*Backgrounder*

Atlantic Salmon Federation
P. O. Box 5200, St. Andrews, NB E5B 3S8
P. O. Box 807, Calais, ME USA 04619–0807
Tel: (506) 529–4581 www.asf.ca

# INFECTIOUS SALMON ANEMIA (ISA) – THE FACTS

## General

- Infectious Salmon Anemia (ISA) is a virus that is highly contagious in the marine environment, spread through the water between Atlantic salmon within a grow-out site, and carried by the water from one site to another
- ISA is highly lethal to Atlantic salmon, but does not harm humans, according to all sources.
- ISA is complicated to diagnose, as there are both virulent and non-virulent forms of the virus. The virulent form occurs through mutation, possibly as the result of stress factors in the salmon. When a lab says “suspected” of having ISA, in part they are determining if the virulent form of ISA is present.
- ISA was only discovered in wild Atlantic salmon in 1999, but has been known in farmed Atlantic salmon from a much earlier date
- ISA was unknown to science prior to epidemics in the Norwegian salmon farming industry in 1984
- Disease symptoms include the salmon becoming lethargic or moribund, lifting of scales, protuberance of the eyes, skin lesions, pale gills, and internal hemorrhages.

## Geographical Distribution

- ISA is found on both sides of the Atlantic Ocean, and at times has caused massive losses for salmon farmers in Norway, Scotland, and the Faroes.
- Norwegian salmon farms were the first to be affected, and, by 1990, 101 salmon farms were infected
- In Scotland, an outbreak in 1998 spread so that, by the following year, 11 sites were infected, and a further 24 sites were suspected of being infected, a total of 10% of Scotland's salmon farms. Since then there have been outbreaks from time to time.
- In the Faroe Islands the aquaculture was nearly wiped out by ISA outbreaks from 2001 to 2003, resulting in losses to the industry of DKK 250 Million

## Canada and Maine

- In 1996, ISA severely crippled the aquaculture industry in southwest New Brunswick, requiring the slaughter and industrial disposal of millions of farmed salmon that were dead, or needed to be slaughtered
- By 1997, there were 21 farm sites testing positive for ISA, and more than 35 farm sites in 1998, and even in 2000 there were 17 sites infected
- ISA caused the first eradication order for the Canadian sea cage industry.
- More than $75 Million (Canadian) was paid by governments to growers to compensate for losses by 2006, with additional uncompensated losses as much as $40 Million (Canadian) or more.
- Between 1996 and 2006 approximately 9 million farmed Atlantic salmon were slaughtered due to ISA epidemics in the Canadian Bay of Fundy.
- In 2001, Maine's Cobscook Bay was infected and more than 2.5 million fish were killed, to be followed by other outbreaks in 2002 and 2003 that killed at least another 150,000 salmon
- The most recent case in NB requiring "depopulation" was 2007 (528,000 fish destroyed).

## Pacific Ocean

- Chile's aquaculture industry was partly destroyed by widespread outbreaks of ISA in the past several years, resulting in the deaths of 10's of millions of fish, and the loss of thousands of jobs in the industry. Chile is now trying to rebuild on a healthier model, but outbreaks continue to occur.
- In British Columbia, there were reports of ISA showing up in wild and aquaculture salmon, but the tests have proven inconclusive at this point.

## ISA Transmission and the Environment

- ISA likely infects fish via the gills and possibly by ingestion
- ISA is shed in urine, feces, epidermal mucus, gonadal fluids, blood and through tissue wastes when farmed salmon are slaughtered and processed.
- ISA thrives in cold water temperatures (5-15 celcuis). It does not survive at temperatures exceeding mid 20s.
- ISA can be transmitted either through the water or by close contact between fish.
- Sealice might act as mechanical vectors. They may also increase the susceptibility of fish to infection by stressing the salmon
- Wild fish may act as carriers. Salmonids might be the natural reservoir of the ISA Virus
- It remains uncertain whether adult Atlantic salmon can transfer the virus to eggs within the adult, but some scientists believe the non-virulent form of the virus can be transmitted this way
- ISA normally occurs in the salmon's marine life stage, and only rarely has been reported among young fish
- There appear to be two yearly peaks of the disease – early summer and winter

## Controlling ISA

- ISA being highly contagious, it is necessary to slaughter immediately all the fish in any site suspected of having the disease
- It requires two positives within a cage of salmon for the cage depopulation to be ordered.
- Bay-wide management with single year classes has been implemented to attempt to control the outbreak of ISA. Overall it is successful, but there are still outbreaks, and those will result in widespread death of farmed salmon
- ISA require the expenditure of many millions of dollars to control and deal with the disease. The costs begin with disinfection, and may include use of vaccine
- The industry, wherever it exists, should use only ISA virus-free broodstock

## ISA in Wild Salmon

- ASF was the first to find ISA in wild Atlantic salmon in North America, when several individuals were tested on entering the Magaguadavic River fish ladder.
- The impact on wild Atlantic salmon remains an uncertain area, but there is great concern for individual salmon swimming through areas where farmed salmon are infected.
- Wild salmon are less susceptible to ISA than farmed salmon. It could be related to genetics or increased stress in farmed populations
- On the Pacific Coast, there is continued concern that, if ISA is confirmed, it could have massive implications there for wild salmon populations

*April 30, 2012*