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Developing an Integrated Pest Management approach for marine finfish aquaculture activities in B.C.

Aquaculture Management Advisory Committee

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Introduction

- Long-term integrated strategies for managing sea lice is important to the sustainability of the aquaculture industry and the environment within which it operates.
- As part of an ongoing review of its approach to sea lice management in Pacific Region, DFO is working with aquaculture industry to examine the development of an Integrated Pest Management approach for sea lice.
- Purpose of this presentation is to provide AMAC with an overview of IPM, the status of IPM in B.C. and seek feedback on approach and potential next steps.



Sea lice management

- Sea lice continue to pose a management challenge at marine finfish aquaculture sites in B.C.
- At elevated levels, sea lice can pose risks to the health of both farmed and wild salmon.
- DFO's sea lice management approach in Pacific Region is to ensure that risks associated with the transfer of sea lice from farmed to wild fish is minimized.
- Farms are required to monitor the number of sea lice on farmed salmon and take management action to reduce sea lice levels should they exceed a threshold of 3 lice per fish.
- Such management action includes enhanced monitoring, harvesting of stock, mechanical removal of lice and the use of therapeutants.



What is Integrated Pest Management?

- Many different definitions and examples – generally focussing on the following elements:
 - Multifactorial approach to pest management;
 - Series of evaluations, decisions and controls;
 - Take advantage of all pest management control options;
 - Strategies to achieve long-term solutions.
- The goal is to establish an overall management strategy that uses all available measures to suppress pests effectively, economically and in an environmentally sound manner.
(PMRA 2003 – Integrated Pest Management of Sea Lice in Salmon Aquaculture)
- Knowledge and experience from terrestrial sector can be applied in aquaculture settings.



General Principles of IPM

- Focussing on sea lice/aquaculture setting:
 - Good husbandry and management practices
 - Use of biological/non-chemical practices
 - Optimal use of therapeutants (drugs and pest control products)
- These in turn serve to optimize present control methods and to contain threat of resistance development in sea lice.
- Key steps to unpack:
 - Prevention
 - Monitoring
 - Threshold for action
 - Medicinal and non-medicinal controls



Prevention

- Prevention is fundamental to IPM – reduces the likelihood and severity of sea lice infestations.
- Location of sites – sources of infection and water quality.
- Year class separation – probably the most effective husbandry technique; slowing down acquisition of sea lice.
- Fallowing of sites – reduce or eliminate self-sustaining lice popn's.
- Husbandry – minimize stress, stocking densities, nutrition, hygiene, regular removal of mortalities, predator control.
- Innovative technologies – cleaner fish, vaccines, immunostimulants.



Monitoring of pest issue

- Decisions about when to conduct treatment should be based on a program of monitoring lice numbers.
- Sampling programs (frequency and sample size) should be conducted continuously following transfer to sea water.
- Selection of appropriate treatment should be based on sea lice population dynamics.
- Monitoring is necessary to ensure interventions are carried out at the correct time with appropriate product.
- Monitoring also allows the site operator to build up a picture of the dynamics of sea lice populations and make predictions around optimal management/treatment approaches.



Threshold for action

- Treatment triggers should be low enough to protect the salmon and reduce risks associated with the transfer of sea lice from farmed to wild fish.
- Too low a trigger can lead to unnecessary therapeutant use, which can be difficult, costly and environmentally unsound.
- Current regulatory approach in Pacific Region requires:
 - March 1 to June 30; if the sea lice abundance exceeds 3 motile lice (*Lep spp.*) per fish then implement a plan to reduce absolute sea lice inventory within 15 days.
 - July 1 to February 28; if the sea lice abundance exceeds 3 motile lice (*Lep spp.*) per fish then provide a plan to address exceedance to Department within 30 days.



Medicinal and non-medicinal controls

Main principals, steps and procedures applied to medicinal treatments

- Therapeutants are prescribed and used according to clinical need, based on the safest profile for that application.
- Application method, dose, withdrawal period, operator and environmental safety will be respected.
- For topical treatments, enclosures (tarps and skirts) or well-boats are used; monitoring of fish and environment throughout treatment.
- The therapeutic treatment should be optimized by using the recommended dose and duration, ensuring non concurrent disease during application.



Current IPM status in B.C.

- In terms of general principles – prevention, monitoring, thresholds for action and medicinal and non-medicinal controls – all are being pursued to different degrees.
- Good knowledge base of lice dynamics on farms.
- Year class separation at farms.
- Comprehensive sea lice monitoring regimes.
- In B.C. there are two fully registered therapeutants available:
 - the in-feed drug SLICE® and;
 - the topical pest control product Paramove® 50.



Areas for IPM development

The following sets out some of the issues that could be pursued or further investigated under the IPM development review:

- Resistance management – treatment rotation, accurate dose/duration, sensitivity testing.
- Access to treatments with different modes of action.
- Alternates to treatments (non-medicinal).
- Co-ordination with linked sites – synchronous treatments, areas based strategy for pest management.
- Further review of regulatory approach to sea lice management (e.g. precautionary thresholds, area based thresholds).



Strategic Questions

- Within the four general IPM principles – are there additional considerations that need to be included?
- What additional IPM components are already being pursued in B.C.?
- Are there additional areas for IPM development in B.C.
- What are views on DFO's role in terms of governance of an IPM approach in B.C.?
- What are the scientific research needs to support development and implementation of IPM in B.C.?



FAO IPM Definition

- **Integrated Pest Management (IPM)** means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms.

<http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/ipm/en/>