Husbandry & Risk management
Optimizing value out of mussel culture

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Åland- Aquabest: 12 Oct’12
Husbandry is not growing mussels- it’s managing
It’s an artform of interplay to manage the production equipment, technical operations, logistics and personnel within the biological and physical conditions on your site, so that your mussels not only survive, but can reach market size with high quality meat at a value that will make your business profitable.

**Management interplay**

- Type of infrastructure (lines, tubes) impacts on how you produce mussels
- Production equipment & access impact on efficiency/ability of execution
- Bio-physical conditions impact your time to market & operating schedule
- Production method (sock, harvest) impacts your independence & control
- Your knowledge of mussel behavior, yield & growth impact decision ability

- What your mussels are doing below is your business!
Moving offshore requires that we
Produce more efficiently with less!

A) Preparing for offshore & harsh conditions
   1) Infrastructure
   2) Boats & equipment
   3) Anchoring

B) Practical examples that impact on yield/value
   1) Adapted floatation
   2) Managing invasives
   3) Quality socking
   4) Duck predation
1) Infrastructure: the critical starting point!

Infrastructure: impacts production method!

(how you manage & grow mussels)

Single surface line

Double longline

Net system

Single submerged
2) Size of boats or raft impacts efficiency
2) Work space & equipment impact ability of execution
2) Hoisting power/ quality ropes: meet offshore needs

Bio-Physical conditions impact on equipment selection, risk and logistic execution
3) Anchoring & logistic installation impact on risk

Installation may require large initial resources.
3) Screw Anchor System depends on bottom type
B) Practical examples that impact on yield/value

1) Adapted floatation
2) Managing invasives
3) Quality socking
4) Duck predation

Right choice shown to increase production yields without increasing farm size!
Some detailed examples from Results

1) Adapted floatation is cost-effective

Killary Harbour
- Galway

Roaring water
- Cork
1) Right floatation technologies can increase profits, decrease costs!

Should use the right floats to hold mussels, get maximum yields and value!
1- Comparing JFC and thin-walled floats

Do costlier JFC floats really increase commercial value growers?

**Measured**

- size distribution
- density
- commercial biomass (yield)
- fall-off
- time to market
1-Typical biomass differences with JFC-ribbed vs barrel floats

- Larger mean size
- Higher densities
- Stable densities
- Faster growth
- Less fall-off
- Yields 10-30% > /

### Outer-02-A(end), Online Mussel, DIS: 01-jul-09 Sampled: 10-des-09 (5,4 mon.-start)

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<th>% frekvens</th>
<th>No. Shells/ m</th>
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**Sum** 100,0 1020/m

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**Sum** 100,0 413/m

### Density: (1020/m) 1m  (Pegolini 8mm JFC)  MeanSize: (37,3 mm)

### Density: (413/m) 1m  Pegolini 8mm ROM  MeanSize: (30 mm)
2) Fouling and Managing invasives

- Sea squirts and starfish can wipe out a site
Invasive fouling: 2\textsuperscript{nd} set spat/ starfish/...?
2) Risk management– war on sea squirts & starfish - one line at a time!
2-Results from spraying formic acid

- Clean mussels
- No fouling
- High quality
- Maintain 5+kg/m yields
Ex: Swedish producer takes action fast after consultation-sep’12
3) Socking right produces mussel lines with high commercial biomass

- Even with depth, consistent yields
- Better planning ability
- Quality shells, efficient harvesting
Avoid Mishaps

Winter storm + floatation

Wrong timing for socking

Wrong densities
4) Managing offshore eider duck predation

Before predation

After predation
Husbandry

c) Practical examples that explain differences in yield & size
Sampling at different depth - know what you have!
**ASK-B-01-C, Afjord, Utsett: 13-des-05  Prøve: 13-nov-07 (23,3 mo.-start)**

**Tethet: (1996/m) z=1m  Aqualoop  Middel: (32,6 mm)**

**461 salgbar skjell/m**

**% Frekvens**

**ASK-B-01-C, Afjord, Utsett: 13-des-05  Prøve: 13-nov-07 (23,3 mo.-start)**

**Tethet: (885/m) z=3m  Aqualoop  Middel: (43,6 mm)**

**510 salgbar skjell/m**

**% Frekvens**
Sampling your offshore sites is key: Know when/why mussels give higher value & select quality

- Timing for best declumping-grading of spat
- Sock narrow size range
- Use proper sock rope

Get:
- High % commercial yields
- Better control of fouling
- Cost-effective harvest
- Better risk management

Automatic socking allows for rapid response: can import spat, limit fouling
Respond to 2\textsuperscript{nd} set, extend socking season
Access to greater depth for grow-out
Vary density- using all same material
Sockeying increases yield and volume

Growth on collector only

1m collector = 3.8kg

73% market

<<< after 30 mo >>>>

1m = 3.9 * 2m = 7.8kg
Issues affecting expansion of market quality mussels

1) Poor harvesting machines damage shell quality & break largest shells

2) Wild ’collector’ mussels - too much fouling on shells by Tubeworms, tear packaging, compared to socked mussels from other countries/areas

3) Variation in quality as mussels get older. This needs to be managed for different seasons.
Making good management decisions:
about comparing the right information to get best results

Moving offshore is about:

a) creating a common understanding of what is important
b) Selecting the most effective technologies for this exposed environment
c) Structuring a framework for a phased-in offshore development plan
Thank you

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