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INTERNATIONAL SALMON FARMERS ASSOCIATION (ISFA) Report to NASCO 2017

Aquaculture Technological Developments Related to Sealice Management

Mr. President, distinguished Delegates, Observers, Ladies and Gentlemen, on behalf of ISFA, I would like to thank the EU and Sweden for hosting the Thirty-Fourth Annual Meeting of NASCO and the Council for this opportunity to present this report.

The International Salmon Farmers Association (ISFA) shares the concerns of NASCO regarding the control of sealice in salmon aquaculture. This concern is related to animal welfare and their potential negative effects on wild fish. Viewed against marine mortality rates at or above 95%, the additional mortality attributable to sea lice from both wild and cultured salmon has been estimated at around 1% (Jackson et al., 2013, ICES 2016).

In a number of jurisdictions, sealice has become an important factor for the authorities in regulating the growth in the aquaculture industry. As such, the investment in controlling and reducing lice levels in marine net pens has become significant. For example, the Norwegian Aquaculture industry last year invested about 5 billion NOK (about 600 million US dollars) to combat sealice and in the development and testing of alternative treatment methods.

The aquaculture industry's main objectives to combat sealice are to:

1. Keep the amount of salmon lice in aquaculture operations as low as possible to minimise negative effects on cultures and wild fish;
2. Ensure access to viable treatment methods; and
3. Ensure that sea lice management methods are effective.

To achieve these objectives, the following main points constitute the overall strategy:

1. Identifying most suitable geographical sea location;
2. Establishing suitable management zones and fallowing;
3. Controlling the amount of salmon lice on aquaculture sites by means of biological and/or mechanical measures only; and
4. Coordinating the combat of increasing levels of salmon lice through intensified biological and mechanical de-lousing measures and, if necessary, using medicines in accordance with agreed criteria.

The main objectives and overall strategy points are still valid and have over the last couple of years materialised through the "blue triangle".



The blue triangle is divided into four levels:

1. Biological protection

This is the basic level consisting of **breeding** for increased resistance against salmon lice and development of different **infeed products** stimulating the mucus layer of the fish skin and the immune system.

2. Mechanical protection

This second level consists of different methods protecting the salmon from the infestation stage of the salmon lice. Methods relevant at this level are for example different types of skirts around the upper 5-10 meters of the cages, artificial lights to keep the fish deeper in the cages, electric fences, and snorkels to keep the fish deeper in the sea but still allowing the fish to fill the swim bladder by reaching the sea surface through the snorkel.

3. Biological removal

The most relevant methods here are cleaner fish. In industry is today establishing production units, and the aim is that industry became self-sufficient with cleaner fish.

4. Mechanical removal

At this level are different methods using for example fresh water or sea water with higher temperature (around 30-32 °C) than the sea temperature, and hosing the fish with low pressure water (<1 Bar). These methods are evolving to require minimal handling of the fish. Several farms also use laser to kill the sealice.

5. Medicated reduction of salmon lice

Anthelmintic treatments and Hydrogen Peroxide are the tools in this fourth and last level. Except for available infeed treatments, which varies regionally, these methods involve handling of the fish.

The main ideas behind this pyramid approach is to establish procedures on the farms where the preferred measures for controlling the levels of salmon lice are those that minimize handling of the fish and the use of medications. Although effective methods are available at the first four levels, the use of the methods on the first three levels are not optimized. When new treatments are made available it is important to apply the principles of the pyramid to minimize their use while continuing to treat effectively. In doing so we maintain the salmon lice's sensitivity to the treatments and minimize any possible negative effects on the environment.

Several farms now prolong the “smolt period” by keeping the fish in closed containment in the beginning of the production cycle. This is done to increase the size of the fish put into the sea cages. With increased size, the production period is reduced and by that also the time the fish is exposed for sealices. The industry expects that this also will be a significant contribution to get better control of the parasite.

All farmers monitor and report on sea lice at all farms. They work with top scientists around the world to collaborate on research and monitoring projects leading to the development of new technologies. Information is shared with fisheries groups and the community through various reporting systems, depending on the operational jurisdiction. All sea lice treatment products undergo extensive risk assessments by federal agencies to ensure they are safe for salmon, other species, the environment and human health. Treatments must be prescribed and their use managed by a veterinarian. All products used to date have been approved for use, and all treatments are reported to government regulators and stakeholders. All salmon farms, for example in Canada and the United States are certified to BAP / GAA or ASC certification – which among many other factors addresses sea lice. So not only are farmers in compliance with legislation and regulations, but they are compliant with global standards that go above and beyond those regulations.

Salmon farmers around the world are making significant investments and progress in the development and testing of nonchemical sealice control methods. Over the last 5 years in excess of 20 million euros have been spent on a number of biological and physical control methods that show great promise. Pressure showers, hot water and fresh water systems, cages skirts and floating containment barriers are all being tried to physically remove or exclude sealice. Biological control measures such as cleaner fish, so called biological fences, vaccines and a selection of sea lice resistant salmon strains are all being researched and trialed.

Farm management methods such as area or zone management, site rotation and fallowing have been employed in Canada for some time along with site to site coordinated sea lice management activities within these management areas. The efficacy and stage of development of any of these management tools varies between the specific sites in which they are being used, but significant progress has been made.

Of course, many of the techniques and tools being developed are proprietary, making communication of specifics difficult but ISFA members remain committed to sharing test results amongst themselves in order to increase the pace of innovation and success.

The International Salmon Farmers Association (ISFA) is an umbrella organization comprised of national and regional associations from around the world. ISFA members share a common vision and dedication to helping our farmers and industry professionals produce healthy food, revitalize coastal communities and build vibrant businesses.