

Monitoring & Control of Sea Lice

Current situation in Ireland

Possible international collaboration



Overview

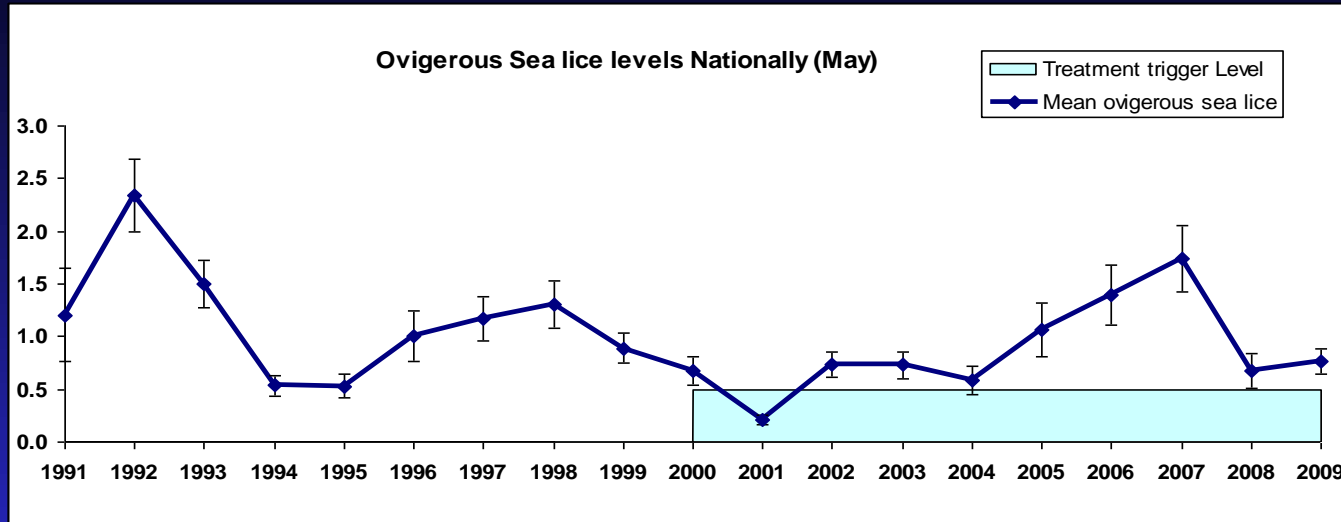
- Increasing trend in lice levels up to 2007
- New Strategy introduced in 2008
- Trend reversing
- Difficult issues remain
- What are the causes of poor clearance/failed treatments?

Key areas of Difficulty

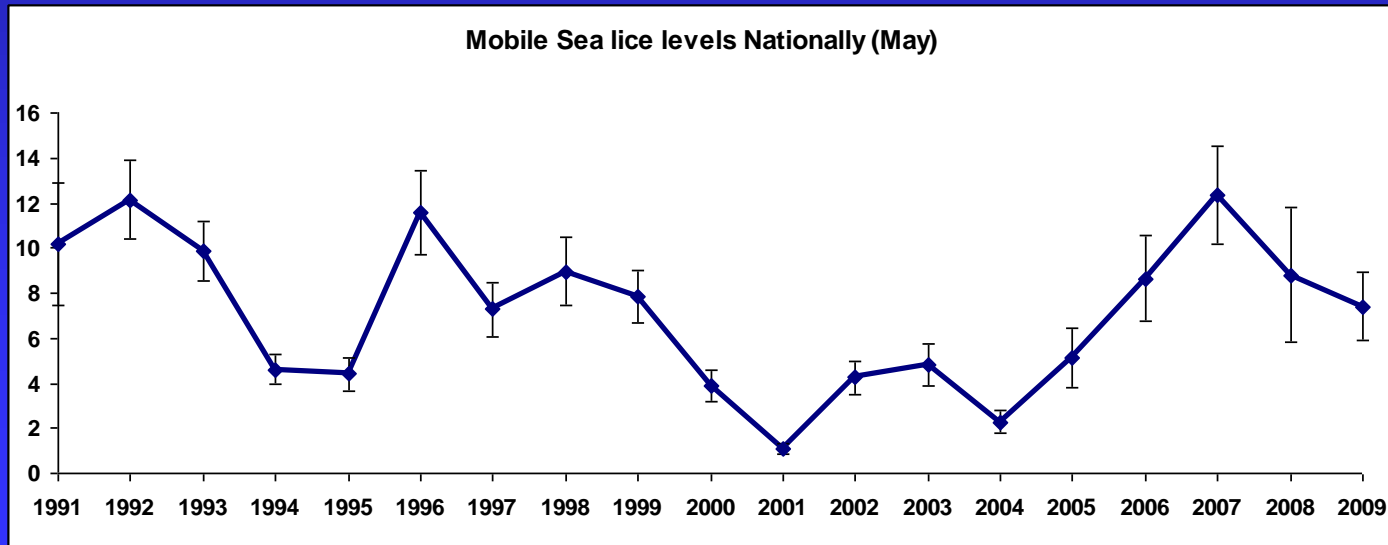
- In feeds – feed uptake and dosage issues
- Optimising product delivery for bath treatments
- Dealing with large numbers of cages
- Strategic treatments:- timing & extent
- Optimising well boat usage

| Compound | Trade Name | Licensing status | Delivery Method | Group | Mode of action | Stages targeted | Withdrawal period |
|--|-------------------|-------------------------|------------------------|-------------------------|--|--|--|
| Animal medicines | | | | | | | |
| Azamethiphos | Salmosan® | AR-16 | Bath | Organo-phosphate | Interferes with nerve transmission by blocking acetylcholinesterase at synapse | Adults, Preadults | 24 hours |
| Cypermethrin | Excis® | Full MA | Bath | Pyrethroid | Interferes with nerve transmission by blocking sodium channels in nerve cells | Adults, Preadults, Chalimus III-IV | 24 hours |
| Deltamethrin | Alphamax® | AR-16 | Bath | Pyrethroid | Interferes with nerve transmission by blocking sodium channels in nerve cells | Adults, Preadults. Chalimus unknown | 3 days (2 days for pen within 100m of treatment) |
| Emamectin benzoate | Slice® | Full MA | In-feed | Avermectin | Interferes with neurotransmission disrupting nerve cells causing paralysis and death. Effective at 3- 15°C. Protects fish for up to 11 weeks post treatment. | All stages | Zero |
| Teflubenzuron | Ektobann® | AR-16 | In-feed | Insect Growth Regulator | Inhibits chitin synthesis preventing moulting and growth. Limited efficacy beyond medication period. Not authorized for use below 9°C | Moulting stages - Chalimus, Preadults only | 7 days |
| Disinfectants | | | | | | | |
| Hydrogen peroxide | | | Bath | Oxidizer | Formation of gas bubbles on and within the sea lice. | Adults, Preadults | |
| Immuno-stimulants& Food supplements | | | | | | | |
| | Bio-mos® | | In-feed | Extract from yeast wall | Increases mucus production | | |
| | Ecoboost® | | In-feed | Blend of aromatic herbs | Immuno-stimulant | | |
| | Ergosan® | | In-feed | Seaweed extract | Immuno-stimulant | | |
| Others | | | | | | | |
| Bioemitters | | | In cage | | Electromagnetic signal | | |
| Wrasse | | | In cage | | Cleaner fish. Issues with wrasse availability and efficacy | Adults, Preadults | |

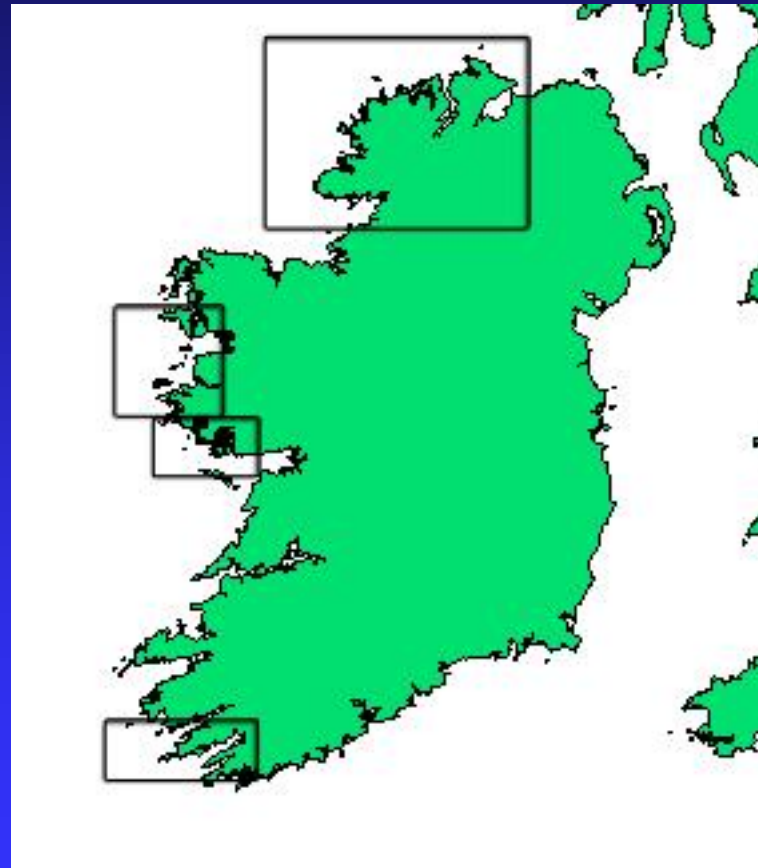
Annual trend (May mean) (SE) ovigerous *L. salmonis* on one-sea-winter salmon.



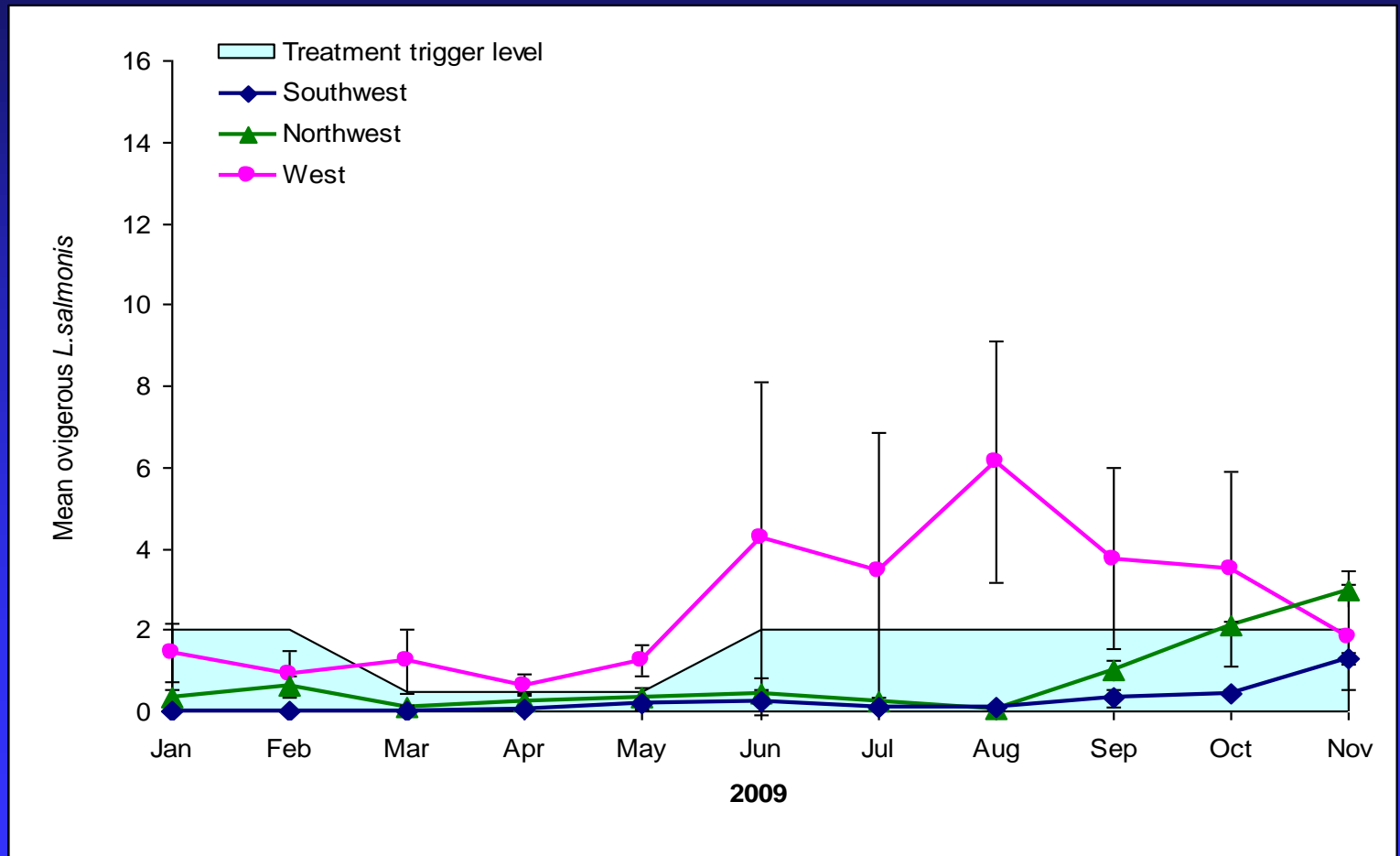
Annual trend (May mean) (SE) mobile *L. salmonis* on one-sea-winter salmon.



Three farming regions in Ireland



Mean (SE) ovigerous *L. salmonis* per month per region in 2009 on one-sea-winter fish.



DAFF Pest Management Strategy 2008

- Launched by Minister Coughlan in May 2008
- Implementation group in Place since Dec 2008
- Pilot mgt cells in place spring 2009



A strategy for improved pest control on Irish salmon farms

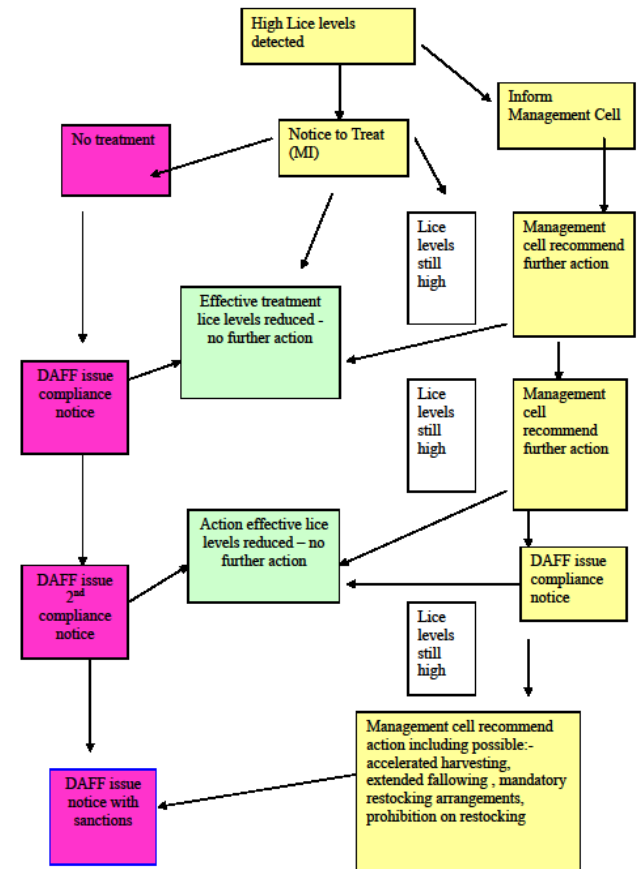
May 2008

Recommendations of DAFF Strategy

- 1. *A joint DAFF/industry working group to identify “break out” site options for fallowing etc.*
- 2. *A review of treatments covering: environmental conditions, farming practices, sensitivity of lice and fish health issues.*
- 3. *Increased availability of well boats for controlled bath treatments.*
- 4. *The optimisation of product rotation for strategic treatments.*
- 5. *Intensive consultation with the fish farming industry*
- 6. *A working group on the potential of alternative treatment approaches .*
- 7. *A national implementation group to be established*
- 8. *A New role for SBM:- Management Cells*

What is a management cell?

- Mgt Cell is a local Group
- Convened when there is a problem
- Give advice- way forward
- Can advise on DAFF intervention
- Comprised ISGA, MI, BIM, Vet, SBM, Affected farm



Ireland - a different industry

- Irish Production is circa 10,000 tonnes
- Multi site bays the norm
- Fish move from offshore smolt sites to inshore grow-out sites
- Prolonged (3 months +) harvest common
- Bays have high exposure level & strong water exchange

Lice control:-causes of poor results

- Poor clearance rates on treatment
- Rapid re-infection of sites post treatment
- Incomplete treatments
- Vertical transmission between generations
- Prolonged harvest situations

Concerns

- Difficult to separate reduced sensitivity from poor treatment delivery (dose and/or duration)
- High lice levels can overwhelm treatments (not enough molecules present)
- Homogeneity of dose rate an issue (hot spots)
- High reliance on Hydrogen Peroxide for early spring control

Potential areas for collaboration

- Optimising Hydrogen Peroxide treatments
- Modelling of suitable scales for strategic treatments
- Development of improved treatment delivery strategies
- Optimisation of IPM approach
- Optimise SBM and fallowing
- Standardisation of sensitivity bioassays

Thank you

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