



**An overview of IPM principles  
in sea lice control**

*Sea lice: establishment of a multinational  
R&D initiative and respective activities*

**10 Feb 2010**

**Dr Gordon Ritchie  
Marine Harvest ASA**

# Content

---

- Introduction
  - IPM
    - What is it? + objectives
    - The 5 critical steps / measures
  - The way forward?
-

# Introduction

## “IPM for sea lice” – a new/trendy concept?



Salmon Health Consortium  
987-75 Albert St.  
Ottawa, Ontario K1P 1E7



### Overview



### Integrated Pest M of Sea Lice in Salt



March 2003



A National Treat for the Co Sea Lice on Scottis

A Code of

February

**INTEGRATED SEA LICE MANAGEMENT**  
**ISLM**

Provides a forum for the exchange of information on the management of sea lice on farmed Atlantic salmon and promotes the development and implementation of environmentally sustainable, integrated control strategies.

**Objectives**

- To facilitate the free exchange of information amongst stakeholders including farmers, regulators, research scientists, pharmaceutical companies, wild fishery and environmental interest groups.
- To identify current best practices in lice control and resistance management and to promote their use in the Scottish salmon farming industry.
- To provide practical guidance to salmon farmers.
- To provide information and advice on policy to government and non-governmental organisations and to identify research priorities.

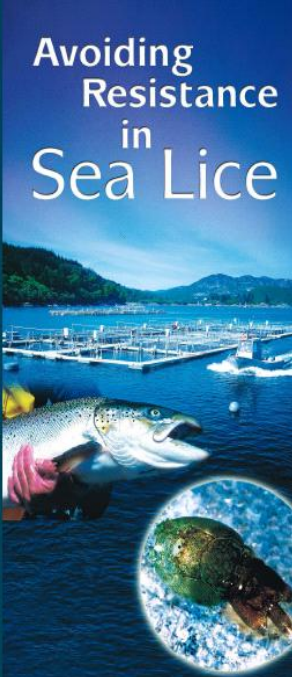
The ISLM Group first convened in October 1999. It is an informal group and includes representatives of Strathclyde University, Aberdeen University, International Research, The Fish Veterinary Society, Scottish Quality Salmon (SQS), Marine Harvest (Scotland), Fisheries Research Service (FRS), BASF, Novartis Animal Health, Skretting and Scottish Panga Animal Health. A representative from the Scottish Environment Protection Agency (SEPA) attends meetings as an observer. ISLM has links with research groups both within the UK and abroad.

You can contact the ISLM Group through Scottish Quality Salmon at [www.scottishsalmon.co.uk](http://www.scottishsalmon.co.uk).

Copies of this leaflet (produced in February 2005), along with up to date advice, may be downloaded from the ISLM area of the SQS web site.

The generous support of The Crown Estate is gratefully acknowledged.

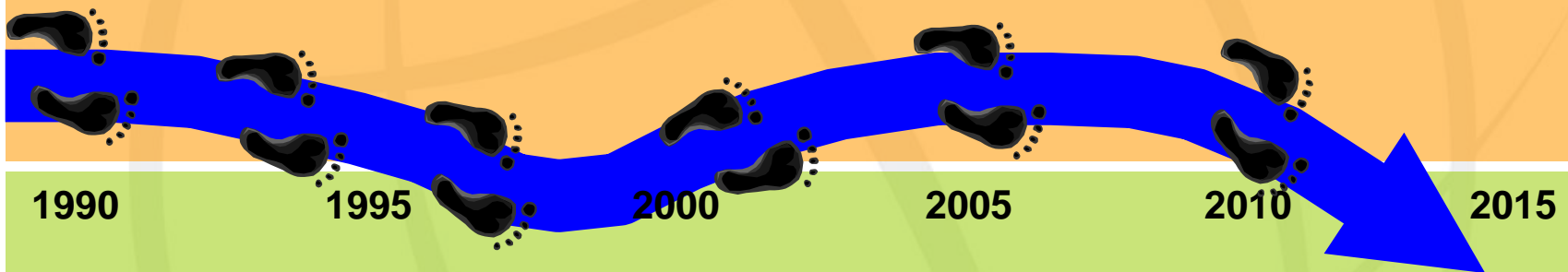
## Avoiding Resistance in Sea Lice



**INTEGRATED SEA LICE MANAGEMENT**  
**ISLM**

# Introduction: A paradigm shift?

## Medicinal measures



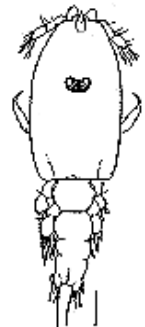
Sustainable IPM

## Non-medicinal measures

# IPM: What is it? + objectives

**the integration of a number of control strategies and products, including biological, management, chemical and cultural, to provide a sustainable production system with minimum inputs**

- combine good husbandry/management practices & biological control
- optimise the effectiveness of available medicines
- avoid resistance development
- prolong the market life of medicines
- minimise environmental inputs
- With focus on ;
  1. Preventative measures
  2. Strategic and coordinated measures

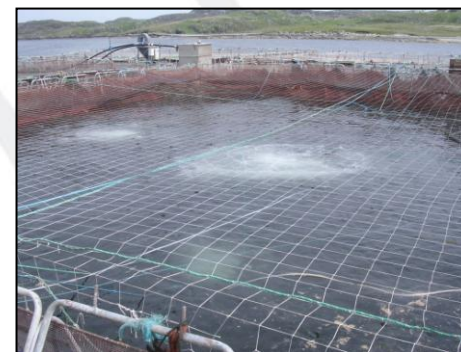




# IPM: The 5 critical steps/measures

## 1. Well defined and implemented SOPs /BPs. egs;

- Lice counting and monitoring
- Use of wrasse
- Net cleanliness
- Treatments
  - Tarpaulins and skirts
  - In-feeds
  - Wellboats
  - Product rotation
- Other general biosecurity aspects

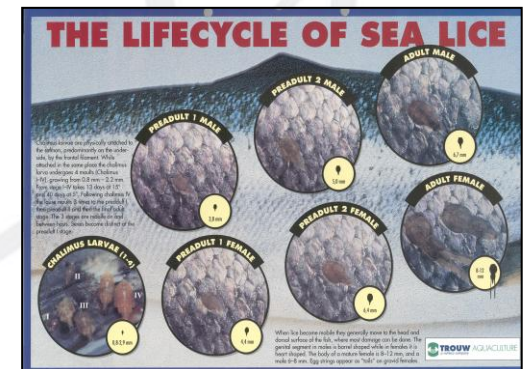
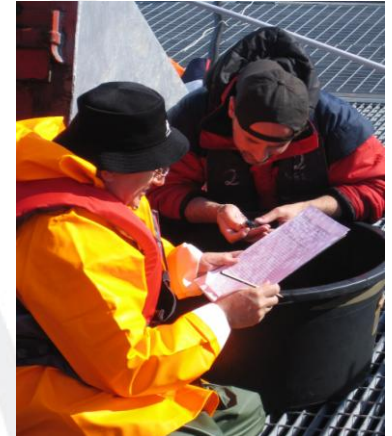




# IPM: The 5 critical steps/measures

## 2. Identification and monitoring

- training/competent “lice counters”
- regular lice counting (stages and species)
- reveal the status of infection, identify impulses, waves of infection, temporal trends, predict peak infestation times...
- ensure threshold values not exceeded
- predict the need for, choice of, and timing of treatment
- determine the efficacy of treatments





# IPM: The 5 critical steps/measures

## 3. Management by prevention

### 3.1 Good husbandry and management

- fallowing
- separation of year classes (single YC sites)
- single year class production areas
- proper management of fish densities
- clean nets that maintain good water circulation
- frequent moribund/mortality removal
- minimise stress (handling, grading, crowding, predators ...)
- biosecurity plans







# IPM: The 5 critical steps/measures

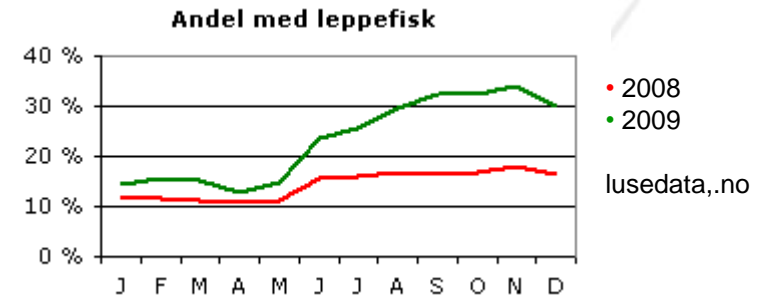
## 3.2 Biological approaches

- Wrasse (locally sourced & sustainable stocks, or commercially produced)
- Other spp.?
- Health feeds / supplements



## 3.3 Alternative technologies

- Traps?
- Pumps, suction...?
- Bioenergetics?
- ....





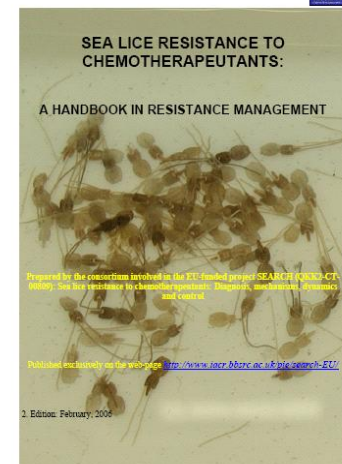
# IPM: The 5 critical steps/measures

## 4. Optimise medicinal control

- the appropriate product for the situation
  - product availability, lice population structure, weather, appetite, fish size, health status, discharge consent etc
- rotate products to reduce selection pressure & resistance development
- correct method of application and dose
- ensure applications do not result in sub-therapeutic doses
- treat whole sites in shortest possible time
- monitor efficacy of treatments
- do not use a product once efficacy begins to decline
- resistance monitoring with bioassays



Rwp of ISPAH





# IPM: The 5 critical steps/measures

---

## 5. Coordinated measures

- cooperation with other companies and stakeholders in operational areas/zones
  - production
  - health management
  - treatments
- agreement on common treatment windows / dates
- synchronisation of treatments
  - in zones
  - reduce overwintering populations
  - reduce spring settlements
  - during period of wild smolt migration



# The way forward?

---

- We all know what an IPM strategy for sea lice should consist of
- Is there a need to update an IPM strategy, based on new knowledge, and tailor it to today's production systems and approaches, and make it sustainable?
- Do we need to start at Step 1 (well defined and implemented SOPs/BPs)?
- What improvements can be made at Step 2 (identification and monitoring)?
- What new knowledge exists to strengthen Step 3-5?





**Thank you for your attention**