

Infectious Pancreatic Necrosis Virus Distribution and Estimated Prevalence in Wild Fish from Scotland



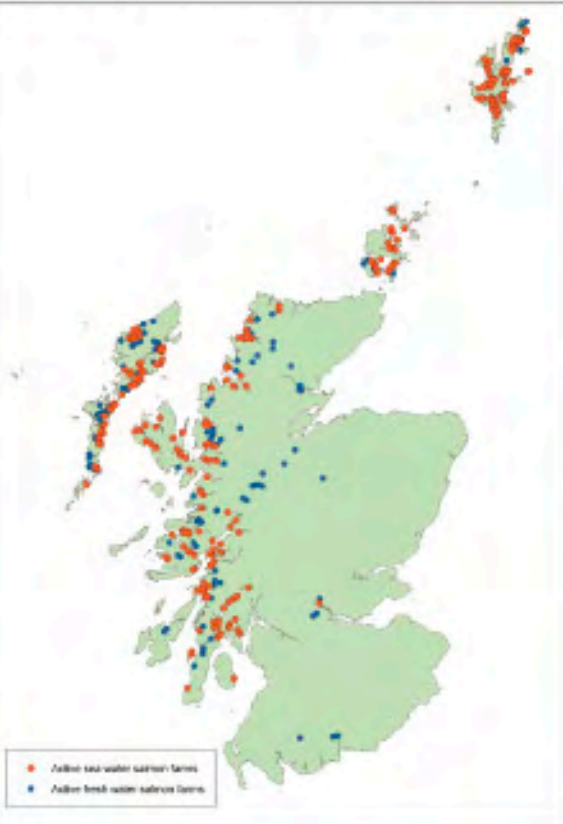
FISHERIES RESEARCH SERVICES

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INTRODUCTION

Infectious pancreatic necrosis (IPN) is the most economically important viral disease of the salmonid aquaculture industry in Europe

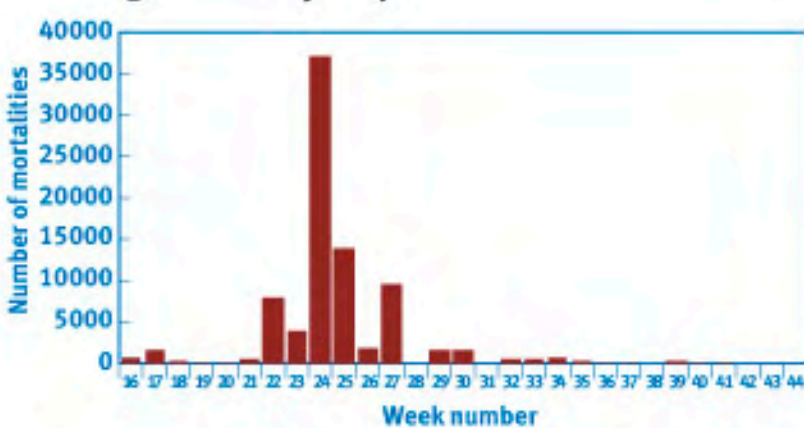


Annual production of farmed Salmon in Scotland is approx 140,000 tonnes

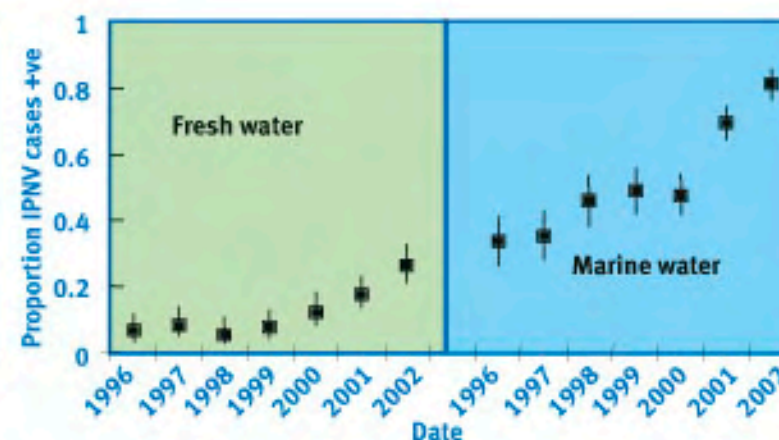


FACTS ABOUT IPN

- Caused by an aquabirnavirus
- Wide host range – trout, salmon, charr, halibut, cod
- Mortality in farmed salmon and trout
- Disease only observed in farmed fish
- High mortality – up to 50% farm stock



Mortality during an outbreak of IPN at a marine Atlantic salmon farm



The prevalence of infection within salmon farms has increased reaching over 80% for marine sites by 2002

CONCERN FOR WILD FISH

Wild Atlantic salmon and trout are an important part of Scotland's natural heritage. Against a background of increasing prevalence in farms we aimed to determine the potential for spill over of IPN virus from infected farms and for wild fish to be reservoirs for farm infections

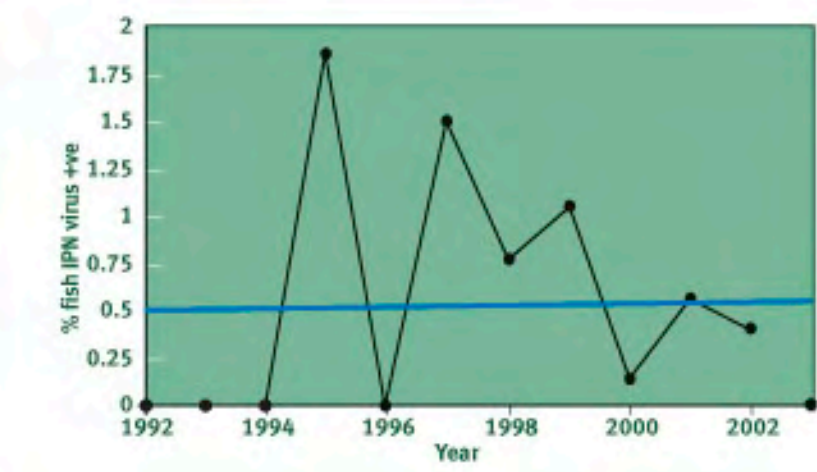
Investigations in wild salmon and trout from freshwater

7553 fish tested for IPNV by virus isolation from kidney samples.

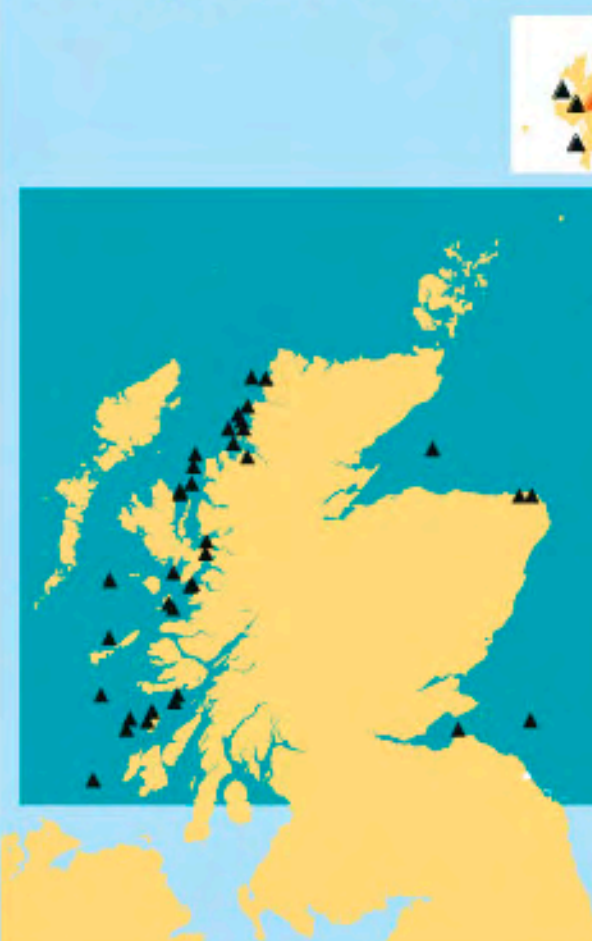


Prevalence of IPNV in wild freshwater fish

Increased prevalence of IPNV infection in farms was not associated with increased prevalence in wild freshwater salmon and trout



Investigation in wild marine fish species



Location of wild fish capture	Number of fish tested for IPN virus	Estimated prevalence (95% CI)
Within 5km of 2 salmon farms affected by IPN	6,411 17 species	0.6% (0.46-0.78)
Greater than 5km of salmon farms	2,962 24 species	0.07% (0.025-0.21)
Greater than 5km from salmon farms	15,590 37 species	0.03% (0.013-0.06)

Wild species carriers of IPNV

- Saithe (*Pollachius virens*)
- Common dab (*Limanda limanda*)
- Plaice (*Pleuronectes platessa*)
- Grey gurnard (*Eutrigla gurnardus*)
- Flounder (*Platichthys flesus*)
- Long rough dab (*Hippoglossoides platessoides*)
- Whiting (*Merlangius merlangus*)

Prevalence was generally low but increased close to salmon farms affected by IPN.

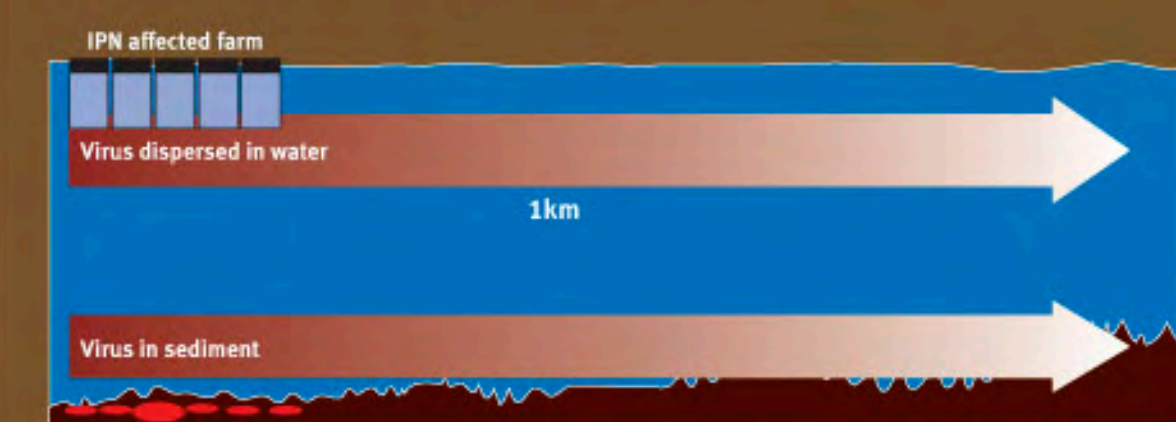
Increased prevalence persists for a period of at least a year and may decline with time although the regression is not statistically significant probably due to insufficient data (regression is -0.026% per month (+0.023% to -0.075%, 95% confidence intervals). The initial value of the regression line at 1 June is 0.88% prevalence.

Virus titres in wild fish were several orders of magnitude lower in comparison to farmed fish.

IPN virus from farmed and wild fish were very similar genetically (97-100%).

Benthic, bottom dwelling wild fish species were more likely to be infected than wild fish living in the demersal and pelagic higher waters.

Dispersal of IPN virus in the environment



IPN virus was dispersed by currents for at least 1km (greater distances not measured)

Virus in sediment beneath salmon cages was present at 300 times the concentration found in seawater and was detectable at distances of up to 1km. This may explain the finding of highest prevalence in the benthic fish species.

CONCLUSIONS

At a large scale, there is no evidence for IPN virus from farms having an effect on prevalence of infection in wild fish.

At a local scale there is evidence that IPN affected marine salmon farms may have a small effect on IPN virus prevalence in wild fish. This effect may be short lived with no evidence that increased prevalence can be maintained by transmission within wild fish populations.

Prevalence of IPNV in wild fish is low and no IPN diseased wild fish have been seen or reported. This makes studying infection in wild fish resource intensive and strongly indicates that IPN has little or no effect on wild fish.

Models of the transmission of IPN virus at the salmon farm level (Murray and Raynard 2006) show that wild fish reservoirs are not important for infection of marine farms. The timescale for turnover of infection/non-infection being the period of the production cycle of fallowing and restocking and transmission being due to live fish movements and neighbouring infected farms.

Reference
AG Murray and RS Raynard (2006) A model of the emergence of infectious pancreatic necrosis virus in Scottish salmon farms 1996-2003. Proceedings of the Society for Veterinary Epidemiology and Preventive Medicine, Exeter 2006.