

Shaffer, J. Anne 2021. Piscine Orthoreovirus (PRV) and ectoparasites of young of the year juvenile herring, *Clupea pallasii*, of the Salish Sea. In: Osprey, The International Journal of Salmon and Steelhead Conservation. 98:pp.17-21

## Literature Cited

Barker SE, Bricknell IR, Covello J, Purcell S, Fast MD, Wolters W, Bouchard DA 2019. Sea lice, *Lepeophtheirus salmonis* (Krøyer 1837), infected Atlantic salmon (*Salmo salar* L.) are more susceptible to infectious salmon anemia virus. *PloS one*, 14(1), p.e0209178.

Beamish R, Wade J, Pennell W, Gordon E, Jones S, Neville C., Lange K., Sweeting R. 2009. A large, natural infection of sea lice on juvenile Pacific salmon in the Gulf Islands area of British Columbia, Canada. *Aquaculture*, 297(1-4), pp.31-37.

Costello MJ 2009. How PRV from salmon farms may cause wild salmonid declines in Europe and North America and be a threat to fishes elsewhere. *Proceedings of the Royal Society of London B: Biological Sciences*, 276(1672), pp.3385-3394.

Department of Fisheries and Oceans (DFO) file:///C:/anne/CWI/ffpiscentereoviruspsvhsmiliterature/Piscine%20Orthoreovirus%20(PRV)%20and%20Heart%20and%20Skeletal%20Muscle%20Inflammation%20(HSMI).html.

Department of Fisheries and Oceans (DFO) (2018). [https://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/reporting-documents/environmental-enforcement-docs/fish-processing-compliance-audit/prv\\_in\\_wastewater\\_bc\\_cahs.pdf](https://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/reporting-documents/environmental-enforcement-docs/fish-processing-compliance-audit/prv_in_wastewater_bc_cahs.pdf)

Department of Fisheries and Oceans (DFO) 2015. [https://www.pac.dfo-mpo.gc.ca/science/species-espèces/pelagic-pelagique/herring-hareng/herspawn/pages/bc\\_fig-eng.html](https://www.pac.dfo-mpo.gc.ca/science/species-espèces/pelagic-pelagique/herring-hareng/herspawn/pages/bc_fig-eng.html)

Finstad ØW, Dahle MK, Lindholm TH, Nyman IB, Løvoll M, Wallace C, Olsen CM, Storset AK, Rimstad E 2014. Piscine orthoreovirus (PRV) infects Atlantic salmon erythrocytes. *Veterinary research*, 45(1), p.35.

Garseth ÅH, Ekrem T, Biering E. 2013. Phylogenetic evidence of long distance dispersal and transmission of PRV between farmed and wild Atlantic salmon. *PLoS One*, 8(12), p.e82202.

Glover KA, Sørvik AGE, Karlsbakk E, Zhang Z, Skaala Ø. 2013. Molecular genetic analysis of stomach contents reveals wild Atlantic cod feeding on piscine reovirus (PRV) infected Atlantic salmon originating from a commercial fish farm. *PLoS One*, 8(4), p.e60924.

Godoy, MG, Kibenge MJ, Wang Y, Suarez R, Leiva C, Vallejos F, Kibenge FS 2016. First description of clinical presentation of piscine orthoreovirus (PRV) infections in salmonid aquaculture in Chile and identification of a second genotype (Genotype II) of PRV. *Virology journal*, 13(1), p.98.

Godwin, S.C., Dill, L.M., Reynolds, J.D. and Krkošek, M., 2015. Sea lice, sockeye salmon, and foraging competition: lousy fish are lousy competitors. *Canadian Journal of Fisheries and Aquatic Sciences*, 72(7), pp.1113-1120.

Godwin, S.C., Dill, L.M., Krkošek, M., Price, M.H.H. and Reynolds, J.D., 2017. Reduced growth in wild juvenile sockeye salmon *Oncorhynchus nerka* infected with sea lice. *Journal of Fish Biology*, 91(1), pp.41-57.

Haugland Ø, Mikalsen AB, Nilsen P, Lindmo K, Thu BJ, Eliassen TM, Roos N, Rode M Evensen, Ø. 2011. Cardiomyopathy syndrome of Atlantic salmon (*Salmo salar* L.) is caused by a double-stranded RNA virus of the Totiviridae family. *Journal of virology*, 85(11), pp.5275-5286.

Hershberger PK, Garver KA, Winton JR. 2016. Principles underlying the epizootiology of viral hemorrhagic septicemia in Pacific herring and other fishes throughout the North Pacific Ocean. *Canadian journal of fisheries and aquatic sciences*, 73(5), pp.853-859.

Hershberger PK, Gregg JL, Grady CA, Hart LM, Roon SR, Winton JR. 2011. Factors controlling the early stages of viral haemorrhagic septicaemia epizootics: low exposure levels, virus amplification and fish-to-fish transmission. *Journal of fish diseases*. 34(12):893-9.

Kibenge MJ, Iwamoto T, Wang Y, Morton A, Godoy MG, Kibenge FS. 2013. Whole-genome analysis of piscine reovirus (PRV) shows PRV represents a new genus in family Reoviridae and its genome segment S1 sequences group it into two separate sub-genotypes. *Virology journal*, 10(1), p.230

Krkošek, M., 2017. Population biology of infectious diseases shared by wild and farmed fish. *Canadian Journal of Fisheries and Aquatic Sciences*, 74(4), pp.620-628.

Krkošek M, Morton A, Volpe JP. 2005. Nonlethal assessment of juvenile pink and chum salmon for parasitic PRV infections and fish health. *Trans. Am. Fish. Soc.* 134 (3): 711–716.

Krkošek M, Gottesfeld A, Proctor B, Rolston D, Carr-Harris C, & Lewis MA 2007. Effects of host migration, diversity and aquaculture on sea lice threats to Pacific salmon populations. *Proc R Soc B* 274(1629):3141–3149.

Krkošek M, Revie CW, Gargan PG, Skilbrei OT, Finstad B, Todd CD 2013. Impact of parasites on salmon recruitment in the Northeast Atlantic Ocean. *Proceedings of the Royal Society of London B: Biological Sciences*, 280(1750), p.20122359.

Living Oceans 2015. <https://livingoceans.org/media/news/salmon-farms-out-control>.

Lovy J, Piesik P, Hershberger PK, Garver KA. 2013. Experimental infection studies demonstrating Atlantic salmon as a host and reservoir of viral hemorrhagic septicemia virus type IVa with insights into pathology and host immunity. *Veterinary Osprey International Journal of Salmon and Steelhead Conservation*

*microbiology*, 166(1-2), pp.91-101.

Løvoll, M., Wiik-Nielsen, J., Grove, S., Wiik-Nielsen, C.R., Kristoffersen, A.B., Faller, R., Poppe, T., Jung, J., Pedamallu, C.S., Nederbragt, A.J. and Meyerson, M., 2010. A novel totivirus and piscine reovirus (PRV) in Atlantic salmon (*Salmo salar*) with cardiomyopathy syndrome (CMS). *Virology Journal*, 7(1), pp.1-7.

Mikalsen AB, Haugland O, Rode M, Solbakk IT, Evensen O. 2012. Atlantic salmon reovirus infection causes a CD8 T cell myocarditis in Atlantic salmon (*Salmo salar* L.). *PloS one*, 7(6).

Morton A, Routledge R. 2016. Risk and precaution: Salmon farming. *Marine Policy*, 74, pp.205-212.

Morton A, Routledge R, Peet C, Ladwig A. 2004. Sea Lice (*Lepeophtheirus salmonis*) infection rates on juvenile pink (*Oncorhynchus gorbuscha*) and chum (*Oncorhynchus keta*) salmon in the nearshore marine environment of British Columbia, Canada. *Canadian Journal of Fisheries and Aquatic Sciences*, 61(2), pp.147-157.

Morton A, Routledge R, Krkosek M. 2008. Sea Louse Infestation in Wild Juvenile Salmon and Pacific Herring Associated with Fish Farms off the East-Central Coast of Vancouver Island, British Columbia. *North American Journal of Fisheries Management*, 28(2), pp.523-532

Morton A, Routledge R, Hrushowy S, Kibenge M, Kibenge F. 2017. The effect of exposure to farmed salmon on piscine orthoreovirus infection and fitness in wild Pacific salmon in British Columbia, Canada. PLoS ONE 12 (12): e0188793. <https://doi.org/10.1371/journal.pone.0188793>

Olsen AB, Hjortaaas M, Tengs T, Hellberg H, Johansen R. 2015. First description of a new disease in rainbow trout (*Oncorhynchus mykiss* (Walbaum)) similar to heart and skeletal muscle inflammation (HSMI) and detection of a gene sequence related to piscine orthoreovirus (PRV). *PloS one*, 10(7).

Palacios G, Lovoll M, Tengs T, Hornig M, Hutchison S, Hui J, Kongtorp RT, Savji N, Bussetti AV,

Solovyov A, Kristoffersen AB. 2010. Heart and skeletal muscle inflammation of farmed salmon is associated with infection with a novel reovirus. *PLoS one*, 5(7).

Patanasatienkul T, Sanchez J, Rees EE, Krkošek M, Jones SR, Revie CW. 2013. PRV infestations on juvenile chum and pink salmon in the Broughton Archipelago, Canada, from 2003 to 2012. *Diseases of aquatic organisms*, 105(2), pp.149-161.

Purcell MK, Powers RL, Evered J, Kerwin J, Meyers TR, Stewart B, Winton JR. 2018. Molecular testing of adult Pacific salmon and trout (*Oncorhynchus* spp.) for several RNA viruses demonstrates widespread distribution of piscine orthoreovirus in Alaska and Washington. *Journal of fish diseases*, 41(2), pp.347-355.

Rees EE, St-Hilaire S, Jones SRM, Krkošek M, DeDominicis S, Foreman MGG, Patanasatienkul  
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T, Revie CW.2015. Spatial patterns of PRV infection among wild and captive salmon in western Canada. *Landscape Ecology*, 30(6), pp.989-1004.

Shaffer JA, Weber S, Harvey D. 2019 Observations of sea lice on juvenile forage fish along the northwest Salish Sea. Coastal Watershed Institute CWI Technical Report Number CWI 052019:1. ISSN 2643-9697

Snauffer E L. 2013. Modeling herring and hake larval dispersal in the Salish Sea (Doctoral dissertation, University of British Columbia).

Stick K C, Lindquist A, Lowry D. 2014. The 2014 Washington State Herring Stock Status Report. Fish Program Technical Report No. FPA14-09. Washington State Department of Fish and Wildlife, Olympia, Washington.

Thorstad E B, Finstad B. 2018. Impacts of salmon lice emanating from salmon farms on wild Atlantic salmon and sea trout. NINA Report 1449: 1-22.

Webster SJ, Dill LM, Butterworth K. 2007. The effect of PRV infestation on the salinity preference and energetic expenditure of juvenile pink salmon (*Oncorhynchus gorbuscha*). *Canadian Journal of Fisheries and Aquatic Sciences*. 64(4):672-80.

Wiik-Nielsen, J., Alarcón, M., Jensen, B.B., Haugland, Ø. and Mikalsen, A.B., 2016. Viral co-infections in farmed Atlantic salmon, *Salmo salar* L., displaying myocarditis. *Journal of fish diseases*, 39(12), pp.1495-1507.

Wiik-Nielsen, CR, Løvoll M, Sandlund N, Faller R, Wiik-Nielsen J, Jensen BB. 2012. First detection of piscine reovirus (PRV) in marine fish species. *Diseases of aquatic organisms*, 97(3), pp.255-258