

Western Fisheries Research Center

Salmonid alphavirus

(Other names: *Salmon pancreas disease virus*, Sleeping disease virus, and Norwegian salmon alphavirus)

Key points

- The salmonid alphavirus (SAV) is a single-stranded, positive-sense RNA virus that is responsible for pancreas disease (PD) in farmed Atlantic salmon and sleeping disease (SD) in rainbow trout in Europe. Mortality rates for PD in Ireland have been reported to vary between 1 – 48%. Mortality rates for SD in Europe have been reported to vary from negligible – 22%. [1]
- The International Committee on the Taxonomy of Viruses (ICTV) formally recognizes *Salmon pancreas disease virus* as the type species in the genus *Alphavirus* in the Family *Togaviridae*.
- Recent molecular taxonomic studies indicate that there are six salmonid alphavirus subtypes. Subtype 3 is found exclusively in Norway and is associated with salmon PD. Subtypes 1, 4, 5 and 6 are associated with salmon PD in the British Isles. Subtype 2 is associated with freshwater rainbow trout SD in a number of European countries. Given the close genetic similarity of these subtypes, researchers have proposed that all subtypes be classified as a single species named Salmonid alphavirus (SAV). [2]
- The clinical signs of salmon PD are abnormal swimming, lethargy and loss of appetite. Histopathological signs include pancreatic necrosis, cardiomyopathy and skeletal myopathy. Trout sleeping disease is similar in presentation but also includes trout lying on their side due to necrosis of skeletal muscle. [1]
- SAV RNA has been found by polymerase chain reaction (PCR) methods in marine fish species near Scotland. Although suspected, there is not sufficient study yet to conclude a marine reservoir for SAV. [3]
- Salmon PD was first described in 1976 but a viral etiology was not confirmed until 1995. The virus was first isolated by co-culture and serial passage using the Chinook salmon embryo (CHSE-214) cell line. Several passages were required for visible CPE to be observed. Improved culture methods have been reported but visualization of viral cytopathic effect (CPE) is not a reliable indicator of SAV. Diagnostic laboratories will typically combine cell culture with immunostaining or molecular methods to enhance SAV detection rates. [4]
- Kent and Elston [5] reported a case of pancreas disease in farmed Atlantic salmon from Washington State. The etiological agent of PD was not known at the time, so no testing was done to confirm the presence of SAV. To our knowledge, this is the only formal report of a pancreas disease-like condition and there are no confirmed reports of SAV in North America.

- The risk that this virus would pose to Pacific salmon is unknown and may vary depending on subtype. Subtype 2 is clearly associated with disease in freshwater rainbow trout. Viral isolation and controlled laboratory challenge studies would need to be performed to fully evaluate the risk.

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References

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