

# Do Mussel Farms Need Mussel Hatcheries?

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# Seed Collecting Issues

3 **wild** seed sources – on ropes, gear or bottom

**Timing** – each cohort planted is market size for window of 3 to 4 months, **need 3-4 plantings/yr**

**Space** constraints

- Offshore sites need to dedicated up to half of lease for sufficient wild seed collection

# Seed Timing Issues

- Typically, big spring spawn produces seed supply suitable for socking in early fall
- Lighter fall spawn and other trickle spawns don't produce enough spat on rope collectors

# Seed Timing and Supply Issues

- Changeable spat settlement times recently shift from February to May in 2013 in SNE

no seed found in some nearshore MA sites

similar issues in Maine (DEI hatchery initiative)

related to climate change? Parasite load??

# Space Issues for Seed Collecting

Pressure to optimizing use of lease space

Trade-off between space allocation for  
nursery seed ropes vs. grow-out ropes

1 wild seed rope : 2 grow-out ropes

**VS**

1 hatchery rope : 10 grow-out ropes

# Space Issues for Seed Collecting

Aquaculture licenses are limited, hard-to-get

Difficult enough to get lease for grow-out

Some towns will not allow collection (Chatham)

Bottom collection limited to Town residents (MA)

Suitable sites in closed waters not allowed (RI)

# Seed Collection as By-product

- Seed sets on Narragansett Bay oyster cages
- Grows to sockable size over the summer but needs to be cleaned off in the Fall
- Seed collection timed with cage cleaning but logistics of socking and weather restrictions limit the timing (2 – 3 day window) and number of offshore grow-out ropes that can be planted in 6 week season.

# Mussel Growers (Reliably) Need Seed!

- Hatchery seed can produce dependable supply timed with multiple plantings per year
- Cost of hatched seed may be more than wild
- Having seed vs not having seed is **priceless**

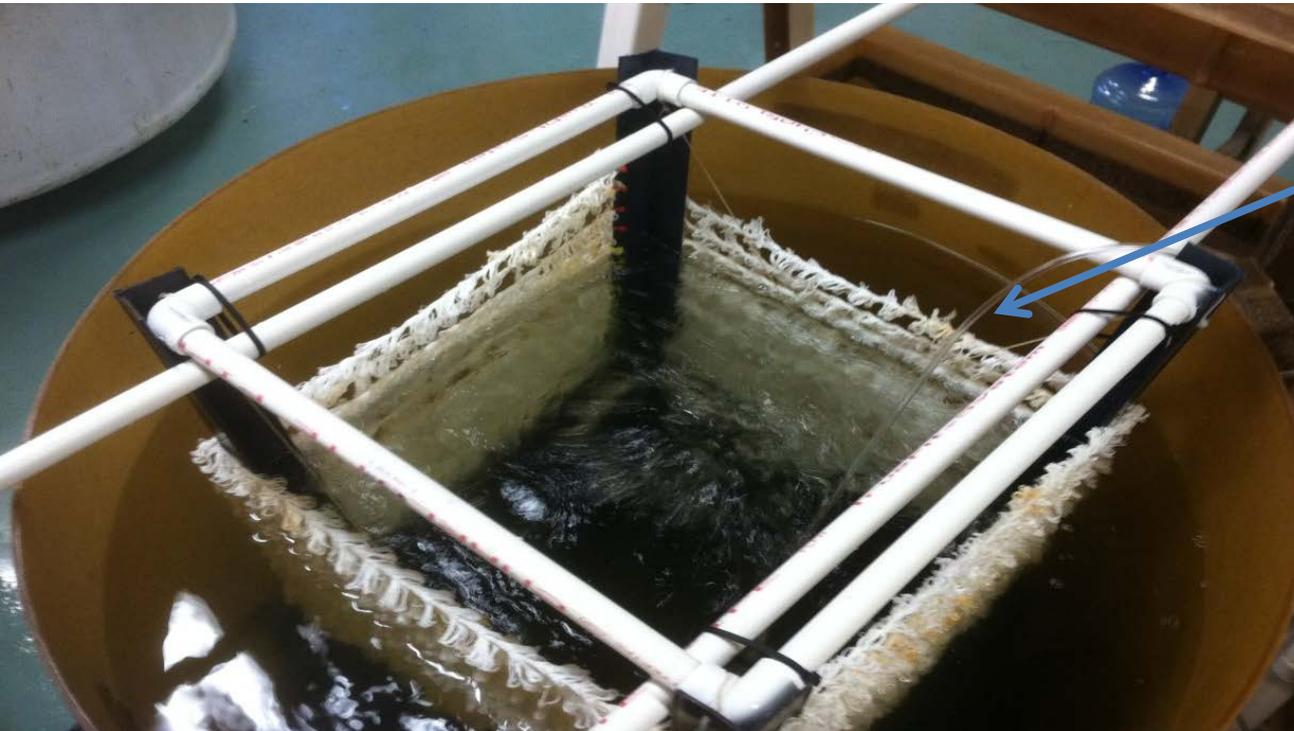
# Offsetting Cost of Hatchery Seed

- Ability to set more seed per meter of rope (>5K/m) and reduce need for nursery space
- Ability to time production offset from wild seed
- Possible genetic selection
- Possible triploidy to improve meat yields



Golden (left) and blue (right) color morphs of *Mytilus edulis*.

# Feb. 2012 MBL Hatchery Trials



RI rope wrapped around a frame

1-3mm seed produced in 2 months



# Nursery Phase 2012

- **Planted in Harbor**
- **Seed grew from 3 mm – 20 mm, May – Dec.**
- **~ 3mm/month growth rate**

# August 2013 Hatchery Trial

- Spawned 3 million fertile eggs from 5 males and 8 females
- 18 – 20 °C and typical live algal diets
- 16 to 19 Days to eyed larvae

# 2013 Seed Setting Experiments

4 tanks each with 2 types of “rope”

– Coir and NZ fuzzy

2 diets

– Live (mix of Iso, Pav and Chaet)

– Paste (Reed “Shellfish Diet”)



Figure 7. 8 mm coirtwine (A) and NZ “Xmas” rope (B), both for spat collection. NZ grow rope (C) and cotton socking (D) to be paired for

# Results of Spat Setting

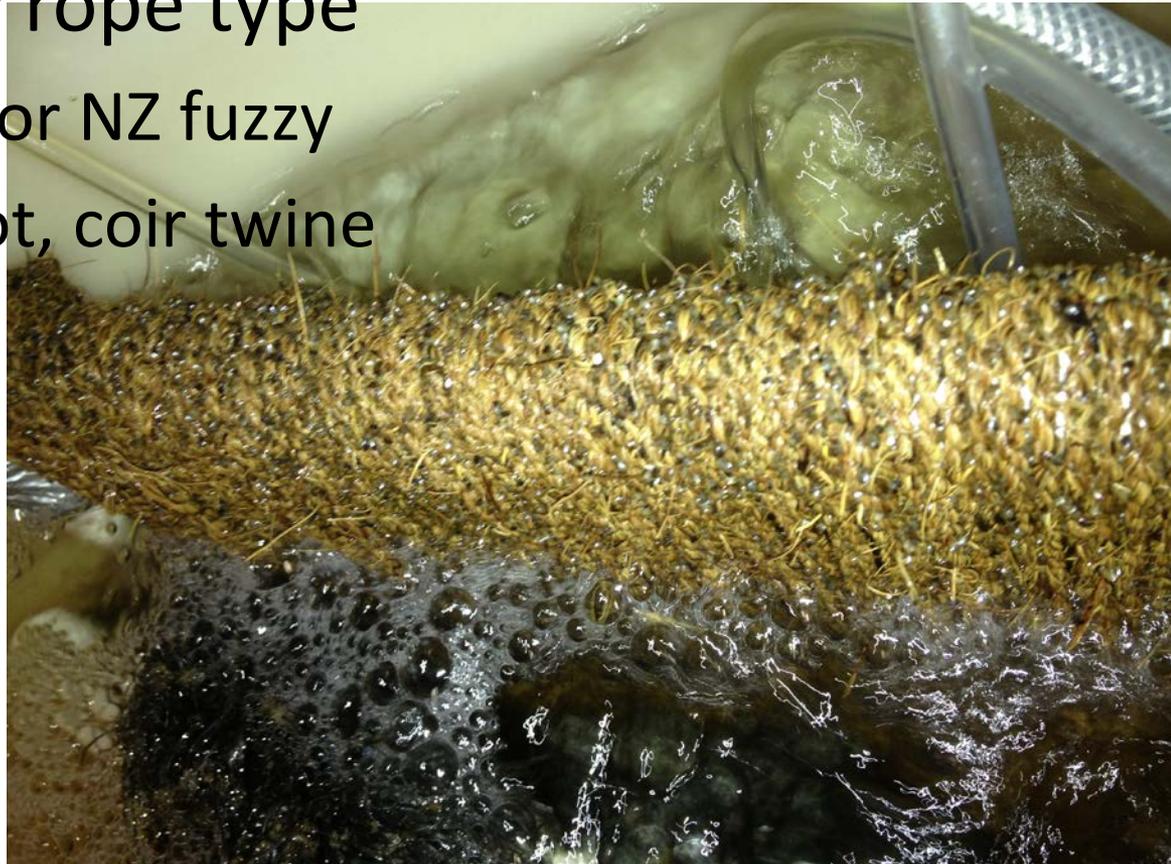
Better survival with live diets (+ 25% larger)

– >95% vs 60% with algal paste

Setting density by rope type

– 470 spat/foot for NZ fuzzy

– vs 130 spat/foot, coir twine



# Examples of Setting Success



Mussel spat on Christmas Tree spat collecting rope (left) is a more conventional spat collector and is reusable. Coir twine (right) is made from coconut fiber, is less expensive and biodegradable, therefore a single use product.

# 2013 Hatchery Summary

- 350k eyed larvae set onto xmas rope and 3mm coir twine
- 300k or ~80% ave. survival
- 3-4mm spat in 3 months



# 2013 Nursery Progress

- Socked spat hung from raft in October
- Seed at end of December
  - Average L = 11 mm
  - Growth rate average of 3 mm per month



# Conclusions

- Available ropes and twine work but which is best?
- Algal pastes may replace or supplement live diets in post-set nursery phase
- Early spring and late summer spawns are feasible
- Need to optimize seed density and growth through hatchery and nursery stages
- Need to measure costs and benefits of hatchery raised mussel seed

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