Occurrence of atypical furunculosis in Chile

Sandra Bravo

Instituto de Pesquerías y Oceanografía, Universidad Austral de Chile. Casilla 1327. Puerto Montt. Chile. e-mail:sbravo@uach.cl

Abstract
Atypical furunculosis has been reported in Chile since 1995. A survey over the last 5 years has shown that the disease is endemic in specific areas, and is as yet confined to the seawater salmon farming industry with no cases so far recorded in freshwater. In spite of the localised nature of atypical furunculosis, it is nonetheless becoming a serious concern for marine salmon farmers in Chile.

Atlantic salmon (Salmo salar) is one of the three main species of salmonids reared in Chile accounting for about 40% of Chilean salmon production in 1999. About half of the production of Atlantic salmon originated from eggs imported from Europe, mainly from Ireland, Scotland and Norway.

About 90% of salmon production in Chile is carried out in the X-Region (Lat. 42º S), where the best conditions for these exotic species exist. The main pathogens which cause mortality in salmon in seawater are Piscirickettsia salmonis (SRS), Renibacterium salmoninarum (BKD), Infectious Pancreatic Necrosis Virus, (IPN) and atypical Aeromonas salmonicida (atypical furunculosis).

Atypical A. salmonicida strains are the cause of ulcerative and systemic infections in a wide variety of economically important fish species, including salmonids, carp, goldfish, cod, eel, turbot, flounder, halibut, wolffish and many others (Rodger et al. 1997; Gudmundsdóttir 1998). The disease has a wide geographical distribution. Atypical strains have been reported from temperate regions of the northern hemisphere, that is Canada, USA, Japan, and central and Northern Europe, including the Nordic countries.

Isolated atypical strains have also been identified in Australia and in the Mediterranean (Wiklund & Dalsgaard, 1998; Gudmundsdóttir 1999). More than 25 strains of atypical Aeromonas salmonicida have been isolated from different species of fish and countries (Gudmundsdóttir, 1996).

Atypical furunculosis was diagnosed in Chile for the first time in November of 1995 at a site located near Puerto Montt (X Region). One of four stocks of Atlantic salmon reared in seawater net pens in the site showed signs of furunculosis with symptoms and losses typically associated with the disease. The affected stock (at the time weighing about 900 g average) originated as eggs imported from Norway and had been reared with the three other stocks from different origin in which the disease was not detected. The outbreak was easily controlled by a 14-day treatment with flumequine. However in the Spring of the following year a new outbreak of the disease occurred in the same stock. At the time, the fish were over 4 kg. Because of the re-occurrence and to avoid spreading of the disease,
all the infected fish were harvested immediately. Following that event, atypical furunculosis has not been reported in that area again.

Three years later, in October of 1998, this disease was observed in Atlantic salmon, at Llancahue, a site located about 50 nautical miles south of the place where it was diagnosed in 1995. Initially, atypical furunculosis was reported from one company, which owns five farms located in the area, rearing only Atlantic salmon. Mean weight of the infected fish was about 670 g and the water temperature was about 11ºC. By December 1998, the disease had spread to three of the five sites and in March 1999 the disease was present in all the sites located in the area where atypical furunculosis is now considered endemic (Fig.1).

Following these events, the disease has appeared every Spring in the area where it was diagnosed in 1998, mostly when the temperature of seawater is over 11ºC reaching almost 17ºC, between December and January. Llancahue is an area where there are periodical fluctuations of temperature and salinity caused by the influence of the Blanco River. Additionally, there is also influence of thermal waters associated with volcanic activity, a situation which increases the stress in the fish. Low visibility (less than 4 m) and severe depletions of oxygen during the summer are factors which have contributed to increased stress and further outbreaks of this chronic disease.

The disease is easily controlled with antibiotics. The isolates from this region are generally sensitive to oxolinic acid, flumequine, oxytetracycline, trimethoprim, sulfonamides and florfenicol. However, under stressful conditions new outbreaks have occurred, reaching levels of 15% mortality per month in the worst affected cages. Although today there are vaccines commercially available in the countries where the atypical furunculosis is present (Gudmundsdóttir & Gudmundsdóttir, 1977; Gudmundsdóttir & Magnadóttir, 1997), none is yet commercially available in Chile.

Moribund fish showed lack of appetite, lethargy, loss of orientation and abnormal swimming behavior. Such fish had superficial ulcers, with necrotic swelling in the muscle and eruptions of the skin, mostly located on the flanks of the fish. Haemorrhages at the base of the fins have also been observed. In some cases, the necrotic lesions appeared only in the muscle, without external evidence. The main internal signs included haemorrhages in the internal organs and the mucosae. An
empty gut with yellow mucus and bloody exudate was also observed in some fish.

Bacteria were isolated from the kidney of fish showing signs of the disease. They were incubated at 20° C in BHIA with 1.5% NaCl. Numerous small light brown colonies developed. Growth of the colonies slowed after one week. Isolates from the periphery of the external ulcers were contaminated with other opportunistic bacteria. The short rods, Gram-negative, oxidase-positive, non-motile, indol-positive were identified as atypical *Aeromonas salmonicida*. Samples of the isolates were sending to Alpharma A.S. in Norway and to Dr. B. K. Gudmundsdóttir in Iceland, who confirmed the identification.

To date, there are no reports of atypical furunculosis in freshwater in Chile or at other marine locations where salmonids are reared remote from of the sites where the disease is endemic. Characteristically, atypical furunculosis spreads between sites and one may assume that the geographic distribution of this bacterium should be widespread in Chilean seawater. However, according to the information collected, it seems that the disease is so far confined to the area of Llancahue, South of Puerto Montt, where it is now a serious problem for the Atlantic salmon farming industry, mainly during the Spring season when conditions for the fish are particularly unfavourable.

The origin of the disease is still unknown. Perhaps, as in many countries, the pathogen is present naturally in Chilean seawater or perhaps it was introduced to Chile through eggs imported from countries where atypical *A. salmonicida* is endemic. The fact is that the atypical furunculosis is now an increasing problem for Chilean aquaculture due to the heavy losses in salmon farms.

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**References**


