

NORDLUS

Short presentation

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Development of Lumpfish Culture for Eco-friendly Biological Delousing of Atlantic Salmon (NORDLUS)

- Financed by NRC (BIP) and the Mabit programme (Tromsø)
- Start-up April and Mai 2011
- Partners
 - Nordlaks (project responsible)
 - Akvaplan-niva (co-ordinator)
 - Gifas



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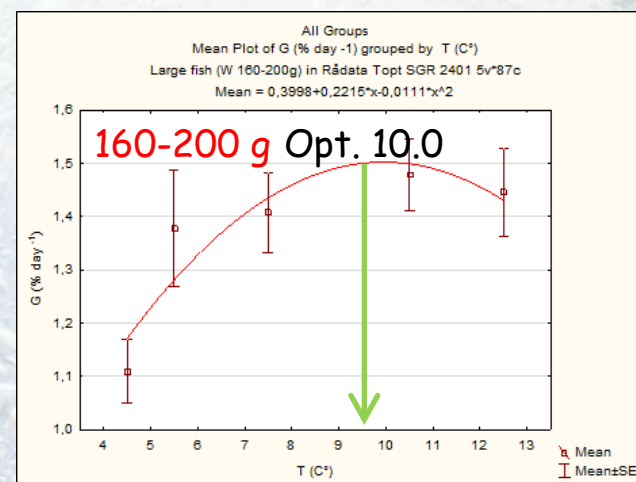
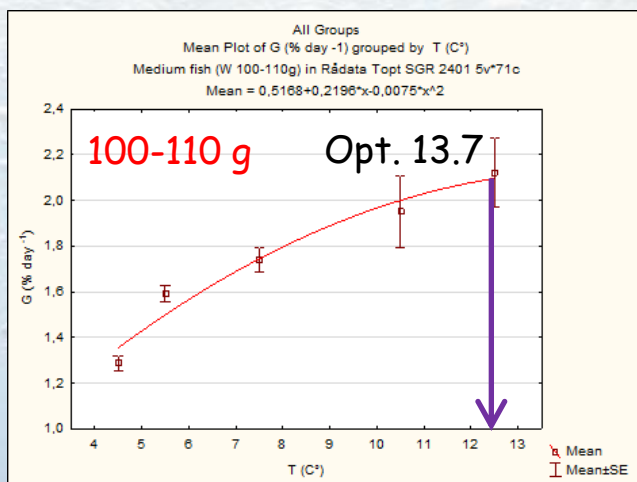
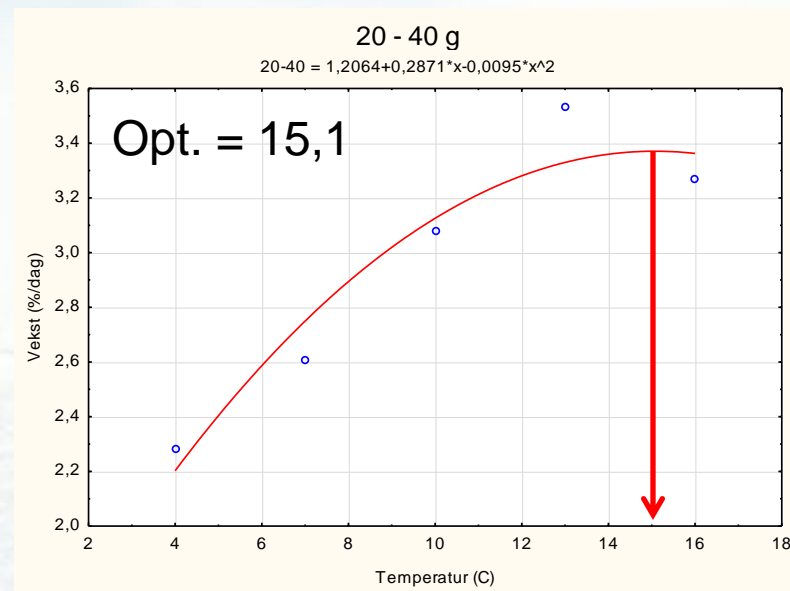
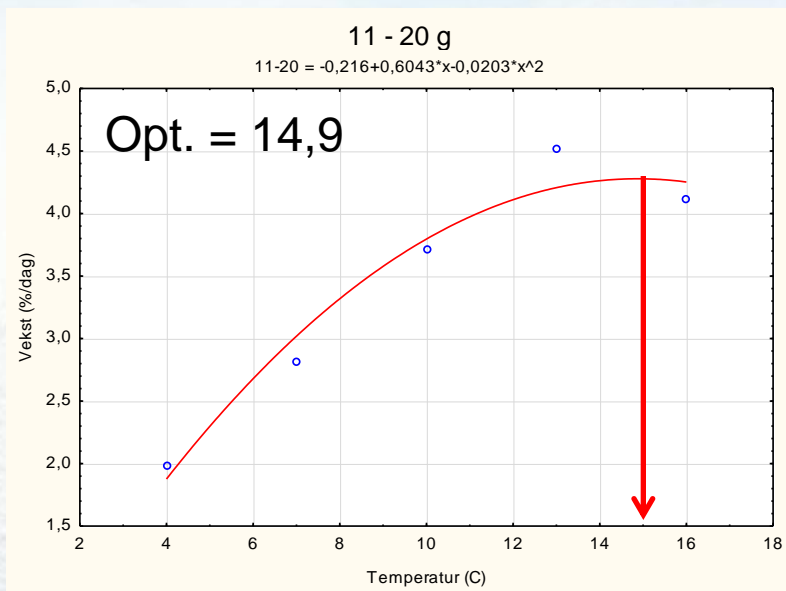
Short on results in NORDLUS so far

- Successful juvenile production
- Behavioural studies (with salmon) in small scale
- Mapping of temperature tolerance and optimum
- Sea cage trials in small scale with promising results

Temperature tolerance and optimum

- Juvenile lumpfish grow very fast
- Robust juveniles, no mortality in temp. trials
- Large temperature tolerance range (4-16°C)
- Temperature optimum for growth between 13 and 16°C for small juveniles and decreases with increasing size

Temperature optimum for lumpfish



Trials with lumpfish in sea cages

- Juvenile lumpfish (c. 60 g) reared in 5x5x5 m sea cages with salmon (0.6-1.7 kg)
- Three experimental groups:
 - Control (without lumpfish)
 - 10% mix of lumpfish (i.e. 120 salmon vs. 12 lumpfish in each cage)
 - 15% mix of lumpfish (120 salmon vs. 18 lumpfish)
- All groups reared in replicates
- All lumpfish individually tagged

Materials and methods

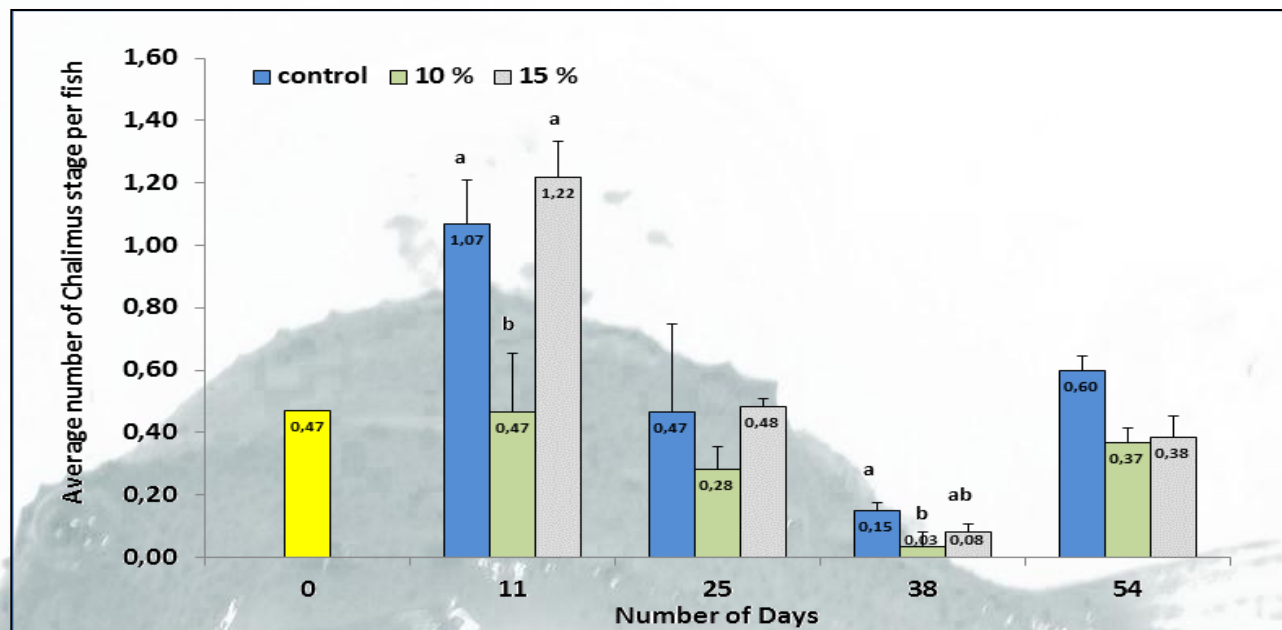
- Sea lice were registered in five categories (*Lepeophtheirus salmonis* in four categories - chalimus, pre-adult, adult male, adult female - and *Caligus elongatus*) and infestation levels were analysed every other week for 54 days
- To determine the feed choices of lumpfish in the cages gastric lavage was performed every two weeks

Results

- Growth
 - No differences in growth between test groups and controls in either salmon or lumpfish were observed
- Sea lice grazing
 - Clear signs of lumpfish grazing of sea lice with significantly lower average numbers of pre-adult, mature males and females stages of *L. salmonis* per salmon

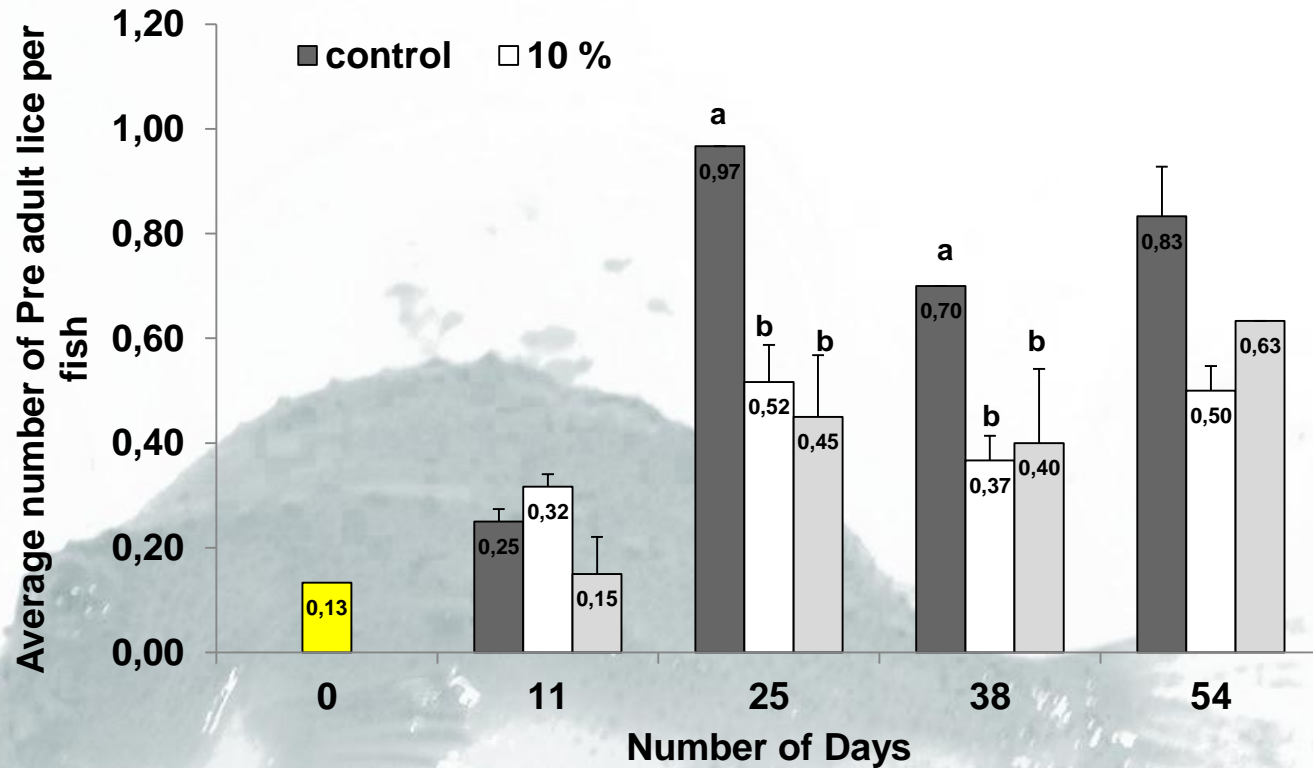
Levels of sea lice infestations, *L. salmonis*

Chalimus



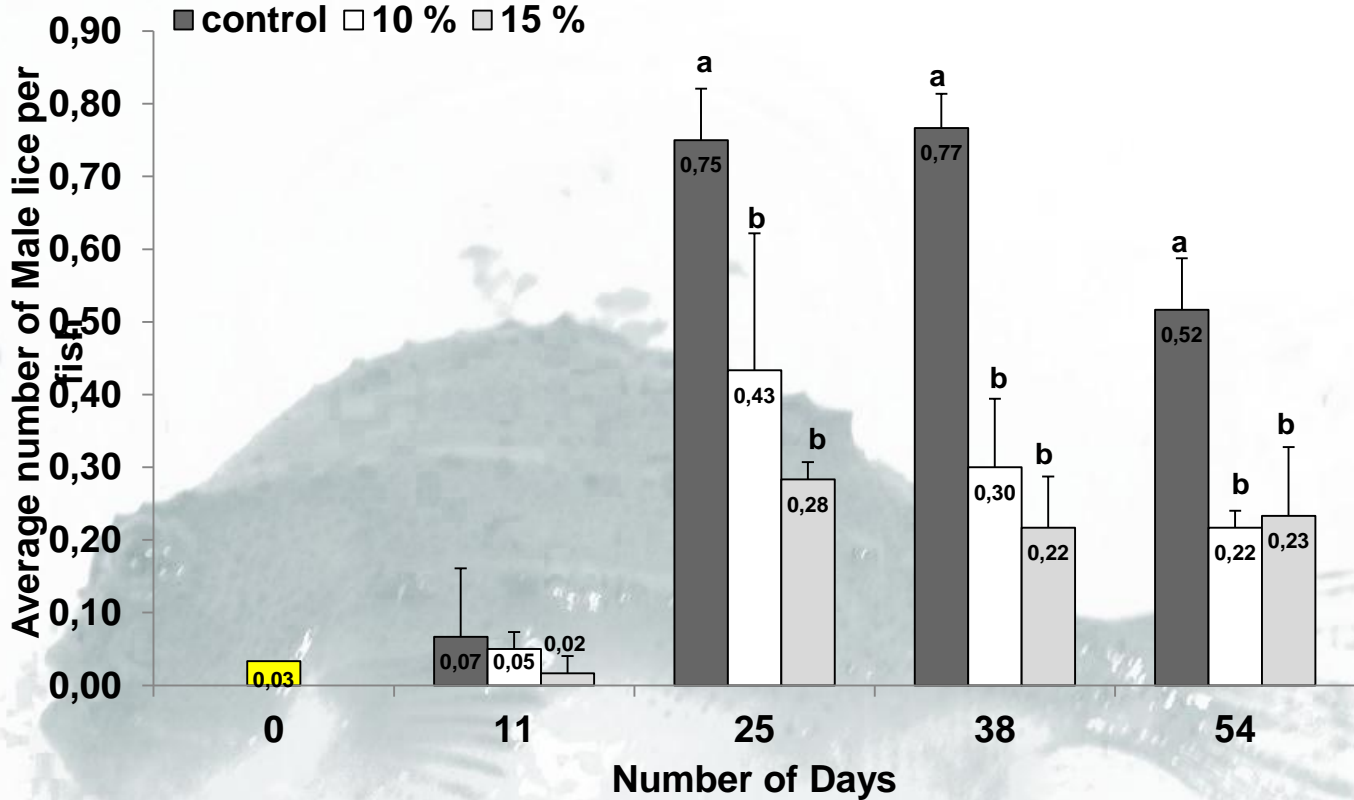
- From day 38 onwards both the 10% and 15% stocked cages showing less attached *chalimus* stages compared to the control cages

Pre adults



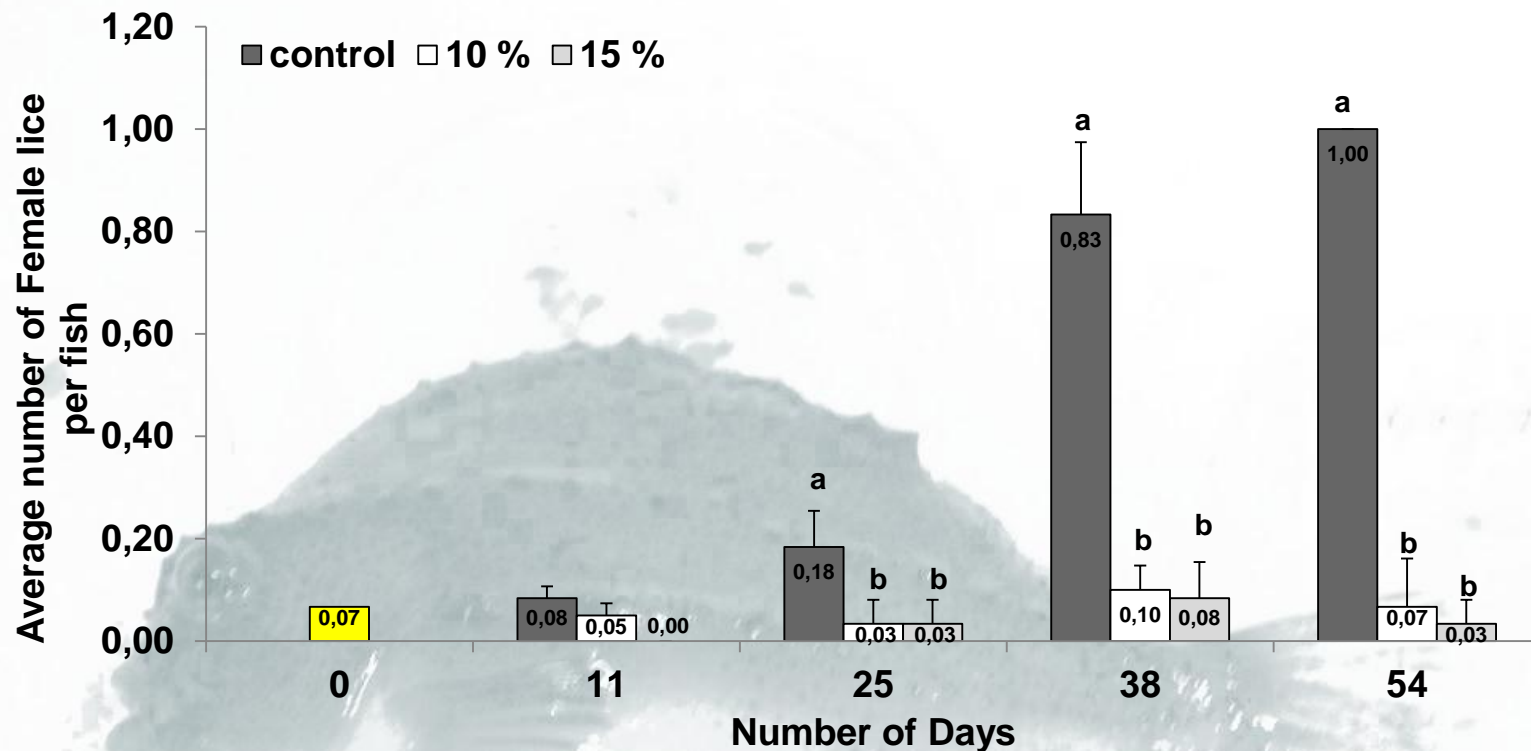
- Evidence of grazing from day 25 onwards
- Both lumpfish treatments had significantly less pre adults per fish compared to the control group at day 25 and 38
- Both lumpfish treatments had 40% and 24% respectively less pre adults compared to the control cages at day 54

Mature males



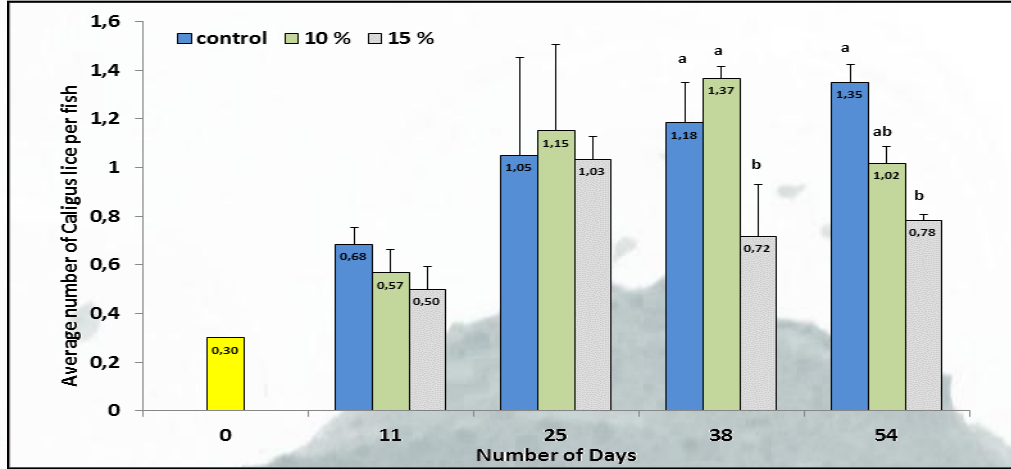
- Evidence of grazing from day 25 onwards
- 58% and 55% respectively less compared to the control group at day 54

Mature females



- Clear evidence of grazing in both treatments with average numbers per fish recorded at day 54 being 0.07 and 0.03 per fish
- At day 54, the 10% and 15% treatments had 93% and 97% less female lice compared to the control
- Control group: by day 38 had surpassed the set treatment threshold (average 0.83 per fish)

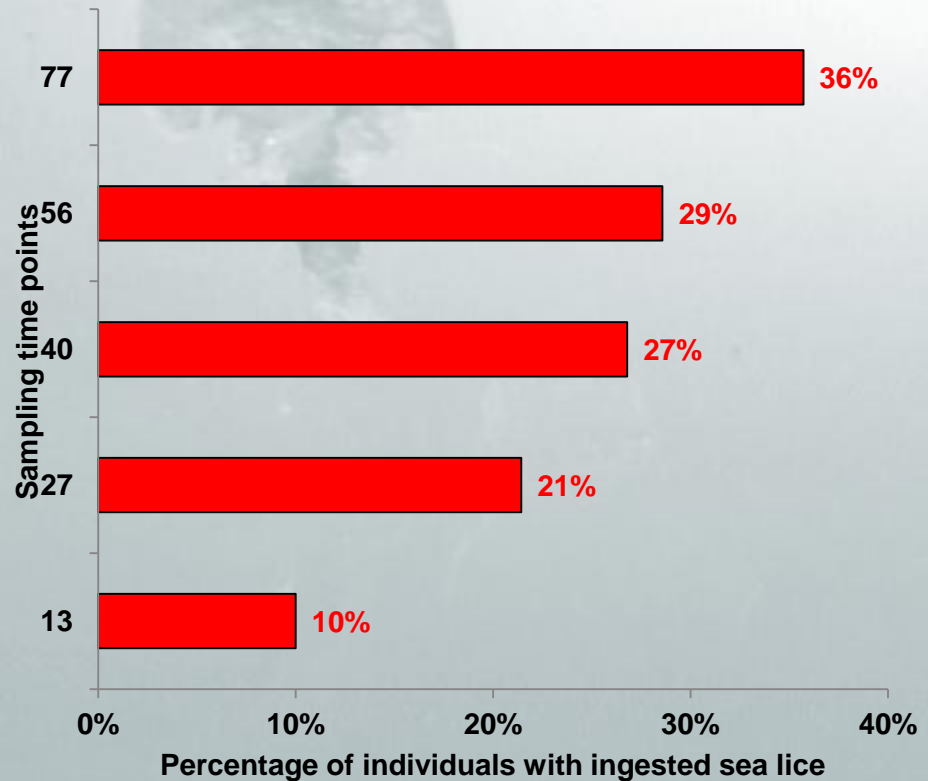
Sea lice: *Caligus elongatus*



- Evidence of grazing from gastric lavage
- Day 54, both the 10% and 15% stocked cages had 25% and 42% less

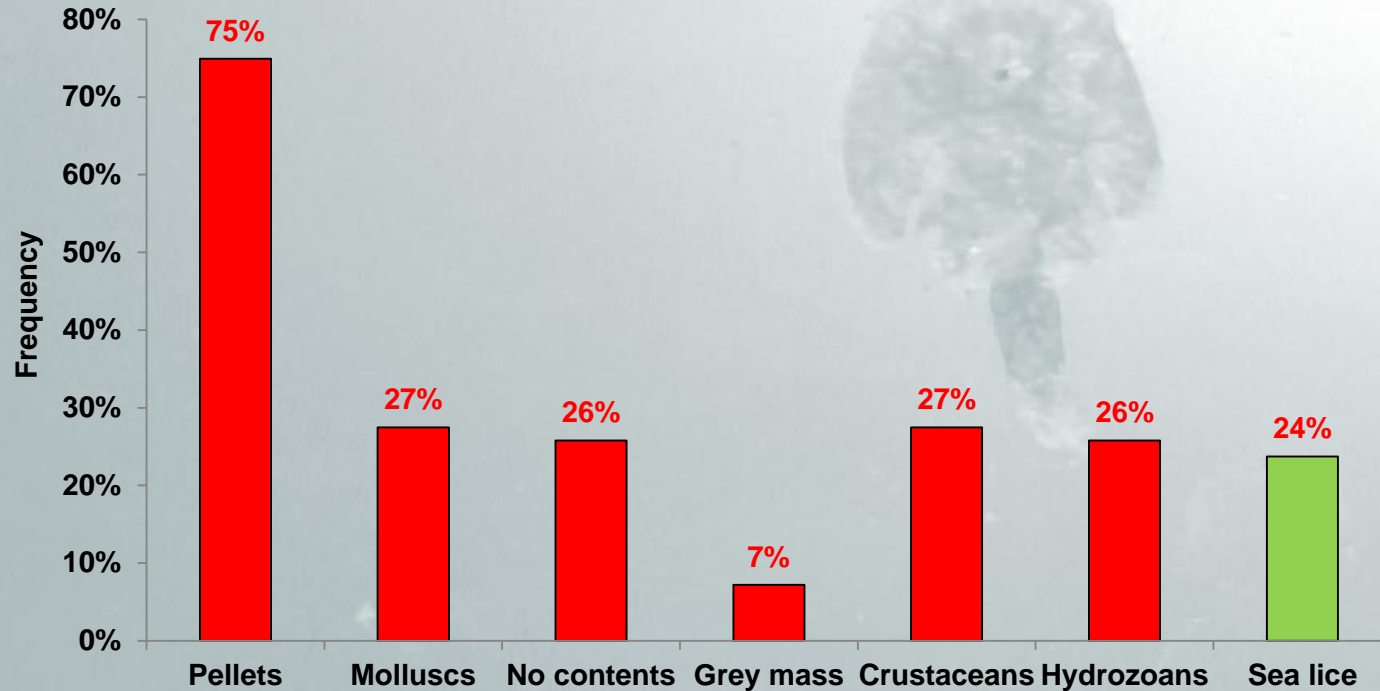
Gastric lavage of lumpfish

- The proportion eating sea lice increases from 10 to 36% during the trial period
- But still 60% of lumpfish not eating lice
- Large individual differences in sea lice preferences
- No differences between 10 and 15% groups in lice preferences



Gastric lavage

The percentage frequency of food choices identified over all 291 individual gastric lavages



Further trials in 2013-14

- Sea lice preferences of different size groups of lumpfish
- Behavioural studies
- Large scale studies
- Broodstock development
- Genetic studies of sea lice preferences in different groups of lumpfish



Thank you for your attention