years (Mumps vaccine) from need to availability of licenced products.
- Several licenced and effective vaccines available within a year!
- Some countries have 50% of population with at least first dose.
- Misinformation (anti-vaxxers) and reported side effects have halted the speed of vaccination roll out.
- BUT none of us are protected until all of us are protected- so vaccination inequality needs to be addressed. Need at least 80% fully vaccinated to achieve herd or community immunity.
- Vaccination certification currently controversial!
- Health monitoring and certification the bedrock of animal disease control! We need to highlight the importance of vaccination & certification.



OIE: WHAT CAN NATIONAL VETERINARY SERVICES DO?

- Veterinary Services should work closely with Public Health authorities and those responsible for wildlife using a One Health approach to share information and cooperate in the response to COVID-19.
- Veterinary Services should be considered as <u>essential services</u>. National authorities should advocate for this within COVID-19 and future pandemic response plans and operations, to ensure a continuum in the activities related to animal health, animal welfare and veterinary public health, under appropriate protocols.



LESSONS FOR AQUACULTURE

- We have the Experience and Knowledge of how to control epidemic diseases, and we should look for opportunities to collaborate with public health colleagues. (PCR testing)
- Due to Covid 19, the technology & processes developed should positively impact vaccine development in veterinary as well as human medicine, are there opportunities for aquaculture? (Alphavirus as a vector vaccine)?
- We need to continue to share and robustly implement all our knowledge on the control of infectious diseases in aquaculture for the benefit of our fish and the industry.
- PD Trination is an excellent and early example of fruitful international scientific collaboration, let's continue to lead the way!



ONE HEALTH COMMISSION

"One Health is the collaborative effort of multiple professionals, together with related disciplines and institutions — working locally, nationally, and globally — towards optimal health and wellbeing for people, domestic animals, wildlife, plants, and our environment."



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Thank you for your attention.

