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 pest/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 is performed by trained and dedicated site staff, at a the level and frequency defined by local regulations, but weekly as a minimum. This to ensure consistency in counting personnel and allocation of time exclusively to lice counting
- 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 tool[1]
- Re-stock with additional cleanerfish as and when required
- Integrate preventive tools (skirts, deep-feeding, deep-lights etc), or a combination of these (Dynamic prevention), where conditions permit and such tools are available.
- Preventive tools are applied in a manner that accommodates and synchronises, and does not interfere with, the natural behaviour and well being of our fish, and environmental conditions
- 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 the use of non-medicinal treatment tools (flushing, freshwater, thermal and Combi systems) with proven effect and with respect to fish welfare
- 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

Reporting

- Sea lice levels in our operations are reported routinely through several public channels. Links to publicly available sea lice data are provided below.
- Sea lice levels in our operations are reported to the respective local authorities at the frequency and level (pen, farm, area and region) defined by local legislation
- Through our annual report, we disclose the % sites above national trigger levels[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).

Research & Development

- Mowi will continuously develop better management practices, new solutions and sharing best management practices between our operations.
- Together with our academic and commercial partners, and relevant suppliers, we work continuously to optimize existing solutions, develop and test novel and cost-effective methods (eg. functional feeds, traps, lasers, probiotics, Dynamic prevention, sound waves, cavitation, and several other proprietary solution) for more gentle control of lice and improved welfare, and to improve the efficiency and welfare of cleanerfish.

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[1] *Mowi's expenditure on cleanerfish R&D in 2023 was €253 500 (2022 = €169 700). 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 optimization, capture/handling, welfare and improving best practices. In addition, Mowi's spend on hides in 2023 was € 1 195 200. When using hides, we actively re-position them to maximise cleanerfish effect and ensure they are placed relative to the salmon biomass in the pens, thereby also providing further 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 will continue to be above the limit. On the contrary, if a site is registered above the limit, then action is taken to bring the site below the limit. Meaning, all sites registered above the limit should be treated to, again, be below the limit. For Canada West, Ireland and Chile, any sites above the limit should be brought below the limit within the regulatory defined timeframe (these timeframes are now factored into our calculations). 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.*

Links

Norway
https://www.barentswatch.no/fiskehelse/

Scotland
https://sepaweb.maps.arcgis.com/apps/webappviewer/index.html?id=f1527f9cf8cc43acad27dee61d8597de

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, 2018-2023

BUSINESS UNIT	2018	2019	2020	2021	2022	2023
NORWAY	0.14	0.16	0.15	0.12	0.15	0.14
SCOTLAND	0.5	0.7	0.9	1.0	0.7	0.4
IRELAND	0.5	0.6	0.5	0.1	0.2	0.4
FAROES	0.2	0.6	0.6	0.4	0.3	0.2
*CANADA**	0.4	0.8	1.1	0.9	1.3	0.9
*CHILE***	1.6	1.7	2.1	1.2	1.6	1.8

* 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*

Faroes
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*