Production Trends and Best Practices for Better Oyster Culture

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Contents

- Global technologies of note
- State of BC Technology (redux)
- Estimate of tray culture best practices
Global Trends

- Increase in scale of production
- Standardization of techniques within growing regions
- Increase in mechanization
- Move towards offshore grow-out
Norway - SmartFarm

- Mussel farm equipment for more mechanised farm
- Longlines with suspended nets
- Automated harvesting machines

http://www.smartfarm.no/index2.html
PE pipe used for buoyancy

- Less visually intrusive
- Length is farm specific – usually 126 m
- Easy anchoring and installation
Norway - SmartFarm

- Husbandry and harvesting done in the water
- No disassembly and reassembly of gear
Norway - SmartFarm

- **Scooter** – rental unit for line cleaning
  - 1 line (126 m) can be cleaned in 5 – 10 minutes
Scotland — Xplora Mussel Farming Equipment

- **Double or Single longline floats**
  - Scotland uses 400 L floats, Norway uses 300 L floats, 200 L also available
  - Multiple colours available

http://www.xploraproducts.com/xplora/Xplora%20floats.htm
Scotland — Xplora Mussel Farming Equipment

- **Fabricated Steel Construction rafts**
- **Finish - Galvanised - Marine Grade**
- **All floats rotationally moulded then filled with closed cell polyurethane foam**
  - Wall Thickness 8 mm
  - UV Stabilised Medium Density Polyethylene

http://www.xploraproducts.com/xplora/Xplora%20mussel%20growing%20raft.htm
Spain — Medusa Mussel Raft

- Circular raft for deep water mussel grow out
- Has been tested in high wind/wave area

http://www.bateamedusa.com/
http://www.opmega.com/index1.htm
http://www.corelsa.com/
Spain – Medusa Mussel Raft

- High density polyethylene for strength and flexibility
- More ergonomic handling
- Even growth around perimeter with no dead spots in the center
- Increased production and reduced growth time
- Central mooring point
- Custom sizing (here shown 34 m diameter, 150 tons production)
Maine/Scotland

- Maine Aquaculture Equipment (MAE) now markets the Scottish mussel rafts and longline system
- High capacity raft with long life

http://www.kames.co.uk/products/shell.htm
Maine Aquaculture Equipment (MAE)
Maine Aquaculture Equipment (MAE)

- Raft kit ready for assembly on truck.
- Assembly in 4 hours – 6 people
Maine Aquaculture Equipment (MAE) Raft ready to tow out to mooring after being constructed on the ramp.
Maine Aquaculture Equipment (MAE)

- rafts are 40 x 40 feet (20 x 20 available)
- Floats are foam filled polyethylene
- hang 400 x 13 m ropes off the rafts,
  - harvest of 1200 bushels (about 72,000 lbs)
    including predator net perimeter
- Anchored with 1 ton plough anchor
- Moor 3 rafts in row, 15° to flow
- Designed for semi-exposed sites
  - Recently withstood 90 knot wind – no damage
BC Culture State of technology

- Use of rafts and longlines
- Tray culture typically with rafts
- 5 types of trays in service
- Extensive use of FLUPSY seed and Tumblers
- Best practices not fully established!
LONGLINE CULTURE

• Best for large, more exposed or sites with less current
• Use with trays, pipes or strings
• Surface or subsurface longlines
• Barrels or oyster floats
RAFT CULTURE

- Large amount of production in small area
- Best for small or sites with sufficient current
- Use with trays, pipes or strings
- Two and three foam designs
Rafts

- Stable platform
- Last 5-10 years
- Easy to Build
- Large production in small area
- Able to withstand some rough conditions
3 – Dimensional Use of Water Column by Oyster Culture Rafts

Graphics Courtesy of John Richardson, Earth-Tec Inc.
Physical and Biological Modelling of Rafts used for Oyster Tray Culture

Graphics Courtesy of John Richardson, Earth-Tec Inc.
Easy to Build
Anchoring System for Paradise Oyster Company

- 65' x 24' Rafts
- Total drop sites 432
- 12 foot Chains
- Total length required 142 feet
- 800 lb Kelt
- 1 cubic metre Concrete each

Rope may be substituted for Chain, but not for any surface connections.
Working on the raft
Working on the raft
Tumbler
Tumbler
Rotary Oyster Tumbler and Grader
Oyster Grading and Tumbling
Working on the raft – lightweight sorting table
New Developments: Taylor Mussel Raft

New Floats: www.barrplastics.com
Potential Production Values per raft sites

Raft Culture Oysters
@ 20 rafts per hectare
~ 100 – 180 tonnes per hectare per year
Potential Production Values per Rafts

Surface Area 8 m²

Tray Culture Oysters

- ~5000 – 6000 doz sm – med per 1 – 1.5 yr rotation (Hi-Flow/Aqua-Pacific)
- ~8,000 - 10,000 doz Xsmall per 1 – 1.5 yr rotation (Dark – Sea)

( ~ 6 – 9 tonnes)
### Rough comparison of capital costs

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<th>$/doz</th>
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*Estimates only does not include construction costs, freight, anchoring*
RECOMMENDATIONS FOR TRAY MANAGEMENT

• Frequency of handling is most important
• Regular handling MUST be adaptive to biological fouling
• Generally, regular handling as effective as tumbling
• Post handling time to return to water important (minimize)
• Tumbling may be done w/out increased mortality/slightly beneficial shell shape characteristics – recommend early intervals.
• Starting stock at high densities and reducing densities can be done without decreasing quality characteristics – economic benefits of optimizing trays
Best Practices?

• Start with as large seed as possible
• Load high density and reduce each handling $500 > 250 > 125 > \ldots$ /layer
• Handle at least every 2 months during growing cycle
• Tumble early cycles – handle afterwards
• Extra handling to prevent build-up of fouling
• Production records at each handling
• On-going environmental monitoring
## Example Production calculation

Stock trays in August with 5 litres of 400/L = **2000 per tray**
Total number of oyster seed: **1,000,000**
Cost of seed: **$30,000**
Total Trays (High Flow) = **500** (7 per stack = 71 stacks)
Handle once per month in growing season, every 3 months in winter,

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<th>Month</th>
<th>Trays</th>
<th>Trays per stack</th>
<th>Stacks</th>
<th>Rafts</th>
<th>Seed per tray</th>
<th>Total Stock</th>
<th>Handling cost/tray</th>
<th>Handing Stock Sold</th>
<th>Revenue per oyster</th>
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Harvest Cost of 15% $31,950.00
Seed Cost $30,000.00
Total Expenses: $116,744.83
Balance $77,807.19

$54,794.83 $194,552.02
Initial Loading

High OK – needs more attention
Overgrowth in oyster trays
Fouling in Oyster Trays
Biological Fouling Control – Green Urchins
Biological Fouling Control – Green Urchins