Saving the Queen of the Sea

Queen Conch Conservation Aquaculture

Megan Davis, Ph.D.
Research Professor, Queen Conch Lab
Florida Atlantic University Harbor Branch Oceanographic Institute

Regional workshop: OECS Blue BioTrade Action Plan, May 27th, 2022
40 Years of Queen Conch Knowledge
Our **mission** is to grow the queen conch for the sake of the species, ecosystem, and people who depend on the fishery.

Our **vision** is for there to be a queen conch farm in every Caribbean nation.
Life Cycle & Reproduction Overview

- **Egg Stage**
- **Veliger Stage**
- **Egg Groove**
- **Metamorphosis Stage**
- **Juvenile Stage**

**PELAGIC STAGES**
- **NEWLY HATCHED VELIGER 2-LOBED** 300-400 μm
- **4-LOBED VELIGER** 400-650 μm
- **6-LOBED VELIGER** 650-950 μm

**COMPETENCE PERIOD** ≥ 950 μm

**METAMORPHOSIS**
- **POSTLARVA** ~ 1.0 mm
- **INFAUNAL JUVENILES** to ~ 80 mm (3-10 months)

**BENTHIC STAGES**
- **BENTHIC EGGS**
- **HERBIVOROUS DIET ON MACROALGAE, DETRITUS, AND DIATOMS**

**ADULT** > 180 mm (3.5 years)
**LONGEVITY** 10-25 years
Egg Mass Collection

Egg development
Growing Microalgae

*Chaetoceros gracilis*

*Isochrysis galbana*

~5 micron

~7 micron
VELIGER DEVELOPMENT

STAGE 1: 2 lobes
STAGE 2: 4 lobes
STAGE 3: 6 lobes
STAGE 4: 6 elongated lobes
STAGE 5: Shell length is 1-1.2 mm

1.5 whorls
2 whorls
2.5 whorls
3 whorls
4 whorls
METAMORPHOSIS

Newly metamorphosed conch grazing
# Queen Conch Aquaculture

<table>
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<th>Aquaculture</th>
<th>Socioeconomic Benefits</th>
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<tr>
<td>• Breeding Area</td>
<td>• Community-Based</td>
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<td>• Hatchery</td>
<td>• Diversified Livelihoods</td>
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<td>• Restoration</td>
<td>• Training in Aquaculture</td>
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<td>• Ranching – Sustainable Seafood</td>
<td>• Training in Conservation</td>
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<td>• Professional Development</td>
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<td>• Co-Management of Resources</td>
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Protecting Breeding Stocks in MPAs

- Re-establishing breeding populations
- Protected areas
- Source of egg masses
  - Increase larvae in nature
  - Available for aquaculture
Community-Based Queen Conch (Aliger gigas) Aquaculture for Restoration and Sustainable Seafood Supply in Puerto Rico

Megan Davis: Research Professor, FAU Harbor Branch

Raimundo Espinoza: Executive Director, Conservación ConCiencia

Carlos Velazquez: President, Naguabo Fishing Association
Naguabo, Puerto Rico
Partners

Raimundo Espinoza
Founder and Executive Director
Conservación ConCiencia

Carlos Velasquez
President
and
Naguabo Fishing Association Members

Megan Davis, PhD
Research Professor

Julio Ortiz
Treasurer, Fisher

Marie Garcia
Hatchery Assistant

Chalier Dones Ortiz
Research Intern

Paola Sotomayor Landron
Research Intern

Edna Mary Díaz Negrón
Aquaculture Manager

HARBOR BRANCH
Florida Atlantic University

ASOCIACIÓN DE PESCADORES
Villa Pesquera Naguabo

Megan Davis, PhD
Research Professor
## Project Goals:

To assist with restoration of the queen conch fishery in PR by producing queen conch in a fishers-operated aquaculture facility

<table>
<thead>
<tr>
<th>Build and Operate</th>
<th>Build and operate a pilot-scale conch hatchery and nursery facility at the Puerto Rico Naguabo Commercial Fishing Association</th>
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<tr>
<td>Open to Others</td>
<td>Open the facility for others to learn about queen conch aquaculture, biology, conservation and fisheries</td>
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<td>Release</td>
<td>Release hatchery-raised juvenile conch for restoration purposes</td>
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<td>Produce a Plan</td>
<td>Produce a plan that recommends other areas in Puerto Rico for conch hatcheries and potential grow-out areas</td>
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S-K NOAA Award NA19NMF4270029; September 1, 2019 to August 31, 2022
Hatchery
Juvenile Recirculating Nursery System
Restoration Considerations

- Shell size (7-9 cm)
- Shell strength
- Morphology (with spines)
- Time of Day and Year (Fall)
- Lunar Phase
- Density (1-5/m²)
- Conditioning
- Habitat
- Conch Movement
Sustainable Seafood

- Ranching
- Grow to Market Size
Development of an online course called **eConch: eLearning for Growing Queen Conch** with 6 modules that feature video content, live virtual presentations, activities, and group discussions.


Five professional quality instructional videos with the production company Timber + Frame
Next Steps

Planning

- Site selection and community
- Identifying local community members and staff
- Pilot-Scale Hatchery and Nursery
  - Modification of Existing Infrastructure
  - Mobile Queen Conch Lab
Our Vision: A Queen Conch Farm in Every Caribbean Nation

Queen Conch Lab – HEADQUARTERS
Fort Pierce, Florida
Florida Atlantic University Harbor Branch Oceanographic Institute

Grand Bahama, Bahamas
Bahamas National Trust

Nassau, Bahamas

Great Exuma, Bahamas
Bahamas National Trust

Lower Town, St. Eustatius
Caribbean Netherlands Science Institute & St. Eustatius National Parks Foundation

Dominican Republic

Naguabo, Puerto Rico
Puerto Rico Conch Hatchery:
FAU Harbor Branch,
Conservación ConCiencia,
Naguabo Fishing Association & NOAA Fisheries

US Virgin Islands

Antigua
Guadeloupe

St. Vincent and the Grenadines

Trinidad and Tobago

Belize

Belize

Colombian Archipelago

Willemstad, Curaçao
Curaçao Sea Aquarium Conch Hatchery

Jamaica
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<tr>
<th>Contact Information</th>
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<tbody>
<tr>
<td>Website</td>
</tr>
<tr>
<td><a href="http://www.conchaquaculture.org">www.conchaquaculture.org</a></td>
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<tr>
<td><a href="http://www.fau.edu/hboi">www.fau.edu/hboi</a></td>
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<tr>
<td>Instagram</td>
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<tr>
<td>@queenconchlab</td>
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</tr>
<tr>
<td>@harborbranch</td>
</tr>
<tr>
<td>Email</td>
</tr>
<tr>
<td><a href="mailto:Mdavi105@fau.edu">Mdavi105@fau.edu</a></td>
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