

Recently, there has again been news coverage about the detection of Piscine Orthoreovirus (PRV) in the waters on both coasts of Vancouver Island. We do have PRV naturally occurring in our waters on the west coast, but there are important facts that we want to share about the PRV conversation.

PRV Testing of Smolts

Before our smolts are transferred to our ocean farm sites, we complete health testing and ensure the fish we are entering into our ocean farm sites are healthy, disease-free and enter the water PRV-free.

- **Cermaq Canada and Creative Salmon began comprehensively screening our smolts for PRV in 2016.**
- PRV has never been detected in Cermaq Canada nor Creative Salmon freshwater hatchery facilities.
- All smolts transferred from Creative Salmon and Cermaq Canada hatcheries to marine net pen sites are PRV-free.
- **No eggs or smolts are imported to BC** by Cermaq Canada nor Creative Salmon. We use local brood stock and local land-based hatcheries.

PRV is a virus that can infect salmonids. There are multiple subtypes and strains or variants of PRV, meaning the virus can behave in different ways, in different geographical locations and in different fish species.

- None of our smolts transferred into the sites in Clayoquot Sound were positive for PRV – neither variant 1a or 1b.
- We did not provide Clayoquot Action with any of our fish – these results must be from water samples near our farms which **in no way** can be assumed to accurately represent our fish populations.
- There is no true evidence that shows that PRV 1a variant is harmful to Pacific species of salmon.
- The fish on our farms become infected with PRV 1a variant after being transferred into the saltwater sites. However, the fact that they can carry the virus does not mean it presents as disease.
- PRV 1a variant is what we have in BC, it is also present in Norway (linked with low or no-pathogenicity) and Iceland.
- PRV 1b variant is what is linked to HSMI in Norway – from our knowledge this hasn't been found in BC.

PRV in BC

PRV is naturally occurring in the Pacific. The fact that our fish, once moved to our ocean farm sites, may be exposed to the virus and test positive for the virus, is not new information for the industry nor regulators.

- Not all viruses or bacteria that infect animals cause disease.
- PRV 1a variant has been in B.C. waters for decades.
- Research has shown that PRV 1a variant (present in BC) has little to no ability to cause disease in fish infected with the virus.
- Our veterinarian has advised us that although our fish may carry the PRV 1a variant, that their robustness or health is not impacted by the virus.

HSMI and Jaundice Syndrome:

- HSMI (Heart and Skeletal Muscle Inflammation) is a multi-factorial disease seen in Europe that has a causal relationship with PRV 1b variant. However, not all fish infected with the virus develop the disease.
- HSMI (or a similar disease) has not been seen in Clayoquot Sound. There is not enough evidence to indicate that HSMI, as it presents in Europe, is here in BC.
- Jaundice Syndrome is a disease of unknown cause that affects farmed Chinook salmon in BC. Only 0.3% or less of stocked farmed Chinook salmon are affected by this condition, which tends to have a strong seasonal influence that may be associated with environmental factors.
- PRV has not been shown to be the cause of Jaundice Syndrome.

Mechanical De-licing at Cermaq:

- Mechanical de-licing (removing lice) can be a stressor for fish, as are changes in temperature and naturally occurring environmental shifts. However, we closely monitor our fish during these handling events to ensure the stress is limited and welfare is top of mind.
- All sea lice removed through this process are captured in fine filters and deposited on land.

DFO and Federal Policy

- The Federal Government's announcement in June 2019 to test non-native (i.e. Icelandic and Norwegian) strains of the PRV virus which is responsible oversight by the Department of Fisheries and Oceans. (attached)
- This additional testing will add further confidence to our already rigorous science-based testing process.
- BC salmon aquaculture is proud to be one of Canada's highly regulated food industries.
- Fish health and welfare – including wild salmon – is important to us and we will continue to research and development treatments, vaccinations and medicine (only as needed and rarely) to support the health of both wild and farmed salmon.
- Human health and wellbeing. PRV is not linked to any human health concerns.

Resources Available for more information:

There has been quite a lot of independent research into PRV. For the most current and authoritative review on the subject, please visit DFO's website and search for PRV. <https://www.dfo-mpo.gc.ca/science/index-eng.htm>

PRV and HSMI: <https://www.dfo-mpo.gc.ca/science/aah-saa/species-especes/aq-health-sante/prv-rp-eng.html>

Fisheries and Oceans Canada. Mimeault, C., Polinski, M., Garver, K.A., Jones, S.R.M., Johnson, S., Boily, F., Malcolm, G., Holt, K., Burgetz I.J., and Parsons, G.J. (2019). Assessment of the risk to Fraser River Sockeye Salmon due to piscine orthoreovirus (PRV) transfer from Atlantic Salmon farms in the Discovery Islands area, British Columbia. Canadian Science Advisory Secretariat Response 2019/036. http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ResDocs-DocRech/2019/2019_036-eng.pdf

Garver, K.A., Johnson, S.C., Polinski, M.P., Bradshaw, J.C., Marty, G.D., Snyman, H.N., et al. 2016b. Piscine Orthoreovirus from Western North America is transmissible to Atlantic Salmon and Sockeye Salmon but fails to cause Heart and Skeletal Muscle Inflammation. *PLoS ONE* 11(1): 1-17.

<https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0146229&type=printable>

Marty, G.D., Morrison, D.B., Bidulka, J., Joseph, T., and A. Siah. (2015). Piscine reovirus in wild and farmed salmonids in British Columbia, Canada: 1974–2013. *Journal of Fish Diseases* 2015, 38, 713728.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/jfd.12285>

Polinski, M.P., Marty, G.D., Snyman, H.N., and Garver, K.A. 2019. Piscine orthoreovirus demonstrates high infectivity but low virulence in Atlantic salmon of Pacific Canada. *Sci Rep* 9 (3297): 1-22. doi.org/10.1038/s41598-019-40025-7.

Zhang Y., Polinski M.P., Morrison P.R., Brauner C.J., Farrell A.P. and Garver K.A. (2019) High-Load Reovirus Infections Do Not Imply Physiological Impairment in Salmon. *Front. Physiol.* 10:114. doi: 10.3389/fphys.2019.00114

Fish health events at British Columbia marine finfish aquaculture sites:

<https://open.canada.ca/data/en/dataset/deefd1d7-7184-44c7-83aa-ec0db91aad27>

Infographic: [Monitoring fish health from hatchery to harvest](#)

Infographic: [How DFO inspects fish health at BC aquaculture sites](#)

<http://www.dfo-mpo.gc.ca/aquaculture/publications/infographics-infographie/health-sante-eng.html>

<https://www.dfo-mpo.gc.ca/aquaculture/regulations-reglements-eng.html>

<https://www.dfo-mpo.gc.ca/aquaculture/management-gestion/regs-eng.htm>