

Policy on Integrated Pest Management (IPM) for sea lice control

Integrated Pest Management (IPM) involves a comprehensive and systematic approach to pest management and is considered highly important for effective sea lice management. IPM for sea lice is based upon proven techniques and approaches to terrestrial parasite management for agriculture systems. It accounts for multiple objectives in managing the situation, considers available preventive and intervention options and makes informed decisions aimed at achieving optimal results.

Mowi recognizes the importance of IPM to mitigate lice infection pressure, resistance development and medicine use, and optimise lice control in our operations. The following key elements are identified as part of Mowi's IPM approach:.

Lice levels and monitoring

- Adhere to National limits on sea lice levels and other required actions
- Keep lice pressure as low as possible throughout the production cycle
- Lice counting and reporting by trained staff, at a minimum frequency as defined by local regulations
- Weekly and precise counting, and reporting, of sea lice levels on all seawater sites (see Appendix I for average sea lice levels per fish across our farming operations and respective regulatory limits)
- Monitor lice development on all seawater sites

Husbandry and management

- Fallow between production cycles/stocking
- Health management / veterinary health plan in operation
- Maintain clean nets to increase water flow
- Routine removal of moribund fish
- Monitor fish health status, behaviour and disease

Prevention

- Use cleanerfish where experiences are good and cleanerfish is an available preventive tool¹
- Re-stock with additional cleanerfish as and when required
- Integrate preventive tools (skirts, deep-feeding, deep-lights etc) where conditions permit and such tools are available
- Apply functional feeds with proven effect
- Coordinate lice management plans within the Area Bay Management (ABM)

Intervention

- Only use licensed medicines, prescribed by a veterinarian/fish health professional, and according to clinical needs
- Minimise internal infection pressure, and handling, by treating on pen level (single pen treatment strategy) when appropriate and possible
- Use the appropriate intervention tools for the lice stages being targeted
- Ensure sufficient capacity on intervention tools
- For each production cycle, and where available, evaluate and use non-medicinal treatment tools
- Practice intervention rotation, where possible and permitted
- Maintain treatment records and monitor treatment efficacy
- Coordinate treatments within the ABM, where possible
- Have knowledge of the resistance status in the ABM

Sea lice levels in our operations are reported regularly through several public channels. Links to publicly available sea lice data are provided below. In addition, through our annual report, we disclose the % sites above national trigger levels (at any time)², the proportion of fish treated with non-medicinal systems and the quantity of sea lice medicines (oral, topical and hydrogen peroxide) used in our operations (as g active ingredient/t produced).

¹ Mowi's expenditure on cleanerfish R&D and use of hides (for enrichment) in 2021 was €1 526 570 (budget 2022 = €1 623 400). Main goals of our research are to secure good welfare, survival and effect of the cleanerfish. To reach these goals we work on areas of feed development, vaccines, production optimisation and developing best practices. When using hides, we actively re-position them to maximise cleanerfish effect and ensure they are placed relative to the salmon biomass, thereby also providing enrichment for salmon.

² The % of sites above national trigger levels is registered on a monthly basis for each of our farming operations and the average calculated on an annual basis. This does not mean that a site above the limit at any time will continue to be above the limit. On the contrary, when a site is registered above the limit, then action is taken to get below the limit. Meaning, all sites registered above the limit (at any time) would be treated to, again, be below the limit. In Scotland, Ireland, Faroes, Canada and Chile, regulatory sea limits are limits for action to be taken ie. to treat. In Norway, the regulatory limits are absolute, and if exceeded a period of 3 weeks is granted to again get below the limit. Failure to do so within 3 weeks results in financial penalties.

Dr Gordon Ritchie
Group Manager Fish Health & Welfare
Mowi ASA

June 2022

Links

Norway

<https://www.barentswatch.no/fiskehelse/>

Scotland

<https://scottishepa.maps.arcgis.com/apps/webappviewer/index.html?id=2218824350e5470e8026076d4138da58>

Faroes

https://www.hfs.fo/webcenter/portal/HFS/pages_aling/hagtl/lsatl

Ireland

<https://www.marine.ie/Home/site-area/areas-activity/aquaculture/sea-lice>

Canada

<https://mowi.com/caw/sustainability/sea-lice-reporting/>

<https://open.canada.ca/data/en/dataset/3cafbe89-c98b-4b44-88f1-594e8d28838d>

Appendix I

Average sea lice levels (adult females) per fish across our farming operations, 2018-2021

BUSINESS UNIT	2018	2019	2020	2021
NORWAY	0.14	0.16	0.15	0.12
SCOTLAND	0.5	0.7	0.9	1.0
IRELAND	0.5	0.6	0.5	0.1
FAROEES	0.2	0.6	0.6	0.4
CANADA*	0.4	0.8	1.1	0.9
CHILE**	1.6	1.7	2.1	1.2

* Canada West only

** *Caligus* spp.

Lice limits per country

Norway

0.5 adult females fish⁻¹ and 0.2 adult females fish⁻¹ during spring period (05 March – 16 April, Norway West; 26 March – 01 May, Norway Mid; 26 April – 01 June, Norway North)

Species: *Lepeophtheirus salmonis*

Scotland

2 adult females fish⁻¹ (reporting) and 6 adult females fish⁻¹ (intervention), all year round

Species: *Lepeophtheirus salmonis*

Ireland

0.3-0.5 ovigerous adult females fish⁻¹ Mar-May, and 2 ovigerous adult females fish⁻¹ Jun-Feb

Species: *Lepeophtheirus salmonis*

Faroese

0.5 adult females fish⁻¹ May-July, and 1.0 adult females fish⁻¹ Aug-Apr

Species: *Lepeophtheirus salmonis*

Canada

3 motile lice fish⁻¹ (preadults+adults) from 01 Mar-30 June

Species: *Lepeophtheirus salmonis*

Chile

3 ovigerous females fish⁻¹ all year round

Species: *Caligus rogercresseyi*