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Skin lesions in fish: causes and solutions

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Introduction

In recent years, the welfare of fish has received increasing attention and attempts have been made to control welfare in farmed fish. This may be achieved through regulation of management practices, including stocking density, etc. Skin lesions in farmed fish are an important challenge to the fish farmer. Fish with ulcers, fin erosions or impaired eyes are very conspicuous among the healthy fish swimming around in the tank or net pen. If only few fish are affected it is not an economical problem, but the welfare of these fish are not taken care of in an acceptable manner. Despite giving the fish the best environmental conditions, gentle handling or an adequate treatment if necessary, some members of such large populations will suffer because of skin lesions. To get these individuals out of the production may be a great challenge.

Internationally, the World Animal Health Organization (OIE) is currently working to establish international accepted guidelines on welfare of fish at slaughter, killing for disposal and land/sea transport [1].

For the purpose of this meeting, only some key diseases causing skin lesions will be covered, as it will be impossible to cover all diseases that may lead to welfare problems in fish. Of the following conditions causing skin lesions will be discussed in more detail.

Management

Impaired function and thus impaired welfare in fish may be caused both by external abiotic factors such as water quality criteria as well as by biotic factors such as starvation, stocking density, invasive species, etc.

A variety of aetiological factors may cause lesions in skin, fins and eyes of fish under farming conditions. Poor husbandry and rapid changes in environmental conditions may lead to health problems and diseases that will have an impact on fish welfare. Handling and grading may impair the mucus and skin if not carried out in a gentle way.

Lesions of mechanical origin may be caused by aggression, particularly in the hatchery stage, because of suboptimal conditions such as insufficient feeding. Sharp protrusions in tanks and cages as well as predators (birds, mink, otter and seal), bacteria and parasites also are important factors impairing fish health and welfare.

Using nets to protect the fish against birds may be a great risk for the fish themselves if the net is not thoroughly tied up.

Winter ulcer disease

Winter ulcer disease is a bacterial condition affecting in particular ongrowing Atlantic salmon (*Salmo salar*) in seawater and pre-smolts in hatcheries that use seawater [2]. The disease is caused by *Moritella viscosa* [3] and it occurs at low water temperatures during the winter months [2]. In the initial phase of the disease, the fish dies without development of lesions in the skin, but in more protracted cases, it is characterised by skin ulcers that may extend to

cover large parts of the body. Mortality may extend 40% over a prolonged period, which in addition to downgrading of fish for slaughter may cause considerable economic losses in affected farms.

The main welfare aspect of the winter ulcers is due to osmo-regulatory problems associated with the ulcers at low water temperature as well as the septicaemia involved during a disease outbreak.

In order to combat the disease, medicinal therapy may be used, but antimicrobial treatments are not always effective. This is partly due to the low temperature and difficulties in fish taking enough feed (anorrhexia). From a prevention point of view, commercial vaccines are available, but are not reported to be fully effective [4]. When the temperature rises above 10°C, the disease disappears by itself.

Crustacean parasites (*Lepeophteirus salmonis, Caligus elongatus*)

Under farming conditions where fish are kept at high densities, this eases the ability of a parasite to find a host organism and clearly influences the level of parasitic infestation [5]. Parasites may thus have an impact on the welfare of an affected fish as pathological changes may occur as a result of the attachment and movement of parasites on the fish.

Sea lice (*Lepeophteirus salmonis*, *Caligus elongatus*) are crustacean ectoparasites that may cause severe infestations in salmonids. Not only farmed fish in seawater but also in wild salmonid populations in seawater period such as Atlantic salmon and sea trout [6,7]. The lesions caused by sea lice may be localised or extensive depending on the size of the fish and on the mobility and number of parasites. Infestations can result in itching, skin irritation and ulcerations, starvation, reduced growth, secondary infections and mortality.

Sea lice may also be implicated in the transmission of a number of viral and bacterial diseases, i.e. infectious salmon anaemia (ISA). Sea lice can transfer between farmed and wild populations and have an impact on both.

Treatments are available for farmed salmon, but there are serious practical difficulties in their application as well as concerns regarding environmental impacts. The risk of development of resistance to the limited range of effective therapeutants is a serious challenge.

Several species of fish such as ballan wrasse (*Labrus berggylta*), goldsinny wrasse (*Ctenolabrus rupestris*), sea patridge (*Symphodus melops*), rock cock (*Centrolabrus exoletus*) are also used for delousing of Atlantic salmon. One problem, when using these species as cleaning fish, is that they may attack the Atlantic salmon when the nets are clean and only small numbers of lice are available and thus also causing ulcerations in the skin of the salmon.

No commercial vaccines against sea lice are yet available, but work is ongoing to develop such a vaccine.

In addition to osmoregulatory problems associated with the ulcerations caused by the lice, secondary bacterial infections may hamper the welfare of affected fish unless treated properly.

Jellyfish

Several jellyfish species may cause problems under farming conditions of Atlantic salmon. In Scotland, the four species listed below have been associated with mortalities:

- *Aurelia aurita*
- *Cyaneae capillata*
- *Phialella quadrata*
- *Phialidium sp*.

In Norway mortality in Atlantic salmon has mainly been associated with:

- *Apolemia uvaria*
- *Bolinopsis infundibulum*
- *Cyanea capillata*/*C. lamarcki*
- *Lepomedusae* spp
- *Muggiaea atlantica* (Siphonophora)

Mass occurrence of jellyfish swarms (blooms) may occur throughout the year, but is most common in the period spring through summer to autumn.

In seawater, mass mortalities may occur if large swarms of jellyfish are carried into areas where Atlantic salmon and rainbow trout are being farmed. While small jellyfish may enter the cages and reach the fish inside the pens, larger jellyfish tend to cling to the nets and tentacles or parts of tentacles enter the cage and sting the fish. In some cases the quantity of jellyfish may cause anoxia in the cages while under other circumstances, the jellyfish may affect the fish by stinging on the body surface, in the eyes or gills or through ingestion. Serious stings can cause rapid death but less severe stinging may result in ulcer formation and

secondary infections. There are currently no methods available to prevent jellyfish "attacks". The welfare issues of jellyfish attacks are both the effects of the toxins associated with the attacks and secondary bacterial infections.

From a preventive point of view, measures in order to avoid jellyfish to enter the cages should be carried out.

References

1. Håstein T: **OIE involvement in aquatic animal welfare: The need for development of guidelines based on welfare for farming, transport and slaughter purposes in aquatic animals.** in press.
2. Lunder T, Evensen Ø, Holstad G, Håstein T: **«Winter ulcer» in the Atlantic salmon *Salmo salar*. Pathological and bacteriological investigations and transmission experiments.** *Dis Aquat Org* 1995, **23:**39-49.
3. Benediktsdottir E, Verdonck L, Sproer C, Helgason S, Swings J: **Characterisation of *Vibrio viscosus* and *Vibrio woodanis* isolated at different geographical locations: a proposal for reclassification of *Vibrio viscosus* as *Moritella viscosa*.** *comb nov Int J System Evol Microbiol* 2000, **50:**479-488.
4. Håstein T, Gudding R, Evensen Ø: **Bacterial vaccines for fish – an update of the current situation world wide.** In *Progress in Fish Vaccinology, Dev Biol Volume 121*. Edited by: *Midtlyng PJ. Basel, Karger*; 2005:55-74.
5. Barber I: **Parasites, behaviour and welfare in fish.** *Appl Anim Behaviour Sci* 2007, **104:**251-264.
6. Anon: **Fiskehelse og fiskesykdommer.** Edited by: *Poppe TT. Universitetsforlaget*; 1999:411. (in Norwegian).
7. Roberts RJ: **Fish Pathology.** Third edition. *W.B. Saunders*; 2001:472.