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| **Project Title** | *There is Gold in Them Thar Mussels; Testing the Feasibility of Golden Mussel Culture for Branding and Market Expansion of Farmed New England Mussels* |
| **Reporting Period** | 9/01/15 - 8/31/16 - FINAL |
| **Author (Chair)** | Emma Green-Beach |
| **Key Word** | *Mytulis edilus*, blue mussel, selective breeding |
| **Funding Level** | Total funds allocated for this project to date. $9,727.47<br>*Invoice #1 :* $4,340.75<br>*Invoice #2: $5,386.72* |
| **Participants** | **Name(s)/Role(s):** Richard Karney*, Lead PI<br>Institution/Agency/Business: Martha's Vineyard Shellfish Group<br>Address(s): PO Box 1552 Oak Bluffs, MA 02557<br>Phone(s): (508) 639-0391<br>Email(s): Mvsg@comcast.net<br>Funded (Yes/No): yes<br>**Name(s)/Role(s):** Emma Green-Beach*, Technician<br>Institution/Agency/Business: Martha's Vineyard Shellfish Group<br>Address(s): PO Box 1552 Oak Bluffs, MA 02557<br>Phone(s): (508) 639-0391<br>Email(s): emma.greenbeach@mvshellfishgroup.org<br>Funded (Yes/No): yes<br>**Name(s)/Role(s):** Scott Lindell*, PI/Consultant<br>Institution/Agency/Business: Marine Biological Laboratory<br>Address(s): 7 MBL Street Woods Hole MA 02543<br>Phone(s): (508) 274-0578<br>Email(s): slindell@whoi.edu (formerly slindell@mbl.edu)<br>Funded (Yes/No): yes |
| | Objective 1: To produce both golden and blue shelled mussel seed in the hatchery and to compare larval competence and growth through at least 1 mm in size.<br><br>Objective 2: To deploy gold and blue mussel seed produced in the hatchery, onto the offshore mussel farm in the town waters of Chilmark, MA.<br><br>Objective 3: To survey the response of seafood dealers and/or local chefs to a color branded aquaculture product. |
| **Anticipated Benefits** | This project will explore the potential for producing mussel seed for private culture that will be recognizable by the consumer, which may strengthen the market for farmed product. If mussel farmers find value in growing the golden shelled mussels, there will be a need for mussel hatcheries. Mussel hatcheries, should stabilize the seed supply, and therefor also stabilize the supply of local mussels to market |
| **Project Progress** | Attached, including photographs. |
| **Accomplishments:** | |

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| **Outreach Overview** | We have deployed golden mussel seed on the offshore mussel farm for grow out. We have heard some interest from chefs but have not gotten enough market sized product to bring them to test. |
| **Targeted Audiences** | The target audience with whom we aim to change the knowledge of is local chefs and seafood purveyors. In order for golden mussels to have a positive impact on the market for locally farmed mussels, these chefs and sellers must want to sell and serve mussels with a non-conventional look. There have been a few articles in the local newspapers which resulted in constructive on-line conversations and emails to us regarding the project. |
| **Outputs:** | The main output of this project is mussel seed. A presentation at a shellfish/aquaculture conference will be made at the end of the project. |
| **Outcomes/Impacts:** | *Articles written about the project in local newspapers have spurred discussions of the project that we believe have informed the public and target audience about mussel farming and how selective breeding operates.* |
| **Impacts Summary** | 1. **Relevance:** In order for the mussel farming industry to grow in southern New England, the product must compete with Canadian imports. One way of doing so is to develop a distinct looking product such as golden shelled mussels<br>2. **Response:** We spawned blue and gold mussels in the MVSG hatchery, deployed seed onto the off shore mussel farm on Martha's Vineyard, and kept some seed to observe how the shell color changes with time/age.<br>3. **Results:** So far, our work has made chefs and consumers that golden shelled mussels are simply selected, native mussels (not an exotic species) that could be grown locally and used to identify their local product.<br>4. **Recap: One- sentence summary**<br>This project has produced golden and blue mussel seed that has been planted out onto a commercial aquaculture site, as well as conversation about mussel aquaculture amongst seafood consumers and purveyors. |
| **Publications** | Follow the format to list publications in the following categories:<br>• Presentations:<br>o Oral<br>o Posters<br>• Peer-reviewed:<br>o Print (journal, etc.)<br>o Digital (websites, videos, etc.)<br>• Non-Peer-reviewed:<br>o Extension factsheets |

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<tr><td></td><td colspan="4">o Popular articles</td></tr>
<tr><td>Students/Participants:</td><td colspan="4">Provide the following information for every student that worked with you during the reporting period:<br>• Name:<br>• Whether Degree was completed during the reporting period (name, yes/no):<br>• New or Continuing Student:<br>• Capstone/Thesis Title (actual or anticipated):<br>• Date of Graduation:<br>• Provide link to thesis/dissertation document:</td></tr>
<tr><td rowspan="2">Partnerships</td><td colspan="4">List any partners that you worked with on your project. Provide the following information for each Partner:</td></tr>
<tr><td>Partner<br>Stanley Larsen<br><br>Scott Lindell</td><td>Specific Type<br>Commercial Grower<br><br>Researcher, Consultant</td><td>Level</td><td>Nature of Partnership<br>Unfunded, supplied seed and technical advise<br><br>Funded. Provided MVSG and Mr. Larsen with advice and some supplies.</td></tr>
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Project Final Report
Martha's Vineyard Shellfish Group, Inc.
Subaward #11705-Z5551009
August 2016

Title: *There is Gold in Them Thar Mussels; Testing the Feasibility of Golden Mussel Culture for Branding and Market Expansion of Farmed New England Mussels*

**Objective 1:** ***To produce both golden and blue shelled mussel seed in the hatchery and to compare larval*** *competence and growth through at least 1 mm in size.*

We have spawn, set and grown both blue and gold mussels to at least 3mm in shell length, and have not seen a difference in larval setting time or growth. However, we noticed that mussel growth is greatly arrested in tanks inside the hatchery, so it was hard to measure growth rates.

**Objective 2:** ***To deploy gold and blue mussel seed produced in the hatchery, onto the offshore mussel farm in the town waters of Chilmark, MA.***

This objective has been fulfilled, but not in the manner originally envisioned. We raised both gold and blue seed in the hatchery, set them on seed rope or transferred them onto seed rope from conventional setting screens. They were deployed onto the mussel farm in Chilmark, however recovery of the seed has been minimal. During this project period the mussel farm changed owners so maintenance of the lines was minimal for a long period. We are continuing to work and collaborate with Stanley Larsen, the new operator of the farm. During additional trips onto the mussel farm in 2016 we were not able to locate the gold seed we deployed in the summer of 2015.

**Objective 3:** ***To survey the response of seafood dealers and/or local chefs to a color branded aquaculture product.***

This objective has been introduced to the target audience through newspaper articles that have been met with interest. We have not produced any market sized golden mussels for them to actually sell or cook with.

*Important things we learned about gold mussels*

1. Mussel broodstock with only gold highlights towards the umbo, do not produce reliably gold offspring.
2. Many seed are gold as a smaller size but many darken with time/size.
3. Very gold mussels can be produced by using choice, gold broodstock.
4. There is no apparent difference in growth or survival between gold and blue larvae, post-sets or juvenile mussels

*Valuable general knowledge about growing mussels in the hatchery*

1. Large numbers of larvae are better set directly on some type of rope rather than conventional screens.
2. However, if set on screens, small seed maybe manipulated to byss to appropriate ropes.
3. A very low proportion of mussels are ripe to spawn at any given time, so large numbers are helpful for a successful spawn.
4. Using thermal stimulation of over 30C will likely kill mussels on the spawning table.

**Illustrated summary of spawning and observations**

Successful spawn #1- 6/24/2014

These broodstock were spawned at the Marine Biological Lab, and the larvae were raised at the MVSG hatchery.

Offspring from spawn #1 ranged in color. Some was separated by hand to monitor color change with time and size. Unfortunately, over time, both groups were blue and no gold shells could be found.

Successful (sponteneous) spawn #2 - 5/21/16

These broodstock (24 in total) were being held in chilled water when they spawned in their tank. Fertilized eggs were recovered and cultured as usual.

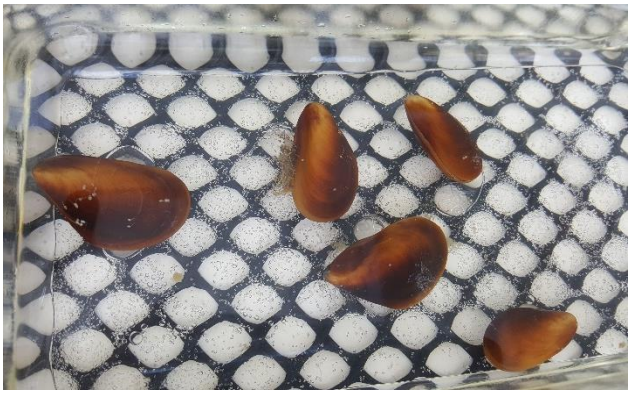
White seed rope with many small loops, was wrapped around a PVC frame and lowered into a larvae tank with eyed mussel larvae, for them to set onto.

Small, white seed rope on a nylon setting screen with golden mussel seed. These small loops were good for setting larvae and took up little space.

The small, white, hatchery rope was wound around large looped rope and covered with cotton socking. A few were hung off the MVSG hatchery dock and many were planted on the offshore mussel farm in Chilmark.

In summer 2016 the lines from the dock had grown 1 – 1.5” mussels, many of which were very gold in color. We have not been able to locate the lines from the mussel farm.

Mussels were stripped from the rope and sorted into 3 color categories. We were very pleased to see the good proportion of very gold animals.



There was an unsuccessful attempt to spawn about 50 gold broodstock in August 2016.