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NEW ZEALAND FRESHWATER FISHERIES MISCELLANEOUS REPORT NO. 15

VIRAL HAEMORRHAGIC SEPTICAEMIA (VHS)

NOTE
Further studies have found this VHS from America is different to that found in Europe and is not pathogenic to Salmoni

Revised edition to be produced

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by

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Report to: Department of Conservation

Freshwater Fisheries Centre

MAF Fisheries

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CHRISTCHURCH

Servicing freshwater fisheries and aquaculture

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NEW ZEALAND FRESHWATER FISHERIES MISCELLANEOUS REPORTS

This report is one of a series initiated in January 1989, and issued by the Freshwater Fisheries Centre, MAF Fisheries. The series was established to ensure that reports prepared for clients, tribunal hearings, internal use, etc., are collected together and available to future users. They are for limited circulation, and some may be confidential.

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VIRAL HAEMORRHAGIC SEPTICAEMIA (VHS)

A synopsis prepared for the Department of Conservation

by
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CAUSE

VHS refers to a disease, most commonly occurring in trout, caused by a virus belonging to the rhabdovirus group. VHS refers to the disease, which is caused by the VHS virus.

DISTRIBUTION

VHS is reported from 13 countries in Europe, namely: Belgium, Bulgaria, Czechoslovakia, Denmark, East and West Germany, France, Italy, Norway, Poland, Sweden, Switzerland and USSR. It is not known in Britain. In 1989 it was reported from two locations in Washington State in the United States.

HOST RANGE

VHS causes mortality, either experimentally or in farms, to several species of trout, the young of Atlantic salmon, grayling, whitefish, pike, turbot, and sea bass. Chinook and coho salmon appear to be refractory to VHS disease.

THE DISEASE

Fishes of all ages can become infected and can show signs of disease but young fish fall ill more commonly. Outbreaks of disease usually occur at temperatures below 14°C. Above 15°C fish may be infected but show no clinical signs of disease or mortality.

Studies in Bavaria found that although many trout farms showed evidence of the presence of the VHS virus the actual occurrences of VHS disease were much less. Some farms where there was evidence of the virus had no history of VHS disease. These results show that the presence of VHS virus alone cannot provoke the outbreak of disease, apparently other factors must also be present. These factors include management and environmental factors such as stress, transport, changes in water quality and high population density.

EFFECT ON WILD FISH

Dr R Hoffman, professor at the Institut fur Zoologie und Hydrobiologie in Germany, had this to say concerning VHS in wild fish:

> "....we never found clinical outbreaks of VHS with high loss in wild fish populations, except in the first or second week after introducing farm bred fish in a free river. Apparently, the adaption of wild fish to the environment as well as the high dilution of VHS in brooks and rivers does not allow the establishment of epidemic VHS in wild salmonids, even if they show antibodies documenting the presence of the virus. Therefore, VHS can be classified also as a disease of farmed fish which becomes clinically evident only in combination with a poor environment"

TRANSMISSION

Natural infection occurs by horizontal transmission, ie fish to adjacent fish. It is generally conceded that vertical transmission (parent to offspring) is extremely rare or does not exist. Egg-borne infectivity has never been implicated in outbreaks of VHS. Vectors of VHS are neither known or suspected. Gulls and other fish-eating birds can carry VHS victims short distances from one farm to another. However VHS does not survive during passage through the gut of a gull because of the high acidity and 40°C avian body temperature.

VHS virus does not survive for long outside the living fish. It is over 90% inactivated after 14 days in stream water or mud or after drying at 15°C. VHS virus will survive freezing and thawing.

OCCURRENCE IN THE UNITED STATES

United States and Canadian laws require that salmon and trout, dead or alive, cannot be imported into those countries unless the fish have been tested by approved methods and certified free of VHS. As part of routine fish health programs most hatcheries in the Pacific Northwest of America have their fish stocks and broodstock examined for a variety of diseases.

Samples taken from apparently healthy broodstock in 1988 were found to contain a virus that was identified in 1989 as VHS virus.

The virus was found at two locations 120 km apart in fish returning from the sea. One location was at Orcas Island where it was found in a single pooled sample of five fish out of 68 chinook sampled. The other positive finding was in coho salmon returning to the Makah National Fish Hatchery (MNFH) located near

Neah bay. Locations are indicated on the map appended. At the MNFH eight out of ten, five fish pools collected on 1 December and one out of four pooled samples collected on 8 December were positive for VHS. The virus was subsequently found at this location in steelhead yearlings, coho yearlings and chinook fry.

Emergency procedures were implemented by the Pacific Northwest Fish Health Protection Committee in an attempt to eradicate the virus. All stocks of adults and juveniles present at these two sites were destroyed. They were destroyed in an attempt to eradicate the virus, there was no indication that the fish were suffering from disease as distinct from infection. In addition to stock destruction a comprehensive testing program was implemented for wild and hatchery stocks in the area. As at March 4 1989 no further isolates of VHS had been found. At that date testing was complete at 95 locations and tests of other locations were proceeding.

The origin of the virus to the United States has been the subject of much speculation however US fish pathologists are unable to say how the virus was introduced and comment:

> "... it is unlikely that any new information about the source will be forthcoming. The recovery of the virus from two species of anadromous fish at two locations in the same year suggests that the salmon may have been infected in the marine environment. Whether a marine reservoir of infection has been established is not known"

The Atlantic salmon introduced to the region were from stocks certified free of VHS and are being tested again. In Europe, VHS has not been found in Atlantic salmon net pen or hatchery operations.

CONTROL

Control of VHS is best effected by avoidance. Provided that the water supplies are free of virus, facilities affected by VHS can be restored to virus free production. An eradication program in Denmark since 1965 has been successful and cost effective. The procedure involves removing infected stock, disinfection, re-population with virus free stock and inspection.

THE SITUATION IN NEW ZEALAND

VHS is not known in New Zealand.

As part of meeting United States market requirements all salmon stocks destined for that market are routinely examined for VHS virus at least once a year. These examinations are conducted by MAFQual at the request and expense of the salmon farming industry. By May 1987, approximately 6000 salmon had been tested

for VHS with negative results. Testing has continued and the total today would be much higher.

The possibility of introducing VHS and other fish diseases to New Zealand has been addressed and has led to stringent controls on the importation of salmonids. This is contained within the Animals Act 1967, which is administered by MAFQual.

16 August 1989.

APPENDIX

Map showing locations of hatcheries in Washington State where VHS was found.