

AQUACULTURE *update*

Number: 72

Editor: L. Margolis
Pacific Biological Station

July 21, 1995

Isolation of North American Strain of VHS Virus from Farmed Atlantic Salmon

The North American strain of the viral hemorrhagic septicemia virus was isolated from Atlantic salmon farmed in British Columbia in March 1995, apparently representing the first time that the virus has been isolated from farmed Atlantic salmon. Identification of the virus was based on a specific DNA probe. The virus was isolated from 2 of 30 market-size fish sampled in a processing plant, the fish being sampled because they were derived from a netpen showing unexplained but increasing losses. Atlantic salmon in the 19 other netpens on the farm showed only low mortalities. The source of the virus in the positive fish is unknown but it is thought to be a marine fish.

The first isolates of VHS virus in North America were obtained in 1988 from feral adult coho and chinook salmon in Washington State. These isolates differed genetically from the European strain. Extensive sampling of salmonids throughout the Pacific Northwest over the next several years resulted in two isolations in 1989, one in 1991, and one in 1994, all from apparently healthy adult coho in Washington State. The North American strain of VHS virus has also been isolated from skin lesions of Pacific cod caught in Alaska in 1990, 1991, and 1993. Subsequently, VHS virus was isolated from Pacific herring populations over a wide geographic area ranging from Kodiak Island in Alaska to Puget Sound in Washington state. The widespread occurrence of VHS virus in Pacific herring, an important food item for chinook and coho salmon, likely explains the occurrences of the virus in these species of salmon.

In British Columbia, the North American strain of VHS virus has been found in herring

collected from Prince Rupert, Campbell River, Sechelt, and Departure Bay. In addition, shiner perch and tubesnouts recently sampled from Departure Bay were found to be positive for the VHS virus. The finding of VHS virus in these species of marine fishes often associated with netpen sites suggests that they may serve as a source of the virus for the farmed fish.

Although, the European strain of VHS virus is pathogenic to trout, pike, grayling, whitefish, and turbot, pathogenicity tests by researchers in Alaska indicated that Pacific salmon (coho, chinook, sockeye, and pink salmon) and rainbow trout are not highly susceptible to the North American strain of VHS virus. Tests conducted at the Pacific Biological Station by injection and bath exposure of Pacific herring, shiner perch, and tubesnouts, caused losses in all species by both exposure methods. The susceptibility of Atlantic salmon post-smolts to the virus was also tested using bath and injection challenges. Losses occurred only in the injected group of Atlantic salmon.

Tests conducted at the Pacific Biological Station on 3 moribund and 7 grilse from adjacent pens, shortly after harvest of fish from the affected pen, were negative for VHS virus as were 60 fish sampled randomly from the remaining pens one month after fish from the affected pen were harvested. Although the North American strain of VHS virus was isolated from Atlantic salmon from the affected pen during processing, it is not certain that the increasing mortalities observed in the pen were due to the virus. Sampling of non-salmonids is planned to determine if these fish were a possible source of the virus.

Aquaculture Division
Pacific Biological Station
Nanaimo, B.C.
V9R 5K6
Telephone 756-7033



Fisheries
and Oceans

Pêches
et Océans

Canada 

If the North American strain of VHS (or any other virus) is found in farmed fish in British Columbia, the following measures should be taken to minimize the risk of spread to other farmed and wild fish:

1. The Fish Transplant Committee should be notified of the findings and fish from affected sites should not be transferred to other farm sites.
2. All dead fish should be incinerated, or, failing that, should be composted at a plant in which the treatment temperatures reach levels high enough (60°C) to deactivate the virus and where any run-off from the composting process is contained.
3. There should be no transfer of fish farming equipment from the affected site to other farms. Movement of personnel to other sites should be avoided if possible. If personnel need to work on other sites, boots, etc. should be thoroughly disinfected prior to entering the new site.
4. Harvesting or processing of the affected fish may call for special precautions to prevent the spread of infectious material. This should include the following:
 - a. No release of water from transport tanks between the farm and the processing plant.
 - b. Containment of blood water and processing wastes with disposal in landfill.
 - c. Disinfection of processing equipment after processing is completed.
5. None of the stocks should be used for broodstock. We recommend that all broodstock be screened for any virus infections and that eggs from virus-positive fish be destroyed. Also, an Alaska sockeye-type protocol of thorough egg disinfection is recommended.

For further information contact:

Garth Traxler (604) 756-7068
Dorothee Kieser (604) 756-7069
Dr. T.P.T. Evelyn (604) 756-7066
Pacific Biological Station
Nanaimo, B.C. V9R 5K6